

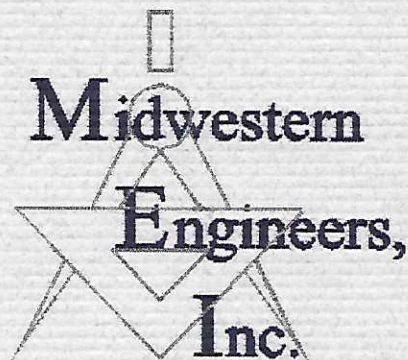
**PRELIMINARY ENGINEERING REPORT
FOR
STORMWATER DRAINAGE IMPROVEMENTS**

FOR THE

**CITY OF LOOGOOTEE
MARTIN COUNTY, INDIANA
MEI PROJECT #98032**

\$17,000

3-13-00



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**PRELIMINARY ENGINEERING REPORT
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FOR THE
CITY OF LOOGOOTEE
MARTIN COUNTY, INDIANA**

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CITY COUNCIL

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Rich D. Taylor, Member

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John Hunt, Member

Betty Summers, Member

CLERK-TREASURER

Bettye Norris

ATTORNEY

Mark Jones

Loogootee, IN

ENGINEER

MIDWESTERN ENGINEERS, INC.
Loogootee, Indiana

FEBRUARY, 2000



Handwritten signature and date: 2/21/00

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Proposed Improvements
Drainage Calculations

**PRELIMINARY ENGINEERING REPORT
FOR
STORMWATER DRAINAGE IMPROVEMENTS
FOR
CITY OF LOOGOOTEE
MARTIN COUNTY, INDIANA**

I. Introduction – Purpose and Scope

The City of Loogootee developed this project from the efforts of concerned local citizens. Over the past several years, many inquiries have been made by several citizens regarding drainage inadequacies throughout the City.

This study has been prepared to present the background data, select watersheds, determine the main drainage ways and to localize drainage problems throughout the City of Loogootee. The report then recommends a drainage improvement program for the surface water and storm water needs of the City based upon cost effectiveness and the ability to implement.

II. Project Planning Area

A. Location

The City of Loogootee is located in Perry Township in the western portion of Martin County located in south central Indiana. The City is bisected east and west by US 50, and north and south US 231.

B. Topography and Hydrology

The geographical area of the City comprises of approximately 982 acres. The terrain of this area is generally rolling with ground elevations ranging from 620 feet above sea level to 490 feet above sea level.

Loogootee is located in the drainage of the White River which is part of the Lower Wabash Valley River Basin. Plasterer's Creek bisects the southwestern portion of the City. The convergence of Plasterer's Creek with the White River is 3.5 miles downstream of the Corporation limits. Plasterer's Creek has a 7 day, 10 year low flow of zero. This creek serves as the main drainage way for Loogootee. Surface water and storm water from approximately 75% of the City flows to this creek by various drainage structures and ditches. The remaining 25% of the storm water flows through a drainage way in the southeastern portion of the City that originates in the Eastgate community.

The total annual precipitation for the City of Loogootee is about 43 inches. Nearly 24 inches, or 55 %, usually falls in April through September. During the summer months of June and July of 1998, an exceeding amount of rainfall occurred. Rainfall intensities of 50 year floods occurred in June and 25 year floods in July. Localized flooding was extensive throughout the area.

C. Population Trends and Projections

The City is typical of most rural communities comprising of farm related businesses and markets for farm products. However, textile industries and other commercial businesses are located in the community. Crane Naval Weapons Support Center located North of the City provides most of the economic income for the community. Additional sources of employment for area residents are industries and businesses in the surrounding communities. The median household income for Loogootee is \$21,032.

The population of Loogootee has remained relatively stable over the past five (5) years. This trend of development is expected to continue. An approximate growth of 2 % has been projected

for Perry Township and Martin County. No projections were made for the City itself. Historical population data and projected populations are presented in the following tables.

