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UNITED STATES DEPARTMENT OF AGRICULTURE  
Soil Conservation Service - Regional Technical Service Center  
7600 West Chester Pike, Upper Darby, Pennsylvania

August 6, 1970

TSC-TECHNICAL NOTE - WATERSHEDS - UD-25

Re: Watersheds - Rounding of Numbers in Work Plans

This Technical Note provides a guide for rounding numbers used in the agreement, narrative and tables of Watershed Work Plans and River Basin Reports. Rounded numbers improve appearance and creditability, and reduce errors and conflicts.

Ideas presented herein and in the attachments can serve as a guide. However, they will not rule out the necessity for prudent judgment in each case. Therefore, in review of the examples attached, recognize that rounding of values for a particular Watershed Work Plan must be tailored for that particular plan.

The three rules which follow, sum up the ideas for rounding included herein.

1. Round answers that will appear in reports, work plans, and conclusions or summaries in basic supporting data.
2. Provide rounded answers to all specialists who use them.
3. Employ judgment in all cases.

The following discussion is directed at the problem areas.

Table #3

Desirable ranges for rounding work plan table No. 3 values are shown on the modified table No. 3 attached. The ranges shown can be applied to other tables and the narrative where similar values occur.

Drainage Area

The area of the watershed, important sub-divisions, land ownership, land use, etc., may usually be rounded to the nearest 100 or 10 acres depending on the size of the sub-elements. Watershed area is usually rounded to the nearest tenth when expressed in square miles.

STC  
TSC

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TECHNICAL NOTES

### Capacity Requirements

Capacity requirements are usually expressed initially in acre feet or cubic feet per second. Acre feet may be translated to its equivalent in inches over the watershed later.

Rounding of storage capacity can usually begin with required sediment storage on the form SCS-309. Total sediment capacity may usually be rounded to the next highest 5 to 10 acre feet. Sub-elements of total sediment capacity can usually be rounded to equal the total. Other capacity values may usually be rounded after computation to the nearest 5 to 10 acre feet.

Rate of flow in cfs. can usually be rounded to the nearest 5, 10, or 100 cfs.

In some cases, prudent engineering judgment may dictate that capacity, rate, and similar values be expressed in the nearest whole number.

### Elevation

Elevation may be expressed to the nearest tenth of a foot as consistent with rounded capacities.

### Estimated Costs and Benefits

When completing estimated costs for land treatment and structural measures, round totals and sub-elements that will appear in the work plan to the nearest \$10, \$100, or \$1000, etc., depending on the relative size of the values. Benefits may be rounded in a similar way.

### Allocation and Sharing of Costs

Allocation and sharing of costs will be determined on a structure-by-structure basis for those cost breakdowns which will appear in the agreement. Round percentages to tenths. Round costs to \$1000, \$100 or \$10, dependent upon the size of the costs. After allocation, perform a check to insure that the P.L. 566 share, in either percentage or dollars, does not exceed established limits for that purpose. Make adjustments as needed.

A sample cost allocation - cost sharing problem for an assumed case is attached to illustrate the process of rounding. The assumed case is reflected in the attached example tables 2, 2A, 4, 5 and 6. Standard paragraphs for the agreement are attached to show how all values cross check.

Example - Cost Allocation - Cost Sharing  
Flood Prevention - Recreation - Municipal Water Supply

The sample problem reflected on work sheets 1 through 5, attached shows rounding in both percentages and dollars to yield rounded values that appear in one place or another in the work plan. All allocation and sharing, percentages and dollars, have been rounded to insure that P.L. 566 funds bear no more and other funds bear no less than established limits. Percentages have been rounded to one-tenth percent and dollars to hundreds.

Sheet 1 of 5 shows a summary of the allocation-sharing rounding process in both percentages and dollars. Given the basis for allocation and sharing of land rights cost from Sheet 2 of 5 and an understanding of cost sharing policy, this work sheet alone will serve to complete the process.

