Appendix 5-2

Agendas and Presentations for Public Meetings

HANNUM, WAGLE & CLINE
engineering

CITY OF TERRE HAUTE, INDIANA
CSO Long Term Control Plan
Citizen Advisory Committee
Meeting Minutes
April 16, 2002 @ 7:00 p.m.

ATTENDEES:
(See Sign In Sheet)

Mike Cline began the meeting with an overview of the items which will be presented. First item is a review of the revisions from the last meeting. He discussed that the cost opinions that had been presented on March 18, had been updated to include funding for modifying the existing railroad spur (either relocating it or working around it during construction to keep it in place). These additional costs were included in the updated cost estimate as well as money for lining sewers in the wellhead protection zone and adding funds for creating a sewer maintenance crew. We reviewed the updated project costs for each of the alternatives at that point.

Second item was the discussion of the Wabash Environmental Technologies (WET) proposal. Since the last meeting the technical committee had met with WET. Correspondence has been back and forth and a final response from WET was received today. The proposed cost from WET is approximately $6.6 million and it was placed in the present worth table as the WET alternative. There was also a cost for their annual lease payment that was factored into the O&M costs, the result is that it became slightly cheaper on a present worth basis than Alternative 3A but is over $4 million more expensive on a present worth basis than Alternative 1. Also that cost does not include various operational components that WET had not included in their proposal, such as power, debris removal, etc.

Since it appears that the Alternative 1 on a present worth basis is the most cost effective, a discussion on Alternative 1 versus 3A took place. Alternative 3A at the last meeting was discussed as a possibility by the CAC because they felt it may be more beneficial to the city to spend more at the wastewater plant.

Gui DeReamer presented the two alternatives again. He showed that incrementally the wastewater plant expansion to 60 mgd is not able to treat all of the flows that are received during the E-storm because of the high intensity. This would still require there to be storage volume out in the system. He explained that Alternative 1 has about $5 million less in capital costs and that the Alternative 3 upgrade to 60 mgd would really only get used on average 132 hours a year per the modeling that was completed. That represents approximately 1.5% of the time. Blending this high flow would become more difficult. As a side note, Alternative 1 does include some rehabilitation at the wastewater plant to improve the performance. So in the end the technical committee still felt that Alternative 1 was the best solution for this plan.

The knee of the curve was reviewed versus the days of excedence with these noted revisions.

H.J. Umbaugh then presented the projected user rate information. Jason Semler with H.J. Umbaugh explained how they developed the projected user rates. He explained that they factored in the current O&M and expected inflationary growth on that item over the scheduled implementation period. He then used $27 million project for Phase I and that the Phase II increase was estimated at $18 million. He explained that the projected revenue requirements also include the debt service and coverage required for bond issue and also factored in additional O&M due to the projects and additional labor anticipated at the plant.

The overall project is $45 million for these user rates with the additional O&M etc. He showed that the current rates are $8 a month after Phase I which is to be implemented in early 2004. The rate at that time would go to $12.70 per month per residential user that uses approximately 5,000 gallons a month.

Phase II would be implemented with a rate increase at the early part of 2006 with the total rate being $16.80 a month. The final rate would be for additional staff in early 2009 which would bring the total rate to $17.85 a month. He compared this to other communities – such as Indianapolis, Ft. Wayne, Evansville, South Bend, Hammond, Muncie, Bloomington, Anderson and Kokomo. He showed that based on the current monthly bills, only Indianapolis has a lower monthly rate than Terre Haute. He also explained that many of these communities anticipate CSO projects because of the same regulations that Terre Haute is facing right now.

Dick Weigel began discussion on which options the City wants to use. He reiterated that Option 1, Option 2 and Option 3 had been previously discussed with various degrees of elimination of overflows around Fairbanks Park. These items can be used on top of Alternative 1 because Alternative 1 capital cost is approximately $38 million. There were also the improvements that are recommended potentially at the wastewater plant and that additional money could be used there in lieu of these options. The technical committee had recommended that Alternative 1 with Option 2 be utilized for cost of approximately $40,400,000. It was believed that the incremental cost to go to Option 3 which was another $4 million on top of Option 2 did not merit that investment. It was believed that the additional money could be spent at the plant.

There was considerable discussion on the options and alternatives to be selected. The committee felt that it was important that some additional money be set aside to study the back up sewer areas and maybe implement some of those improvements because it may benefit the residents of the community more than cleaning up the river. They also felt that there

needed to be something in the plan to address odors at the wastewater plant. Given those issues, the committee voted and unanimously favored Alternative 1 with Option 2 resulting in a cost of $40,400,000. This was with the understanding that the remaining money should go to the backup sewer areas and addressing odor at the wastewater plant.

With those decisions, the review of the phasing was discussed and explained how projects in the collection and wastewater system could be broken apart. Areas of work for Phase I were presented along with those in Phase II. There were several questions and discussion on how the project would be implemented. One item was regarding the demolition of the control administration building during Phase I and its replacement being built in Phase II. It was explained that the building would come down and people would need to work temporarily in a trailer type facility.

Remaining work was then discussed. It was explained that the plan would need to be summarized and a recommended plan written to present to IDEM by the end of the month. The plan will be reviewed by IDEM and then a Preliminary Engineering Report will be written that will more specifically detail and cost out the Phase I project. At that point in time, the CAC would come back and be updated of how things are proceeding.

Mike Cline explained that in the future the City will be looking at the stormwater from their urban areas and its loading on the Wabash River much like this plan has looked at combined sewers. The CAC was encouraged to participate in that process.

Pat Goodwin closed the meeting and thanked everyone for attending. He thanked the committee for their participation in this process and expressed his belief that it allowed the city to get significant input from the residents.

CAC Meetings

City of Terre Haute

CSO LTCP

Citizen Advisory Committee

April 16, 2002

NAME:	AFFILIATE	PHONE
1. Dick Weigel	HWC	812-234-2551
2. Bill Cultice	QEC ~~[illegible]~~ Environment	(812) 299-438
3. Chuck Adamson	Indiana - American H_2O Co.	812-232-7369
4. Tim Hennessy	WTWO-TV	812-298-9094
5. DAVE DANNER	VCSC	812-462-4336
6. Jeff Duell	Tri Remanufacturing	812-234-5889
7. Joyce V. Cadwallader	Saint Mary-of the Woods College	812-232-2184
8. CHRIS PFAFF	IN DEPT. OF COMMERCE	317-232-8992
9. Robert J. Houghtaler	Rose-Hulman	(812)877-9449
10. Rich Ziemba	Amer. Water INWTP	
11. Troy Swan	TH	
12. Pat Goodwin	TH	
13. Mike Cline	HWC	
14. Scott Girmen	G+H	
15. Gi. DeReamer	G+H	
16. Julie Hansen	G+H	
17. Derrik Hagerman	W.E.T. - Pres	
18.	W.E.T. - V. Pres	

City of Terre Haute
Long-term Control Plan
Citizen Advisory Committee
April 16, 2002 - 7:00 PM
Agenda

1. Opening Remarks

2. Review Revisions from the last Meeting
   - Cost Opinion Update
   - Review of Wabash Environmental Proposal
   - Alternate 1 vs. Alternate 3

3. Review of Recommended Plan and Related Work Items

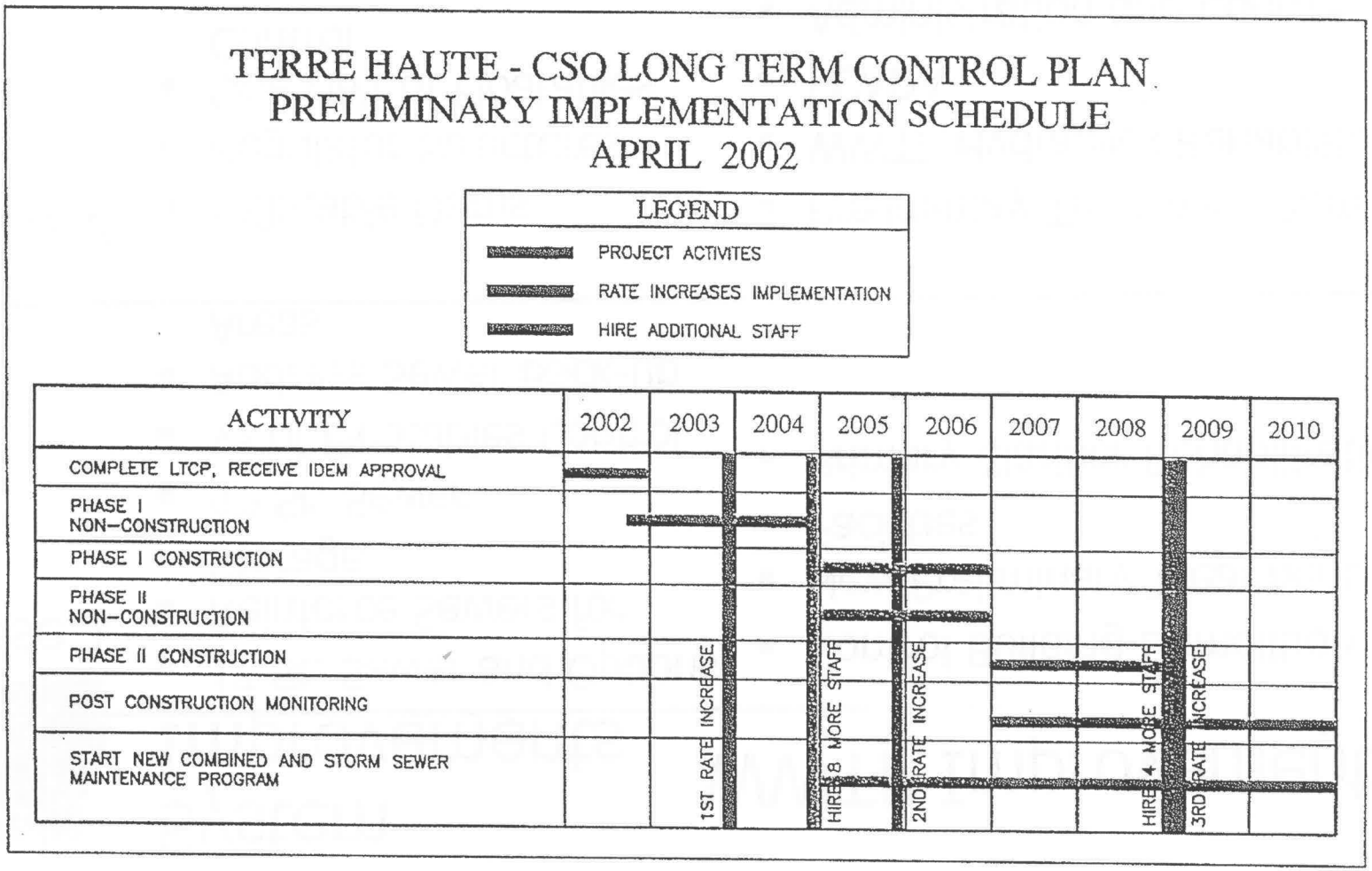
4. Review of User Rates

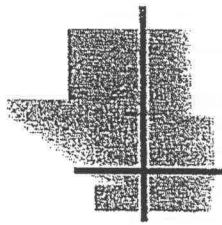
5. Review the Implementation Schedule and Phases

6. Where do we go from here?

7. Miscellaneous

TERRE HAUTE - CSO LONG TERM CONTROL PLAN
PRELIMINARY IMPLEMENTATION SCHEDULE
APRIL 2002





	Collection System Improvements	WWTP Improvements
Phase 1	▪ 1st St. Sewer and Options ▪ Reinforce Sewers for Storage ▪ 4th St. Sewer ▪ ½ of Floatables Control ▪ Address Sewer Back-up Areas	▪ Control Building Demolition ▪ New Preliminary Treatment Facilities ▪ Primary Clarifier Rehabilitation
Phase 2	▪ Inflatable Dams ▪ Regulator Structures ▪ One Half of Floatables Control	▪ Preliminary Treatment Demolition ▪ WWTP Hydraulics Rehabilitation ▪ SCADA ▪ Administration and Control Building

HANNUM, WAGLE & CLINE
GREELEY AND HANSEN

H J U

H.J.Umbaugh & Associates

Certified Public Accountants, LLP

Herschell J. Umbaugh, CPA
(1915-1989)
Myron H. Frasier, CPA
(Retired)

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Indianapolis, Indiana 46240-0458 Telephone 317 844-7288 Facsimile 317 848-3604

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Partners & Principals
Roger L. Umbaugh, CPA
Edward W. Guntz, CPA
Gerald G. Malone, CPA
Charles A. Dalton, CPA
David C. Frederick, CPA
John D. Julien, CPA
John M. Seever, CPA
Colette J. Irwin-Knott
Todd A. Samuelson, CPA
Loren M. Matthes

April 16, 2002

Honorable Judy Anderson, Mayor
and Members of the Common Council
City of Terre Haute
City Hall
17 Harding Avenue
Terre Haute, IN 47807-3430

The attached schedules (listed below) present unaudited and limited financial information for the purpose of discussion and consideration by appropriate officers and officials of the City of Terre Haute in the preliminary planning stage of the funding of combined sewer overflows and related projects. The use of these schedules should be restricted to this purpose as the information is subject to future revision and further reports.

Page(s)	
2	Alternative Projects and Estimated Maximum Projected Impact on Sewage Rates
Graph	Comparison of Monthly Bills

The schedules and underlying assumptions are based upon information provided by the City of Terre Haute and its consulting engineers. In the preparation of these schedules, assumptions were made as noted regarding certain future events. As is the case with such assumptions regarding future events and transactions, some or all may not occur as expected and the resulting differences could be material. We have not examined the underlying assumptions nor have we audited or reviewed the historical data. Consequently, we express no opinion thereon nor do we have a responsibility to prepare subsequent reports.

We would appreciate your questions or comments on this information and would provide additional information upon request.

H. J. Umbaugh & Associates

A Half Century of Advising Indiana Communities

TERRE HAUTE (INDIANA) WASTEWATER UTILITY

ALTERNATIVE PROJECTS AND ESTIMATED
MAXIMUM PROJECTED IMPACT ON SEWAGE RATES
(Assumes a 5.5% interest rate through conventional financing.)
(Amounts rounded to nearest $100.)

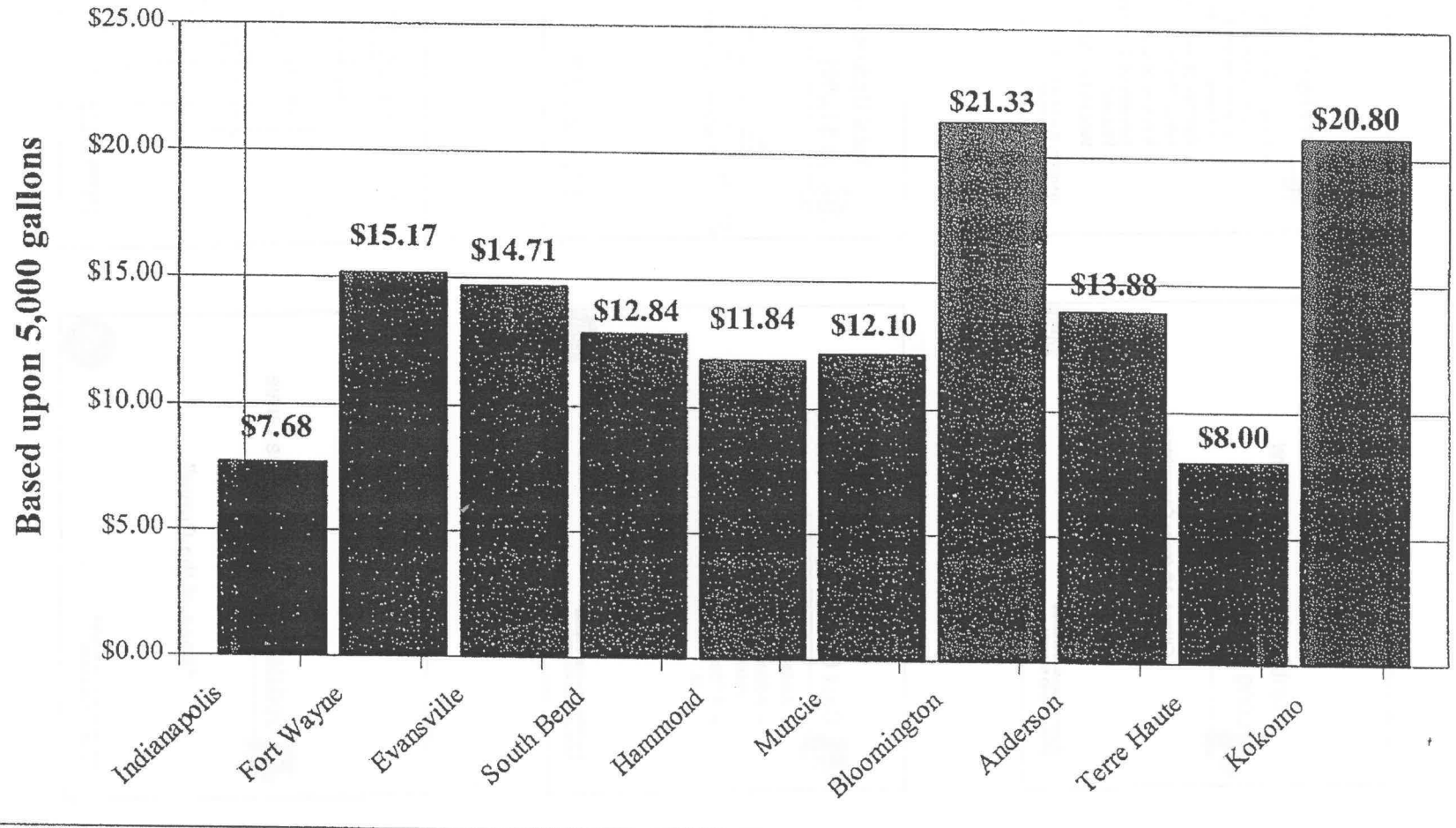
	Phase 1 (End of 2003 to beginning of 2004)	Phase 2 (End of 2005 to eginning of 2006)	Phase 3 (End of 2008 to eginning of 2009)
Project Costs & Proposed Bond	$27,000,000	$18,000,000	$0
Revenue Requirements:			
Debt Service (20 years @ 5.5%)			
Phase 1	$2,259,400	$2,259,400	$2,259,400
Phase 2		1,506,300	1,506,300
Phase 3			0
Debt Service Coverage (30%)			
Phase 1	677,900	677,900	677,900
Phase 2		451,900	451,900
Phase 3			0
Additional Operation and Maintenance (2)			
Phase 1	350,000	350,000	350,000
Phase 2		250,000	250,000
Phase 3			400,000
Operation and Maintenance (1)	4,333,700	4,507,000	4,687,300
Total Revenue Requirements	$7,621,000	$10,002,500	$10,582,800
Available Revenues:			
Collections	$4,779,600 (1)	$7,551,800 (3)	$9,968,400 (4)
Other income (1)	76,600	76,600	76,600
Total Available Revenues	$4,856,200	$7,628,400	$10,045,000
Additional Revenues Required	$2,764,800	$2,374,100	$537,800
Resulting Approximate Average Residential Monthly Bill (Presently $8.00 for 668 cubic feet for users inside the City)	$12.70	$16.80	$17.85
Resulting Approximate Increase in Average Residential Monthly Bill	$5.00	$4.00	$1.00

(1) Per Wastewater Utility's 2002 budget, increased 4% per year due to inflation.
(2) Per Engineer.
(3) Assumes Phase 1 rate increase.
Assumes Phase 2 rate increase.

(Subject to the comments in the attached letter
dated April 16, 2002 of H.J. Umbaugh & Associates.)

Comparison of Monthly Bills

Current



Combined Sewer Overflow Long Term Control Plan

Citizen Advisory Committee
Meeting #5

April 16, 2002

HANNUM, WAGLE & CLINE
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Meeting Overview

- Review Revisions from last meeting
  - Cost Opinion Update
  - Review Wabash Environmental Technologies, LLC Proposal
  - Alternative 1 vs. Alternative 3
- Review of Recommended Plan and Related Work Items
- Review of User Rates
- Review of Implementation Schedule and Phases
- Where Do We Go From Here?

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Cost Opinion Update

- Added Railroad Spur cost
- Added cost for lining sewers in Wellhead Protection zone
- Added sewer maintenance and evaluation cost

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Total Updated Project Costs (in $1,000)

Overflow Alternative:	Storm D (8.68") Alternative 1	Storm E - (9.81") Alternative 1	Alternative 1A	Alternative 2B	Alternative 3A	Alternative 3B	Storm F - (1.31") Alternative 2	Alternative 1	Alternative 3	Storm G (2.84") Alternative 1
Total Project Cost of Alternative:	$24,810	$38,160	$45,730	$48,180	$43,180	$51,130	$94,350	$99,750	$95,080	$192,690

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Updated Cost Performance Curve

"Knee-of-the-Curve"

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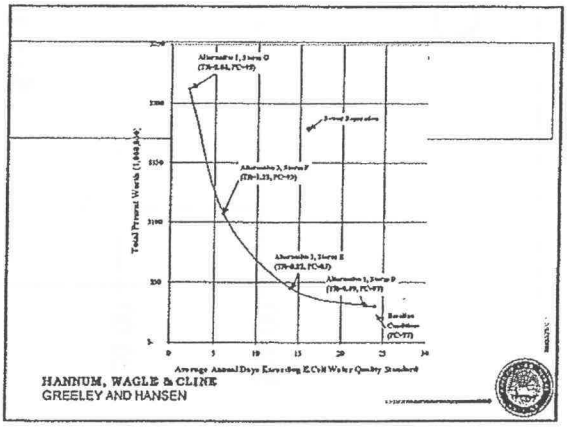

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Wabash Environmental Technologies (W.E.T.) Proposal

- First proposal received prior to March 18th Citizen Advisory Committee meeting
- Technical committee meeting with W.E.T. on March 25th to review proposal
- Revised proposal received on April 10th
- Clarification letter sent to W.E.T. on April 12th
- Response from W.E.T. received today

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Description	Alternative 1	Alternative 2A	Alternative 2B	W.E.T. Alternative	Alternative 3A	Alternative 3B
A. Conveyance	$4,180,000	$3,980,000	$5,130,000	$5,980,000	$5,060,000	$6,930,000
B. Storage Facilities						
1. Replace Sewer for Storage	$2,480,000	-	-		$2,160,000	-
2. Inflatable Dam	$1,250,000	$300,000	$300,000		$2,710,000	$300,000
3. Regulator Structure	$80,000	-	-		$100,000	-
4. Buried Concrete Storage Tanks	-	$10,800,000	$12,600,000		-	$10,000,000
5. Above Ground Storage Tanks and L.S.				$6,600,000		
Subtotal Storage Facilities Costs:	$4,930,000	$11,100,000	$13,200,000	$6,600,000	$4,910,000	$10,300,000
C. WWTP Upgrade to 60 MGD	-	-	-		$3,870,000	$5,970,000
D. CSO Related Improvements	$19,500,000	$19,500,000	$19,500,000	$19,500,000	$19,500,000	$19,500,000
Subtotal Construction Costs:	$30,330,000	$34,580,000	$38,540,000	$32,080,000	$34,540,000	$40,000,000
Engineering, Legal, Administration, and Contingency (25%) Cost	$7,650,000	$9,150,000	$9,640,000	$8,020,000	$8,640,000	$10,000,000
Total Project Costs:	$37,980,000	$43,730,000	$48,180,000	$40,100,000	$43,180,000	$50,000,000
Operation and Maintenance Costs:	$910,000	$920,000	$950,000	$1,161,300	$1,650,000	$1,350,000
Total Present Worth of Alternative:	$33,200,000	$32,850,000	$33,330,000	$39,100,000	$33,310,000	$39,650,000

W.E.T. Proposal does not include the costs of electricity for lift station, installation of SCADA system, and debris removal from tank, piping pumps, and lift station. Debris removal includes labor, equipment, transportation, disposal and 15% management fee.

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Alternative 1 – In-line Storage

- Main Lift Station capacity = 48 MGD
- 24" flow diversion sewer on First Street from CSO 008 to CSO 007
- 30" flow diversion sewer on First Street from CSO 007 to CSO 005 to a 48" sewer from CSO 005 to Hulman Street
- In-line storage at CSOs 004 and 011 at the diversion structures
- Additional in-line storage in Hulman and Idaho sewers at 6th Street
- Reinforce Hulman sewer for storage from First Street to 14th Street
- Reinforce Lafayette sewer for storage from CSO 009 diversion structure to Spruce St.
- Remove weir and install inflatable dam at Ohio and 16th Street

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Alternative 3A – Increase WWTP Capacity

- Increase Main Lift Station capacity = 55 MGD
- Increase WWTP capacity to 60 MGD
- 24" flow diversion sewer an First Street from CSO 008 to CSO 007
- 30" flow diversion sewer on First Street from CSO 007 to CSO 005 to a 48" sewer from CSO 005 to Hulman Street
- Remove weir and install inflatable dam at Ohio and 16th Street
- In-line storage at CSOs 004 and 011 at the diversion structures
- Additional in-line storage in Hulman and Idaho sewers at 6th Street
- Reinforce Hulman sewer for storage from First Street to 14th Street

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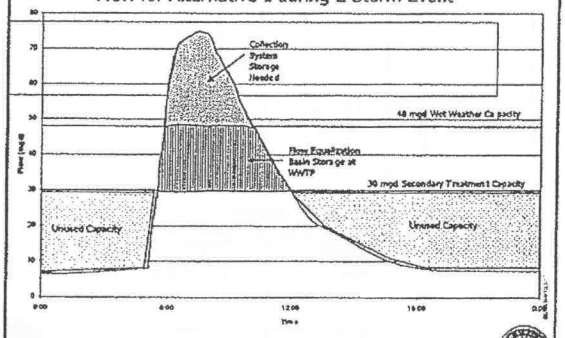
Flow for Alternative 1 during E Storm Event



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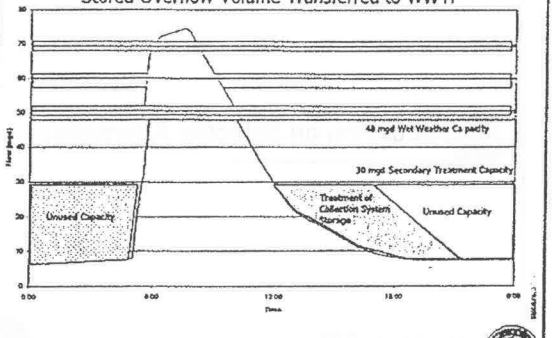
Stored Overflow Volume Transferred to WWTP



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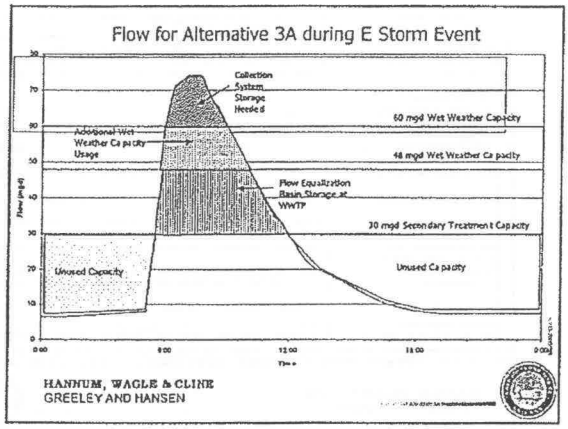

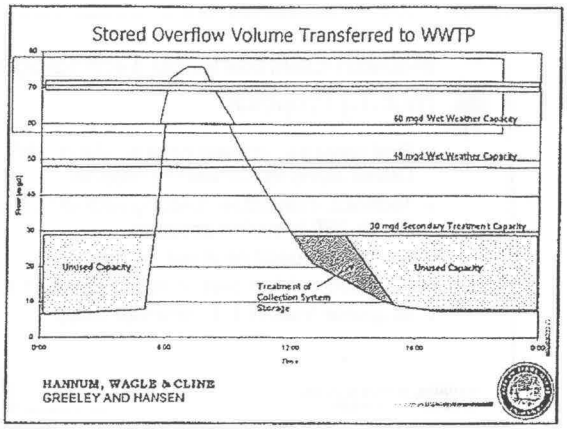

Alternative 1 vs. Alternative 3

- $5 Million less Capital Cost
- 12 mgd upgrade (Alt. 3) would get used on average 132 hours/year (1.5%)
- Effluent limits are more difficult to meet with increased effluent blending (Alt. 3)
- Effluent blending may not be permitted in the future
- Alternative 1 still includes work at WWTP

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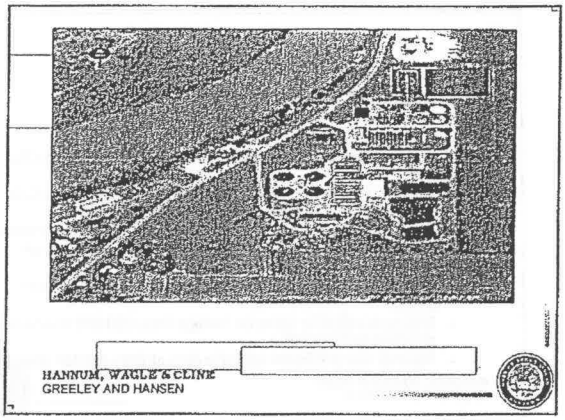

Discussion on Selected Alternative

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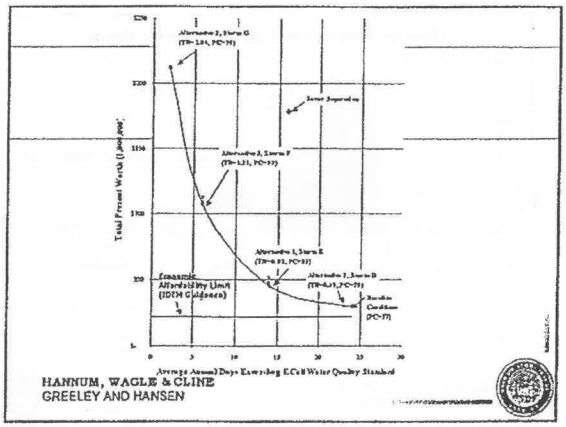

Sewer User Rate Analysis

H.J. Umbaugh & Associates

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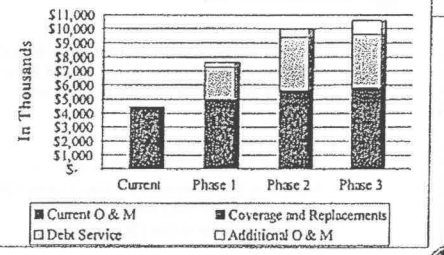
Projected Revenue Requirements

(Based on $45 Million Project plus additional O & M)



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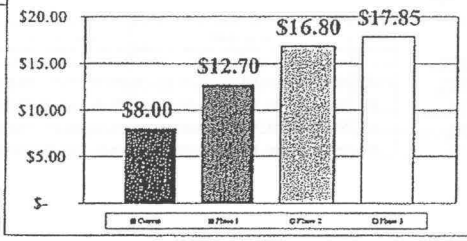
Resulting Approximate Average Monthly Residential Bill

(Assumes 668 cubic feet for residential users inside the City.)