Table 2
Historical Population Data

<u>Year</u>	<u>City of Loogootee</u>	<u>Perry Township</u>	<u>Martin County</u>
1960	2,858	5,347	10,608
1970	2,953	5,775	10,969
1980	3,100	5,624	11,001
1990	2,884	5,126	10,369

Source: Census of Population and Housing

Table 3
Projected Populations

<u>Year</u>	<u>Perry Township</u>	<u>Martin County</u>
2000	5,460	10,540
2010	5,520	10,620
2020	5,550	10,700

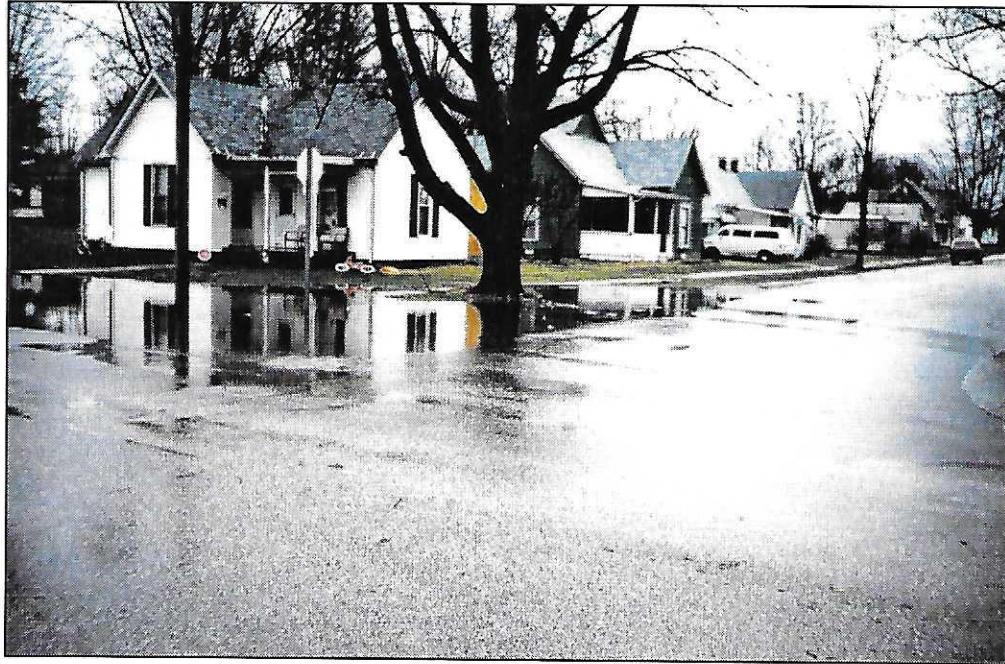
-*Source: Indiana Business Research Center, IU School of Business

III. Documentation of Need

The City of Loogootee experiences severe flooding during times of heavy rains. Resident's yards become flooded. Ponding occurs in the streets. These drainage problems occur are a result of not enough drainage structures or too small of structures. Another major drainage problem is the current condition of existing ditches. Some ditches are full of trash, roots or soil that has eroded into the drainage ways which cause an impedance of flow. Complaints have been filed by the residents about these drainage inadequacies. The pictures on the following pages illustrate the most problematic areas in the City. Another contributing factor to the City's drainage problems is the types of soils in the area. Soils in the area are typical of glaciated regions, characterized by rock, loam and clay soils. Table 4 presents the dominant soil types of the area and their limitations.

Table 4
Soil Types

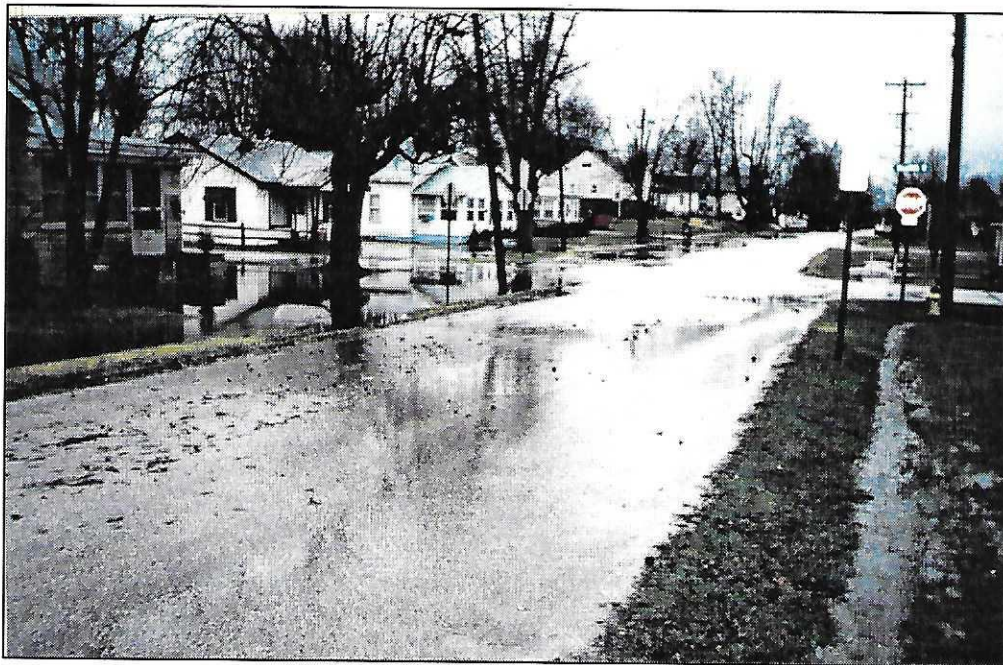
<u>Soil Name and Symbol</u>	<u>Hydrologic Group</u>	<u>Features Affecting Drainage</u>
Bartle (Ba)	D	Perks slowly, frost action
Cincinnati (CnB)	C	Perks slowly, frost action, slope
Haymond (Hd)	B	Deep to water
Hosmer (HoB)	C	Perks slowly, frost action, slope
Johnsburg (JoA)	D	Perks slowly, frost action
Parke (PaC2)	B	Deep to water
Wellston (WeB, WeC2, WeD2)	B	Deep to water
Zanesville (ZaB, ZaC2, & ZaC3)	C	Perks slowly, slope