Sheets 2, 3, 4, and 5 are included to illustrate the procedure in detail.

Sheet 2 of 5 shows:

- (1) Estimated installation costs rounded to the nearest \$1000.
- (2) Basis for allocation of costs by the use of facilities method utilizing rounded storage capacities. Note that the allocation percentage for flood prevention was rounded downward and the percentages for other purposes were rounded upward.
- (3) Basis for allocation of land rights cost. Allocation percentages for lands to be acquired in fee simple title and for modification or relocation of facilities are based upon subparagraph 108.091 b of the W.P.H. When necessary, the allocation percentage of the non-cost shared purpose is rounded upward. Allocation and sharing of costs for flowage easements and survey, legal fees, and other costs are based upon service policy.

Sheet 3 of 5 shows:

A convenient method for computing and rounding control P.L. 566 and other cost sharing percentages. This computation is based upon Sheet 2 of 5 and policy with respect to cost sharing. Note: Where necessary, P.L. 566 cost sharing percentages are rounded downward and other percentages are rounded upward.

Sheet 4 of 5 shows:

Sharing of costs between P.L. 566 and other funds for the structure. Computed dollars, based upon percentages from Sheet 4 of 5, are rounded to hundreds. P.L. 566 share is rounded downward and other shares are rounded upward.

Sheet 5 of 5 shows:

- (1) Allocation percentages for each purpose from Sheet 2 of 5 and P.L. 566 and other sharing percentages for each purpose are based upon policy. After addition, these sharing percentages will check with those on Sheet 3 of 5. Rounding and adjustments may be necessary in some cases.
- (2) Distribution of dollars in accordance with allocation and sharing percentages.



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Example - Cost Allocation - Cost Sharing

(Flood Prevention - Recreation - Municipal Water Supply)

## A. Estimated Cost: (Multiple-purpose Structure #2)

|                                  | <u>Computed</u> | <u>Used</u> |
|----------------------------------|-----------------|-------------|
| Construction                     |                 |             |
| Joint                            | \$2,467,542     | \$2,468,000 |
| Specific (MWS, tower and outlet) | 9,675           | 10,000      |
| Engineering                      |                 |             |
| Joint                            | 443,700         | 444,000     |
| Specific                         | 970             | 1,000       |
| Land Rights                      |                 |             |
| Lands                            | 1,473,769       | 1,474,000   |
| Legal, survey, etc.              | 20,000          | 20,000      |
| Specific (flowage)               | 26,785          | 27,000      |
| Total                            |                 | \$4,444,000 |

B. Basis for Allocation of Joint Construction and Engineering Costs  
(Use-of-facilities Method)Capacity by Purpose in Acre-Feet<sup>1/</sup>

| For:                   | <u>Flood<br/>Prevention</u> | <u>Municipal<br/>Water<br/>Supply</u> | <u>Recreation</u> | <u>Total</u> |
|------------------------|-----------------------------|---------------------------------------|-------------------|--------------|
| Sediment               | 60                          |                                       |                   | 60           |
| Floodwater             | 4,740                       |                                       |                   | 4,740        |
| Municipal water supply |                             | 180                                   |                   | 180          |
| Recreation             |                             |                                       | 5,220             | 5,220        |
| Total                  | <u>4,800</u>                | <u>180</u>                            | <u>5,220</u>      | 10,200       |
| Percent computed       | (47.059)                    | (1.765)                               | (51.176)          | (100)        |
| Percent used           | 47.0                        | 1.8                                   | 51.2              | 100          |

<sup>1/</sup> Rounded capacities from basic data.C. Basis for Allocation of Costs for Land Rights

Lands in Fee Title and Relocation or Modification of Facilities

- Lands required for reservoir, dam, construction zone, perimeter access, recreation facilities, and access road (obtained in fee title) -1,000 ac
- Area between top of recreation pool and top of water supply pool - 20 ac
- Area associated with recreation and flood prevention purpose - 980 ac
- Allocation percentages
 

|   |        |
|---|--------|
| Percentage allocated to municipal water storage     | - 2.0% |
| Percentage allocated as specific cost to recreation | -98.0% |

Flowage, legal fees, survey, etc.