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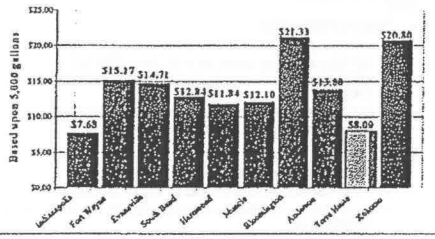
Comparison of Monthly Bills

Current



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Project Phasing Schedule

ACTIVITY	2002	2003	2004	2005	2006	2007	2008	2009	2010
COMPLETE EIOP, RECEIVE IDEM APPROVAL									
PHASE I NON-CONSTRUCTION									
PHASE I CONSTRUCTION									
PHASE II NON-CONSTRUCTION									
PHASE II CONSTRUCTION									
POST CONSTRUCTION MONITORING									
START NEW COMBINED AND STORM SEWER MAINTENANCE PROGRAM		1ST RATE INCREASE		2ND RATE INCREASE				3RD RATE INCREASE	

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Options

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Option 1 – Transfer CSOs 006 and 005 to CSO 004

- Improvements
  - 60" flow diversion sewer on First Street from CSO 006 to CSO 005 to an 84" sewer from CSO 005 to Hulman Street
  - Remove outfall pipes at CSOs 006 and 005
- Benefits
  - 2 less outfalls to maintain
  - 2 less floatable control devices to install and maintain
  - More days in compliance with Water Quality Standards at Fairbanks Park (Priority Area)
  - Eliminate 2 highly visible CSO structures

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Option 2 – Transfer CSOs 008, 006, and 005 to CSO 004

- Improvements
  - 48" flow diversion sewer on 1st St. from CSO008 to CSO 007
  - 60" flow diversion sewer on 1st St. from CSO007 to CSO 006
  - 78" flow diversion sewer on 1st St. from CSO006 to CSO 005
  - 96" flow diversion sewer on 1st St. from CSO005 to Hulman St.
  - Remove outfall pipes atCSOs 008, 006, and 005
- Benefits
  - 3 less outfalls to maintain
  - 3 less floatablecontrol devices to install andmaintain
  - More days in compliance with Water Quality Standards at Fairbanks Park (Priority Area)
  - Eliminate 3 highly visible CSO structures

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Option 3 – Transfer CSOs 008, 007, 006, and 005 to CSO 004

- Improvements
  - 48" flow diversion sewer on 1st St. from CSO 008 to CSO 007
  - 96" flow diversion sewer on 1st St. from CSO 007 to a new CSO outfall with a new throttle pipe to the interceptor just downstream of CSO 005 in Fairbanks Park
  - Parallel 60" flow diversion sewer on 1st St. from CSO 005 to Hulman St
  - Remove outfall pipes atCSOs 008, 006, and 005
- Benefits
  - 3 less outfalls to maintain
  - 3 less floatablecontrol devices to install andmaintain
  - More days in compliance with Water Quality Standards at Fairbanks Park (Priority Area)
  - Eliminate 3 highly visible CSO structures

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Total Project Costs with Options (in $1,000)

Description	Storm D (8.6hr) Alternative 1	Storm E - (9.81hr) Alternative 1	Alternative 2A	Alternative 2B	Alternative 3A	Alternative 3B	Storm F - (1.32hr) Alternative 1	Alternative 2	Alternative 3	Storm G (2.81hr) Alternative 1
Total Project Cost of Alternative:	$74,310	$38,160	$45,730	$48,380	$43,180	$51,130	$94,850	$99,750	$95,080	$192,690
Total If Option 1 is selected	$0	$39,535	$47,702	$49,393	$44,501	$53,176	$95,204	$100,030	$95,818	$0
Total If Option 2 is selected	$0	$40,403	$49,219	$50,764	$45,890	$54,639	$96,149	$100,877	$96,528	$0
Total If Option 3 is selected	$0	$44,302	$51,959	$51,767	$49,839	$57,507	$98,684	$104,186	$100,324	$0

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Discussion on Selection of Option

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Project Phasing Schedule

ACTIVITY	2002	2003	2004	2005	2006	2007	2008	2009	2010
COMPLETE UTP, RECEIVE IDEM APPROVAL									
PHASE I NON-CONSTRUCTION									
PHASE I CONSTRUCTION									
PHASE II NON-CONSTRUCTION									
PHASE II CONSTRUCTION									
POST CONSTRUCTION MONITORING									
START NEW COMBINED AND STORM SEWER MAINTENANCE PROGRAM		1ST AVE. INCREASE		FAIRVIEW HOME START		2ND/3RD AVE. INCREASE		FAIRVIEW HOME START	1ST AVE. INCREASE

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Discussion on Project Phasing

- 1st St. Sewer
- Reinforce Sewers for Storage
- Inflatable Dams
- Regulator Structures
- Floatables Control
- 4th St. Sewer
- WWTP Improvements
- SCADA
- Address Sewer Back-up Areas

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	Collection System Improvements	WWTP Improvements
Phase 1	▪ 1st St. Sewer and Options ▪ Reinforce Sewers for Storage ▪ 4th St. Sewer ▪ ½ of Floatables Control ▪ Address Sewer Back-up Areas	▪ Control Building Demolition ▪ New Preliminary Treatment Facilities ▪ Primary Clarifier Rehabilitation
Phase 2	▪ Inflatable Dams ▪ Regulator Structures ▪ One Half of Floatables Control	▪ Preliminary Treatment Demolition ▪ WWTP Hydraulics Rehabilitation ▪ SCADA ▪ Administration and Control Building

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Where do we go from here?

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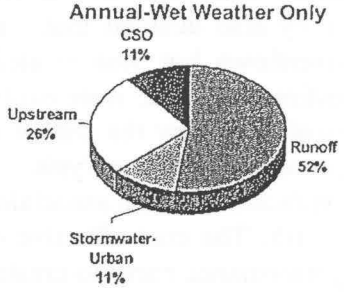
Bacteria Load to Wabash River- Annual-Wet Weather Only



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Thank you for attending!

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engineering

CITY OF TERRE HAUTE
CSO LTCP – Phase II
Citizen Advisory Committee Meeting
March 18, 2002 @ 7:00 PM

ATTENDEES: (See Attendance Sheet)

1. Mike Cline gave an overview of the meeting to be held this evening. He discussed the goals of the meeting and then a brief outline of the items of discussion.
2. Adrienne Nemura discussed the river model that LTI had completed. She presented all the loading inputs to the model and described the results. She showed that basically there are anywhere from 23 to 31 overflow events in a typical year and by controlling overflows to the "E" storm, the overflows would be reduced to 11 overflows per structure. The information also noted that 11% of the load on an annual basis to the river is due to the CSO's and 52% is due to runoff.
3. Julie Hanson detailed the alternatives.
   - Maximize in line storage
   - Utilize off line storage
   - Increase the wastewater treatment plant and lift station capacity
4. Mike Cline and Gui DeReamer then reviewed the cost estimates for the alternatives. They also detailed that there was CSO related work that was not specific to reducing overflows but was related to CSO's in some manner which were included in the estimates. These were expressed as a need during the technical committee meetings. Gui explained how the capital construction costs and non construction costs are used in the present worth analysis. He then explained the operation and maintenance and replacement costs associated with each alternative and how that is converted into present worth. The cost effective option on each alternative is then plotted on the cost versus performance curve to create the knee of the curve.
5. Dick Weigel explained the options that had been considered. These are the three options that were basically recommended at the last CAC meeting in order to alleviate overflows in the Fairbanks Park (priority area).
   - Option 1 – Included the removal of CSO 005 and 006 and diverted the flow down to Hulman Street.
   - Option 2 – Diverted the CSO flow from CSO 005, 006 and 008 by increasing the pipes down to Hulman Street.
   - Option 3 – Diverted the flow from 008, 007, 006 and 005 to a new outfall structure (a consolidation) just south of Fairbanks Park.

   After describing the options he also explained the benefits. The benefits including eliminating outfalls which would need to be maintained, eliminating the floatable control devices which would need to be maintained and eliminating a public accessible or visible overflow structure. The cost increased from approximately $1.3 million for Option 1 up to about $6.2 million per Option 3. He then explained and showed the knee of the curve with these options added to those points that we plotted for each alternative. It did not reduce the number of overflows but just strictly increased the cost. These items are beyond the curve and are strictly options that can be added but are not required.

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317-347-3663

6. Mike Cline then explained the knee of the curve with the $22.2 million minimum that is required to be spent. This is based on the state's guides that the combined water and sewer bill for Terre Haute based on economic factors would be $48 a month. Mike then explained that due to the hardship and socio economic conditions of Terre Haute they are at a level of 2.0. He reviewed the implementation schedule and at 2.0, the implementation of the plan is to be within 5 to 10 years.
7. Mike Cline then reviewed a bar chart schedule that showed how a couple of phases could be implemented by the year 2010. This would involve two projects separated into study/design/construction phases. He discussed all the work items that would need to considered in the phasing.
8. There was then considerable discussion regarding the benefits of the alternatives. Why it would be beneficial to maybe spend more for Alternative 3A versus Alternative 1, etc. The general consensus of the meeting was that they would like to look at Alternative 3A (plant expansion) even though it's more expensive because they feel it would be beneficial to have more capacity at the plant and then look at adding Option 1 and maybe Option 2 to eliminate overflows in the priority area. These selections were after discussions on the pros and cons, lengthy discussions on inflatable dams versus storage tanks and the thought of spending money at the plant versus storage in the system. An important factor in the selection of the treatment plant option was the fact that a second force main would be added from the main lift station to the wastewater treatment plant. This is a redundancy that is not currently available and it was believed to be beneficial in the long run..
9. Next meeting is scheduled for April 16, 2002 at 7:00 pm. It is the intent to have as many Council Members and Board of Works Members present as possible. The meeting will discuss the preliminary recommended plan, schedule costs and effect on user rates.

TERRA [illegible]
MARCH [illegible]

CAC Mtg

Name	Phone Number
MIKE CCINE	243-2551
Joyce V. Cadwallader	232-2184
John H Lovering for Dave Danner VCSC	462-4243
George J Azar	877-3780
Robert J Houghtaler	877-8449
Chuck Adamson	232-7369 EXT. 227
Jack Roetker	462-3428
Bill Cultice	299-4383
Tim Hennessy	298-9094
Pat Sodini	232-4028
Lois Gardner	235-1053
Dick Weiss	234-2551
ADRIENNE NEMURA LIMNO-TECH	734-332-1200

Plus

- Mayor Anderson,
- Troy Swan, Eng. Office
- Rich Zienba, WWTP
- Derrik Hagerman, WET
- ? Vets. WET

Combined Sewer Overflow Long Term Control Plan

Citizen Advisory Committee
Meeting #4

March 18, 2002

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Meeting Overview

- Goals of Meeting
- River Model Results
- Alternative and Options Discussion
- Cost Estimation
- Knee-of-the-Curve
- Financial Analysis
- Project Phasing/Schedule
- Next Meeting

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Goals of the Meeting

- Alternative Selection
- Options Consideration
- Project Phasing Plan

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River Model Results

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Once per month (Storm E) controls reduce overflows to 11 per year.

Location	CSO	Baseline Volume (MG)	Days of Overflow		
			Baseline	Storm D (1 in 15 d)	Storm E (1 per mo)
Spruce St	010	303	11	11	11
Chestnut St	009	260	23	23	11
Ohio St	008	100	23	23	11
Walnut St	007	777	23	23	11
Oak St	006	7	11	11	11
Crawford St	005	242	31	23	11
Human St	004	562	23	23	11
Idaho St	011	303	23	23	11
Turner St	003	225	23	23	11
Main L3	002	44	11	23	9

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Storm E controls reduce water quality violations to less than 9 days during recreation season.

	Fairbanks Park		Downstream of all CSOs	
	Average Year	Recreation Season	Average Year	Recreation Season
Baseline	25	17	24	16
Storm D (1 in 15 d)	16	13	23	15
Storm E (1 per mo)	12	8	14	9

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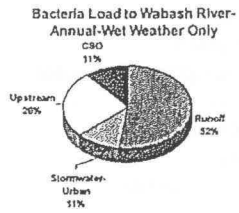
CSOs are a small percentage of the existing bacteria load during wet weather.

Bacteria Load to Wabash River-
Annual-Wet Weather Only



Source	Conc counts/100mL
Upstream	138
Water Quality Standard	235
Storm water	7,500
CSO	250,000
Raw sewage	10,000,000 +

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Alternative 1

In-Line Storage Maximization

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Alternative 1

- Main Lift Station capacity = 48 MGD
- 24" flow diversion sewer on First Street from CSO 008 to CSO 007
- 30" flow diversion sewer on First Street from CSO 007 to CSO 005 to a 48" sewer from CSO 005 to Hulman Street
- In-line storage at CSOs 004 and 011 at the diversion structures
- Additional in-line storage in Hulman and Idaho sewers at 6th Street
- Reinforce Hulman sewer for storage from First Street to 14th Street
- Reinforce Lafayette sewer for storage from CSO 009 diversion structure to Spruce St.
- Remove weir and install inflatable dam at Ohio and 16th Street

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Alternatives 2A and 2B

Off-Line Storage Tank

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Alternative 2A

- Main Lift Station capacity = 48 MGD
- 24" flow diversion sewer from Third Street to First Street along Chestnut St.
- 24" flow diversion sewer on First Street from CSO 009 to CSO 007
- 30" flow diversion sewer on First Street from CSO 007 to CSO 005 to a 48" sewer from CSO 005 to Hulman sewer
- 48" cross connection between Idaho and Hulman sewers
- 60" sewer from Idaho sewer to a 4 MG buried storage tank with a pump station
- Raise weir at CSO 004 diversion structure
- Remove weir and install inflatable dam at Ohio and 16th Street

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Alternative 2B

- Main Lift Station capacity = 48 MGD
- 24" flow diversion sewer from Third Street to First Street along Chestnut St.
- 24" flow diversion sewer on First Street from CSO 009 to CSO 007
- 30" flow diversion sewer on First Street from CSO 007 to CSO 005
- 60" sewer from CSO 005 to a 1 MG buried storage tank with a pump station and connection to the Interceptor
- 48" cross connection between Idaho and Hulman sewers
- 60" sewer from Idaho sewer to a 2.8 MG buried storage tank with a pump station
- Raise weir at CSO 004 diversion structure
- Remove weir and install inflatable dam at Ohio and 16th Street

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Alternatives 3A and 3B

Increase WWTP Capacity to 60 MGD

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Alternative 3A

- Increase Main Lift Station capacity = 55 MGD
- Increase WWTP capacity to 60 MGD
- 24" flow diversion sewer an First Street from CSO 008 to CSO 007
- 30" flow diversion sewer on First Street from CSO 007 to CSO 005 to a 48" sewer from CSO 005 to Hulman Street
- Remove weir and install inflatable dam at Ohio and 16th Street
- In-line storage at CSOs 004 and 011 at the diversion structures
- Additional in-line storage in Hulman and Idaho sewers at 6th Street
- Reinforce Hulman sewer for storage from First Street to 14th Street

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Alternative 3B

- Increase Main Lift Station capacity = 55 MGD
- Increase WWTP capacity to 60 MGD
- 24" flow diversion sewer from Third Street to First Street along Chestnut St.
- 24" flow diversion sewer on First Street from CSO 009 to CSO 007
- 30" flow diversion sewer on First Street from CSO 007 to CSO 005 to a 48" sewer from CSO 005 to Hulman Street
- 48" cross connection between Idaho and Hulman sewers
- 60" sewer from Idaho sewer to a 2.8 MG buried storage tank with a pump station
- Remove weir and install inflatable dam at Ohio and 16th Street

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Cost Estimation without Options

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Present Worth Costs

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Present Worth Costs (in $1,000)

	Storm D (9,484")	Storm E - (9,910")					Storm F - (2,112")			Storm G (2,947")
	Alternative 2	Alternative 1	Alternative 2A	Alternative 2B	Alternative 3A	Alternative 3B	Alternative 1	Alternative 2	Alternative 3	Alternative 1
Present Worth Construction Cost,	$18,910	$31,010	$38,580	$41,030	$36,030	$43,980	$92,350	$92,600	$92,580	$190,190
Present Worth O&M Cost	$5,570	$7,040	$7,120	$7,350	$8,130	$8,360	$11,380	$11,530	$12,380	$19,890
Total Present Worth of Alternative:	$24,480	$38,050	$45,700	$48,380	$44,160	$52,340	$103,730	$104,130	$104,960	$210,080

(1) Present Worth of O&M costs were calculated using a factor of 7.74, which assumes the cost increases from $0 to the full annual amount five only over the first 8 years, then the full amount for the remaining 12 years. A total planning period of 20 years was used, with an interest rate of 6 %.

(2) None of the above costs include Land Acquisition Costs.

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Cost Performance Curve

"Knee-of-the-Curve"

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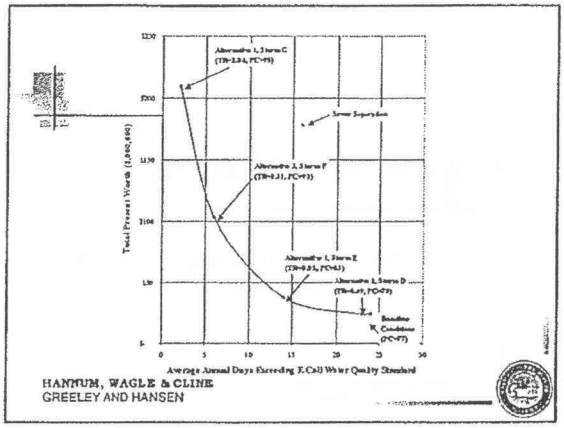

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Percent Volume Captured – 85% Rule

- EPA CSO Control Policy states that a program is presumed to meet water quality if 85% by volume of the combined sewage collected in the combined sewer system is captured during precipitation events on a system-wide annual average basis.

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Option 1

Transfer CSOs 006 and 005 to CSO 004

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Option 1

- Improvements
  - 60" flow diversion sewer on First Street from CSO 006 to CSO 005 to an 84" sewer from CSO 005 to Hulman Street
  - Remove outfall pipes at CSOs 006 and 005
- Benefits
  - 2 less outfalls to maintain
  - 2 less floatable control devices to install and maintain
  - More days in compliance with Water Quality Standards at Fairbanks Park (Priority Area)
  - Eliminate 2 highly visible CSO structures

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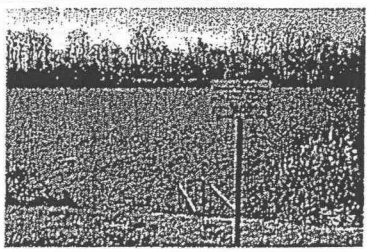
Crawford St. CSO in Fairbanks Park



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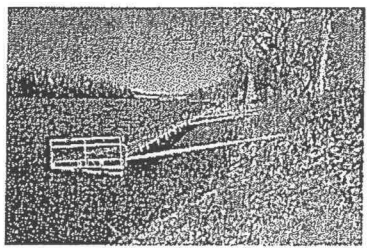
Boat Dock



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Option 2

Transfer CSOs 008, 006, and 005 to CSO 004

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Option 2

- Improvements
  - 48" flow diversion sewer on 1st St. from CSO008 to CSO 007
  - 60" flow diversion sewer on 1st St. from CSO007 to CSO 006
  - 78" flow diversion sewer on 1st St. from CSO006 to CSO 005
  - 96" flow diversion sewer on 1st St. from CSO005 to Hulman St.
  - Remove outfall pipes atCSOs 008, 006, and 005
- Benefits
  - 3 less outfalls to mainbin
  - 3 less floatablecontrol devices to install andmaintain
  - More days in compliarte with Water Quality Standards at Fairbanks Park (Priority Area)
  - Eliminate 3 highly visible CSO strudres

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Option 3

Transfer CSOs 008, 007, 006, and 005 to CSO 004

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Option 3

- Improvements
  - 48" flow diversion sewer on 1st St. from CSO 008 to CSO 007
  - 96" flow diversion sewer on 1st St. from CSO 007 to a new CSO outfall with a new throttle pipe to the interceptor just downstream of CSO 005 in Fairbanks Park
  - Parallel 60" flow diversion sewer on 1st St. from CSO 005 to Hulman St
  - Remove outfall pipes atCSOs 008, 006, and 005
- Benefits
  - 3 less outfalls to mainbin
  - 3 less floatable control devices to install andmaintain
  - More days in compliarce with Water Quality Standards at Fairbanks Park (Priority Area)
  - Eliminate 3 highly visible CSO strudres

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Cost Estimation with Options

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Option Costs

- If Option 1 is Selected
  - Project Cost is Increased by $1,370,000
  - Net Project Cost for Alternative E-1 is $32,380,000
- If Option 2 is Selected
  - Project Cost is Increased by $2,240,000
  - Net Project Cost for Alternative E-1 is $33,250,000
- If Option 3 is Selected
  - Project Cost is Increased by $6,140,000
  - Net Project Cost for Alternative E-1 is $44,190,000

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Cost Performance Curve

"Knee-of-the-Curve"

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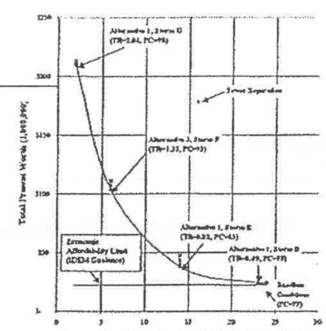

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Socio-Economic Indicator Phasing Table

S-E Indicator Score	Length of Time for LTCP Implementation Schedule
Above 2.5	High = 10 – 20 years
1.5 to 2.5	Medium = 5 – 10 years
Below 1.5	Low = 5 years

Preliminary S-E Indicator Score for Terre Haute = 2.0

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Preliminary Implementation Schedule

ACTIVITY	2002	2003	2004	2005	2006	2007	2008	2009	2010
COMPLETE LTCP, OBTAIN IDEM APPROVAL									
WRITE PER FOR FIRST PHASE PROJECTS, FINALIZE FINANCING, INITIATE PHASE 1 ENGINEERING & LAND ACQUISITION									
COMPLETE PHASE 1 PRE-BID, BID PROJECT, START CONSTRUCTION									
CONSTRUCT PHASE 1									
WRITE PER FOR 2ND PHASE, FINALIZE FINANCING, INITIATE PHASE 2 ENGINEERING & LAND ACQUISITION									
COMPLETE PHASE 2 PRE-BID, BID PROJECT, START CONSTRUCTION									
CONSTRUCT PHASE 2									
POST CONSTRUCTION MONITORING									
START NEW COMBINED AND STORM SEWER MAINTENANCE PROGRAM									

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Discussion on Project Phasing

- 1st St. Sewer
- Reinforce Sewers for Storage
- Inflatable Dams
- Regulator Structures
- Floatables Control
- 4th St. Sewer
- WWTP Improvements
- SCADA

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Technical Committee
Phase 1 Project Planning

- 1st St. Sewer
- Reinforce Sewers for Storage
- 4th St. Sewer
- One Half of Floatables Control
- Control Building Demolition
- New Preliminary Treatment Facilities
- Primary Clarifier Rehabilitation
- Investigate Condition of CSO Sewers

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Technical Committee
Phase 2 Project Planning

- Preliminary Treatment Demolition
- Inflatable Dams
- Regulator Structures
- One Half Floatables Control
- WWTP Hydraulics Rehabilitation
- SCADA
- Administration and Control Building
- Key Sewer Area Back-up Elimination

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Goals of the Meeting

- Alternative Selection
- Options Consideration
- Project Phasing Plan

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Next Meeting and Discussion Items

- Next Meeting
  - April 16, 2002, 7pm
- Discussion Items
  - Recommended Plan Description
  - Recommended Plan Cost Estimate
  - Recommended Plan Implementation Schedule
  - Recommended Plan Impact on Sewer Rates

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engineering

CITY OF TERRE HAUTE, INDIANA
CSO Long Term Control Plan
Meeting Minutes
January 31, 2002 – 7:00 p.m.

ATTENDEES:
(See Sign In Sheet)

Pat Goodwin opened the meeting and welcomed everyone. He explained that the process is moving forward rapidly and appreciates everyone's time and effort to attend these meetings.

Mike Cline gave a brief meeting overview explaining what was to be covered at the meeting today. Primarily it includes the alternatives, some options and hopefully build consensus on the alternatives to evaluate.

Gui DeReamer reviewed the work completed to date. He went over the rainfall information that was utilized, the hydrographs used in the model and how the E-storm (0.818" rainfall) would be the starting point for the alternative evaluation. He was able to show the estimated CSO volumes and the overflow durations for typical storm events from those hydrographs. The starting point is the E-storm based on previous studies, which has been the knee of the curve. The estimated volume of overflow that will need to be captured to achieve that design storm level of control is almost 4 million gallons. He explained that this will be the basis for developing alternatives after the alternatives are selected.

Julie Hanson then reviewed the collection system model and how data was input to facilitate its operation. She explained that the sewer system was put into the computer for large diameter sewers, manholes, regulators and CSO structures. She showed how the rainfall and stormwater contributions are input into the model and also how the rain gauge data was input. She then showed how the sewer profiles were able to depict back up areas and also when sewers become overloaded during the rain events. With this presentation, a curve was presented that generally depicted the overflow volume that is not able to be pumped from the main lift station. This volume, of course, is estimated at approximately 4 million gallons.

Presentation was then made on the process for evaluating the control alternatives. This process will develop alternatives that will be costed out for each level of control. For instance, the cost will be developed for the E-storm for several alternatives. It will also be developed for a heavier rainfall such as the F and G storms and also for the lesser storms like the D storm. The potential alternatives to consider included inflatable dams for in line storage, a relief or storage interceptor, increasing the plant capacity, storage tunnels, off line storage tanks, raising weirs, etc. All these will be considered in the initial evaluation.

Preliminarily, the technical group has come up with three alternatives that seem most appropriate. In some cases, for all alternatives there are common elements; however these are depicted in the slides and were reviewed thoroughly. In general Alternative 1 utilized in-line storage as much as possible. It diverted flows down 1st Street to in line storage in Hulman and Idaho interceptors. These are large sewers that it appeared were oversized years ago and could be beneficial today. The pros and cons were reviewed for the in-line storage primarily due to the inflatable dams.

The second Alternative that was proposed will use off line storage tanks. Again this involves some large relief sewers to get the flow down into the Hulman/Idaho sewer area, or possibly utilizing an area south of Fairbanks Park. Again, this option provides approximately 4 million gallons of storage to prevent an overflow during the E-storm event. The pros and cons of the storage tanks were also reviewed.

The third Alternative was also presented. It would increase the wastewater treatment capacity to approximately 60 mgd. This in turn would increase the main lift station capacity to approximately 55 mgd because it is projected that there is 5 mgd of capacity not pumped through the main lift station that must be treated at the wastewater plant.

Even though the lift station capacity is expanded it cannot shave off the extremely high peaks during an intense rain event. Therefore there is approximately 2.8 million gallons of storage required with this alternative. This can be evaluated as Alternative 3A or 3B, meaning wastewater plant expansion with in-line storage or wastewater expansion with an off line tank. The pros and cons of this option were also discussed.

Wabash Environmental Technologies (WET) was present at the meeting. The committee was updated on who they are and what they do. They offered to the committee and technical staff, the opportunity to utilize their facility if cost effective, to implement the plan. WET will develop a proposal and provide information to the City. These will be reviewed as a possible alternative.

