

KEY FLAWS IN CITY OF FRANKLIN & BONAR'S PROPOSAL

1. The current proposal is based upon a flawed supposition: That the "big pipe" is the only solution!

Rather than using standard engineering practice by asking the question "what would be the best way to solve Roaring Run storm water problems on North Main Street", the city and the consultant proceeded on the basis that a pre-conceived, unsupported, urban-myth "solution" - the "big pipe" as I call it – must be inserted into the project. I say "urban myth" because it probably predates Bonar's design by decades. A search of project records, whether held by Bonar or the city, will document this to some extent. Via Google, I find in an August 29, 2002 Daily Journal newspaper article about the award of the DOT funds: "[A] facet of the project is installing new storm sewers running west from Main Street along Madison Street. Public works superintendent Rick Littleton said the current drainage system is inadequate, causing the roadway to fill with water during heavy rains, such as those seen this spring." I believe that a thorough review (I haven't had time so far) of city meeting records will show discussions, going back years and perhaps decades, about an alleged need to enlarge and/or divert the downtown sections of Roaring Run.

Bonar's "Calculations for Storm Sewer Design" document dated July 14, 2004 states on the summary page: "The Town of Franklin has no plans to change the current contributing storm sewers and watersheds." Correspondence from that era between the city and the consultant, as well as public meeting records, will doubtless show that Bonar was instructed to design ONLY a "big pipe" drainage component into the North Main project. Therefore, the project design could not comply with INDOT guidelines, from its inception. See: Appendix.

2. The City of Franklin is attempting to use transportation funds for a local flood control issue.

The primary goal of the city, by mandating the "big pipe" be inserted into the project, was to solve local flooding issues far beyond the project's right-of-way. Given Bonar's "Cash in on federal funds!" language on its web site, I would venture to guess that they were hired with the understanding that they would find a way to use DOT transportation funds to solve the wider community flooding problem from Roaring Run.

3. The current proposal is based upon incomplete and intentionally omitted data.

Bonar (ibid.) states: "The watershed area was analyzed using a contour map from the City of Franklin, GIS System and site visits. Research... indicated no better source for watershed analysis was available." It's unclear how much of the "watershed area" was even "analyzed," given the consultant's marching orders, plus the admission later in the page that the "watershed area used" in the calculations was closely adjacent to the right-of-way. Detailed FEMA maps became available in recent years. The County Surveyor has sub-watershed maps. However, the biggest flaw of this aspect of the design is that the city's own storm sewer maps were not used! Which was obviously because there was no intention to do a complete watershed analysis, or to consider alternatives to the "big pipe." But the city could not present accurate information about its storm sewer system in 2004 anyway, because at that time the only documentation was a map from 1931! It was only in response to my complaints (although they won't admit it) about the "big pipe" boondoggle, and the ignorance of our own storm water system, that the city hired a consultant to map the older areas, earlier this year. That study was completed in July 2009! And there is currently an aerial survey going on which, according to Mayor Paris, has bearing on the Roaring Run issue:

"Eye in sky to help county update drainage maps" Daily Journal Nov. 12, 2009 – (Quote:) [New data] will be layered on top of the county's elevation model, or topography map, revealing which cities and towns are prone to flooding, GIS director Aaron Shaw said... Contour lines show the shape of the land surface, which will help Franklin identify low spots and figure out which way water flows, Mayor Fred Paris said. "*The big reason it's beneficial to us is the 1-foot contours,*" he said. "*Having that allows us to take a look at a log of drainage problems and not have to spend a lot of money on engineering.*" For example, **the city is studying how water flows in downtown east of Main Street.** [WHICH IS THE AREA THE "BIG PIPE" IS TARGETED FOR!] Engineers are studying the area and believe [?] that water flows from north to south, but a quick look at a contour model would answer the question, Paris said. (End quote.)

Therefore, once again, the project design could not comply with INDOT guidelines, from its inception. See: Appendix.

4. Bonar used the faulty method of calculating runoff and flows only immediately adjacent to the street.

Bonar (ibid.) states: "...**the watershed area used was limited to the area directly contributing to the right-of-way of North Main Street** and the surrounding areas the proposed storm sewer helps eliminate." That is, with the outright intent of only studying the city's mandated "solution", and to cover up the facts about how Roaring Run flows get to Main, and where they come from, Bonar only surveyed a narrow corridor – short distances at a right angle to the project corridor, not even reaching the next parallel street! Thus, measurements are cited at King, Adams, Martin Place, Graham, etc., plus short distances less than a block away from Main – but NOT along Roaring Run at Water, or Ritchey, etc., upstream of Main! Therefore, Bonar was able to only show that a surplus of water exists ON North Main in the area of Roaring Run, and thereby bamboozle state and federal officials, who have looked at a thick pile of computer printouts containing oodles of numbers, been too easily impressed, and agreed that "a lot of water gets to Main Street" without bothering to think about, or check to see if Bonar considered, WHY it gets there! (Nor was Commissioner Reed able to understand my "finding out why your house is drafty versus just buying a bigger furnace" analogy.) Therefore, once again, the project design could not comply with INDOT guidelines, from its inception. See: Appendix.