All of the costs for flowage easements, \$27,000 are specific costs associated with the flood prevention purpose. Legal, survey fees, and other costs, \$20,000, are not subject to cost sharing but may be allocated to purpose on the same basis as costs for lands.

Example - Cost Allocation - Cost Sharing (continued)D. Basis for Sharing Cost

## Construction Cost

## 1. Joint

$$a. \text{ P.L. 566 \%} = 47.0 + (.50 \times 51.2) = 72.6\%$$

$$b. \text{ Other \%} = (.50 \times 51.2) + 1.8 = 27.4\%$$

## 2. Specific (for municipal water supply)

$$\text{Other \%} = 100.0\%$$

## Engineering

## 1. Joint

$$a. \text{ P.L. 566 \%} = 47.0 + 51.2 = 98.2\%$$

$$b. \text{ Other \%} = 1.8 = 1.8\%$$

## 2. Specific (for municipal water supply)

$$\text{Other \%} = 100.0\%$$

## Land Rights

## 1. Cost of lands in fee simple title

$$a. \text{ P.L. 566 \%} = .50 \times 98.0 = 49.0\%$$

$$b. \text{ Other \%} = (.50 \times 98.0) + 2.0 = 51.0\%$$

## 2. Legal survey, etc.

$$\text{Other \%} = 100.0\%$$

## 3. Flowage (for flood prevention)

$$\text{Other \%} = 100.0\%$$



Example - Cost Allocation - Cost Sharing (continued)E. Sharing of Cost:

|                           | <u>P.L. 566</u>                     | <u>Other</u>                     | <u>Total</u>  |
|---------------------------|-------------------------------------|----------------------------------|---------------|
| Construction              |                                     |                                  |               |
| Joint                     | (\$1,791,768)<br>\$1,791,700 (72.6) | (\$676,232)<br>\$ 676,300 (27.4) | \$2,468,000   |
| Specific                  |                                     | 10,000 (100.0)                   | 10,000        |
| Engineering               |                                     |                                  |               |
| Joint                     | (436,008)<br>435,900 (98.2)         | (7,992)<br>8,100 (1.8)           | 444,000       |
| Specific                  |                                     | 1,000 (100.0)                    | 1,000         |
| Land Rights               |                                     |                                  |               |
| Lands                     | (722,260)<br>722,200 (49.0)         | (751,740)<br>751,800 (51.0)      | 1,474,000     |
| Legal,<br>survey,<br>etc. |                                     | 20,000 (100.0)                   | 20,000        |
| Flowage                   |                                     | <u>27,000 (100.0)</u>            | <u>27,000</u> |
| Total                     | \$2,949,800                         | \$1,494,200                      | \$4,444,000   |