Based on the discussion at the previous meeting we reviewed that the goals were to eliminate or reduce the volume of CSO's from No. 005, 006, 007 and 008. We also looked at trying to improve some of the wastewater treatment plant features that have become depreciated and cannot adequately treat CSO volumes. We also reviewed a goal to correct the combined sewers collapse and disrepair on 4th Street. All of these items could likely be integrated into the overall plan.

The item that was also reminded was the lining of sewer in the wellhead protection zone. This may not be a specific item in the LTCP but it would begin as a study and a project that would need to be reviewed and potentially implemented.

In general the group felt like these were good alternatives to evaluate and it was explained that these could now be developed for the various size storm events so that cost could start to be developed.

We then discussed the priority area. The priority area options that could be considered. It was explained that the alternatives were really like selecting a Chevy or Ford but these options we will select the CD Player option or Cruise Control option or whatever you may purchase on a car. These options do not reduce the overflow, but they would transfer the overflow from upstream, or at Fairbanks Park, to a point south of the Park.

Option #1 – Transferred the volume of CSO-005 and CSO-006 down to CSO-004. This would require a larger sewer along 1st Street.
Option #2 – Transferred the volume of overflow from CSO-008, 006 and 005 down to CSO-004. This increased the pipe along 1st Street.
Option #3 – The third was to eliminate all four overflows in the park. CSO-008, 007,006, and 005. Because of the large volume that would need to be transferred the CSO-004. It cannot handle all of the flow. Therefore an additional overflow would be constructed just south of Fairbanks Park. In general this would be consolidating the CSO's to a relocated location.

These options were discussed with the committee. It was believed that it was appropriate to begin costing out these options for their review.

Time line was then presented to show the present day, January 31 and what is required until the next scheduled CAC Meeting on March 18. The next step will be to complete the CSO alternative analysis for all of the storms and then develop cost estimates. These costs will be used to create the knee of the curve with the reduction in overflow volumes for each storm event. The knee of the curve will be presented at the next CAC Meeting.

The next meeting will be held Monday, March 18, 2002 at 7:00 pm at City Hall.

City of Terre Haute
Long-term Control Plan
Citizen Advisory Committee
January 31, 2002 - 7:00 PM
Agenda

1. Opening Remarks

2. Work Completed to Date
   - Rainfall Analysis
   - Computer Modeling
   - Establish Preliminary Goals

3. Knee-of-the-Curve

4. Establish Means of Eliminating Overflows
   - Alternative No. 1
   - Alternative No. 2
   - Alternative No. 3
   - Other

5. Achieving Priorities Previously Established (Beyond the Knee-of-the-Curve)
   - Option No. 1
   - Option No. 2
   - Option No. 3

6. Schedule
   - Next Meeting Date - March 18, 2002 - 7:00

Goals:

1. Eliminate / Reduce CSOs 005, 006, 007 and 008

2. WWTP Improvements
   - New Pretreatment Facility
   - Equipment Replacement & Upgrades
   - Eliminate Peak Flow Bottlenecks at Plant

3. 4th Street Sewer Collapse & Investigate other Key Sewers

4. Reduce Sewer Back-up on 1 year storm

5. Control & Eliminate Floatables

6. Create Sewer Maintenance/Upgrade Program with GIS

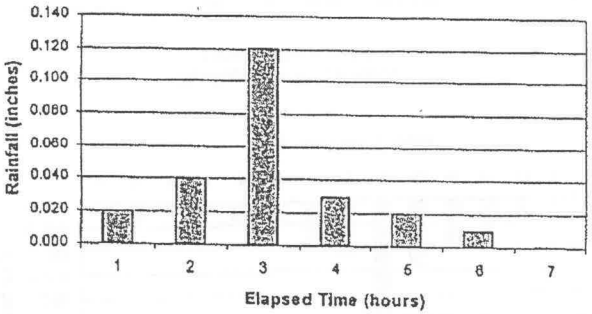
7. Wellhead Protection Zone
   - Lining of Sewers within the protection zone

8. Reasonable Rate Increase

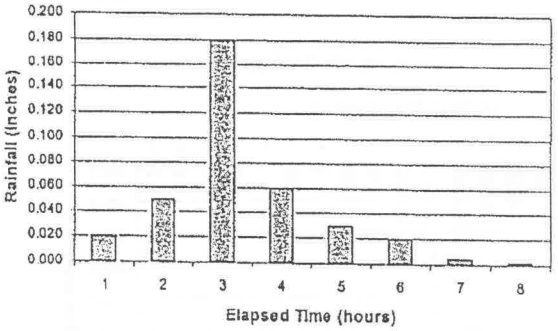
9. IDEM Compliance

Design Storm Hydrographs

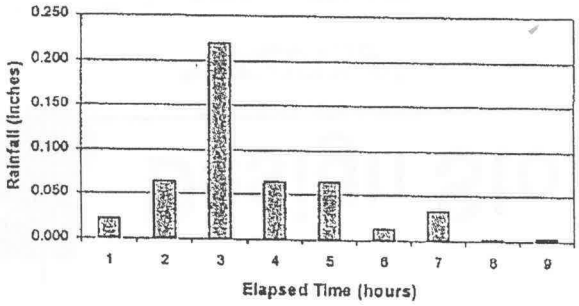
Hyetograph for Storm B
Total Rainfall = 0.242"



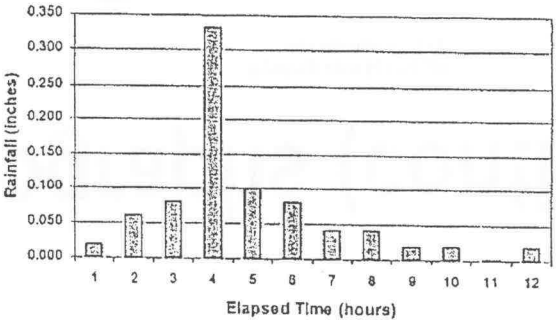
Hyetograph for Storm C
Total Rainfall = 0.367"



Hyetograph for Storm D
Total Rainfall = 0.486"



Hyetograph for Storm E
Total Rainfall = 0.618"



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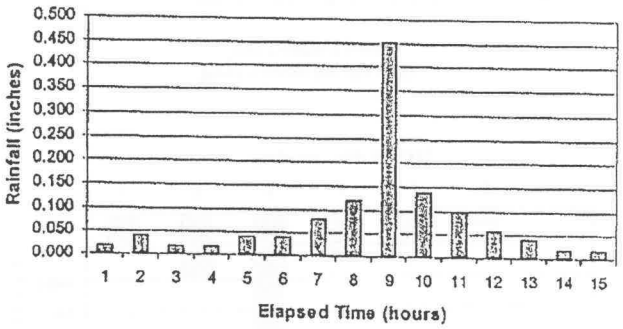
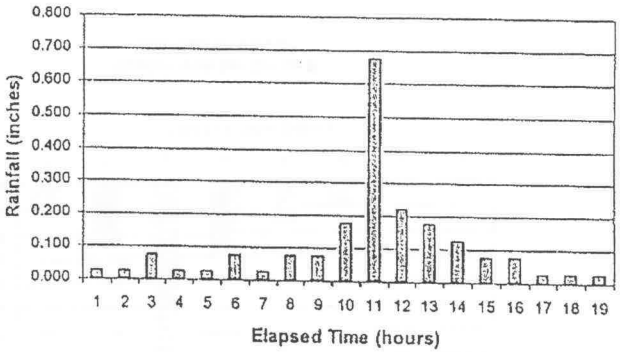
CITY OF TERRE HAUTE INDIANA

Design Storm Hydrographs (continued)

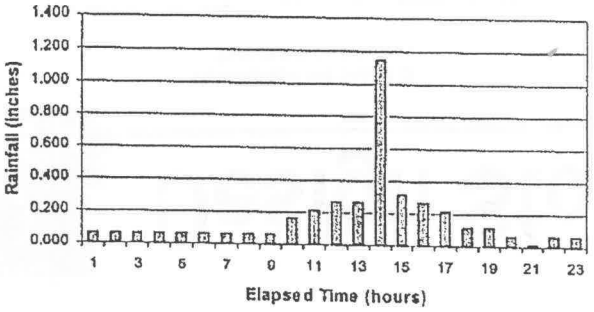
Hyetograph for Storm F
Total Rainfall = 1.212"



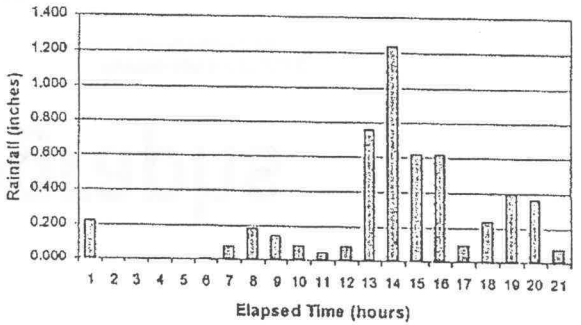
Hyetograph for Storm G
Total Rainfall = 2.043"



Hyetograph for Storm H
Total Rainfall = 3.888"



Hyetograph for Storm I
Total Rainfall = 5.320"



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CITY OF TERRE HAUTE INDIANA

City of Terre Haute, Indiana

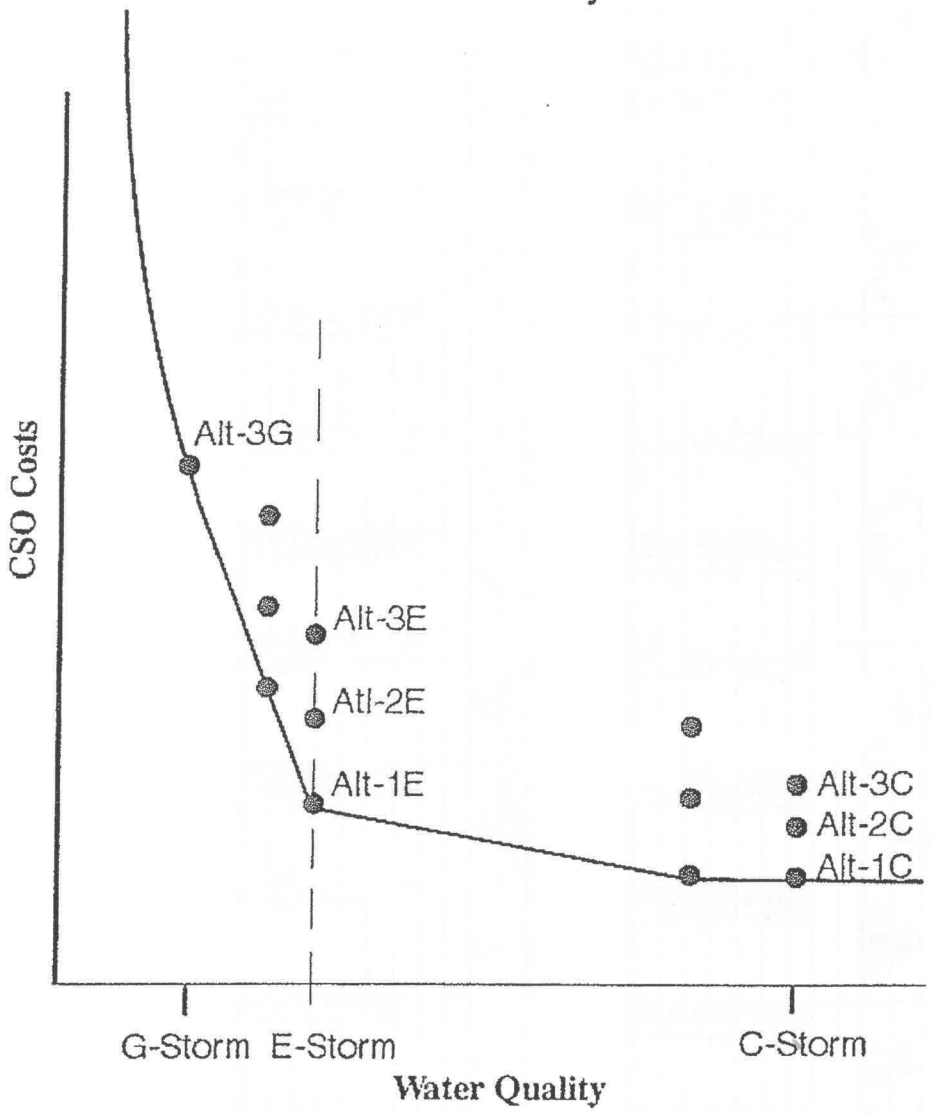
Combined Sewer Overflow Long-term Control Plan

Estimated CSO Volume (MG) and Overflow Duration (hours) In Response to the Typical Storms

Typical Storm	Rainfall (inches)	Duration (hours)	CSO Volume (MG)										Total	Peak Flow to Main L.S. (MGD)
			010	009	008	007	006	005	004	011	003	002		
			1260 ac.	350 ac.	90 ac.	1,000 ac.	270 ac.		1560 ac.		425 ac.	4,955 ac.		
A	0.023	2												
B	0.242	7												
C	0.367	8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
D	0.486	9	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.15	31.00
E	0.818	12	0.00	0.05	0.17	1.41	0.00	0.79	1.38	0.07	0.01	0.00	3.89	48.50
F	1.212	15	2.03	2.20	0.70	5.47	0.01	1.52	3.98	1.97	1.55	0.40	19.83	48.50
G	2.043	19	7.18	5.42	1.64	12.83	0.16	2.62	8.11	6.54	4.82	0.87	50.19	48.50
H	3.888	23	12.29	14.98	3.90	28.58	0.61	9.71	18.32	15.95	12.03	1.73	118.10	48.50
I	5.320	21	30.47	19.62	6.18	41.37	1.91	6.05	26.11	24.40	18.51	1.96	176.58	48.50

Typical Storm	Rainfall (inches)	Duration (hours)	CSO Duration (hours)										Total
			010	009	008	007	006	005	004	011	003	002	
A	0.023	2											
B	0.242	7											
C	0.367	8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
D	0.486	9	0.0	0.0	0.0	0.0	0.0	2.5	0.0	0.0	0.0	0.0	2.5
E	0.818	12	0.0	4.5	2.5	5.0	0.0	4.5	3.5	1.0	1.0	0.0	22.0
F	1.212	15	3.0	4.5	4.0	6.0	1.0	6.0	5.0	4.0	4.5	4.0	42.0
G	2.043	19	5.0	5.5	7.0	9.0	4.5	9.0	8.0	6.5	6.5	6.5	67.5
H	3.888	23	9.5	11.0	11.0	15.5	6.0	16.5	14.0	11.0	11.0	10.5	116.0
I	5.320	21	9.0	12.5	13.0	15.5	7.0	14.5	14.0	12.0	13.0	13.0	123.5

Knee of the Curve (IDEM minimum) Alternative Analysis



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Terre Haute
CSO Control
Plan

Alternative 1: In-line Storage Maximization

- Main Lift Station capacity = 48 MGD
- Raise weir 1.5 feet at CSO 009 diversion structure
- 30" flow diversion sewer on First Street from CSO 008 to CSO 007
- 30" flow diversion sewer on First Street from CSO 007 to CSO 005 to a 48" sewer from CSO 005 to Hulman Street
- In-line storage at CSOs 004 and 011 at the diversion structures
- Additional in-line storage in Hulman and Idaho sewers at 6th Street
- Reinforce Hulman sewer for storage from interceptor to 14th Street
- Remove weir and install inflatable dam at Ohio and 15th Street
- Remove 60" bottleneck at College and 14th Street
- Raise weir 1.1 feet at CSO 003 diversion structure

Pros:

- Inflatable dams are less capital costs because existing facilities are utilized

Cons:

- Inflatable dams require additional O&M
- Confined space entry required to maintain facilities
- If dam fails to deflate then it can cause sewer back-ups
- If dam fails to inflate then CSOs will occur

Alternative 2: Off-line Storage Tank

- Main Lift Station capacity = 48 MGD
- Raise weir 1.5 feet at CSO 009 diversion structure
- 30" flow diversion sewer on First Street from CSO 008 to CSO 007
- 30" flow diversion sewer on First Street from CSO 007 to CSO 005 to a 48" sewer from CSO 005 to a 4 MG buried storage tank at the Wabash Environmental site with a pump station and connection to the interceptor
- 60" connection pipe from Hulman Street sewer to 4 MG storage tank
- Raise weir at CSO 04 diversion structure
- Remove weir and install inflatable dam at Ohio and 15th Street
- Remove 60" bottleneck at College and 14th Street
- Raise weir 1.1 feet at CSO 003 diversion structure

Pros:

- No restrictions to cause sewer back-ups
- More reliable at preventing overflows

Cons:

- Higher capital costs
- Requires more land
- Odor control required

Alternative 3A: Increase WWTP Capacity to 60 MGD

- Increase Main Lift Station capacity = 55 MGD
- Increase WWTP capacity to 60 MGD
- Raise weir 1.5 feet at CSO 009 diversion structure
- 30" flow diversion sewer on First Street from CSO 008 to CSO 007
- 30" flow diversion sewer on First Street from CSO 007 to CSO 005 to a 48" sewer from CSO 005 to Hulman Street
- Remove weir and install inflatable dam at Ohio and 15th Street
- Remove 60" bottleneck at College and 14th Street
- Raise weir 1.1 feet at CSO 003 diversion structure
- In-line storage at CSOs 004 and 011 at the diversion structures
- Reinforce Hulman sewer for storage from interceptor to 6th Street

Pros:

- Inflatable dams decrease capital costs by utilizing existing facilities
- Existing WWTP facilities need to be upgraded

Cons:

- Inflatable dams increase O&M costs
- Confined space entry required to maintain facilities
- If dam fails to deflate then it can cause sewer back-ups
- If dam fails to inflate then CSOs will occur
- Higher capital costs to expand WWTP

Alternative 3B: Increase WWTP Capacity to 60 MGD

- Increase Main Lift Station capacity = 55 MGD
- Increase WWTP capacity to 60 MGD
- Raise weir 1.5 feet at CSO 009 diversion structure
- 30" flow diversion sewer on First Street from CSO 008 to CSO 007
- 30" flow diversion sewer on First Street from CSO 007 to CSO 005 to a 48" sewer from CSO 005 to Hulman Street
- Remove weir and install inflatable dam at Ohio and 15th Street
- Remove 60" bottleneck at College and 14th Street
- Raise weir 1.1 feet at CSO 003 diversion structure
- 2.8 MG storage tank downstream of CSO 005 in Fairbanks Park with connection from First Street sewer to interceptor

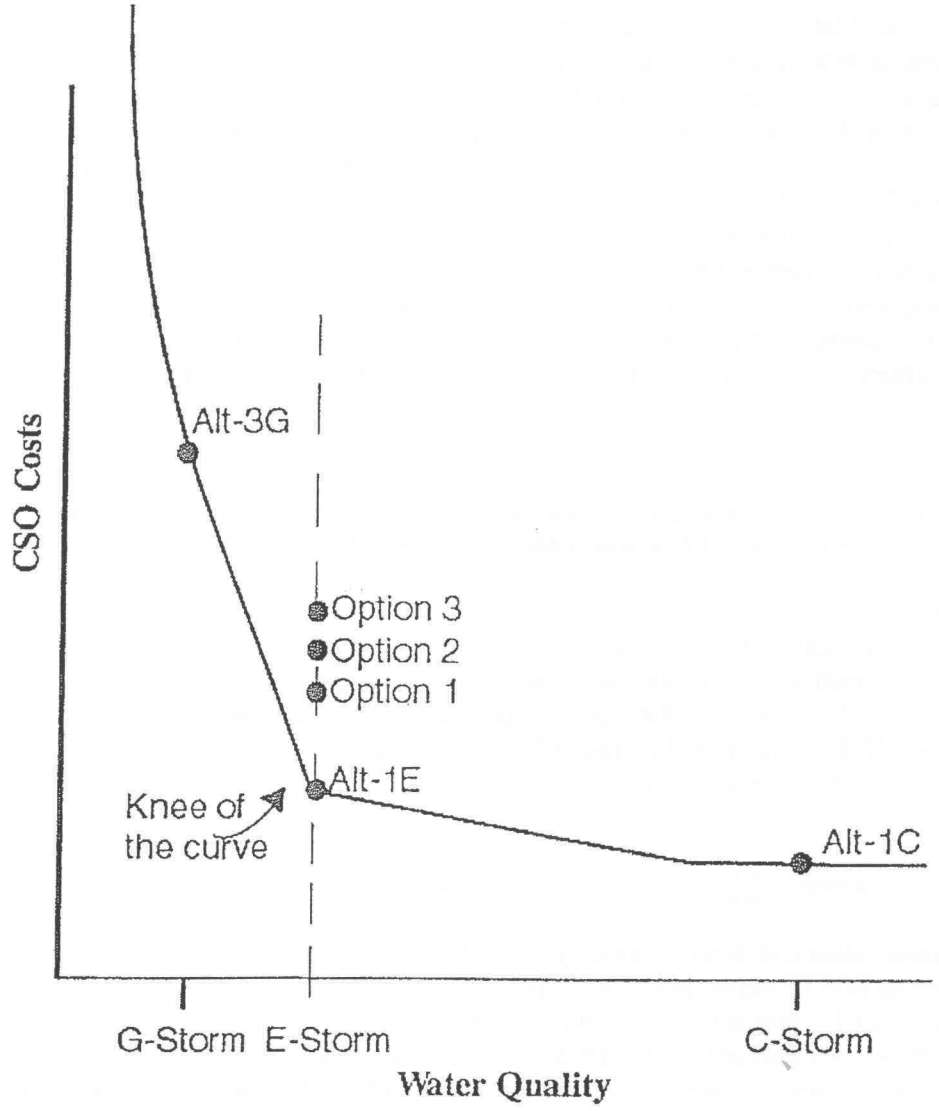
Pros:

- No restrictions to cause sewer back-ups
- More reliable at preventing overflows
- Existing WWTP facilities need to be upgraded

Cons:

- Higher capital costs to expand WWTP
- Odor control required

Priority Area Option Analysis



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Terre Haute
CSO Control
Plan

Option 1: Transfer CSOs 006 and 005 to CSO 004

- 60" flow diversion sewer on First Street from CSO 006 to CSO 005 to a 84" sewer from CSO 005 to Hulman Street
- Close outfall pipes at CSOs 006 and 005

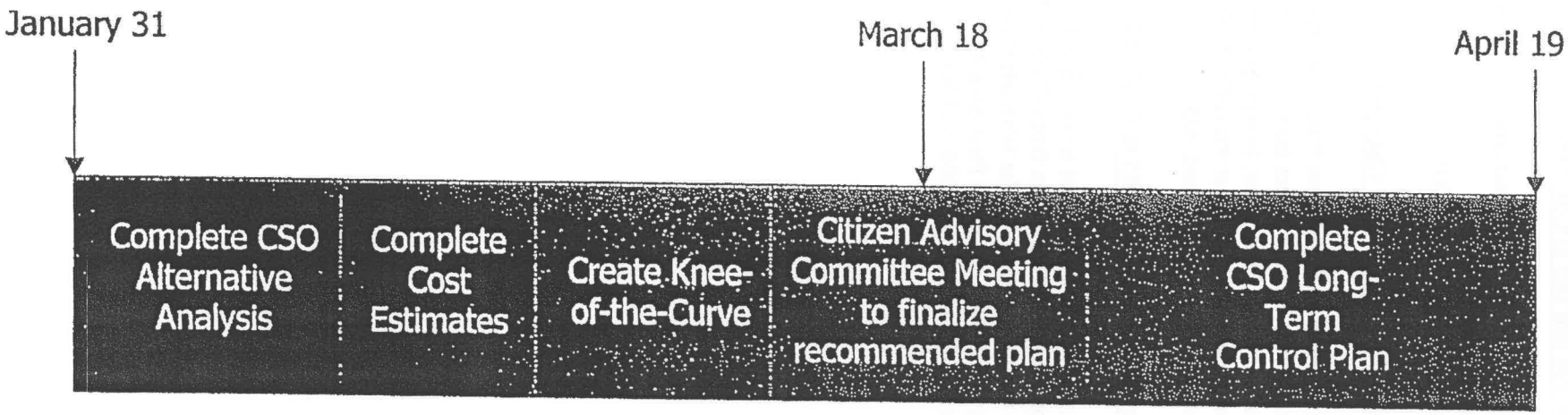
Option 2: Transfer CSOs 008, 006 and 005 to CSO 004

- 48" flow diversion sewer on First Street from CSO 008 to CSO 007
- 60" flow diversion sewer on First Street from CSO 007 to CSO 006
- 78" flow diversion sewer on First Street from CSO 006 to CSO 005
- 96" flow diversion sewer on First Street from CSO 005 to Hulman Street
- Close outfall pipes at CSOs 008, 006 and 005

Option 3: Transfer CSOs 008, 007, 006, and 005 to CSO 004

- 48" flow diversion sewer on First Street from CSO 008 to CSO 007
- 96" flow diversion sewer on First Street from CSO 007 to a new CSO outfall with a new throttle pipe to the interceptor at the Wabash Environmental site
- A parallel 60" flow diversion sewer on First Street from CSO 006 to Hulman Street
- Close outfall pipes at CSOs 008, 007, 006 and 005

What's Next?


January 31
March 18
April 19
Complete CSO Alternative Analysis
Complete Cost Estimates
Create Knee-of-the-Curve
Citizen Advisory Committee Meeting to finalize recommended plan
Complete CSO Long-Term Control Plan

WABASH ENVIRONMENTAL TECHNOLOGIES, LLC

1331 South 1st Street • Terre Haute, IN 47802
812.232.0121 • Fax 812.232.3269

BENEFICIAL REASONS TO CONSIDER
WABASH ENVIRONMENTAL TECHNOLOGIES, LLC
AS A
PARTNER FOR THE CSO LONG TERM CONTROL PLAN

Wabash Environmental Technologies, LLC (W.E.T.) has interest in assisting the City of Terre Haute with the CSO Long Term Control Plan.

W.E.T.'s goals are to offer affordable options to the City of Terre Haute. The goals include the following:

Minimize the costs associated with the CSO project;

Keep sewer bills and taxes at an affordable rate for residents;

Reduce the amount of proposed construction costs at the City of Terre Haute WWTP;

Minimize the disruption of business and services throughout the city due to CSO construction activities;

Assist in improving the ecology of the Wabash River and protect the public's health.

ADVANTAGES AND BENEFITS WITH WABASH ENVIRONMENTAL TECHNOLOGIES, LLC

- W.E.T. is located adjacent to the 72" main Interceptor and the Hulman Street Interceptor.
- W.E.T. has 20 to 30 acres available to build 50 to 80 million gallons of relief/side by side interceptors or storage lagoons at W.E.T.'s expense. These facilities could store the CSO "first flush".
- If a lagoon is constructed, W.E.T. has the technology to treat any possible odors.
- W.E.T. has a wastewater treatment plant capable of treating 1.9 million gallons per day of high organic wastewater. With permit and equipment modifications at W.E.T.'s expense, the treatment capability could increase 300% to 400% because of the low organic content of CSO. Using W.E.T.'s treatment plant as an alternative source for CSO treatment, the City of Terre Haute would have a cost savings by not having to over-build at the WWTP.
- Minimal construction needed to pump CSO from the Interceptors to W.E.T.
- No Bond issues are needed to include W.E.T. in the Long Term Control Plan.