Looking Northeasterly at the intersection of North Oak Street and North Line Street

See Proposed Improvements - Sheet 2 in Appendix

Area III A



Looking Southerly at a point 100' North of the intersection of Williams Street along North Line Street.

See Proposed Improvements - Sheet 2 in Appendix

Area I



Looking East at a point 50' North of Williams Street along North Line Street.



Looking East at a point 150' North of Williams Street along North Line Street.
(Next to Bruce Smith Residence)

See Proposed Improvements - Sheets 1 and 2 in Appendix - Area I and Ditch I



Looking North at a point approximately 100' East of North Line Street along Williams Street.

(Next to Gary Arvin Residence)

See Proposed Improvements - Sheet 1 and 2 in Appendix

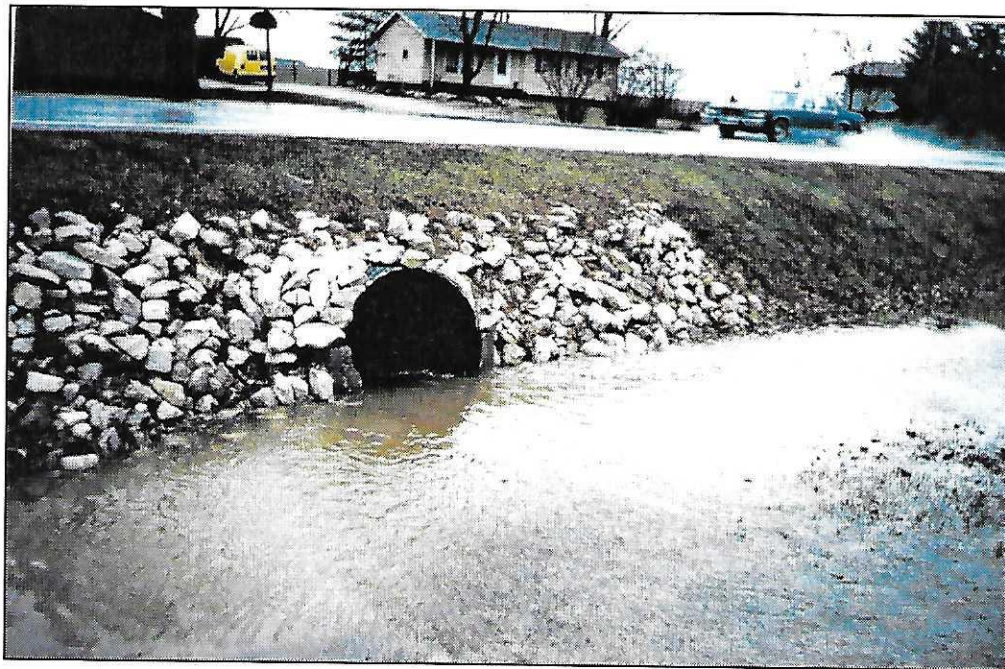
Area I and Ditch I



Looking Northeast while standing approximately 200' North of Williams Street and along U.S. 231