## Example - Cost Allocation - Cost Sharing (continued)

F. Allocation and Sharing by Purpose (dollars)

| Cost Classification        | Flood Prevention    |                   |                     | Recreation        |                   |                     | MWS               | Grand Total          |
|----------------------------|---------------------|-------------------|---------------------|-------------------|-------------------|---------------------|-------------------|----------------------|
|                            | PL-566              | Other             | Total               | PL-566            | Other             | Total               | Other             |                      |
| Construction Cost          |                     |                   | (1,159,960)         |                   |                   | (1,263,616)         | (44,424)          |                      |
| Joint                      | 1,159,900<br>(47.0) |                   | 1,159,900<br>(47.0) | 631,800<br>(25.6) | 631,800<br>(25.6) | 1,263,600<br>(51.2) | 44,500<br>(1.8)   | 2,468,000<br>(100.0) |
| Specific                   |                     |                   |                     |                   |                   |                     | 10,000<br>(100.0) | 10,000<br>(100.0)    |
| Engineering                |                     |                   | (208,680)           |                   |                   | (227,328)           | (7,992)           |                      |
| Joint                      | 208,600<br>(47.0)   |                   | 208,600<br>(47.0)   | 227,300<br>(51.2) | 227,300<br>(51.2) | 227,300<br>(51.2)   | 8,100<br>(1.8)    | 444,000<br>(100.0)   |
| Specific                   |                     |                   |                     |                   |                   |                     | 1,000<br>(100.0)  | 1,000<br>(100.0)     |
| Land Rights                |                     |                   |                     |                   |                   | (1,444,520)         | (29,480)          |                      |
| Lands                      |                     |                   |                     | 722,200<br>(49.0) | 722,300<br>(49.0) | 1,444,500<br>(98.0) | 29,500<br>(2.0)   | 1,474,000<br>(100.0) |
| Legal, Survey<br>and other |                     |                   |                     |                   | 19,600<br>(98.0)  | 19,600<br>(98.0)    | 400<br>(2.0)      | 20,000<br>(100.0)    |
| Flowage                    |                     | 27,000<br>(100.0) | 27,000<br>(100.0)   |                   |                   |                     |                   | 27,000<br>(100.0)    |
| <b>Total</b>               | <b>1,368,500</b>    | <b>27,000</b>     | <b>1,395,500</b>    | <b>1,581,300</b>  | <b>1,373,700</b>  | <b>2,955,000</b>    | <b>93,500</b>     | <b>4,444,000</b>     |

EXAMPLE - TABLE 2 - ESTIMATED STRUCTURAL COST DISTRIBUTION

(Dollars)<sup>1/</sup>

| Item   | Installation Cost PL-566 Funds |                  |                |                 | Installation Cost - Other Funds |                       |                       |                         | Total Install. Cost |
|--|--------------------------------|------------------|----------------|-----------------|---------------------------------|-----------------------|-----------------------|-------------------------|---------------------|
|  | Construction                   | Engi-<br>neering | Land<br>Rights | Total<br>PL-566 | Construction                    | Engi-<br>neering      | Land<br>Rights        | Total<br>Other          |                     |
| Floodwater Retard-<br>ing Structure<br>No. 1 | 602,000                        | 108,000          | -              | 710,000         | -                               |                       | 80,000                | 80,000                  | 790,000             |
| Multiple-purpose<br>Structure No. 2          | 1,791,700                      | 435,900          | 722,200        | 2,949,800       | 676,300                         | 8,100                 | 798,800 <sup>3/</sup> | 1,483,200 <sup>3/</sup> | 4,433,000           |
| Water Intake<br>Tower                        |                                |                  |                |                 | 10,000                          | 1,000                 |                       | 11,000                  | 11,000              |
| Recreational<br>Facilities                   | 508,000                        | 5,000            | -              | 513,000         | 508,000                         | 200,000 <sup>2/</sup> | -                     | 708,000                 | 1,221,000           |
| Channel Improve-<br>ment                     | 342,000                        | 61,600           | -              | 403,600         | -                               | -                     | 47,400                | 47,400                  | 451,000             |
| Subtotal                                     | 3,243,700                      | 610,500          | 722,200        | 4,576,400       | 1,194,300                       | 209,100               | 926,200               | 2,329,600               | 6,906,000           |
| Project Adm.                                 |                                |                  |                | 430,000         |                                 |                       |                       | 260,000                 | 690,000             |
| Grand Total                                  | 3,243,700                      | 610,500          | 722,200        | 5,006,400       | 1,194,300                       | 209,100               | 926,200               | 2,589,600               | 7,596,000           |

<sup>1/</sup> Price base: 1970 prices

<sup>2/</sup> For engineering services to be provided by sponsor's staff

<sup>3/</sup> Includes \$20,000 for survey, legal fees and other costs and \$27,000 for flowage easements

