



## Memorandum

June 8, 2007

TO: Greg Hazel, Peter Pasarelli

CC: 07R008 File

FR: Tom Overmyer, Mary Cave

RE: Murray Road/Indian Hills Drainage Study

### Purpose

Indian Hills Subdivision, located in the Village of Rantoul, has been experiencing high water levels in their two detention ponds during high-frequency rain events. In addition, the Village of Rantoul has been experiencing intermittent flooding on Murray Road and in adjacent agricultural lands, lying north of US 136/Champaign Avenue and approximately 0.25 miles east of the I-57 interchange.

This study analyzed several options to alleviate the flooding problems in the Indian Hills Subdivision and Murray Road area with both the current land uses, as well as, future development. The following proposed projects are the result of these analyses and reflect the most desired alternates in terms of both operation and cost.

### Design Considerations (Indian Hills)

- All scenarios were analyzed and designed for the 100-year, 24-hour storm in the East Zone of Illinois.
- Elevation 737' was determined to be the maximum allowable high water elevation of the two ponds during a 100-yr, 24-hr storm.
- The 2-year predeveloped discharge rate of the total study area is approximately 32 cfs.
- Normal pool elevation of the West Pond is approximately 733.7'.
- Normal pool elevation of the East Pond is approximately 733.3'.

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Existing Conditions (Indian Hills)

This presents a "no action" option. The existing drainage area conditions would remain, being the residential area of Indian Hills and agricultural land lying between Murray Road and Indian Hills Subdivision. Flows from the intersection of U.S. Route 136 and Murray Road would continue to flow to the low point on Murray Road.

Physical Conditions

- 68-acre drainage area to the West Pond (48-ac. agricultural, 20-ac. residential)
- 16-acre drainage area to the East Pond (all residential)
- Normal Pool Elevation of West Pond: 733.7'
- Normal Pool Elevation of East Pond: 733.3'
- Current Pond Volumes – Available storage from normal pool elevation to elevation 737': West Pond = 11,344 cy (7.03 ac-ft) and East Pond = 15,500 cy (9.57 ac-ft)
- 1-30" culvert between the two lakes
- 2-10" outlets from the East Pond flow to a 12" field tile just north of the East Pond
- The 12" field tile changes to a 15" field tile at approximately the intersection Cemetery Road and Penfield Road.
- The 15" field tile empties into a drainage ditch lying adjacent to the old wastewater treatment plant.

Results

Storm	W. Pond Elevation	W. Pond Storage	E. Pond Elevation	E. Pond Storage	Indian Hills Outlet Q, cfs
100-yr	738.2'	4.5'	737.8'	4.5'	2.7
50-yr	737.6'	3.9'	737.3'	4.0'	2.6
10-yr	736.4'	2.7'	736.1'	2.8'	2.4
200-yr	738.6'	4.9'	738.5'	5.2'	2.8
500-yr	738.9'	5.2'	739.3'	6.0'	2.9

Note: Storage in W. Pond from Elev. 733.7', Storage in E. Pond from Elev. 733.3'

Exhibit – See Sheet 1 of the Exhibits

This exhibit also shows the targeted maximum water surface elevation of 737'. This maximum water surface elevation would be allowed to occur during a 100-yr, 24 hour storm.

Cost Estimate – See Attached Preliminary Project Cost Estimate

Summary – The lowest elevation of adjacent houses of the West Pond is 738.84'. Taking no action will allow water to encroach into the yards of adjacent houses and possibly approach crawl space entrances.

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**Proposed Project (Indian Hills)**– Currently, runoff from the Murray Road/Route 136 intersection is routed to the low point on Murray Road. There is a field tile system on the west side of Murray Road that carries these flows, as well as, flows from the Murray Road drainage area to the west towards I-57. This option takes the Murray Road/Route 136 flows directly to I-57 instead of to the low point on Murray Road. The runoff from the actual drainage area to the Murray Road low point is then diverted to the Indian Hills ponds via a 12” field tile.

This option also increases the outlet pipe from the east pond of Indian Hills to 30” and adds a second 30” culvert between the west and east pond in Indian Hills. The existing drainage area conditions would remain, being the residential area of Indian Hills and agricultural land lying between Murray Road and Indian Hills Subdivision. Refer to Sheet 2 of the Exhibits.

