

**FINAL REPORT ON LANDSLIDES  
OF JULY 9, 1973  
IN KANAWHA CITY AREA  
OF CHARLESTON, WEST VIRGINIA**

**By**

**Ronald A. Landers  
and  
Richard A. Smosna**

**WEST VIRGINIA GEOLOGICAL AND ECONOMIC SURVEY  
ROBERT B. ERWIN, DIRECTOR AND STATE GEOLOGIST**

**OF1**

**September 7, 1973**

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SUMMARY

The factors initiating the landslides of July 9, 1973, in the Kanawha City area included a combination of geologic, topographic, surface-water, and ground-water conditions. The storm of that day added an extremely intense rainfall to what was apparently an existing, naturally unstable situation. The slides resulted from the liquefaction of the upper 1 to 3 feet of soil after complete saturation with water. This mixture of water and soil then cascaded rapidly down-slope. No evidence of any coal mining was observed in or around the scarps of the landslides investigated.

The probability of small slides recurring in the area is very likely. This type of slide is mainly a nuisance that causes minor damage that poses little or no threat to public safety. The larger slides started primarily as a result of an intense summer thunderstorm. Since the probability is very low that this storm intensity will happen again, it follows that the probability also is low that these large slides will recur. However, it is quite possible that a less intense rainfall could produce other disastrous landslides in the future.

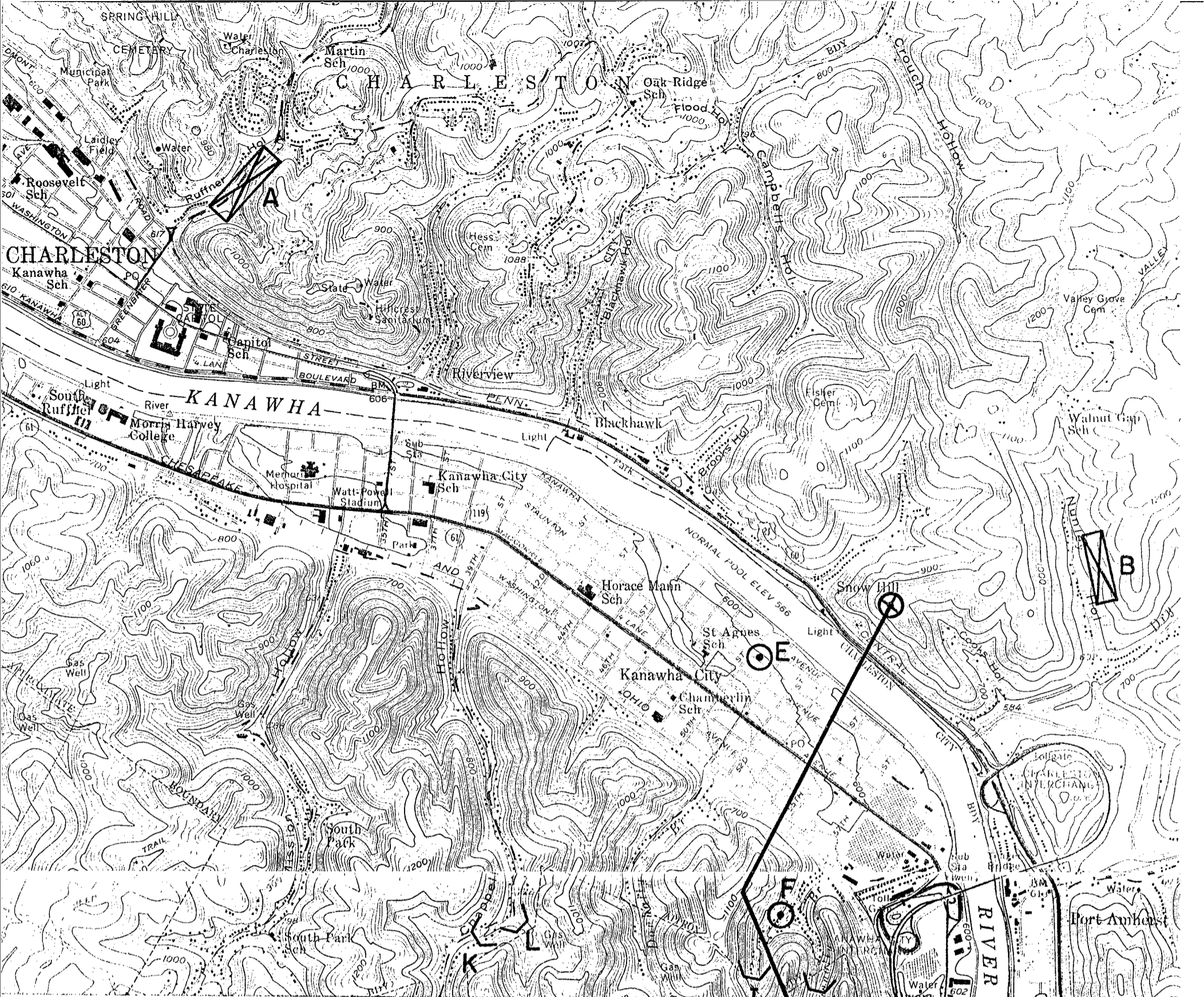
Listed at the end of this report are eight recommendations to reduce the likelihood of future landslides and to minimize damage from any that may occur. Included in these recommendations is the drilling