5. Bonar presented false and misleading information in its August 12, 2008 public hearing presentation.

Bonar's "Information Packet" handed out at the Artcraft Theatre public hearing states: "The existing roadway storm sewer drainage system is inadequate. Flooding and standing water problems exist due to the undersized drainage system along the project."

This statement is completely misleading and contains outright falsehoods. The existing **roadway** storm sewer drainage system cannot be described as inadequate, either in part or in whole, although Bonar is attempting to convey the latter impression, notably by using the phrase "undersized drainage system along the project." The fact is that, at the Roaring Run location, it is the **Roaring Run** system that is inadequate, and only because it is a system designed circa 1850 that has long been unable to contain flows from increasing urbanization. As this document makes clear, if flows are dealt with upstream via storm system improvements and volume removal, the portion of the Roaring Run system that is in the project vicinity will likely become **adequate**, as-is. As for the wording in the second sentence, "flooding and standing water problems exist" ONLY in about a half-block area near the Roaring Run crossing.

6. Bonar's entire project drainage scheme is probably faulty and must be reviewed!

At this point I must raise the issue that the other parts of Bonar's drainage schemes are very suspect. I have only had the time to focus on the "big pipe" specifically, and not on the other components. For example, Bonar seems to be proposing to ADD to the Roaring Run problem by running a pipe south to it from Lemley Street. Also, they propose sending flows northward from Jefferson to Madison, and then have it outfall from Roaring Run, upstream of downtown, which makes no sense. And the pipe from US 31 to Circle Drive will possibly have flows wind up in the LHH storm sewer, which now connects to Roaring Run!

Again, NEW DATA IS AVAILABLE: The July 2009 Williams Creek Consulting study, plus, just in the news today, a county aerial photography and pictometry study due to start in December – should we need to wait for that.

7. The project proposal violates the National Environmental Policy Act (NEPA).

According to the EPA, "The National Environmental Policy Act (NEPA) requires federal agencies to integrate environmental values into their decision making processes by considering the environmental impacts of their proposed actions and reasonable alternatives to those actions." Middlemen of federal program funding (SAFETEA-LU for example), such as INDOT, and end recipients of federal funding, and their consultants, such as The City of Franklin and Bonar, are also bound by these requirements. It is DOT/FHWA's duty to see that the

law is followed (see Public Law 109-59). In the case of this project, the city and consultant's over-engineered, incompetent, and ludicrous drainage designs will have a big impact on the community, and absolutely no reasonable alternative was ever considered. There was never any intention to do so, obviously. Yet FHWA documentation states: "The identification, consideration, and analysis of alternatives are key to the NEPA process and goal of objective decision-making. Consideration of alternatives leads to a solution that satisfies the transportation need and protects environmental and community resources." There has been NO Alternatives Screening. There has been NO consideration of Logical Project Termini. Pardon my sarcasm, but logic was "terminated" from whenever this drainage scheme was first envisioned. Logic has never been involved in the process. See: Appendix.

8. Bonar's "CASH IN" hype is suspect – and they've "cashed in" on Franklin!

Below is an image composed of parts of Bonar's web site, <http://www.bonargroup.com>. The text at left is on the main page, and clicking "read on" links to the pitch at right. This language looked fishy to me the instant I first saw it. I have a strong suspicion that Bonar will go beyond the bounds of ethics and professionalism in order to get federal funds flowing to a project, and that once they have a community on the hook, Bonar will reel in all they can get. I'd like to know how many hundreds of thousands of dollars that Bonar has already reaped from this one project. I've personally witnessed them tapping Franklin's coffers in public meetings, and some records I've found show other instances of that.

Over \$115 Million Secured!

Over the past eight funding cycles, Bonar Group helped secure a total of over **\$115 million in Federal funding** for 35 community transportation projects. SAFETEA-LU (The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users) provides 80% federal funds with a 20% local share for transportation improvements. Federal funds are available to rehabilitate, reconstruct, and resurface major streets. A street must be classified as a "Major Collector" street in order to be eligible for funding. All streets within the State of Indiana have a designated functional classification. [Read on...](#)

Bonar Group has a proven track record assisting communities throughout Indiana with obtaining funding sources to make their projects happen.

