

# **ANEJO 6**

## **CÁLCULOS HIDRÁULICOS**

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## 1. Introducción

El presente Anejo contiene el conjunto de cálculos comprobatorios de la idoneidad hidráulica de los elementos diseñados para la presa de Isbert:

- Aliviaderos de superficie.
- Aliviadero inferior.
- Cuenca amortiguador.

Para cada uno de los órganos de evacuación de caudales, se ha efectuado una comprobación de cavitación. La cavitación es un fenómeno que comienza cuando la presión en el agua cae a valores inferiores a la presión del vapor de agua  $p_v$  correspondiente a la temperatura existente en el líquido. En esta situación se forman burbujas en el seno del líquido que transportan tanto vapor de agua como otros gases contenidos en el agua y liberados causa de la baja presión. Cuando estas burbujas llegan a zonas con mayor presión se produce una implosión de las mismas liberándose energía tanto en forma de sonido (ruido importante) como en altas presiones, que pueden llegar a las mil atmósferas y que golpean al hormigón en forma de una sucesión rápida de impactos violentos. Este golpeteo puede causar graves daños.

Adicionalmente, se incluye un estudio de laminación de avenidas; donde se obtienen, tras simular el paso de las avenidas de proyecto y extrema, los caudales de cálculo de los distintos elementos hidráulicos.

## 2. Comprobación hidráulica del aliviadero de superficie A1.

### 2.1. Descripción

El aliviadero de superficie A1 de la presa de Isbert se ubica sobre los bloques N° 1, 2, 3 y 4 de la presa de tal manera que en esos bloques, la presa se constituye en vertedero evacuando los caudales, a través de un perfil, a un cuenco de resalto proyectado a tal efecto y ubicado en el pie de aguas abajo:

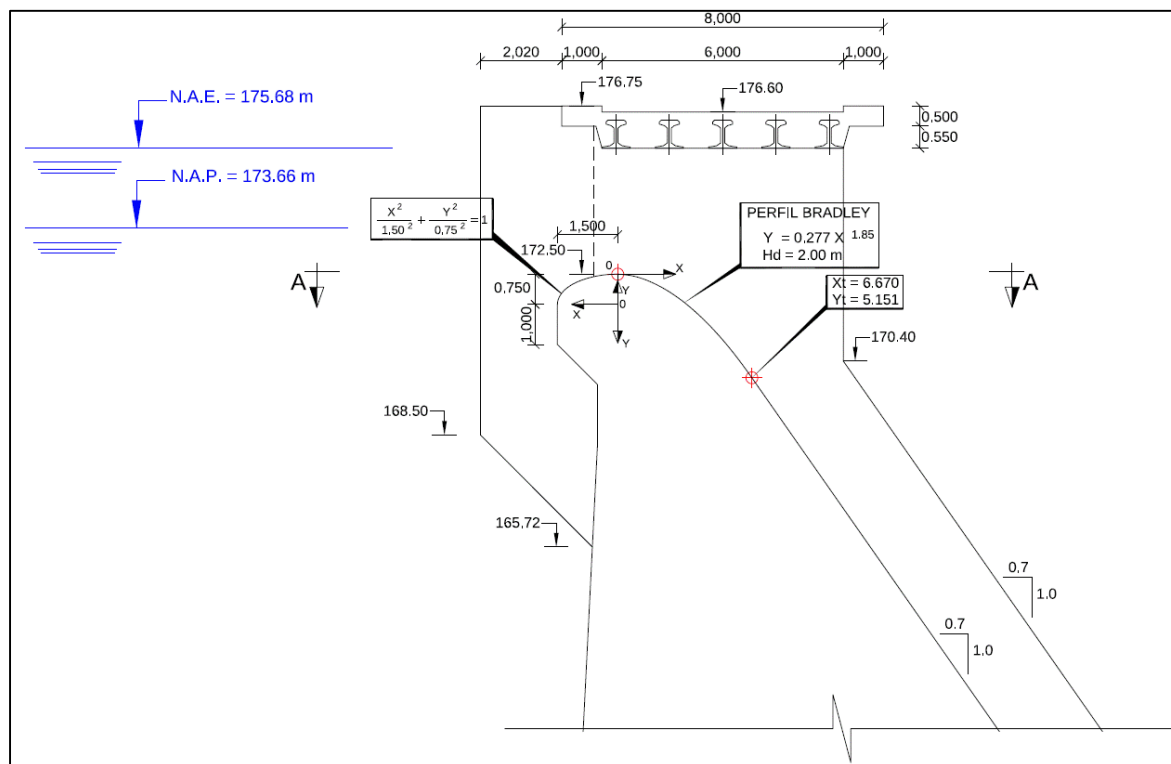


Figura 1: Sección tipo por el aliviadero A1.

La embocadura está conformada por dos vanos de 15,00 m de longitud cada uno de ellos, delimitados por dos pilas - estribo que se han diseñado según formas hidrodinámicas al objeto de mejorar la alimentación desde el embalse y airear lateralmente la lámina de agua.

El escarpe posee el umbral a la cota 172,50 m. Por aguas arriba del umbral, el referido escarpe adopta un perfil de un cuarto de elipse de semiejes 0,75 y 1,50 m. Por aguas abajo del umbral, la geometría del referido escarpe responde, por una parte a formas hidráulicamente adecuadas (perfiles hidrodinámicos que eviten el despegue de la lámina vertiente) y por otra se adapta a la geometría del canal de descarga, a la que tiene que ser tangente, que inicialmente tiene talud 0.7H/1V. Así, el escarpe se corresponde con un perfil Bradley, para una lámina de diseño de 2,00 m, según la siguiente expresión:

$$Y=0,277 \cdot X^{1.85}$$

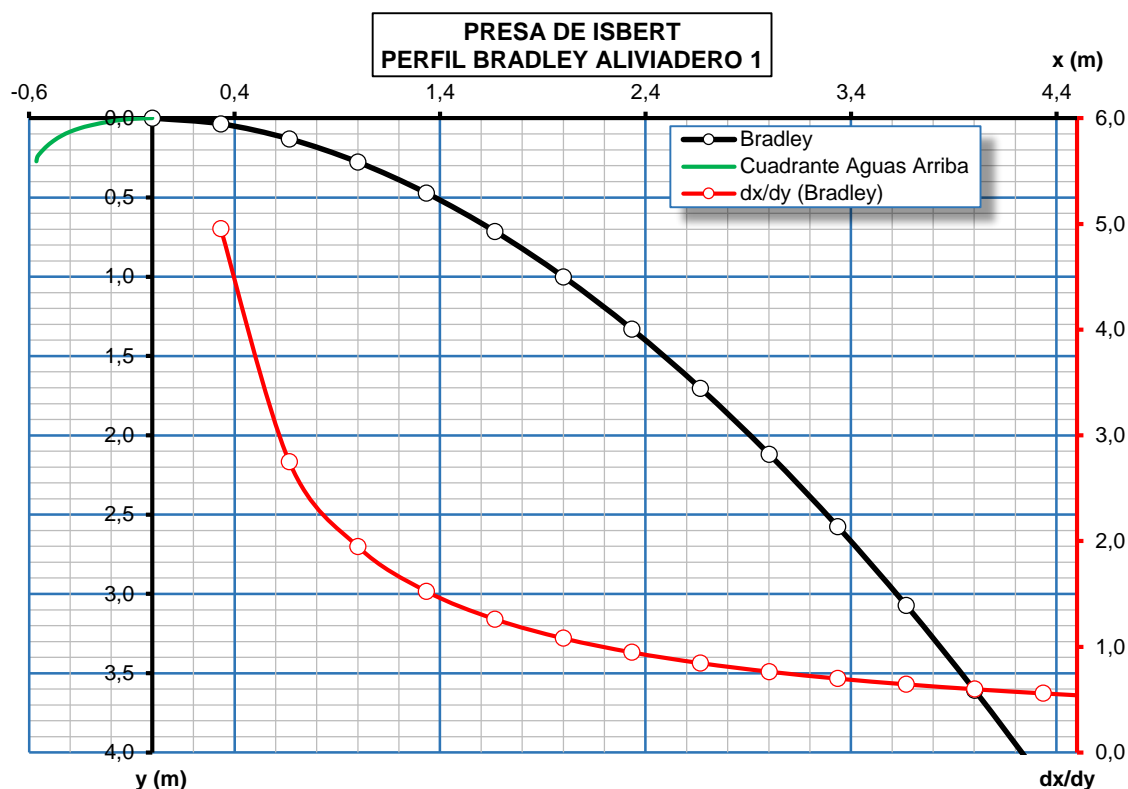


Figura 2: Perfil BRADLEY del Aliviadero 1.

El canal de descarga se ubica en prolongación de la embocadura y utiliza el paramento de la presa para tal fin y está encajado por muros – cajero. Los muros – cajero tienen una altura medida perpendicularmente al canal de descarga de 2,10 m.

La estructura terminal del aliviadero consiste en un cuenco amortiguador, tipo USACE, el cual se detalla en páginas sucesivas.

## 2.2. Cálculo de la capacidad hidráulica

La capacidad hidráulica del aliviadero principal se ha obtenido empleando la conocida ecuación relativa a la capacidad hidráulica de un vertedero en pared curva, en el que el escarpe adopta un perfil del tipo Bradley:

$$Q = C_d \cdot L_u \cdot h^{3/2}$$

En donde:

- h: Espesor de la lámina vertiente, más la altura debida a la velocidad de aproximación. En nuestro caso, dado que ésta última adopta valores muy bajos en comparación, se considera despreciable.
- $L_u$ : Longitud útil del vertedero en metros. La cual se obtiene mediante la siguiente fórmula:

$$L_u = L - 2(n \cdot C_p + C_e) \cdot h$$

- L: Longitud total de vertido en metros.
- n: Número de pilas. En este caso, aunque se trata de dos aliviaderos separados, se simplifica y se toma el valor de 1.
- $C_p$ : Coeficiente contracción de pilas. Depende de la forma y estado de los estribos. Se ha estimado el valor de 0,03 (Pilas 3A - USACE).

- $C_e$ : Coeficiente contracción de estribos. Depende de la forma y estado de los estribos. Se ha estimado el valor de 0,03 (Pilas 3A - USACE).
- $C_d$ : Coeficiente de descarga del vertedero de pared curva. Para su obtención se utiliza la fórmula propuesta por el Waterway Experiment Station:

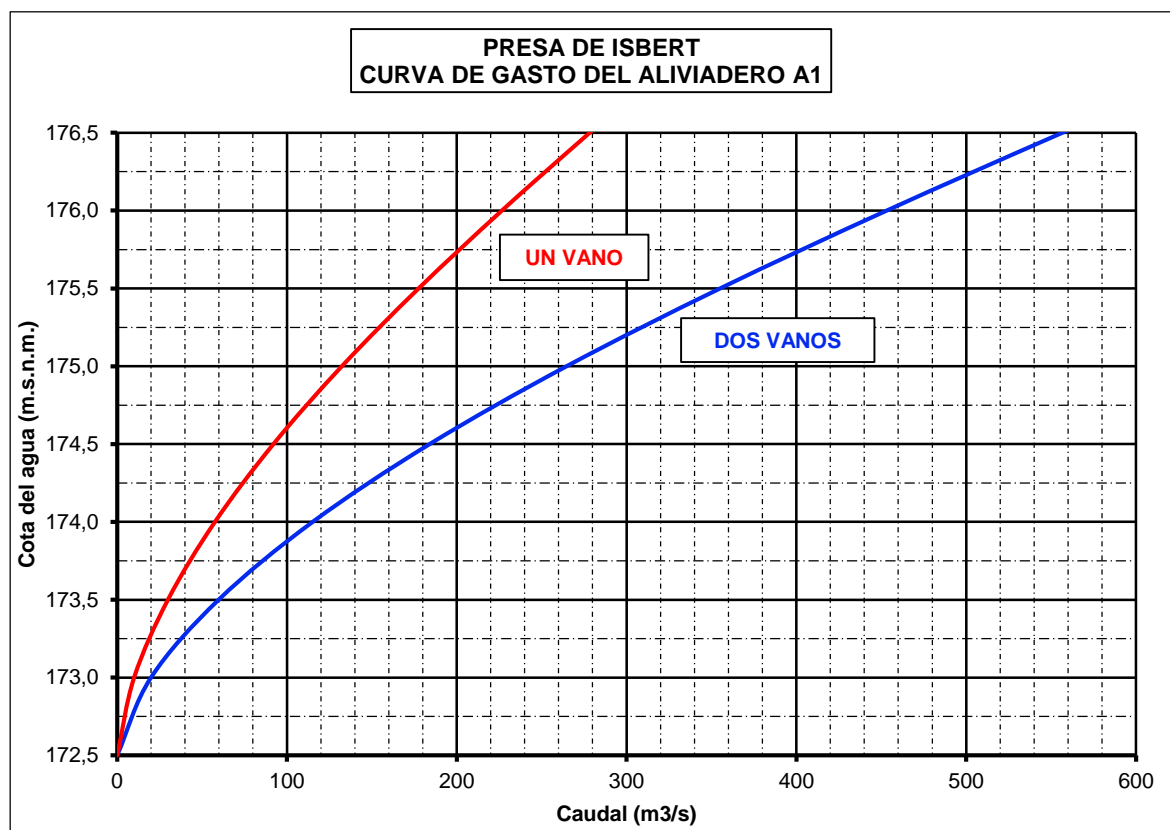
$$C_d = C_0 \left( 0,801 + 0,261 \frac{h}{H_d} - 0,062 \left( \frac{h}{H_d} \right)^2 \right)$$

- $H_d$ : Espesor de la lámina vertiente de diseño. En este caso, se considera 2,00 metros.

Obteniéndose por tanto, la capacidad que muestra la siguiente tabla y figura:

**Tabla 1: Capacidad de descarga del Aliviadero A1.**

| Cota del agua [m] | Altura de lámina [m] | Longitud efectiva [m] | Coeficiente de descarga | Caudal Evacuado por vano [m3/s] | Caudal Evacuado [m3/s] |
|-------------------|----------------------|-----------------------|-------------------------|---------------------------------|------------------------|
| 172.50            | 0.00                 | 30.00                 | 1.75                    | 0.00                            | 0.00                   |
| 173.00            | 0.50                 | 29.96                 | 1.88                    | 9.96                            | 19.92                  |
| 173.50            | 1.00                 | 29.92                 | 2.00                    | 29.88                           | 59.77                  |
| 174.00            | 1.50                 | 29.88                 | 2.10                    | 57.57                           | 115.14                 |
| 174.50            | 2.00                 | 29.84                 | 2.18                    | 92.03                           | 184.05                 |
| 175.00            | 2.50                 | 29.80                 | 2.25                    | 132.34                          | 264.68                 |
| 175.50            | 3.00                 | 29.76                 | 2.30                    | 177.55                          | 355.09                 |
| 176.00            | 3.50                 | 29.72                 | 2.33                    | 226.59                          | 453.18                 |
| 176.50            | 4.00                 | 29.68                 | 2.34                    | 278.31                          | 556.63                 |



**Figura 3: Curva de gasto del Aliviadero A1.**

### 3. Comprobación hidráulica del aliviadero de superficie A2.

#### 3.1. Descripción

El aliviadero de superficie A2 de la presa de Isbert se ubica sobre los bloques N° 0, 1 y 2 de la presa de tal manera que en esos bloques, la presa se constituye en vertedero evacuando los caudales, a través de un perfil, a un cuenco de resalto proyectado a tal efecto y ubicado en el pie de aguas abajo:

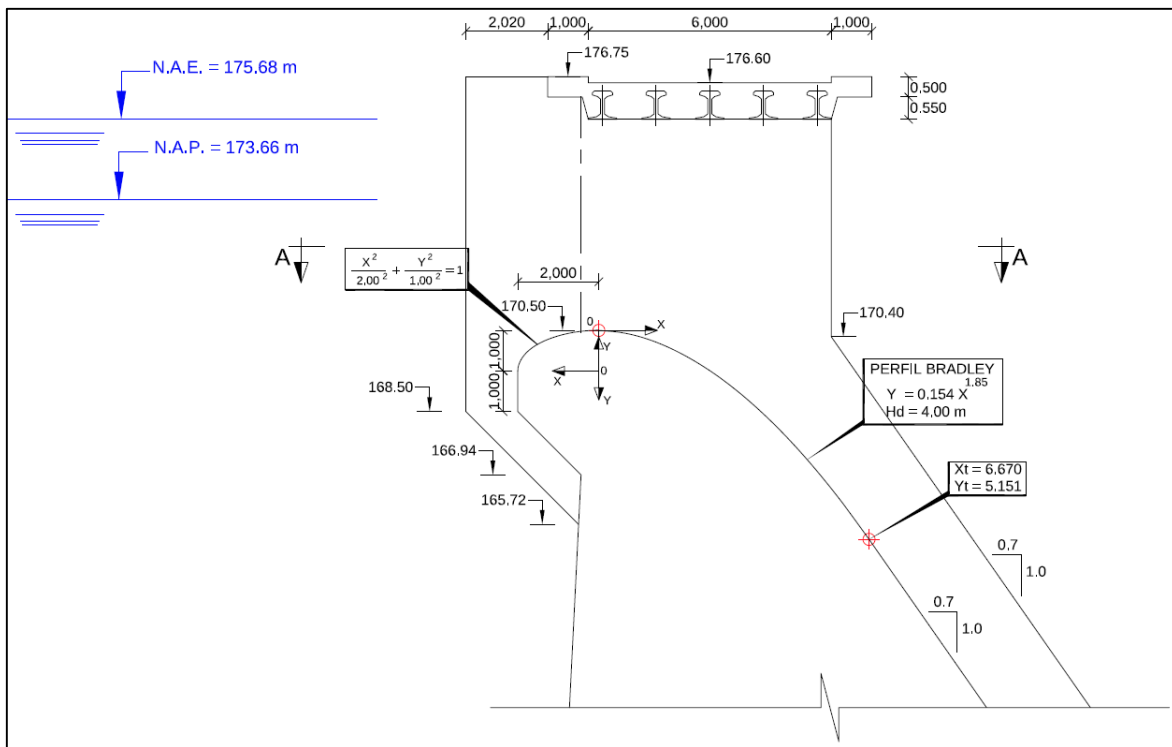


Figura 4: Sección tipo por el aliviadero A2.

La embocadura está conformada por dos vanos de 15,00 m de longitud cada uno de ellos, delimitados por dos pilas - estribo que se han diseñado según formas hidrodinámicas al objeto de mejorar la alimentación desde el embalse y airear lateralmente la lámina de agua.

El escarpe posee el umbral a la cota 170,50 m. Por aguas arriba del umbral, el referido escarpe adopta un perfil de un cuarto de elipse de semiejes 2,00 y 1,00 m. Por aguas abajo del umbral, la geometría del referido escarpe responde, por una parte a formas hidráulicamente adecuadas (perfiles hidrodinámicos que eviten el despegue de la lámina vertiente) y por otra se adapta a la geometría del canal de descarga, a la que tiene que ser tangente, que inicialmente tiene talud 0.7H/1V. Así, el escarpe se corresponde con un perfil BRADLEY, para una lámina de diseño de 4,00 m, según la siguiente expresión:

$$Y=0,154 \cdot X^{1.85}$$

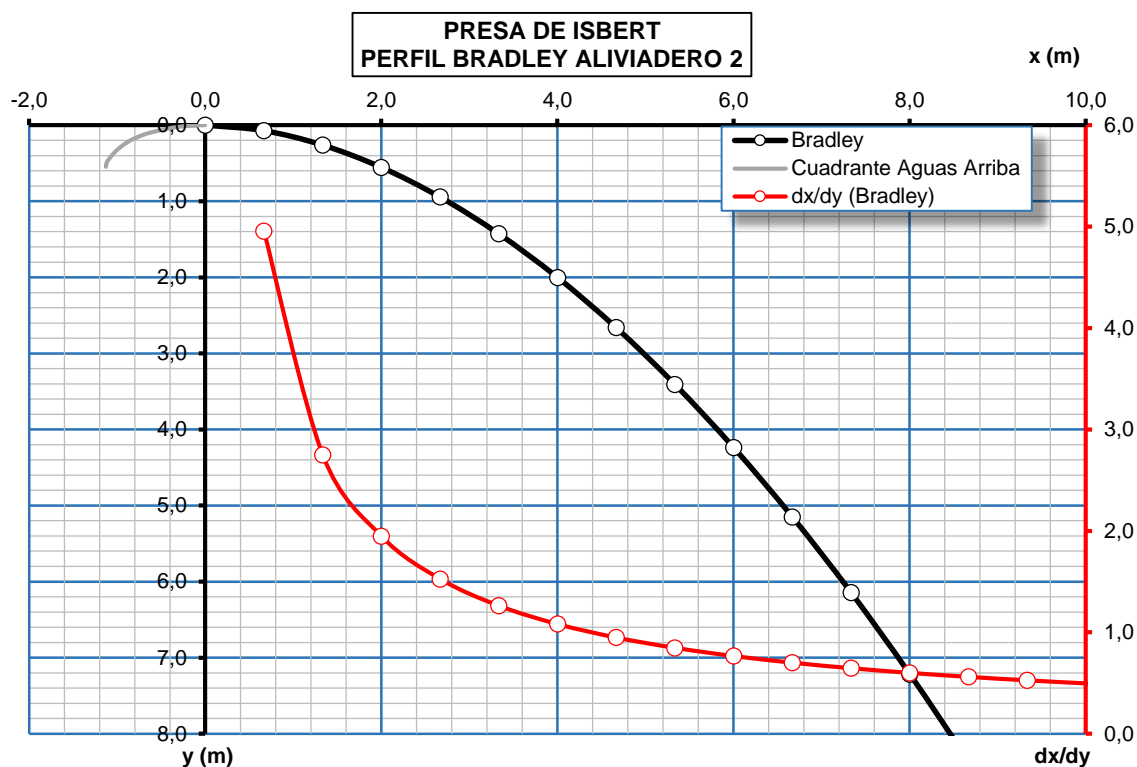


Figura 5: Perfil BRADLEY del Aliviadero 2.

El canal de descarga se ubica en prolongación de la embocadura y utiliza el paramento de la presa para tal fin y está encajado por muros – cajero. Los muros – cajero tienen una altura medida perpendicularmente al canal de descarga de 2,10 m.

La estructura terminal del aliviadero consiste en un cuenco amortiguador, tipo USACE, el cual se detalla en páginas sucesivas.

### 3.2. Cálculo de la capacidad hidráulica

La capacidad hidráulica del aliviadero principal se ha obtenido empleando la conocida ecuación relativa a la capacidad hidráulica de un vertedero en pared curva, en el que el escarpe adopta un perfil del tipo Bradley:

$$Q = C_d \cdot L_u \cdot h^{3/2}$$

En donde:

- h: Espesor de la lámina vertiente, más la altura debida a la velocidad de aproximación. En nuestro caso, dado que ésta última adopta valores muy bajos en comparación, se considera despreciable.
- $L_u$ : Longitud útil del vertedero en metros. La cual se obtiene mediante la siguiente fórmula:

$$L_u = L - 2(n \cdot C_p + C_e) \cdot h$$

- L: Longitud total de vertido en metros.
- n: Número de pilas. En este caso, aunque se trata de dos aliviaderos separados, se simplifica y se toma el valor de 1.
- $C_p$ : Coeficiente contracción de pilas. Depende de la forma y estado de los estribos. Se ha estimado el valor de 0,03 (Pilas 3A - USACE).



- $C_e$ : Coeficiente contracción de estribos. Depende de la forma y estado de los estribos. Se ha estimado el valor de 0,03 (Pilas 3A - USACE).
- $C_d$ : Coeficiente de descarga del vertedero de pared curva. Para su obtención se utiliza la fórmula propuesta por el Waterway Experiment Station:

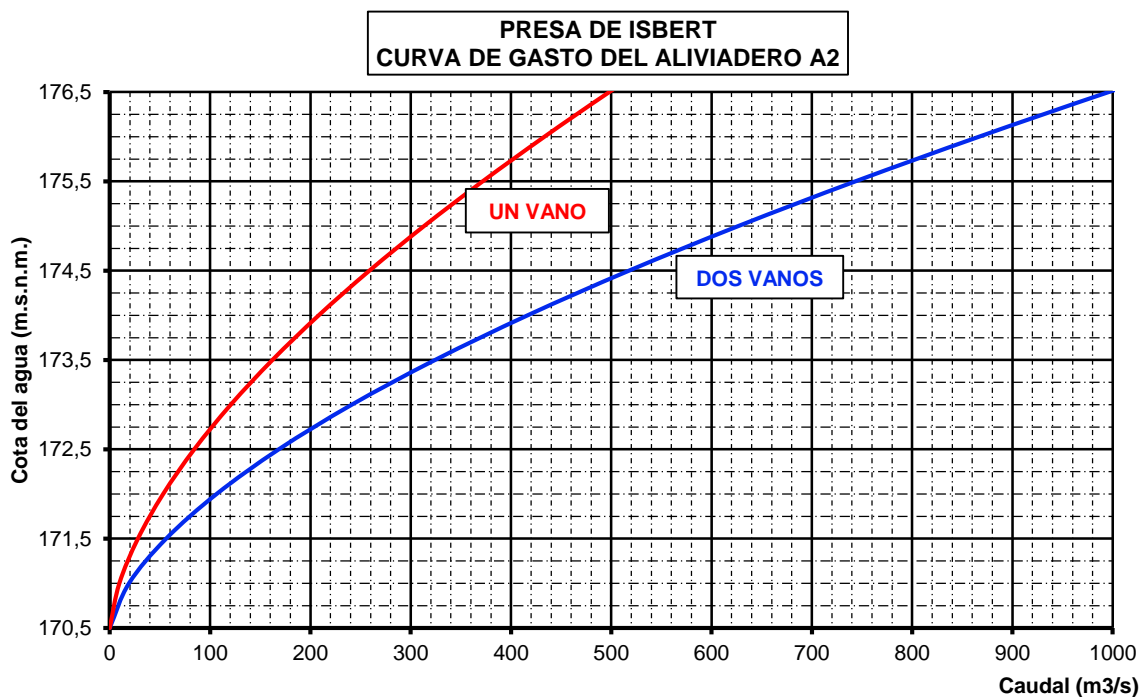
$$C_d = C_0 \left( 0,801 + 0,261 \frac{h}{H_d} - 0,062 \left( \frac{h}{H_d} \right)^2 \right)$$

- $H_d$ : Espesor de la lámina vertiente de diseño. En este caso, se considera 4,00 metros.

Obteniéndose por tanto, la capacidad que muestra la siguiente tabla y figura:

**Tabla 2: Capacidad de descarga del Aliviadero A2.**

| Cota del agua [m] | Altura de lámina [m] | Longitud efectiva [m] | Coeficiente de descarga | Caudal Evacuado por vano [m3/s] | Caudal Evacuado [m3/s] |
|-------------------|----------------------|-----------------------|-------------------------|---------------------------------|------------------------|
| 170.50            | 0.00                 | 30.00                 | 1.75                    | 0.00                            | 0.00                   |
| 171.00            | 0.50                 | 29.96                 | 1.82                    | 9.62                            | 19.23                  |
| 171.50            | 1.00                 | 29.92                 | 1.88                    | 28.13                           | 56.27                  |
| 172.00            | 1.50                 | 29.88                 | 1.94                    | 53.28                           | 106.56                 |
| 172.50            | 2.00                 | 29.84                 | 2.00                    | 84.30                           | 168.59                 |
| 173.00            | 2.50                 | 29.80                 | 2.05                    | 120.72                          | 241.44                 |
| 173.50            | 3.00                 | 29.76                 | 2.10                    | 162.18                          | 324.37                 |
| 174.00            | 3.50                 | 29.72                 | 2.14                    | 208.35                          | 416.70                 |
| 174.50            | 4.00                 | 29.68                 | 2.18                    | 258.90                          | 517.79                 |
| 175.00            | 4.50                 | 29.64                 | 2.22                    | 313.49                          | 626.99                 |
| 175.50            | 5.00                 | 29.60                 | 2.25                    | 371.80                          | 743.61                 |
| 176.00            | 5.50                 | 29.56                 | 2.27                    | 433.47                          | 866.94                 |
| 176.50            | 6.00                 | 29.52                 | 2.30                    | 498.13                          | 996.26                 |



**Figura 6: Curva de gasto del Aliviadero A2.**

## 4. Rápida

Se procede en este punto al cálculo de la forma teórica del comportamiento hidráulico de la rápida tanto para la lámina líquida como la lámina aireada, así como la altura de cajeros necesaria para no producir desbordamientos.

La rápida en su tramo central, presenta un diente deflector para mejorar la interacción con el Aliviadero A3.

### 4.1. Lámina líquida

Para el cálculo de la lámina de agua en la rápida, se analizará la rápida de arriba a abajo. Para dicho análisis se necesita una condición de contorno aguas arriba, siendo la elegida el calado crítico que se alcanzará en la cresta del perfil Bradley.

A través de la ecuación de Energía:

$$z_0 + y_0 + \frac{v_0^2}{2g} = z_i + y_i + \frac{v_i^2}{2g} + \Delta H_{0i}$$

En donde:

$$y_i = \frac{d_i}{\cos \alpha}$$

Y aplicando la ecuación de continuidad, con  $z_0 + y_0 = h_0$  y  $H_0 - z_i = \Delta C$ :

$$v_0 \cdot d_0 = v_i \cdot d_i$$

Se obtiene:

$$\frac{v_i^2}{2g_0} + \frac{v_0 \cdot d_0}{v_i \cdot \cos \alpha} - \Delta C = 0$$

En primer lugar se obtiene el cálculo de la lámina líquida en el aliviadero 1 hasta su punto de tangencia:

**Tabla 3: Lámina líquida en el aliviadero A1 hasta su tangencia con el paramento de aguas abajo.**

|              |              |               |               |                 |                   |           |              |   |
|--------------|--------------|---------------|---------------|-----------------|-------------------|-----------|--------------|---|
| <b>a</b>     | 0.960        | rad           | <b>Q</b>      | 73.80           | m <sup>3</sup> /s | <b>b</b>  | 14.95        | m |
| <b>d0</b>    | 0.85         | m             | <b>v0</b>     | 2.89            | m/s               | <b>q</b>  | 2.46         |   |
| <b>Talud</b> | 0.7          | H/V           | <b>H0</b>     | 1.14            | m                 |           |              |   |
| <b>Punto</b> | <b>X (m)</b> | <b>zi (m)</b> | <b>AC (m)</b> | <b>vi (m/s)</b> | <b>Eq</b>         | <b>di</b> | <b>y (m)</b> |   |
| <b>0</b>     | 0            | 172.50        | 1.14          | 2.89            | -                 | 0.85      | 0.85         |   |
| <b>1</b>     | 3.34         | 169.92        | 3.72          | 7.89            | 0.00              | 0.31      | 0.55         |   |
| <b>2</b>     | 3.50         | 169.69        | 3.95          | 8.20            | 0.00              | 0.30      | 0.52         |   |
| <b>3</b>     | 4            | 168.97        | 4.67          | 9.07            | 0.00              | 0.27      | 0.47         |   |
| <b>4</b>     | 4.5          | 168.26        | 5.38          | 9.85            | 0.00              | 0.25      | 0.44         |   |
| <b>5</b>     | 5.5          | 166.83        | 6.81          | 11.23           | 0.00              | 0.22      | 0.38         |   |
| <b>6</b>     | 6            | 166.12        | 7.52          | 11.85           | 0.00              | 0.21      | 0.36         |   |
| <b>7</b>     | 6.5          | 165.40        | 8.24          | 12.44           | 0.00              | 0.20      | 0.35         |   |

A continuación se obtiene también la lámina líquida en el aliviadero 2 hasta su punto de tangencia:

**Tabla 4: Lámina líquida en el aliviadero A2 hasta su tangencia con el paramento de aguas abajo.**

|              |              |               |               |                 |                   |           |              |   |
|--------------|--------------|---------------|---------------|-----------------|-------------------|-----------|--------------|---|
| <b>a</b>     | 0.960        | rad           | <b>Q</b>      | 381.88          | m <sup>3</sup> /s | <b>b</b>  | 14.87        | m |
| <b>d0</b>    | 2.56         | m             | <b>v0</b>     | 5.01            | m/s               | <b>q</b>  | 12.73        |   |
| <b>Talud</b> | 0.7          | H/V           | <b>H0</b>     | 3.14            | m                 |           |              |   |
| <b>Punto</b> | <b>X (m)</b> | <b>zi (m)</b> | <b>AC (m)</b> | <b>vi (m/s)</b> | <b>Eq</b>         | <b>di</b> | <b>y (m)</b> |   |
| <b>0</b>     | 0            | 170.50        | 3.14          | 5.01            | -                 | 2.56      | 2.56         |   |
| <b>1</b>     | 4.67         | 167.84        | 5.80          | 4.88            | 0.00              | 2.63      | 4.59         |   |
| <b>2</b>     | 5.34         | 167.09        | 6.55          | 8.89            | 0.00              | 1.44      | 2.52         |   |
| <b>3</b>     | 6.00         | 166.26        | 7.38          | 10.05           | 0.00              | 1.28      | 2.23         |   |
| <b>4</b>     | 6.67         | 165.35        | 8.29          | 11.09           | 0.00              | 1.16      | 2.02         |   |

A partir de este punto, donde las rápidas se unen, se han de obtener unos parámetros equivalentes para continuar con el análisis del resto de la rápida hasta el cuenco. Para ello, se realizará una semejanza en función del ancho de cada una de las rápidas obteniendo los siguientes parámetros de partida y los siguientes valores a lo largo de la rápida.

**Tabla 5: Lámina líquida en el aliviadero hasta el cuenco.**

|              |              |               |               |                 |                   |           |              |   |
|--------------|--------------|---------------|---------------|-----------------|-------------------|-----------|--------------|---|
| <b>a</b>     | 0.960        | rad           | <b>Q</b>      | 455.68          | m <sup>3</sup> /s | <b>b</b>  | 63           | m |
| <b>d0</b>    | 0.65         | m             | <b>v0</b>     | 11.21           | m/s               | <b>q</b>  | 7.23         |   |
| <b>Talud</b> | 0.7          | H/V           | <b>H0</b>     | -               | m                 |           |              |   |
| <b>Punto</b> | <b>X (m)</b> | <b>zi (m)</b> | <b>hv (m)</b> | <b>vi (m/s)</b> | <b>Eq</b>         | <b>di</b> | <b>y (m)</b> |   |
| <b>0</b>     | 6.5          | 165.40        | 6.40          | 11.21           | -                 | 0.65      | 0.65         |   |
| <b>1</b>     | 7            | 164.69        | 7.11          | 11.81           | 0.00              | 0.61      | 1.07         |   |
| <b>2</b>     | 8            | 163.26        | 8.48          | 12.90           | 0.00              | 0.56      | 0.98         |   |
| <b>3</b>     | 9            | 161.83        | 9.80          | 13.87           | 0.00              | 0.52      | 0.91         |   |
| <b>4</b>     | 10           | 160.40        | 11.08         | 14.75           | 0.00              | 0.49      | 0.86         |   |
| <b>5</b>     | 12           | 157.55        | 13.52         | 16.29           | 0.00              | 0.44      | 0.77         |   |
| <b>6</b>     | 14           | 154.69        | 15.78         | 17.60           | 0.00              | 0.41      | 0.72         |   |
| <b>7</b>     | 16           | 151.83        | 17.88         | 18.73           | 0.00              | 0.39      | 0.67         |   |
| <b>8</b>     | 18           | 148.97        | 19.81         | 19.71           | 0.00              | 0.37      | 0.64         |   |
| <b>9</b>     | 20           | 146.12        | 21.58         | 20.58           | 0.00              | 0.35      | 0.61         |   |
| <b>10</b>    | 22           | 143.26        | 23.19         | 21.33           | 0.00              | 0.34      | 0.59         |   |
| <b>11</b>    | 24           | 140.40        | 24.65         | 21.99           | 0.00              | 0.33      | 0.57         |   |
| <b>12</b>    | 26           | 137.55        | 25.97         | 22.57           | 0.00              | 0.32      | 0.56         |   |
| <b>13</b>    | 28           | 134.69        | 27.16         | 23.09           | 0.00              | 0.31      | 0.55         |   |
| <b>14</b>    | 30           | 131.83        | 28.24         | 23.54           | 0.00              | 0.31      | 0.54         |   |
| <b>15</b>    | 32           | 128.97        | 29.20         | 23.93           | 0.00              | 0.30      | 0.53         |   |
| <b>16</b>    | 34           | 126.12        | 30.05         | 24.28           | 0.00              | 0.30      | 0.52         |   |
| <b>17</b>    | 36           | 123.26        | 30.82         | 24.59           | 0.00              | 0.29      | 0.51         |   |
| <b>18</b>    | 37.64        | 121.10        | 31.30         | 24.78           | 0.00              | 0.29      | 0.51         |   |

## 4.2. Lámina aireada

Como consecuencia de la gran velocidad del agua en el aliviadero, se absorbe aire por arrastre desde la superficie y posteriormente penetran burbujas hacia el interior del líquido. El volumen de aire ocluido puede ser notable y produce un entumecimiento de la lámina que, al aumentar su altura real, existe un correlativo incremento en los cajeros. La evaluación del fenómeno, por tanto, es de gran interés dado sus repercusiones.

Para realizar las correcciones por esponjamiento del flujo correspondientes, se utiliza la fórmula de corrección de Wood, la cual se fundamenta en las siguientes fórmulas:

$$\frac{C}{1-C} = 0.1\sqrt{0.2F^2-1}$$

$$\frac{Y_{mix}}{Y_w} = \frac{1}{1-C^2} \cdot \frac{1}{1-C}$$

Donde:

- $Y_{mix}$ : Calado aireado.
- $Y_w$ : Calado líquido.
- $C$ : Concentración media de aire.

Realizando los cálculos correspondientes, se obtienen los siguientes resultados:

**Tabla 6: Calados aireados en el Aliviadero.**

| Punto | X (m) | d (m) | Yw (m) | F     | C(%)  | Ymix | dmix | Fmix | vmix  |
|-------|-------|-------|--------|-------|-------|------|------|------|-------|
| 0     | 6.5   | 0.65  | 0.65   | 4.45  | 0.00  | 0.65 | 0.65 | 4.45 | 11.21 |
| 1     | 7.0   | 0.61  | 1.07   | 4.82  | 16.02 | 1.31 | 0.75 | 3.30 | 8.94  |
| 2     | 8.0   | 0.56  | 0.98   | 5.50  | 18.34 | 1.24 | 0.71 | 3.70 | 9.77  |
| 3     | 9.0   | 0.52  | 0.91   | 6.13  | 20.34 | 1.19 | 0.68 | 4.06 | 10.50 |
| 4     | 10.0  | 0.49  | 0.86   | 6.72  | 22.09 | 1.15 | 0.66 | 4.38 | 11.17 |
| 5     | 12.0  | 0.44  | 0.77   | 7.80  | 25.05 | 1.10 | 0.63 | 4.95 | 12.33 |
| 6     | 14.0  | 0.41  | 0.72   | 8.76  | 27.48 | 1.07 | 0.61 | 5.43 | 13.33 |
| 7     | 16.0  | 0.39  | 0.67   | 9.62  | 29.51 | 1.05 | 0.60 | 5.85 | 14.18 |
| 8     | 18.0  | 0.37  | 0.64   | 10.39 | 31.22 | 1.03 | 0.59 | 6.20 | 14.93 |
| 9     | 20.0  | 0.35  | 0.61   | 11.08 | 32.67 | 1.02 | 0.58 | 6.51 | 15.58 |
| 10    | 22.0  | 0.34  | 0.59   | 11.69 | 33.92 | 1.01 | 0.58 | 6.77 | 16.15 |
| 11    | 24.0  | 0.33  | 0.57   | 12.24 | 34.99 | 1.01 | 0.58 | 7.00 | 16.65 |
| 12    | 26.0  | 0.32  | 0.56   | 12.73 | 35.92 | 1.00 | 0.57 | 7.20 | 17.09 |
| 13    | 28.0  | 0.31  | 0.55   | 13.17 | 36.72 | 1.00 | 0.57 | 7.38 | 17.48 |
| 14    | 30.0  | 0.31  | 0.54   | 13.56 | 37.42 | 1.00 | 0.57 | 7.53 | 17.82 |
| 15    | 32.0  | 0.30  | 0.53   | 13.90 | 38.02 | 0.99 | 0.57 | 7.66 | 18.12 |
| 16    | 34.0  | 0.30  | 0.52   | 14.20 | 38.55 | 0.99 | 0.57 | 7.78 | 18.39 |
| 17    | 36.0  | 0.29  | 0.51   | 14.48 | 39.01 | 0.99 | 0.57 | 7.88 | 18.62 |
| 18    | 37.6  | 0.29  | 0.51   | 14.64 | 39.29 | 0.99 | 0.60 | 7.95 | 19.27 |

### 4.3. Diente deflector

Como se ha dicho anteriormente, se coloca un diente deflector intermedio en la rápida, de forma que se derive del caudal vertiente por aliviadero que pasa por encima del Aliviadero A3 para evitar interferencias de flujo no deseadas.

El caudal derivado por el diente deflector se produce a través de un chorro que incide en el resalto generado en el cuenco amortiguador. Lo que se pretende en este punto es demostrar cómo afecta el impacto del chorro en el comportamiento del resalto hidráulico y por tanto en el del cuenco a disponer.

Los caudales que van a intervenir en el diseño hidráulico global de los órganos de alivio, para la evacuación de la avenida de proyecto, en la solución planteada son, atendiendo a su origen, los siguientes:

- Q1 = Caudal vertido por la rápida y posteriormente lanzado por el diente deflector.
- Q2 = Caudal vertido por la rápida y posteriormente no lanzado por el diente deflector.
- Q3 = Caudal evacuado por el Aliviadero A3.

En el caso que nos ocupa, se corresponden con las siguientes condiciones de entrada:

**Tabla 7: Condiciones de entrada al cuenco.**

|           | Caudal (Q – m³/s) | Caudal Esp. (q – m²/s) | Calado (d – m.) | Velocidad (v – m/s) |
|-----------|-------------------|------------------------|-----------------|---------------------|
| <b>Q1</b> | 43.40             | 7.23                   | 0.30            | 24.08               |
| <b>Q2</b> | 412.28            | 7.23                   | 0.29            | 24.78               |
| <b>Q3</b> | 171.88            | 28.65                  | 1.16            | 23.93               |

Con estos valores, el calado a pie de cuenco ( $y_B$ ) se obtiene como la media ponderada de los obtenidos para Q2 y Q3:

$$y_B = \frac{0.29 \cdot 57 + 1.16 \cdot 6}{63} = 0.37 \text{ m.}$$

con el que se obtiene una velocidad de  $v = 24.77 \text{ m/s}$ ,  $F = 12.92$  y un  $y_2^* = 6.66 \text{ m}$ .

Según Hager (1992) la longitud del resalto hidráulico asistido por chorro ( $L_{rch}$ ) viene dada por la expresión:

$$\frac{L_{rch}}{L_r^*} = (1 + 10q_A^{1.22})^{-1}$$

Donde:

- $L_r^*$ : Es la longitud de resalto hidráulico clásico, en el caso que nos ocupa 29.6 metros.
- $q_A = \frac{Q_1}{Q_2 + Q_3} = 0.074$ .

Con lo que  $L_{rch}/L_r^*$  toma el valor de 0.70, y por tanto la longitud de resalto hidráulico asistido por chorro es de 20.83 metros.

Una vez realizados los cálculos explicados anteriormente estamos en disposición de definir geométricamente el diente deflector así como las características del chorro que incidirá sobre el resalto hidráulico.

Se establece como criterio de diseño que el punto de contacto del chorro incidente en el cuenco, esté aproximadamente dentro de los primeros dos tercios de la longitud del resalto, es decir, a unos 13.9 m del pie de presa, estando este a unos 18.7 m aguas abajo del punto de lanzamiento.

Con ello se consigue que el chorro incida dentro de la zona de máxima turbulencia del resalto hidráulico logrando de este modo los objetivos perseguidos.

Las ecuaciones paramétricas que definen el punto de impacto del chorro despreciando el rozamiento con el aire son:

$$L_0 = v_0 \cdot t \cdot \cos \beta$$

$$-10 = v_0 \cdot t \cdot \sin \beta - \frac{g \cdot t^2}{2}$$

Con lo que se obtiene un ángulo de lanzamiento ( $\beta$ ) de  $-19.62^\circ$ .

Si se tiene en cuenta la resistencia del aire (Kawakami, K. 1973) entonces el punto de incidencia del chorro será a 12,0 metros del pie de presa.

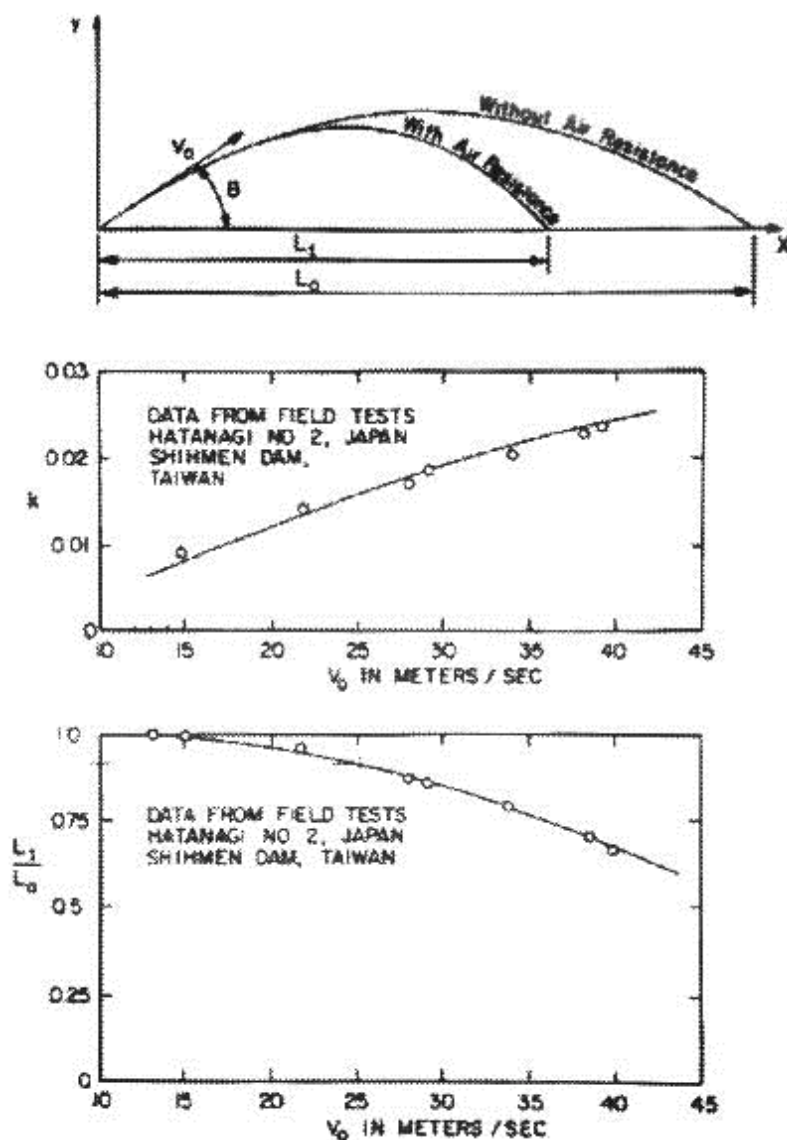


Figura 7: Cálculo de la resistencia al aire (Kawakami, K. 1973)

#### 4.4. Altura de cajeros

La altura de cajeros, se obtiene como la altura máxima de la lámina de agua sobre la rápida más un resguardo adicional por seguridad.

El resguardo mínimo que recomienda el USBR (1968) viene dado por la siguiente expresión:

$$R_{\min}=0,61+0,037 \cdot v \cdot \sqrt[3]{d}$$

Donde:

- d: Calado máximo en la rápida.
- v: Velocidad asociada al punto de máximo calado.

De los cálculos realizados con anterioridad se obtiene que el punto de máximo calado sobre la rápida, tanto para la lámina aireada como para la líquida, es de 0,65, punto en el que se tiene una velocidad de 11,21 m/s.

Con estos datos el resguardo a disponer es de 1,0 metro, por tanto, los muros cajero del aliviadero deben tener una altura mínima de 1,65 metros. Se establece en el diseño final una altura de 2,10 metros para considerar también el paso de la avenida de 5000 años de periodo de retorno.

#### 4.5. Cavitación

En aliviaderos tipo Bradley diseñados para una altura  $H_0$ , la elevación de esta altura hasta un valor  $h > H_0$  produce necesariamente una disminución de la presión sobre el hormigón del aliviadero, que llega a originar depresiones para  $h > \mu \cdot h$ , con  $\mu$  comprendido entre 1,65 y 2,0.

Considerando el primero de estos valores el caudal correspondiente sería:

$$Q=\lambda C_0 L_{\text{neta}} h^{3/2}$$

Tomando el coeficiente  $\lambda$  el valor 1,080.

Con  $H_0 = 4$  m., resulta  $h_{\max} = 6,6$  m para el Aliviadero 2 y; con  $H_0 = 2$  m., resulta  $h_{\max} = 3,3$  m para el Aliviadero 1; obteniéndose un caudal  $Q = 1596,76$  m<sup>3</sup>/s, valor más del doble del caudal de diseño y por ello muy improbable que se produzca cavitación para caudales de diseño.

## 5. Comprobación hidráulica del aliviadero inferior A3

### 5.1. Descripción

El aliviadero inferior o agujero se establece mediante dos conducciones gemelas y dispuestas simétricamente respecto del eje del transversal de la presa en el bloque 0.

Las conducciones tienen funcionamiento lámina libre y en carga. Para el funcionamiento en carga, esta se produce desde los emboquilles en el paramento de aguas arriba de la presa, hasta las secciones de control, que se ubican inmediatamente aguas abajo. Esta sección de control se proyecta mediante un perfil de despegue, de tal manera a continuación, tiene lugar un cambio de régimen hidráulico para que el flujo discorra, por el interior de la presa, en lámina libre. En planta, ambas conducciones son rectilíneas.

Las secciones de control tienen unas dimensiones rectangulares de 1,75 x 2,00 m, dimensiones éstas que se abren ampliamente por aguas arriba generando las embocaduras. El umbral se dispone a la cota 126,00 m. Por aguas abajo, las galerías de descarga poseen sección rectangular, con altura variable, puesto que si bien la clave de la galería se sitúa horizontal a la cota 128,00 m en toda la galería, la solera se corresponde con una parábola de segundo grado con el vértice en el umbral o sección de control. La anchura de la galería es, en la base, de 6,00 m. El perfil parabólico de la solera se prolonga hasta su salida al cuenco amortiguador a la cota 121,00 m.

A continuación se adjunta una figura del aliviadero inferior donde puede observarse la distribución:

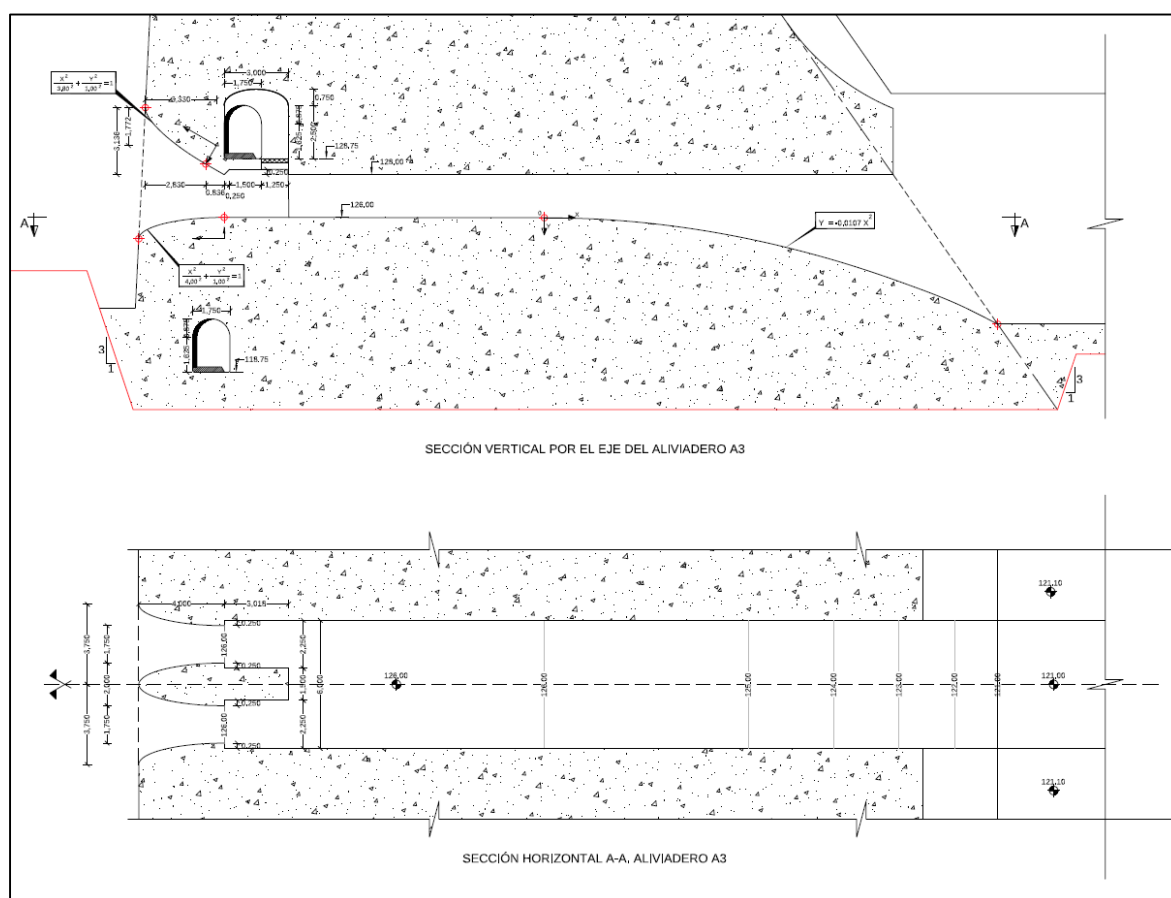


Figura 8: Detalle del Aliviadero 3.



## 5.2. Cálculo de la capacidad hidráulica

Para calcular el caudal evacuado por estos elementos en función de la cota utilizamos la ecuación de Bernouilli, teniendo en cuenta que el funcionamiento es en lámina libre hasta que el agua alcanza la cota superior y en presión a partir de ese momento:

### 5.2.1. Funcionamiento en lámina libre

Se produce entre las cotas 126,00 y 128,00 m.s.n.m. el cálculo de los caudales vertidos se realiza aplicando la fórmula de Manning:

$$Q = S \cdot v$$

$$v = \frac{i^{1/2}}{n \cdot R_h^{2/3}}$$

Tomando para la pendiente el valor  $i=0,001$  y para el número de Manning  $n=0,011$  se obtienen las velocidades y caudales de la tabla adjunta:

**Tabla 8: Caudales de descarga del Aliviadero 3 en lámina libre.**

| Cota agua | v (m/s) | Q (m³/s) | Q <sub>total</sub> (m³/s) | F    |
|-----------|---------|----------|---------------------------|------|
| 126.00    | 0.00    | 0.00     | 0.00                      | 0.00 |
| 126.10    | 0.42    | 0.07     | 0.15                      | 0.43 |
| 126.20    | 0.63    | 0.22     | 0.44                      | 0.45 |
| 126.30    | 0.78    | 0.41     | 0.82                      | 0.45 |
| 126.40    | 0.89    | 0.62     | 1.25                      | 0.45 |
| 126.50    | 0.98    | 0.86     | 1.72                      | 0.44 |
| 126.60    | 1.06    | 1.11     | 2.22                      | 0.44 |
| 126.70    | 1.12    | 1.38     | 2.75                      | 0.43 |
| 126.80    | 1.18    | 1.65     | 3.30                      | 0.42 |
| 126.90    | 1.23    | 1.93     | 3.86                      | 0.41 |
| 127.00    | 1.27    | 2.22     | 4.44                      | 0.40 |
| 127.10    | 1.31    | 2.51     | 5.03                      | 0.40 |
| 127.20    | 1.34    | 2.81     | 5.62                      | 0.39 |
| 127.30    | 1.37    | 3.11     | 6.23                      | 0.38 |
| 127.40    | 1.40    | 3.42     | 6.84                      | 0.38 |
| 127.50    | 1.42    | 3.73     | 7.45                      | 0.37 |
| 127.60    | 1.44    | 4.04     | 8.07                      | 0.36 |
| 127.70    | 1.46    | 4.35     | 8.70                      | 0.36 |
| 127.80    | 1.48    | 4.67     | 9.33                      | 0.35 |
| 127.90    | 1.50    | 4.98     | 9.96                      | 0.35 |
| 128.00    | 1.51    | 5.30     | 10.60                     | 0.34 |

Se observa que en lámina libre el caudal máximo alcanzable entre los dos conductos es 10,60 m³/s, a la cota 128,00 m.s.n.m., y que, en todos los casos, la conducción se realiza en régimen lento.

### 5.2.2. Funcionamiento en presión

Una vez alcanzada la cota 128,00 m.s.n.m., el aliviadero entra en presión, con las siguientes pérdidas de carga, definidas por el coeficiente K.

La curva de capacidad de una conducción en carga se puede expresar, mediante la ecuación de Bernoulli, de la siguiente manera:

$$H-Z = \sum \frac{v_i^2}{2g} \times k_i + \frac{v_{sc}^2}{2g}$$

En donde:

- H: Nivel de agua en el embalse.
- Z: Cota geométrica del eje de la sección de control de la conducción.
- $V_i$ : Velocidad del agua en cada elemento de la conducción.
- $V_{sc}$ : Velocidad del agua en la sección de control.
- $k_i$ : Factor de pérdida de carga de cada elemento de la conducción.

Los coeficientes de pérdida de carga en elementos localizados tales como rejillas, embocaduras, transiciones hidráulicas, válvulas, compuertas, etc.; se han tomado de la publicación “Hidráulica Técnica y Mecánica de Fluidos” redactado por Antonio Osuna, de la publicación “Proyecto de Presas Pequeñas” elaborado por el Bureau of Reclamation.

A su vez, la estimación de las pérdidas de carga uniformes se ha realizado mediante la fórmula de Manning:

$$i = \frac{v^2 n^3}{R_h^{4/3}}$$

En donde:

- i: Pérdida de carga unitaria o a lo largo de la conducción.
- v: Velocidad (m/s).
- n: Coeficiente de Manning. Se ha estimado en 0.013.
- $R_h$ : Radio hidráulico de la conducción.

Operando la referida ecuación, se obtiene que la capacidad de desagüe es:

$$Q = S \cdot \sqrt{\frac{2 \cdot g \cdot (H-Z)}{K}}$$

A continuación se adjuntan unas tablas con el conjunto de parámetros empleados en los cálculos según se ha explicado en la metodología y con las K obtenidas para las distintas hipótesis de funcionamiento de los desagües:

**Tabla 9: Valores detallados de K para el Aliviadero 3.**

|                                       | <b>K(<math>v^2/2g</math>)</b> |
|---------------------------------------|-------------------------------|
| <b>K<sub>Sección de control</sub></b> | 1.0000                        |
| <b>K<sub>Embocadura</sub></b>         | 0.0500                        |
| <b>K<sub>Transición</sub></b>         | 0.2000                        |
| <b>K<sub>Vertido al aire</sub></b>    | 0.3000                        |
| <b>K<sub>TOTAL</sub></b>              | <b>1.5502</b>                 |

Obteniéndose los siguientes valores en función de la cota de agua:

**Tabla 10: Caudales de descarga del Aliviadero 3 en presión.**

| Cota agua | v (m/s) | Q (m3/s) | Qtotal (m3/s) |
|-----------|---------|----------|---------------|
| 128.10    | 1.12    | 3.94     | 7.87          |
| 130.00    | 5.03    | 17.61    | 35.22         |
| 132.00    | 7.12    | 24.90    | 49.81         |
| 134.00    | 8.71    | 30.50    | 61.00         |
| 136.00    | 10.06   | 35.22    | 70.44         |
| 138.00    | 11.25   | 39.37    | 78.75         |
| 140.00    | 12.32   | 43.13    | 86.27         |
| 142.00    | 13.31   | 46.59    | 93.18         |
| 144.00    | 14.23   | 49.81    | 99.61         |
| 146.00    | 15.09   | 52.83    | 105.65        |
| 148.00    | 15.91   | 55.68    | 111.37        |
| 150.00    | 16.69   | 58.40    | 116.80        |
| 152.00    | 17.43   | 61.00    | 122.00        |
| 154.00    | 18.14   | 63.49    | 126.98        |
| 156.00    | 18.82   | 65.89    | 131.77        |
| 158.00    | 19.49   | 68.20    | 136.40        |
| 160.00    | 20.12   | 70.44    | 140.87        |
| 162.00    | 20.74   | 72.60    | 145.21        |
| 164.00    | 21.35   | 74.71    | 149.42        |
| 166.00    | 21.93   | 76.76    | 153.51        |
| 168.00    | 22.50   | 78.75    | 157.50        |
| 170.00    | 23.06   | 80.69    | 161.39        |
| 172.00    | 23.60   | 82.59    | 165.19        |
| 174.00    | 24.13   | 84.45    | 168.90        |
| 176.00    | 24.65   | 86.27    | 172.53        |

El gráfico adjunto representa los caudales evacuados por uno de estos desagües en función de la cota:

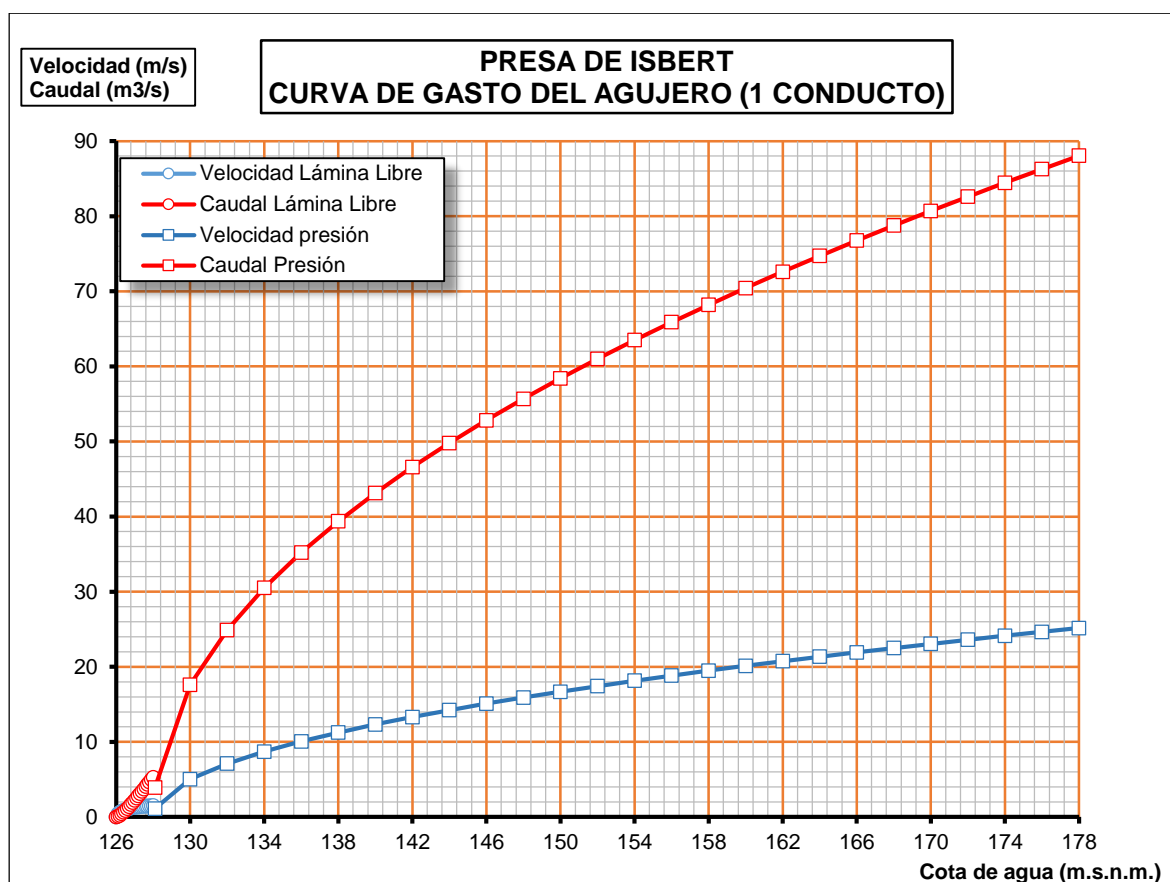


Figura 9: Curva de Caudal de descarga y Velocidad para un conducto del Aliviadero 3

### 5.3. Canal de descarga en lámina libre

A la salida del conducto en presión el agua en el canal sale con un calado  $y_{\text{CANAL}} = b$  y una velocidad  $v_{\text{CANAL}} = v_b$ , lo que proporciona como número de Froude del movimiento:

$$F_{\text{CANAL}} = \frac{v_{\text{CANAL}}}{\sqrt{g \cdot y_{\text{CANAL}}}} = 5,485$$

Que nos indica que el agua es conducida en régimen rápido.

#### 5.3.1. Definición geométrica

Después de un trayecto en presión el aliviadero de medio fondo se abre a un canal en lámina libre que vierte sobre el paramento de aguas abajo de la presa al cuenco amortiguador.

La solera del canal en lámina libre tiene un tramo de 15 metros de longitud con una pendiente de 0.001 m/m seguido de un tramo parabólico definido por la ecuación  $y = -0,0108 x^2$ , referida a los ejes  $x$  e  $y$  dibujados en la figura. Valores de esta curva y de su pendiente ( $y'$ ) se recogen en el cuadro y gráfico siguientes.

Tabla 11: Coordenadas y pendiente de la solera de descarga.

| x      | y     | y'    |
|--------|-------|-------|
| 0,000  | 0,000 | 0,000 |
| 1,935  | 0,040 | 0,042 |
| 3,869  | 0,161 | 0,083 |
| 5,804  | 0,363 | 0,125 |
| 7,738  | 0,646 | 0,167 |
| 9,673  | 1,009 | 0,209 |
| 11,607 | 1,453 | 0,250 |
| 13,542 | 1,978 | 0,292 |
| 15,476 | 2,584 | 0,334 |
| 17,411 | 3,270 | 0,376 |
| 19,345 | 4,037 | 0,417 |
| 21,280 | 4,885 | 0,459 |

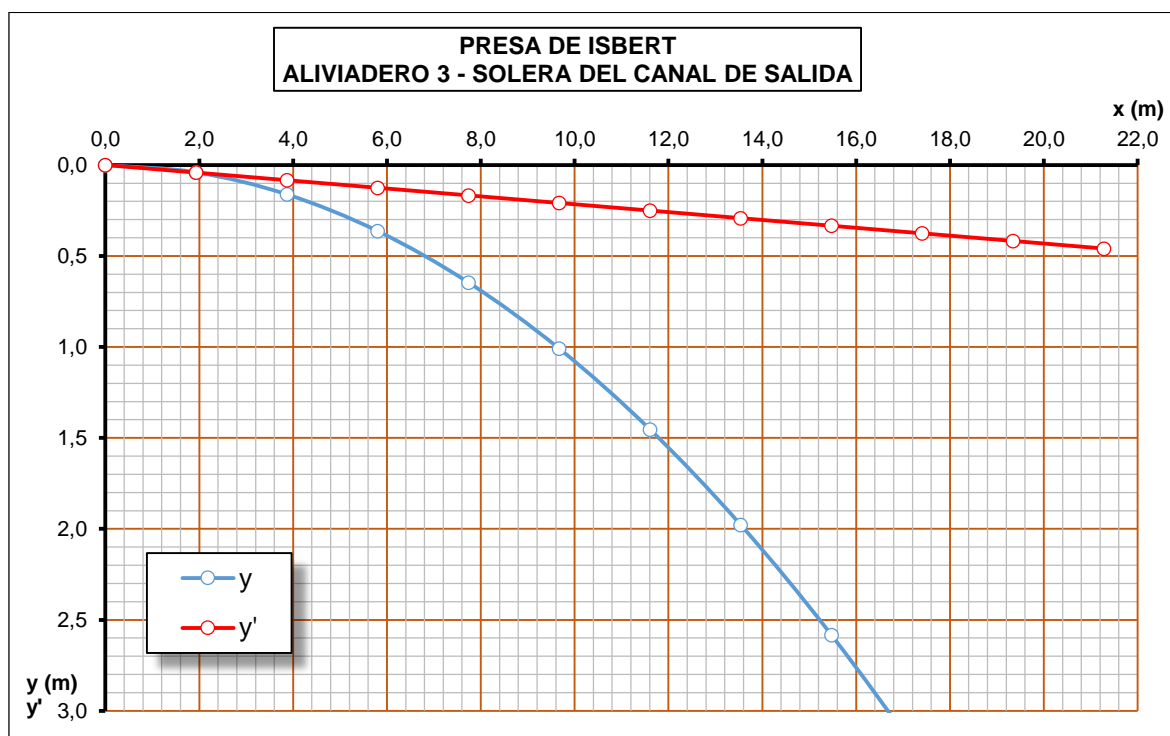


Figura 10: Solera y pendiente del canal de descarga del Aliviadero A3.

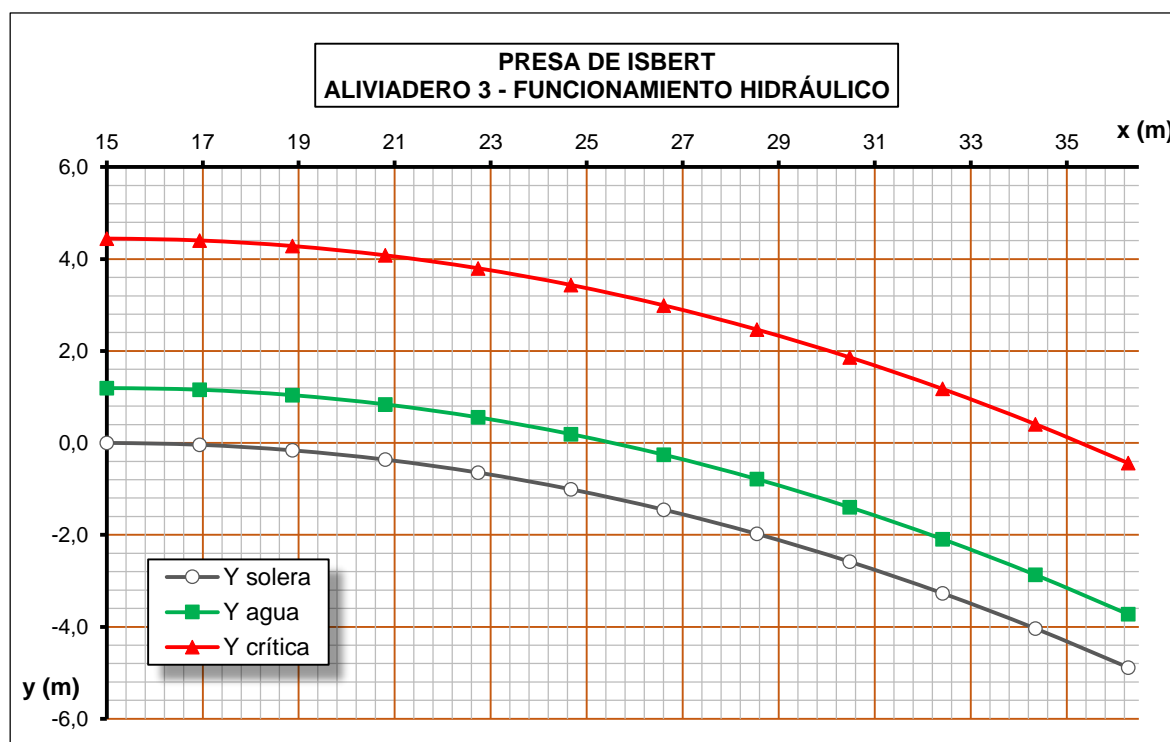
### 5.3.3. Funcionamiento hidráulico del canal de descarga.

Para analizar el comportamiento de la lámina de agua en esta zona se ha utilizado una hoja de cálculo del programa Excel en la que se aplican las distintas fórmulas para obtener a partir de la ecuación de Bernoulli los calados en cada uno de los puntos del canal de descarga.

Los valores obtenidos se muestran en el cuadro y gráfico adjuntos:

**Tabla 12: Funcionamiento hidráulico del canal de descarga.**

| X    | Y solera | Y agua | Y crítica | v     | F    |
|------|----------|--------|-----------|-------|------|
| 0.0  | 0.00     | 2.00   | 4.44      | 24.81 | 5.60 |
| 2.5  | 0.00     | 1.55   | 4.44      | 24.86 | 6.37 |
| 5.0  | 0.00     | 1.16   | 4.44      | 24.87 | 7.36 |
| 7.5  | 0.00     | 1.17   | 4.44      | 24.71 | 7.29 |
| 10.0 | 0.00     | 1.18   | 4.44      | 24.56 | 7.22 |
| 12.5 | 0.00     | 1.19   | 4.44      | 24.41 | 7.16 |
| 15.0 | 0.00     | 1.19   | 4.44      | 24.26 | 7.09 |
| 16.9 | -0.04    | 1.16   | 4.40      | 24.17 | 7.05 |
| 18.9 | -0.16    | 1.04   | 4.28      | 24.11 | 7.02 |
| 20.8 | -0.36    | 0.84   | 4.08      | 24.08 | 7.01 |
| 22.7 | -0.65    | 0.56   | 3.80      | 24.09 | 7.01 |
| 24.7 | -1.01    | 0.19   | 3.44      | 24.13 | 7.03 |
| 26.6 | -1.45    | -0.26  | 2.99      | 24.20 | 7.06 |
| 28.5 | -1.98    | -0.79  | 2.47      | 24.30 | 7.11 |
| 30.5 | -2.58    | -1.40  | 1.86      | 24.43 | 7.17 |
| 32.4 | -3.27    | -2.09  | 1.17      | 24.60 | 7.24 |
| 34.3 | -4.04    | -2.87  | 0.41      | 24.79 | 7.32 |
| 36.3 | -4.89    | -3.73  | -0.44     | 25.00 | 7.42 |



**Figura 11: Perfil de la lámina de agua en el Aliviadero A3.**

### 5.3.4. Aireación.

Para garantizar que el régimen libre se produzca se realizan dos acciones:

- Se curva la solera en una curva, con tangente inicialmente horizontal, que se sitúa por encima de la trayectoria que tomaría la línea de corriente más baja a su salida del tramo en presión.
- Se dispone un sistema de aireación que aporte el aire necesario para el mantenimiento de la lámina libre sin petardeos ni cavitaciones. Aunque el aire que entra en el canal proviene de dos orígenes, de aguas abajo  $Q_{A1}$  y del sistema de aireación  $Q_{A2}$ , se hará el cálculo de la sección necesaria sin contar con la primera de las aportaciones.

Emplearemos la fórmula de Sharma (1976) que relaciona el caudal de aire necesario con el caudal de agua y con el número de Froude, mediante la relación:

$$Q_{A2} = 0.09 \cdot F_{CANAL} \cdot Q_B = 41,98 \text{ m}^3/\text{s}$$

Obligando a que la velocidad del aire sea menor de 30 m/s y suponiendo que desde el conducto se produce el 40% de la aireación, el caudal anterior necesita una sección de 0,56 m<sup>2</sup> en el conducto de aireación, que resolvemos mediante dos tubos de hormigón de 0,60 m de diámetro interior (0,565 m<sup>2</sup> de sección).

Ambos conductos salen lateralmente hasta alcanzar una los laterales del aliviadero, por donde alcanzar la salida en el lateral de los accesos a la galería I. En la salida los conductos se protegen con una rejilla de alambre tipo tela de gallinero.

### 5.4. Cavitación

Para este tipo de estructuras se define el índice de cavitación, como el cociente adimensional:

$$\sigma_c = \frac{p - p_v}{\gamma_w v^2 / 2g}$$

Que, para acabados normales de la superficie del hormigón, no deberá sobrepasar un cierto valor crítico  $\sigma_c$  para el que Falvey (1980, 1990) obtuvo una gráfica, la cual se presenta a continuación:

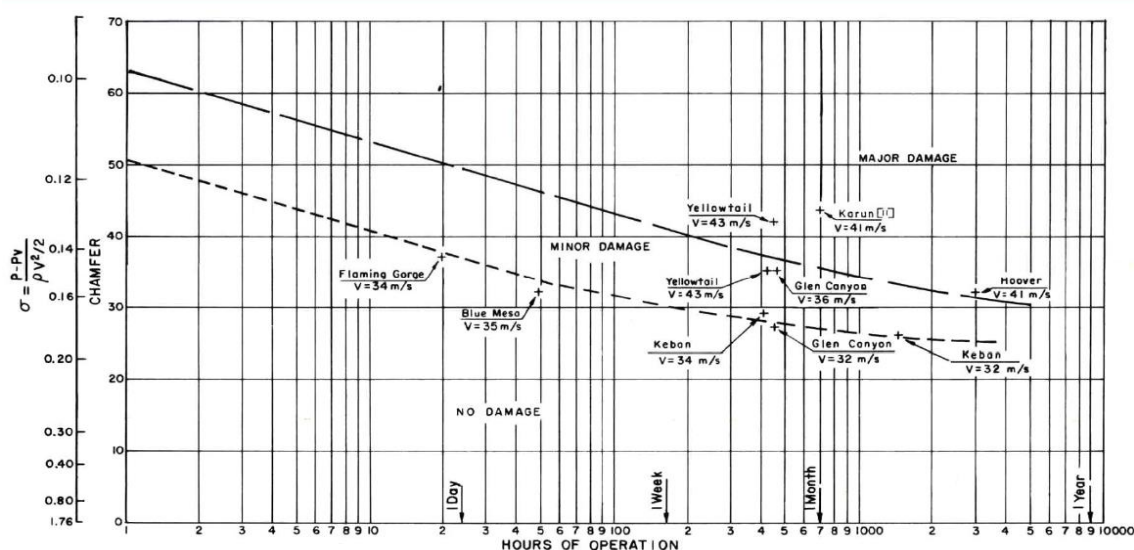


Figura 12: Gráfica de números de cavitación en infraestructuras hidráulicas (Falvey, 1988).

El punto crítico para este aliviadero se produce a la salida de la zona en presión y, para  $p_v = -0.240$  m, se obtienen los siguientes valores en función de la altura del agua en el embalse:

| Cota    | h      | v      | $v^2/2g$ | $\sigma_c$ |
|---------|--------|--------|----------|------------|
| 173.640 | 46.640 | 24.296 | 30.086   | 1.542      |
| 170.380 | 43.380 | 23.431 | 27.983   | 1.542      |
| 167.120 | 40.120 | 22.534 | 25.880   | 1.541      |
| 163.860 | 36.860 | 21.599 | 23.777   | 1.540      |
| 160.600 | 33.600 | 20.622 | 21.674   | 1.539      |
| 157.340 | 30.340 | 19.596 | 19.571   | 1.538      |
| 154.080 | 27.080 | 18.513 | 17.468   | 1.536      |
| 150.820 | 23.820 | 17.363 | 15.365   | 1.535      |
| 147.560 | 20.560 | 16.131 | 13.263   | 1.532      |
| 144.300 | 17.300 | 14.797 | 11.160   | 1.529      |
| 141.040 | 14.040 | 13.330 | 9.057    | 1.524      |
| 137.780 | 10.780 | 11.680 | 6.954    | 1.516      |
| 134.520 | 7.520  | 9.756  | 4.851    | 1.501      |
| 131.260 | 4.260  | 7.343  | 2.748    | 1.463      |
| 128.000 | 1.000  | 3.558  | 0.645    | 1.178      |

**Tabla 13: Índices de cavitación en el Aliviadero inferior A3.**

Se observa que en todos los casos se obtienen valores superiores a los valores críticos, por tanto, es posible descartar la aparición de fenómenos de cavitación en este aliviadero.



## 6. Cuenco amortiguador

### 6.1. Elección del cuenco

Dado el gran número de combinaciones de elementos que pueden utilizarse para disipar la energía en un cuenco a pie de presa, se ha optado en este caso por un cuenco de los que se denominan tipificados, es decir, se han ensayado y validado para un rango de números de Froude definido. Para la elección del cuenco amortiguador tipificado se utiliza la metodología propuesta por Vallés Morán F.J. y Marco Segura J. en el artículo “Adaptación del diseño de cuencos amortiguadores de pie de presa a caudales superiores a los de diseño. El uso de la aireación forzada como herramienta para la extensión de su campo de aplicación”, presentado en la Jornada Técnica de Avances en investigación aplicada en seguridad de presas (Madrid, 2013).

El dimensionamiento del cuenco amortiguador, conocidas las características más importantes de las distintas tipologías, se realiza a criterio del ingeniero proyectista en función de los requisitos a satisfacer para cada caso concreto. La metodología propuesta, presenta un ábaco que permite mediante unos sencillos cálculos orientar hacia qué tipo de cuenco amortiguador utilizar.

Se trata de un ábaco de predimensionamiento que facilita la elección del tipo de cuenco amortiguador en función de las características de caudal específico ( $q$ ) en  $m^2/s$  y altura de caída de la presa ( $Z$ ) en metros.

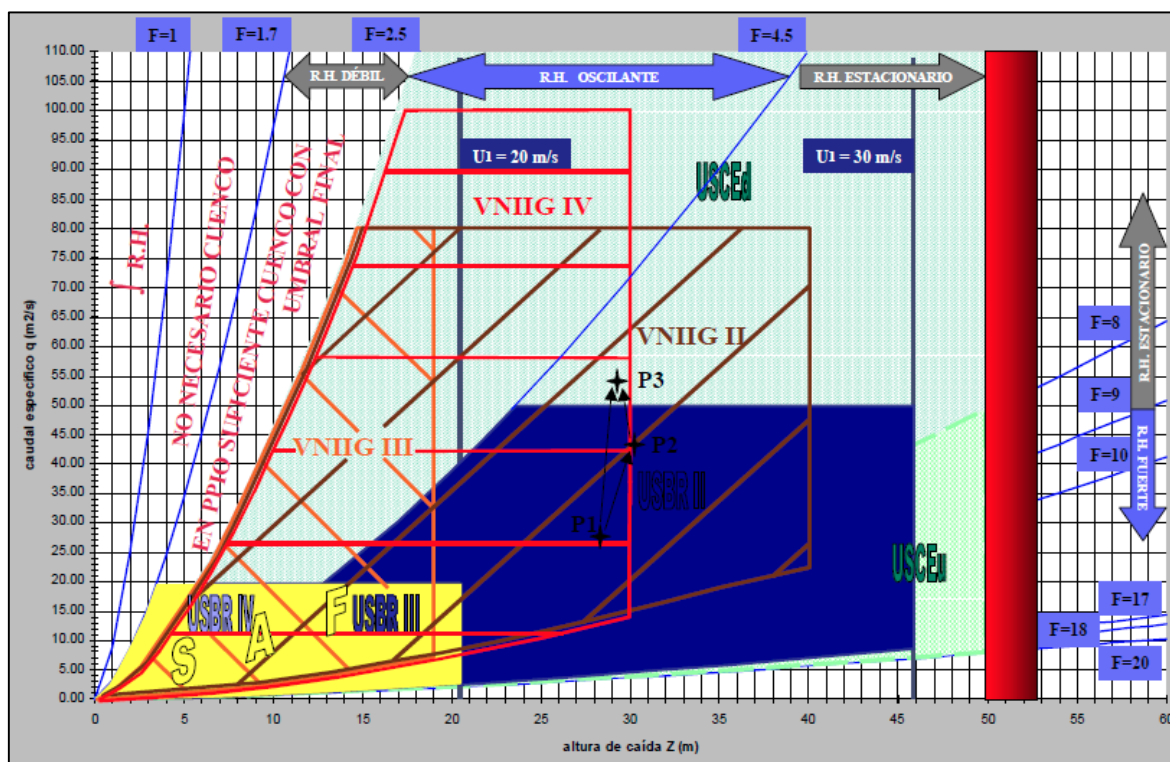


Figura 13: Ábaco para la elección y predimensionamiento de cuencos amortiguadores. (Vallés Morán, F.J. Y Marco Segura, J.)

En el caso particular que nos ocupa, con una altura de caída de 50,4 metros y un caudal específico de  $7,2 m^2/s$   $[(Z, q) = (50.4, 7.2)]$  nos encontramos entre la franja roja para la cual no se han definido claramente ningún cuenco y la zona de dimensionamiento del cuenco USCEu, que dado el efecto de aireación de la lámina que producen las pilas, claramente nos desplaza el punto hacia la zona de dimensionamiento del cuenco USCE con umbral terminal.

Como se ha visto con anterioridad en el punto 4.3 el caso que nos corresponde analizar no representa un resalto clásico, sino que este está alimentado por el caudal de salida continuo del Aliviadero inferior y por la incidencia de un chorro procedente del diente deflector. No obstante, como ha quedado demostrado que la incidencia del chorro mejora las condiciones del resalto hidráulico, se dimensiona el cuenco según el modelo tipificado USCE, quedándonos en el caso que nos ocupa ampliamente del lado de la seguridad.

## 6.2. Características geométricas

Según las recomendaciones del U.S. Army Corps of Engineers (USACE, 1995), publicadas en Technical Engineering and Design Guides nº 12, por la American Society of Civil Engineers, la longitud del cuenco puede obtenerse mediante la aplicación de la siguiente ecuación:

$$L_c = K \cdot y_1 \cdot F_1^{1.5}$$

donde k es un coeficiente de longitud de cuenco, cuyo valor se obtiene a partir de la tabla siguiente:

**Tabla 14: Valores de coeficiente K de la longitud del cuenco (USACE, 1995).**

| K   | Cuenco   |
|-----|--|
| 1.4 | Con umbral terminal, vertical, escalonado o en contrapendiente y una o dos filas de bloques. |
| 1.7 | Con umbral terminal, vertical, escalonado o en contrapendiente solamente.                    |

### Longitud del cuenco

Obtenidas las condiciones de entrada al resalto hidráulico para la avenida de diseño (T = 1000 años), esto es  $y_1 = 0.37$  m,  $v_1 = 24.77$  m/s y  $F_1 = 12.92$ , se obtiene el siguiente resultado:

$$y_2^* = 6.66 \text{ m}$$

Con estos datos y con la formulación propuesta por el USACE para el cálculo de la longitud del cuenco se obtiene que dicha longitud es de  $L_c = 29,6$  m. Estableciéndose en el caso que corresponde a una longitud de 28 metros, longitud que se cree suficiente para que el resalto se desarrolle en el interior del cuenco.

### Umbral terminal

El dimensionamiento del umbral terminal se realiza siguiendo las recomendaciones del U.S. Army Corps of Engineers (USACE, 1995). Según las cuales, la altura recomendable del umbral ha de ser de  $0.2 \cdot y_2$ , dado que umbrales más altos pueden provocar problemas de socavación o erosión aguas abajo de los mismos. En nuestro caso la altura del umbral es de 1.4 metros.

### Dientes deflectores

En la zona de desagüe del Aliviadero A3, se diseñan unos dientes deflectores para intersectar el flujo y ayudar a la disipación de energía. El dimensionamiento de estos se realiza siguiendo las recomendaciones del U.S. Army Corps of Engineers (USACE, 1995) como en el caso anterior. Según las cuales, la altura recomendable del umbral se obtiene en función de la figura siguiente:

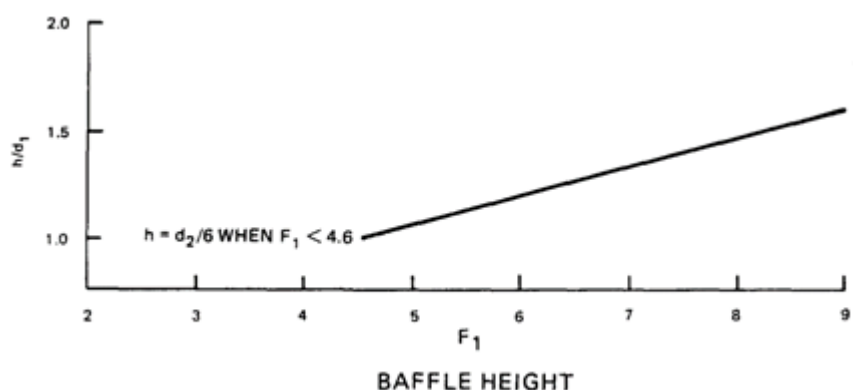


Figura 14: Gráfico de diseño de la altura de los dientes deflectores (USACE, 1995).

En nuestro caso la altura de los dientes deflectores es de 0.6 metros.

#### Muros cajeros y losa del cuenco

En cuanto a la altura de los cajeros del cuenco amortiguador ( $h_{\text{muro}}$ ) ha de ser la mayor de las siguientes alturas:

- $y_{2, T1000} + \text{Resguardo} = 6.66 + 1 = 7.66$  metros.
- $y_{2, T1000} + \Delta h_v = 6.66 + \frac{1.39^2}{2 \cdot 9.81} = 6.77$  metros.
- $y_{2, T5000} \approx 10.3$  metros.

Dado que la condición más desfavorable es la producida por el paso de la avenida extrema, se considerará esta como altura de cajeros, por tanto, la altura de los muros cajeros se establece en 10.30 metros.

Los cajeros del cuenco estarán compuestos por muros ménsula, con unas dimensiones aproximadas de  $0.2 \cdot h_{\text{muro}}$  para el arranque del muro y de  $0.1 \cdot h_{\text{muro}}$  en cabeza, según recomendaciones de Yepes (2015). En el caso que nos ocupa se tiene un arranque de 2.0 metros y una coronación de 1.0 metros de ancho.

#### Resumen de características

Tabla 15: Resumen de características del cuenco amortiguador.

| Característica             | Dimensión |    |
|----------------------------|-----------|----|
| Calado máximo en el cuenco | 6.66      | m. |
| Longitud del cuenco        | 28.0      | m. |
| Espesor losa               | 1.5       | m. |
| <b>Deflectores:</b>        |           |    |
| Altura                     | 0.6       | m. |
| Espesor                    | 0.5       | m. |
| <b>Umbral:</b>             |           |    |
| Altura                     | 1.4       | m. |
| Espesor                    | 1.0       | m. |
| <b>Muros cajeros:</b>      |           |    |
| Altura                     | 10.3      | m. |
| Ancho base                 | 2.0       | m. |
| Ancho coronación           | 1.0       | m. |

### 6.3. Restitución al cauce

Cuando la lámina de agua vertiente por el aliviadero alcanza el pie de presa, presenta una velocidad superior a la del régimen natural y uniforme en el cauce. Parte la energía en forma de velocidad se disipa en el cuenco amortiguador, no obstante, a la salida del cuenco amortiguador puede existir suficiente velocidad y por tanto, tensión tangencial para arrastrar las partículas del cauce produciendo lo que se conoce como socavación. Si la socavación supera la profundidad de la cimentación se corre el riesgo de que la infraestructura pierda el apoyo y se produzca el fallo. Por ello, es necesario obtener el tamaño característico de las partículas del lecho.

En el caso que nos ocupa, se emplea la fórmula de Schoklitsch (1932), ampliamente recomendada para este tipo de cuencos amortiguadores:

$$S+h_d=4.75 \frac{H^{0.2}q^{0.5}}{D_{90}^{0.32}}$$

Los datos de partida para el cálculo son los siguientes:

- $H = 50.40$  metros.
- $q = 9.96 \text{ m}^2/\text{s}$ .
- $h_d = 6.66$  metros.

Obteniéndose un diámetro  $D_{90}$  de 146.61 mm, por tanto, un diámetro medio ( $D_{50}$ ) de 81 mm.

Se observa que este diámetro medio es similar al observado en el cauce, por lo que no es necesario la protección de los márgenes del cauce con otro tipo de material de mayor tamaño al natural.

Por otro lado, dado que el aliviadero presenta una mayor anchura que el cauce, se deberá excavar un encauzamiento para canalizar las aguas hasta su restitución al cauce natural.

El encauzamiento proyectado, se excavará en terreno aluvial y rocoso y no irá revestido debido a la presencia de material de suficiente dimensión como para ser estable frente a las tensiones tangenciales.

Se realiza una sección de transición de los taludes rectos del cuenco hasta tener taludes 1.5H:1V en el PK 0+010, que se mantiene constante hasta el final. La altura de los márgenes se mantiene igual a la del cuenco hasta el PK 0+040, punto desde el cual los cajeros se reducen hasta desaparecer en el PK 0+088.32.

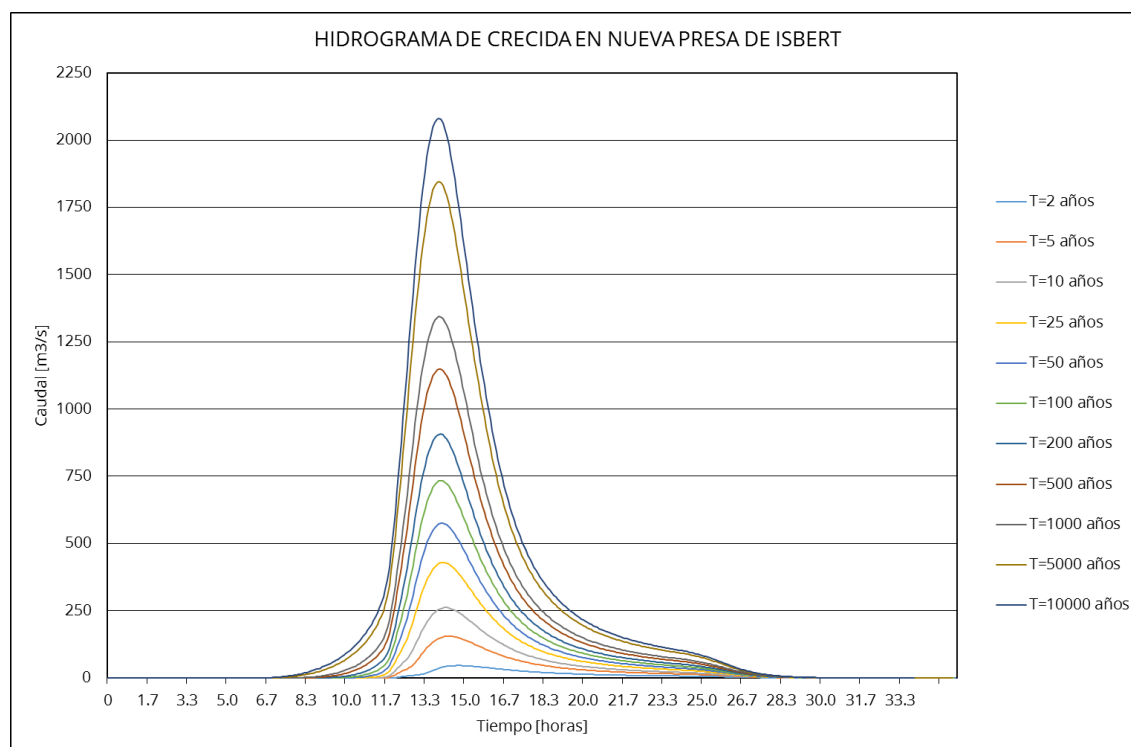
## 7. Estudio de laminación de avenidas

### 7.1. Metodología

#### 7.1.1. Hidrogramas de cálculo

Para el estudio de laminación de avenidas se ha empleado un grupo de hidrogramas de cálculo, obtenidos en el anejo 4 del presente estudio. Los periodos de retorno estudiados van desde 2 años hasta 5.000 años.

A continuación se presentan los hidrogramas obtenidos:



**Figura 15: Hidrogramas de cálculo.**

Se adjuntan a continuación los valores principales de estos hidrogramas:

| T (años) | Qp (m³/s) | V (Hm³) |
|----------|-----------|---------|
| 2        | 46        | 0.97    |
| 5        | 155       | 2.77    |
| 10       | 262       | 4.44    |
| 25       | 430       | 7.03    |
| 50       | 576       | 9.29    |
| 100      | 734       | 11.75   |
| 200      | 907       | 14.45   |
| 500      | 1149      | 18.37   |
| 1000     | 1344      | 21.58   |
| 5000     | 1847      | 29.86   |
| 10000    | 2082      | 33.77   |

**Tabla 16: Caudales y volúmenes de los hidrogramas asociados a cada periodo de retorno.**

### 7.1.2. Estrategias de gestión de las avenidas

Se ha realizado un completo estudio de simulación de avenidas al objeto de verificar el correcto dimensionamiento del embalse y de los elementos hidráulicos así como para verificar lo dispuesto por el Reglamento Técnico sobre Seguridad de Presas y Embalses.

La característica principal de los cálculos ha sido la siguiente:

1. Nivel inicial del embalse a la cota 126,00 m (coincidente con la cota del umbral del Agujero o Aliviadero A3 y del N.M.N.).

### 7.1.3. Aplicación informática

El estudio de la laminación de las avenidas se ha llevado a cabo con el auxilio de una hoja de cálculo implementada en Excel para tal cometido, así como con el software HEC-HMS.

El software HEC-HMS tiene como inputs los hidrogramas y las curvas de desagüe y de embalse provenientes de la hoja Excel y realiza un balance hídrico en el tiempo, de acuerdo con el incremento diferencial de tiempo elegido y determina el estado del embalse tanto en volumen almacenado y como nivel.

Posteriormente la hoja de cálculo recibe como datos de entrada del software HEC-HMS, los niveles de embalse y volúmenes almacenados, a partir de los cuales determina los caudales evacuados por los distintos órganos de evacuación y representa los balances de caudales y niveles en función del tiempo.

En la parte final del anejo, se incluye un apéndice con los listados de cálculo de la citada hoja de cálculo.