See Overall Maps in Appendix

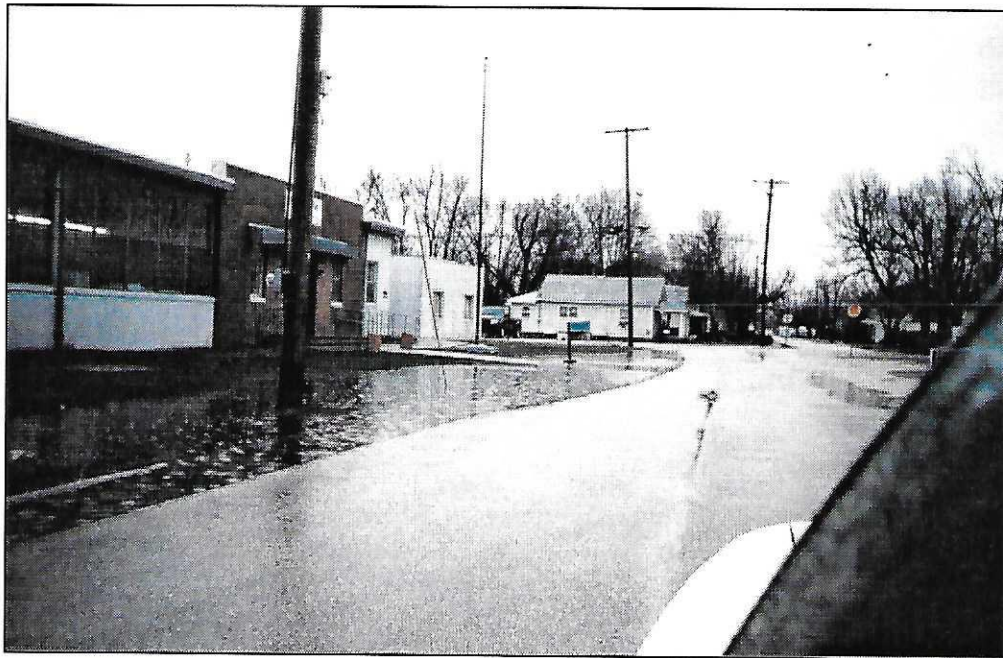
Ditch 5B



Looking Northwest at structure under U.S. 231, approximately 200' North of Williams Street

See Proposed Improvements - Sheet 2 in Appendix

Area VB



Looking West along West Washington Street, East of Park Street.

(North side of Perfect Fit Building)

See Proposed Improvements - Sheet 2 - Area XIII



Looking West along Friends Creek, East of Red Wing Trailer Court.

See Overall Maps in Appendix

Ditch 9



Looking Easterly along West Washington Street at Indiana Street.



Looking West along West Washington Street at Indiana Street (Jackson Street to the left).
See Proposed Improvements - Sheet 2 in Appendix
Area IXX



Looking East along Friends Creek along Lincoln Avenue at a point 400' South of Jackson Street.
See Overall Maps in Appendix
Ditch 9



Looking West along West Washington Street at Indiana Street.
See Proposed Improvements - Sheet 2 in Appendix
Area IXX



Looking East along Norris Street, East of U.S. 231.

See Proposed Improvements - Sheet 2 in Appendix

Area VC



Looking East at the Intersection of Mulberry Street and Oak Street.

See Proposed Improvements - Sheet 2 in Appendix

Area III



Looking South along Dewey Street, approximately 150' North of West Washington Street.

(Perfect Fit, Inc. to the left)

See Proposed Improvements - Sheet 2 in Appendix

Area XIII



Looking Northeast at the intersection of West Main Street and Walker Street.

See Proposed Improvements - Sheet 2 in Appendix

Area XII

IV. Alternatives Considered

A. No Action Alternative

This alternative consists of making no improvements. The current operation of the drainage structures and ditches would continue. The condition of the existing facilities would likely continue to deteriorate.

If no replacement of drainage structures is completed, then water would continue to overflow existing structures upstream into yards and streets. This alternative does not consist of constructing new structures in areas which need relief during times of heavy rain. There currently exists trash and debris in the main drainage ways that cause an impedence of flow. If these drainage ways are not cleaned out and restored back to their original cross sections, then there would continue not to be a clear path for the water to travel. Therefore, the water will overflow the ditches.

This is not considered a viable solution to correcting the City of Loogootee's drainage problems and is not pursued further.

