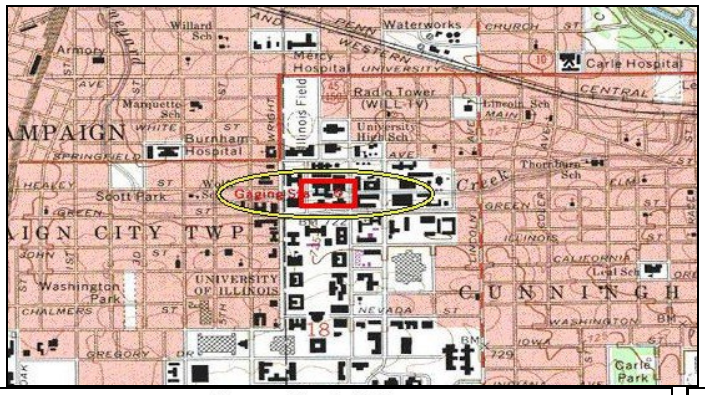
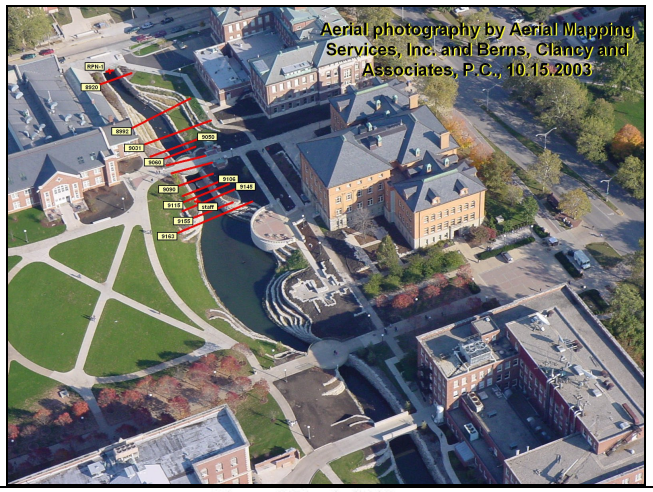
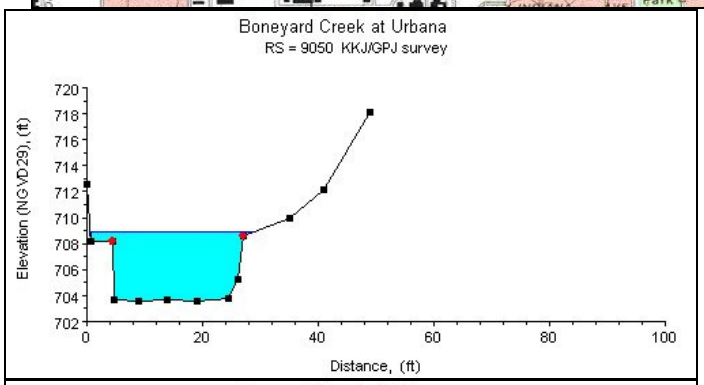
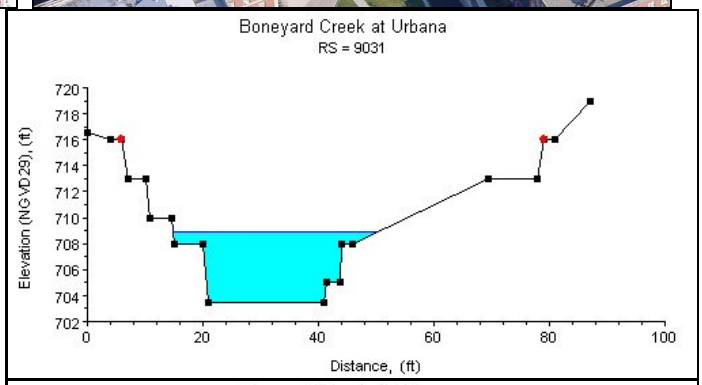
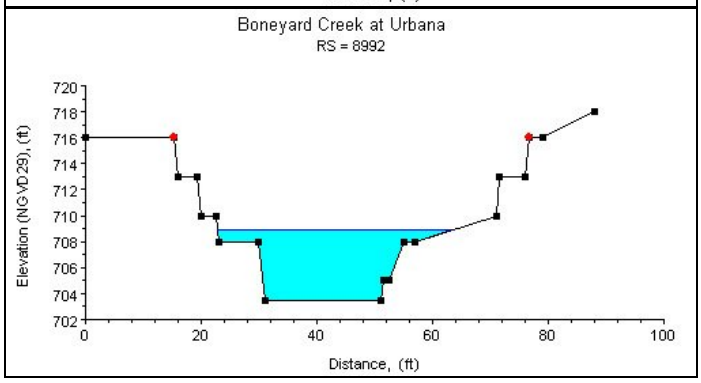
# Boneyard Creek at Urbana, IL

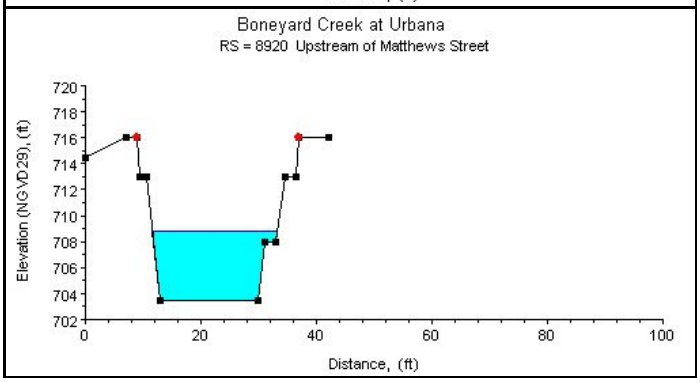



**Study Reach.**--The channel under consideration is constructed in an urban setting, as shown in the quadrangle map on the top left. The study reach, approximately 225 ft long, begins at a staff gage located on the left bank 45 ft upstream from the gage house and extends downstream to the upstream side of Matthews Street bridge. Eighteen surveyed cross sections (surveyed by Berns, Clancy, and Associates, in July 2000) are available for describing the geometries of the study reach. The channel alignment, approximate variations in channel width and bank conditions, and locations of cross sections are shown in the aerial photo on the top right.