## 7.2. Resultados

### 7.2.1. Resumen de resultados

En la página siguiente se muestra un cuadro resumen de los resultados de las simulaciones realizadas:

| AVENIDA           | Vap.<br>(Hm3) | Qm.ap.<br>(m3/s) | Qa.a1<br>(m3/s) | Qa.a2<br>(m3/s) | Qd.a3<br>(m3/s) | Qm.des.<br>(m3/s) | Zmáx.<br>(m) | % lamin |
|-------------------|---------------|------------------|-----------------|-----------------|-----------------|-------------------|--------------|---------|
| <b>2 años</b>     | 0.97          | 46               | 0.00            | 0.00            | 44.46           | 44.46             | 131.19       | 3.5     |
| <b>5 años</b>     | 2.77          | 155              | 0.00            | 0.00            | 82.56           | 82.56             | 139.49       | 46.9    |
| <b>10 años</b>    | 4.44          | 262              | 0.00            | 0.00            | 105.38          | 105.38            | 145.91       | 59.8    |
| <b>25 años</b>    | 7.03          | 430              | 0.00            | 0.00            | 124.67          | 124.67            | 153.06       | 71.0    |
| <b>50 años</b>    | 9.29          | 576              | 0.00            | 0.00            | 136.63          | 136.63            | 157.04       | 76.3    |
| <b>100 años</b>   | 11.75         | 734              | 0.00            | 0.00            | 147.29          | 147.29            | 162.98       | 79.9    |
| <b>200 años</b>   | 14.45         | 907              | 0.00            | 0.00            | 157.16          | 157.16            | 167.83       | 82.7    |
| <b>500 años</b>   | 18.37         | 1149             | 0.00            | 153.20          | 165.90          | 319.10            | 172.38       | 72.2    |
| <b>1.000 años</b> | 21.58         | 1344             | 77.90           | 356.30          | 168.30          | 602.50            | 173.68       | 55.2    |
| <b>5.000 años</b> | 29.86         | 1847             | 386.00          | 782.60          | 171.90          | 1340.50           | 175.66       | 27.4    |

Las abreviaturas empleadas en la tabla son las siguientes:

- Vap.: Volumen total de aportación del hidrograma de entrada.
- Qm.ap.: Caudal punta o máximo de aportación del hidrograma de entrada.
- Qa.a1.: Caudal punta desaguado por los aliviaderos A1.
- Qa.a2.: Caudal punta desaguado por los aliviaderos A2.
- Qd.a3.: Caudal punta desaguado por los agujeros A3.
- Qm.des.: Caudal punta o máximo desaguado.
- Zmáx: Cota máxima alcanzada por el embalse durante el paso de la avenida.
- % lamin: Porcentaje de caudal laminado. Mide cuánto de efectiva ha sido la laminación de los caudales punta.

$$\% \text{lamin} = \left( 1 - \frac{Qm.des}{Qm.ap.} \right) \cdot 100$$

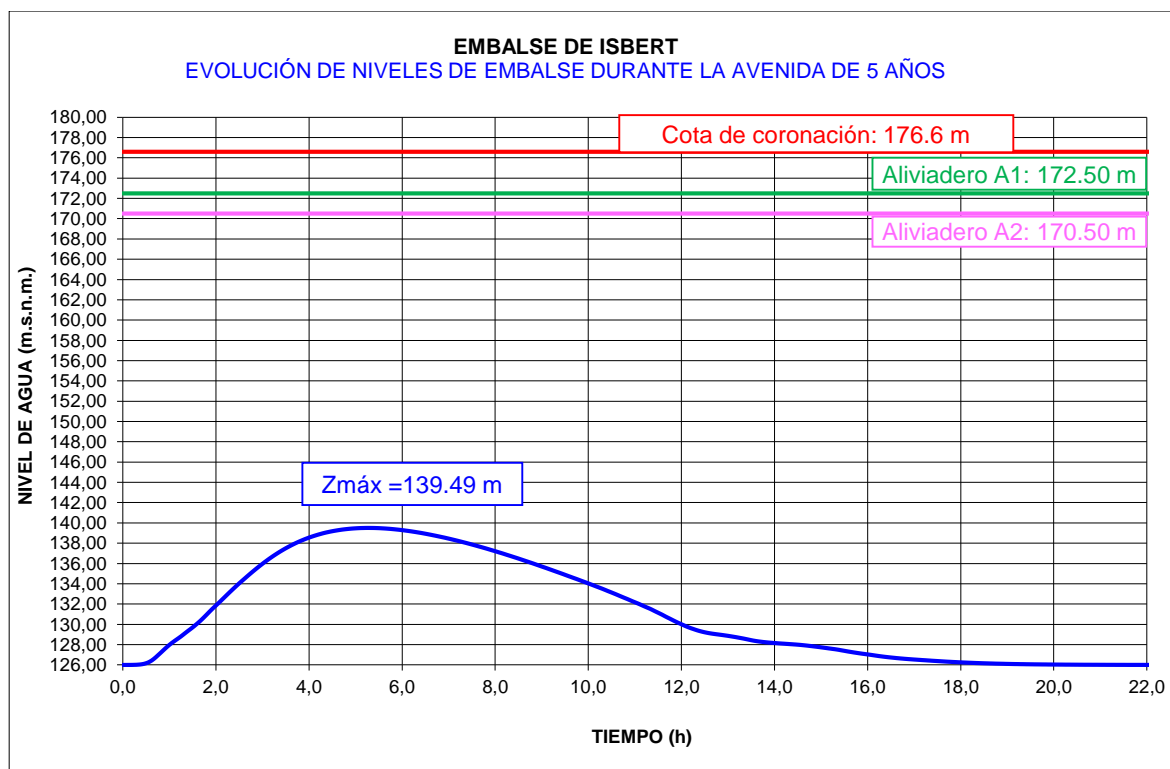
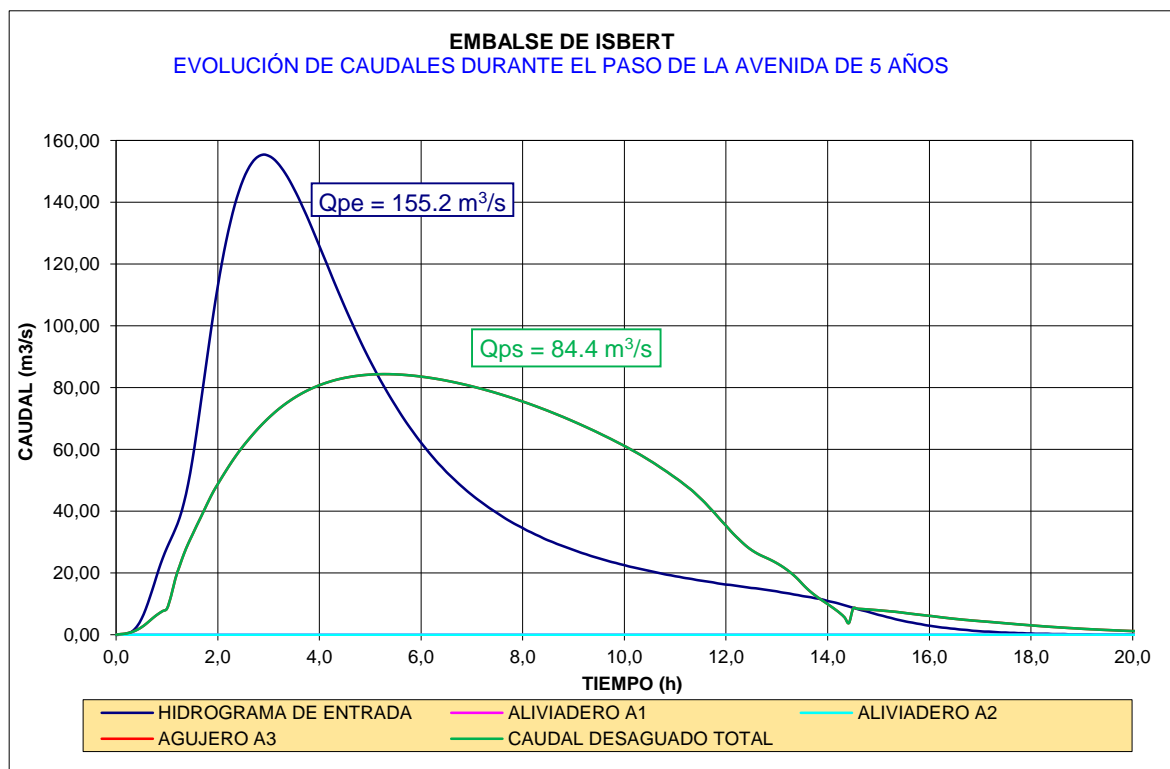
Es decir, un valor próximo a 100 nos indica que gran parte del caudal entrante ha conseguido ser laminado por el embalse.

Se extraen las siguientes conclusiones:

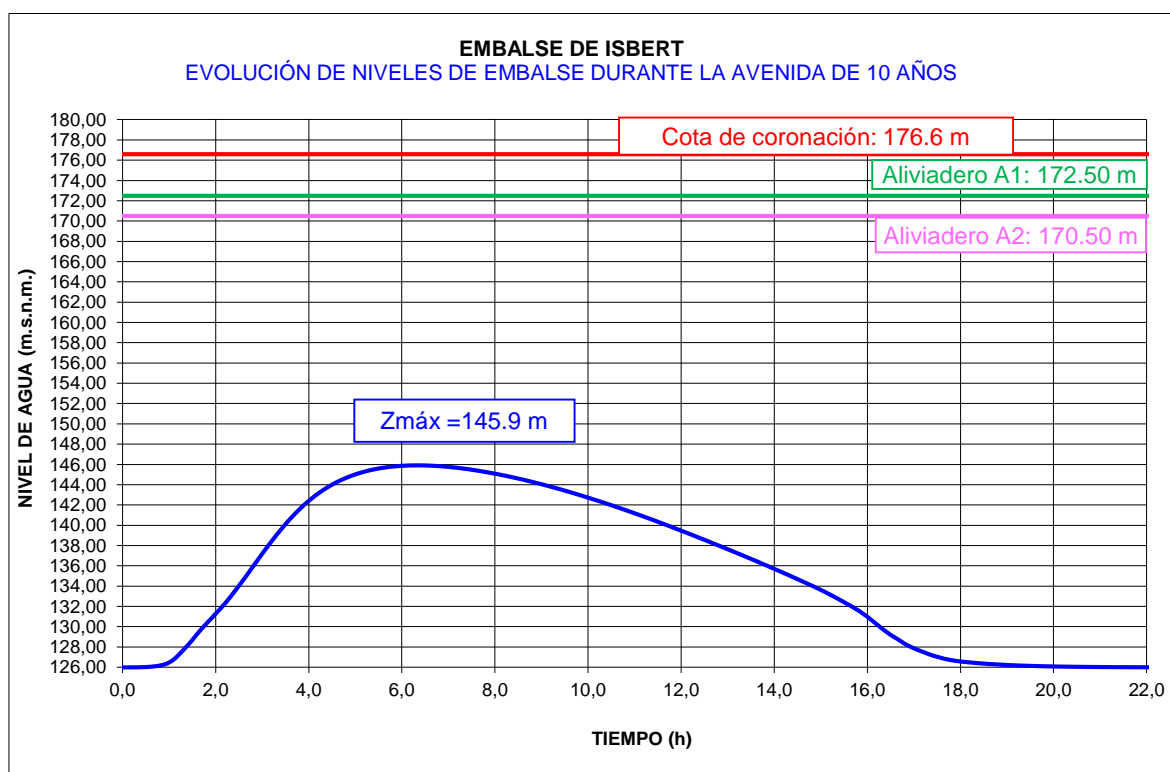
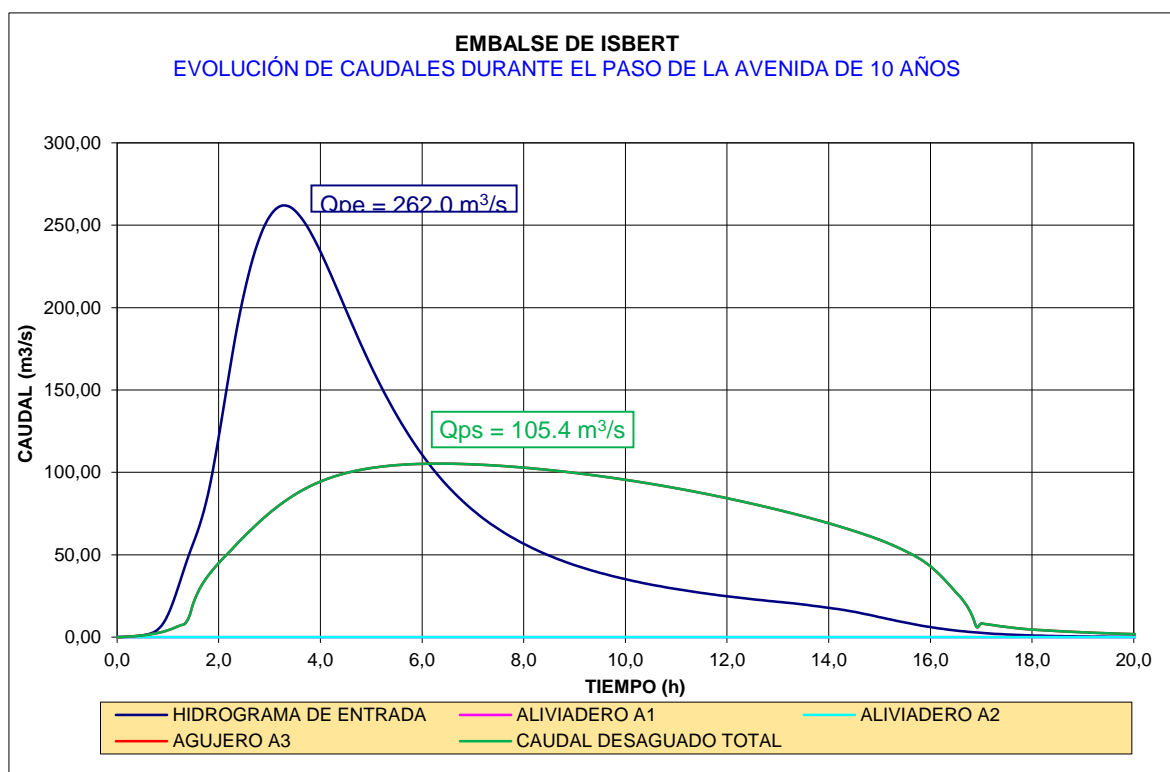
1. Los escenarios considerados de proyecto y extremo son los presentados en azul:
  - a. Se corresponden con el paso de las avenidas de 1.000 y 5.000 años, para hidrogramas obtenidos mediante hietograma simétrico, pues son los que se han revelado pésimos en cuanto a máximos niveles generados en el embalse.
  - b. Estos escenarios son los que dan lugar a :
    - i. Nivel de Avenida de Proyecto = 173,64 m.s.n.m.
    - ii. Nivel de Avenida Extrema = 175,63 m.s.n.m.
  - c. Los resguardos que se obtienen hasta coronación son suficientes: más de tres metros en el caso del escenario de proyecto y cerca de un metro en el escenario extremo. Este aspecto se estudia más detalladamente en el apartado correspondiente a comprobación de resguardos, contenido en este mismo Anejo.
2. La capacidad laminadora del embalse es muy importante, como puede observarse en los porcentajes de laminación de caudales recogidos en la anterior tabla. Siendo para casi todos los periodos de retorno cercanos o superiores al 30% y encontrándose en el entorno al 80%, para las tormentas con periodos de retorno próximos a los 200 años. Esto puede observarse también en los gráficos de resultados del apartado siguiente.

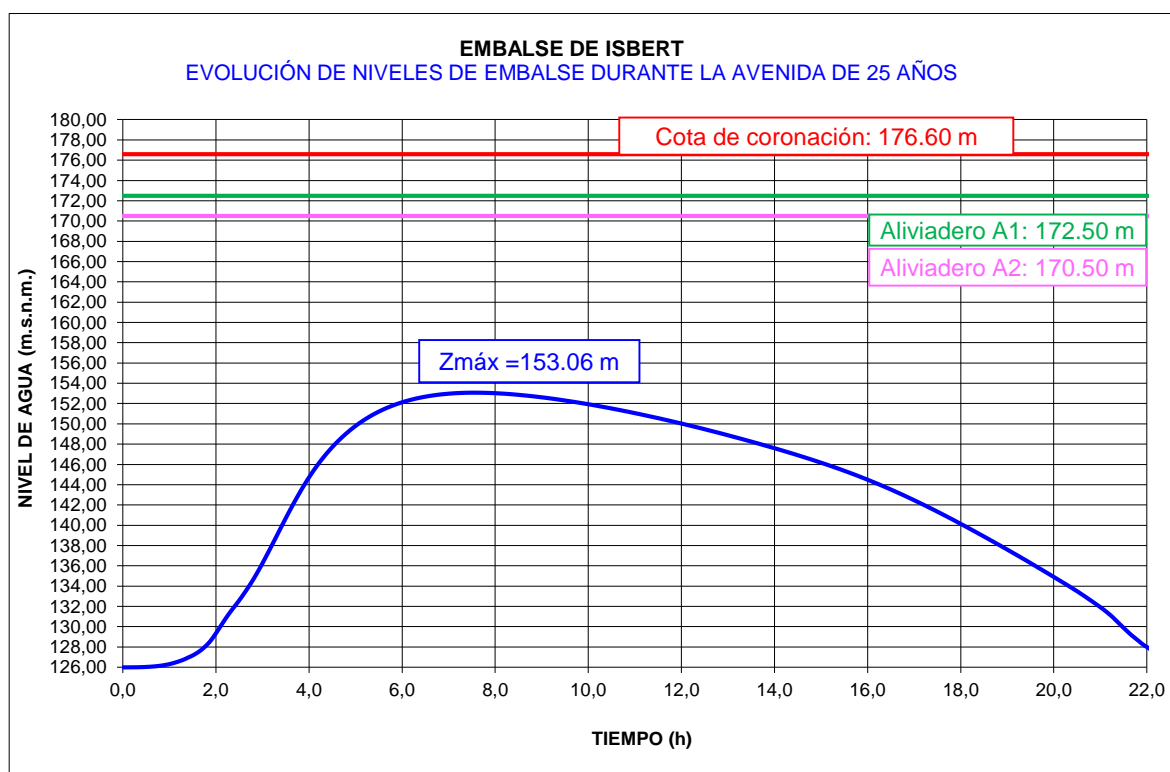
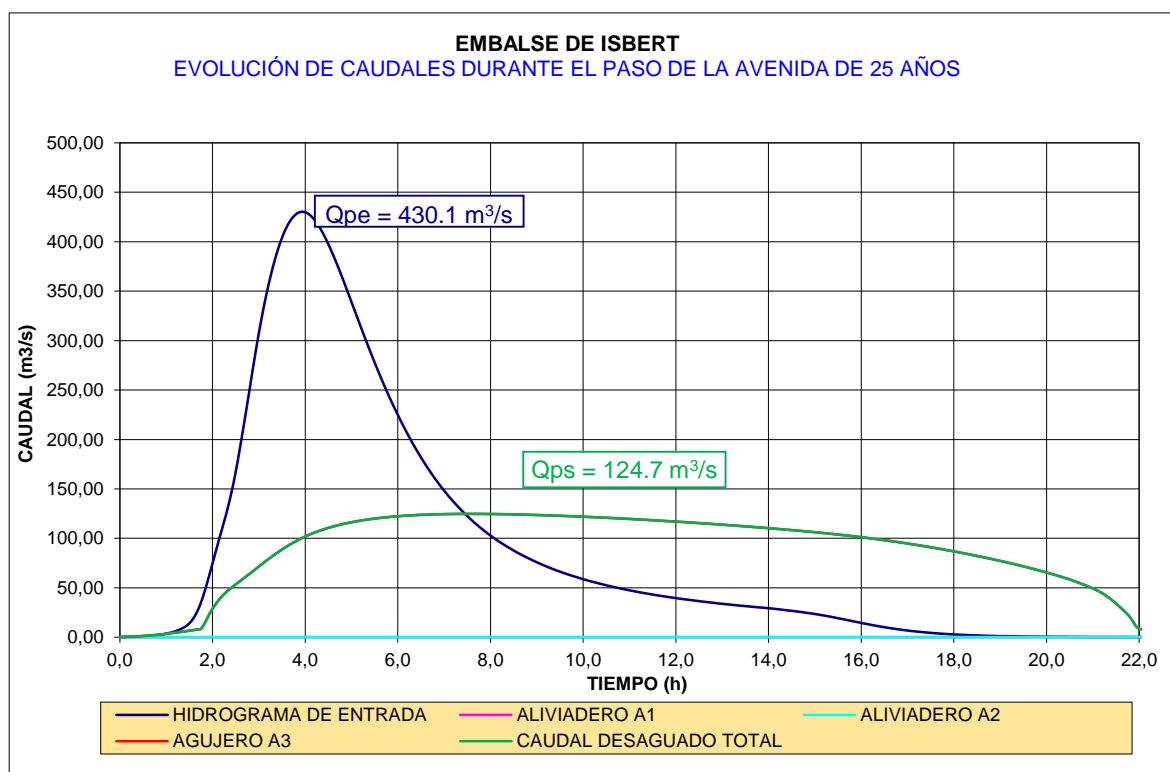
## 7.2.2. Gráficos de resultados

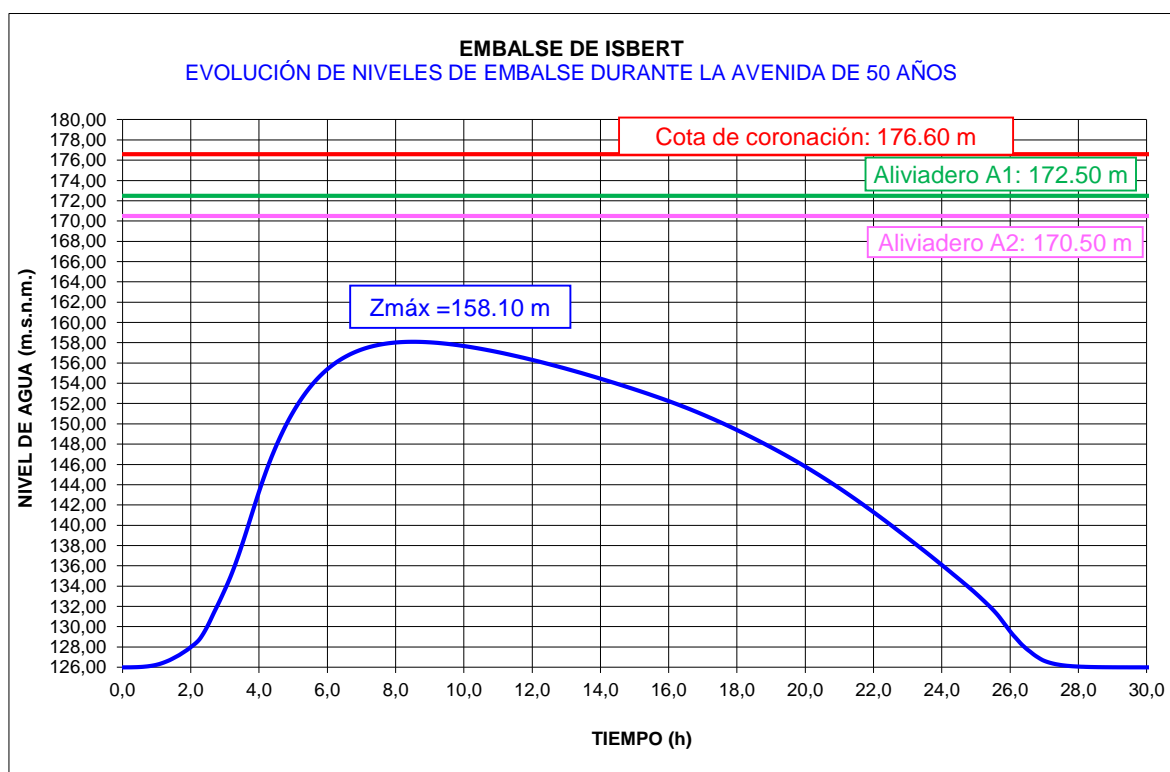
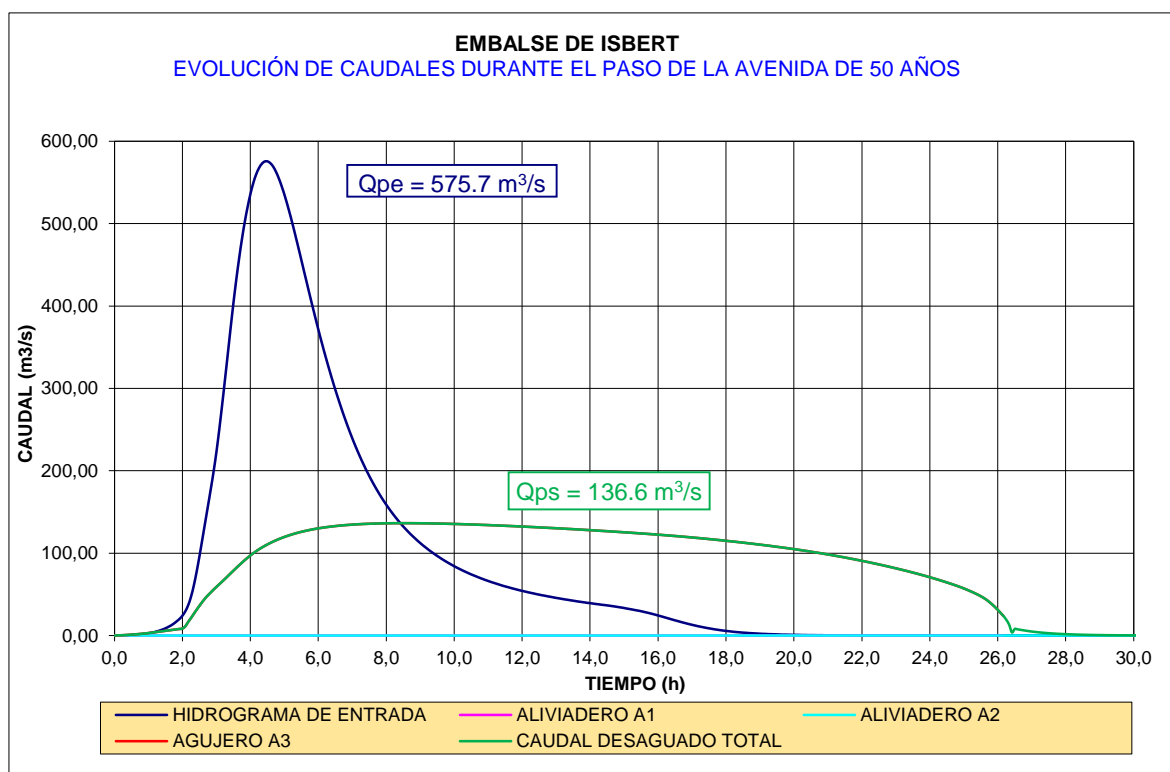
A continuación se adjuntan gráficos de evolución de niveles y de caudales más representativos de los cálculos realizados, con los hidrogramas obtenidos mediante hietograma simétrico:

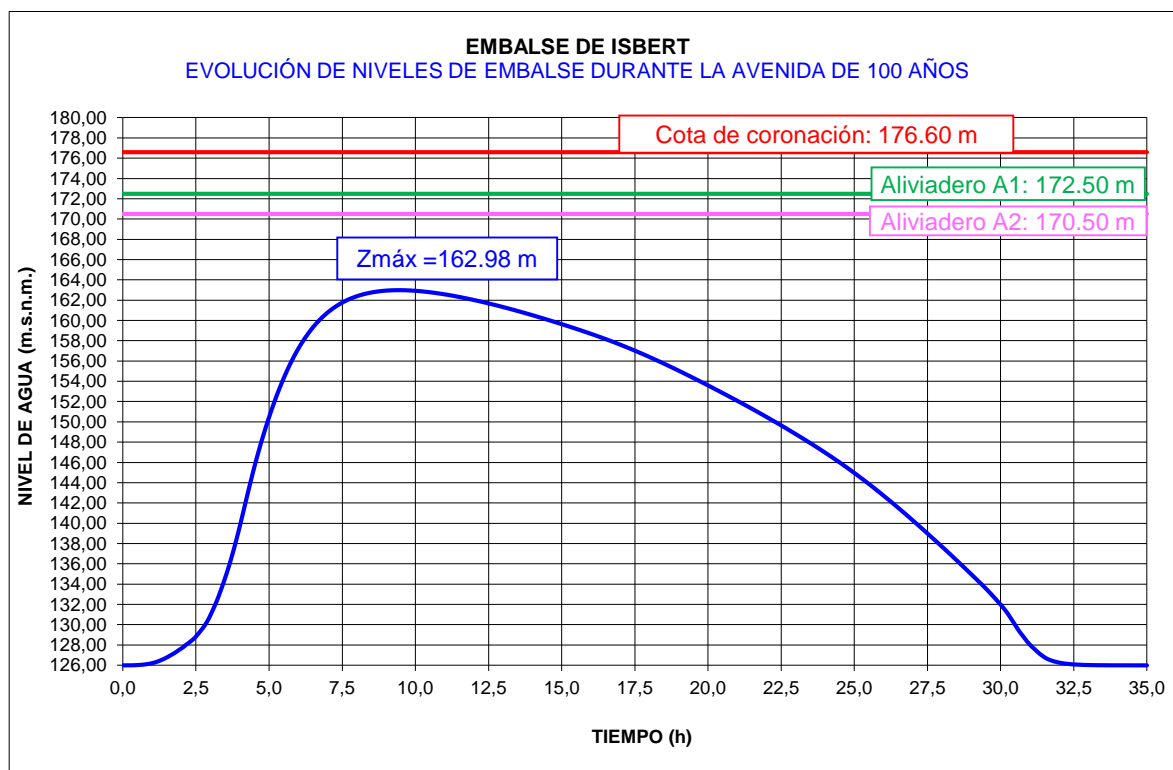
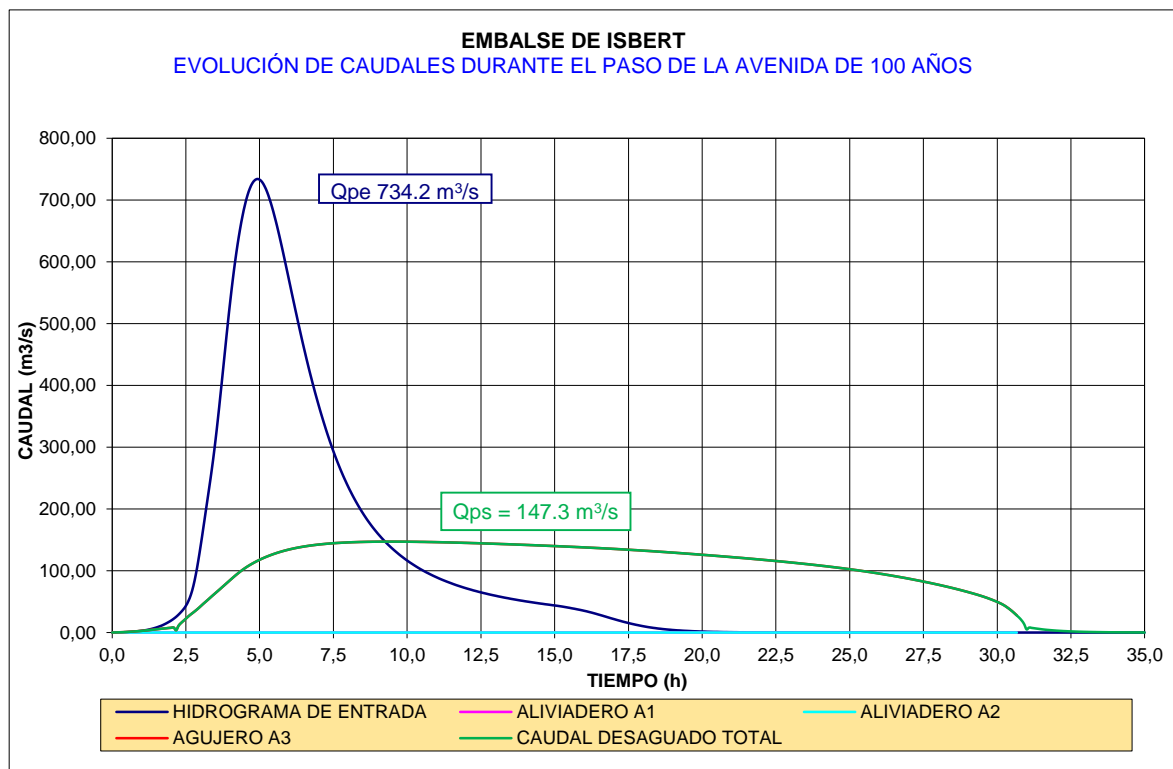


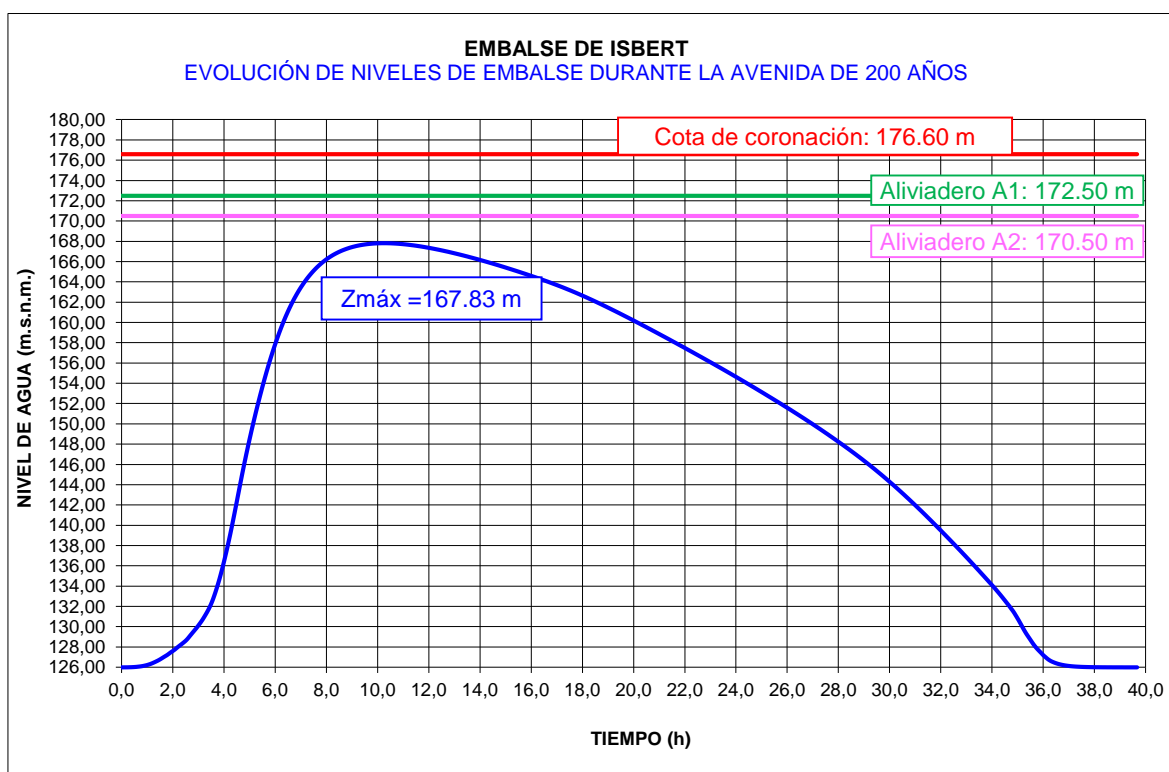
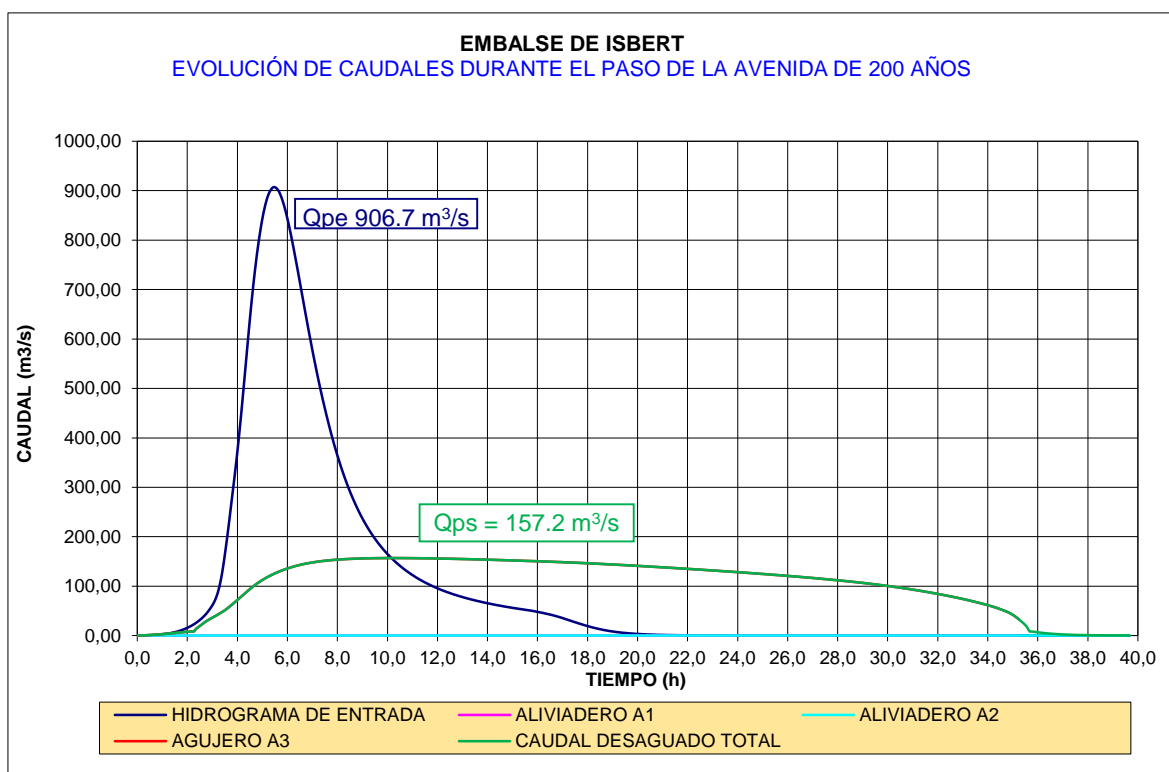


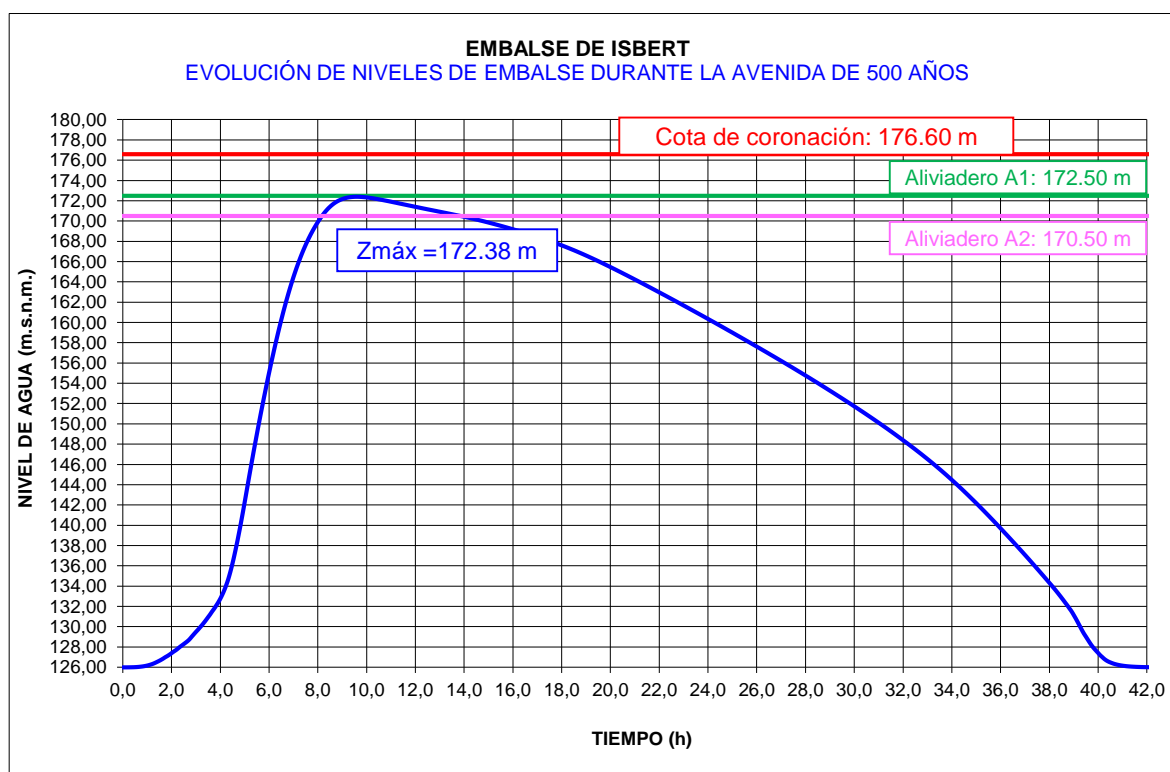
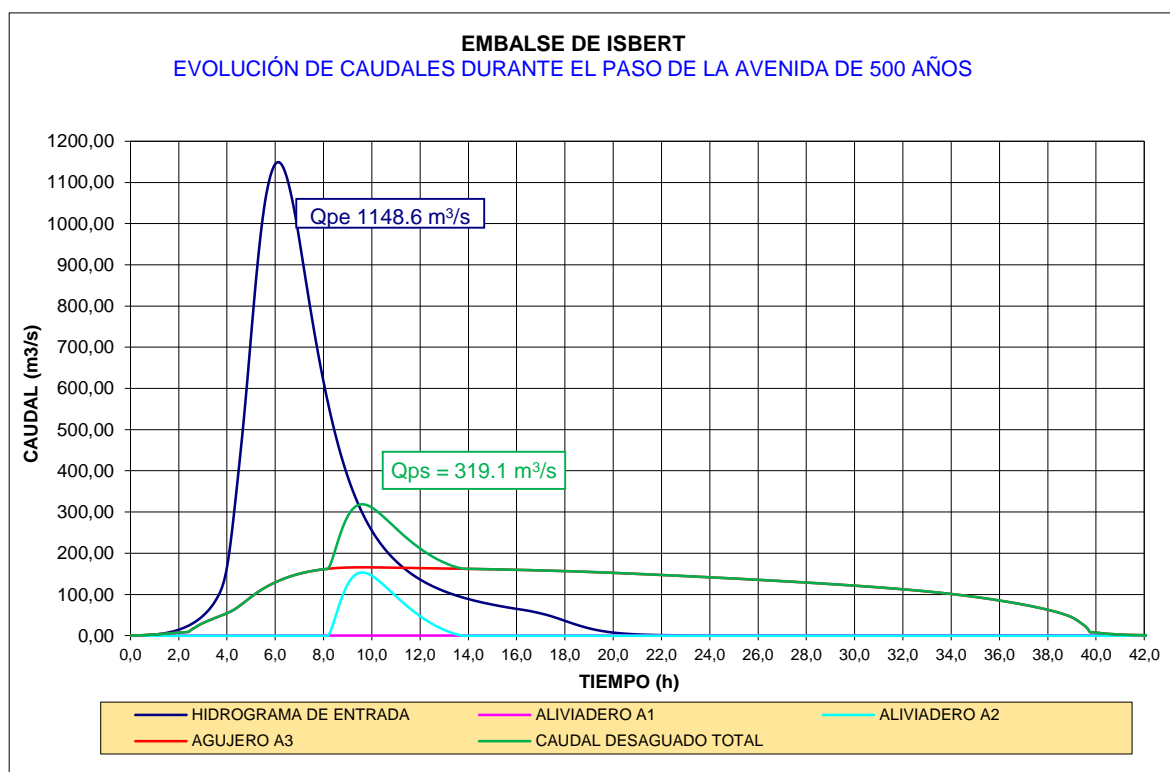


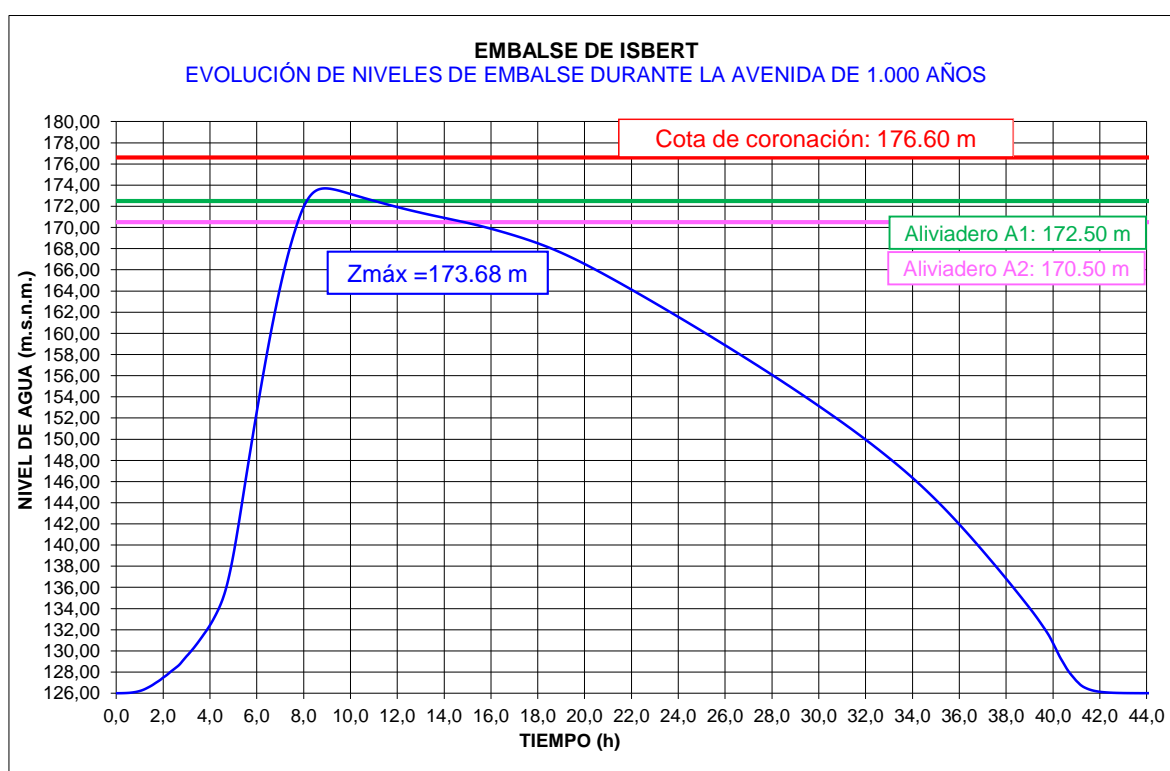
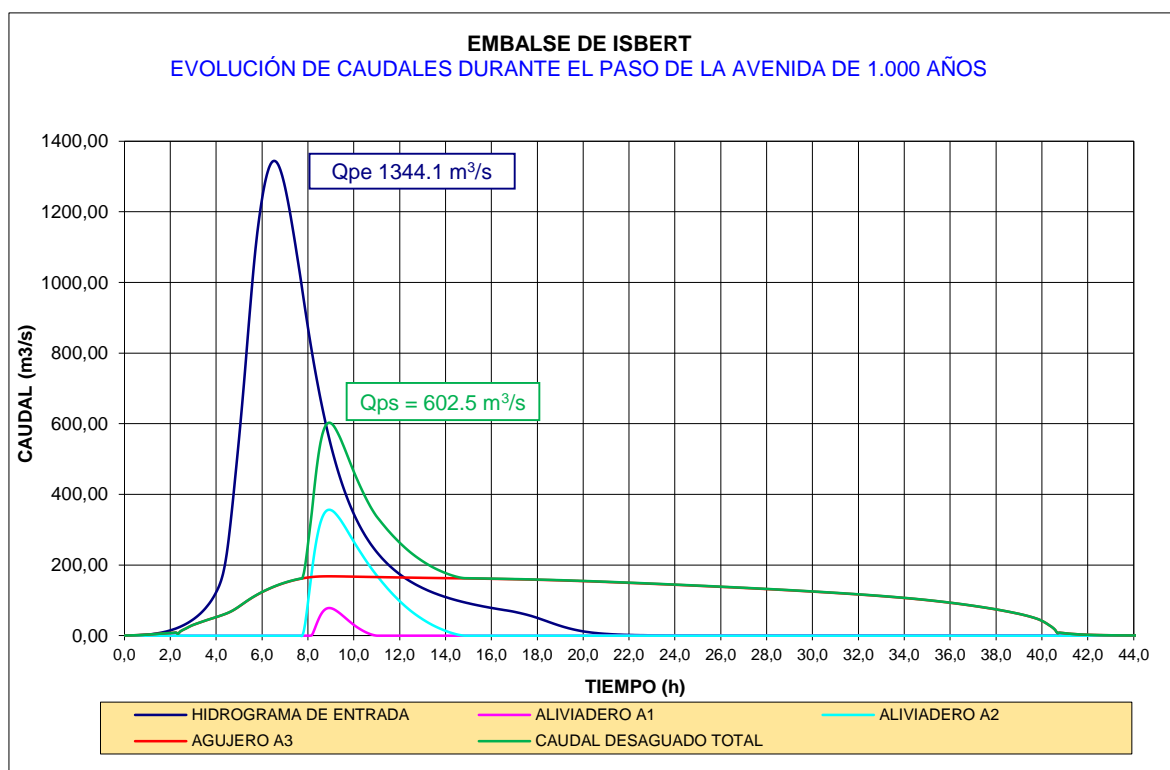


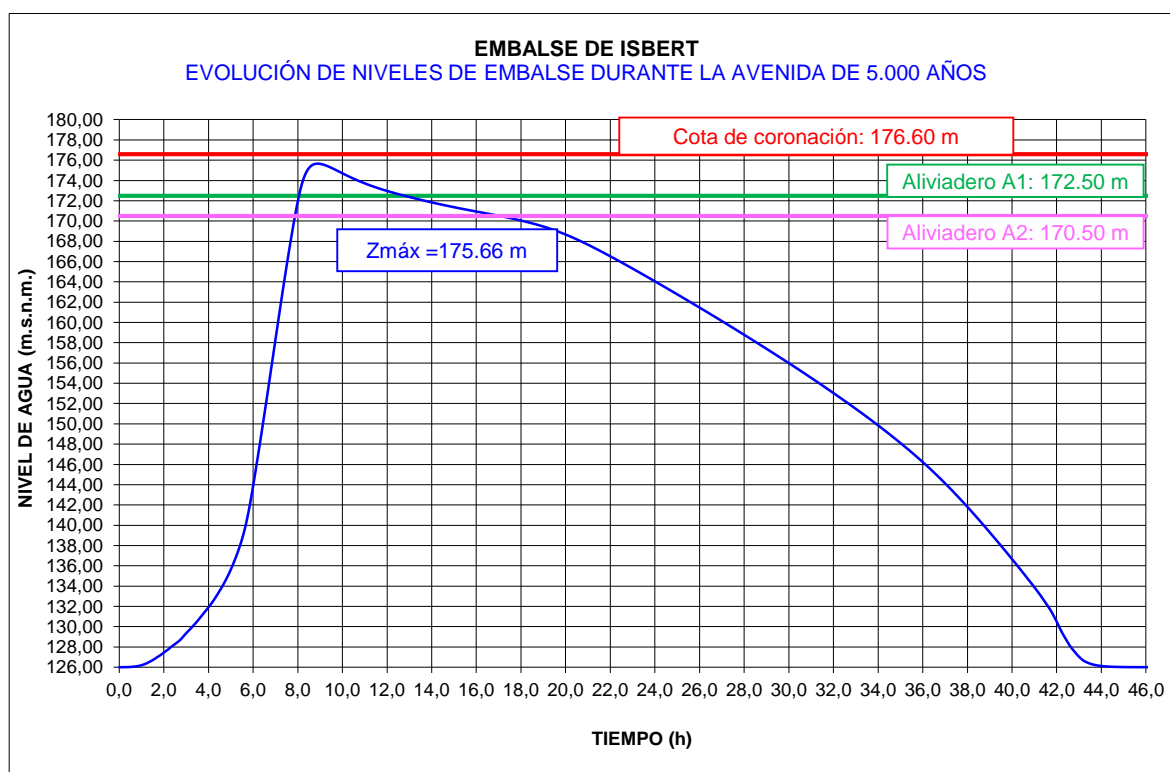
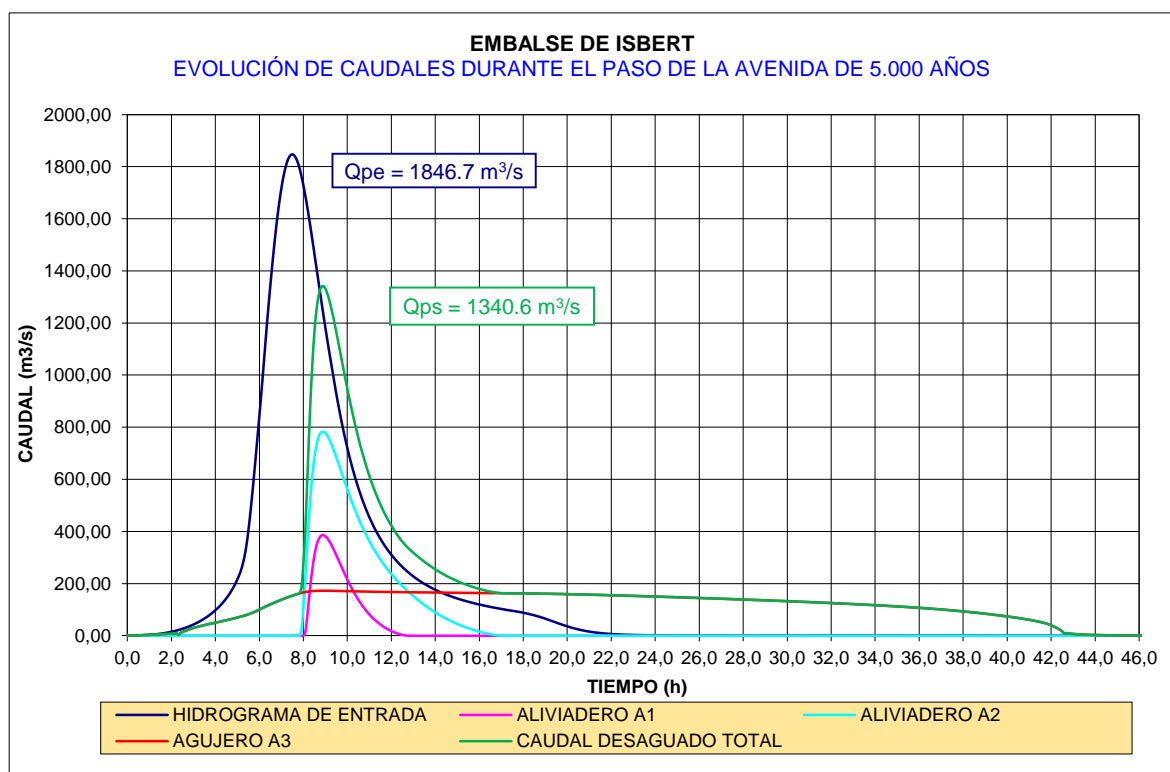














## 8. Comprobación de resguardos

La sobreelevación producida por una crecida da lugar a dos efectos: el directo, de mayor nivel, con el posible riesgo de sobrepasar la coronación y verter sobre ella; y el incremento del empuje hidrostático, que crece con el cuadrado de la altura.

El Artículo 13º del Reglamento sobre Seguridad de Presas y Embalses relativo a los resguardos, los define como la diferencia de nivel entre el agua embalsada en una situación concreta y la coronación de la presa, siendo esta última cota la más elevada de la estructura resistente del cuerpo de la presa. Posteriormente define los resguardos para las dos situaciones principales del embalse:

- Resguardo Normal. Es el relativo al Nivel Máximo Normal (NMN). Este resguardo, además de ser suficiente para el desagüe de las avenidas, será igual o superior a las sobreelevaciones producidas por los oleajes máximos, incluyendo los debidos a los efectos sísmicos.
- Resguardo Mínimo. Es el relativo al Nivel para la Avenida de Proyecto (NAP). Este resguardo será igual o superior a las sobreelevaciones producidas por los oleajes en situaciones de avenida y para su determinación se tendrá en cuenta el desagüe de la avenida extrema.

Se ha procedido a calcular cuáles son los resguardos existentes en la presa proyectada, dados los niveles característicos de embalse obtenidos de la simulación del paso de las avenidas de proyecto y extrema y la cota de coronación.

| Nivel característico de embalse | Cota de coronación | Resguardo |
|---------------------------------|--------------------|-----------|
| N.M.N. = 126.00 m               | 176.60 m.          | 50.60 m   |
| N.A.P. = 173.68 m               |                    | 2.92 m    |
| N.A.E. = 175.66 m               |                    | 0.94 m    |

Tabla 17: Resguardos existentes para cada uno de los niveles de embalse.

Se calcula la altura de ola generada por el viento en el embalse mediante la fórmula de Stevenson:

$$A = 0.76 + 0.34 \times F^{0.50} - 0.26 \times F^{0.25} = 0.898 \text{ m.}, \text{ en donde } F \text{ es el Fetch en km, de valor } 1.6 \text{ km.}$$

La altura de ola a considerar, debe tener en cuenta el impacto contra el paramento (mayoración de 4/3 de A) y la escasa probabilidad de que la ola coincida temporalmente con un episodio de avenida (minoración de 0,70 de la anterior).

$$h_{OLA}(N.M.N.) = \frac{4}{3} \times A = 1.197 \text{ m}$$

$$h_{OLA}(N.A.P.) = 0.7 \times h(N.M.N.) = 0.838 \text{ m}$$

Finalmente, para el caso de una presa de fábrica, durante el paso de la avenida extrema, se permite el sobrevertido accidental por la acción del oleaje, por lo que el resguardo mínimo es nulo.

La comprobación del nivel de coronación ha de verificar según la Guía Técnica en Presas de hormigón lo siguiente:

- $NC > NMN + h_{OLA}(NMN)$
- $NC > NAP + h_{OLA}(NAP)$
- $NC > NAE$

Con los datos de niveles de embalse y sobreelevaciones de ola, hacemos las comprobaciones anteriores y tenemos que:

- |   |  |        |
|---|--|--------|
| - | $NMN + h_{OLA}(NMN) = 126.00 + 1.197 = 125.197 < 176.60$ | Cumple |
| - | $NAP + h_{OLA}(NAP) = 173.68 + 0.838 = 174.518 < 176.60$ | Cumple |
| - | $NAE = 175.66 < 176.60$                                  | Cumple |

Los resguardos resultantes son, por tanto, adecuados.

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## **Apéndice 1. Listado de cálculos de laminación**

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## Laminación de avenida T = 2 años

| TIEMPO  |           | CAUDAL ENTRADA | COTA DE EMBALSE |
|---------|-----------|----------------|-----------------|
| [horas] | [minutos] | [m³/s]         | [m.s.n.m.]      |
| 0.0     | 0         | 0.00           | 126.000         |
| 0.1     | 5         | 0.10           | 126.001         |
| 0.2     | 10        | 0.30           | 126.004         |
| 0.3     | 15        | 0.80           | 126.014         |
| 0.3     | 20        | 1.50           | 126.039         |
| 0.4     | 25        | 2.50           | 126.088         |
| 0.5     | 30        | 3.60           | 126.168         |
| 0.6     | 35        | 4.60           | 126.284         |
| 0.7     | 40        | 5.60           | 126.432         |
| 0.8     | 45        | 6.50           | 126.591         |
| 0.8     | 50        | 7.30           | 126.748         |
| 0.9     | 55        | 8.00           | 126.904         |
| 1.0     | 60        | 8.70           | 127.044         |
| 1.1     | 65        | 9.30           | 127.159         |
| 1.2     | 70        | 10.10          | 127.274         |
| 1.3     | 75        | 10.90          | 127.389         |
| 1.3     | 80        | 12.00          | 127.506         |
| 1.4     | 85        | 13.20          | 127.598         |
| 1.5     | 90        | 14.90          | 127.703         |
| 1.6     | 95        | 16.90          | 127.826         |
| 1.7     | 100       | 19.60          | 127.974         |
| 1.8     | 105       | 22.60          | 128.119         |
| 1.8     | 110       | 25.70          | 128.275         |
| 1.9     | 115       | 29.00          | 128.447         |
| 2.0     | 120       | 32.00          | 128.633         |
| 2.1     | 125       | 34.60          | 128.862         |
| 2.2     | 130       | 36.90          | 129.109         |
| 2.3     | 135       | 38.80          | 129.339         |
| 2.3     | 140       | 40.60          | 129.546         |
| 2.4     | 145       | 42.00          | 129.724         |
| 2.5     | 150       | 43.20          | 129.897         |
| 2.6     | 155       | 44.20          | 130.054         |
| 2.7     | 160       | 44.90          | 130.193         |
| 2.8     | 165       | 45.50          | 130.326         |
| 2.8     | 170       | 45.80          | 130.453         |
| 2.9     | 175       | 46.00          | 130.562         |
| 3.0     | 180       | 46.10          | 130.658         |
| 3.1     | 185       | 46.00          | 130.748         |
| 3.2     | 190       | 45.80          | 130.831         |
| 3.3     | 195       | 45.50          | 130.906         |
| 3.3     | 200       | 45.10          | 130.973         |
| 3.4     | 205       | 44.70          | 131.026         |
| 3.5     | 210       | 44.20          | 131.068         |
| 3.6     | 215       | 43.60          | 131.103         |
| 3.7     | 220       | 43.00          | 131.132         |
| 3.8     | 225       | 42.40          | 131.155         |
| 3.8     | 230       | 41.70          | 131.172         |
| 3.9     | 235       | 41.00          | 131.183         |
| 4.0     | 240       | 40.20          | 131.187         |
| 4.1     | 245       | 39.50          | 131.186         |
| 4.2     | 250       | 38.70          | 131.179         |
| 4.3     | 255       | 37.90          | 131.166         |
| 4.3     | 260       | 37.10          | 131.148         |
| 4.4     | 265       | 36.30          | 131.125         |
| 4.5     | 270       | 35.60          | 131.097         |
| 4.6     | 275       | 34.80          | 131.064         |
| 4.7     | 280       | 34.00          | 131.028         |
| 4.8     | 285       | 33.30          | 130.985         |
| 4.8     | 290       | 32.50          | 130.932         |
| 4.9     | 295       | 31.80          | 130.876         |
| 5.0     | 300       | 31.10          | 130.817         |
| 5.1     | 305       | 30.40          | 130.756         |
| 5.2     | 310       | 29.70          | 130.694         |
| 5.3     | 315       | 29.00          | 130.629         |
| 5.3     | 320       | 28.40          | 130.564         |
| 5.4     | 325       | 27.70          | 130.496         |
| 5.5     | 330       | 27.10          | 130.418         |
| 5.6     | 335       | 26.50          | 130.342         |
| 5.7     | 340       | 25.90          | 130.266         |
| 5.8     | 345       | 25.30          | 130.192         |
| 5.8     | 350       | 24.80          | 130.119         |
| 5.9     | 355       | 24.20          | 130.048         |
| 6.0     | 360       | 23.70          | 129.974         |
| 6.1     | 365       | 23.20          | 129.897         |

| CAUDALES DE SALIDA [m³/s] |               |            |       | INCREMENTO DE VOLUMEN | VOLUMEN DE EMBALSE |
|---------------------------|---------------|------------|-------|-----------------------|--------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL | [m³]                  | [m³]               |
| 0.00                      | 0.00          | 0.00       | 0.00  | -                     | 0                  |
| 0.00                      | 0.00          | 0.19       | 0.19  | 3.08                  | 3                  |
| 0.00                      | 0.00          | 0.38       | 0.38  | 17.85                 | 21                 |
| 0.00                      | 0.00          | 0.71       | 0.71  | 58.81                 | 80                 |
| 0.00                      | 0.00          | 1.19       | 1.19  | 144.68                | 224                |
| 0.00                      | 0.00          | 1.78       | 1.78  | 283.65                | 508                |
| 0.00                      | 0.00          | 2.46       | 2.46  | 465.83                | 974                |
| 0.00                      | 0.00          | 3.20       | 3.20  | 669.48                | 1643               |
| 0.00                      | 0.00          | 3.95       | 3.95  | 858.50                | 2502               |
| 0.00                      | 0.00          | 4.62       | 4.62  | 979.71                | 3482               |
| 0.00                      | 0.00          | 5.20       | 5.20  | 1017.04               | 4499               |
| 0.00                      | 0.00          | 5.72       | 5.72  | 1009.55               | 5508               |
| 0.00                      | 0.00          | 6.14       | 6.14  | 989.38                | 6498               |
| 0.00                      | 0.00          | 6.47       | 6.47  | 977.53                | 7475               |
| 0.00                      | 0.00          | 6.79       | 6.79  | 974.85                | 8450               |
| 0.00                      | 0.00          | 7.09       | 7.09  | 978.50                | 9429               |
| 0.00                      | 0.00          | 7.38       | 7.38  | 1010.85               | 10439              |
| 0.00                      | 0.00          | 7.60       | 7.60  | 1107.06               | 11546              |
| 0.00                      | 0.00          | 7.85       | 7.85  | 1264.83               | 12811              |
| 0.00                      | 0.00          | 8.12       | 8.12  | 1478.46               | 14290              |
| 0.00                      | 0.00          | 8.45       | 8.45  | 1777.60               | 16067              |
| 0.00                      | 0.00          | 8.59       | 8.59  | 2068.71               | 18136              |
| 0.00                      | 0.00          | 13.06      | 13.06 | 2310.31               | 20446              |
| 0.00                      | 0.00          | 16.65      | 16.65 | 2543.37               | 22990              |
| 0.00                      | 0.00          | 19.81      | 19.81 | 3031.34               | 26021              |
| 0.00                      | 0.00          | 23.12      | 23.12 | 3856.86               | 29878              |
| 0.00                      | 0.00          | 26.23      | 26.23 | 4456.95               | 34335              |
| 0.00                      | 0.00          | 28.82      | 28.82 | 4451.38               | 38786              |
| 0.00                      | 0.00          | 30.96      | 30.96 | 4160.33               | 42947              |
| 0.00                      | 0.00          | 32.70      | 32.70 | 3987.65               | 46934              |
| 0.00                      | 0.00          | 34.30      | 34.30 | 3875.24               | 50809              |
| 0.00                      | 0.00          | 35.69      | 35.69 | 3734.52               | 54544              |
| 0.00                      | 0.00          | 36.88      | 36.88 | 3614.01               | 58158              |
| 0.00                      | 0.00          | 37.98      | 37.98 | 3484.12               | 61642              |
| 0.00                      | 0.00          | 39.00      | 39.00 | 3306.08               | 64948              |
| 0.00                      | 0.00          | 39.86      | 39.86 | 3115.57               | 68064              |
| 0.00                      | 0.00          | 40.60      | 40.60 | 2932.87               | 70997              |
| 0.00                      | 0.00          | 41.28      | 41.28 | 2736.35               | 73733              |
| 0.00                      | 0.00          | 41.90      | 41.90 | 2516.28               | 76249              |
| 0.00                      | 0.00          | 42.45      | 42.45 | 2278.55               | 78528              |
| 0.00                      | 0.00          | 42.94      | 42.94 | 2029.62               | 80557              |
| 0.00                      | 0.00          | 43.32      | 43.32 | 1785.11               | 82343              |
| 0.00                      | 0.00          | 43.62      | 43.62 | 1554.07               | 83897              |
| 0.00                      | 0.00          | 43.87      | 43.87 | 1325.80               | 85222              |
| 0.00                      | 0.00          | 44.07      | 44.07 | 1093.62               | 86316              |
| 0.00                      | 0.00          | 44.23      | 44.23 | 859.27                | 87175              |
| 0.00                      | 0.00          | 44.35      | 44.35 | 625.30                | 87801              |
| 0.00                      | 0.00          | 44.43      | 44.43 | 394.18                | 88195              |
| 0.00                      | 0.00          | 44.46      | 44.46 | 167.24                | 88362              |
| 0.00                      | 0.00          | 44.45      | 44.45 | -54.15                | 88308              |
| 0.00                      | 0.00          | 44.40      | 44.40 | -268.76               | 88039              |
| 0.00                      | 0.00          | 44.31      | 44.31 | -475.74               | 87563              |
| 0.00                      | 0.00          | 44.18      | 44.18 | -673.80               | 86890              |
| 0.00                      | 0.00          | 44.02      | 44.02 | -861.86               | 86028              |
| 0.00                      | 0.00          | 43.83      | 43.83 | -1039.35              | 84988              |
| 0.00                      | 0.00          | 43.59      | 43.59 | -1205.84              | 83783              |
| 0.00                      | 0.00          | 43.33      | 43.33 | -1361.28              | 82421              |
| 0.00                      | 0.00          | 43.03      | 43.03 | -1500.95              | 80920              |
| 0.00                      | 0.00          | 42.64      | 42.64 | -1612.95              | 79307              |
| 0.00                      | 0.00          | 42.23      | 42.23 | -1702.05              | 77605              |
| 0.00                      | 0.00          | 41.80      | 41.80 | -1780.44              | 75825              |
| 0.00                      | 0.00          | 41.34      | 41.34 | -1848.63              | 73976              |
| 0.00                      | 0.00          | 40.87      | 40.87 | -1907.33              | 72069              |
| 0.00                      | 0.00          | 40.38      | 40.38 | -1957.33              | 70112              |
| 0.00                      | 0.00          | 39.88      | 39.88 | -1999.04              | 68113              |
| 0.00                      | 0.00          | 39.34      | 39.34 | -2031.48              | 66081              |
| 0.00                      | 0.00          | 38.72      | 38.72 | -2030.65              | 64050              |
| 0.00                      | 0.00          | 38.11      | 38.11 | -2000.79              | 62050              |
| 0.00                      | 0.00          | 37.49      | 37.49 | -1969.29              | 60080              |
| 0.00                      | 0.00          | 36.87      | 36.87 | -1936.44              | 58144              |
| 0.00                      | 0.00          | 36.25      | 36.25 | -1902.32              | 56242              |
| 0.00                      | 0.00          | 35.64      | 35.64 | -1867.00              | 54375              |
| 0.00                      | 0.00          | 34.99      | 34.99 | -1819.45              | 52555              |
| 0.00                      | 0.00          | 34.30      | 34.30 | -1738.38              | 50817              |

## Laminación de avenida T = 2 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 6.2     | 370       | 22.70             | 129.824            |
| 6.3     | 375       | 22.20             | 129.755            |
| 6.3     | 380       | 21.80             | 129.689            |
| 6.4     | 385       | 21.30             | 129.627            |
| 6.5     | 390       | 20.90             | 129.567            |
| 6.6     | 395       | 20.40             | 129.510            |
| 6.7     | 400       | 20.00             | 129.450            |
| 6.8     | 405       | 19.60             | 129.395            |
| 6.8     | 410       | 19.20             | 129.345            |
| 6.9     | 415       | 18.80             | 129.300            |
| 7.0     | 420       | 18.40             | 129.259            |
| 7.1     | 425       | 18.10             | 129.220            |
| 7.2     | 430       | 17.70             | 129.184            |
| 7.3     | 435       | 17.40             | 129.151            |
| 7.3     | 440       | 17.00             | 129.119            |
| 7.4     | 445       | 16.70             | 129.089            |
| 7.5     | 450       | 16.40             | 129.061            |
| 7.6     | 455       | 16.10             | 129.034            |
| 7.7     | 460       | 15.80             | 129.008            |
| 7.8     | 465       | 15.50             | 128.978            |
| 7.8     | 470       | 15.20             | 128.943            |
| 7.9     | 475       | 14.90             | 128.903            |
| 8.0     | 480       | 14.70             | 128.858            |
| 8.1     | 485       | 14.40             | 128.809            |
| 8.2     | 490       | 14.20             | 128.754            |
| 8.3     | 495       | 13.90             | 128.695            |
| 8.3     | 500       | 13.70             | 128.631            |
| 8.4     | 505       | 13.40             | 128.564            |
| 8.5     | 510       | 13.20             | 128.492            |
| 8.6     | 515       | 13.00             | 128.418            |
| 8.7     | 520       | 12.80             | 128.359            |
| 8.8     | 525       | 12.60             | 128.310            |
| 8.8     | 530       | 12.40             | 128.270            |
| 8.9     | 535       | 12.20             | 128.237            |
| 9.0     | 540       | 12.00             | 128.208            |
| 9.1     | 545       | 11.80             | 128.183            |
| 9.2     | 550       | 11.60             | 128.161            |
| 9.3     | 555       | 11.50             | 128.141            |
| 9.3     | 560       | 11.30             | 128.123            |
| 9.4     | 565       | 11.10             | 128.106            |
| 9.5     | 570       | 11.00             | 128.091            |
| 9.6     | 575       | 10.80             | 128.076            |
| 9.7     | 580       | 10.70             | 128.062            |
| 9.8     | 585       | 10.50             | 128.049            |
| 9.8     | 590       | 10.40             | 128.037            |
| 9.9     | 595       | 10.20             | 128.024            |
| 10.0    | 600       | 10.10             | 128.013            |
| 10.1    | 605       | 9.90              | 128.001            |
| 10.2    | 610       | 9.80              | 127.987            |
| 10.3    | 615       | 9.70              | 127.972            |
| 10.3    | 620       | 9.50              | 127.956            |
| 10.4    | 625       | 9.40              | 127.939            |
| 10.5    | 630       | 9.30              | 127.922            |
| 10.6    | 635       | 9.20              | 127.904            |
| 10.7    | 640       | 9.00              | 127.887            |
| 10.8    | 645       | 8.90              | 127.869            |
| 10.8    | 650       | 8.80              | 127.850            |
| 10.9    | 655       | 8.70              | 127.832            |
| 11.0    | 660       | 8.60              | 127.814            |
| 11.1    | 665       | 8.50              | 127.796            |
| 11.2    | 670       | 8.40              | 127.778            |
| 11.3    | 675       | 8.30              | 127.761            |
| 11.3    | 680       | 8.20              | 127.743            |
| 11.4    | 685       | 8.10              | 127.726            |
| 11.5    | 690       | 8.00              | 127.709            |
| 11.6    | 695       | 7.90              | 127.692            |
| 11.7    | 700       | 7.80              | 127.675            |
| 11.8    | 705       | 7.70              | 127.659            |
| 11.8    | 710       | 7.60              | 127.643            |
| 11.9    | 715       | 7.50              | 127.627            |
| 12.0    | 720       | 7.40              | 127.611            |
| 12.1    | 725       | 7.40              | 127.596            |
| 12.2    | 730       | 7.30              | 127.581            |
| 12.3    | 735       | 7.20              | 127.566            |

| CAUDALES DE SALIDA [m3/s] |               |            |       | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|-------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 33.63      | 33.63 | -1640.57                 | 49176                 |
| 0.00                      | 0.00          | 32.99      | 32.99 | -1552.38                 | 47624                 |
| 0.00                      | 0.00          | 32.36      | 32.36 | -1472.93                 | 46151                 |
| 0.00                      | 0.00          | 31.76      | 31.76 | -1401.48                 | 44749                 |
| 0.00                      | 0.00          | 31.17      | 31.17 | -1336.55                 | 43413                 |
| 0.00                      | 0.00          | 30.60      | 30.60 | -1276.85                 | 42136                 |
| 0.00                      | 0.00          | 29.99      | 29.99 | -1187.98                 | 40948                 |
| 0.00                      | 0.00          | 29.41      | 29.41 | -1070.38                 | 39878                 |
| 0.00                      | 0.00          | 28.88      | 28.88 | -965.64                  | 38912                 |
| 0.00                      | 0.00          | 28.39      | 28.39 | -878.86                  | 38033                 |
| 0.00                      | 0.00          | 27.94      | 27.94 | -806.48                  | 37227                 |
| 0.00                      | 0.00          | 27.51      | 27.51 | -745.66                  | 36481                 |
| 0.00                      | 0.00          | 27.10      | 27.10 | -694.15                  | 35787                 |
| 0.00                      | 0.00          | 26.72      | 26.72 | -650.22                  | 35137                 |
| 0.00                      | 0.00          | 26.34      | 26.34 | -612.37                  | 34524                 |
| 0.00                      | 0.00          | 25.99      | 25.99 | -579.39                  | 33945                 |
| 0.00                      | 0.00          | 25.65      | 25.65 | -550.48                  | 33394                 |
| 0.00                      | 0.00          | 25.32      | 25.32 | -524.93                  | 32869                 |
| 0.00                      | 0.00          | 25.00      | 25.00 | -502.22                  | 32367                 |
| 0.00                      | 0.00          | 24.63      | 24.63 | -518.79                  | 31848                 |
| 0.00                      | 0.00          | 24.18      | 24.18 | -589.58                  | 31259                 |
| 0.00                      | 0.00          | 23.66      | 23.66 | -675.44                  | 30583                 |
| 0.00                      | 0.00          | 23.07      | 23.07 | -758.97                  | 29824                 |
| 0.00                      | 0.00          | 22.40      | 22.40 | -840.25                  | 28984                 |
| 0.00                      | 0.00          | 21.62      | 21.62 | -919.27                  | 28065                 |
| 0.00                      | 0.00          | 20.76      | 20.76 | -996.11                  | 27069                 |
| 0.00                      | 0.00          | 19.78      | 19.78 | -1070.74                 | 25998                 |
| 0.00                      | 0.00          | 18.70      | 18.70 | -1143.15                 | 24855                 |
| 0.00                      | 0.00          | 17.47      | 17.47 | -1195.94                 | 23659                 |
| 0.00                      | 0.00          | 16.10      | 16.10 | -1091.70                 | 22567                 |
| 0.00                      | 0.00          | 14.92      | 14.92 | -878.33                  | 21689                 |
| 0.00                      | 0.00          | 13.87      | 13.87 | -716.34                  | 20973                 |
| 0.00                      | 0.00          | 12.94      | 12.94 | -593.02                  | 20380                 |
| 0.00                      | 0.00          | 12.12      | 12.12 | -498.77                  | 19881                 |
| 0.00                      | 0.00          | 11.36      | 11.36 | -426.49                  | 19454                 |
| 0.00                      | 0.00          | 10.65      | 10.65 | -370.79                  | 19084                 |
| 0.00                      | 0.00          | 9.99       | 9.99  | -327.66                  | 18756                 |
| 0.00                      | 0.00          | 9.35       | 9.35  | -294.04                  | 18462                 |
| 0.00                      | 0.00          | 8.73       | 8.73  | -267.59                  | 18194                 |
| 0.00                      | 0.00          | 8.11       | 8.11  | -246.50                  | 17948                 |
| 0.00                      | 0.00          | 7.51       | 7.51  | -229.55                  | 17718                 |
| 0.00                      | 0.00          | 6.87       | 6.87  | -215.75                  | 17502                 |
| 0.00                      | 0.00          | 6.20       | 6.20  | -204.38                  | 17298                 |
| 0.00                      | 0.00          | 5.51       | 5.51  | -194.90                  | 17103                 |
| 0.00                      | 0.00          | 4.79       | 4.79  | -186.84                  | 16916                 |
| 0.00                      | 0.00          | 3.86       | 3.86  | -179.81                  | 16736                 |
| 0.00                      | 0.00          | 2.84       | 2.84  | -173.60                  | 16563                 |
| 0.00                      | 0.00          | 8.50       | 8.50  | -168.00                  | 16395                 |
| 0.00                      | 0.00          | 8.47       | 8.47  | -171.27                  | 16224                 |
| 0.00                      | 0.00          | 8.44       | 8.44  | -183.04                  | 16041                 |
| 0.00                      | 0.00          | 8.41       | 8.41  | -193.37                  | 15847                 |
| 0.00                      | 0.00          | 8.37       | 8.37  | -201.31                  | 15646                 |
| 0.00                      | 0.00          | 8.33       | 8.33  | -207.27                  | 15439                 |
| 0.00                      | 0.00          | 8.30       | 8.30  | -211.58                  | 15227                 |
| 0.00                      | 0.00          | 8.26       | 8.26  | -214.57                  | 15012                 |
| 0.00                      | 0.00          | 8.22       | 8.22  | -216.47                  | 14796                 |
| 0.00                      | 0.00          | 8.18       | 8.18  | -217.41                  | 14579                 |
| 0.00                      | 0.00          | 8.14       | 8.14  | -217.55                  | 14361                 |
| 0.00                      | 0.00          | 8.10       | 8.10  | -217.03                  | 14144                 |
| 0.00                      | 0.00          | 8.06       | 8.06  | -215.96                  | 13928                 |
| 0.00                      | 0.00          | 8.02       | 8.02  | -214.45                  | 13714                 |
| 0.00                      | 0.00          | 7.98       | 7.98  | -212.59                  | 13501                 |
| 0.00                      | 0.00          | 7.94       | 7.94  | -210.41                  | 13291                 |
| 0.00                      | 0.00          | 7.90       | 7.90  | -207.94                  | 13083                 |
| 0.00                      | 0.00          | 7.86       | 7.86  | -205.27                  | 12877                 |
| 0.00                      | 0.00          | 7.82       | 7.82  | -202.45                  | 12675                 |
| 0.00                      | 0.00          | 7.78       | 7.78  | -199.53                  | 12475                 |
| 0.00                      | 0.00          | 7.74       | 7.74  | -196.54                  | 12279                 |
| 0.00                      | 0.00          | 7.71       | 7.71  | -193.48                  | 12085                 |
| 0.00                      | 0.00          | 7.67       | 7.67  | -190.37                  | 11895                 |
| 0.00                      | 0.00          | 7.63       | 7.63  | -187.24                  | 11708                 |
| 0.00                      | 0.00          | 7.59       | 7.59  | -184.14                  | 11524                 |
| 0.00                      | 0.00          | 7.56       | 7.56  | -181.13                  | 11343                 |
| 0.00                      | 0.00          | 7.52       | 7.52  | -178.18                  | 11164                 |

## Laminación de avenida T = 2 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 12.3    | 740       | 7.10              | 127.552            |
| 12.4    | 745       | 7.00              | 127.537            |
| 12.5    | 750       | 6.90              | 127.523            |
| 12.6    | 755       | 6.80              | 127.509            |
| 12.7    | 760       | 6.70              | 127.493            |
| 12.8    | 765       | 6.60              | 127.473            |
| 12.8    | 770       | 6.50              | 127.454            |
| 12.9    | 775       | 6.40              | 127.434            |
| 13.0    | 780       | 6.30              | 127.415            |
| 13.1    | 785       | 6.20              | 127.397            |
| 13.2    | 790       | 6.10              | 127.378            |
| 13.3    | 795       | 6.00              | 127.360            |
| 13.3    | 800       | 5.90              | 127.341            |
| 13.4    | 805       | 5.80              | 127.324            |
| 13.5    | 810       | 5.70              | 127.306            |
| 13.6    | 815       | 5.60              | 127.288            |
| 13.7    | 820       | 5.50              | 127.271            |
| 13.8    | 825       | 5.30              | 127.253            |
| 13.8    | 830       | 5.20              | 127.235            |
| 13.9    | 835       | 5.10              | 127.216            |
| 14.0    | 840       | 4.90              | 127.196            |
| 14.1    | 845       | 4.70              | 127.176            |
| 14.2    | 850       | 4.60              | 127.154            |
| 14.3    | 855       | 4.40              | 127.132            |
| 14.3    | 860       | 4.20              | 127.108            |
| 14.4    | 865       | 4.00              | 127.083            |
| 14.5    | 870       | 3.90              | 127.058            |
| 14.6    | 875       | 3.70              | 127.031            |
| 14.7    | 880       | 3.50              | 127.004            |
| 14.8    | 885       | 3.30              | 126.969            |
| 14.8    | 890       | 3.20              | 126.934            |
| 14.9    | 895       | 3.00              | 126.900            |
| 15.0    | 900       | 2.80              | 126.866            |
| 15.1    | 905       | 2.70              | 126.833            |
| 15.2    | 910       | 2.50              | 126.801            |
| 15.3    | 915       | 2.40              | 126.769            |
| 15.3    | 920       | 2.20              | 126.739            |
| 15.4    | 925       | 2.10              | 126.710            |
| 15.5    | 930       | 2.00              | 126.681            |
| 15.6    | 935       | 1.90              | 126.654            |
| 15.7    | 940       | 1.70              | 126.628            |
| 15.8    | 945       | 1.60              | 126.603            |
| 15.8    | 950       | 1.50              | 126.578            |
| 15.9    | 955       | 1.40              | 126.555            |
| 16.0    | 960       | 1.30              | 126.533            |
| 16.1    | 965       | 1.30              | 126.512            |
| 16.2    | 970       | 1.20              | 126.491            |
| 16.3    | 975       | 1.10              | 126.468            |
| 16.3    | 980       | 1.00              | 126.445            |
| 16.4    | 985       | 0.90              | 126.423            |
| 16.5    | 990       | 0.90              | 126.400            |
| 16.6    | 995       | 0.80              | 126.378            |
| 16.7    | 1000      | 0.80              | 126.357            |
| 16.8    | 1005      | 0.70              | 126.336            |
| 16.8    | 1010      | 0.70              | 126.316            |
| 16.9    | 1015      | 0.60              | 126.297            |
| 17.0    | 1020      | 0.60              | 126.279            |
| 17.1    | 1025      | 0.50              | 126.261            |
| 17.2    | 1030      | 0.50              | 126.245            |
| 17.3    | 1035      | 0.50              | 126.229            |
| 17.3    | 1040      | 0.40              | 126.214            |
| 17.4    | 1045      | 0.40              | 126.200            |
| 17.5    | 1050      | 0.40              | 126.187            |
| 17.6    | 1055      | 0.30              | 126.174            |
| 17.7    | 1060      | 0.30              | 126.163            |
| 17.8    | 1065      | 0.30              | 126.152            |
| 17.8    | 1070      | 0.30              | 126.141            |
| 17.9    | 1075      | 0.30              | 126.132            |
| 18.0    | 1080      | 0.20              | 126.122            |
| 18.1    | 1085      | 0.20              | 126.114            |
| 18.2    | 1090      | 0.20              | 126.106            |
| 18.3    | 1095      | 0.20              | 126.099            |
| 18.3    | 1100      | 0.20              | 126.092            |
| 18.4    | 1105      | 0.20              | 126.085            |

| CAUDALES DE SALIDA [m³/s] |               |            |       | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|-------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 7.49       | 7.49  | -175.27                  | 10989                 |
| 0.00                      | 0.00          | 7.45       | 7.45  | -172.64                  | 10816                 |
| 0.00                      | 0.00          | 7.42       | 7.42  | -170.80                  | 10646                 |
| 0.00                      | 0.00          | 7.39       | 7.39  | -170.18                  | 10475                 |
| 0.00                      | 0.00          | 7.35       | 7.35  | -169.64                  | 10306                 |
| 0.00                      | 0.00          | 7.30       | 7.30  | -166.97                  | 10139                 |
| 0.00                      | 0.00          | 7.25       | 7.25  | -163.81                  | 9975                  |
| 0.00                      | 0.00          | 7.20       | 7.20  | -162.13                  | 9813                  |
| 0.00                      | 0.00          | 7.15       | 7.15  | -161.00                  | 9652                  |
| 0.00                      | 0.00          | 7.11       | 7.11  | -159.80                  | 9492                  |
| 0.00                      | 0.00          | 7.06       | 7.06  | -158.20                  | 9334                  |
| 0.00                      | 0.00          | 7.01       | 7.01  | -156.24                  | 9178                  |
| 0.00                      | 0.00          | 6.96       | 6.96  | -153.89                  | 9024                  |
| 0.00                      | 0.00          | 6.92       | 6.92  | -151.60                  | 8872                  |
| 0.00                      | 0.00          | 6.87       | 6.87  | -149.93                  | 8722                  |
| 0.00                      | 0.00          | 6.82       | 6.82  | -149.29                  | 8573                  |
| 0.00                      | 0.00          | 6.78       | 6.78  | -149.86                  | 8423                  |
| 0.00                      | 0.00          | 6.73       | 6.73  | -151.78                  | 8271                  |
| 0.00                      | 0.00          | 6.68       | 6.68  | -155.09                  | 8116                  |
| 0.00                      | 0.00          | 6.63       | 6.63  | -159.88                  | 7956                  |
| 0.00                      | 0.00          | 6.57       | 6.57  | -166.11                  | 7790                  |
| 0.00                      | 0.00          | 6.52       | 6.52  | -173.63                  | 7617                  |
| 0.00                      | 0.00          | 6.46       | 6.46  | -182.10                  | 7435                  |
| 0.00                      | 0.00          | 6.40       | 6.40  | -191.18                  | 7243                  |
| 0.00                      | 0.00          | 6.33       | 6.33  | -200.40                  | 7043                  |
| 0.00                      | 0.00          | 6.26       | 6.26  | -209.34                  | 6834                  |
| 0.00                      | 0.00          | 6.18       | 6.18  | -217.58                  | 6616                  |
| 0.00                      | 0.00          | 6.10       | 6.10  | -224.77                  | 6391                  |
| 0.00                      | 0.00          | 6.02       | 6.02  | -230.68                  | 6161                  |
| 0.00                      | 0.00          | 5.92       | 5.92  | -231.60                  | 5929                  |
| 0.00                      | 0.00          | 5.81       | 5.81  | -227.61                  | 5701                  |
| 0.00                      | 0.00          | 5.70       | 5.70  | -222.98                  | 5478                  |
| 0.00                      | 0.00          | 5.59       | 5.59  | -218.25                  | 5260                  |
| 0.00                      | 0.00          | 5.49       | 5.49  | -213.23                  | 5047                  |
| 0.00                      | 0.00          | 5.38       | 5.38  | -207.86                  | 4839                  |
| 0.00                      | 0.00          | 5.27       | 5.27  | -202.11                  | 4637                  |
| 0.00                      | 0.00          | 5.17       | 5.17  | -196.02                  | 4441                  |
| 0.00                      | 0.00          | 5.07       | 5.07  | -189.67                  | 4251                  |
| 0.00                      | 0.00          | 4.96       | 4.96  | -183.13                  | 4068                  |
| 0.00                      | 0.00          | 4.86       | 4.86  | -176.45                  | 3892                  |
| 0.00                      | 0.00          | 4.76       | 4.76  | -169.71                  | 3722                  |
| 0.00                      | 0.00          | 4.67       | 4.67  | -162.95                  | 3559                  |
| 0.00                      | 0.00          | 4.57       | 4.57  | -156.21                  | 3403                  |
| 0.00                      | 0.00          | 4.48       | 4.48  | -149.49                  | 3253                  |
| 0.00                      | 0.00          | 4.39       | 4.39  | -142.86                  | 3110                  |
| 0.00                      | 0.00          | 4.30       | 4.30  | -136.34                  | 2974                  |
| 0.00                      | 0.00          | 4.21       | 4.21  | -131.70                  | 2842                  |
| 0.00                      | 0.00          | 4.11       | 4.11  | -131.15                  | 2711                  |
| 0.00                      | 0.00          | 4.01       | 4.01  | -132.01                  | 2579                  |
| 0.00                      | 0.00          | 3.91       | 3.91  | -131.45                  | 2448                  |
| 0.00                      | 0.00          | 3.80       | 3.80  | -129.74                  | 2318                  |
| 0.00                      | 0.00          | 3.70       | 3.70  | -127.10                  | 2191                  |
| 0.00                      | 0.00          | 3.59       | 3.59  | -123.74                  | 2067                  |
| 0.00                      | 0.00          | 3.48       | 3.48  | -119.80                  | 1947                  |
| 0.00                      | 0.00          | 3.38       | 3.38  | -115.47                  | 1832                  |
| 0.00                      | 0.00          | 3.28       | 3.28  | -110.82                  | 1721                  |
| 0.00                      | 0.00          | 3.18       | 3.18  | -105.98                  | 1615                  |
| 0.00                      | 0.00          | 3.07       | 3.07  | -101.05                  | 1514                  |
| 0.00                      | 0.00          | 2.98       | 2.98  | -96.08                   | 1418                  |
| 0.00                      | 0.00          | 2.88       | 2.88  | -91.13                   | 1327                  |
| 0.00                      | 0.00          | 2.78       | 2.78  | -86.24                   | 1241                  |
| 0.00                      | 0.00          | 2.69       | 2.69  | -81.46                   | 1159                  |
| 0.00                      | 0.00          | 2.60       | 2.60  | -76.83                   | 1082                  |
| 0.00                      | 0.00          | 2.51       | 2.51  | -72.33                   | 1010                  |
| 0.00                      | 0.00          | 2.43       | 2.43  | -68.02                   | 942                   |
| 0.00                      | 0.00          | 2.34       | 2.34  | -63.89                   | 878                   |
| 0.00                      | 0.00          | 2.26       | 2.26  | -59.95                   | 818                   |
| 0.00                      | 0.00          | 2.18       | 2.18  | -56.20                   | 762                   |
| 0.00                      | 0.00          | 2.10       | 2.10  | -52.64                   | 709                   |
| 0.00                      | 0.00          | 2.03       | 2.03  | -49.27                   | 660                   |
| 0.00                      | 0.00          | 1.96       | 1.96  | -46.07                   | 614                   |
| 0.00                      | 0.00          | 1.89       | 1.89  | -43.06                   | 571                   |
| 0.00                      | 0.00          | 1.82       | 1.82  | -40.22                   | 531                   |
| 0.00                      | 0.00          | 1.75       | 1.75  | -37.54                   | 493                   |

## Laminación de avenida T = 2 años

| TIEMPO  |           | CAUDAL<br>ENTRADA   | COTA DE<br>EMBALSE |
|---------|-----------|---------------------|--------------------|
| [horas] | [minutos] | [m <sup>3</sup> /s] | [m.s.n.m.]         |
| 18.5    | 1110      | 0.10                | 126.079            |
| 18.6    | 1115      | 0.10                | 126.073            |
| 18.7    | 1120      | 0.10                | 126.068            |
| 18.8    | 1125      | 0.10                | 126.063            |
| 18.8    | 1130      | 0.10                | 126.059            |
| 18.9    | 1135      | 0.10                | 126.054            |
| 19.0    | 1140      | 0.10                | 126.050            |
| 19.1    | 1145      | 0.10                | 126.047            |
| 19.2    | 1150      | 0.10                | 126.043            |
| 19.3    | 1155      | 0.10                | 126.040            |
| 19.3    | 1160      | 0.10                | 126.037            |
| 19.4    | 1165      | 0.10                | 126.034            |
| 19.5    | 1170      | 0.10                | 126.032            |
| 19.6    | 1175      | 0.10                | 126.029            |
| 19.7    | 1180      | 0.00                | 126.027            |
| 19.8    | 1185      | 0.00                | 126.025            |
| 19.8    | 1190      | 0.00                | 126.023            |
| 19.9    | 1195      | 0.00                | 126.022            |
| 20.0    | 1200      | 0.00                | 126.020            |
| 20.1    | 1205      | 0.00                | 126.018            |
| 20.2    | 1210      | 0.00                | 126.017            |
| 20.3    | 1215      | 0.00                | 126.016            |
| 20.3    | 1220      | 0.00                | 126.014            |
| 20.4    | 1225      | 0.00                | 126.013            |
| 20.5    | 1230      | 0.00                | 126.012            |
| 20.6    | 1235      | 0.00                | 126.011            |
| 20.7    | 1240      | 0.00                | 126.010            |
| 20.8    | 1245      | 0.00                | 126.009            |
| 20.8    | 1250      | 0.00                | 126.008            |
| 20.9    | 1255      | 0.00                | 126.007            |
| 21.0    | 1260      | 0.00                | 126.007            |
| 21.1    | 1265      | 0.00                | 126.006            |
| 21.2    | 1270      | 0.00                | 126.005            |
| 21.3    | 1275      | 0.00                | 126.005            |
| 21.3    | 1280      | 0.00                | 126.004            |
| 21.4    | 1285      | 0.00                | 126.004            |
| 21.5    | 1290      | 0.00                | 126.003            |
| 21.6    | 1295      | 0.00                | 126.003            |
| 21.7    | 1300      | 0.00                | 126.002            |
| 21.8    | 1305      | 0.00                | 126.002            |
| 21.8    | 1310      | 0.00                | 126.002            |
| 21.9    | 1315      | 0.00                | 126.002            |
| 22.0    | 1320      | 0.00                | 126.001            |

| CAUDALES DE SALIDA [m3/s] |               |            |       | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|-------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL | [m <sup>3</sup> ]        | [m <sup>3</sup> ]     |
| 0.00                      | 0.00          | 1.69       | 1.69  | -35.04                   | 458                   |
| 0.00                      | 0.00          | 1.62       | 1.62  | -32.67                   | 425                   |
| 0.00                      | 0.00          | 1.57       | 1.57  | -30.47                   | 395                   |
| 0.00                      | 0.00          | 1.51       | 1.51  | -28.39                   | 367                   |
| 0.00                      | 0.00          | 1.46       | 1.46  | -26.45                   | 340                   |
| 0.00                      | 0.00          | 1.40       | 1.40  | -24.63                   | 315                   |
| 0.00                      | 0.00          | 1.34       | 1.34  | -22.94                   | 293                   |
| 0.00                      | 0.00          | 1.30       | 1.30  | -21.36                   | 271                   |
| 0.00                      | 0.00          | 1.25       | 1.25  | -19.87                   | 251                   |
| 0.00                      | 0.00          | 1.20       | 1.20  | -18.50                   | 233                   |
| 0.00                      | 0.00          | 1.16       | 1.16  | -17.21                   | 216                   |
| 0.00                      | 0.00          | 1.11       | 1.11  | -16.01                   | 200                   |
| 0.00                      | 0.00          | 1.08       | 1.08  | -14.90                   | 185                   |
| 0.00                      | 0.00          | 1.02       | 1.02  | -13.84                   | 171                   |
| 0.00                      | 0.00          | 0.99       | 0.99  | -12.88                   | 158                   |
| 0.00                      | 0.00          | 0.95       | 0.95  | -11.96                   | 146                   |
| 0.00                      | 0.00          | 0.91       | 0.91  | -11.12                   | 135                   |
| 0.00                      | 0.00          | 0.89       | 0.89  | -10.32                   | 125                   |
| 0.00                      | 0.00          | 0.85       | 0.85  | -9.58                    | 115                   |
| 0.00                      | 0.00          | 0.81       | 0.81  | -8.91                    | 106                   |
| 0.00                      | 0.00          | 0.78       | 0.78  | -8.29                    | 98                    |
| 0.00                      | 0.00          | 0.76       | 0.76  | -7.76                    | 90                    |
| 0.00                      | 0.00          | 0.71       | 0.71  | -7.31                    | 83                    |
| 0.00                      | 0.00          | 0.69       | 0.69  | -6.88                    | 76                    |
| 0.00                      | 0.00          | 0.66       | 0.66  | -6.49                    | 69                    |
| 0.00                      | 0.00          | 0.63       | 0.63  | -6.08                    | 63                    |
| 0.00                      | 0.00          | 0.60       | 0.60  | -5.68                    | 58                    |
| 0.00                      | 0.00          | 0.57       | 0.57  | -5.28                    | 52                    |
| 0.00                      | 0.00          | 0.54       | 0.54  | -4.89                    | 47                    |
| 0.00                      | 0.00          | 0.50       | 0.50  | -4.71                    | 43                    |
| 0.00                      | 0.00          | 0.50       | 0.50  | -4.59                    | 38                    |
| 0.00                      | 0.00          | 0.47       | 0.47  | -4.24                    | 34                    |
| 0.00                      | 0.00          | 0.43       | 0.43  | -3.82                    | 30                    |
| 0.00                      | 0.00          | 0.43       | 0.43  | -3.40                    | 27                    |
| 0.00                      | 0.00          | 0.38       | 0.38  | -3.04                    | 24                    |
| 0.00                      | 0.00          | 0.38       | 0.38  | -2.72                    | 21                    |
| 0.00                      | 0.00          | 0.33       | 0.33  | -2.42                    | 18                    |
| 0.00                      | 0.00          | 0.33       | 0.33  | -2.16                    | 16                    |
| 0.00                      | 0.00          | 0.27       | 0.27  | -1.92                    | 14                    |
| 0.00                      | 0.00          | 0.27       | 0.27  | -1.71                    | 13                    |
| 0.00                      | 0.00          | 0.27       | 0.27  | -1.52                    | 11                    |
| 0.00                      | 0.00          | 0.27       | 0.27  | -1.36                    | 10                    |
| 0.00                      | 0.00          | 0.19       | 0.19  | -1.20                    | 9                     |