Date: June 1970

(Dollars)<sup>1/</sup>

| COST ALLOCATION                     |                  |                  |                      |                  | COST SHARING     |                  |                    |                  |                |                  |                    |                  |
|-------------------------------------|------------------|------------------|----------------------|------------------|------------------|------------------|--------------------|------------------|----------------|------------------|--------------------|------------------|
| PURPOSE                             |                  |                  |                      |                  | P.L. 566         |                  |                    |                  | OTHER          |                  |                    |                  |
|                                     | Flood Prevention | Rec.             | Munic. Water Storage | Total            | Flood Prevent.   | Rec.             | Munic. Water Stor. | Total            | Flood Prevent. | Rec.             | Munic. Water Stor. | Total            |
| Floodwtr. Retarding Structure No. 1 | 790,000          |                  |                      | 790,000          | 710,000          |                  | -                  | 710,000          | 80,000         |                  |                    | 80,000           |
| Multiple-purpose Structure No. 2    | 1,395,500        | 2,955,000        | 82,500               | 4,433,000        | 1,368,500        | 1,581,300        | -                  | 2,949,800        | 27,000         | 1,373,700        | 82,500             | 1,483,200        |
| Tower & Outlet                      |                  |                  | 11,000               | 11,000           |                  |                  |                    |                  |                |                  | 11,000             | 11,000           |
| Rec. Facil.                         |                  | 1,221,000        |                      | 1,221,000        |                  | 513,000          | -                  | 513,000          |                | 708,000          |                    | 708,000          |
| Channel Improvement                 | 451,000          |                  |                      | 451,000          | 403,600          |                  |                    | 403,600          | 47,400         |                  |                    | 47,400           |
| <b>GRAND TOTAL</b>                  | <b>2,636,500</b> | <b>4,176,000</b> | <b>93,500</b>        | <b>6,906,000</b> | <b>2,482,100</b> | <b>2,094,300</b> | <b>-</b>           | <b>4,576,400</b> | <b>154,400</b> | <b>2,081,700</b> | <b>93,500</b>      | <b>2,329,600</b> |

Price Base: 1970 Prices

Date: June 1970

TABLE 3 - STRUCTURE DATA

## FLOODWATER RETARDING STRUCTURES AND WATER SUPPLY RESERVOIRS

David Creek Watershed, Middlestate

| Item                                 | Unit       | Desirable Range         |     |
|--------------------------------------|------------|-------------------------|-----|
| Class of structure                   |            | Tenths                  |     |
| Drainage area                        | Sq. Mi.    | "                       |     |
| Controlled                           | Sq. Mi.    | Whole Number            |     |
| Curve No. (1-day) (AMC II)           |            | Tenths                  |     |
| T <sub>C</sub>                       | Hours      | "                       |     |
| Elevation top of dam                 | Feet       | "                       |     |
| Elevation crest emergency spillway   | Feet       | "                       |     |
| Elevation crest high stage inlet     | Feet       | "                       |     |
| Elevation crest low stage inlet      | Feet       | "                       |     |
| Maximum height of dam                | Feet       | Whole Number            |     |
| Volume of fill                       | Cu. Yds.   | 1000                    | 100 |
| *Total capacity <sup>1/</sup>        | Ac. Ft.    | 10                      | 10  |
| Sediment submerged 1st 50 years      | Ac. Ft.    | 10                      | 1   |
| Sediment submerged 2nd 50 years      | Ac. Ft.    | 10                      | 1   |
| Sediment aerated                     | Ac. Ft.    | 10                      | 1   |
| Beneficial use (identify use)        | Ac. Ft.    | 10                      | 5   |
| Retarding                            | Ac. Ft.    | 10                      | 5   |
| Between high and low stage           | Ac. Ft.    | 10                      | 5   |
| Surface area                         |            |                         |     |
| Sediment pool                        | Acres      | 10                      | 1   |
| Beneficial use pool (identify use)   | Acres      | 10                      | 1   |
| Retarding pool                       | Acres      | 10                      | 1   |
| Principal spillway                   |            | Tenths                  |     |
| Rainfall volume (areal) (1-day)      | Inches     | "                       |     |
| Rainfall volume (areal) (10-day)     | Inches     | "                       |     |
| Runoff volume (10-day)               | Inches     | "                       |     |
| Capacity of low stage (max.)         | cfs.       | 5                       | 1   |
| Capacity of high stage (max.)        | cfs.       | 5                       | 1   |
| Frequency operation - emer. spillway | 1/2 chance | Whole Number -          |     |
| Size of conduit                      | Dim.       | Inches or feet & tenths |     |
| Emergency spillway                   |            | Tenths                  |     |
| Rainfall volume (ESH) (areal)        | Inches     | "                       |     |
| Runoff volume (ESH)                  | Inches     | "                       |     |
| Type                                 |            |                         |     |
| Bottom width                         | Feet       | 10                      | 1   |
| Velocity of flow (V <sub>e</sub> )   | Ft./Sec.   | Tenths                  |     |
| Slope of exit channel                | Ft./Ft.    | "                       |     |
| Maximum water surface                | Feet       | "                       |     |
| Freeboard                            |            | "                       |     |
| Rainfall volume (FH) (areal)         | Inches     | "                       |     |
| Runoff volume (FH)                   | Inches     | "                       |     |
| Maximum water surface elevation      | Feet       | "                       |     |
| Capacity Equivalents                 |            | "                       |     |
| Sediment volume                      | Inches     | "                       |     |
| Retarding volume                     | Inches     | "                       |     |