**Gage Location.**--Lat 40°06' 40", long 88°13' 35", in NW1/4 NE1/4 sec.18, T.19N., R.9E., Champaign County, Hydrologic Unit 05120109, on right bank 300 ft upstream from Matthews St. on University of Illinois campus in Urbana, and at river mile 1.2. The USGS streamgage-station number is 03337000.

**Drainage Area.**--4.46 sq mi.

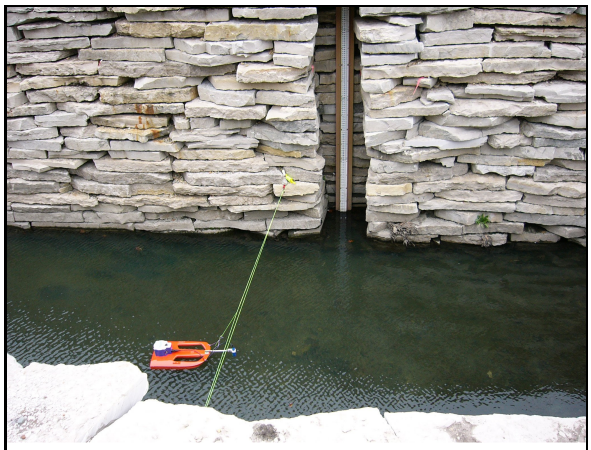
**Gage Datum and Elevations of Reference Points.**--Datum of the gage is 694.00 ft. A staff gage is located at the upstream end, elevation of brass screw=708.456 ft; RP-N1 is the top of the handrail above the center upright on the guardrail on the upstream side of Matthews Street bridge, elevation=718.141ft. All elevations are in NGVD 1929 convention.

**Stage, Discharge Measurement, and Computed n-Values.**--Water-surface elevations were measured by reading the staff near the gage and by tape down from the reference point on Matthews Street bridge before, during, and after each discharge measurement. Discharge measurements were made using an acoustic Doppler current profiler (ADCP). When possible, multiple discharge measurements were made during a rise and recession to provide data for calculating n-values over a range in stage. The computed n-values are listed in the following table. Whenever possible, the computed n-values are associated with a photo taken at the time of the measurement. The photos are arranged from low stage to high stage in order to illustrate contributing factors of n-value at a particular stage.

| Date of Observation | Discharge ($ft^3/s$) | Average Cross Section Area ($ft^2$) | Hydraulic Radius (ft) | Mean Velocity (ft/s) | Slope | Coefficient of Roughness *n* |
|---|---|---|---|---|---|---|
| 10/18/2004 | 96.2 | 49.7 | 1.97 | 1.96 | 0.001911 | 0.043 |
| 10/18/2004 | 112.0 | 53.0 | 2.07 | 2.14 | 0.001867 | 0.040 |
| 3/26/2004 | 243.0 | 82.3 | 2.80 | 3.13 | 0.000755 | 0.053 |

03337000 Boneyard Creek at Urbana, IL
Looking Downstream from staff gage

03337000 Boneyard Creek at Urbana, IL
Close of right bank, terraced bank



03337000 Boneyard Creek at Urbana, IL
Close up of lannon stone

03337000 Boneyard Creek at Urbana, IL 08/29/03
Looking Upstream from Mathews Ave

03337000 Boneyard Creek at Urbana, IL 08/29/03
Looking Upstream from Mathews St bridge

03337000 Boneyard Creek at Urbana, IL 07/12/06
Looking downstream, photo taken at stage
comprable to measurement done on 03/26/04

**Description of the Channel.**--This channel is constructed, straight, and varies gradually. The streambed consists of precast concrete revetment pavers with randomly placed 12- to 15- inch rounded river boulders extending 6 to 8 inches above the surface of the pavers. The pavers are gravel filled. Low flow is constricted by a prefabricated Parshall Flume with a 2-ft opening, located in the reach on the upstream side of Kingshighway bridge. The elevation of the crest of the flume is 703.69 ft. The flume becomes submerged at a stage of about 10.74 ft. Dense seasonal growth of aquatic plants and algae occurs on the channel bottom. Urban debris, such as bicycles and assorted garbage, accumulates and dissipates during events. Banks are constructed from layers of lannon stones; the bank surface is jagged and irregular. The banks are from 13- to 19- ft high. The bottom width is from about 18 to 20 ft. The upstream end of the reach is a rectangular channel from near the gage to the downstream side of Kingshighway bridge. Downstream, the channel is a steep-sided trapezoid with terraced banks until Matthews Street. The top width of the channel varies from 20 ft in the upstream rectangular section to 90 ft at the widest point in the trapezoidal section downstream. Cross-sectional geometries vary gradually and continuously from upstream to downstream.

**Floods.**--Maximum discharge, 946 $ft^3/s$, from rating based on two indirect measurements, August 12, 1993, gage height, 9.93 ft. (datum then in use), from flood marks, as a result of 6.3 inches of rain in a 3-hour period.

**Estimated n-Values using Cowan  s Approach.**--0.034 - 0.044