**Physical Conditions**

- **114-acre drainage area to the West Pond (48-ac. agricultural, 20-ac. residential, 46-ac Murray Rd/Rte 136)**
- 16-acre drainage area to the East Pond (all residential)
- Normal Pool Elevation of West Pond: 733.7’
- Normal Pool Elevation of East Pond: 733.3’
- Current Pond Volumes – Available storage from normal pool elevation to elevation 737’: West Pond =11,344 cy (7.03 ac-ft) and East Pond = 15,500 cy (9.57 ac-ft)
- **2-30” culvert between the two lakes**
- **1-30” outlet from the East Pond to the drainage ditch adjacent to the old wastewater treatment plant.**
- **Approximately 16-acres gathered by U.S. Route 136/Murray Road storm sewer system and routed to I-57 via a 24” storm sewer.**
- **46-acre drainage area at Murray Road diverted to Indian Hill via a 12” field tile (this drainage area is included in the 114-acre drainage area above)**

**Results**

Storm	W. Pond Elevation	W. Pond Storage	E. Pond Elevation	E. Pond Storage	Indian Hills Outlet Q, cfs
100-yr	736.7’	3’	736.8’	3.5’	18.8
50-yr	736.2	2.5’	736.2’	2.9’	18.5
10-yr	735.2	1.5’	735.0’	1.7’	16.9
200-yr	737.7	4’	737.7’	4.4’	19.5
500-yr	738.4	4.7’	738.5’	5.2’	20.2

Note: Storage in W. Pond from Elev. 733.7’, Storage in E. Pond from Elev. 733.3’

**Exhibit** – See Sheet 2 of the Exhibits

**Cost Estimate** – See Attached Preliminary Project Cost Estimate

**Summary** – This option meets the desired parameters and provides adequate protection for adjacent houses.

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# Memorandum

**Proposed Future Project (Indian Hills)**– Proposed future conditions are considered in this option. Indian Hills would remain as residential. 132 acres lying west of Indian Hills would become a mix of commercial and residential uses. This option takes the Murray Road/Route 136 flows directly to I-57 instead of to the low point on Murray Road. The runoff from the actual drainage area to the Murray Road low point is then diverted to the Indian Hills ponds via a 12” field tile and/or future storm sewer system.

This option also increases the outlet pipe from the east pond of Indian Hills to 30”, adds a second 30” culvert between the west and east pond in Indian Hills, and increases the volume of the west pond to account for the additional drainage area. Refer to Sheet 3 of the Exhibits.

### Physical Conditions

- **152-acre drainage area to the West Pond (132-ac. mixed commercial and residential, 20-ac. Indian Hills residential)**
- 16-acre drainage area to the East Pond (all residential)
- Normal Pool Elevation of West Pond: 733.7’
- Normal Pool Elevation of East Pond: 733.3’
- **West Pond Storage Volume from 733.7’ to 737’ increased to 56,094 cy (34.77 ac.-ft.)**
- **2-30” culvert between the two lakes**
- **1-30” outlet from the East Pond to the drainage ditch adjacent to the old wastewater treatment plant.**
- **Approximately 16-acres gathered by U.S. Route 136/Murray Road storm sewer system and routed to I-57 via a 24” storm sewer.**
- **46-acre drainage area at Murray Road diverted to Indian Hill via a 12” field tile (this drainage area is included in the 152-acre drainage area above)**

### Results

Storm	W. Pond Elevation	W. Pond Storage	E. Pond Elevation	E. Pond Storage	Indian Hills Outlet Q, cfs
100-yr	737.1’	3.4’	736.6’	3.3’	24.8
50-yr	736.6’	2.9’	736.1’	2.8’	24.3
10-yr	735.6’	1.9’	734.8’	1.5’	21.4
200-yr	738.0’	4.3’	737.7’	4.4’	25.7
500-yr	738.8’	5.1’	738.8’	5.5’	27.3

Note: Storage in W. Pond from Elev. 733.7’, Storage in E. Pond from Elev. 733.3’

*Exhibit – See Sheet 3 of the Exhibits*

*Cost Estimate – See Attached Preliminary Project Cost Estimate*

**Summary** – This option approximately meets the desired parameters and provides adequate protection for adjacent houses.

