What goes in the final folder

1. Review by District or Regional Surface Water Specialists
2. Slope-Area summary - usually prepared by party chief
3. Plan view plot of slope-area reach
4. High-water profile plot and high-water marks list
5. Cross-section plots
6. High-water mark profile past gage
7. Computer computation printouts
8. Original field notes
9. Stereo slides (or other photos)
10. Miscellaneous
    a. Flood reports from local newspapers, other agencies, etc.
    b. Rating curve for site
    c. Station description
    d. Bed material grain-size distribution data
    e. Any other information pertinent to discharge computation, gage height, or flood. For example, an assessment of contributing area or rainfall amounts in basin.

INDIRECT MEASUREMENT SUMMARY

FORMAT

- TYPE OF INDIRECT MEASUREMENT

  LOCATION OF SITE

- SURVEY OF SITE
- DISCHARGE AND GAGE-HEIGHT FOR MEASUREMENT
- DRAINAGE AREA
- NATURE OF FLOOD
- FIELD CONDITIONS
- COMPUTATIONS
- EVALUATION
- REMARKS
- SIGNATURES

SAMPLE INDIRECT MEASUREMENT SUMMARY

02518050 PEARL RIVER AT JACKSON, MS
PEARL RIVER BASIN
Regular or CSI station

Flood of January 5, 1990

TYPE OF MEASUREMENT.--Contracted opening, Flow through culvert, ?-section slope area, or flow over dam, etc.

LOCATION OF SITE.--Give location with respect to the gaging station or if a miscellaneous site, give lat., long., land line location, distance from nearest tributary and nearest community.

SURVEY OF SITE.--List the following information:

- who selected the site and date
- who surveyed the site and date or dates
- datum of the survey and RM's used
- date of last two-peg test of instrument

Example: Site was selected on February 14, 1963 by S.H. Hoffard. Highwater profiles were surveyed February 17 by R. Chinn, B.R. Davies, and R.H. Hansen. X-sections were run on February 18 by R. Chinn and B.R. Davies. Gage datum +10 feet was used and survey was referenced to RM-2 and RM-3 at the station. Instrument was checked by two-peg test on February 7, 1963.

DISCHARGE AND GAGE-HEIGHT.--62,500 ft^3/s; Recorded peak gage height 17.93 feet; HWM in well 17.98 feet; and 18.35 feet fromwell defined highwater profile past gage (Note this paragraph MUST give both inside and outside gage heights and how they were obtained.

DRAINAGE AREA.--Give drainage area at measurement site and at gage site, and if pertinent, how discharge was adjusted to gage site.

UNIT DISCHARGE.--Discharge in ft^3/s divided by drainage area in mi^2.

NATURE OF FLOOD.--Very brief description of the storm that caused the flood, rainfall (etc.) and any other pertinent remarks.

FIELD CONDITIONS.--Describe the reach (dam, culvert, embankment, etc.) with particular emphasis on composition of the bed material, banks, trees, vegetation, overflow. Describe in detail any evidence of scour or fill. Give a general description of the type and quality of highwater marks. List "n" values. Were x-sections subdivided, and if so on what basis? State specifically whether x-sections were located after the highwater profiles wer plotted. State how many pictures were taken and type.

For dams describe conditions of the dam crest and the time of the peak (debris, flashboards, gate settings.) Also how much water was bypassing the main spillway through power releases, fishways, irrigation diversion, water supply, etc.

For culverts give "n" value used, and reason (size of corrugations, condition of concrete, etc.), presence of debris or fill, entrance conditions and other pertinent facts.

For contracted openings describe approach section, contracted section, "n" values, scour, debris, skew, type of opening, submergence.

COMPUTATIONS.--

Slope Area:

1. Give fall and portions that are velocity head change and friction loss.
2. List computed discharge for each reach, state whether reach is contracting or expanding (for expanding reaches show % spread between 0% and 100% energy recovery), compute Froude numbers and % spread between subreaches.

Example: Reach 1-2, 85,300 cfs, expanding, 15% spread 0% to 100%.

F1 = 0.75 and F2 = 0.65

Reach 2-3, 105,000 cfs, contracting, F2 = 0.78 and F3 = 0.75.

3. Explain how the final discharge figure was determined.

Example: Reach 1-2 discarded, excessive expansion.

Reach 4-5 discarded because of poor profile definition and Froude numbers indicate a transition from supercritical to subcritical.

Reach 2-3-4, 103,000 cfs, F2 = 0.75, F3 = 0.77, F4 = 0.75.

This is considered the most reliable computation to use.

Culverts and contracted openings:

1. Give $(h_1-z)/D$ ratio, culvert slope, entrance coefficient and type of flow. State what adjustments were made to the coefficient for wing walls, projections, raduis of rounding (etc.), and whether it was corrected for contraction ratio of less that 80%. Give Froude number for the approach section and finally list the proof for the type of flow in question.

Example: The $(h_1-z)/D$ ratio is 1.14, culvert slope = 0.00643, the entrance coefficient is 0.86, corrected for contraction, projection and raduis of rounding, and flow was identified as Type III. Froude number in the approach is 0.57 and finally Type III flow was proven because $(h_1-z)/D < 1.5$; $h_4/D < 1.00$; and $h/h_c < 1.00$.

Dams, embankments and critical depth:

Describe the dam (or embankment or critical depth section) in detail and state specifically how the discharge coefficient was obtained (references). State what the static head is and the velocity head. Give the percent of submergence. Discuss other factors that affect the computations.

Example: The dam is broad-crested, rock-crib, timber sheathed structure. The crest is 10 feet wide and is horizontal. The upstream face is on a slope of 1-1/2 to 1 and the downstream face is on a 2 to 1 slope. The average static-head of 11.53 feet was determined 35 feet upstream, from well defined highwater profiles along both banks. The velocity head is only 0.34 feet. Tailwater elevation was poorly defined but still good enough to prove that there was no submergence. Base coeffi-

cient of 3.63 was determined from Figures 10 and 11 in Circular 397 and the raised to 3.74 because of the 6" radius of rounding of the upstream edge. Froude number in the approach section is 0.43.

EVALUATION.--Briefly review the conditions affecting accuracy and rate the measurement.

Example: Use 86,400 cfs and consider it of good reliability. Profiles are well defined, reach is slightly contracting, there is little evidence of excessive scour or fill and the results from the two subreaches agree within 8%.

PREVIOUS COMPUTATIONS.--List previous indirects by date of peak, type, and evaluation.

Date of Peak	Type of measurement	Evaluation
December 21, 1953	Slope area	Poor
February 14, 1959	Contracted opening	Poor

REMARKS.--Discuss how well the indirect looks on the current rating curve and anything else that may be pertinent.

John J. Smith

February 18, 1990