Combined Sewer Overflow Long Term Control Plan

Citizen Advisory Committee
Meeting #3

January 31, 2002

HANNUM, WAGLE & CLINE
GREELEY AND HANSEN

Meeting Overview

- Work Completed to Date
- Model Results
- Goals Established
- Options Identified
- Integrated Alternatives Developed From Model Results and Goals

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GREELEY AND HANSEN

Work Completed To Date

- Completed Collection System Model
- Completed River Model
- Established Preliminary Goals
- Developed Preliminary CSO Control Alternatives and Options

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Work Completed To Date (continued)

- Used 50 years of hourly rainfall data to establish typical 10 years of historical rainfall (1977-1986)
  - Compared yearly rainfall totals from 50 years of rainfall data
  - Used for river model calibration
- Established typical design storms from historical rainfall analysis
- Conducted continuous model simulations using actual rainfall collected September through November

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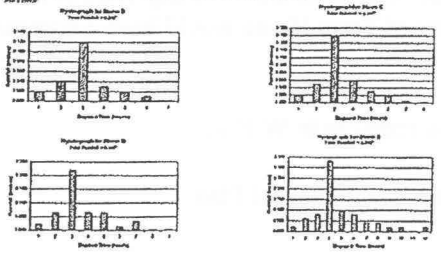
Design Storm Hydrographs



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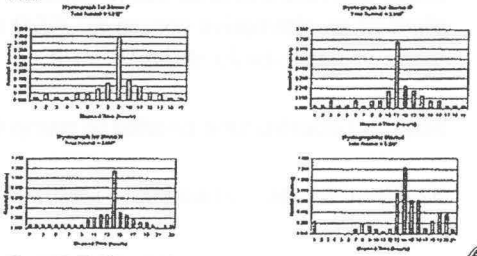
GREELEY AND HANSEN

Design Storm Hydrographs (continued)



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Model Results:

Estimated CSO Volume (MG) and Overflow Duration (Hours) in Response to the Typical Storms

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Collection System Model

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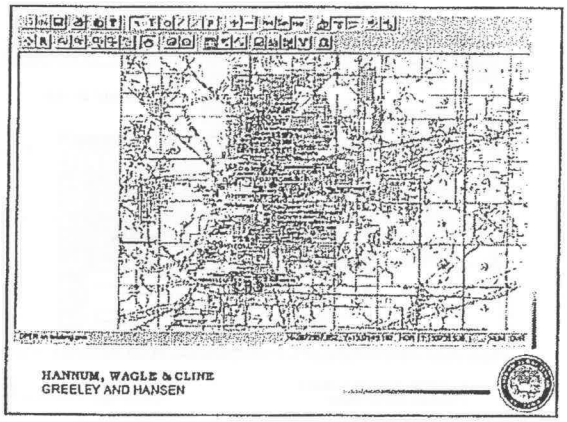

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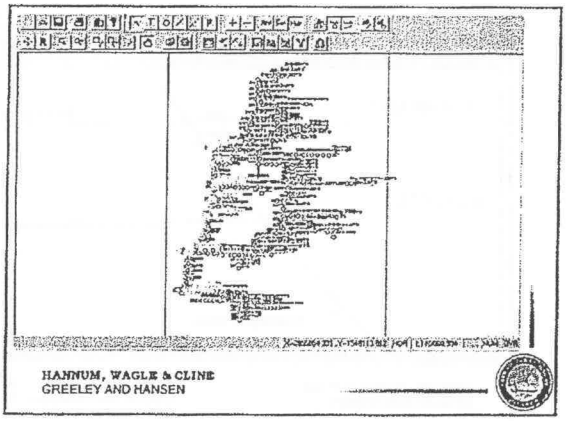
GREELEY AND HANSEN



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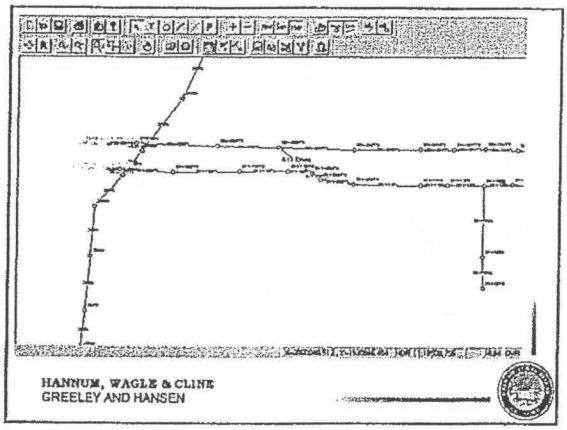
GREELEY AND HANSEN



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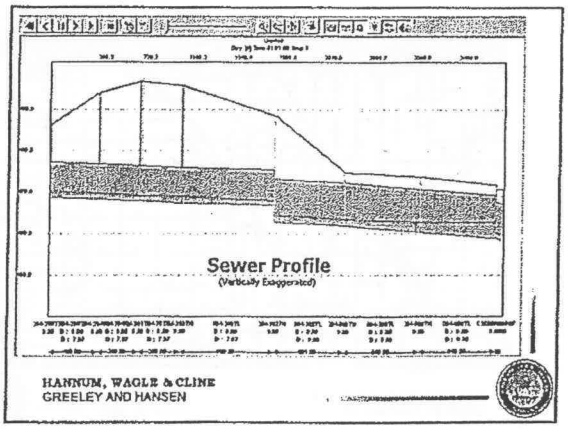
GREELEY AND HANSEN



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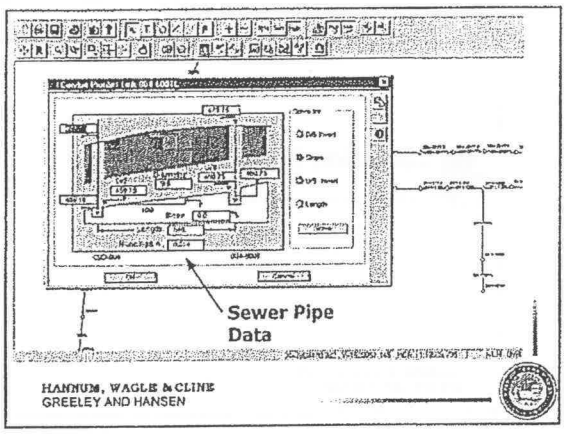
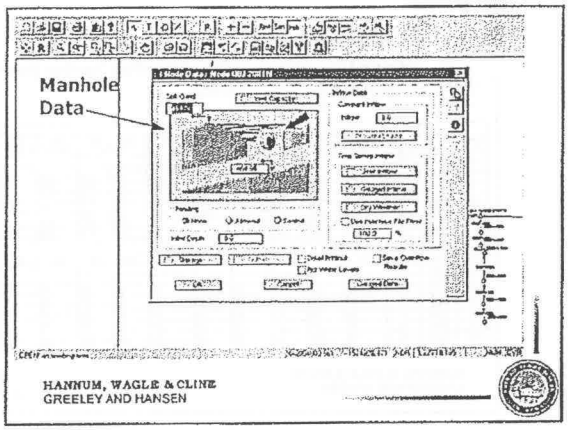
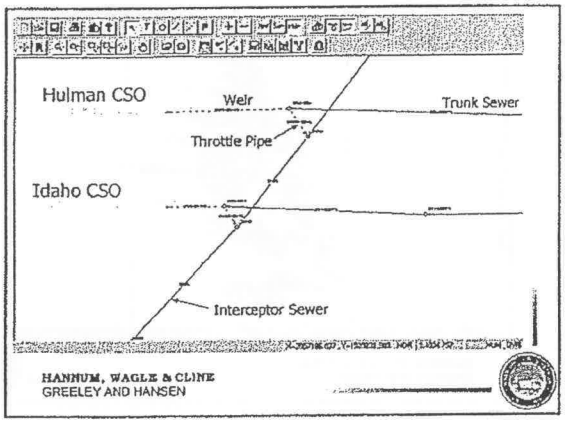
GREELEY AND HANSEN


Sewer Pipe
Data
HANNUM, WAGLE & CLINE
GREELEY AND HANSEN


Manhole
Data
HANNUM, WAGLE & CLINE
GREELEY AND HANSEN


Hulman CSO
Weir
Trunk Sewer
Throttle Pipe
Idaho CSO
Interceptor Sewer
HANNUM, WAGLE & CLINE
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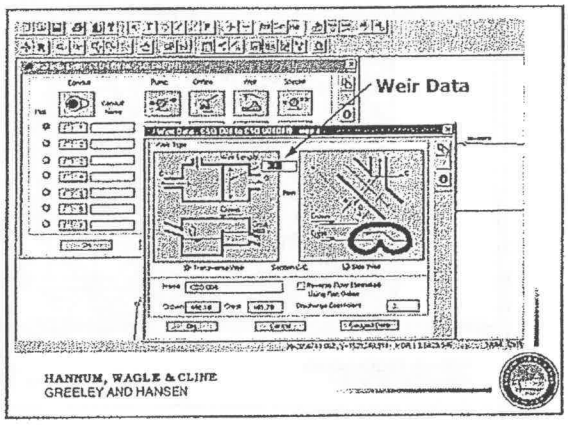
Weir Data
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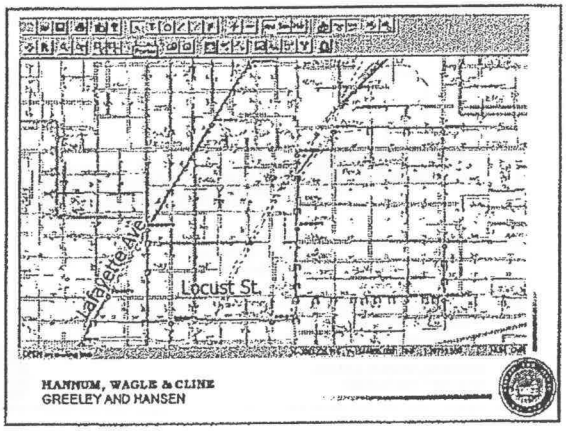
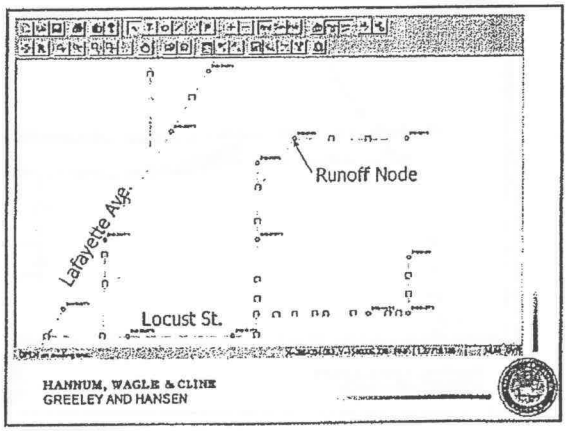

Lafayette Ave.
Locust St.
HANNUM, WAGLE & CLINE
GREELEY AND HANSEN


Runoff Node
Lafayette Ave.
Locust St.
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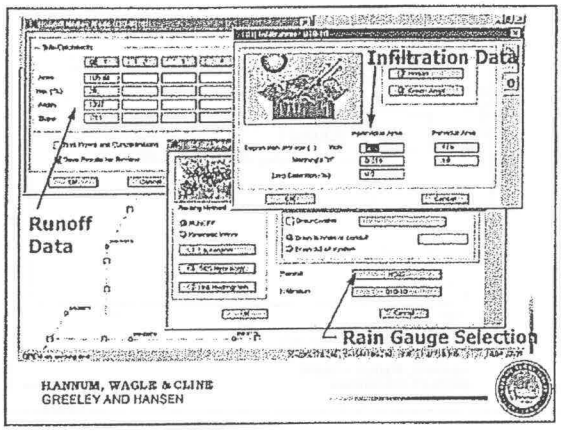
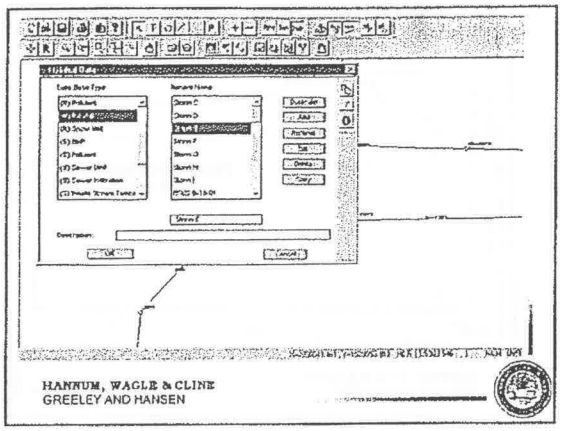
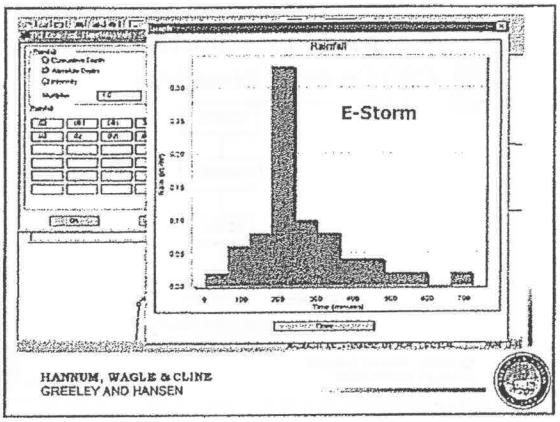
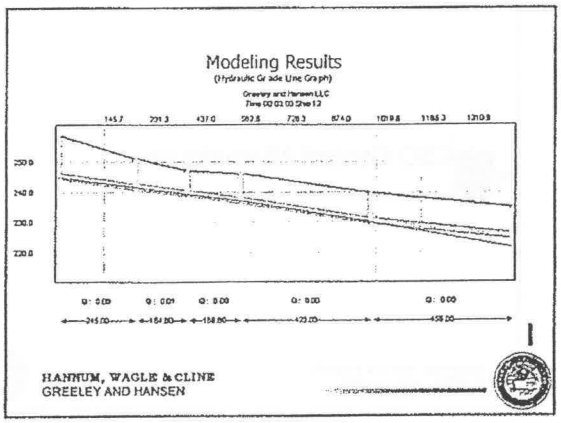
GREELEY AND HANSEN


Infiltration Data
Runoff Data
Rain Gauge Selection
HANNUM, WAGLE & CLINE
GREELEY AND HANSEN


HANNUM, WAGLE & CLINE
GREELEY AND HANSEN


Rainfall
E-Storm
HANNUM, WAGLE & CLINE
GREELEY AND HANSEN


Modeling Results
(Hydraulic Grade Line Graph)
HANNUM, WAGLE & CLINE
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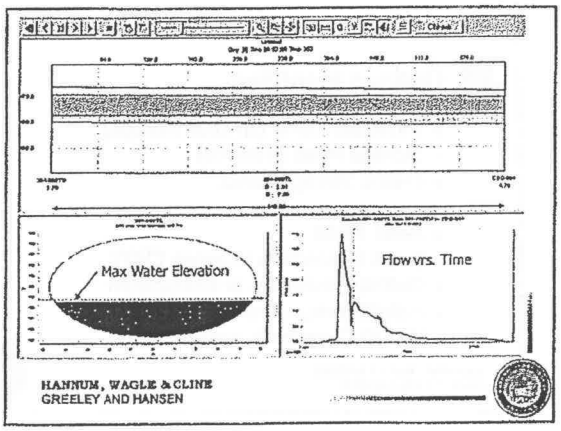
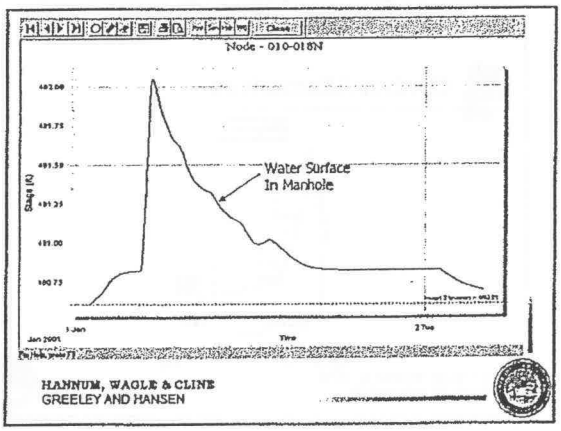

Max Water Elevation
Flow vrs. Time
HANNUM, WAGLE & CLINE
GREELEY AND HANSEN


Node - 030-018N
Water Surface
In Manhole
HANNUM, WAGLE & CLINE
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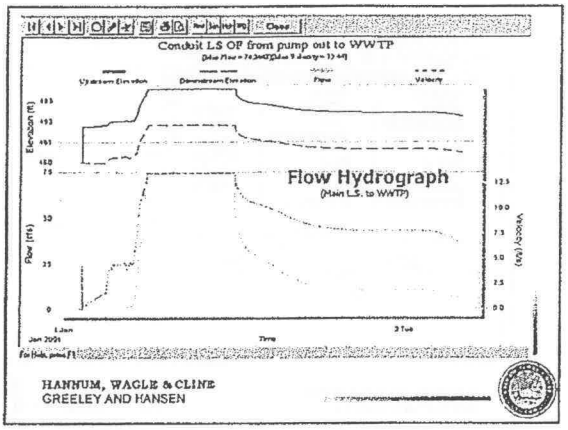
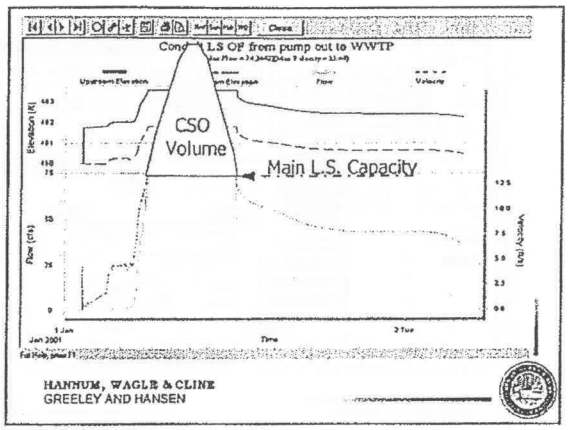
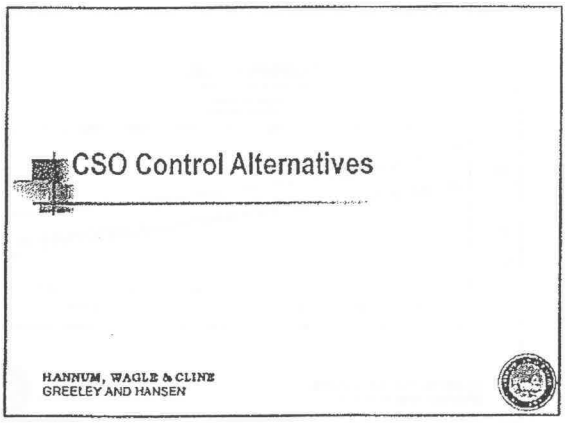
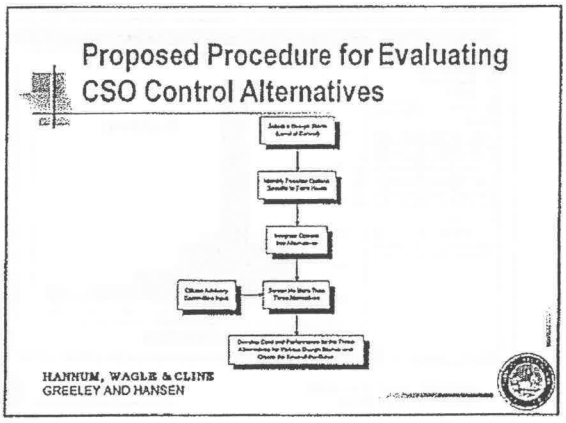
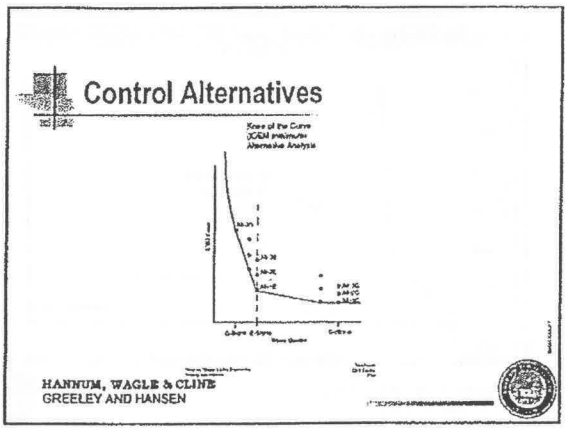
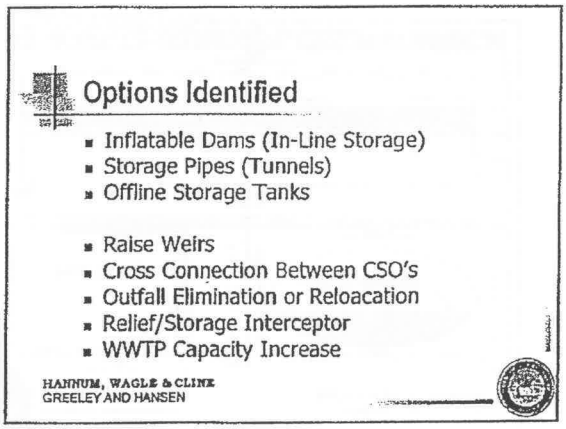

Conduit LS OF from pump out to WWTP
Flow Hydrograph
(Main L.S. to WWTP)
HANNUM, WAGLE & CLINE
GREELEY AND HANSEN


LS OF from pump out to WWTP
CSO
Volume
Main L.S. Capacity
HANNUM, WAGLE & CLINE
GREELEY AND HANSEN


CSO Control Alternatives
HANNUM, WAGLE & CLINE
GREELEY AND HANSEN


Proposed Procedure for Evaluating
CSO Control Alternatives
HANNUM, WAGLE & CLINE
GREELEY AND HANSEN


Control Alternatives
HANNUM, WAGLE & CLINE
GREELEY AND HANSEN


Options Identified
Inflatable Dams (In-Line Storage)
Storage Pipes (Tunnels)
Offline Storage Tanks
Raise Weirs
Cross Connection Between CSO's
Outfall Elimination or Reloacation
Relief/Storage Interceptor
WWTP Capacity Increase
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Alternative 1

In-Line Storage Maximization

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Alternative 1

- Main Lift Station capacity = 48 MGD
- Raise weir 1.5 feet at CSO 009 diversion structue
- 30" flow diversion sewer on First Street from CSO 08 to CSO 007
- 30" flow diversion sewer on First Street from CSO 07 to CSO 005 to a 48" sewer from CSO 005 to Hulman Street
- In-line storage at CSOs 004 and 011 at the diversion structures
- Additional in-line storage in Hulmanand Idaho sewers at 9th Street
- Reinforce Hulmansewer for storage from Interceptor to 14th Street
- Remove weir and install inflatable dam at Ohio and 15th Street
- Raise weir 1.1 feet at CSO 003 diversion structue

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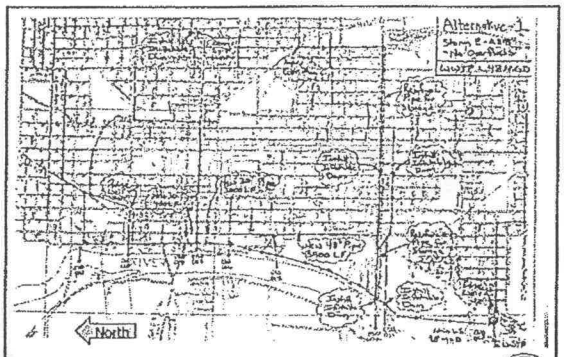

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Alternative 1

- Pros
  - Inflatable dams are less capital costs because existing facilities are utilized
- Cons
  - Inflatable dams require additional O&M
  - Confined space entry required to maintain facilities
  - If dam fails to deflate then it can cause sewer back-ups
  - If dam fails to inflate then CSOs will occur

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Alternative 2

Off-Line Storage Tank

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Alternative 2

- Main Lift Station capacity = 48 MGD
- Raise weir 1.5 feet at CSO 009 diversion structue
- 30" flow diversion sewer on First Street from CSO 08 to CSO 007
- 30" flow diversion sewer on First Street from CSO 07 to CSO 005 to a 48" sewer from CSO 005 to a 4 MG buried storage tank at the Wabash Environmental site with a pump station and connection to the interceptor
- 60" connection pipe from Hulman Street sewer to 4 MG storage tank
- Raise weir at CSO 04 diversion structure
- Remove weir and install inflatable dam at Ohio and 15th Street
- Remove 80" bottleneck at College and 14th Street
- Raise weir 1.1 feet at CSO 003 diversion structue

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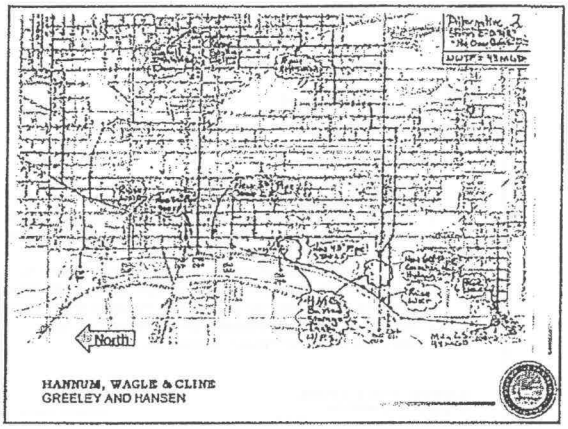

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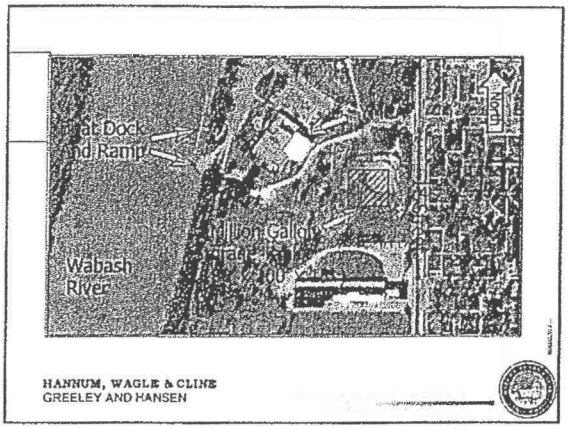

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Alternative 2

- Pros
  - No restrictions to cause sewer back-ups
  - More reliable at preventing overflows
- Cons
  - Higher capital costs
  - Requires more land
  - Odor control required

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Alternative 3A

Increase WWTP Capacity to 60 MGD

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Alternative 3A

- Increase Main Lift Station capacity = 55 MGD
- Increase WWTP capacity to 60 MGD
- Raise weir 1.5 feet at CSO 009 diversion structure
- 30" flow diversion sewer on First Street from CSO008 to CSO 007
- 30" flow diversion sewer on First Street from CSO 07 to CSO 005 to a 48" sewer from CSO 005 to Hulman Street
- Remove weir and install inflatable dam at Ohio and 15th Street
- Remove 60" bottleneck at College and 14th Street
- Raise weir 1.1 feet at CSO 003 diversion structure
- In-line storage at CSOs 004 and 011 at the diversion structures
- Reinforce Hulmansewer for storage from Intereptor to 6th Street

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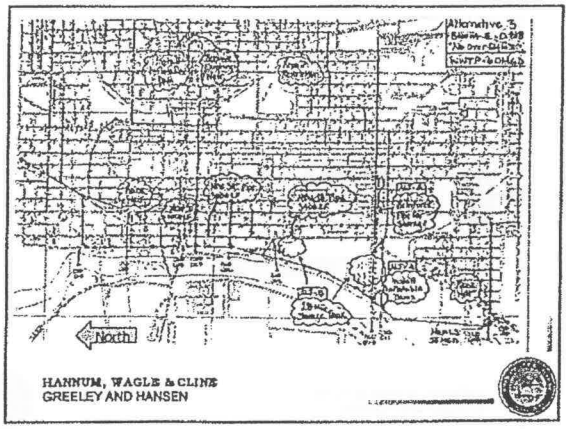

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Alternative 3A

- Pros
  - Inflatable dams decrease capital costs by utilizing existing facilities
  - Existing WWTP facilities need to be upgraded
- Cons
  - Inflatable dams increase O&M costs
  - Confined space entry required to maintain facilities
  - If dam fails to deflate then it can cause sewer back-ups
  - If dam fails to inflate then CSOs will occur
  - Higher capital costs to expand WWTP

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Alternative 3B

Increase WWTP Capacity to 60 MGD

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Alternative 3B

- Increase Main Lift Station capacity = 55 MGD
- Increase WWTP capacity to 60 MGD
- Raise weir 1.5 feet at CSO 009 diversion structue
- 30" flow diversion sewer on First Street from CSO 08 to CSO 007
- 30" flow diversion sewer on First Street from CSO 07 to CSO 005 to a 48" sewer from CSO 005 to Hulman Street
- Remove weir and instsll inflatable dam at Ohio and 15th Street
- Remove 60" bottleneck at College and 14th Street
- Raise weir 1.1 feet at CSO 003 diversion structure
- 2.8 MG storage tank downstream of CSO 005 in Fairbanks Park with connection from First Street sewer to Interceptor

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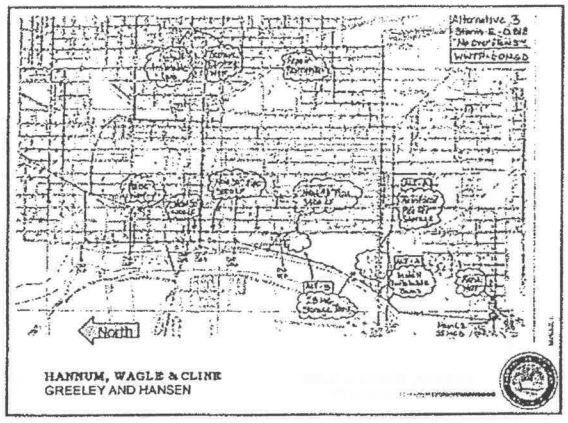

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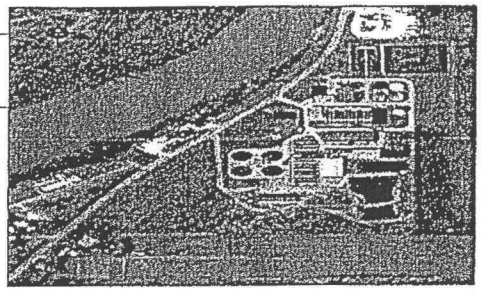
GREELEY AND HANSEN



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Alternative 3B

- Pros
  - No restrictions to cause sewer back-ups
  - More reliable at preventing overflows
  - Existing WWTP facilities need to be upgraded
- Cons
  - Higher capital costs to expand WWTP
  - Odor control required

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Goals Established

- Eliminate / Reduce CSOs 005, 006, 007 and 008
- WWTP Improvements
  - New Pretreatment Facility
  - Equipment Replacement & Upgrades
  - Eliminate Peak Flow Bottlenecks at WWTP
- 4th Street Sewer Collapse & Investigate Other Key Sewers
- Reduce Sewer Back-ups on 1-Year Storm
- Control and Eliminate Floatables
- Create Sewer Maintenance Program
- Wellhead Protection Zone
  - Lining of Sewers within the protection zone
- Reasonable Rate Increase
- IDEM Compliance

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Discussion on Alternatives

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Priority Area Options

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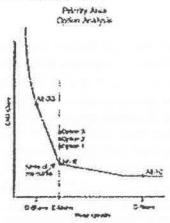
Priority Area Options



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Option 1

Transfer CSOs 006 and 005 to CSO 004

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Option 1

- 60" flow diversion sewer on First Street from CSO 006 to CSO 005 to an 84" sewer from CSO 005 to Hulman Street
- Close outfall pipes at CSOs 006 and 005

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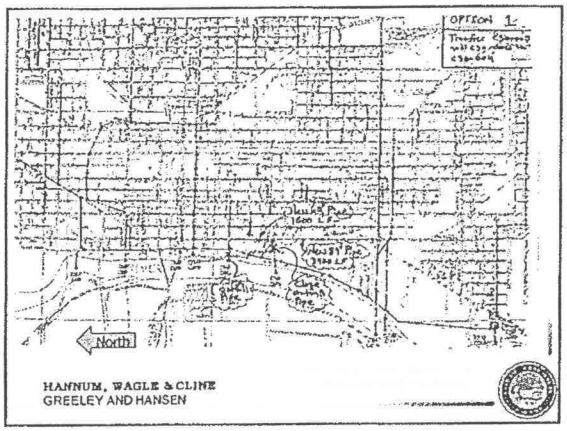

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Option 2

Transfer CSOs 008, 006, and 005 to CSO 004

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Option 2

- 48" flow diversion sewer on First Street from CSO 008 to CSO 007
- 60" flow diversion sewer on First Street from CSO 007 to CSO 006
- 78" flow diversion sewer on First Street from CSO 006 to CSO 005
- 96" flow diversion sewer on First Street from CSO 005 to Hulman Street
- Close outfall pipes at CSOs 008, 006, and 005

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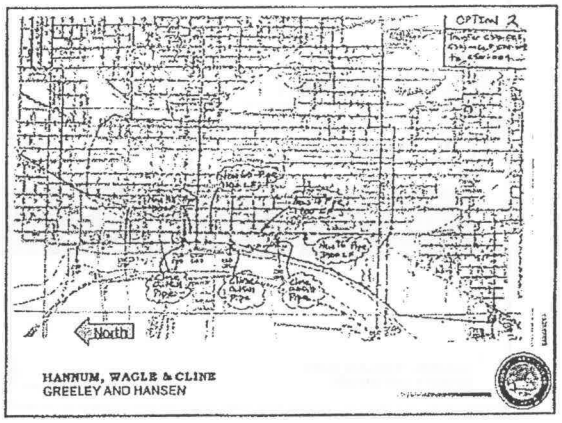

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Option 3

Transfer CSOs 008, 007, 006, and 005 to CSO 004

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Option 3

- 48" flow diversion sewer on First Street from CSO 008 to CSO 007
- 96" flow diversion sewer on First Street from CSO 007 to a new CSO outfall with a new throttle pipe to the interceptor just downstream of CSO 005 in Fairbanks Park
- A parallel 60" flow diversion sewer on First Street from CSO 006 to Hulman Street
- Close outfall pipes at CSOs 008, 007, 006, and 005

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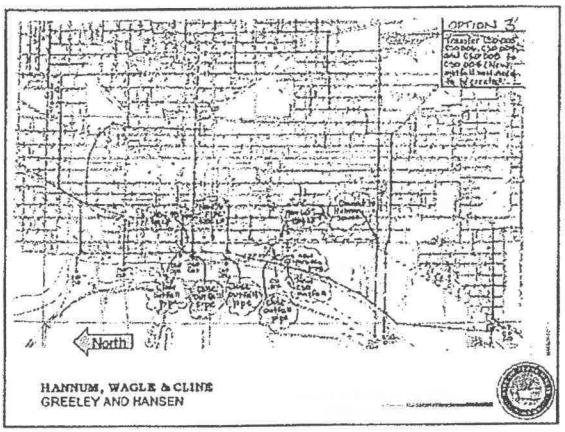

Discussion on Options

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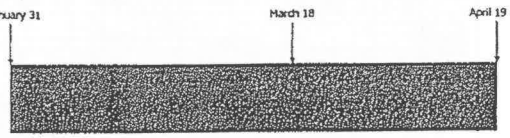
What's Next?