## Laminación de avenida T = 5 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 0.0     | 0         | 0.00              | 126.000            |
| 0.1     | 5         | 0.10              | 126.001            |
| 0.2     | 10        | 0.20              | 126.003            |
| 0.3     | 15        | 0.60              | 126.010            |
| 0.3     | 20        | 1.40              | 126.028            |
| 0.4     | 25        | 2.90              | 126.072            |
| 0.5     | 30        | 5.20              | 126.162            |
| 0.6     | 35        | 8.40              | 126.326            |
| 0.7     | 40        | 12.30             | 126.582            |
| 0.8     | 45        | 16.50             | 126.918            |
| 0.8     | 50        | 20.90             | 127.269            |
| 0.9     | 55        | 24.80             | 127.625            |
| 1.0     | 60        | 28.20             | 127.963            |
| 1.1     | 65        | 31.20             | 128.257            |
| 1.2     | 70        | 34.30             | 128.531            |
| 1.3     | 75        | 37.90             | 128.800            |
| 1.3     | 80        | 42.70             | 129.101            |
| 1.4     | 85        | 48.80             | 129.396            |
| 1.5     | 90        | 56.40             | 129.685            |
| 1.6     | 95        | 65.40             | 130.004            |
| 1.7     | 100       | 75.10             | 130.335            |
| 1.8     | 105       | 84.90             | 130.704            |
| 1.8     | 110       | 94.70             | 131.092            |
| 1.9     | 115       | 104.10            | 131.480            |
| 2.0     | 120       | 112.70            | 131.837            |
| 2.1     | 125       | 120.50            | 132.201            |
| 2.2     | 130       | 127.50            | 132.570            |
| 2.3     | 135       | 133.60            | 132.945            |
| 2.3     | 140       | 139.00            | 133.311            |
| 2.4     | 145       | 143.50            | 133.671            |
| 2.5     | 150       | 147.30            | 134.022            |
| 2.6     | 155       | 150.30            | 134.358            |
| 2.7     | 160       | 152.60            | 134.692            |
| 2.8     | 165       | 154.20            | 135.022            |
| 2.8     | 170       | 155.10            | 135.341            |
| 2.9     | 175       | 155.40            | 135.651            |
| 3.0     | 180       | 155.00            | 135.952            |
| 3.1     | 185       | 154.20            | 136.239            |
| 3.2     | 190       | 152.90            | 136.516            |
| 3.3     | 195       | 151.20            | 136.776            |
| 3.3     | 200       | 149.20            | 137.026            |
| 3.4     | 205       | 146.90            | 137.259            |
| 3.5     | 210       | 144.30            | 137.482            |
| 3.6     | 215       | 141.60            | 137.688            |
| 3.7     | 220       | 138.60            | 137.884            |
| 3.8     | 225       | 135.60            | 138.066            |
| 3.8     | 230       | 132.40            | 138.234            |
| 3.9     | 235       | 129.10            | 138.391            |
| 4.0     | 240       | 125.80            | 138.536            |
| 4.1     | 245       | 122.50            | 138.668            |
| 4.2     | 250       | 119.20            | 138.789            |
| 4.3     | 255       | 115.80            | 138.900            |
| 4.3     | 260       | 112.50            | 139.001            |
| 4.4     | 265       | 109.30            | 139.089            |
| 4.5     | 270       | 106.10            | 139.167            |
| 4.6     | 275       | 103.00            | 139.236            |
| 4.7     | 280       | 100.00            | 139.297            |
| 4.8     | 285       | 97.00             | 139.348            |
| 4.8     | 290       | 94.10             | 139.391            |
| 4.9     | 295       | 91.30             | 139.427            |
| 5.0     | 300       | 88.60             | 139.454            |
| 5.1     | 305       | 86.00             | 139.474            |
| 5.2     | 310       | 83.40             | 139.486            |

| CAUDALES DE SALIDA [m³/s] |               |            |       | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|-------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 8.50       | 8.50  | -                        | 377                   |
| 0.00                      | 0.00          | 8.50       | 8.50  | 0.93                     | 378                   |
| 0.00                      | 0.00          | 8.51       | 8.51  | 3.37                     | 381                   |
| 0.00                      | 0.00          | 2.49       | 2.49  | 8.58                     | 390                   |
| 0.00                      | 0.00          | 4.17       | 4.17  | 25.44                    | 415                   |
| 0.00                      | 0.00          | 6.68       | 6.68  | 70.79                    | 486                   |
| 0.00                      | 0.00          | 10.02      | 10.02 | 161.87                   | 648                   |
| 0.00                      | 0.00          | 14.22      | 14.22 | 317.81                   | 966                   |
| 0.00                      | 0.00          | 19.00      | 19.00 | 530.35                   | 1496                  |
| 0.00                      | 0.00          | 23.86      | 23.86 | 811.41                   | 2308                  |
| 0.00                      | 0.00          | 28.05      | 28.05 | 1195.44                  | 3503                  |
| 0.00                      | 0.00          | 31.75      | 31.75 | 1706.67                  | 5210                  |
| 0.00                      | 0.00          | 34.89      | 34.89 | 2004.01                  | 7214                  |
| 0.00                      | 0.00          | 37.41      | 37.41 | 2083.10                  | 9297                  |
| 0.00                      | 0.00          | 39.62      | 39.62 | 2640.30                  | 11937                 |
| 0.00                      | 0.00          | 41.67      | 41.67 | 2841.47                  | 14779                 |
| 0.00                      | 0.00          | 43.85      | 43.85 | 2516.26                  | 17295                 |
| 0.00                      | 0.00          | 45.89      | 45.89 | 2652.01                  | 19947                 |
| 0.00                      | 0.00          | 47.80      | 47.80 | 3153.23                  | 23100                 |
| 0.00                      | 0.00          | 49.83      | 49.83 | 4009.23                  | 27109                 |
| 0.00                      | 0.00          | 51.85      | 51.85 | 5243.69                  | 32353                 |
| 0.00                      | 0.00          | 54.01      | 54.01 | 6809.69                  | 39163                 |
| 0.00                      | 0.00          | 56.20      | 56.20 | 8627.53                  | 47790                 |
| 0.00                      | 0.00          | 58.30      | 58.30 | 10553.17                 | 58343                 |
| 0.00                      | 0.00          | 60.17      | 60.17 | 12536.63                 | 70880                 |
| 0.00                      | 0.00          | 62.01      | 62.01 | 14517.29                 | 85397                 |
| 0.00                      | 0.00          | 63.83      | 63.83 | 16390.04                 | 101787                |
| 0.00                      | 0.00          | 65.63      | 65.63 | 18125.31                 | 119913                |
| 0.00                      | 0.00          | 67.34      | 67.34 | 19692.17                 | 139605                |
| 0.00                      | 0.00          | 68.97      | 68.97 | 21050.26                 | 160655                |
| 0.00                      | 0.00          | 70.53      | 70.53 | 22191.10                 | 182846                |
| 0.00                      | 0.00          | 72.00      | 72.00 | 23125.08                 | 205971                |
| 0.00                      | 0.00          | 73.42      | 73.42 | 23857.98                 | 229829                |
| 0.00                      | 0.00          | 74.80      | 74.80 | 24391.27                 | 254221                |
| 0.00                      | 0.00          | 76.11      | 76.11 | 24737.24                 | 278958                |
| 0.00                      | 0.00          | 77.36      | 77.36 | 24894.22                 | 303852                |
| 0.00                      | 0.00          | 78.56      | 78.56 | 24859.13                 | 328711                |
| 0.00                      | 0.00          | 79.69      | 79.69 | 24647.56                 | 353359                |
| 0.00                      | 0.00          | 80.76      | 80.76 | 24269.56                 | 377628                |
| 0.00                      | 0.00          | 81.75      | 81.75 | 23745.24                 | 401374                |
| 0.00                      | 0.00          | 82.69      | 82.69 | 23097.87                 | 424471                |
| 0.00                      | 0.00          | 83.56      | 83.56 | 22346.23                 | 446818                |
| 0.00                      | 0.00          | 84.38      | 84.38 | 21508.39                 | 468326                |
| 0.00                      | 0.00          | 85.14      | 85.14 | 20597.66                 | 488924                |
| 0.00                      | 0.00          | 85.85      | 85.85 | 19623.38                 | 508547                |
| 0.00                      | 0.00          | 86.50      | 86.50 | 18598.33                 | 527145                |
| 0.00                      | 0.00          | 87.10      | 87.10 | 17535.68                 | 544681                |
| 0.00                      | 0.00          | 87.66      | 87.66 | 16439.87                 | 561121                |
| 0.00                      | 0.00          | 88.17      | 88.17 | 15325.15                 | 576446                |
| 0.00                      | 0.00          | 88.64      | 88.64 | 14199.64                 | 590646                |
| 0.00                      | 0.00          | 89.06      | 89.06 | 13066.14                 | 603712                |
| 0.00                      | 0.00          | 89.44      | 89.44 | 11934.84                 | 615647                |
| 0.00                      | 0.00          | 89.79      | 89.79 | 10815.47                 | 626462                |
| 0.00                      | 0.00          | 90.10      | 90.10 | 9711.93                  | 636174                |
| 0.00                      | 0.00          | 90.36      | 90.36 | 8627.11                  | 644801                |
| 0.00                      | 0.00          | 90.60      | 90.60 | 7565.36                  | 652367                |
| 0.00                      | 0.00          | 90.81      | 90.81 | 6529.80                  | 658896                |
| 0.00                      | 0.00          | 90.98      | 90.98 | 5523.81                  | 664420                |
| 0.00                      | 0.00          | 91.13      | 91.13 | 4550.98                  | 668971                |
| 0.00                      | 0.00          | 91.25      | 91.25 | 3612.01                  | 672583                |
| 0.00                      | 0.00          | 91.34      | 91.34 | 2705.80                  | 675289                |
| 0.00                      | 0.00          | 91.41      | 91.41 | 1832.19                  | 677121                |
| 0.00                      | 0.00          | 91.45      | 91.45 | 991.20                   | 678112                |

## Laminación de avenida T = 5 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 5.3     | 315       | 81.00             | 139.492            |
| 5.3     | 320       | 78.60             | 139.491            |
| 5.4     | 325       | 76.30             | 139.484            |
| 5.5     | 330       | 74.10             | 139.471            |
| 5.6     | 335       | 71.90             | 139.452            |
| 5.7     | 340       | 69.80             | 139.427            |
| 5.8     | 345       | 67.80             | 139.397            |
| 5.8     | 350       | 65.90             | 139.362            |
| 5.9     | 355       | 64.00             | 139.322            |
| 6.0     | 360       | 62.20             | 139.277            |
| 6.1     | 365       | 60.50             | 139.228            |
| 6.2     | 370       | 58.80             | 139.175            |
| 6.3     | 375       | 57.20             | 139.118            |
| 6.3     | 380       | 55.60             | 139.057            |
| 6.4     | 385       | 54.20             | 138.993            |
| 6.5     | 390       | 52.70             | 138.923            |
| 6.6     | 395       | 51.40             | 138.850            |
| 6.7     | 400       | 50.10             | 138.774            |
| 6.8     | 405       | 48.80             | 138.695            |
| 6.8     | 410       | 47.60             | 138.614            |
| 6.9     | 415       | 46.40             | 138.530            |
| 7.0     | 420       | 45.30             | 138.442            |
| 7.1     | 425       | 44.20             | 138.351            |
| 7.2     | 430       | 43.20             | 138.257            |
| 7.3     | 435       | 42.20             | 138.162            |
| 7.3     | 440       | 41.20             | 138.065            |
| 7.4     | 445       | 40.30             | 137.965            |
| 7.5     | 450       | 39.40             | 137.861            |
| 7.6     | 455       | 38.50             | 137.756            |
| 7.7     | 460       | 37.60             | 137.649            |
| 7.8     | 465       | 36.80             | 137.542            |
| 7.8     | 470       | 36.00             | 137.430            |
| 7.9     | 475       | 35.30             | 137.316            |
| 8.0     | 480       | 34.60             | 137.201            |
| 8.1     | 485       | 33.80             | 137.085            |
| 8.2     | 490       | 33.20             | 136.967            |
| 8.3     | 495       | 32.50             | 136.846            |
| 8.3     | 500       | 31.90             | 136.723            |
| 8.4     | 505       | 31.20             | 136.601            |
| 8.5     | 510       | 30.60             | 136.477            |
| 8.6     | 515       | 30.10             | 136.348            |
| 8.7     | 520       | 29.50             | 136.220            |
| 8.8     | 525       | 29.00             | 136.092            |
| 8.8     | 530       | 28.50             | 135.962            |
| 8.9     | 535       | 28.00             | 135.828            |
| 9.0     | 540       | 27.50             | 135.695            |
| 9.1     | 545       | 27.00             | 135.562            |
| 9.2     | 550       | 26.50             | 135.427            |
| 9.3     | 555       | 26.10             | 135.290            |
| 9.3     | 560       | 25.60             | 135.153            |
| 9.4     | 565       | 25.20             | 135.017            |
| 9.5     | 570       | 24.80             | 134.877            |
| 9.6     | 575       | 24.40             | 134.736            |
| 9.7     | 580       | 24.00             | 134.597            |
| 9.8     | 585       | 23.60             | 134.458            |
| 9.8     | 590       | 23.30             | 134.314            |
| 9.9     | 595       | 22.90             | 134.173            |
| 10.0    | 600       | 22.60             | 134.032            |
| 10.1    | 605       | 22.20             | 133.886            |
| 10.2    | 610       | 21.90             | 133.738            |
| 10.3    | 615       | 21.60             | 133.593            |
| 10.3    | 620       | 21.30             | 133.443            |
| 10.4    | 625       | 21.00             | 133.286            |

| CAUDALES DE SALIDA [m³/s] |               |            |       | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|-------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 91.47      | 91.47 | 183.50                   | 678296                |
| 0.00                      | 0.00          | 91.47      | 91.47 | -590.61                  | 677705                |
| 0.00                      | 0.00          | 91.45      | 91.45 | -1331.78                 | 676374                |
| 0.00                      | 0.00          | 91.40      | 91.40 | -2040.75                 | 674333                |
| 0.00                      | 0.00          | 91.34      | 91.34 | -2718.82                 | 671614                |
| 0.00                      | 0.00          | 91.25      | 91.25 | -3369.60                 | 668244                |
| 0.00                      | 0.00          | 91.15      | 91.15 | -3994.71                 | 664250                |
| 0.00                      | 0.00          | 91.03      | 91.03 | -4590.67                 | 659659                |
| 0.00                      | 0.00          | 90.89      | 90.89 | -5156.63                 | 654502                |
| 0.00                      | 0.00          | 90.74      | 90.74 | -5694.51                 | 648808                |
| 0.00                      | 0.00          | 90.57      | 90.57 | -6205.31                 | 642603                |
| 0.00                      | 0.00          | 90.39      | 90.39 | -6690.11                 | 635912                |
| 0.00                      | 0.00          | 90.20      | 90.20 | -7149.36                 | 628763                |
| 0.00                      | 0.00          | 89.99      | 89.99 | -7583.68                 | 621179                |
| 0.00                      | 0.00          | 89.77      | 89.77 | -7994.21                 | 613185                |
| 0.00                      | 0.00          | 89.52      | 89.52 | -8379.90                 | 604805                |
| 0.00                      | 0.00          | 89.27      | 89.27 | -8741.26                 | 596064                |
| 0.00                      | 0.00          | 89.01      | 89.01 | -9081.18                 | 586983                |
| 0.00                      | 0.00          | 88.73      | 88.73 | -9400.57                 | 577582                |
| 0.00                      | 0.00          | 88.45      | 88.45 | -9700.00                 | 567882                |
| 0.00                      | 0.00          | 88.15      | 88.15 | -9979.76                 | 557902                |
| 0.00                      | 0.00          | 87.84      | 87.84 | -10238.06                | 547664                |
| 0.00                      | 0.00          | 87.52      | 87.52 | -10476.62                | 537188                |
| 0.00                      | 0.00          | 87.19      | 87.19 | -10699.02                | 526489                |
| 0.00                      | 0.00          | 86.85      | 86.85 | -10905.83                | 515583                |
| 0.00                      | 0.00          | 86.50      | 86.50 | -11095.53                | 504487                |
| 0.00                      | 0.00          | 86.14      | 86.14 | -11267.26                | 493220                |
| 0.00                      | 0.00          | 85.77      | 85.77 | -11424.07                | 481796                |
| 0.00                      | 0.00          | 85.39      | 85.39 | -11568.64                | 470227                |
| 0.00                      | 0.00          | 85.00      | 85.00 | -11699.87                | 458528                |
| 0.00                      | 0.00          | 84.60      | 84.60 | -11815.01                | 446713                |
| 0.00                      | 0.00          | 84.19      | 84.19 | -11916.30                | 434796                |
| 0.00                      | 0.00          | 83.77      | 83.77 | -12007.57                | 422789                |
| 0.00                      | 0.00          | 83.35      | 83.35 | -12086.32                | 410702                |
| 0.00                      | 0.00          | 82.91      | 82.91 | -12150.41                | 398552                |
| 0.00                      | 0.00          | 82.47      | 82.47 | -12203.58                | 386348                |
| 0.00                      | 0.00          | 82.01      | 82.01 | -12248.62                | 374100                |
| 0.00                      | 0.00          | 81.55      | 81.55 | -12279.67                | 361820                |
| 0.00                      | 0.00          | 81.08      | 81.08 | -12296.80                | 349523                |
| 0.00                      | 0.00          | 80.61      | 80.61 | -12306.38                | 337217                |
| 0.00                      | 0.00          | 80.11      | 80.11 | -12305.77                | 324911                |
| 0.00                      | 0.00          | 79.61      | 79.61 | -12292.42                | 312619                |
| 0.00                      | 0.00          | 79.11      | 79.11 | -12270.04                | 300349                |
| 0.00                      | 0.00          | 78.60      | 78.60 | -12239.85                | 288109                |
| 0.00                      | 0.00          | 78.07      | 78.07 | -12196.11                | 275913                |
| 0.00                      | 0.00          | 77.54      | 77.54 | -12141.62                | 263771                |
| 0.00                      | 0.00          | 77.01      | 77.01 | -12082.03                | 251689                |
| 0.00                      | 0.00          | 76.46      | 76.46 | -12007.39                | 239682                |
| 0.00                      | 0.00          | 75.90      | 75.90 | -11919.28                | 227762                |
| 0.00                      | 0.00          | 75.34      | 75.34 | -11826.35                | 215936                |
| 0.00                      | 0.00          | 74.78      | 74.78 | -11713.35                | 204223                |
| 0.00                      | 0.00          | 74.20      | 74.20 | -11583.21                | 192640                |
| 0.00                      | 0.00          | 73.61      | 73.61 | -11445.85                | 181194                |
| 0.00                      | 0.00          | 73.02      | 73.02 | -11290.67                | 169903                |
| 0.00                      | 0.00          | 72.42      | 72.42 | -11124.76                | 158778                |
| 0.00                      | 0.00          | 71.81      | 71.81 | -10946.24                | 147832                |
| 0.00                      | 0.00          | 71.19      | 71.19 | -10751.94                | 137080                |
| 0.00                      | 0.00          | 70.58      | 70.58 | -10548.24                | 126532                |
| 0.00                      | 0.00          | 69.93      | 69.93 | -10317.68                | 116214                |
| 0.00                      | 0.00          | 69.27      | 69.27 | -10069.80                | 106144                |
| 0.00                      | 0.00          | 68.62      | 68.62 | -9776.13                 | 96368                 |
| 0.00                      | 0.00          | 67.94      | 67.94 | -9436.82                 | 86931                 |
| 0.00                      | 0.00          | 67.22      | 67.22 | -9047.10                 | 77884                 |

## Laminación de avenida T = 5 años

| TIEMPO  |           | CAUDAL ENTRADA | COTA DE EMBALSE |
|---------|-----------|----------------|-----------------|
| [horas] | [minutos] | [m³/s]         | [m.s.n.m.]      |
| 10.5    | 630       | 20.70          | 133.132         |
| 10.6    | 635       | 20.40          | 132.978         |
| 10.7    | 640       | 20.10          | 132.815         |
| 10.8    | 645       | 19.80          | 132.655         |
| 10.8    | 650       | 19.50          | 132.499         |
| 10.9    | 655       | 19.30          | 132.334         |
| 11.0    | 660       | 19.00          | 132.174         |
| 11.1    | 665       | 18.80          | 132.018         |
| 11.2    | 670       | 18.50          | 131.847         |
| 11.3    | 675       | 18.30          | 131.680         |
| 11.3    | 680       | 18.10          | 131.517         |
| 11.4    | 685       | 17.80          | 131.326         |
| 11.5    | 690       | 17.60          | 131.140         |
| 11.6    | 695       | 17.40          | 130.954         |
| 11.7    | 700       | 17.20          | 130.750         |
| 11.8    | 705       | 17.00          | 130.561         |
| 11.8    | 710       | 16.70          | 130.366         |
| 11.9    | 715       | 16.50          | 130.180         |
| 12.0    | 720       | 16.30          | 130.010         |
| 12.1    | 725       | 16.20          | 129.836         |
| 12.2    | 730       | 16.00          | 129.681         |
| 12.3    | 735       | 15.80          | 129.546         |
| 12.3    | 740       | 15.60          | 129.419         |
| 12.4    | 745       | 15.40          | 129.307         |
| 12.5    | 750       | 15.20          | 129.216         |
| 12.6    | 755       | 15.10          | 129.140         |
| 12.7    | 760       | 14.90          | 129.077         |
| 12.8    | 765       | 14.70          | 129.025         |
| 12.8    | 770       | 14.50          | 128.975         |
| 12.9    | 775       | 14.30          | 128.922         |
| 13.0    | 780       | 14.10          | 128.865         |
| 13.1    | 785       | 13.80          | 128.804         |
| 13.2    | 790       | 13.60          | 128.739         |
| 13.3    | 795       | 13.40          | 128.670         |
| 13.3    | 800       | 13.10          | 128.597         |
| 13.4    | 805       | 12.90          | 128.519         |
| 13.5    | 810       | 12.60          | 128.437         |
| 13.6    | 815       | 12.40          | 128.367         |
| 13.7    | 820       | 12.20          | 128.310         |
| 13.8    | 825       | 11.90          | 128.263         |
| 13.8    | 830       | 11.70          | 128.223         |
| 13.9    | 835       | 11.40          | 128.189         |
| 14.0    | 840       | 11.00          | 128.158         |
| 14.1    | 845       | 10.70          | 128.129         |
| 14.2    | 850       | 10.40          | 128.102         |
| 14.3    | 855       | 10.00          | 128.076         |
| 14.3    | 860       | 9.60           | 128.050         |
| 14.4    | 865       | 9.20           | 128.023         |
| 14.5    | 870       | 8.80           | 127.995         |
| 14.6    | 875       | 8.40           | 127.960         |
| 14.7    | 880       | 8.00           | 127.920         |
| 14.8    | 885       | 7.70           | 127.877         |
| 14.8    | 890       | 7.30           | 127.832         |
| 14.9    | 895       | 6.90           | 127.784         |
| 15.0    | 900       | 6.50           | 127.734         |
| 15.1    | 905       | 6.20           | 127.682         |
| 15.2    | 910       | 5.80           | 127.630         |
| 15.3    | 915       | 5.50           | 127.577         |
| 15.3    | 920       | 5.10           | 127.524         |
| 15.4    | 925       | 4.80           | 127.459         |
| 15.5    | 930       | 4.50           | 127.389         |
| 15.6    | 935       | 4.20           | 127.322         |
| 15.7    | 940       | 4.00           | 127.258         |

| CAUDALES DE SALIDA [m³/s] |               |            |       | INCREMENTO DE VOLUMEN | VOLUMEN DE EMBALSE |
|---------------------------|---------------|------------|-------|-----------------------|--------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL | [m³]                  | [m³]               |
| 0.00                      | 0.00          | 66.51      | 66.51 | -8597.18              | 69287              |
| 0.00                      | 0.00          | 65.78      | 65.78 | -8114.26              | 61173              |
| 0.00                      | 0.00          | 65.01      | 65.01 | -7575.31              | 53598              |
| 0.00                      | 0.00          | 64.24      | 64.24 | -6998.32              | 46599              |
| 0.00                      | 0.00          | 63.49      | 63.49 | -6377.23              | 40222              |
| 0.00                      | 0.00          | 62.67      | 62.67 | -5704.53              | 34517              |
| 0.00                      | 0.00          | 61.88      | 61.88 | -5028.71              | 29489              |
| 0.00                      | 0.00          | 61.09      | 61.09 | -4323.34              | 25165              |
| 0.00                      | 0.00          | 60.22      | 60.22 | -3617.49              | 21548              |
| 0.00                      | 0.00          | 59.35      | 59.35 | -2915.20              | 18633              |
| 0.00                      | 0.00          | 58.49      | 58.49 | -2264.89              | 16368              |
| 0.00                      | 0.00          | 57.47      | 57.47 | -1631.20              | 14737              |
| 0.00                      | 0.00          | 56.46      | 56.46 | -1043.75              | 13693              |
| 0.00                      | 0.00          | 55.43      | 55.43 | -671.27               | 13022              |
| 0.00                      | 0.00          | 54.28      | 54.28 | -450.35               | 12571              |
| 0.00                      | 0.00          | 53.18      | 53.18 | -318.83               | 12252              |
| 0.00                      | 0.00          | 52.03      | 52.03 | -240.06               | 12012              |
| 0.00                      | 0.00          | 50.91      | 50.91 | -203.31               | 11809              |
| 0.00                      | 0.00          | 49.87      | 49.87 | -227.15               | 11582              |
| 0.00                      | 0.00          | 48.77      | 48.77 | -288.54               | 11293              |
| 0.00                      | 0.00          | 47.78      | 47.78 | -348.86               | 10944              |
| 0.00                      | 0.00          | 46.89      | 46.89 | -407.98               | 10537              |
| 0.00                      | 0.00          | 46.05      | 46.05 | -465.90               | 10071              |
| 0.00                      | 0.00          | 45.29      | 45.29 | -522.65               | 9548               |
| 0.00                      | 0.00          | 44.66      | 44.66 | -578.30               | 8970               |
| 0.00                      | 0.00          | 44.13      | 44.13 | -554.13               | 8416               |
| 0.00                      | 0.00          | 43.68      | 43.68 | -388.12               | 8027               |
| 0.00                      | 0.00          | 43.31      | 43.31 | -220.03               | 7807               |
| 0.00                      | 0.00          | 42.95      | 42.95 | -141.20               | 7666               |
| 0.00                      | 0.00          | 42.57      | 42.57 | -105.11               | 7561               |
| 0.00                      | 0.00          | 42.15      | 42.15 | -89.98                | 7471               |
| 0.00                      | 0.00          | 41.70      | 41.70 | -85.86                | 7385               |
| 0.00                      | 0.00          | 41.21      | 41.21 | -87.71                | 7298               |
| 0.00                      | 0.00          | 40.69      | 40.69 | -91.77                | 7206               |
| 0.00                      | 0.00          | 40.13      | 40.13 | -95.46                | 7110               |
| 0.00                      | 0.00          | 39.52      | 39.52 | -97.91                | 7012               |
| 0.00                      | 0.00          | 38.88      | 38.88 | -98.85                | 6914               |
| 0.00                      | 0.00          | 38.31      | 38.31 | -98.61                | 6815               |
| 0.00                      | 0.00          | 37.85      | 37.85 | -97.91                | 6717               |
| 0.00                      | 0.00          | 37.46      | 37.46 | -97.19                | 6620               |
| 0.00                      | 0.00          | 37.13      | 37.13 | -97.47                | 6522               |
| 0.00                      | 0.00          | 36.84      | 36.84 | -99.77                | 6423               |
| 0.00                      | 0.00          | 36.58      | 36.58 | -104.25               | 6318               |
| 0.00                      | 0.00          | 36.34      | 36.34 | -110.59               | 6208               |
| 0.00                      | 0.00          | 36.11      | 36.11 | -118.16               | 6090               |
| 0.00                      | 0.00          | 35.88      | 35.88 | -126.28               | 5963               |
| 0.00                      | 0.00          | 35.66      | 35.66 | -134.34               | 5829               |
| 0.00                      | 0.00          | 35.42      | 35.42 | -148.21               | 5681               |
| 0.00                      | 0.00          | 35.17      | 35.17 | -178.36               | 5502               |
| 0.00                      | 0.00          | 34.86      | 34.86 | -212.97               | 5289               |
| 0.00                      | 0.00          | 34.51      | 34.51 | -237.54               | 5052               |
| 0.00                      | 0.00          | 34.12      | 34.12 | -254.65               | 4797               |
| 0.00                      | 0.00          | 33.71      | 33.71 | -266.07               | 4531               |
| 0.00                      | 0.00          | 33.26      | 33.26 | -273.10               | 4258               |
| 0.00                      | 0.00          | 32.79      | 32.79 | -276.72               | 3981               |
| 0.00                      | 0.00          | 32.30      | 32.30 | -277.66               | 3704               |
| 0.00                      | 0.00          | 31.79      | 31.79 | -275.62               | 3428               |
| 0.00                      | 0.00          | 31.27      | 31.27 | -250.11               | 3178               |
| 0.00                      | 0.00          | 30.74      | 30.74 | -212.85               | 2965               |
| 0.00                      | 0.00          | 30.08      | 30.08 | -190.63               | 2774               |
| 0.00                      | 0.00          | 29.35      | 29.35 | -176.07               | 2598               |
| 0.00                      | 0.00          | 28.63      | 28.63 | -165.42               | 2433               |
| 0.00                      | 0.00          | 27.93      | 27.93 | -156.72               | 2276               |

## Laminación de avenida T = 5 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 15.8    | 945       | 3.70              | 127.198            |
| 15.8    | 950       | 3.50              | 127.141            |
| 15.9    | 955       | 3.20              | 127.087            |
| 16.0    | 960       | 3.00              | 127.036            |
| 16.1    | 965       | 2.80              | 126.983            |
| 16.2    | 970       | 2.60              | 126.924            |
| 16.3    | 975       | 2.40              | 126.870            |
| 16.3    | 980       | 2.30              | 126.820            |
| 16.4    | 985       | 2.10              | 126.774            |
| 16.5    | 990       | 2.00              | 126.732            |
| 16.6    | 995       | 1.80              | 126.693            |
| 16.7    | 1000      | 1.70              | 126.656            |
| 16.8    | 1005      | 1.60              | 126.622            |
| 16.8    | 1010      | 1.40              | 126.590            |
| 16.9    | 1015      | 1.30              | 126.561            |
| 17.0    | 1020      | 1.20              | 126.534            |
| 17.1    | 1025      | 1.10              | 126.508            |
| 17.2    | 1030      | 1.10              | 126.482            |
| 17.3    | 1035      | 1.00              | 126.456            |
| 17.3    | 1040      | 0.90              | 126.430            |
| 17.4    | 1045      | 0.80              | 126.405            |
| 17.5    | 1050      | 0.80              | 126.380            |
| 17.6    | 1055      | 0.70              | 126.357            |
| 17.7    | 1060      | 0.70              | 126.334            |
| 17.8    | 1065      | 0.60              | 126.312            |
| 17.8    | 1070      | 0.60              | 126.292            |
| 17.9    | 1075      | 0.50              | 126.272            |
| 18.0    | 1080      | 0.50              | 126.254            |
| 18.1    | 1085      | 0.40              | 126.236            |
| 18.2    | 1090      | 0.40              | 126.220            |
| 18.3    | 1095      | 0.40              | 126.204            |
| 18.3    | 1100      | 0.40              | 126.190            |
| 18.4    | 1105      | 0.30              | 126.176            |
| 18.5    | 1110      | 0.30              | 126.164            |
| 18.6    | 1115      | 0.30              | 126.152            |
| 18.7    | 1120      | 0.30              | 126.141            |
| 18.8    | 1125      | 0.20              | 126.130            |
| 18.8    | 1130      | 0.20              | 126.121            |
| 18.9    | 1135      | 0.20              | 126.112            |
| 19.0    | 1140      | 0.20              | 126.103            |
| 19.1    | 1145      | 0.20              | 126.095            |
| 19.2    | 1150      | 0.20              | 126.088            |
| 19.3    | 1155      | 0.10              | 126.082            |
| 19.3    | 1160      | 0.10              | 126.075            |
| 19.4    | 1165      | 0.10              | 126.069            |
| 19.5    | 1170      | 0.10              | 126.064            |
| 19.6    | 1175      | 0.10              | 126.059            |
| 19.7    | 1180      | 0.10              | 126.054            |
| 19.8    | 1185      | 0.10              | 126.050            |
| 19.8    | 1190      | 0.10              | 126.046            |
| 19.9    | 1195      | 0.10              | 126.042            |
| 20.0    | 1200      | 0.10              | 126.039            |
| 20.1    | 1205      | 0.10              | 126.036            |
| 20.2    | 1210      | 0.10              | 126.033            |
| 20.3    | 1215      | 0.00              | 126.030            |
| 20.3    | 1220      | 0.00              | 126.028            |
| 20.4    | 1225      | 0.00              | 126.025            |
| 20.5    | 1230      | 0.00              | 126.023            |
| 20.6    | 1235      | 0.00              | 126.021            |
| 20.7    | 1240      | 0.00              | 126.019            |
| 20.8    | 1245      | 0.00              | 126.018            |
| 20.8    | 1250      | 0.00              | 126.016            |
| 20.9    | 1255      | 0.00              | 126.015            |

| CAUDALES DE SALIDA [m³/s] |               |            |       | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|-------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 27.26      | 27.26 | -149.03                  | 2127                  |
| 0.00                      | 0.00          | 26.60      | 26.60 | -141.76                  | 1985                  |
| 0.00                      | 0.00          | 25.96      | 25.96 | -122.78                  | 1863                  |
| 0.00                      | 0.00          | 25.35      | 25.35 | -100.07                  | 1763                  |
| 0.00                      | 0.00          | 24.69      | 24.69 | -88.56                   | 1674                  |
| 0.00                      | 0.00          | 23.94      | 23.94 | -81.45                   | 1593                  |
| 0.00                      | 0.00          | 23.23      | 23.23 | -76.10                   | 1517                  |
| 0.00                      | 0.00          | 22.55      | 22.55 | -71.50                   | 1445                  |
| 0.00                      | 0.00          | 21.91      | 21.91 | -67.24                   | 1378                  |
| 0.00                      | 0.00          | 21.31      | 21.31 | -63.17                   | 1315                  |
| 0.00                      | 0.00          | 20.73      | 20.73 | -59.27                   | 1255                  |
| 0.00                      | 0.00          | 20.17      | 20.17 | -55.51                   | 1200                  |
| 0.00                      | 0.00          | 19.64      | 19.64 | -51.91                   | 1148                  |
| 0.00                      | 0.00          | 19.13      | 19.13 | -48.49                   | 1099                  |
| 0.00                      | 0.00          | 18.65      | 18.65 | -45.51                   | 1054                  |
| 0.00                      | 0.00          | 18.20      | 18.20 | -44.47                   | 1009                  |
| 0.00                      | 0.00          | 17.75      | 17.75 | -44.01                   | 965                   |
| 0.00                      | 0.00          | 17.29      | 17.29 | -42.13                   | 923                   |
| 0.00                      | 0.00          | 16.82      | 16.82 | -39.71                   | 884                   |
| 0.00                      | 0.00          | 16.33      | 16.33 | -37.15                   | 846                   |
| 0.00                      | 0.00          | 15.85      | 15.85 | -34.64                   | 812                   |
| 0.00                      | 0.00          | 15.35      | 15.35 | -32.23                   | 780                   |
| 0.00                      | 0.00          | 14.88      | 14.88 | -29.95                   | 750                   |
| 0.00                      | 0.00          | 14.39      | 14.39 | -27.82                   | 722                   |
| 0.00                      | 0.00          | 13.91      | 13.91 | -25.81                   | 696                   |
| 0.00                      | 0.00          | 13.46      | 13.46 | -23.94                   | 672                   |
| 0.00                      | 0.00          | 12.99      | 12.99 | -22.21                   | 650                   |
| 0.00                      | 0.00          | 12.55      | 12.55 | -20.58                   | 629                   |
| 0.00                      | 0.00          | 12.10      | 12.10 | -19.09                   | 610                   |
| 0.00                      | 0.00          | 11.68      | 11.68 | -17.68                   | 592                   |
| 0.00                      | 0.00          | 11.25      | 11.25 | -16.40                   | 576                   |
| 0.00                      | 0.00          | 10.86      | 10.86 | -15.19                   | 561                   |
| 0.00                      | 0.00          | 10.45      | 10.45 | -14.07                   | 547                   |
| 0.00                      | 0.00          | 10.08      | 10.08 | -13.04                   | 534                   |
| 0.00                      | 0.00          | 9.71       | 9.71  | -12.08                   | 522                   |
| 0.00                      | 0.00          | 9.35       | 9.35  | -11.19                   | 511                   |
| 0.00                      | 0.00          | 8.98       | 8.98  | -10.35                   | 500                   |
| 0.00                      | 0.00          | 8.66       | 8.66  | -9.59                    | 491                   |
| 0.00                      | 0.00          | 8.33       | 8.33  | -8.87                    | 482                   |
| 0.00                      | 0.00          | 7.99       | 7.99  | -8.21                    | 474                   |
| 0.00                      | 0.00          | 7.68       | 7.68  | -7.60                    | 466                   |
| 0.00                      | 0.00          | 7.39       | 7.39  | -7.03                    | 459                   |
| 0.00                      | 0.00          | 7.13       | 7.13  | -6.50                    | 452                   |
| 0.00                      | 0.00          | 6.82       | 6.82  | -6.01                    | 446                   |
| 0.00                      | 0.00          | 6.54       | 6.54  | -5.57                    | 441                   |
| 0.00                      | 0.00          | 6.30       | 6.30  | -5.15                    | 436                   |
| 0.00                      | 0.00          | 6.05       | 6.05  | -4.78                    | 431                   |
| 0.00                      | 0.00          | 5.79       | 5.79  | -4.41                    | 426                   |
| 0.00                      | 0.00          | 5.57       | 5.57  | -4.09                    | 422                   |
| 0.00                      | 0.00          | 5.34       | 5.34  | -3.79                    | 419                   |
| 0.00                      | 0.00          | 5.10       | 5.10  | -3.49                    | 415                   |
| 0.00                      | 0.00          | 4.92       | 4.92  | -3.24                    | 412                   |
| 0.00                      | 0.00          | 4.73       | 4.73  | -2.98                    | 409                   |
| 0.00                      | 0.00          | 4.52       | 4.52  | -2.76                    | 406                   |
| 0.00                      | 0.00          | 4.31       | 4.31  | -2.54                    | 404                   |
| 0.00                      | 0.00          | 4.17       | 4.17  | -2.34                    | 401                   |
| 0.00                      | 0.00          | 3.94       | 3.94  | -2.15                    | 399                   |
| 0.00                      | 0.00          | 3.78       | 3.78  | -1.97                    | 397                   |
| 0.00                      | 0.00          | 3.61       | 3.61  | -1.81                    | 395                   |
| 0.00                      | 0.00          | 3.43       | 3.43  | -1.66                    | 394                   |
| 0.00                      | 0.00          | 3.34       | 3.34  | -1.56                    | 392                   |
| 0.00                      | 0.00          | 3.15       | 3.15  | -1.48                    | 391                   |
| 0.00                      | 0.00          | 3.05       | 3.05  | -1.41                    | 389                   |

## Laminación de avenida T = 5 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 21.0    | 1260      | 0.00              | 126.013            |
| 21.1    | 1265      | 0.00              | 126.012            |
| 21.2    | 1270      | 0.00              | 126.011            |
| 21.3    | 1275      | 0.00              | 126.010            |
| 21.3    | 1280      | 0.00              | 126.009            |
| 21.4    | 1285      | 0.00              | 126.008            |
| 21.5    | 1290      | 0.00              | 126.007            |
| 21.6    | 1295      | 0.00              | 126.006            |
| 21.7    | 1300      | 0.00              | 126.005            |
| 21.8    | 1305      | 0.00              | 126.005            |
| 21.8    | 1310      | 0.00              | 126.004            |
| 21.9    | 1315      | 0.00              | 126.004            |
| 22.0    | 1320      | 0.00              | 126.003            |
| 22.1    | 1325      | 0.00              | 126.003            |
| 22.2    | 1330      | 0.00              | 126.002            |
| 22.3    | 1335      | 0.00              | 126.002            |
| 22.3    | 1340      | 0.00              | 126.002            |
| 22.4    | 1345      | 0.00              | 126.002            |
| 22.5    | 1350      | 0.00              | 126.001            |
| 22.6    | 1355      | 0.00              | 126.001            |
| 22.7    | 1360      | 0.00              | 126.001            |
| 22.8    | 1365      | 0.00              | 126.001            |
| 22.8    | 1370      | 0.00              | 126.001            |
| 22.9    | 1375      | 0.00              | 126.001            |
| 23.0    | 1380      | 0.00              | 126.001            |
| 23.1    | 1385      | 0.00              | 126.001            |
| 23.2    | 1390      | 0.00              | 126.000            |

| CAUDALES DE SALIDA [m3/s] |               |            |       | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|-------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 2.84       | 2.84  | -1.33                    | 388                   |
| 0.00                      | 0.00          | 2.73       | 2.73  | -1.24                    | 387                   |
| 0.00                      | 0.00          | 2.61       | 2.61  | -1.12                    | 385                   |
| 0.00                      | 0.00          | 2.49       | 2.49  | -1.01                    | 384                   |
| 0.00                      | 0.00          | 8.52       | 8.52  | -0.91                    | 384                   |
| 0.00                      | 0.00          | 8.52       | 8.52  | -0.82                    | 383                   |
| 0.00                      | 0.00          | 8.52       | 8.52  | -0.87                    | 382                   |
| 0.00                      | 0.00          | 8.51       | 8.51  | -0.87                    | 381                   |
| 0.00                      | 0.00          | 8.51       | 8.51  | -0.68                    | 380                   |
| 0.00                      | 0.00          | 8.51       | 8.51  | -0.53                    | 380                   |
| 0.00                      | 0.00          | 8.51       | 8.51  | -0.42                    | 379                   |
| 0.00                      | 0.00          | 8.51       | 8.51  | -0.35                    | 379                   |
| 0.00                      | 0.00          | 8.51       | 8.51  | -0.30                    | 379                   |
| 0.00                      | 0.00          | 8.51       | 8.51  | -0.25                    | 378                   |
| 0.00                      | 0.00          | 8.51       | 8.51  | -0.22                    | 378                   |
| 0.00                      | 0.00          | 8.51       | 8.51  | -0.18                    | 378                   |
| 0.00                      | 0.00          | 8.51       | 8.51  | -0.16                    | 378                   |
| 0.00                      | 0.00          | 8.51       | 8.51  | -0.14                    | 378                   |
| 0.00                      | 0.00          | 8.50       | 8.50  | -0.11                    | 378                   |
| 0.00                      | 0.00          | 8.50       | 8.50  | -0.11                    | 378                   |
| 0.00                      | 0.00          | 8.50       | 8.50  | -0.11                    | 377                   |
| 0.00                      | 0.00          | 8.50       | 8.50  | -0.11                    | 377                   |
| 0.00                      | 0.00          | 8.50       | 8.50  | -0.11                    | 377                   |
| 0.00                      | 0.00          | 8.50       | 8.50  | -0.11                    | 377                   |
| 0.00                      | 0.00          | 8.50       | 8.50  | -0.11                    | 377                   |
| 0.00                      | 0.00          | 8.50       | 8.50  | -0.11                    | 377                   |

## Laminación de avenida T = 10 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 0.0     | 0         | 0.00              | 126.000            |
| 0.1     | 5         | 0.10              | 126.000            |
| 0.2     | 10        | 0.10              | 126.001            |
| 0.3     | 15        | 0.30              | 126.004            |
| 0.3     | 20        | 0.50              | 126.008            |
| 0.4     | 25        | 0.70              | 126.017            |
| 0.5     | 30        | 1.10              | 126.031            |
| 0.6     | 35        | 1.60              | 126.054            |
| 0.7     | 40        | 2.30              | 126.088            |
| 0.8     | 45        | 3.50              | 126.137            |
| 0.8     | 50        | 5.60              | 126.206            |
| 0.9     | 55        | 8.80              | 126.311            |
| 1.0     | 60        | 13.60             | 126.477            |
| 1.1     | 65        | 19.80             | 126.710            |
| 1.2     | 70        | 27.10             | 127.042            |
| 1.3     | 75        | 34.90             | 127.425            |
| 1.3     | 80        | 42.80             | 127.826            |
| 1.4     | 85        | 50.30             | 128.248            |
| 1.5     | 90        | 57.20             | 128.689            |
| 1.6     | 95        | 64.20             | 129.159            |
| 1.7     | 100       | 72.30             | 129.616            |
| 1.8     | 105       | 81.80             | 130.040            |
| 1.8     | 110       | 93.30             | 130.448            |
| 1.9     | 115       | 106.90            | 130.856            |
| 2.0     | 120       | 121.70            | 131.267            |
| 2.1     | 125       | 137.30            | 131.680            |
| 2.2     | 130       | 153.00            | 132.102            |
| 2.3     | 135       | 168.60            | 132.547            |
| 2.3     | 140       | 183.40            | 133.027            |
| 2.4     | 145       | 196.80            | 133.524            |
| 2.5     | 150       | 208.90            | 134.023            |
| 2.6     | 155       | 219.80            | 134.531            |
| 2.7     | 160       | 229.50            | 135.053            |
| 2.8     | 165       | 237.80            | 135.583            |
| 2.8     | 170       | 244.90            | 136.117            |
| 2.9     | 175       | 250.80            | 136.648            |
| 3.0     | 180       | 255.30            | 137.173            |
| 3.1     | 185       | 258.70            | 137.691            |
| 3.2     | 190       | 260.90            | 138.197            |
| 3.3     | 195       | 262.00            | 138.693            |
| 3.3     | 200       | 261.90            | 139.175            |
| 3.4     | 205       | 260.90            | 139.643            |
| 3.5     | 210       | 258.90            | 140.095            |
| 3.6     | 215       | 256.10            | 140.530            |
| 3.7     | 220       | 252.70            | 140.943            |
| 3.8     | 225       | 248.80            | 141.336            |
| 3.8     | 230       | 244.20            | 141.709            |
| 3.9     | 235       | 239.30            | 142.063            |
| 4.0     | 240       | 234.10            | 142.395            |
| 4.1     | 245       | 228.50            | 142.708            |
| 4.2     | 250       | 222.80            | 143.005            |
| 4.3     | 255       | 216.90            | 143.278            |
| 4.3     | 260       | 210.90            | 143.537            |
| 4.4     | 265       | 204.90            | 143.774            |
| 4.5     | 270       | 198.80            | 143.998            |
| 4.6     | 275       | 192.80            | 144.201            |
| 4.7     | 280       | 186.90            | 144.392            |
| 4.8     | 285       | 181.00            | 144.568            |
| 4.8     | 290       | 175.30            | 144.728            |
| 4.9     | 295       | 169.70            | 144.877            |
| 5.0     | 300       | 164.20            | 145.014            |
| 5.1     | 305       | 158.90            | 145.135            |
| 5.2     | 310       | 153.80            | 145.247            |

| CAUDALES DE SALIDA [m³/s] |               |            |        | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|--------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL  | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 0.00       | 0.00   | -                        | 2                     |
| 0.00                      | 0.00          | 0.00       | 0.00   | 5.45                     | 8                     |
| 0.00                      | 0.00          | 0.19       | 0.19   | 12.90                    | 21                    |
| 0.00                      | 0.00          | 0.38       | 0.38   | 26.44                    | 47                    |
| 0.00                      | 0.00          | 0.54       | 0.54   | 48.79                    | 96                    |
| 0.00                      | 0.00          | 0.78       | 0.78   | 83.15                    | 179                   |
| 0.00                      | 0.00          | 1.06       | 1.06   | 132.69                   | 312                   |
| 0.00                      | 0.00          | 1.40       | 1.40   | 198.95                   | 511                   |
| 0.00                      | 0.00          | 1.78       | 1.78   | 281.41                   | 792                   |
| 0.00                      | 0.00          | 2.23       | 2.23   | 401.54                   | 1194                  |
| 0.00                      | 0.00          | 2.73       | 2.73   | 608.91                   | 1802                  |
| 0.00                      | 0.00          | 3.35       | 3.35   | 961.45                   | 2764                  |
| 0.00                      | 0.00          | 4.15       | 4.15   | 1486.85                  | 4251                  |
| 0.00                      | 0.00          | 5.07       | 5.07   | 2227.73                  | 6478                  |
| 0.00                      | 0.00          | 6.14       | 6.14   | 3252.05                  | 9731                  |
| 0.00                      | 0.00          | 7.18       | 7.18   | 4557.50                  | 14288                 |
| 0.00                      | 0.00          | 8.12       | 8.12   | 5765.50                  | 20054                 |
| 0.00                      | 0.00          | 12.40      | 12.40  | 6911.39                  | 26965                 |
| 0.00                      | 0.00          | 20.67      | 20.67  | 8339.52                  | 35304                 |
| 0.00                      | 0.00          | 26.81      | 26.81  | 9213.70                  | 44518                 |
| 0.00                      | 0.00          | 31.66      | 31.66  | 9660.66                  | 54179                 |
| 0.00                      | 0.00          | 35.57      | 35.57  | 10640.95                 | 64820                 |
| 0.00                      | 0.00          | 38.96      | 38.96  | 12186.93                 | 77007                 |
| 0.00                      | 0.00          | 42.09      | 42.09  | 14337.52                 | 91344                 |
| 0.00                      | 0.00          | 45.01      | 45.01  | 17162.54                 | 108507                |
| 0.00                      | 0.00          | 47.77      | 47.77  | 20544.88                 | 129052                |
| 0.00                      | 0.00          | 50.44      | 50.44  | 24246.49                 | 153298                |
| 0.00                      | 0.00          | 53.10      | 53.10  | 28080.41                 | 181378                |
| 0.00                      | 0.00          | 55.84      | 55.84  | 31925.88                 | 213304                |
| 0.00                      | 0.00          | 58.53      | 58.53  | 35647.14                 | 248952                |
| 0.00                      | 0.00          | 61.12      | 61.12  | 39076.90                 | 288028                |
| 0.00                      | 0.00          | 63.64      | 63.64  | 42124.51                 | 330153                |
| 0.00                      | 0.00          | 66.14      | 66.14  | 44808.20                 | 374961                |
| 0.00                      | 0.00          | 68.58      | 68.58  | 47157.70                 | 422119                |
| 0.00                      | 0.00          | 70.95      | 70.95  | 49136.15                 | 471255                |
| 0.00                      | 0.00          | 73.23      | 73.23  | 50753.25                 | 522008                |
| 0.00                      | 0.00          | 75.42      | 75.42  | 52039.44                 | 574048                |
| 0.00                      | 0.00          | 77.52      | 77.52  | 52967.60                 | 627015                |
| 0.00                      | 0.00          | 79.52      | 79.52  | 53542.48                 | 680558                |
| 0.00                      | 0.00          | 81.43      | 81.43  | 53810.36                 | 734368                |
| 0.00                      | 0.00          | 83.25      | 83.25  | 53761.21                 | 788129                |
| 0.00                      | 0.00          | 84.97      | 84.97  | 53387.09                 | 841516                |
| 0.00                      | 0.00          | 86.61      | 86.61  | 52739.58                 | 894256                |
| 0.00                      | 0.00          | 88.15      | 88.15  | 51840.94                 | 946097                |
| 0.00                      | 0.00          | 89.59      | 89.59  | 50698.81                 | 996796                |
| 0.00                      | 0.00          | 90.94      | 90.94  | 49370.38                 | 1046166               |
| 0.00                      | 0.00          | 92.21      | 92.21  | 47891.37                 | 1094057               |
| 0.00                      | 0.00          | 93.39      | 93.39  | 46268.22                 | 1140326               |
| 0.00                      | 0.00          | 94.48      | 94.48  | 44533.25                 | 1184859               |
| 0.00                      | 0.00          | 95.51      | 95.51  | 42708.88                 | 1227568               |
| 0.00                      | 0.00          | 96.47      | 96.47  | 40808.40                 | 1268376               |
| 0.00                      | 0.00          | 97.34      | 97.34  | 38856.08                 | 1307232               |
| 0.00                      | 0.00          | 98.16      | 98.16  | 36874.42                 | 1344107               |
| 0.00                      | 0.00          | 98.91      | 98.91  | 34874.23                 | 1378981               |
| 0.00                      | 0.00          | 99.61      | 99.61  | 32868.27                 | 1411849               |
| 0.00                      | 0.00          | 100.24     | 100.24 | 30870.29                 | 1442720               |
| 0.00                      | 0.00          | 100.83     | 100.83 | 28889.46                 | 1471609               |
| 0.00                      | 0.00          | 101.37     | 101.37 | 26939.57                 | 1498549               |
| 0.00                      | 0.00          | 101.85     | 101.85 | 25025.47                 | 1523574               |
| 0.00                      | 0.00          | 102.31     | 102.31 | 23153.48                 | 1546728               |
| 0.00                      | 0.00          | 102.72     | 102.72 | 21334.40                 | 1568062               |
| 0.00                      | 0.00          | 103.09     | 103.09 | 19567.09                 | 1587629               |
| 0.00                      | 0.00          | 103.42     | 103.42 | 17852.14                 | 1605481               |

## Laminación de avenida T = 10 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 5.3     | 315       | 148.80            | 145.349            |
| 5.3     | 320       | 144.00            | 145.441            |
| 5.4     | 325       | 139.30            | 145.523            |
| 5.5     | 330       | 134.80            | 145.595            |
| 5.6     | 335       | 130.40            | 145.658            |
| 5.7     | 340       | 126.20            | 145.713            |
| 5.8     | 345       | 122.10            | 145.761            |
| 5.8     | 350       | 118.20            | 145.801            |
| 5.9     | 355       | 114.40            | 145.835            |
| 6.0     | 360       | 110.80            | 145.862            |
| 6.1     | 365       | 107.30            | 145.882            |
| 6.2     | 370       | 103.90            | 145.897            |
| 6.3     | 375       | 100.70            | 145.905            |
| 6.3     | 380       | 97.60             | 145.908            |
| 6.4     | 385       | 94.60             | 145.905            |
| 6.5     | 390       | 91.80             | 145.897            |
| 6.6     | 395       | 89.10             | 145.885            |
| 6.7     | 400       | 86.50             | 145.867            |
| 6.8     | 405       | 84.00             | 145.846            |
| 6.8     | 410       | 81.60             | 145.820            |
| 6.9     | 415       | 79.30             | 145.789            |
| 7.0     | 420       | 77.10             | 145.755            |
| 7.1     | 425       | 75.00             | 145.718            |
| 7.2     | 430       | 72.90             | 145.677            |
| 7.3     | 435       | 71.00             | 145.632            |
| 7.3     | 440       | 69.10             | 145.585            |
| 7.4     | 445       | 67.40             | 145.534            |
| 7.5     | 450       | 65.70             | 145.480            |
| 7.6     | 455       | 64.00             | 145.421            |
| 7.7     | 460       | 62.40             | 145.360            |
| 7.8     | 465       | 60.90             | 145.296            |
| 7.8     | 470       | 59.50             | 145.230            |
| 7.9     | 475       | 58.00             | 145.161            |
| 8.0     | 480       | 56.70             | 145.091            |
| 8.1     | 485       | 55.40             | 145.018            |
| 8.2     | 490       | 54.10             | 144.941            |
| 8.3     | 495       | 52.90             | 144.861            |
| 8.3     | 500       | 51.70             | 144.779            |
| 8.4     | 505       | 50.60             | 144.695            |
| 8.5     | 510       | 49.50             | 144.610            |
| 8.6     | 515       | 48.50             | 144.523            |
| 8.7     | 520       | 47.40             | 144.433            |
| 8.8     | 525       | 46.50             | 144.339            |
| 8.8     | 530       | 45.50             | 144.245            |
| 8.9     | 535       | 44.60             | 144.149            |
| 9.0     | 540       | 43.70             | 144.052            |
| 9.1     | 545       | 42.90             | 143.952            |
| 9.2     | 550       | 42.10             | 143.848            |
| 9.3     | 555       | 41.30             | 143.744            |
| 9.3     | 560       | 40.50             | 143.639            |
| 9.4     | 565       | 39.80             | 143.533            |
| 9.5     | 570       | 39.00             | 143.423            |
| 9.6     | 575       | 38.40             | 143.310            |
| 9.7     | 580       | 37.70             | 143.197            |
| 9.8     | 585       | 37.00             | 143.084            |
| 9.8     | 590       | 36.40             | 142.968            |
| 9.9     | 595       | 35.80             | 142.849            |
| 10.0    | 600       | 35.20             | 142.730            |
| 10.1    | 605       | 34.60             | 142.609            |
| 10.2    | 610       | 34.00             | 142.488            |
| 10.3    | 615       | 33.50             | 142.363            |
| 10.3    | 620       | 32.90             | 142.238            |
| 10.4    | 625       | 32.40             | 142.112            |

| CAUDALES DE SALIDA [m³/s] |               |            |        | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|--------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL  | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 103.73     | 103.73 | 16196.35                 | 1621677               |
| 0.00                      | 0.00          | 104.00     | 104.00 | 14596.68                 | 1636274               |
| 0.00                      | 0.00          | 104.25     | 104.25 | 13053.09                 | 1649327               |
| 0.00                      | 0.00          | 104.46     | 104.46 | 11569.08                 | 1660896               |
| 0.00                      | 0.00          | 104.65     | 104.65 | 10139.40                 | 1671036               |
| 0.00                      | 0.00          | 104.81     | 104.81 | 8760.94                  | 1679797               |
| 0.00                      | 0.00          | 104.95     | 104.95 | 7435.88                  | 1687233               |
| 0.00                      | 0.00          | 105.07     | 105.07 | 6157.88                  | 1693390               |
| 0.00                      | 0.00          | 105.17     | 105.17 | 4925.36                  | 1698316               |
| 0.00                      | 0.00          | 105.25     | 105.25 | 3745.55                  | 1702061               |
| 0.00                      | 0.00          | 105.31     | 105.31 | 2617.25                  | 1704679               |
| 0.00                      | 0.00          | 105.35     | 105.35 | 1536.01                  | 1706215               |
| 0.00                      | 0.00          | 105.38     | 105.38 | 503.34                   | 1706718               |
| 0.00                      | 0.00          | 105.38     | 105.38 | -480.95                  | 1706237               |
| 0.00                      | 0.00          | 105.38     | 105.38 | -1422.28                 | 1704815               |
| 0.00                      | 0.00          | 105.35     | 105.35 | -2321.14                 | 1702494               |
| 0.00                      | 0.00          | 105.32     | 105.32 | -3176.91                 | 1699317               |
| 0.00                      | 0.00          | 105.26     | 105.26 | -3993.90                 | 1695323               |
| 0.00                      | 0.00          | 105.20     | 105.20 | -4773.20                 | 1690550               |
| 0.00                      | 0.00          | 105.13     | 105.13 | -5513.70                 | 1685036               |
| 0.00                      | 0.00          | 105.03     | 105.03 | -6218.99                 | 1678817               |
| 0.00                      | 0.00          | 104.93     | 104.93 | -6891.60                 | 1671925               |
| 0.00                      | 0.00          | 104.82     | 104.82 | -7530.78                 | 1664394               |
| 0.00                      | 0.00          | 104.70     | 104.70 | -8138.49                 | 1656256               |
| 0.00                      | 0.00          | 104.57     | 104.57 | -8717.17                 | 1647539               |
| 0.00                      | 0.00          | 104.43     | 104.43 | -9266.45                 | 1638272               |
| 0.00                      | 0.00          | 104.28     | 104.28 | -9787.46                 | 1628485               |
| 0.00                      | 0.00          | 104.12     | 104.12 | -10282.35                | 1618203               |
| 0.00                      | 0.00          | 103.94     | 103.94 | -10751.80                | 1607451               |
| 0.00                      | 0.00          | 103.76     | 103.76 | -11197.30                | 1596253               |
| 0.00                      | 0.00          | 103.57     | 103.57 | -11621.41                | 1584632               |
| 0.00                      | 0.00          | 103.37     | 103.37 | -12024.65                | 1572607               |
| 0.00                      | 0.00          | 103.16     | 103.16 | -12407.40                | 1560200               |
| 0.00                      | 0.00          | 102.95     | 102.95 | -12772.23                | 1547428               |
| 0.00                      | 0.00          | 102.73     | 102.73 | -13118.27                | 1534310               |
| 0.00                      | 0.00          | 102.50     | 102.50 | -13444.48                | 1520865               |
| 0.00                      | 0.00          | 102.26     | 102.26 | -13754.07                | 1507111               |
| 0.00                      | 0.00          | 102.01     | 102.01 | -14048.59                | 1493062               |
| 0.00                      | 0.00          | 101.75     | 101.75 | -14327.84                | 1478735               |
| 0.00                      | 0.00          | 101.49     | 101.49 | -14593.22                | 1464141               |
| 0.00                      | 0.00          | 101.23     | 101.23 | -14844.22                | 1449297               |
| 0.00                      | 0.00          | 100.95     | 100.95 | -15079.53                | 1434218               |
| 0.00                      | 0.00          | 100.66     | 100.66 | -15301.20                | 1418916               |
| 0.00                      | 0.00          | 100.37     | 100.37 | -15510.88                | 1403405               |
| 0.00                      | 0.00          | 100.08     | 100.08 | -15708.35                | 1387697               |
| 0.00                      | 0.00          | 99.77      | 99.77  | -15893.03                | 1371804               |
| 0.00                      | 0.00          | 99.46      | 99.46  | -16064.87                | 1355739               |
| 0.00                      | 0.00          | 99.14      | 99.14  | -16224.92                | 1339514               |
| 0.00                      | 0.00          | 98.81      | 98.81  | -16374.62                | 1323140               |
| 0.00                      | 0.00          | 98.48      | 98.48  | -16515.29                | 1306624               |
| 0.00                      | 0.00          | 98.15      | 98.15  | -16645.04                | 1289979               |
| 0.00                      | 0.00          | 97.80      | 97.80  | -16763.13                | 1273216               |
| 0.00                      | 0.00          | 97.44      | 97.44  | -16872.85                | 1256343               |
| 0.00                      | 0.00          | 97.08      | 97.08  | -16975.25                | 1239368               |
| 0.00                      | 0.00          | 96.72      | 96.72  | -17069.30                | 1222299               |
| 0.00                      | 0.00          | 96.35      | 96.35  | -17153.44                | 1205145               |
| 0.00                      | 0.00          | 95.96      | 95.96  | -17228.93                | 1187916               |
| 0.00                      | 0.00          | 95.58      | 95.58  | -17298.12                | 1170618               |
| 0.00                      | 0.00          | 95.18      | 95.18  | -17361.22                | 1153257               |
| 0.00                      | 0.00          | 94.79      | 94.79  | -17415.52                | 1135842               |
| 0.00                      | 0.00          | 94.38      | 94.38  | -17461.10                | 1118381               |
| 0.00                      | 0.00          | 93.97      | 93.97  | -17501.25                | 1100879               |
| 0.00                      | 0.00          | 93.55      | 93.55  | -17536.06                | 1083343               |



## Laminación de avenida T = 10 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 10.5    | 630       | 31.90             | 141.985            |
| 10.6    | 635       | 31.40             | 141.855            |
| 10.7    | 640       | 31.00             | 141.724            |
| 10.8    | 645       | 30.50             | 141.593            |
| 10.8    | 650       | 30.00             | 141.460            |
| 10.9    | 655       | 29.60             | 141.325            |
| 11.0    | 660       | 29.20             | 141.189            |
| 11.1    | 665       | 28.80             | 141.054            |
| 11.2    | 670       | 28.40             | 140.915            |
| 11.3    | 675       | 28.00             | 140.775            |
| 11.3    | 680       | 27.60             | 140.636            |
| 11.4    | 685       | 27.20             | 140.496            |
| 11.5    | 690       | 26.80             | 140.352            |
| 11.6    | 695       | 26.50             | 140.208            |
| 11.7    | 700       | 26.10             | 140.064            |
| 11.8    | 705       | 25.80             | 139.919            |
| 11.8    | 710       | 25.40             | 139.771            |
| 11.9    | 715       | 25.10             | 139.625            |
| 12.0    | 720       | 24.80             | 139.478            |
| 12.1    | 725       | 24.50             | 139.328            |
| 12.2    | 730       | 24.20             | 139.178            |
| 12.3    | 735       | 23.90             | 139.029            |
| 12.3    | 740       | 23.60             | 138.877            |
| 12.4    | 745       | 23.30             | 138.725            |
| 12.5    | 750       | 23.00             | 138.574            |
| 12.6    | 755       | 22.70             | 138.421            |
| 12.7    | 760       | 22.50             | 138.266            |
| 12.8    | 765       | 22.20             | 138.113            |
| 12.8    | 770       | 21.90             | 137.959            |
| 12.9    | 775       | 21.70             | 137.802            |
| 13.0    | 780       | 21.40             | 137.646            |
| 13.1    | 785       | 21.20             | 137.491            |
| 13.2    | 790       | 20.90             | 137.331            |
| 13.3    | 795       | 20.70             | 137.173            |
| 13.3    | 800       | 20.40             | 137.016            |
| 13.4    | 805       | 20.10             | 136.854            |
| 13.5    | 810       | 19.80             | 136.694            |
| 13.6    | 815       | 19.50             | 136.534            |
| 13.7    | 820       | 19.10             | 136.371            |
| 13.8    | 825       | 18.80             | 136.207            |
| 13.8    | 830       | 18.50             | 136.045            |
| 13.9    | 835       | 18.10             | 135.879            |
| 14.0    | 840       | 17.80             | 135.712            |
| 14.1    | 845       | 17.40             | 135.547            |
| 14.2    | 850       | 17.10             | 135.378            |
| 14.3    | 855       | 16.70             | 135.210            |
| 14.3    | 860       | 16.30             | 135.042            |
| 14.4    | 865       | 15.80             | 134.871            |
| 14.5    | 870       | 15.40             | 134.699            |
| 14.6    | 875       | 14.90             | 134.529            |
| 14.7    | 880       | 14.30             | 134.354            |
| 14.8    | 885       | 13.80             | 134.179            |
| 14.8    | 890       | 13.30             | 134.006            |
| 14.9    | 895       | 12.70             | 133.822            |
| 15.0    | 900       | 12.10             | 133.639            |
| 15.1    | 905       | 11.60             | 133.453            |
| 15.2    | 910       | 11.00             | 133.254            |
| 15.3    | 915       | 10.50             | 133.057            |
| 15.3    | 920       | 9.90              | 132.850            |
| 15.4    | 925       | 9.40              | 132.641            |
| 15.5    | 930       | 8.90              | 132.431            |
| 15.6    | 935       | 8.40              | 132.214            |
| 15.7    | 940       | 7.90              | 132.003            |

| CAUDALES DE SALIDA [m³/s] |               |            |       | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|-------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 93.13      | 93.13 | -17562.63                | 1065781               |
| 0.00                      | 0.00          | 92.70      | 92.70 | -17581.65                | 1048199               |
| 0.00                      | 0.00          | 92.26      | 92.26 | -17596.42                | 1030602               |
| 0.00                      | 0.00          | 91.81      | 91.81 | -17605.68                | 1012997               |
| 0.00                      | 0.00          | 91.36      | 91.36 | -17606.71                | 995390                |
| 0.00                      | 0.00          | 90.90      | 90.90 | -17601.20                | 977789                |
| 0.00                      | 0.00          | 90.44      | 90.44 | -17592.16                | 960197                |
| 0.00                      | 0.00          | 89.98      | 89.98 | -17577.69                | 942619                |
| 0.00                      | 0.00          | 89.50      | 89.50 | -17556.69                | 925062                |
| 0.00                      | 0.00          | 89.01      | 89.01 | -17531.27                | 907531                |
| 0.00                      | 0.00          | 88.52      | 88.52 | -17502.73                | 890028                |
| 0.00                      | 0.00          | 88.03      | 88.03 | -17466.73                | 872562                |
| 0.00                      | 0.00          | 87.52      | 87.52 | -17423.77                | 855138                |
| 0.00                      | 0.00          | 87.01      | 87.01 | -17378.55                | 837759                |
| 0.00                      | 0.00          | 86.50      | 86.50 | -17328.70                | 820431                |
| 0.00                      | 0.00          | 85.98      | 85.98 | -17272.46                | 803158                |
| 0.00                      | 0.00          | 85.44      | 85.44 | -17212.31                | 785946                |
| 0.00                      | 0.00          | 84.91      | 84.91 | -17149.75                | 768796                |
| 0.00                      | 0.00          | 84.37      | 84.37 | -17081.44                | 751715                |
| 0.00                      | 0.00          | 83.82      | 83.82 | -17008.11                | 734707                |
| 0.00                      | 0.00          | 83.26      | 83.26 | -16933.37                | 717773                |
| 0.00                      | 0.00          | 82.70      | 82.70 | -16853.74                | 700919                |
| 0.00                      | 0.00          | 82.13      | 82.13 | -16768.39                | 684151                |
| 0.00                      | 0.00          | 81.56      | 81.56 | -16681.03                | 667470                |
| 0.00                      | 0.00          | 80.98      | 80.98 | -16590.15                | 650880                |
| 0.00                      | 0.00          | 80.39      | 80.39 | -16493.37                | 634386                |
| 0.00                      | 0.00          | 79.79      | 79.79 | -16393.28                | 617993                |
| 0.00                      | 0.00          | 79.19      | 79.19 | -16290.92                | 601702                |
| 0.00                      | 0.00          | 78.59      | 78.59 | -16182.00                | 585520                |
| 0.00                      | 0.00          | 77.97      | 77.97 | -16068.24                | 569452                |
| 0.00                      | 0.00          | 77.34      | 77.34 | -15953.98                | 553498                |
| 0.00                      | 0.00          | 76.72      | 76.72 | -15833.20                | 537665                |
| 0.00                      | 0.00          | 76.07      | 76.07 | -15706.22                | 521959                |
| 0.00                      | 0.00          | 75.42      | 75.42 | -15580.25                | 506378                |
| 0.00                      | 0.00          | 74.78      | 74.78 | -15451.48                | 490927                |
| 0.00                      | 0.00          | 74.10      | 74.10 | -15321.18                | 475606                |
| 0.00                      | 0.00          | 73.43      | 73.43 | -15197.52                | 460408                |
| 0.00                      | 0.00          | 72.75      | 72.75 | -15076.22                | 445332                |
| 0.00                      | 0.00          | 72.05      | 72.05 | -14954.40                | 430378                |
| 0.00                      | 0.00          | 71.34      | 71.34 | -14836.07                | 415542                |
| 0.00                      | 0.00          | 70.63      | 70.63 | -14715.01                | 400827                |
| 0.00                      | 0.00          | 69.90      | 69.90 | -14587.60                | 386239                |
| 0.00                      | 0.00          | 69.16      | 69.16 | -14459.49                | 371779                |
| 0.00                      | 0.00          | 68.41      | 68.41 | -14326.63                | 357453                |
| 0.00                      | 0.00          | 67.64      | 67.64 | -14187.29                | 343266                |
| 0.00                      | 0.00          | 66.87      | 66.87 | -14050.98                | 329215                |
| 0.00                      | 0.00          | 66.08      | 66.08 | -13915.50                | 315299                |
| 0.00                      | 0.00          | 65.28      | 65.28 | -13780.04                | 301519                |
| 0.00                      | 0.00          | 64.46      | 64.46 | -13653.55                | 287865                |
| 0.00                      | 0.00          | 63.63      | 63.63 | -13528.48                | 274337                |
| 0.00                      | 0.00          | 62.77      | 62.77 | -13401.92                | 260935                |
| 0.00                      | 0.00          | 61.90      | 61.90 | -13283.08                | 247652                |
| 0.00                      | 0.00          | 61.03      | 61.03 | -13156.32                | 234496                |
| 0.00                      | 0.00          | 60.09      | 60.09 | -13019.77                | 221476                |
| 0.00                      | 0.00          | 59.14      | 59.14 | -12883.11                | 208593                |
| 0.00                      | 0.00          | 58.15      | 58.15 | -12727.23                | 195866                |
| 0.00                      | 0.00          | 57.08      | 57.08 | -12557.36                | 183308                |
| 0.00                      | 0.00          | 56.00      | 56.00 | -12372.71                | 170935                |
| 0.00                      | 0.00          | 54.84      | 54.84 | -12165.29                | 158770                |
| 0.00                      | 0.00          | 53.65      | 53.65 | -11945.86                | 146824                |
| 0.00                      | 0.00          | 52.42      | 52.42 | -11703.70                | 135121                |
| 0.00                      | 0.00          | 51.12      | 51.12 | -11447.86                | 123673                |
| 0.00                      | 0.00          | 49.82      | 49.82 | -11151.63                | 112521                |



## Laminación de avenida T = 10 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 15.8    | 945       | 7.40              | 131.766            |
| 15.8    | 950       | 6.90              | 131.536            |
| 15.9    | 955       | 6.50              | 131.266            |
| 16.0    | 960       | 6.10              | 130.998            |
| 16.1    | 965       | 5.70              | 130.689            |
| 16.2    | 970       | 5.30              | 130.385            |
| 16.3    | 975       | 5.00              | 130.077            |
| 16.3    | 980       | 4.60              | 129.768            |
| 16.4    | 985       | 4.30              | 129.484            |
| 16.5    | 990       | 4.00              | 129.208            |
| 16.6    | 995       | 3.70              | 128.978            |
| 16.7    | 1000      | 3.50              | 128.739            |
| 16.8    | 1005      | 3.20              | 128.495            |
| 16.8    | 1010      | 3.00              | 128.248            |
| 16.9    | 1015      | 2.80              | 128.058            |
| 17.0    | 1020      | 2.60              | 127.883            |
| 17.1    | 1025      | 2.40              | 127.721            |
| 17.2    | 1030      | 2.20              | 127.578            |
| 17.3    | 1035      | 2.00              | 127.434            |
| 17.3    | 1040      | 1.90              | 127.282            |
| 17.4    | 1045      | 1.80              | 127.154            |
| 17.5    | 1050      | 1.60              | 127.045            |
| 17.6    | 1055      | 1.50              | 126.939            |
| 17.7    | 1060      | 1.40              | 126.839            |
| 17.8    | 1065      | 1.30              | 126.757            |
| 17.8    | 1070      | 1.20              | 126.688            |
| 17.9    | 1075      | 1.10              | 126.630            |
| 18.0    | 1080      | 1.00              | 126.580            |
| 18.1    | 1085      | 0.90              | 126.539            |
| 18.2    | 1090      | 0.90              | 126.502            |
| 18.3    | 1095      | 0.80              | 126.467            |
| 18.3    | 1100      | 0.70              | 126.433            |
| 18.4    | 1105      | 0.70              | 126.402            |
| 18.5    | 1110      | 0.60              | 126.372            |
| 18.6    | 1115      | 0.60              | 126.345            |
| 18.7    | 1120      | 0.50              | 126.320            |
| 18.8    | 1125      | 0.50              | 126.296            |
| 18.8    | 1130      | 0.50              | 126.274            |
| 18.9    | 1135      | 0.40              | 126.254            |
| 19.0    | 1140      | 0.40              | 126.235            |
| 19.1    | 1145      | 0.40              | 126.217            |
| 19.2    | 1150      | 0.30              | 126.200            |
| 19.3    | 1155      | 0.30              | 126.185            |
| 19.3    | 1160      | 0.30              | 126.171            |
| 19.4    | 1165      | 0.30              | 126.158            |
| 19.5    | 1170      | 0.20              | 126.146            |
| 19.6    | 1175      | 0.20              | 126.135            |
| 19.7    | 1180      | 0.20              | 126.124            |
| 19.8    | 1185      | 0.20              | 126.114            |
| 19.8    | 1190      | 0.20              | 126.105            |
| 19.9    | 1195      | 0.20              | 126.097            |
| 20.0    | 1200      | 0.10              | 126.089            |
| 20.1    | 1205      | 0.10              | 126.082            |
| 20.2    | 1210      | 0.10              | 126.076            |
| 20.3    | 1215      | 0.10              | 126.070            |
| 20.3    | 1220      | 0.10              | 126.064            |
| 20.4    | 1225      | 0.10              | 126.059            |
| 20.5    | 1230      | 0.10              | 126.054            |
| 20.6    | 1235      | 0.10              | 126.049            |
| 20.7    | 1240      | 0.10              | 126.045            |
| 20.8    | 1245      | 0.10              | 126.042            |
| 20.8    | 1250      | 0.10              | 126.038            |
| 20.9    | 1255      | 0.00              | 126.035            |

| CAUDALES DE SALIDA [m³/s] |               |            |       | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|-------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 48.33      | 48.33 | -10816.74                | 101704                |
| 0.00                      | 0.00          | 46.83      | 46.83 | -10420.75                | 91284                 |
| 0.00                      | 0.00          | 45.01      | 45.01 | -9956.44                 | 81327                 |
| 0.00                      | 0.00          | 43.12      | 43.12 | -9402.78                 | 71924                 |
| 0.00                      | 0.00          | 40.84      | 40.84 | -8746.51                 | 63178                 |
| 0.00                      | 0.00          | 38.46      | 38.46 | -8033.59                 | 55144                 |
| 0.00                      | 0.00          | 35.89      | 35.89 | -7214.60                 | 47930                 |
| 0.00                      | 0.00          | 33.11      | 33.11 | -6338.95                 | 41591                 |
| 0.00                      | 0.00          | 30.34      | 30.34 | -5352.55                 | 36238                 |
| 0.00                      | 0.00          | 27.37      | 27.37 | -4393.35                 | 31845                 |
| 0.00                      | 0.00          | 24.63      | 24.63 | -4032.17                 | 27813                 |
| 0.00                      | 0.00          | 21.41      | 21.41 | -4108.40                 | 23704                 |
| 0.00                      | 0.00          | 17.52      | 17.52 | -3660.01                 | 20044                 |
| 0.00                      | 0.00          | 12.40      | 12.40 | -2817.64                 | 17227                 |
| 0.00                      | 0.00          | 6.00       | 6.00  | -2258.15                 | 14968                 |
| 0.00                      | 0.00          | 8.25       | 8.25  | -1941.22                 | 13027                 |
| 0.00                      | 0.00          | 7.89       | 7.89  | -1716.36                 | 11311                 |
| 0.00                      | 0.00          | 7.55       | 7.55  | -1505.76                 | 9805                  |
| 0.00                      | 0.00          | 7.20       | 7.20  | -1289.06                 | 8516                  |
| 0.00                      | 0.00          | 6.81       | 6.81  | -1087.07                 | 7429                  |
| 0.00                      | 0.00          | 6.46       | 6.46  | -920.62                  | 6508                  |
| 0.00                      | 0.00          | 6.15       | 6.15  | -776.10                  | 5732                  |
| 0.00                      | 0.00          | 5.83       | 5.83  | -645.00                  | 5087                  |
| 0.00                      | 0.00          | 5.51       | 5.51  | -533.89                  | 4553                  |
| 0.00                      | 0.00          | 5.23       | 5.23  | -445.29                  | 4108                  |
| 0.00                      | 0.00          | 4.99       | 4.99  | -374.39                  | 3734                  |
| 0.00                      | 0.00          | 4.77       | 4.77  | -317.25                  | 3416                  |
| 0.00                      | 0.00          | 4.58       | 4.58  | -270.95                  | 3146                  |
| 0.00                      | 0.00          | 4.41       | 4.41  | -233.28                  | 2912                  |
| 0.00                      | 0.00          | 4.26       | 4.26  | -208.72                  | 2704                  |
| 0.00                      | 0.00          | 4.11       | 4.11  | -194.51                  | 2509                  |
| 0.00                      | 0.00          | 3.96       | 3.96  | -181.68                  | 2327                  |
| 0.00                      | 0.00          | 3.81       | 3.81  | -169.55                  | 2158                  |
| 0.00                      | 0.00          | 3.67       | 3.67  | -158.05                  | 2000                  |
| 0.00                      | 0.00          | 3.53       | 3.53  | -147.27                  | 1852                  |
| 0.00                      | 0.00          | 3.40       | 3.40  | -137.13                  | 1715                  |
| 0.00                      | 0.00          | 3.27       | 3.27  | -127.59                  | 1588                  |
| 0.00                      | 0.00          | 3.15       | 3.15  | -118.65                  | 1469                  |
| 0.00                      | 0.00          | 3.03       | 3.03  | -110.29                  | 1359                  |
| 0.00                      | 0.00          | 2.91       | 2.91  | -102.46                  | 1256                  |
| 0.00                      | 0.00          | 2.80       | 2.80  | -95.13                   | 1161                  |
| 0.00                      | 0.00          | 2.69       | 2.69  | -88.31                   | 1073                  |
| 0.00                      | 0.00          | 2.59       | 2.59  | -81.94                   | 991                   |
| 0.00                      | 0.00          | 2.49       | 2.49  | -75.97                   | 915                   |
| 0.00                      | 0.00          | 2.39       | 2.39  | -70.45                   | 845                   |
| 0.00                      | 0.00          | 2.30       | 2.30  | -65.30                   | 779                   |
| 0.00                      | 0.00          | 2.21       | 2.21  | -60.49                   | 719                   |
| 0.00                      | 0.00          | 2.12       | 2.12  | -56.05                   | 663                   |
| 0.00                      | 0.00          | 2.03       | 2.03  | -51.92                   | 611                   |
| 0.00                      | 0.00          | 1.95       | 1.95  | -48.08                   | 563                   |
| 0.00                      | 0.00          | 1.87       | 1.87  | -44.53                   | 518                   |
| 0.00                      | 0.00          | 1.79       | 1.79  | -41.23                   | 477                   |
| 0.00                      | 0.00          | 1.72       | 1.72  | -38.17                   | 439                   |
| 0.00                      | 0.00          | 1.66       | 1.66  | -35.33                   | 403                   |
| 0.00                      | 0.00          | 1.59       | 1.59  | -32.71                   | 371                   |
| 0.00                      | 0.00          | 1.52       | 1.52  | -30.25                   | 340                   |
| 0.00                      | 0.00          | 1.46       | 1.46  | -27.99                   | 313                   |
| 0.00                      | 0.00          | 1.40       | 1.40  | -25.88                   | 287                   |
| 0.00                      | 0.00          | 1.33       | 1.33  | -23.91                   | 263                   |
| 0.00                      | 0.00          | 1.28       | 1.28  | -22.08                   | 241                   |
| 0.00                      | 0.00          | 1.23       | 1.23  | -20.39                   | 220                   |
| 0.00                      | 0.00          | 1.17       | 1.17  | -18.81                   | 201                   |
| 0.00                      | 0.00          | 1.12       | 1.12  | -17.32                   | 184                   |

## Laminación de avenida T = 10 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 21.0    | 1260      | 0.00              | 126.032            |
| 21.1    | 1265      | 0.00              | 126.029            |
| 21.2    | 1270      | 0.00              | 126.026            |
| 21.3    | 1275      | 0.00              | 126.024            |
| 21.3    | 1280      | 0.00              | 126.022            |
| 21.4    | 1285      | 0.00              | 126.020            |
| 21.5    | 1290      | 0.00              | 126.018            |
| 21.6    | 1295      | 0.00              | 126.016            |
| 21.7    | 1300      | 0.00              | 126.015            |
| 21.8    | 1305      | 0.00              | 126.013            |
| 21.8    | 1310      | 0.00              | 126.012            |
| 21.9    | 1315      | 0.00              | 126.011            |
| 22.0    | 1320      | 0.00              | 126.010            |
| 22.1    | 1325      | 0.00              | 126.009            |
| 22.2    | 1330      | 0.00              | 126.008            |
| 22.3    | 1335      | 0.00              | 126.007            |
| 22.3    | 1340      | 0.00              | 126.006            |
| 22.4    | 1345      | 0.00              | 126.005            |
| 22.5    | 1350      | 0.00              | 126.005            |
| 22.6    | 1355      | 0.00              | 126.004            |
| 22.7    | 1360      | 0.00              | 126.004            |
| 22.8    | 1365      | 0.00              | 126.003            |
| 22.8    | 1370      | 0.00              | 126.003            |
| 22.9    | 1375      | 0.00              | 126.002            |
| 23.0    | 1380      | 0.00              | 126.002            |
| 23.1    | 1385      | 0.00              | 126.002            |
| 23.2    | 1390      | 0.00              | 126.002            |
| 23.3    | 1395      | 0.00              | 126.001            |
| 23.3    | 1400      | 0.00              | 126.001            |
| 23.4    | 1405      | 0.00              | 126.001            |
| 23.5    | 1410      | 0.00              | 126.001            |
| 23.6    | 1415      | 0.00              | 126.001            |
| 23.7    | 1420      | 0.00              | 126.001            |
| 23.8    | 1425      | 0.00              | 126.001            |
| 23.8    | 1430      | 0.00              | 126.000            |

| CAUDALES DE SALIDA [m3/s] |               |            |       | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|-------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 1.08       | 1.08  | -15.95                   | 168                   |
| 0.00                      | 0.00          | 1.02       | 1.02  | -14.67                   | 153                   |
| 0.00                      | 0.00          | 0.97       | 0.97  | -13.49                   | 140                   |
| 0.00                      | 0.00          | 0.93       | 0.93  | -12.45                   | 128                   |
| 0.00                      | 0.00          | 0.89       | 0.89  | -11.52                   | 116                   |
| 0.00                      | 0.00          | 0.85       | 0.85  | -10.70                   | 105                   |
| 0.00                      | 0.00          | 0.81       | 0.81  | -9.93                    | 95                    |
| 0.00                      | 0.00          | 0.76       | 0.76  | -9.20                    | 86                    |
| 0.00                      | 0.00          | 0.74       | 0.74  | -8.50                    | 78                    |
| 0.00                      | 0.00          | 0.69       | 0.69  | -7.82                    | 70                    |
| 0.00                      | 0.00          | 0.66       | 0.66  | -7.17                    | 63                    |
| 0.00                      | 0.00          | 0.63       | 0.63  | -6.56                    | 56                    |
| 0.00                      | 0.00          | 0.60       | 0.60  | -6.05                    | 50                    |
| 0.00                      | 0.00          | 0.57       | 0.57  | -5.67                    | 44                    |
| 0.00                      | 0.00          | 0.54       | 0.54  | -5.24                    | 39                    |
| 0.00                      | 0.00          | 0.50       | 0.50  | -4.69                    | 35                    |
| 0.00                      | 0.00          | 0.47       | 0.47  | -4.19                    | 30                    |
| 0.00                      | 0.00          | 0.43       | 0.43  | -3.71                    | 27                    |
| 0.00                      | 0.00          | 0.43       | 0.43  | -3.29                    | 23                    |
| 0.00                      | 0.00          | 0.38       | 0.38  | -2.91                    | 20                    |
| 0.00                      | 0.00          | 0.38       | 0.38  | -2.56                    | 18                    |
| 0.00                      | 0.00          | 0.33       | 0.33  | -2.26                    | 16                    |
| 0.00                      | 0.00          | 0.33       | 0.33  | -1.99                    | 14                    |
| 0.00                      | 0.00          | 0.27       | 0.27  | -1.74                    | 12                    |
| 0.00                      | 0.00          | 0.27       | 0.27  | -1.53                    | 10                    |
| 0.00                      | 0.00          | 0.27       | 0.27  | -1.34                    | 9                     |
| 0.00                      | 0.00          | 0.27       | 0.27  | -1.17                    | 8                     |
| 0.00                      | 0.00          | 0.19       | 0.19  | -1.03                    | 7                     |
| 0.00                      | 0.00          | 0.19       | 0.19  | -0.89                    | 6                     |
| 0.00                      | 0.00          | 0.19       | 0.19  | -0.78                    | 5                     |
| 0.00                      | 0.00          | 0.19       | 0.19  | -0.68                    | 4                     |
| 0.00                      | 0.00          | 0.19       | 0.19  | -0.59                    | 4                     |
| 0.00                      | 0.00          | 0.19       | 0.19  | -0.52                    | 3                     |
| 0.00                      | 0.00          | 0.19       | 0.19  | -0.44                    | 3                     |
| 0.00                      | 0.00          | 0.00       | 0.00  | -0.44                    | 2                     |

## Laminación de avenida T = 25 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 0.0     | 0         | 0.00              | 126.000            |
| 0.1     | 5         | 0.10              | 126.001            |
| 0.2     | 10        | 0.10              | 126.003            |
| 0.3     | 15        | 0.20              | 126.007            |
| 0.3     | 20        | 0.30              | 126.014            |
| 0.4     | 25        | 0.50              | 126.024            |
| 0.5     | 30        | 0.70              | 126.039            |
| 0.6     | 35        | 0.90              | 126.060            |
| 0.7     | 40        | 1.30              | 126.089            |
| 0.8     | 45        | 1.70              | 126.127            |
| 0.8     | 50        | 2.20              | 126.176            |
| 0.9     | 55        | 2.80              | 126.238            |
| 1.0     | 60        | 3.50              | 126.316            |
| 1.1     | 65        | 4.40              | 126.413            |
| 1.2     | 70        | 5.50              | 126.528            |
| 1.3     | 75        | 6.90              | 126.656            |
| 1.3     | 80        | 8.60              | 126.807            |
| 1.4     | 85        | 10.80             | 126.987            |
| 1.5     | 90        | 14.00             | 127.160            |
| 1.6     | 95        | 18.80             | 127.385            |
| 1.7     | 100       | 25.70             | 127.640            |
| 1.8     | 105       | 35.10             | 127.961            |
| 1.8     | 110       | 47.00             | 128.326            |
| 1.9     | 115       | 60.40             | 128.785            |
| 2.0     | 120       | 74.70             | 129.333            |
| 2.1     | 125       | 89.10             | 129.911            |
| 2.2     | 130       | 103.20            | 130.493            |
| 2.3     | 135       | 117.00            | 131.060            |
| 2.3     | 140       | 131.60            | 131.587            |
| 2.4     | 145       | 148.20            | 132.078            |
| 2.5     | 150       | 167.30            | 132.579            |
| 2.6     | 155       | 189.10            | 133.113            |
| 2.7     | 160       | 212.30            | 133.672            |
| 2.8     | 165       | 236.20            | 134.253            |
| 2.8     | 170       | 260.70            | 134.873            |
| 2.9     | 175       | 284.90            | 135.535            |
| 3.0     | 180       | 307.60            | 136.228            |
| 3.1     | 185       | 328.60            | 136.949            |
| 3.2     | 190       | 347.60            | 137.682            |
| 3.3     | 195       | 364.60            | 138.427            |
| 3.3     | 200       | 379.70            | 139.175            |
| 3.4     | 205       | 392.90            | 139.925            |
| 3.5     | 210       | 404.00            | 140.667            |
| 3.6     | 215       | 413.20            | 141.395            |
| 3.7     | 220       | 420.30            | 142.105            |
| 3.8     | 225       | 425.40            | 142.793            |
| 3.8     | 230       | 428.70            | 143.458            |
| 3.9     | 235       | 430.10            | 144.092            |
| 4.0     | 240       | 429.70            | 144.696            |
| 4.1     | 245       | 427.60            | 145.271            |
| 4.2     | 250       | 423.90            | 145.815            |
| 4.3     | 255       | 418.80            | 146.327            |
| 4.3     | 260       | 412.60            | 146.809            |
| 4.4     | 265       | 405.40            | 147.263            |
| 4.5     | 270       | 397.40            | 147.690            |
| 4.6     | 275       | 388.60            | 148.093            |
| 4.7     | 280       | 379.40            | 148.473            |
| 4.8     | 285       | 369.60            | 148.829            |
| 4.8     | 290       | 359.50            | 149.166            |
| 4.9     | 295       | 349.20            | 149.484            |
| 5.0     | 300       | 338.80            | 149.778            |
| 5.1     | 305       | 328.40            | 150.057            |
| 5.2     | 310       | 317.90            | 150.315            |

| CAUDALES DE SALIDA [m³/s] |               |            |        | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|--------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL  | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 0.00       | 0.00   | -                        | 2                     |
| 0.00                      | 0.00          | 0.19       | 0.19   | 4.83                     | 7                     |
| 0.00                      | 0.00          | 0.33       | 0.33   | 11.32                    | 18                    |
| 0.00                      | 0.00          | 0.50       | 0.50   | 22.07                    | 40                    |
| 0.00                      | 0.00          | 0.71       | 0.71   | 37.89                    | 78                    |
| 0.00                      | 0.00          | 0.93       | 0.93   | 59.65                    | 138                   |
| 0.00                      | 0.00          | 1.19       | 1.19   | 87.96                    | 226                   |
| 0.00                      | 0.00          | 1.47       | 1.47   | 123.46                   | 349                   |
| 0.00                      | 0.00          | 1.79       | 1.79   | 166.99                   | 516                   |
| 0.00                      | 0.00          | 2.14       | 2.14   | 220.17                   | 736                   |
| 0.00                      | 0.00          | 2.52       | 2.52   | 284.57                   | 1021                  |
| 0.00                      | 0.00          | 2.93       | 2.93   | 360.40                   | 1381                  |
| 0.00                      | 0.00          | 3.38       | 3.38   | 450.13                   | 1832                  |
| 0.00                      | 0.00          | 3.86       | 3.86   | 559.70                   | 2391                  |
| 0.00                      | 0.00          | 4.37       | 4.37   | 688.84                   | 3080                  |
| 0.00                      | 0.00          | 4.87       | 4.87   | 824.15                   | 3904                  |
| 0.00                      | 0.00          | 5.40       | 5.40   | 976.64                   | 4881                  |
| 0.00                      | 0.00          | 5.97       | 5.97   | 1162.46                  | 6043                  |
| 0.00                      | 0.00          | 6.47       | 6.47   | 1441.96                  | 7485                  |
| 0.00                      | 0.00          | 7.08       | 7.08   | 1904.52                  | 9390                  |
| 0.00                      | 0.00          | 7.70       | 7.70   | 2658.98                  | 12049                 |
| 0.00                      | 0.00          | 8.42       | 8.42   | 3861.72                  | 15911                 |
| 0.00                      | 0.00          | 14.22      | 14.22  | 5289.79                  | 21200                 |
| 0.00                      | 0.00          | 22.06      | 22.06  | 7394.70                  | 28595                 |
| 0.00                      | 0.00          | 28.75      | 28.75  | 10083.85                 | 38679                 |
| 0.00                      | 0.00          | 34.43      | 34.43  | 12454.62                 | 51133                 |
| 0.00                      | 0.00          | 39.32      | 39.32  | 14866.04                 | 66000                 |
| 0.00                      | 0.00          | 43.56      | 43.56  | 17599.82                 | 83599                 |
| 0.00                      | 0.00          | 47.16      | 47.16  | 20499.81                 | 104099                |
| 0.00                      | 0.00          | 50.29      | 50.29  | 23673.18                 | 127772                |
| 0.00                      | 0.00          | 53.29      | 53.29  | 27364.84                 | 155137                |
| 0.00                      | 0.00          | 56.31      | 56.31  | 31762.22                 | 186899                |
| 0.00                      | 0.00          | 59.31      | 59.31  | 36949.32                 | 223849                |
| 0.00                      | 0.00          | 62.27      | 62.27  | 42767.13                 | 266616                |
| 0.00                      | 0.00          | 65.29      | 65.29  | 48896.06                 | 315512                |
| 0.00                      | 0.00          | 68.36      | 68.36  | 55203.69                 | 370716                |
| 0.00                      | 0.00          | 71.43      | 71.43  | 61558.47                 | 432274                |
| 0.00                      | 0.00          | 74.50      | 74.50  | 67643.86                 | 499918                |
| 0.00                      | 0.00          | 77.49      | 77.49  | 73257.97                 | 573176                |
| 0.00                      | 0.00          | 80.41      | 80.41  | 78341.54                 | 651517                |
| 0.00                      | 0.00          | 83.25      | 83.25  | 82858.79                 | 734376                |
| 0.00                      | 0.00          | 86.00      | 86.00  | 86818.06                 | 821194                |
| 0.00                      | 0.00          | 88.63      | 88.63  | 90231.00                 | 911425                |
| 0.00                      | 0.00          | 91.14      | 91.14  | 93089.69                 | 1004515               |
| 0.00                      | 0.00          | 93.53      | 93.53  | 95386.11                 | 1099901               |
| 0.00                      | 0.00          | 95.78      | 95.78  | 97118.40                 | 1197019               |
| 0.00                      | 0.00          | 97.91      | 97.91  | 98287.32                 | 1295307               |
| 0.00                      | 0.00          | 99.90      | 99.90  | 98915.93                 | 1394223               |
| 0.00                      | 0.00          | 101.76     | 101.76 | 99027.30                 | 1493250               |
| 0.00                      | 0.00          | 103.49     | 103.49 | 98631.99                 | 1591882               |
| 0.00                      | 0.00          | 105.11     | 105.11 | 97747.65                 | 1689630               |
| 0.00                      | 0.00          | 106.61     | 106.61 | 96403.54                 | 1786033               |
| 0.00                      | 0.00          | 108.00     | 108.00 | 94647.76                 | 1880681               |
| 0.00                      | 0.00          | 109.30     | 109.30 | 92543.05                 | 1973224               |
| 0.00                      | 0.00          | 110.50     | 110.50 | 90148.79                 | 2063373               |
| 0.00                      | 0.00          | 111.63     | 111.63 | 87512.09                 | 2150885               |
| 0.00                      | 0.00          | 112.68     | 112.68 | 84672.47                 | 2235557               |
| 0.00                      | 0.00          | 113.65     | 113.65 | 81664.22                 | 2317222               |
| 0.00                      | 0.00          | 114.57     | 114.57 | 78518.80                 | 2395740               |
| 0.00                      | 0.00          | 115.43     | 115.43 | 75273.09                 | 2471013               |
| 0.00                      | 0.00          | 116.22     | 116.22 | 71968.08                 | 2542982               |
| 0.00                      | 0.00          | 116.96     | 116.96 | 68632.57                 | 2611614               |
| 0.00                      | 0.00          | 117.64     | 117.64 | 65289.52                 | 2676904               |

