**SCHOOL OF
CIVIL ENGINEERING**

INDIANA

DEPARTMENT OF HIGHWAYS

JOINT HIGHWAY
RESEARCH PROJECT
JHRP-89/16

ENGINEERING SOILS MAP OF
ADAMS COUNTY, INDIANA
FINAL REPORT

Arvind Chaturvedi

PURDUE UNIVERSITY

Digitized by the Internet Archive
in 2011 with funding from
LYRASIS members and Sloan Foundation; Indiana Department of Transportation

Final Report

ENGINEERING SOILS MAP OF ADAMS COUNTY, INDIANA

TO: H.L. Michael, Director
Joint Highway Research Project

December 13, 1989
Project: C-36-51-B

FROM: Robert D. Miles, Research Engineer
Joint Highway Research Project

File: 1-5-2-85

The attached report entitled "Engineering Soils Map of Adams County, Indiana," completes a portion of the long-term project concerned with the development of county engineering soils maps of the 92 counties in the state of Indiana. This is the 85th report of the series. The report was prepared by Arvind Chaturvedi, Research Assistant, Joint Highway Research Project, under my direction.

The soils mapping of Adams County was done primarily by the analysis of landforms and associated parent materials as portrayed on stereoscopic aerial photographs. Valuable information on soils was obtained from publications of the Soil Conservation Service, USDA. Test data from roadway and bridge projects was obtained from INDOT. Soil profiles for the landform/parent material areas mapped are presented on the engineering soils map. A print of the engineering soils map of Adams County is included at the end of the report.

Respectfully submitted,

Robert D. Miles, P.E.
Research Engineer

cc: A. G. Altschaeffl
D. Andrews
J. L. Chameau
W. F. Chen
W. L. Dolch
A. F. Fendrick
J. D. Fricker

D. W. Halpin
K. R. Hoover
C. W. Letts
C. W. Lovell
D. W. Lucas
R. D. Miles
D. C. Nelson

B. K. Partridge
C. F. Scholer
G. B. Schoener
K. C. Sinha
C. A. Venable
T. D. White
L. E. Wood

FINAL REPORT
ENGINEERING SOILS MAP OF ADAMS COUNTY, INDIANA

by

Arvind Chaturvedi
Research Assistant

Joint Highway Research Project

Project No.: C-36-51-B

File No.: 1-5-2-85

Prepared as Part of an Investigation

Conducted by

Joint Highway Research Project
Engineering Experiment Station
Purdue University

in cooperation with

Indiana Department of Transportation
Indianapolis, Indiana

School of Civil Engineering
Purdue University
West Lafayette, Indiana

December 13, 1989

ACKNOWLEDGEMENTS

The author would like to thank Professor R. D. Miles for providing the opportunity to work on this project and his guidance throughout its duration.

Thanks are also due Professor H. L. Michael, Director, Joint Highway Research Project, and the other members of the Joint Highway Research Board for their continued support of the county soil mapping project.

The author is grateful to his colleagues, Andrew Garrigus and Barbara Schmidt, for their assistance and helpful discussions.

Drafting of the Engineering Soils Map of Adams County, and other figures included in this report, was skillfully done by Xue Weiqing and Mei Zhang and is gratefully acknowledged. Thanks also go to Cheryl Henson for painstakingly typing the classification test results presented in Appendix A of this report.

Last, but not the least, special thanks to Will McDermott and Marian Sipes for their help in formatting the text and final preparation of this report.

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS	i
LIST OF TABLES	iv
LIST OF FIGURES	v
LIST OF APPENDICES	vi
INTRODUCTION	1
DESCRIPTION OF THE AREA	3
GENERAL	3
CLIMATE	5
DRAINAGE FEATURES	7
WATER SUPPLY	10
PHYSIOGRAPHY	13
TOPOGRAPHY	13
GEOLOGY OF ADAMS COUNTY	16
BEDROCK GEOLOGY	18
PLEISTOCENE GEOLOGY	25
LANDFORM-PARENT MATERIAL REGIONS	32
GLACIAL DRIFT	32
Ridge Moraine	33
Ground Moraine	34
Engineering Considerations in Glacial Drift	35
LACUSTRINE DRIFT	37
Lacustrine Plain	37
Engineering Considerations in Lacustrine Drift	38
FLUVIAL DRIFT	38
Flood Plain	39
River Terrace	39
Engineering Considerations in Fluvial Drift	39

	Page
CUMULOSE DRIFT	.41
Muck Basin	.41
Engineering Considerations in Cumulose Drift	.41
MINED LAND	.42
Gravel Pits	.42
SUMMARY OF ENGINEERING CONSIDERATIONS IN ADAMS COUNTY . .	.43
REFERENCES	.45
APPENDICES	.49

LIST OF TABLES

	Page
1. Population Summary of Adams County	5
2. Climatological Summary of Adams County	6
3. Thirty Year Normal Climate Data	6
4. 1988 Water Use Summary for Adams County	12
5. Summary of Engineering Considerations for Landform-Parent Material Regions in Adams County	44

LIST OF FIGURES

	Page
1. Location Map of Adams County	4
2. Drainage Map of Adams County	8
3. Major Watersheds of Indiana	9
4. Groundwater Sections of Indiana	11
5. Physiographic Units and Glacial Boundaries in Indiana	14
6. Topographic Map of Adams County	15
7. Bedrock Geology of Indiana	17
8. Bedrock Geology of Adams County	19
9. Bedrock Topography of Adams County	23
10. Unconsolidated Deposits of Adams County	27
11. Thickness of Unconsolidated Deposits in Adams County	29
12. Schematic Section Showing Relationships of Unconsolidated Deposits	30

LIST OF APPENDICES

	Page
A. Classification Test Results for Selected Engineering Projects in Adams County	49
B. Physical and Chemical Properties of Agricultural Soils in Adams County	75
C. Engineering Index Properties of Agricultural Soils in Adams County	78
D. Statistical Stream Flow Data for Selected Streams in Adams County	82
D-1. St. Mary's River at Decatur	83
D-2. Wabash River at Linn Grove	88

ENGINEERING SOILS MAP
OF
ADAMS COUNTY, INDIANA

INTRODUCTION

The engineering soils map of Adams County, Indiana which accompanies this report was prepared by airphoto interpretation techniques using accepted principles of observation and inference. The 7-inch x 9-inch aerial photographs used in this study, having an approximate scale of 1:20,000, were taken in the summer of 1940 for the United States Department of Agriculture and were purchased from that agency. The attached engineering soils map was prepared at a scale ratio of 1:63,360 (1 inch = 1 mile).

Standard symbols developed by the staff of the Airphoto Interpretation Laboratory, School of Civil Engineering, Purdue University, were employed to delineate landform-parent material associations and soil textures. The text of this report represents an effort to overcome the limitations imposed by adherence to a standard symbolism and map presentation.

Extensive use was made of the Agricultural Soil Survey of Adams County published in 1986 (1). It was particularly useful as a cross-reference to check soil boundaries and in locating gravel pits, ponds, etc. not present on the 1940 aerial photographs. Also, a reconnaissance field trip was made to the county in the earlier stages of the work.

The map and report are part of a continuing effort to complete a comprehensive soil survey for the state of Indiana. Therefore, a consistent mapping of soil units at the boundary of the previously mapped Allen County was attempted; the other two adjacent counties, Jay and Wells, are as yet unmapped at the time of writing this report.

Included on the map is a set of subsurface profiles which illustrate the approximate variations that are expected in the general soil profiles of the major soils of each landform-parent material area. The profiles were constructed from information obtained from agricultural literature and from boring data collected from roadway and bridge site investigations (26 - 42) *. Boring locations are shown on the map. Appendix A contains a summary of classification test results for these locations.

The text of this report supplements the engineering soils map and includes a general description of the study area, descriptions of the different landform-parent material regions, and a discussion of the engineering considerations associated with the soils found in Adams County.

The predominant soils associated with each landform-parent material classification are covered in the discussion of the different landforms in the county. The physical, chemical, and engineering index properties of these soils are included in Appendices B and C.

* Numbers in parentheses refer to list of references.

DESCRIPTION OF THE AREA

GENERAL

Adams County is located in northeastern Indiana as illustrated in Figure 1. The county is rectangular in shape and is bordered by Allen County on the north, Wells County on the west, and Jay County on the south. The east boundary is the State line of Ohio along the First Principal Meridian. Decatur, the county seat, is located along the St. Mary's River in the north-central part of the county, approximately 90 miles northeast of Indianapolis.

The county is about 14 miles wide (east-west) and about 24 miles long (north-south), and has a total area of approximately 340 square miles (217,555 acres). Most urban development in the county is centered around Decatur; other important urban areas are Monroe, Berne, and Geneva. Urban development is proceeding at a faster rate around Decatur and Berne than around the other communities (1).

Adams County is served by three railroads. There are 115 miles of federal and state highways and 703 miles of county roads. Most roads are paved, but many of the county roads have a gravel surface.

The population of Adams County was approximately 21,840 in 1910, and had increased to about 29,619 by 1980. The population density is 78 people per square mile, and a total population of 36,000 is anticipated by the year 1995 (1). A population summary of the important cities and towns in the county is given in Table 1.

The residents of Adams County make their living from farming, work at factories in local towns, or commute to work in Fort Wayne. Most of the county is actively farmed with corn, soybeans, and wheat being the principal crops. Vegetable crops are grown to a lesser extent (1).

Table 1. Population Summary of Adams County (2)

City-Town	Population		Population Change (1970-1980)	
	1980 Census	1970 Census	Difference	% Change
Berne	3,300	2,988	312	10.44
Decatur	8,649	8,445	204	2.42
Geneva	1,430	1,100	330	30.00
Monroe	739	622	117	18.81
Urban Areas	14,118	13,155	963	7.32
Rural Areas	15,501	13,716	1,785	13.01
County Total	29,619	26,871	2,748	10.23

CLIMATE

The climate of Adams County is continental, humid, and temperate with hot summers and cold winters. Tables 2 and 3 give data on temperature and precipitation for the area, as recorded at Berne (44, 14).

In winter, the average temperature is 28 degrees F, with the lowest temperature on record being -18 degrees F. The average summer temperature is 72 degrees F, with the highest recorded temperature being 101 degrees F. The total annual precipitation is about 36 inches, of which nearly 60 percent (21 inches) falls between April and September. Average seasonal snowfall is about 29 inches. On the average, 17 days of the year have at least one inch of snow on the ground. The prevailing wind is from the southwest with the highest average windspeed, 12 mph, occurring in the spring (1).