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**East Basin Outlet Alternates**

As a separate exercise, Foth Infrastructure & Environment, LLC, was asked to determine what additional pipe sizes would be required if land was developed between the existing Indian Hills ponds and the outlet drainage ditch near the old wastewater treatment plant. After considering the flows from Indian Hills and the potential increases in flows from developed land north of Indian Hills, it is recommended that a drainage ditch be constructed to allow for future development flows.

Three different ditch sections were considered and it was determined that the ditch could be shallower than the current drainage ditch. See Sheet 4 of the Exhibits.

Below is a comparison of project construction costs that are associated with the various outlet alternates that were considered.

<u>Alternate Number</u>	<u>Project Construction Cost</u>	<u>Difference from Alt. 1</u>
1. Replace Existing Field Tile With 12" Storm Sewer	\$232,200	---
2. 30-inch Diameter Outlet Pipe with Ditch (4:1 slopes) beginning at Penfield/Cemetery Intersection	\$479,300	\$247,100
3. 30-inch Diameter Outlet Pipe with Ditch (5:1 slopes) beginning at Penfield/Cemetery Intersection	\$487,000	\$254,800
4. 30-inch Diameter Outlet Pipe	\$551,300	\$319,100
5. 30-inch Diameter Outlet Pipe with Ditch (10:1 slopes) beginning at Penfield/Cemetery Intersection	\$574,500	\$342,300

**Note:** Project Construction Costs include 15% for preliminary and construction engineering. No Land Acquisition or Easement Obtainment included.

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**MURRAY ROAD / INDIAN HILLS DRAINAGE STUDY**  
 PRELIMINARY PROJECT COST ESTIMATE  
 RANTOUL, IL  
 FOTH PROJECT 07R008

DATE: 06-08-2007

#	ITEM DESCRIPTION	UNIT	UNIT PRICE	PROPOSED IMPROVEMENTS		FUTURE IMPROVEMENTS	
				QUANTITY	EXTENSION	QUANTITY	EXTENSION
<b>A</b>	<b>NEW OUTLET FROM EAST BASIN</b>						
A1	STORM SEWERS, 30"	FOOT	\$60.00	4,760	\$285,600	4,760	\$285,600
A2	STORM SEWERS JACKED IN PLACE, 30"	FOOT	\$900.00	100	\$90,000	100	\$90,000
A3	PRC FLARED END SECTIONS, 30"	EACH	\$800.00	2	\$1,600	2	\$1,600
A4	MANHOLES, TY A, 5' DIA	EACH	\$2,800.00	13	\$36,400	13	\$36,400
A5	CLASS D PATCHES, TYPE III, 10"	SQ YD	\$80.00	35	\$2,800	35	\$2,800
A6	TRENCH BACKFILL	CU YD	\$25.00	20	\$500	20	\$500
A7	CONTINGENCY (15%)				\$62,500		\$62,500
A8	CONSTRUCTION COST				\$479,400		\$479,400
A9	PRELIMINARY & CONSTRUCTION ENGINEERING				\$71,900		\$71,900
<b>A</b>	<b>TOTAL</b>				<b>\$551,300</b>		<b>\$551,300</b>
<b>B</b>	<b>NEW CULVERT BETWEEN EAST &amp; WEST BASIN</b>						
B1	STORM SEWERS, 30"	FOOT	\$60.00	90	\$5,400	90	\$5,400
B2	PRC FLARED END SECTIONS, 30"	EACH	\$800.00	2	\$1,600	2	\$1,600
B3	PCC SIDEWALK, 6"	SQ FT	\$10.00	25	\$250	25	\$250
B4	CLASS B PATCHES, TYPE III, 8"	SQ YD	\$125.00	20	\$2,500	20	\$2,500
B5	TRENCH BACKFILL	CU YD	\$25.00	30	\$750	30	\$750
B6	CONTINGENCY (15%)				\$1,600		\$1,600
B7	CONSTRUCTION COST				\$12,100		\$12,100
B8	PRELIMINARY & CONSTRUCTION ENGINEERING				\$1,800		\$1,800
<b>B</b>	<b>TOTAL</b>				<b>\$13,900</b>		<b>\$13,900</b>
<b>C</b>	<b>MURRAY ROAD LOW POINT DIVERSION TO INDIAN HILLS</b>						
C1	FIELD TILE, 12"	FOOT	\$27.00	1,400	\$37,800	1,400	\$37,800
C2	END SECTION, 12"	EACH	\$500.00	1	\$500	1	\$500
C3	CLASS D PATCHES, TYPE III, 10"	SQ YD	\$80.00	15	\$1,200	15	\$1,200
C4	TRENCH BACKFILL	CU YD	\$25.00	10	\$250	10	\$250
C5	CONTINGENCY (15%)				\$6,000		\$6,000
C6	CONSTRUCTION COST				\$45,750		\$45,750
C7	PRELIMINARY & CONSTRUCTION ENGINEERING				\$6,900		\$6,900
<b>C</b>	<b>TOTAL</b>				<b>\$52,650</b>		<b>\$52,650</b>
<b>D</b>	<b>MURRAY ROAD / RTE 136 STORM SEWER REROUTED TO I-57 DITCH</b>						
D1	STORM SEWERS, 24"	FOOT	\$40.00	2,625	\$105,000	2,625	\$105,000
D2	PRC FLARED END SECTIONS, 24"	EACH	\$700.00	1	\$700	1	\$700
D3	MANHOLES, TY A, 5' DIA	EACH	\$2,800.00	7	\$19,600	7	\$19,600
D4	CLASS D PATCHES, TYPE III, 10"	SQ YD	\$80.00	30	\$2,400	30	\$2,400
D5	TRENCH BACKFILL	CU YD	\$25.00	50	\$1,250	50	\$1,250
D6	CONTINGENCY (15%)				\$19,300		\$19,300
D7	CONSTRUCTION COST				\$148,250		\$148,250
D8	PRELIMINARY & CONSTRUCTION ENGINEERING				\$22,200		\$22,200
<b>D</b>	<b>TOTAL</b>				<b>\$170,450</b>		<b>\$170,450</b>