of a 300-foot core hole on the mountain top above the Right Fork of Upper Donnally Branch; results of this drill hole can be used to more clearly define the probability of recurrence of large slides at this location. Another recommendation is to study the feasibility of regulatory zoning for houses at the bases of mountain slopes.

#### INTRODUCTION

Between 4 and 6 a.m. on Monday, July 9, 1973, a severe, isolated thunderstorm occurred in the Kanawha City area of Charleston, West Virginia. The following unofficial rainfall measurements were made: greater than 4 inches in Lower Donnally Branch (marked as D on Figure 1); 5 inches at 50th and Kanawha Avenue (marked as E on Figure 1); and 5 to 6 inches in Upper Donnally Branch (marked as F on Figure 1). The intense rainfall caused local flashflooding, the overtopping of several small dams, the failure of one siltation dam, and numerous landslides. These effects are located on Figure 2, where slides F, G, H, I, and K caused minor local damage from soil and debris and slides B, C, D, E, and J caused little or no damage. Slide A totally destroyed three houses on Upper Donnally Road and killed three children. Several sections of Chappell Hollow have artificial dams across the creek with small culverts for normal flow only. These dams backed up the creek and were overtopped during the storm, causing much siltation and flooding, although none failed. A siltation dam on the Right Fork of Rush Creek (marked as N on Figure 2) did fail during the storm, although downstream damage was only minor.





As of this date, numerous agencies have been involved with the investigations of this storm including: the West Virginia Department