Table 2. Climatological Summary For Adams County (44)

For The Period 1980 - 1988				
	Temperature (F)			Average Precipitation
MONTH	MAX	MIN	AVERAGE	(inches)
January	31.2	17.0	24.1	1.37
February	36.9	20.3	28.6	1.98
March	49.0	29.2	39.1	2.77
April	60.9	39.8	50.4	3.09
May	73.1	51.1	62.1	3.31
June	81.2	59.8	70.5	5.00
July	85.8	65.0	75.4	3.45
August	83.5	62.9	73.2	3.22
September	76.9	55.3	66.1	2.31
October	61.5	43.2	52.4	2.68
November	50.9	34.6	42.8	3.61
December	37.1	23.6	30.4	2.77

Table 3. Thirty Year Normal Climate Data (14)

For The Period 1951 - 1980				
	Temperature (F)			Average Precipitation
MONTH	MAX	MIN	AVERAGE	(inches)
January	33.0	17.4	25.2	2.30
February	36.8	19.8	28.3	2.06
March	47.4	28.9	38.2	3.28
April	61.4	39.7	50.6	3.90
May	72.6	49.6	61.1	3.56
June	82.1	58.8	70.5	4.15
July	85.3	62.8	74.0	3.80
August	83.7	60.7	72.2	3.19
September	77.6	54.0	65.8	3.24
October	65.5	42.9	54.2	2.46
November	49.7	33.0	41.4	2.74
December	37.9	23.1	30.5	2.65
Annual	61.1	40.9	51.0	37.33

DRAINAGE FEATURES

Drainage features of Adams County are shown in Figure 2, "Drainage Map - Adams County, Indiana," prepared by the Joint Highway Research Project, Purdue University, 1954 (3). Adams County lies within two major watersheds of the State of Indiana as illustrated in Figure 3. The southern quarter of the county is located in the Wabash River watershed, while the remainder is in the Maumee River watershed.

The principal stream in Adams County is the St. Mary's River which carries three times as much water as the Wabash River. Both the St. Mary's River and the Wabash River flow in a northwesterly direction across the county. The water of an area of about 16 square miles on the northeastern corner of the county drains northeasterly into Flatrock Creek which is a tributary of the Maumee River (3).

There are no natural lakes in Adams County. However, a few ponds are found scattered throughout the county; these ponds are either the result of the development of borrow pits or farming practice.

In the more level sections of the county, the natural stream courses have been straightened, widened, and deepened. In addition, large artificial ditches have been constructed to improve the drainage condition. These dredged ditches can be readily observed on the aerial photographs. Although the rectilinear effect of the dredged ditches is very pronounced on a local basis, it does not change the overall drainage pattern of this area (3).

The drainage patterns of Adams County may be classified into two groups. In the areas occupied by the ridge moraines, along the north banks of both the St. Mary's and Wabash rivers, subdendritic patterns are recognized (4). Broadly subdendritic patterns may be assigned to the ground moraine areas of the county (3).

DRAINAGE MAP
ADAMS COUNTY
INDIANA

PREPARED FROM
1940 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1954

SCALE OF MILES
0 1 2 3 4 5 6 7 8 9 10

FIGURE 2. DRAINAGE MAP OF ADAMS COUNTY (16)

FIGURE 3. MAJOR WATERSHEDS OF INDIANA (17)

WATER SUPPLY

Adams County is located in the Northern Till Plain Groundwater Section of Indiana (Figure 4). Groundwater is the major source of water in Adams County. Decatur and Berne, the two largest communities in the area, depend on groundwater from wells in glacial drift; other potential sources of water are reservoirs and wells drilled into limestone bedrock (1).

The principal sources of ground water in Adams County are dolomite and dolomitic limestone of Middle Silurian age and deposits of sand and gravel of Pleistocene age. Rocks of Middle Silurian age and adjacent sand and gravel of Pleistocene age that fill the preglacial bedrock channels and depressions form a single aquifer, the chief aquifer in the county (5).

Wells tapping rocks of Middle Silurian age yield small to moderate quantities of water. The maximum yield of a well tapping this bedrock unit has been reported to be about 250 gallons per minute, but water-yielding characteristics of the bedrock may change rapidly in short distances (5). Water levels in observation wells at or near Decatur, in the area of heaviest usage, do not show a marked decline or a declining trend due to pumpage. This factor indicates that even in the area of heavy pumpage, additional water is available from the bedrock. Additional quantities of ground water are available from this source in many places in the county for domestic, farm, municipal, and industrial supplies. Development of groundwater resources of the bedrock should be limited to the upper 100 feet or the upper zone of solutioning in the carbonate bedrock (5).

Wells tapping into the sand and gravel units of the glacial aquifer yield moderate quantities of water, but can probably yield still larger quantities. The maximum yield of a well tapping the sand and gravel has been reported to be about 500 gallons per minute. Data from short-term drillers' tests indicate that the water-yielding characteristics of the sand and gravel part of the aquifer do not change as rapidly and are generally better than those of the bedrock.

FIGURE 4. GROUNDWATER SECTIONS OF INDIANA (17)

The sand and gravel is capable of transmitting large quantities of water to properly constructed wells. The sand and gravel in the preglacial bedrock channels and depressions is potentially the best source for obtaining large amounts of additional groundwater for municipal and industrial supplies (5).

Water from the glacial aquifer generally has a hardness of more than 300 and less than 1,400 ppm and a dissolved-solids content of more than 700 and less than 2,200 ppm. Treatment of the water for removal of hardness and iron is desirable for most purposes (5).

The water use summary for Adams County for 1988, a year of drought throughout the Midwest, is given in Table 4.

Table 4. Water Use Summary for Adams County (15)
(1988 usage in millions of gallons)

MONTH	SOURCE		
	Ground	Surface	Total
January	87.46	67.56	155.01
February	81.70	70.83	152.53
March	87.69	67.04	154.74
April	85.55	57.82	143.37
May	93.14	60.92	154.06
June	118.23	68.60	186.83
July	106.94	46.01	152.94
August	118.96	52.56	171.52
September	102.19	63.74	165.92
October	94.70	56.71	151.41
November	82.53	66.57	149.10
December	89.87	76.19	166.06
Total	1148.95	754.54	1903.49

PHYSIOGRAPHY

Adams County lies wholly within the Tipton Till Plain physiographic province of the State of Indiana as shown in Figure 5. In respect to its physiographic situation in the United States, Adams County is a part of the Till Plains Section of the Central Lowland Province (6).

TOPOGRAPHY

The till plain topography or ground moraine of Adams County is from level to slightly undulating. This plain topography is broken only by the valleys of the St. Mary's and Wabash rivers and their tributaries, and by the Ft. Wayne and Wabash ridge moraines (3). The ridge moraines commonly rise so gradually above the ground moraine that they are not conspicuous. The general topography of Adams County is shown in Figure 6.

The highest point of Adams County reaches about 895 feet above sea level, and is located north of the Wabash River in Section 15, T25N R14E. The lowest point is at an approximate elevation of 760 feet above sea level, and is located in the northwestern part of the county along the boundary with Allen County where the St. Mary's River leaves Adams County (3). The average altitude of the county is about 840 feet, with a maximum local relief of 60 feet in the river valleys (6).

FIGURE 5. PHYSIOGRAPHIC UNITS AND GLACIAL BOUNDARIES IN INDIANA (18)

Scale

0 5 miles

EXPLANATION

Elevation Range in Feet.
Contour Interval = 50 Feet.

750-800 800-850 850-900

FIGURE 6. TOPOGRAPHIC MAP OF ADAMS COUNTY (19)

GEOLOGY OF ADAMS COUNTY

Adams County is located on the northern flank of the Cincinnati Arch, which is one of three major elements making up the regional structure of Northern Indiana, the other two being the Michigan and Illinois Basins.

The Cincinnati Arch is a broad crestal feature that extends from east-central Indiana northwestward to Lake County. The crestal area of the Cincinnati Arch is broad and platformlike. The crestal area exhibits low dips, whereas the dip is 35 feet or more per mile on the flanks of the arch. Northeast and southwest of the Cincinnati Arch are the flanks of two large structural depressions, the Michigan Basin and the Illinois Basin. Dip from the flank of the arch into these basins is approximately 35 feet per mile. These gross structural features have had a profound influence on the outcrop patterns of Silurian formations in the area (7).

The surface and near surface geology of Adams County consists of bedrock of Paleozoic age (Figure 7), and unconsolidated materials of the Quaternary period. The bedrock surface in Adams County is covered by unconsolidated gravel, sand, silt, and clay deposited by continental glaciers during Pleistocene time. The glacial deposits and locally the bedrock, along the flood plains of the St. Mary's and Wabash rivers and their tributaries, are overlain by thin deposits of alluvium of Recent age. The bedrock underlying the glacial drift consists of about 400 feet of dolomite, dolomitic limestone, limestone, and shale of Middle Silurian age. These rocks are underlain by a series of blue calcareous shales and thin-bedded impure limestones about 700 feet thick of Ordovician age, and at greater depths by older rocks of Ordovician and Cambrian ages (5).

FIGURE 7. BEDROCK GEOLOGY OF INDIANA (20)

BEDROCK GEOLOGY

Adams County is underlain by rocks of Ordovician and Silurian ages (Figure 8). Surface outcrops are scarce, and are encountered only at a few places such as along deep stream channels and in stone quarries.

In the eastern part of Indiana, the most common lithologies in the uppermost Ordovician rocks are light- to dark-colored fine- to coarse-grained fossiliferous limestone and dolomitic limestone that are interbedded with calcareous shale and argillaceous dolomite. All the uppermost Ordovician rocks in eastern Indiana generally are assigned to the Richmond Group of the Cincinnati Series (7).

Rocks of Ordovician age are encountered at depths from 400 to 500 feet in Adams County. Many wells have been drilled into these rocks to test the Trenton limestone for oil and gas. The Trenton, in Adams County, is usually overlain by several hundred feet of shale of Ordovician age. These shale beds are overlain by rocks of Silurian age except in the southern part of the county where the deepest parts of the pre-Pleistocene valleys may be cut into the uppermost rocks of Ordovician age (5).

The Ordovician-Silurian boundary is marked by an unconformity, but it commonly is difficult to recognize. Rocks of Early Silurian age have not been identified in Adams County and regional relationships indicate that rocks of Middle Silurian age rest directly on rocks of Ordovician age (7).

In Northern Indiana, lowermost Middle Silurian rocks generally consist of granular carbonate rocks that characteristically lie just below a prominent cherty and glauconitic unit.

The Brassfield Limestone, the lowermost rock unit of Silurian age, has been poorly defined in the subsurface of northern Indiana. It consists of fine-grained dolomitic limestone and dolomite, and medium-grained fossiliferous limestone. Average thickness of the

FIGURE 8. BEDROCK GEOLOGY OF ADAMS COUNTY (21)

EXPLANATION

Silurian	[		Wabash Formation - Limestone, Dolomite, and Argillaceous Dolomite
		Pleasant Mills Formation - Dolomite, Limestone, and Argillaceous Dolomite
		Salamonie Dolomite, Cataract Formation, and Brassfield Limestone
Ordovician	[		Ordovician Rocks - Undifferentiated Shale and Limestone

Brassfield Limestone in northern Indiana is about 12 feet, but in the northeast corner of Indiana the Brassfield equivalent, the Cataract Formation of Michigan, may be as much as 200 feet thick (7).

The Salamonie Dolomite Formation, which overlies the Brassfield Limestone, is a thick deposit of carbonate rocks. Multiple post-Silurian episodes of erosion may have led to its removal from the area of present exposures of Ordovician rocks in east-central and southeastern Indiana (8). Rocks referred to by earlier workers as the Huntington Dolomite and the New Corydon Limestone in east-central Indiana are now considered to be a part of the Salamonie Dolomite Formation (7).