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Next Meeting

Monday
March 18, 2002
7 PM

HANNUM, WAGLE & CLINE
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Thank You for Attending

HANNUM, WAGLE & CLINE
GREELEY AND HANSEN

ENGINEERS
ARCHITECTS
SURVEYORS
NUM, WAGLE & CLINE
n g i n e e r i n g

rincipals:
David L. Hannum, P.E.
alph E. Wagle, P.E.
Michael R. Cline, P.E.

artners:
ric M. Smith, P.E.
ick R. Weigel, P.E.

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ottsburg, IN 47170
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CITY OF TERRE HAUTE
CSO LTCP – Phase II
Citizen Advisory Committee Meeting
November 29, 2001 – 7:00 PM

This was the second Citizen Advisory Committee Meeting in regard to the LTCP.

A. The meeting was brought to order by Mike Cline and he:
   1. Reviewed the role of the committee,
   2. Briefly described was what was presented at the first meeting;
   3. Explained what would be expected of the committee tonight, and
   4. Explained the importance of the sensitive and priority areas in the Long Term Control Planning process.

B. Scott Girman then gave an update on the modeling, river sampling and flow monitoring that had been completed to date. He explained the typical rain events, river flows and how these CSO's might affect the actual river. Handouts were available.

C. Julie Hanson then presented the sensitive areas that had been reviewed to date. She discussed the letter from the US Fish and Wildlife and Department of Natural Resources and the potential areas for the river mussles and other endangered species that were listed in that correspondence. She then reviewed briefly explained what could be considered as sensitive areas and why this needed to be considered.

D. Dick Weigel, Gui DeReamer and Lon Gardner then reviewed display boards that showed three segments of the river. The north section, the central section and south section. During the time they explained photos and areas that were documented during the river reconnaissance of any stairs, footpaths, boat docks, etc. found along the river.
   1. The north section was referred to by the group as an area that had some remote campsites and fishing areas and minimal public access. One area of significant concern to the committee was the fact that the northern most interceptor on Spruce Street outfall appeared to fall within the five year time of travel for the city water wellfield. The overflow for Spruce Street did not occur in that zone, however the interceptor did lie in the time of travel zone and is a concern to the committee.

      The committee members felt that this northern area (Fairbanks Park and north) would be considered to have the greatest potential for river contact by any individuals. It would be the only area that could be considered partially residential as there is a Taylorville (Dresser) area on the west side of the river and a couple of small mobile home parks up around the water plant. The other area of concern in the northern area is the Fairbanks Park. There is no swimming allowed, however there is a boat dock and a fishing pier and it is an area that somewhat promote activities near the riverbank.

2. The central map was then discussed. It was referred to as an industrial area once you get south of the Fairbanks Park. There were only a couple of minor areas noted with footpaths during the river reconnaissance. (Items such as four wheeler paths, etc. and a couple of footpaths for fishing.) They did not seem to be heavily used. It was also noted in this area that the Sugar Creek discharge occurred into the river.
3. The southern portion reviewed on the map included the plan outfall and one location of stairs leading down to the river which is used by the plant staff to obtain samples. It is behind a residence.

E. The committee then had a discussion on actual uses, frequency of use and areas that seem to be of greatest concern to the members. The areas circled on the map that were brought up during the review included Fairbanks Park area, the waterwell issue and isolated fishing paths and comping spots. It was concluded that the CSO discharge to the river did not affect the time of travel based on the water company representative. So the real impact of the CSO's in the river was limited to Fairbanks Park and the isolated fishing paths. Consensus of the group was the priority area should be those CSO's upstream of the Fairbanks Park. Future work and modeling results will help dictate which of those have the greatest priority. However, all of them should be considered to potentially eliminate or relocate because of the park.

Mike Cline then summarized the meeting and the consensus regarding the priority area being Fairbanks Park and the CSO's upstream of it.

F. The meeting date of January 31, 2002 was set for the next meeting and he explained at that time we will be talking about possible alternatives without cost that can be considered by the committee. He also explained that there will be work done at the wastewater plant, or studies at the wastewater plant, that help determine the maximum flow that can be treated by the plant. Pat Goodwin concluded and asked that any members who had not taken the tour of the wastewater plant, please contact Rich Ziemba in order to set up a tour.

Other areas of discussion by the committee members during the meeting included the discussion on the possibility of using the area between Hulman overflow and the main lift station to store volume rather than overflow to the river. There was also discussion regarding:

1. The Hagerman owned wastewater treatment works north of the Hulman/Idaho overflows and the potential of using it and some of its ground for store,
2. The river quality prior to any Terre Haute CSO structures. It was explained that often times river quality did not change after the CSO's. However the city will be required to do their share in improving the overall water qualities. Other pollutants upstream will be addressed by other regulations in the future.
3. The time of travel limits for the well field. It was discussed that the possibility of lining the interceptor or investigation of potential exfiltration of the interceptor in that area would be a separate study. It could be a phase or task in the long term control plan. The committee felt that it was an important item for the quality of

life for the Terre Haute residents and it should be something that should be on the mind of the wastewater system and the city staff.

4. A Rose Hulman senior design project looking at renovating a mill and then improving access from that mill to the Wabash. It was anticipated that there may be a canoe launch area at the renovated mill and it is assumed it would likely bring canoers onto the Wabash. The entry point of this creek is a considerable ways north of the northern most CSO, however the logical take out point of the canoe would be Fairbanks Park. This is an area that should be considered and dialogue continued with the county park group who is heading up this project.

Citizen Advisory Comm
Fire Hook
LTCP Meeting
Nov 29, 2001 7:00PM

Name

Tim Hennessey
JOHN LOVING for DAVE DANNER
Bob Hellmann
Janice Webster
Jeff Dull
Bill CULTICE -
MIKE JOHNSON
Robert J. Houghtalen
CHUCK ADAMSON
Tim PORTER
CHRIS PFAFF
Pat Goodwin
Annette Schotter
Troy Swan
RICH ZIEMBA
Lori Guess
Earl Heidebaugh

HWC | [illegible] Group MAC, DW, LA SG, KB, JH

City of Terre Haute
Long-term Control Plan
Citizen Advisory Committee
November 29, 2001 - 7:00 PM
Agenda

1. Opening Rèmarks

2. Work Completed to Date - 15 minutes
   - Sampling Program
   - Modeling Status
   - Wastewater Treatment Plant Information

3. Purpose of Citizen Advisory Committee in Process - 5 minutes

4. Public Uses and Location - 30 minutes
   - Fishing Holes
   - Wading Spots
   - Parks and Pubic Areas
   - Other Areas used by Children
   - etc.

5. Schedule and Closing - 10 Minutes

Combined Sewer Overflow Long Term Control Plan

Work Completed to Date

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Completed Historical Rainfall Analysis

- 50 Years of Hourly Rainfall Data (1948 to 1998)
- Average of 117 Storms Per Year
- Frequency of Occurrence
  - 80% of Storms Less Than ½"
  - 90% of Storms Less Than 1"

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Collection System Model Status

- Model Is Built
  - 5,000 Acres
  - 10 Combined Sewer Overflows
- In Process of Calibrating With Flow Monitoring Data
- Prepared Input Data
  - Base Dry Weather Flow Rate
  - 8 Design Storms From 0.1" to 5.4"

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River Model Status

- Developing River Cross Sections (Shape)
- Setting up Input Data
  - CSOs
  - Stormwater
  - Industries
- Average River Flow Rate = 12,400 Cubic Feet Per Second
- Average River Velocity = 1.8 Feet Per Second
- 2.5 fps Is Considered Unsafe for Swimming

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E.coli River Sampling Data

September 19, 2001 to November 21, 2001

- Water Quality Standard for Swimming
  - E. Coli – 235 Counts Per 100 ml
- Wet Weather (3 Days After a Storm)
  - 19 Out of 20 Samples Above Water Quality Standards
  - Maximum Concentration Measured 2,040 Counts Per 100 ml
- River Model Will Determine
  - Percent of Time Above Water Quality Standards Per Year

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Sensitive Areas – Endangered Species

- Contacted U.S. Fish and Wildlife Service and the Indiana Dept. Of Natural Resources
- U.S. Fish and Wildlife
  - Habitat Supports Federally Endangered Indiana Bat, Ring Pink Mussel, Tubercled-blossom Pearlymussel, White-warty-back Pearlymussel
  - Bald Eagle Nest Near Wabash River In Northwest Vigo County

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Sensitive Areas – Endangered Species

- Indiana Dept. of Natural Resources
  - Lake Sturgeon Spotted in 1938
  - Bald Eagle Nest Spotted West of the River in 2000
  - Mollusks Spotted in 1988

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Priority Areas From IDEM's Guidance

- Determine Which Section of the River Are Safe and Accessible Near Residential Areas, Schools or Parks

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Priority Areas From IDEM's Guidance

- Conduct River Survey:
  - Actual Public Uses of Streams (Including Frequency of Use)
  - Location of CSOs and Other Discharges in Relation to the Use
  - Factors That Support/encourage Recreational Uses (Easy Access, Trails Leading to the Site, Nearby School, Parks)
  - Factors That Discourage or Prohibit Recreational Use (Warning Signs, Fences, Steep Banks, Retaining Walls)
  - Physical Attributes of the Water Body (Depth, Width, Substrate, Safety)
  - River Velocities Greater Than 2.5 fps Are Considered Unsafe

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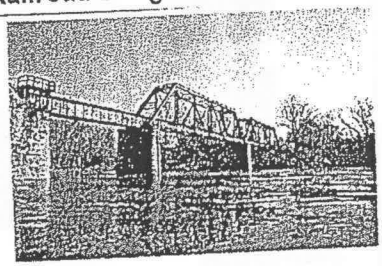
Railroad Bridge Near Spruce St.



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Spruce St. CSO

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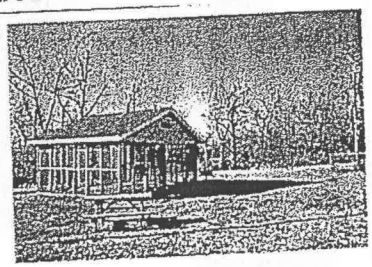
Fire Department Maintenance Building Area



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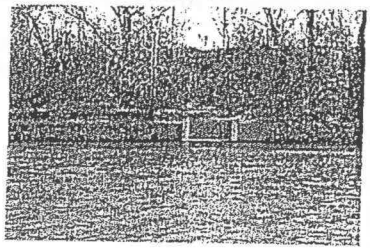
Chestnut St. CSO



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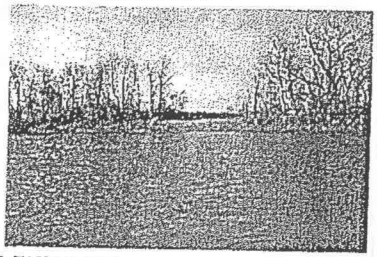
Access Near Chestnut St. CSO at Power Line Crossing



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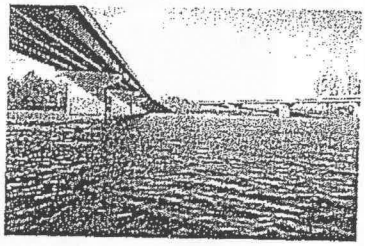
Access Point at US 40 Bridges



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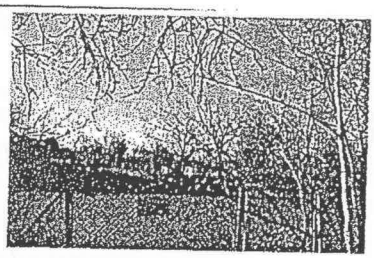
Ohio St. CSO



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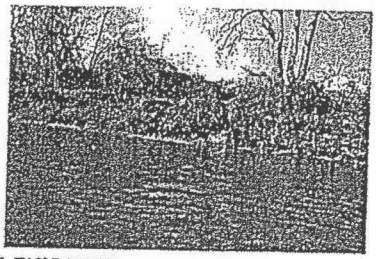
Access on West Bank of Wabash River Across From Ohio St. CSO



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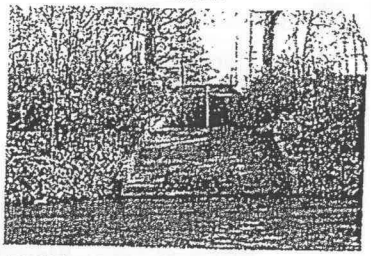
Walnut St. CSO



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In Fairbanks Park Near Oak St. CSO

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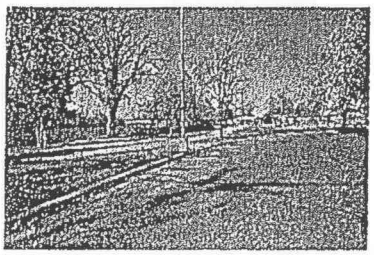
Playground in Fairbanks Park



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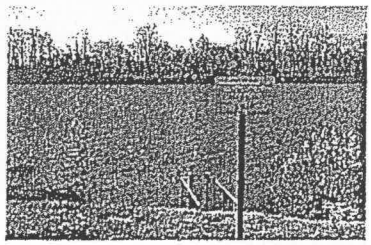
Crawford St. CSO in Fairbanks Park



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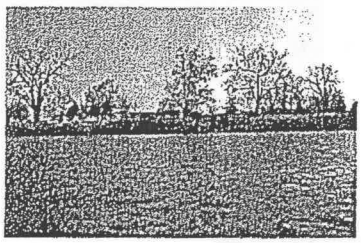
Fishing Pier Near Crawford St. CSO



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Boat Dock and Ramp

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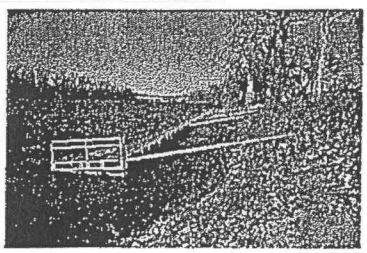
GREELEY AND HANSEN

Boat Dock



HANNUM, WAGLE & CLINE
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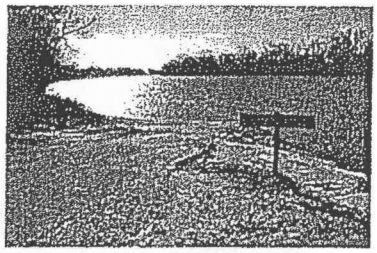
Boat Ramp



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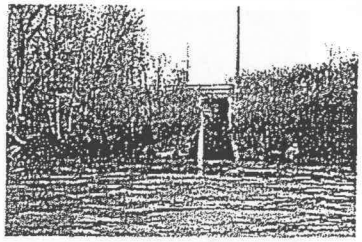
Hulman St. CSO



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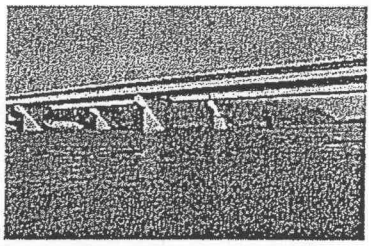
I-70 Bridge



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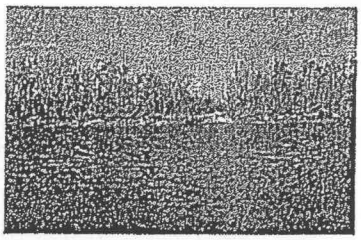
Sugar Creek Junction



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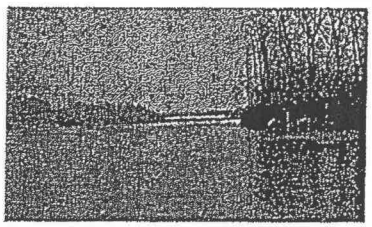
Looking Upstream at Sugar Creek



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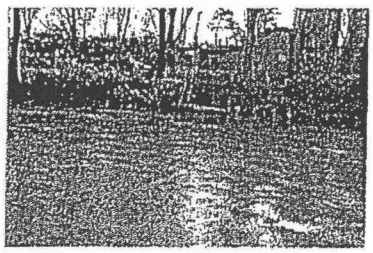
Residence Downstream of WWTP Outfall



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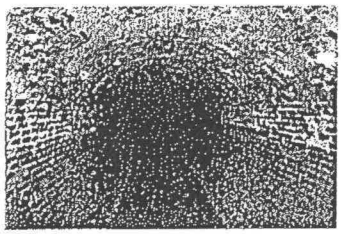
Looking Into Combined Sewer



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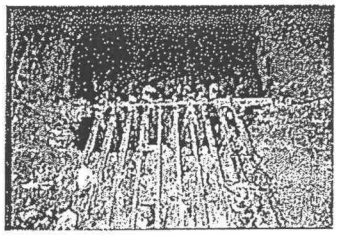
Wastewater Diversion to Interceptor



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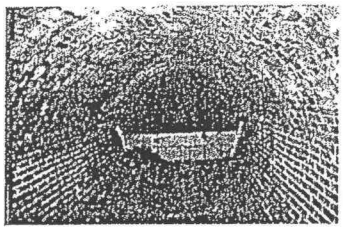
GREELEY AND HANSEN

CSO Diversion Weir



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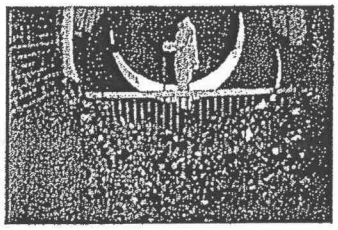
GREELEY AND HANSEN

CSO Outfall and Flap Gate



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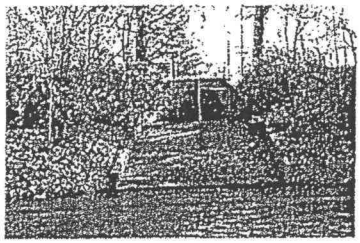
GREELEY AND HANSEN

CSO Outfall to River



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GREELEY AND HANSEN

City of Terre Haute
CSO Control Program

Citizen Advisory Committee

Meeting Agenda
September 27, 2001

- History of Wastewater Treatment
- Combined Sewer System
- Combined Sewer Overflows and Why They Are a Problem
- Mishawaka Case Study
- Long Term Control Plan Approach
- Actual Public Uses and Priority Areas
- Possible Control Options
- Potential Costs and Funding
- Goals for the Citizen Advisory Committee
- Future Meetings

City of Terre Haute
CSO Control Program

Citizen Advisory Committee

Role of the Committee:

1. Liaisons between the general public and the City officials.
2. Input on Water Quality Goals and level of control
3. Input on Priority Areas
4. Input on Control Alternatives
5. Input on the Economic Impact Assessment
6. Comments on the Long Term Control Plan
7. Development of the Public Education and Community Notification Program

Goals for the Meetings:

September 27, 2001 Meeting:

- Describe the history of Waste Water Treatment
- Describe the Combined Sewer System
- Describe Combined Sewer Overflows and why they are a problem
- What are Priority Areas
- What are some possible control options
- What are the potential Costs an how will it be paid for
- Describe the approach to development of the Long Term Control Plan
- Establish goals for the Citizen Advisory Committee

November 29, 2001 Meeting:

- Provide input on the Priority Areas
- Input on Public Education and Notification Program

January 31, 2002 Meeting:

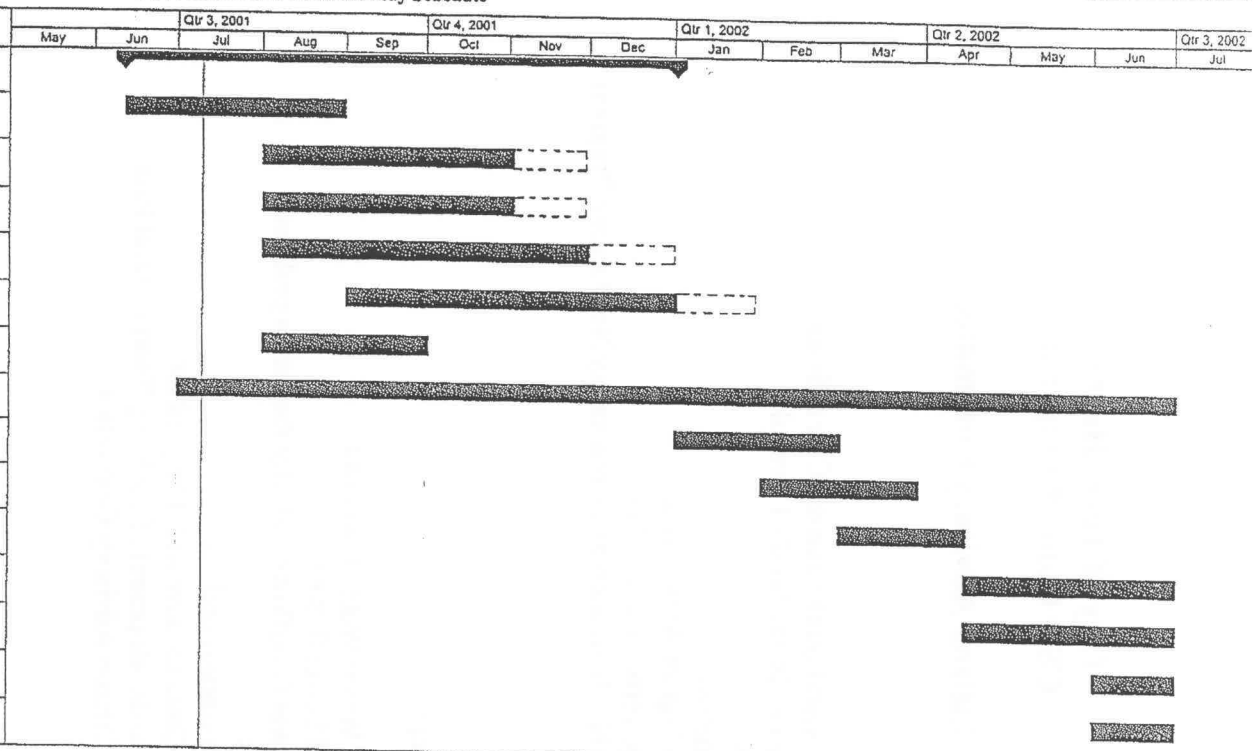
- Present Results of Sampling and Flow Monitoring Program
- Present Computer Model Development

March 28, 2002 Meeting:

- Input on CSO Control Alternatives
- Input on level of CSO Control

Terre Haute CSO Control Study Schedule

ID	Task Name
1	Characterization, Monitoring and Modeling of the Combined Sewer System
2	Data Gathering
3	Combined Sewer system flow Monitoring
4	CSO and River Sampling
5	Collection System Model Development
6	Wabash River Baseline Model
7	Consideration of Sensitive Areas
8	Public Participation
9	Maximizing Treatment At The WWTP
10	Evaluation Of CSO Control Alternatives
11	Cost and Performance Considerations
12	Long Term Control Plan
13	Development of Financial Capability and Implementation Schedule
14	Development of a Post-Construction Compliance Monitoring Program
15	Revising the CSO Operational Plan



Project: LTCP Schedule
Date: Tue 7/10/01

Task
Progress
Milestone
Summary
Rolled Up Task
Rolled Up Milestone
Rolled Up Progress
Split
External Tasks
Project Summary
Group By Summary

CITY OF TERRE HAUTE
CSO CONTROL PROGRAM
CITIZEN ADVISORY COMMITTEE
SEPTEMBER 27, 2001

SIGN-IN-SHEET

	Name	Address	Phone	e-mail
1.	GEORGE AZAR			GCOOS@aol.com
2.	ROBERT HELLMANN		230-7035	
3.	Joyce V. Cadwallader			jcadwall@smwc.edu
4.	Tim Hennessy		298-9094	newsdirector1@juno.com
5.	DAVE DANNER		462-4336	DBD@VIGOSCHOOLS.ORG
6.	Janice Webster		877-3700	jwebster@abcs.com
7.				
8.				
9.				
10.				
11.				
12.				

CITY OF TERRE HAUTE
CSO CONTROL PROGRAM
CITIZEN ADVISORY COMMITTEE
SEPTEMBER 27, 2001

SIGN-IN-SHEET

	Name	Address	Phone	e-mail
1.	Bill Cultice	1036 WINDSOR ROAD	299-4383	
2.	Jeff Duell	3390 Locust	234-5889	Jeff.duell@ae.ge.com
3.	Robert Houghtalen	525 Dobbs Dell	877-8449	Robert.Houghtalen@Rose-Hulman.edu
4.	CHRIS PFAFF	2340 N. 7th ST.	466-9600	cpfaff@commerce.state.in.
5.	Tim Porter	159 OAK STREET	462-3354	FAX 234-3248
6.				
7.				
8.				
9.				
10.				
11.				
12.				