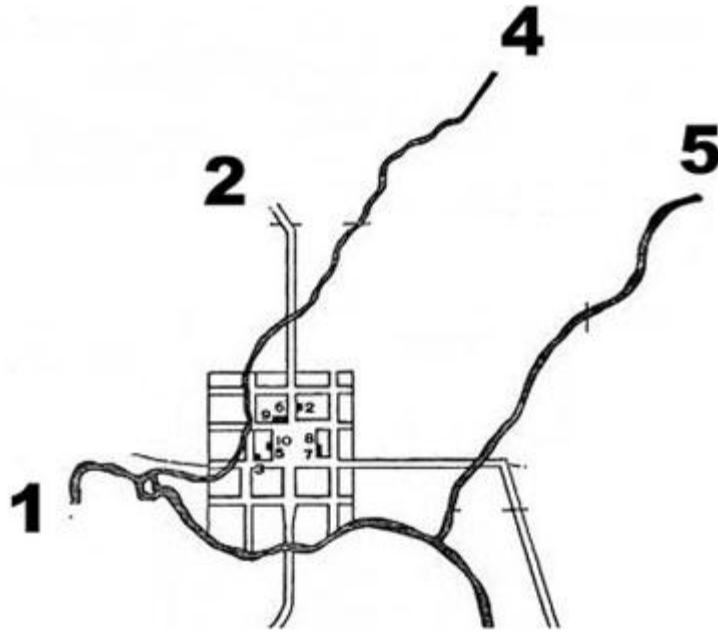
If you want to CASH IN on the SAFETEA funds for your city or town, NOW is the time to act! SAFETEA provides 80% federal funds with a 20% local share. Federal funds are available to rehabilitate, reconstruct, and resurface major streets.



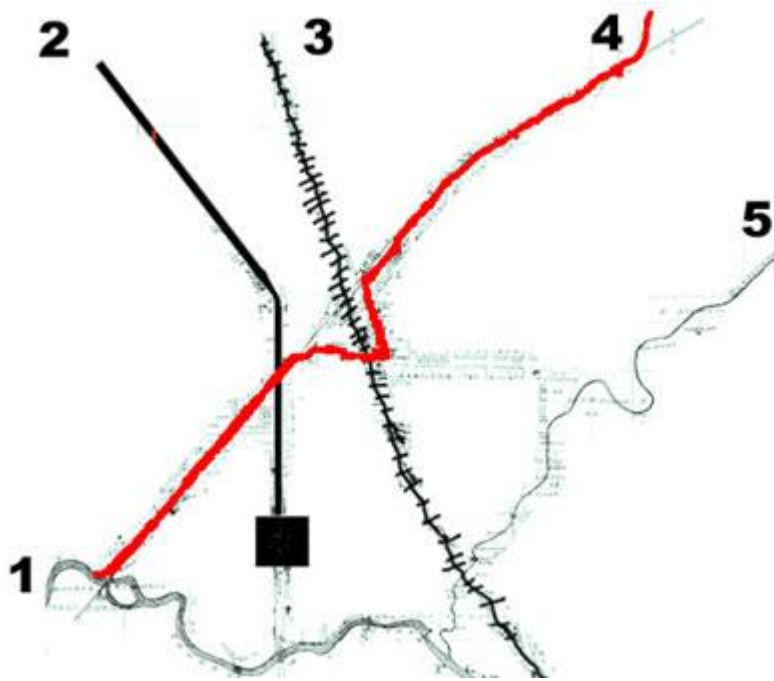
KEY TO DIAGRAMS BELOW:

1. Youngs Creek entering Franklin from the west.
2. North Main Street.
3. Railroad which bisects Franklin.
4. Roaring Run drainage utility, flowing from the northeast.
5. Hurricane Creek, flowing from the northeast.

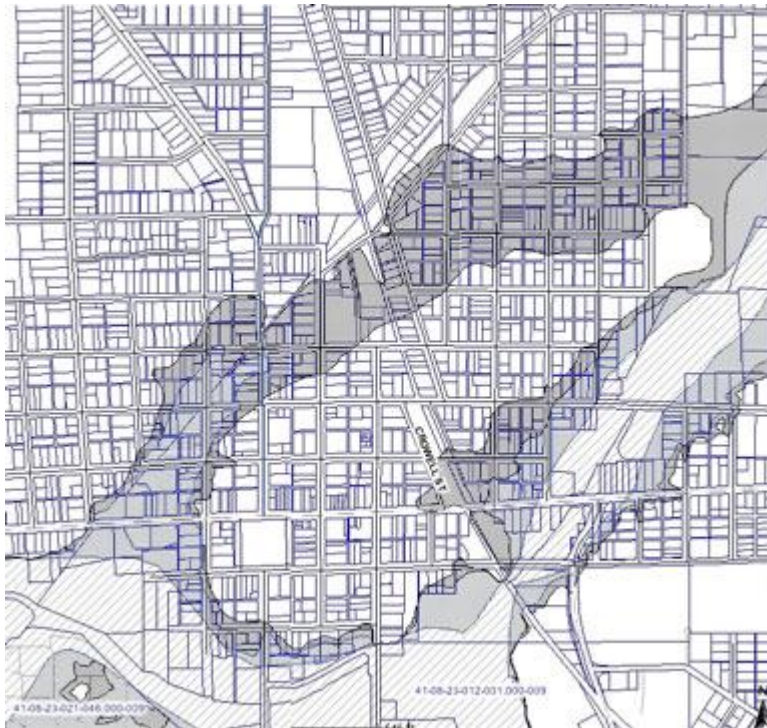
The detailed map images are from Johnson County GIS system online. Lines drawn on them indicate approximate areas.