In areas where the Salamonie Formation is exposed at the bedrock surface in Adams and adjacent counties, it usually is a light-colored medium-grained porous dolomite that frequently has been called reef or reef-detrital dolomite.

In much of the northern third of Indiana, the Salamonie Dolomite can be divided into two members that show significant lateral continuity. The lower member is a light-gray and tan, dense to fine-grained, argillaceous dolomite and dolomitic limestone; chert is abundant and is the most characteristic aspect of the lower member. The upper member of the Salamonie Dolomite is light-gray to white granular porous vuggy dolomite which commonly has been referred to as a reef-type dolomite in subsurface studies (7).

Overlying the Salamonie Dolomite Formation is the Pleasant Mills Formation which belongs to the Salina Group of Silurian age, and consists chiefly of dolomite, dolomitic limestone, and argillaceous dolomite. The Pleasant Mills Formation was named for exposures of dolomitic rocks in the Meshberger Brothers Stone Corporation quarry three miles south of the town of Pleasant Mills in Adams County (9). A reference section for this formation also was designated in the nearby Linn Grove Quarry. The Pleasant Mills Formation is subdivided

into three members, viz. the Limberlost Dolomite, the Waldron, and the Louisville members (9).

The lowermost member of the Pleasant Mills Formation, which was earlier referred to as the Limberlost Dolomite Formation (8) but has now been re-classified as the Limberlost Dolomite Member of the Pleasant Mills Formation (9), is a brown to tan pure granular dolomite that ranges in thickness from 0 to more than 70 feet (8). The middle member, now known as the Waldron Member but earlier referred to as the Waldron Formation, consists of shales that are typically interbedded with silt and fossiliferous limestone beds. The uppermost member of the Pleasant Mills Formation, known as the Louisville Member, consists of fairly pure dolomites in northern Indiana (9).

The Wabash Formation overlies the Pleasant Hills Formation in northern Indiana, and consists primarily of limestone, dolomite and argillaceous dolomite. The Wabash Formation has been divided into two members, viz. the Mississinewa Shale Member and the Liston Creek Limestone Member. The Mississinewa Shale Member is composed of gray fine-grained argillaceous silty dolomite and dolomitic limestone. The Liston Creek Limestone Member consists of light-gray and tan fine- to medium-grained fossiliferous cherty limestone and dolomitic limestone, with nodular and bedded chert being most characteristic (8, 9).

A nearly flat limestone upland, known as the Bluffton Plain, that slopes gently to the north constitutes the bedrock surface in east-central Indiana. The plain was formed upon the thick sequence of Silurian limestones and dolomites of northern Indiana, and its slope corresponds closely to the regional dip on the northeast side of the Cincinnati Arch (10).

The general bedrock topography of Adams County is illustrated in Figure 9. Bedrock exhibits the highest elevation, greater than 800 feet above mean sea level, in the southern portion of the county and the lowest, less than 500 feet, also in the southern part of the county.

FIGURE 9. BEDROCK TOPOGRAPHY OF ADAMS COUNTY (22)

A preglacial, southward-flowing stream system was deeply entrenched over the relatively flat surface of the Bluffton Plain. The pattern of preglacial streams was controlled to a large extent by the jointing in the rocks of Middle Silurian age. The deep valleys, especially in the southern part of Adams County, were eroded 400 feet or more below the present upland surface and may cut the uppermost rocks of Ordovician age. The bedrock channels of this system were later modified by glaciation during Pleistocene time (5).

Karst phenomena were moderately well developed upon the limestone plain before its burial. Discoveries of caverns have been reported by water well drillers in Adams and adjacent counties near the Teays Valley and some of its deeply incised tributaries (10).

Solution openings in the rocks of Middle Silurian age are reported in wells drilled in every township of Adams County except Blue Creek and Union. The heaviest concentration of these solution openings is in the southern half of the county, particularly in the southwestern part (5). One of these sinkholes underlies the town of Preble in the northwestern part of Adams County; another sinkhole is located west of Berne, and two smaller ones are located near Linn Grove in the southwestern part of the county (5). Some of these solution openings yield large quantities of groundwater (10).

The major part of the erosion that shaped the bedrock surface in Indiana occurred before the Illinoian glaciation. At the beginning of the Pleistocene, five major river systems were well developed in Indiana; of these, the largest was the Teays and its tributaries which extended across central Indiana (10).

The Teays Valley enters Indiana in Adams County and trends generally westward across the state. Across the Bluffton Plain, the Teays is a nearly vertical walled valley about two miles wide. Such a valley form probably developed because the massive dolomites and limestones in the walls of the valley were more resistant to erosion than were the shales, which underlie

glacial deposits at the bottom of the valley (10). Maps showing the bedrock topography of the Teays Valley in north-central Indiana have been published (11), but have not been included in this report.

PLEISTOCENE GEOLOGY

The youngest rocks in Adams County are the unconsolidated glacial deposits of Pleistocene age and alluvium of Recent age. The glacial deposits were formed by the ice sheets which moved over northern Indiana from Canada. These glaciers deposited large quantities of clay, silt, sand, and gravel over the bedrock surface of Adams County. At the present time, only those materials deposited by the youngest glacier of Wisconsinan age are recognized at the surface. The present day topography is mainly a result of glaciation, although it reflects to some extent the geometry of the underlying bedrock surface (5).

The preglacial bedrock uplands are covered by a layer of glacial material, which ranges in thickness from about three feet in the southern part to about 70 feet in the northern part of Adams County. Depressions in the bedrock surface contain fillings of glacial material. Unconsolidated glacial debris, reaching as much as 400 feet in thickness, fills the bedrock valleys formed in preglacial times (5).

The gently undulating plain that forms the central part of Adams County is interrupted by two slightly hummocky morainal ridges. The southernmost ridge parallels the Wabash River on its north side and is known as the Wabash moraine; the northernmost ridge parallels the St. Mary's River on its north side and is called the Fort Wayne moraine. These two ridge moraines consist of upto 130 feet of glacial drift and are probably the prime control factors of the present channels of the Wabash and St. Mary's rivers (5).

The upper part of the glacial drift in Adams County consists chiefly of till - a poorly sorted silty clay containing sand and gravel. Interbedded with the till is some glaciofluvial sand and gravel. Locally, thin sand and gravel was deposited between the till and the top of the bedrock (5).

The deposits of till, and stratified clay, sand, and gravel in the preglacial bedrock valleys and in other depressions indicate more than one stage of glaciation. Several well logs report hardpan and clay separating deposits of sand and gravel; this hardpan and clay may represent buried till. However, the sand and gravel, which were deposited by glacial streams, are found chiefly in valley fill of preglacial bedrock channels and depressions. An exception is a thin, sheetlike deposit in the northeast corner of Adams County, which in part is unrelated to the channels and lies beneath the moraine north of the St. Mary's River (5).

The deposits of Recent age consist chiefly of alluvium of the flood plains of the Wabash and St. Mary's rivers and their tributaries in Adams County (5).

The distribution of unconsolidated deposits of Adams County is shown in Figure 10, and the variable thickness of these unconsolidated deposits is illustrated in Figure 11. A schematic representation of the relationships between unconsolidated deposits in the county is presented in Figure 12.

As shown in Figure 10, the unconsolidated deposits in Adams County consist predominantly of glacial drift belonging to the ground moraine and ridge moraines of Wisconsinan age. Late Wisconsinan and Recent unconsolidated deposits, consisting of varying amounts of gravel, sand, silt, and clay, occur in narrow strips only and their distribution tends to correspond to the present day courses of the St. Mary's and Wabash rivers and their major tributaries. The thickness of the unconsolidated deposits varies throughout the county, but is generally between zero and 100 feet (Figure 11). The unconsolidated deposits attain greater

FIGURE 10. UNCONSOLIDATED DEPOSITS OF ADAMS COUNTY (23)

EXPLANATION

Recent	[		Silt, Sand, and Gravel - Mostly Alluvium, Martinsville Formation
Recent	[		Muck, Peat, and Marl - Paludal and Lacustrine Deposits.
and			Clay, Silt, and Sand - Clay-rich Lacustrine Facies of Atherton Formation
Wisconsinan	[		Gravel, Sand, and Silt - Valley Train Deposits. Outwash Facies of Atherton Formation
	[		Till - Wisconsinan Ground Moraine
Wisconsinan	[		Till - Wisconsinan End Moraine
Ordovician	[		Rocks of Late Ordovician Age - Shale and Limestone

FIGURE 11. THICKNESS OF UNCONSOLIDATED DEPOSITS (24)

EXPLANATION

Quaternary	Qsa	Silt, sand, and gravel
	Qmp	Muck, peat, and marl
	Qgm	Muck, clay, silt, and gravel
	Qcl/Qsl	Clay, silt, and sand
	Qsd/Qsb	Sand
	Qgv/Qgp	Gravel, sand, and silt
	Qgk	Gravel and sand
	Qt/Qte	Till

FIGURE 12. SCHEMATIC SECTION SHOWING RELATIONSHIPS OF UNCONSOLIDATED DEPOSITS (24)

thicknesses, up to 350 feet in some cases, only in a narrow strip in the southern part of the county; this area may correspond to the course of the ancient, deeply entrenched, buried Teays Valley.

LANDFORM-PARENT MATERIAL REGIONS

The engineering soils in Adams County were formed primarily from unconsolidated materials. These materials have been classified according to parent material and landform in the following section. Five parent material units have been mapped in the county. These are: glacial drift, fluvial drift, lacustrine drift, cumuloose drift, and mined land. The parent materials have been further divided into individual landforms for discussion purposes.

Each landform-parent material region is characterized by its overall extent, surface morphology and character, and general soil profile. Soils have been classified in the profile description using both the United States Department of Agriculture (USDA) textural designation, i.e. clay loam, and the American Association of State Highway and Transportation Officials (AASHTO) system, i.e. A-6(10). The agricultural soil series that form in each of the landform units have also been indicated. Boring numbers, which correlate with the classification test results tabulated in Appendix A, are indicated for the individual soil units. The physical, chemical, and engineering index properties of these soils have been presented in Appendices B and C.

The engineering considerations for the landform-parent material regions are briefly addressed. This discussion provides the investigator with a general idea of the behavior of materials and possible problems that may be encountered within a given landform-parent material region. For site specific information, the reader is referred to the information contained in Appendix A, and to the soil investigation reports listed in the references.

GLACIAL DRIFT

Glacial material occurs in two distinct forms in Adams County, viz., ridge moraine and ground moraine. A ridge moraine, as the name implies, usually forms a distinct ridge and

consists of material deposited by a glacier either at its terminus, or along its margins, or in its median part. A ground moraine takes the form of an irregular sheet, varying in thickness from a few tens of feet to several hundred feet, and is formed by the deposition of debris from a melting glacier. The glacial materials found in Adams County were deposited by glaciers of Wisconsinan age.