CITY OF TERRE HAUTE
CSO CONTROL PROGRAM
CITIZEN ADVISORY COMMITTEE
SEPTEMBER 27, 2001

SIGN-IN-SHEET

	Name	Address	Phone	e-mail
1.	Chuck Adamson	800 No. 1st St. T.H.	232-7369	CADamson@Amwater
2.	Charles A. Batts III	2417 N. 17th St	841-4266	
3.	Jack Roetker	147 Oak St	462-3428	
4.	Jan Francis	17 Harding St	232-7508	
5.	Mike Caine	HWC 1000 S 14th St. Terre Haute	234-2551	
6.	Lon Gardner	HWC	234-2551	
7.	Mike Johnson	8974 S. Dixie Road	299-2547	
8.	Pat Goodwin			
9.	Scott Girmin	G+H		
10.	Gil Dereamer	"		
11.	Julie Hanson	"		
12.	Dick Weigel	HWC		

TECHNOLOGIES	ENVIRONMENTAL IMPACTS AND IMPROVEMENTS							IMPLEMENTATION & OPERATION FACTORS
	Flow Reduction	BOD Reduction	DO Enhancement	Settleable Solids Removal	Bacteria Reduction	Floatables Reduction	Other	
COLLECTION SYSTEM CONTROL								
Infiltration/Inflow Reduction	High	Low	Low	Low	Low	Low		Controlling infiltration might have minimal impact on CSO volume due to its small magnitude when compared to inflow; Labor intensive; Requires specialized equipment; Particularly effective in separated sewer areas; Ongoing O & M.
Real Time Control	High	High	High	High	High	Low		Highly automated system; Mechanical control requires O & M; Increases potential for sewer backups.
Sewer Separation	High	Low	Low	Low	Low	High		Disruptive to local neighborhoods; Effectiveness of separation has been reassessed in recent years. Results show increased loads of storm water runoff pollutants (Sediments, bacteria, oil and metals).
Outfall Consolidation/ Relocation	Low	Low	Low	High	Low	High		Directs flow away from specific area; Low operational cost; May reduce permitting/monitoring; Can be used in conjunction with storage & treatment technologies.
STORAGE TECHNOLOGIES								
Storage Before Sewer								
Industrial Discharge Detention	Low	High	High	High	Low	High	Toxics Reduction	Industry to hold stormwater or combined sewage until after the storm.
Dry Detention Basin	High	Low	Low	Low	Low	High		Siting and land requirements make location selection difficult.
Wet Detention Pond	High	Low	Low	High	Low	High		Siting and land requirements make location selection difficult.

TECHNOLOGIES	ENVIRONMENTAL IMPACTS AND IMPROVEMENTS							IMPLEMENTATION & OPERATION FACTORS
	Flow Reduction	BOD Reduction	DO Enhancement	Settleable Solids Removal	Bacteria Reduction	Floatables Reduction	Other	
Storage in Sewer System								
In-Line Storage – Interceptor	High	High	High	High	High	High		Increased O & M costs; Increased potential for basement flooding; Maximizes use of existing facilities.
In-Line Storage – Trunk Sewer	High	High	High	High	High	High		Increased O & M costs; Increased potential for basement flooding; Maximizes use of existing facilities.
Off-Line Storage								
Tunnels	High	High	High	High	High	High		Eliminates land restrictions and costs associated with storage basins; Tunnels can provide large storage volumes with relatively minimal disturbance to the ground surface which can be very beneficial in congested urban areas; Increased O & M costs.
Off-Line Covered Storage Basins/ Sedimentation Tanks	High	High	High	High	High	High		Includes variations of retention, detention and flow-through systems; requires large area for location of underground basins; Increased O & M costs Potentially high neighborhood disturbance. Fully captures first flush and provides partial treatment of larger flows.
Off-Line Open Storage Basins/ Sedimentation	High	High	High	High	High	High		Includes variations of retention, detention and flow-through systems; Example – Louisville, Kentucky; Requires area for location of above-ground basin; Increased O & M costs; Odor issues are a consideration. Fully captures first flush and provides partial treatment of larger flows.

TECHNOLOGIES	ENVIRONMENTAL IMPACTS AND IMPROVEMENTS							IMPLEMENTATION & OPERATION FACTORS
	Flow Reduction	BOD Reduction	DO Enhancement	Settleable Solids Removal	Bacteria Reduction	Floatables Reduction	Other	
TREATMENT TECHNOLOGIES								
At CSO Facility								
High Rate Treatment w/screens and disinfection	High	High	High	High	High	High		Currently being piloted in Ft. Worth, TX and Rochester, NY; Examples – Actiflo, Densadeg, Microsep; High O & M costs; Limited ammonia removal.
Mechanical Screens	None	None	None	None	None	High		Mechanical devise requires additional O & M.
Netting Systems	None	None	None	None	None	High		Labor intensive.
Existing Treatment Facility								
Maximize Flow to Treatment Plant	High	High	High	High	High	High		CSO Operational Plan requirement; Low O & M cost.
Primary Treatment	High	High	High	High	None	High		More space than high rate treatment. Increased O & M costs.
High Rate Treatment	High	High	High	High	None	High		Performance is between primary and secondary treatment.
Equalization/Open Storage	High	High	High	High	High	High		Limited space at treatment plant; Odors must be monitored.
Chlorination/ Dechlorination	None	None	None	None	High	None		Effective against bacteria. Easily available. Widely used. Inexpensive. Effective when suspended solids are present. Long detention time and dechlorination required, creating added expense. Health concerns. Production of chlorinated by-products.

TECHNOLOGIES	ENVIRONMENTAL IMPACTS AND IMPROVEMENTS							IMPLEMENTATION & OPERATION FACTORS
	Flow Reduction	BOD Reduction	DO Enhancement	Settleable Solids Removal	Bacteria Reduction	Floatables Reduction	Other	
Ultraviolet Disinfection	None	None	None	None	High	None		Fewer health and safety risks than chlorination. Does not produce chlorine in discharge. Less effective when suspended solids are present. Higher capital and operation and maintenance costs than other disinfection alternatives.
In Stream								
Sidestream Aeration	None	None	High	None	None	High		Includes screening; Example – SEPA Project (Chicago); High O & M.

Proposed Agenda's for Future Meetings

November 29, 2001 Meeting:

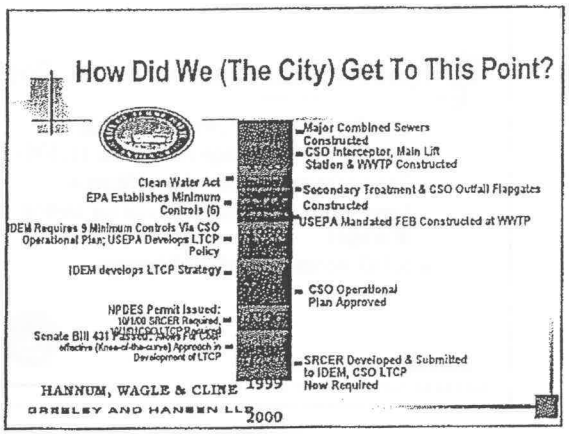
- Preliminary River Sampling Results
- Input on the Priority Areas
- Input on Public Education and Notification Program

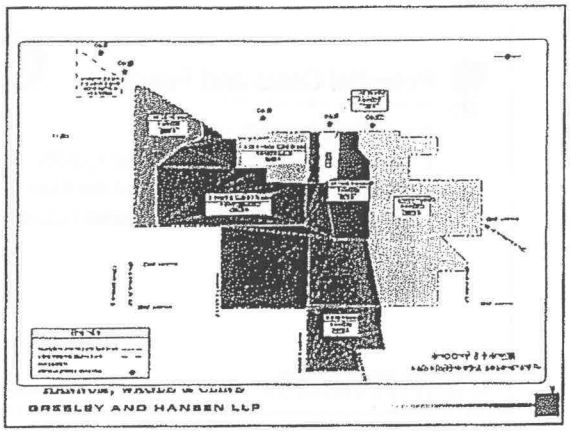
January 31, 2001 Meeting:

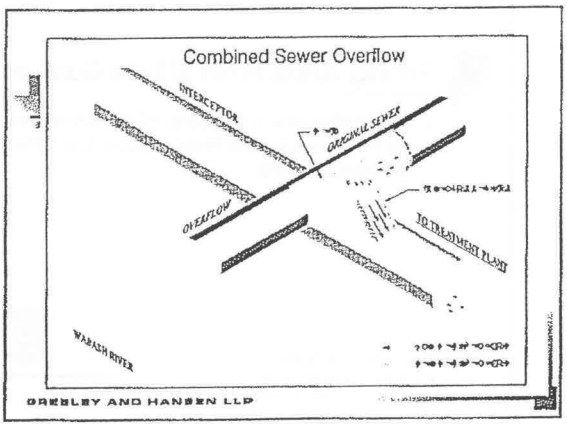
- Present Results of Sampling and Flow Monitoring Program
- Present Computer Model Development

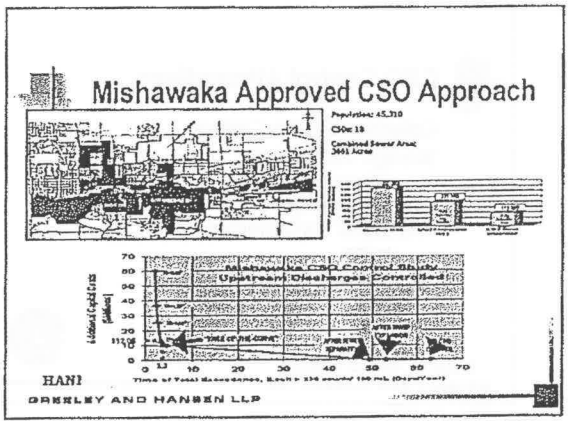
March 28, 2002 Meeting:

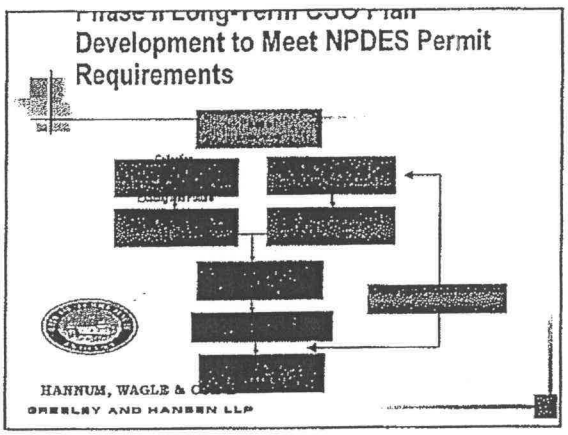
- Input on CSO Control Alternatives
- Input on Level of CSO Control

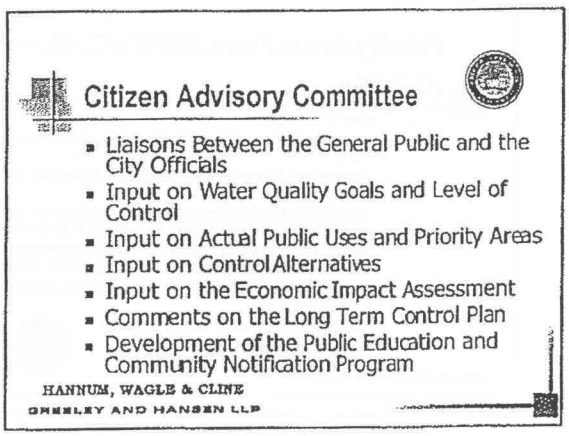

How Did We (The City) Get To This Point?
Major Combined Sewers Constructed
CSO Interceptor, Main Lift Station & WWTP Constructed
Clean Water Act
EPA Establishes Minimum Controls (6)
Secondary Treatment & CSO Outfall Flapgates Constructed
USEPA Mandated FEB Constructed at WWTP
IDEM Requires 9 Minimum Controls Via CSO Operational Plan; USEPA Develops LTCP Policy
IDEM develops LTCP Strategy
CSO Operational Plan Approved
NPDES Permit Issued:
SRCER Developed & Submitted to IDEM, CSO LTCP Now Required
HANNUM, WAGLE & CLINE
1999
2000
GREELEY AND HANSEN LLP


GREELEY AND HANSEN LLP


Combined Sewer Overflow
INTERCEPTOR
ORIGINAL SEWER
OVERFLOW
TO TREATMENT PLANT
WABASH RIVER
GREELEY AND HANSEN LLP


Mishawaka Approved CSO Approach
Upstream Discharges Controlled
HANI
GREELEY AND HANSEN LLP


Development to Meet NPDES Permit Requirements
HANNUM, WAGLE &
GREELEY AND HANSEN LLP


Citizen Advisory Committee
Liaisons Between the General Public and the City Officials
Input on Water Quality Goals and Level of Control
Input on Actual Public Uses and Priority Areas
Input on Control Alternatives
Input on the Economic Impact Assessment
Comments on the Long Term Control Plan
Development of the Public Education and Community Notification Program
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GREELEY AND HANSEN LLP

Potential Costs and Funding

Actual Cost Depends on:

- Level of CSO Control and Water Quality Goals
- IDEM's (and EPA's) Approval of the Plan
- Sources of Funding – Low Interest Loans and Grants

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Specific Factors that Affect the Cost

- One Parameter of Concern: E. coli
- Large River – Average Flow Rate 11,100 cfs
- Ten CSOs on One Receiving Stream
- Large Trunk Sewers (Potential for In-line Storage)
- 5,147 Acres of Combined Sewers

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CSO Control Alternatives

Collection System Control

Storage Technologies

- Storage In Sewer System
- Off-line Storage

Treatment Technologies

- At CSO
- Existing Treatment Plant
- In Stream

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Priority Areas From IDEM's Guidance

- Determine which Sections of the River Are Safe and Accessible Near Residential Areas, Schools or Parks

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Priority Areas From IDEM's Guidance (Cont'd)

- Conduct River Survey:
  - Actual Public Uses of Streams (Including Frequency of Use)
  - Location of CSOs and Other Discharges in Relation to the Use
  - Factors that Support/Encourage Recreational Uses (Easy Access, Trails Leading to the Site, Nearby School, Parks)
  - Factors That Discourage or Prohibit Recreational Use (Warning Signs, Fences, Steep Banks, Retaining Walls)
  - Physical Attributes of the Water Body (Depth, Width, Substrate, Safety)
  - River Velocities Greater than 2.5 fps are Considered Unsafe

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CITY OF TERRE HAUTE
CITIZENS ADVISORY COMMITTEE
CSO & MS4 MEETING SIGN-IN SHEET
May 20, 2008 at 6:00 p.m.

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CITY OF TERRE HAUTE
CITIZENS ADVISORY COMMITTEE
CSO & MS4 MEETING SIGN-IN SHEET
May 20, 2008
Page Two

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City of Terre Haute
Long Term Control Plan (LTCP)
Program Management
Citizens Advisory Committee
Update Presentation

May 20, 2008

Terre Haute Sanitary District

CSO Long Term Control Plan

Citizens Advisory Committee

Why Are We Here?

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What is a CSO?

- A CSO is a Combined Sewer Overflow
  - A Combined Sewer System is a sewer system that is designed to collect sanitary and storm flows in the same pipes
  - House sewers, street inlets and downspouts deposit flow into the combined system
  - When the collection system and wastewater treatment plant cannot process the flow during a rain event, the excess flow outlets to the Wabash River

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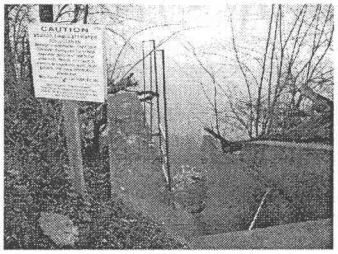
Existing CSO Outfalls



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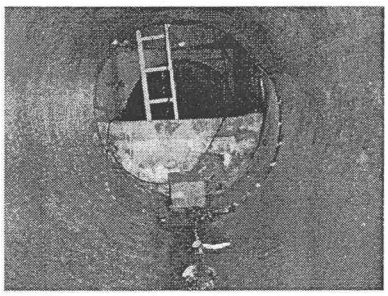
Existing Outfalls

Diversion Structure



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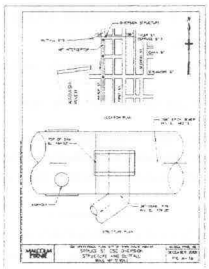
Existing Outfalls

Diversion Structure



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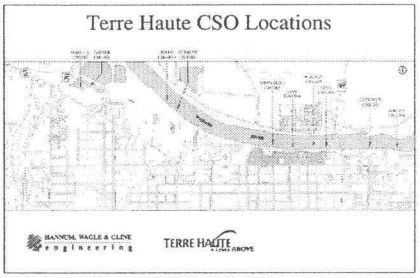
Existing Outfalls



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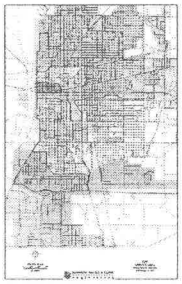
Existing CSO System Service Areas



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History of the Terre Haute Long Term Control Plan

- Original Long Term Control Plan (LTCP)
  - The LTCP was required in the City's NPDES permit
  - The LTCP was submitted to the Indiana Department of Environmental Management (IDEM) in April 2002
  - Proposed Project Cost: Approximately $45 Million
  - The original CAC met during development of the original LTCP
  - There were no specific requirements for levels of CSO control by IDEM for any communities
  - The Plan Resulted in 12 overflows per year per outfall on average
  - The level of control of the plan captured 3.9 MG per event
  - The plan was based on the "Knee of the Curve"

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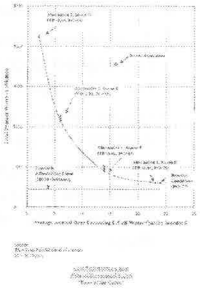
History of the Long Control Plan

- Original LTCP
  - "Knee of the Curve"



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History of the Long Term Control Plan

- Original Long Term Control Plan
  - Major Projects included:
    - CSO Interceptor on 1st Street (to reroute flows around Fairbanks Park – Priority Area)
    - In-Line Storage using inflatable dams in several existing large sewers
      - Large Diameter Sewer Rehabilitation (in preparation for storage)
      - Additional Rehabilitation Wellhead Protection Area
    - Wastewater Treatment Facility Upgrades for wet weather capacity
      - Headworks – Major Components
    - Floatables Controls at all outfalls to remain in service
    - Replacement of the 4th Street Combined Sewer

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History of the Long Term Control Plan

- "Early Action Items"
  - IDEM had not reviewed the Terre Haute plan
  - The City chose to begin some projects in order to stay on the schedule included in the LTCP
  - A $30 Million bond was issued in 2004 to begin selected projects which would not be affected by regulatory review

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History of the Long Term Control Plan

- "Early Action Items"
  - Large Diameter Sewer Rehabilitation
  - 4th Street Sewer
  - Floatables Study

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History of the Long Term Control Plan

- "Early Action Items"
  - Large Diameter Sewer Rehabilitation
    - Approximately 21,000 linear feet of existing sewer was rehabilitated using wire mesh and Shotcrete
      - Hulman Street
      - Walnut Street
      - Spruce/Chestnut

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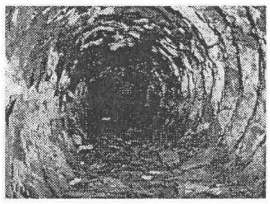
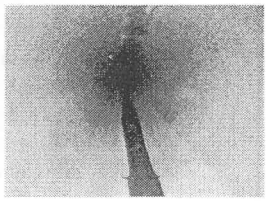
History of the Long Term Control Plan

- "Early Action Items"
  - Large Diameter Sewer Rehabilitation

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History of the Long Term Control Plan

- "Early Action Items"
  - Floatables Control
    - A structure will be designed for each outfall to catch any "floatables"
    - Floatables enter the system through house drains as well as street inlets
    - Consist of trash, leaves, limbs, and others
    - A study was conducted in 2004/2005 to determine the type of floatable control at each structure

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History of the Long Term Control Plan

- "Early Action Items"
  - 4th Street Combined Sewer Replacement
    - The combined sewer on 4th Street between Oak Street and Washington Street was in disrepair
    - Large sections of 4th Street had collapsed
    - The project is currently in construction and should be complete by summer, 2008.

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Updates to the Long Term Control Plan

- After Terre Haute's Original Plan Submission
  - IDEM established guidelines and requirements for the CSO control of all communities
- Since IDEM had not reviewed the original plan and given the new requirements, the entire plan had to be re-evaluated

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Updates to the Long Term Control Plan

- New Alternative Screening
  - Two different paths for evaluating alternatives
  - Michigan Design Approach
    - 1 year, 1 hour and 10 year, 1 hour storms
    - The methodology cannot be used if it is deemed "unaffordable"
  - Use Attainability Analysis Approach
    - Use Attainability Analysis – refines designated use

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Updates to the Long Term Control Plan

- SWMM Model Recalibration
  - The basis of the plan established in the LTCP is the SWMM model
    - A computer simulation model of the CSO system
  - The model predicts the volume and frequency of overflows based on variable rain events
  - In order to estimate overflow volume and frequency, the model must be calibrated

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Updates to the Long Term Control Plan

- SWMM Model Recalibration
  - Why did the model have to be recalibrated?
    - The City had made changes within the collection system that warranted calibration
    - More extensive flow monitoring data was collected for the recalibration

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Updates to the Long Term Control Plan

- SWMM model recalibration
  - New metering in the collection system completed
  - 17 flow meters were set up within the system
  - At least 5 rain events were required of at least ½" inch of a particular duration
  - The model was calibrated to most closely match actual volumes occurring within the system based on a given rain event

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Updates to the Long Term Control Plan

- SWMM model recalibration was approved by IDEM in mid-2007.

LTCP Year	Target Overflow Volume to Capture/Treat
2002	3.9
2008	38.1

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Updates to the Long Term Control Plan

- As a result of approval, new alternatives could be evaluated with the new model overflows predicted

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Updates to the Long Term Control Plan

- New Alternative Screening
  - Terre Haute will evaluate the Michigan Approach and the Use Attainability Analysis Approach

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Updates to the Long Term Control Plan

- New Alternative Screening
  - Prior to screening alternatives, several other areas of the LTCP had to be re-evaluated
    - River Model
      - All field data has been collected and the model has been re-calibrated
      - The river model is important in quantifying the expected water quality in each different alternative
    - Typical Year Rainfall
      - The "Typical Year" Rainfall during 1978 has been approved by IDEM
    - Emerging Technologies (tunnels, caissons)
      - Tunneling and caissons are being researched
      - Indianapolis is using a tunnel and Detroit is using caissons

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Updates to the Long Term Control Plan

- Alternative Screening
  - Some CSO reduction strategies will be included in every alternative

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Updates to the Long Term Control Plan

- "Early Action Projects" Considered
  - Remaining bond proceeds from 2002 bond issue can be used for projects to be started prior to final approval of the LTCP
  - Technical Team evaluated several alternatives for the "Most Bang for the Buck"

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Updates to the Long Term Control Plan

- "Early Action Projects"
  - Plant Upgrades including additional Force Main and Headworks
  - Inline Storage
  - Floatables
  - Separation

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Updates to the Long Term Control Plan

- "Early Action Projects"
  - Plant Upgrades including Additional Force Main and Headworks
    - Parallel Force Main/Main Lift Station Upgrades
    - New Headworks Facility at WWTF
    - Chlorine Contact Tank Upgrades
    - Throttle Increase at Turner

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Updates to the Long Term Control Plan

- "Early Action Projects"
  - Inline Storage
    - Back-Up Structure for Hulman/Idaho
    - Diversion Structure for Walnut
    - Back-Up Structure at 15th/Ohio
    - Large Diameter Pipe Rehabilitation – North Hulman
    - Large Diameter Pipe Rehabilitation – North Walnut

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Updates to the Long Term Control Plan

- "Early Action Projects"
  - Floatables
    - Floatables Structure at Spruce (009)
    - Floatables Structure at Hulman/Idaho (004/011)
  - Separation
    - Partial Separation of East 003
    - Partial Separation of West 009

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Updates to the Long Term Control Plan

- Phase I – "Early Action Projects"
  - The Early Action Items were divided into two phases in order to use existing bond proceeds in the next 3 to 5 years
    - Also includes work already completed
  - Remaining Early Action Projects will be completed at a later time

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Updates to the Long Term Control Plan

- Phase I – "Early Action Items"

Item	Description	Estimated System CSO Reduction from Project Implementation (mg)	% Reduction
1	WWTF Operational Change from 32 mgd to 48 mgd	6.4	up to 16.8%
2	WWTF Upgrade from 48 mgd to 60 mgd	3.5	9.2%
3	Hulman/Idaho Inline Storage	2.9	7.6%
4	Walnut Inline Storage/15th & Ohio Weir Changes	3.6	9.4%
5	Turner Throttle	0.4	1.0%
6	Other Projects	0.2	0.5%
	Total Volume Reduction:	17.0	44.6%

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Updates to the Long Term Control Plan

- Phase II "Early Action Projects" – Further Common Alternatives
  - New Headworks Facility at WWTF
  - Chlorine Contact Tank Upgrades at WWTF
  - Floatables Controls at Spruce (010)
  - Large Diameter Pipe Rehab – North Walnut
  - Separation of East 003
  - Separation of West 009

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Updates to the Long Term Control Plan

- New Alternative Screening
  - Current Progress Status Update
    - IDEM has approved the "Typical Year" Rainfall
    - IDEM has approved the design storm (1.56 in of rain in 17 hours)
    - "Early Action Projects" Request for Approval has been submitted to IDEM
    - The River Model Calibration Memo has been submitted to IDEM for Approval
    - Each option will be input into the SWMM model and then costs will be developed

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Updates to the Long Term Control Plan

- Alternative Screening
  - Further Alternatives
    - After alternative screening is complete, costs will be associated with all options
    - Affordability will be evaluated for each option and the total plan

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Preliminary Schedule

- A preliminary working schedule has been submitted to IDEM
- The schedule outlines working items through the upcoming year
- The GANTT chart shows all of the tasks

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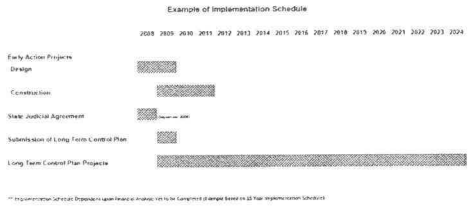
Preliminary Schedule



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Preliminary Schedule

- The key date on the schedule is the State Judicial Agreement (SJA) by September 2008
  - The SJA is the mechanism that IDEM uses to guide development of the LTCP
  - A schedule for submission of the revised LTCP will be included in the SJA
  - The City of Terre Haute is working closely with Fred Andes from Barnes and Thornburg. Mr. Andes has been involved in numerous communities around the state regarding the SJA process

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Public Awareness

- A key element of the LTCP continues to be public input and awareness
  - The Citizens Action Committee has been reconvened to provide input for the new alternatives and priority areas
  - A website has been established to provide information about the Terre Haute CSO process
    - www.terrehautecleanwater.com

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What's Next?

- Technical Team Meetings
  - The Technical Team will work closely with IDEM to ensure the best plan for the City of Terre Haute
- Citizens Advisory Committee Meetings
- State Judicial Agreement

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Thank you.

Questions?

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CITY OF TERRE HAUTE
CITIZENS ADVISORY COMMITTEE
CSO MEETING SIGN-IN SHEET
February 15, 2010 at 6:00 p.m.

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CITY OF TERRE HAUTE CITIZENS ADVISORY COMMITTEE
CSO MEETING SIGN-IN SHEET
February 15, 2010
Page 2

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City of Terre Haute
Long Term Control Plan (LTCP)
Program Management
Citizens Advisory Committee
Update Presentation

February 15, 2010
Terre Haute Sanitary District
Terre Haute Wastewater Utility

Purpose of the Citizens Advisory Committee

- Welcome

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Meeting Topics

I. Review CSO System, LTCP Goals and Purpose of Meeting
II. Present Summary of Activities Completed Since Last Meeting of CAC (5/20/2008)
III. Summary of Alternative Development/Screening
IV. Present Range of Screened Alternatives
V. Public Involvement/Awareness
VI. Schedule and Upcoming Milestones

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CSO Long Term Control Plan Citizens Advisory Committee

I. Review CSO System, LTCP Goals and Purpose of Meeting
- LTCP Required by NPDES Permit
- Purpose of Planning Effort and Public Involvement

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What is a CSO?