# MURRAY ROAD / INDIAN HILLS DRAINAGE STUDY

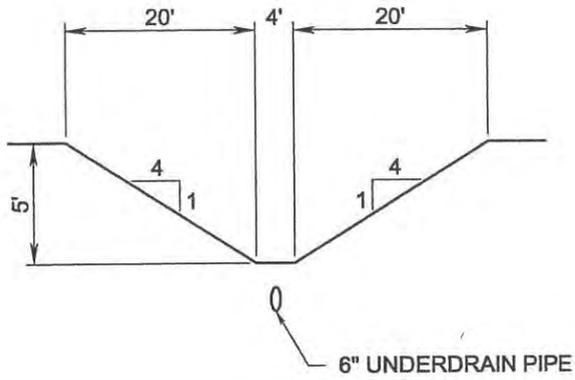
PRELIMINARY PROJECT COST ESTIMATE

RANTOUL, IL

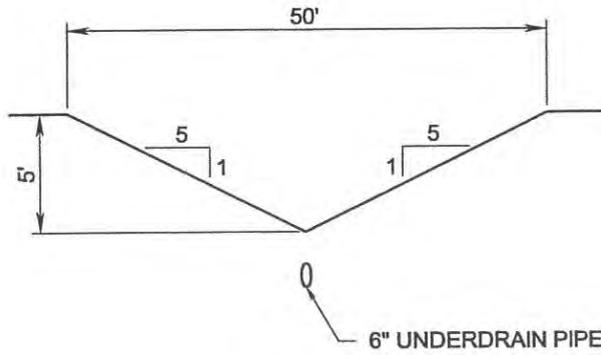
FOTH PROJECT 07R008

DATE: 06-08-2007

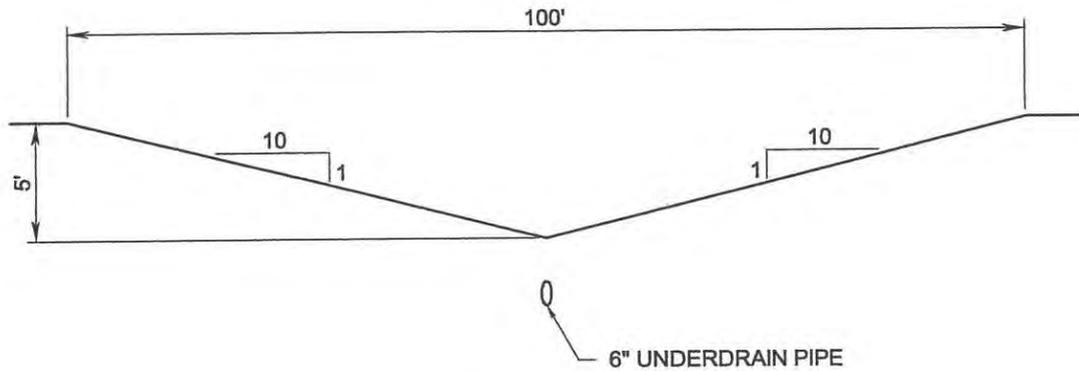
#	ITEM DESCRIPTION	UNIT	UNIT PRICE	PROPOSED IMPROVEMENTS		FUTURE IMPROVEMENTS	
				QUANTITY	EXTENSION	QUANTITY	EXTENSION
<b>E</b>	<b>EXPAND WEST BASIN</b>						
E1	EARTH EXCAVATION (734' & ABOVE) - DRY	CU YD	\$6.00		\$0	73,650	\$441,900
E2	EARTH EXCAVATION (729' TO 734') - 5' DEEP	CU YD	\$6.00		\$0	56,550	\$339,300
E3	EARTH EXCAVATION (724' TO 729') - 10' DEEP	CU YD	\$6.00		\$0	12,450	\$74,700
E4	RIPRAP PROTECTION, A-2	SY	\$20.00		\$0	8,200	\$164,000
E5	SEEDING AND MULCH	ACRE	\$3,500.00		\$0	18	\$63,000
E6	CONTINGENCY (15%)				\$0		\$162,400
E7	CONSTRUCTION COST				\$0		\$1,245,300
E8	PRELIMINARY & CONSTRUCTION ENGINEERING				\$0		\$186,800
E9	LAND ACQUISITION	ACRE	\$5,000.00	0	\$0	13	\$65,000
<b>E</b>	<b>TOTAL</b>				<b>\$0</b>		<b>\$1,497,100</b>
<b>F</b>	<b>TOTAL PROJECT COST ESTIMATE (A+B+C+D+E)</b>				<b>\$788,300</b>		<b>\$2,285,400</b>



ALTERNATE 2



ALTERNATE 3



ALTERNATE 5

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**Foth**  
 Foth Infrastructure & Environment, LLC  
 1610 Broadmoor Drive  