Ridge Moraine

Two distinct ridge moraines, trending roughly southeast-northwest, occur in Adams County. These are the Fort Wayne ridge moraine in the northern part of the county, and the Wabash ridge moraine in the southern portion of the county. These ridge moraines are roughly parallel to each other and appear to control the course of the two major rivers - the St. Mary's and Wabash rivers - in the county.

On a regional scale, ridge moraines occur in the form of a gently undulating ridge. The regional drainage is usually dendritic; since internal drainage may be poorly developed, artificial drainage systems (e.g. ditches or tiles) are frequently constructed to improve the drainage conditions (12). The gullies are usually broad saucer-shaped C-type, and have very long low gradients. Mottled photo tones are commonly seen on ridge moraines of Wisconsin Age and indicate fine-textured materials (12). The parent material on ridge moraines is heterogeneous glacial drift that consists of unsorted boulders, gravel, sand, silt and clay (12). Although clay and silt may be the predominant materials, layers of stratified sand and silty sand may occur within the unsorted material (12)

The Fort Wayne and Wabash ridge moraines do not form very distinct topographic features in Adams County, but rise very gradually above the ground moraine. Delineation of the boundaries for these two moraines, as shown on the accompanying Engineering Soils Map

of Adams County, has been facilitated by the use of topographic maps for the area. Additionally, the mottled texture of the ridge moraines, as seen on aerial photographs, has been used in order to demarcate their boundaries as accurately as possible.

The texture of glacial drift as formed on ridge moraines in Adams County varies from place to place. The surface soils generally consist of loam (A-4, A-6) and silt (A-4). The subsurface soils are mostly loam (A-4, A-6) with layers of clay (A-4) and silt (A-4). The underlying material is usually till of varying depth to bedrock. Highly organic topsoil, upto a depth of 18 inches, occurs in depressions on ridge moraines and some of these areas are delineated on the map.

The agricultural soils that form on ridge moraines are the Haskins, Morley, Nappanee, Pewamo, Rawson, and St. Clair series.

Boring numbers 1, 2, and 3 are located in ridge moraines.

Ground Moraine

Glacial drift in the form of a ground moraine of Wisconsin Age covers a major part of Adams County. Ground moraines have a very gently undulating topography and are characterized by low swells and shallow swales (12).

Development of surface drainage on Wisconsin Age ground moraines is in the juvenile stage. In areas where silty clay and clay are found, gullies are usually of the C-type; the presence of V-type gullies in other areas indicates the predominance of gravel and sand in the glacial drift (12). Because the terrain is nearly level, rectangular fields and road systems are common. The higher areas on the ground moraine usually consist of silty soils and display light gray to white photo tones. In contrast, the depressions on ground moraines are rich in organic silts and exhibit black to dark gray photo tones. The mixture of these irregularly shaped dark

depressions, light elevated areas, and dark drainage channels between the depressed areas results in a mottled texture which aids in recognizing the ground moraines (12). The parent material of ground moraines, because of lack of sorting by water, is an assorted mixture of gravel, sand, silt and clay with occasional occurrence of boulders. In general, nearly all of the soils occurring on ground moraines in Indiana can be classified as silty clays (12).

The surface soils developed on the ground moraine in Adams County generally consist of silt loam (A-4) and clay loam (A-6). The subsurface soils, at depths greater than 24 inches below the surface, consist of silty loam (A-4) and silty clay loam (A-6(10)). Layers of clay (A-7-6) are often encountered. The underlying layers generally consist of silty clay (A-6) and loam (A-4). Limestone bedrock often occurs at depths as little as 10 feet at a few places under the ground moraine in the county. Highly organic topsoil, upto a depth of 18 inches, occurs in depressions on the ground moraine and several areas are designated on the map.

The agricultural soils that form on the ground moraine are the Blount, Glynwood, Haskins, Morley, Pewamo, Rawson, and St. Clair series.

Boring numbers 4 to 36, and 82 to 113 are located on ground moraine.

Engineering Considerations in Glacial Drift

Glacial drift as developed on the two ridge moraines in Adams County is classified as fine-textured material. Plasticity indices for these materials range from 0 to 9, and the liquid limits generally vary between 21 and 32.

The glacial deposits occurring on the ground moraine in Adams County also consist of fine-textured materials. Plasticity indices for these materials vary from 3 to 24, and the liquid limits generally lie between 21 and 45.

In areas of glacial drift, occurring either as ridge moraines or ground moraine, soils developed on the gentler slopes (1 - 6 %) are characterized by slow surface runoff, wetness, frost action, shrinking and swelling, and low strengths (1). To avoid frost heaving and soft subgrades, drainage ditches and culverts need to be installed during construction to improve the drainage of these areas. In order to increase the load-bearing capacity of the roads, the base material has to be strengthened or replaced. For areas with steeper slopes (12 - 18 %), the road construction should proceed along the contour (1). Because of their high liquid limits, soils developed both on the ridge moraines and the ground moraine may be difficult to compact to required levels.

When erecting large and/or heavy structures on ridge moraines, it is necessary to carry out detailed investigations for foundation design (12).

Areas classified as ground moraines are relatively poor sites for construction of highways. This shortcoming results from the presence of clay-rich soils which have low bearing values, poor surface and internal drainage, close-to-surface water tables, and shortage of aggregate and construction materials (12). Although sites for buildings abound on ground moraines, poor drainage can still lead to significant problems (12).

Pavement pumping is a common feature on highways constructed over ground moraines (12). Pumping usually occurs in rigid pavements, and is indicated by the ejection of water from beneath the slab due to the forces exerted by a passing heavily loaded vehicle (13). The water thus displaced removes soil materials from under the slab, thereby creating voids which may ultimately lead to pavement cracking and collapse as the pumping progresses (13). Although pumping predominates during spring and fall, it may also occur during drier weather (13).

Since pumping is usually noticed in poorly drained areas, its effects can be minimized by using granular materials, e.g. gravel and sand, for subgrade treatment during highway

construction (13). Procedures such as mud-jacking can also be used during maintenance of the pavement to reduce pumping (13).

Soils developed in depressed areas in the glacial drift are characteristically high in organic matter and in clay content, belonging to the Pewamo Series in the USDA classification scheme. These depressed areas have very slow surface runoff, the soils have low strengths, and the areas are subject to frost action and frequent ponding (1). For these areas, roads need to be elevated on raised, well compacted fill, and side ditches and culverts have to be installed during highway or road construction in order to reduce the problems.

LACUSTRINE DRIFT

Lacustrine drift occurs in lacustrine plains scattered throughout the county. Most of these lacustrine plains are small in areal extent and lack beach ridges. The absence of beach ridges thus distinguishes these lacustrine plains from "true" lacustrine plains.

Lacustrine Plain

Although several lacustrine plains are seen to occur in the county, only a few of them are of a significant size to be mentioned in this report.

A large lacustrine plain, encompassing an area of muck deposits, occurs to the east of the town of Berne. Slightly smaller lacustrine plains are also seen in the southwestern and northwestern parts of Adams County.

In general, lacustrine drift usually consists of fine-textured sediments. The materials are predominantly clays and silts, with clays occurring towards the center of the lacustrine plain and silts occurring in the marginal areas (12).

The soils developed on lacustrine plains in Adams County consist mainly of silty clay (A-7) to silty clay loam, and stratified clay to sandy loam (A-6), and are characterized by high organic

matter contents (1). The substratum to a depth of 60 inches is silty clay to silty clay loam that occasionally may have thin strata of sand (1).

The agricultural soils that form in these areas are the Milford and Montgomery series.

No soil boring reports are available for lacustrine plains at the time of writing this report.

Engineering Considerations in Lacustrine Drift

Lacustrine drift as developed on lacustrine plains is classified as fine-textured (1). Plasticity indices for these materials range from 10 to 42, and the liquid limits generally lie between 25 and 65 (1).

These areas are characterized by frequent ponding since the water table is at or above the surface for the most part of the year (1). Because of ponding, frost action, low strength materials, and shrink-swell potential, the areas are severely limited as a site for road construction. Elevation of the road on raised, well compacted fill material, and construction of ditches and culverts is necessary to reduce the problems associated with these areas (1). Pavement failures in these areas may be avoided by increasing the thickness of the pavement, by using a high-level profile and granular base materials, and by improving the drainage to stabilize the subgrade (13).

The presence of clays in lacustrine drift may give rise to problems in foundation design, and the poor drainage in these areas may cause additional problems in construction (12). The presence of thin strata of sand could lead to slump failures in road cuts, since the sand layers would act as planes of weakness conducive to slippage.

FLUVIAL DRIFT

Fluvial drift occurs in two separate landforms in Adams County, viz., along the flood plains of the rivers and their major tributaries, and on terraces along the rivers.

Flood Plain

Fluvial drift in the form of flood plains occurs along the Wabash and St. Mary's rivers and their major tributaries in Adams County.

The surface and subsurface soils developed along these flood plains consist of clay (A-6), loam (A-4), and silty clay loam (A-6(9)). Limestone and dolomite bedrock has often been encountered in these areas at depths as little as five feet below the surface.

The agricultural soils that form in these areas are the Armiesburg, Chagrin, Saranac, Shoals, Sloan, and Tice series.

Boring numbers 37 to 81, and 114 to 118 are located along flood plains.

River Terrace

River terraces occur predominantly along the courses of the Wabash and St. Mary's rivers in Adams County, and to a lesser extent along Loblolly Creek which is a tributary to the Wabash River. A few small terraces are also found in the southwestern part of the county.

The texture of fluvial drift as developed on river terraces is mainly sandy loam to clay loam at the surface. At depths of 65 to 80 inches below the surface, gravelly sandy loam with upto 27 percent gravel is often encountered (1).

The agricultural soils that form on river terraces belong to the Martinsville and Whitaker series.

No soil boring reports for these areas are available at the time of writing this report.

Engineering Considerations in Fluvial Drift

Fluvial drift as formed on flood plains and terraces is classified as fine-textured to coarse-textured material. For materials found on the flood plains, plasticity indices range from

2 to 31, and the liquid limits vary between 15 and 57. The materials on the river terraces have plasticity indices ranging from 2 to 16, and their liquid limits lie between 15 and 40 (1).

Areas classified as flood plains on the accompanying Engineering Soils Map of Adams County are subject to frequent flooding, and are characterized by slow surface runoff, frost action, wetness, moderately slow permeability, and low strength materials (1). To alleviate the problems associated with these characteristics, it is necessary to elevate the road on raised, well compacted fill, and to install culverts and establish ditches to improve drainage (1). Foundation problems arising from saturated soils and non-uniform strength of materials may often be encountered (13). Compaction of saturated soils is often problematic, and the non-uniform strength of soil materials may result in differential settlement of highways and other structures.

Soil materials found on river terraces are also characterized by low strengths and shrink-swell potential, and are subject to the effects of frost action (1). It is necessary to strengthen the base material and to construct ditches and culverts to improve the performance of these materials. Although terraces are ideal for site development because of their flat topography, good drainage, and high elevation (12), only a few of the river terraces mapped in Adams County are large enough to be considered for any major construction activity.