- A CSO is a Combined Sewer Overflow
  - A Combined Sewer System is a sewer system that is designed to collect sanitary and storm flows in the same pipes
  - House sewers, street inlets and downspouts deposit flow into the combined system
  - Normally, 100% of all flow is treated by the WWTF.
  - In the unusual situation when the collection system and wastewater treatment plant cannot process the flow during a rain event, the excess flow outlets to the Wabash River

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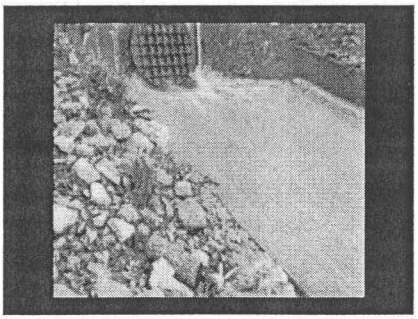
A CSO Event in Progress



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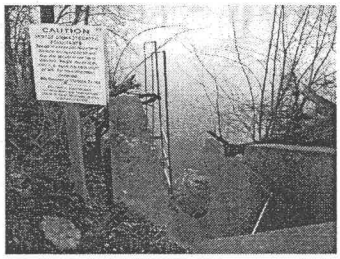
Existing CSO Outfalls



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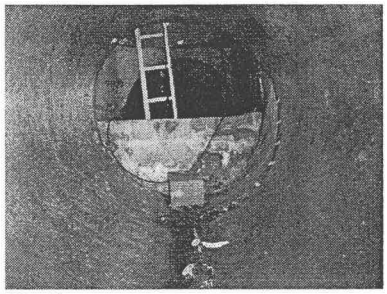
Existing Outfalls

Diversion Structure



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Existing Outfalls

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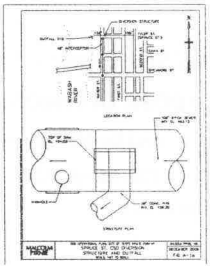

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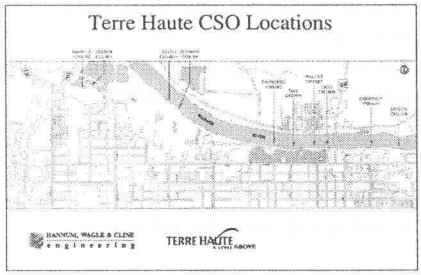
Existing Outfalls

Terre Haute CSO Locations



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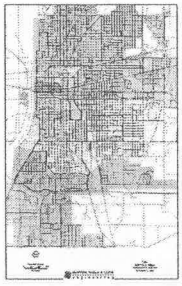
Existing CSO System Service Areas



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Annual CSO Volumes

City of Terre Haute
CSO Volume (MG)

	Turner	Hulman	Crawford	Oak	Walnut	Ohio	Chestnut	Spruce	Idaho	Total	# of Days of OF Events
	003	004	005	006	007	008	009	010	011		
Typical Year (1978)	17.2	189.3	15.2	8.3	118.9	13.3	74.0	73.4	110.5	620.1	39
2009 (actual)	31.8	144.6	25.9	6.1	75.9	7.9	72.2	23.0	33.6	421.0	125

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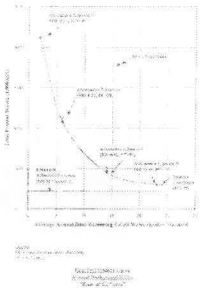
Updates to the Long Term Control Plan

- Terre Haute's Original Plan Submission (2002)
  "Knee of the Curve"



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Updates to the Long Term Control Plan

- Since IDEM had not reviewed the original plan and given the new requirements, the entire plan had to be re-evaluated

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Updates to the Long Term Control Plan

- New CSO Long Term Control Plan Requirements
  - Two different paths for evaluating alternatives
  - "Design Storm" or "Michigan" Approach
    1 year, 1 hour ("First Flush" storm) and 10 year, 1 hour storms
    The methodology cannot be used if it is deemed "unaffordable"
  - Use Attainability Analysis Approach
    Use Attainability Analysis – refines designated use description based on affordability and other factors
    Target Level of Control from EPA and IDEM: 4 Overflow events per year

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Updates to the Long Term Control Plan

- Updated SWMM Model
  - The City installed 17 flow meters in the system in 2005
  - The basis for effectiveness, prediction and analysis of the plan established in the LTCP is the SWMM model
    - A computer simulation model of the CSO system
  - The model predicts the volume and frequency of overflows based on variable rain events
  - In order to estimate overflow volume and frequency, the model had to be calibrated
  - IDEM approved revised model calibration and "typical year"
  - As a result of approval, new alternatives were evaluated with the new model and overflows predicted.

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Updates to the Long Term Control Plan

- Alternative Screening
  - IDEM has approved the "Typical Year" of Rainfall
  - IDEM has approved the design storm (1.56 in of rain in 17 hours). This is the 4 overflow per year event
  - "Early Action Projects" have been approved by IDEM – Projects are necessary for future CSO control measures
  - Alternatives were screened using the EPA recommended method and approved by IDEM
  - The River Model Calibration has been approved by IDEM
  - Each option remaining after screening is being input into the SWMM model and costs are being developed based on size of CSO control infrastructure

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II. Summary of Activities Completed Since Last Meeting

- Approval of river model wet weather results by IDEM
- Development of system control plan alternatives
- Screening of control plan alternatives
- IDEM approval of alternative screening process/methodology
- Geotechnical testing for soil profiles
- SWMM model analysis of developed and screened alternatives (on-going)
- IP property investigation

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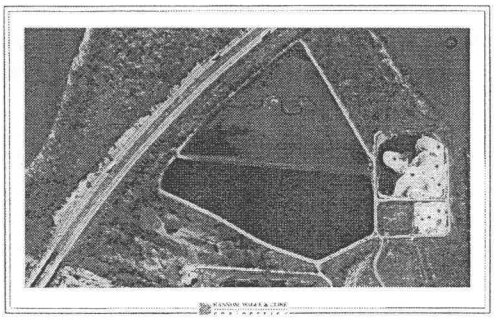
International Paper Lagoons



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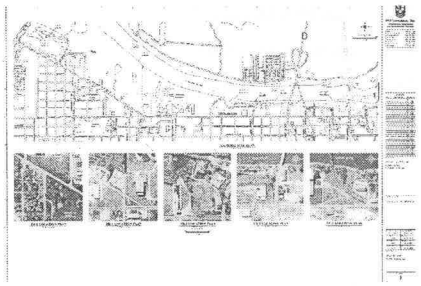
Geotechnical Testing



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III. Summary of Alternative Development/Screening

- Analyzed feasible control technologies
- Initially analyzed individual outfall controls and expanded to a system wide approach
- Inclusion of common alternatives
  - Outfalls that remain open must have floatable controls
- Fairbanks Park considered a priority area by previous CAC
  - Prefer to close all outfalls at the park if feasible
- Design storm approach unfeasible due to affordability (Michigan Approach)
- Initial target of maximum 4 overflows/year for outfalls to remain

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IV. Range of Screened Alternatives

- Alternatives controlling to maximum 4 overflows/year likely unaffordable considering other wastewater utility needs
- Two remaining alternatives to be evaluated
  - Alternative 7B – Tunnel to new main lift station with IP.
    - Will result in closing all CSO outfalls up to a 10-year storm event (only overflow at larger events at 003)
  - Alternative 11 – Relief sewer from Ohio Street to IP storage, consolidation/storage of north CSO's.
    - Close outfalls in park area, 4 per year at others except 009/010 (approximately 9 per year)
- Other options in between will be studied at different levels of CSO reduction and cost

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Alternative 7B – Tunnel to Main Lift Station, Utilizing Lagoons

- Description
  - 13' Diameter Tunnel from Spruce Street to New Main Lift Station
  - New Main Lift Station/Tunnel Evacuation Lift Station to replace existing Main Lift Station .
  - Modification of existing IP pond for storage including sludge removal, liner, influent/effluent structures, cover, aeration and mitigation landscaping.
  - Common Alternatives Include: Back-up structure at Hulman/Idaho, Walnut diversion structure, large diameter pipe rehabilitation – north Hulman, north Walnut and separation of east Basin 003.
  - Completely eliminates all but one CSO - 003 (overflow only at 10 year, 1 hour storm)

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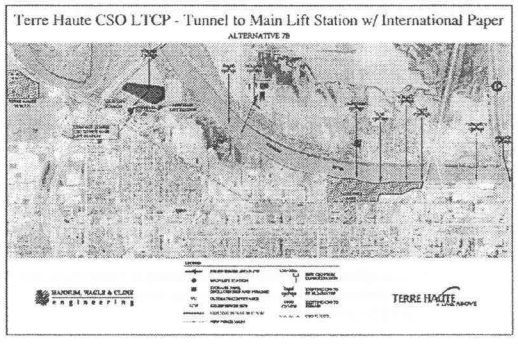

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Alternative 11 – Relief Sewer Along River Parallel to Main Interceptor Utilizing IP Pond Storage/North Consolidation and Storage

- Description
  - 48"-72" Relief Sewer from Ohio street to New Main Lift Station
  - New Main Lift Station
  - Increase Capacity of WWTF to 60 MGD wet weather
  - Modification of IP pond for storage including sludge removal, liner, influent/effluent structures, cover, aeration and mitigation landscaping.
  - CSO's 009, 008, 007, 006, 005, 004, 003 to be closed.
  - Floatables Control on CSO's 010, 011, new IP CSO
  - 7' Diameter sewer from Chestnut to Spruce, Closure of Chestnut
  - Storage Tank at Spruce (up to 6 MG)
  - Common Alternatives Include: Back-up structure at Hulman/Idaho, Walnut diversion structure, large diameter pipe rehabilitation – north Hulman, north Walnut and separation of east Basin 003, floatables control at Spruce and Hulman/Idaho
  - System-wide Control will result in more than 4 overflows per year
    - Could meet 4 overflows per year if certain actions (i.e. green infrastructure) were taken within drainage basins 009 and 010

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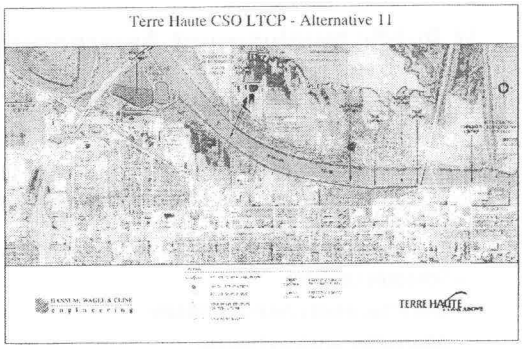
Terre Haute CSO LTCP - Alternative 11



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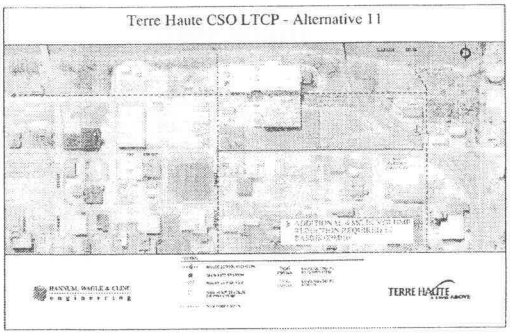
Terre Haute CSO LTCP - Alternative 11



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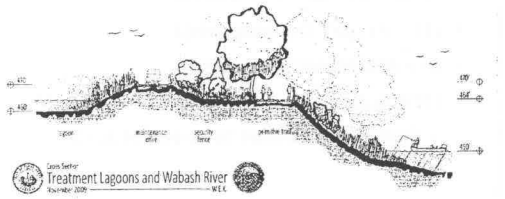
IP Storage Pond Mitigation



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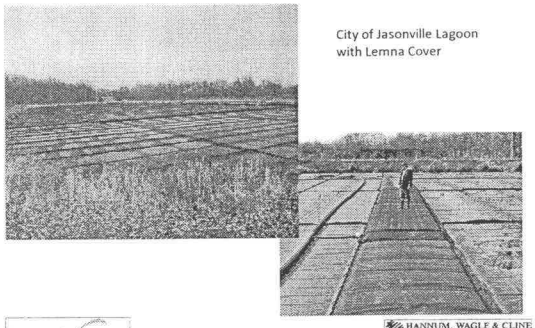
IP Storage Pond Odor Mitigation



City of Jasonville Lagoon with Lemna Cover

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V. Public Involvement Awareness

- A key element of the LTCP continues to be public input and awareness
  - Initially established in 2001, the Citizens Advisory Committee has been tasked to provide input for the new alternatives and priority areas
  - A website was established and is being maintained to provide information about the Terre Haute CSO process
    - www.terrehautecleanwater.com
  - Progress updates presented at Terre Haute Sanitary District meetings
  - CAC Meetings/Public Hearings prior to plan completion

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V. Public Involvement Awareness

- Citizens Advisory Committee
  - Next Scheduled Meeting will include organizational issues
    - Nominate Chairperson and determine regular meeting time
    - Requirement if Federal Funding is used for the project
  - Schedule Updates
  - Use Attainability Analysis Update
  - Alternative Analysis Update

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VI. Upcoming Milestones

- Final Cost Analysis of Screened Alternatives
  - Develop sizing and cost of final alternatives at varying levels of control
- SWMM Model and River Model Evaluation of Screened Alternatives at Various Levels of Control
- Affordability/Financial Analysis
  - Rate Impact / % of MHI

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VI. Upcoming Milestones

- Final Alternative Selection
- LTCP Report Development
- Use Attainability Analysis
- LTCP Submission to IDEM
  - Currently estimated to be end of 2010

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Thank you.

Questions?

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engineering

CITY OF TERRE HAUTE
CITIZENS ADVISORY COMMITTEE
CSO MEETING SIGN-IN SHEET
June 23, 2010 at 6:00 p.m.

	Name	Contact Information (address, phone number or email address)
1.	Rusty Schroedel	rusty.schroedel@zecom.com
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4.	Bryan Duncan	bduncan1@indstate.edu
5.	Jeff Perry	jperry@oakleyusa.com
6.	Joe Weber	joemap263@yahoo.com
7.	Michael Robinson	robinson@rose-hulman.edu
8.	TODD NATION	BODYNATION@EARTHLINK.NET
9.	Bob Clifford	Clifford@vmbagh.com
10.	Deen Rogers	Rogers@vmbagh.com
11.		
12.		
13.		
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City of Terre Haute
Long Term Control Plan (LTCP)
Program Management
Citizens Advisory Committee
Update Presentation

June 23, 2010
Terre Haute Sanitary District
Terre Haute Wastewater Utility

Meeting Topics

I. Long Term Control Plan Goals and Purpose of Meeting
II. History of Terre Haute Sewer/Improvements
III. Description of a CSO/Terre haute CSO System
IV. Existing Wabash River Pollutant Sources
V. Present Range of Screened Alternatives
VI. Estimated Sewer Rate Impacts of the Screened Alternatives
VII. Public Involvement/Awareness
VIII. Schedule and Upcoming Activities

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I. LTCP Goals and Purpose of Meeting

- LTCP Required by NPDES Permit
- Purpose of Planning Effort and Public Involvement

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II. History of Terre Haute Sewer System/Improvements

Post Civil War – The City built large diameter sewers in area drainage-ways, connected sanitary waste into all sewers, which connected to these trunk line sewers

- **1964 Project** – Built Diversion Structures, the relief interceptor, the main lift station and the wastewater treatment plant. Created 8 CSO's- captured approximately 60% of sewage before over-flowing
- **1968 Project** – Primarily for drainage relief – built CSO 011 and Thompson Ditch
- **1970-72** – Clean water Act Approved, USEPA formed
- **1976** – First NPDES Permit Issued to a Municipality
- **1991** – Consent Decree issued to the City, paid fine and built small EQ basins at the WWTF
- **1996** – CSO Operational Plan developed and approved
- **1999** – Stream Reach Characterization Report completed – showed CSO impacts on the Wabash River due primarily to Fecal Coliform/E-Coli concentrations during first flush
- **2002** – Initial Draft of the CSOLTCP sent in – "Knee of the Curve" – would capture about 84% prior to over-flowing (4 month storm event). IDEM never reviewed this study
- **2005** – City staff installs flow meters and auto-samplers at CSO over-flows
- **2007** – City CSO's overflow over 1000 times (total off all CSOs)
- **2007** – IDEM sets new standards for CSOLTCP – must now eliminate all overflows up to a 1 year storm & capture up to a 10 year storm event OR reduce the overflows per outfall subject to affordability/UAA
- **2009** – City has potential to acquire the International paper site – CSOLTCP
- **2010** - Alternatives adjusted to include consideration of this site

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III. Description of a CSO/Terre Haute CSO System

- A CSO is a Combined Sewer Overflow
  - A Combined Sewer System is a sewer system that is designed to collect sanitary and storm flows in the same pipes
  - House sewers, street inlets and downspouts deposit flow into the combined system
  - Normally, 100% of all flow is treated by the WWTF.
  - In the unusual situation when the collection system and wastewater treatment plant cannot process the flow during a rain event, the excess flow outlets to the Wabash River

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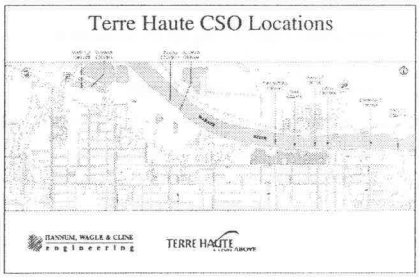
Existing Outfalls



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Existing CSO System Service Areas

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Annual CSO Volumes

City of Terre Haute
CSO Volume (MG)

	Turner	Hulman	Crawford	Oak	Walnut	Ohio	Chestnut	Spruce	Idaho	Total	# of Days of OF Events
	003	004	005	006	007	008	009	010	011		
Typical Year (1978)	17.2	189.3	15.2	8.3	118.9	13.3	74.0	73.4	110.5	620.1	39
2009 (actual)	31.8	144.6	25.9	6.1	75.9	7.9	72.2	23.0	33.6	421.0	125

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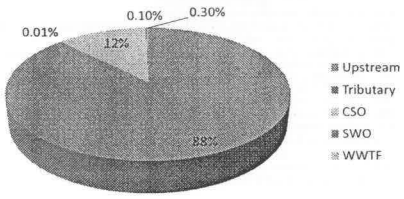
IV. Existing Wabash River Pollutant Sources

Annual E. coli Loading – Based on "Typical Year"
(for sources in the Terre Haute area)



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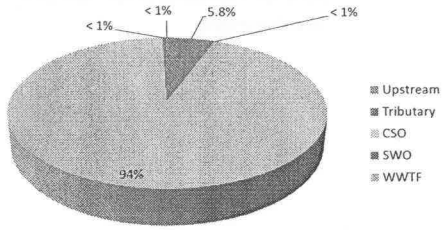
IV. Existing Wabash River Pollutant Sources

Average E. Coli Loading During a Rain Event –
Average of Rain Events Sampled in 2007
(for sources in the Terre Haute area)



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IV. Range of Screened Alternatives

- Alternatives controlling to maximum 4 overflows/year likely unaffordable considering other wastewater utility needs
- Three remaining alternatives to be evaluated
- Other options in between will be studied at different levels of CSO reduction and cost

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IV. Range of Screened Alternatives

- Three remaining alternatives to be evaluated
  - Alternative 7B – Tunnel to new main lift station with IP.
  - Alternative 11 – Relief sewer from Ohio Street to IP storage, consolidation/storage of north CSO's, new main lift station.
  - Hybrid Alternative – Relief Sewer from Ohio Street to IP storage

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Alternative 7B – Tunnel to Main Lift Station, Utilizing Lagoons

- Description
  - 17' Diameter Tunnel from Spruce Street to New Main Lift Station
  - New Main Lift Station/Tunnel Evacuation Lift Station to replace existing Main Lift Station .
  - Modification of existing IP pond for storage including sludge removal, liner, influent/effluent structures, cover, aeration and mitigation landscaping.
  - Common Alternatives Include: Back-up structure at Hulman/Idaho, Walnut diversion structure, 15th and Ohio Diversion Structure, Large diameter pipe rehabilitation – north Hulman, north Walnut and separation of east Basin 003.

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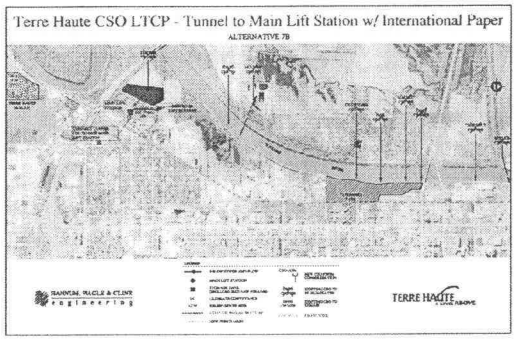

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Alternative 11 – Relief Sewer Along River Parallel to Main Interceptor Utilizing IP Pond Storage/North Consolidation and Storage

- Description
  - 48"-72" Relief Sewer from Ohio street to New Main Lift Station
  - New Main Lift Station
  - Modification of IP pond for storage including sludge removal, liner, influent/effluent structures, cover, aeration and mitigation landscaping.
  - CSO's 009, 008, 007, 006, 005, 004, 003 to be closed.
  - Floatables Control on CSO's 010, 011, new IP CSO
  - 8' Diameter sewer from Chestnut to Spruce, Closure of Chestnut
  - Storage Tank at Spruce (up to 6 MG)
  - Common Alternatives Include: Back-up structure at Hulman/Idaho, Walnut diversion structure, 15th and Ohio Diversion Structure, Large diameter pipe rehabilitation – north Hulman, north Walnut and separation of east Basin 003, floatables control at Spruce and Hulman/Idaho
  - System-wide Control will result in more than 4 overflows per year
    - No overflows at some outfalls, less than 10 at remaining outfalls

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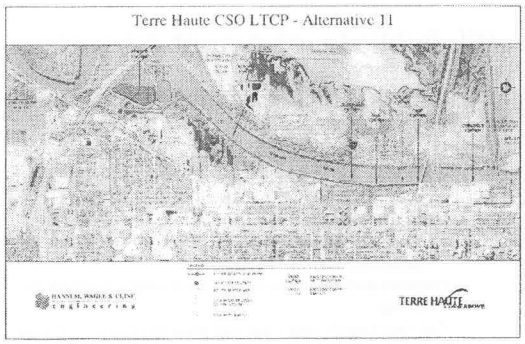

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Hybrid Alternative– Relief Sewer Along River Parallel to Main Interceptor Utilizing IP Pond Storage

- Description
  - 72" Relief Sewer from Ohio street to New Main Lift Station
  - New CSO Pumping Station
  - Modification of IP pond for storage including sludge removal, liner, influent/effluent structures, cover, aeration and mitigation landscaping.
  - CSO's 008, 007, 006, 005, 004 to be closed.
  - Floatables Control on CSO's 009, 010, 011, 003
  - Common Alternatives Include: Back-up structure at Hulman/Idaho, Walnut diversion structure, 15th and Ohio Diversion Structure, Large diameter pipe rehabilitation – north Hulman, north Walnut and separation of east Basin 003, floatables control at Spruce and Hulman/Idaho
  - System-wide Control will result in significantly more than 4 overflows per year
    - Overflows at 009/010 expected to be >20 per year

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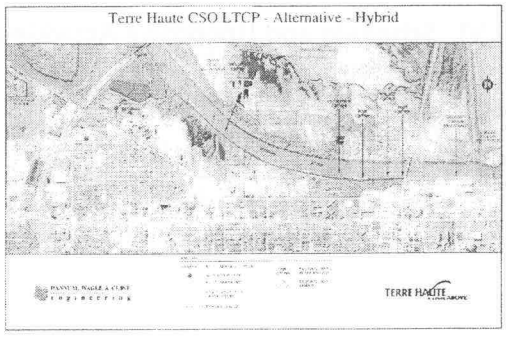

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Estimated Annual Overflow Frequency of Screened Alternatives

Alternative	010	009	Park Outfalls	004	011	003
Alternative 7	0	0	0	0	0	0
Alternative 11	< 10	0	0	0	< 10	< 10
Hybrid	> 20	> 20	0	0	7	9

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VI. Estimated Sewer Rate Impacts of the Screened Alternatives

Description	LTCP Plan Cost	Estimated Annual Residential Cost	Estimated Monthly Residential Cost	% MHI
Current Cost	N/A	$376	$31	1.08%
With New WWTF	N/A	$576	$47	1.64%
Hybrid	$56,000,000	$724	$60	2.09%
Hybrid + New Main Lift	$80,000,000	$771	$64	2.22%
Alternative 11	$95,000,000	$801	$67	2.31%
Alternative 7 – with IP	$146,000,000	$900	$75	2.60%
Alternative 7 – No IP	$170,000,000	$947	$79	2.73%

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VII. Public Involvement Awareness

- A key element of the LTCP continues to be public input and awareness
  - Initially established in 2001, the Citizens Advisory Committee has been tasked to provide input for the new alternatives and priority areas
  - A website was established and is being maintained to provide information about the Terre Haute CSO process
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  - Progress updates presented at Terre Haute Sanitary District meetings
  - CAC Meetings/Public Hearings prior to plan completion

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VI. Schedule and Upcoming Activities

- Final Cost Analysis of Screened Alternatives
  - Develop sizing and cost of final alternatives at varying levels of control
- SWMM Model and River Model Evaluation of Screened Alternatives at Various Levels of Control
- Affordability/Financial Analysis
  - Rate Impact / % of MHI

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VI. Schedule and Upcoming Activities

- Final Alternative Selection
- LTCP Report Development
- LTCP Submission to IDEM
  - Currently estimated to be Spring of 2011
- Use Attainability Analysis

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Thank you.

Questions?

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TERRE HAUTE CSOLTCP PUBLIC MEETING

NAME	EMAIL ADDRESS (OPTIONAL)
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Byron Boulton	bboulton@indstate.edu
~~DARREL ZECK~~	
DOUG GRIM	
CHUCK ENNIS	
PATRICK MARTIN	
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City of Terre Haute
Long Term Control Plan (LTCP)
Program Management
Citizens Advisory Committee
Final Alternative Selection
Presentation

November 1, 2010
Terre Haute Sanitary District
Terre Haute Wastewater Utility

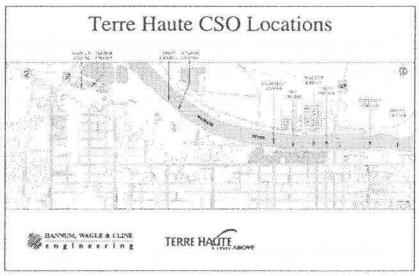
Meeting Topics

I. Purpose of Meeting
II. Description of Terre Haute CSO System
III. Existing Wabash River Pollutant Sources
IV. Final Alternatives Evaluated
V. Water Quality Impacts of Alternatives – Limno Tech
VI. Financial Analysis/Rate Impact – HJ Umbaugh
VII. Public Involvement/Awareness
VIII. Schedule and Upcoming Activities

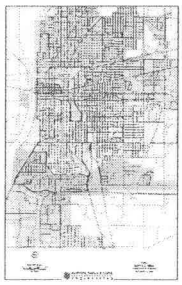
I. Purpose of Meeting

- Review CSO LTCP Requirements and Past Meeting Information
- Present Final Alternative Evaluation Data
- Provide Input to Sanitary District
- Review Process for Finalization of CSO LTCP

II. Description of Terre Haute CSO System
Existing Outfalls



Existing CSO System Service Areas



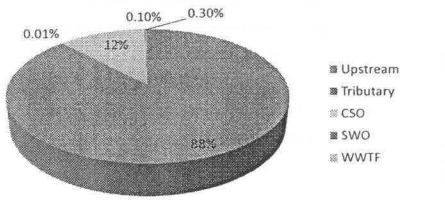
Annual CSO Volumes

City of Terre Haute
CSO Volume (MG)

	Turner	Hulman	Crawford	Oak	Walnut	Ohio	Chestnut	Spruce	Idaho	Total	Max # of Days of Overflows
	003	004	005	006	007	008	009	010	011		
Typical Year (1978)	18.6	229.3	15.5	7.8	116.7	12.6	76.3	76.1	137.0	690.0	39
2009 (actual)	31.8	144.6	25.9	6.1	75.9	7.9	72.2	23.0	33.6	421.0	125

III. Existing Wabash River Pollutant Sources

Annual E. coli Loading – Based on "Typical Year"
(for sources in the Terre Haute area)



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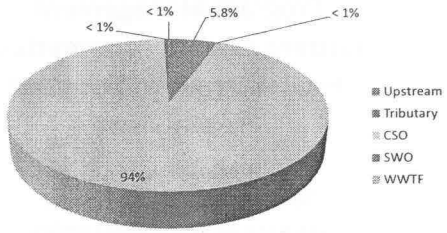
III. Existing Wabash River Pollutant Sources

Average E. Coli Loading During a Rain Event –
Average of Rain Events Sampled in 2007
(for sources in the Terre Haute area)



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IV. Final Alternatives Evaluated

- Three remaining alternatives to be evaluated
  - Alternative 7B – Tunnel to new main lift station with IP.
  - Alternative 11 – Relief sewer from Ohio Street to IP storage, consolidation/storage of north CSO's, new main lift station.
  - Hybrid Alternative – Relief Sewer from Ohio Street to IP storage

*All 3 Alternatives Assume Use of IP Storage

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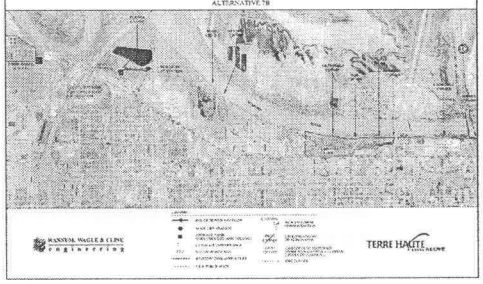
Terre Haute CSO LTCP - Tunnel to Main Lift Station w/ International Paper



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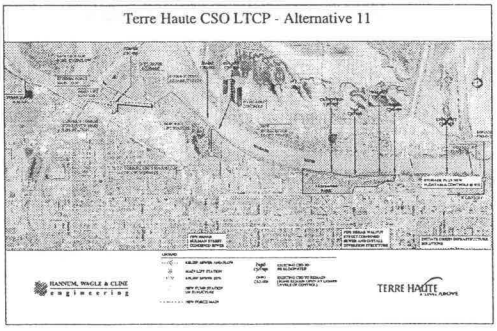
Terre Haute CSO LTCP - Alternative 11



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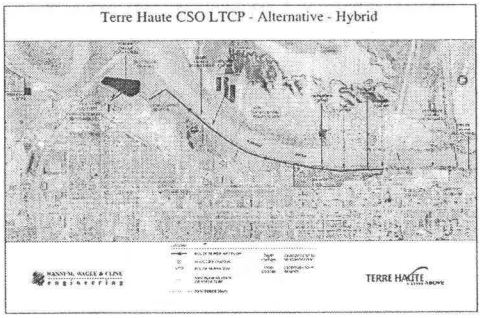
Terre Haute CSO LTCP - Alternative - Hybrid



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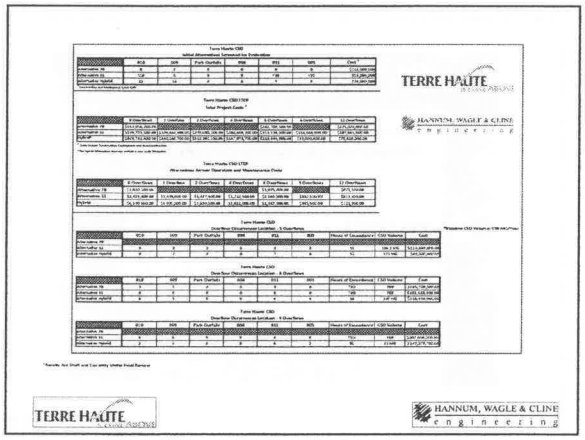

V. Water Quality/Impact of Alternatives

- Limno Tech Developed Water Quality Model Based on Final SWMM (Hydraulic) Model Results
- Present Impact of CSO's on River Water Quality for Range of Alternatives/Level of Control

Outline

- Review Baseline (Current Conditions)
- CSO Control Alternatives
  - End of pipe comparisons
- River Model Results Compared to Water Quality Standards (WQS)
  - Alternative 7B
  - Alternative 11
  - Alternative 'Hybrid'
- Cost-Benefit performance results
  - Water Quality (WQ)-driven Knee-of-curve

Note: For all results presented here, the lower the number, the better the result (e.g. lower number of events, fewer hours > WQS, etc.)