<sup>1/</sup> The elements making up the total capacity can usually be rounded into range indicated.

Date: June 1970

EXAMPLE - TABLE 4 - ANNUAL COST

(Dollars)<sup>1/</sup>

| Evaluation Unit  | Amortization of Installation Cost <sup>2/</sup> | Operation and Maintenance Cost | Total   |
|--|---|--------------------------------|---------|
| Floodwater Retarding Structure and Channel Improvement | 64,100  | 5,500                          | 69,600  |
| Multiple-purpose Structure and Recreation Facilities   | 293,300   | 121,300 <sup>3/</sup>          | 414,600 |
| Project Administration                                 | 35,600  | xxx                            | 35,600  |
| GRAND TOTAL  | 393,000   | 126,800                        | 519,800 |

<sup>1/</sup> Price Base: Installation cost - 1970 prices, O&M in 1969 Adjusted Normalized Prices.

<sup>2/</sup> 100 years @ 5 1/8 percent. (0.05160)

<sup>3/</sup> Includes \$114,800 for operation, maintenance and replacement of the recreational development.

Date: June 1970

WORK SHEET FOR TABLE 4  
and Values Needed in the Narrative of the Plan

OPERATION, MAINTENANCE AND REPLACEMENT

|                                      |     |                   |
|--------------------------------------|-----|-------------------|
| F.W.R.S.                             |     |                   |
| \$4,468 (computed) x 0.79 (a.n.p.)   | =   | \$ 3,530          |
|                                      | Use | <u>\$ 3,500</u>   |
| Channel Improvement                  |     |                   |
| \$2,513 (computed) x 0.79 (a.n.p.)   | =   | \$ 1,985          |
|                                      | Use | <u>\$ 2,000</u>   |
| M.P. Structure                       |     |                   |
| Dam, Spillway and Appurtenances -    |     |                   |
| \$6,171 (computed) x 0.79 (a.n.p.)   | =   | \$ 4,875          |
|                                      | Use | <u>\$ 4,900</u>   |
| Outlet Works and M.W.S.              |     |                   |
| \$2,000 (computed) x 0.79 (a.n.p.)   | =   | \$ 1,580          |
|                                      | Use | <u>\$ 1,600</u>   |
| Reservoir for Recreation             |     |                   |
| \$3,000 (computed) x 0.79 (a.n.p.)   | =   | \$ 2,370          |
|                                      | Use | <u>\$ 2,400</u>   |
| Subtotal M.P.S.                      |     | \$ 8,900          |
| Recreation Facilities                |     |                   |
| \$142,289 (computed) x 0.79 (a.n.p.) | =   | \$ 112,408        |
|                                      | Use | <u>\$ 112,400</u> |
| a.n.p. - adjusted normalized price   |     |                   |