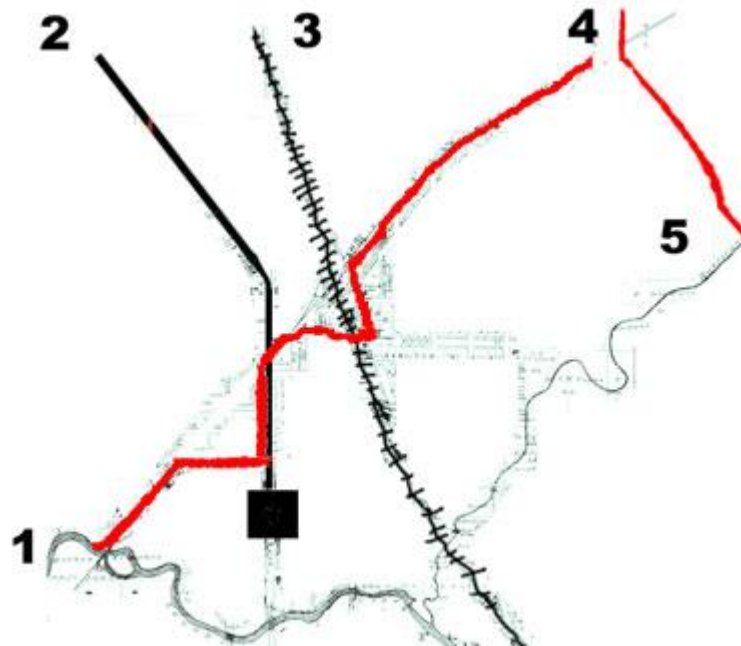
Above: 1825 map of Franklin, before railroads arrived, and when Roaring Run was still in its natural stream course.



Above: 1880 map showing the path of Roaring Run (#4) which was ditched circa 1850 to serve as the “Main Drainage Ditch and Sewer” adjacent to a now-vanished railroad. The hatched line (#3) is the railroad currently in operation. Note that this ancient drainage system sent flows diagonally through the city, more and more as the area urbanized and runoff increased, into the downtown area, and then deposited it UPSTREAM of downtown in Youngs Creek. Localized flooding still occurs periodically in neighborhoods along the lower 75% or so of this 1850 course.

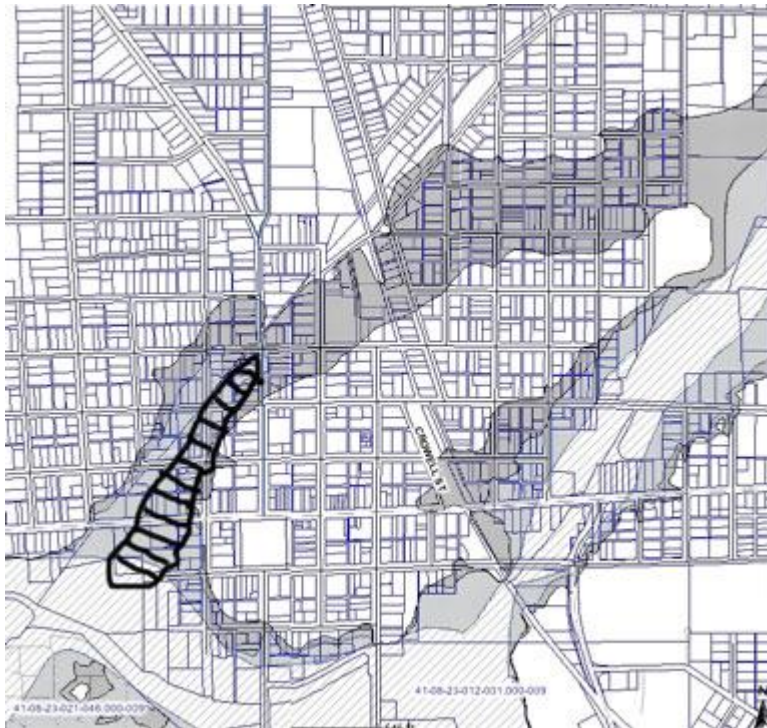


Above: Project area watershed showing flood zones.