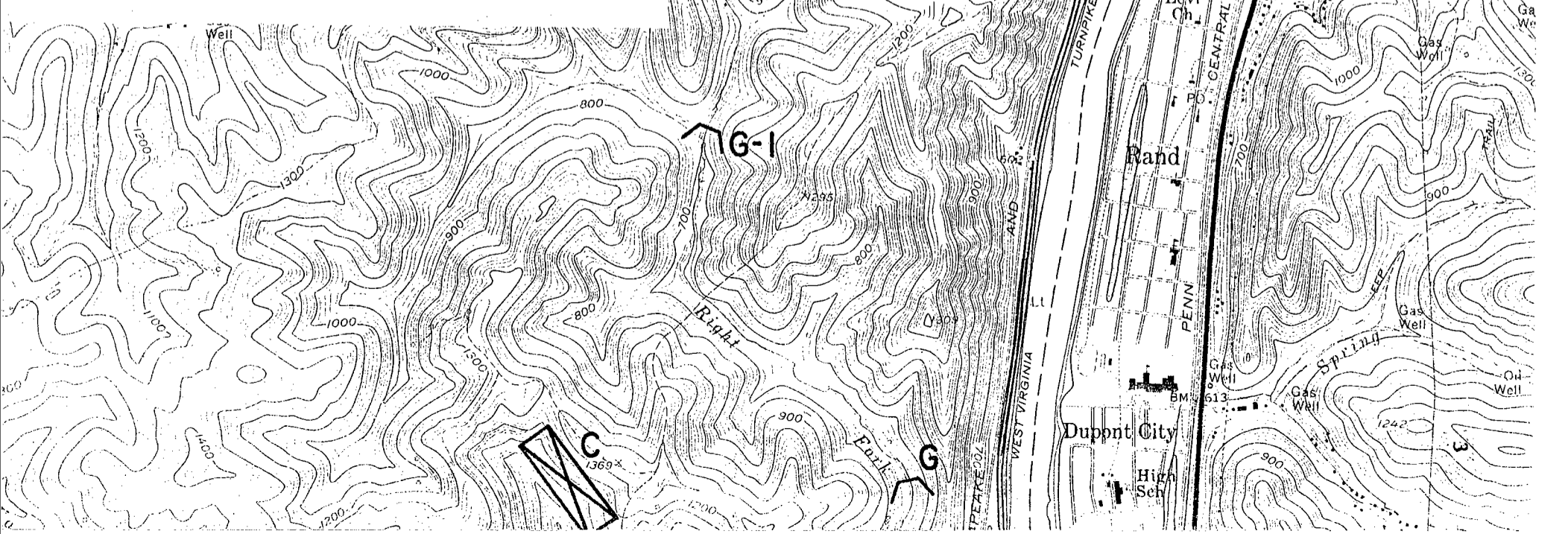


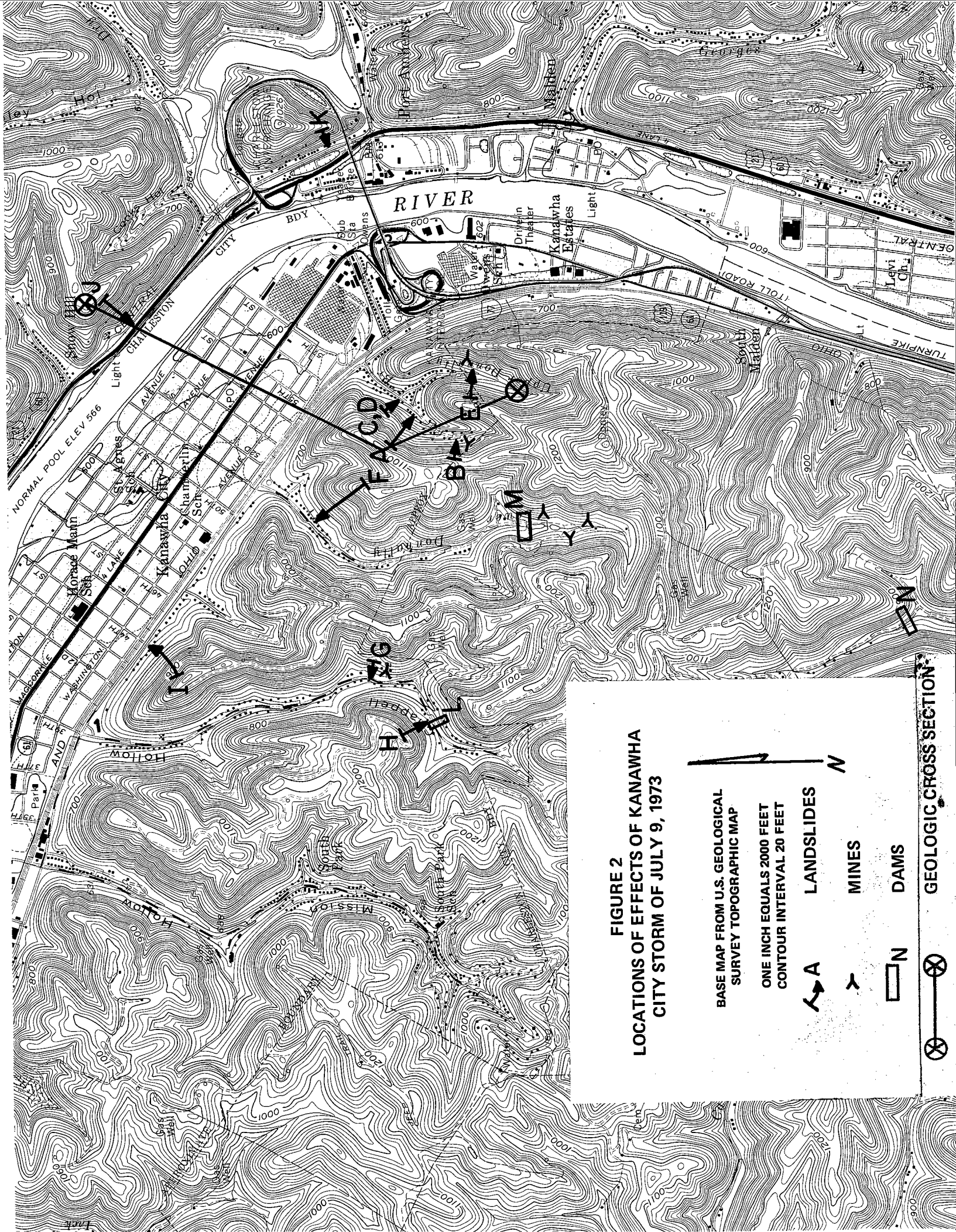
**FIGURE 1**  
**LOCATION OF BASIC DATA FOR KANAWHA**  
**CITY STORM OF JULY 9, 1973**

BASE MAP FROM U.S. GEOLOGICAL SURVEY  
 TOPOGRAPHIC MAP

ONE INCH EQUALS 2000 FEET  
 CONTOUR INTERVAL 20 FEET

- A  VERTICAL ROCK SECTIONS
- D  RAINFALL MEASUREMENT
- G  PEAK STREAM-FLOW MEASUREMENT
-  GEOLOGIC CROSS SECTION





**FIGURE 2**  
**LOCATIONS OF EFFECTS OF KANAWHA**  
**CITY STORM OF JULY 9, 1973**

BASE MAP FROM U.S. GEOLOGICAL  
 SURVEY TOPOGRAPHIC MAP  
 ONE INCH EQUALS 2000 FEET  
 CONTOUR INTERVAL 20 FEET

- A** LANDSLIDES
- N** MINES
- ⊗** DAMS

GEOLOGIC CROSS SECTION