## Laminación de avenida T = 25 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 5.3     | 315       | 307.60            | 150.559            |
| 5.3     | 320       | 297.40            | 150.785            |
| 5.4     | 325       | 287.40            | 150.998            |
| 5.5     | 330       | 277.60            | 151.194            |
| 5.6     | 335       | 268.10            | 151.377            |
| 5.7     | 340       | 258.80            | 151.548            |
| 5.8     | 345       | 249.80            | 151.705            |
| 5.8     | 350       | 241.10            | 151.851            |
| 5.9     | 355       | 232.80            | 151.988            |
| 6.0     | 360       | 224.70            | 152.112            |
| 6.1     | 365       | 216.80            | 152.226            |
| 6.2     | 370       | 209.30            | 152.332            |
| 6.3     | 375       | 202.00            | 152.429            |
| 6.3     | 380       | 194.90            | 152.518            |
| 6.4     | 385       | 188.20            | 152.598            |
| 6.5     | 390       | 181.70            | 152.670            |
| 6.6     | 395       | 175.50            | 152.735            |
| 6.7     | 400       | 169.50            | 152.793            |
| 6.8     | 405       | 163.80            | 152.845            |
| 6.8     | 410       | 158.30            | 152.891            |
| 6.9     | 415       | 153.10            | 152.930            |
| 7.0     | 420       | 148.10            | 152.964            |
| 7.1     | 425       | 143.30            | 152.993            |
| 7.2     | 430       | 138.70            | 153.016            |
| 7.3     | 435       | 134.40            | 153.034            |
| 7.3     | 440       | 130.20            | 153.048            |
| 7.4     | 445       | 126.20            | 153.057            |
| 7.5     | 450       | 122.40            | 153.062            |
| 7.6     | 455       | 118.70            | 153.062            |
| 7.7     | 460       | 115.20            | 153.059            |
| 7.8     | 465       | 111.90            | 153.053            |
| 7.8     | 470       | 108.70            | 153.043            |
| 7.9     | 475       | 105.60            | 153.029            |
| 8.0     | 480       | 102.70            | 153.013            |
| 8.1     | 485       | 99.90             | 152.993            |
| 8.2     | 490       | 97.20             | 152.970            |
| 8.3     | 495       | 94.70             | 152.945            |
| 8.3     | 500       | 92.20             | 152.917            |
| 8.4     | 505       | 89.90             | 152.886            |
| 8.5     | 510       | 87.60             | 152.852            |
| 8.6     | 515       | 85.40             | 152.817            |
| 8.7     | 520       | 83.30             | 152.779            |
| 8.8     | 525       | 81.30             | 152.739            |
| 8.8     | 530       | 79.40             | 152.697            |
| 8.9     | 535       | 77.50             | 152.653            |
| 9.0     | 540       | 75.70             | 152.607            |
| 9.1     | 545       | 74.00             | 152.560            |
| 9.2     | 550       | 72.30             | 152.510            |
| 9.3     | 555       | 70.70             | 152.459            |
| 9.3     | 560       | 69.10             | 152.405            |
| 9.4     | 565       | 67.60             | 152.350            |
| 9.5     | 570       | 66.20             | 152.293            |
| 9.6     | 575       | 64.80             | 152.235            |
| 9.7     | 580       | 63.50             | 152.176            |
| 9.8     | 585       | 62.20             | 152.115            |
| 9.8     | 590       | 61.00             | 152.054            |
| 9.9     | 595       | 59.80             | 151.990            |
| 10.0    | 600       | 58.60             | 151.925            |
| 10.1    | 605       | 57.50             | 151.858            |
| 10.2    | 610       | 56.40             | 151.790            |
| 10.3    | 615       | 55.40             | 151.721            |
| 10.3    | 620       | 54.40             | 151.651            |
| 10.4    | 625       | 53.40             | 151.580            |

| CAUDALES DE SALIDA [m³/s] |               |            |        | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|--------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL  | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 118.28     | 118.28 | 61958.18                 | 2738862               |
| 0.00                      | 0.00          | 118.87     | 118.87 | 58654.77                 | 2797517               |
| 0.00                      | 0.00          | 119.43     | 119.43 | 55397.94                 | 2852915               |
| 0.00                      | 0.00          | 119.93     | 119.93 | 52204.43                 | 2905119               |
| 0.00                      | 0.00          | 120.41     | 120.41 | 49085.63                 | 2954205               |
| 0.00                      | 0.00          | 120.85     | 120.85 | 46049.47                 | 3000254               |
| 0.00                      | 0.00          | 121.25     | 121.25 | 43103.99                 | 3043358               |
| 0.00                      | 0.00          | 121.62     | 121.62 | 40250.98                 | 3083609               |
| 0.00                      | 0.00          | 121.97     | 121.97 | 37492.43                 | 3121101               |
| 0.00                      | 0.00          | 122.28     | 122.28 | 34832.13                 | 3155934               |
| 0.00                      | 0.00          | 122.57     | 122.57 | 32267.88                 | 3188201               |
| 0.00                      | 0.00          | 122.84     | 122.84 | 29795.52                 | 3217997               |
| 0.00                      | 0.00          | 123.09     | 123.09 | 27413.41                 | 3245410               |
| 0.00                      | 0.00          | 123.31     | 123.31 | 25113.38                 | 3270524               |
| 0.00                      | 0.00          | 123.51     | 123.51 | 22894.34                 | 3293418               |
| 0.00                      | 0.00          | 123.69     | 123.69 | 20764.34                 | 3314182               |
| 0.00                      | 0.00          | 123.85     | 123.85 | 18724.20                 | 3332907               |
| 0.00                      | 0.00          | 124.00     | 124.00 | 16771.73                 | 3349678               |
| 0.00                      | 0.00          | 124.13     | 124.13 | 14903.46                 | 3364582               |
| 0.00                      | 0.00          | 124.24     | 124.24 | 13115.85                 | 3377698               |
| 0.00                      | 0.00          | 124.34     | 124.34 | 11407.21                 | 3389105               |
| 0.00                      | 0.00          | 124.43     | 124.43 | 9775.55                  | 3398880               |
| 0.00                      | 0.00          | 124.50     | 124.50 | 8217.62                  | 3407098               |
| 0.00                      | 0.00          | 124.56     | 124.56 | 6730.67                  | 3413829               |
| 0.00                      | 0.00          | 124.60     | 124.60 | 5311.47                  | 3419140               |
| 0.00                      | 0.00          | 124.64     | 124.64 | 3956.30                  | 3423097               |
| 0.00                      | 0.00          | 124.66     | 124.66 | 2663.00                  | 3425760               |
| 0.00                      | 0.00          | 124.67     | 124.67 | 1429.78                  | 3427189               |
| 0.00                      | 0.00          | 124.67     | 124.67 | 254.08                   | 3427443               |
| 0.00                      | 0.00          | 124.66     | 124.66 | -866.58                  | 3426577               |
| 0.00                      | 0.00          | 124.65     | 124.65 | -1934.61                 | 3424642               |
| 0.00                      | 0.00          | 124.62     | 124.62 | -2952.76                 | 3421689               |
| 0.00                      | 0.00          | 124.59     | 124.59 | -3923.17                 | 3417766               |
| 0.00                      | 0.00          | 124.55     | 124.55 | -4847.87                 | 3412918               |
| 0.00                      | 0.00          | 124.50     | 124.50 | -5729.24                 | 3407189               |
| 0.00                      | 0.00          | 124.44     | 124.44 | -6569.42                 | 3400620               |
| 0.00                      | 0.00          | 124.38     | 124.38 | -7371.05                 | 3393249               |
| 0.00                      | 0.00          | 124.31     | 124.31 | -8136.87                 | 3385112               |
| 0.00                      | 0.00          | 124.23     | 124.23 | -8868.48                 | 3376243               |
| 0.00                      | 0.00          | 124.15     | 124.15 | -9567.30                 | 3366676               |
| 0.00                      | 0.00          | 124.06     | 124.06 | -10235.22                | 3356441               |
| 0.00                      | 0.00          | 123.96     | 123.96 | -10873.91                | 3345567               |
| 0.00                      | 0.00          | 123.86     | 123.86 | -11485.18                | 3334082               |
| 0.00                      | 0.00          | 123.76     | 123.76 | -12070.81                | 3322011               |
| 0.00                      | 0.00          | 123.65     | 123.65 | -12631.63                | 3309379               |
| 0.00                      | 0.00          | 123.53     | 123.53 | -13168.47                | 3296211               |
| 0.00                      | 0.00          | 123.41     | 123.41 | -13682.70                | 3282528               |
| 0.00                      | 0.00          | 123.29     | 123.29 | -14175.50                | 3268353               |
| 0.00                      | 0.00          | 123.16     | 123.16 | -14647.48                | 3253705               |
| 0.00                      | 0.00          | 123.02     | 123.02 | -15099.50                | 3238606               |
| 0.00                      | 0.00          | 122.89     | 122.89 | -15532.34                | 3223073               |
| 0.00                      | 0.00          | 122.74     | 122.74 | -15946.23                | 3207127               |
| 0.00                      | 0.00          | 122.60     | 122.60 | -16341.68                | 3190785               |
| 0.00                      | 0.00          | 122.45     | 122.45 | -16719.51                | 3174066               |
| 0.00                      | 0.00          | 122.29     | 122.29 | -17080.81                | 3156985               |
| 0.00                      | 0.00          | 122.14     | 122.14 | -17426.64                | 3139558               |
| 0.00                      | 0.00          | 121.97     | 121.97 | -17757.43                | 3121801               |
| 0.00                      | 0.00          | 121.81     | 121.81 | -18072.94                | 3103728               |
| 0.00                      | 0.00          | 121.64     | 121.64 | -18374.15                | 3085354               |
| 0.00                      | 0.00          | 121.46     | 121.46 | -18662.45                | 3066691               |
| 0.00                      | 0.00          | 121.29     | 121.29 | -18938.74                | 3047753               |
| 0.00                      | 0.00          | 121.11     | 121.11 | -19203.90                | 3028549               |
| 0.00                      | 0.00          | 120.93     | 120.93 | -19458.24                | 3009091               |

## Laminación de avenida T = 25 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 10.5    | 630       | 52.40             | 151.509            |
| 10.6    | 635       | 51.50             | 151.434            |
| 10.7    | 640       | 50.60             | 151.359            |
| 10.8    | 645       | 49.80             | 151.283            |
| 10.8    | 650       | 48.90             | 151.206            |
| 10.9    | 655       | 48.10             | 151.128            |
| 11.0    | 660       | 47.30             | 151.050            |
| 11.1    | 665       | 46.60             | 150.970            |
| 11.2    | 670       | 45.80             | 150.888            |
| 11.3    | 675       | 45.10             | 150.805            |
| 11.3    | 680       | 44.40             | 150.722            |
| 11.4    | 685       | 43.70             | 150.638            |
| 11.5    | 690       | 43.10             | 150.554            |
| 11.6    | 695       | 42.40             | 150.468            |
| 11.7    | 700       | 41.80             | 150.380            |
| 11.8    | 705       | 41.20             | 150.292            |
| 11.8    | 710       | 40.60             | 150.203            |
| 11.9    | 715       | 40.00             | 150.114            |
| 12.0    | 720       | 39.50             | 150.025            |
| 12.1    | 725       | 38.90             | 149.933            |
| 12.2    | 730       | 38.40             | 149.840            |
| 12.3    | 735       | 37.90             | 149.747            |
| 12.3    | 740       | 37.40             | 149.653            |
| 12.4    | 745       | 36.90             | 149.559            |
| 12.5    | 750       | 36.40             | 149.463            |
| 12.6    | 755       | 35.90             | 149.365            |
| 12.7    | 760       | 35.50             | 149.267            |
| 12.8    | 765       | 35.00             | 149.169            |
| 12.8    | 770       | 34.60             | 149.070            |
| 12.9    | 775       | 34.10             | 148.970            |
| 13.0    | 780       | 33.70             | 148.868            |
| 13.1    | 785       | 33.30             | 148.766            |
| 13.2    | 790       | 32.90             | 148.663            |
| 13.3    | 795       | 32.50             | 148.560            |
| 13.3    | 800       | 32.10             | 148.456            |
| 13.4    | 805       | 31.70             | 148.350            |
| 13.5    | 810       | 31.40             | 148.244            |
| 13.6    | 815       | 31.00             | 148.138            |
| 13.7    | 820       | 30.60             | 148.031            |
| 13.8    | 825       | 30.30             | 147.922            |
| 13.8    | 830       | 29.90             | 147.812            |
| 13.9    | 835       | 29.60             | 147.702            |
| 14.0    | 840       | 29.20             | 147.592            |
| 14.1    | 845       | 28.90             | 147.481            |
| 14.2    | 850       | 28.40             | 147.366            |
| 14.3    | 855       | 28.00             | 147.251            |
| 14.3    | 860       | 27.50             | 147.136            |
| 14.4    | 865       | 27.00             | 147.021            |
| 14.5    | 870       | 26.60             | 146.902            |
| 14.6    | 875       | 26.10             | 146.782            |
| 14.7    | 880       | 25.60             | 146.661            |
| 14.8    | 885       | 25.10             | 146.541            |
| 14.8    | 890       | 24.50             | 146.416            |
| 14.9    | 895       | 24.00             | 146.290            |
| 15.0    | 900       | 23.40             | 146.164            |
| 15.1    | 905       | 22.80             | 146.037            |
| 15.2    | 910       | 22.10             | 145.906            |
| 15.3    | 915       | 21.40             | 145.773            |
| 15.3    | 920       | 20.70             | 145.639            |
| 15.4    | 925       | 19.90             | 145.505            |
| 15.5    | 930       | 19.10             | 145.365            |
| 15.6    | 935       | 18.40             | 145.224            |
| 15.7    | 940       | 17.60             | 145.082            |

| CAUDALES DE SALIDA [m³/s] |               |            |        | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|--------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL  | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 120.75     | 120.75 | -19702.02                | 2989389               |
| 0.00                      | 0.00          | 120.55     | 120.55 | -19934.68                | 2969454               |
| 0.00                      | 0.00          | 120.36     | 120.36 | -20156.45                | 2949297               |
| 0.00                      | 0.00          | 120.16     | 120.16 | -20368.89                | 2928929               |
| 0.00                      | 0.00          | 119.96     | 119.96 | -20572.62                | 2908356               |
| 0.00                      | 0.00          | 119.76     | 119.76 | -20767.58                | 2887588               |
| 0.00                      | 0.00          | 119.56     | 119.56 | -20953.85                | 2866634               |
| 0.00                      | 0.00          | 119.35     | 119.35 | -21131.36                | 2845503               |
| 0.00                      | 0.00          | 119.14     | 119.14 | -21299.82                | 2824203               |
| 0.00                      | 0.00          | 118.92     | 118.92 | -21460.09                | 2802743               |
| 0.00                      | 0.00          | 118.71     | 118.71 | -21613.41                | 2781130               |
| 0.00                      | 0.00          | 118.49     | 118.49 | -21759.82                | 2759370               |
| 0.00                      | 0.00          | 118.27     | 118.27 | -21899.46                | 2737471               |
| 0.00                      | 0.00          | 118.04     | 118.04 | -22032.19                | 2715438               |
| 0.00                      | 0.00          | 117.81     | 117.81 | -22157.57                | 2693281               |
| 0.00                      | 0.00          | 117.58     | 117.58 | -22276.38                | 2671004               |
| 0.00                      | 0.00          | 117.34     | 117.34 | -22389.85                | 2648615               |
| 0.00                      | 0.00          | 117.11     | 117.11 | -22497.98                | 2626117               |
| 0.00                      | 0.00          | 116.87     | 116.87 | -22600.92                | 2603516               |
| 0.00                      | 0.00          | 116.63     | 116.63 | -22697.77                | 2580818               |
| 0.00                      | 0.00          | 116.38     | 116.38 | -22788.36                | 2558030               |
| 0.00                      | 0.00          | 116.13     | 116.13 | -22874.22                | 2535155               |
| 0.00                      | 0.00          | 115.88     | 115.88 | -22956.15                | 2512199               |
| 0.00                      | 0.00          | 115.63     | 115.63 | -23034.08                | 2489165               |
| 0.00                      | 0.00          | 115.37     | 115.37 | -23107.26                | 2466058               |
| 0.00                      | 0.00          | 115.11     | 115.11 | -23174.70                | 2442883               |
| 0.00                      | 0.00          | 114.84     | 114.84 | -23237.23                | 2419646               |
| 0.00                      | 0.00          | 114.58     | 114.58 | -23296.30                | 2396350               |
| 0.00                      | 0.00          | 114.31     | 114.31 | -23352.18                | 2372997               |
| 0.00                      | 0.00          | 114.04     | 114.04 | -23404.31                | 2349593               |
| 0.00                      | 0.00          | 113.76     | 113.76 | -23451.59                | 2326141               |
| 0.00                      | 0.00          | 113.48     | 113.48 | -23494.64                | 2302647               |
| 0.00                      | 0.00          | 113.20     | 113.20 | -23534.79                | 2279112               |
| 0.00                      | 0.00          | 112.92     | 112.92 | -23572.29                | 2255540               |
| 0.00                      | 0.00          | 112.63     | 112.63 | -23606.57                | 2231933               |
| 0.00                      | 0.00          | 112.34     | 112.34 | -23636.48                | 2208297               |
| 0.00                      | 0.00          | 112.05     | 112.05 | -23662.72                | 2184634               |
| 0.00                      | 0.00          | 111.75     | 111.75 | -23686.48                | 2160948               |
| 0.00                      | 0.00          | 111.46     | 111.46 | -23707.90                | 2137240               |
| 0.00                      | 0.00          | 111.15     | 111.15 | -23725.58                | 2113514               |
| 0.00                      | 0.00          | 110.85     | 110.85 | -23739.06                | 2089775               |
| 0.00                      | 0.00          | 110.54     | 110.54 | -23749.81                | 2066025               |
| 0.00                      | 0.00          | 110.23     | 110.23 | -23759.78                | 2042265               |
| 0.00                      | 0.00          | 109.92     | 109.92 | -23771.28                | 2018494               |
| 0.00                      | 0.00          | 109.59     | 109.59 | -23784.94                | 1994709               |
| 0.00                      | 0.00          | 109.26     | 109.26 | -23804.48                | 1970905               |
| 0.00                      | 0.00          | 108.94     | 108.94 | -23834.34                | 1947070               |
| 0.00                      | 0.00          | 108.61     | 108.61 | -23872.99                | 1923197               |
| 0.00                      | 0.00          | 108.27     | 108.27 | -23914.46                | 1899283               |
| 0.00                      | 0.00          | 107.93     | 107.93 | -23955.73                | 1875327               |
| 0.00                      | 0.00          | 107.58     | 107.58 | -23997.25                | 1851330               |
| 0.00                      | 0.00          | 107.23     | 107.23 | -24039.31                | 1827291               |
| 0.00                      | 0.00          | 106.87     | 106.87 | -24081.63                | 1803209               |
| 0.00                      | 0.00          | 106.50     | 106.50 | -24124.93                | 1779084               |
| 0.00                      | 0.00          | 106.14     | 106.14 | -24173.83                | 1754910               |
| 0.00                      | 0.00          | 105.76     | 105.76 | -24232.45                | 1730678               |
| 0.00                      | 0.00          | 105.38     | 105.38 | -24299.96                | 1706378               |
| 0.00                      | 0.00          | 104.99     | 104.99 | -24375.57                | 1682002               |
| 0.00                      | 0.00          | 104.59     | 104.59 | -24461.10                | 1657541               |
| 0.00                      | 0.00          | 104.19     | 104.19 | -24556.23                | 1632985               |
| 0.00                      | 0.00          | 103.77     | 103.77 | -24655.82                | 1608329               |
| 0.00                      | 0.00          | 103.35     | 103.35 | -24757.91                | 1583571               |
| 0.00                      | 0.00          | 102.93     | 102.93 | -24863.99                | 1558707               |

## Laminación de avenida T = 25 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 15.8    | 945       | 16.80             | 144.937            |
| 15.8    | 950       | 16.00             | 144.788            |
| 15.9    | 955       | 15.20             | 144.638            |
| 16.0    | 960       | 14.40             | 144.488            |
| 16.1    | 965       | 13.60             | 144.331            |
| 16.2    | 970       | 12.90             | 144.174            |
| 16.3    | 975       | 12.10             | 144.016            |
| 16.3    | 980       | 11.40             | 143.852            |
| 16.4    | 985       | 10.70             | 143.687            |
| 16.5    | 990       | 10.10             | 143.522            |
| 16.6    | 995       | 9.40              | 143.350            |
| 16.7    | 1000      | 8.80              | 143.178            |
| 16.8    | 1005      | 8.30              | 143.005            |
| 16.8    | 1010      | 7.70              | 142.826            |
| 16.9    | 1015      | 7.20              | 142.647            |
| 17.0    | 1020      | 6.70              | 142.467            |
| 17.1    | 1025      | 6.20              | 142.282            |
| 17.2    | 1030      | 5.80              | 142.097            |
| 17.3    | 1035      | 5.40              | 141.909            |
| 17.3    | 1040      | 5.00              | 141.719            |
| 17.4    | 1045      | 4.70              | 141.529            |
| 17.5    | 1050      | 4.30              | 141.335            |
| 17.6    | 1055      | 4.00              | 141.140            |
| 17.7    | 1060      | 3.70              | 140.943            |
| 17.8    | 1065      | 3.40              | 140.743            |
| 17.8    | 1070      | 3.20              | 140.544            |
| 17.9    | 1075      | 2.90              | 140.341            |
| 18.0    | 1080      | 2.70              | 140.137            |
| 18.1    | 1085      | 2.50              | 139.933            |
| 18.2    | 1090      | 2.30              | 139.725            |
| 18.3    | 1095      | 2.20              | 139.519            |
| 18.3    | 1100      | 2.00              | 139.308            |
| 18.4    | 1105      | 1.80              | 139.099            |
| 18.5    | 1110      | 1.70              | 138.888            |
| 18.6    | 1115      | 1.60              | 138.675            |
| 18.7    | 1120      | 1.40              | 138.463            |
| 18.8    | 1125      | 1.30              | 138.248            |
| 18.8    | 1130      | 1.20              | 138.035            |
| 18.9    | 1135      | 1.10              | 137.817            |
| 19.0    | 1140      | 1.00              | 137.601            |
| 19.1    | 1145      | 1.00              | 137.382            |
| 19.2    | 1150      | 0.90              | 137.162            |
| 19.3    | 1155      | 0.80              | 136.942            |
| 19.3    | 1160      | 0.80              | 136.719            |
| 19.4    | 1165      | 0.70              | 136.498            |
| 19.5    | 1170      | 0.60              | 136.271            |
| 19.6    | 1175      | 0.60              | 136.047            |
| 19.7    | 1180      | 0.50              | 135.818            |
| 19.8    | 1185      | 0.50              | 135.592            |
| 19.8    | 1190      | 0.50              | 135.362            |
| 19.9    | 1195      | 0.40              | 135.133            |
| 20.0    | 1200      | 0.40              | 134.903            |
| 20.1    | 1205      | 0.40              | 134.672            |
| 20.2    | 1210      | 0.30              | 134.441            |
| 20.3    | 1215      | 0.30              | 134.208            |
| 20.3    | 1220      | 0.30              | 133.977            |
| 20.4    | 1225      | 0.30              | 133.735            |
| 20.5    | 1230      | 0.20              | 133.499            |
| 20.6    | 1235      | 0.20              | 133.242            |
| 20.7    | 1240      | 0.20              | 132.991            |
| 20.8    | 1245      | 0.20              | 132.724            |
| 20.8    | 1250      | 0.20              | 132.463            |
| 20.9    | 1255      | 0.10              | 132.193            |

| CAUDALES DE SALIDA [m³/s] |               |            |        | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|--------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL  | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 102.49     | 102.49 | -24970.68                | 1533737               |
| 0.00                      | 0.00          | 102.04     | 102.04 | -25074.09                | 1508662               |
| 0.00                      | 0.00          | 101.58     | 101.58 | -25174.54                | 1483488               |
| 0.00                      | 0.00          | 101.12     | 101.12 | -25272.86                | 1458215               |
| 0.00                      | 0.00          | 100.64     | 100.64 | -25364.51                | 1432851               |
| 0.00                      | 0.00          | 100.15     | 100.15 | -25448.80                | 1407402               |
| 0.00                      | 0.00          | 99.66      | 99.66  | -25528.26                | 1381873               |
| 0.00                      | 0.00          | 99.15      | 99.15  | -25598.45                | 1356275               |
| 0.00                      | 0.00          | 98.63      | 98.63  | -25658.15                | 1330617               |
| 0.00                      | 0.00          | 98.11      | 98.11  | -25710.22                | 1304907               |
| 0.00                      | 0.00          | 97.57      | 97.57  | -25750.17                | 1279156               |
| 0.00                      | 0.00          | 97.02      | 97.02  | -25776.90                | 1253380               |
| 0.00                      | 0.00          | 96.47      | 96.47  | -25794.40                | 1227585               |
| 0.00                      | 0.00          | 95.89      | 95.89  | -25798.64                | 1201787               |
| 0.00                      | 0.00          | 95.31      | 95.31  | -25789.57                | 1175997               |
| 0.00                      | 0.00          | 94.72      | 94.72  | -25771.14                | 1150226               |
| 0.00                      | 0.00          | 94.11      | 94.11  | -25739.80                | 1124486               |
| 0.00                      | 0.00          | 93.50      | 93.50  | -25696.63                | 1098789               |
| 0.00                      | 0.00          | 92.88      | 92.88  | -25643.39                | 1073146               |
| 0.00                      | 0.00          | 92.24      | 92.24  | -25577.73                | 1047568               |
| 0.00                      | 0.00          | 91.60      | 91.60  | -25502.31                | 1022066               |
| 0.00                      | 0.00          | 90.94      | 90.94  | -25415.15                | 996651                |
| 0.00                      | 0.00          | 90.27      | 90.27  | -25315.77                | 971335                |
| 0.00                      | 0.00          | 89.59      | 89.59  | -25208.05                | 946127                |
| 0.00                      | 0.00          | 88.90      | 88.90  | -25089.88                | 921037                |
| 0.00                      | 0.00          | 88.20      | 88.20  | -24963.07                | 896074                |
| 0.00                      | 0.00          | 87.48      | 87.48  | -24826.20                | 871248                |
| 0.00                      | 0.00          | 86.76      | 86.76  | -24678.28                | 846570                |
| 0.00                      | 0.00          | 86.03      | 86.03  | -24523.02                | 822047                |
| 0.00                      | 0.00          | 85.27      | 85.27  | -24358.20                | 797688                |
| 0.00                      | 0.00          | 84.52      | 84.52  | -24186.27                | 773502                |
| 0.00                      | 0.00          | 83.74      | 83.74  | -24006.24                | 749496                |
| 0.00                      | 0.00          | 82.97      | 82.97  | -23817.96                | 725678                |
| 0.00                      | 0.00          | 82.17      | 82.17  | -23624.02                | 702054                |
| 0.00                      | 0.00          | 81.36      | 81.36  | -23422.35                | 678631                |
| 0.00                      | 0.00          | 80.55      | 80.55  | -23215.42                | 655416                |
| 0.00                      | 0.00          | 79.72      | 79.72  | -23000.54                | 632416                |
| 0.00                      | 0.00          | 78.89      | 78.89  | -22779.30                | 609636                |
| 0.00                      | 0.00          | 78.03      | 78.03  | -22550.95                | 587085                |
| 0.00                      | 0.00          | 77.16      | 77.16  | -22314.43                | 564771                |
| 0.00                      | 0.00          | 76.28      | 76.28  | -22072.30                | 542699                |
| 0.00                      | 0.00          | 75.38      | 75.38  | -21821.96                | 520877                |
| 0.00                      | 0.00          | 74.47      | 74.47  | -21566.34                | 499310                |
| 0.00                      | 0.00          | 73.53      | 73.53  | -21303.33                | 478007                |
| 0.00                      | 0.00          | 72.60      | 72.60  | -21035.47                | 456971                |
| 0.00                      | 0.00          | 71.62      | 71.62  | -20758.33                | 436213                |
| 0.00                      | 0.00          | 70.64      | 70.64  | -20472.41                | 415741                |
| 0.00                      | 0.00          | 69.63      | 69.63  | -20180.57                | 395560                |
| 0.00                      | 0.00          | 68.62      | 68.62  | -19880.82                | 375679                |
| 0.00                      | 0.00          | 67.57      | 67.57  | -19574.67                | 356105                |
| 0.00                      | 0.00          | 66.51      | 66.51  | -19259.57                | 336845                |
| 0.00                      | 0.00          | 65.43      | 65.43  | -18937.97                | 317907                |
| 0.00                      | 0.00          | 64.33      | 64.33  | -18607.57                | 299300                |
| 0.00                      | 0.00          | 63.20      | 63.20  | -18270.52                | 281029                |
| 0.00                      | 0.00          | 62.05      | 62.05  | -17923.40                | 263106                |
| 0.00                      | 0.00          | 60.88      | 60.88  | -17568.56                | 245537                |
| 0.00                      | 0.00          | 59.64      | 59.64  | -17198.29                | 228339                |
| 0.00                      | 0.00          | 58.40      | 58.40  | -16815.39                | 211523                |
| 0.00                      | 0.00          | 57.02      | 57.02  | -16409.59                | 195114                |
| 0.00                      | 0.00          | 55.63      | 55.63  | -15981.27                | 179133                |
| 0.00                      | 0.00          | 54.13      | 54.13  | -15530.30                | 163602                |
| 0.00                      | 0.00          | 52.61      | 52.61  | -15054.85                | 148547                |
| 0.00                      | 0.00          | 50.99      | 50.99  | -14560.37                | 133987                |

## Laminación de avenida T = 25 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 21.0    | 1260      | 0.10              | 131.924            |
| 21.1    | 1265      | 0.10              | 131.637            |
| 21.2    | 1270      | 0.10              | 131.328            |
| 21.3    | 1275      | 0.10              | 131.003            |
| 21.3    | 1280      | 0.10              | 130.631            |
| 21.4    | 1285      | 0.10              | 130.255            |
| 21.5    | 1290      | 0.10              | 129.883            |
| 21.6    | 1295      | 0.10              | 129.521            |
| 21.7    | 1300      | 0.10              | 129.175            |
| 21.8    | 1305      | 0.10              | 128.866            |
| 21.8    | 1310      | 0.00              | 128.554            |
| 21.9    | 1315      | 0.00              | 128.243            |
| 22.0    | 1320      | 0.00              | 127.994            |
| 22.1    | 1325      | 0.00              | 127.750            |
| 22.2    | 1330      | 0.00              | 127.542            |
| 22.3    | 1335      | 0.00              | 127.313            |
| 22.3    | 1340      | 0.00              | 127.112            |
| 22.4    | 1345      | 0.00              | 126.934            |
| 22.5    | 1350      | 0.00              | 126.767            |
| 22.6    | 1355      | 0.00              | 126.637            |
| 22.7    | 1360      | 0.00              | 126.536            |
| 22.8    | 1365      | 0.00              | 126.451            |
| 22.8    | 1370      | 0.00              | 126.378            |
| 22.9    | 1375      | 0.00              | 126.316            |
| 23.0    | 1380      | 0.00              | 126.265            |
| 23.1    | 1385      | 0.00              | 126.222            |
| 23.2    | 1390      | 0.00              | 126.186            |
| 23.3    | 1395      | 0.00              | 126.156            |
| 23.3    | 1400      | 0.00              | 126.130            |
| 23.4    | 1405      | 0.00              | 126.109            |
| 23.5    | 1410      | 0.00              | 126.092            |
| 23.6    | 1415      | 0.00              | 126.077            |
| 23.7    | 1420      | 0.00              | 126.064            |
| 23.8    | 1425      | 0.00              | 126.054            |
| 23.8    | 1430      | 0.00              | 126.045            |
| 23.9    | 1435      | 0.00              | 126.038            |
| 24.0    | 1440      | 0.00              | 126.032            |
| 24.1    | 1445      | 0.00              | 126.027            |
| 24.2    | 1450      | 0.00              | 126.022            |
| 24.3    | 1455      | 0.00              | 126.019            |
| 24.3    | 1460      | 0.00              | 126.016            |
| 24.4    | 1465      | 0.00              | 126.013            |
| 24.5    | 1470      | 0.00              | 126.011            |
| 24.6    | 1475      | 0.00              | 126.009            |
| 24.7    | 1480      | 0.00              | 126.008            |
| 24.8    | 1485      | 0.00              | 126.006            |
| 24.8    | 1490      | 0.00              | 126.005            |
| 24.9    | 1495      | 0.00              | 126.005            |
| 25.0    | 1500      | 0.00              | 126.004            |
| 25.1    | 1505      | 0.00              | 126.003            |
| 25.2    | 1510      | 0.00              | 126.003            |
| 25.3    | 1515      | 0.00              | 126.002            |
| 25.3    | 1520      | 0.00              | 126.002            |
| 25.4    | 1525      | 0.00              | 126.002            |
| 25.5    | 1530      | 0.00              | 126.001            |
| 25.6    | 1535      | 0.00              | 126.001            |
| 25.7    | 1540      | 0.00              | 126.001            |
| 25.8    | 1545      | 0.00              | 126.001            |
| 25.8    | 1550      | 0.00              | 126.001            |
| 25.9    | 1555      | 0.00              | 126.001            |
| 26.0    | 1560      | 0.00              | 126.000            |

| CAUDALES DE SALIDA [m³/s] |               |            |       | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|-------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 49.33      | 49.33 | -14038.39                | 119949                |
| 0.00                      | 0.00          | 47.49      | 47.49 | -13478.83                | 106470                |
| 0.00                      | 0.00          | 45.43      | 45.43 | -12849.04                | 93621                 |
| 0.00                      | 0.00          | 43.16      | 43.16 | -12149.18                | 81472                 |
| 0.00                      | 0.00          | 40.39      | 40.39 | -11322.21                | 70149                 |
| 0.00                      | 0.00          | 37.40      | 37.40 | -10353.40                | 59796                 |
| 0.00                      | 0.00          | 34.17      | 34.17 | -9289.07                 | 50507                 |
| 0.00                      | 0.00          | 30.71      | 30.71 | -8125.29                 | 42382                 |
| 0.00                      | 0.00          | 26.99      | 26.99 | -6773.44                 | 35608                 |
| 0.00                      | 0.00          | 23.17      | 23.17 | -5646.67                 | 29961                 |
| 0.00                      | 0.00          | 18.54      | 18.54 | -5265.61                 | 24696                 |
| 0.00                      | 0.00          | 12.28      | 12.28 | -4726.14                 | 19970                 |
| 0.00                      | 0.00          | 8.49       | 8.49  | -3670.31                 | 16299                 |
| 0.00                      | 0.00          | 7.95       | 7.95  | -2925.35                 | 13374                 |
| 0.00                      | 0.00          | 7.47       | 7.47  | -2499.88                 | 10874                 |
| 0.00                      | 0.00          | 6.89       | 6.89  | -2095.54                 | 8779                  |
| 0.00                      | 0.00          | 6.34       | 6.34  | -1706.24                 | 7072                  |
| 0.00                      | 0.00          | 5.81       | 5.81  | -1371.40                 | 5701                  |
| 0.00                      | 0.00          | 5.27       | 5.27  | -1081.37                 | 4620                  |
| 0.00                      | 0.00          | 4.80       | 4.80  | -839.56                  | 3780                  |
| 0.00                      | 0.00          | 4.40       | 4.40  | -651.90                  | 3128                  |
| 0.00                      | 0.00          | 4.04       | 4.04  | -515.66                  | 2613                  |
| 0.00                      | 0.00          | 3.70       | 3.70  | -423.97                  | 2189                  |
| 0.00                      | 0.00          | 3.38       | 3.38  | -355.25                  | 1833                  |
| 0.00                      | 0.00          | 3.09       | 3.09  | -297.69                  | 1536                  |
| 0.00                      | 0.00          | 2.83       | 2.83  | -249.35                  | 1286                  |
| 0.00                      | 0.00          | 2.59       | 2.59  | -208.83                  | 1077                  |
| 0.00                      | 0.00          | 2.37       | 2.37  | -174.91                  | 903                   |
| 0.00                      | 0.00          | 2.17       | 2.17  | -146.49                  | 756                   |
| 0.00                      | 0.00          | 1.98       | 1.98  | -122.70                  | 633                   |
| 0.00                      | 0.00          | 1.82       | 1.82  | -102.77                  | 531                   |
| 0.00                      | 0.00          | 1.67       | 1.67  | -86.08                   | 444                   |
| 0.00                      | 0.00          | 1.52       | 1.52  | -72.11                   | 372                   |
| 0.00                      | 0.00          | 1.40       | 1.40  | -60.40                   | 312                   |
| 0.00                      | 0.00          | 1.28       | 1.28  | -50.59                   | 261                   |
| 0.00                      | 0.00          | 1.17       | 1.17  | -42.38                   | 219                   |
| 0.00                      | 0.00          | 1.08       | 1.08  | -35.51                   | 183                   |
| 0.00                      | 0.00          | 0.99       | 0.99  | -29.74                   | 154                   |
| 0.00                      | 0.00          | 0.89       | 0.89  | -24.92                   | 129                   |
| 0.00                      | 0.00          | 0.83       | 0.83  | -20.87                   | 108                   |
| 0.00                      | 0.00          | 0.76       | 0.76  | -17.49                   | 90                    |
| 0.00                      | 0.00          | 0.69       | 0.69  | -14.66                   | 76                    |
| 0.00                      | 0.00          | 0.63       | 0.63  | -12.28                   | 64                    |
| 0.00                      | 0.00          | 0.57       | 0.57  | -10.28                   | 53                    |
| 0.00                      | 0.00          | 0.54       | 0.54  | -8.62                    | 45                    |
| 0.00                      | 0.00          | 0.47       | 0.47  | -7.23                    | 37                    |
| 0.00                      | 0.00          | 0.43       | 0.43  | -6.05                    | 31                    |
| 0.00                      | 0.00          | 0.43       | 0.43  | -5.07                    | 26                    |
| 0.00                      | 0.00          | 0.38       | 0.38  | -4.25                    | 22                    |
| 0.00                      | 0.00          | 0.33       | 0.33  | -3.56                    | 18                    |
| 0.00                      | 0.00          | 0.33       | 0.33  | -2.99                    | 15                    |
| 0.00                      | 0.00          | 0.27       | 0.27  | -2.50                    | 13                    |
| 0.00                      | 0.00          | 0.27       | 0.27  | -2.10                    | 11                    |
| 0.00                      | 0.00          | 0.27       | 0.27  | -1.75                    | 9                     |
| 0.00                      | 0.00          | 0.19       | 0.19  | -1.48                    | 8                     |
| 0.00                      | 0.00          | 0.19       | 0.19  | -1.23                    | 6                     |
| 0.00                      | 0.00          | 0.19       | 0.19  | -1.04                    | 5                     |
| 0.00                      | 0.00          | 0.19       | 0.19  | -0.87                    | 5                     |
| 0.00                      | 0.00          | 0.19       | 0.19  | -0.72                    | 4                     |
| 0.00                      | 0.00          | 0.19       | 0.19  | -0.61                    | 3                     |
| 0.00                      | 0.00          | 0.00       | 0.00  | -0.51                    | 3                     |



## Laminación de avenida T = 50 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 0.0     | 0         | 0.00              | 126.000            |
| 0.1     | 5         | 0.10              | 126.001            |
| 0.2     | 10        | 0.10              | 126.003            |
| 0.3     | 15        | 0.20              | 126.006            |
| 0.3     | 20        | 0.30              | 126.012            |
| 0.4     | 25        | 0.40              | 126.021            |
| 0.5     | 30        | 0.60              | 126.033            |
| 0.6     | 35        | 0.80              | 126.051            |
| 0.7     | 40        | 1.00              | 126.075            |
| 0.8     | 45        | 1.30              | 126.106            |
| 0.8     | 50        | 1.70              | 126.145            |
| 0.9     | 55        | 2.20              | 126.194            |
| 1.0     | 60        | 2.70              | 126.255            |
| 1.1     | 65        | 3.40              | 126.330            |
| 1.2     | 70        | 4.10              | 126.421            |
| 1.3     | 75        | 5.10              | 126.526            |
| 1.3     | 80        | 6.10              | 126.639            |
| 1.4     | 85        | 7.40              | 126.768            |
| 1.5     | 90        | 8.80              | 126.915            |
| 1.6     | 95        | 10.50             | 127.066            |
| 1.7     | 100       | 12.40             | 127.219            |
| 1.8     | 105       | 14.70             | 127.401            |
| 1.8     | 110       | 17.40             | 127.583            |
| 1.9     | 115       | 20.40             | 127.770            |
| 2.0     | 120       | 24.20             | 127.995            |
| 2.1     | 125       | 29.50             | 128.204            |
| 2.2     | 130       | 36.80             | 128.442            |
| 2.3     | 135       | 47.10             | 128.733            |
| 2.3     | 140       | 60.90             | 129.130            |
| 2.4     | 145       | 77.70             | 129.598            |
| 2.5     | 150       | 96.60             | 130.119            |
| 2.6     | 155       | 116.80            | 130.696            |
| 2.7     | 160       | 137.20            | 131.295            |
| 2.8     | 165       | 157.60            | 131.869            |
| 2.8     | 170       | 178.10            | 132.441            |
| 2.9     | 175       | 199.50            | 133.042            |
| 3.0     | 180       | 223.50            | 133.653            |
| 3.1     | 185       | 250.70            | 134.278            |
| 3.2     | 190       | 280.20            | 134.944            |
| 3.3     | 195       | 310.80            | 135.656            |
| 3.3     | 200       | 342.00            | 136.416            |
| 3.4     | 205       | 373.70            | 137.213            |
| 3.5     | 210       | 404.10            | 138.044            |
| 3.6     | 215       | 432.30            | 138.903            |
| 3.7     | 220       | 458.10            | 139.784            |
| 3.8     | 225       | 481.50            | 140.676            |
| 3.8     | 230       | 502.40            | 141.566            |
| 3.9     | 235       | 520.50            | 142.445            |
| 4.0     | 240       | 536.20            | 143.304            |
| 4.1     | 245       | 549.40            | 144.138            |
| 4.2     | 250       | 559.80            | 144.942            |
| 4.3     | 255       | 567.50            | 145.709            |
| 4.3     | 260       | 572.70            | 146.442            |
| 4.4     | 265       | 575.50            | 147.137            |
| 4.5     | 270       | 575.70            | 147.799            |
| 4.6     | 275       | 573.60            | 148.432            |
| 4.7     | 280       | 569.50            | 149.037            |
| 4.8     | 285       | 563.20            | 149.614            |
| 4.8     | 290       | 555.20            | 150.161            |
| 4.9     | 295       | 545.80            | 150.682            |
| 5.0     | 300       | 535.20            | 151.176            |
| 5.1     | 305       | 523.50            | 151.645            |
| 5.2     | 310       | 511.00            | 152.089            |

| CAUDALES DE SALIDA [m³/s] |               |            |        | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|--------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL  | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 0.00       | 0.00   | -                        | 2                     |
| 0.00                      | 0.00          | 0.19       | 0.19   | 4.46                     | 7                     |
| 0.00                      | 0.00          | 0.33       | 0.33   | 10.07                    | 17                    |
| 0.00                      | 0.00          | 0.47       | 0.47   | 19.11                    | 36                    |
| 0.00                      | 0.00          | 0.66       | 0.66   | 32.36                    | 68                    |
| 0.00                      | 0.00          | 0.87       | 0.87   | 50.82                    | 119                   |
| 0.00                      | 0.00          | 1.09       | 1.09   | 74.42                    | 193                   |
| 0.00                      | 0.00          | 1.36       | 1.36   | 103.12                   | 297                   |
| 0.00                      | 0.00          | 1.65       | 1.65   | 137.49                   | 434                   |
| 0.00                      | 0.00          | 1.96       | 1.96   | 178.27                   | 612                   |
| 0.00                      | 0.00          | 2.29       | 2.29   | 227.00                   | 839                   |
| 0.00                      | 0.00          | 2.65       | 2.65   | 285.37                   | 1125                  |
| 0.00                      | 0.00          | 3.04       | 3.04   | 353.58                   | 1478                  |
| 0.00                      | 0.00          | 3.45       | 3.45   | 432.70                   | 1911                  |
| 0.00                      | 0.00          | 3.90       | 3.90   | 525.82                   | 2437                  |
| 0.00                      | 0.00          | 4.36       | 4.36   | 629.54                   | 3066                  |
| 0.00                      | 0.00          | 4.81       | 4.81   | 728.25                   | 3795                  |
| 0.00                      | 0.00          | 5.27       | 5.27   | 830.80                   | 4625                  |
| 0.00                      | 0.00          | 5.75       | 5.75   | 953.56                   | 5579                  |
| 0.00                      | 0.00          | 6.21       | 6.21   | 1104.97                  | 6684                  |
| 0.00                      | 0.00          | 6.64       | 6.64   | 1301.66                  | 7986                  |
| 0.00                      | 0.00          | 7.12       | 7.12   | 1540.00                  | 9526                  |
| 0.00                      | 0.00          | 7.56       | 7.56   | 1841.90                  | 11367                 |
| 0.00                      | 0.00          | 8.00       | 8.00   | 2239.18                  | 13607                 |
| 0.00                      | 0.00          | 8.49       | 8.49   | 2703.41                  | 16310                 |
| 0.00                      | 0.00          | 11.25      | 11.25  | 3089.23                  | 19399                 |
| 0.00                      | 0.00          | 16.56      | 16.56  | 3522.12                  | 22921                 |
| 0.00                      | 0.00          | 21.32      | 21.32  | 4784.48                  | 27706                 |
| 0.00                      | 0.00          | 26.47      | 26.47  | 7023.23                  | 34729                 |
| 0.00                      | 0.00          | 31.48      | 31.48  | 9374.96                  | 44104                 |
| 0.00                      | 0.00          | 36.25      | 36.25  | 12141.65                 | 56246                 |
| 0.00                      | 0.00          | 40.89      | 40.89  | 15878.79                 | 72124                 |
| 0.00                      | 0.00          | 45.20      | 45.20  | 20251.53                 | 92376                 |
| 0.00                      | 0.00          | 48.98      | 48.98  | 25017.03                 | 117393                |
| 0.00                      | 0.00          | 52.48      | 52.48  | 29957.24                 | 147350                |
| 0.00                      | 0.00          | 55.92      | 55.92  | 34976.76                 | 182327                |
| 0.00                      | 0.00          | 59.21      | 59.21  | 40199.19                 | 222526                |
| 0.00                      | 0.00          | 62.40      | 62.40  | 45992.85                 | 268519                |
| 0.00                      | 0.00          | 65.62      | 65.62  | 52666.18                 | 321185                |
| 0.00                      | 0.00          | 68.91      | 68.91  | 60158.76                 | 381344                |
| 0.00                      | 0.00          | 72.24      | 72.24  | 68152.32                 | 449496                |
| 0.00                      | 0.00          | 75.59      | 75.59  | 76394.02                 | 525890                |
| 0.00                      | 0.00          | 78.92      | 78.92  | 84797.86                 | 610688                |
| 0.00                      | 0.00          | 82.23      | 82.23  | 93078.34                 | 703767                |
| 0.00                      | 0.00          | 85.49      | 85.49  | 100864.24                | 804631                |
| 0.00                      | 0.00          | 88.66      | 88.66  | 107988.87                | 912620                |
| 0.00                      | 0.00          | 91.72      | 91.72  | 114409.00                | 1027029               |
| 0.00                      | 0.00          | 94.65      | 94.65  | 120127.79                | 1147156               |
| 0.00                      | 0.00          | 97.42      | 97.42  | 125113.03                | 1272269               |
| 0.00                      | 0.00          | 100.04     | 100.04 | 129365.03                | 1401635               |
| 0.00                      | 0.00          | 102.50     | 102.50 | 132920.61                | 1534555               |
| 0.00                      | 0.00          | 104.80     | 104.80 | 135744.03                | 1670299               |
| 0.00                      | 0.00          | 106.94     | 106.94 | 137780.66                | 1808080               |
| 0.00                      | 0.00          | 108.94     | 108.94 | 139079.40                | 1947159               |
| 0.00                      | 0.00          | 110.81     | 110.81 | 139690.62                | 2086850               |
| 0.00                      | 0.00          | 112.57     | 112.57 | 139585.18                | 2226435               |
| 0.00                      | 0.00          | 114.22     | 114.22 | 138786.89                | 2365222               |
| 0.00                      | 0.00          | 115.78     | 115.78 | 137373.75                | 2502596               |
| 0.00                      | 0.00          | 117.23     | 117.23 | 135363.09                | 2637959               |
| 0.00                      | 0.00          | 118.60     | 118.60 | 132792.84                | 2770752               |
| 0.00                      | 0.00          | 119.89     | 119.89 | 129778.62                | 2900530               |
| 0.00                      | 0.00          | 121.09     | 121.09 | 126399.82                | 3026930               |
| 0.00                      | 0.00          | 122.23     | 122.23 | 122692.99                | 3149623               |



## Laminación de avenida T = 50 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 5.3     | 315       | 497.80            | 152.510            |
| 5.3     | 320       | 484.00            | 152.909            |
| 5.4     | 325       | 469.90            | 153.286            |
| 5.5     | 330       | 455.60            | 153.643            |
| 5.6     | 335       | 441.20            | 153.981            |
| 5.7     | 340       | 426.90            | 154.297            |
| 5.8     | 345       | 412.60            | 154.596            |
| 5.8     | 350       | 398.60            | 154.877            |
| 5.9     | 355       | 384.80            | 155.140            |
| 6.0     | 360       | 371.20            | 155.387            |
| 6.1     | 365       | 358.10            | 155.618            |
| 6.2     | 370       | 345.30            | 155.834            |
| 6.3     | 375       | 333.00            | 156.037            |
| 6.3     | 380       | 321.00            | 156.225            |
| 6.4     | 385       | 309.40            | 156.402            |
| 6.5     | 390       | 298.20            | 156.566            |
| 6.6     | 395       | 287.50            | 156.718            |
| 6.7     | 400       | 277.10            | 156.861            |
| 6.8     | 405       | 267.00            | 156.994            |
| 6.8     | 410       | 257.40            | 157.115            |
| 6.9     | 415       | 248.10            | 157.228            |
| 7.0     | 420       | 239.20            | 157.332            |
| 7.1     | 425       | 230.70            | 157.428            |
| 7.2     | 430       | 222.60            | 157.515            |
| 7.3     | 435       | 214.80            | 157.595            |
| 7.3     | 440       | 207.40            | 157.667            |
| 7.4     | 445       | 200.30            | 157.733            |
| 7.5     | 450       | 193.50            | 157.793            |
| 7.6     | 455       | 187.00            | 157.846            |
| 7.7     | 460       | 180.80            | 157.893            |
| 7.8     | 465       | 174.90            | 157.935            |
| 7.8     | 470       | 169.20            | 157.972            |
| 7.9     | 475       | 163.80            | 158.004            |
| 8.0     | 480       | 158.70            | 158.030            |
| 8.1     | 485       | 153.80            | 158.052            |
| 8.2     | 490       | 149.10            | 158.070            |
| 8.3     | 495       | 144.60            | 158.083            |
| 8.3     | 500       | 140.30            | 158.093            |
| 8.4     | 505       | 136.20            | 158.099            |
| 8.5     | 510       | 132.30            | 158.101            |
| 8.6     | 515       | 128.60            | 158.100            |
| 8.7     | 520       | 125.00            | 158.096            |
| 8.8     | 525       | 121.60            | 158.089            |
| 8.8     | 530       | 118.40            | 158.078            |
| 8.9     | 535       | 115.20            | 158.065            |
| 9.0     | 540       | 112.20            | 158.049            |
| 9.1     | 545       | 109.30            | 158.031            |
| 9.2     | 550       | 106.60            | 158.010            |
| 9.3     | 555       | 103.90            | 157.987            |
| 9.3     | 560       | 101.40            | 157.961            |
| 9.4     | 565       | 98.90             | 157.933            |
| 9.5     | 570       | 96.60             | 157.903            |
| 9.6     | 575       | 94.30             | 157.871            |
| 9.7     | 580       | 92.10             | 157.837            |
| 9.8     | 585       | 90.00             | 157.802            |
| 9.8     | 590       | 88.00             | 157.764            |
| 9.9     | 595       | 86.00             | 157.725            |
| 10.0    | 600       | 84.10             | 157.684            |
| 10.1    | 605       | 82.30             | 157.641            |
| 10.2    | 610       | 80.60             | 157.597            |
| 10.3    | 615       | 78.90             | 157.552            |
| 10.3    | 620       | 77.30             | 157.505            |
| 10.4    | 625       | 75.70             | 157.456            |

| CAUDALES DE SALIDA [m³/s] |               |            |        | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|--------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL  | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 123.29     | 123.29 | 118723.06                | 3268346               |
| 0.00                      | 0.00          | 124.29     | 124.29 | 114552.47                | 3382899               |
| 0.00                      | 0.00          | 125.23     | 125.23 | 110213.17                | 3493112               |
| 0.00                      | 0.00          | 126.11     | 126.11 | 105754.45                | 3598866               |
| 0.00                      | 0.00          | 126.94     | 126.94 | 101236.91                | 3700103               |
| 0.00                      | 0.00          | 127.70     | 127.70 | 96698.04                 | 3796801               |
| 0.00                      | 0.00          | 128.43     | 128.43 | 92165.52                 | 3888967               |
| 0.00                      | 0.00          | 129.11     | 129.11 | 87664.29                 | 3976631               |
| 0.00                      | 0.00          | 129.74     | 129.74 | 83216.13                 | 4059847               |
| 0.00                      | 0.00          | 130.32     | 130.32 | 78847.37                 | 4138694               |
| 0.00                      | 0.00          | 130.87     | 130.87 | 74578.44                 | 4213273               |
| 0.00                      | 0.00          | 131.38     | 131.38 | 70416.87                 | 4283690               |
| 0.00                      | 0.00          | 131.86     | 131.86 | 66376.21                 | 4350066               |
| 0.00                      | 0.00          | 132.30     | 132.30 | 62469.33                 | 4412535               |
| 0.00                      | 0.00          | 132.72     | 132.72 | 58689.82                 | 4471225               |
| 0.00                      | 0.00          | 133.10     | 133.10 | 55035.37                 | 4526260               |
| 0.00                      | 0.00          | 133.45     | 133.45 | 51515.00                 | 4577775               |
| 0.00                      | 0.00          | 133.79     | 133.79 | 48124.37                 | 4625900               |
| 0.00                      | 0.00          | 134.09     | 134.09 | 44854.95                 | 4670755               |
| 0.00                      | 0.00          | 134.37     | 134.37 | 41700.07                 | 4712455               |
| 0.00                      | 0.00          | 134.63     | 134.63 | 38661.45                 | 4751116               |
| 0.00                      | 0.00          | 134.87     | 134.87 | 35743.35                 | 4786860               |
| 0.00                      | 0.00          | 135.09     | 135.09 | 32947.11                 | 4819807               |
| 0.00                      | 0.00          | 135.29     | 135.29 | 30277.70                 | 4850084               |
| 0.00                      | 0.00          | 135.48     | 135.48 | 27727.79                 | 4877812               |
| 0.00                      | 0.00          | 135.64     | 135.64 | 25286.96                 | 4903099               |
| 0.00                      | 0.00          | 135.79     | 135.79 | 22955.62                 | 4926055               |
| 0.00                      | 0.00          | 135.93     | 135.93 | 20732.40                 | 4946787               |
| 0.00                      | 0.00          | 136.05     | 136.05 | 18607.81                 | 4965395               |
| 0.00                      | 0.00          | 136.16     | 136.16 | 16579.74                 | 4981975               |
| 0.00                      | 0.00          | 136.25     | 136.25 | 14649.42                 | 4996624               |
| 0.00                      | 0.00          | 136.34     | 136.34 | 12807.55                 | 5009432               |
| 0.00                      | 0.00          | 136.41     | 136.41 | 11046.80                 | 5020479               |
| 0.00                      | 0.00          | 136.47     | 136.47 | 9369.61                  | 5029848               |
| 0.00                      | 0.00          | 136.52     | 136.52 | 7772.96                  | 5037621               |
| 0.00                      | 0.00          | 136.56     | 136.56 | 6248.87                  | 5043870               |
| 0.00                      | 0.00          | 136.59     | 136.59 | 4796.32                  | 5048666               |
| 0.00                      | 0.00          | 136.61     | 136.61 | 3413.96                  | 5052080               |
| 0.00                      | 0.00          | 136.62     | 136.62 | 2094.32                  | 5054175               |
| 0.00                      | 0.00          | 136.63     | 136.63 | 834.73                   | 5055009               |
| 0.00                      | 0.00          | 136.63     | 136.63 | -363.63                  | 5054646               |
| 0.00                      | 0.00          | 136.62     | 136.62 | -1505.31                 | 5053140               |
| 0.00                      | 0.00          | 136.60     | 136.60 | -2595.80                 | 5050545               |
| 0.00                      | 0.00          | 136.58     | 136.58 | -3636.30                 | 5046908               |
| 0.00                      | 0.00          | 136.55     | 136.55 | -4629.40                 | 5042279               |
| 0.00                      | 0.00          | 136.51     | 136.51 | -5579.74                 | 5036699               |
| 0.00                      | 0.00          | 136.47     | 136.47 | -6488.63                 | 5030211               |
| 0.00                      | 0.00          | 136.42     | 136.42 | -7356.40                 | 5022854               |
| 0.00                      | 0.00          | 136.37     | 136.37 | -8186.70                 | 5014667               |
| 0.00                      | 0.00          | 136.31     | 136.31 | -8982.96                 | 5005684               |
| 0.00                      | 0.00          | 136.25     | 136.25 | -9745.85                 | 4995939               |
| 0.00                      | 0.00          | 136.18     | 136.18 | -10476.46                | 4985462               |
| 0.00                      | 0.00          | 136.11     | 136.11 | -11177.44                | 4974285               |
| 0.00                      | 0.00          | 136.03     | 136.03 | -11849.81                | 4962435               |
| 0.00                      | 0.00          | 135.95     | 135.95 | -12493.92                | 4949941               |
| 0.00                      | 0.00          | 135.86     | 135.86 | -13112.60                | 4936828               |
| 0.00                      | 0.00          | 135.77     | 135.77 | -13707.59                | 4923121               |
| 0.00                      | 0.00          | 135.68     | 135.68 | -14277.95                | 4908843               |
| 0.00                      | 0.00          | 135.58     | 135.58 | -14824.25                | 4894019               |
| 0.00                      | 0.00          | 135.48     | 135.48 | -15348.34                | 4878670               |
| 0.00                      | 0.00          | 135.38     | 135.38 | -15850.28                | 4862820               |
| 0.00                      | 0.00          | 135.27     | 135.27 | -16330.74                | 4846489               |
| 0.00                      | 0.00          | 135.16     | 135.16 | -16791.65                | 4829698               |

## Laminación de avenida T = 50 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 10.5    | 630       | 74.20             | 157.406            |
| 10.6    | 635       | 72.80             | 157.355            |
| 10.7    | 640       | 71.40             | 157.302            |
| 10.8    | 645       | 70.00             | 157.248            |
| 10.8    | 650       | 68.70             | 157.194            |
| 10.9    | 655       | 67.40             | 157.138            |
| 11.0    | 660       | 66.20             | 157.081            |
| 11.1    | 665       | 65.00             | 157.023            |
| 11.2    | 670       | 63.90             | 156.964            |
| 11.3    | 675       | 62.80             | 156.903            |
| 11.3    | 680       | 61.70             | 156.842            |
| 11.4    | 685       | 60.60             | 156.779            |
| 11.5    | 690       | 59.60             | 156.716            |
| 11.6    | 695       | 58.70             | 156.652            |
| 11.7    | 700       | 57.70             | 156.587            |
| 11.8    | 705       | 56.80             | 156.522            |
| 11.8    | 710       | 55.90             | 156.455            |
| 11.9    | 715       | 55.00             | 156.387            |
| 12.0    | 720       | 54.20             | 156.319            |
| 12.1    | 725       | 53.40             | 156.249            |
| 12.2    | 730       | 52.60             | 156.180            |
| 12.3    | 735       | 51.80             | 156.109            |
| 12.3    | 740       | 51.10             | 156.038            |
| 12.4    | 745       | 50.30             | 155.966            |
| 12.5    | 750       | 49.60             | 155.893            |
| 12.6    | 755       | 48.90             | 155.819            |
| 12.7    | 760       | 48.30             | 155.745            |
| 12.8    | 765       | 47.60             | 155.670            |
| 12.8    | 770       | 47.00             | 155.595            |
| 12.9    | 775       | 46.30             | 155.519            |
| 13.0    | 780       | 45.70             | 155.442            |
| 13.1    | 785       | 45.10             | 155.364            |
| 13.2    | 790       | 44.50             | 155.285            |
| 13.3    | 795       | 43.90             | 155.206            |
| 13.3    | 800       | 43.40             | 155.127            |
| 13.4    | 805       | 42.80             | 155.047            |
| 13.5    | 810       | 42.30             | 154.967            |
| 13.6    | 815       | 41.70             | 154.884            |
| 13.7    | 820       | 41.20             | 154.802            |
| 13.8    | 825       | 40.70             | 154.719            |
| 13.8    | 830       | 40.20             | 154.636            |
| 13.9    | 835       | 39.70             | 154.553            |
| 14.0    | 840       | 39.30             | 154.469            |
| 14.1    | 845       | 38.80             | 154.383            |
| 14.2    | 850       | 38.30             | 154.297            |
| 14.3    | 855       | 37.90             | 154.211            |
| 14.3    | 860       | 37.40             | 154.125            |
| 14.4    | 865       | 37.00             | 154.039            |
| 14.5    | 870       | 36.60             | 153.951            |
| 14.6    | 875       | 36.10             | 153.862            |
| 14.7    | 880       | 35.60             | 153.773            |
| 14.8    | 885       | 35.10             | 153.684            |
| 14.8    | 890       | 34.50             | 153.594            |
| 14.9    | 895       | 34.00             | 153.504            |
| 15.0    | 900       | 33.40             | 153.412            |
| 15.1    | 905       | 32.70             | 153.320            |
| 15.2    | 910       | 32.10             | 153.227            |
| 15.3    | 915       | 31.50             | 153.134            |
| 15.3    | 920       | 30.80             | 153.040            |
| 15.4    | 925       | 30.20             | 152.945            |
| 15.5    | 930       | 29.50             | 152.848            |
| 15.6    | 935       | 28.70             | 152.751            |
| 15.7    | 940       | 27.90             | 152.654            |

| CAUDALES DE SALIDA [m³/s] |               |            |        | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|--------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL  | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 135.04     | 135.04 | -17233.54                | 4812464               |
| 0.00                      | 0.00          | 134.93     | 134.93 | -17656.58                | 4794807               |
| 0.00                      | 0.00          | 134.80     | 134.80 | -18062.35                | 4776745               |
| 0.00                      | 0.00          | 134.68     | 134.68 | -18452.33                | 4758293               |
| 0.00                      | 0.00          | 134.56     | 134.56 | -18827.03                | 4739466               |
| 0.00                      | 0.00          | 134.43     | 134.43 | -19187.45                | 4720278               |
| 0.00                      | 0.00          | 134.29     | 134.29 | -19534.65                | 4700744               |
| 0.00                      | 0.00          | 134.16     | 134.16 | -19868.66                | 4680875               |
| 0.00                      | 0.00          | 134.02     | 134.02 | -20189.35                | 4660686               |
| 0.00                      | 0.00          | 133.88     | 133.88 | -20497.54                | 4640188               |
| 0.00                      | 0.00          | 133.74     | 133.74 | -20794.31                | 4619394               |
| 0.00                      | 0.00          | 133.60     | 133.60 | -21079.83                | 4598314               |
| 0.00                      | 0.00          | 133.45     | 133.45 | -21354.09                | 4576960               |
| 0.00                      | 0.00          | 133.30     | 133.30 | -21617.61                | 4555342               |
| 0.00                      | 0.00          | 133.15     | 133.15 | -21870.59                | 4533472               |
| 0.00                      | 0.00          | 133.00     | 133.00 | -22113.24                | 4511358               |
| 0.00                      | 0.00          | 132.84     | 132.84 | -22346.31                | 4489012               |
| 0.00                      | 0.00          | 132.68     | 132.68 | -22570.33                | 4466442               |
| 0.00                      | 0.00          | 132.52     | 132.52 | -22785.39                | 4443656               |
| 0.00                      | 0.00          | 132.36     | 132.36 | -22991.93                | 4420664               |
| 0.00                      | 0.00          | 132.20     | 132.20 | -23190.76                | 4397474               |
| 0.00                      | 0.00          | 132.03     | 132.03 | -23382.06                | 4374092               |
| 0.00                      | 0.00          | 131.86     | 131.86 | -23566.30                | 4350525               |
| 0.00                      | 0.00          | 131.69     | 131.69 | -23744.05                | 4326781               |
| 0.00                      | 0.00          | 131.52     | 131.52 | -23914.87                | 4302866               |
| 0.00                      | 0.00          | 131.35     | 131.35 | -24078.81                | 4278788               |
| 0.00                      | 0.00          | 131.17     | 131.17 | -24236.78                | 4254551               |
| 0.00                      | 0.00          | 131.00     | 131.00 | -24389.18                | 4230162               |
| 0.00                      | 0.00          | 130.82     | 130.82 | -24536.26                | 4205625               |
| 0.00                      | 0.00          | 130.64     | 130.64 | -24678.39                | 4180947               |
| 0.00                      | 0.00          | 130.46     | 130.46 | -24815.16                | 4156132               |
| 0.00                      | 0.00          | 130.27     | 130.27 | -24946.25                | 4131186               |
| 0.00                      | 0.00          | 130.08     | 130.08 | -25072.40                | 4106113               |
| 0.00                      | 0.00          | 129.89     | 129.89 | -25194.26                | 4080919               |
| 0.00                      | 0.00          | 129.70     | 129.70 | -25312.16                | 4055607               |
| 0.00                      | 0.00          | 129.51     | 129.51 | -25426.25                | 4030181               |
| 0.00                      | 0.00          | 129.32     | 129.32 | -25536.02                | 4004645               |
| 0.00                      | 0.00          | 129.12     | 129.12 | -25640.88                | 3979004               |
| 0.00                      | 0.00          | 128.93     | 128.93 | -25741.37                | 3953262               |
| 0.00                      | 0.00          | 128.73     | 128.73 | -25838.22                | 3927424               |
| 0.00                      | 0.00          | 128.53     | 128.53 | -25931.84                | 3901492               |
| 0.00                      | 0.00          | 128.32     | 128.32 | -26022.48                | 3875470               |
| 0.00                      | 0.00          | 128.12     | 128.12 | -26109.55                | 3849360               |
| 0.00                      | 0.00          | 127.91     | 127.91 | -26192.44                | 3823168               |
| 0.00                      | 0.00          | 127.70     | 127.70 | -26271.69                | 3796896               |
| 0.00                      | 0.00          | 127.50     | 127.50 | -26347.85                | 3770548               |
| 0.00                      | 0.00          | 127.29     | 127.29 | -26421.12                | 3744127               |
| 0.00                      | 0.00          | 127.08     | 127.08 | -26491.82                | 3717635               |
| 0.00                      | 0.00          | 126.86     | 126.86 | -26559.29                | 3691076               |
| 0.00                      | 0.00          | 126.64     | 126.64 | -26624.53                | 3664451               |
| 0.00                      | 0.00          | 126.43     | 126.43 | -26691.57                | 3637760               |
| 0.00                      | 0.00          | 126.21     | 126.21 | -26764.19                | 3610996               |
| 0.00                      | 0.00          | 125.99     | 125.99 | -26846.47                | 3584149               |
| 0.00                      | 0.00          | 125.76     | 125.76 | -26941.28                | 3557208               |
| 0.00                      | 0.00          | 125.54     | 125.54 | -27045.86                | 3530162               |
| 0.00                      | 0.00          | 125.31     | 125.31 | -27155.83                | 3503006               |
| 0.00                      | 0.00          | 125.08     | 125.08 | -27269.39                | 3475737               |
| 0.00                      | 0.00          | 124.85     | 124.85 | -27384.65                | 3448352               |
| 0.00                      | 0.00          | 124.62     | 124.62 | -27501.51                | 3420851               |
| 0.00                      | 0.00          | 124.38     | 124.38 | -27621.71                | 3393229               |
| 0.00                      | 0.00          | 124.14     | 124.14 | -27746.41                | 3365483               |
| 0.00                      | 0.00          | 123.89     | 123.89 | -27878.83                | 3337604               |
| 0.00                      | 0.00          | 123.65     | 123.65 | -28023.53                | 3309580               |

## Laminación de avenida T = 50 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 15.8    | 945       | 27.10             | 152.556            |
| 15.8    | 950       | 26.20             | 152.456            |
| 15.9    | 955       | 25.30             | 152.355            |
| 16.0    | 960       | 24.30             | 152.253            |
| 16.1    | 965       | 23.40             | 152.150            |
| 16.2    | 970       | 22.40             | 152.047            |
| 16.3    | 975       | 21.40             | 151.941            |
| 16.3    | 980       | 20.40             | 151.834            |
| 16.4    | 985       | 19.40             | 151.726            |
| 16.5    | 990       | 18.40             | 151.617            |
| 16.6    | 995       | 17.50             | 151.507            |
| 16.7    | 1000      | 16.50             | 151.393            |
| 16.8    | 1005      | 15.60             | 151.279            |
| 16.8    | 1010      | 14.70             | 151.163            |
| 16.9    | 1015      | 13.80             | 151.047            |
| 17.0    | 1020      | 13.00             | 150.929            |
| 17.1    | 1025      | 12.20             | 150.808            |
| 17.2    | 1030      | 11.40             | 150.687            |
| 17.3    | 1035      | 10.70             | 150.565            |
| 17.3    | 1040      | 10.00             | 150.442            |
| 17.4    | 1045      | 9.30              | 150.316            |
| 17.5    | 1050      | 8.70              | 150.189            |
| 17.6    | 1055      | 8.10              | 150.062            |
| 17.7    | 1060      | 7.50              | 149.933            |
| 17.8    | 1065      | 7.00              | 149.802            |
| 17.8    | 1070      | 6.50              | 149.670            |
| 17.9    | 1075      | 6.00              | 149.538            |
| 18.0    | 1080      | 5.60              | 149.403            |
| 18.1    | 1085      | 5.20              | 149.266            |
| 18.2    | 1090      | 4.80              | 149.129            |
| 18.3    | 1095      | 4.40              | 148.992            |
| 18.3    | 1100      | 4.10              | 148.851            |
| 18.4    | 1105      | 3.80              | 148.710            |
| 18.5    | 1110      | 3.50              | 148.569            |
| 18.6    | 1115      | 3.30              | 148.426            |
| 18.7    | 1120      | 3.00              | 148.281            |
| 18.8    | 1125      | 2.80              | 148.137            |
| 18.8    | 1130      | 2.60              | 147.992            |
| 18.9    | 1135      | 2.40              | 147.843            |
| 19.0    | 1140      | 2.20              | 147.695            |
| 19.1    | 1145      | 2.00              | 147.546            |
| 19.2    | 1150      | 1.90              | 147.394            |
| 19.3    | 1155      | 1.70              | 147.241            |
| 19.3    | 1160      | 1.60              | 147.088            |
| 19.4    | 1165      | 1.50              | 146.932            |
| 19.5    | 1170      | 1.40              | 146.774            |
| 19.6    | 1175      | 1.20              | 146.616            |
| 19.7    | 1180      | 1.10              | 146.457            |
| 19.8    | 1185      | 1.10              | 146.294            |
| 19.8    | 1190      | 1.00              | 146.131            |
| 19.9    | 1195      | 0.90              | 145.967            |
| 20.0    | 1200      | 0.80              | 145.799            |
| 20.1    | 1205      | 0.80              | 145.631            |
| 20.2    | 1210      | 0.70              | 145.462            |
| 20.3    | 1215      | 0.60              | 145.289            |
| 20.3    | 1220      | 0.60              | 145.116            |
| 20.4    | 1225      | 0.50              | 144.941            |
| 20.5    | 1230      | 0.50              | 144.763            |
| 20.6    | 1235      | 0.50              | 144.585            |
| 20.7    | 1240      | 0.40              | 144.405            |
| 20.8    | 1245      | 0.40              | 144.222            |
| 20.8    | 1250      | 0.40              | 144.040            |
| 20.9    | 1255      | 0.30              | 143.854            |

| CAUDALES DE SALIDA [m³/s] |               |            |        | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|--------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL  | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 123.40     | 123.40 | -28182.48                | 3281398               |
| 0.00                      | 0.00          | 123.15     | 123.15 | -28354.34                | 3253043               |
| 0.00                      | 0.00          | 122.90     | 122.90 | -28537.27                | 3224506               |
| 0.00                      | 0.00          | 122.64     | 122.64 | -28730.66                | 3195775               |
| 0.00                      | 0.00          | 122.38     | 122.38 | -28932.70                | 3166843               |
| 0.00                      | 0.00          | 122.12     | 122.12 | -29140.98                | 3137702               |
| 0.00                      | 0.00          | 121.85     | 121.85 | -29352.89                | 3108349               |
| 0.00                      | 0.00          | 121.58     | 121.58 | -29565.81                | 3078783               |
| 0.00                      | 0.00          | 121.30     | 121.30 | -29778.62                | 3049004               |
| 0.00                      | 0.00          | 121.02     | 121.02 | -29990.36                | 3019014               |
| 0.00                      | 0.00          | 120.74     | 120.74 | -30199.47                | 2988815               |
| 0.00                      | 0.00          | 120.45     | 120.45 | -30402.87                | 2958412               |
| 0.00                      | 0.00          | 120.15     | 120.15 | -30599.33                | 2927812               |
| 0.00                      | 0.00          | 119.85     | 119.85 | -30789.34                | 2897023               |
| 0.00                      | 0.00          | 119.55     | 119.55 | -30971.99                | 2866051               |
| 0.00                      | 0.00          | 119.25     | 119.25 | -31145.50                | 2834906               |
| 0.00                      | 0.00          | 118.93     | 118.93 | -31308.04                | 2803598               |
| 0.00                      | 0.00          | 118.62     | 118.62 | -31459.57                | 2772138               |
| 0.00                      | 0.00          | 118.30     | 118.30 | -31600.59                | 2740537               |
| 0.00                      | 0.00          | 117.97     | 117.97 | -31730.00                | 2708807               |
| 0.00                      | 0.00          | 117.64     | 117.64 | -31846.48                | 2676961               |
| 0.00                      | 0.00          | 117.31     | 117.31 | -31951.02                | 2645010               |
| 0.00                      | 0.00          | 116.97     | 116.97 | -32044.90                | 2612965               |
| 0.00                      | 0.00          | 116.63     | 116.63 | -32126.80                | 2580838               |
| 0.00                      | 0.00          | 116.28     | 116.28 | -32195.70                | 2548642               |
| 0.00                      | 0.00          | 115.93     | 115.93 | -32253.34                | 2516389               |
| 0.00                      | 0.00          | 115.57     | 115.57 | -32301.07                | 2484088               |
| 0.00                      | 0.00          | 115.21     | 115.21 | -32336.96                | 2451751               |
| 0.00                      | 0.00          | 114.84     | 114.84 | -32360.89                | 2419390               |
| 0.00                      | 0.00          | 114.47     | 114.47 | -32375.27                | 2387015               |
| 0.00                      | 0.00          | 114.10     | 114.10 | -32380.93                | 2354634               |
| 0.00                      | 0.00          | 113.71     | 113.71 | -32376.23                | 2322258               |
| 0.00                      | 0.00          | 113.33     | 113.33 | -32361.97                | 2289896               |
| 0.00                      | 0.00          | 112.94     | 112.94 | -32340.62                | 2257555               |
| 0.00                      | 0.00          | 112.55     | 112.55 | -32311.17                | 2225244               |
| 0.00                      | 0.00          | 112.15     | 112.15 | -32273.05                | 2192971               |
| 0.00                      | 0.00          | 111.75     | 111.75 | -32228.01                | 2160743               |
| 0.00                      | 0.00          | 111.35     | 111.35 | -32177.44                | 2128566               |
| 0.00                      | 0.00          | 110.93     | 110.93 | -32118.98                | 2096447               |
| 0.00                      | 0.00          | 110.52     | 110.52 | -32053.25                | 2064393               |
| 0.00                      | 0.00          | 110.10     | 110.10 | -31983.31                | 2032410               |
| 0.00                      | 0.00          | 109.67     | 109.67 | -31907.09                | 2000503               |
| 0.00                      | 0.00          | 109.24     | 109.24 | -31823.94                | 1968679               |
| 0.00                      | 0.00          | 108.80     | 108.80 | -31736.49                | 1936942               |
| 0.00                      | 0.00          | 108.36     | 108.36 | -31644.45                | 1905298               |
| 0.00                      | 0.00          | 107.90     | 107.90 | -31546.07                | 1873752               |
| 0.00                      | 0.00          | 107.45     | 107.45 | -31443.20                | 1842309               |
| 0.00                      | 0.00          | 106.99     | 106.99 | -31337.21                | 1810972               |
| 0.00                      | 0.00          | 106.51     | 106.51 | -31225.83                | 1779746               |
| 0.00                      | 0.00          | 106.04     | 106.04 | -31110.20                | 1748636               |
| 0.00                      | 0.00          | 105.56     | 105.56 | -30992.09                | 1717643               |
| 0.00                      | 0.00          | 105.06     | 105.06 | -30867.94                | 1686775               |
| 0.00                      | 0.00          | 104.57     | 104.57 | -30738.87                | 1656037               |
| 0.00                      | 0.00          | 104.06     | 104.06 | -30607.81                | 1625429               |
| 0.00                      | 0.00          | 103.55     | 103.55 | -30471.44                | 1594957               |
| 0.00                      | 0.00          | 103.03     | 103.03 | -30330.87                | 1564626               |
| 0.00                      | 0.00          | 102.50     | 102.50 | -30188.09                | 1534438               |
| 0.00                      | 0.00          | 101.96     | 101.96 | -30039.91                | 1504398               |
| 0.00                      | 0.00          | 101.42     | 101.42 | -29888.07                | 1474510               |
| 0.00                      | 0.00          | 100.87     | 100.87 | -29733.74                | 1444777               |
| 0.00                      | 0.00          | 100.30     | 100.30 | -29574.96                | 1415202               |
| 0.00                      | 0.00          | 99.74      | 99.74  | -29414.10                | 1385788               |
| 0.00                      | 0.00          | 99.16      | 99.16  | -29249.78                | 1356538               |

## Laminación de avenida T = 50 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 21.0    | 1260      | 0.30              | 143.667            |
| 21.1    | 1265      | 0.30              | 143.480            |
| 21.2    | 1270      | 0.20              | 143.288            |
| 21.3    | 1275      | 0.20              | 143.096            |
| 21.3    | 1280      | 0.20              | 142.903            |
| 21.4    | 1285      | 0.20              | 142.707            |
| 21.5    | 1290      | 0.20              | 142.513            |
| 21.6    | 1295      | 0.20              | 142.313            |
| 21.7    | 1300      | 0.10              | 142.115            |
| 21.8    | 1305      | 0.10              | 141.914            |
| 21.8    | 1310      | 0.10              | 141.712            |
| 21.9    | 1315      | 0.10              | 141.511            |
| 22.0    | 1320      | 0.10              | 141.305            |
| 22.1    | 1325      | 0.10              | 141.100            |
| 22.2    | 1330      | 0.10              | 140.893            |
| 22.3    | 1335      | 0.10              | 140.684            |
| 22.3    | 1340      | 0.10              | 140.477            |
| 22.4    | 1345      | 0.10              | 140.264            |
| 22.5    | 1350      | 0.10              | 140.054            |
| 22.6    | 1355      | 0.00              | 139.840            |
| 22.7    | 1360      | 0.00              | 139.627            |
| 22.8    | 1365      | 0.00              | 139.413            |
| 22.8    | 1370      | 0.00              | 139.197            |
| 22.9    | 1375      | 0.00              | 138.983            |
| 23.0    | 1380      | 0.00              | 138.765            |
| 23.1    | 1385      | 0.00              | 138.549            |
| 23.2    | 1390      | 0.00              | 138.330            |
| 23.3    | 1395      | 0.00              | 138.112            |
| 23.3    | 1400      | 0.00              | 137.893            |
| 23.4    | 1405      | 0.00              | 137.672            |
| 23.5    | 1410      | 0.00              | 137.452            |
| 23.6    | 1415      | 0.00              | 137.228            |
| 23.7    | 1420      | 0.00              | 137.007            |
| 23.8    | 1425      | 0.00              | 136.780            |
| 23.8    | 1430      | 0.00              | 136.556            |
| 23.9    | 1435      | 0.00              | 136.328            |
| 24.0    | 1440      | 0.00              | 136.101            |
| 24.1    | 1445      | 0.00              | 135.872            |
| 24.2    | 1450      | 0.00              | 135.643            |
| 24.3    | 1455      | 0.00              | 135.413            |
| 24.3    | 1460      | 0.00              | 135.181            |
| 24.4    | 1465      | 0.00              | 134.951            |
| 24.5    | 1470      | 0.00              | 134.717            |
| 24.6    | 1475      | 0.00              | 134.487            |
| 24.7    | 1480      | 0.00              | 134.251            |
| 24.8    | 1485      | 0.00              | 134.019            |
| 24.8    | 1490      | 0.00              | 133.777            |
| 24.9    | 1495      | 0.00              | 133.539            |
| 25.0    | 1500      | 0.00              | 133.284            |
| 25.1    | 1505      | 0.00              | 133.032            |
| 25.2    | 1510      | 0.00              | 132.766            |
| 25.3    | 1515      | 0.00              | 132.505            |
| 25.3    | 1520      | 0.00              | 132.233            |
| 25.4    | 1525      | 0.00              | 131.967            |
| 25.5    | 1530      | 0.00              | 131.677            |
| 25.6    | 1535      | 0.00              | 131.375            |
| 25.7    | 1540      | 0.00              | 131.046            |
| 25.8    | 1545      | 0.00              | 130.679            |
| 25.8    | 1550      | 0.00              | 130.306            |
| 25.9    | 1555      | 0.00              | 129.934            |
| 26.0    | 1560      | 0.00              | 129.564            |
| 26.1    | 1565      | 0.00              | 129.215            |
| 26.2    | 1570      | 0.00              | 128.906            |

| CAUDALES DE SALIDA [m3/s] |               |            |       | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|-------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 98.57      | 98.57 | -29081.16                | 1327457               |
| 0.00                      | 0.00          | 97.98      | 97.98 | -28911.30                | 1298545               |
| 0.00                      | 0.00          | 97.37      | 97.37 | -28736.49                | 1269809               |
| 0.00                      | 0.00          | 96.76      | 96.76 | -28557.44                | 1241251               |
| 0.00                      | 0.00          | 96.14      | 96.14 | -28376.40                | 1212875               |
| 0.00                      | 0.00          | 95.50      | 95.50 | -28190.79                | 1184684               |
| 0.00                      | 0.00          | 94.87      | 94.87 | -28003.28                | 1156681               |
| 0.00                      | 0.00          | 94.21      | 94.21 | -27811.84                | 1128869               |
| 0.00                      | 0.00          | 93.56      | 93.56 | -27616.23                | 1101253               |
| 0.00                      | 0.00          | 92.89      | 92.89 | -27419.07                | 1073834               |
| 0.00                      | 0.00          | 92.22      | 92.22 | -27217.72                | 1046616               |
| 0.00                      | 0.00          | 91.54      | 91.54 | -27014.50                | 1019602               |
| 0.00                      | 0.00          | 90.84      | 90.84 | -26806.77                | 992795                |
| 0.00                      | 0.00          | 90.13      | 90.13 | -26594.30                | 966201                |
| 0.00                      | 0.00          | 89.42      | 89.42 | -26380.42                | 939820                |
| 0.00                      | 0.00          | 88.69      | 88.69 | -26163.02                | 913657                |
| 0.00                      | 0.00          | 87.96      | 87.96 | -25944.01                | 887713                |
| 0.00                      | 0.00          | 87.21      | 87.21 | -25719.65                | 861993                |
| 0.00                      | 0.00          | 86.46      | 86.46 | -25490.81                | 836503                |
| 0.00                      | 0.00          | 85.69      | 85.69 | -25259.19                | 811243                |
| 0.00                      | 0.00          | 84.92      | 84.92 | -25023.24                | 786220                |
| 0.00                      | 0.00          | 84.13      | 84.13 | -24785.32                | 761435                |
| 0.00                      | 0.00          | 83.33      | 83.33 | -24543.41                | 736891                |
| 0.00                      | 0.00          | 82.53      | 82.53 | -24299.57                | 712592                |
| 0.00                      | 0.00          | 81.71      | 81.71 | -24051.63                | 688540                |
| 0.00                      | 0.00          | 80.88      | 80.88 | -23800.18                | 664740                |
| 0.00                      | 0.00          | 80.04      | 80.04 | -23545.61                | 641194                |
| 0.00                      | 0.00          | 79.19      | 79.19 | -23286.36                | 617908                |
| 0.00                      | 0.00          | 78.33      | 78.33 | -23024.08                | 594884                |
| 0.00                      | 0.00          | 77.45      | 77.45 | -22756.15                | 572128                |
| 0.00                      | 0.00          | 76.56      | 76.56 | -22484.89                | 549643                |
| 0.00                      | 0.00          | 75.65      | 75.65 | -22207.72                | 527435                |
| 0.00                      | 0.00          | 74.74      | 74.74 | -21926.62                | 505509                |
| 0.00                      | 0.00          | 73.79      | 73.79 | -21640.17                | 483869                |
| 0.00                      | 0.00          | 72.84      | 72.84 | -21348.40                | 462520                |
| 0.00                      | 0.00          | 71.87      | 71.87 | -21051.64                | 441468                |
| 0.00                      | 0.00          | 70.88      | 70.88 | -20747.46                | 420721                |
| 0.00                      | 0.00          | 69.87      | 69.87 | -20438.58                | 400282                |
| 0.00                      | 0.00          | 68.85      | 68.85 | -20123.06                | 380159                |
| 0.00                      | 0.00          | 67.80      | 67.80 | -19802.55                | 360357                |
| 0.00                      | 0.00          | 66.73      | 66.73 | -19474.19                | 340883                |
| 0.00                      | 0.00          | 65.66      | 65.66 | -19140.29                | 321742                |
| 0.00                      | 0.00          | 64.54      | 64.54 | -18798.54                | 302944                |
| 0.00                      | 0.00          | 63.43      | 63.43 | -18451.22                | 284493                |
| 0.00                      | 0.00          | 62.26      | 62.26 | -18094.64                | 266398                |
| 0.00                      | 0.00          | 61.10      | 61.10 | -17730.17                | 248668                |
| 0.00                      | 0.00          | 59.86      | 59.86 | -17352.77                | 231315                |
| 0.00                      | 0.00          | 58.61      | 58.61 | -16961.32                | 214354                |
| 0.00                      | 0.00          | 57.24      | 57.24 | -16550.73                | 197803                |
| 0.00                      | 0.00          | 55.86      | 55.86 | -16118.95                | 181684                |
| 0.00                      | 0.00          | 54.37      | 54.37 | -15663.97                | 166020                |
| 0.00                      | 0.00          | 52.86      | 52.86 | -15188.20                | 150832                |
| 0.00                      | 0.00          | 51.24      | 51.24 | -14689.79                | 136142                |
| 0.00                      | 0.00          | 49.60      | 49.60 | -14167.87                | 121974                |
| 0.00                      | 0.00          | 47.75      | 47.75 | -13607.54                | 108367                |
| 0.00                      | 0.00          | 45.75      | 45.75 | -12982.56                | 95384                 |
| 0.00                      | 0.00          | 43.46      | 43.46 | -12286.48                | 83098                 |
| 0.00                      | 0.00          | 40.76      | 40.76 | -11463.81                | 71634                 |
| 0.00                      | 0.00          | 37.82      | 37.82 | -10514.66                | 61119                 |
| 0.00                      | 0.00          | 34.63      | 34.63 | -9472.18                 | 51647                 |
| 0.00                      | 0.00          | 31.14      | 31.14 | -8305.96                 | 43341                 |
| 0.00                      | 0.00          | 27.45      | 27.45 | -6954.30                 | 36387                 |
| 0.00                      | 0.00          | 23.70      | 23.70 | -5753.69                 | 30633                 |

## Laminación de avenida T = 50 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 26.3    | 1575      | 0.00              | 128.593            |
| 26.3    | 1580      | 0.00              | 128.280            |
| 26.4    | 1585      | 0.00              | 128.023            |
| 26.5    | 1590      | 0.00              | 127.777            |
| 26.6    | 1595      | 0.00              | 127.564            |
| 26.7    | 1600      | 0.00              | 127.337            |
| 26.8    | 1605      | 0.00              | 127.131            |
| 26.8    | 1610      | 0.00              | 126.953            |
| 26.9    | 1615      | 0.00              | 126.780            |
| 27.0    | 1620      | 0.00              | 126.647            |
| 27.1    | 1625      | 0.00              | 126.543            |
| 27.2    | 1630      | 0.00              | 126.456            |
| 27.3    | 1635      | 0.00              | 126.382            |
| 27.3    | 1640      | 0.00              | 126.319            |
| 27.4    | 1645      | 0.00              | 126.267            |
| 27.5    | 1650      | 0.00              | 126.223            |
| 27.6    | 1655      | 0.00              | 126.187            |
| 27.7    | 1660      | 0.00              | 126.156            |
| 27.8    | 1665      | 0.00              | 126.131            |
| 27.8    | 1670      | 0.00              | 126.109            |
| 27.9    | 1675      | 0.00              | 126.091            |
| 28.0    | 1680      | 0.00              | 126.077            |
| 28.1    | 1685      | 0.00              | 126.064            |
| 28.2    | 1690      | 0.00              | 126.054            |
| 28.3    | 1695      | 0.00              | 126.045            |
| 28.3    | 1700      | 0.00              | 126.037            |
| 28.4    | 1705      | 0.00              | 126.031            |
| 28.5    | 1710      | 0.00              | 126.026            |
| 28.6    | 1715      | 0.00              | 126.022            |
| 28.7    | 1720      | 0.00              | 126.018            |
| 28.8    | 1725      | 0.00              | 126.015            |
| 28.8    | 1730      | 0.00              | 126.013            |
| 28.9    | 1735      | 0.00              | 126.011            |
| 29.0    | 1740      | 0.00              | 126.009            |
| 29.1    | 1745      | 0.00              | 126.008            |
| 29.2    | 1750      | 0.00              | 126.006            |
| 29.3    | 1755      | 0.00              | 126.005            |
| 29.3    | 1760      | 0.00              | 126.004            |
| 29.4    | 1765      | 0.00              | 126.004            |
| 29.5    | 1770      | 0.00              | 126.003            |
| 29.6    | 1775      | 0.00              | 126.003            |
| 29.7    | 1780      | 0.00              | 126.002            |
| 29.8    | 1785      | 0.00              | 126.002            |
| 29.8    | 1790      | 0.00              | 126.002            |
| 29.9    | 1795      | 0.00              | 126.001            |
| 30.0    | 1800      | 0.00              | 126.001            |
| 30.1    | 1805      | 0.00              | 126.001            |
| 30.2    | 1810      | 0.00              | 126.001            |
| 30.3    | 1815      | 0.00              | 126.001            |
| 30.3    | 1820      | 0.00              | 126.001            |
| 30.4    | 1825      | 0.00              | 126.000            |

| CAUDALES DE SALIDA [m3/s] |               |            |       | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|-------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 19.18      | 19.18 | -5282.98                 | 25350                 |
| 0.00                      | 0.00          | 13.18      | 13.18 | -4821.19                 | 20529                 |
| 0.00                      | 0.00          | 3.78       | 3.78  | -3817.52                 | 16711                 |
| 0.00                      | 0.00          | 8.01       | 8.01  | -3016.95                 | 13694                 |
| 0.00                      | 0.00          | 7.52       | 7.52  | -2557.05                 | 11137                 |
| 0.00                      | 0.00          | 6.95       | 6.95  | -2148.54                 | 8989                  |
| 0.00                      | 0.00          | 6.39       | 6.39  | -1754.53                 | 7234                  |
| 0.00                      | 0.00          | 5.87       | 5.87  | -1411.59                 | 5823                  |
| 0.00                      | 0.00          | 5.31       | 5.31  | -1114.53                 | 4708                  |
| 0.00                      | 0.00          | 4.84       | 4.84  | -864.50                  | 3844                  |
| 0.00                      | 0.00          | 4.43       | 4.43  | -670.55                  | 3173                  |
| 0.00                      | 0.00          | 4.06       | 4.06  | -528.47                  | 2645                  |
| 0.00                      | 0.00          | 3.72       | 3.72  | -432.56                  | 2212                  |
| 0.00                      | 0.00          | 3.40       | 3.40  | -361.82                  | 1850                  |
| 0.00                      | 0.00          | 3.11       | 3.11  | -302.63                  | 1548                  |
| 0.00                      | 0.00          | 2.84       | 2.84  | -253.13                  | 1294                  |
| 0.00                      | 0.00          | 2.60       | 2.60  | -211.73                  | 1083                  |
| 0.00                      | 0.00          | 2.37       | 2.37  | -177.09                  | 906                   |
| 0.00                      | 0.00          | 2.18       | 2.18  | -148.13                  | 757                   |
| 0.00                      | 0.00          | 1.98       | 1.98  | -123.90                  | 634                   |
| 0.00                      | 0.00          | 1.81       | 1.81  | -103.64                  | 530                   |
| 0.00                      | 0.00          | 1.67       | 1.67  | -86.68                   | 443                   |
| 0.00                      | 0.00          | 1.52       | 1.52  | -72.50                   | 371                   |
| 0.00                      | 0.00          | 1.40       | 1.40  | -60.65                   | 310                   |
| 0.00                      | 0.00          | 1.28       | 1.28  | -50.72                   | 259                   |
| 0.00                      | 0.00          | 1.16       | 1.16  | -42.43                   | 217                   |
| 0.00                      | 0.00          | 1.06       | 1.06  | -35.49                   | 181                   |
| 0.00                      | 0.00          | 0.97       | 0.97  | -29.69                   | 152                   |
| 0.00                      | 0.00          | 0.89       | 0.89  | -24.82                   | 127                   |
| 0.00                      | 0.00          | 0.81       | 0.81  | -20.77                   | 106                   |
| 0.00                      | 0.00          | 0.74       | 0.74  | -17.37                   | 89                    |
| 0.00                      | 0.00          | 0.69       | 0.69  | -14.53                   | 74                    |
| 0.00                      | 0.00          | 0.63       | 0.63  | -12.15                   | 62                    |
| 0.00                      | 0.00          | 0.57       | 0.57  | -10.17                   | 52                    |
| 0.00                      | 0.00          | 0.54       | 0.54  | -8.50                    | 43                    |
| 0.00                      | 0.00          | 0.47       | 0.47  | -7.11                    | 36                    |
| 0.00                      | 0.00          | 0.43       | 0.43  | -5.95                    | 30                    |
| 0.00                      | 0.00          | 0.38       | 0.38  | -4.98                    | 25                    |
| 0.00                      | 0.00          | 0.38       | 0.38  | -4.16                    | 21                    |
| 0.00                      | 0.00          | 0.33       | 0.33  | -3.48                    | 18                    |
| 0.00                      | 0.00          | 0.33       | 0.33  | -2.91                    | 15                    |
| 0.00                      | 0.00          | 0.27       | 0.27  | -2.44                    | 12                    |
| 0.00                      | 0.00          | 0.27       | 0.27  | -2.03                    | 10                    |
| 0.00                      | 0.00          | 0.27       | 0.27  | -1.71                    | 9                     |
| 0.00                      | 0.00          | 0.19       | 0.19  | -1.42                    | 7                     |
| 0.00                      | 0.00          | 0.19       | 0.19  | -1.19                    | 6                     |
| 0.00                      | 0.00          | 0.19       | 0.19  | -1.00                    | 5                     |
| 0.00                      | 0.00          | 0.19       | 0.19  | -0.84                    | 4                     |
| 0.00                      | 0.00          | 0.19       | 0.19  | -0.69                    | 4                     |
| 0.00                      | 0.00          | 0.19       | 0.19  | -0.59                    | 3                     |
| 0.00                      | 0.00          | 0.00       | 0.00  | -0.48                    | 3                     |