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Summary of Current Conditions (1)

- Bacteria (*E. coli*) only pollutant of concern where CSOs are impacting Wabash River water quality
- CSOs are not the only source of bacteria
  - Upstream loads can be significant
  - Upstream loads can affect Terre Haute at different times than CSOs
  - During wet weather, CSOs are the largest source of bacteria to the local stretch of the Wabash River
- State *E. coli* Water Quality Standards are not met approximately 30% of the time
  - Bacteria loads from City's CSOs alone can result in the river not meeting standards 5% of the time
  - See next slide

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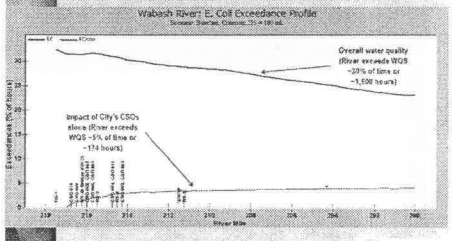
Summary of Current Conditions (2)



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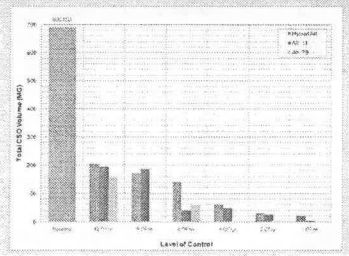
Overview of CSO Control Alternatives



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CSO Control Alternatives-Summary of 7B

Number of CSO Events/Yr

Alternative	Level of Control (OF/yr)	Spruce (010)	Chestnut (009)	Ohio (008)	Walnut (007)	Oak (006)	Crawford (005)	Holman (004)	Idaho (011)	Turner (003)
Baseline	n/a	24	33	37	30	24	31	39	32	24
7B	12	7	10						12	11
7B	0	0	0						0	0

Overflow Volume (MG/Yr)

Alternative	Level of Control (OF/yr)	Spruce (010)	Chestnut (009)	Ohio (008)	Walnut (007)	Oak (006)	Crawford (005)	Holman (004)	Idaho (011)	Turner (003)
Baseline	n/a	76.1	76.3	12.8	115.7	7.8	15.4	229.3	137.1	19.5
7B	12	18.7	27.7	0	0	0	0	0	86.1	23.9
7B	0	0.7	3.7	0	0	0	0	0	39.8	14.1

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River Water Quality Improvement Alt. 7B-Key Locations

Hours > 235 cfu/100 ml (Indiana Single Sample Maximum Water Quality Standard)

Location	River Mile	Baseline	Alternative 7B 12 OF/yr	6 OF/yr	0 OF/yr
Upstream of City's CSOs	217.5	0	0	0	0
US-40	216.3	72	26	10	0
Fairbanks Park	215.5	104	33	12	0
Downstream of CSOs 004 and 011	214.5	143	44	20	0
Downstream WWTP	211.3	174	54	25	0

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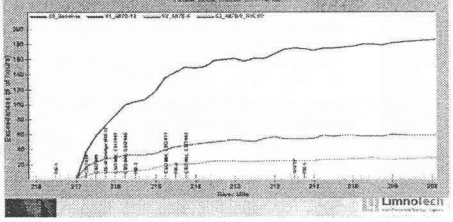
River Water Quality Improvement Alt 7B-River Profile

Hours > 235 cfu/100 ml (Indiana Single Sample Maximum Water Quality Standard)

Wabash River: E. Coli Exceedance Profile



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CSO Control Alternatives-Summary of Alt. 11

Number of CSO Events/Yr

Alternative	Level of Control (OF/yr)	Spruce (010)	Chestnut (009)	Ohio (008)	Walnut (007)	Oak (006)	Crawford (005)	Holman (004)	Idaho (011)	Turner (003)
Baseline	n/a	24	33	37	30	24	31	39	32	24
11	12	10							8	9
11	9	9							8	9
11	6	6							6	6
11	4	4							4	4
11	2	2							2	2
11	1	1							1	1

Overflow Volume (MG/Yr)

Alternative	Level of Control (OF/yr)	Spruce (010)	Chestnut (009)	Ohio (008)	Walnut (007)	Oak (006)	Crawford (005)	Holman (004)	Idaho (011)	Turner (003)
Baseline	n/a	76.1	76.3	12.8	115.7	7.8	15.4	229.3	137.1	19.5
11	12	63.9	0	0	0	0	0	0	110.0	0
11	9	75.8	0	0	0	0	0	0	110.3	0
11	6	17.9	0	0	0	0	0	0	58.4	6.6
11	4	24.6	0	0	0	0	0	0	17.4	7.3
11	2	12.8	0	0	0	0	0	0	0.9	3.9
11	1	1.6	0	0	0	0	0	0	1.3	0.5

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River Water Quality Improvement Alt. 11-Key Locations

Hours > 235 cfu/100 ml (Indiana Single Sample Maximum Water Quality Standard)

Location	River Mile	Baseline	Alternative 11 12 OF/yr	9 OF/yr	6 OF/yr	4 OF/yr	2 OF/yr	1 OF/yr	0 OF/yr
Upstream of City's CSOs	217.5	0	0	0	0	0	0	0	0
US-40	216.3	72	34	32	17	13	9	3	0
Fairbanks Park	215.5	104	44	40	19	17	10	4	0
Downstream of CSOs 004 and 011	214.5	143	45	43	24	19	13	6	0
Downstream WWTP	211.3	174	55	51	28	24	16	6	0

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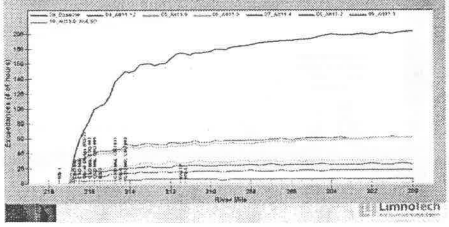
River Water Quality Improvement Alt. 11 – River Profile

Hours > 235 cfu/100 ml (Indiana Single Sample Maximum Water Quality Standard)

Wabash River: E. Coli Exceedance Profile



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CSO Control Alternatives-Summary of Hybrid

Number of CSO Events/Yr

Alternative	Level of Control (OF/yr)	Spruce (010)	Chestnut (009)	Ohio (008)	Walnut (007)	Oak (006)	Crawford (005)	Holman (004)	Idaho (011)	Turner (003)
Baseline	n/a	24	33	37	30	24	21	36	32	34
Hybrid	12	11	9						7	7
Hybrid	9	9	7						7	6
Hybrid	6	6	5						6	5
Hybrid	4	3	4						4	3
Hybrid	2	2	2						2	1
Hybrid	1	1	1						1	1

Overflow Volume (MG/Yr)

Alternative	Level of Control (OF/yr)	Spruce (010)	Chestnut (009)	Ohio (008)	Walnut (007)	Oak (006)	Crawford (005)	Holman (004)	Idaho (011)	Turner (003)
Baseline	n/a	75.1	70.3	72.6	116.7	7.8	13.4	226.3	137.1	49.6
Hybrid	12	74.6	14.9	0	0	0	0	0	52.5	41.7
Hybrid	9	63.4	8.9	0	0	0	0	0	47.9	33.8
Hybrid	6	17.5	20.7	0	0	0	0	0	37.9	53.7
Hybrid	4	11.4	14.2	0	0	0	0	0	19.2	7.3
Hybrid	2	7.4	9.3	0	0	0	0	0	11.7	4.5
Hybrid	1	2.8	4.5	0	0	0	0	0	7.9	4.5

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River Water Quality Improvement Hybrid Alt.-Key Locations

Hours > 235 cfu/100 ml (Indiana Single Sample Maximum Water Quality Standard)

Location	River Mile	Baseline	Alternative 11: 12 OF/yr	9 OF/yr	6 OF/yr	4 OF/yr	2 OF/yr	1 OF/yr	0 OF/yr
Upstream of City's CSOs	217.5	0	0	0	0	0	0	0	0
US-40	216.3	72	30	32	23	17	12	7	0
Fairbanks Park	215.5	104	38	39	28	17	14	7	0
Downstream of CSOs 004 and 011	214.5	143	45	45	29	22	15	10	0
Downstream WWTP	211.3	174	55	52	38	27	18	11	0

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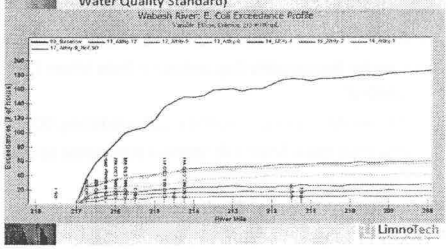
River Water Quality Improvement Hybrid Alt. - River Profile

Hours > 235 cfu/100 ml (Indiana Single Sample Maximum Water Quality Standard)



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Cost-Benefit Performance Results Summary

- "Knee of curve" analysis helps identify most cost-effective level of control (e.g. maximum "bang for buck")
  - it does not tell you whether you can afford the most cost-effective control
- "Knee" = Corresponds to where slope (cost) of curve changes most sharply
  - Knee can vary based on in-stream location
  - Results shown are based on capital costs only
- Knee of each alternative
  - Alt 7B: Knee is at 0 OF/yr (no discernable knee)
  - Alt 11: Knee is at about 6 OF/yr at both locations
  - Alt Hybrid: Knee is at about 4 OF/yr at both locations

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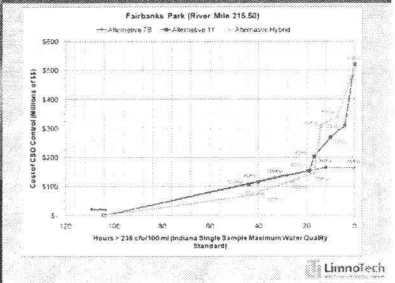
Cost-Benefit Performance at Fairbanks Park



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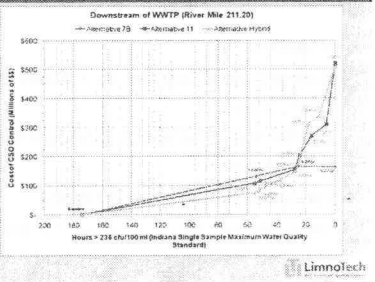
Cost-Benefit Performance Downstream of WWTP (downstream of all CSOs)



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VI. Financial Analysis/Rate Impact – HJ Umbaugh

- Capital and Annual Operation, Maintenance and Replacement Costs Provided to Umbaugh for Rate Impact/Affordability

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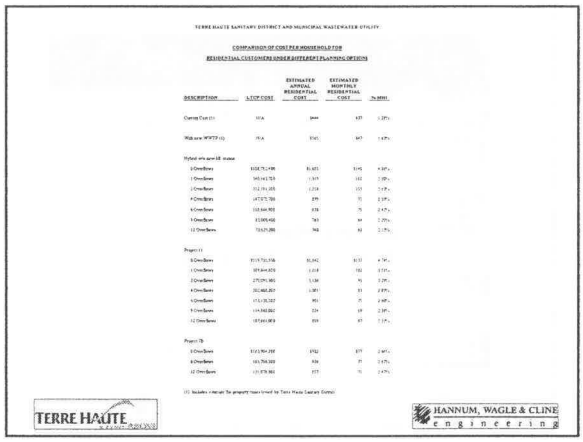

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Factors to Consider

- Hybrid
  - Lowest Capital Cost
  - Lowest Rate Impact
  - Can be Phased over 20 to 25 years (Project/Rate)
  - Highest Operating Cost
  - Could Limit Potential Development for Indiana State
  - Continued Use of Old Main Lift Station (1965)
  - Expansion Capacity for more CSO Control Very Limited

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Factors to Consider

- Alternative 11
  - Can be Phased Over 20 to 25 Years (Project/Rate)
  - Can Be Reasonably Expanded to Gain More CSO Control
  - Allows ISU Development by Consolidating 009/010
  - Provides New Main Lift Station (Designed to Allow for Future Tunnel Connection)
  - Lower Operational Costs Than Hybrid
  - Lower Capital Costs than 7B at Most Overflow Levels

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Factors to Consider

- Alternative 7B
  - Lowest Capital Cost for Best Water Quality Benefit Over Long Term
  - Shorter Implementation Schedule for Project and Rate Increases
  - Cannot be Phased over 20 Years
  - Unlike Hybrid and Alternative 11, Implementation of Green Technologies is not Cost Effective

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VII. Public Involvement Awareness

- A public meeting will be held to present the final Long Term Control Plan.
- The City's Clean Water website will outline the final Long Term Control Plan.
  - www.terrehautecleanwater.com

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VIII. Schedule and Upcoming Activities

- The Terre Haute Sanitary District will select a preferred alternative for the Long Term Control Plan.
- The preferred alternative will be presented to IDEM and EPA at a meeting in early December.
- The Final Draft of the Long Term Control Plan will be submitted to IDEM/EPA by February 1, 2011.

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City of Terre Haute
Long Term Control Plan (LTCP)
Program Management
Preferred Alternative Presentation
Public Meeting

January 24, 2011

CSO Long Term Control Plan

Welcome
and
Introductions

Project Technical Team

- City Staff – Engineering, Wastewater and THSD
- HWC – Program Manager
- LimnoTech – River Water Quality Modeling
- HJ Umbaugh – Financial Consultant
- Barnes and Thornburg – Legal Counsel
- Citizens Advisory Committee (CAC)

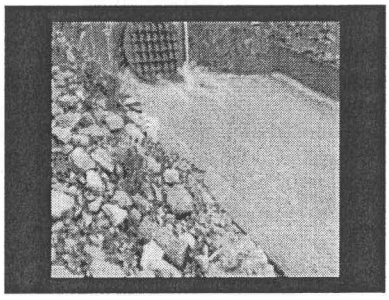
What is a CSO?

- A CSO is a Combined Sewer Overflow
  - A Combined Sewer System is a sewer system that is designed to collect sanitary and storm flows in the same pipes
  - House sewers, street inlets and downspouts deposit flow into the combined system

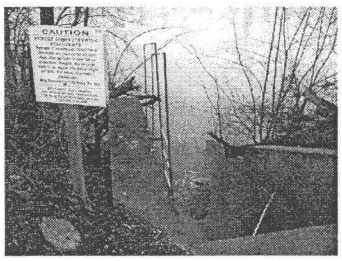
What is a CSO?

- A CSO is a Combined Sewer Overflow
  - Most of the time, all of the flow, sanitary and storm, goes to the wastewater treatment plant
  - When the collection system and wastewater treatment plant cannot process the flow during a rain event, the excess flow outlets to the Wabash River

Overflow in Action

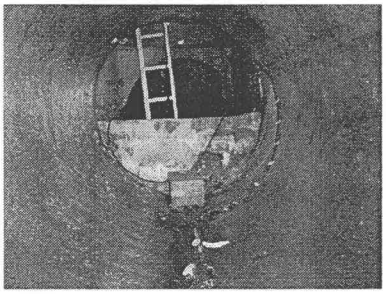


Existing CSO Outfalls

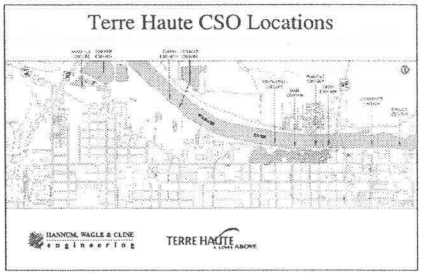


Existing Outfalls

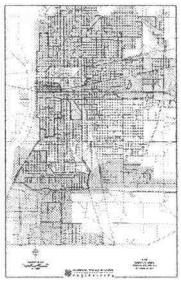
Diversion Structure



Existing Outfalls



Existing CSO System Service Areas



History of the Terre Haute Long Term Control Plan

- Original Long Term Control Plan (LTCP)
  - The LTCP was required in the City's NPDES permit
  - The LTCP was submitted to the Indiana Department of Environmental Management (IDEM) in April 2002
  - Proposed Project Cost: Approximately $45 Million
  - Total CSO Volume Captured was estimated at 83%
    - (Note: Existing capture of CSO Volume is approximately 65%)

History of the Terre Haute Long Term Control Plan

- The Original LTCP projects included:
  - CSO Interceptor on 1st Street
  - Inline Storage using Inflatable Dams
  - Wastewater Treatment Facility Upgrades
  - Floatable Controls at all remaining outfalls

History of the Long Term Control Plan

- "Early Action Items"
  - Some projects were started before approval of the LTCP
  - Large Diameter Sewer Rehabilitation
    - Approximately 21,000 linear feet of existing sewer was rehabilitated using wire mesh and Shotcrete
      - Hulman Street
      - Walnut Street
      - Spruce/Chestnut
  - 4th Street Sewer Replacement

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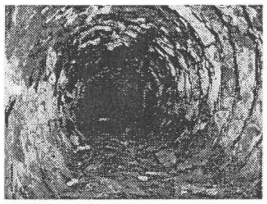
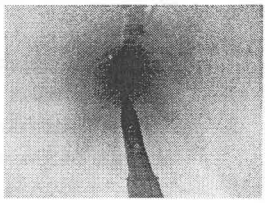
History of the Long Term Control Plan

- "Early Action Items"
  - Large Diameter Sewer Rehabilitation

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Long Term Control Plan

- Why Are We Doing This Again?
  - 2002 LTCP was never reviewed by IDEM or EPA
- New Alternative Screening – IDEM and EPA
  - The City had updated information
    - Outfall flow meters, collection system monitoring
  - An expanded list of alternatives was to be evaluated
  - Evaluate control alternatives based on a "typical year" of rainfall
  - Alternative selection and approval are based on affordability and other factors

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Use Attainability Analysis

- The UAA addresses attainability of bacterial water quality standards in wet weather
- The UAA is being done in conjunction with the affordability analysis, as part of the LTCP
- If CSO's will not be completely eliminated, then the UAA would revise the water quality standards to reflect the final LTCP level of control, so that when the City reaches that level, it will be in compliance with all legal requirements
- The process includes some additional steps including public participation

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Long Term Control Plan

- State Judicial Agreement (SJA)
  - The City signed a State Judicial Agreement in 2008 to complete a Long Term Control Plan
  - The schedule stated that the City would submit the LTCP by January 31, 2011. (Extended by IDEM from original SJA)

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Alternative Evaluation

- Goals:
  - Evaluate a range of alternatives from "No Action" to complete closure of all outfalls
  - Find system-wide solutions to the CSO problem
  - Narrow down the overall system-wide alternatives
  - Evaluate (in detail) 3 final alternatives
  - Determine costs and impact on river water quality (in terms of E. coli)

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Alternative Evaluation

- What kind of solutions were considered?
  - Storage (Ponds, Tanks, Inline)
  - Tunnels
  - Additional Interceptors (Outfall Consolidation)
  - Satellite Treatment
  - Complete Separation of the combined system
  - Increased Treatment Plant Capacity
  - "Green" Infrastructure Technology

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Alternatives Evaluation

- Three alternatives to be evaluated
  - Alternative 7B – Tunnel to new main lift station with IP.
  - Alternative 11 – Relief sewer from Ohio Street to IP storage, consolidation/storage of north CSO's, new main lift station.
  - Hybrid Alternative – Relief Sewer from Ohio Street to IP storage

*All 3 Alternatives Assume Use of IP Storage

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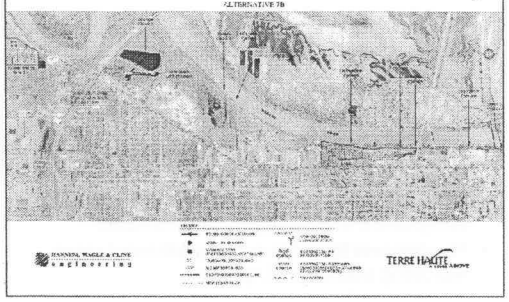
Terre Haute CSO LTCP - Tunnel to Main Lift Station w/ International Paper



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Costs and Water Quality Alternative 7B

# of Overflows	Total Project Cost	Hours of Exceedance of Water Quality Standards *
Baseline	No Cost	174
12	$131,078,800.00	54
9	$145,173,400.00	49
6	$165,708,300.00	24
0	$163,904,200.00	0

* Downstream of the Wastewater Treatment Plant

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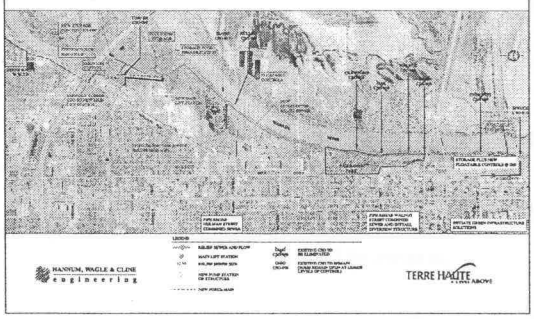
Terre Haute CSO LTCP - Alternative 11



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Costs and Water Quality Alternative 11

# of Overflows	Total Project Cost	Hours of Exceedance of Water Quality Standards*
Baseline	No Cost	174
12	$103,303,100.00	55
9	$117,777,500.00	51
7	$119,096,600.00	45
6	$139,301,200.00	31
4	$197,664,600.00	24
2	$265,151,800.00	16
1	$304,901,000.00	6
0	$541,792,000.00	0

* Downstream of the Wastewater Treatment Plant

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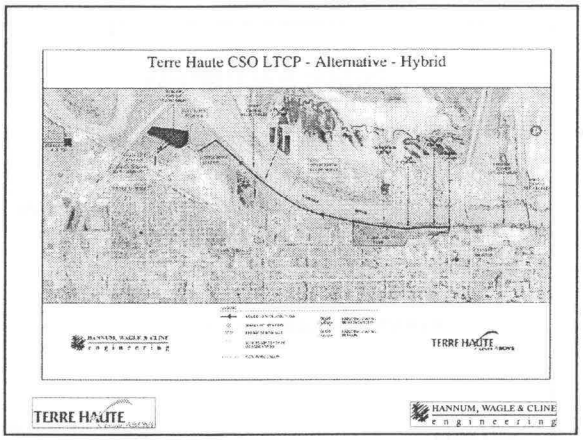

Costs and Water Quality Alternative Hybrid

# of Overflows	Total Project Cost	Hours of Exceedance of Water Quality Standards*
Baseline	No Cost	174
12	$73,629,200.00	55
9	$83,000,400.00	52
6	$118,644,900.00	38
4	$147,078,700.00	27
2	$312,391,200.00	18
1	$340,163,700.00	11
0	$508,782,400.00	0

* Downstream of the Wastewater Treatment Plant

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Preferred Alternative

- Alternative 11-7
  - Approximately 96% of CSO Volume Captured
- Benefits:
  - Can be Phased Over 25 Years (Project/Rate)
  - Can Be Reasonably Expanded to Gain More CSO Control (i.e. utilizing green technologies)
  - Allows ISU Development by Consolidating 009/010
  - Provides New Main Lift Station (Designed to Allow for Future Tunnel Connection)
  - Lower Operational Costs Than Hybrid
  - Lower Capital Costs than 7B at Most Overflow Levels

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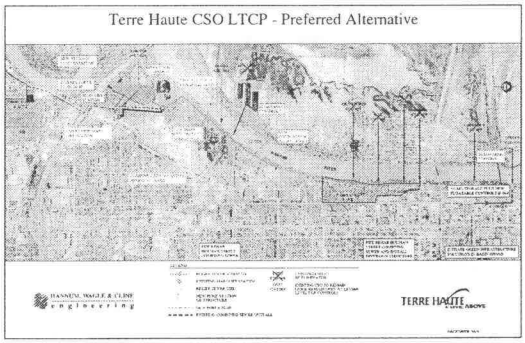

How Will This Change My Sewer Rates?

Phase	Estimated Annual Rate*	Estimated Monthly Rate*
Current Rate	$444	$37
After WWTF Upgrades	$565	$47
After Final CSO Project Complete	$833	$69

* Includes the property tax component

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When will this happen?

- Long Term Control Plan Submission 1/31/2011
- Phasing Plan (25 years):

Phase	Proposed Construction Start Date
1	2014
2	2019
3	2024
4	2028
5	2033

- Project Complete 2036

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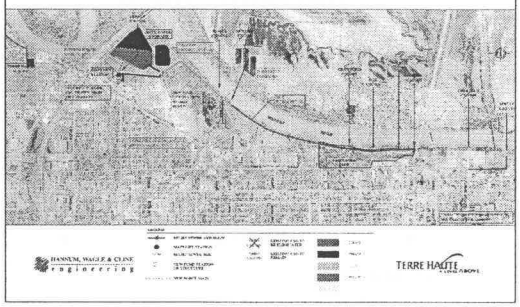
Terre Haute CSO LTCP - Alternative 11



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Public Awareness

- A key element of the LTCP continues to be public input and awareness
  - The Citizens Action Committee has met to provide input for the new alternatives and priority areas
  - A website has been established to provide information about the Terre Haute CSO process
    - www.terrehautecleanwater.com

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Thank you.

Questions?

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Terre Haute CSOLTCP Implementation Schedule
(25 Years)

Item	Milestone Date
Complete & Submit CSOLTCP	04/2011
WWTF Improvements – Complete Phase I Construction	04/2012
WWTF Improvements – Complete Phase II Design	04/2012
Finalize Financing, Procure Bids	
CSOLTCP – Complete Phase I P.E.R.	04/2012
Initiate Design of Phase I	
CSOLTCP – Complete Phase I Design	06/2014
Finalize Financing, Procure Bids	
WWTF Improvements – Complete Phase III Design	06/2014
Finalize Financing, Procure Bids	
WWTF Improvements – Complete Construction of Phase II	03/2015
WWTF Improvements – Complete Construction of Phase III	03/2016
CSOLTCP – Complete Construction of Phase I	03/2016
CSOLTCP – Initiate Monitoring of Phase I and P.E.R. of Phase II	04/2016
Review and Re-evaluate CSOLTCP	12/2016
CSOLTCP – Complete Phase I Monitoring and Phase II P.E.R.	04/2017
Initiate Phase II Design	
CSOLTCP – Complete Phase II Design	03/2019
Finalize Financing, Procure Bids	
CSOLTCP – Complete Construction of Phase II	10/2020
CSOLTCP – Initiate Monitoring of Phase II and P.E.R. of Phase III	11/2020
CSOLTCP – Complete Phase II Monitoring and Phase III P.E.R.	12/2021
Initiate Phase III Design	
Review and Re-evaluate CSOLTCP	12/2021
CSOLTCP – Complete Phase III Design	07/2024
Finalize Financing, Procure Bids	
CSOLTCP – Complete Phase III Construction	07/2025
CSOLTCP – Initiate Monitoring of Phase III and P.E.R. of Phase IV	08/2025
CSOLTCP – Complete Phase III Monitoring and Phase IV P.E.R.	08/2026
Initiate Design of Phase IV	
Review and Re-evaluate CSOLTCP	12/2026
CSOLTCP – Complete Phase IV Design	07/2028
Finalize Financing, Procure Bids	
CSOLTCP – Complete Phase IV Construction	04/2030
CSOLTCP – Initiate Monitoring of Phase IV and Phase V P.E.R.	05/2030
CSOLTCP – Complete Phase IV Monitoring and Phase V P.E.R.	05/2031
Initiate Design of Phase V	
Review and Re-evaluate CSOLTCP	12/2031
CSOLTCP – Complete Phase V Design	04/2033
Finalize Financing, Procure Bids	
CSOLTCP – Complete Phase V Construction	11/2034
CSOLTCP – Initiate Monitoring of Phase V	12/2034
CSOLTCP – Complete Monitoring of Phase V	12/2035
Review and Re-evaluate CSOLTCP	12/2036

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