B. Rehabilitating and Replacement of Existing Facilities

This alternative consists of making improvements to the main drainage way that flows through the City. This drainage way starts at Green Acres on the Northeast side of the City and flows southwest towards the White River. A new drainage ditch is proposed to be constructed in the Green Acres Subdivision. This alternative also consists of widening and cleaning out the existing ditches along this main flow route. The existing structures at the intersections of North Line St. and Williams St., Mulberry St. and High St., and also at the intersection of Mulberry St. and North Oak St. will be replaced with larger structures. This will allow more water to flow between the drainage ditches.

This alternative also consists of widening and cleaning out the secondary drainage route that starts in the Eastgate Subdivision. This drainage way collects surface water from the southeastern section of the City and flows Southwest also to the White River. Improvements will also need to be made in isolated areas. This will consist of replacing existing structures with larger structures and adding new structures or ditches. These improvements will cause surface water that currently ponds in the street or yard to drain into one of the main drainage ways.

V. Proposed Project

A. Project Description

This study recommends that the City of Loogootee proceed with the rehabilitation and replacement of existing facilities. This alternative is broken down into three phases. The first phase includes improvements to the main drainage way that flows through the City. It starts in the Green Acres Subdivision and ends South of the City. The second phase consists of the drainage improvements to the most problematic isolated areas in the City. The third phase consists of the remaining rehabilitation of drainage ditches for the secondary drainage way which was previously described in the report. The areas and ditches for each phase are labeled on overall maps located in the Appendix. The following tables present brief descriptions of the improvements for each phase.

Proposed Improvements – Phase I

- Ditch 1 - Construct a 1 foot flat bottom trapezoidal ditch, 18 inches deep with 4:1 side slopes.
- Area I - Replace existing catch basin, with a type E-7 Inlet replace approximately 30 L.F. of sidewalk, install 150 L.F. of 24" x 38" elliptical CMP.
- Ditch 2 - Upgrade existing ditch to a 1 foot flat bottom trapezoidal ditch, 2 feet deep with 4:1 side slopes.
- Area II - Replace existing 18" CMP with 50 L.F. of 29" x 45" elliptical CMP.
- Ditch 3 - Upgrade existing ditch to a 1 foot flat bottom trapezoidal ditch, 2 feet deep with 4:1 side slopes.
- Area III - Replace 2 – 12" RCP with 2 – 24" x 38", approximately 180 L.F. of CMP.
- Ditch 4 - Upgrade existing ditch to a 1 foot flat bottom trapezoidal ditch, 3 feet deep with 4:1 side slopes.
- Area IV - Existing 4' x 3' box culvert is adequate.
- Ditch 5 - Existing 2 foot flat bottom ditch needs to be re-established with 3:1 side slopes and cleaned out.
- Area V - Replace existing bridge and install 80 L.F. of 39" x 110" culvert.
- Ditch 6 - Existing 2 foot flat bottom ditch needs to be re-established with 3:1 side slopes and cleaned out.
- Area VI - Existing 39" x 110" culvert is adequate.
- Ditch 7 - Upgrade existing ditch from the school's south property to the R.R. to a 2 foot flat bottom ditch, 6 feet deep with 3:1 side slopes.
- Area VII- Existing culvert underneath R.R. is adequate.
- Ditch 8 - Re-establish existing 3 foot flat bottom ditch with 3:1 side slopes and clean out.
- Area VIII – Existing culvert is adequate.
- Ditch 9 - Re-establish existing 4 foot flat bottom ditch with 3:1 side slopes and clean out.

Area IX - Existing bridge is adequate.

Ditch 10 - Re-establish existing 4 foot flat bottom ditch with 3:1 side slopes and clean out.

Area X - Existing bridge is adequate.

Ditch 11 - Re-establish existing 4 foot flat bottom ditch with 2:1 side slopes and rip rap sides from U.S. 50 to U.S. 231.

Proposed Improvements – Phase II

Area IIIA - Install 2 new type N-12 & Inlets and 270 L.F. of 18" pipe along North Oak Street.

Area VA - Existing structures are adequate.

Ditch 5A - Upgrade existing ditch to 1 foot flat bottom, 2 feet deep with 4:1 side slopes.

Area VB - Existing structure is adequate.

Ditch 5B - Upgrade existing ditch to a 1 foot flat bottom, 2 feet deep with 4:1 side slopes.

Area VC - Install type N-12 Inlet and 40 L.F. of 12" CMP.

Area XI - Existing structure is adequate.