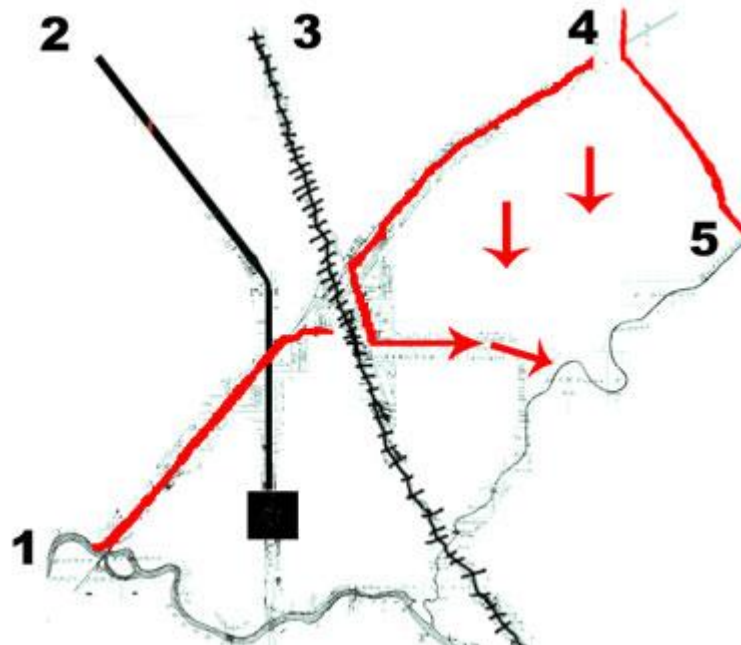


Above: Course of Roaring Run utility post-Main Street project, as now planned. The plan of the city and consultant is to divert Roaring Run flows where it crosses North Main, through a 72-inch pipe installed in a trench running south down the street, then west under Madison (a historic brick street which should be restored) and then intercepting the original course at some point. At a cost of “between \$800,000 and \$1,200,000” according to the consultant. And still sending the same flows down a slightly different route.

Note that the upper reaches of Roaring Run were diverted a few decades ago (about where the #4 is) to a large pipe running southeast to Hurricane Creek.

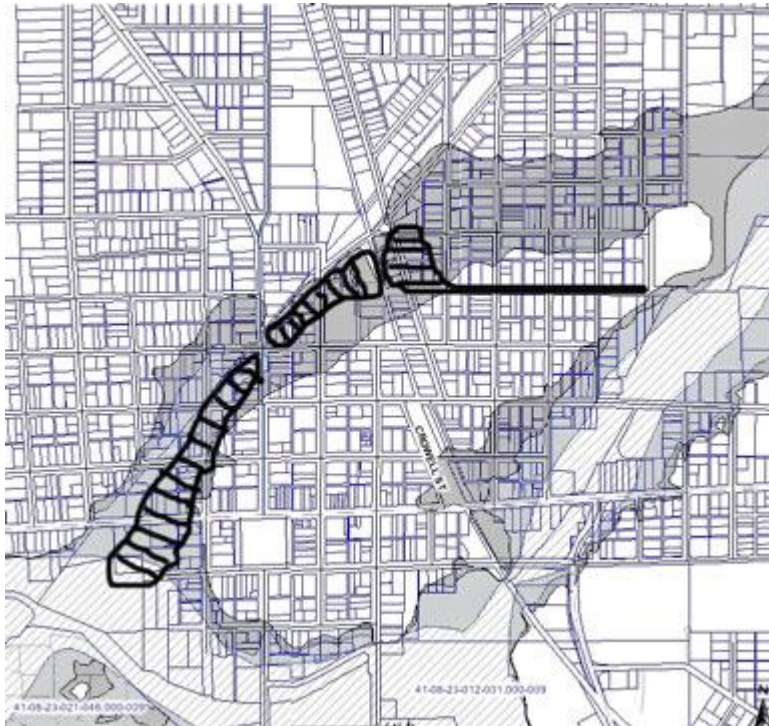


Above: Hatched area at lower left is the approximate area that would benefit in terms of drainage from the current “big pipe” plan. That is, only the area downstream of North Main, because no volume would be removed upstream.



Above: **The Common-Sense Solution.** Because the railroad is a natural barrier, where Roaring Run also creates a bad situation under the track and an adjoining property, and in order to achieve volume removal UPSTREAM as was done in the previous diversion, the line should be blocked at the railroad and diverted towards Hurricane Creek. A storm sewer can be constructed along Kentucky Street, which currently has NO storm drainage, and other storm drainage improvements can be made (as indicated by the extra arrows) in that long-neglected and downtrodden neighborhood. This will solve the typical localized flooding throughout the area, particularly AT North Main, plus the area between there and the railroad, and probably in the area downstream

of North Main along Roaring Run. Also, substantial flows will be diverted DOWNstream of the downtown area: About 9 blocks or 3450 feet east, in Youngs Creek, of the Roaring Run outfall. All of these factors can be quickly analyzed via computer modeling by Williams Creek Consulting. Thus, much greater benefits can be achieved, without the wanton destruction of the current plan, with the proper source of flood-control/storm water utility funding, and at a savings of “between \$800,000 and \$1,200,000” in transportation funds, which can then be applied to their intended purpose, which is the actual rehabilitation of North Main Street. Versus a flood control boondoggle.



Above: Approximate areas that would realize an improvement in drainage from **The Common-Sense Solution**. By removing Roaring Run volume upstream, east of the railroad tracks, the areas downstream, disconnected from about a half-mile of the upper reaches of the ditch (plus all the other contributing flows), would see flooding abated – without the need for the “big pipe.” That is an addition of some 620 linear feet of downtown neighborhood that would benefit versus the “big pipe” scheme. Plus, storm drain improvements would benefit the area just east of the tracks, and about five blocks of Kentucky Street where the new storm sewer would be installed. I've also suggested that the LHH storm sewer line, which runs from the northwest and intersects Roaring Run just west of the railroad, should be diverted to the expanded system on the east side of the tracks, in order to further reduce flows headed downtown and instead send them to Hurricane Creek. Which is in keeping with the big-picture flood solutions I've presented at <http://www.ccjcin.org/floodreport.htm>



Above: Additional storm sewer improvements, including some suggested in the city's July 2009 study, tied into the Kentucky and Ott street lines, would benefit a wide area of a neglected and decayed part of town.