Soils belonging to the Martinsville Series in the USDA classification scheme, and occurring on river terraces, are characterized by the presence of upto 27 percent gravel in the subsurface, and can be used as a source of construction materials in the county (1). However, the more rounded material present in the gravels could create problems when used as an aggregate in concrete because of a lack of interlocking of the rounded material.

CUMULOSE DRIFT

Cumulose drift occurs in the form of muck basins which are seen throughout Adams County.

Muck Basin

Most of the muck basins mapped in Adams County are small in size. However, one large muck basin occurs to the east of the town of Berne and is surrounded by a lacustrine plain. Muck basins typically have a very dark photo tone, and are characterized by flat topography and the absence of natural surface drainage.

In a typical soil profile, the top nine inches is composed of black sapric material which contains about two percent fibers. From about nine inches below the surface to a depth of approximately 30 inches, the black sapric material consists of upto five percent fibers. With increasing depth, the fiber content also increases, reaching upto 25 percent of all material between depths of 30 to 60 inches below the surface. The top 60 inches or more of the muck deposits are thus essentially organic (A-8) in nature, with marl deposits, clay loam, or sandy loam being found at greater depths at some localities (1).

The agricultural soils found in muck basins belong to the Houghton Muck Series, which are typical soils developed from decomposed marsh vegetation.

Engineering Considerations in Cumulose Drift

Cumulose drift as developed in muck basins is classified as highly organic material. These materials exhibit very high fiber content, and are characterized by very slow surface runoff or ponding, with the water table being at or above the surface for the most part of the year (1).

Areas classified as muck basins are unsuitable as sites for roads and streets because of low strength materials, high compressibility, ponding, and frost action. Additionally, the

organic matter comprising these areas may subside during dry periods (1). Differential settlement of the material is also a distinct possibility, and can be minimized by removing the muck and peat material and replacing it with materials of greater and uniform strengths.

Muck deposits are not satisfactory for use as embankment foundations, and are also unsuitable for use as subgrade material. In order to reduce the problems associated with these deposits, it is necessary to secure a stable foundation on the soil material below the muck and to place the structure on the foundation (13).

Because of frequent ponding, these areas may be potential wetlands which are protected under Federal law, a fact that has to be remembered when planning any major construction activities in, or near, these areas.

MINED LAND

A number of gravel pits, and some limestone quarries, are seen in Adams County. The limestone quarries are of limited extent, and are not discussed further.

Gravel Pits

These are open excavations from which gravel and sand have been mined for use as construction materials. Most of the pits are shallow, although some may be as much as 30 feet deep. The areal extent of these pits ranges from 2 to 40 acres. The abandoned pits are usually filled with water (1), and may be considered as wetlands under Federal law.

The gravel pits usually occur along the courses of the major rivers. Generally, the clayey materials overlying the gravel layers have been removed. The majority of the gravel layers are only a few feet thick and overlie the glacial till, or rest directly on the bedrock (1).

The abandoned pits can be used as habitats for wildlife, or for recreation purposes. It is also conceivable to use the dry abandoned pits as sanitary landfills. However, proper

precautions, such as the use of double liners and ground water monitoring systems, should be utilized to prevent and monitor lateral leakage from the landfills. Adequate precautions should also be taken to prevent, or at least minimize, leakage through the bedrock.

The active pits constitute an important source of gravel and sand in Adams County.

SUMMARY OF ENGINEERING CONSIDERATIONS IN ADAMS COUNTY

Table 5 contains a summary of engineering considerations for different landform-parent material regions in Adams County. Each of the landform-parent material regions discussed in the earlier section is represented in the table, along with the probability of certain problems that may be encountered. The rankings, as shown in the table, represent the average behavior and characteristics of the parent material type, and should therefore be used only as general guidelines when planning any construction projects in Adams County.

Table 5: Summary of Engineering Considerations for Landform-Parent
Material Regions in Adams County