AMORTIZATION OF INSTALLATION COST

|                       |     |                   |
|-----------------------|-----|-------------------|
| F.W.R.S.              |     |                   |
| \$790,000 x .05160    | =   | \$ 40,764         |
|                       | Use | <u>\$ 40,800</u>  |
| Channel Improvement   |     |                   |
| \$451,000 x .05160    | =   | \$ 23,272         |
|                       | Use | <u>\$ 23,300</u>  |
| M.P. Structure        |     |                   |
| \$4,444,000 x .05160  | =   | \$ 229,310        |
|                       | Use | <u>\$ 229,300</u> |
| Recreation Facilities |     |                   |
| \$1,221,000 x .05160  | =   | \$ 63,004         |
|                       | Use | <u>\$ 64,000</u>  |

EXAMPLE - TABLE 5 - ESTIMATED AVERAGE ANNUAL FLOOD DAMAGE REDUCTION BENEFITS

(Dollars)<sup>1/</sup>

| Item                                   | Estimated Average Annual Damage |              | Damage Reduction Benefit |
|--|---------------------------------|--------------|--------------------------|
|  | Without Project                 | With Project |                          |
| Floodwater                             |                                 |              |                          |
| Crop and Pasture                       | 12,600                          | 600          | 12,000                   |
| Other Agricultural                     | 6,800                           | 800          | 6,000                    |
| Nonagricultural (list important items) | 125,000                         | 1,000        | 124,000                  |
| Subtotal                               | 144,400                         | 2,400        | 142,000                  |
| Sediment                               |                                 |              |                          |
| Overbank Deposition                    | 5,500                           | 500          | 5,000                    |
| Reservoirs                             | 400                             | 100          | 300                      |
| Other (list important items)           | 1,000                           | 100          | 900                      |
| Subtotal                               | 6,900                           | 700          | 6,200                    |
| Erosion                                |                                 |              |                          |
| Flood Plain Scour                      | 480                             | 50           | 430                      |
| Streambank                             | 100                             | 80           | 20                       |
| Gullies                                | 200                             | 50           | 150                      |
| Subtotal                               | 780                             | 180          | 600                      |
| Indirect                               | 22,800                          | 500          | 22,300                   |
| TOTAL                                  | 174,880                         | 3,780        | 171,100                  |

1/ Price base: 1970 adjusted normalized prices

Date: June 1970



(Dollars)

| Evaluation Unit   | AVERAGE ANNUAL BENEFITS <sup>1/</sup> |                               |                               |            |                              |                | Total     | 3/<br>Average<br>Annual<br>Cost | Benefit<br>Cost<br>Ratio |
|---|---------------------------------------|-------------------------------|-------------------------------|------------|------------------------------|----------------|-----------|---------------------------------|--------------------------|
|   | Damage<br>Reduction                   | More<br>Intensive<br>Land Use | Changed<br>Land Use<br>-Urban | Recreation | Municipal<br>Water<br>Supply | Second-<br>ary |           |                                 |                          |
| Floodwater<br>Retarding<br>Structure #1<br>and Channel<br>Improvement | 92,000                                | 1,000                         | 1,500                         | -          | -                            | 7,900          | 100,900   | 69,600                          | 1.4:1                    |
| Multiple-<br>purpose<br>Structure and<br>Recreation<br>Facilities     | 72,000                                | -                             | -                             | 800,000    | 7,000                        | 86,700         | 965,700   | 414,600                         | 2.3:1                    |
| Project Admini-<br>stration   | xxx                                   | xxx                           | xxx                           | xxx        | xxx                          | xxx            | xxx       | 35,600                          | xxx                      |
| GRAND TOTAL   | 164,000 <sup>2/</sup>                 | 1,000                         | 1,500                         | 800,000    | 7,000                        | 94,600         | 1,066,600 | 519,800                         | 2.1:1                    |

<sup>1/</sup> Price base: 1970 adjusted normalized prices.