Ditch 11A - Re-establish existing 4 foot flat bottom ditch, 3 feet deep with 3:1 side slopes and clean out.

Area XIA - Existing structure is adequate.

Ditch 11B - Re-establish 2 foot flat bottom ditch, 3 feet deep with 3:1 side slopes and clean out.

Area XIB - Existing structure is adequate.

Ditch 11C - Re-establish 2 foot flat bottom ditch, 3 feet deep with 3:1 side slopes and clean out.

Area XII - Install 2 new type N-12 Inlets and 50 L.F. of 12" CMP.

Area XIII - Install 4 new type N-12 Inlet and 120 L.F. of 12" CMP and construct 1 foot flat bottom ditch East of Intersection.

Area IXX - Install new E-7 Inlet & new N-12 Inlet, approximately 50 L.F. of 12" CMP, and approximately 250 L.F. of 24" x 38" elliptical CMP.

Proposed Improvements – Phase III

Ditch 12 - Upgrade existing ditch to a 2 foot flat bottom, 3 feet deep with 3:1 side slopes and clean out.

Ditch 13 - Re-establish 2 foot flat bottom ditch, 3 feet deep with 3:1 side slopes and clean out.

Ditch 13A - Upgrade existing ditch to a 1 foot flat bottom, 2 feet deep with 4:1 side slopes.

Ditch 14 - Re-establish 3 foot flat bottom ditch, 3 feet deep with 3:1 side slopes.

Ditch 15 - Clean out ditch.

Ditch 16 - Reestablish 2 foot flat bottom ditch.

B. Cost Estimates

The probable construction and non-construction costs for each phase are presented on the following tables.

**PROBABLE PROJECT COSTS
FOR
DRAINAGE IMPROVEMENTS
FOR THE
CITY OF LOOGOOTEE**

PHASE I

I. PROBABLE CONSTRUCTION COSTS

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT PRICE	TOTAL PRICE
1.	24" X 38" ELLIPTICAL CMP	330 L.F.	\$45.00	\$14,850.00
2.	29" X 45" ELLIPTICAL CMP	50 L.F.	\$50.00	\$2,500.00
3.	TYPE E-7 INLET	1 EA.	\$2,000.00	\$2,000.00
4.	39" x 110" CULVERT	1 L.S.	\$20,000.00	\$20,000.00
5.	BITUMINOUS RESURFACING	250 L.F.	\$15.00	\$3,750.00
6.	GRADE "B" BORROW BACKFILL	300 TON	\$8.00	\$2,400.00
7.	SIDEWALK	30 L.F.	\$30.00	\$900.00
8.	COMMON EXCAVATION	5,000 C.Y.	\$17.00	\$85,000.00
9.	MULCHED SEEDING	8,000 L.F.	\$5.00	\$40,000.00
10.	RIP-RAP	300 TON	\$20.00	\$6,000.00
11.	RIGHT OF WAY CLEARING	1 L.S.	\$60,000.00	\$60,000.00
12.	REMOVAL OF EXISTING BRIDGE ON WALKER STREET	1 L.S.	\$20,000.00	\$20,000.00
13.	REMOVAL OF EXISTING DRAINAGE STRUCTURES	1 L.S.	\$15,000.00	\$15,000.00
SUB-TOTAL CONSTRUCTION COSTS				\$272,400.00
CONTINGENCIES (15%)				\$40,600.00
TOTAL CONSTRUCTION COSTS				\$313,000.00

II. PROBABLE NON-CONSTRUCTION COSTS

1.	ADMINISTRATION, ENVIRONMENTAL & LABOR STANDARDS	\$20,000.00
2.	EASEMENT RECORDING \$2.00/L.F. X 8,000 L.F.	\$16,000.00
3.	EASEMENT PREPARATION \$200.00/EA. X 40 EA.	\$8,000.00
4.	ENGINEERING	\$35,000.00
5.	INSPECTION	\$23,000.00
6.	LEGAL	\$10,000.00
7.	RATE ACCOUNTANT	\$5,000.00
TOTAL NON-CONSTRUCTION COSTS		\$117,000.00