EXPLANATION	CUT DESIGN				EMBANKMENT FILLS					EMBANKMENT FOUNDATION				SUBGRADE				FOUNDATION DESIGN						MISCELLANEOUS																																																									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31																																																		
PROBABILITY OF A MAJOR PROBLEM DEVELOPING L (LOW) M (MEDIUM) H (HIGH)	SOIL/ROCK BACKSLOPE INSTABILITY	GROUNDWATER CONTROL			NATURAL SLOPE AND RIVER BANK INSTABILITY				COMPACTED PROPERTIES	INADEQUATE SHEAR STRENGTH				EXCESSIVE SETTLEMENTS				GROUNDWATER CONTROL				SUBGRADE SUPPORT INADEQUATE				FROST ACTION POTENTIAL				PUMPING POTENTIAL				SHRINK-SWELL POTENTIAL				INADEQUATE BEARING CAPACITY				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				ESTIMATION OF LATERAL EARTH PRESSURES FOR RETAINING STRUCTURES				AVAILABILITY OF AGGREGATE				STEEL CORROSION				CONCRETE CORROSION				BEHAVIOR OF SEPTIC TANK FIELDS				GROUNDWATER RESOURCE POTENTIAL			
		EROSION POTENTIAL			SURFACE DRAINAGE					EROSION RESISTANCE				ORGANIC DEPOSIT OCCURRENCE				SUBGRADE SUPPORT INADEQUATE				FROST ACTION POTENTIAL				PUMPING POTENTIAL				SHRINK-SWELL POTENTIAL				INADEQUATE BEARING CAPACITY				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				ESTIMATION OF LATERAL EARTH PRESSURES FOR RETAINING STRUCTURES				AVAILABILITY OF AGGREGATE				STEEL CORROSION				CONCRETE CORROSION				BEHAVIOR OF SEPTIC TANK FIELDS				GROUNDWATER RESOURCE POTENTIAL							
		EROSION POTENTIAL			SURFACE DRAINAGE					EROSION RESISTANCE				ORGANIC DEPOSIT OCCURRENCE				SUBGRADE SUPPORT INADEQUATE				FROST ACTION POTENTIAL				PUMPING POTENTIAL				SHRINK-SWELL POTENTIAL				INADEQUATE BEARING CAPACITY				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				ESTIMATION OF LATERAL EARTH PRESSURES FOR RETAINING STRUCTURES				AVAILABILITY OF AGGREGATE				STEEL CORROSION				CONCRETE CORROSION				BEHAVIOR OF SEPTIC TANK FIELDS				GROUNDWATER RESOURCE POTENTIAL							
		EROSION POTENTIAL			SURFACE DRAINAGE					EROSION RESISTANCE				ORGANIC DEPOSIT OCCURRENCE				SUBGRADE SUPPORT INADEQUATE				FROST ACTION POTENTIAL				PUMPING POTENTIAL				SHRINK-SWELL POTENTIAL				INADEQUATE BEARING CAPACITY				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				ESTIMATION OF LATERAL EARTH PRESSURES FOR RETAINING STRUCTURES				AVAILABILITY OF AGGREGATE				STEEL CORROSION				CONCRETE CORROSION				BEHAVIOR OF SEPTIC TANK FIELDS				GROUNDWATER RESOURCE POTENTIAL							
AVAILABILITY RATING 1 (LOW) 2 (MEDIUM) 3 (HIGH)	GENERAL SOIL TEXTURE	EROSION POTENTIAL				SURFACE DRAINAGE				EROSION RESISTANCE				ORGANIC DEPOSIT OCCURRENCE				SUBGRADE SUPPORT INADEQUATE				FROST ACTION POTENTIAL				PUMPING POTENTIAL				SHRINK-SWELL POTENTIAL				INADEQUATE BEARING CAPACITY				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				ESTIMATION OF LATERAL EARTH PRESSURES FOR RETAINING STRUCTURES				AVAILABILITY OF AGGREGATE				STEEL CORROSION				CONCRETE CORROSION				BEHAVIOR OF SEPTIC TANK FIELDS				GROUNDWATER RESOURCE POTENTIAL							
		EROSION POTENTIAL				SURFACE DRAINAGE				EROSION RESISTANCE				ORGANIC DEPOSIT OCCURRENCE				SUBGRADE SUPPORT INADEQUATE				FROST ACTION POTENTIAL				PUMPING POTENTIAL				SHRINK-SWELL POTENTIAL				INADEQUATE BEARING CAPACITY				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				ESTIMATION OF LATERAL EARTH PRESSURES FOR RETAINING STRUCTURES				AVAILABILITY OF AGGREGATE				STEEL CORROSION				CONCRETE CORROSION				BEHAVIOR OF SEPTIC TANK FIELDS				GROUNDWATER RESOURCE POTENTIAL							
		EROSION POTENTIAL				SURFACE DRAINAGE				EROSION RESISTANCE				ORGANIC DEPOSIT OCCURRENCE				SUBGRADE SUPPORT INADEQUATE				FROST ACTION POTENTIAL				PUMPING POTENTIAL				SHRINK-SWELL POTENTIAL				INADEQUATE BEARING CAPACITY				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				ESTIMATION OF LATERAL EARTH PRESSURES FOR RETAINING STRUCTURES				AVAILABILITY OF AGGREGATE				STEEL CORROSION				CONCRETE CORROSION				BEHAVIOR OF SEPTIC TANK FIELDS				GROUNDWATER RESOURCE POTENTIAL							
		EROSION POTENTIAL				SURFACE DRAINAGE				EROSION RESISTANCE				ORGANIC DEPOSIT OCCURRENCE				SUBGRADE SUPPORT INADEQUATE				FROST ACTION POTENTIAL				PUMPING POTENTIAL				SHRINK-SWELL POTENTIAL				INADEQUATE BEARING CAPACITY				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				ESTIMATION OF LATERAL EARTH PRESSURES FOR RETAINING STRUCTURES				AVAILABILITY OF AGGREGATE				STEEL CORROSION				CONCRETE CORROSION				BEHAVIOR OF SEPTIC TANK FIELDS				GROUNDWATER RESOURCE POTENTIAL							
	RIDGE MORaine	EROSION POTENTIAL				SURFACE DRAINAGE				EROSION RESISTANCE				ORGANIC DEPOSIT OCCURRENCE				SUBGRADE SUPPORT INADEQUATE				FROST ACTION POTENTIAL				PUMPING POTENTIAL				SHRINK-SWELL POTENTIAL				INADEQUATE BEARING CAPACITY				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				ESTIMATION OF LATERAL EARTH PRESSURES FOR RETAINING STRUCTURES				AVAILABILITY OF AGGREGATE				STEEL CORROSION				CONCRETE CORROSION				BEHAVIOR OF SEPTIC TANK FIELDS				GROUNDWATER RESOURCE POTENTIAL							
		EROSION POTENTIAL				SURFACE DRAINAGE				EROSION RESISTANCE				ORGANIC DEPOSIT OCCURRENCE				SUBGRADE SUPPORT INADEQUATE				FROST ACTION POTENTIAL				PUMPING POTENTIAL				SHRINK-SWELL POTENTIAL				INADEQUATE BEARING CAPACITY				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				ESTIMATION OF LATERAL EARTH PRESSURES FOR RETAINING STRUCTURES				AVAILABILITY OF AGGREGATE				STEEL CORROSION				CONCRETE CORROSION				BEHAVIOR OF SEPTIC TANK FIELDS				GROUNDWATER RESOURCE POTENTIAL							
		EROSION POTENTIAL				SURFACE DRAINAGE				EROSION RESISTANCE				ORGANIC DEPOSIT OCCURRENCE				SUBGRADE SUPPORT INADEQUATE				FROST ACTION POTENTIAL				PUMPING POTENTIAL				SHRINK-SWELL POTENTIAL				INADEQUATE BEARING CAPACITY				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				ESTIMATION OF LATERAL EARTH PRESSURES FOR RETAINING STRUCTURES				AVAILABILITY OF AGGREGATE				STEEL CORROSION				CONCRETE CORROSION				BEHAVIOR OF SEPTIC TANK FIELDS				GROUNDWATER RESOURCE POTENTIAL							
		EROSION POTENTIAL				SURFACE DRAINAGE				EROSION RESISTANCE				ORGANIC DEPOSIT OCCURRENCE				SUBGRADE SUPPORT INADEQUATE				FROST ACTION POTENTIAL				PUMPING POTENTIAL				SHRINK-SWELL POTENTIAL				INADEQUATE BEARING CAPACITY				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				ESTIMATION OF LATERAL EARTH PRESSURES FOR RETAINING STRUCTURES				AVAILABILITY OF AGGREGATE				STEEL CORROSION				CONCRETE CORROSION				BEHAVIOR OF SEPTIC TANK FIELDS				GROUNDWATER RESOURCE POTENTIAL							
	GROUND MORaine	EROSION POTENTIAL				SURFACE DRAINAGE				EROSION RESISTANCE				ORGANIC DEPOSIT OCCURRENCE				SUBGRADE SUPPORT INADEQUATE				FROST ACTION POTENTIAL				PUMPING POTENTIAL				SHRINK-SWELL POTENTIAL				INADEQUATE BEARING CAPACITY				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				ESTIMATION OF LATERAL EARTH PRESSURES FOR RETAINING STRUCTURES				AVAILABILITY OF AGGREGATE				STEEL CORROSION				CONCRETE CORROSION				BEHAVIOR OF SEPTIC TANK FIELDS				GROUNDWATER RESOURCE POTENTIAL							
		EROSION POTENTIAL				SURFACE DRAINAGE				EROSION RESISTANCE				ORGANIC DEPOSIT OCCURRENCE				SUBGRADE SUPPORT INADEQUATE				FROST ACTION POTENTIAL				PUMPING POTENTIAL				SHRINK-SWELL POTENTIAL				INADEQUATE BEARING CAPACITY				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				ESTIMATION OF LATERAL EARTH PRESSURES FOR RETAINING STRUCTURES				AVAILABILITY OF AGGREGATE				STEEL CORROSION				CONCRETE CORROSION				BEHAVIOR OF SEPTIC TANK FIELDS				GROUNDWATER RESOURCE POTENTIAL							
		EROSION POTENTIAL				SURFACE DRAINAGE				EROSION RESISTANCE				ORGANIC DEPOSIT OCCURRENCE				SUBGRADE SUPPORT INADEQUATE				FROST ACTION POTENTIAL				PUMPING POTENTIAL				SHRINK-SWELL POTENTIAL				INADEQUATE BEARING CAPACITY				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				ESTIMATION OF LATERAL EARTH PRESSURES FOR RETAINING STRUCTURES				AVAILABILITY OF AGGREGATE				STEEL CORROSION				CONCRETE CORROSION				BEHAVIOR OF SEPTIC TANK FIELDS				GROUNDWATER RESOURCE POTENTIAL							
		EROSION POTENTIAL				SURFACE DRAINAGE				EROSION RESISTANCE				ORGANIC DEPOSIT OCCURRENCE				SUBGRADE SUPPORT INADEQUATE				FROST ACTION POTENTIAL				PUMPING POTENTIAL				SHRINK-SWELL POTENTIAL				INADEQUATE BEARING CAPACITY				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				ESTIMATION OF LATERAL EARTH PRESSURES FOR RETAINING STRUCTURES				AVAILABILITY OF AGGREGATE				STEEL CORROSION				CONCRETE CORROSION				BEHAVIOR OF SEPTIC TANK FIELDS				GROUNDWATER RESOURCE POTENTIAL							
	LACustrine PLain	EROSION POTENTIAL				SURFACE DRAINAGE				EROSION RESISTANCE				ORGANIC DEPOSIT OCCURRENCE				SUBGRADE SUPPORT INADEQUATE				FROST ACTION POTENTIAL				PUMPING POTENTIAL				SHRINK-SWELL POTENTIAL				INADEQUATE BEARING CAPACITY				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				ESTIMATION OF LATERAL EARTH PRESSURES FOR RETAINING STRUCTURES				AVAILABILITY OF AGGREGATE				STEEL CORROSION				CONCRETE CORROSION				BEHAVIOR OF SEPTIC TANK FIELDS				GROUNDWATER RESOURCE POTENTIAL							
		EROSION POTENTIAL				SURFACE DRAINAGE				EROSION RESISTANCE				ORGANIC DEPOSIT OCCURRENCE				SUBGRADE SUPPORT INADEQUATE				FROST ACTION POTENTIAL				PUMPING POTENTIAL				SHRINK-SWELL POTENTIAL				INADEQUATE BEARING CAPACITY				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				ESTIMATION OF LATERAL EARTH PRESSURES FOR RETAINING STRUCTURES				AVAILABILITY OF AGGREGATE				STEEL CORROSION				CONCRETE CORROSION				BEHAVIOR OF SEPTIC TANK FIELDS				GROUNDWATER RESOURCE POTENTIAL							
		EROSION POTENTIAL				SURFACE DRAINAGE				EROSION RESISTANCE				ORGANIC DEPOSIT OCCURRENCE				SUBGRADE SUPPORT INADEQUATE				FROST ACTION POTENTIAL				PUMPING POTENTIAL				SHRINK-SWELL POTENTIAL				INADEQUATE BEARING CAPACITY				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				ESTIMATION OF LATERAL EARTH PRESSURES FOR RETAINING STRUCTURES				AVAILABILITY OF AGGREGATE				STEEL CORROSION				CONCRETE CORROSION				BEHAVIOR OF SEPTIC TANK FIELDS				GROUNDWATER RESOURCE POTENTIAL							
		EROSION POTENTIAL				SURFACE DRAINAGE				EROSION RESISTANCE				ORGANIC DEPOSIT OCCURRENCE				SUBGRADE SUPPORT INADEQUATE				FROST ACTION POTENTIAL				PUMPING POTENTIAL				SHRINK-SWELL POTENTIAL				INADEQUATE BEARING CAPACITY				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				ESTIMATION OF LATERAL EARTH PRESSURES FOR RETAINING STRUCTURES				AVAILABILITY OF AGGREGATE				STEEL CORROSION				CONCRETE CORROSION				BEHAVIOR OF SEPTIC TANK FIELDS				GROUNDWATER RESOURCE POTENTIAL							
	FLOOD PLain	EROSION POTENTIAL				SURFACE DRAINAGE				EROSION RESISTANCE				ORGANIC DEPOSIT OCCURRENCE				SUBGRADE SUPPORT INADEQUATE				FROST ACTION POTENTIAL				PUMPING POTENTIAL				SHRINK-SWELL POTENTIAL				INADEQUATE BEARING CAPACITY				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				ESTIMATION OF LATERAL EARTH PRESSURES FOR RETAINING STRUCTURES				AVAILABILITY OF AGGREGATE				STEEL CORROSION				CONCRETE CORROSION				BEHAVIOR OF SEPTIC TANK FIELDS				GROUNDWATER RESOURCE POTENTIAL							
		EROSION POTENTIAL				SURFACE DRAINAGE				EROSION RESISTANCE				ORGANIC DEPOSIT OCCURRENCE				SUBGRADE SUPPORT INADEQUATE				FROST ACTION POTENTIAL				PUMPING POTENTIAL				SHRINK-SWELL POTENTIAL				INADEQUATE BEARING CAPACITY				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				ESTIMATION OF LATERAL EARTH PRESSURES FOR RETAINING STRUCTURES				AVAILABILITY OF AGGREGATE				STEEL CORROSION				CONCRETE CORROSION				BEHAVIOR OF SEPTIC TANK FIELDS				GROUNDWATER RESOURCE POTENTIAL							
		EROSION POTENTIAL				SURFACE DRAINAGE				EROSION RESISTANCE				ORGANIC DEPOSIT OCCURRENCE				SUBGRADE SUPPORT INADEQUATE				FROST ACTION POTENTIAL				PUMPING POTENTIAL				SHRINK-SWELL POTENTIAL				INADEQUATE BEARING CAPACITY				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				ESTIMATION OF LATERAL EARTH PRESSURES FOR RETAINING STRUCTURES				AVAILABILITY OF AGGREGATE				STEEL CORROSION				CONCRETE CORROSION				BEHAVIOR OF SEPTIC TANK FIELDS				GROUNDWATER RESOURCE POTENTIAL							
		EROSION POTENTIAL				SURFACE DRAINAGE				EROSION RESISTANCE				ORGANIC DEPOSIT OCCURRENCE				SUBGRADE SUPPORT INADEQUATE				FROST ACTION POTENTIAL				PUMPING POTENTIAL				SHRINK-SWELL POTENTIAL				INADEQUATE BEARING CAPACITY				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				ESTIMATION OF LATERAL EARTH PRESSURES FOR RETAINING STRUCTURES				AVAILABILITY OF AGGREGATE				STEEL CORROSION				CONCRETE CORROSION				BEHAVIOR OF SEPTIC TANK FIELDS				GROUNDWATER RESOURCE POTENTIAL							
	CLAY, SILT	EROSION POTENTIAL				SURFACE DRAINAGE				EROSION RESISTANCE				ORGANIC DEPOSIT OCCURRENCE				SUBGRADE SUPPORT INADEQUATE				FROST ACTION POTENTIAL				PUMPING POTENTIAL				SHRINK-SWELL POTENTIAL				INADEQUATE BEARING CAPACITY				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				ESTIMATION OF LATERAL EARTH PRESSURES FOR RETAINING STRUCTURES				AVAILABILITY OF AGGREGATE				STEEL CORROSION				CONCRETE CORROSION				BEHAVIOR OF SEPTIC TANK FIELDS				GROUNDWATER RESOURCE POTENTIAL							
		EROSION POTENTIAL				SURFACE DRAINAGE				EROSION RESISTANCE				ORGANIC DEPOSIT OCCURRENCE				SUBGRADE SUPPORT INADEQUATE				FROST ACTION POTENTIAL				PUMPING POTENTIAL				SHRINK-SWELL POTENTIAL				INADEQUATE BEARING CAPACITY				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				ESTIMATION OF LATERAL EARTH PRESSURES FOR RETAINING STRUCTURES				AVAILABILITY OF AGGREGATE				STEEL CORROSION				CONCRETE CORROSION				BEHAVIOR OF SEPTIC TANK FIELDS				GROUNDWATER RESOURCE POTENTIAL							
		EROSION POTENTIAL				SURFACE DRAINAGE				EROSION RESISTANCE				ORGANIC DEPOSIT OCCURRENCE				SUBGRADE SUPPORT INADEQUATE				FROST ACTION POTENTIAL				PUMPING POTENTIAL				SHRINK-SWELL POTENTIAL				INADEQUATE BEARING CAPACITY				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				ESTIMATION OF LATERAL EARTH PRESSURES FOR RETAINING STRUCTURES				AVAILABILITY OF AGGREGATE				STEEL CORROSION				CONCRETE CORROSION				BEHAVIOR OF SEPTIC TANK FIELDS				GROUNDWATER RESOURCE POTENTIAL							
		EROSION POTENTIAL				SURFACE DRAINAGE				EROSION RESISTANCE				ORGANIC DEPOSIT OCCURRENCE				SUBGRADE SUPPORT INADEQUATE				FROST ACTION POTENTIAL				PUMPING POTENTIAL				SHRINK-SWELL POTENTIAL				INADEQUATE BEARING CAPACITY				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				ESTIMATION OF LATERAL EARTH PRESSURES FOR RETAINING STRUCTURES				AVAILABILITY OF AGGREGATE				STEEL CORROSION				CONCRETE CORROSION				BEHAVIOR OF SEPTIC TANK FIELDS				GROUNDWATER RESOURCE POTENTIAL							
	CLAY, SILT, SAND	EROSION POTENTIAL				SURFACE DRAINAGE				EROSION RESISTANCE				ORGANIC DEPOSIT OCCURRENCE				SUBGRADE SUPPORT INADEQUATE				FROST ACTION POTENTIAL				PUMPING POTENTIAL				SHRINK-SWELL POTENTIAL				INADEQUATE BEARING CAPACITY				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				ESTIMATION OF LATERAL EARTH PRESSURES FOR RETAINING STRUCTURES				AVAILABILITY OF AGGREGATE				STEEL CORROSION				CONCRETE CORROSION				BEHAVIOR OF SEPTIC TANK FIELDS				GROUNDWATER RESOURCE POTENTIAL							
		EROSION POTENTIAL				SURFACE DRAINAGE				EROSION RESISTANCE				ORGANIC DEPOSIT OCCURRENCE				SUBGRADE SUPPORT INADEQUATE				FROST ACTION POTENTIAL				PUMPING POTENTIAL				SHRINK-SWELL POTENTIAL				INADEQUATE BEARING CAPACITY				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				ESTIMATION OF LATERAL EARTH PRESSURES FOR RETAINING STRUCTURES				AVAILABILITY OF AGGREGATE				STEEL CORROSION				CONCRETE CORROSION				BEHAVIOR OF SEPTIC TANK FIELDS				GROUNDWATER RESOURCE POTENTIAL							
		EROSION POTENTIAL				SURFACE DRAINAGE				EROSION RESISTANCE				ORGANIC DEPOSIT OCCURRENCE				SUBGRADE SUPPORT INADEQUATE				FROST ACTION POTENTIAL				PUMPING POTENTIAL				SHRINK-SWELL POTENTIAL				INADEQUATE BEARING CAPACITY				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				ESTIMATION OF LATERAL EARTH PRESSURES FOR RETAINING STRUCTURES				AVAILABILITY OF AGGREGATE				STEEL CORROSION				CONCRETE CORROSION				BEHAVIOR OF SEPTIC TANK FIELDS				GROUNDWATER RESOURCE POTENTIAL							
		EROSION POTENTIAL				SURFACE DRAINAGE				EROSION RESISTANCE				ORGANIC DEPOSIT OCCURRENCE				SUBGRADE SUPPORT INADEQUATE				FROST ACTION POTENTIAL				PUMPING POTENTIAL				SHRINK-SWELL POTENTIAL				INADEQUATE BEARING CAPACITY				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				ESTIMATION OF LATERAL EARTH PRESSURES FOR RETAINING STRUCTURES				AVAILABILITY OF AGGREGATE				STEEL CORROSION				CONCRETE CORROSION				BEHAVIOR OF SEPTIC TANK FIELDS				GROUNDWATER RESOURCE POTENTIAL							
	CLAY, SILT, SAND, GRAVEL	EROSION POTENTIAL				SURFACE DRAINAGE				EROSION RESISTANCE				ORGANIC DEPOSIT OCCURRENCE				SUBGRADE SUPPORT INADEQUATE				FROST ACTION POTENTIAL				PUMPING POTENTIAL				SHRINK-SWELL POTENTIAL				INADEQUATE BEARING CAPACITY				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				ESTIMATION OF LATERAL EARTH PRESSURES FOR RETAINING STRUCTURES				AVAILABILITY OF AGGREGATE				STEEL CORROSION				CONCRETE CORROSION				BEHAVIOR OF SEPTIC TANK FIELDS				GROUNDWATER RESOURCE POTENTIAL							
		EROSION POTENTIAL				SURFACE DRAINAGE				EROSION RESISTANCE				ORGANIC DEPOSIT OCCURRENCE				SUBGRADE SUPPORT INADEQUATE				FROST ACTION POTENTIAL				PUMPING POTENTIAL				SHRINK-SWELL POTENTIAL				INADEQUATE BEARING CAPACITY				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				ESTIMATION OF LATERAL EARTH PRESSURES FOR RETAINING STRUCTURES				AVAILABILITY OF AGGREGATE				STEEL CORROSION				CONCRETE CORROSION				BEHAVIOR OF SEPTIC TANK FIELDS				GROUNDWATER RESOURCE POTENTIAL							
		EROSION POTENTIAL				SURFACE DRAINAGE				EROSION RESISTANCE				ORGANIC DEPOSIT OCCURRENCE				SUBGRADE SUPPORT INADEQUATE				FROST ACTION POTENTIAL				PUMPING POTENTIAL				SHRINK-SWELL POTENTIAL				INADEQUATE BEARING CAPACITY				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				ESTIMATION OF LATERAL EARTH PRESSURES FOR RETAINING STRUCTURES				AVAILABILITY OF AGGREGATE				STEEL CORROSION				CONCRETE CORROSION				BEHAVIOR OF SEPTIC TANK FIELDS				GROUNDWATER RESOURCE POTENTIAL							
		EROSION POTENTIAL				SURFACE DRAINAGE				EROSION RESISTANCE				ORGANIC DEPOSIT OCCURRENCE				SUBGRADE SUPPORT INADEQUATE				FROST ACTION POTENTIAL				PUMPING POTENTIAL				SHRINK-SWELL POTENTIAL				INADEQUATE BEARING CAPACITY				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				ESTIMATION OF LATERAL EARTH PRESSURES FOR RETAINING STRUCTURES				AVAILABILITY OF AGGREGATE				STEEL CORROSION				CONCRETE CORROSION				BEHAVIOR OF SEPTIC TANK FIELDS				GROUNDWATER RESOURCE POTENTIAL							
	MUCK, MARL	EROSION POTENTIAL				SURFACE DRAINAGE				EROSION RESISTANCE				ORGANIC DEPOSIT OCCURRENCE				SUBGRADE SUPPORT INADEQUATE				FROST ACTION POTENTIAL				PUMPING POTENTIAL				SHRINK-SWELL POTENTIAL				INADEQUATE BEARING CAPACITY				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				ESTIMATION OF LATERAL EARTH PRESSURES FOR RETAINING STRUCTURES				AVAILABILITY OF AGGREGATE				STEEL CORROSION				CONCRETE CORROSION				BEHAVIOR OF SEPTIC TANK FIELDS				GROUNDWATER RESOURCE POTENTIAL							
		EROSION POTENTIAL				SURFACE DRAINAGE				EROSION RESISTANCE				ORGANIC DEPOSIT OCCURRENCE				SUBGRADE SUPPORT INADEQUATE				FROST ACTION POTENTIAL				PUMPING POTENTIAL				SHRINK-SWELL POTENTIAL				INADEQUATE BEARING CAPACITY				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				ESTIMATION OF LATERAL EARTH PRESSURES FOR RETAINING STRUCTURES				AVAILABILITY OF AGGREGATE				STEEL CORROSION				CONCRETE CORROSION				BEHAVIOR OF SEPTIC TANK FIELDS				GROUNDWATER RESOURCE POTENTIAL							
		EROSION POTENTIAL				SURFACE DRAINAGE				EROSION RESISTANCE				ORGANIC DEPOSIT OCCURRENCE				SUBGRADE SUPPORT INADEQUATE				FROST ACTION POTENTIAL				PUMPING POTENTIAL				SHRINK-SWELL POTENTIAL				INADEQUATE BEARING CAPACITY				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				ESTIMATION OF LATERAL EARTH PRESSURES FOR RETAINING STRUCTURES				AVAILABILITY OF AGGREGATE				STEEL CORROSION				CONCRETE CORROSION				BEHAVIOR OF SEPTIC TANK FIELDS				GROUNDWATER RESOURCE POTENTIAL							
		EROSION POTENTIAL				SURFACE DRAINAGE				EROSION RESISTANCE				ORGANIC DEPOSIT OCCURRENCE				SUBGRADE SUPPORT INADEQUATE				FROST ACTION POTENTIAL				PUMPING POTENTIAL				SHRINK-SWELL POTENTIAL				INADEQUATE BEARING CAPACITY				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				EXCESSIVE SETTLEMENT POTENTIAL				SCOUR POTENTIAL				ESTIMATION OF LATERAL EARTH PRESSURES FOR RETAINING STRUCTURES				AVAILABILITY OF AGGREGATE				STEEL CORROSION				CONCRETE CORROSION				BEHAVIOR OF SEPTIC TANK FIELDS				GROUNDWATER RESOURCE POTENTIAL							