<sup>2/</sup> In addition, it is estimated that land treatment measures will provide flood damage reduction benefits of \$7,100 annually.

<sup>3/</sup> From Table 4.

Date: June 1970

1. Except as hereinafter provided, the Sponsoring Local Organization will acquire without cost to the Federal Government such land rights as will be needed in connection with the works of improvement. (Estimated Cost \$1,648,400). The percentages of this cost to be borne by the Sponsoring Local Organization and the Service are as follows:

| <u>Works of Improvement</u>                                | <u>Sponsoring Local Organizations (percent)</u> | <u>Service (percent)</u> | <u>Estimated Land Rights Cost (dollars)</u> |
|--|---|--------------------------|---|
| Multiple-purpose Structure No. and Recreational Facilities |   |                          |   |
| Payment to land-owners for about <u>1,000 acres</u>        | 51.0  | 49.0                     | 1,474,000                                   |
| Legal fees, survey costs, flowage easements, and other     | 100.0   | 0.0                      | 47,000                                      |
| All other structural measures                              | 100.0   | 0.0                      | 127,400                                     |

The Sponsoring Local Organization agrees that all land acquired or improved with P.L. 566 financial or credit assistance will not be sold or otherwise disposed of for the evaluated life of the project except to a public agency which will continue to maintain and operate the development in accordance with the Operation and Maintenance Agreement.

2. The Sponsoring Local Organization will acquire or provide assurance that land-owners or water users have acquired such water rights pursuant to State law as may be needed in the installation and operation of the works of improvement.
3. The percentages of construction costs of structural measures to be paid by the Sponsoring Local Organization and by the Service are as follows:

| <u>Works of Improvement</u>          | <u>Sponsoring Local Organization (percent)</u> | <u>Service (percent)</u> | <u>Estimated Construction Cost (dollars)</u> |
|--------------------------------------|--|--------------------------|--|
| Floodwater Retarding Structure No. 1 | 0.0  | 100.0                    | 602,000                                      |
| Multiple-purpose Structure No. 2     | 27.4   | 72.6                     | 2,468,000                                    |

3. (Continued)

| <u>Works of Improvement</u> | <u>Sponsoring Local Organization (percent)</u> | <u>Service (percent)</u> | <u>Estimated Construction Cost (dollars)</u> |
|-----------------------------|--|--------------------------|--|
| Water Intake Tower          | 100.0  | 0.0                      | 10,000                                       |
| Recreational Facilities     | 50.0   | 50.0                     | 1,016,000                                    |
| Channel Improvement         | 0.0  | 100.0                    | 342,000                                      |

4. The percentages of the engineering costs to be borne by the Sponsoring Local Organization and the Service are as follows:

| <u>Works of Improvement</u>          | <u>Sponsoring Local Organization (percent)</u> | <u>Service (percent)</u> | <u>Estimated Engineering Costs (dollars)</u> |
|--------------------------------------|--|--------------------------|--|
| Floodwater Retarding Structure No. 1 | 0.0  | 100.0                    | 108,000                                      |
| Multiple-purpose Structure No. 2     | 1.8  | 98.2                     | 444,000                                      |
| Water Intake Tower                   | 100.0  | 0.0                      | 1,000  |
| Recreational Facilities              |  |                          |  |
| Erosion Control Practices            | 0.0  | 100.0*                   | 5,000  |
| All other facilities                 | 100.0  | 0.0                      | 200,000                                      |
| Channel Improvement                  | 0.0  | 100.0                    | 61,600                                       |

\*Assuming prior approval granted by Administrator. See item "e" under Explanatory Note, page 113.40-4 of W.P.H.

5. The Sponsoring Local Organization and the Service will each bear the costs of Project Administration which it incurs, estimated to be \$260,000 and \$430,000, respectively.