Mitigation will need to occur on Hurricane Creek – which we need to do anyway, because the County Surveyor deforested and channelized it in recent years. It is now possible to use computer modeling to analyze – about 2 days worth of labor – both reduced flows at North Main and beyond along Roaring Run, and increased flows in Hurricane Creek, due to the completion of a storm sewer survey – at my suggestion – in July 2009.

APPENDIX:

I. INDOT Design Manual excerpts.

GENERAL INFORMATION

In aggregate, Part IV discusses INDOT policies, practices, and procedures for performing hydraulic analyses on each project which is the responsibility of the Department. Specifically, this Chapter discusses general information on INDOT hydraulic practices. This includes defining the responsibilities of Department entities in hydraulic analyses, discussing the coordination between the Indiana Design Manual and the AASHTO Model Drainage Manual, describing the basic legal authority for drainage, providing the documentation requirements for the hydraulic analyses...

28-1.0 GENERAL

28-1.01 Introduction

The hydraulics designer must rely on engineering judgment, experience, and **common sense** to achieve meaningful results.

For this Manual, highway drainage design will be confined to methods of preventing the accumulation and retention of water on and by the roadway through the following:

3. providing the most efficient disposal facility consistent with **cost**, the importance of the road, maintenance, and legal obligations;

In hydraulic design, the basic objective is to protect the highway against damage from storm and subsurface waters considering the effect of the proposed improvement on traffic and property. Therefore, unless the State

will benefit, **no improvement in the drainage of areas outside the right of way is warranted.**

28-1.02 Responsibilities

28-1.02(02) Consultant-Designed Project

For a project designed by a consultant, the following summarizes the division of responsibilities.

1. Consultant. The consultant is responsible for the following:

The consultant is responsible for performing its analyses consistent with the policies and criteria adopted by the Department.

2. Hydraulics Unit. For roadway drainage appurtenances, the Hydraulics Team will perform the following:

b. review the consultant's computations for a project in an urban area where the drainage basin exceeds 200 acres;

28-4.02 General Hydraulic Design Policies

28-4.02(01) Introduction

An adequate drainage structure is defined as one which satisfies the following:

1. the design of the structure satisfies or exceeds INDOT **standard engineering practice**; and
2. the design is consistent with what a **reasonably competent and prudent designer** will do under similar circumstances.

28-4.02(03) Hydraulic Analysis

The next step in the design process involves preliminary selections of **alternative designs** that are judged to meet the site conditions and to accommodate the flood flow selected for analysis.

28-4.02(04) Engineering Evaluation

The final step in the design process is the **engineering evaluation of the preliminary designs** and approval of the selected final design. This process involves consideration and balancing of a number of factors. Some of these factors are as follows:

1. legal considerations;
2. flood hazards to highway users or neighboring property owners;
3. **hydraulic efficiencies**;
4. **costs**;
5. **environmental and social concerns**; and
6. **other site-specific concerns.**

28-4.02(05) General Policies

Hydrologic and hydraulic analyses set forth the design-process representative of INDOT's **standard engineering practice**. Engineering evaluation outlines the approach to be followed by a **reasonably competent and prudent designer in evaluating, selecting, and approving a final design**. The following policies are made regarding this design process.

2. The **detail of design studies should be commensurate** with the risk associated with the encroachment and **with other economic, engineering, social, or environmental concerns.**

28-5.0 DOCUMENTATION

28-5.01(02) Definition

The definition of hydrologic and hydraulic documentation as used in this Section is the compilation and preservation of the design and related details and all pertinent information on which the design and decisions were based. This should include the **drainage area** and other maps, field survey information, source references,

photographs, engineering calculations and analyses, measured and other data, and flood history including narratives from newspapers and individuals such as highway maintenance personnel or local residents who witnessed or had knowledge of an unusual event.

28-5.01(03) Purpose

The purpose of providing documentation is to define the design procedure that was used and to **show how the final design and decisions were selected**... Thus, good documentation can provide the following:

3. documenting that **rationally-accepted procedures and analyses were used** at the time of the design which were commensurate with the perceived site importance and flood hazard

28-5.01(04) Types

The types of documentation which should be considered are preconstruction, design, and construction or operation.

1. Preconstruction documentation should include the following, if available, or within the budgetary restraints of the project.

c. **watershed map** or plan including **flow directions, watershed boundaries, and watershed areas**;

d. surveyed data reduced to include **existing hydraulic facilities**, existing controls,

e. flood insurance studies and maps by FEMA;

g. field trip report(s) which may include videocassette recordings, audio tape recordings, still-camera photographs, movie-camera films, or written analysis of findings with sketches;

28-5.01(05) Scheduling

Documentation should not be considered as occurring at specific times during the design, or as the final step in the process; this could be long after the final design is completed. Documentation should rather be an **ongoing process** and part of each step in the hydrologic and hydraulic analysis and design process.