III. TOTAL PROJECT COSTS

\$430,000.00

**PROBABLE PROJECT COSTS
FOR
DRAINAGE IMPROVEMENTS
FOR THE
CITY OF LOOGOOTEE**

PHASE II

I. PROBABLE CONSTRUCTION COSTS

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT PRICE	TOTAL PRICE
1.	18" CMP	270 L.F.	\$30.00	\$8,100.00
2.	12" CMP	630 L.F.	\$25.00	\$15,750.00
3.	24" x 38" CMP	250 L.F.	\$45.00	\$11,250.00
3.	TYPE N-12 INLET	10 EA.	\$2,000.00	\$20,000.00
4.	TYPE G-7 INLET	1 EA.	\$2,000.00	\$2,000.00
5.	BITUMINOUS RESURFACING	800 L.F.	\$15.00	\$12,000.00
6.	GRADE "B" BORROW BACKFILL	500 TON	\$8.00	\$4,000.00
7.	COMMON EXCAVATION	1,000 C.Y.	\$17.00	\$17,000.00
8.	MULCHED SEEDING	2,500 L.F.	\$5.00	\$12,500.00
9.	RIGHT OF WAY CLEARING	1 L.S.	\$13,000.00	\$13,000.00
10.	REMOVAL OF EXISTING DRAINAGE STRUCTURES	1 L.S.	\$15,000.00	\$15,000.00
SUB-TOTAL CONSTRUCTION COSTS				\$130,600.00
CONTINGENCIES (15%)				\$16,400.00
TOTAL CONSTRUCTION COSTS				\$147,000.00

II. PROBABLE NON-CONSTRUCTION COSTS

1.	ADMINISTRATION, ENVIRONMENTAL & LABOR STANDARDS	\$15,000.00
2.	EASEMENT RECORDING \$2.00/L.F. X 2,500 L.F.	\$5,000.00
3.	EASEMENT PREPARATION \$200.00/EA. X 20 EA.	\$4,000.00
4.	ENGINEERING	\$19,000.00
5.	INSPECTION	\$14,000.00
6.	LEGAL	\$10,000.00
7.	RATE ACCOUNTANT	\$5,000.00
TOTAL NON-CONSTRUCTION COSTS		\$72,000.00

III. TOTAL PROJECT COSTS

\$219,000.00

**PROBABLE PROJECT COSTS
FOR
DRAINAGE IMPROVEMENTS
FOR THE
CITY OF LOOGOOTEE**

PHASE III

I. PROBABLE CONSTRUCTION COSTS

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT PRICE	TOTAL PRICE
1.	COMMON EXCAVATION	3,500 C.Y.	\$17.00	\$59,500.00
2.	MULCHED SEEDING	6,000 L.F.	\$5.00	\$30,000.00
3.	RIGHT OF WAY CLEARING	1 L.S.	\$104,000.00	\$104,000.00
SUB-TOTAL CONSTRUCTION COSTS				\$193,500.00
CONTINGENCIES (15%)				\$29,500.00
TOTAL CONSTRUCTION COSTS				\$223,000.00

II. PROBABLE NON-CONSTRUCTION COSTS

1.	ADMINISTRATION, ENVIRONMENTAL & LABOR STANDARDS	\$20,000.00
2.	EASEMENT RECORDING \$2.00/L.F. X 6,000 L.F.	\$12,000.00
3.	EASEMENT PREPARATION \$200.00/EA. X 30 EA.	\$6,000.00
4.	ENGINEERING	\$27,000.00
5.	INSPECTION	\$18,000.00
6.	LEGAL	\$10,000.00
7.	RATE ACCOUNTANT	\$5,000.00
8.	CONTINGENCIES	\$9,000.00
TOTAL NON-CONSTRUCTION COSTS		\$107,000.00

III. TOTAL PROJECT COSTS **\$330,000.00**

IV. TOTAL PROJECT COSTS
PHASE I = II = III **\$979,000.00**

C. Land Requirements

The construction of the drainage structures are proposed to be mainly within the City's road right-of-way. A forty-foot drainage easement will be needed on the ditches previously mentioned in the report. Perpetual Easements will extend twenty feet from the centerline of the ditch on each side where it lies on private property.

D. Design Criteria and Computer Modeling

The drainage structures and ditches were designed to be capable of providing stormwater drainage for a 2-year or 10-year flood event. It is a state requirement that all structures in state right-of-way are able to handle a 25-year flood event. All of the existing structures within the City Limits that lie in state right-of-way were checked for this flood event. These structures were determined to be adequate. The inlets and catch basins that are proposed at City intersections also meet INDOT requirements.