## Laminación de avenida T = 100 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 0.0     | 0         | 0.00              | 126.000            |
| 0.1     | 5         | 0.10              | 126.001            |
| 0.2     | 10        | 0.10              | 126.002            |
| 0.3     | 15        | 0.20              | 126.005            |
| 0.3     | 20        | 0.30              | 126.009            |
| 0.4     | 25        | 0.50              | 126.016            |
| 0.5     | 30        | 0.60              | 126.027            |
| 0.6     | 35        | 0.90              | 126.042            |
| 0.7     | 40        | 1.10              | 126.062            |
| 0.8     | 45        | 1.40              | 126.087            |
| 0.8     | 50        | 1.80              | 126.120            |
| 0.9     | 55        | 2.30              | 126.161            |
| 1.0     | 60        | 2.80              | 126.212            |
| 1.1     | 65        | 3.40              | 126.274            |
| 1.2     | 70        | 4.10              | 126.349            |
| 1.3     | 75        | 4.90              | 126.439            |
| 1.3     | 80        | 5.90              | 126.540            |
| 1.4     | 85        | 7.00              | 126.647            |
| 1.5     | 90        | 8.20              | 126.767            |
| 1.6     | 95        | 9.60              | 126.902            |
| 1.7     | 100       | 11.10             | 127.041            |
| 1.8     | 105       | 12.90             | 127.175            |
| 1.8     | 110       | 14.90             | 127.330            |
| 1.9     | 115       | 17.10             | 127.506            |
| 2.0     | 120       | 19.50             | 127.654            |
| 2.1     | 125       | 22.30             | 127.828            |
| 2.2     | 130       | 25.40             | 128.024            |
| 2.3     | 135       | 29.10             | 128.200            |
| 2.3     | 140       | 33.20             | 128.386            |
| 2.4     | 145       | 37.80             | 128.585            |
| 2.5     | 150       | 43.50             | 128.826            |
| 2.6     | 155       | 51.10             | 129.113            |
| 2.7     | 160       | 61.30             | 129.410            |
| 2.8     | 165       | 75.40             | 129.714            |
| 2.8     | 170       | 93.90             | 130.065            |
| 2.9     | 175       | 116.20            | 130.470            |
| 3.0     | 180       | 141.20            | 130.945            |
| 3.1     | 185       | 167.80            | 131.471            |
| 3.2     | 190       | 195.00            | 132.011            |
| 3.3     | 195       | 222.30            | 132.592            |
| 3.3     | 200       | 249.60            | 133.235            |
| 3.4     | 205       | 278.80            | 133.905            |
| 3.5     | 210       | 311.00            | 134.597            |
| 3.6     | 215       | 346.20            | 135.332            |
| 3.7     | 220       | 383.70            | 136.115            |
| 3.8     | 225       | 421.90            | 136.943            |
| 3.8     | 230       | 461.10            | 137.812            |
| 3.9     | 235       | 499.60            | 138.724            |
| 4.0     | 240       | 536.00            | 139.677            |
| 4.1     | 245       | 569.90            | 140.660            |
| 4.2     | 250       | 600.80            | 141.658            |
| 4.3     | 255       | 628.50            | 142.658            |
| 4.3     | 260       | 652.90            | 143.648            |
| 4.4     | 265       | 674.40            | 144.614            |
| 4.5     | 270       | 692.50            | 145.550            |
| 4.6     | 275       | 707.50            | 146.447            |
| 4.7     | 280       | 719.00            | 147.305            |
| 4.8     | 285       | 727.30            | 148.130            |
| 4.8     | 290       | 732.20            | 148.927            |
| 4.9     | 295       | 734.20            | 149.695            |
| 5.0     | 300       | 733.00            | 150.434            |
| 5.1     | 305       | 729.10            | 151.143            |
| 5.2     | 310       | 722.30            | 151.823            |

| CAUDALES DE SALIDA [m³/s] |               |            |        | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|--------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL  | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 0.00       | 0.00   | -                        | 2                     |
| 0.00                      | 0.00          | 0.19       | 0.19   | 3.42                     | 5                     |
| 0.00                      | 0.00          | 0.27       | 0.27   | 7.85                     | 13                    |
| 0.00                      | 0.00          | 0.43       | 0.43   | 15.15                    | 28                    |
| 0.00                      | 0.00          | 0.57       | 0.57   | 25.96                    | 54                    |
| 0.00                      | 0.00          | 0.76       | 0.76   | 41.22                    | 95                    |
| 0.00                      | 0.00          | 0.99       | 0.99   | 61.28                    | 156                   |
| 0.00                      | 0.00          | 1.23       | 1.23   | 85.81                    | 242                   |
| 0.00                      | 0.00          | 1.50       | 1.50   | 114.91                   | 357                   |
| 0.00                      | 0.00          | 1.77       | 1.77   | 149.25                   | 506                   |
| 0.00                      | 0.00          | 2.08       | 2.08   | 189.67                   | 696                   |
| 0.00                      | 0.00          | 2.41       | 2.41   | 237.53                   | 934                   |
| 0.00                      | 0.00          | 2.77       | 2.77   | 294.11                   | 1228                  |
| 0.00                      | 0.00          | 3.15       | 3.15   | 359.70                   | 1587                  |
| 0.00                      | 0.00          | 3.55       | 3.55   | 434.79                   | 2022                  |
| 0.00                      | 0.00          | 3.98       | 3.98   | 520.83                   | 2543                  |
| 0.00                      | 0.00          | 4.42       | 4.42   | 610.20                   | 3153                  |
| 0.00                      | 0.00          | 4.84       | 4.84   | 691.13                   | 3844                  |
| 0.00                      | 0.00          | 5.27       | 5.27   | 774.19                   | 4619                  |
| 0.00                      | 0.00          | 5.71       | 5.71   | 871.45                   | 5490                  |
| 0.00                      | 0.00          | 6.13       | 6.13   | 987.60                   | 6478                  |
| 0.00                      | 0.00          | 6.52       | 6.52   | 1136.99                  | 7615                  |
| 0.00                      | 0.00          | 6.93       | 6.93   | 1314.13                  | 8929                  |
| 0.00                      | 0.00          | 7.38       | 7.38   | 1511.19                  | 10440                 |
| 0.00                      | 0.00          | 7.73       | 7.73   | 1773.65                  | 12214                 |
| 0.00                      | 0.00          | 8.13       | 8.13   | 2096.13                  | 14310                 |
| 0.00                      | 0.00          | 3.86       | 3.86   | 2417.02                  | 16727                 |
| 0.00                      | 0.00          | 11.14      | 11.14  | 2617.88                  | 19345                 |
| 0.00                      | 0.00          | 15.47      | 15.47  | 2745.19                  | 22090                 |
| 0.00                      | 0.00          | 19.05      | 19.05  | 3130.84                  | 25221                 |
| 0.00                      | 0.00          | 22.63      | 22.63  | 4054.12                  | 29275                 |
| 0.00                      | 0.00          | 26.27      | 26.27  | 5120.33                  | 34395                 |
| 0.00                      | 0.00          | 29.57      | 29.57  | 5771.60                  | 40167                 |
| 0.00                      | 0.00          | 32.60      | 32.60  | 6554.83                  | 46722                 |
| 0.00                      | 0.00          | 35.79      | 35.79  | 8093.93                  | 54815                 |
| 0.00                      | 0.00          | 39.14      | 39.14  | 10594.59                 | 65410                 |
| 0.00                      | 0.00          | 42.74      | 42.74  | 14307.12                 | 79717                 |
| 0.00                      | 0.00          | 46.40      | 46.40  | 19238.17                 | 98955                 |
| 0.00                      | 0.00          | 49.87      | 49.87  | 25172.08                 | 124127                |
| 0.00                      | 0.00          | 53.36      | 53.36  | 31783.71                 | 155911                |
| 0.00                      | 0.00          | 56.98      | 56.98  | 38727.20                 | 194638                |
| 0.00                      | 0.00          | 60.52      | 60.52  | 45769.07                 | 240407                |
| 0.00                      | 0.00          | 63.96      | 63.96  | 52871.65                 | 293279                |
| 0.00                      | 0.00          | 67.43      | 67.43  | 60274.87                 | 353554                |
| 0.00                      | 0.00          | 70.94      | 70.94  | 68388.32                 | 421942                |
| 0.00                      | 0.00          | 74.47      | 74.47  | 77402.48                 | 499345                |
| 0.00                      | 0.00          | 78.01      | 78.01  | 87210.64                 | 586555                |
| 0.00                      | 0.00          | 81.55      | 81.55  | 97474.52                 | 684030                |
| 0.00                      | 0.00          | 85.10      | 85.10  | 107998.84                | 792029                |
| 0.00                      | 0.00          | 88.61      | 88.61  | 118555.84                | 910585                |
| 0.00                      | 0.00          | 92.03      | 92.03  | 128725.12                | 1039310               |
| 0.00                      | 0.00          | 95.34      | 95.34  | 138243.70                | 1177553               |
| 0.00                      | 0.00          | 98.51      | 98.51  | 146972.20                | 1324526               |
| 0.00                      | 0.00          | 101.51     | 101.51 | 154832.86                | 1479358               |
| 0.00                      | 0.00          | 104.33     | 104.33 | 161776.00                | 1641134               |
| 0.00                      | 0.00          | 106.96     | 106.96 | 167832.02                | 1808966               |
| 0.00                      | 0.00          | 109.42     | 109.42 | 172998.76                | 1981965               |
| 0.00                      | 0.00          | 111.73     | 111.73 | 177240.91                | 2159206               |
| 0.00                      | 0.00          | 113.92     | 113.92 | 180528.90                | 2339735               |
| 0.00                      | 0.00          | 115.99     | 115.99 | 182858.24                | 2522593               |
| 0.00                      | 0.00          | 117.95     | 117.95 | 184232.98                | 2706826               |
| 0.00                      | 0.00          | 119.80     | 119.80 | 184690.12                | 2891516               |
| 0.00                      | 0.00          | 121.55     | 121.55 | 184265.70                | 3075782               |



## Laminación de avenida T = 100 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 5.3     | 315       | 713.30            | 152.477            |
| 5.3     | 320       | 701.90            | 153.104            |
| 5.4     | 325       | 689.00            | 153.706            |
| 5.5     | 330       | 674.40            | 154.282            |
| 5.6     | 335       | 658.70            | 154.833            |
| 5.7     | 340       | 641.90            | 155.356            |
| 5.8     | 345       | 624.40            | 155.853            |
| 5.8     | 350       | 606.20            | 156.325            |
| 5.9     | 355       | 587.70            | 156.773            |
| 6.0     | 360       | 569.10            | 157.197            |
| 6.1     | 365       | 550.40            | 157.600            |
| 6.2     | 370       | 531.80            | 157.982            |
| 6.3     | 375       | 513.50            | 158.341            |
| 6.3     | 380       | 495.40            | 158.681            |
| 6.4     | 385       | 477.60            | 159.002            |
| 6.5     | 390       | 460.40            | 159.303            |
| 6.6     | 395       | 443.60            | 159.587            |
| 6.7     | 400       | 427.30            | 159.853            |
| 6.8     | 405       | 411.60            | 160.104            |
| 6.8     | 410       | 396.40            | 160.339            |
| 6.9     | 415       | 381.70            | 160.560            |
| 7.0     | 420       | 367.60            | 160.766            |
| 7.1     | 425       | 353.90            | 160.960            |
| 7.2     | 430       | 340.80            | 161.140            |
| 7.3     | 435       | 328.10            | 161.309            |
| 7.3     | 440       | 315.90            | 161.467            |
| 7.4     | 445       | 304.30            | 161.613            |
| 7.5     | 450       | 293.10            | 161.750            |
| 7.6     | 455       | 282.50            | 161.876            |
| 7.7     | 460       | 272.30            | 161.994            |
| 7.8     | 465       | 262.60            | 162.102            |
| 7.8     | 470       | 253.30            | 162.202            |
| 7.9     | 475       | 244.50            | 162.294            |
| 8.0     | 480       | 236.00            | 162.380            |
| 8.1     | 485       | 228.00            | 162.458            |
| 8.2     | 490       | 220.30            | 162.529            |
| 8.3     | 495       | 213.00            | 162.593            |
| 8.3     | 500       | 206.00            | 162.651            |
| 8.4     | 505       | 199.30            | 162.704            |
| 8.5     | 510       | 192.90            | 162.751            |
| 8.6     | 515       | 186.80            | 162.794            |
| 8.7     | 520       | 181.00            | 162.831            |
| 8.8     | 525       | 175.50            | 162.863            |
| 8.8     | 530       | 170.20            | 162.892            |
| 8.9     | 535       | 165.20            | 162.915            |
| 9.0     | 540       | 160.40            | 162.935            |
| 9.1     | 545       | 155.80            | 162.951            |
| 9.2     | 550       | 151.40            | 162.964            |
| 9.3     | 555       | 147.20            | 162.972            |
| 9.3     | 560       | 143.20            | 162.978            |
| 9.4     | 565       | 139.40            | 162.980            |
| 9.5     | 570       | 135.70            | 162.979            |
| 9.6     | 575       | 132.20            | 162.976            |
| 9.7     | 580       | 128.80            | 162.969            |
| 9.8     | 585       | 125.50            | 162.960            |
| 9.8     | 590       | 122.40            | 162.949            |
| 9.9     | 595       | 119.40            | 162.934            |
| 10.0    | 600       | 116.50            | 162.918            |
| 10.1    | 605       | 113.70            | 162.899            |
| 10.2    | 610       | 111.10            | 162.879            |
| 10.3    | 615       | 108.50            | 162.856            |
| 10.3    | 620       | 106.00            | 162.831            |
| 10.4    | 625       | 103.60            | 162.804            |

| CAUDALES DE SALIDA [m³/s] |               |            |        | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|--------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL  | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 123.21     | 123.21 | 182985.63                | 3258768               |
| 0.00                      | 0.00          | 124.77     | 124.77 | 180896.33                | 3439664               |
| 0.00                      | 0.00          | 126.26     | 126.26 | 178059.71                | 3617724               |
| 0.00                      | 0.00          | 127.67     | 127.67 | 174562.26                | 3792286               |
| 0.00                      | 0.00          | 129.00     | 129.00 | 170499.87                | 3962786               |
| 0.00                      | 0.00          | 130.25     | 130.25 | 165977.17                | 4128763               |
| 0.00                      | 0.00          | 131.43     | 131.43 | 161069.50                | 4289833               |
| 0.00                      | 0.00          | 132.54     | 132.54 | 155850.83                | 4445683               |
| 0.00                      | 0.00          | 133.58     | 133.58 | 150378.00                | 4596061               |
| 0.00                      | 0.00          | 134.56     | 134.56 | 144715.42                | 4740777               |
| 0.00                      | 0.00          | 135.49     | 135.49 | 138929.12                | 4879706               |
| 0.00                      | 0.00          | 136.36     | 136.36 | 133087.29                | 5012793               |
| 0.00                      | 0.00          | 137.17     | 137.17 | 127236.45                | 5140030               |
| 0.00                      | 0.00          | 137.94     | 137.94 | 121413.46                | 5261443               |
| 0.00                      | 0.00          | 138.66     | 138.66 | 115646.14                | 5377089               |
| 0.00                      | 0.00          | 139.33     | 139.33 | 109962.71                | 5487052               |
| 0.00                      | 0.00          | 139.96     | 139.96 | 104392.35                | 5591444               |
| 0.00                      | 0.00          | 140.55     | 140.55 | 98956.85                 | 5690401               |
| 0.00                      | 0.00          | 141.10     | 141.10 | 93673.79                 | 5784075               |
| 0.00                      | 0.00          | 141.62     | 141.62 | 88555.01                 | 5872630               |
| 0.00                      | 0.00          | 142.10     | 142.10 | 83606.09                 | 5956236               |
| 0.00                      | 0.00          | 142.55     | 142.55 | 78824.35                 | 6035060               |
| 0.00                      | 0.00          | 142.97     | 142.97 | 74209.77                 | 6109270               |
| 0.00                      | 0.00          | 143.36     | 143.36 | 69763.14                 | 6179033               |
| 0.00                      | 0.00          | 143.73     | 143.73 | 65484.59                 | 6244518               |
| 0.00                      | 0.00          | 144.07     | 144.07 | 61359.12                 | 6305877               |
| 0.00                      | 0.00          | 144.38     | 144.38 | 57382.02                 | 6363259               |
| 0.00                      | 0.00          | 144.67     | 144.67 | 53564.20                 | 6416823               |
| 0.00                      | 0.00          | 144.94     | 144.94 | 49908.28                 | 6466732               |
| 0.00                      | 0.00          | 145.20     | 145.20 | 46413.09                 | 6513145               |
| 0.00                      | 0.00          | 145.43     | 145.43 | 43074.74                 | 6556219               |
| 0.00                      | 0.00          | 145.64     | 145.64 | 39887.94                 | 6596107               |
| 0.00                      | 0.00          | 145.84     | 145.84 | 36844.50                 | 6632952               |
| 0.00                      | 0.00          | 146.02     | 146.02 | 33938.41                 | 6666890               |
| 0.00                      | 0.00          | 146.18     | 146.18 | 31165.45                 | 6698056               |
| 0.00                      | 0.00          | 146.33     | 146.33 | 28522.28                 | 6726578               |
| 0.00                      | 0.00          | 146.47     | 146.47 | 26002.74                 | 6752581               |
| 0.00                      | 0.00          | 146.59     | 146.59 | 23601.78                 | 6776182               |
| 0.00                      | 0.00          | 146.70     | 146.70 | 21312.36                 | 6797495               |
| 0.00                      | 0.00          | 146.80     | 146.80 | 19128.83                 | 6816624               |
| 0.00                      | 0.00          | 146.89     | 146.89 | 17047.09                 | 6833671               |
| 0.00                      | 0.00          | 146.97     | 146.97 | 15064.50                 | 6848735               |
| 0.00                      | 0.00          | 147.04     | 147.04 | 13176.08                 | 6861911               |
| 0.00                      | 0.00          | 147.10     | 147.10 | 11377.13                 | 6873288               |
| 0.00                      | 0.00          | 147.15     | 147.15 | 9662.23                  | 6882951               |
| 0.00                      | 0.00          | 147.19     | 147.19 | 8026.98                  | 6890978               |
| 0.00                      | 0.00          | 147.23     | 147.23 | 6468.35                  | 6897446               |
| 0.00                      | 0.00          | 147.25     | 147.25 | 4983.54                  | 6902430               |
| 0.00                      | 0.00          | 147.27     | 147.27 | 3568.33                  | 6905998               |
| 0.00                      | 0.00          | 147.28     | 147.28 | 2218.74                  | 6908217               |
| 0.00                      | 0.00          | 147.29     | 147.29 | 930.33                   | 6909147               |
| 0.00                      | 0.00          | 147.28     | 147.28 | -301.37                  | 6908846               |
| 0.00                      | 0.00          | 147.28     | 147.28 | -1478.86                 | 6907367               |
| 0.00                      | 0.00          | 147.26     | 147.26 | -2604.41                 | 6904762               |
| 0.00                      | 0.00          | 147.24     | 147.24 | -3680.95                 | 6901081               |
| 0.00                      | 0.00          | 147.22     | 147.22 | -4711.39                 | 6896370               |
| 0.00                      | 0.00          | 147.19     | 147.19 | -5698.72                 | 6890671               |
| 0.00                      | 0.00          | 147.16     | 147.16 | -6645.82                 | 6884025               |
| 0.00                      | 0.00          | 147.12     | 147.12 | -7553.92                 | 6876471               |
| 0.00                      | 0.00          | 147.07     | 147.07 | -8424.44                 | 6868047               |
| 0.00                      | 0.00          | 147.03     | 147.03 | -9259.46                 | 6858788               |
| 0.00                      | 0.00          | 146.97     | 146.97 | -10061.04                | 6848727               |
| 0.00                      | 0.00          | 146.92     | 146.92 | -10831.01                | 6837896               |

## Laminación de avenida T = 100 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 10.5    | 630       | 101.30            | 162.775            |
| 10.6    | 635       | 99.10             | 162.745            |
| 10.7    | 640       | 97.00             | 162.713            |
| 10.8    | 645       | 95.00             | 162.679            |
| 10.8    | 650       | 93.00             | 162.644            |
| 10.9    | 655       | 91.10             | 162.607            |
| 11.0    | 660       | 89.30             | 162.569            |
| 11.1    | 665       | 87.50             | 162.530            |
| 11.2    | 670       | 85.80             | 162.489            |
| 11.3    | 675       | 84.20             | 162.446            |
| 11.3    | 680       | 82.60             | 162.402            |
| 11.4    | 685       | 81.10             | 162.357            |
| 11.5    | 690       | 79.60             | 162.311            |
| 11.6    | 695       | 78.10             | 162.264            |
| 11.7    | 700       | 76.70             | 162.215            |
| 11.8    | 705       | 75.40             | 162.166            |
| 11.8    | 710       | 74.10             | 162.116            |
| 11.9    | 715       | 72.80             | 162.064            |
| 12.0    | 720       | 71.60             | 162.012            |
| 12.1    | 725       | 70.40             | 161.958            |
| 12.2    | 730       | 69.30             | 161.904            |
| 12.3    | 735       | 68.10             | 161.848            |
| 12.3    | 740       | 67.10             | 161.792            |
| 12.4    | 745       | 66.00             | 161.735            |
| 12.5    | 750       | 65.00             | 161.677            |
| 12.6    | 755       | 64.00             | 161.618            |
| 12.7    | 760       | 63.10             | 161.559            |
| 12.8    | 765       | 62.10             | 161.499            |
| 12.8    | 770       | 61.20             | 161.438            |
| 12.9    | 775       | 60.30             | 161.376            |
| 13.0    | 780       | 59.50             | 161.313            |
| 13.1    | 785       | 58.60             | 161.250            |
| 13.2    | 790       | 57.80             | 161.186            |
| 13.3    | 795       | 57.00             | 161.122            |
| 13.3    | 800       | 56.20             | 161.057            |
| 13.4    | 805       | 55.50             | 160.991            |
| 13.5    | 810       | 54.70             | 160.924            |
| 13.6    | 815       | 54.00             | 160.857            |
| 13.7    | 820       | 53.30             | 160.789            |
| 13.8    | 825       | 52.60             | 160.721            |
| 13.8    | 830       | 51.90             | 160.652            |
| 13.9    | 835       | 51.30             | 160.583            |
| 14.0    | 840       | 50.60             | 160.513            |
| 14.1    | 845       | 50.00             | 160.443            |
| 14.2    | 850       | 49.40             | 160.371            |
| 14.3    | 855       | 48.80             | 160.299            |
| 14.3    | 860       | 48.20             | 160.227            |
| 14.4    | 865       | 47.60             | 160.155            |
| 14.5    | 870       | 47.00             | 160.082            |
| 14.6    | 875       | 46.50             | 160.009            |
| 14.7    | 880       | 45.90             | 159.934            |
| 14.8    | 885       | 45.40             | 159.859            |
| 14.8    | 890       | 44.90             | 159.784            |
| 14.9    | 895       | 44.30             | 159.708            |
| 15.0    | 900       | 43.80             | 159.632            |
| 15.1    | 905       | 43.30             | 159.556            |
| 15.2    | 910       | 42.70             | 159.479            |
| 15.3    | 915       | 42.10             | 159.402            |
| 15.3    | 920       | 41.40             | 159.323            |
| 15.4    | 925       | 40.70             | 159.245            |
| 15.5    | 930       | 40.00             | 159.166            |
| 15.6    | 935       | 39.20             | 159.086            |
| 15.7    | 940       | 38.50             | 159.006            |

| CAUDALES DE SALIDA [m³/s] |               |            |        | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|--------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL  | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 146.85     | 146.85 | -11571.09                | 6826324               |
| 0.00                      | 0.00          | 146.79     | 146.79 | -12281.54                | 6814043               |
| 0.00                      | 0.00          | 146.72     | 146.72 | -12962.83                | 6801080               |
| 0.00                      | 0.00          | 146.65     | 146.65 | -13615.92                | 6787464               |
| 0.00                      | 0.00          | 146.58     | 146.58 | -14242.00                | 6773222               |
| 0.00                      | 0.00          | 146.50     | 146.50 | -14842.64                | 6758380               |
| 0.00                      | 0.00          | 146.42     | 146.42 | -15419.70                | 6742960               |
| 0.00                      | 0.00          | 146.34     | 146.34 | -15973.93                | 6726986               |
| 0.00                      | 0.00          | 146.25     | 146.25 | -16505.95                | 6710480               |
| 0.00                      | 0.00          | 146.16     | 146.16 | -17016.77                | 6693463               |
| 0.00                      | 0.00          | 146.06     | 146.06 | -17507.70                | 6675955               |
| 0.00                      | 0.00          | 145.97     | 145.97 | -17980.42                | 6657975               |
| 0.00                      | 0.00          | 145.87     | 145.87 | -18436.32                | 6639539               |
| 0.00                      | 0.00          | 145.77     | 145.77 | -18875.90                | 6620663               |
| 0.00                      | 0.00          | 145.67     | 145.67 | -19299.43                | 6601363               |
| 0.00                      | 0.00          | 145.56     | 145.56 | -19707.62                | 6581656               |
| 0.00                      | 0.00          | 145.46     | 145.46 | -20101.06                | 6561555               |
| 0.00                      | 0.00          | 145.35     | 145.35 | -20480.48                | 6541074               |
| 0.00                      | 0.00          | 145.23     | 145.23 | -20846.56                | 6520228               |
| 0.00                      | 0.00          | 145.12     | 145.12 | -21198.95                | 6499029               |
| 0.00                      | 0.00          | 145.00     | 145.00 | -21537.54                | 6477491               |
| 0.00                      | 0.00          | 144.88     | 144.88 | -21863.30                | 6455628               |
| 0.00                      | 0.00          | 144.76     | 144.76 | -22176.93                | 6433451               |
| 0.00                      | 0.00          | 144.64     | 144.64 | -22479.31                | 6410972               |
| 0.00                      | 0.00          | 144.52     | 144.52 | -22771.19                | 6388200               |
| 0.00                      | 0.00          | 144.39     | 144.39 | -23052.73                | 6365148               |
| 0.00                      | 0.00          | 144.26     | 144.26 | -23324.01                | 6341824               |
| 0.00                      | 0.00          | 144.14     | 144.14 | -23585.70                | 6318238               |
| 0.00                      | 0.00          | 144.00     | 144.00 | -23837.84                | 6294400               |
| 0.00                      | 0.00          | 143.87     | 143.87 | -24081.18                | 6270319               |
| 0.00                      | 0.00          | 143.73     | 143.73 | -24316.80                | 6246002               |
| 0.00                      | 0.00          | 143.60     | 143.60 | -24544.68                | 6221458               |
| 0.00                      | 0.00          | 143.46     | 143.46 | -24764.80                | 6196693               |
| 0.00                      | 0.00          | 143.32     | 143.32 | -24977.52                | 6171715               |
| 0.00                      | 0.00          | 143.18     | 143.18 | -25183.20                | 6146532               |
| 0.00                      | 0.00          | 143.04     | 143.04 | -25382.28                | 6121150               |
| 0.00                      | 0.00          | 142.89     | 142.89 | -25574.80                | 6095575               |
| 0.00                      | 0.00          | 142.75     | 142.75 | -25760.80                | 6069814               |
| 0.00                      | 0.00          | 142.60     | 142.60 | -25940.73                | 6043873               |
| 0.00                      | 0.00          | 142.45     | 142.45 | -26114.92                | 6017758               |
| 0.00                      | 0.00          | 142.30     | 142.30 | -26283.74                | 5991475               |
| 0.00                      | 0.00          | 142.15     | 142.15 | -26447.59                | 5965027               |
| 0.00                      | 0.00          | 142.00     | 142.00 | -26606.89                | 5938420               |
| 0.00                      | 0.00          | 141.85     | 141.85 | -26761.24                | 5911659               |
| 0.00                      | 0.00          | 141.69     | 141.69 | -26910.43                | 5884749               |
| 0.00                      | 0.00          | 141.53     | 141.53 | -27054.97                | 5857694               |
| 0.00                      | 0.00          | 141.37     | 141.37 | -27195.13                | 5830498               |
| 0.00                      | 0.00          | 141.21     | 141.21 | -27331.25                | 5803167               |
| 0.00                      | 0.00          | 141.05     | 141.05 | -27463.69                | 5775704               |
| 0.00                      | 0.00          | 140.89     | 140.89 | -27592.33                | 5748111               |
| 0.00                      | 0.00          | 140.73     | 140.73 | -27716.32                | 5720395               |
| 0.00                      | 0.00          | 140.56     | 140.56 | -27835.80                | 5692559               |
| 0.00                      | 0.00          | 140.40     | 140.40 | -27951.65                | 5664607               |
| 0.00                      | 0.00          | 140.23     | 140.23 | -28064.25                | 5636543               |
| 0.00                      | 0.00          | 140.06     | 140.06 | -28173.88                | 5608369               |
| 0.00                      | 0.00          | 139.89     | 139.89 | -28280.37                | 5580089               |
| 0.00                      | 0.00          | 139.72     | 139.72 | -28385.45                | 5551703               |
| 0.00                      | 0.00          | 139.55     | 139.55 | -28492.85                | 5523211               |
| 0.00                      | 0.00          | 139.38     | 139.38 | -28606.74                | 5494604               |
| 0.00                      | 0.00          | 139.20     | 139.20 | -28732.36                | 5465872               |
| 0.00                      | 0.00          | 139.03     | 139.03 | -28873.22                | 5436998               |
| 0.00                      | 0.00          | 138.85     | 138.85 | -29027.19                | 5407971               |
| 0.00                      | 0.00          | 138.67     | 138.67 | -29189.27                | 5378782               |



## Laminación de avenida T = 100 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 15.8    | 945       | 37.70             | 158.925            |
| 15.8    | 950       | 36.90             | 158.843            |
| 15.9    | 955       | 36.10             | 158.761            |
| 16.0    | 960       | 35.20             | 158.678            |
| 16.1    | 965       | 34.30             | 158.594            |
| 16.2    | 970       | 33.30             | 158.510            |
| 16.3    | 975       | 32.30             | 158.424            |
| 16.3    | 980       | 31.20             | 158.338            |
| 16.4    | 985       | 30.10             | 158.250            |
| 16.5    | 990       | 28.90             | 158.162            |
| 16.6    | 995       | 27.80             | 158.074            |
| 16.7    | 1000      | 26.60             | 157.984            |
| 16.8    | 1005      | 25.40             | 157.892            |
| 16.8    | 1010      | 24.20             | 157.799            |
| 16.9    | 1015      | 23.00             | 157.706            |
| 17.0    | 1020      | 21.90             | 157.612            |
| 17.1    | 1025      | 20.70             | 157.517            |
| 17.2    | 1030      | 19.60             | 157.419            |
| 17.3    | 1035      | 18.50             | 157.321            |
| 17.3    | 1040      | 17.40             | 157.222            |
| 17.4    | 1045      | 16.40             | 157.122            |
| 17.5    | 1050      | 15.40             | 157.022            |
| 17.6    | 1055      | 14.40             | 156.919            |
| 17.7    | 1060      | 13.50             | 156.815            |
| 17.8    | 1065      | 12.60             | 156.711            |
| 17.8    | 1070      | 11.80             | 156.606            |
| 17.9    | 1075      | 11.00             | 156.501            |
| 18.0    | 1080      | 10.20             | 156.393            |
| 18.1    | 1085      | 9.50              | 156.284            |
| 18.2    | 1090      | 8.80              | 156.176            |
| 18.3    | 1095      | 8.20              | 156.066            |
| 18.3    | 1100      | 7.60              | 155.956            |
| 18.4    | 1105      | 7.10              | 155.844            |
| 18.5    | 1110      | 6.50              | 155.732            |
| 18.6    | 1115      | 6.10              | 155.619            |
| 18.7    | 1120      | 5.60              | 155.506            |
| 18.8    | 1125      | 5.20              | 155.391            |
| 18.8    | 1130      | 4.80              | 155.275            |
| 18.9    | 1135      | 4.50              | 155.159            |
| 19.0    | 1140      | 4.10              | 155.043            |
| 19.1    | 1145      | 3.80              | 154.925            |
| 19.2    | 1150      | 3.50              | 154.806            |
| 19.3    | 1155      | 3.30              | 154.688            |
| 19.3    | 1160      | 3.00              | 154.569            |
| 19.4    | 1165      | 2.80              | 154.449            |
| 19.5    | 1170      | 2.60              | 154.328            |
| 19.6    | 1175      | 2.40              | 154.207            |
| 19.7    | 1180      | 2.20              | 154.086            |
| 19.8    | 1185      | 2.00              | 153.965            |
| 19.8    | 1190      | 1.90              | 153.841            |
| 19.9    | 1195      | 1.70              | 153.718            |
| 20.0    | 1200      | 1.60              | 153.595            |
| 20.1    | 1205      | 1.50              | 153.472            |
| 20.2    | 1210      | 1.30              | 153.346            |
| 20.3    | 1215      | 1.20              | 153.221            |
| 20.3    | 1220      | 1.10              | 153.096            |
| 20.4    | 1225      | 1.00              | 152.971            |
| 20.5    | 1230      | 1.00              | 152.844            |
| 20.6    | 1235      | 0.90              | 152.717            |
| 20.7    | 1240      | 0.80              | 152.590            |
| 20.8    | 1245      | 0.70              | 152.463            |
| 20.8    | 1250      | 0.70              | 152.334            |
| 20.9    | 1255      | 0.60              | 152.206            |

| CAUDALES DE SALIDA [m³/s] |               |            |        | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|--------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL  | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 138.49     | 138.49 | -29355.76                | 5349426               |
| 0.00                      | 0.00          | 138.30     | 138.30 | -29524.75                | 5319901               |
| 0.00                      | 0.00          | 138.12     | 138.12 | -29697.16                | 5290204               |
| 0.00                      | 0.00          | 137.93     | 137.93 | -29875.36                | 5260329               |
| 0.00                      | 0.00          | 137.74     | 137.74 | -30061.28                | 5230268               |
| 0.00                      | 0.00          | 137.55     | 137.55 | -30258.19                | 5200009               |
| 0.00                      | 0.00          | 137.36     | 137.36 | -30469.29                | 5169540               |
| 0.00                      | 0.00          | 137.17     | 137.17 | -30695.99                | 5138844               |
| 0.00                      | 0.00          | 136.97     | 136.97 | -30938.58                | 5107905               |
| 0.00                      | 0.00          | 136.77     | 136.77 | -31195.60                | 5076710               |
| 0.00                      | 0.00          | 136.57     | 136.57 | -31464.76                | 5045245               |
| 0.00                      | 0.00          | 136.36     | 136.36 | -31743.40                | 5013502               |
| 0.00                      | 0.00          | 136.15     | 136.15 | -32028.22                | 4981474               |
| 0.00                      | 0.00          | 135.94     | 135.94 | -32316.98                | 4949157               |
| 0.00                      | 0.00          | 135.73     | 135.73 | -32608.04                | 4916548               |
| 0.00                      | 0.00          | 135.52     | 135.52 | -32899.43                | 4883649               |
| 0.00                      | 0.00          | 135.30     | 135.30 | -33189.34                | 4850460               |
| 0.00                      | 0.00          | 135.07     | 135.07 | -33475.07                | 4816985               |
| 0.00                      | 0.00          | 134.85     | 134.85 | -33754.90                | 4783230               |
| 0.00                      | 0.00          | 134.62     | 134.62 | -34028.27                | 4749201               |
| 0.00                      | 0.00          | 134.39     | 134.39 | -34294.07                | 4714907               |
| 0.00                      | 0.00          | 134.16     | 134.16 | -34551.00                | 4680356               |
| 0.00                      | 0.00          | 133.92     | 133.92 | -34797.39                | 4645559               |
| 0.00                      | 0.00          | 133.68     | 133.68 | -35031.92                | 4610527               |
| 0.00                      | 0.00          | 133.44     | 133.44 | -35254.12                | 4575273               |
| 0.00                      | 0.00          | 133.19     | 133.19 | -35463.44                | 4539810               |
| 0.00                      | 0.00          | 132.95     | 132.95 | -35659.63                | 4504150               |
| 0.00                      | 0.00          | 132.70     | 132.70 | -35841.61                | 4468308               |
| 0.00                      | 0.00          | 132.44     | 132.44 | -36009.45                | 4432299               |
| 0.00                      | 0.00          | 132.19     | 132.19 | -36164.18                | 4396135               |
| 0.00                      | 0.00          | 131.93     | 131.93 | -36306.01                | 4359829               |
| 0.00                      | 0.00          | 131.67     | 131.67 | -36434.73                | 4323394               |
| 0.00                      | 0.00          | 131.41     | 131.41 | -36549.97                | 4286844               |
| 0.00                      | 0.00          | 131.14     | 131.14 | -36652.47                | 4250191               |
| 0.00                      | 0.00          | 130.88     | 130.88 | -36743.27                | 4213448               |
| 0.00                      | 0.00          | 130.61     | 130.61 | -36822.84                | 4176625               |
| 0.00                      | 0.00          | 130.33     | 130.33 | -36890.48                | 4139735               |
| 0.00                      | 0.00          | 130.06     | 130.06 | -36946.66                | 4102788               |
| 0.00                      | 0.00          | 129.78     | 129.78 | -36993.06                | 4065795               |
| 0.00                      | 0.00          | 129.50     | 129.50 | -37030.33                | 4028765               |
| 0.00                      | 0.00          | 129.22     | 129.22 | -37058.00                | 3991707               |
| 0.00                      | 0.00          | 128.93     | 128.93 | -37076.06                | 3954631               |
| 0.00                      | 0.00          | 128.65     | 128.65 | -37086.04                | 3917545               |
| 0.00                      | 0.00          | 128.36     | 128.36 | -37089.06                | 3880456               |
| 0.00                      | 0.00          | 128.07     | 128.07 | -37085.08                | 3843371               |
| 0.00                      | 0.00          | 127.78     | 127.78 | -37073.81                | 3806297               |
| 0.00                      | 0.00          | 127.49     | 127.49 | -37056.19                | 3769241               |
| 0.00                      | 0.00          | 127.19     | 127.19 | -37033.36                | 3732207               |
| 0.00                      | 0.00          | 126.90     | 126.90 | -37005.30                | 3695202               |
| 0.00                      | 0.00          | 126.59     | 126.59 | -36971.45                | 3658231               |
| 0.00                      | 0.00          | 126.29     | 126.29 | -36932.48                | 3621298               |
| 0.00                      | 0.00          | 125.99     | 125.99 | -36889.69                | 3584408               |
| 0.00                      | 0.00          | 125.69     | 125.69 | -36843.03                | 3547565               |
| 0.00                      | 0.00          | 125.37     | 125.37 | -36791.75                | 3510774               |
| 0.00                      | 0.00          | 125.06     | 125.06 | -36736.41                | 3474037               |
| 0.00                      | 0.00          | 124.75     | 124.75 | -36678.32                | 3437359               |
| 0.00                      | 0.00          | 124.44     | 124.44 | -36617.35                | 3400741               |
| 0.00                      | 0.00          | 124.13     | 124.13 | -36552.70                | 3364189               |
| 0.00                      | 0.00          | 123.81     | 123.81 | -36484.85                | 3327704               |
| 0.00                      | 0.00          | 123.49     | 123.49 | -36415.04                | 3291289               |
| 0.00                      | 0.00          | 123.17     | 123.17 | -36342.92                | 3254946               |
| 0.00                      | 0.00          | 122.85     | 122.85 | -36267.42                | 3218679               |
| 0.00                      | 0.00          | 122.52     | 122.52 | -36189.16                | 3182489               |

## Laminación de avenida T = 100 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 21.0    | 1260      | 0.60              | 152.078            |
| 21.1    | 1265      | 0.50              | 151.949            |
| 21.2    | 1270      | 0.50              | 151.818            |
| 21.3    | 1275      | 0.40              | 151.688            |
| 21.3    | 1280      | 0.40              | 151.558            |
| 21.4    | 1285      | 0.40              | 151.426            |
| 21.5    | 1290      | 0.30              | 151.292            |
| 21.6    | 1295      | 0.30              | 151.160            |
| 21.7    | 1300      | 0.30              | 151.027            |
| 21.8    | 1305      | 0.30              | 150.892            |
| 21.8    | 1310      | 0.20              | 150.756            |
| 21.9    | 1315      | 0.20              | 150.621            |
| 22.0    | 1320      | 0.20              | 150.486            |
| 22.1    | 1325      | 0.20              | 150.348            |
| 22.2    | 1330      | 0.20              | 150.210            |
| 22.3    | 1335      | 0.10              | 150.073            |
| 22.3    | 1340      | 0.10              | 149.934            |
| 22.4    | 1345      | 0.10              | 149.793            |
| 22.5    | 1350      | 0.10              | 149.653            |
| 22.6    | 1355      | 0.10              | 149.513            |
| 22.7    | 1360      | 0.10              | 149.369            |
| 22.8    | 1365      | 0.10              | 149.225            |
| 22.8    | 1370      | 0.10              | 149.082            |
| 22.9    | 1375      | 0.10              | 148.937            |
| 23.0    | 1380      | 0.10              | 148.790            |
| 23.1    | 1385      | 0.10              | 148.644            |
| 23.2    | 1390      | 0.00              | 148.498            |
| 23.3    | 1395      | 0.00              | 148.348            |
| 23.3    | 1400      | 0.00              | 148.200            |
| 23.4    | 1405      | 0.00              | 148.051            |
| 23.5    | 1410      | 0.00              | 147.900            |
| 23.6    | 1415      | 0.00              | 147.748            |
| 23.7    | 1420      | 0.00              | 147.596            |
| 23.8    | 1425      | 0.00              | 147.443            |
| 23.8    | 1430      | 0.00              | 147.286            |
| 23.9    | 1435      | 0.00              | 147.130            |
| 24.0    | 1440      | 0.00              | 146.974            |
| 24.1    | 1445      | 0.00              | 146.813            |
| 24.2    | 1450      | 0.00              | 146.653            |
| 24.3    | 1455      | 0.00              | 146.493            |
| 24.3    | 1460      | 0.00              | 146.328            |
| 24.4    | 1465      | 0.00              | 146.163            |
| 24.5    | 1470      | 0.00              | 146.000            |
| 24.6    | 1475      | 0.00              | 145.829            |
| 24.7    | 1480      | 0.00              | 145.660            |
| 24.8    | 1485      | 0.00              | 145.491            |
| 24.8    | 1490      | 0.00              | 145.316            |
| 24.9    | 1495      | 0.00              | 145.142            |
| 25.0    | 1500      | 0.00              | 144.967            |
| 25.1    | 1505      | 0.00              | 144.787            |
| 25.2    | 1510      | 0.00              | 144.609            |
| 25.3    | 1515      | 0.00              | 144.428            |
| 25.3    | 1520      | 0.00              | 144.245            |
| 25.4    | 1525      | 0.00              | 144.062            |
| 25.5    | 1530      | 0.00              | 143.875            |
| 25.6    | 1535      | 0.00              | 143.688            |
| 25.7    | 1540      | 0.00              | 143.501            |
| 25.8    | 1545      | 0.00              | 143.308            |
| 25.8    | 1550      | 0.00              | 143.116            |
| 25.9    | 1555      | 0.00              | 142.923            |
| 26.0    | 1560      | 0.00              | 142.726            |
| 26.1    | 1565      | 0.00              | 142.531            |
| 26.2    | 1570      | 0.00              | 142.332            |

| CAUDALES DE SALIDA [m³/s] |               |            |        | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|--------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL  | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 122.20     | 122.20 | -36109.55                | 3146380               |
| 0.00                      | 0.00          | 121.87     | 121.87 | -36028.08                | 3110352               |
| 0.00                      | 0.00          | 121.54     | 121.54 | -35943.86                | 3074408               |
| 0.00                      | 0.00          | 121.20     | 121.20 | -35857.69                | 3038550               |
| 0.00                      | 0.00          | 120.87     | 120.87 | -35770.59                | 3002780               |
| 0.00                      | 0.00          | 120.53     | 120.53 | -35681.44                | 2967098               |
| 0.00                      | 0.00          | 120.19     | 120.19 | -35589.29                | 2931509               |
| 0.00                      | 0.00          | 119.85     | 119.85 | -35495.53                | 2896013               |
| 0.00                      | 0.00          | 119.50     | 119.50 | -35401.20                | 2860612               |
| 0.00                      | 0.00          | 119.15     | 119.15 | -35304.90                | 2825307               |
| 0.00                      | 0.00          | 118.80     | 118.80 | -35206.28                | 2790101               |
| 0.00                      | 0.00          | 118.44     | 118.44 | -35106.92                | 2754994               |
| 0.00                      | 0.00          | 118.09     | 118.09 | -35007.06                | 2719987               |
| 0.00                      | 0.00          | 117.73     | 117.73 | -34905.05                | 2685082               |
| 0.00                      | 0.00          | 117.36     | 117.36 | -34801.12                | 2650281               |
| 0.00                      | 0.00          | 117.00     | 117.00 | -34697.02                | 2615584               |
| 0.00                      | 0.00          | 116.63     | 116.63 | -34591.61                | 2580992               |
| 0.00                      | 0.00          | 116.26     | 116.26 | -34483.56                | 2546509               |
| 0.00                      | 0.00          | 115.88     | 115.88 | -34374.12                | 2512135               |
| 0.00                      | 0.00          | 115.51     | 115.51 | -34264.67                | 2477870               |
| 0.00                      | 0.00          | 115.12     | 115.12 | -34152.67                | 2443717               |
| 0.00                      | 0.00          | 114.73     | 114.73 | -34037.91                | 2409679               |
| 0.00                      | 0.00          | 114.34     | 114.34 | -33922.99                | 2375756               |
| 0.00                      | 0.00          | 113.95     | 113.95 | -33807.20                | 2341949               |
| 0.00                      | 0.00          | 113.55     | 113.55 | -33689.24                | 2308260               |
| 0.00                      | 0.00          | 113.15     | 113.15 | -33570.16                | 2274690               |
| 0.00                      | 0.00          | 112.75     | 112.75 | -33451.27                | 2241238               |
| 0.00                      | 0.00          | 112.33     | 112.33 | -33329.99                | 2207908               |
| 0.00                      | 0.00          | 111.93     | 111.93 | -33206.41                | 2174702               |
| 0.00                      | 0.00          | 111.51     | 111.51 | -33083.23                | 2141619               |
| 0.00                      | 0.00          | 111.09     | 111.09 | -32958.42                | 2108660               |
| 0.00                      | 0.00          | 110.67     | 110.67 | -32830.94                | 2075829               |
| 0.00                      | 0.00          | 110.24     | 110.24 | -32702.75                | 2043127               |
| 0.00                      | 0.00          | 109.81     | 109.81 | -32573.64                | 2010553               |
| 0.00                      | 0.00          | 109.36     | 109.36 | -32441.43                | 1978112               |
| 0.00                      | 0.00          | 108.92     | 108.92 | -32307.42                | 1945804               |
| 0.00                      | 0.00          | 108.48     | 108.48 | -32173.26                | 1913631               |
| 0.00                      | 0.00          | 108.01     | 108.01 | -32035.86                | 1881595               |
| 0.00                      | 0.00          | 107.55     | 107.55 | -31895.99                | 1849699               |
| 0.00                      | 0.00          | 107.09     | 107.09 | -31756.54                | 1817943               |
| 0.00                      | 0.00          | 106.61     | 106.61 | -31614.09                | 1786328               |
| 0.00                      | 0.00          | 106.13     | 106.13 | -31468.89                | 1754860               |
| 0.00                      | 0.00          | 105.65     | 105.65 | -31324.29                | 1723535               |
| 0.00                      | 0.00          | 105.15     | 105.15 | -31175.67                | 1692360               |
| 0.00                      | 0.00          | 104.65     | 104.65 | -31023.11                | 1661336               |
| 0.00                      | 0.00          | 104.15     | 104.15 | -30871.03                | 1630465               |
| 0.00                      | 0.00          | 103.63     | 103.63 | -30715.27                | 1599750               |
| 0.00                      | 0.00          | 103.11     | 103.11 | -30556.07                | 1569194               |
| 0.00                      | 0.00          | 102.58     | 102.58 | -30396.80                | 1538797               |
| 0.00                      | 0.00          | 102.03     | 102.03 | -30233.38                | 1508564               |
| 0.00                      | 0.00          | 101.49     | 101.49 | -30066.80                | 1478497               |
| 0.00                      | 0.00          | 100.94     | 100.94 | -29899.42                | 1448598               |
| 0.00                      | 0.00          | 100.37     | 100.37 | -29728.58                | 1418869               |
| 0.00                      | 0.00          | 99.81      | 99.81  | -29556.04                | 1389313               |
| 0.00                      | 0.00          | 99.22      | 99.22  | -29381.49                | 1359932               |
| 0.00                      | 0.00          | 98.64      | 98.64  | -29203.40                | 1330728               |
| 0.00                      | 0.00          | 98.05      | 98.05  | -29024.83                | 1301703               |
| 0.00                      | 0.00          | 97.43      | 97.43  | -28842.05                | 1272861               |
| 0.00                      | 0.00          | 96.82      | 96.82  | -28655.07                | 1244206               |
| 0.00                      | 0.00          | 96.20      | 96.20  | -28467.21                | 1215739               |
| 0.00                      | 0.00          | 95.56      | 95.56  | -28275.32                | 1187464               |
| 0.00                      | 0.00          | 94.93      | 94.93  | -28081.52                | 1159382               |
| 0.00                      | 0.00          | 94.28      | 94.28  | -27884.75                | 1131497               |

## Laminación de avenida T = 100 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 26.3    | 1575      | 0.00              | 142.133            |
| 26.3    | 1580      | 0.00              | 141.933            |
| 26.4    | 1585      | 0.00              | 141.730            |
| 26.5    | 1590      | 0.00              | 141.529            |
| 26.6    | 1595      | 0.00              | 141.323            |
| 26.7    | 1600      | 0.00              | 141.118            |
| 26.8    | 1605      | 0.00              | 140.911            |
| 26.8    | 1610      | 0.00              | 140.702            |
| 26.9    | 1615      | 0.00              | 140.495            |
| 27.0    | 1620      | 0.00              | 140.282            |
| 27.1    | 1625      | 0.00              | 140.071            |
| 27.2    | 1630      | 0.00              | 139.858            |
| 27.3    | 1635      | 0.00              | 139.644            |
| 27.3    | 1640      | 0.00              | 139.430            |
| 27.4    | 1645      | 0.00              | 139.214            |
| 27.5    | 1650      | 0.00              | 139.000            |
| 27.6    | 1655      | 0.00              | 138.782            |
| 27.7    | 1660      | 0.00              | 138.566            |
| 27.8    | 1665      | 0.00              | 138.347            |
| 27.8    | 1670      | 0.00              | 138.129            |
| 27.9    | 1675      | 0.00              | 137.910            |
| 28.0    | 1680      | 0.00              | 137.689            |
| 28.1    | 1685      | 0.00              | 137.469            |
| 28.2    | 1690      | 0.00              | 137.245            |
| 28.3    | 1695      | 0.00              | 137.024            |
| 28.3    | 1700      | 0.00              | 136.798            |
| 28.4    | 1705      | 0.00              | 136.573            |
| 28.5    | 1710      | 0.00              | 136.346            |
| 28.6    | 1715      | 0.00              | 136.119            |
| 28.7    | 1720      | 0.00              | 135.890            |
| 28.8    | 1725      | 0.00              | 135.660            |
| 28.8    | 1730      | 0.00              | 135.431            |
| 28.9    | 1735      | 0.00              | 135.199            |
| 29.0    | 1740      | 0.00              | 134.969            |
| 29.1    | 1745      | 0.00              | 134.735            |
| 29.2    | 1750      | 0.00              | 134.505            |
| 29.3    | 1755      | 0.00              | 134.268            |
| 29.3    | 1760      | 0.00              | 134.037            |
| 29.4    | 1765      | 0.00              | 133.795            |
| 29.5    | 1770      | 0.00              | 133.557            |
| 29.6    | 1775      | 0.00              | 133.304            |
| 29.7    | 1780      | 0.00              | 133.051            |
| 29.8    | 1785      | 0.00              | 132.786            |
| 29.8    | 1790      | 0.00              | 132.525            |
| 29.9    | 1795      | 0.00              | 132.254            |
| 30.0    | 1800      | 0.00              | 131.989            |
| 30.1    | 1805      | 0.00              | 131.699            |
| 30.2    | 1810      | 0.00              | 131.401            |
| 30.3    | 1815      | 0.00              | 131.071            |
| 30.3    | 1820      | 0.00              | 130.707            |
| 30.4    | 1825      | 0.00              | 130.336            |
| 30.5    | 1830      | 0.00              | 129.964            |
| 30.6    | 1835      | 0.00              | 129.590            |
| 30.7    | 1840      | 0.00              | 129.240            |
| 30.8    | 1845      | 0.00              | 128.932            |
| 30.8    | 1850      | 0.00              | 128.619            |
| 30.9    | 1855      | 0.00              | 128.306            |
| 31.0    | 1860      | 0.00              | 128.042            |
| 31.1    | 1865      | 0.00              | 127.796            |
| 31.2    | 1870      | 0.00              | 127.580            |
| 31.3    | 1875      | 0.00              | 127.356            |
| 31.3    | 1880      | 0.00              | 127.146            |
| 31.4    | 1885      | 0.00              | 126.969            |

| CAUDALES DE SALIDA [m³/s] |               |            |       | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|-------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 93.62      | 93.62 | -27684.24                | 1103813               |
| 0.00                      | 0.00          | 92.96      | 92.96 | -27482.62                | 1076331               |
| 0.00                      | 0.00          | 92.28      | 92.28 | -27277.16                | 1049053               |
| 0.00                      | 0.00          | 91.60      | 91.60 | -27069.71                | 1021984               |
| 0.00                      | 0.00          | 90.90      | 90.90 | -26858.63                | 995125                |
| 0.00                      | 0.00          | 90.20      | 90.20 | -26643.12                | 968482                |
| 0.00                      | 0.00          | 89.48      | 89.48 | -26426.38                | 942056                |
| 0.00                      | 0.00          | 88.75      | 88.75 | -26206.40                | 915849                |
| 0.00                      | 0.00          | 88.03      | 88.03 | -25985.22                | 889864                |
| 0.00                      | 0.00          | 87.27      | 87.27 | -25758.90                | 864105                |
| 0.00                      | 0.00          | 86.52      | 86.52 | -25527.75                | 838577                |
| 0.00                      | 0.00          | 85.75      | 85.75 | -25294.49                | 813283                |
| 0.00                      | 0.00          | 84.98      | 84.98 | -25057.05                | 788226                |
| 0.00                      | 0.00          | 84.19      | 84.19 | -24817.71                | 763408                |
| 0.00                      | 0.00          | 83.39      | 83.39 | -24574.47                | 738834                |
| 0.00                      | 0.00          | 82.59      | 82.59 | -24329.40                | 714504                |
| 0.00                      | 0.00          | 81.77      | 81.77 | -24080.38                | 690424                |
| 0.00                      | 0.00          | 80.95      | 80.95 | -23827.49                | 666596                |
| 0.00                      | 0.00          | 80.11      | 80.11 | -23572.19                | 643024                |
| 0.00                      | 0.00          | 79.26      | 79.26 | -23312.32                | 619712                |
| 0.00                      | 0.00          | 78.40      | 78.40 | -23049.64                | 596662                |
| 0.00                      | 0.00          | 77.52      | 77.52 | -22781.38                | 573881                |
| 0.00                      | 0.00          | 76.63      | 76.63 | -22509.92                | 551371                |
| 0.00                      | 0.00          | 75.72      | 75.72 | -22232.48                | 529138                |
| 0.00                      | 0.00          | 74.81      | 74.81 | -21950.51                | 507188                |
| 0.00                      | 0.00          | 73.87      | 73.87 | -21664.09                | 485524                |
| 0.00                      | 0.00          | 72.92      | 72.92 | -21372.41                | 464151                |
| 0.00                      | 0.00          | 71.94      | 71.94 | -21075.95                | 443075                |
| 0.00                      | 0.00          | 70.96      | 70.96 | -20772.12                | 422303                |
| 0.00                      | 0.00          | 69.95      | 69.95 | -20463.55                | 401840                |
| 0.00                      | 0.00          | 68.92      | 68.92 | -20148.38                | 381691                |
| 0.00                      | 0.00          | 67.89      | 67.89 | -19828.33                | 361863                |
| 0.00                      | 0.00          | 66.82      | 66.82 | -19500.43                | 342363                |
| 0.00                      | 0.00          | 65.74      | 65.74 | -19167.04                | 323196                |
| 0.00                      | 0.00          | 64.63      | 64.63 | -18825.78                | 304370                |
| 0.00                      | 0.00          | 63.52      | 63.52 | -18478.79                | 285891                |
| 0.00                      | 0.00          | 62.35      | 62.35 | -18122.82                | 267768                |
| 0.00                      | 0.00          | 61.19      | 61.19 | -17758.06                | 250010                |
| 0.00                      | 0.00          | 59.95      | 59.95 | -17381.73                | 232628                |
| 0.00                      | 0.00          | 58.70      | 58.70 | -16991.30                | 215637                |
| 0.00                      | 0.00          | 57.35      | 57.35 | -16582.37                | 199055                |
| 0.00                      | 0.00          | 55.97      | 55.97 | -16152.15                | 182903                |
| 0.00                      | 0.00          | 54.48      | 54.48 | -15698.82                | 167204                |
| 0.00                      | 0.00          | 52.97      | 52.97 | -15224.60                | 151979                |
| 0.00                      | 0.00          | 51.36      | 51.36 | -14727.59                | 137252                |
| 0.00                      | 0.00          | 49.74      | 49.74 | -14211.32                | 123040                |
| 0.00                      | 0.00          | 47.90      | 47.90 | -13653.67                | 109387                |
| 0.00                      | 0.00          | 45.93      | 45.93 | -13034.41                | 96352                 |
| 0.00                      | 0.00          | 43.64      | 43.64 | -12343.37                | 84009                 |
| 0.00                      | 0.00          | 40.97      | 40.97 | -11526.17                | 72483                 |
| 0.00                      | 0.00          | 38.06      | 38.06 | -10591.36                | 61891                 |
| 0.00                      | 0.00          | 34.90      | 34.90 | -9564.96                 | 52326                 |
| 0.00                      | 0.00          | 31.40      | 31.40 | -8400.61                 | 43926                 |
| 0.00                      | 0.00          | 27.73      | 27.73 | -7052.91                 | 36873                 |
| 0.00                      | 0.00          | 24.04      | 24.04 | -5808.52                 | 31064                 |
| 0.00                      | 0.00          | 19.59      | 19.59 | -5283.00                 | 25781                 |
| 0.00                      | 0.00          | 13.78      | 13.78 | -4874.80                 | 20906                 |
| 0.00                      | 0.00          | 5.10       | 5.10  | -3911.42                 | 16995                 |
| 0.00                      | 0.00          | 8.06       | 8.06  | -3074.99                 | 13920                 |
| 0.00                      | 0.00          | 7.56       | 7.56  | -2590.00                 | 11330                 |
| 0.00                      | 0.00          | 7.00       | 7.00  | -2180.79                 | 9149                  |
| 0.00                      | 0.00          | 6.44       | 6.44  | -1785.41                 | 7364                  |
| 0.00                      | 0.00          | 5.92       | 5.92  | -1438.39                 | 5925                  |

## Laminación de avenida T = 100 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 31.5    | 1890      | 0.00              | 126.793            |
| 31.6    | 1895      | 0.00              | 126.656            |
| 31.7    | 1900      | 0.00              | 126.550            |
| 31.8    | 1905      | 0.00              | 126.463            |
| 31.8    | 1910      | 0.00              | 126.387            |
| 31.9    | 1915      | 0.00              | 126.324            |
| 32.0    | 1920      | 0.00              | 126.271            |
| 32.1    | 1925      | 0.00              | 126.227            |
| 32.2    | 1930      | 0.00              | 126.190            |
| 32.3    | 1935      | 0.00              | 126.159            |
| 32.3    | 1940      | 0.00              | 126.133            |
| 32.4    | 1945      | 0.00              | 126.111            |
| 32.5    | 1950      | 0.00              | 126.093            |
| 32.6    | 1955      | 0.00              | 126.078            |
| 32.7    | 1960      | 0.00              | 126.065            |
| 32.8    | 1965      | 0.00              | 126.054            |
| 32.8    | 1970      | 0.00              | 126.045            |
| 32.9    | 1975      | 0.00              | 126.038            |
| 33.0    | 1980      | 0.00              | 126.032            |
| 33.1    | 1985      | 0.00              | 126.027            |
| 33.2    | 1990      | 0.00              | 126.022            |
| 33.3    | 1995      | 0.00              | 126.019            |
| 33.3    | 2000      | 0.00              | 126.016            |
| 33.4    | 2005      | 0.00              | 126.013            |
| 33.5    | 2010      | 0.00              | 126.011            |
| 33.6    | 2015      | 0.00              | 126.009            |
| 33.7    | 2020      | 0.00              | 126.008            |
| 33.8    | 2025      | 0.00              | 126.006            |
| 33.8    | 2030      | 0.00              | 126.005            |
| 33.9    | 2035      | 0.00              | 126.004            |
| 34.0    | 2040      | 0.00              | 126.004            |
| 34.1    | 2045      | 0.00              | 126.003            |
| 34.2    | 2050      | 0.00              | 126.003            |
| 34.3    | 2055      | 0.00              | 126.002            |
| 34.3    | 2060      | 0.00              | 126.002            |
| 34.4    | 2065      | 0.00              | 126.002            |
| 34.5    | 2070      | 0.00              | 126.001            |
| 34.6    | 2075      | 0.00              | 126.001            |
| 34.7    | 2080      | 0.00              | 126.001            |
| 34.8    | 2085      | 0.00              | 126.001            |
| 34.8    | 2090      | 0.00              | 126.001            |
| 34.9    | 2095      | 0.00              | 126.001            |
| 35.0    | 2100      | 0.00              | 126.000            |

| CAUDALES DE SALIDA [m3/s] |               |            |       | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|-------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 5.35       | 5.35  | -1137.60                 | 4788                  |
| 0.00                      | 0.00          | 4.87       | 4.87  | -882.40                  | 3905                  |
| 0.00                      | 0.00          | 4.46       | 4.46  | -684.44                  | 3221                  |
| 0.00                      | 0.00          | 4.09       | 4.09  | -537.95                  | 2683                  |
| 0.00                      | 0.00          | 3.74       | 3.74  | -438.87                  | 2244                  |
| 0.00                      | 0.00          | 3.42       | 3.42  | -367.08                  | 1877                  |
| 0.00                      | 0.00          | 3.13       | 3.13  | -307.04                  | 1570                  |
| 0.00                      | 0.00          | 2.86       | 2.86  | -256.81                  | 1313                  |
| 0.00                      | 0.00          | 2.62       | 2.62  | -214.81                  | 1098                  |
| 0.00                      | 0.00          | 2.40       | 2.40  | -179.68                  | 919                   |
| 0.00                      | 0.00          | 2.19       | 2.19  | -150.28                  | 769                   |
| 0.00                      | 0.00          | 2.00       | 2.00  | -125.70                  | 643                   |
| 0.00                      | 0.00          | 1.83       | 1.83  | -105.15                  | 538                   |
| 0.00                      | 0.00          | 1.68       | 1.68  | -87.94                   | 450                   |
| 0.00                      | 0.00          | 1.53       | 1.53  | -73.56                   | 376                   |
| 0.00                      | 0.00          | 1.40       | 1.40  | -61.53                   | 315                   |
| 0.00                      | 0.00          | 1.28       | 1.28  | -51.46                   | 263                   |
| 0.00                      | 0.00          | 1.17       | 1.17  | -43.05                   | 220                   |
| 0.00                      | 0.00          | 1.08       | 1.08  | -36.00                   | 184                   |
| 0.00                      | 0.00          | 0.99       | 0.99  | -30.12                   | 154                   |
| 0.00                      | 0.00          | 0.89       | 0.89  | -25.19                   | 129                   |
| 0.00                      | 0.00          | 0.83       | 0.83  | -21.07                   | 108                   |
| 0.00                      | 0.00          | 0.76       | 0.76  | -17.62                   | 90                    |
| 0.00                      | 0.00          | 0.69       | 0.69  | -14.74                   | 75                    |
| 0.00                      | 0.00          | 0.63       | 0.63  | -12.33                   | 63                    |
| 0.00                      | 0.00          | 0.57       | 0.57  | -10.31                   | 53                    |
| 0.00                      | 0.00          | 0.54       | 0.54  | -8.63                    | 44                    |
| 0.00                      | 0.00          | 0.47       | 0.47  | -7.21                    | 37                    |
| 0.00                      | 0.00          | 0.43       | 0.43  | -6.04                    | 31                    |
| 0.00                      | 0.00          | 0.38       | 0.38  | -5.05                    | 26                    |
| 0.00                      | 0.00          | 0.38       | 0.38  | -4.22                    | 22                    |
| 0.00                      | 0.00          | 0.33       | 0.33  | -3.53                    | 18                    |
| 0.00                      | 0.00          | 0.33       | 0.33  | -2.95                    | 15                    |
| 0.00                      | 0.00          | 0.27       | 0.27  | -2.48                    | 13                    |
| 0.00                      | 0.00          | 0.27       | 0.27  | -2.06                    | 11                    |
| 0.00                      | 0.00          | 0.27       | 0.27  | -1.73                    | 9                     |
| 0.00                      | 0.00          | 0.19       | 0.19  | -1.45                    | 7                     |
| 0.00                      | 0.00          | 0.19       | 0.19  | -1.21                    | 6                     |
| 0.00                      | 0.00          | 0.19       | 0.19  | -1.01                    | 5                     |
| 0.00                      | 0.00          | 0.19       | 0.19  | -0.84                    | 4                     |
| 0.00                      | 0.00          | 0.19       | 0.19  | -0.71                    | 4                     |
| 0.00                      | 0.00          | 0.19       | 0.19  | -0.59                    | 3                     |
| 0.00                      | 0.00          | 0.00       | 0.00  | -0.50                    | 3                     |

## Laminación de avenida T = 200 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 0.0     | 0         | 0.00              | 126.000            |
| 0.1     | 5         | 0.10              | 126.001            |
| 0.2     | 10        | 0.10              | 126.003            |
| 0.3     | 15        | 0.20              | 126.006            |
| 0.3     | 20        | 0.30              | 126.012            |
| 0.4     | 25        | 0.40              | 126.020            |
| 0.5     | 30        | 0.50              | 126.032            |
| 0.6     | 35        | 0.70              | 126.048            |
| 0.7     | 40        | 0.90              | 126.070            |
| 0.8     | 45        | 1.20              | 126.097            |
| 0.8     | 50        | 1.50              | 126.132            |
| 0.9     | 55        | 1.90              | 126.175            |
| 1.0     | 60        | 2.30              | 126.227            |
| 1.1     | 65        | 2.90              | 126.291            |
| 1.2     | 70        | 3.50              | 126.367            |
| 1.3     | 75        | 4.10              | 126.457            |
| 1.3     | 80        | 4.90              | 126.555            |
| 1.4     | 85        | 5.80              | 126.659            |
| 1.5     | 90        | 6.80              | 126.774            |
| 1.6     | 95        | 7.90              | 126.902            |
| 1.7     | 100       | 9.10              | 127.035            |
| 1.8     | 105       | 10.50             | 127.159            |
| 1.8     | 110       | 12.00             | 127.301            |
| 1.9     | 115       | 13.70             | 127.461            |
| 2.0     | 120       | 15.60             | 127.603            |
| 2.1     | 125       | 17.60             | 127.754            |
| 2.2     | 130       | 19.80             | 127.928            |
| 2.3     | 135       | 22.30             | 128.097            |
| 2.3     | 140       | 25.00             | 128.258            |
| 2.4     | 145       | 28.10             | 128.426            |
| 2.5     | 150       | 31.40             | 128.603            |
| 2.6     | 155       | 35.00             | 128.818            |
| 2.7     | 160       | 39.10             | 129.075            |
| 2.8     | 165       | 43.60             | 129.330            |
| 2.8     | 170       | 48.80             | 129.583            |
| 2.9     | 175       | 54.60             | 129.836            |
| 3.0     | 180       | 61.00             | 130.107            |
| 3.1     | 185       | 68.80             | 130.394            |
| 3.2     | 190       | 78.90             | 130.698            |
| 3.3     | 195       | 92.40             | 131.040            |
| 3.3     | 200       | 110.60            | 131.399            |
| 3.4     | 205       | 134.30            | 131.788            |
| 3.5     | 210       | 162.90            | 132.237            |
| 3.6     | 215       | 194.40            | 132.765            |
| 3.7     | 220       | 228.10            | 133.375            |
| 3.8     | 225       | 263.20            | 134.036            |
| 3.8     | 230       | 297.80            | 134.750            |
| 3.9     | 235       | 333.30            | 135.532            |
| 4.0     | 240       | 370.90            | 136.364            |
| 4.1     | 245       | 411.20            | 137.243            |
| 4.2     | 250       | 454.90            | 138.165            |
| 4.3     | 255       | 500.40            | 139.134            |
| 4.3     | 260       | 546.70            | 140.149            |
| 4.4     | 265       | 593.30            | 141.199            |
| 4.5     | 270       | 638.90            | 142.270            |
| 4.6     | 275       | 681.70            | 143.353            |
| 4.7     | 280       | 721.20            | 144.426            |
| 4.8     | 285       | 757.60            | 145.480            |
| 4.8     | 290       | 789.60            | 146.499            |
| 4.9     | 295       | 817.90            | 147.483            |
| 5.0     | 300       | 842.80            | 148.435            |
| 5.1     | 305       | 863.20            | 149.364            |
| 5.2     | 310       | 880.00            | 150.264            |

| CAUDALES DE SALIDA [m3/s] |               |            |        | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|--------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL  | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 0.00       | 0.00   | -                        | 3                     |
| 0.00                      | 0.00          | 0.19       | 0.19   | 5.14                     | 8                     |
| 0.00                      | 0.00          | 0.33       | 0.33   | 10.59                    | 19                    |
| 0.00                      | 0.00          | 0.47       | 0.47   | 19.01                    | 38                    |
| 0.00                      | 0.00          | 0.66       | 0.66   | 31.23                    | 69                    |
| 0.00                      | 0.00          | 0.85       | 0.85   | 47.86                    | 117                   |
| 0.00                      | 0.00          | 1.08       | 1.08   | 68.83                    | 185                   |
| 0.00                      | 0.00          | 1.32       | 1.32   | 94.16                    | 280                   |
| 0.00                      | 0.00          | 1.59       | 1.59   | 124.15                   | 404                   |
| 0.00                      | 0.00          | 1.87       | 1.87   | 159.16                   | 563                   |
| 0.00                      | 0.00          | 2.18       | 2.18   | 200.23                   | 763                   |
| 0.00                      | 0.00          | 2.51       | 2.51   | 248.41                   | 1012                  |
| 0.00                      | 0.00          | 2.86       | 2.86   | 304.41                   | 1316                  |
| 0.00                      | 0.00          | 3.24       | 3.24   | 368.96                   | 1685                  |
| 0.00                      | 0.00          | 3.64       | 3.64   | 441.43                   | 2126                  |
| 0.00                      | 0.00          | 4.06       | 4.06   | 522.82                   | 2649                  |
| 0.00                      | 0.00          | 4.48       | 4.48   | 602.58                   | 3252                  |
| 0.00                      | 0.00          | 4.88       | 4.88   | 671.44                   | 3923                  |
| 0.00                      | 0.00          | 5.29       | 5.29   | 743.69                   | 4667                  |
| 0.00                      | 0.00          | 5.71       | 5.71   | 827.93                   | 5495                  |
| 0.00                      | 0.00          | 6.12       | 6.12   | 926.34                   | 6421                  |
| 0.00                      | 0.00          | 6.47       | 6.47   | 1053.08                  | 7474                  |
| 0.00                      | 0.00          | 6.86       | 6.86   | 1202.15                  | 8676                  |
| 0.00                      | 0.00          | 7.27       | 7.27   | 1361.44                  | 10038                 |
| 0.00                      | 0.00          | 7.61       | 7.61   | 1565.83                  | 11604                 |
| 0.00                      | 0.00          | 7.96       | 7.96   | 1819.89                  | 13424                 |
| 0.00                      | 0.00          | 8.35       | 8.35   | 2091.90                  | 15515                 |
| 0.00                      | 0.00          | 7.76       | 7.76   | 2295.64                  | 17811                 |
| 0.00                      | 0.00          | 12.65      | 12.65  | 2389.12                  | 20200                 |
| 0.00                      | 0.00          | 16.25      | 16.25  | 2478.34                  | 22679                 |
| 0.00                      | 0.00          | 19.34      | 19.34  | 2837.67                  | 25516                 |
| 0.00                      | 0.00          | 22.52      | 22.52  | 3632.66                  | 29149                 |
| 0.00                      | 0.00          | 25.82      | 25.82  | 4513.61                  | 33663                 |
| 0.00                      | 0.00          | 28.72      | 28.72  | 4948.39                  | 38611                 |
| 0.00                      | 0.00          | 31.33      | 31.33  | 5166.03                  | 43777                 |
| 0.00                      | 0.00          | 33.74      | 33.74  | 5683.46                  | 49460                 |
| 0.00                      | 0.00          | 36.15      | 36.15  | 6473.31                  | 55934                 |
| 0.00                      | 0.00          | 38.53      | 38.53  | 7469.76                  | 63403                 |
| 0.00                      | 0.00          | 40.90      | 40.90  | 8801.11                  | 72205                 |
| 0.00                      | 0.00          | 43.42      | 43.42  | 10669.73                 | 82874                 |
| 0.00                      | 0.00          | 45.91      | 45.91  | 13380.80                 | 96255                 |
| 0.00                      | 0.00          | 48.47      | 48.47  | 17328.77                 | 113584                |
| 0.00                      | 0.00          | 51.26      | 51.26  | 22754.41                 | 136338                |
| 0.00                      | 0.00          | 54.36      | 54.36  | 29642.97                 | 165981                |
| 0.00                      | 0.00          | 57.74      | 57.74  | 37639.91                 | 203621                |
| 0.00                      | 0.00          | 61.18      | 61.18  | 46357.28                 | 249978                |
| 0.00                      | 0.00          | 64.70      | 64.70  | 55579.71                 | 305558                |
| 0.00                      | 0.00          | 68.35      | 68.35  | 64907.78                 | 370466                |
| 0.00                      | 0.00          | 72.02      | 72.02  | 74281.52                 | 444747                |
| 0.00                      | 0.00          | 75.71      | 75.71  | 84125.50                 | 528873                |
| 0.00                      | 0.00          | 79.40      | 79.40  | 94682.00                 | 623555                |
| 0.00                      | 0.00          | 83.10      | 83.10  | 106130.13                | 729685                |
| 0.00                      | 0.00          | 86.80      | 86.80  | 118376.46                | 848062                |
| 0.00                      | 0.00          | 90.47      | 90.47  | 131027.67                | 979089                |
| 0.00                      | 0.00          | 94.07      | 94.07  | 143852.38                | 1122942               |
| 0.00                      | 0.00          | 97.58      | 97.58  | 156576.09                | 1279518               |
| 0.00                      | 0.00          | 100.93     | 100.93 | 168787.23                | 1448305               |
| 0.00                      | 0.00          | 104.12     | 104.12 | 180139.67                | 1628445               |
| 0.00                      | 0.00          | 107.11     | 107.11 | 190583.22                | 1819028               |
| 0.00                      | 0.00          | 109.92     | 109.92 | 199984.41                | 2019012               |
| 0.00                      | 0.00          | 112.57     | 112.57 | 208190.22                | 2227202               |
| 0.00                      | 0.00          | 115.11     | 115.11 | 215363.34                | 2442566               |
| 0.00                      | 0.00          | 117.50     | 117.50 | 221412.58                | 2663978               |

## Laminación de avenida T = 200 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 5.3     | 315       | 892.70            | 151.138            |
| 5.3     | 320       | 901.00            | 151.985            |
| 5.4     | 325       | 906.00            | 152.804            |
| 5.5     | 330       | 906.70            | 153.603            |
| 5.6     | 335       | 903.70            | 154.376            |
| 5.7     | 340       | 897.70            | 155.123            |
| 5.8     | 345       | 888.00            | 155.840            |
| 5.8     | 350       | 875.50            | 156.530            |
| 5.9     | 355       | 860.70            | 157.192            |
| 6.0     | 360       | 843.50            | 157.828            |
| 6.1     | 365       | 824.70            | 158.437            |
| 6.2     | 370       | 804.50            | 159.019            |
| 6.3     | 375       | 783.00            | 159.573            |
| 6.3     | 380       | 760.70            | 160.100            |
| 6.4     | 385       | 737.80            | 160.601            |
| 6.5     | 390       | 714.50            | 161.076            |
| 6.6     | 395       | 691.10            | 161.527            |
| 6.7     | 400       | 667.70            | 161.953            |
| 6.8     | 405       | 644.60            | 162.356            |
| 6.8     | 410       | 621.70            | 162.737            |
| 6.9     | 415       | 599.20            | 163.097            |
| 7.0     | 420       | 577.20            | 163.436            |
| 7.1     | 425       | 555.90            | 163.755            |
| 7.2     | 430       | 535.20            | 164.057            |
| 7.3     | 435       | 515.10            | 164.340            |
| 7.3     | 440       | 495.80            | 164.607            |
| 7.4     | 445       | 477.10            | 164.857            |
| 7.5     | 450       | 459.00            | 165.093            |
| 7.6     | 455       | 441.60            | 165.314            |
| 7.7     | 460       | 424.80            | 165.522            |
| 7.8     | 465       | 408.70            | 165.715            |
| 7.8     | 470       | 393.20            | 165.897            |
| 7.9     | 475       | 378.40            | 166.067            |
| 8.0     | 480       | 364.20            | 166.225            |
| 8.1     | 485       | 350.70            | 166.374            |
| 8.2     | 490       | 337.70            | 166.512            |
| 8.3     | 495       | 325.40            | 166.640            |
| 8.3     | 500       | 313.60            | 166.759            |
| 8.4     | 505       | 302.30            | 166.870            |
| 8.5     | 510       | 291.60            | 166.973            |
| 8.6     | 515       | 281.30            | 167.068            |
| 8.7     | 520       | 271.60            | 167.155            |
| 8.8     | 525       | 262.30            | 167.235            |
| 8.8     | 530       | 253.40            | 167.309            |
| 8.9     | 535       | 244.90            | 167.378            |
| 9.0     | 540       | 236.90            | 167.440            |
| 9.1     | 545       | 229.20            | 167.496            |
| 9.2     | 550       | 221.90            | 167.547            |
| 9.3     | 555       | 214.90            | 167.593            |
| 9.3     | 560       | 208.30            | 167.634            |
| 9.4     | 565       | 201.90            | 167.670            |
| 9.5     | 570       | 195.90            | 167.703            |
| 9.6     | 575       | 190.10            | 167.731            |
| 9.7     | 580       | 184.60            | 167.755            |
| 9.8     | 585       | 179.40            | 167.775            |
| 9.8     | 590       | 174.30            | 167.792            |
| 9.9     | 595       | 169.50            | 167.806            |
| 10.0    | 600       | 164.90            | 167.816            |
| 10.1    | 605       | 160.50            | 167.823            |
| 10.2    | 610       | 156.30            | 167.828            |
| 10.3    | 615       | 152.30            | 167.829            |
| 10.3    | 620       | 148.40            | 167.828            |
| 10.4    | 625       | 144.60            | 167.824            |

| CAUDALES DE SALIDA [m³/s] |               |            |        | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|--------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL  | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 119.79     | 119.79 | 226277.01                | 2890255               |
| 0.00                      | 0.00          | 121.96     | 121.96 | 230032.09                | 3120287               |
| 0.00                      | 0.00          | 124.03     | 124.03 | 232543.75                | 3352831               |
| 0.00                      | 0.00          | 126.01     | 126.01 | 233904.53                | 3586736               |
| 0.00                      | 0.00          | 127.90     | 127.90 | 234179.75                | 3820916               |
| 0.00                      | 0.00          | 129.69     | 129.69 | 233286.17                | 4054202               |
| 0.00                      | 0.00          | 131.40     | 131.40 | 231403.02                | 4285605               |
| 0.00                      | 0.00          | 133.02     | 133.02 | 228554.21                | 4514159               |
| 0.00                      | 0.00          | 134.55     | 134.55 | 224746.58                | 4738905               |
| 0.00                      | 0.00          | 136.01     | 136.01 | 220193.18                | 4959099               |
| 0.00                      | 0.00          | 137.39     | 137.39 | 214958.49                | 5174057               |
| 0.00                      | 0.00          | 138.70     | 138.70 | 209153.81                | 5383211               |
| 0.00                      | 0.00          | 139.93     | 139.93 | 202923.81                | 5586135               |
| 0.00                      | 0.00          | 141.09     | 141.09 | 196304.08                | 5782439               |
| 0.00                      | 0.00          | 142.19     | 142.19 | 189398.83                | 5971838               |
| 0.00                      | 0.00          | 143.22     | 143.22 | 182294.07                | 6154132               |
| 0.00                      | 0.00          | 144.20     | 144.20 | 175047.99                | 6329180               |
| 0.00                      | 0.00          | 145.11     | 145.11 | 167757.51                | 6496937               |
| 0.00                      | 0.00          | 145.97     | 145.97 | 160479.51                | 6657417               |
| 0.00                      | 0.00          | 146.77     | 146.77 | 153251.97                | 6810669               |
| 0.00                      | 0.00          | 147.53     | 147.53 | 146107.47                | 6956776               |
| 0.00                      | 0.00          | 148.24     | 148.24 | 139083.29                | 7095859               |
| 0.00                      | 0.00          | 148.91     | 148.91 | 132212.29                | 7228072               |
| 0.00                      | 0.00          | 149.54     | 149.54 | 125514.48                | 7353586               |
| 0.00                      | 0.00          | 150.12     | 150.12 | 119023.01                | 7472609               |
| 0.00                      | 0.00          | 150.67     | 150.67 | 112737.02                | 7585346               |
| 0.00                      | 0.00          | 151.19     | 151.19 | 106657.35                | 7692004               |
| 0.00                      | 0.00          | 151.67     | 151.67 | 100800.99                | 7792805               |
| 0.00                      | 0.00          | 152.12     | 152.12 | 95146.37                 | 7887951               |
| 0.00                      | 0.00          | 152.54     | 152.54 | 89698.07                 | 7977649               |
| 0.00                      | 0.00          | 152.94     | 152.94 | 84455.96                 | 8062105               |
| 0.00                      | 0.00          | 153.30     | 153.30 | 79397.50                 | 8141503               |
| 0.00                      | 0.00          | 153.65     | 153.65 | 74545.26                 | 8216048               |
| 0.00                      | 0.00          | 153.97     | 153.97 | 69900.01                 | 8285948               |
| 0.00                      | 0.00          | 154.27     | 154.27 | 65447.95                 | 8351396               |
| 0.00                      | 0.00          | 154.54     | 154.54 | 61204.42                 | 8412600               |
| 0.00                      | 0.00          | 154.80     | 154.80 | 57150.84                 | 8469751               |
| 0.00                      | 0.00          | 155.04     | 155.04 | 53277.15                 | 8523028               |
| 0.00                      | 0.00          | 155.26     | 155.26 | 49591.51                 | 8572620               |
| 0.00                      | 0.00          | 155.47     | 155.47 | 46068.40                 | 8618688               |
| 0.00                      | 0.00          | 155.66     | 155.66 | 42707.50                 | 8661396               |
| 0.00                      | 0.00          | 155.83     | 155.83 | 39511.95                 | 8700908               |
| 0.00                      | 0.00          | 155.99     | 155.99 | 36461.10                 | 8737369               |
| 0.00                      | 0.00          | 156.13     | 156.13 | 33557.72                 | 8770926               |
| 0.00                      | 0.00          | 156.27     | 156.27 | 30792.39                 | 8801719               |
| 0.00                      | 0.00          | 156.39     | 156.39 | 28150.74                 | 8829869               |
| 0.00                      | 0.00          | 156.51     | 156.51 | 25640.02                 | 8855509               |
| 0.00                      | 0.00          | 156.61     | 156.61 | 23247.91                 | 8878757               |
| 0.00                      | 0.00          | 156.70     | 156.70 | 20967.47                 | 8899725               |
| 0.00                      | 0.00          | 156.78     | 156.78 | 18801.68                 | 8918527               |
| 0.00                      | 0.00          | 156.85     | 156.85 | 16734.35                 | 8935261               |
| 0.00                      | 0.00          | 156.92     | 156.92 | 14762.90                 | 8950024               |
| 0.00                      | 0.00          | 156.97     | 156.97 | 12887.61                 | 8962911               |
| 0.00                      | 0.00          | 157.02     | 157.02 | 11097.92                 | 8974009               |
| 0.00                      | 0.00          | 157.06     | 157.06 | 9394.66                  | 8983404               |
| 0.00                      | 0.00          | 157.09     | 157.09 | 7771.05                  | 8991175               |
| 0.00                      | 0.00          | 157.12     | 157.12 | 6218.44                  | 8997393               |
| 0.00                      | 0.00          | 157.14     | 157.14 | 4737.91                  | 9002131               |
| 0.00                      | 0.00          | 157.15     | 157.15 | 3321.35                  | 9005453               |
| 0.00                      | 0.00          | 157.16     | 157.16 | 1965.97                  | 9007419               |
| 0.00                      | 0.00          | 157.16     | 157.16 | 672.64                   | 9008091               |
| 0.00                      | 0.00          | 157.16     | 157.16 | -567.24                  | 9007524               |
| 0.00                      | 0.00          | 157.15     | 157.15 | -1755.40                 | 9005769               |

## Laminación de avenida T = 200 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 10.5    | 630       | 141.10            | 167.818            |
| 10.6    | 635       | 137.60            | 167.809            |
| 10.7    | 640       | 134.30            | 167.798            |
| 10.8    | 645       | 131.10            | 167.785            |
| 10.8    | 650       | 128.10            | 167.770            |
| 10.9    | 655       | 125.10            | 167.752            |
| 11.0    | 660       | 122.30            | 167.733            |
| 11.1    | 665       | 119.60            | 167.712            |
| 11.2    | 670       | 116.90            | 167.689            |
| 11.3    | 675       | 114.40            | 167.664            |
| 11.3    | 680       | 112.00            | 167.638            |
| 11.4    | 685       | 109.70            | 167.610            |
| 11.5    | 690       | 107.40            | 167.581            |
| 11.6    | 695       | 105.30            | 167.550            |
| 11.7    | 700       | 103.20            | 167.518            |
| 11.8    | 705       | 101.20            | 167.484            |
| 11.8    | 710       | 99.20             | 167.449            |
| 11.9    | 715       | 97.30             | 167.412            |
| 12.0    | 720       | 95.50             | 167.375            |
| 12.1    | 725       | 93.70             | 167.336            |
| 12.2    | 730       | 92.00             | 167.295            |
| 12.3    | 735       | 90.40             | 167.254            |
| 12.3    | 740       | 88.80             | 167.212            |
| 12.4    | 745       | 87.30             | 167.169            |
| 12.5    | 750       | 85.80             | 167.125            |
| 12.6    | 755       | 84.30             | 167.079            |
| 12.7    | 760       | 82.90             | 167.033            |
| 12.8    | 765       | 81.60             | 166.986            |
| 12.8    | 770       | 80.30             | 166.938            |
| 12.9    | 775       | 79.00             | 166.888            |
| 13.0    | 780       | 77.80             | 166.838            |
| 13.1    | 785       | 76.60             | 166.787            |
| 13.2    | 790       | 75.40             | 166.736            |
| 13.3    | 795       | 74.30             | 166.684            |
| 13.3    | 800       | 73.20             | 166.631            |
| 13.4    | 805       | 72.10             | 166.577            |
| 13.5    | 810       | 71.10             | 166.523            |
| 13.6    | 815       | 70.00             | 166.467            |
| 13.7    | 820       | 69.10             | 166.411            |
| 13.8    | 825       | 68.10             | 166.354            |
| 13.8    | 830       | 67.10             | 166.297            |
| 13.9    | 835       | 66.20             | 166.239            |
| 14.0    | 840       | 65.30             | 166.180            |
| 14.1    | 845       | 64.50             | 166.121            |
| 14.2    | 850       | 63.60             | 166.061            |
| 14.3    | 855       | 62.80             | 166.001            |
| 14.3    | 860       | 61.90             | 165.940            |
| 14.4    | 865       | 61.10             | 165.878            |
| 14.5    | 870       | 60.40             | 165.816            |
| 14.6    | 875       | 59.60             | 165.753            |
| 14.7    | 880       | 58.80             | 165.690            |
| 14.8    | 885       | 58.10             | 165.626            |
| 14.8    | 890       | 57.40             | 165.562            |
| 14.9    | 895       | 56.70             | 165.497            |
| 15.0    | 900       | 56.00             | 165.432            |
| 15.1    | 905       | 55.30             | 165.365            |
| 15.2    | 910       | 54.70             | 165.299            |
| 15.3    | 915       | 54.00             | 165.232            |
| 15.3    | 920       | 53.40             | 165.165            |
| 15.4    | 925       | 52.80             | 165.097            |
| 15.5    | 930       | 52.10             | 165.030            |
| 15.6    | 935       | 51.50             | 164.961            |
| 15.7    | 940       | 50.90             | 164.891            |

| CAUDALES DE SALIDA [m³/s] |               |            |        | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|--------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL  | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 157.14     | 157.14 | -2893.74                 | 9002875               |
| 0.00                      | 0.00          | 157.12     | 157.12 | -3987.14                 | 8998888               |
| 0.00                      | 0.00          | 157.10     | 157.10 | -5034.04                 | 8993854               |
| 0.00                      | 0.00          | 157.08     | 157.08 | -6038.55                 | 8987815               |
| 0.00                      | 0.00          | 157.05     | 157.05 | -7004.33                 | 8980811               |
| 0.00                      | 0.00          | 157.01     | 157.01 | -7930.33                 | 8972881               |
| 0.00                      | 0.00          | 156.97     | 156.97 | -8821.43                 | 8964059               |
| 0.00                      | 0.00          | 156.93     | 156.93 | -9677.88                 | 8954381               |
| 0.00                      | 0.00          | 156.89     | 156.89 | -10497.76                | 8943884               |
| 0.00                      | 0.00          | 156.84     | 156.84 | -11285.22                | 8932598               |
| 0.00                      | 0.00          | 156.79     | 156.79 | -12040.29                | 8920558               |
| 0.00                      | 0.00          | 156.73     | 156.73 | -12764.42                | 8907794               |
| 0.00                      | 0.00          | 156.67     | 156.67 | -13461.52                | 8894332               |
| 0.00                      | 0.00          | 156.61     | 156.61 | -14130.48                | 8880202               |
| 0.00                      | 0.00          | 156.55     | 156.55 | -14773.25                | 8865428               |
| 0.00                      | 0.00          | 156.48     | 156.48 | -15391.82                | 8850037               |
| 0.00                      | 0.00          | 156.41     | 156.41 | -15985.52                | 8834051               |
| 0.00                      | 0.00          | 156.34     | 156.34 | -16558.07                | 8817493               |
| 0.00                      | 0.00          | 156.27     | 156.27 | -17111.04                | 8800382               |
| 0.00                      | 0.00          | 156.19     | 156.19 | -17643.70                | 8782738               |
| 0.00                      | 0.00          | 156.11     | 156.11 | -18157.83                | 8764580               |
| 0.00                      | 0.00          | 156.03     | 156.03 | -18653.40                | 8745927               |
| 0.00                      | 0.00          | 155.94     | 155.94 | -19130.95                | 8726796               |
| 0.00                      | 0.00          | 155.86     | 155.86 | -19592.28                | 8707204               |
| 0.00                      | 0.00          | 155.77     | 155.77 | -20037.00                | 8687167               |
| 0.00                      | 0.00          | 155.68     | 155.68 | -20465.87                | 8666701               |
| 0.00                      | 0.00          | 155.59     | 155.59 | -20879.15                | 8645822               |
| 0.00                      | 0.00          | 155.49     | 155.49 | -21276.36                | 8624545               |
| 0.00                      | 0.00          | 155.40     | 155.40 | -21659.38                | 8602886               |
| 0.00                      | 0.00          | 155.30     | 155.30 | -22029.22                | 8580857               |
| 0.00                      | 0.00          | 155.20     | 155.20 | -22386.39                | 8558470               |
| 0.00                      | 0.00          | 155.09     | 155.09 | -22731.93                | 8535738               |
| 0.00                      | 0.00          | 154.99     | 154.99 | -23065.34                | 8512673               |
| 0.00                      | 0.00          | 154.89     | 154.89 | -23387.37                | 8489286               |
| 0.00                      | 0.00          | 154.78     | 154.78 | -23699.13                | 8465587               |
| 0.00                      | 0.00          | 154.67     | 154.67 | -24000.77                | 8441586               |
| 0.00                      | 0.00          | 154.57     | 154.57 | -24293.55                | 8417292               |
| 0.00                      | 0.00          | 154.45     | 154.45 | -24577.45                | 8392715               |
| 0.00                      | 0.00          | 154.34     | 154.34 | -24851.72                | 8367863               |
| 0.00                      | 0.00          | 154.23     | 154.23 | -25117.71                | 8342745               |
| 0.00                      | 0.00          | 154.11     | 154.11 | -25375.86                | 8317370               |
| 0.00                      | 0.00          | 154.00     | 154.00 | -25626.46                | 8291743               |
| 0.00                      | 0.00          | 153.88     | 153.88 | -25870.59                | 8265872               |
| 0.00                      | 0.00          | 153.76     | 153.76 | -26107.74                | 8239765               |
| 0.00                      | 0.00          | 153.64     | 153.64 | -26337.88                | 8213427               |
| 0.00                      | 0.00          | 153.52     | 153.52 | -26561.60                | 8186865               |
| 0.00                      | 0.00          | 153.39     | 153.39 | -26778.32                | 8160087               |
| 0.00                      | 0.00          | 153.27     | 153.27 | -26988.85                | 8133098               |
| 0.00                      | 0.00          | 153.14     | 153.14 | -27194.00                | 8105904               |
| 0.00                      | 0.00          | 153.01     | 153.01 | -27393.28                | 8078511               |
| 0.00                      | 0.00          | 152.89     | 152.89 | -27587.00                | 8050924               |
| 0.00                      | 0.00          | 152.76     | 152.76 | -27775.32                | 8023148               |
| 0.00                      | 0.00          | 152.63     | 152.63 | -27958.37                | 7995190               |
| 0.00                      | 0.00          | 152.49     | 152.49 | -28136.84                | 7967053               |
| 0.00                      | 0.00          | 152.36     | 152.36 | -28310.34                | 7938743               |
| 0.00                      | 0.00          | 152.23     | 152.23 | -28478.82                | 7910264               |
| 0.00                      | 0.00          | 152.09     | 152.09 | -28642.65                | 7881621               |
| 0.00                      | 0.00          | 151.95     | 151.95 | -28801.68                | 7852820               |
| 0.00                      | 0.00          | 151.82     | 151.82 | -28956.37                | 7823863               |
| 0.00                      | 0.00          | 151.68     | 151.68 | -29107.06                | 7794756               |
| 0.00                      | 0.00          | 151.54     | 151.54 | -29253.81                | 7765503               |
| 0.00                      | 0.00          | 151.40     | 151.40 | -29396.61                | 7736106               |
| 0.00                      | 0.00          | 151.26     | 151.26 | -29537.35                | 7706569               |



## Laminación de avenida T = 200 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 15.8    | 945       | 50.20             | 164.822            |
| 15.8    | 950       | 49.50             | 164.752            |
| 15.9    | 955       | 48.70             | 164.681            |
| 16.0    | 960       | 47.90             | 164.610            |
| 16.1    | 965       | 47.00             | 164.539            |
| 16.2    | 970       | 46.20             | 164.467            |
| 16.3    | 975       | 45.30             | 164.393            |
| 16.3    | 980       | 44.30             | 164.320            |
| 16.4    | 985       | 43.40             | 164.245            |
| 16.5    | 990       | 42.40             | 164.170            |
| 16.6    | 995       | 41.40             | 164.095            |
| 16.7    | 1000      | 40.30             | 164.019            |
| 16.8    | 1005      | 39.10             | 163.942            |
| 16.8    | 1010      | 37.90             | 163.863            |
| 16.9    | 1015      | 36.60             | 163.784            |
| 17.0    | 1020      | 35.30             | 163.704            |
| 17.1    | 1025      | 33.90             | 163.623            |
| 17.2    | 1030      | 32.50             | 163.542            |
| 17.3    | 1035      | 31.10             | 163.459            |
| 17.3    | 1040      | 29.70             | 163.374            |
| 17.4    | 1045      | 28.30             | 163.289            |
| 17.5    | 1050      | 26.90             | 163.203            |
| 17.6    | 1055      | 25.60             | 163.116            |
| 17.7    | 1060      | 24.20             | 163.028            |
| 17.8    | 1065      | 22.90             | 162.938            |
| 17.8    | 1070      | 21.60             | 162.847            |
| 17.9    | 1075      | 20.30             | 162.755            |
| 18.0    | 1080      | 19.10             | 162.663            |
| 18.1    | 1085      | 17.90             | 162.570            |
| 18.2    | 1090      | 16.80             | 162.475            |
| 18.3    | 1095      | 15.70             | 162.379            |
| 18.3    | 1100      | 14.70             | 162.283            |
| 18.4    | 1105      | 13.70             | 162.185            |
| 18.5    | 1110      | 12.80             | 162.087            |
| 18.6    | 1115      | 11.90             | 161.989            |
| 18.7    | 1120      | 11.00             | 161.888            |
| 18.8    | 1125      | 10.30             | 161.788            |
| 18.8    | 1130      | 9.50              | 161.686            |
| 18.9    | 1135      | 8.80              | 161.585            |
| 19.0    | 1140      | 8.20              | 161.482            |
| 19.1    | 1145      | 7.60              | 161.378            |
| 19.2    | 1150      | 7.00              | 161.274            |
| 19.3    | 1155      | 6.50              | 161.170            |
| 19.3    | 1160      | 6.00              | 161.065            |
| 19.4    | 1165      | 5.60              | 160.960            |
| 19.5    | 1170      | 5.20              | 160.853            |
| 19.6    | 1175      | 4.80              | 160.746            |
| 19.7    | 1180      | 4.40              | 160.639            |
| 19.8    | 1185      | 4.10              | 160.532            |
| 19.8    | 1190      | 3.80              | 160.424            |
| 19.9    | 1195      | 3.50              | 160.315            |
| 20.0    | 1200      | 3.20              | 160.206            |
| 20.1    | 1205      | 3.00              | 160.097            |
| 20.2    | 1210      | 2.70              | 159.988            |
| 20.3    | 1215      | 2.50              | 159.878            |
| 20.3    | 1220      | 2.30              | 159.767            |
| 20.4    | 1225      | 2.10              | 159.657            |
| 20.5    | 1230      | 2.00              | 159.547            |
| 20.6    | 1235      | 1.80              | 159.435            |
| 20.7    | 1240      | 1.70              | 159.323            |
| 20.8    | 1245      | 1.50              | 159.211            |
| 20.8    | 1250      | 1.40              | 159.099            |
| 20.9    | 1255      | 1.30              | 158.988            |

| CAUDALES DE SALIDA [m³/s] |               |            |        | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|--------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL  | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 151.11     | 151.11 | -29680.98                | 7676888               |
| 0.00                      | 0.00          | 150.97     | 150.97 | -29832.61                | 7647055               |
| 0.00                      | 0.00          | 150.83     | 150.83 | -29998.04                | 7617057               |
| 0.00                      | 0.00          | 150.68     | 150.68 | -30181.47                | 7586875               |
| 0.00                      | 0.00          | 150.53     | 150.53 | -30380.59                | 7556495               |
| 0.00                      | 0.00          | 150.38     | 150.38 | -30589.73                | 7525905               |
| 0.00                      | 0.00          | 150.23     | 150.23 | -30804.89                | 7495100               |
| 0.00                      | 0.00          | 150.08     | 150.08 | -31024.60                | 7464076               |
| 0.00                      | 0.00          | 149.93     | 149.93 | -31250.22                | 7432825               |
| 0.00                      | 0.00          | 149.77     | 149.77 | -31483.31                | 7401342               |
| 0.00                      | 0.00          | 149.62     | 149.62 | -31726.59                | 7369616               |
| 0.00                      | 0.00          | 149.46     | 149.46 | -31983.67                | 7337632               |
| 0.00                      | 0.00          | 149.30     | 149.30 | -32256.86                | 7305375               |
| 0.00                      | 0.00          | 149.13     | 149.13 | -32549.14                | 7272826               |
| 0.00                      | 0.00          | 148.97     | 148.97 | -32859.39                | 7239966               |
| 0.00                      | 0.00          | 148.80     | 148.80 | -33185.41                | 7206781               |
| 0.00                      | 0.00          | 148.63     | 148.63 | -33526.00                | 7173255               |
| 0.00                      | 0.00          | 148.47     | 148.47 | -33876.89                | 7139378               |
| 0.00                      | 0.00          | 148.29     | 148.29 | -34234.96                | 7105143               |
| 0.00                      | 0.00          | 148.11     | 148.11 | -34597.78                | 7070545               |
| 0.00                      | 0.00          | 147.94     | 147.94 | -34962.65                | 7035583               |
| 0.00                      | 0.00          | 147.76     | 147.76 | -35327.78                | 7000255               |
| 0.00                      | 0.00          | 147.57     | 147.57 | -35691.12                | 6964564               |
| 0.00                      | 0.00          | 147.39     | 147.39 | -36050.66                | 6928513               |
| 0.00                      | 0.00          | 147.20     | 147.20 | -36404.07                | 6892109               |
| 0.00                      | 0.00          | 147.01     | 147.01 | -36749.91                | 6855359               |
| 0.00                      | 0.00          | 146.81     | 146.81 | -37086.82                | 6818272               |
| 0.00                      | 0.00          | 146.62     | 146.62 | -37412.76                | 6780860               |
| 0.00                      | 0.00          | 146.42     | 146.42 | -37727.05                | 6743133               |
| 0.00                      | 0.00          | 146.22     | 146.22 | -38027.91                | 6705105               |
| 0.00                      | 0.00          | 146.02     | 146.02 | -38313.26                | 6666791               |
| 0.00                      | 0.00          | 145.81     | 145.81 | -38583.39                | 6628208               |
| 0.00                      | 0.00          | 145.60     | 145.60 | -38837.82                | 6589370               |
| 0.00                      | 0.00          | 145.39     | 145.39 | -39076.55                | 6550294               |
| 0.00                      | 0.00          | 145.19     | 145.19 | -39300.02                | 6510994               |
| 0.00                      | 0.00          | 144.97     | 144.97 | -39506.75                | 6471487               |
| 0.00                      | 0.00          | 144.76     | 144.76 | -39697.84                | 6431789               |
| 0.00                      | 0.00          | 144.54     | 144.54 | -39874.19                | 6391915               |
| 0.00                      | 0.00          | 144.32     | 144.32 | -40035.20                | 6351880               |
| 0.00                      | 0.00          | 144.10     | 144.10 | -40182.21                | 6311697               |
| 0.00                      | 0.00          | 143.87     | 143.87 | -40314.76                | 6271383               |
| 0.00                      | 0.00          | 143.65     | 143.65 | -40433.11                | 6230950               |
| 0.00                      | 0.00          | 143.43     | 143.43 | -40539.22                | 6190410               |
| 0.00                      | 0.00          | 143.20     | 143.20 | -40633.13                | 6149777               |
| 0.00                      | 0.00          | 142.97     | 142.97 | -40715.35                | 6109062               |
| 0.00                      | 0.00          | 142.74     | 142.74 | -40786.30                | 6068276               |
| 0.00                      | 0.00          | 142.51     | 142.51 | -40846.32                | 6027429               |
| 0.00                      | 0.00          | 142.27     | 142.27 | -40897.16                | 5986532               |
| 0.00                      | 0.00          | 142.04     | 142.04 | -40939.35                | 5945593               |
| 0.00                      | 0.00          | 141.80     | 141.80 | -40972.66                | 5904620               |
| 0.00                      | 0.00          | 141.56     | 141.56 | -40998.07                | 5863622               |
| 0.00                      | 0.00          | 141.33     | 141.33 | -41016.23                | 5822606               |
| 0.00                      | 0.00          | 141.09     | 141.09 | -41027.66                | 5781578               |
| 0.00                      | 0.00          | 140.85     | 140.85 | -41032.99                | 5740545               |
| 0.00                      | 0.00          | 140.60     | 140.60 | -41031.27                | 5699514               |
| 0.00                      | 0.00          | 140.36     | 140.36 | -41023.16                | 5658491               |
| 0.00                      | 0.00          | 140.12     | 140.12 | -41010.23                | 5617481               |
| 0.00                      | 0.00          | 139.87     | 139.87 | -40992.54                | 5576488               |
| 0.00                      | 0.00          | 139.62     | 139.62 | -40970.42                | 5535518               |
| 0.00                      | 0.00          | 139.38     | 139.38 | -40943.84                | 5494574               |
| 0.00                      | 0.00          | 139.13     | 139.13 | -40913.29                | 5453660               |
| 0.00                      | 0.00          | 138.88     | 138.88 | -40879.52                | 5412781               |
| 0.00                      | 0.00          | 138.63     | 138.63 | -40842.55                | 5371938               |