28-5.02 Procedures

28-5.02(01) Introduction

A complete hydrologic and hydraulic design and analysis documentation file for each waterway encroachment or crossing should be maintained by the Hydraulics Team. If practical, this file should include the following:

2. photographs (ground and aerial);

3. hydrologic investigations;

4. **drainage area maps**, vicinity maps, and topographic maps;

5. contour maps;

6. interviews (local residents, adjacent property owners, or maintenance forces);

7. newspaper clippings;

8. **design notes and correspondence relating to design decisions**;

10. assumptions.

The documentation file should include design and analysis data **and information which influenced the facility design**.

28-5.02(02) Practices

The following are the Department's practices related to documentation of hydrologic and hydraulic design and analysis.

2. The designer should document **all design assumptions** and selected criteria including **the decisions related thereto**.

7. Documentation should include data and information from the **conceptual stage of project development** through construction to provide successors with all information.

28-5.03 Documentation Procedures

28-5.03(01) Introduction

The following should be included in the documentation file. The intent is not to limit the data to only those items listed but, rather, to establish a minimum requirement consistent with the hydraulic design procedures as outlined in this Manual. If circumstances are such that **the drainage facility is sized by other than normal procedures** or if the size of the facility is governed by **factors other than hydrologic or hydraulic factors**, a narrative summary detailing the design basis should appear in the documentation file. The designer should include the items listed below which are useful in understanding the analysis, design, findings, and final recommendations.

28-5.03(02) Hydrology

The items used in the design or analyses to be included in the documentation file are as follow

1. contributing watershed-area size and identification of source (map name, etc.);

28-5.03(06) Storm Drain

The items to be included in the documentation file are as follows:

3. **complete drainage area map**;
5. information concerning outfalls, **existing storm drains**, or other design considerations; and
6. **a schematic indicating storm-drain system layout**.

29-1.0 HYDROLOGIC DESIGN POLICIES

29-1.02 Surveys

Hydrologic considerations can influence the selection of a highway corridor and the alternative routes within the corridor. Studies and investigations should be performed, including the consideration of the **environmental and ecological impact** of the project. The magnitude and complexity of these studies should be commensurate with the importance and magnitude of the project and the problems encountered. The data to be included in these surveys or studies include topographic maps, aerial photographs, streamflow records, historical high-water elevations, flood discharges, or locations of hydraulic features such as reservoirs, water projects, or designated or regulatory floodplain areas.

29-1.03 Flood-Hazard Areas

A hydrologic analysis is a prerequisite to identifying flood-hazard areas and determining the locations at which construction and maintenance will be **unusually expensive** or hazardous.

29-1.04 Coordination

Interagency coordination is necessary because many levels of government plan, design, and construct highway and water resource projects which can have an effect on each other. Agencies can share data and experiences within project areas to assist in the completion of accurate hydrologic analyses.

29-1.05 Documentation

The design of a highway drainage facility should be adequately documented. It is often necessary to refer to plans or specifications long after the actual construction has been completed. Documentation should include final computations, method of analysis selected, **drainage area map**, designer's name and date, project **correspondence relative to hydraulic considerations**, and permit information. See Section 28-5.0 for Department guidelines on documentation for hydrologic information.

29-1.06 Evaluation of Runoff Factors

For each hydrologic analysis, the following must be evaluated and included if they will have a significant effect on the final results.

1. **Drainage-basin characteristics** including size, shape, slope, land use, geology, soil type, surface infiltration, and storage.

29-2.0 OVERVIEW

29-2.01 Introduction

The analysis of the peak rate of runoff, volume of runoff, and time distribution of flow is fundamental to the design of a drainage facility. The design of each highway drainage facility requires the determination of discharge-frequency relationships. One design may require a peak-flow rate while another requires a runoff hydrograph providing an estimate of runoff volume. The peak-flow rate is used in the design of a bridge, culvert, roadside ditch, or small storm-sewer system. A drainage system involving detention storage, pumping stations, or **large or complex storm-sewer systems** require the development of a runoff hydrograph.

Errors in the estimates will result in a structure that is either undersized and causes more drainage problems, or **oversized and costs more than necessary**. A hydrologic analysis is only an approximation. The relationship between the amount of precipitation on a drainage basin and the amount of runoff from the basin is complex. Insufficient data is available concerning the factors influencing the rural and urban rainfall-runoff relationship to expect exact solutions.

II. NEPA policy excerpts.

<http://www.environment.fhwa.dot.gov/projdev/tdmalts.asp>
NEPA and Transportation Decisionmaking

- * **Flexibility** in Highway Design
- * **Context Sensitive** Design

Development and Evaluation of **Alternatives**

Information on **alternatives analysis** can be found in the FHWA/FTA SAFETEA-LU Environmental Review Process

Final Guidance, November 15, 2006. On this page, learn about: Alternatives Screening, Range of Alternatives, Logical Termini and Segmentation, and Other Requirements Involving Alternatives Analysis

The identification, consideration, and analysis of **alternatives** are **key** to the **NEPA** process and goal of **objective decisionmaking**. Consideration of alternatives leads to a solution that satisfies the transportation need and **protects environmental and community resources**. The Council on Environmental Quality (CEQ) refers to the alternatives analysis section as the "**heart of the EIS**," and requires agencies to:

1. **Rigorously explore and objectively evaluate all reasonable alternatives** and for alternatives which were **eliminated from detailed study**, briefly discuss the reasons for their having been eliminated.
2. Devote substantial treatment to each alternative considered in detail including the proposed action so that reviewers may evaluate their comparative merits.
3. Include reasonable alternatives not within the jurisdiction of the lead agency.
4. Include the alternative of no action.
5. Identify the agency's preferred alternative or alternatives, if one or more exists, in the draft statement and identify such alternative in the final statement unless another law prohibits the expression of such a preference.
6. Include appropriate mitigation measures not already included in the proposed action or alternatives.