REFERENCES

1. Farmer, D. L., et al., "Soil Survey of Adams County, Indiana," United States Department of Agriculture, Soil Conservation Service in Cooperation with Purdue University Agricultural Experiment Station, March 1986.
2. Hittle, J. H., "Population Trends for Indiana Counties, Cities, Towns 1970-1980," Highway Extension and Research Project for Indiana Counties, 1981.
3. Yeh, P. T., "Airphoto Interpretation of Drainage Features of Adams County, Indiana," Joint Highway Research Project, Purdue University, West Lafayette, Indiana, 1954.
4. Parvis, M., "Regional Drainage Pattern of Indiana," A Thesis, Purdue University, West Lafayette, Indiana, 1947.
5. Watkins, F. A., Jr., and Ward, P. E., "Ground-Water Resources of Adams County, Indiana," Indiana Department of Conservation, Division of Water Resources, Bulletin No. 9, 1962.
6. Logan, W. N. et al., "Handbook of Indiana Geology," Indiana Department of Conservation Division of Geology, Indianapolis, Indiana, 1922.
7. Pinsak, A. P., and Shaver, R. H., "The Silurian Formations of Northern Indiana," Indiana Department of Conservation, Geological Survey Bulletin 32, Bloomington, Indiana, 1964.
8. Droste, J. B., and Shaver, R. H., "The Limberlost Dolomite of Indiana A Key to the Great Silurian Facies in the Southern Great Lakes Area," Department of Natural Resources, Geological Survey Occasional Paper 15, Bloomington, Indiana, 1976.
9. Shaver, R. H. et al., "Compendium of Paleozoic Rock- Unit Stratigraphy in Indiana - A Revision," Department of Natural Resources, Geological Survey Bulletin 59, Bloomington, Indiana, 1986.
10. Wayne, W. J., "Thickness of Drift and Bedrock Physiography of Indiana North of the Wisconsin Glacial Boundary," Indiana Department of Conservation, Geological Survey Report of Progress No. 7, Bloomington, Indiana, 1956.
11. Bruns, T. M. et al., "Map showing Bedrock Topography of the Teays Valley, Eastern Part, North-Central Indiana," Miscellaneous Map No. 44, Indiana Geological Survey, Department of Natural Resources, Bloomington, Indiana, 1985.
12. Miles, R.D., CE 567 Class Notes, Purdue University.
13. Belcher, D. J. et al., "The Formation, Distribution and Engineering Characteristics of Soils," Highway Research Bulletin No. 10, Joint Highway Research Project, Engineering Experiment Station, Purdue University, West Lafayette, Indiana, 1943.