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 Phone: 217-352-4169 Fax: 217-352-0085

Murray Road and  
 Indian Hills  
 Drainage Study

Date of Preparation:  
 May 23, 2007  
 Designed By \_\_\_\_\_ Drawn By \_\_\_\_\_  
 Checked By \_\_\_\_\_ Approved By \_\_\_\_\_

Sheet Title  
**Proposed East Basin  
 Open Drainage**

Project No.  
 07R008  
 Sheet No.  
**4**  
 of 4 Sheets



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**MURRAY ROAD AND INDIAN HILLS  
 DRAINAGE STUDY**

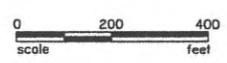
VILLAGE OF RANTOUL, ILLINOIS  
 CHAMPAIGN COUNTY

REVISIONS		NO.	BY	DATE	DESCRIPTION

RECORD DRAWING OF COMPLETED CONSTRUCTION BY  
 RECORD DRAWINGS OF COMPLETED CONSTRUCTION  
 CONFORMING TO CONTRACTOR AND/OR OWNERS RECORDS.  
 BY \_\_\_\_\_ DATE \_\_\_\_\_

	BY	DATE
SURVEYED		
DRAWN		
DESIGNED	MEC	
CHECKED	TLO	

**EXISTING  
 CONDITIONS**











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**MURRAY ROAD AND INDIAN HILLS  
 DRAINAGE STUDY**

CHAMPAIGN COUNTY  
 VILLAGE OF RANTOUL, ILLINOIS

NO.	BY	DATE	DESCRIPTION

RECORD DRAWING OF COMPLETED CONSTRUCTION BY \_\_\_\_\_  
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 BY \_\_\_\_\_ DATE \_\_\_\_\_

	BY	DATE
SURVEYED		
DRAWN		
DESIGNED	MEC	
CHECKED	TLO	

**FUTURE PROJECT**  
**PROPOSED FUTURE  
 CONDITIONS**  
**MURRAY-RT 136  
 FLOWS REROUTED**