## Laminación de avenida T = 200 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 21.0    | 1260      | 1.20              | 158.874            |
| 21.1    | 1265      | 1.10              | 158.761            |
| 21.2    | 1270      | 1.00              | 158.648            |
| 21.3    | 1275      | 0.90              | 158.535            |
| 21.3    | 1280      | 0.90              | 158.421            |
| 21.4    | 1285      | 0.80              | 158.307            |
| 21.5    | 1290      | 0.70              | 158.192            |
| 21.6    | 1295      | 0.70              | 158.078            |
| 21.7    | 1300      | 0.60              | 157.964            |
| 21.8    | 1305      | 0.60              | 157.848            |
| 21.8    | 1310      | 0.50              | 157.733            |
| 21.9    | 1315      | 0.50              | 157.618            |
| 22.0    | 1320      | 0.40              | 157.503            |
| 22.1    | 1325      | 0.40              | 157.386            |
| 22.2    | 1330      | 0.40              | 157.270            |
| 22.3    | 1335      | 0.30              | 157.153            |
| 22.3    | 1340      | 0.30              | 157.037            |
| 22.4    | 1345      | 0.30              | 156.920            |
| 22.5    | 1350      | 0.20              | 156.803            |
| 22.6    | 1355      | 0.20              | 156.686            |
| 22.7    | 1360      | 0.20              | 156.569            |
| 22.8    | 1365      | 0.20              | 156.451            |
| 22.8    | 1370      | 0.20              | 156.333            |
| 22.9    | 1375      | 0.20              | 156.214            |
| 23.0    | 1380      | 0.10              | 156.096            |
| 23.1    | 1385      | 0.10              | 155.978            |
| 23.2    | 1390      | 0.10              | 155.858            |
| 23.3    | 1395      | 0.10              | 155.739            |
| 23.3    | 1400      | 0.10              | 155.619            |
| 23.4    | 1405      | 0.10              | 155.500            |
| 23.5    | 1410      | 0.10              | 155.379            |
| 23.6    | 1415      | 0.10              | 155.258            |
| 23.7    | 1420      | 0.10              | 155.137            |
| 23.8    | 1425      | 0.10              | 155.016            |
| 23.8    | 1430      | 0.00              | 154.894            |
| 23.9    | 1435      | 0.00              | 154.771            |
| 24.0    | 1440      | 0.00              | 154.649            |
| 24.1    | 1445      | 0.00              | 154.526            |
| 24.2    | 1450      | 0.00              | 154.403            |
| 24.3    | 1455      | 0.00              | 154.279            |
| 24.3    | 1460      | 0.00              | 154.155            |
| 24.4    | 1465      | 0.00              | 154.031            |
| 24.5    | 1470      | 0.00              | 153.906            |
| 24.6    | 1475      | 0.00              | 153.781            |
| 24.7    | 1480      | 0.00              | 153.656            |
| 24.8    | 1485      | 0.00              | 153.531            |
| 24.8    | 1490      | 0.00              | 153.405            |
| 24.9    | 1495      | 0.00              | 153.278            |
| 25.0    | 1500      | 0.00              | 153.151            |
| 25.1    | 1505      | 0.00              | 153.025            |
| 25.2    | 1510      | 0.00              | 152.897            |
| 25.3    | 1515      | 0.00              | 152.769            |
| 25.3    | 1520      | 0.00              | 152.641            |
| 25.4    | 1525      | 0.00              | 152.514            |
| 25.5    | 1530      | 0.00              | 152.384            |
| 25.6    | 1535      | 0.00              | 152.255            |
| 25.7    | 1540      | 0.00              | 152.126            |
| 25.8    | 1545      | 0.00              | 151.997            |
| 25.8    | 1550      | 0.00              | 151.865            |
| 25.9    | 1555      | 0.00              | 151.734            |
| 26.0    | 1560      | 0.00              | 151.604            |
| 26.1    | 1565      | 0.00              | 151.472            |
| 26.2    | 1570      | 0.00              | 151.339            |

| CAUDALES DE SALIDA [m³/s] |               |            |        | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|--------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL  | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 138.37     | 138.37 | -40801.80                | 5331137               |
| 0.00                      | 0.00          | 138.12     | 138.12 | -40757.66                | 5290379               |
| 0.00                      | 0.00          | 137.87     | 137.87 | -40711.06                | 5249668               |
| 0.00                      | 0.00          | 137.61     | 137.61 | -40662.28                | 5209006               |
| 0.00                      | 0.00          | 137.35     | 137.35 | -40610.83                | 5168395               |
| 0.00                      | 0.00          | 137.10     | 137.10 | -40556.48                | 5127838               |
| 0.00                      | 0.00          | 136.84     | 136.84 | -40500.17                | 5087338               |
| 0.00                      | 0.00          | 136.58     | 136.58 | -40442.28                | 5046896               |
| 0.00                      | 0.00          | 136.32     | 136.32 | -40382.60                | 5006513               |
| 0.00                      | 0.00          | 136.05     | 136.05 | -40320.68                | 4966193               |
| 0.00                      | 0.00          | 135.79     | 135.79 | -40256.88                | 4925936               |
| 0.00                      | 0.00          | 135.53     | 135.53 | -40191.99                | 4885744               |
| 0.00                      | 0.00          | 135.27     | 135.27 | -40126.11                | 4845618               |
| 0.00                      | 0.00          | 135.00     | 135.00 | -40058.02                | 4805560               |
| 0.00                      | 0.00          | 134.73     | 134.73 | -39987.79                | 4765572               |
| 0.00                      | 0.00          | 134.46     | 134.46 | -39916.81                | 4725655               |
| 0.00                      | 0.00          | 134.19     | 134.19 | -39845.13                | 4685810               |
| 0.00                      | 0.00          | 133.92     | 133.92 | -39772.40                | 4646037               |
| 0.00                      | 0.00          | 133.65     | 133.65 | -39698.47                | 4606339               |
| 0.00                      | 0.00          | 133.38     | 133.38 | -39623.81                | 4566715               |
| 0.00                      | 0.00          | 133.11     | 133.11 | -39548.72                | 4527166               |
| 0.00                      | 0.00          | 132.83     | 132.83 | -39472.77                | 4487694               |
| 0.00                      | 0.00          | 132.56     | 132.56 | -39395.42                | 4448298               |
| 0.00                      | 0.00          | 132.28     | 132.28 | -39317.15                | 4408981               |
| 0.00                      | 0.00          | 132.00     | 132.00 | -39238.57                | 4369742               |
| 0.00                      | 0.00          | 131.72     | 131.72 | -39159.53                | 4330583               |
| 0.00                      | 0.00          | 131.44     | 131.44 | -39079.09                | 4291504               |
| 0.00                      | 0.00          | 131.16     | 131.16 | -38997.49                | 4252506               |
| 0.00                      | 0.00          | 130.88     | 130.88 | -38915.72                | 4213591               |
| 0.00                      | 0.00          | 130.59     | 130.59 | -38833.83                | 4174757               |
| 0.00                      | 0.00          | 130.31     | 130.31 | -38750.50                | 4136006               |
| 0.00                      | 0.00          | 130.02     | 130.02 | -38665.82                | 4097341               |
| 0.00                      | 0.00          | 129.73     | 129.73 | -38581.07                | 4058759               |
| 0.00                      | 0.00          | 129.44     | 129.44 | -38496.31                | 4020263               |
| 0.00                      | 0.00          | 129.15     | 129.15 | -38410.15                | 3981853               |
| 0.00                      | 0.00          | 128.85     | 128.85 | -38322.42                | 3943531               |
| 0.00                      | 0.00          | 128.56     | 128.56 | -38234.54                | 3905296               |
| 0.00                      | 0.00          | 128.26     | 128.26 | -38146.73                | 3867149               |
| 0.00                      | 0.00          | 127.96     | 127.96 | -38057.95                | 3829091               |
| 0.00                      | 0.00          | 127.66     | 127.66 | -37967.94                | 3791123               |
| 0.00                      | 0.00          | 127.36     | 127.36 | -37877.69                | 3753246               |
| 0.00                      | 0.00          | 127.06     | 127.06 | -37787.52                | 3715458               |
| 0.00                      | 0.00          | 126.75     | 126.75 | -37696.44                | 3677762               |
| 0.00                      | 0.00          | 126.45     | 126.45 | -37604.14                | 3640158               |
| 0.00                      | 0.00          | 126.14     | 126.14 | -37511.61                | 3602646               |
| 0.00                      | 0.00          | 125.83     | 125.83 | -37419.35                | 3565227               |
| 0.00                      | 0.00          | 125.52     | 125.52 | -37326.21                | 3527900               |
| 0.00                      | 0.00          | 125.21     | 125.21 | -37231.73                | 3490669               |
| 0.00                      | 0.00          | 124.89     | 124.89 | -37137.06                | 3453532               |
| 0.00                      | 0.00          | 124.58     | 124.58 | -37042.58                | 3416489               |
| 0.00                      | 0.00          | 124.26     | 124.26 | -36947.19                | 3379542               |
| 0.00                      | 0.00          | 123.94     | 123.94 | -36850.65                | 3342691               |
| 0.00                      | 0.00          | 123.62     | 123.62 | -36754.06                | 3305937               |
| 0.00                      | 0.00          | 123.30     | 123.30 | -36657.69                | 3269279               |
| 0.00                      | 0.00          | 122.97     | 122.97 | -36559.99                | 3232719               |
| 0.00                      | 0.00          | 122.65     | 122.65 | -36460.78                | 3196259               |
| 0.00                      | 0.00          | 122.32     | 122.32 | -36361.63                | 3159897               |
| 0.00                      | 0.00          | 121.99     | 121.99 | -36262.69                | 3123634               |
| 0.00                      | 0.00          | 121.66     | 121.66 | -36162.42                | 3087472               |
| 0.00                      | 0.00          | 121.32     | 121.32 | -36060.83                | 3051411               |
| 0.00                      | 0.00          | 120.99     | 120.99 | -35959.52                | 3015452               |
| 0.00                      | 0.00          | 120.65     | 120.65 | -35858.01                | 2979594               |
| 0.00                      | 0.00          | 120.31     | 120.31 | -35754.51                | 2943839               |

## Laminación de avenida T = 200 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 26.3    | 1575      | 0.00              | 151.205            |
| 26.3    | 1580      | 0.00              | 151.072            |
| 26.4    | 1585      | 0.00              | 150.938            |
| 26.5    | 1590      | 0.00              | 150.802            |
| 26.6    | 1595      | 0.00              | 150.666            |
| 26.7    | 1600      | 0.00              | 150.531            |
| 26.8    | 1605      | 0.00              | 150.393            |
| 26.8    | 1610      | 0.00              | 150.255            |
| 26.9    | 1615      | 0.00              | 150.117            |
| 27.0    | 1620      | 0.00              | 149.979            |
| 27.1    | 1625      | 0.00              | 149.838            |
| 27.2    | 1630      | 0.00              | 149.697            |
| 27.3    | 1635      | 0.00              | 149.557            |
| 27.3    | 1640      | 0.00              | 149.415            |
| 27.4    | 1645      | 0.00              | 149.271            |
| 27.5    | 1650      | 0.00              | 149.127            |
| 27.6    | 1655      | 0.00              | 148.984            |
| 27.7    | 1660      | 0.00              | 148.836            |
| 27.8    | 1665      | 0.00              | 148.690            |
| 27.8    | 1670      | 0.00              | 148.544            |
| 27.9    | 1675      | 0.00              | 148.395            |
| 28.0    | 1680      | 0.00              | 148.246            |
| 28.1    | 1685      | 0.00              | 148.097            |
| 28.2    | 1690      | 0.00              | 147.948            |
| 28.3    | 1695      | 0.00              | 147.795            |
| 28.3    | 1700      | 0.00              | 147.643            |
| 28.4    | 1705      | 0.00              | 147.491            |
| 28.5    | 1710      | 0.00              | 147.335            |
| 28.6    | 1715      | 0.00              | 147.179            |
| 28.7    | 1720      | 0.00              | 147.023            |
| 28.8    | 1725      | 0.00              | 146.863            |
| 28.8    | 1730      | 0.00              | 146.703            |
| 28.9    | 1735      | 0.00              | 146.543            |
| 29.0    | 1740      | 0.00              | 146.379            |
| 29.1    | 1745      | 0.00              | 146.214            |
| 29.2    | 1750      | 0.00              | 146.050            |
| 29.3    | 1755      | 0.00              | 145.882            |
| 29.3    | 1760      | 0.00              | 145.712            |
| 29.4    | 1765      | 0.00              | 145.544            |
| 29.5    | 1770      | 0.00              | 145.370            |
| 29.6    | 1775      | 0.00              | 145.196            |
| 29.7    | 1780      | 0.00              | 145.022            |
| 29.8    | 1785      | 0.00              | 144.843            |
| 29.8    | 1790      | 0.00              | 144.664            |
| 29.9    | 1795      | 0.00              | 144.485            |
| 30.0    | 1800      | 0.00              | 144.301            |
| 30.1    | 1805      | 0.00              | 144.118            |
| 30.2    | 1810      | 0.00              | 143.934            |
| 30.3    | 1815      | 0.00              | 143.746            |
| 30.3    | 1820      | 0.00              | 143.559            |
| 30.4    | 1825      | 0.00              | 143.368            |
| 30.5    | 1830      | 0.00              | 143.176            |
| 30.6    | 1835      | 0.00              | 142.984            |
| 30.7    | 1840      | 0.00              | 142.787            |
| 30.8    | 1845      | 0.00              | 142.592            |
| 30.8    | 1850      | 0.00              | 142.394            |
| 30.9    | 1855      | 0.00              | 142.194            |
| 31.0    | 1860      | 0.00              | 141.996            |
| 31.1    | 1865      | 0.00              | 141.793            |
| 31.2    | 1870      | 0.00              | 141.591            |
| 31.3    | 1875      | 0.00              | 141.387            |
| 31.3    | 1880      | 0.00              | 141.181            |
| 31.4    | 1885      | 0.00              | 140.976            |

| CAUDALES DE SALIDA [m³/s] |               |            |        | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|--------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL  | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 119.96     | 119.96 | -35649.51                | 2908190               |
| 0.00                      | 0.00          | 119.62     | 119.62 | -35544.79                | 2872645               |
| 0.00                      | 0.00          | 119.27     | 119.27 | -35439.51                | 2837205               |
| 0.00                      | 0.00          | 118.92     | 118.92 | -35332.65                | 2801873               |
| 0.00                      | 0.00          | 118.56     | 118.56 | -35225.07                | 2766648               |
| 0.00                      | 0.00          | 118.21     | 118.21 | -35117.82                | 2731530               |
| 0.00                      | 0.00          | 117.84     | 117.84 | -35009.41                | 2696520               |
| 0.00                      | 0.00          | 117.48     | 117.48 | -34899.44                | 2661621               |
| 0.00                      | 0.00          | 117.12     | 117.12 | -34789.37                | 2626832               |
| 0.00                      | 0.00          | 116.75     | 116.75 | -34679.28                | 2592152               |
| 0.00                      | 0.00          | 116.38     | 116.38 | -34566.98                | 2557585               |
| 0.00                      | 0.00          | 116.00     | 116.00 | -34452.87                | 2523132               |
| 0.00                      | 0.00          | 115.62     | 115.62 | -34339.15                | 2488793               |
| 0.00                      | 0.00          | 115.24     | 115.24 | -34224.12                | 2454569               |
| 0.00                      | 0.00          | 114.85     | 114.85 | -34106.66                | 2420462               |
| 0.00                      | 0.00          | 114.46     | 114.46 | -33988.45                | 2386474               |
| 0.00                      | 0.00          | 114.08     | 114.08 | -33870.39                | 2352604               |
| 0.00                      | 0.00          | 113.67     | 113.67 | -33750.42                | 2318853               |
| 0.00                      | 0.00          | 113.27     | 113.27 | -33628.83                | 2285224               |
| 0.00                      | 0.00          | 112.87     | 112.87 | -33507.68                | 2251717               |
| 0.00                      | 0.00          | 112.46     | 112.46 | -33385.10                | 2218332               |
| 0.00                      | 0.00          | 112.05     | 112.05 | -33260.33                | 2185071               |
| 0.00                      | 0.00          | 111.64     | 111.64 | -33135.24                | 2151936               |
| 0.00                      | 0.00          | 111.23     | 111.23 | -33009.57                | 2118926               |
| 0.00                      | 0.00          | 110.80     | 110.80 | -32881.36                | 2086045               |
| 0.00                      | 0.00          | 110.37     | 110.37 | -32751.66                | 2053293               |
| 0.00                      | 0.00          | 109.94     | 109.94 | -32622.26                | 2020671               |
| 0.00                      | 0.00          | 109.50     | 109.50 | -32489.91                | 1988181               |
| 0.00                      | 0.00          | 109.06     | 109.06 | -32354.79                | 1955826               |
| 0.00                      | 0.00          | 108.62     | 108.62 | -32220.24                | 1923606               |
| 0.00                      | 0.00          | 108.16     | 108.16 | -32083.11                | 1891523               |
| 0.00                      | 0.00          | 107.70     | 107.70 | -31942.88                | 1859580               |
| 0.00                      | 0.00          | 107.24     | 107.24 | -31802.71                | 1827778               |
| 0.00                      | 0.00          | 106.76     | 106.76 | -31660.67                | 1796117               |
| 0.00                      | 0.00          | 106.28     | 106.28 | -31515.84                | 1764601               |
| 0.00                      | 0.00          | 105.80     | 105.80 | -31370.76                | 1733230               |
| 0.00                      | 0.00          | 105.31     | 105.31 | -31223.12                | 1702007               |
| 0.00                      | 0.00          | 104.81     | 104.81 | -31071.55                | 1670936               |
| 0.00                      | 0.00          | 104.31     | 104.31 | -30919.29                | 1640016               |
| 0.00                      | 0.00          | 103.79     | 103.79 | -30764.50                | 1609252               |
| 0.00                      | 0.00          | 103.27     | 103.27 | -30606.09                | 1578646               |
| 0.00                      | 0.00          | 102.74     | 102.74 | -30447.34                | 1548198               |
| 0.00                      | 0.00          | 102.20     | 102.20 | -30285.10                | 1517913               |
| 0.00                      | 0.00          | 101.66     | 101.66 | -30118.78                | 1487794               |
| 0.00                      | 0.00          | 101.11     | 101.11 | -29952.41                | 1457842               |
| 0.00                      | 0.00          | 100.55     | 100.55 | -29782.57                | 1428060               |
| 0.00                      | 0.00          | 99.98      | 99.98  | -29609.68                | 1398450               |
| 0.00                      | 0.00          | 99.41      | 99.41  | -29436.18                | 1369014               |
| 0.00                      | 0.00          | 98.82      | 98.82  | -29259.14                | 1339755               |
| 0.00                      | 0.00          | 98.23      | 98.23  | -29080.21                | 1310674               |
| 0.00                      | 0.00          | 97.63      | 97.63  | -28898.70                | 1281776               |
| 0.00                      | 0.00          | 97.01      | 97.01  | -28713.00                | 1253063               |
| 0.00                      | 0.00          | 96.40      | 96.40  | -28526.38                | 1224536               |
| 0.00                      | 0.00          | 95.76      | 95.76  | -28335.72                | 1196201               |
| 0.00                      | 0.00          | 95.13      | 95.13  | -28141.48                | 1168059               |
| 0.00                      | 0.00          | 94.48      | 94.48  | -27945.88                | 1140113               |
| 0.00                      | 0.00          | 93.82      | 93.82  | -27746.51                | 1112367               |
| 0.00                      | 0.00          | 93.17      | 93.17  | -27546.06                | 1084821               |
| 0.00                      | 0.00          | 92.49      | 92.49  | -27341.78                | 1057479               |
| 0.00                      | 0.00          | 91.81      | 91.81  | -27133.82                | 1030345               |
| 0.00                      | 0.00          | 91.12      | 91.12  | -26924.13                | 1003421               |
| 0.00                      | 0.00          | 90.41      | 90.41  | -26709.98                | 976711                |
| 0.00                      | 0.00          | 89.71      | 89.71  | -26494.24                | 950217                |

## Laminación de avenida T = 200 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 31.5    | 1890      | 0.00              | 140.766            |
| 31.6    | 1895      | 0.00              | 140.559            |
| 31.7    | 1900      | 0.00              | 140.348            |
| 31.8    | 1905      | 0.00              | 140.136            |
| 31.8    | 1910      | 0.00              | 139.924            |
| 31.9    | 1915      | 0.00              | 139.710            |
| 32.0    | 1920      | 0.00              | 139.498            |
| 32.1    | 1925      | 0.00              | 139.281            |
| 32.2    | 1930      | 0.00              | 139.066            |
| 32.3    | 1935      | 0.00              | 138.849            |
| 32.3    | 1940      | 0.00              | 138.633            |
| 32.4    | 1945      | 0.00              | 138.415            |
| 32.5    | 1950      | 0.00              | 138.196            |
| 32.6    | 1955      | 0.00              | 137.979            |
| 32.7    | 1960      | 0.00              | 137.757            |
| 32.8    | 1965      | 0.00              | 137.538            |
| 32.8    | 1970      | 0.00              | 137.314            |
| 32.9    | 1975      | 0.00              | 137.092            |
| 33.0    | 1980      | 0.00              | 136.868            |
| 33.1    | 1985      | 0.00              | 136.643            |
| 33.2    | 1990      | 0.00              | 136.417            |
| 33.3    | 1995      | 0.00              | 136.189            |
| 33.3    | 2000      | 0.00              | 135.962            |
| 33.4    | 2005      | 0.00              | 135.731            |
| 33.5    | 2010      | 0.00              | 135.504            |
| 33.6    | 2015      | 0.00              | 135.270            |
| 33.7    | 2020      | 0.00              | 135.041            |
| 33.8    | 2025      | 0.00              | 134.807            |
| 33.8    | 2030      | 0.00              | 134.575            |
| 33.9    | 2035      | 0.00              | 134.341            |
| 34.0    | 2040      | 0.00              | 134.108            |
| 34.1    | 2045      | 0.00              | 133.871            |
| 34.2    | 2050      | 0.00              | 133.630            |
| 34.3    | 2055      | 0.00              | 133.383            |
| 34.3    | 2060      | 0.00              | 133.129            |
| 34.4    | 2065      | 0.00              | 132.869            |
| 34.5    | 2070      | 0.00              | 132.605            |
| 34.6    | 2075      | 0.00              | 132.338            |
| 34.7    | 2080      | 0.00              | 132.072            |
| 34.8    | 2085      | 0.00              | 131.788            |
| 34.8    | 2090      | 0.00              | 131.506            |
| 34.9    | 2095      | 0.00              | 131.171            |
| 35.0    | 2100      | 0.00              | 130.822            |
| 35.1    | 2105      | 0.00              | 130.457            |
| 35.2    | 2110      | 0.00              | 130.078            |
| 35.3    | 2115      | 0.00              | 129.700            |
| 35.3    | 2120      | 0.00              | 129.346            |
| 35.4    | 2125      | 0.00              | 129.031            |
| 35.5    | 2130      | 0.00              | 128.719            |
| 35.6    | 2135      | 0.00              | 128.406            |
| 35.7    | 2140      | 0.00              | 128.117            |
| 35.8    | 2145      | 0.00              | 127.869            |
| 35.8    | 2150      | 0.00              | 127.643            |
| 35.9    | 2155      | 0.00              | 127.430            |
| 36.0    | 2160      | 0.00              | 127.206            |
| 36.1    | 2165      | 0.00              | 127.024            |
| 36.2    | 2170      | 0.00              | 126.842            |
| 36.3    | 2175      | 0.00              | 126.694            |
| 36.3    | 2180      | 0.00              | 126.580            |
| 36.4    | 2185      | 0.00              | 126.490            |
| 36.5    | 2190      | 0.00              | 126.410            |
| 36.6    | 2195      | 0.00              | 126.343            |
| 36.7    | 2200      | 0.00              | 126.287            |

| CAUDALES DE SALIDA [m³/s] |               |            |       | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|-------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 88.98      | 88.98 | -26275.25                | 923941                |
| 0.00                      | 0.00          | 88.25      | 88.25 | -26053.65                | 897888                |
| 0.00                      | 0.00          | 87.51      | 87.51 | -25828.93                | 872059                |
| 0.00                      | 0.00          | 86.75      | 86.75 | -25599.13                | 846460                |
| 0.00                      | 0.00          | 85.99      | 85.99 | -25367.19                | 821092                |
| 0.00                      | 0.00          | 85.22      | 85.22 | -25131.04                | 795961                |
| 0.00                      | 0.00          | 84.44      | 84.44 | -24892.92                | 771069                |
| 0.00                      | 0.00          | 83.64      | 83.64 | -24650.86                | 746418                |
| 0.00                      | 0.00          | 82.84      | 82.84 | -24405.04                | 722013                |
| 0.00                      | 0.00          | 82.03      | 82.03 | -24157.24                | 697855                |
| 0.00                      | 0.00          | 81.20      | 81.20 | -23905.54                | 673950                |
| 0.00                      | 0.00          | 80.37      | 80.37 | -23651.68                | 650298                |
| 0.00                      | 0.00          | 79.52      | 79.52 | -23393.21                | 626905                |
| 0.00                      | 0.00          | 78.67      | 78.67 | -23132.28                | 603773                |
| 0.00                      | 0.00          | 77.79      | 77.79 | -22865.72                | 580907                |
| 0.00                      | 0.00          | 76.91      | 76.91 | -22594.51                | 558312                |
| 0.00                      | 0.00          | 76.00      | 76.00 | -22318.91                | 535994                |
| 0.00                      | 0.00          | 75.09      | 75.09 | -22037.45                | 513956                |
| 0.00                      | 0.00          | 74.16      | 74.16 | -21752.70                | 492203                |
| 0.00                      | 0.00          | 73.21      | 73.21 | -21462.65                | 470741                |
| 0.00                      | 0.00          | 72.25      | 72.25 | -21168.54                | 449572                |
| 0.00                      | 0.00          | 71.26      | 71.26 | -20866.96                | 428705                |
| 0.00                      | 0.00          | 70.27      | 70.27 | -20560.49                | 408145                |
| 0.00                      | 0.00          | 69.24      | 69.24 | -20247.33                | 387897                |
| 0.00                      | 0.00          | 68.22      | 68.22 | -19929.56                | 367968                |
| 0.00                      | 0.00          | 67.15      | 67.15 | -19604.03                | 348364                |
| 0.00                      | 0.00          | 66.08      | 66.08 | -19270.88                | 329093                |
| 0.00                      | 0.00          | 64.97      | 64.97 | -18932.02                | 310161                |
| 0.00                      | 0.00          | 63.86      | 63.86 | -18585.52                | 291575                |
| 0.00                      | 0.00          | 62.71      | 62.71 | -18232.43                | 273343                |
| 0.00                      | 0.00          | 61.55      | 61.55 | -17870.36                | 255473                |
| 0.00                      | 0.00          | 60.34      | 60.34 | -17498.60                | 237974                |
| 0.00                      | 0.00          | 59.09      | 59.09 | -17112.47                | 220862                |
| 0.00                      | 0.00          | 57.78      | 57.78 | -16710.45                | 204151                |
| 0.00                      | 0.00          | 56.40      | 56.40 | -16286.72                | 187864                |
| 0.00                      | 0.00          | 54.95      | 54.95 | -15840.23                | 172024                |
| 0.00                      | 0.00          | 53.44      | 53.44 | -15372.36                | 156652                |
| 0.00                      | 0.00          | 51.87      | 51.87 | -14881.13                | 141771                |
| 0.00                      | 0.00          | 50.25      | 50.25 | -14372.15                | 127398                |
| 0.00                      | 0.00          | 48.47      | 48.47 | -13826.10                | 113572                |
| 0.00                      | 0.00          | 46.63      | 46.63 | -13244.61                | 100328                |
| 0.00                      | 0.00          | 44.35      | 44.35 | -12574.38                | 87753                 |
| 0.00                      | 0.00          | 41.83      | 41.83 | -11782.31                | 75971                 |
| 0.00                      | 0.00          | 39.04      | 39.04 | -10906.43                | 65065                 |
| 0.00                      | 0.00          | 35.90      | 35.90 | -9907.31                 | 55157                 |
| 0.00                      | 0.00          | 32.47      | 32.47 | -8756.10                 | 46401                 |
| 0.00                      | 0.00          | 28.89      | 28.89 | -7470.30                 | 38931                 |
| 0.00                      | 0.00          | 25.29      | 25.29 | -6109.31                 | 32822                 |
| 0.00                      | 0.00          | 21.12      | 21.12 | -5351.71                 | 27470                 |
| 0.00                      | 0.00          | 15.87      | 15.87 | -5084.70                 | 22385                 |
| 0.00                      | 0.00          | 8.52       | 8.52  | -4279.03                 | 18106                 |
| 0.00                      | 0.00          | 8.22       | 8.22  | -3302.27                 | 14804                 |
| 0.00                      | 0.00          | 7.71       | 7.71  | -2718.94                 | 12085                 |
| 0.00                      | 0.00          | 7.19       | 7.19  | -2307.08                 | 9778                  |
| 0.00                      | 0.00          | 6.60       | 6.60  | -1906.33                 | 7872                  |
| 0.00                      | 0.00          | 6.08       | 6.08  | -1539.65                 | 6332                  |
| 0.00                      | 0.00          | 5.52       | 5.52  | -1225.15                 | 5107                  |
| 0.00                      | 0.00          | 5.01       | 5.01  | -953.94                  | 4153                  |
| 0.00                      | 0.00          | 4.58       | 4.58  | -739.93                  | 3413                  |
| 0.00                      | 0.00          | 4.21       | 4.21  | -575.91                  | 2837                  |
| 0.00                      | 0.00          | 3.85       | 3.85  | -464.04                  | 2373                  |
| 0.00                      | 0.00          | 3.52       | 3.52  | -388.14                  | 1985                  |
| 0.00                      | 0.00          | 3.22       | 3.22  | -324.65                  | 1660                  |

## Laminación de avenida T = 200 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 36.8    | 2205      | 0.00              | 126.240            |
| 36.8    | 2210      | 0.00              | 126.200            |
| 36.9    | 2215      | 0.00              | 126.168            |
| 37.0    | 2220      | 0.00              | 126.140            |
| 37.1    | 2225      | 0.00              | 126.117            |
| 37.2    | 2230      | 0.00              | 126.098            |
| 37.3    | 2235      | 0.00              | 126.082            |
| 37.3    | 2240      | 0.00              | 126.069            |
| 37.4    | 2245      | 0.00              | 126.057            |
| 37.5    | 2250      | 0.00              | 126.048            |
| 37.6    | 2255      | 0.00              | 126.040            |
| 37.7    | 2260      | 0.00              | 126.034            |
| 37.8    | 2265      | 0.00              | 126.028            |
| 37.8    | 2270      | 0.00              | 126.024            |
| 37.9    | 2275      | 0.00              | 126.020            |
| 38.0    | 2280      | 0.00              | 126.016            |
| 38.1    | 2285      | 0.00              | 126.014            |
| 38.2    | 2290      | 0.00              | 126.012            |
| 38.3    | 2295      | 0.00              | 126.010            |
| 38.3    | 2300      | 0.00              | 126.008            |
| 38.4    | 2305      | 0.00              | 126.007            |
| 38.5    | 2310      | 0.00              | 126.006            |
| 38.6    | 2315      | 0.00              | 126.005            |
| 38.7    | 2320      | 0.00              | 126.004            |
| 38.8    | 2325      | 0.00              | 126.003            |
| 38.8    | 2330      | 0.00              | 126.003            |
| 38.9    | 2335      | 0.00              | 126.002            |
| 39.0    | 2340      | 0.00              | 126.002            |
| 39.1    | 2345      | 0.00              | 126.002            |
| 39.2    | 2350      | 0.00              | 126.001            |
| 39.3    | 2355      | 0.00              | 126.001            |
| 39.3    | 2360      | 0.00              | 126.001            |
| 39.4    | 2365      | 0.00              | 126.001            |
| 39.5    | 2370      | 0.00              | 126.001            |
| 39.6    | 2375      | 0.00              | 126.001            |
| 39.7    | 2380      | 0.00              | 126.000            |

| CAUDALES DE SALIDA [m3/s] |               |            |       | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|-------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 2.95       | 2.95  | -271.55                  | 1389                  |
| 0.00                      | 0.00          | 2.69       | 2.69  | -227.14                  | 1161                  |
| 0.00                      | 0.00          | 2.46       | 2.46  | -189.98                  | 972                   |
| 0.00                      | 0.00          | 2.25       | 2.25  | -158.90                  | 813                   |
| 0.00                      | 0.00          | 2.06       | 2.06  | -132.92                  | 680                   |
| 0.00                      | 0.00          | 1.88       | 1.88  | -111.17                  | 569                   |
| 0.00                      | 0.00          | 1.72       | 1.72  | -92.99                   | 476                   |
| 0.00                      | 0.00          | 1.58       | 1.58  | -77.78                   | 398                   |
| 0.00                      | 0.00          | 1.44       | 1.44  | -65.06                   | 333                   |
| 0.00                      | 0.00          | 1.32       | 1.32  | -54.41                   | 278                   |
| 0.00                      | 0.00          | 1.20       | 1.20  | -45.52                   | 233                   |
| 0.00                      | 0.00          | 1.11       | 1.11  | -38.07                   | 195                   |
| 0.00                      | 0.00          | 1.01       | 1.01  | -31.84                   | 163                   |
| 0.00                      | 0.00          | 0.93       | 0.93  | -26.64                   | 136                   |
| 0.00                      | 0.00          | 0.85       | 0.85  | -22.28                   | 114                   |
| 0.00                      | 0.00          | 0.76       | 0.76  | -18.63                   | 95                    |
| 0.00                      | 0.00          | 0.71       | 0.71  | -15.59                   | 80                    |
| 0.00                      | 0.00          | 0.66       | 0.66  | -13.03                   | 67                    |
| 0.00                      | 0.00          | 0.60       | 0.60  | -10.91                   | 56                    |
| 0.00                      | 0.00          | 0.54       | 0.54  | -9.12                    | 47                    |
| 0.00                      | 0.00          | 0.50       | 0.50  | -7.63                    | 39                    |
| 0.00                      | 0.00          | 0.47       | 0.47  | -6.38                    | 33                    |
| 0.00                      | 0.00          | 0.43       | 0.43  | -5.34                    | 27                    |
| 0.00                      | 0.00          | 0.38       | 0.38  | -4.46                    | 23                    |
| 0.00                      | 0.00          | 0.33       | 0.33  | -3.73                    | 19                    |
| 0.00                      | 0.00          | 0.33       | 0.33  | -3.13                    | 16                    |
| 0.00                      | 0.00          | 0.27       | 0.27  | -2.61                    | 13                    |
| 0.00                      | 0.00          | 0.27       | 0.27  | -2.19                    | 11                    |
| 0.00                      | 0.00          | 0.27       | 0.27  | -1.82                    | 9                     |
| 0.00                      | 0.00          | 0.19       | 0.19  | -1.53                    | 8                     |
| 0.00                      | 0.00          | 0.19       | 0.19  | -1.28                    | 7                     |
| 0.00                      | 0.00          | 0.19       | 0.19  | -1.07                    | 5                     |
| 0.00                      | 0.00          | 0.19       | 0.19  | -0.90                    | 5                     |
| 0.00                      | 0.00          | 0.19       | 0.19  | -0.74                    | 4                     |
| 0.00                      | 0.00          | 0.19       | 0.19  | -0.63                    | 3                     |
| 0.00                      | 0.00          | 0.00       | 0.00  | -0.52                    | 3                     |

## Laminación de avenida T = 500 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 0.0     | 0         | 0.00              | 126.000            |
| 0.1     | 5         | 0.10              | 126.001            |
| 0.2     | 10        | 0.10              | 126.001            |
| 0.3     | 15        | 0.20              | 126.003            |
| 0.3     | 20        | 0.30              | 126.007            |
| 0.4     | 25        | 0.40              | 126.012            |
| 0.5     | 30        | 0.50              | 126.020            |
| 0.6     | 35        | 0.70              | 126.032            |
| 0.7     | 40        | 0.90              | 126.048            |
| 0.8     | 45        | 1.20              | 126.070            |
| 0.8     | 50        | 1.50              | 126.097            |
| 0.9     | 55        | 1.90              | 126.131            |
| 1.0     | 60        | 2.30              | 126.173            |
| 1.1     | 65        | 2.80              | 126.225            |
| 1.2     | 70        | 3.40              | 126.287            |
| 1.3     | 75        | 4.00              | 126.361            |
| 1.3     | 80        | 4.70              | 126.448            |
| 1.4     | 85        | 5.60              | 126.544            |
| 1.5     | 90        | 6.50              | 126.643            |
| 1.6     | 95        | 7.50              | 126.752            |
| 1.7     | 100       | 8.60              | 126.872            |
| 1.8     | 105       | 9.80              | 127.004            |
| 1.8     | 110       | 11.10             | 127.118            |
| 1.9     | 115       | 12.60             | 127.246            |
| 2.0     | 120       | 14.10             | 127.391            |
| 2.1     | 125       | 15.90             | 127.538            |
| 2.2     | 130       | 17.70             | 127.669            |
| 2.3     | 135       | 19.80             | 127.819            |
| 2.3     | 140       | 22.00             | 127.989            |
| 2.4     | 145       | 24.30             | 128.137            |
| 2.5     | 150       | 26.90             | 128.285            |
| 2.6     | 155       | 29.70             | 128.437            |
| 2.7     | 160       | 32.80             | 128.595            |
| 2.8     | 165       | 36.00             | 128.786            |
| 2.8     | 170       | 39.60             | 129.023            |
| 2.9     | 175       | 43.40             | 129.252            |
| 3.0     | 180       | 47.70             | 129.482            |
| 3.1     | 185       | 52.30             | 129.694            |
| 3.2     | 190       | 57.20             | 129.923            |
| 3.3     | 195       | 62.60             | 130.154            |
| 3.3     | 200       | 68.60             | 130.403            |
| 3.4     | 205       | 75.10             | 130.659            |
| 3.5     | 210       | 82.50             | 130.935            |
| 3.6     | 215       | 90.70             | 131.204            |
| 3.7     | 220       | 99.70             | 131.500            |
| 3.8     | 225       | 110.50            | 131.772            |
| 3.8     | 230       | 124.30            | 132.074            |
| 3.9     | 235       | 142.40            | 132.391            |
| 4.0     | 240       | 166.60            | 132.745            |
| 4.1     | 245       | 197.70            | 133.147            |
| 4.2     | 250       | 234.80            | 133.603            |
| 4.3     | 255       | 276.10            | 134.119            |
| 4.3     | 260       | 320.10            | 134.718            |
| 4.4     | 265       | 365.60            | 135.415            |
| 4.5     | 270       | 411.50            | 136.201            |
| 4.6     | 275       | 458.50            | 137.067            |
| 4.7     | 280       | 507.40            | 137.997            |
| 4.8     | 285       | 559.90            | 138.983            |
| 4.8     | 290       | 614.80            | 140.023            |
| 4.9     | 295       | 671.90            | 141.106            |
| 5.0     | 300       | 729.90            | 142.221            |
| 5.1     | 305       | 786.80            | 143.362            |
| 5.2     | 310       | 841.80            | 144.509            |

| CAUDALES DE SALIDA [m³/s] |               |            |        | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|--------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL  | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 0.00       | 0.00   | -                        | 1                     |
| 0.00                      | 0.00          | 0.19       | 0.19   | 2.19                     | 3                     |
| 0.00                      | 0.00          | 0.19       | 0.19   | 5.47                     | 8                     |
| 0.00                      | 0.00          | 0.33       | 0.33   | 11.05                    | 20                    |
| 0.00                      | 0.00          | 0.50       | 0.50   | 19.54                    | 39                    |
| 0.00                      | 0.00          | 0.66       | 0.66   | 31.75                    | 71                    |
| 0.00                      | 0.00          | 0.85       | 0.85   | 47.95                    | 119                   |
| 0.00                      | 0.00          | 1.08       | 1.08   | 68.33                    | 187                   |
| 0.00                      | 0.00          | 1.32       | 1.32   | 93.25                    | 280                   |
| 0.00                      | 0.00          | 1.59       | 1.59   | 123.06                   | 403                   |
| 0.00                      | 0.00          | 1.87       | 1.87   | 157.99                   | 561                   |
| 0.00                      | 0.00          | 2.18       | 2.18   | 198.31                   | 760                   |
| 0.00                      | 0.00          | 2.50       | 2.50   | 244.83                   | 1005                  |
| 0.00                      | 0.00          | 2.85       | 2.85   | 298.28                   | 1303                  |
| 0.00                      | 0.00          | 3.22       | 3.22   | 359.51                   | 1662                  |
| 0.00                      | 0.00          | 3.61       | 3.61   | 429.05                   | 2091                  |
| 0.00                      | 0.00          | 4.02       | 4.02   | 506.36                   | 2598                  |
| 0.00                      | 0.00          | 4.43       | 4.43   | 581.32                   | 3179                  |
| 0.00                      | 0.00          | 4.82       | 4.82   | 643.47                   | 3823                  |
| 0.00                      | 0.00          | 5.21       | 5.21   | 704.12                   | 4527                  |
| 0.00                      | 0.00          | 5.61       | 5.61   | 775.38                   | 5302                  |
| 0.00                      | 0.00          | 6.02       | 6.02   | 857.34                   | 6159                  |
| 0.00                      | 0.00          | 6.36       | 6.36   | 964.23                   | 7124                  |
| 0.00                      | 0.00          | 6.71       | 6.71   | 1092.77                  | 8216                  |
| 0.00                      | 0.00          | 7.09       | 7.09   | 1226.14                  | 9443                  |
| 0.00                      | 0.00          | 7.46       | 7.46   | 1377.25                  | 10820                 |
| 0.00                      | 0.00          | 7.77       | 7.77   | 1574.21                  | 12394                 |
| 0.00                      | 0.00          | 8.11       | 8.11   | 1805.97                  | 14200                 |
| 0.00                      | 0.00          | 8.48       | 8.48   | 2043.55                  | 16243                 |
| 0.00                      | 0.00          | 9.22       | 9.22   | 2167.60                  | 18411                 |
| 0.00                      | 0.00          | 13.29      | 13.29  | 2189.77                  | 20601                 |
| 0.00                      | 0.00          | 16.46      | 16.46  | 2245.79                  | 22847                 |
| 0.00                      | 0.00          | 19.21      | 19.21  | 2539.80                  | 25386                 |
| 0.00                      | 0.00          | 22.08      | 22.08  | 3219.00                  | 28605                 |
| 0.00                      | 0.00          | 25.19      | 25.19  | 4046.98                  | 32652                 |
| 0.00                      | 0.00          | 27.86      | 27.86  | 4441.60                  | 37094                 |
| 0.00                      | 0.00          | 30.32      | 30.32  | 4459.64                  | 41554                 |
| 0.00                      | 0.00          | 32.41      | 32.41  | 4700.45                  | 46254                 |
| 0.00                      | 0.00          | 34.53      | 34.53  | 5159.31                  | 51413                 |
| 0.00                      | 0.00          | 36.55      | 36.55  | 5750.58                  | 57164                 |
| 0.00                      | 0.00          | 38.60      | 38.60  | 6488.23                  | 63652                 |
| 0.00                      | 0.00          | 40.61      | 40.61  | 7357.10                  | 71009                 |
| 0.00                      | 0.00          | 42.66      | 42.66  | 8379.41                  | 79389                 |
| 0.00                      | 0.00          | 44.58      | 44.58  | 9599.62                  | 88988                 |
| 0.00                      | 0.00          | 46.59      | 46.59  | 11042.63                 | 100031                |
| 0.00                      | 0.00          | 48.37      | 48.37  | 12764.19                 | 112795                |
| 0.00                      | 0.00          | 50.26      | 50.26  | 14753.66                 | 127549                |
| 0.00                      | 0.00          | 52.18      | 52.18  | 17104.55                 | 144653                |
| 0.00                      | 0.00          | 54.25      | 54.25  | 20157.88                 | 164811                |
| 0.00                      | 0.00          | 56.50      | 56.50  | 24255.65                 | 189067                |
| 0.00                      | 0.00          | 58.95      | 58.95  | 29858.84                 | 218926                |
| 0.00                      | 0.00          | 61.60      | 61.60  | 37365.83                 | 256292                |
| 0.00                      | 0.00          | 64.55      | 64.55  | 46732.52                 | 303024                |
| 0.00                      | 0.00          | 67.81      | 67.81  | 57531.89                 | 360556                |
| 0.00                      | 0.00          | 71.32      | 71.32  | 69272.75                 | 429829                |
| 0.00                      | 0.00          | 74.99      | 74.99  | 81603.20                 | 511432                |
| 0.00                      | 0.00          | 78.74      | 78.74  | 94171.75                 | 605604                |
| 0.00                      | 0.00          | 82.53      | 82.53  | 106947.85                | 712552                |
| 0.00                      | 0.00          | 86.35      | 86.35  | 120165.67                | 832717                |
| 0.00                      | 0.00          | 90.15      | 90.15  | 134205.89                | 966923                |
| 0.00                      | 0.00          | 93.91      | 93.91  | 149160.12                | 1116083               |
| 0.00                      | 0.00          | 97.61      | 97.61  | 164784.79                | 1280868               |
| 0.00                      | 0.00          | 101.18     | 101.18 | 180928.77                | 1461797               |

## Laminación de avenida T = 500 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 5.3     | 315       | 893.60            | 145.647            |
| 5.3     | 320       | 941.40            | 146.764            |
| 5.4     | 325       | 984.60            | 147.858            |
| 5.5     | 330       | 1023.10           | 148.935            |
| 5.6     | 335       | 1055.90           | 149.996            |
| 5.7     | 340       | 1083.00           | 151.033            |
| 5.8     | 345       | 1105.00           | 152.049            |
| 5.8     | 350       | 1122.60           | 153.045            |
| 5.9     | 355       | 1135.80           | 154.024            |
| 6.0     | 360       | 1144.50           | 154.981            |
| 6.1     | 365       | 1148.60           | 155.913            |
| 6.2     | 370       | 1148.40           | 156.819            |
| 6.3     | 375       | 1144.00           | 157.704            |
| 6.3     | 380       | 1135.40           | 158.564            |
| 6.4     | 385       | 1123.10           | 159.399            |
| 6.5     | 390       | 1107.20           | 160.206            |
| 6.6     | 395       | 1088.30           | 160.985            |
| 6.7     | 400       | 1066.80           | 161.734            |
| 6.8     | 405       | 1043.20           | 162.454            |
| 6.8     | 410       | 1017.30           | 163.144            |
| 6.9     | 415       | 989.00            | 163.804            |
| 7.0     | 420       | 959.00            | 164.436            |
| 7.1     | 425       | 928.50            | 165.037            |
| 7.2     | 430       | 897.70            | 165.609            |
| 7.3     | 435       | 867.00            | 166.151            |
| 7.3     | 440       | 836.50            | 166.665            |
| 7.4     | 445       | 806.40            | 167.152            |
| 7.5     | 450       | 776.80            | 167.612            |
| 7.6     | 455       | 747.80            | 168.047            |
| 7.7     | 460       | 719.60            | 168.457            |
| 7.8     | 465       | 692.20            | 168.843            |
| 7.8     | 470       | 665.70            | 169.207            |
| 7.9     | 475       | 640.10            | 169.551            |
| 8.0     | 480       | 615.50            | 169.875            |
| 8.1     | 485       | 591.60            | 170.179            |
| 8.2     | 490       | 568.80            | 170.466            |
| 8.3     | 495       | 546.70            | 170.732            |
| 8.3     | 500       | 525.40            | 170.977            |
| 8.4     | 505       | 505.00            | 171.198            |
| 8.5     | 510       | 485.50            | 171.397            |
| 8.6     | 515       | 466.80            | 171.573            |
| 8.7     | 520       | 449.00            | 171.727            |
| 8.8     | 525       | 432.00            | 171.860            |
| 8.8     | 530       | 415.80            | 171.976            |
| 8.9     | 535       | 400.30            | 172.073            |
| 9.0     | 540       | 385.60            | 172.154            |
| 9.1     | 545       | 371.50            | 172.221            |
| 9.2     | 550       | 358.10            | 172.274            |
| 9.3     | 555       | 345.30            | 172.315            |
| 9.3     | 560       | 333.20            | 172.345            |
| 9.4     | 565       | 321.60            | 172.367            |
| 9.5     | 570       | 310.60            | 172.379            |
| 9.6     | 575       | 300.00            | 172.384            |
| 9.7     | 580       | 290.00            | 172.382            |
| 9.8     | 585       | 280.50            | 172.375            |
| 9.8     | 590       | 271.40            | 172.362            |
| 9.9     | 595       | 262.80            | 172.344            |
| 10.0    | 600       | 254.50            | 172.323            |
| 10.1    | 605       | 246.70            | 172.298            |
| 10.2    | 610       | 239.20            | 172.270            |
| 10.3    | 615       | 232.10            | 172.239            |
| 10.3    | 620       | 225.30            | 172.207            |
| 10.4    | 625       | 218.80            | 172.172            |

| CAUDALES DE SALIDA [m³/s] |               |            |        | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|--------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL  | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 104.61     | 104.61 | 197084.64                | 1658881               |
| 0.00                      | 0.00          | 107.87     | 107.87 | 212851.30                | 1871733               |
| 0.00                      | 0.00          | 110.97     | 110.97 | 227889.13                | 2099622               |
| 0.00                      | 0.00          | 113.94     | 113.94 | 241899.62                | 2341521               |
| 0.00                      | 0.00          | 116.80     | 116.80 | 254665.11                | 2596187               |
| 0.00                      | 0.00          | 119.52     | 119.52 | 266074.47                | 2862261               |
| 0.00                      | 0.00          | 122.12     | 122.12 | 275960.44                | 3138222               |
| 0.00                      | 0.00          | 124.63     | 124.63 | 284185.25                | 3422407               |
| 0.00                      | 0.00          | 127.04     | 127.04 | 290805.61                | 3713212               |
| 0.00                      | 0.00          | 129.35     | 129.35 | 296035.51                | 4009248               |
| 0.00                      | 0.00          | 131.57     | 131.57 | 299982.71                | 4309231               |
| 0.00                      | 0.00          | 133.69     | 133.69 | 302608.37                | 4611839               |
| 0.00                      | 0.00          | 135.73     | 135.73 | 303899.69                | 4915739               |
| 0.00                      | 0.00          | 137.68     | 137.68 | 303888.65                | 5219627               |
| 0.00                      | 0.00          | 139.54     | 139.54 | 302622.31                | 5522250               |
| 0.00                      | 0.00          | 141.33     | 141.33 | 300121.94                | 5822372               |
| 0.00                      | 0.00          | 143.02     | 143.02 | 296456.68                | 6118828               |
| 0.00                      | 0.00          | 144.64     | 144.64 | 291713.11                | 6410541               |
| 0.00                      | 0.00          | 146.18     | 146.18 | 286022.85                | 6696564               |
| 0.00                      | 0.00          | 147.63     | 147.63 | 279511.47                | 6976076               |
| 0.00                      | 0.00          | 149.01     | 149.01 | 272323.05                | 7248399               |
| 0.00                      | 0.00          | 150.32     | 150.32 | 264495.33                | 7512894               |
| 0.00                      | 0.00          | 151.56     | 151.56 | 255981.64                | 7768876               |
| 0.00                      | 0.00          | 152.72     | 152.72 | 246861.53                | 8015737               |
| 0.00                      | 0.00          | 153.82     | 153.82 | 237443.38                | 8253181               |
| 0.00                      | 0.00          | 154.85     | 154.85 | 227925.79                | 8481106               |
| 0.00                      | 0.00          | 155.82     | 155.82 | 218404.85                | 8699511               |
| 0.00                      | 0.00          | 156.74     | 156.74 | 208940.55                | 8908452               |
| 0.00                      | 0.00          | 157.59     | 157.59 | 199585.42                | 9108037               |
| 0.00                      | 0.00          | 158.40     | 158.40 | 190376.03                | 9298413               |
| 0.00                      | 0.00          | 159.15     | 159.15 | 181350.78                | 9479764               |
| 0.00                      | 0.00          | 159.86     | 159.86 | 172548.90                | 9652313               |
| 0.00                      | 0.00          | 160.53     | 160.53 | 163999.88                | 9816313               |
| 0.00                      | 0.00          | 161.15     | 161.15 | 155723.57                | 9972036               |
| 0.00                      | 0.00          | 161.73     | 161.73 | 147730.60                | 10119767              |
| 0.00                      | 0.00          | 162.28     | 162.28 | 140021.53                | 10259788              |
| 0.00                      | 5.96          | 162.79     | 168.75 | 131251.18                | 10391040              |
| 0.00                      | 17.89         | 163.26     | 181.14 | 121345.61                | 10512385              |
| 0.00                      | 32.15         | 163.68     | 195.83 | 110715.66                | 10623101              |
| 0.00                      | 47.47         | 164.05     | 211.52 | 99553.81                 | 10722655              |
| 0.00                      | 62.81         | 164.39     | 227.19 | 88746.28                 | 10811401              |
| 0.00                      | 77.54         | 164.68     | 242.22 | 78101.89                 | 10889503              |
| 0.00                      | 91.21         | 164.93     | 256.14 | 67953.82                 | 10957457              |
| 0.00                      | 103.83        | 165.14     | 268.98 | 58648.29                 | 11016105              |
| 0.00                      | 114.87        | 165.33     | 280.20 | 49893.67                 | 11065999              |
| 0.00                      | 124.42        | 165.48     | 289.90 | 41624.37                 | 11107623              |
| 0.00                      | 132.55        | 165.60     | 298.15 | 34087.34                 | 11141710              |
| 0.00                      | 139.12        | 165.70     | 304.82 | 27296.94                 | 11169007              |
| 0.00                      | 144.29        | 165.78     | 310.07 | 21190.09                 | 11190197              |
| 0.00                      | 148.12        | 165.83     | 313.95 | 15712.26                 | 11205910              |
| 0.00                      | 150.95        | 165.88     | 316.83 | 10812.29                 | 11216722              |
| 0.00                      | 152.51        | 165.90     | 318.41 | 6440.31                  | 11223162              |
| 0.00                      | 153.16        | 165.91     | 319.07 | 2550.28                  | 11225713              |
| 0.00                      | 152.90        | 165.90     | 318.80 | -901.53                  | 11224811              |
| 0.00                      | 151.99        | 165.89     | 317.88 | -3955.27                 | 11220856              |
| 0.00                      | 150.31        | 165.87     | 316.17 | -6644.54                 | 11214211              |
| 0.00                      | 147.99        | 165.83     | 313.82 | -9000.05                 | 11205211              |
| 0.00                      | 145.31        | 165.79     | 311.10 | -11053.12                | 11194158              |
| 0.00                      | 142.14        | 165.75     | 307.88 | -12832.51                | 11181326              |
| 0.00                      | 138.62        | 165.69     | 304.31 | -14365.24                | 11166960              |
| 0.00                      | 134.76        | 165.64     | 300.40 | -15675.36                | 11151285              |
| 0.00                      | 130.83        | 165.58     | 296.41 | -16783.09                | 11134502              |
| 0.00                      | 126.58        | 165.51     | 292.10 | -17707.03                | 11116795              |

## Laminación de avenida T = 500 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 10.5    | 630       | 212.60            | 172.136            |
| 10.6    | 635       | 206.60            | 172.099            |
| 10.7    | 640       | 201.00            | 172.061            |
| 10.8    | 645       | 195.50            | 172.022            |
| 10.8    | 650       | 190.30            | 171.983            |
| 10.9    | 655       | 185.40            | 171.942            |
| 11.0    | 660       | 180.60            | 171.901            |
| 11.1    | 665       | 176.00            | 171.859            |
| 11.2    | 670       | 171.60            | 171.817            |
| 11.3    | 675       | 167.30            | 171.775            |
| 11.3    | 680       | 163.30            | 171.732            |
| 11.4    | 685       | 159.40            | 171.690            |
| 11.5    | 690       | 155.60            | 171.648            |
| 11.6    | 695       | 152.00            | 171.606            |
| 11.7    | 700       | 148.50            | 171.564            |
| 11.8    | 705       | 145.20            | 171.522            |
| 11.8    | 710       | 142.00            | 171.481            |
| 11.9    | 715       | 138.90            | 171.439            |
| 12.0    | 720       | 135.90            | 171.397            |
| 12.1    | 725       | 133.10            | 171.356            |
| 12.2    | 730       | 130.30            | 171.314            |
| 12.3    | 735       | 127.60            | 171.273            |
| 12.3    | 740       | 125.10            | 171.231            |
| 12.4    | 745       | 122.60            | 171.190            |
| 12.5    | 750       | 120.20            | 171.149            |
| 12.6    | 755       | 117.90            | 171.109            |
| 12.7    | 760       | 115.70            | 171.069            |
| 12.8    | 765       | 113.60            | 171.029            |
| 12.8    | 770       | 111.50            | 170.990            |
| 12.9    | 775       | 109.50            | 170.950            |
| 13.0    | 780       | 107.50            | 170.910            |
| 13.1    | 785       | 105.60            | 170.869            |
| 13.2    | 790       | 103.80            | 170.829            |
| 13.3    | 795       | 102.10            | 170.788            |
| 13.3    | 800       | 100.40            | 170.747            |
| 13.4    | 805       | 98.70             | 170.706            |
| 13.5    | 810       | 97.10             | 170.665            |
| 13.6    | 815       | 95.60             | 170.624            |
| 13.7    | 820       | 94.10             | 170.583            |
| 13.8    | 825       | 92.60             | 170.542            |
| 13.8    | 830       | 91.20             | 170.501            |
| 13.9    | 835       | 89.80             | 170.459            |
| 14.0    | 840       | 88.50             | 170.417            |
| 14.1    | 845       | 87.20             | 170.373            |
| 14.2    | 850       | 86.00             | 170.329            |
| 14.3    | 855       | 84.70             | 170.284            |
| 14.3    | 860       | 83.50             | 170.238            |
| 14.4    | 865       | 82.40             | 170.192            |
| 14.5    | 870       | 81.20             | 170.145            |
| 14.6    | 875       | 80.10             | 170.097            |
| 14.7    | 880       | 79.00             | 170.048            |
| 14.8    | 885       | 78.00             | 169.999            |
| 14.8    | 890       | 77.00             | 169.949            |
| 14.9    | 895       | 76.00             | 169.898            |
| 15.0    | 900       | 75.00             | 169.847            |
| 15.1    | 905       | 74.00             | 169.795            |
| 15.2    | 910       | 73.10             | 169.742            |
| 15.3    | 915       | 72.10             | 169.689            |
| 15.3    | 920       | 71.20             | 169.635            |
| 15.4    | 925       | 70.40             | 169.581            |
| 15.5    | 930       | 69.50             | 169.526            |
| 15.6    | 935       | 68.60             | 169.470            |
| 15.7    | 940       | 67.80             | 169.414            |

| CAUDALES DE SALIDA [m³/s] |               |            |        | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|--------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL  | [m³]                     | [m³]                  |
| 0.00                      | 122.27        | 165.44     | 287.72 | -18466.59                | 11098328              |
| 0.00                      | 117.90        | 165.37     | 283.28 | -19079.24                | 11079249              |
| 0.00                      | 113.48        | 165.30     | 278.78 | -19562.34                | 11059687              |
| 0.00                      | 109.01        | 165.23     | 274.24 | -19931.04                | 11039756              |
| 0.00                      | 104.61        | 165.16     | 269.77 | -20252.78                | 11019503              |
| 0.00                      | 100.07        | 165.08     | 265.15 | -20607.63                | 10998895              |
| 0.00                      | 95.60         | 165.00     | 260.60 | -20944.54                | 10977951              |
| 0.00                      | 91.11         | 164.92     | 256.03 | -21196.57                | 10956754              |
| 0.00                      | 86.70         | 164.84     | 251.54 | -21373.30                | 10935381              |
| 0.00                      | 82.38         | 164.77     | 247.14 | -21482.84                | 10913898              |
| 0.00                      | 78.04         | 164.68     | 242.73 | -21531.15                | 10892367              |
| 0.00                      | 73.89         | 164.61     | 238.50 | -21523.67                | 10870843              |
| 0.00                      | 69.84         | 164.53     | 234.36 | -21467.02                | 10849376              |
| 0.00                      | 65.87         | 164.45     | 230.31 | -21366.85                | 10828009              |
| 0.00                      | 61.99         | 164.37     | 226.35 | -21228.63                | 10806781              |
| 0.00                      | 58.20         | 164.29     | 222.49 | -21056.73                | 10785724              |
| 0.00                      | 54.59         | 164.21     | 218.80 | -20923.38                | 10764801              |
| 0.00                      | 50.98         | 164.13     | 215.11 | -20909.61                | 10743891              |
| 0.00                      | 47.47         | 164.05     | 211.52 | -20940.64                | 10722950              |
| 0.00                      | 44.13         | 163.98     | 208.11 | -20932.48                | 10702018              |
| 0.00                      | 40.81         | 163.90     | 204.71 | -20889.43                | 10681128              |
| 0.00                      | 37.66         | 163.82     | 201.48 | -20815.42                | 10660313              |
| 0.00                      | 34.54         | 163.74     | 198.28 | -20713.01                | 10639600              |
| 0.00                      | 31.59         | 163.66     | 195.25 | -20584.27                | 10619016              |
| 0.00                      | 28.73         | 163.58     | 192.31 | -20432.36                | 10598583              |
| 0.00                      | 26.04         | 163.51     | 189.55 | -20260.04                | 10578323              |
| 0.00                      | 23.46         | 163.43     | 186.89 | -20070.41                | 10558253              |
| 0.00                      | 20.97         | 163.36     | 184.32 | -19866.08                | 10538387              |
| 0.00                      | 18.64         | 163.28     | 181.92 | -19699.59                | 10518687              |
| 0.00                      | 16.36         | 163.21     | 179.56 | -19720.29                | 10498967              |
| 0.00                      | 14.19         | 163.13     | 177.31 | -19871.04                | 10479096              |
| 0.00                      | 12.08         | 163.05     | 175.13 | -19997.16                | 10459099              |
| 0.00                      | 10.14         | 162.98     | 173.11 | -20100.31                | 10438998              |
| 0.00                      | 8.28          | 162.90     | 171.17 | -20181.92                | 10418816              |
| 0.00                      | 6.55          | 162.82     | 169.37 | -20242.50                | 10398574              |
| 0.00                      | 4.98          | 162.74     | 167.72 | -20282.68                | 10378291              |
| 0.00                      | 3.56          | 162.66     | 166.22 | -20304.09                | 10357987              |
| 0.00                      | 2.31          | 162.59     | 164.89 | -20308.20                | 10337679              |
| 0.00                      | 1.26          | 162.51     | 163.77 | -20296.77                | 10317382              |
| 0.00                      | 0.45          | 162.43     | 162.88 | -20271.27                | 10297111              |
| 0.00                      | 0.00          | 162.35     | 162.35 | -20232.15                | 10276879              |
| 0.00                      | 0.00          | 162.27     | 162.27 | -20409.13                | 10256470              |
| 0.00                      | 0.00          | 162.19     | 162.19 | -20808.17                | 10235662              |
| 0.00                      | 0.00          | 162.11     | 162.11 | -21199.88                | 10214462              |
| 0.00                      | 0.00          | 162.02     | 162.02 | -21579.55                | 10192882              |
| 0.00                      | 0.00          | 161.94     | 161.94 | -21948.02                | 10170934              |
| 0.00                      | 0.00          | 161.85     | 161.85 | -22305.37                | 10148629              |
| 0.00                      | 0.00          | 161.76     | 161.76 | -22651.57                | 10125977              |
| 0.00                      | 0.00          | 161.67     | 161.67 | -22987.32                | 10102990              |
| 0.00                      | 0.00          | 161.58     | 161.58 | -23313.22                | 10079677              |
| 0.00                      | 0.00          | 161.48     | 161.48 | -23630.10                | 10056046              |
| 0.00                      | 0.00          | 161.39     | 161.39 | -23938.63                | 10032108              |
| 0.00                      | 0.00          | 161.29     | 161.29 | -24238.34                | 10007870              |
| 0.00                      | 0.00          | 161.19     | 161.19 | -24529.15                | 9983340               |
| 0.00                      | 0.00          | 161.10     | 161.10 | -24811.83                | 9958529               |
| 0.00                      | 0.00          | 161.00     | 161.00 | -25086.86                | 9933442               |
| 0.00                      | 0.00          | 160.89     | 160.89 | -25354.89                | 9908087               |
| 0.00                      | 0.00          | 160.79     | 160.79 | -25616.46                | 9882470               |
| 0.00                      | 0.00          | 160.69     | 160.69 | -25871.42                | 9856599               |
| 0.00                      | 0.00          | 160.58     | 160.58 | -26119.54                | 9830479               |
| 0.00                      | 0.00          | 160.48     | 160.48 | -26361.21                | 9804118               |
| 0.00                      | 0.00          | 160.37     | 160.37 | -26596.53                | 9777522               |
| 0.00                      | 0.00          | 160.26     | 160.26 | -26825.84                | 9750696               |



## Laminación de avenida T = 500 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 15.8    | 945       | 67.00             | 169.357            |
| 15.8    | 950       | 66.20             | 169.300            |
| 15.9    | 955       | 65.40             | 169.242            |
| 16.0    | 960       | 64.70             | 169.184            |
| 16.1    | 965       | 63.90             | 169.125            |
| 16.2    | 970       | 63.20             | 169.066            |
| 16.3    | 975       | 62.40             | 169.007            |
| 16.3    | 980       | 61.60             | 168.947            |
| 16.4    | 985       | 60.80             | 168.886            |
| 16.5    | 990       | 60.00             | 168.824            |
| 16.6    | 995       | 59.00             | 168.762            |
| 16.7    | 1000      | 58.00             | 168.700            |
| 16.8    | 1005      | 56.90             | 168.637            |
| 16.8    | 1010      | 55.90             | 168.574            |
| 16.9    | 1015      | 54.80             | 168.510            |
| 17.0    | 1020      | 53.60             | 168.445            |
| 17.1    | 1025      | 52.40             | 168.379            |
| 17.2    | 1030      | 51.20             | 168.313            |
| 17.3    | 1035      | 49.90             | 168.245            |
| 17.3    | 1040      | 48.60             | 168.177            |
| 17.4    | 1045      | 47.10             | 168.109            |
| 17.5    | 1050      | 45.60             | 168.039            |
| 17.6    | 1055      | 44.00             | 167.969            |
| 17.7    | 1060      | 42.40             | 167.897            |
| 17.8    | 1065      | 40.80             | 167.824            |
| 17.8    | 1070      | 39.10             | 167.750            |
| 17.9    | 1075      | 37.40             | 167.675            |
| 18.0    | 1080      | 35.70             | 167.599            |
| 18.1    | 1085      | 34.00             | 167.522            |
| 18.2    | 1090      | 32.30             | 167.444            |
| 18.3    | 1095      | 30.60             | 167.364            |
| 18.3    | 1100      | 29.00             | 167.283            |
| 18.4    | 1105      | 27.40             | 167.201            |
| 18.5    | 1110      | 25.80             | 167.119            |
| 18.6    | 1115      | 24.30             | 167.035            |
| 18.7    | 1120      | 22.80             | 166.949            |
| 18.8    | 1125      | 21.40             | 166.863            |
| 18.8    | 1130      | 20.00             | 166.775            |
| 18.9    | 1135      | 18.70             | 166.687            |
| 19.0    | 1140      | 17.50             | 166.597            |
| 19.1    | 1145      | 16.30             | 166.507            |
| 19.2    | 1150      | 15.20             | 166.415            |
| 19.3    | 1155      | 14.10             | 166.323            |
| 19.3    | 1160      | 13.20             | 166.230            |
| 19.4    | 1165      | 12.20             | 166.136            |
| 19.5    | 1170      | 11.30             | 166.041            |
| 19.6    | 1175      | 10.50             | 165.946            |
| 19.7    | 1180      | 9.80              | 165.849            |
| 19.8    | 1185      | 9.00              | 165.752            |
| 19.8    | 1190      | 8.40              | 165.654            |
| 19.9    | 1195      | 7.70              | 165.557            |
| 20.0    | 1200      | 7.20              | 165.458            |
| 20.1    | 1205      | 6.60              | 165.358            |
| 20.2    | 1210      | 6.10              | 165.258            |
| 20.3    | 1215      | 5.70              | 165.158            |
| 20.3    | 1220      | 5.20              | 165.057            |
| 20.4    | 1225      | 4.80              | 164.956            |
| 20.5    | 1230      | 4.50              | 164.854            |
| 20.6    | 1235      | 4.10              | 164.752            |
| 20.7    | 1240      | 3.80              | 164.650            |
| 20.8    | 1245      | 3.50              | 164.547            |
| 20.8    | 1250      | 3.20              | 164.444            |
| 20.9    | 1255      | 3.00              | 164.340            |

| CAUDALES DE SALIDA [m³/s] |               |            |        | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|--------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL  | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 160.15     | 160.15 | -27049.72                | 9723646               |
| 0.00                      | 0.00          | 160.04     | 160.04 | -27268.19                | 9696378               |
| 0.00                      | 0.00          | 159.93     | 159.93 | -27481.03                | 9668897               |
| 0.00                      | 0.00          | 159.82     | 159.82 | -27688.60                | 9641208               |
| 0.00                      | 0.00          | 159.70     | 159.70 | -27891.19                | 9613317               |
| 0.00                      | 0.00          | 159.59     | 159.59 | -28089.22                | 9585228               |
| 0.00                      | 0.00          | 159.47     | 159.47 | -28283.06                | 9556945               |
| 0.00                      | 0.00          | 159.35     | 159.35 | -28472.27                | 9528473               |
| 0.00                      | 0.00          | 159.24     | 159.24 | -28659.33                | 9499813               |
| 0.00                      | 0.00          | 159.12     | 159.12 | -28850.24                | 9470963               |
| 0.00                      | 0.00          | 158.99     | 158.99 | -29050.87                | 9441912               |
| 0.00                      | 0.00          | 158.87     | 158.87 | -29268.37                | 9412644               |
| 0.00                      | 0.00          | 158.75     | 158.75 | -29507.93                | 9383136               |
| 0.00                      | 0.00          | 158.63     | 158.63 | -29766.90                | 9353369               |
| 0.00                      | 0.00          | 158.50     | 158.50 | -30038.85                | 9323330               |
| 0.00                      | 0.00          | 158.37     | 158.37 | -30319.64                | 9293010               |
| 0.00                      | 0.00          | 158.25     | 158.25 | -30607.39                | 9262403               |
| 0.00                      | 0.00          | 158.12     | 158.12 | -30903.17                | 9231500               |
| 0.00                      | 0.00          | 157.98     | 157.98 | -31210.31                | 9200290               |
| 0.00                      | 0.00          | 157.85     | 157.85 | -31530.51                | 9168759               |
| 0.00                      | 0.00          | 157.72     | 157.72 | -31867.39                | 9136892               |
| 0.00                      | 0.00          | 157.58     | 157.58 | -32225.12                | 9104666               |
| 0.00                      | 0.00          | 157.44     | 157.44 | -32604.92                | 9072062               |
| 0.00                      | 0.00          | 157.30     | 157.30 | -33005.70                | 9039056               |
| 0.00                      | 0.00          | 157.15     | 157.15 | -33424.95                | 9005631               |
| 0.00                      | 0.00          | 157.01     | 157.01 | -33859.62                | 8971771               |
| 0.00                      | 0.00          | 156.86     | 156.86 | -34306.01                | 8937465               |
| 0.00                      | 0.00          | 156.71     | 156.71 | -34760.85                | 8902704               |
| 0.00                      | 0.00          | 156.56     | 156.56 | -35221.05                | 8867483               |
| 0.00                      | 0.00          | 156.40     | 156.40 | -35683.44                | 8831800               |
| 0.00                      | 0.00          | 156.24     | 156.24 | -36145.20                | 8795655               |
| 0.00                      | 0.00          | 156.08     | 156.08 | -36604.25                | 8759050               |
| 0.00                      | 0.00          | 155.92     | 155.92 | -37058.24                | 8721992               |
| 0.00                      | 0.00          | 155.76     | 155.76 | -37505.07                | 8684487               |
| 0.00                      | 0.00          | 155.59     | 155.59 | -37942.69                | 8646544               |
| 0.00                      | 0.00          | 155.42     | 155.42 | -38368.92                | 8608176               |
| 0.00                      | 0.00          | 155.25     | 155.25 | -38781.59                | 8569394               |
| 0.00                      | 0.00          | 155.07     | 155.07 | -39179.35                | 8530215               |
| 0.00                      | 0.00          | 154.89     | 154.89 | -39560.67                | 8490654               |
| 0.00                      | 0.00          | 154.71     | 154.71 | -39924.37                | 8450730               |
| 0.00                      | 0.00          | 154.53     | 154.53 | -40269.56                | 8410460               |
| 0.00                      | 0.00          | 154.35     | 154.35 | -40595.56                | 8369864               |
| 0.00                      | 0.00          | 154.16     | 154.16 | -40902.21                | 8328962               |
| 0.00                      | 0.00          | 153.98     | 153.98 | -41189.86                | 8287772               |
| 0.00                      | 0.00          | 153.79     | 153.79 | -41458.67                | 8246314               |
| 0.00                      | 0.00          | 153.60     | 153.60 | -41708.90                | 8204605               |
| 0.00                      | 0.00          | 153.40     | 153.40 | -41940.52                | 8162664               |
| 0.00                      | 0.00          | 153.21     | 153.21 | -42153.68                | 8120511               |
| 0.00                      | 0.00          | 153.01     | 153.01 | -42349.30                | 8078161               |
| 0.00                      | 0.00          | 152.81     | 152.81 | -42528.26                | 8035633               |
| 0.00                      | 0.00          | 152.62     | 152.62 | -42691.29                | 7992942               |
| 0.00                      | 0.00          | 152.41     | 152.41 | -42838.84                | 7950103               |
| 0.00                      | 0.00          | 152.21     | 152.21 | -42971.31                | 7907132               |
| 0.00                      | 0.00          | 152.01     | 152.01 | -43089.72                | 7864042               |
| 0.00                      | 0.00          | 151.80     | 151.80 | -43195.30                | 7820847               |
| 0.00                      | 0.00          | 151.60     | 151.60 | -43288.84                | 7777558               |
| 0.00                      | 0.00          | 151.39     | 151.39 | -43370.99                | 7734187               |
| 0.00                      | 0.00          | 151.18     | 151.18 | -43442.27                | 7690745               |
| 0.00                      | 0.00          | 150.97     | 150.97 | -43503.56                | 7647241               |
| 0.00                      | 0.00          | 150.76     | 150.76 | -43555.75                | 7603685               |
| 0.00                      | 0.00          | 150.55     | 150.55 | -43599.44                | 7560086               |
| 0.00                      | 0.00          | 150.34     | 150.34 | -43634.85                | 7516451               |
| 0.00                      | 0.00          | 150.12     | 150.12 | -43662.18                | 7472789               |



## Laminación de avenida T = 500 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 21.0    | 1260      | 2.80              | 164.236            |
| 21.1    | 1265      | 2.50              | 164.133            |
| 21.2    | 1270      | 2.30              | 164.029            |
| 21.3    | 1275      | 2.20              | 163.924            |
| 21.3    | 1280      | 2.00              | 163.819            |
| 21.4    | 1285      | 1.80              | 163.713            |
| 21.5    | 1290      | 1.70              | 163.608            |
| 21.6    | 1295      | 1.50              | 163.503            |
| 21.7    | 1300      | 1.40              | 163.396            |
| 21.8    | 1305      | 1.30              | 163.290            |
| 21.8    | 1310      | 1.20              | 163.184            |
| 21.9    | 1315      | 1.10              | 163.077            |
| 22.0    | 1320      | 1.00              | 162.971            |
| 22.1    | 1325      | 0.90              | 162.863            |
| 22.2    | 1330      | 0.90              | 162.756            |
| 22.3    | 1335      | 0.80              | 162.649            |
| 22.3    | 1340      | 0.70              | 162.541            |
| 22.4    | 1345      | 0.70              | 162.433            |
| 22.5    | 1350      | 0.60              | 162.325            |
| 22.6    | 1355      | 0.60              | 162.217            |
| 22.7    | 1360      | 0.50              | 162.109            |
| 22.8    | 1365      | 0.50              | 162.001            |
| 22.8    | 1370      | 0.40              | 161.891            |
| 22.9    | 1375      | 0.40              | 161.782            |
| 23.0    | 1380      | 0.40              | 161.673            |
| 23.1    | 1385      | 0.30              | 161.564            |
| 23.2    | 1390      | 0.30              | 161.455            |
| 23.3    | 1395      | 0.30              | 161.344            |
| 23.3    | 1400      | 0.20              | 161.234            |
| 23.4    | 1405      | 0.20              | 161.125            |
| 23.5    | 1410      | 0.20              | 161.015            |
| 23.6    | 1415      | 0.20              | 160.904            |
| 23.7    | 1420      | 0.20              | 160.793            |
| 23.8    | 1425      | 0.10              | 160.682            |
| 23.8    | 1430      | 0.10              | 160.572            |
| 23.9    | 1435      | 0.10              | 160.461            |
| 24.0    | 1440      | 0.10              | 160.349            |
| 24.1    | 1445      | 0.10              | 160.237            |
| 24.2    | 1450      | 0.10              | 160.126            |
| 24.3    | 1455      | 0.10              | 160.015            |
| 24.3    | 1460      | 0.10              | 159.902            |
| 24.4    | 1465      | 0.10              | 159.789            |
| 24.5    | 1470      | 0.10              | 159.677            |
| 24.6    | 1475      | 0.00              | 159.565            |
| 24.7    | 1480      | 0.00              | 159.452            |
| 24.8    | 1485      | 0.00              | 159.339            |
| 24.8    | 1490      | 0.00              | 159.225            |
| 24.9    | 1495      | 0.00              | 159.112            |
| 25.0    | 1500      | 0.00              | 158.999            |
| 25.1    | 1505      | 0.00              | 158.885            |
| 25.2    | 1510      | 0.00              | 158.770            |
| 25.3    | 1515      | 0.00              | 158.656            |
| 25.3    | 1520      | 0.00              | 158.543            |
| 25.4    | 1525      | 0.00              | 158.428            |
| 25.5    | 1530      | 0.00              | 158.313            |
| 25.6    | 1535      | 0.00              | 158.198            |
| 25.7    | 1540      | 0.00              | 158.083            |
| 25.8    | 1545      | 0.00              | 157.968            |
| 25.8    | 1550      | 0.00              | 157.852            |
| 25.9    | 1555      | 0.00              | 157.736            |
| 26.0    | 1560      | 0.00              | 157.620            |
| 26.1    | 1565      | 0.00              | 157.505            |
| 26.2    | 1570      | 0.00              | 157.388            |

| CAUDALES DE SALIDA [m³/s] |               |            |        | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|--------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL  | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 149.91     | 149.91 | -43682.32                | 7429106               |
| 0.00                      | 0.00          | 149.69     | 149.69 | -43696.07                | 7385410               |
| 0.00                      | 0.00          | 149.48     | 149.48 | -43703.91                | 7341706               |
| 0.00                      | 0.00          | 149.26     | 149.26 | -43705.74                | 7298001               |
| 0.00                      | 0.00          | 149.04     | 149.04 | -43701.77                | 7254299               |
| 0.00                      | 0.00          | 148.82     | 148.82 | -43692.91                | 7210606               |
| 0.00                      | 0.00          | 148.60     | 148.60 | -43679.72                | 7166926               |
| 0.00                      | 0.00          | 148.38     | 148.38 | -43662.52                | 7123264               |
| 0.00                      | 0.00          | 148.16     | 148.16 | -43640.87                | 7079623               |
| 0.00                      | 0.00          | 147.94     | 147.94 | -43615.05                | 7036008               |
| 0.00                      | 0.00          | 147.72     | 147.72 | -43586.05                | 6992422               |
| 0.00                      | 0.00          | 147.49     | 147.49 | -43554.13                | 6948868               |
| 0.00                      | 0.00          | 147.27     | 147.27 | -43519.38                | 6905348               |
| 0.00                      | 0.00          | 147.04     | 147.04 | -43481.71                | 6861867               |
| 0.00                      | 0.00          | 146.81     | 146.81 | -43441.42                | 6818425               |
| 0.00                      | 0.00          | 146.59     | 146.59 | -43399.02                | 6775026               |
| 0.00                      | 0.00          | 146.36     | 146.36 | -43354.68                | 6731671               |
| 0.00                      | 0.00          | 146.13     | 146.13 | -43308.08                | 6688363               |
| 0.00                      | 0.00          | 145.90     | 145.90 | -43259.08                | 6645104               |
| 0.00                      | 0.00          | 145.67     | 145.67 | -43208.27                | 6601896               |
| 0.00                      | 0.00          | 145.44     | 145.44 | -43156.11                | 6558740               |
| 0.00                      | 0.00          | 145.21     | 145.21 | -43102.70                | 6515637               |
| 0.00                      | 0.00          | 144.98     | 144.98 | -43047.34                | 6472590               |
| 0.00                      | 0.00          | 144.74     | 144.74 | -42990.15                | 6429600               |
| 0.00                      | 0.00          | 144.51     | 144.51 | -42932.01                | 6386668               |
| 0.00                      | 0.00          | 144.27     | 144.27 | -42873.00                | 6343795               |
| 0.00                      | 0.00          | 144.04     | 144.04 | -42812.85                | 6300982               |
| 0.00                      | 0.00          | 143.80     | 143.80 | -42751.13                | 6258231               |
| 0.00                      | 0.00          | 143.56     | 143.56 | -42688.25                | 6215542               |
| 0.00                      | 0.00          | 143.33     | 143.33 | -42624.77                | 6172918               |
| 0.00                      | 0.00          | 143.09     | 143.09 | -42560.71                | 6130357               |
| 0.00                      | 0.00          | 142.85     | 142.85 | -42495.40                | 6087862               |
| 0.00                      | 0.00          | 142.61     | 142.61 | -42428.77                | 6045433               |
| 0.00                      | 0.00          | 142.37     | 142.37 | -42361.59                | 6003071               |
| 0.00                      | 0.00          | 142.13     | 142.13 | -42294.03                | 5960777               |
| 0.00                      | 0.00          | 141.88     | 141.88 | -42225.90                | 5918551               |
| 0.00                      | 0.00          | 141.64     | 141.64 | -42156.93                | 5876394               |
| 0.00                      | 0.00          | 141.39     | 141.39 | -42087.29                | 5834307               |
| 0.00                      | 0.00          | 141.15     | 141.15 | -42017.42                | 5792290               |
| 0.00                      | 0.00          | 140.91     | 140.91 | -41947.30                | 5750342               |
| 0.00                      | 0.00          | 140.66     | 140.66 | -41875.94                | 5708466               |
| 0.00                      | 0.00          | 140.41     | 140.41 | -41803.19                | 5666663               |
| 0.00                      | 0.00          | 140.16     | 140.16 | -41730.15                | 5624933               |
| 0.00                      | 0.00          | 139.91     | 139.91 | -41657.04                | 5583276               |
| 0.00                      | 0.00          | 139.66     | 139.66 | -41583.65                | 5541692               |
| 0.00                      | 0.00          | 139.41     | 139.41 | -41509.68                | 5500183               |
| 0.00                      | 0.00          | 139.16     | 139.16 | -41435.38                | 5458747               |
| 0.00                      | 0.00          | 138.90     | 138.90 | -41361.03                | 5417386               |
| 0.00                      | 0.00          | 138.65     | 138.65 | -41286.62                | 5376100               |
| 0.00                      | 0.00          | 138.40     | 138.40 | -41211.22                | 5334888               |
| 0.00                      | 0.00          | 138.14     | 138.14 | -41134.88                | 5293754               |
| 0.00                      | 0.00          | 137.88     | 137.88 | -41058.52                | 5252695               |
| 0.00                      | 0.00          | 137.63     | 137.63 | -40982.16                | 5211713               |
| 0.00                      | 0.00          | 137.37     | 137.37 | -40905.23                | 5170808               |
| 0.00                      | 0.00          | 137.11     | 137.11 | -40827.38                | 5129980               |
| 0.00                      | 0.00          | 136.85     | 136.85 | -40749.34                | 5089231               |
| 0.00                      | 0.00          | 136.59     | 136.59 | -40671.39                | 5048560               |
| 0.00                      | 0.00          | 136.33     | 136.33 | -40593.13                | 5007966               |
| 0.00                      | 0.00          | 136.06     | 136.06 | -40513.97                | 4967452               |
| 0.00                      | 0.00          | 135.80     | 135.80 | -40434.21                | 4927018               |
| 0.00                      | 0.00          | 135.53     | 135.53 | -40354.57                | 4886664               |
| 0.00                      | 0.00          | 135.27     | 135.27 | -40275.05                | 4846389               |
| 0.00                      | 0.00          | 135.00     | 135.00 | -40194.39                | 4806194               |

## Laminación de avenida T = 500 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 26.3    | 1575      | 0.00              | 157.271            |
| 26.3    | 1580      | 0.00              | 157.155            |
| 26.4    | 1585      | 0.00              | 157.038            |
| 26.5    | 1590      | 0.00              | 156.921            |
| 26.6    | 1595      | 0.00              | 156.803            |
| 26.7    | 1600      | 0.00              | 156.686            |
| 26.8    | 1605      | 0.00              | 156.569            |
| 26.8    | 1610      | 0.00              | 156.451            |
| 26.9    | 1615      | 0.00              | 156.332            |
| 27.0    | 1620      | 0.00              | 156.214            |
| 27.1    | 1625      | 0.00              | 156.096            |
| 27.2    | 1630      | 0.00              | 155.977            |
| 27.3    | 1635      | 0.00              | 155.857            |
| 27.3    | 1640      | 0.00              | 155.738            |
| 27.4    | 1645      | 0.00              | 155.618            |
| 27.5    | 1650      | 0.00              | 155.499            |
| 27.6    | 1655      | 0.00              | 155.377            |
| 27.7    | 1660      | 0.00              | 155.256            |
| 27.8    | 1665      | 0.00              | 155.135            |
| 27.8    | 1670      | 0.00              | 155.015            |
| 27.9    | 1675      | 0.00              | 154.892            |
| 28.0    | 1680      | 0.00              | 154.769            |
| 28.1    | 1685      | 0.00              | 154.647            |
| 28.2    | 1690      | 0.00              | 154.525            |
| 28.3    | 1695      | 0.00              | 154.401            |
| 28.3    | 1700      | 0.00              | 154.277            |
| 28.4    | 1705      | 0.00              | 154.153            |
| 28.5    | 1710      | 0.00              | 154.030            |
| 28.6    | 1715      | 0.00              | 153.904            |
| 28.7    | 1720      | 0.00              | 153.779            |
| 28.8    | 1725      | 0.00              | 153.654            |
| 28.8    | 1730      | 0.00              | 153.529            |
| 28.9    | 1735      | 0.00              | 153.403            |
| 29.0    | 1740      | 0.00              | 153.276            |
| 29.1    | 1745      | 0.00              | 153.149            |
| 29.2    | 1750      | 0.00              | 153.023            |
| 29.3    | 1755      | 0.00              | 152.895            |
| 29.3    | 1760      | 0.00              | 152.767            |
| 29.4    | 1765      | 0.00              | 152.639            |
| 29.5    | 1770      | 0.00              | 152.512            |
| 29.6    | 1775      | 0.00              | 152.382            |
| 29.7    | 1780      | 0.00              | 152.253            |
| 29.8    | 1785      | 0.00              | 152.124            |
| 29.8    | 1790      | 0.00              | 151.995            |
| 29.9    | 1795      | 0.00              | 151.863            |
| 30.0    | 1800      | 0.00              | 151.732            |
| 30.1    | 1805      | 0.00              | 151.601            |
| 30.2    | 1810      | 0.00              | 151.470            |
| 30.3    | 1815      | 0.00              | 151.336            |
| 30.3    | 1820      | 0.00              | 151.203            |
| 30.4    | 1825      | 0.00              | 151.070            |
| 30.5    | 1830      | 0.00              | 150.935            |
| 30.6    | 1835      | 0.00              | 150.799            |
| 30.7    | 1840      | 0.00              | 150.664            |
| 30.8    | 1845      | 0.00              | 150.528            |
| 30.8    | 1850      | 0.00              | 150.391            |
| 30.9    | 1855      | 0.00              | 150.253            |
| 31.0    | 1860      | 0.00              | 150.115            |
| 31.1    | 1865      | 0.00              | 149.977            |
| 31.2    | 1870      | 0.00              | 149.836            |
| 31.3    | 1875      | 0.00              | 149.695            |
| 31.3    | 1880      | 0.00              | 149.555            |
| 31.4    | 1885      | 0.00              | 149.412            |

| CAUDALES DE SALIDA [m³/s] |               |            |        | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|--------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL  | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 134.73     | 134.73 | -40112.52                | 4766082               |
| 0.00                      | 0.00          | 134.47     | 134.47 | -40030.74                | 4726051               |
| 0.00                      | 0.00          | 134.20     | 134.20 | -39949.12                | 4686102               |
| 0.00                      | 0.00          | 133.92     | 133.92 | -39867.20                | 4646235               |
| 0.00                      | 0.00          | 133.65     | 133.65 | -39784.77                | 4606450               |
| 0.00                      | 0.00          | 133.38     | 133.38 | -39702.29                | 4566748               |
| 0.00                      | 0.00          | 133.11     | 133.11 | -39619.97                | 4527128               |
| 0.00                      | 0.00          | 132.83     | 132.83 | -39537.37                | 4487590               |
| 0.00                      | 0.00          | 132.55     | 132.55 | -39453.91                | 4448136               |
| 0.00                      | 0.00          | 132.28     | 132.28 | -39370.01                | 4408766               |
| 0.00                      | 0.00          | 132.00     | 132.00 | -39286.28                | 4369480               |
| 0.00                      | 0.00          | 131.72     | 131.72 | -39202.51                | 4330278               |
| 0.00                      | 0.00          | 131.44     | 131.44 | -39117.74                | 4291160               |
| 0.00                      | 0.00          | 131.16     | 131.16 | -39032.22                | 4252128               |
| 0.00                      | 0.00          | 130.87     | 130.87 | -38946.88                | 4213181               |
| 0.00                      | 0.00          | 130.59     | 130.59 | -38861.72                | 4174319               |
| 0.00                      | 0.00          | 130.30     | 130.30 | -38775.43                | 4135544               |
| 0.00                      | 0.00          | 130.01     | 130.01 | -38688.05                | 4096856               |
| 0.00                      | 0.00          | 129.72     | 129.72 | -38600.85                | 4058255               |
| 0.00                      | 0.00          | 129.44     | 129.44 | -38513.87                | 4019741               |
| 0.00                      | 0.00          | 129.14     | 129.14 | -38425.61                | 3981315               |
| 0.00                      | 0.00          | 128.85     | 128.85 | -38335.89                | 3942979               |
| 0.00                      | 0.00          | 128.55     | 128.55 | -38246.18                | 3904733               |
| 0.00                      | 0.00          | 128.26     | 128.26 | -38156.69                | 3866576               |
| 0.00                      | 0.00          | 127.96     | 127.96 | -38066.36                | 3828510               |
| 0.00                      | 0.00          | 127.66     | 127.66 | -37974.97                | 3790535               |
| 0.00                      | 0.00          | 127.35     | 127.35 | -37883.54                | 3752652               |
| 0.00                      | 0.00          | 127.05     | 127.05 | -37792.32                | 3714859               |
| 0.00                      | 0.00          | 126.75     | 126.75 | -37700.32                | 3677159               |
| 0.00                      | 0.00          | 126.44     | 126.44 | -37607.21                | 3639552               |
| 0.00                      | 0.00          | 126.13     | 126.13 | -37514.02                | 3602038               |
| 0.00                      | 0.00          | 125.83     | 125.83 | -37421.05                | 3564617               |
| 0.00                      | 0.00          | 125.52     | 125.52 | -37327.26                | 3527289               |
| 0.00                      | 0.00          | 125.20     | 125.20 | -37232.34                | 3490057               |
| 0.00                      | 0.00          | 124.89     | 124.89 | -37137.34                | 3452920               |
| 0.00                      | 0.00          | 124.57     | 124.57 | -37042.58                | 3415877               |
| 0.00                      | 0.00          | 124.25     | 124.25 | -36946.94                | 3378930               |
| 0.00                      | 0.00          | 123.93     | 123.93 | -36850.18                | 3342080               |
| 0.00                      | 0.00          | 123.61     | 123.61 | -36753.42                | 3305327               |
| 0.00                      | 0.00          | 123.29     | 123.29 | -36656.92                | 3268670               |
| 0.00                      | 0.00          | 122.97     | 122.97 | -36559.07                | 3232111               |
| 0.00                      | 0.00          | 122.64     | 122.64 | -36459.72                | 3195651               |
| 0.00                      | 0.00          | 122.31     | 122.31 | -36360.48                | 3159290               |
| 0.00                      | 0.00          | 121.99     | 121.99 | -36261.46                | 3123029               |
| 0.00                      | 0.00          | 121.65     | 121.65 | -36161.09                | 3086868               |
| 0.00                      | 0.00          | 121.32     | 121.32 | -36059.44                | 3050808               |
| 0.00                      | 0.00          | 120.98     | 120.98 | -35958.10                | 3014850               |
| 0.00                      | 0.00          | 120.65     | 120.65 | -35856.51                | 2978994               |
| 0.00                      | 0.00          | 120.30     | 120.30 | -35752.95                | 2943241               |
| 0.00                      | 0.00          | 119.96     | 119.96 | -35647.91                | 2907593               |
| 0.00                      | 0.00          | 119.61     | 119.61 | -35543.18                | 2872050               |
| 0.00                      | 0.00          | 119.26     | 119.26 | -35437.86                | 2836612               |
| 0.00                      | 0.00          | 118.91     | 118.91 | -35330.94                | 2801281               |
| 0.00                      | 0.00          | 118.56     | 118.56 | -35223.36                | 2766058               |
| 0.00                      | 0.00          | 118.20     | 118.20 | -35116.10                | 2730942               |
| 0.00                      | 0.00          | 117.84     | 117.84 | -35007.65                | 2695934               |
| 0.00                      | 0.00          | 117.48     | 117.48 | -34897.65                | 2661036               |
| 0.00                      | 0.00          | 117.11     | 117.11 | -34787.57                | 2626249               |
| 0.00                      | 0.00          | 116.74     | 116.74 | -34677.44                | 2591571               |
| 0.00                      | 0.00          | 116.37     | 116.37 | -34565.09                | 2557006               |
| 0.00                      | 0.00          | 115.99     | 115.99 | -34450.99                | 2522555               |
| 0.00                      | 0.00          | 115.62     | 115.62 | -34337.27                | 2488218               |
| 0.00                      | 0.00          | 115.23     | 115.23 | -34222.19                | 2453996               |