In order to determine the appropriate size of structure and typical cross section for the ditches, a computer model entitled Softdesk Civil Survey was utilized. Each watershed was modeled using the rational method to determine the peak flow discharge. The structures and drainage ways in these watersheds were then modeled to analyze the existing structures. If these structures and drainage ways were determined not to be adequate, then new structures were sized to meet the requirements for the peak discharge. These drainage calculations are presented in the Appendix.

VI. Environmental Impacts

A. Biota

It is not anticipated that this project will negatively affect any state or federal listed endangered species or their habitat. The project will be implemented to minimize impact to non-endangered species and their habitat. Mitigation measures cited in comment letters from the Indiana Department of Natural Resources and the U.S. Fish and Wildlife Service will be implemented.

B. Wetlands

A minimal amount of wetlands will be impacted by the project. However, all mitigation measures to lessen wetlands impacts cited in comment letters from the Indiana Department of Natural Resources and the U.S. Fish and Wildlife Service will be implemented.

C. Soils/Geology

Minimal impacts to the soil are expected to result from the project. Portions of the proposed project may contain bedrock. Blasting may be necessary in some places. The contractor in charge of construction shall obey all rules and regulations for the protection of life and property that may be imposed by any public authorities. The blasting shall be done by experienced personnel and shall be done in conformity with all laws and regulations.

To minimize soil erosion, the contractor may be required to submit an erosion control plan for the project. The contractor must adhere to contract specifications outlining methods of grading, clearing, and seeding. The specifications will state that all disturbed areas used in construction of the collection system will be refurbished and seeded to establish cover and prevent erosion. Disturbed streambanks should be stabilized immediately following construction.

D. Hydrology

The purpose of the proposed project is to improve the hydrology of the project planning area. Therefore, no negative impacts to the hydrology of the area will occur. Portions of the proposed project will lie in the floodplain. No fill material will be placed in these areas that would cause an impedance of the normal flow of stormwater. Therefore, there will be no adverse impacts placed on the floodplains.

E. Groundwater

Excavation will be required to construct the proposed facilities. By using proper construction techniques to minimize soil erosion and runoff, the short term impacts to groundwater are expected to be minimal.

F. Natural National Landmarks

The construction of the proposed project is not likely to impact National Natural Landmarks.

G. Induced Impacts

Over the past few years, many residents of the City of Loogootee have made inquiries on drainage improvements within the City. The purpose of the proposed project is to alleviate the documented problems with the drainage structures and drainage ways in these areas. It is not anticipated that any growth will occur as a result of the proposed project.

H. Air Quality

Construction for the proposed project may have minimal short-term impacts on air quality. Increased noise and fugitive dust emissions may occur. To minimize the effects on air quality, construction activities should be limited to normal working periods and the proper techniques and clean up practices should be implemented. Surface wetting practices can also be utilized to control dust emissions.

I. Open Space and Recreational Opportunities

The proposed project's construction and operation will neither create nor destroy open space and recreational opportunities.

VII. Conclusions and Recommendations

The following conclusions can be reached as a result of this Preliminary Engineering Report:

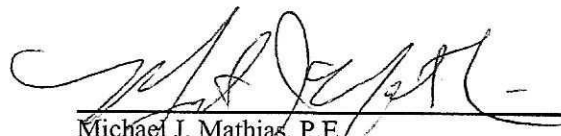
1. In isolated sections of the City, streets and yards become flooded during times of heavy rain due to lack of drainage structures or insufficient sizing of these structures.
2. Existing drainage ditches are filled with debris which cause an impedance of flow or are too small allowing stormwater to overflow the ditches.

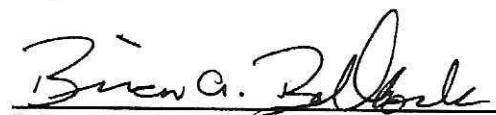
The following recommendations are provided for consideration:

1. The City must review the report and determine if it meets the goals of the City and if it is acceptable to its residents.
2. Upon acceptance of the report, submit it to the applicable funding institutions for review and approval.
3. After financing has been secured, proceed with the design phase of the project; submit all applicable permits to agencies for approval then proceed with the rehabilitation.
4. Develop an Annual Maintenance Program to address stormwater drainage maintenance of existing facilities. An in depth financial study should be completed to address proper funding and allocation of such cost.

Respectfully submitted,

MIDWESTERN ENGINEERS, INC.


Michael J. Mathias, P.E.
Senior Project Engineer


Brian A. Bullock
Assistant Project Engineer

APPENDICES

Overall Maps

Watershed Maps

Proposed Improvements

Drainage Calculations