-- 40 CFR 1502.14

Alternatives Screening

Alternatives analysis should **clearly** indicate why and how the particular range of project alternatives was developed, including **what kind of public and agency input was used**. In addition, alternatives analysis should explain **why and how alternatives were eliminated from consideration**. It must be made clear what criteria were used to eliminate alternatives, **at what point in the process the alternatives were removed, who was**

involved in establishing the criteria for assessing alternatives, and the measures for assessing the alternatives' effectiveness.

In preparing NEPA documents, **project sponsors should be candid about the rationale for generating, evaluating, and eliminating alternatives.** Being as specific as possible is important. If an alternative is eliminated from further consideration because it "does not meet the purpose and need," we **must** adequately explain **how or why this alternative doesn't meet the purpose and need.**

<http://www.environment.fhwa.dot.gov/projdev/tdmtermini.asp>
NEPA and Transportation Decisionmaking
The Development of Logical Project Termini
November 5, 1993

I. Introduction

In developing a project concept which can be advanced through the stages of planning, environment, design, and construction, the project sponsor needs to consider a "whole" or integrated project. This project should satisfy an identified need, such as safety, rehabilitation, economic development, or capacity improvements, and **should be considered in the context of the local area socioeconomics and topography**, the future travel demand, and **other infrastructure improvements in the area.** Without framing a project in this way, proposed improvements may miss the mark by only peripherally satisfying the need or by **causing unexpected side effects which require additional corrective action.**

40 CFR 1508.8

Significance of Environmental Impacts

According to the Council on Environmental Quality (CEQ) regulations (40 CFR §§ 1500-1508), the determination of a significant impact is a function of both context and intensity.

Context: This means that the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend upon the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant.

Intensity: This refers to the severity of impact. Responsible officials must bear in mind that more than one agency may make decisions about partial aspects of a major action. The following should be considered in evaluating intensity:

1. **Impacts that may be both beneficial and adverse.** A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial.
2. The degree to which the proposed action affects public health or safety.
3. Unique characteristics of the geographic area such as **proximity to historic or cultural resources...**
4. The degree to which the effects on the quality of the human environment are likely to be highly controversial.
5. The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.
6. The degree to which the action **may establish a precedent for future actions** with significant effects or represents a decision in principle about a future consideration.
7. **Whether the action is related to other actions with individually insignificant but cumulatively significant impacts.** Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.
8. The degree to which the action may adversely affect districts, sites, highways, structures, or objects **listed in or eligible for listing in the National Register of Historic Places** or may cause loss or destruction of significant scientific, cultural, or historical resources.
10. **Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.**

III. Misc:

Eye in sky to help county update drainage maps
Daily Journal Nov. 12, 2009

Johnson County residents, you are not experiencing an alien invasion.

The airplanes you'll see buzzing over your property and shooting down light beams starting next month aren't part of a science fiction flick. They're taking updated aerial photographs of the county.

The photographs will be layered on top of the county's elevation model, or topography map, revealing which cities and towns are prone to flooding, GIS director Aaron Shaw said.

The county hasn't updated its elevation model in more than 10 years, and much of its drainage and runoff flows have changed due to new subdivisions, strip malls and industrial buildings, he said.

Nearly 80 percent of the about \$35,000 cost of the project is being paid for by federal highway funds. The remaining about \$7,000 will be split among Franklin, Greenwood and the Johnson County Highway Department, Shaw said.

Marion, Morgan and Shelby counties also are a part of the project, he said. Work is expected to start in December.

Beams of light will be emitted from airplanes, capturing detailed images of land and buildings from all angles, including straight above.

Although the beam starts off with a small diameter in the airplane, the width expands as the light gets closer to the ground and will be visible to people. The beams are weak and not harmful, Shaw said.

The method, called pictometry, provides more detail than satellite images.

Shaw will be able to take the data collected from the pulses to show what different cities or towns would look like with 1- or 2-foot contours. A contour line links points of the same elevation on a map, which illustrate peaks and valleys between the two points.

Contour lines show the shape of the land surface, which will help Franklin identify low spots and figure out which way water flows, Mayor Fred Paris said.

"The big reason it's beneficial to us is the 1-foot contours," he said. "Having that allows us to take a look at a log of drainage problems and not have to spend a lot of money on engineering."

For example, the city is studying how water flows in downtown east of Main Street. Engineers are studying the area and believe that water flows from north to south, but a quick look at a contour model would answer the question, Paris said.