## Laminación de avenida T = 500 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 31.5    | 1890      | 0.00              | 149.268            |
| 31.6    | 1895      | 0.00              | 149.125            |
| 31.7    | 1900      | 0.00              | 148.981            |
| 31.8    | 1905      | 0.00              | 148.834            |
| 31.8    | 1910      | 0.00              | 148.687            |
| 31.9    | 1915      | 0.00              | 148.541            |
| 32.0    | 1920      | 0.00              | 148.393            |
| 32.1    | 1925      | 0.00              | 148.244            |
| 32.2    | 1930      | 0.00              | 148.095            |
| 32.3    | 1935      | 0.00              | 147.945            |
| 32.3    | 1940      | 0.00              | 147.792            |
| 32.4    | 1945      | 0.00              | 147.641            |
| 32.5    | 1950      | 0.00              | 147.489            |
| 32.6    | 1955      | 0.00              | 147.332            |
| 32.7    | 1960      | 0.00              | 147.176            |
| 32.8    | 1965      | 0.00              | 147.021            |
| 32.8    | 1970      | 0.00              | 146.860            |
| 32.9    | 1975      | 0.00              | 146.700            |
| 33.0    | 1980      | 0.00              | 146.540            |
| 33.1    | 1985      | 0.00              | 146.377            |
| 33.2    | 1990      | 0.00              | 146.212            |
| 33.3    | 1995      | 0.00              | 146.048            |
| 33.3    | 2000      | 0.00              | 145.879            |
| 33.4    | 2005      | 0.00              | 145.710            |
| 33.5    | 2010      | 0.00              | 145.541            |
| 33.6    | 2015      | 0.00              | 145.367            |
| 33.7    | 2020      | 0.00              | 145.193            |
| 33.8    | 2025      | 0.00              | 145.019            |
| 33.8    | 2030      | 0.00              | 144.840            |
| 33.9    | 2035      | 0.00              | 144.661            |
| 34.0    | 2040      | 0.00              | 144.482            |
| 34.1    | 2045      | 0.00              | 144.298            |
| 34.2    | 2050      | 0.00              | 144.115            |
| 34.3    | 2055      | 0.00              | 143.931            |
| 34.3    | 2060      | 0.00              | 143.743            |
| 34.4    | 2065      | 0.00              | 143.556            |
| 34.5    | 2070      | 0.00              | 143.364            |
| 34.6    | 2075      | 0.00              | 143.172            |
| 34.7    | 2080      | 0.00              | 142.981            |
| 34.8    | 2085      | 0.00              | 142.784            |
| 34.8    | 2090      | 0.00              | 142.588            |
| 34.9    | 2095      | 0.00              | 142.391            |
| 35.0    | 2100      | 0.00              | 142.191            |
| 35.1    | 2105      | 0.00              | 141.993            |
| 35.2    | 2110      | 0.00              | 141.789            |
| 35.3    | 2115      | 0.00              | 141.588            |
| 35.3    | 2120      | 0.00              | 141.383            |
| 35.4    | 2125      | 0.00              | 141.177            |
| 35.5    | 2130      | 0.00              | 140.972            |
| 35.6    | 2135      | 0.00              | 140.763            |
| 35.7    | 2140      | 0.00              | 140.555            |
| 35.8    | 2145      | 0.00              | 140.344            |
| 35.8    | 2150      | 0.00              | 140.133            |
| 35.9    | 2155      | 0.00              | 139.921            |
| 36.0    | 2160      | 0.00              | 139.706            |
| 36.1    | 2165      | 0.00              | 139.494            |
| 36.2    | 2170      | 0.00              | 139.277            |
| 36.3    | 2175      | 0.00              | 139.063            |
| 36.3    | 2180      | 0.00              | 138.846            |
| 36.4    | 2185      | 0.00              | 138.629            |
| 36.5    | 2190      | 0.00              | 138.412            |
| 36.6    | 2195      | 0.00              | 138.193            |
| 36.7    | 2200      | 0.00              | 137.975            |

| CAUDALES DE SALIDA [m³/s] |               |            |        | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|--------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL  | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 114.85     | 114.85 | -34104.69                | 2419891               |
| 0.00                      | 0.00          | 114.46     | 114.46 | -33986.49                | 2385904               |
| 0.00                      | 0.00          | 114.07     | 114.07 | -33868.39                | 2352036               |
| 0.00                      | 0.00          | 113.67     | 113.67 | -33748.39                | 2318288               |
| 0.00                      | 0.00          | 113.27     | 113.27 | -33626.80                | 2284661               |
| 0.00                      | 0.00          | 112.87     | 112.87 | -33505.65                | 2251155               |
| 0.00                      | 0.00          | 112.46     | 112.46 | -33383.04                | 2217772               |
| 0.00                      | 0.00          | 112.05     | 112.05 | -33258.24                | 2184514               |
| 0.00                      | 0.00          | 111.63     | 111.63 | -33133.14                | 2151381               |
| 0.00                      | 0.00          | 111.22     | 111.22 | -33007.44                | 2118373               |
| 0.00                      | 0.00          | 110.79     | 110.79 | -32879.19                | 2085494               |
| 0.00                      | 0.00          | 110.37     | 110.37 | -32749.48                | 2052745               |
| 0.00                      | 0.00          | 109.94     | 109.94 | -32620.04                | 2020125               |
| 0.00                      | 0.00          | 109.49     | 109.49 | -32487.64                | 1987637               |
| 0.00                      | 0.00          | 109.05     | 109.05 | -32352.53                | 1955285               |
| 0.00                      | 0.00          | 108.61     | 108.61 | -32217.99                | 1923067               |
| 0.00                      | 0.00          | 108.15     | 108.15 | -32080.81                | 1890986               |
| 0.00                      | 0.00          | 107.69     | 107.69 | -31940.52                | 1859045               |
| 0.00                      | 0.00          | 107.23     | 107.23 | -31800.36                | 1827245               |
| 0.00                      | 0.00          | 106.76     | 106.76 | -31658.28                | 1795587               |
| 0.00                      | 0.00          | 106.28     | 106.28 | -31513.40                | 1764073               |
| 0.00                      | 0.00          | 105.80     | 105.80 | -31368.32                | 1732705               |
| 0.00                      | 0.00          | 105.30     | 105.30 | -31220.63                | 1701484               |
| 0.00                      | 0.00          | 104.80     | 104.80 | -31068.99                | 1670415               |
| 0.00                      | 0.00          | 104.30     | 104.30 | -30916.73                | 1639498               |
| 0.00                      | 0.00          | 103.78     | 103.78 | -30761.90                | 1608737               |
| 0.00                      | 0.00          | 103.26     | 103.26 | -30603.41                | 1578133               |
| 0.00                      | 0.00          | 102.74     | 102.74 | -30444.68                | 1547688               |
| 0.00                      | 0.00          | 102.19     | 102.19 | -30282.38                | 1517406               |
| 0.00                      | 0.00          | 101.65     | 101.65 | -30115.99                | 1487290               |
| 0.00                      | 0.00          | 101.10     | 101.10 | -29949.55                | 1457341               |
| 0.00                      | 0.00          | 100.54     | 100.54 | -29779.66                | 1427561               |
| 0.00                      | 0.00          | 99.97      | 99.97  | -29606.78                | 1397954               |
| 0.00                      | 0.00          | 99.40      | 99.40  | -29433.23                | 1368521               |
| 0.00                      | 0.00          | 98.81      | 98.81  | -29256.13                | 1339265               |
| 0.00                      | 0.00          | 98.22      | 98.22  | -29077.21                | 1310188               |
| 0.00                      | 0.00          | 97.61      | 97.61  | -28895.64                | 1281292               |
| 0.00                      | 0.00          | 97.00      | 97.00  | -28709.86                | 1252582               |
| 0.00                      | 0.00          | 96.39      | 96.39  | -28523.17                | 1224059               |
| 0.00                      | 0.00          | 95.75      | 95.75  | -28332.45                | 1195726               |
| 0.00                      | 0.00          | 95.12      | 95.12  | -28138.23                | 1167588               |
| 0.00                      | 0.00          | 94.47      | 94.47  | -27942.57                | 1139646               |
| 0.00                      | 0.00          | 93.81      | 93.81  | -27743.13                | 1111903               |
| 0.00                      | 0.00          | 93.16      | 93.16  | -27542.62                | 1084360               |
| 0.00                      | 0.00          | 92.47      | 92.47  | -27338.28                | 1057022               |
| 0.00                      | 0.00          | 91.80      | 91.80  | -27130.34                | 1029891               |
| 0.00                      | 0.00          | 91.10      | 91.10  | -26920.58                | 1002971               |
| 0.00                      | 0.00          | 90.40      | 90.40  | -26706.35                | 976264                |
| 0.00                      | 0.00          | 89.69      | 89.69  | -26490.56                | 949774                |
| 0.00                      | 0.00          | 88.97      | 88.97  | -26271.51                | 923502                |
| 0.00                      | 0.00          | 88.24      | 88.24  | -26049.95                | 897452                |
| 0.00                      | 0.00          | 87.49      | 87.49  | -25825.14                | 871627                |
| 0.00                      | 0.00          | 86.74      | 86.74  | -25595.26                | 846032                |
| 0.00                      | 0.00          | 85.98      | 85.98  | -25363.25                | 820669                |
| 0.00                      | 0.00          | 85.20      | 85.20  | -25127.02                | 795542                |
| 0.00                      | 0.00          | 84.43      | 84.43  | -24888.84                | 770653                |
| 0.00                      | 0.00          | 83.63      | 83.63  | -24646.72                | 746006                |
| 0.00                      | 0.00          | 82.83      | 82.83  | -24400.93                | 721605                |
| 0.00                      | 0.00          | 82.01      | 82.01  | -24153.06                | 697452                |
| 0.00                      | 0.00          | 81.19      | 81.19  | -23901.31                | 673551                |
| 0.00                      | 0.00          | 80.36      | 80.36  | -23647.37                | 649903                |
| 0.00                      | 0.00          | 79.51      | 79.51  | -23388.82                | 626515                |
| 0.00                      | 0.00          | 78.65      | 78.65  | -23127.79                | 603387                |

## Laminación de avenida T = 500 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 36.8    | 2205      | 0.00              | 137.753            |
| 36.8    | 2210      | 0.00              | 137.534            |
| 36.9    | 2215      | 0.00              | 137.311            |
| 37.0    | 2220      | 0.00              | 137.089            |
| 37.1    | 2225      | 0.00              | 136.864            |
| 37.2    | 2230      | 0.00              | 136.639            |
| 37.3    | 2235      | 0.00              | 136.413            |
| 37.3    | 2240      | 0.00              | 136.185            |
| 37.4    | 2245      | 0.00              | 135.958            |
| 37.5    | 2250      | 0.00              | 135.727            |
| 37.6    | 2255      | 0.00              | 135.500            |
| 37.7    | 2260      | 0.00              | 135.266            |
| 37.8    | 2265      | 0.00              | 135.037            |
| 37.8    | 2270      | 0.00              | 134.803            |
| 37.9    | 2275      | 0.00              | 134.572            |
| 38.0    | 2280      | 0.00              | 134.337            |
| 38.1    | 2285      | 0.00              | 134.104            |
| 38.2    | 2290      | 0.00              | 133.866            |
| 38.3    | 2295      | 0.00              | 133.626            |
| 38.3    | 2300      | 0.00              | 133.379            |
| 38.4    | 2305      | 0.00              | 133.124            |
| 38.5    | 2310      | 0.00              | 132.865            |
| 38.6    | 2315      | 0.00              | 132.601            |
| 38.7    | 2320      | 0.00              | 132.333            |
| 38.8    | 2325      | 0.00              | 132.067            |
| 38.8    | 2330      | 0.00              | 131.783            |
| 38.9    | 2335      | 0.00              | 131.502            |
| 39.0    | 2340      | 0.00              | 131.165            |
| 39.1    | 2345      | 0.00              | 130.816            |
| 39.2    | 2350      | 0.00              | 130.450            |
| 39.3    | 2355      | 0.00              | 130.072            |
| 39.3    | 2360      | 0.00              | 129.694            |
| 39.4    | 2365      | 0.00              | 129.340            |
| 39.5    | 2370      | 0.00              | 129.027            |
| 39.6    | 2375      | 0.00              | 128.714            |
| 39.7    | 2380      | 0.00              | 128.401            |
| 39.8    | 2385      | 0.00              | 128.113            |
| 39.8    | 2390      | 0.00              | 127.866            |
| 39.9    | 2395      | 0.00              | 127.640            |
| 40.0    | 2400      | 0.00              | 127.427            |
| 40.1    | 2405      | 0.00              | 127.203            |
| 40.2    | 2410      | 0.00              | 127.022            |
| 40.3    | 2415      | 0.00              | 126.840            |
| 40.3    | 2420      | 0.00              | 126.693            |
| 40.4    | 2425      | 0.00              | 126.578            |
| 40.5    | 2430      | 0.00              | 126.488            |
| 40.6    | 2435      | 0.00              | 126.409            |
| 40.7    | 2440      | 0.00              | 126.342            |
| 40.8    | 2445      | 0.00              | 126.286            |
| 40.8    | 2450      | 0.00              | 126.239            |
| 40.9    | 2455      | 0.00              | 126.200            |
| 41.0    | 2460      | 0.00              | 126.167            |
| 41.1    | 2465      | 0.00              | 126.140            |
| 41.2    | 2470      | 0.00              | 126.117            |
| 41.3    | 2475      | 0.00              | 126.098            |
| 41.3    | 2480      | 0.00              | 126.082            |
| 41.4    | 2485      | 0.00              | 126.068            |
| 41.5    | 2490      | 0.00              | 126.057            |
| 41.6    | 2495      | 0.00              | 126.048            |
| 41.7    | 2500      | 0.00              | 126.040            |
| 41.8    | 2505      | 0.00              | 126.034            |
| 41.8    | 2510      | 0.00              | 126.028            |
| 41.9    | 2515      | 0.00              | 126.023            |

| CAUDALES DE SALIDA [m³/s] |               |            |       | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|-------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 77.77      | 77.77 | -22861.15                | 580526                |
| 0.00                      | 0.00          | 76.89      | 76.89 | -22589.98                | 557936                |
| 0.00                      | 0.00          | 75.99      | 75.99 | -22314.29                | 535621                |
| 0.00                      | 0.00          | 75.08      | 75.08 | -22032.73                | 513589                |
| 0.00                      | 0.00          | 74.14      | 74.14 | -21747.90                | 491841                |
| 0.00                      | 0.00          | 73.20      | 73.20 | -21457.75                | 470383                |
| 0.00                      | 0.00          | 72.23      | 72.23 | -21163.51                | 449219                |
| 0.00                      | 0.00          | 71.25      | 71.25 | -20861.81                | 428358                |
| 0.00                      | 0.00          | 70.25      | 70.25 | -20555.23                | 407802                |
| 0.00                      | 0.00          | 69.22      | 69.22 | -20241.96                | 387560                |
| 0.00                      | 0.00          | 68.20      | 68.20 | -19924.26                | 367636                |
| 0.00                      | 0.00          | 67.13      | 67.13 | -19598.59                | 348038                |
| 0.00                      | 0.00          | 66.06      | 66.06 | -19265.34                | 328772                |
| 0.00                      | 0.00          | 64.95      | 64.95 | -18926.33                | 309846                |
| 0.00                      | 0.00          | 63.84      | 63.84 | -18579.72                | 291266                |
| 0.00                      | 0.00          | 62.69      | 62.69 | -18226.47                | 273040                |
| 0.00                      | 0.00          | 61.53      | 61.53 | -17864.25                | 255176                |
| 0.00                      | 0.00          | 60.31      | 60.31 | -17492.25                | 237683                |
| 0.00                      | 0.00          | 59.07      | 59.07 | -17105.88                | 220577                |
| 0.00                      | 0.00          | 57.76      | 57.76 | -16703.48                | 203874                |
| 0.00                      | 0.00          | 56.37      | 56.37 | -16279.40                | 187595                |
| 0.00                      | 0.00          | 54.93      | 54.93 | -15832.54                | 171762                |
| 0.00                      | 0.00          | 53.42      | 53.42 | -15364.33                | 156398                |
| 0.00                      | 0.00          | 51.84      | 51.84 | -14872.77                | 141525                |
| 0.00                      | 0.00          | 50.22      | 50.22 | -14363.52                | 127161                |
| 0.00                      | 0.00          | 48.44      | 48.44 | -13816.83                | 113345                |
| 0.00                      | 0.00          | 46.60      | 46.60 | -13234.77                | 100110                |
| 0.00                      | 0.00          | 44.30      | 44.30 | -12563.31                | 87546                 |
| 0.00                      | 0.00          | 41.79      | 41.79 | -11768.15                | 75778                 |
| 0.00                      | 0.00          | 38.98      | 38.98 | -10889.02                | 64889                 |
| 0.00                      | 0.00          | 35.85      | 35.85 | -9889.26                 | 55000                 |
| 0.00                      | 0.00          | 32.41      | 32.41 | -8737.20                 | 46263                 |
| 0.00                      | 0.00          | 28.83      | 28.83 | -7446.96                 | 38816                 |
| 0.00                      | 0.00          | 25.24      | 25.24 | -6085.98                 | 32730                 |
| 0.00                      | 0.00          | 21.04      | 21.04 | -5341.36                 | 27389                 |
| 0.00                      | 0.00          | 15.77      | 15.77 | -5074.59                 | 22314                 |
| 0.00                      | 0.00          | 8.37       | 8.37  | -4261.31                 | 18053                 |
| 0.00                      | 0.00          | 8.21       | 8.21  | -3291.30                 | 14761                 |
| 0.00                      | 0.00          | 7.70       | 7.70  | -2712.72                 | 12049                 |
| 0.00                      | 0.00          | 7.18       | 7.18  | -2301.00                 | 9748                  |
| 0.00                      | 0.00          | 6.59       | 6.59  | -1900.50                 | 7847                  |
| 0.00                      | 0.00          | 6.08       | 6.08  | -1534.94                 | 6312                  |
| 0.00                      | 0.00          | 5.51       | 5.51  | -1221.06                 | 5091                  |
| 0.00                      | 0.00          | 5.00       | 5.00  | -950.42                  | 4141                  |
| 0.00                      | 0.00          | 4.57       | 4.57  | -737.21                  | 3403                  |
| 0.00                      | 0.00          | 4.20       | 4.20  | -574.04                  | 2829                  |
| 0.00                      | 0.00          | 3.84       | 3.84  | -462.80                  | 2367                  |
| 0.00                      | 0.00          | 3.52       | 3.52  | -387.11                  | 1980                  |
| 0.00                      | 0.00          | 3.22       | 3.22  | -323.78                  | 1656                  |
| 0.00                      | 0.00          | 2.94       | 2.94  | -270.83                  | 1385                  |
| 0.00                      | 0.00          | 2.69       | 2.69  | -226.53                  | 1158                  |
| 0.00                      | 0.00          | 2.46       | 2.46  | -189.47                  | 969                   |
| 0.00                      | 0.00          | 2.25       | 2.25  | -158.48                  | 810                   |
| 0.00                      | 0.00          | 2.06       | 2.06  | -132.56                  | 678                   |
| 0.00                      | 0.00          | 1.88       | 1.88  | -110.88                  | 567                   |
| 0.00                      | 0.00          | 1.72       | 1.72  | -92.74                   | 474                   |
| 0.00                      | 0.00          | 1.57       | 1.57  | -77.57                   | 397                   |
| 0.00                      | 0.00          | 1.44       | 1.44  | -64.89                   | 332                   |
| 0.00                      | 0.00          | 1.32       | 1.32  | -54.27                   | 278                   |
| 0.00                      | 0.00          | 1.20       | 1.20  | -45.39                   | 232                   |
| 0.00                      | 0.00          | 1.11       | 1.11  | -37.97                   | 194                   |
| 0.00                      | 0.00          | 1.01       | 1.01  | -31.76                   | 162                   |
| 0.00                      | 0.00          | 0.91       | 0.91  | -26.56                   | 136                   |

## Laminación de avenida T = 500 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 42.0    | 2520      | 0.00              | 126.020            |
| 42.1    | 2525      | 0.00              | 126.016            |
| 42.2    | 2530      | 0.00              | 126.014            |
| 42.3    | 2535      | 0.00              | 126.011            |
| 42.3    | 2540      | 0.00              | 126.010            |
| 42.4    | 2545      | 0.00              | 126.008            |
| 42.5    | 2550      | 0.00              | 126.007            |
| 42.6    | 2555      | 0.00              | 126.006            |
| 42.7    | 2560      | 0.00              | 126.005            |
| 42.8    | 2565      | 0.00              | 126.004            |
| 42.8    | 2570      | 0.00              | 126.003            |
| 42.9    | 2575      | 0.00              | 126.003            |
| 43.0    | 2580      | 0.00              | 126.002            |
| 43.1    | 2585      | 0.00              | 126.002            |
| 43.2    | 2590      | 0.00              | 126.002            |
| 43.3    | 2595      | 0.00              | 126.001            |
| 43.3    | 2600      | 0.00              | 126.001            |
| 43.4    | 2605      | 0.00              | 126.001            |
| 43.5    | 2610      | 0.00              | 126.001            |
| 43.6    | 2615      | 0.00              | 126.001            |
| 43.7    | 2620      | 0.00              | 126.001            |
| 43.8    | 2625      | 0.00              | 126.000            |

| CAUDALES DE SALIDA [m3/s] |               |            |       | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|-------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 0.85       | 0.85  | -22.22                   | 114                   |
| 0.00                      | 0.00          | 0.76       | 0.76  | -18.58                   | 95                    |
| 0.00                      | 0.00          | 0.71       | 0.71  | -15.55                   | 79                    |
| 0.00                      | 0.00          | 0.63       | 0.63  | -13.00                   | 66                    |
| 0.00                      | 0.00          | 0.60       | 0.60  | -10.88                   | 56                    |
| 0.00                      | 0.00          | 0.54       | 0.54  | -9.09                    | 47                    |
| 0.00                      | 0.00          | 0.50       | 0.50  | -7.61                    | 39                    |
| 0.00                      | 0.00          | 0.47       | 0.47  | -6.37                    | 33                    |
| 0.00                      | 0.00          | 0.43       | 0.43  | -5.32                    | 27                    |
| 0.00                      | 0.00          | 0.38       | 0.38  | -4.45                    | 23                    |
| 0.00                      | 0.00          | 0.33       | 0.33  | -3.73                    | 19                    |
| 0.00                      | 0.00          | 0.33       | 0.33  | -3.11                    | 16                    |
| 0.00                      | 0.00          | 0.27       | 0.27  | -2.61                    | 13                    |
| 0.00                      | 0.00          | 0.27       | 0.27  | -2.18                    | 11                    |
| 0.00                      | 0.00          | 0.27       | 0.27  | -1.82                    | 9                     |
| 0.00                      | 0.00          | 0.19       | 0.19  | -1.52                    | 8                     |
| 0.00                      | 0.00          | 0.19       | 0.19  | -1.28                    | 7                     |
| 0.00                      | 0.00          | 0.19       | 0.19  | -1.07                    | 5                     |
| 0.00                      | 0.00          | 0.19       | 0.19  | -0.89                    | 5                     |
| 0.00                      | 0.00          | 0.19       | 0.19  | -0.74                    | 4                     |
| 0.00                      | 0.00          | 0.19       | 0.19  | -0.63                    | 3                     |
| 0.00                      | 0.00          | 0.00       | 0.00  | -0.52                    | 3                     |

## Laminación de avenida T = 1.000 años

| TIEMPO  |           | CAUDAL  | COTÁ DE    |
|---------|-----------|---------|------------|
| [horas] | [minutos] | ENTRADA | EMBALSE    |
|         |           | [m³/s]  | [m.s.n.m.] |
| 0.0     | 0         | 0.00    | 126.000    |
| 0.1     | 5         | 0.10    | 126.001    |
| 0.2     | 10        | 0.10    | 126.002    |
| 0.3     | 15        | 0.20    | 126.005    |
| 0.3     | 20        | 0.30    | 126.010    |
| 0.4     | 25        | 0.50    | 126.017    |
| 0.5     | 30        | 0.60    | 126.027    |
| 0.6     | 35        | 0.80    | 126.041    |
| 0.7     | 40        | 1.10    | 126.060    |
| 0.8     | 45        | 1.40    | 126.085    |
| 0.8     | 50        | 1.70    | 126.117    |
| 0.9     | 55        | 2.10    | 126.156    |
| 1.0     | 60        | 2.60    | 126.203    |
| 1.1     | 65        | 3.10    | 126.261    |
| 1.2     | 70        | 3.70    | 126.330    |
| 1.3     | 75        | 4.40    | 126.412    |
| 1.3     | 80        | 5.20    | 126.506    |
| 1.4     | 85        | 6.00    | 126.602    |
| 1.5     | 90        | 7.00    | 126.705    |
| 1.6     | 95        | 8.00    | 126.819    |
| 1.7     | 100       | 9.10    | 126.944    |
| 1.8     | 105       | 10.30   | 127.063    |
| 1.8     | 110       | 11.60   | 127.182    |
| 1.9     | 115       | 13.10   | 127.315    |
| 2.0     | 120       | 14.70   | 127.464    |
| 2.1     | 125       | 16.40   | 127.593    |
| 2.2     | 130       | 18.20   | 127.728    |
| 2.3     | 135       | 20.10   | 127.882    |
| 2.3     | 140       | 22.30   | 128.041    |
| 2.4     | 145       | 24.50   | 128.183    |
| 2.5     | 150       | 27.00   | 128.325    |
| 2.6     | 155       | 29.60   | 128.471    |
| 2.7     | 160       | 32.40   | 128.623    |
| 2.8     | 165       | 35.40   | 128.814    |
| 2.8     | 170       | 38.70   | 129.041    |
| 2.9     | 175       | 42.20   | 129.259    |
| 3.0     | 180       | 45.90   | 129.477    |
| 3.1     | 185       | 49.90   | 129.677    |
| 3.2     | 190       | 54.20   | 129.890    |
| 3.3     | 195       | 58.90   | 130.107    |
| 3.3     | 200       | 63.80   | 130.332    |
| 3.4     | 205       | 69.30   | 130.571    |
| 3.5     | 210       | 75.10   | 130.813    |
| 3.6     | 215       | 81.50   | 131.070    |
| 3.7     | 220       | 88.30   | 131.323    |
| 3.8     | 225       | 95.70   | 131.586    |
| 3.8     | 230       | 103.90  | 131.843    |
| 3.9     | 235       | 113.00  | 132.116    |
| 4.0     | 240       | 123.20  | 132.402    |
| 4.1     | 245       | 134.20  | 132.710    |
| 4.2     | 250       | 147.40  | 133.046    |
| 4.3     | 255       | 164.10  | 133.396    |
| 4.3     | 260       | 185.90  | 133.764    |
| 4.4     | 265       | 215.00  | 134.163    |
| 4.5     | 270       | 252.10  | 134.606    |
| 4.6     | 275       | 296.20  | 135.115    |
| 4.7     | 280       | 345.20  | 135.707    |
| 4.8     | 285       | 397.60  | 136.394    |
| 4.8     | 290       | 451.80  | 137.175    |
| 4.9     | 295       | 506.80  | 138.048    |
| 5.0     | 300       | 562.90  | 139.003    |
| 5.1     | 305       | 621.20  | 140.032    |
| 5.2     | 310       | 682.80  | 141.117    |

| CAUDALES DE SALIDA [m3/s] |               |            |       | INCREMENTO | VOLUMEN DE |
|---------------------------|---------------|------------|-------|------------|------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL | DE VOLUMEN | EMBALSE    |
|                           |               |            |       | [m³]       | [m³]       |
| 0.00                      | 0.00          | 0.00       | 0.00  | -          | 2          |
| 0.00                      | 0.00          | 0.19       | 0.19  | 3.88       | 6          |
| 0.00                      | 0.00          | 0.27       | 0.27  | 8.55       | 14         |
| 0.00                      | 0.00          | 0.43       | 0.43  | 15.75      | 30         |
| 0.00                      | 0.00          | 0.60       | 0.60  | 26.20      | 56         |
| 0.00                      | 0.00          | 0.78       | 0.78  | 40.77      | 97         |
| 0.00                      | 0.00          | 0.99       | 0.99  | 59.51      | 157        |
| 0.00                      | 0.00          | 1.22       | 1.22  | 82.73      | 239        |
| 0.00                      | 0.00          | 1.47       | 1.47  | 110.74     | 350        |
| 0.00                      | 0.00          | 1.75       | 1.75  | 143.75     | 494        |
| 0.00                      | 0.00          | 2.06       | 2.06  | 181.95     | 676        |
| 0.00                      | 0.00          | 2.37       | 2.37  | 225.94     | 902        |
| 0.00                      | 0.00          | 2.71       | 2.71  | 276.46     | 1178       |
| 0.00                      | 0.00          | 3.07       | 3.07  | 334.39     | 1512       |
| 0.00                      | 0.00          | 3.45       | 3.45  | 400.12     | 1913       |
| 0.00                      | 0.00          | 3.86       | 3.86  | 473.05     | 2386       |
| 0.00                      | 0.00          | 4.28       | 4.28  | 551.35     | 2937       |
| 0.00                      | 0.00          | 4.66       | 4.66  | 615.69     | 3553       |
| 0.00                      | 0.00          | 5.05       | 5.05  | 669.39     | 4222       |
| 0.00                      | 0.00          | 5.44       | 5.44  | 733.45     | 4956       |
| 0.00                      | 0.00          | 5.84       | 5.84  | 806.89     | 5762       |
| 0.00                      | 0.00          | 6.20       | 6.20  | 897.07     | 6659       |
| 0.00                      | 0.00          | 6.54       | 6.54  | 1008.95    | 7668       |
| 0.00                      | 0.00          | 6.89       | 6.89  | 1132.12    | 8801       |
| 0.00                      | 0.00          | 7.27       | 7.27  | 1259.90    | 10060      |
| 0.00                      | 0.00          | 7.59       | 7.59  | 1421.98    | 11482      |
| 0.00                      | 0.00          | 7.90       | 7.90  | 1626.84    | 13109      |
| 0.00                      | 0.00          | 8.25       | 8.25  | 1843.58    | 14953      |
| 0.00                      | 0.00          | 5.04       | 5.04  | 2027.34    | 16980      |
| 0.00                      | 0.00          | 10.65      | 10.65 | 2098.38    | 19079      |
| 0.00                      | 0.00          | 14.20      | 14.20 | 2111.33    | 21190      |
| 0.00                      | 0.00          | 17.09      | 17.09 | 2163.51    | 23353      |
| 0.00                      | 0.00          | 19.66      | 19.66 | 2506.95    | 25860      |
| 0.00                      | 0.00          | 22.47      | 22.47 | 3209.10    | 29069      |
| 0.00                      | 0.00          | 25.41      | 25.41 | 3934.84    | 33004      |
| 0.00                      | 0.00          | 27.94      | 27.94 | 4240.19    | 37244      |
| 0.00                      | 0.00          | 30.27      | 30.27 | 4222.87    | 41467      |
| 0.00                      | 0.00          | 32.25      | 32.25 | 4409.35    | 45877      |
| 0.00                      | 0.00          | 34.24      | 34.24 | 4792.77    | 50669      |
| 0.00                      | 0.00          | 36.15      | 36.15 | 5264.37    | 55934      |
| 0.00                      | 0.00          | 38.03      | 38.03 | 5855.88    | 61790      |
| 0.00                      | 0.00          | 39.93      | 39.93 | 6547.81    | 68338      |
| 0.00                      | 0.00          | 41.77      | 41.77 | 7359.83    | 75697      |
| 0.00                      | 0.00          | 43.63      | 43.63 | 8307.28    | 84005      |
| 0.00                      | 0.00          | 45.40      | 45.40 | 9407.20    | 93412      |
| 0.00                      | 0.00          | 47.16      | 47.16 | 10661.69   | 104074     |
| 0.00                      | 0.00          | 48.82      | 48.82 | 12072.52   | 116146     |
| 0.00                      | 0.00          | 50.52      | 50.52 | 13668.46   | 129815     |
| 0.00                      | 0.00          | 52.25      | 52.25 | 15461.46   | 145276     |
| 0.00                      | 0.00          | 54.05      | 54.05 | 17499.36   | 162775     |
| 0.00                      | 0.00          | 55.94      | 55.94 | 19805.71   | 182581     |
| 0.00                      | 0.00          | 57.85      | 57.85 | 22383.41   | 204964     |
| 0.00                      | 0.00          | 59.79      | 59.79 | 25412.02   | 230376     |
| 0.00                      | 0.00          | 61.82      | 61.82 | 29275.26   | 259652     |
| 0.00                      | 0.00          | 64.01      | 64.01 | 34391.59   | 294043     |
| 0.00                      | 0.00          | 66.43      | 66.43 | 41294.35   | 335338     |
| 0.00                      | 0.00          | 69.13      | 69.13 | 50419.55   | 385757     |
| 0.00                      | 0.00          | 72.15      | 72.15 | 61723.80   | 447481     |
| 0.00                      | 0.00          | 75.43      | 75.43 | 74719.92   | 522201     |
| 0.00                      | 0.00          | 78.94      | 78.94 | 88879.01   | 611080     |
| 0.00                      | 0.00          | 82.61      | 82.61 | 103766.67  | 714847     |
| 0.00                      | 0.00          | 86.38      | 86.38 | 119006.53  | 833853     |
| 0.00                      | 0.00          | 90.19      | 90.19 | 134504.18  | 968357     |

## Laminación de avenida T = 1.000 años

| TIEMPO  |           | CAUDAL  | COTA DE    |
|---------|-----------|---------|------------|
| [horas] | [minutos] | ENTRADA | EMBALSE    |
|         |           | [m³/s]  | [m.s.n.m.] |
| 5.3     | 315       | 746.90  | 142.241    |
| 5.3     | 320       | 813.40  | 143.397    |
| 5.4     | 325       | 880.40  | 144.566    |
| 5.5     | 330       | 945.30  | 145.734    |
| 5.6     | 335       | 1007.80 | 146.893    |
| 5.7     | 340       | 1066.50 | 148.038    |
| 5.8     | 345       | 1118.40 | 149.177    |
| 5.8     | 350       | 1163.00 | 150.307    |
| 5.9     | 355       | 1202.90 | 151.426    |
| 6.0     | 360       | 1238.20 | 152.528    |
| 6.1     | 365       | 1268.90 | 153.618    |
| 6.2     | 370       | 1294.60 | 154.694    |
| 6.3     | 375       | 1315.10 | 155.752    |
| 6.3     | 380       | 1330.20 | 156.790    |
| 6.4     | 385       | 1339.90 | 157.812    |
| 6.5     | 390       | 1344.10 | 158.814    |
| 6.6     | 395       | 1343.20 | 159.794    |
| 6.7     | 400       | 1337.40 | 160.750    |
| 6.8     | 405       | 1326.60 | 161.680    |
| 6.8     | 410       | 1311.40 | 162.582    |
| 6.9     | 415       | 1292.10 | 163.456    |
| 7.0     | 420       | 1269.30 | 164.298    |
| 7.1     | 425       | 1243.50 | 165.111    |
| 7.2     | 430       | 1215.20 | 165.892    |
| 7.3     | 435       | 1184.90 | 166.641    |
| 7.3     | 440       | 1152.90 | 167.358    |
| 7.4     | 445       | 1119.70 | 168.042    |
| 7.5     | 450       | 1085.60 | 168.694    |
| 7.6     | 455       | 1051.10 | 169.314    |
| 7.7     | 460       | 1015.80 | 169.903    |
| 7.8     | 465       | 979.20  | 170.463    |
| 7.8     | 470       | 942.40  | 170.986    |
| 7.9     | 475       | 906.40  | 171.464    |
| 8.0     | 480       | 871.40  | 171.891    |
| 8.1     | 485       | 837.40  | 172.268    |
| 8.2     | 490       | 804.60  | 172.594    |
| 8.3     | 495       | 773.00  | 172.870    |
| 8.3     | 500       | 742.50  | 173.096    |
| 8.4     | 505       | 713.20  | 173.276    |
| 8.5     | 510       | 685.00  | 173.416    |
| 8.6     | 515       | 657.90  | 173.521    |
| 8.7     | 520       | 631.90  | 173.595    |
| 8.8     | 525       | 606.90  | 173.643    |
| 8.8     | 530       | 582.90  | 173.670    |
| 8.9     | 535       | 560.00  | 173.679    |
| 9.0     | 540       | 538.10  | 173.674    |
| 9.1     | 545       | 517.30  | 173.658    |
| 9.2     | 550       | 497.40  | 173.632    |
| 9.3     | 555       | 478.50  | 173.599    |
| 9.3     | 560       | 460.40  | 173.561    |
| 9.4     | 565       | 443.20  | 173.519    |
| 9.5     | 570       | 426.90  | 173.472    |
| 9.6     | 575       | 411.30  | 173.423    |
| 9.7     | 580       | 396.50  | 173.371    |
| 9.8     | 585       | 382.40  | 173.318    |
| 9.8     | 590       | 368.90  | 173.263    |
| 9.9     | 595       | 356.10  | 173.208    |
| 10.0    | 600       | 344.00  | 173.153    |
| 10.1    | 605       | 332.40  | 173.098    |
| 10.2    | 610       | 321.40  | 173.044    |
| 10.3    | 615       | 310.90  | 172.990    |
| 10.3    | 620       | 300.90  | 172.936    |
| 10.4    | 625       | 291.40  | 172.881    |

| CAUDALES DE SALIDA [m³/s] |               |            |        | INCREMENTO | VOLUMEN DE |
|---------------------------|---------------|------------|--------|------------|------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL  | DE VOLUMEN | EMBALSE    |
|                           |               |            |        | [m³]       | [m³]       |
| 0.00                      | 0.00          | 93.98      | 93.98  | 150498.44  | 1118856    |
| 0.00                      | 0.00          | 97.72      | 97.72  | 167345.54  | 1286201    |
| 0.00                      | 0.00          | 101.36     | 101.36 | 185081.78  | 1471283    |
| 0.00                      | 0.00          | 104.87     | 104.87 | 203580.90  | 1674864    |
| 0.00                      | 0.00          | 108.24     | 108.24 | 222550.96  | 1897415    |
| 0.00                      | 0.00          | 111.48     | 111.48 | 241318.35  | 2138733    |
| 0.00                      | 0.00          | 114.60     | 114.60 | 259456.51  | 2398190    |
| 0.00                      | 0.00          | 117.62     | 117.62 | 276710.18  | 2674900    |
| 0.00                      | 0.00          | 120.53     | 120.53 | 292404.26  | 2967304    |
| 0.00                      | 0.00          | 123.33     | 123.33 | 306006.72  | 3273311    |
| 0.00                      | 0.00          | 126.05     | 126.05 | 317850.84  | 3591162    |
| 0.00                      | 0.00          | 128.67     | 128.67 | 328327.48  | 3919489    |
| 0.00                      | 0.00          | 131.19     | 131.19 | 337440.93  | 4256930    |
| 0.00                      | 0.00          | 133.62     | 133.62 | 345155.47  | 4602086    |
| 0.00                      | 0.00          | 135.97     | 135.97 | 351368.74  | 4953454    |
| 0.00                      | 0.00          | 138.24     | 138.24 | 356009.83  | 5309464    |
| 0.00                      | 0.00          | 140.42     | 140.42 | 359048.52  | 5668513    |
| 0.00                      | 0.00          | 142.51     | 142.51 | 360483.70  | 6028996    |
| 0.00                      | 0.00          | 144.52     | 144.52 | 360367.41  | 6389364    |
| 0.00                      | 0.00          | 146.45     | 146.45 | 358762.47  | 6748126    |
| 0.00                      | 0.00          | 148.29     | 148.29 | 355708.51  | 7103835    |
| 0.00                      | 0.00          | 150.04     | 150.04 | 351274.24  | 7455109    |
| 0.00                      | 0.00          | 151.71     | 151.71 | 345577.03  | 7800686    |
| 0.00                      | 0.00          | 153.29     | 153.29 | 338760.46  | 8139447    |
| 0.00                      | 0.00          | 154.80     | 154.80 | 330995.60  | 8470442    |
| 0.00                      | 0.00          | 156.23     | 156.23 | 322445.61  | 8792888    |
| 0.00                      | 0.00          | 157.58     | 157.58 | 313242.08  | 9106130    |
| 0.00                      | 0.00          | 158.86     | 158.86 | 303506.42  | 9409636    |
| 0.00                      | 0.00          | 160.07     | 160.07 | 293354.19  | 9702991    |
| 0.00                      | 0.00          | 161.20     | 161.20 | 282901.96  | 9985892    |
| 0.00                      | 0.00          | 162.28     | 162.28 | 272275.60  | 10258168   |
| 0.00                      | 18.41         | 163.27     | 181.68 | 258680.57  | 10516849   |
| 0.00                      | 53.12         | 164.18     | 217.30 | 239563.18  | 10756412   |
| 0.00                      | 94.52         | 164.98     | 259.51 | 216755.67  | 10973167   |
| 0.00                      | 138.37        | 165.69     | 304.06 | 192690.24  | 11165858   |
| 1.53                      | 181.43        | 166.30     | 349.26 | 168281.86  | 11334140   |
| 12.46                     | 221.43        | 166.81     | 400.70 | 143152.26  | 11477292   |
| 26.24                     | 256.52        | 167.23     | 449.99 | 118153.63  | 11595445   |
| 39.84                     | 285.92        | 167.57     | 493.32 | 94560.40   | 11690006   |
| 51.91                     | 309.66        | 167.83     | 529.39 | 73363.50   | 11763369   |
| 61.78                     | 327.95        | 168.02     | 557.74 | 55150.47   | 11818520   |
| 69.14                     | 341.09        | 168.16     | 578.39 | 39169.09   | 11857689   |
| 74.09                     | 349.72        | 168.24     | 592.06 | 25437.45   | 11883126   |
| 76.94                     | 354.62        | 168.29     | 599.85 | 14148.32   | 11897275   |
| 77.89                     | 356.25        | 168.31     | 602.46 | 4896.17    | 11902171   |
| 77.36                     | 355.34        | 168.30     | 601.01 | -2640.96   | 11899530   |
| 75.67                     | 352.44        | 168.27     | 596.38 | -8714.73   | 11890815   |
| 72.94                     | 347.74        | 168.22     | 588.91 | -13558.04  | 11877257   |
| 69.55                     | 341.81        | 168.16     | 579.52 | -17365.92  | 11859891   |
| 65.71                     | 335.03        | 168.09     | 568.83 | -20305.27  | 11839586   |
| 61.58                     | 327.60        | 168.02     | 557.19 | -22522.26  | 11817064   |
| 57.08                     | 319.36        | 167.93     | 544.37 | -24320.27  | 11792743   |
| 52.54                     | 310.86        | 167.84     | 531.24 | -25918.22  | 11766825   |
| 47.89                     | 301.94        | 167.74     | 517.58 | -27194.97  | 11739630   |
| 43.32                     | 292.96        | 167.64     | 503.93 | -28077.21  | 11711553   |
| 38.78                     | 283.75        | 167.54     | 490.08 | -28625.57  | 11682927   |
| 34.44                     | 274.66        | 167.44     | 476.54 | -28895.35  | 11654032   |
| 30.30                     | 265.69        | 167.34     | 463.33 | -28933.67  | 11625098   |
| 26.38                     | 256.84        | 167.24     | 450.45 | -28782.16  | 11596316   |
| 22.73                     | 248.26        | 167.14     | 438.13 | -28475.86  | 11567840   |
| 19.29                     | 239.80        | 167.04     | 426.13 | -28122.64  | 11539718   |
| 16.08                     | 231.46        | 166.94     | 414.48 | -28089.58  | 11511628   |
| 13.04                     | 223.09        | 166.83     | 402.96 | -28264.73  | 11483363   |



## Laminación de avenida T = 1.000 años

| TIEMPO  |           | CAUDAL  | COTA DE    |
|---------|-----------|---------|------------|
| [horas] | [minutos] | ENTRADA | EMBALSE    |
|         |           | [m³/s]  | [m.s.n.m.] |
| 10.5    | 630       | 282.30  | 172.827    |
| 10.6    | 635       | 273.70  | 172.773    |
| 10.7    | 640       | 265.50  | 172.719    |
| 10.8    | 645       | 257.60  | 172.666    |
| 10.8    | 650       | 250.20  | 172.614    |
| 10.9    | 655       | 243.00  | 172.562    |
| 11.0    | 660       | 236.20  | 172.512    |
| 11.1    | 665       | 229.70  | 172.462    |
| 11.2    | 670       | 223.40  | 172.412    |
| 11.3    | 675       | 217.40  | 172.361    |
| 11.3    | 680       | 211.70  | 172.311    |
| 11.4    | 685       | 206.20  | 172.260    |
| 11.5    | 690       | 200.90  | 172.210    |
| 11.6    | 695       | 195.90  | 172.161    |
| 11.7    | 700       | 191.00  | 172.111    |
| 11.8    | 705       | 186.40  | 172.063    |
| 11.8    | 710       | 181.90  | 172.015    |
| 11.9    | 715       | 177.60  | 171.967    |
| 12.0    | 720       | 173.40  | 171.919    |
| 12.1    | 725       | 169.40  | 171.872    |
| 12.2    | 730       | 165.60  | 171.825    |
| 12.3    | 735       | 161.90  | 171.778    |
| 12.3    | 740       | 158.40  | 171.732    |
| 12.4    | 745       | 155.00  | 171.686    |
| 12.5    | 750       | 151.70  | 171.641    |
| 12.6    | 755       | 148.60  | 171.597    |
| 12.7    | 760       | 145.50  | 171.553    |
| 12.8    | 765       | 142.60  | 171.510    |
| 12.8    | 770       | 139.80  | 171.467    |
| 12.9    | 775       | 137.10  | 171.425    |
| 13.0    | 780       | 134.40  | 171.382    |
| 13.1    | 785       | 131.90  | 171.340    |
| 13.2    | 790       | 129.40  | 171.298    |
| 13.3    | 795       | 127.00  | 171.256    |
| 13.3    | 800       | 124.70  | 171.215    |
| 13.4    | 805       | 122.50  | 171.174    |
| 13.5    | 810       | 120.30  | 171.134    |
| 13.6    | 815       | 118.30  | 171.094    |
| 13.7    | 820       | 116.30  | 171.055    |
| 13.8    | 825       | 114.30  | 171.016    |
| 13.8    | 830       | 112.50  | 170.977    |
| 13.9    | 835       | 110.60  | 170.938    |
| 14.0    | 840       | 108.90  | 170.899    |
| 14.1    | 845       | 107.20  | 170.859    |
| 14.2    | 850       | 105.50  | 170.819    |
| 14.3    | 855       | 103.90  | 170.780    |
| 14.3    | 860       | 102.30  | 170.740    |
| 14.4    | 865       | 100.80  | 170.700    |
| 14.5    | 870       | 99.30   | 170.660    |
| 14.6    | 875       | 97.90   | 170.621    |
| 14.7    | 880       | 96.50   | 170.581    |
| 14.8    | 885       | 95.10   | 170.541    |
| 14.8    | 890       | 93.80   | 170.502    |
| 14.9    | 895       | 92.50   | 170.462    |
| 15.0    | 900       | 91.30   | 170.421    |
| 15.1    | 905       | 90.00   | 170.379    |
| 15.2    | 910       | 88.80   | 170.336    |
| 15.3    | 915       | 87.60   | 170.293    |
| 15.3    | 920       | 86.50   | 170.249    |
| 15.4    | 925       | 85.40   | 170.204    |
| 15.5    | 930       | 84.30   | 170.159    |
| 15.6    | 935       | 83.20   | 170.113    |
| 15.7    | 940       | 82.10   | 170.066    |

| CAUDALES DE SALIDA [m³/s] |               |            |        | INCREMENTO | VOLUMEN DE |
|---------------------------|---------------|------------|--------|------------|------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL  | DE VOLUMEN | EMBALSE    |
|                           |               |            |        | [m³]       | [m³]       |
| 10.29                     | 214.99        | 166.73     | 392.01 | -28275.13  | 11455088   |
| 7.79                      | 207.01        | 166.63     | 381.43 | -28146.00  | 11426942   |
| 5.55                      | 199.15        | 166.53     | 371.23 | -27898.94  | 11399043   |
| 3.64                      | 191.55        | 166.43     | 361.62 | -27551.03  | 11371492   |
| 2.05                      | 184.22        | 166.34     | 352.61 | -27118.46  | 11344374   |
| 0.82                      | 177.00        | 166.24     | 344.05 | -26617.34  | 11317757   |
| 0.07                      | 170.16        | 166.15     | 336.38 | -26061.86  | 11291695   |
| 0.00                      | 163.43        | 166.05     | 329.49 | -25785.19  | 11265910   |
| 0.00                      | 156.82        | 165.96     | 322.78 | -25871.65  | 11240038   |
| 0.00                      | 150.18        | 165.86     | 316.04 | -25969.55  | 11214068   |
| 0.00                      | 143.78        | 165.77     | 309.55 | -25975.68  | 11188093   |
| 0.00                      | 137.37        | 165.68     | 303.05 | -25901.86  | 11162191   |
| 0.00                      | 131.20        | 165.58     | 296.78 | -25758.71  | 11136432   |
| 0.00                      | 125.26        | 165.49     | 290.75 | -25555.83  | 11110876   |
| 0.00                      | 119.31        | 165.40     | 284.71 | -25301.52  | 11085575   |
| 0.00                      | 113.71        | 165.31     | 279.02 | -25001.92  | 11060573   |
| 0.00                      | 108.22        | 165.22     | 273.43 | -24662.93  | 11035910   |
| 0.00                      | 102.83        | 165.13     | 267.96 | -24396.85  | 11011513   |
| 0.00                      | 97.55         | 165.04     | 262.59 | -24248.39  | 10987265   |
| 0.00                      | 92.49         | 164.95     | 257.44 | -24105.64  | 10963159   |
| 0.00                      | 87.53         | 164.86     | 252.39 | -23922.91  | 10939236   |
| 0.00                      | 82.68         | 164.77     | 247.45 | -23703.30  | 10915533   |
| 0.00                      | 78.04         | 164.68     | 242.73 | -23449.67  | 10892083   |
| 0.00                      | 73.50         | 164.60     | 238.10 | -23165.84  | 10868917   |
| 0.00                      | 69.17         | 164.51     | 233.68 | -22855.46  | 10846062   |
| 0.00                      | 65.03         | 164.43     | 229.46 | -22522.64  | 10823539   |
| 0.00                      | 60.98         | 164.35     | 225.33 | -22171.55  | 10801368   |
| 0.00                      | 57.13         | 164.27     | 221.40 | -21804.72  | 10779563   |
| 0.00                      | 53.37         | 164.19     | 217.56 | -21543.50  | 10758019   |
| 0.00                      | 49.80         | 164.11     | 213.91 | -21421.11  | 10736598   |
| 0.00                      | 46.24         | 164.02     | 210.26 | -21311.42  | 10715287   |
| 0.00                      | 42.86         | 163.94     | 206.80 | -21177.79  | 10694109   |
| 0.00                      | 39.57         | 163.87     | 203.44 | -21023.53  | 10673086   |
| 0.00                      | 36.39         | 163.79     | 200.17 | -20850.17  | 10652235   |
| 0.00                      | 33.37         | 163.71     | 197.08 | -20658.72  | 10631577   |
| 0.00                      | 30.46         | 163.63     | 194.09 | -20450.97  | 10611126   |
| 0.00                      | 27.71         | 163.55     | 191.27 | -20228.41  | 10590897   |
| 0.00                      | 25.06         | 163.48     | 188.54 | -19992.68  | 10570905   |
| 0.00                      | 22.57         | 163.41     | 185.98 | -19745.56  | 10551159   |
| 0.00                      | 20.18         | 163.33     | 183.51 | -19487.66  | 10531671   |
| 0.00                      | 17.89         | 163.26     | 181.14 | -19336.25  | 10512335   |
| 0.00                      | 15.69         | 163.18     | 178.88 | -19370.06  | 10492965   |
| 0.00                      | 13.61         | 163.11     | 176.72 | -19466.49  | 10473499   |
| 0.00                      | 11.58         | 163.03     | 174.61 | -19542.76  | 10453956   |
| 0.00                      | 9.67          | 162.96     | 172.63 | -19600.76  | 10434355   |
| 0.00                      | 7.93          | 162.88     | 170.81 | -19641.14  | 10414714   |
| 0.00                      | 6.27          | 162.81     | 169.08 | -19664.47  | 10395049   |
| 0.00                      | 4.76          | 162.73     | 167.49 | -19672.10  | 10375377   |
| 0.00                      | 3.39          | 162.65     | 166.05 | -19665.28  | 10355712   |
| 0.00                      | 2.23          | 162.58     | 164.81 | -19645.49  | 10336067   |
| 0.00                      | 1.22          | 162.50     | 163.72 | -19614.13  | 10316452   |
| 0.00                      | 0.44          | 162.43     | 162.86 | -19571.55  | 10296881   |
| 0.00                      | 0.00          | 162.35     | 162.36 | -19517.99  | 10277363   |
| 0.00                      | 0.00          | 162.28     | 162.28 | -19669.66  | 10257693   |
| 0.00                      | 0.00          | 162.20     | 162.20 | -20037.74  | 10237656   |
| 0.00                      | 0.00          | 162.12     | 162.12 | -20407.01  | 10217249   |
| 0.00                      | 0.00          | 162.03     | 162.03 | -20766.87  | 10196482   |
| 0.00                      | 0.00          | 161.95     | 161.95 | -21117.20  | 10175364   |
| 0.00                      | 0.00          | 161.87     | 161.87 | -21457.83  | 10153907   |
| 0.00                      | 0.00          | 161.78     | 161.78 | -21789.26  | 10132117   |
| 0.00                      | 0.00          | 161.70     | 161.70 | -22111.95  | 10110005   |
| 0.00                      | 0.00          | 161.61     | 161.61 | -22426.63  | 10087579   |
| 0.00                      | 0.00          | 161.52     | 161.52 | -22734.02  | 10064845   |



## Laminación de avenida T = 1.000 años

| TIEMPO  |           | CAUDAL  | COTA DE    |
|---------|-----------|---------|------------|
| [horas] | [minutos] | ENTRADA | EMBALSE    |
|         |           | [m³/s]  | [m.s.n.m.] |
| 15.8    | 945       | 81.10   | 170.019    |
| 15.8    | 950       | 80.10   | 169.971    |
| 15.9    | 955       | 79.10   | 169.922    |
| 16.0    | 960       | 78.10   | 169.872    |
| 16.1    | 965       | 77.20   | 169.822    |
| 16.2    | 970       | 76.30   | 169.772    |
| 16.3    | 975       | 75.30   | 169.720    |
| 16.3    | 980       | 74.40   | 169.669    |
| 16.4    | 985       | 73.60   | 169.616    |
| 16.5    | 990       | 72.70   | 169.564    |
| 16.6    | 995       | 71.80   | 169.510    |
| 16.7    | 1000      | 71.00   | 169.456    |
| 16.8    | 1005      | 70.10   | 169.401    |
| 16.8    | 1010      | 69.20   | 169.346    |
| 16.9    | 1015      | 68.20   | 169.290    |
| 17.0    | 1020      | 67.10   | 169.234    |
| 17.1    | 1025      | 65.90   | 169.177    |
| 17.2    | 1030      | 64.70   | 169.119    |
| 17.3    | 1035      | 63.50   | 169.061    |
| 17.3    | 1040      | 62.20   | 169.003    |
| 17.4    | 1045      | 60.90   | 168.942    |
| 17.5    | 1050      | 59.50   | 168.881    |
| 17.6    | 1055      | 58.10   | 168.820    |
| 17.7    | 1060      | 56.60   | 168.757    |
| 17.8    | 1065      | 55.10   | 168.694    |
| 17.8    | 1070      | 53.40   | 168.630    |
| 17.9    | 1075      | 51.70   | 168.565    |
| 18.0    | 1080      | 49.90   | 168.499    |
| 18.1    | 1085      | 48.00   | 168.431    |
| 18.2    | 1090      | 46.10   | 168.362    |
| 18.3    | 1095      | 44.20   | 168.292    |
| 18.3    | 1100      | 42.30   | 168.221    |
| 18.4    | 1105      | 40.40   | 168.149    |
| 18.5    | 1110      | 38.40   | 168.076    |
| 18.6    | 1115      | 36.50   | 168.001    |
| 18.7    | 1120      | 34.60   | 167.925    |
| 18.8    | 1125      | 32.70   | 167.847    |
| 18.8    | 1130      | 30.90   | 167.768    |
| 18.9    | 1135      | 29.10   | 167.688    |
| 19.0    | 1140      | 27.40   | 167.607    |
| 19.1    | 1145      | 25.70   | 167.525    |
| 19.2    | 1150      | 24.10   | 167.441    |
| 19.3    | 1155      | 22.60   | 167.356    |
| 19.3    | 1160      | 21.10   | 167.269    |
| 19.4    | 1165      | 19.70   | 167.182    |
| 19.5    | 1170      | 18.40   | 167.094    |
| 19.6    | 1175      | 17.10   | 167.005    |
| 19.7    | 1180      | 15.90   | 166.914    |
| 19.8    | 1185      | 14.80   | 166.823    |
| 19.8    | 1190      | 13.70   | 166.730    |
| 19.9    | 1195      | 12.70   | 166.637    |
| 20.0    | 1200      | 11.80   | 166.544    |
| 20.1    | 1205      | 10.90   | 166.449    |
| 20.2    | 1210      | 10.10   | 166.353    |
| 20.3    | 1215      | 9.40    | 166.257    |
| 20.3    | 1220      | 8.70    | 166.160    |
| 20.4    | 1225      | 8.00    | 166.063    |
| 20.5    | 1230      | 7.40    | 165.965    |
| 20.6    | 1235      | 6.90    | 165.866    |
| 20.7    | 1240      | 6.30    | 165.767    |
| 20.8    | 1245      | 5.90    | 165.667    |
| 20.8    | 1250      | 5.40    | 165.568    |
| 20.9    | 1255      | 5.00    | 165.467    |

| CAUDALES DE SALIDA [m³/s] |               |            |        | INCREMENTO | VOLUMEN DE |
|---------------------------|---------------|------------|--------|------------|------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL  | DE VOLUMEN | EMBALSE    |
|                           |               |            |        | [m³]       | [m³]       |
| 0.00                      | 0.00          | 161.43     | 161.43 | -23033.86  | 10041811   |
| 0.00                      | 0.00          | 161.33     | 161.33 | -23325.82  | 10018485   |
| 0.00                      | 0.00          | 161.24     | 161.24 | -23610.13  | 9994875    |
| 0.00                      | 0.00          | 161.14     | 161.14 | -23887.36  | 9970988    |
| 0.00                      | 0.00          | 161.05     | 161.05 | -24158.28  | 9946829    |
| 0.00                      | 0.00          | 160.95     | 160.95 | -24423.41  | 9922406    |
| 0.00                      | 0.00          | 160.85     | 160.85 | -24682.45  | 9897723    |
| 0.00                      | 0.00          | 160.75     | 160.75 | -24935.17  | 9872788    |
| 0.00                      | 0.00          | 160.65     | 160.65 | -25181.84  | 9847606    |
| 0.00                      | 0.00          | 160.55     | 160.55 | -25422.75  | 9822184    |
| 0.00                      | 0.00          | 160.45     | 160.45 | -25658.42  | 9796525    |
| 0.00                      | 0.00          | 160.34     | 160.34 | -25889.03  | 9770636    |
| 0.00                      | 0.00          | 160.24     | 160.24 | -26114.21  | 9744522    |
| 0.00                      | 0.00          | 160.13     | 160.13 | -26337.09  | 9718185    |
| 0.00                      | 0.00          | 160.02     | 160.02 | -26564.33  | 9691621    |
| 0.00                      | 0.00          | 159.91     | 159.91 | -26802.60  | 9664818    |
| 0.00                      | 0.00          | 159.80     | 159.80 | -27060.10  | 9637758    |
| 0.00                      | 0.00          | 159.69     | 159.69 | -27342.73  | 9610415    |
| 0.00                      | 0.00          | 159.58     | 159.58 | -27647.66  | 9582768    |
| 0.00                      | 0.00          | 159.46     | 159.46 | -27967.74  | 9554800    |
| 0.00                      | 0.00          | 159.34     | 159.34 | -28298.87  | 9526501    |
| 0.00                      | 0.00          | 159.23     | 159.23 | -28639.25  | 9497862    |
| 0.00                      | 0.00          | 159.11     | 159.11 | -28989.97  | 9468872    |
| 0.00                      | 0.00          | 158.98     | 158.98 | -29354.26  | 9439517    |
| 0.00                      | 0.00          | 158.86     | 158.86 | -29733.67  | 9409784    |
| 0.00                      | 0.00          | 158.74     | 158.74 | -30132.07  | 9379652    |
| 0.00                      | 0.00          | 158.61     | 158.61 | -30554.16  | 9349098    |
| 0.00                      | 0.00          | 158.48     | 158.48 | -31000.99  | 9318097    |
| 0.00                      | 0.00          | 158.35     | 158.35 | -31470.55  | 9286626    |
| 0.00                      | 0.00          | 158.21     | 158.21 | -31959.91  | 9254666    |
| 0.00                      | 0.00          | 158.07     | 158.07 | -32465.83  | 9222200    |
| 0.00                      | 0.00          | 157.94     | 157.94 | -32984.43  | 9189216    |
| 0.00                      | 0.00          | 157.79     | 157.79 | -33512.02  | 9155704    |
| 0.00                      | 0.00          | 157.65     | 157.65 | -34045.15  | 9121659    |
| 0.00                      | 0.00          | 157.50     | 157.50 | -34580.71  | 9087078    |
| 0.00                      | 0.00          | 157.35     | 157.35 | -35115.57  | 9051962    |
| 0.00                      | 0.00          | 157.20     | 157.20 | -35646.91  | 9016315    |
| 0.00                      | 0.00          | 157.04     | 157.04 | -36172.25  | 8980143    |
| 0.00                      | 0.00          | 156.89     | 156.89 | -36689.07  | 8943454    |
| 0.00                      | 0.00          | 156.73     | 156.73 | -37195.17  | 8906259    |
| 0.00                      | 0.00          | 156.56     | 156.56 | -37688.50  | 8868570    |
| 0.00                      | 0.00          | 156.40     | 156.40 | -38166.60  | 8830404    |
| 0.00                      | 0.00          | 156.23     | 156.23 | -38627.20  | 8791777    |
| 0.00                      | 0.00          | 156.06     | 156.06 | -39068.67  | 8752708    |
| 0.00                      | 0.00          | 155.88     | 155.88 | -39489.69  | 8713218    |
| 0.00                      | 0.00          | 155.71     | 155.71 | -39889.52  | 8673329    |
| 0.00                      | 0.00          | 155.53     | 155.53 | -40267.85  | 8633061    |
| 0.00                      | 0.00          | 155.35     | 155.35 | -40624.04  | 8592437    |
| 0.00                      | 0.00          | 155.17     | 155.17 | -40957.90  | 8551479    |
| 0.00                      | 0.00          | 154.98     | 154.98 | -41270.01  | 8510209    |
| 0.00                      | 0.00          | 154.79     | 154.79 | -41560.76  | 8468648    |
| 0.00                      | 0.00          | 154.61     | 154.61 | -41830.76  | 8426817    |
| 0.00                      | 0.00          | 154.42     | 154.42 | -42080.40  | 8384737    |
| 0.00                      | 0.00          | 154.22     | 154.22 | -42310.16  | 8342427    |
| 0.00                      | 0.00          | 154.03     | 154.03 | -42520.81  | 8299906    |
| 0.00                      | 0.00          | 153.84     | 153.84 | -42713.19  | 8257193    |
| 0.00                      | 0.00          | 153.64     | 153.64 | -42888.35  | 8214305    |
| 0.00                      | 0.00          | 153.44     | 153.44 | -43047.03  | 8171258    |
| 0.00                      | 0.00          | 153.24     | 153.24 | -43189.69  | 8128068    |
| 0.00                      | 0.00          | 153.04     | 153.04 | -43317.47  | 8084750    |
| 0.00                      | 0.00          | 152.84     | 152.84 | -43431.61  | 8041319    |
| 0.00                      | 0.00          | 152.64     | 152.64 | -43532.96  | 7997786    |
| 0.00                      | 0.00          | 152.43     | 152.43 | -43622.26  | 7954164    |

## Laminación de avenida T = 1.000 años

| TIEMPO  |           | CAUDAL  | COTA DE    |
|---------|-----------|---------|------------|
| [horas] | [minutos] | ENTRADA | EMBALSE    |
|         |           | [m³/s]  | [m.s.n.m.] |
| 21.0    | 1260      | 4.60    | 165.366    |
| 21.1    | 1265      | 4.30    | 165.264    |
| 21.2    | 1270      | 3.90    | 165.163    |
| 21.3    | 1275      | 3.60    | 165.061    |
| 21.3    | 1280      | 3.30    | 164.958    |
| 21.4    | 1285      | 3.10    | 164.855    |
| 21.5    | 1290      | 2.80    | 164.752    |
| 21.6    | 1295      | 2.60    | 164.649    |
| 21.7    | 1300      | 2.40    | 164.545    |
| 21.8    | 1305      | 2.20    | 164.441    |
| 21.8    | 1310      | 2.00    | 164.337    |
| 21.9    | 1315      | 1.90    | 164.232    |
| 22.0    | 1320      | 1.70    | 164.127    |
| 22.1    | 1325      | 1.60    | 164.023    |
| 22.2    | 1330      | 1.50    | 163.917    |
| 22.3    | 1335      | 1.30    | 163.811    |
| 22.3    | 1340      | 1.20    | 163.706    |
| 22.4    | 1345      | 1.10    | 163.600    |
| 22.5    | 1350      | 1.00    | 163.494    |
| 22.6    | 1355      | 1.00    | 163.387    |
| 22.7    | 1360      | 0.90    | 163.281    |
| 22.8    | 1365      | 0.80    | 163.174    |
| 22.8    | 1370      | 0.70    | 163.067    |
| 22.9    | 1375      | 0.70    | 162.960    |
| 23.0    | 1380      | 0.60    | 162.852    |
| 23.1    | 1385      | 0.60    | 162.745    |
| 23.2    | 1390      | 0.50    | 162.637    |
| 23.3    | 1395      | 0.50    | 162.530    |
| 23.3    | 1400      | 0.40    | 162.422    |
| 23.4    | 1405      | 0.40    | 162.313    |
| 23.5    | 1410      | 0.40    | 162.205    |
| 23.6    | 1415      | 0.30    | 162.096    |
| 23.7    | 1420      | 0.30    | 161.988    |
| 23.8    | 1425      | 0.30    | 161.878    |
| 23.8    | 1430      | 0.20    | 161.769    |
| 23.9    | 1435      | 0.20    | 161.660    |
| 24.0    | 1440      | 0.20    | 161.551    |
| 24.1    | 1445      | 0.20    | 161.441    |
| 24.2    | 1450      | 0.20    | 161.331    |
| 24.3    | 1455      | 0.10    | 161.221    |
| 24.3    | 1460      | 0.10    | 161.111    |
| 24.4    | 1465      | 0.10    | 161.001    |
| 24.5    | 1470      | 0.10    | 160.890    |
| 24.6    | 1475      | 0.10    | 160.779    |
| 24.7    | 1480      | 0.10    | 160.669    |
| 24.8    | 1485      | 0.10    | 160.558    |
| 24.8    | 1490      | 0.10    | 160.447    |
| 24.9    | 1495      | 0.10    | 160.335    |
| 25.0    | 1500      | 0.10    | 160.223    |
| 25.1    | 1505      | 0.00    | 160.112    |
| 25.2    | 1510      | 0.00    | 160.000    |
| 25.3    | 1515      | 0.00    | 159.888    |
| 25.3    | 1520      | 0.00    | 159.775    |
| 25.4    | 1525      | 0.00    | 159.663    |
| 25.5    | 1530      | 0.00    | 159.550    |
| 25.6    | 1535      | 0.00    | 159.437    |
| 25.7    | 1540      | 0.00    | 159.324    |
| 25.8    | 1545      | 0.00    | 159.211    |
| 25.8    | 1550      | 0.00    | 159.097    |
| 25.9    | 1555      | 0.00    | 158.984    |
| 26.0    | 1560      | 0.00    | 158.870    |
| 26.1    | 1565      | 0.00    | 158.756    |
| 26.2    | 1570      | 0.00    | 158.642    |

| CAUDALES DE SALIDA [m³/s] |               |            |        | INCREMENTO | VOLUMEN DE |
|---------------------------|---------------|------------|--------|------------|------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL  | DE VOLUMEN | EMBALSE    |
|                           |               |            |        | [m³]       | [m³]       |
| 0.00                      | 0.00          | 152.23     | 152.23 | -43699.94  | 7910464    |
| 0.00                      | 0.00          | 152.02     | 152.02 | -43766.93  | 7866697    |
| 0.00                      | 0.00          | 151.81     | 151.81 | -43824.37  | 7822872    |
| 0.00                      | 0.00          | 151.60     | 151.60 | -43872.81  | 7778999    |
| 0.00                      | 0.00          | 151.39     | 151.39 | -43912.72  | 7735087    |
| 0.00                      | 0.00          | 151.18     | 151.18 | -43944.51  | 7691142    |
| 0.00                      | 0.00          | 150.97     | 150.97 | -43968.91  | 7647173    |
| 0.00                      | 0.00          | 150.76     | 150.76 | -43986.66  | 7603187    |
| 0.00                      | 0.00          | 150.55     | 150.55 | -43998.25  | 7559188    |
| 0.00                      | 0.00          | 150.33     | 150.33 | -44003.68  | 7515185    |
| 0.00                      | 0.00          | 150.12     | 150.12 | -44003.07  | 7471182    |
| 0.00                      | 0.00          | 149.90     | 149.90 | -43997.31  | 7427184    |
| 0.00                      | 0.00          | 149.68     | 149.68 | -43987.03  | 7383197    |
| 0.00                      | 0.00          | 149.47     | 149.47 | -43972.62  | 7339225    |
| 0.00                      | 0.00          | 149.25     | 149.25 | -43953.75  | 7295271    |
| 0.00                      | 0.00          | 149.03     | 149.03 | -43930.55  | 7251340    |
| 0.00                      | 0.00          | 148.81     | 148.81 | -43903.88  | 7207437    |
| 0.00                      | 0.00          | 148.59     | 148.59 | -43874.18  | 7163562    |
| 0.00                      | 0.00          | 148.36     | 148.36 | -43841.67  | 7119721    |
| 0.00                      | 0.00          | 148.14     | 148.14 | -43805.81  | 7075915    |
| 0.00                      | 0.00          | 147.92     | 147.92 | -43766.84  | 7032148    |
| 0.00                      | 0.00          | 147.69     | 147.69 | -43725.66  | 6988422    |
| 0.00                      | 0.00          | 147.47     | 147.47 | -43682.47  | 6944740    |
| 0.00                      | 0.00          | 147.24     | 147.24 | -43637.28  | 6901103    |
| 0.00                      | 0.00          | 147.02     | 147.02 | -43589.96  | 6857513    |
| 0.00                      | 0.00          | 146.79     | 146.79 | -43540.81  | 6813972    |
| 0.00                      | 0.00          | 146.56     | 146.56 | -43490.24  | 6770482    |
| 0.00                      | 0.00          | 146.34     | 146.34 | -43438.36  | 6727043    |
| 0.00                      | 0.00          | 146.11     | 146.11 | -43384.75  | 6683659    |
| 0.00                      | 0.00          | 145.88     | 145.88 | -43329.29  | 6640329    |
| 0.00                      | 0.00          | 145.65     | 145.65 | -43272.61  | 6597057    |
| 0.00                      | 0.00          | 145.41     | 145.41 | -43215.03  | 6553842    |
| 0.00                      | 0.00          | 145.18     | 145.18 | -43156.51  | 6510685    |
| 0.00                      | 0.00          | 144.95     | 144.95 | -43096.42  | 6467589    |
| 0.00                      | 0.00          | 144.71     | 144.71 | -43034.89  | 6424554    |
| 0.00                      | 0.00          | 144.48     | 144.48 | -42972.72  | 6381581    |
| 0.00                      | 0.00          | 144.25     | 144.25 | -42909.97  | 6338671    |
| 0.00                      | 0.00          | 144.01     | 144.01 | -42846.20  | 6295825    |
| 0.00                      | 0.00          | 143.77     | 143.77 | -42781.11  | 6253044    |
| 0.00                      | 0.00          | 143.54     | 143.54 | -42715.17  | 6210329    |
| 0.00                      | 0.00          | 143.30     | 143.30 | -42648.80  | 6167680    |
| 0.00                      | 0.00          | 143.06     | 143.06 | -42582.06  | 6125098    |
| 0.00                      | 0.00          | 142.82     | 142.82 | -42514.12  | 6082584    |
| 0.00                      | 0.00          | 142.58     | 142.58 | -42445.02  | 6040139    |
| 0.00                      | 0.00          | 142.34     | 142.34 | -42375.64  | 5997763    |
| 0.00                      | 0.00          | 142.10     | 142.10 | -42306.02  | 5955457    |
| 0.00                      | 0.00          | 141.85     | 141.85 | -42235.97  | 5913221    |
| 0.00                      | 0.00          | 141.61     | 141.61 | -42165.20  | 5871056    |
| 0.00                      | 0.00          | 141.36     | 141.36 | -42094.04  | 5828962    |
| 0.00                      | 0.00          | 141.12     | 141.12 | -42022.80  | 5786939    |
| 0.00                      | 0.00          | 140.87     | 140.87 | -41951.56  | 5744987    |
| 0.00                      | 0.00          | 140.63     | 140.63 | -41879.05  | 5703108    |
| 0.00                      | 0.00          | 140.38     | 140.38 | -41805.24  | 5661303    |
| 0.00                      | 0.00          | 140.13     | 140.13 | -41731.36  | 5619572    |
| 0.00                      | 0.00          | 139.88     | 139.88 | -41657.41  | 5577914    |
| 0.00                      | 0.00          | 139.63     | 139.63 | -41583.05  | 5536331    |
| 0.00                      | 0.00          | 139.38     | 139.38 | -41508.10  | 5494823    |
| 0.00                      | 0.00          | 139.13     | 139.13 | -41432.85  | 5453390    |
| 0.00                      | 0.00          | 138.87     | 138.87 | -41357.60  | 5412033    |
| 0.00                      | 0.00          | 138.62     | 138.62 | -41282.24  | 5370750    |
| 0.00                      | 0.00          | 138.36     | 138.36 | -41206.00  | 5329544    |
| 0.00                      | 0.00          | 138.11     | 138.11 | -41129.11  | 5288415    |
| 0.00                      | 0.00          | 137.85     | 137.85 | -41052.27  | 5247363    |

## Laminación de avenida T = 1.000 años

| TIEMPO  |           | CAUDAL  | COTÁ DE    |
|---------|-----------|---------|------------|
| [horas] | [minutos] | ENTRADA | EMBALSE    |
|         |           | [m³/s]  | [m.s.n.m.] |
| 26.3    | 1575      | 0.00    | 158.528    |
| 26.3    | 1580      | 0.00    | 158.413    |
| 26.4    | 1585      | 0.00    | 158.298    |
| 26.5    | 1590      | 0.00    | 158.183    |
| 26.6    | 1595      | 0.00    | 158.068    |
| 26.7    | 1600      | 0.00    | 157.953    |
| 26.8    | 1605      | 0.00    | 157.837    |
| 26.8    | 1610      | 0.00    | 157.721    |
| 26.9    | 1615      | 0.00    | 157.605    |
| 27.0    | 1620      | 0.00    | 157.490    |
| 27.1    | 1625      | 0.00    | 157.373    |
| 27.2    | 1630      | 0.00    | 157.256    |
| 27.3    | 1635      | 0.00    | 157.139    |
| 27.3    | 1640      | 0.00    | 157.023    |
| 27.4    | 1645      | 0.00    | 156.906    |
| 27.5    | 1650      | 0.00    | 156.788    |
| 27.6    | 1655      | 0.00    | 156.670    |
| 27.7    | 1660      | 0.00    | 156.553    |
| 27.8    | 1665      | 0.00    | 156.435    |
| 27.8    | 1670      | 0.00    | 156.317    |
| 27.9    | 1675      | 0.00    | 156.198    |
| 28.0    | 1680      | 0.00    | 156.080    |
| 28.1    | 1685      | 0.00    | 155.961    |
| 28.2    | 1690      | 0.00    | 155.842    |
| 28.3    | 1695      | 0.00    | 155.722    |
| 28.3    | 1700      | 0.00    | 155.603    |
| 28.4    | 1705      | 0.00    | 155.483    |
| 28.5    | 1710      | 0.00    | 155.362    |
| 28.6    | 1715      | 0.00    | 155.240    |
| 28.7    | 1720      | 0.00    | 155.119    |
| 28.8    | 1725      | 0.00    | 154.999    |
| 28.8    | 1730      | 0.00    | 154.876    |
| 28.9    | 1735      | 0.00    | 154.753    |
| 29.0    | 1740      | 0.00    | 154.631    |
| 29.1    | 1745      | 0.00    | 154.509    |
| 29.2    | 1750      | 0.00    | 154.385    |
| 29.3    | 1755      | 0.00    | 154.261    |
| 29.3    | 1760      | 0.00    | 154.137    |
| 29.4    | 1765      | 0.00    | 154.013    |
| 29.5    | 1770      | 0.00    | 153.888    |
| 29.6    | 1775      | 0.00    | 153.763    |
| 29.7    | 1780      | 0.00    | 153.638    |
| 29.8    | 1785      | 0.00    | 153.513    |
| 29.8    | 1790      | 0.00    | 153.386    |
| 29.9    | 1795      | 0.00    | 153.259    |
| 30.0    | 1800      | 0.00    | 153.133    |
| 30.1    | 1805      | 0.00    | 153.007    |
| 30.2    | 1810      | 0.00    | 152.878    |
| 30.3    | 1815      | 0.00    | 152.750    |
| 30.3    | 1820      | 0.00    | 152.622    |
| 30.4    | 1825      | 0.00    | 152.495    |
| 30.5    | 1830      | 0.00    | 152.365    |
| 30.6    | 1835      | 0.00    | 152.236    |
| 30.7    | 1840      | 0.00    | 152.107    |
| 30.8    | 1845      | 0.00    | 151.978    |
| 30.8    | 1850      | 0.00    | 151.846    |
| 30.9    | 1855      | 0.00    | 151.715    |
| 31.0    | 1860      | 0.00    | 151.584    |
| 31.1    | 1865      | 0.00    | 151.453    |
| 31.2    | 1870      | 0.00    | 151.319    |
| 31.3    | 1875      | 0.00    | 151.186    |
| 31.3    | 1880      | 0.00    | 151.053    |
| 31.4    | 1885      | 0.00    | 150.918    |

| CAUDALES DE SALIDA [m3/s] |               |            |        | INCREMENTO | VOLUMEN DE |
|---------------------------|---------------|------------|--------|------------|------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL  | DE VOLUMEN | EMBALSE    |
|                           |               |            |        | [m³]       | [m³]       |
| 0.00                      | 0.00          | 137.60     | 137.60 | -40975.38  | 5206388    |
| 0.00                      | 0.00          | 137.34     | 137.34 | -40897.86  | 5165490    |
| 0.00                      | 0.00          | 137.08     | 137.08 | -40819.50  | 5124670    |
| 0.00                      | 0.00          | 136.82     | 136.82 | -40741.02  | 5083929    |
| 0.00                      | 0.00          | 136.55     | 136.55 | -40662.67  | 5043267    |
| 0.00                      | 0.00          | 136.29     | 136.29 | -40584.04  | 5002683    |
| 0.00                      | 0.00          | 136.03     | 136.03 | -40504.59  | 4962178    |
| 0.00                      | 0.00          | 135.76     | 135.76 | -40424.68  | 4921753    |
| 0.00                      | 0.00          | 135.50     | 135.50 | -40344.94  | 4881408    |
| 0.00                      | 0.00          | 135.24     | 135.24 | -40265.20  | 4841143    |
| 0.00                      | 0.00          | 134.97     | 134.97 | -40184.29  | 4800959    |
| 0.00                      | 0.00          | 134.70     | 134.70 | -40102.30  | 4760857    |
| 0.00                      | 0.00          | 134.43     | 134.43 | -40020.48  | 4720836    |
| 0.00                      | 0.00          | 134.16     | 134.16 | -39938.82  | 4680897    |
| 0.00                      | 0.00          | 133.89     | 133.89 | -39856.78  | 4641041    |
| 0.00                      | 0.00          | 133.62     | 133.62 | -39774.24  | 4601266    |
| 0.00                      | 0.00          | 133.34     | 133.34 | -39691.75  | 4561575    |
| 0.00                      | 0.00          | 133.07     | 133.07 | -39609.41  | 4521965    |
| 0.00                      | 0.00          | 132.79     | 132.79 | -39526.69  | 4482438    |
| 0.00                      | 0.00          | 132.52     | 132.52 | -39443.08  | 4442995    |
| 0.00                      | 0.00          | 132.24     | 132.24 | -39359.18  | 4403636    |
| 0.00                      | 0.00          | 131.96     | 131.96 | -39275.47  | 4364361    |
| 0.00                      | 0.00          | 131.68     | 131.68 | -39191.54  | 4325169    |
| 0.00                      | 0.00          | 131.40     | 131.40 | -39106.64  | 4286063    |
| 0.00                      | 0.00          | 131.12     | 131.12 | -39021.14  | 4247041    |
| 0.00                      | 0.00          | 130.84     | 130.84 | -38935.81  | 4208106    |
| 0.00                      | 0.00          | 130.55     | 130.55 | -38850.48  | 4169255    |
| 0.00                      | 0.00          | 130.26     | 130.26 | -38764.06  | 4130491    |
| 0.00                      | 0.00          | 129.97     | 129.97 | -38676.69  | 4091814    |
| 0.00                      | 0.00          | 129.69     | 129.69 | -38589.52  | 4053225    |
| 0.00                      | 0.00          | 129.40     | 129.40 | -38502.54  | 4014722    |
| 0.00                      | 0.00          | 129.10     | 129.10 | -38414.08  | 3976308    |
| 0.00                      | 0.00          | 128.81     | 128.81 | -38324.19  | 3937984    |
| 0.00                      | 0.00          | 128.51     | 128.51 | -38234.51  | 3899750    |
| 0.00                      | 0.00          | 128.22     | 128.22 | -38145.03  | 3861604    |
| 0.00                      | 0.00          | 127.92     | 127.92 | -38054.57  | 3823550    |
| 0.00                      | 0.00          | 127.62     | 127.62 | -37963.04  | 3785587    |
| 0.00                      | 0.00          | 127.32     | 127.32 | -37871.63  | 3747715    |
| 0.00                      | 0.00          | 127.01     | 127.01 | -37780.44  | 3709935    |
| 0.00                      | 0.00          | 126.71     | 126.71 | -37688.30  | 3672246    |
| 0.00                      | 0.00          | 126.40     | 126.40 | -37595.04  | 3634651    |
| 0.00                      | 0.00          | 126.09     | 126.09 | -37501.88  | 3597150    |
| 0.00                      | 0.00          | 125.79     | 125.79 | -37408.94  | 3559741    |
| 0.00                      | 0.00          | 125.47     | 125.47 | -37315.00  | 3522426    |
| 0.00                      | 0.00          | 125.16     | 125.16 | -37219.93  | 3485206    |
| 0.00                      | 0.00          | 124.85     | 124.85 | -37124.96  | 3448081    |
| 0.00                      | 0.00          | 124.53     | 124.53 | -37030.24  | 3411051    |
| 0.00                      | 0.00          | 124.21     | 124.21 | -36934.45  | 3374116    |
| 0.00                      | 0.00          | 123.89     | 123.89 | -36837.54  | 3337279    |
| 0.00                      | 0.00          | 123.57     | 123.57 | -36740.82  | 3300538    |
| 0.00                      | 0.00          | 123.25     | 123.25 | -36644.27  | 3263893    |
| 0.00                      | 0.00          | 122.92     | 122.92 | -36546.22  | 3227347    |
| 0.00                      | 0.00          | 122.60     | 122.60 | -36446.76  | 3190900    |
| 0.00                      | 0.00          | 122.27     | 122.27 | -36347.56  | 3154553    |
| 0.00                      | 0.00          | 121.94     | 121.94 | -36248.35  | 3118305    |
| 0.00                      | 0.00          | 121.61     | 121.61 | -36147.81  | 3082157    |
| 0.00                      | 0.00          | 121.27     | 121.27 | -36046.20  | 3046111    |
| 0.00                      | 0.00          | 120.94     | 120.94 | -35944.89  | 3010166    |
| 0.00                      | 0.00          | 120.60     | 120.60 | -35843.05  | 2974323    |
| 0.00                      | 0.00          | 120.26     | 120.26 | -35739.23  | 2938583    |
| 0.00                      | 0.00          | 119.91     | 119.91 | -35634.23  | 2902949    |
| 0.00                      | 0.00          | 119.57     | 119.57 | -35529.53  | 2867420    |
| 0.00                      | 0.00          | 119.22     | 119.22 | -35424.01  | 2831996    |

## Laminación de avenida T = 1.000 años

| TIEMPO  |           | CAUDAL  | COTA DE    |
|---------|-----------|---------|------------|
| [horas] | [minutos] | ENTRADA | EMBALSE    |
|         |           | [m³/s]  | [m.s.n.m.] |
| 31.5    | 1890      | 0.00    | 150.782    |
| 31.6    | 1895      | 0.00    | 150.646    |
| 31.7    | 1900      | 0.00    | 150.511    |
| 31.8    | 1905      | 0.00    | 150.373    |
| 31.8    | 1910      | 0.00    | 150.235    |
| 31.9    | 1915      | 0.00    | 150.097    |
| 32.0    | 1920      | 0.00    | 149.958    |
| 32.1    | 1925      | 0.00    | 149.817    |
| 32.2    | 1930      | 0.00    | 149.677    |
| 32.3    | 1935      | 0.00    | 149.537    |
| 32.3    | 1940      | 0.00    | 149.393    |
| 32.4    | 1945      | 0.00    | 149.249    |
| 32.5    | 1950      | 0.00    | 149.106    |
| 32.6    | 1955      | 0.00    | 148.962    |
| 32.7    | 1960      | 0.00    | 148.815    |
| 32.8    | 1965      | 0.00    | 148.668    |
| 32.8    | 1970      | 0.00    | 148.522    |
| 32.9    | 1975      | 0.00    | 148.373    |
| 33.0    | 1980      | 0.00    | 148.224    |
| 33.1    | 1985      | 0.00    | 148.076    |
| 33.2    | 1990      | 0.00    | 147.925    |
| 33.3    | 1995      | 0.00    | 147.773    |
| 33.3    | 2000      | 0.00    | 147.621    |
| 33.4    | 2005      | 0.00    | 147.468    |
| 33.5    | 2010      | 0.00    | 147.312    |
| 33.6    | 2015      | 0.00    | 147.156    |
| 33.7    | 2020      | 0.00    | 147.000    |
| 33.8    | 2025      | 0.00    | 146.839    |
| 33.8    | 2030      | 0.00    | 146.679    |
| 33.9    | 2035      | 0.00    | 146.520    |
| 34.0    | 2040      | 0.00    | 146.355    |
| 34.1    | 2045      | 0.00    | 146.190    |
| 34.2    | 2050      | 0.00    | 146.026    |
| 34.3    | 2055      | 0.00    | 145.857    |
| 34.3    | 2060      | 0.00    | 145.688    |
| 34.4    | 2065      | 0.00    | 145.519    |
| 34.5    | 2070      | 0.00    | 145.344    |
| 34.6    | 2075      | 0.00    | 145.170    |
| 34.7    | 2080      | 0.00    | 144.996    |
| 34.8    | 2085      | 0.00    | 144.817    |
| 34.8    | 2090      | 0.00    | 144.638    |
| 34.9    | 2095      | 0.00    | 144.458    |
| 35.0    | 2100      | 0.00    | 144.274    |
| 35.1    | 2105      | 0.00    | 144.091    |
| 35.2    | 2110      | 0.00    | 143.906    |
| 35.3    | 2115      | 0.00    | 143.718    |
| 35.3    | 2120      | 0.00    | 143.531    |
| 35.4    | 2125      | 0.00    | 143.339    |
| 35.5    | 2130      | 0.00    | 143.147    |
| 35.6    | 2135      | 0.00    | 142.955    |
| 35.7    | 2140      | 0.00    | 142.758    |
| 35.8    | 2145      | 0.00    | 142.563    |
| 35.8    | 2150      | 0.00    | 142.364    |
| 35.9    | 2155      | 0.00    | 142.165    |
| 36.0    | 2160      | 0.00    | 141.966    |
| 36.1    | 2165      | 0.00    | 141.763    |
| 36.2    | 2170      | 0.00    | 141.561    |
| 36.3    | 2175      | 0.00    | 141.356    |
| 36.3    | 2180      | 0.00    | 141.151    |
| 36.4    | 2185      | 0.00    | 140.945    |
| 36.5    | 2190      | 0.00    | 140.736    |
| 36.6    | 2195      | 0.00    | 140.528    |
| 36.7    | 2200      | 0.00    | 140.316    |

| CAUDALES DE SALIDA [m3/s] |               |            |        | INCREMENTO | VOLUMEN DE |
|---------------------------|---------------|------------|--------|------------|------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL  | DE VOLUMEN | EMBALSE    |
|                           |               |            |        | [m³]       | [m³]       |
| 0.00                      | 0.00          | 118.86     | 118.86 | -35316.89  | 2796679    |
| 0.00                      | 0.00          | 118.51     | 118.51 | -35209.34  | 2761469    |
| 0.00                      | 0.00          | 118.15     | 118.15 | -35102.12  | 2726367    |
| 0.00                      | 0.00          | 117.79     | 117.79 | -34993.48  | 2691374    |
| 0.00                      | 0.00          | 117.43     | 117.43 | -34883.26  | 2656490    |
| 0.00                      | 0.00          | 117.06     | 117.06 | -34773.24  | 2621717    |
| 0.00                      | 0.00          | 116.69     | 116.69 | -34662.81  | 2587054    |
| 0.00                      | 0.00          | 116.32     | 116.32 | -34550.19  | 2552504    |
| 0.00                      | 0.00          | 115.95     | 115.95 | -34436.13  | 2518068    |
| 0.00                      | 0.00          | 115.57     | 115.57 | -34322.45  | 2483746    |
| 0.00                      | 0.00          | 115.18     | 115.18 | -34207.06  | 2449539    |
| 0.00                      | 0.00          | 114.79     | 114.79 | -34089.25  | 2415449    |
| 0.00                      | 0.00          | 114.41     | 114.41 | -33971.09  | 2381478    |
| 0.00                      | 0.00          | 114.02     | 114.02 | -33852.74  | 2347626    |
| 0.00                      | 0.00          | 113.62     | 113.62 | -33732.50  | 2313893    |
| 0.00                      | 0.00          | 113.21     | 113.21 | -33610.97  | 2280282    |
| 0.00                      | 0.00          | 112.81     | 112.81 | -33489.87  | 2246792    |
| 0.00                      | 0.00          | 112.40     | 112.40 | -33366.98  | 2213425    |
| 0.00                      | 0.00          | 111.99     | 111.99 | -33241.89  | 2180183    |
| 0.00                      | 0.00          | 111.58     | 111.58 | -33116.86  | 2147066    |
| 0.00                      | 0.00          | 111.16     | 111.16 | -32990.81  | 2114076    |
| 0.00                      | 0.00          | 110.74     | 110.74 | -32862.23  | 2081213    |
| 0.00                      | 0.00          | 110.31     | 110.31 | -32732.60  | 2048481    |
| 0.00                      | 0.00          | 109.88     | 109.88 | -32602.77  | 2015878    |
| 0.00                      | 0.00          | 109.44     | 109.44 | -32469.98  | 1983408    |
| 0.00                      | 0.00          | 108.99     | 108.99 | -32334.94  | 1951073    |
| 0.00                      | 0.00          | 108.55     | 108.55 | -32200.47  | 1918873    |
| 0.00                      | 0.00          | 108.09     | 108.09 | -32062.89  | 1886810    |
| 0.00                      | 0.00          | 107.63     | 107.63 | -31922.20  | 1854888    |
| 0.00                      | 0.00          | 107.17     | 107.17 | -31782.12  | 1823105    |
| 0.00                      | 0.00          | 106.69     | 106.69 | -31639.66  | 1791466    |
| 0.00                      | 0.00          | 106.21     | 106.21 | -31494.43  | 1759971    |
| 0.00                      | 0.00          | 105.73     | 105.73 | -31349.44  | 1728622    |
| 0.00                      | 0.00          | 105.23     | 105.23 | -31201.23  | 1697421    |
| 0.00                      | 0.00          | 104.74     | 104.74 | -31049.07  | 1666372    |
| 0.00                      | 0.00          | 104.23     | 104.23 | -30896.93  | 1635475    |
| 0.00                      | 0.00          | 103.71     | 103.71 | -30741.60  | 1604733    |
| 0.00                      | 0.00          | 103.19     | 103.19 | -30582.65  | 1574150    |
| 0.00                      | 0.00          | 102.67     | 102.67 | -30423.93  | 1543727    |
| 0.00                      | 0.00          | 102.12     | 102.12 | -30261.08  | 1513465    |
| 0.00                      | 0.00          | 101.58     | 101.58 | -30094.27  | 1483371    |
| 0.00                      | 0.00          | 101.03     | 101.03 | -29927.37  | 1453444    |
| 0.00                      | 0.00          | 100.46     | 100.46 | -29757.04  | 1423687    |
| 0.00                      | 0.00          | 99.90      | 99.90  | -29584.29  | 1394102    |
| 0.00                      | 0.00          | 99.32      | 99.32  | -29410.27  | 1364692    |
| 0.00                      | 0.00          | 98.73      | 98.73  | -29232.72  | 1335459    |
| 0.00                      | 0.00          | 98.14      | 98.14  | -29053.94  | 1306406    |
| 0.00                      | 0.00          | 97.53      | 97.53  | -28871.81  | 1277534    |
| 0.00                      | 0.00          | 96.92      | 96.92  | -28685.49  | 1248848    |
| 0.00                      | 0.00          | 96.30      | 96.30  | -28498.28  | 1220350    |
| 0.00                      | 0.00          | 95.67      | 95.67  | -28307.02  | 1192043    |
| 0.00                      | 0.00          | 95.03      | 95.03  | -28112.98  | 1163930    |
| 0.00                      | 0.00          | 94.38      | 94.38  | -27916.82  | 1136013    |
| 0.00                      | 0.00          | 93.73      | 93.73  | -27716.91  | 1108296    |
| 0.00                      | 0.00          | 93.07      | 93.07  | -27515.89  | 1080780    |
| 0.00                      | 0.00          | 92.39      | 92.39  | -27311.05  | 1053469    |
| 0.00                      | 0.00          | 91.71      | 91.71  | -27103.33  | 1026366    |
| 0.00                      | 0.00          | 91.01      | 91.01  | -26892.97  | 999473     |
| 0.00                      | 0.00          | 90.31      | 90.31  | -26678.18  | 972795     |
| 0.00                      | 0.00          | 89.60      | 89.60  | -26461.95  | 946333     |
| 0.00                      | 0.00          | 88.87      | 88.87  | -26242.49  | 920090     |
| 0.00                      | 0.00          | 88.14      | 88.14  | -26021.18  | 894069     |
| 0.00                      | 0.00          | 87.40      | 87.40  | -25795.69  | 868273     |

## Laminación de avenida T = 1.000 años

| TIEMPO  |           | CAUDAL  | COTA DE    |
|---------|-----------|---------|------------|
| [horas] | [minutos] | ENTRADA | EMBALSE    |
|         |           | [m³/s]  | [m.s.n.m.] |
| 36.8    | 2205      | 0.00    | 140.105    |
| 36.8    | 2210      | 0.00    | 139.893    |
| 36.9    | 2215      | 0.00    | 139.679    |
| 37.0    | 2220      | 0.00    | 139.466    |
| 37.1    | 2225      | 0.00    | 139.249    |
| 37.2    | 2230      | 0.00    | 139.035    |
| 37.3    | 2235      | 0.00    | 138.817    |
| 37.3    | 2240      | 0.00    | 138.601    |
| 37.4    | 2245      | 0.00    | 138.383    |
| 37.5    | 2250      | 0.00    | 138.164    |
| 37.6    | 2255      | 0.00    | 137.946    |
| 37.7    | 2260      | 0.00    | 137.725    |
| 37.8    | 2265      | 0.00    | 137.506    |
| 37.8    | 2270      | 0.00    | 137.282    |
| 37.9    | 2275      | 0.00    | 137.060    |
| 38.0    | 2280      | 0.00    | 136.834    |
| 38.1    | 2285      | 0.00    | 136.610    |
| 38.2    | 2290      | 0.00    | 136.383    |
| 38.3    | 2295      | 0.00    | 136.155    |
| 38.3    | 2300      | 0.00    | 135.928    |
| 38.4    | 2305      | 0.00    | 135.697    |
| 38.5    | 2310      | 0.00    | 135.469    |
| 38.6    | 2315      | 0.00    | 135.236    |
| 38.7    | 2320      | 0.00    | 135.007    |
| 38.8    | 2325      | 0.00    | 134.772    |
| 38.8    | 2330      | 0.00    | 134.542    |
| 38.9    | 2335      | 0.00    | 134.307    |
| 39.0    | 2340      | 0.00    | 134.074    |
| 39.1    | 2345      | 0.00    | 133.835    |
| 39.2    | 2350      | 0.00    | 133.595    |
| 39.3    | 2355      | 0.00    | 133.345    |
| 39.3    | 2360      | 0.00    | 133.092    |
| 39.4    | 2365      | 0.00    | 132.830    |
| 39.5    | 2370      | 0.00    | 132.567    |
| 39.6    | 2375      | 0.00    | 132.298    |
| 39.7    | 2380      | 0.00    | 132.033    |
| 39.8    | 2385      | 0.00    | 131.746    |
| 39.8    | 2390      | 0.00    | 131.457    |
| 39.9    | 2395      | 0.00    | 131.123    |
| 40.0    | 2400      | 0.00    | 130.767    |
| 40.1    | 2405      | 0.00    | 130.399    |
| 40.2    | 2410      | 0.00    | 130.026    |
| 40.3    | 2415      | 0.00    | 129.647    |
| 40.3    | 2420      | 0.00    | 129.295    |
| 40.4    | 2425      | 0.00    | 128.988    |
| 40.5    | 2430      | 0.00    | 128.675    |
| 40.6    | 2435      | 0.00    | 128.362    |
| 40.7    | 2440      | 0.00    | 128.084    |
| 40.8    | 2445      | 0.00    | 127.837    |
| 40.8    | 2450      | 0.00    | 127.615    |
| 40.9    | 2455      | 0.00    | 127.398    |
| 41.0    | 2460      | 0.00    | 127.179    |
| 41.1    | 2465      | 0.00    | 127.003    |
| 41.2    | 2470      | 0.00    | 126.820    |
| 41.3    | 2475      | 0.00    | 126.677    |
| 41.3    | 2480      | 0.00    | 126.567    |
| 41.4    | 2485      | 0.00    | 126.478    |
| 41.5    | 2490      | 0.00    | 126.400    |
| 41.6    | 2495      | 0.00    | 126.334    |
| 41.7    | 2500      | 0.00    | 126.280    |
| 41.8    | 2505      | 0.00    | 126.234    |
| 41.8    | 2510      | 0.00    | 126.196    |
| 41.9    | 2515      | 0.00    | 126.164    |

| CAUDALES DE SALIDA [m³/s] |               |            |       | INCREMENTO | VOLUMEN DE |
|---------------------------|---------------|------------|-------|------------|------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL | DE VOLUMEN | EMBALSE    |
|                           |               |            |       | [m³]       | [m³]       |
| 0.00                      | 0.00          | 86.64      | 86.64 | -25565.17  | 842708     |
| 0.00                      | 0.00          | 85.88      | 85.88 | -25332.60  | 817376     |
| 0.00                      | 0.00          | 85.11      | 85.11 | -25095.83  | 792280     |
| 0.00                      | 0.00          | 84.33      | 84.33 | -24857.13  | 767423     |
| 0.00                      | 0.00          | 83.52      | 83.52 | -24614.50  | 742808     |
| 0.00                      | 0.00          | 82.73      | 82.73 | -24369.05  | 718439     |
| 0.00                      | 0.00          | 81.90      | 81.90 | -24120.66  | 694319     |
| 0.00                      | 0.00          | 81.08      | 81.08 | -23868.40  | 670450     |
| 0.00                      | 0.00          | 80.24      | 80.24 | -23613.85  | 646836     |
| 0.00                      | 0.00          | 79.39      | 79.39 | -23354.71  | 623482     |
| 0.00                      | 0.00          | 78.54      | 78.54 | -23092.95  | 600389     |
| 0.00                      | 0.00          | 77.66      | 77.66 | -22825.58  | 577563     |
| 0.00                      | 0.00          | 76.78      | 76.78 | -22554.85  | 555008     |
| 0.00                      | 0.00          | 75.87      | 75.87 | -22278.37  | 532730     |
| 0.00                      | 0.00          | 74.96      | 74.96 | -21996.06  | 510734     |
| 0.00                      | 0.00          | 74.02      | 74.02 | -21710.51  | 489023     |
| 0.00                      | 0.00          | 73.07      | 73.07 | -21419.69  | 467604     |
| 0.00                      | 0.00          | 72.10      | 72.10 | -21124.46  | 446479     |
| 0.00                      | 0.00          | 71.12      | 71.12 | -20821.80  | 425657     |
| 0.00                      | 0.00          | 70.12      | 70.12 | -20514.35  | 405143     |
| 0.00                      | 0.00          | 69.09      | 69.09 | -20200.22  | 384943     |
| 0.00                      | 0.00          | 68.06      | 68.06 | -19881.47  | 365061     |
| 0.00                      | 0.00          | 66.99      | 66.99 | -19554.81  | 345506     |
| 0.00                      | 0.00          | 65.92      | 65.92 | -19222.29  | 326284     |
| 0.00                      | 0.00          | 64.81      | 64.81 | -18882.27  | 307402     |
| 0.00                      | 0.00          | 63.70      | 63.70 | -18534.67  | 288867     |
| 0.00                      | 0.00          | 62.54      | 62.54 | -18180.21  | 270687     |
| 0.00                      | 0.00          | 61.37      | 61.37 | -17816.86  | 252870     |
| 0.00                      | 0.00          | 60.16      | 60.16 | -17442.92  | 235427     |
| 0.00                      | 0.00          | 58.91      | 58.91 | -17054.74  | 218373     |
| 0.00                      | 0.00          | 57.57      | 57.57 | -16649.43  | 201723     |
| 0.00                      | 0.00          | 56.20      | 56.20 | -16222.61  | 185500     |
| 0.00                      | 0.00          | 54.73      | 54.73 | -15772.86  | 169728     |
| 0.00                      | 0.00          | 53.22      | 53.22 | -15301.97  | 154426     |
| 0.00                      | 0.00          | 51.63      | 51.63 | -14807.97  | 139618     |
| 0.00                      | 0.00          | 50.01      | 50.01 | -14296.51  | 125321     |
| 0.00                      | 0.00          | 48.20      | 48.20 | -13744.87  | 111576     |
| 0.00                      | 0.00          | 46.30      | 46.30 | -13145.62  | 98431      |
| 0.00                      | 0.00          | 44.01      | 44.01 | -12465.38  | 85965      |
| 0.00                      | 0.00          | 41.42      | 41.42 | -11660.00  | 74305      |
| 0.00                      | 0.00          | 38.57      | 38.57 | -10755.98  | 63549      |
| 0.00                      | 0.00          | 35.45      | 35.45 | -9751.34   | 53798      |
| 0.00                      | 0.00          | 31.96      | 31.96 | -8592.82   | 45205      |
| 0.00                      | 0.00          | 28.34      | 28.34 | -7268.63   | 37937      |
| 0.00                      | 0.00          | 24.75      | 24.75 | -5928.47   | 32008      |
| 0.00                      | 0.00          | 20.46      | 20.46 | -5283.00   | 26725      |
| 0.00                      | 0.00          | 14.98      | 14.98 | -4992.11   | 21733      |
| 0.00                      | 0.00          | 7.22       | 7.22  | -4116.88   | 17616      |
| 0.00                      | 0.00          | 8.15       | 8.15  | -3202.01   | 14414      |
| 0.00                      | 0.00          | 7.64       | 7.64  | -2662.06   | 11752      |
| 0.00                      | 0.00          | 7.11       | 7.11  | -2251.38   | 9501       |
| 0.00                      | 0.00          | 6.53       | 6.53  | -1852.99   | 7648       |
| 0.00                      | 0.00          | 6.02       | 6.02  | -1496.58   | 6151       |
| 0.00                      | 0.00          | 5.44       | 5.44  | -1187.76   | 4963       |
| 0.00                      | 0.00          | 4.95       | 4.95  | -921.75    | 4042       |
| 0.00                      | 0.00          | 4.53       | 4.53  | -714.96    | 3327       |
| 0.00                      | 0.00          | 4.16       | 4.16  | -558.83    | 2768       |
| 0.00                      | 0.00          | 3.80       | 3.80  | -452.72    | 2315       |
| 0.00                      | 0.00          | 3.47       | 3.47  | -378.66    | 1936       |
| 0.00                      | 0.00          | 3.18       | 3.18  | -316.72    | 1620       |
| 0.00                      | 0.00          | 2.91       | 2.91  | -264.92    | 1355       |
| 0.00                      | 0.00          | 2.66       | 2.66  | -221.59    | 1133       |
| 0.00                      | 0.00          | 2.43       | 2.43  | -185.35    | 948        |

## Laminación de avenida T = 1.000 años

| TIEMPO  |           | CAUDAL  | COTÁ DE    |
|---------|-----------|---------|------------|
| [horas] | [minutos] | ENTRADA | EMBALSE    |
|         |           | [m³/s]  | [m.s.n.m.] |
| 42.0    | 2520      | 0.00    | 126.137    |
| 42.1    | 2525      | 0.00    | 126.114    |
| 42.2    | 2530      | 0.00    | 126.096    |
| 42.3    | 2535      | 0.00    | 126.080    |
| 42.3    | 2540      | 0.00    | 126.067    |
| 42.4    | 2545      | 0.00    | 126.056    |
| 42.5    | 2550      | 0.00    | 126.047    |
| 42.6    | 2555      | 0.00    | 126.039    |
| 42.7    | 2560      | 0.00    | 126.033    |
| 42.8    | 2565      | 0.00    | 126.027    |
| 42.8    | 2570      | 0.00    | 126.023    |
| 42.9    | 2575      | 0.00    | 126.019    |
| 43.0    | 2580      | 0.00    | 126.016    |
| 43.1    | 2585      | 0.00    | 126.013    |
| 43.2    | 2590      | 0.00    | 126.011    |
| 43.3    | 2595      | 0.00    | 126.009    |
| 43.3    | 2600      | 0.00    | 126.008    |
| 43.4    | 2605      | 0.00    | 126.007    |
| 43.5    | 2610      | 0.00    | 126.005    |
| 43.6    | 2615      | 0.00    | 126.005    |
| 43.7    | 2620      | 0.00    | 126.004    |
| 43.8    | 2625      | 0.00    | 126.003    |
| 43.8    | 2630      | 0.00    | 126.003    |
| 43.9    | 2635      | 0.00    | 126.002    |
| 44.0    | 2640      | 0.00    | 126.002    |
| 44.1    | 2645      | 0.00    | 126.002    |
| 44.2    | 2650      | 0.00    | 126.001    |
| 44.3    | 2655      | 0.00    | 126.001    |
| 44.3    | 2660      | 0.00    | 126.001    |
| 44.4    | 2665      | 0.00    | 126.001    |
| 44.5    | 2670      | 0.00    | 126.001    |
| 44.6    | 2675      | 0.00    | 126.001    |
| 44.7    | 2680      | 0.00    | 126.000    |

| CAUDALES DE SALIDA [m3/s] |               |            |       | INCREMENTO | VOLUMEN DE |
|---------------------------|---------------|------------|-------|------------|------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL | DE VOLUMEN | EMBALSE    |
|                           |               |            |       | [m³]       | [m³]       |
| 0.00                      | 0.00          | 2.23       | 2.23  | -155.02    | 793        |
| 0.00                      | 0.00          | 2.03       | 2.03  | -129.67    | 663        |
| 0.00                      | 0.00          | 1.86       | 1.86  | -108.46    | 555        |
| 0.00                      | 0.00          | 1.70       | 1.70  | -90.72     | 464        |
| 0.00                      | 0.00          | 1.56       | 1.56  | -75.88     | 388        |
| 0.00                      | 0.00          | 1.42       | 1.42  | -63.47     | 325        |
| 0.00                      | 0.00          | 1.30       | 1.30  | -53.09     | 271        |
| 0.00                      | 0.00          | 1.19       | 1.19  | -44.40     | 227        |
| 0.00                      | 0.00          | 1.09       | 1.09  | -37.14     | 190        |
| 0.00                      | 0.00          | 0.99       | 0.99  | -31.07     | 159        |
| 0.00                      | 0.00          | 0.91       | 0.91  | -25.98     | 133        |
| 0.00                      | 0.00          | 0.83       | 0.83  | -21.74     | 111        |
| 0.00                      | 0.00          | 0.76       | 0.76  | -18.18     | 93         |
| 0.00                      | 0.00          | 0.69       | 0.69  | -15.20     | 78         |
| 0.00                      | 0.00          | 0.63       | 0.63  | -12.72     | 65         |
| 0.00                      | 0.00          | 0.57       | 0.57  | -10.64     | 54         |
| 0.00                      | 0.00          | 0.54       | 0.54  | -8.90      | 46         |
| 0.00                      | 0.00          | 0.50       | 0.50  | -7.44      | 38         |
| 0.00                      | 0.00          | 0.43       | 0.43  | -6.23      | 32         |
| 0.00                      | 0.00          | 0.43       | 0.43  | -5.20      | 27         |
| 0.00                      | 0.00          | 0.38       | 0.38  | -4.36      | 22         |
| 0.00                      | 0.00          | 0.33       | 0.33  | -3.64      | 19         |
| 0.00                      | 0.00          | 0.33       | 0.33  | -3.05      | 16         |
| 0.00                      | 0.00          | 0.27       | 0.27  | -2.55      | 13         |
| 0.00                      | 0.00          | 0.27       | 0.27  | -2.13      | 11         |
| 0.00                      | 0.00          | 0.27       | 0.27  | -1.78      | 9          |
| 0.00                      | 0.00          | 0.19       | 0.19  | -1.49      | 8          |
| 0.00                      | 0.00          | 0.19       | 0.19  | -1.25      | 6          |
| 0.00                      | 0.00          | 0.19       | 0.19  | -1.04      | 5          |
| 0.00                      | 0.00          | 0.19       | 0.19  | -0.88      | 4          |
| 0.00                      | 0.00          | 0.19       | 0.19  | -0.73      | 4          |
| 0.00                      | 0.00          | 0.19       | 0.19  | -0.61      | 3          |
| 0.00                      | 0.00          | 0.00       | 0.00  | -0.51      | 3          |

## Laminación de avenida T = 5.000 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 0.0     | 0         | 0.00              | 126.000            |
| 0.1     | 5         | 0.10              | 126.001            |
| 0.2     | 10        | 0.10              | 126.002            |
| 0.3     | 15        | 0.20              | 126.004            |
| 0.3     | 20        | 0.30              | 126.008            |
| 0.4     | 25        | 0.40              | 126.015            |
| 0.5     | 30        | 0.60              | 126.025            |
| 0.6     | 35        | 0.80              | 126.038            |
| 0.7     | 40        | 1.10              | 126.057            |
| 0.8     | 45        | 1.40              | 126.081            |
| 0.8     | 50        | 1.70              | 126.113            |
| 0.9     | 55        | 2.10              | 126.152            |
| 1.0     | 60        | 2.60              | 126.199            |
| 1.1     | 65        | 3.10              | 126.257            |
| 1.2     | 70        | 3.70              | 126.327            |
| 1.3     | 75        | 4.40              | 126.409            |
| 1.3     | 80        | 5.20              | 126.504            |
| 1.4     | 85        | 6.00              | 126.600            |
| 1.5     | 90        | 6.90              | 126.703            |
| 1.6     | 95        | 7.90              | 126.816            |
| 1.7     | 100       | 9.00              | 126.941            |
| 1.8     | 105       | 10.20             | 127.059            |
| 1.8     | 110       | 11.50             | 127.176            |
| 1.9     | 115       | 12.80             | 127.307            |
| 2.0     | 120       | 14.30             | 127.452            |
| 2.1     | 125       | 15.90             | 127.581            |
| 2.2     | 130       | 17.60             | 127.711            |
| 2.3     | 135       | 19.40             | 127.858            |
| 2.3     | 140       | 21.40             | 128.017            |
| 2.4     | 145       | 23.50             | 128.153            |
| 2.5     | 150       | 25.70             | 128.289            |
| 2.6     | 155       | 28.00             | 128.427            |
| 2.7     | 160       | 30.50             | 128.569            |
| 2.8     | 165       | 33.10             | 128.733            |
| 2.8     | 170       | 35.90             | 128.940            |
| 2.9     | 175       | 38.80             | 129.150            |
| 3.0     | 180       | 42.00             | 129.354            |
| 3.1     | 185       | 45.30             | 129.551            |
| 3.2     | 190       | 48.70             | 129.737            |
| 3.3     | 195       | 52.40             | 129.937            |
| 3.3     | 200       | 56.30             | 130.132            |
| 3.4     | 205       | 60.40             | 130.338            |
| 3.5     | 210       | 64.80             | 130.555            |
| 3.6     | 215       | 69.40             | 130.770            |
| 3.7     | 220       | 74.20             | 131.007            |
| 3.8     | 225       | 79.30             | 131.223            |
| 3.8     | 230       | 84.70             | 131.463            |
| 3.9     | 235       | 90.50             | 131.682            |
| 4.0     | 240       | 96.70             | 131.917            |
| 4.1     | 245       | 103.10            | 132.155            |
| 4.2     | 250       | 110.00            | 132.406            |
| 4.3     | 255       | 117.30            | 132.670            |
| 4.3     | 260       | 125.10            | 132.953            |
| 4.4     | 265       | 133.50            | 133.240            |
| 4.5     | 270       | 142.60            | 133.545            |
| 4.6     | 275       | 152.20            | 133.851            |
| 4.7     | 280       | 162.60            | 134.173            |
| 4.8     | 285       | 173.80            | 134.514            |
| 4.8     | 290       | 186.10            | 134.871            |
| 4.9     | 295       | 199.70            | 135.249            |
| 5.0     | 300       | 214.70            | 135.651            |
| 5.1     | 305       | 231.00            | 136.077            |
| 5.2     | 310       | 250.20            | 136.528            |

| CAUDALES DE SALIDA [m3/s] |               |            |       | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|-------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 0.00       | 0.00  | -                        | 1                     |
| 0.00                      | 0.00          | 0.19       | 0.19  | 3.00                     | 4                     |
| 0.00                      | 0.00          | 0.27       | 0.27  | 7.07                     | 11                    |
| 0.00                      | 0.00          | 0.38       | 0.38  | 13.68                    | 25                    |
| 0.00                      | 0.00          | 0.54       | 0.54  | 23.56                    | 49                    |
| 0.00                      | 0.00          | 0.74       | 0.74  | 37.68                    | 86                    |
| 0.00                      | 0.00          | 0.95       | 0.95  | 56.28                    | 143                   |
| 0.00                      | 0.00          | 1.17       | 1.17  | 79.63                    | 222                   |
| 0.00                      | 0.00          | 1.44       | 1.44  | 108.02                   | 330                   |
| 0.00                      | 0.00          | 1.71       | 1.71  | 141.64                   | 472                   |
| 0.00                      | 0.00          | 2.02       | 2.02  | 180.71                   | 653                   |
| 0.00                      | 0.00          | 2.34       | 2.34  | 225.76                   | 878                   |
| 0.00                      | 0.00          | 2.68       | 2.68  | 277.28                   | 1156                  |
| 0.00                      | 0.00          | 3.05       | 3.05  | 335.89                   | 1491                  |
| 0.00                      | 0.00          | 3.44       | 3.44  | 401.95                   | 1893                  |
| 0.00                      | 0.00          | 3.84       | 3.84  | 474.96                   | 2368                  |
| 0.00                      | 0.00          | 4.27       | 4.27  | 553.61                   | 2922                  |
| 0.00                      | 0.00          | 4.66       | 4.66  | 617.71                   | 3540                  |
| 0.00                      | 0.00          | 5.04       | 5.04  | 669.80                   | 4209                  |
| 0.00                      | 0.00          | 5.43       | 5.43  | 731.32                   | 4941                  |
| 0.00                      | 0.00          | 5.83       | 5.83  | 801.28                   | 5742                  |
| 0.00                      | 0.00          | 6.19       | 6.19  | 886.75                   | 6629                  |
| 0.00                      | 0.00          | 6.52       | 6.52  | 993.15                   | 7622                  |
| 0.00                      | 0.00          | 6.87       | 6.87  | 1110.05                  | 8732                  |
| 0.00                      | 0.00          | 7.24       | 7.24  | 1229.82                  | 9962                  |
| 0.00                      | 0.00          | 7.56       | 7.56  | 1378.04                  | 11340                 |
| 0.00                      | 0.00          | 7.86       | 7.86  | 1565.83                  | 12906                 |
| 0.00                      | 0.00          | 8.19       | 8.19  | 1766.07                  | 14672                 |
| 0.00                      | 0.00          | 8.25       | 8.25  | 1951.90                  | 16624                 |
| 0.00                      | 0.00          | 9.74       | 9.74  | 2023.08                  | 18647                 |
| 0.00                      | 0.00          | 13.39      | 13.39 | 2013.36                  | 20660                 |
| 0.00                      | 0.00          | 16.27      | 16.27 | 2039.59                  | 22700                 |
| 0.00                      | 0.00          | 18.78      | 18.78 | 2238.79                  | 24939                 |
| 0.00                      | 0.00          | 21.32      | 21.32 | 2767.63                  | 27706                 |
| 0.00                      | 0.00          | 24.14      | 24.14 | 3489.97                  | 31196                 |
| 0.00                      | 0.00          | 26.71      | 26.71 | 3926.60                  | 35123                 |
| 0.00                      | 0.00          | 28.98      | 28.98 | 3961.91                  | 39085                 |
| 0.00                      | 0.00          | 31.01      | 31.01 | 3970.82                  | 43055                 |
| 0.00                      | 0.00          | 32.82      | 32.82 | 4167.87                  | 47223                 |
| 0.00                      | 0.00          | 34.66      | 34.66 | 4485.40                  | 51709                 |
| 0.00                      | 0.00          | 36.36      | 36.36 | 4872.60                  | 56581                 |
| 0.00                      | 0.00          | 38.08      | 38.08 | 5360.40                  | 61942                 |
| 0.00                      | 0.00          | 39.81      | 39.81 | 5904.06                  | 67846                 |
| 0.00                      | 0.00          | 41.45      | 41.45 | 6538.14                  | 74384                 |
| 0.00                      | 0.00          | 43.18      | 43.18 | 7249.51                  | 81633                 |
| 0.00                      | 0.00          | 44.71      | 44.71 | 8055.73                  | 89689                 |
| 0.00                      | 0.00          | 46.34      | 46.34 | 8955.46                  | 98645                 |
| 0.00                      | 0.00          | 47.79      | 47.79 | 9946.00                  | 108591                |
| 0.00                      | 0.00          | 49.29      | 49.29 | 11050.29                 | 119641                |
| 0.00                      | 0.00          | 50.76      | 50.76 | 12249.55                 | 131890                |
| 0.00                      | 0.00          | 52.27      | 52.27 | 13560.34                 | 145451                |
| 0.00                      | 0.00          | 53.82      | 53.82 | 14967.60                 | 160418                |
| 0.00                      | 0.00          | 55.42      | 55.42 | 16467.35                 | 176886                |
| 0.00                      | 0.00          | 57.01      | 57.01 | 18087.34                 | 194973                |
| 0.00                      | 0.00          | 58.64      | 58.64 | 19846.34                 | 214819                |
| 0.00                      | 0.00          | 60.24      | 60.24 | 21771.72                 | 236591                |
| 0.00                      | 0.00          | 61.87      | 61.87 | 23889.21                 | 260480                |
| 0.00                      | 0.00          | 63.56      | 63.56 | 26173.22                 | 286654                |
| 0.00                      | 0.00          | 65.28      | 65.28 | 28638.15                 | 315292                |
| 0.00                      | 0.00          | 67.05      | 67.05 | 31329.65                 | 346621                |
| 0.00                      | 0.00          | 68.88      | 68.88 | 34290.92                 | 380912                |
| 0.00                      | 0.00          | 70.77      | 70.77 | 37591.74                 | 418504                |
| 0.00                      | 0.00          | 72.72      | 72.72 | 41289.62                 | 459794                |



## Laminación de avenida T = 5.000 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 5.3     | 315       | 274.40            | 137.004            |
| 5.3     | 320       | 305.60            | 137.508            |
| 5.4     | 325       | 346.90            | 138.049            |
| 5.5     | 330       | 399.30            | 138.640            |
| 5.6     | 335       | 461.50            | 139.299            |
| 5.7     | 340       | 530.40            | 140.045            |
| 5.8     | 345       | 604.30            | 140.884            |
| 5.8     | 350       | 681.00            | 141.817            |
| 5.9     | 355       | 759.30            | 142.836            |
| 6.0     | 360       | 838.80            | 143.922            |
| 6.1     | 365       | 920.30            | 145.051            |
| 6.2     | 370       | 1004.80           | 146.202            |
| 6.3     | 375       | 1091.50           | 147.363            |
| 6.3     | 380       | 1180.40           | 148.536            |
| 6.4     | 385       | 1263.40           | 149.727            |
| 6.5     | 390       | 1340.40           | 150.934            |
| 6.6     | 395       | 1415.50           | 152.151            |
| 6.7     | 400       | 1486.80           | 153.381            |
| 6.8     | 405       | 1553.00           | 154.620            |
| 6.8     | 410       | 1613.30           | 155.864            |
| 6.9     | 415       | 1667.00           | 157.107            |
| 7.0     | 420       | 1714.10           | 158.353            |
| 7.1     | 425       | 1754.50           | 159.596            |
| 7.2     | 430       | 1787.90           | 160.832            |
| 7.3     | 435       | 1813.90           | 162.055            |
| 7.3     | 440       | 1832.30           | 163.264            |
| 7.4     | 445       | 1843.20           | 164.455            |
| 7.5     | 450       | 1846.70           | 165.625            |
| 7.6     | 455       | 1843.10           | 166.771            |
| 7.7     | 460       | 1832.60           | 167.888            |
| 7.8     | 465       | 1815.50           | 168.974            |
| 7.8     | 470       | 1792.30           | 170.026            |
| 7.9     | 475       | 1763.60           | 171.033            |
| 8.0     | 480       | 1730.30           | 171.971            |
| 8.1     | 485       | 1693.00           | 172.814            |
| 8.2     | 490       | 1652.40           | 173.541            |
| 8.3     | 495       | 1609.10           | 174.138            |
| 8.3     | 500       | 1563.80           | 174.609            |
| 8.4     | 505       | 1516.90           | 174.969            |
| 8.5     | 510       | 1469.00           | 175.234            |
| 8.6     | 515       | 1420.70           | 175.422            |
| 8.7     | 520       | 1372.40           | 175.548            |
| 8.8     | 525       | 1324.30           | 175.622            |
| 8.8     | 530       | 1276.70           | 175.658            |
| 8.9     | 535       | 1229.80           | 175.662            |
| 9.0     | 540       | 1183.80           | 175.642            |
| 9.1     | 545       | 1139.00           | 175.604            |
| 9.2     | 550       | 1095.50           | 175.551            |
| 9.3     | 555       | 1053.20           | 175.487            |
| 9.3     | 560       | 1011.40           | 175.415            |
| 9.4     | 565       | 969.50            | 175.336            |
| 9.5     | 570       | 928.70            | 175.253            |
| 9.6     | 575       | 889.80            | 175.166            |
| 9.7     | 580       | 852.70            | 175.077            |
| 9.8     | 585       | 817.30            | 174.986            |
| 9.8     | 590       | 783.50            | 174.893            |
| 9.9     | 595       | 751.40            | 174.800            |
| 10.0    | 600       | 720.90            | 174.707            |
| 10.1    | 605       | 691.90            | 174.616            |
| 10.2    | 610       | 664.40            | 174.526            |
| 10.3    | 615       | 638.30            | 174.437            |
| 10.3    | 620       | 613.50            | 174.350            |
| 10.4    | 625       | 589.90            | 174.264            |

| CAUDALES DE SALIDA [m³/s] |               |            |         | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|---------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL   | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 74.73      | 74.73   | 45372.48                 | 505166                |
| 0.00                      | 0.00          | 76.79      | 76.79   | 50071.26                 | 555237                |
| 0.00                      | 0.00          | 78.94      | 78.94   | 55940.57                 | 611178                |
| 0.00                      | 0.00          | 81.23      | 81.23   | 63572.63                 | 674751                |
| 0.00                      | 0.00          | 83.71      | 83.71   | 73712.89                 | 748463                |
| 0.00                      | 0.00          | 86.43      | 86.43   | 86970.54                 | 835434                |
| 0.00                      | 0.00          | 89.39      | 89.39   | 103296.45                | 938730                |
| 0.00                      | 0.00          | 92.57      | 92.57   | 122023.90                | 1060754               |
| 0.00                      | 0.00          | 95.92      | 95.92   | 142438.85                | 1203193               |
| 0.00                      | 0.00          | 99.37      | 99.37   | 163981.41                | 1367175               |
| 0.00                      | 0.00          | 102.83     | 102.83  | 186175.60                | 1553350               |
| 0.00                      | 0.00          | 106.25     | 106.25  | 208812.58                | 1762163               |
| 0.00                      | 0.00          | 109.58     | 109.58  | 231947.05                | 1994110               |
| 0.00                      | 0.00          | 112.85     | 112.85  | 255840.08                | 2249950               |
| 0.00                      | 0.00          | 116.08     | 116.08  | 280532.81                | 2530483               |
| 0.00                      | 0.00          | 119.26     | 119.26  | 305893.74                | 2836376               |
| 0.00                      | 0.00          | 122.38     | 122.38  | 330707.87                | 3167084               |
| 0.00                      | 0.00          | 125.46     | 125.46  | 353763.51                | 3520848               |
| 0.00                      | 0.00          | 128.49     | 128.49  | 375658.04                | 3896506               |
| 0.00                      | 0.00          | 131.45     | 131.45  | 396712.40                | 4293218               |
| 0.00                      | 0.00          | 134.35     | 134.35  | 416447.72                | 4709666               |
| 0.00                      | 0.00          | 137.20     | 137.20  | 434548.33                | 5144214               |
| 0.00                      | 0.00          | 139.98     | 139.98  | 450803.45                | 5595018               |
| 0.00                      | 0.00          | 142.69     | 142.69  | 465094.09                | 6060112               |
| 0.00                      | 0.00          | 145.33     | 145.33  | 477407.71                | 6537520               |
| 0.00                      | 0.00          | 147.88     | 147.88  | 487699.19                | 7025219               |
| 0.00                      | 0.00          | 150.36     | 150.36  | 495840.31                | 7521059               |
| 0.00                      | 0.00          | 152.75     | 152.75  | 501763.73                | 8022823               |
| 0.00                      | 0.00          | 155.06     | 155.06  | 505453.64                | 8528276               |
| 0.00                      | 0.00          | 157.28     | 157.28  | 506921.48                | 9035198               |
| 0.00                      | 0.00          | 159.41     | 159.41  | 506246.97                | 9541445               |
| 0.00                      | 0.00          | 161.44     | 161.44  | 503502.23                | 10044947              |
| 0.00                      | 21.21         | 163.36     | 184.57  | 495508.79                | 10540456              |
| 0.00                      | 103.27        | 165.13     | 268.41  | 473356.19                | 11013812              |
| 9.66                      | 213.06        | 166.71     | 389.43  | 434319.82                | 11448132              |
| 63.73                     | 331.48        | 168.06     | 563.27  | 380705.30                | 11828837              |
| 132.84                    | 443.60        | 169.15     | 745.60  | 316958.81                | 12145796              |
| 200.63                    | 540.75        | 170.02     | 911.39  | 252931.47                | 12398728              |
| 259.29                    | 619.79        | 170.67     | 1049.75 | 194921.79                | 12593649              |
| 305.80                    | 680.46        | 171.15     | 1157.41 | 144643.10                | 12738292              |
| 340.32                    | 724.71        | 171.49     | 1236.52 | 102712.27                | 12841005              |
| 364.09                    | 754.92        | 171.72     | 1290.73 | 68745.78                 | 12909750              |
| 378.28                    | 772.85        | 171.85     | 1322.98 | 41300.26                 | 12951051              |
| 385.24                    | 781.63        | 171.92     | 1338.79 | 19457.70                 | 12970508              |
| 386.01                    | 782.61        | 171.93     | 1340.55 | 2354.09                  | 12972863              |
| 382.14                    | 777.72        | 171.89     | 1331.75 | -10960.68                | 12961902              |
| 374.81                    | 768.48        | 171.82     | 1315.11 | -21242.38                | 12940659              |
| 364.66                    | 755.64        | 171.72     | 1292.03 | -29087.79                | 12911572              |
| 352.52                    | 740.24        | 171.61     | 1264.37 | -35004.93                | 12876567              |
| 339.01                    | 723.05        | 171.48     | 1233.54 | -39559.16                | 12837008              |
| 324.38                    | 704.35        | 171.34     | 1200.06 | -42998.34                | 12794009              |
| 309.23                    | 684.88        | 171.19     | 1165.30 | -45497.76                | 12748511              |
| 293.62                    | 664.69        | 171.03     | 1129.34 | -47450.45                | 12701061              |
| 277.93                    | 644.27        | 170.87     | 1093.06 | -48871.08                | 12652190              |
| 262.19                    | 623.62        | 170.70     | 1056.51 | -49645.02                | 12602545              |
| 246.45                    | 602.77        | 170.53     | 1019.76 | -50129.13                | 12552416              |
| 231.07                    | 582.19        | 170.36     | 983.62  | -50375.62                | 12502040              |
| 216.05                    | 561.87        | 170.19     | 948.11  | -50127.36                | 12451913              |
| 201.72                    | 542.25        | 170.03     | 913.99  | -49468.95                | 12402444              |
| 187.91                    | 523.10        | 169.86     | 880.88  | -48498.58                | 12353945              |
| 174.63                    | 504.43        | 169.70     | 848.76  | -47592.72                | 12306353              |
| 162.01                    | 486.42        | 169.54     | 817.98  | -46875.69                | 12259477              |
| 149.91                    | 468.87        | 169.39     | 788.16  | -46021.60                | 12213455              |



## Laminación de avenida T = 5.000 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 10.5    | 630       | 567.50            | 174.180            |
| 10.6    | 635       | 546.30            | 174.098            |
| 10.7    | 640       | 526.10            | 174.019            |
| 10.8    | 645       | 506.90            | 173.942            |
| 10.8    | 650       | 488.70            | 173.865            |
| 10.9    | 655       | 471.40            | 173.790            |
| 11.0    | 660       | 455.00            | 173.717            |
| 11.1    | 665       | 439.40            | 173.646            |
| 11.2    | 670       | 424.50            | 173.578            |
| 11.3    | 675       | 410.40            | 173.511            |
| 11.3    | 680       | 397.00            | 173.446            |
| 11.4    | 685       | 384.20            | 173.382            |
| 11.5    | 690       | 372.10            | 173.319            |
| 11.6    | 695       | 360.50            | 173.257            |
| 11.7    | 700       | 349.60            | 173.197            |
| 11.8    | 705       | 339.10            | 173.138            |
| 11.8    | 710       | 329.10            | 173.081            |
| 11.9    | 715       | 319.60            | 173.026            |
| 12.0    | 720       | 310.50            | 172.972            |
| 12.1    | 725       | 301.80            | 172.918            |
| 12.2    | 730       | 293.50            | 172.865            |
| 12.3    | 735       | 285.50            | 172.812            |
| 12.3    | 740       | 277.90            | 172.761            |
| 12.4    | 745       | 270.60            | 172.709            |
| 12.5    | 750       | 263.60            | 172.659            |
| 12.6    | 755       | 256.90            | 172.610            |
| 12.7    | 760       | 250.50            | 172.563            |
| 12.8    | 765       | 244.30            | 172.516            |
| 12.8    | 770       | 238.40            | 172.470            |
| 12.9    | 775       | 232.70            | 172.423            |
| 13.0    | 780       | 227.20            | 172.376            |
| 13.1    | 785       | 221.90            | 172.330            |
| 13.2    | 790       | 216.80            | 172.284            |
| 13.3    | 795       | 212.00            | 172.237            |
| 13.3    | 800       | 207.30            | 172.192            |
| 13.4    | 805       | 202.80            | 172.146            |
| 13.5    | 810       | 198.50            | 172.101            |
| 13.6    | 815       | 194.40            | 172.057            |
| 13.7    | 820       | 190.40            | 172.014            |
| 13.8    | 825       | 186.50            | 171.970            |
| 13.8    | 830       | 182.80            | 171.927            |
| 13.9    | 835       | 179.20            | 171.884            |
| 14.0    | 840       | 175.70            | 171.842            |
| 14.1    | 845       | 172.40            | 171.799            |
| 14.2    | 850       | 169.10            | 171.758            |
| 14.3    | 855       | 166.00            | 171.716            |
| 14.3    | 860       | 163.00            | 171.676            |
| 14.4    | 865       | 160.10            | 171.636            |
| 14.5    | 870       | 157.30            | 171.596            |
| 14.6    | 875       | 154.60            | 171.557            |
| 14.7    | 880       | 151.90            | 171.519            |
| 14.8    | 885       | 149.40            | 171.481            |
| 14.8    | 890       | 146.90            | 171.443            |
| 14.9    | 895       | 144.60            | 171.405            |
| 15.0    | 900       | 142.20            | 171.368            |
| 15.1    | 905       | 140.00            | 171.330            |
| 15.2    | 910       | 137.80            | 171.293            |
| 15.3    | 915       | 135.70            | 171.257            |
| 15.3    | 920       | 133.70            | 171.220            |
| 15.4    | 925       | 131.70            | 171.184            |
| 15.5    | 930       | 129.80            | 171.149            |
| 15.6    | 935       | 127.90            | 171.113            |
| 15.7    | 940       | 126.10            | 171.079            |

| CAUDALES DE SALIDA [m³/s] |               |            |        | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|--------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL  | [m³]                     | [m³]                  |
| 138.44                    | 451.97        | 169.23     | 759.64 | -44945.90                | 12168509              |
| 127.60                    | 435.70        | 169.08     | 732.38 | -43708.93                | 12124800              |
| 117.49                    | 420.24        | 168.94     | 706.67 | -42358.28                | 12082442              |
| 107.95                    | 405.39        | 168.79     | 682.14 | -41256.38                | 12041186              |
| 98.75                     | 390.75        | 168.65     | 658.15 | -40473.75                | 12000712              |
| 90.10                     | 376.69        | 168.52     | 635.31 | -39632.79                | 11961079              |
| 81.99                     | 363.20        | 168.38     | 613.57 | -38648.53                | 11922431              |
| 74.40                     | 350.27        | 168.25     | 592.92 | -37559.69                | 11884871              |
| 67.42                     | 338.05        | 168.12     | 573.60 | -36398.02                | 11848473              |
| 60.81                     | 326.19        | 168.00     | 555.00 | -35184.16                | 11813289              |
| 54.66                     | 314.84        | 167.88     | 537.38 | -34285.02                | 11779004              |
| 48.86                     | 303.82        | 167.76     | 520.44 | -33732.75                | 11745271              |
| 43.41                     | 293.13        | 167.65     | 504.18 | -33129.03                | 11712142              |
| 38.30                     | 282.75        | 167.53     | 488.58 | -32417.21                | 11679725              |
| 33.60                     | 272.86        | 167.42     | 473.87 | -31622.41                | 11648102              |
| 29.21                     | 263.26        | 167.31     | 459.78 | -30763.17                | 11617339              |
| 25.20                     | 254.12        | 167.21     | 446.53 | -29855.42                | 11587484              |
| 21.56                     | 245.43        | 167.10     | 434.09 | -28915.51                | 11558568              |
| 18.20                     | 237.01        | 167.00     | 422.21 | -28184.22                | 11530384              |
| 15.06                     | 228.71        | 166.90     | 410.67 | -27850.07                | 11502534              |
| 12.20                     | 220.68        | 166.80     | 399.68 | -27640.49                | 11474894              |
| 9.57                      | 212.76        | 166.71     | 389.03 | -27333.90                | 11447560              |
| 7.27                      | 205.25        | 166.61     | 379.13 | -26945.64                | 11420614              |
| 5.17                      | 197.71        | 166.51     | 369.39 | -26491.32                | 11394123              |
| 3.40                      | 190.56        | 166.42     | 360.39 | -25984.45                | 11368138              |
| 1.94                      | 183.66        | 166.33     | 351.93 | -25437.15                | 11342701              |
| 0.84                      | 177.13        | 166.24     | 344.21 | -24859.26                | 11317842              |
| 0.11                      | 170.70        | 166.15     | 336.97 | -24256.97                | 11293585              |
| 0.00                      | 164.50        | 166.07     | 330.57 | -23893.90                | 11269691              |
| 0.00                      | 158.26        | 165.98     | 324.24 | -23886.51                | 11245804              |
| 0.00                      | 152.12        | 165.89     | 318.01 | -23945.91                | 11221859              |
| 0.00                      | 146.20        | 165.81     | 312.01 | -23933.42                | 11197925              |
| 0.00                      | 140.37        | 165.72     | 306.09 | -23857.55                | 11174068              |
| 0.00                      | 134.52        | 165.63     | 300.15 | -23723.34                | 11150344              |
| 0.00                      | 129.00        | 165.55     | 294.55 | -23535.84                | 11126808              |
| 0.00                      | 123.46        | 165.46     | 288.93 | -23301.34                | 11103507              |
| 0.00                      | 118.14        | 165.38     | 283.52 | -23026.13                | 11080481              |
| 0.00                      | 113.02        | 165.30     | 278.31 | -22716.92                | 11057764              |
| 0.00                      | 108.10        | 165.21     | 273.32 | -22379.86                | 11035384              |
| 0.00                      | 103.16        | 165.13     | 268.30 | -22113.08                | 11013271              |
| 0.00                      | 98.42         | 165.05     | 263.48 | -21956.25                | 10991315              |
| 0.00                      | 93.77         | 164.97     | 258.74 | -21809.05                | 10969506              |
| 0.00                      | 89.31         | 164.89     | 254.20 | -21629.40                | 10947876              |
| 0.00                      | 84.84         | 164.81     | 249.65 | -21422.49                | 10926454              |
| 0.00                      | 80.65         | 164.73     | 245.39 | -21192.71                | 10905261              |
| 0.00                      | 76.45         | 164.65     | 241.11 | -20941.75                | 10884319              |
| 0.00                      | 72.53         | 164.58     | 237.11 | -20671.01                | 10863648              |
| 0.00                      | 68.69         | 164.50     | 233.20 | -20382.98                | 10843265              |
| 0.00                      | 64.93         | 164.43     | 229.36 | -20080.00                | 10823185              |
| 0.00                      | 61.35         | 164.35     | 225.70 | -19764.49                | 10803421              |
| 0.00                      | 57.93         | 164.28     | 222.21 | -19438.68                | 10783982              |
| 0.00                      | 54.59         | 164.21     | 218.80 | -19172.88                | 10764809              |
| 0.00                      | 51.32         | 164.14     | 215.46 | -19033.26                | 10745776              |
| 0.00                      | 48.13         | 164.07     | 212.20 | -18943.93                | 10726832              |
| 0.00                      | 45.10         | 164.00     | 209.10 | -18833.60                | 10707999              |
| 0.00                      | 42.06         | 163.93     | 205.99 | -18705.23                | 10689293              |
| 0.00                      | 39.19         | 163.86     | 203.04 | -18561.26                | 10670732              |
| 0.00                      | 36.46         | 163.79     | 200.25 | -18402.49                | 10652330              |
| 0.00                      | 33.74         | 163.72     | 197.45 | -18229.91                | 10634100              |
| 0.00                      | 31.16         | 163.65     | 194.81 | -18045.43                | 10616054              |
| 0.00                      | 28.73         | 163.58     | 192.31 | -17850.96                | 10598203              |
| 0.00                      | 26.31         | 163.52     | 189.82 | -17648.44                | 10580555              |
| 0.00                      | 24.09         | 163.45     | 187.54 | -17439.58                | 10563115              |

## Laminación de avenida T = 5.000 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 15.8    | 945       | 124.30            | 171.044            |
| 15.8    | 950       | 122.50            | 171.010            |
| 15.9    | 955       | 120.80            | 170.976            |
| 16.0    | 960       | 119.20            | 170.942            |
| 16.1    | 965       | 117.60            | 170.908            |
| 16.2    | 970       | 116.00            | 170.873            |
| 16.3    | 975       | 114.40            | 170.838            |
| 16.3    | 980       | 112.90            | 170.803            |
| 16.4    | 985       | 111.50            | 170.768            |
| 16.5    | 990       | 110.00            | 170.733            |
| 16.6    | 995       | 108.60            | 170.698            |
| 16.7    | 1000      | 107.20            | 170.663            |
| 16.8    | 1005      | 105.90            | 170.628            |
| 16.8    | 1010      | 104.60            | 170.593            |
| 16.9    | 1015      | 103.30            | 170.558            |
| 17.0    | 1020      | 102.00            | 170.522            |
| 17.1    | 1025      | 100.80            | 170.487            |
| 17.2    | 1030      | 99.50             | 170.451            |
| 17.3    | 1035      | 98.30             | 170.414            |
| 17.3    | 1040      | 97.20             | 170.377            |
| 17.4    | 1045      | 96.00             | 170.338            |
| 17.5    | 1050      | 94.90             | 170.300            |
| 17.6    | 1055      | 93.80             | 170.260            |
| 17.7    | 1060      | 92.70             | 170.220            |
| 17.8    | 1065      | 91.50             | 170.179            |
| 17.8    | 1070      | 90.30             | 170.137            |
| 17.9    | 1075      | 89.00             | 170.095            |
| 18.0    | 1080      | 87.60             | 170.052            |
| 18.1    | 1085      | 86.00             | 170.009            |
| 18.2    | 1090      | 84.50             | 169.964            |
| 18.3    | 1095      | 82.80             | 169.918            |
| 18.3    | 1100      | 81.10             | 169.872            |
| 18.4    | 1105      | 79.40             | 169.824            |
| 18.5    | 1110      | 77.60             | 169.775            |
| 18.6    | 1115      | 75.70             | 169.726            |
| 18.7    | 1120      | 73.70             | 169.675            |
| 18.8    | 1125      | 71.60             | 169.623            |
| 18.8    | 1130      | 69.40             | 169.570            |
| 18.9    | 1135      | 67.10             | 169.516            |
| 19.0    | 1140      | 64.70             | 169.460            |
| 19.1    | 1145      | 62.30             | 169.403            |
| 19.2    | 1150      | 59.80             | 169.344            |
| 19.3    | 1155      | 57.30             | 169.284            |
| 19.3    | 1160      | 54.80             | 169.222            |
| 19.4    | 1165      | 52.20             | 169.159            |
| 19.5    | 1170      | 49.70             | 169.094            |
| 19.6    | 1175      | 47.20             | 169.028            |
| 19.7    | 1180      | 44.70             | 168.960            |
| 19.8    | 1185      | 42.30             | 168.890            |
| 19.8    | 1190      | 39.90             | 168.818            |
| 19.9    | 1195      | 37.60             | 168.745            |
| 20.0    | 1200      | 35.30             | 168.670            |
| 20.1    | 1205      | 33.20             | 168.595            |
| 20.2    | 1210      | 31.10             | 168.517            |
| 20.3    | 1215      | 29.10             | 168.438            |
| 20.3    | 1220      | 27.10             | 168.357            |
| 20.4    | 1225      | 25.30             | 168.275            |
| 20.5    | 1230      | 23.60             | 168.192            |
| 20.6    | 1235      | 22.00             | 168.107            |
| 20.7    | 1240      | 20.40             | 168.022            |
| 20.8    | 1245      | 19.00             | 167.935            |
| 20.8    | 1250      | 17.60             | 167.846            |
| 20.9    | 1255      | 16.30             | 167.757            |

| CAUDALES DE SALIDA [m³/s] |               |            |        | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|--------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL  | [m³]                     | [m³]                  |
| 0.00                      | 21.89         | 163.38     | 185.27 | -17224.53                | 10545891              |
| 0.00                      | 19.82         | 163.32     | 183.14 | -17003.51                | 10528887              |
| 0.00                      | 17.83         | 163.26     | 181.08 | -16897.79                | 10511989              |
| 0.00                      | 15.91         | 163.19     | 179.11 | -16957.00                | 10495032              |
| 0.00                      | 14.08         | 163.13     | 177.21 | -17055.94                | 10477977              |
| 0.00                      | 12.28         | 163.06     | 175.34 | -17140.79                | 10460836              |
| 0.00                      | 10.56         | 162.99     | 173.55 | -17211.61                | 10443624              |
| 0.00                      | 8.94          | 162.93     | 171.87 | -17268.59                | 10426356              |
| 0.00                      | 7.42          | 162.86     | 170.28 | -17312.77                | 10409043              |
| 0.00                      | 6.00          | 162.79     | 168.79 | -17345.24                | 10391698              |
| 0.00                      | 4.69          | 162.73     | 167.41 | -17367.16                | 10374330              |
| 0.00                      | 3.49          | 162.66     | 166.15 | -17379.52                | 10356951              |
| 0.00                      | 2.42          | 162.59     | 165.02 | -17382.19                | 10339569              |
| 0.00                      | 1.50          | 162.53     | 164.02 | -17375.10                | 10322194              |
| 0.00                      | 0.74          | 162.46     | 163.19 | -17359.00                | 10304835              |
| 0.00                      | 0.17          | 162.39     | 162.56 | -17334.64                | 10287500              |
| 0.00                      | 0.00          | 162.32     | 162.32 | -17374.99                | 10270125              |
| 0.00                      | 0.00          | 162.25     | 162.25 | -17609.81                | 10252515              |
| 0.00                      | 0.00          | 162.18     | 162.18 | -17966.05                | 10234549              |
| 0.00                      | 0.00          | 162.11     | 162.11 | -18313.76                | 10216235              |
| 0.00                      | 0.00          | 162.04     | 162.04 | -18653.42                | 10197582              |
| 0.00                      | 0.00          | 161.97     | 161.97 | -18985.52                | 10178596              |
| 0.00                      | 0.00          | 161.89     | 161.89 | -19310.68                | 10159286              |
| 0.00                      | 0.00          | 161.81     | 161.81 | -19629.39                | 10139656              |
| 0.00                      | 0.00          | 161.73     | 161.73 | -19941.27                | 10119715              |
| 0.00                      | 0.00          | 161.65     | 161.65 | -20250.11                | 10099465              |
| 0.00                      | 0.00          | 161.57     | 161.57 | -20564.61                | 10078900              |
| 0.00                      | 0.00          | 161.49     | 161.49 | -20893.60                | 10058007              |
| 0.00                      | 0.00          | 161.41     | 161.41 | -21247.84                | 10036759              |
| 0.00                      | 0.00          | 161.32     | 161.32 | -21635.09                | 10015124              |
| 0.00                      | 0.00          | 161.23     | 161.23 | -22052.11                | 9993072               |
| 0.00                      | 0.00          | 161.14     | 161.14 | -22490.46                | 9970581               |
| 0.00                      | 0.00          | 161.05     | 161.05 | -22945.64                | 9947636               |
| 0.00                      | 0.00          | 160.96     | 160.96 | -23415.65                | 9924220               |
| 0.00                      | 0.00          | 160.86     | 160.86 | -23901.81                | 9900318               |
| 0.00                      | 0.00          | 160.76     | 160.76 | -24408.02                | 9875910               |
| 0.00                      | 0.00          | 160.66     | 160.66 | -24935.45                | 9850975               |
| 0.00                      | 0.00          | 160.56     | 160.56 | -25487.81                | 9825487               |
| 0.00                      | 0.00          | 160.46     | 160.46 | -26069.98                | 9799417               |
| 0.00                      | 0.00          | 160.35     | 160.35 | -26682.76                | 9772734               |
| 0.00                      | 0.00          | 160.24     | 160.24 | -27324.05                | 9745410               |
| 0.00                      | 0.00          | 160.13     | 160.13 | -27990.15                | 9717420               |
| 0.00                      | 0.00          | 160.01     | 160.01 | -28676.18                | 9688744               |
| 0.00                      | 0.00          | 159.89     | 159.89 | -29377.10                | 9659367               |
| 0.00                      | 0.00          | 159.77     | 159.77 | -30088.43                | 9629278               |
| 0.00                      | 0.00          | 159.64     | 159.64 | -30806.21                | 9598472               |
| 0.00                      | 0.00          | 159.51     | 159.51 | -31526.57                | 9566945               |
| 0.00                      | 0.00          | 159.38     | 159.38 | -32245.63                | 9534700               |
| 0.00                      | 0.00          | 159.24     | 159.24 | -32959.65                | 9501740               |
| 0.00                      | 0.00          | 159.10     | 159.10 | -33665.22                | 9468075               |
| 0.00                      | 0.00          | 158.96     | 158.96 | -34359.26                | 9433716               |
| 0.00                      | 0.00          | 158.81     | 158.81 | -35038.93                | 9398677               |
| 0.00                      | 0.00          | 158.67     | 158.67 | -35701.38                | 9362975               |
| 0.00                      | 0.00          | 158.52     | 158.52 | -36343.89                | 9326631               |
| 0.00                      | 0.00          | 158.36     | 158.36 | -36963.31                | 9289668               |
| 0.00                      | 0.00          | 158.20     | 158.20 | -37557.13                | 9252111               |
| 0.00                      | 0.00          | 158.04     | 158.04 | -38123.89                | 9213987               |
| 0.00                      | 0.00          | 157.88     | 157.88 | -38662.59                | 9175325               |
| 0.00                      | 0.00          | 157.71     | 157.71 | -39172.81                | 9136152               |
| 0.00                      | 0.00          | 157.54     | 157.54 | -39654.40                | 9096497               |
| 0.00                      | 0.00          | 157.37     | 157.37 | -40107.17                | 9056390               |
| 0.00                      | 0.00          | 157.20     | 157.20 | -40531.23                | 9015859               |
| 0.00                      | 0.00          | 157.02     | 157.02 | -40927.20                | 8974932               |

## Laminación de avenida T = 5.000 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 21.0    | 1260      | 15.10             | 167.667            |
| 21.1    | 1265      | 14.00             | 167.576            |
| 21.2    | 1270      | 13.00             | 167.484            |
| 21.3    | 1275      | 12.00             | 167.391            |
| 21.3    | 1280      | 11.10             | 167.297            |
| 21.4    | 1285      | 10.30             | 167.203            |
| 21.5    | 1290      | 9.50              | 167.108            |
| 21.6    | 1295      | 8.80              | 167.012            |
| 21.7    | 1300      | 8.10              | 166.916            |
| 21.8    | 1305      | 7.50              | 166.818            |
| 21.8    | 1310      | 6.90              | 166.720            |
| 21.9    | 1315      | 6.40              | 166.622            |
| 22.0    | 1320      | 5.90              | 166.524            |
| 22.1    | 1325      | 5.40              | 166.425            |
| 22.2    | 1330      | 5.00              | 166.325            |
| 22.3    | 1335      | 4.60              | 166.225            |
| 22.3    | 1340      | 4.30              | 166.124            |
| 22.4    | 1345      | 3.90              | 166.024            |
| 22.5    | 1350      | 3.60              | 165.923            |
| 22.6    | 1355      | 3.30              | 165.821            |
| 22.7    | 1360      | 3.10              | 165.719            |
| 22.8    | 1365      | 2.80              | 165.617            |
| 22.8    | 1370      | 2.60              | 165.515            |
| 22.9    | 1375      | 2.40              | 165.411            |
| 23.0    | 1380      | 2.20              | 165.308            |
| 23.1    | 1385      | 2.00              | 165.205            |
| 23.2    | 1390      | 1.90              | 165.101            |
| 23.3    | 1395      | 1.70              | 164.998            |
| 23.3    | 1400      | 1.60              | 164.893            |
| 23.4    | 1405      | 1.40              | 164.789            |
| 23.5    | 1410      | 1.30              | 164.684            |
| 23.6    | 1415      | 1.20              | 164.580            |
| 23.7    | 1420      | 1.10              | 164.475            |
| 23.8    | 1425      | 1.00              | 164.370            |
| 23.8    | 1430      | 0.90              | 164.264            |
| 23.9    | 1435      | 0.90              | 164.159            |
| 24.0    | 1440      | 0.80              | 164.054            |
| 24.1    | 1445      | 0.70              | 163.948            |
| 24.2    | 1450      | 0.70              | 163.841            |
| 24.3    | 1455      | 0.60              | 163.735            |
| 24.3    | 1460      | 0.50              | 163.629            |
| 24.4    | 1465      | 0.50              | 163.523            |
| 24.5    | 1470      | 0.40              | 163.415            |
| 24.6    | 1475      | 0.40              | 163.308            |
| 24.7    | 1480      | 0.40              | 163.201            |
| 24.8    | 1485      | 0.30              | 163.094            |
| 24.8    | 1490      | 0.30              | 162.987            |
| 24.9    | 1495      | 0.30              | 162.879            |
| 25.0    | 1500      | 0.20              | 162.771            |
| 25.1    | 1505      | 0.20              | 162.663            |
| 25.2    | 1510      | 0.20              | 162.555            |
| 25.3    | 1515      | 0.20              | 162.447            |
| 25.3    | 1520      | 0.20              | 162.338            |
| 25.4    | 1525      | 0.10              | 162.230            |
| 25.5    | 1530      | 0.10              | 162.121            |
| 25.6    | 1535      | 0.10              | 162.013            |
| 25.7    | 1540      | 0.10              | 161.903            |
| 25.8    | 1545      | 0.10              | 161.794            |
| 25.8    | 1550      | 0.10              | 161.684            |
| 25.9    | 1555      | 0.10              | 161.575            |
| 26.0    | 1560      | 0.10              | 161.466            |
| 26.1    | 1565      | 0.10              | 161.355            |
| 26.2    | 1570      | 0.00              | 161.245            |

| CAUDALES DE SALIDA [m3/s] |               |            |        | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|--------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL  | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 156.84     | 156.84 | -41295.70                | 8933636               |
| 0.00                      | 0.00          | 156.66     | 156.66 | -41637.57                | 8891998               |
| 0.00                      | 0.00          | 156.48     | 156.48 | -41953.68                | 8850045               |
| 0.00                      | 0.00          | 156.30     | 156.30 | -42244.55                | 8807800               |
| 0.00                      | 0.00          | 156.11     | 156.11 | -42511.42                | 8765289               |
| 0.00                      | 0.00          | 155.92     | 155.92 | -42755.98                | 8722533               |
| 0.00                      | 0.00          | 155.74     | 155.74 | -42979.33                | 8679553               |
| 0.00                      | 0.00          | 155.54     | 155.54 | -43182.64                | 8636371               |
| 0.00                      | 0.00          | 155.35     | 155.35 | -43366.64                | 8593004               |
| 0.00                      | 0.00          | 155.16     | 155.16 | -43532.48                | 8549472               |
| 0.00                      | 0.00          | 154.96     | 154.96 | -43681.89                | 8505790               |
| 0.00                      | 0.00          | 154.76     | 154.76 | -43816.05                | 8461974               |
| 0.00                      | 0.00          | 154.57     | 154.57 | -43936.01                | 8418038               |
| 0.00                      | 0.00          | 154.37     | 154.37 | -44042.40                | 8373995               |
| 0.00                      | 0.00          | 154.17     | 154.17 | -44136.05                | 8329859               |
| 0.00                      | 0.00          | 153.97     | 153.97 | -44218.07                | 8285641               |
| 0.00                      | 0.00          | 153.76     | 153.76 | -44289.37                | 8241352               |
| 0.00                      | 0.00          | 153.56     | 153.56 | -44350.68                | 8197001               |
| 0.00                      | 0.00          | 153.36     | 153.36 | -44402.17                | 8152599               |
| 0.00                      | 0.00          | 153.15     | 153.15 | -44444.37                | 8108155               |
| 0.00                      | 0.00          | 152.94     | 152.94 | -44478.46                | 8063676               |
| 0.00                      | 0.00          | 152.74     | 152.74 | -44505.17                | 8019171               |
| 0.00                      | 0.00          | 152.53     | 152.53 | -44525.08                | 7974646               |
| 0.00                      | 0.00          | 152.32     | 152.32 | -44538.10                | 7930108               |
| 0.00                      | 0.00          | 152.11     | 152.11 | -44544.60                | 7885563               |
| 0.00                      | 0.00          | 151.90     | 151.90 | -44545.61                | 7841018               |
| 0.00                      | 0.00          | 151.69     | 151.69 | -44541.63                | 7796476               |
| 0.00                      | 0.00          | 151.48     | 151.48 | -44533.04                | 7751943               |
| 0.00                      | 0.00          | 151.26     | 151.26 | -44519.81                | 7707423               |
| 0.00                      | 0.00          | 151.05     | 151.05 | -44502.27                | 7662921               |
| 0.00                      | 0.00          | 150.83     | 150.83 | -44481.09                | 7618440               |
| 0.00                      | 0.00          | 150.62     | 150.62 | -44456.60                | 7573983               |
| 0.00                      | 0.00          | 150.40     | 150.40 | -44428.84                | 7529554               |
| 0.00                      | 0.00          | 150.18     | 150.18 | -44397.54                | 7485157               |
| 0.00                      | 0.00          | 149.97     | 149.97 | -44363.09                | 7440794               |
| 0.00                      | 0.00          | 149.75     | 149.75 | -44326.24                | 7396467               |
| 0.00                      | 0.00          | 149.53     | 149.53 | -44287.20                | 7352180               |
| 0.00                      | 0.00          | 149.31     | 149.31 | -44245.79                | 7307934               |
| 0.00                      | 0.00          | 149.09     | 149.09 | -44201.80                | 7263733               |
| 0.00                      | 0.00          | 148.87     | 148.87 | -44155.76                | 7219577               |
| 0.00                      | 0.00          | 148.65     | 148.65 | -44108.16                | 7175469               |
| 0.00                      | 0.00          | 148.43     | 148.43 | -44059.15                | 7131410               |
| 0.00                      | 0.00          | 148.20     | 148.20 | -44008.25                | 7087401               |
| 0.00                      | 0.00          | 147.98     | 147.98 | -43955.37                | 7043446               |
| 0.00                      | 0.00          | 147.75     | 147.75 | -43901.22                | 6999545               |
| 0.00                      | 0.00          | 147.53     | 147.53 | -43846.06                | 6955699               |
| 0.00                      | 0.00          | 147.30     | 147.30 | -43789.89                | 6911909               |
| 0.00                      | 0.00          | 147.07     | 147.07 | -43732.41                | 6868176               |
| 0.00                      | 0.00          | 146.85     | 146.85 | -43673.71                | 6824503               |
| 0.00                      | 0.00          | 146.62     | 146.62 | -43614.29                | 6780888               |
| 0.00                      | 0.00          | 146.39     | 146.39 | -43554.18                | 6737334               |
| 0.00                      | 0.00          | 146.16     | 146.16 | -43493.08                | 6693841               |
| 0.00                      | 0.00          | 145.93     | 145.93 | -43430.60                | 6650411               |
| 0.00                      | 0.00          | 145.70     | 145.70 | -43367.19                | 6607043               |
| 0.00                      | 0.00          | 145.47     | 145.47 | -43303.30                | 6563740               |
| 0.00                      | 0.00          | 145.24     | 145.24 | -43238.97                | 6520501               |
| 0.00                      | 0.00          | 145.00     | 145.00 | -43173.54                | 6477328               |
| 0.00                      | 0.00          | 144.77     | 144.77 | -43106.97                | 6434221               |
| 0.00                      | 0.00          | 144.53     | 144.53 | -43040.02                | 6391181               |
| 0.00                      | 0.00          | 144.30     | 144.30 | -42972.81                | 6348208               |
| 0.00                      | 0.00          | 144.06     | 144.06 | -42905.13                | 6305303               |
| 0.00                      | 0.00          | 143.82     | 143.82 | -42836.44                | 6262466               |
| 0.00                      | 0.00          | 143.59     | 143.59 | -42767.10                | 6219699               |

## Laminación de avenida T = 5.000 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 26.3    | 1575      | 0.00              | 161.135            |
| 26.3    | 1580      | 0.00              | 161.025            |
| 26.4    | 1585      | 0.00              | 160.914            |
| 26.5    | 1590      | 0.00              | 160.803            |
| 26.6    | 1595      | 0.00              | 160.692            |
| 26.7    | 1600      | 0.00              | 160.582            |
| 26.8    | 1605      | 0.00              | 160.471            |
| 26.8    | 1610      | 0.00              | 160.359            |
| 26.9    | 1615      | 0.00              | 160.247            |
| 27.0    | 1620      | 0.00              | 160.136            |
| 27.1    | 1625      | 0.00              | 160.024            |
| 27.2    | 1630      | 0.00              | 159.912            |
| 27.3    | 1635      | 0.00              | 159.799            |
| 27.3    | 1640      | 0.00              | 159.687            |
| 27.4    | 1645      | 0.00              | 159.574            |
| 27.5    | 1650      | 0.00              | 159.462            |
| 27.6    | 1655      | 0.00              | 159.348            |
| 27.7    | 1660      | 0.00              | 159.235            |
| 27.8    | 1665      | 0.00              | 159.121            |
| 27.8    | 1670      | 0.00              | 159.008            |
| 27.9    | 1675      | 0.00              | 158.894            |
| 28.0    | 1680      | 0.00              | 158.780            |
| 28.1    | 1685      | 0.00              | 158.666            |
| 28.2    | 1690      | 0.00              | 158.552            |
| 28.3    | 1695      | 0.00              | 158.437            |
| 28.3    | 1700      | 0.00              | 158.322            |
| 28.4    | 1705      | 0.00              | 158.207            |
| 28.5    | 1710      | 0.00              | 158.092            |
| 28.6    | 1715      | 0.00              | 157.977            |
| 28.7    | 1720      | 0.00              | 157.861            |
| 28.8    | 1725      | 0.00              | 157.745            |
| 28.8    | 1730      | 0.00              | 157.630            |
| 28.9    | 1735      | 0.00              | 157.514            |
| 29.0    | 1740      | 0.00              | 157.397            |
| 29.1    | 1745      | 0.00              | 157.281            |
| 29.2    | 1750      | 0.00              | 157.164            |
| 29.3    | 1755      | 0.00              | 157.048            |
| 29.3    | 1760      | 0.00              | 156.931            |
| 29.4    | 1765      | 0.00              | 156.813            |
| 29.5    | 1770      | 0.00              | 156.695            |
| 29.6    | 1775      | 0.00              | 156.578            |
| 29.7    | 1780      | 0.00              | 156.460            |
| 29.8    | 1785      | 0.00              | 156.342            |
| 29.8    | 1790      | 0.00              | 156.223            |
| 29.9    | 1795      | 0.00              | 156.105            |
| 30.0    | 1800      | 0.00              | 155.987            |
| 30.1    | 1805      | 0.00              | 155.867            |
| 30.2    | 1810      | 0.00              | 155.747            |
| 30.3    | 1815      | 0.00              | 155.628            |
| 30.3    | 1820      | 0.00              | 155.509            |
| 30.4    | 1825      | 0.00              | 155.387            |
| 30.5    | 1830      | 0.00              | 155.266            |
| 30.6    | 1835      | 0.00              | 155.145            |
| 30.7    | 1840      | 0.00              | 155.024            |
| 30.8    | 1845      | 0.00              | 154.902            |
| 30.8    | 1850      | 0.00              | 154.779            |
| 30.9    | 1855      | 0.00              | 154.657            |
| 31.0    | 1860      | 0.00              | 154.534            |
| 31.1    | 1865      | 0.00              | 154.411            |
| 31.2    | 1870      | 0.00              | 154.287            |
| 31.3    | 1875      | 0.00              | 154.163            |
| 31.3    | 1880      | 0.00              | 154.040            |
| 31.4    | 1885      | 0.00              | 153.915            |

| CAUDALES DE SALIDA [m3/s] |               |            |        | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|--------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL  | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 143.35     | 143.35 | -42697.67                | 6177001               |
| 0.00                      | 0.00          | 143.11     | 143.11 | -42628.17                | 6134373               |
| 0.00                      | 0.00          | 142.87     | 142.87 | -42557.87                | 6091815               |
| 0.00                      | 0.00          | 142.63     | 142.63 | -42486.57                | 6049329               |
| 0.00                      | 0.00          | 142.39     | 142.39 | -42414.95                | 6006914               |
| 0.00                      | 0.00          | 142.15     | 142.15 | -42343.25                | 5964571               |
| 0.00                      | 0.00          | 141.91     | 141.91 | -42271.31                | 5922299               |
| 0.00                      | 0.00          | 141.66     | 141.66 | -42198.80                | 5880100               |
| 0.00                      | 0.00          | 141.42     | 141.42 | -42125.85                | 5837975               |
| 0.00                      | 0.00          | 141.17     | 141.17 | -42052.90                | 5795922               |
| 0.00                      | 0.00          | 140.93     | 140.93 | -41979.97                | 5753942               |
| 0.00                      | 0.00          | 140.68     | 140.68 | -41906.20                | 5712036               |
| 0.00                      | 0.00          | 140.43     | 140.43 | -41831.27                | 5670204               |
| 0.00                      | 0.00          | 140.18     | 140.18 | -41756.00                | 5628448               |
| 0.00                      | 0.00          | 139.93     | 139.93 | -41680.80                | 5586768               |
| 0.00                      | 0.00          | 139.68     | 139.68 | -41605.50                | 5545162               |
| 0.00                      | 0.00          | 139.43     | 139.43 | -41529.70                | 5503632               |
| 0.00                      | 0.00          | 139.18     | 139.18 | -41453.63                | 5462179               |
| 0.00                      | 0.00          | 138.93     | 138.93 | -41377.67                | 5420801               |
| 0.00                      | 0.00          | 138.67     | 138.67 | -41301.83                | 5379499               |
| 0.00                      | 0.00          | 138.42     | 138.42 | -41225.24                | 5338274               |
| 0.00                      | 0.00          | 138.16     | 138.16 | -41147.84                | 5297126               |
| 0.00                      | 0.00          | 137.91     | 137.91 | -41070.50                | 5256056               |
| 0.00                      | 0.00          | 137.65     | 137.65 | -40993.31                | 5215062               |
| 0.00                      | 0.00          | 137.39     | 137.39 | -40915.72                | 5174147               |
| 0.00                      | 0.00          | 137.13     | 137.13 | -40837.33                | 5133309               |
| 0.00                      | 0.00          | 136.87     | 136.87 | -40758.64                | 5092551               |
| 0.00                      | 0.00          | 136.61     | 136.61 | -40680.12                | 5051870               |
| 0.00                      | 0.00          | 136.35     | 136.35 | -40601.54                | 5011269               |
| 0.00                      | 0.00          | 136.08     | 136.08 | -40522.14                | 4970747               |
| 0.00                      | 0.00          | 135.82     | 135.82 | -40442.13                | 4930305               |
| 0.00                      | 0.00          | 135.56     | 135.56 | -40362.26                | 4889942               |
| 0.00                      | 0.00          | 135.29     | 135.29 | -40282.56                | 4849660               |
| 0.00                      | 0.00          | 135.02     | 135.02 | -40201.82                | 4809458               |
| 0.00                      | 0.00          | 134.76     | 134.76 | -40119.93                | 4769338               |
| 0.00                      | 0.00          | 134.49     | 134.49 | -40038.03                | 4729300               |
| 0.00                      | 0.00          | 134.22     | 134.22 | -39956.29                | 4689344               |
| 0.00                      | 0.00          | 133.95     | 133.95 | -39874.33                | 4649469               |
| 0.00                      | 0.00          | 133.67     | 133.67 | -39791.88                | 4609678               |
| 0.00                      | 0.00          | 133.40     | 133.40 | -39709.32                | 4569968               |
| 0.00                      | 0.00          | 133.13     | 133.13 | -39626.93                | 4530341               |
| 0.00                      | 0.00          | 132.85     | 132.85 | -39544.37                | 4490797               |
| 0.00                      | 0.00          | 132.58     | 132.58 | -39460.94                | 4451336               |
| 0.00                      | 0.00          | 132.30     | 132.30 | -39377.00                | 4411959               |
| 0.00                      | 0.00          | 132.02     | 132.02 | -39293.22                | 4372666               |
| 0.00                      | 0.00          | 131.74     | 131.74 | -39209.51                | 4333456               |
| 0.00                      | 0.00          | 131.46     | 131.46 | -39124.80                | 4294331               |
| 0.00                      | 0.00          | 131.18     | 131.18 | -39039.25                | 4255292               |
| 0.00                      | 0.00          | 130.90     | 130.90 | -38953.88                | 4216338               |
| 0.00                      | 0.00          | 130.61     | 130.61 | -38868.70                | 4177470               |
| 0.00                      | 0.00          | 130.32     | 130.32 | -38782.49                | 4138687               |
| 0.00                      | 0.00          | 130.04     | 130.04 | -38695.19                | 4099992               |
| 0.00                      | 0.00          | 129.75     | 129.75 | -38607.97                | 4061384               |
| 0.00                      | 0.00          | 129.46     | 129.46 | -38520.95                | 4022863               |
| 0.00                      | 0.00          | 129.17     | 129.17 | -38432.81                | 3984430               |
| 0.00                      | 0.00          | 128.87     | 128.87 | -38343.21                | 3946087               |
| 0.00                      | 0.00          | 128.58     | 128.58 | -38253.48                | 3907834               |
| 0.00                      | 0.00          | 128.28     | 128.28 | -38163.95                | 3869670               |
| 0.00                      | 0.00          | 127.98     | 127.98 | -38073.73                | 3831596               |
| 0.00                      | 0.00          | 127.68     | 127.68 | -37982.41                | 3793613               |
| 0.00                      | 0.00          | 127.38     | 127.38 | -37890.96                | 3755722               |
| 0.00                      | 0.00          | 127.08     | 127.08 | -37799.73                | 3717923               |
| 0.00                      | 0.00          | 126.77     | 126.77 | -37707.81                | 3680215               |

## Laminación de avenida T = 5.000 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 31.5    | 1890      | 0.00              | 153.789            |
| 31.6    | 1895      | 0.00              | 153.664            |
| 31.7    | 1900      | 0.00              | 153.539            |
| 31.8    | 1905      | 0.00              | 153.413            |
| 31.8    | 1910      | 0.00              | 153.286            |
| 31.9    | 1915      | 0.00              | 153.159            |
| 32.0    | 1920      | 0.00              | 153.033            |
| 32.1    | 1925      | 0.00              | 152.905            |
| 32.2    | 1930      | 0.00              | 152.777            |
| 32.3    | 1935      | 0.00              | 152.649            |
| 32.3    | 1940      | 0.00              | 152.522            |
| 32.4    | 1945      | 0.00              | 152.393            |
| 32.5    | 1950      | 0.00              | 152.263            |
| 32.6    | 1955      | 0.00              | 152.134            |
| 32.7    | 1960      | 0.00              | 152.005            |
| 32.8    | 1965      | 0.00              | 151.874            |
| 32.8    | 1970      | 0.00              | 151.743            |
| 32.9    | 1975      | 0.00              | 151.612            |
| 33.0    | 1980      | 0.00              | 151.481            |
| 33.1    | 1985      | 0.00              | 151.347            |
| 33.2    | 1990      | 0.00              | 151.214            |
| 33.3    | 1995      | 0.00              | 151.081            |
| 33.3    | 2000      | 0.00              | 150.946            |
| 33.4    | 2005      | 0.00              | 150.810            |
| 33.5    | 2010      | 0.00              | 150.675            |
| 33.6    | 2015      | 0.00              | 150.539            |
| 33.7    | 2020      | 0.00              | 150.402            |
| 33.8    | 2025      | 0.00              | 150.264            |
| 33.8    | 2030      | 0.00              | 150.126            |
| 33.9    | 2035      | 0.00              | 149.988            |
| 34.0    | 2040      | 0.00              | 149.847            |
| 34.1    | 2045      | 0.00              | 149.706            |
| 34.2    | 2050      | 0.00              | 149.566            |
| 34.3    | 2055      | 0.00              | 149.424            |
| 34.3    | 2060      | 0.00              | 149.280            |
| 34.4    | 2065      | 0.00              | 149.136            |
| 34.5    | 2070      | 0.00              | 148.993            |
| 34.6    | 2075      | 0.00              | 148.846            |
| 34.7    | 2080      | 0.00              | 148.699            |
| 34.8    | 2085      | 0.00              | 148.553            |
| 34.8    | 2090      | 0.00              | 148.405            |
| 34.9    | 2095      | 0.00              | 148.256            |
| 35.0    | 2100      | 0.00              | 148.107            |
| 35.1    | 2105      | 0.00              | 147.957            |
| 35.2    | 2110      | 0.00              | 147.805            |
| 35.3    | 2115      | 0.00              | 147.653            |
| 35.3    | 2120      | 0.00              | 147.501            |
| 35.4    | 2125      | 0.00              | 147.345            |
| 35.5    | 2130      | 0.00              | 147.189            |
| 35.6    | 2135      | 0.00              | 147.033            |
| 35.7    | 2140      | 0.00              | 146.873            |
| 35.8    | 2145      | 0.00              | 146.713            |
| 35.8    | 2150      | 0.00              | 146.553            |
| 35.9    | 2155      | 0.00              | 146.390            |
| 36.0    | 2160      | 0.00              | 146.225            |
| 36.1    | 2165      | 0.00              | 146.061            |
| 36.2    | 2170      | 0.00              | 145.893            |
| 36.3    | 2175      | 0.00              | 145.723            |
| 36.3    | 2180      | 0.00              | 145.555            |
| 36.4    | 2185      | 0.00              | 145.382            |
| 36.5    | 2190      | 0.00              | 145.207            |
| 36.6    | 2195      | 0.00              | 145.033            |
| 36.7    | 2200      | 0.00              | 144.855            |

| CAUDALES DE SALIDA [m³/s] |               |            |        | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|--------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL  | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 126.47     | 126.47 | -37614.79                | 3642600               |
| 0.00                      | 0.00          | 126.16     | 126.16 | -37521.58                | 3605079               |
| 0.00                      | 0.00          | 125.85     | 125.85 | -37428.59                | 3567650               |
| 0.00                      | 0.00          | 125.54     | 125.54 | -37334.90                | 3530315               |
| 0.00                      | 0.00          | 125.23     | 125.23 | -37240.06                | 3493075               |
| 0.00                      | 0.00          | 124.91     | 124.91 | -37145.04                | 3455930               |
| 0.00                      | 0.00          | 124.60     | 124.60 | -37050.27                | 3418880               |
| 0.00                      | 0.00          | 124.28     | 124.28 | -36954.72                | 3381925               |
| 0.00                      | 0.00          | 123.96     | 123.96 | -36858.04                | 3345067               |
| 0.00                      | 0.00          | 123.64     | 123.64 | -36761.27                | 3308306               |
| 0.00                      | 0.00          | 123.32     | 123.32 | -36664.74                | 3271641               |
| 0.00                      | 0.00          | 122.99     | 122.99 | -36567.01                | 3235074               |
| 0.00                      | 0.00          | 122.67     | 122.67 | -36467.79                | 3198606               |
| 0.00                      | 0.00          | 122.34     | 122.34 | -36368.53                | 3162238               |
| 0.00                      | 0.00          | 122.01     | 122.01 | -36269.54                | 3125968               |
| 0.00                      | 0.00          | 121.68     | 121.68 | -36169.28                | 3089799               |
| 0.00                      | 0.00          | 121.34     | 121.34 | -36067.69                | 3053731               |
| 0.00                      | 0.00          | 121.01     | 121.01 | -35966.31                | 3017765               |
| 0.00                      | 0.00          | 120.67     | 120.67 | -35864.89                | 2981900               |
| 0.00                      | 0.00          | 120.33     | 120.33 | -35761.49                | 2946138               |
| 0.00                      | 0.00          | 119.99     | 119.99 | -35656.42                | 2910482               |
| 0.00                      | 0.00          | 119.64     | 119.64 | -35551.67                | 2874930               |
| 0.00                      | 0.00          | 119.29     | 119.29 | -35446.47                | 2839484               |
| 0.00                      | 0.00          | 118.94     | 118.94 | -35339.69                | 2804144               |
| 0.00                      | 0.00          | 118.58     | 118.58 | -35232.08                | 2768912               |
| 0.00                      | 0.00          | 118.23     | 118.23 | -35124.79                | 2733787               |
| 0.00                      | 0.00          | 117.87     | 117.87 | -35016.47                | 2698771               |
| 0.00                      | 0.00          | 117.50     | 117.50 | -34906.60                | 2663864               |
| 0.00                      | 0.00          | 117.14     | 117.14 | -34796.49                | 2629068               |
| 0.00                      | 0.00          | 116.77     | 116.77 | -34686.53                | 2594381               |
| 0.00                      | 0.00          | 116.40     | 116.40 | -34574.38                | 2559807               |
| 0.00                      | 0.00          | 116.02     | 116.02 | -34460.23                | 2525347               |
| 0.00                      | 0.00          | 115.65     | 115.65 | -34346.48                | 2491000               |
| 0.00                      | 0.00          | 115.27     | 115.27 | -34231.61                | 2456769               |
| 0.00                      | 0.00          | 114.88     | 114.88 | -34114.30                | 2422654               |
| 0.00                      | 0.00          | 114.49     | 114.49 | -33996.07                | 2388658               |
| 0.00                      | 0.00          | 114.10     | 114.10 | -33878.12                | 2354780               |
| 0.00                      | 0.00          | 113.70     | 113.70 | -33758.28                | 2321022               |
| 0.00                      | 0.00          | 113.30     | 113.30 | -33636.65                | 2287385               |
| 0.00                      | 0.00          | 112.90     | 112.90 | -33515.46                | 2253870               |
| 0.00                      | 0.00          | 112.49     | 112.49 | -33393.04                | 2220477               |
| 0.00                      | 0.00          | 112.08     | 112.08 | -33268.40                | 2187208               |
| 0.00                      | 0.00          | 111.67     | 111.67 | -33143.28                | 2154065               |
| 0.00                      | 0.00          | 111.25     | 111.25 | -33017.78                | 2121047               |
| 0.00                      | 0.00          | 110.83     | 110.83 | -32889.73                | 2088157               |
| 0.00                      | 0.00          | 110.40     | 110.40 | -32759.99                | 2055397               |
| 0.00                      | 0.00          | 109.97     | 109.97 | -32630.76                | 2022767               |
| 0.00                      | 0.00          | 109.53     | 109.53 | -32498.59                | 1990268               |
| 0.00                      | 0.00          | 109.09     | 109.09 | -32363.47                | 1957905               |
| 0.00                      | 0.00          | 108.64     | 108.64 | -32228.89                | 1925676               |
| 0.00                      | 0.00          | 108.19     | 108.19 | -32091.95                | 1893584               |
| 0.00                      | 0.00          | 107.73     | 107.73 | -31951.93                | 1861632               |
| 0.00                      | 0.00          | 107.27     | 107.27 | -31811.71                | 1829820               |
| 0.00                      | 0.00          | 106.79     | 106.79 | -31669.85                | 1798150               |
| 0.00                      | 0.00          | 106.31     | 106.31 | -31525.20                | 1766625               |
| 0.00                      | 0.00          | 105.83     | 105.83 | -31380.08                | 1735245               |
| 0.00                      | 0.00          | 105.34     | 105.34 | -31232.69                | 1704012               |
| 0.00                      | 0.00          | 104.84     | 104.84 | -31081.38                | 1672931               |
| 0.00                      | 0.00          | 104.34     | 104.34 | -30929.07                | 1642002               |
| 0.00                      | 0.00          | 103.83     | 103.83 | -30774.51                | 1611227               |
| 0.00                      | 0.00          | 103.30     | 103.30 | -30616.34                | 1580611               |
| 0.00                      | 0.00          | 102.78     | 102.78 | -30457.53                | 1550153               |
| 0.00                      | 0.00          | 102.24     | 102.24 | -30295.56                | 1519858               |

## Laminación de avenida T = 5.000 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 36.8    | 2205      | 0.00              | 144.676            |
| 36.8    | 2210      | 0.00              | 144.497            |
| 36.9    | 2215      | 0.00              | 144.313            |
| 37.0    | 2220      | 0.00              | 144.130            |
| 37.1    | 2225      | 0.00              | 143.946            |
| 37.2    | 2230      | 0.00              | 143.758            |
| 37.3    | 2235      | 0.00              | 143.571            |
| 37.3    | 2240      | 0.00              | 143.380            |
| 37.4    | 2245      | 0.00              | 143.188            |
| 37.5    | 2250      | 0.00              | 142.997            |
| 37.6    | 2255      | 0.00              | 142.800            |
| 37.7    | 2260      | 0.00              | 142.604            |
| 37.8    | 2265      | 0.00              | 142.407            |
| 37.8    | 2270      | 0.00              | 142.207            |
| 37.9    | 2275      | 0.00              | 142.009            |
| 38.0    | 2280      | 0.00              | 141.806            |
| 38.1    | 2285      | 0.00              | 141.604            |
| 38.2    | 2290      | 0.00              | 141.400            |
| 38.3    | 2295      | 0.00              | 141.194            |
| 38.3    | 2300      | 0.00              | 140.990            |
| 38.4    | 2305      | 0.00              | 140.780            |
| 38.5    | 2310      | 0.00              | 140.572            |
| 38.6    | 2315      | 0.00              | 140.361            |
| 38.7    | 2320      | 0.00              | 140.150            |
| 38.8    | 2325      | 0.00              | 139.938            |
| 38.8    | 2330      | 0.00              | 139.724            |
| 38.9    | 2335      | 0.00              | 139.511            |
| 39.0    | 2340      | 0.00              | 139.295            |
| 39.1    | 2345      | 0.00              | 139.080            |
| 39.2    | 2350      | 0.00              | 138.863            |
| 39.3    | 2355      | 0.00              | 138.646            |
| 39.3    | 2360      | 0.00              | 138.430            |
| 39.4    | 2365      | 0.00              | 138.210            |
| 39.5    | 2370      | 0.00              | 137.993            |
| 39.6    | 2375      | 0.00              | 137.771            |
| 39.7    | 2380      | 0.00              | 137.552            |
| 39.8    | 2385      | 0.00              | 137.329            |
| 39.8    | 2390      | 0.00              | 137.106            |
| 39.9    | 2395      | 0.00              | 136.882            |
| 40.0    | 2400      | 0.00              | 136.657            |
| 40.1    | 2405      | 0.00              | 136.432            |
| 40.2    | 2410      | 0.00              | 136.203            |
| 40.3    | 2415      | 0.00              | 135.977            |
| 40.3    | 2420      | 0.00              | 135.746            |
| 40.4    | 2425      | 0.00              | 135.518            |
| 40.5    | 2430      | 0.00              | 135.285            |
| 40.6    | 2435      | 0.00              | 135.055            |
| 40.7    | 2440      | 0.00              | 134.822            |
| 40.8    | 2445      | 0.00              | 134.590            |
| 40.8    | 2450      | 0.00              | 134.356            |
| 40.9    | 2455      | 0.00              | 134.123            |
| 41.0    | 2460      | 0.00              | 133.886            |
| 41.1    | 2465      | 0.00              | 133.645            |
| 41.2    | 2470      | 0.00              | 133.400            |
| 41.3    | 2475      | 0.00              | 133.145            |
| 41.3    | 2480      | 0.00              | 132.886            |
| 41.4    | 2485      | 0.00              | 132.622            |
| 41.5    | 2490      | 0.00              | 132.355            |
| 41.6    | 2495      | 0.00              | 132.088            |
| 41.7    | 2500      | 0.00              | 131.807            |
| 41.8    | 2505      | 0.00              | 131.524            |
| 41.8    | 2510      | 0.00              | 131.192            |
| 41.9    | 2515      | 0.00              | 130.846            |

| CAUDALES DE SALIDA [m³/s] |               |            |        | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|--------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL  | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 101.70     | 101.70 | -30129.51                | 1489728               |
| 0.00                      | 0.00          | 101.15     | 101.15 | -29963.35                | 1459765               |
| 0.00                      | 0.00          | 100.58     | 100.58 | -29793.73                | 1429971               |
| 0.00                      | 0.00          | 100.02     | 100.02 | -29620.78                | 1400351               |
| 0.00                      | 0.00          | 99.44      | 99.44  | -29447.51                | 1370903               |
| 0.00                      | 0.00          | 98.86      | 98.86  | -29270.69                | 1341632               |
| 0.00                      | 0.00          | 98.27      | 98.27  | -29091.69                | 1312541               |
| 0.00                      | 0.00          | 97.66      | 97.66  | -28910.46                | 1283630               |
| 0.00                      | 0.00          | 97.05      | 97.05  | -28725.03                | 1254905               |
| 0.00                      | 0.00          | 96.44      | 96.44  | -28538.67                | 1226366               |
| 0.00                      | 0.00          | 95.80      | 95.80  | -28348.26                | 1198018               |
| 0.00                      | 0.00          | 95.17      | 95.17  | -28153.94                | 1169864               |
| 0.00                      | 0.00          | 94.52      | 94.52  | -27958.58                | 1141906               |
| 0.00                      | 0.00          | 93.87      | 93.87  | -27759.46                | 1114146               |
| 0.00                      | 0.00          | 93.21      | 93.21  | -27559.01                | 1086587               |
| 0.00                      | 0.00          | 92.53      | 92.53  | -27354.97                | 1059232               |
| 0.00                      | 0.00          | 91.85      | 91.85  | -27147.16                | 1032085               |
| 0.00                      | 0.00          | 91.16      | 91.16  | -26937.75                | 1005147               |
| 0.00                      | 0.00          | 90.46      | 90.46  | -26723.89                | 978423                |
| 0.00                      | 0.00          | 89.75      | 89.75  | -26508.35                | 951915                |
| 0.00                      | 0.00          | 89.03      | 89.03  | -26289.58                | 925626                |
| 0.00                      | 0.00          | 88.30      | 88.30  | -26067.86                | 899558                |
| 0.00                      | 0.00          | 87.55      | 87.55  | -25843.45                | 873714                |
| 0.00                      | 0.00          | 86.80      | 86.80  | -25613.99                | 848100                |
| 0.00                      | 0.00          | 86.04      | 86.04  | -25382.32                | 822718                |
| 0.00                      | 0.00          | 85.27      | 85.27  | -25146.44                | 797571                |
| 0.00                      | 0.00          | 84.49      | 84.49  | -24908.23                | 772663                |
| 0.00                      | 0.00          | 83.69      | 83.69  | -24666.43                | 747997                |
| 0.00                      | 0.00          | 82.89      | 82.89  | -24420.79                | 723576                |
| 0.00                      | 0.00          | 82.08      | 82.08  | -24173.24                | 699403                |
| 0.00                      | 0.00          | 81.25      | 81.25  | -23921.80                | 675481                |
| 0.00                      | 0.00          | 80.43      | 80.43  | -23668.23                | 651813                |
| 0.00                      | 0.00          | 79.57      | 79.57  | -23410.05                | 628403                |
| 0.00                      | 0.00          | 78.72      | 78.72  | -23149.48                | 605253                |
| 0.00                      | 0.00          | 77.84      | 77.84  | -22883.28                | 582370                |
| 0.00                      | 0.00          | 76.97      | 76.97  | -22611.87                | 559758                |
| 0.00                      | 0.00          | 76.06      | 76.06  | -22336.64                | 537421                |
| 0.00                      | 0.00          | 75.15      | 75.15  | -22055.56                | 515366                |
| 0.00                      | 0.00          | 74.22      | 74.22  | -21771.17                | 493595                |
| 0.00                      | 0.00          | 73.27      | 73.27  | -21481.44                | 472113                |
| 0.00                      | 0.00          | 72.31      | 72.31  | -21187.83                | 450925                |
| 0.00                      | 0.00          | 71.32      | 71.32  | -20886.71                | 430039                |
| 0.00                      | 0.00          | 70.34      | 70.34  | -20580.69                | 409458                |
| 0.00                      | 0.00          | 69.31      | 69.31  | -20267.94                | 389190                |
| 0.00                      | 0.00          | 68.28      | 68.28  | -19949.84                | 369240                |
| 0.00                      | 0.00          | 67.22      | 67.22  | -19624.83                | 349615                |
| 0.00                      | 0.00          | 66.15      | 66.15  | -19292.16                | 330323                |
| 0.00                      | 0.00          | 65.04      | 65.04  | -18953.81                | 311369                |
| 0.00                      | 0.00          | 63.93      | 63.93  | -18607.80                | 292762                |
| 0.00                      | 0.00          | 62.78      | 62.78  | -18255.30                | 274506                |
| 0.00                      | 0.00          | 61.62      | 61.62  | -17893.80                | 256613                |
| 0.00                      | 0.00          | 60.42      | 60.42  | -17522.98                | 239090                |
| 0.00                      | 0.00          | 59.17      | 59.17  | -17137.77                | 221952                |
| 0.00                      | 0.00          | 57.87      | 57.87  | -16737.17                | 205215                |
| 0.00                      | 0.00          | 56.49      | 56.49  | -16314.80                | 188900                |
| 0.00                      | 0.00          | 55.05      | 55.05  | -15869.75                | 173030                |
| 0.00                      | 0.00          | 53.54      | 53.54  | -15403.19                | 157627                |
| 0.00                      | 0.00          | 51.97      | 51.97  | -14913.17                | 142714                |
| 0.00                      | 0.00          | 50.35      | 50.35  | -14405.29                | 128308                |
| 0.00                      | 0.00          | 48.59      | 48.59  | -13861.67                | 114447                |
| 0.00                      | 0.00          | 46.75      | 46.75  | -13282.39                | 101164                |
| 0.00                      | 0.00          | 44.49      | 44.49  | -12616.87                | 88548                 |
| 0.00                      | 0.00          | 42.01      | 42.01  | -11836.63                | 76711                 |



## Laminación de avenida T = 5.000 años

| TIEMPO  |           | CAUDAL<br>ENTRADA | COTA DE<br>EMBALSE |
|---------|-----------|-------------------|--------------------|
| [horas] | [minutos] | [m³/s]            | [m.s.n.m.]         |
| 42.0    | 2520      | 0.00              | 130.483            |
| 42.1    | 2525      | 0.00              | 130.101            |
| 42.2    | 2530      | 0.00              | 129.724            |
| 42.3    | 2535      | 0.00              | 129.369            |
| 42.3    | 2540      | 0.00              | 129.050            |
| 42.4    | 2545      | 0.00              | 128.737            |
| 42.5    | 2550      | 0.00              | 128.424            |
| 42.6    | 2555      | 0.00              | 128.131            |
| 42.7    | 2560      | 0.00              | 127.883            |
| 42.8    | 2565      | 0.00              | 127.654            |
| 42.8    | 2570      | 0.00              | 127.444            |
| 42.9    | 2575      | 0.00              | 127.217            |
| 43.0    | 2580      | 0.00              | 127.033            |
| 43.1    | 2585      | 0.00              | 126.852            |
| 43.2    | 2590      | 0.00              | 126.702            |
| 43.3    | 2595      | 0.00              | 126.586            |
| 43.3    | 2600      | 0.00              | 126.495            |
| 43.4    | 2605      | 0.00              | 126.414            |
| 43.5    | 2610      | 0.00              | 126.346            |
| 43.6    | 2615      | 0.00              | 126.290            |
| 43.7    | 2620      | 0.00              | 126.242            |
| 43.8    | 2625      | 0.00              | 126.203            |
| 43.8    | 2630      | 0.00              | 126.169            |
| 43.9    | 2635      | 0.00              | 126.142            |
| 44.0    | 2640      | 0.00              | 126.119            |
| 44.1    | 2645      | 0.00              | 126.099            |
| 44.2    | 2650      | 0.00              | 126.083            |
| 44.3    | 2655      | 0.00              | 126.069            |
| 44.3    | 2660      | 0.00              | 126.058            |
| 44.4    | 2665      | 0.00              | 126.049            |
| 44.5    | 2670      | 0.00              | 126.041            |
| 44.6    | 2675      | 0.00              | 126.034            |
| 44.7    | 2680      | 0.00              | 126.028            |
| 44.8    | 2685      | 0.00              | 126.024            |
| 44.8    | 2690      | 0.00              | 126.020            |
| 44.9    | 2695      | 0.00              | 126.017            |
| 45.0    | 2700      | 0.00              | 126.014            |
| 45.1    | 2705      | 0.00              | 126.012            |
| 45.2    | 2710      | 0.00              | 126.010            |
| 45.3    | 2715      | 0.00              | 126.008            |
| 45.3    | 2720      | 0.00              | 126.007            |
| 45.4    | 2725      | 0.00              | 126.006            |
| 45.5    | 2730      | 0.00              | 126.005            |
| 45.6    | 2735      | 0.00              | 126.004            |
| 45.7    | 2740      | 0.00              | 126.003            |
| 45.8    | 2745      | 0.00              | 126.003            |
| 45.8    | 2750      | 0.00              | 126.002            |
| 45.9    | 2755      | 0.00              | 126.002            |
| 46.0    | 2760      | 0.00              | 126.002            |
| 46.1    | 2765      | 0.00              | 126.001            |
| 46.2    | 2770      | 0.00              | 126.001            |
| 46.3    | 2775      | 0.00              | 126.001            |
| 46.3    | 2780      | 0.00              | 126.001            |
| 46.4    | 2785      | 0.00              | 126.001            |
| 46.5    | 2790      | 0.00              | 126.001            |
| 46.6    | 2795      | 0.00              | 126.000            |
| 46.7    | 2800      | 0.00              | 126.000            |

| CAUDALES DE SALIDA [m3/s] |               |            |       | INCREMENTO<br>DE VOLUMEN | VOLUMEN DE<br>EMBALSE |
|---------------------------|---------------|------------|-------|--------------------------|-----------------------|
| ALIVIADERO A1             | ALIVIADERO A2 | AGUJERO A3 | TOTAL | [m³]                     | [m³]                  |
| 0.00                      | 0.00          | 39.24      | 39.24 | -10973.24                | 65738                 |
| 0.00                      | 0.00          | 36.10      | 36.10 | -9976.58                 | 55761                 |
| 0.00                      | 0.00          | 32.70      | 32.70 | -8828.61                 | 46932                 |
| 0.00                      | 0.00          | 29.14      | 29.14 | -7559.86                 | 39373                 |
| 0.00                      | 0.00          | 25.52      | 25.52 | -6198.81                 | 33174                 |
| 0.00                      | 0.00          | 21.38      | 21.38 | -5391.42                 | 27782                 |
| 0.00                      | 0.00          | 16.22      | 16.22 | -5123.54                 | 22659                 |
| 0.00                      | 0.00          | 9.01       | 9.01  | -4347.04                 | 18312                 |
| 0.00                      | 0.00          | 8.25       | 8.25  | -3344.31                 | 14967                 |
| 0.00                      | 0.00          | 7.73       | 7.73  | -2742.80                 | 12225                 |
| 0.00                      | 0.00          | 7.22       | 7.22  | -2330.45                 | 9894                  |
| 0.00                      | 0.00          | 6.63       | 6.63  | -1928.69                 | 7966                  |
| 0.00                      | 0.00          | 6.11       | 6.11  | -1557.73                 | 6408                  |
| 0.00                      | 0.00          | 5.55       | 5.55  | -1240.82                 | 5167                  |
| 0.00                      | 0.00          | 5.04       | 5.04  | -967.44                  | 4200                  |
| 0.00                      | 0.00          | 4.60       | 4.60  | -750.41                  | 3449                  |
| 0.00                      | 0.00          | 4.23       | 4.23  | -583.07                  | 2866                  |
| 0.00                      | 0.00          | 3.87       | 3.87  | -468.79                  | 2397                  |
| 0.00                      | 0.00          | 3.54       | 3.54  | -392.12                  | 2005                  |
| 0.00                      | 0.00          | 3.24       | 3.24  | -327.97                  | 1677                  |
| 0.00                      | 0.00          | 2.96       | 2.96  | -274.33                  | 1403                  |
| 0.00                      | 0.00          | 2.71       | 2.71  | -229.46                  | 1173                  |
| 0.00                      | 0.00          | 2.47       | 2.47  | -191.93                  | 981                   |
| 0.00                      | 0.00          | 2.27       | 2.27  | -160.53                  | 821                   |
| 0.00                      | 0.00          | 2.07       | 2.07  | -134.28                  | 687                   |
| 0.00                      | 0.00          | 1.89       | 1.89  | -112.31                  | 574                   |
| 0.00                      | 0.00          | 1.73       | 1.73  | -93.94                   | 480                   |
| 0.00                      | 0.00          | 1.58       | 1.58  | -78.58                   | 402                   |
| 0.00                      | 0.00          | 1.45       | 1.45  | -65.72                   | 336                   |
| 0.00                      | 0.00          | 1.33       | 1.33  | -54.97                   | 281                   |
| 0.00                      | 0.00          | 1.22       | 1.22  | -45.99                   | 235                   |
| 0.00                      | 0.00          | 1.11       | 1.11  | -38.46                   | 197                   |
| 0.00                      | 0.00          | 1.01       | 1.01  | -32.17                   | 165                   |
| 0.00                      | 0.00          | 0.93       | 0.93  | -26.90                   | 138                   |
| 0.00                      | 0.00          | 0.85       | 0.85  | -22.51                   | 115                   |
| 0.00                      | 0.00          | 0.78       | 0.78  | -18.82                   | 96                    |
| 0.00                      | 0.00          | 0.71       | 0.71  | -15.75                   | 81                    |
| 0.00                      | 0.00          | 0.66       | 0.66  | -13.17                   | 67                    |
| 0.00                      | 0.00          | 0.60       | 0.60  | -11.02                   | 56                    |
| 0.00                      | 0.00          | 0.54       | 0.54  | -9.21                    | 47                    |
| 0.00                      | 0.00          | 0.50       | 0.50  | -7.71                    | 39                    |
| 0.00                      | 0.00          | 0.47       | 0.47  | -6.44                    | 33                    |
| 0.00                      | 0.00          | 0.43       | 0.43  | -5.40                    | 28                    |
| 0.00                      | 0.00          | 0.38       | 0.38  | -4.51                    | 23                    |
| 0.00                      | 0.00          | 0.33       | 0.33  | -3.77                    | 19                    |
| 0.00                      | 0.00          | 0.33       | 0.33  | -3.15                    | 16                    |
| 0.00                      | 0.00          | 0.27       | 0.27  | -2.64                    | 14                    |
| 0.00                      | 0.00          | 0.27       | 0.27  | -2.21                    | 11                    |
| 0.00                      | 0.00          | 0.27       | 0.27  | -1.85                    | 9                     |
| 0.00                      | 0.00          | 0.19       | 0.19  | -1.54                    | 8                     |
| 0.00                      | 0.00          | 0.19       | 0.19  | -1.29                    | 7                     |
| 0.00                      | 0.00          | 0.19       | 0.19  | -1.08                    | 6                     |
| 0.00                      | 0.00          | 0.19       | 0.19  | -0.91                    | 5                     |
| 0.00                      | 0.00          | 0.19       | 0.19  | -0.75                    | 4                     |
| 0.00                      | 0.00          | 0.19       | 0.19  | -0.64                    | 3                     |
| 0.00                      | 0.00          | 0.00       | 0.00  | -0.53                    | 3                     |
| 0.00                      | 0.00          | 0.00       | 0.00  | -0.44                    | 2                     |