14. "Monthly Normals of Temperature, Precipitation, and Heating and Cooling Degree Days, 1951-1980, Indiana," National Oceanic and Atmospheric Administration, Environmental Data and Information Service, National Climatic Center, Asheville, North Carolina, September 1982.
15. "1988 Water Use Summary for Adams County," Computer Printouts, County Water Use Summary System, Division of Water, Department of Natural Resources, Indianapolis, Indiana, July 1989.
16. Yeh, P.T., "Drainage Map of Adams County, Indiana," Joint Highway Research Project, Purdue University, West Lafayette, Indiana, 1954.
17. Perrey, J. I., et al., "Indiana's Water Resources," Indiana Flood Control and Water Resources Commission, Bulletin No. 1, June 1951.
18. "Map of Indiana Showing Physiographic Units and Glacial Boundaries," Modified from Indiana Geological Survey Report of Progress No. 7, Figure 1, 1948.
19. "Regional Topographic Map, Muncie Sheet," Prepared by the Army Map Service, Corps of Engineers, U.S. Army, Washington, D.C., 1952.
20. Patton, "Bedrock Geology Map of Indiana," 1955.
21. Gray, H. H., et al., "Bedrock Geologic Map of Indiana," Miscellaneous Map No. 48, Indiana Geological Survey, Department of Natural Resources, Bloomington, Indiana, 1987.
22. Gray, H. H., "Map of Indiana Showing Topography of the Bedrock Surface," Miscellaneous Map No. 35, Indiana Geological Survey, Department of Natural Resources, Bloomington, Indiana, 1982.
23. Burger, A. M., et al., "Geologic Map of the 1 x 2 Muncie Quadrangle, Indiana and Ohio, Showing Bedrock and Unconsolidated Deposits," Regional Geologic Map No. 5, Muncie Sheet, Indiana Geological Survey, Department of Natural Resources, Bloomington, Indiana, 1971.
24. Gray, H. H., "Map of Indiana Showing Thickness of Unconsolidated Deposits," Miscellaneous Map No. 37, Indiana Geological Survey, Department of Natural Resources, Bloomington, Indiana, 1983.
25. "Soil Investigation, Project No. F-158-3(2), Structure No. 224-01-6861, US 224 over Steele Ditch, Adams County, Indiana," Prepared by James and Berger Associates, Indianapolis, Indiana, August 1983, Revised October 1983.
26. "Soil Investigation, Project No. J-665-(1), Winchester Road Improvement in Decatur, Adams County, Indiana," Prepared by Shilts, Graves and Associates, Inc., South Bend, Indiana, August 1982.

27. "Subsurface Investigation and Recommendations, Project No. M-J-660-(1), Reconstruction of Patterson Street from CR 100W to US 27 in Decatur, Adams County, Indiana," Prepared by Alt and Witzig Engineering, Inc., Indianapolis, Indiana, February 1988.
28. "Geotechnical Investigation, Project No. RS-4201-(1), Structure No. 124-01-6673, SR 124 over Yellow Creek, Adams County, Indiana," Prepared by Indiana Department of Highways, Indianapolis, Indiana, December 1984.
29. "Bridge Foundation Analyses and Recommendations, Project No. ST-3801-(A), Structure No. 218-01-6373, SR 218 over Wagley-Farlow Ditch, Adams County, Indiana," Prepared by ATEC Associates, Inc., Indianapolis, Indiana, December 1989.
30. "Geotechnical Investigation, Project No. ST-3201, Structure No. 116-01-6313, SR 116 over Three Mile Creek, 1.5 Miles South of SR 218, Adams County," Prepared by The H.C. Nutting Company, Cincinnati, Ohio, September 1988.
31. "Geotechnical Investigation, Project No. BRZ-9901-(11), Structure No. Adams 10570, CR 350W over St. Mary's River, Adams County, Indiana," Prepared by Engineering and Testing Services, Inc., Indianapolis, Indiana, October 1988.
32. "Soil Survey Investigation, Project No. BRM-J645, Structure No. Adams 10282, Monmouth Road over St. Mary's River in Decatur, Adams County, Indiana," Prepared by Engineering and Testing Services, Inc., Indianapolis, Indiana, March 1984.
33. "Report of Geotechnical Investigation, Project No. RS- 5501, Structure No. 101-01-6299, SR 101 over Drake Ditch, Adams County, Indiana," Prepared by Indiana Department of Highways, Indianapolis, Indiana, February 1985.
34. "Test Boring Report, Project No. 27 Section J, Job No. D-6455, Structure No. 27-J-646-B, Structure over Wabash river, Adams County, Indiana," Prepared by American Testing and Engineering Company, Indianapolis, Indiana, September 1964.
35. "Soil Survey Investigation, Project No. BRZ-9901, Structure No. Adams 10284, CR 150W over Wabash River, Adams County, Indiana," Prepared by Engineering and Testing Services, Inc., Indianapolis, Indiana, June 1983.
36. "Geotechnical Investigation, Project No. BRZ-9901, Structure No. Adams 10283, CR 300W over Wabash River, Adams County, Indiana," Prepared by Engineering and Testing Services, Inc., Indianapolis, Indiana, February 1985.
37. "Geotechnical Investigation, Project No. RS-3201-(1), Structure No. 116-01-7305, SR 116 over Wabash River,, 1.0 mile East of US 27, Adams County, Indiana," Prepared by Engineering and Testing Services, Inc., Indianapolis, Indiana, November 1987.
38. "Test Boring Report, Project No. 27-J-5349, Job No. D- 6455, US 27 over Loblolly Creek, Adams County, Indiana," Prepared by American Testing and Engineering Company, Indianapolis, Indiana, September 1964.

39. "Test Boring Report, Project No. 6-L9-5056, Job No. D- 6484, SR 6 over Turkey Creek, Adams County, Indiana," Prepared by American Testing and Engineering Company, Indianapolis, Indiana, September, 1964.
40. "Report of Geotechnical Investigation, Project No. RS- 3201-(2), Structure No. 116-01-7120, SR 116 over Brewster Ditch, Adams County, Indiana," Prepared by Indiana Department of Highways, Indianapolis, Indiana, February 1985.
41. "Geotechnical Investigation, Project Nos. F-249-9-(), and F-158-3-(1), Structure Nos. 27-01-7508, 33-01-7441 and 7442, US 27 over Borum Run and US 33 Connector from US 27 to existing US 33, Adams County, Indiana," Prepared by Engineering and Testing Services, Inc., Indianapolis, Indiana, June 1989.
42. "Geotechnical Investigation, Project No. RS-4201-(2), Structure No. 124-01-7192, SR 124 over Blue Creek, Adams County, Indiana," Prepared by Engineering and Testing Services, Inc., Indianapolis, Indiana, February 1987.
43. Arvin, D. V., "Statistical Summary of Streamflow Data for Indiana," U.S. Geological Survey Open-File-Report 89-62, Prepared in cooperation with the Indiana Department of Natural Resources, Indianapolis, Indiana, 1989.
44. "Climatological Data, Indiana," Numbers 1 - 12, Volumes 85 - 93, United States Department of Commerce, National Oceanic and Atmospheric Administration, Environmental Data and Information Service, National Climatic Center, Asheville, North Carolina.

APPENDIX A

CLASSIFICATION TEST RESULTS FOR SELECTED ENGINEERING PROJECTS IN ADAMS COUNTY

APPENDIX A. CLASSIFICATION TEST RESULTS FOR SELECTED ENGINEERING PROJECTS
IN ADAMS COUNTY (25 - 42)

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description		Blow per Ft.	Grain Size Distribution				
							Texture	AASHTO		Gravel	Sand	Silt	Clay	LL PL PI
1	US 224	1	43 + 66	22 LT	787.9	0.0 - 1.5	Silt	A-4	12					
"	Bridge over Steele Ditch	2	"	"	"	1.5 - 3.0	"	"	12					
"	"	3	"	"	"	3.0 - 4.5	Loam	A-4(0)	8	5	42	36	17	24 20 17
"	"	4	"	"	"	4.5 - 6.0	"	"	4					
"	"	5	"	"	"	6.0 - 7.5	"	"	9					
"	"	6	"	"	"	7.5 - 9.0	Silt	A-4	9					
"	"	7	"	"	"	9.0 - 10.5	"	A-4	6					
"	"	8	"	"	"	10.5 - 12.0	Clay	A-4(8)	11					
"	"	9	"	"	"	12.0 - 13.5	"	"	22	0	8	47	45	32 23 9
"	"	10	"	"	"	13.5 - 15.0	Loam	A-4	20					
"	"	11	"	"	"	15.0 - 18.5	"	"	22					
"	"	12	"	"	"	18.5 - 20.0	Clay	"	17					
"	"	13	"	"	"	20.0 - 23.5	Loam	"	25					
"	"	14	"	"	"	23.5 - 30.0	Gravelly Sand	A-1-b	107					
"	"	15	"	"	"	30.0 - 33.5	Gravel	"	333					
2	"	1	44 + 35	14RT	776.7	2.0 - 3.5	Silt	A-4	13					
"	"	2	"	"	"	3.5 - 5.0	"	"	34					
"	"	3	"	"	"	5.0 - 6.5	"	A-4(0)	21	0	2	83	15	21 21 0
"	"	4	"	"	"	6.5 - 8.0	Clay	A-4	15					
"	"	5	"	"	"	8.0 - 9.5	"	"	23					
"	"	6	"	"	"	9.5 - 11.0	"	"	15					
"	"	7	"	"	"	11.0 - 12.5	"	"	15					
"	"	8	"	"	"	12.5 - 13.5	Loam	A-4(0)	21	15	29	41	15	18 14 4
"	"	9	"	"	"	13.5 - 15.0	"	"	76					
"	"	10	"	"	"	15.0 - 18.5	Gravelly Sand	A-1-b(0)	166	23	74	0	0	
"	"	11	"	"	"	18.5 - 23.5	Limestone Gravel	"	240					

APPENDIX A. (CONTINUED)

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description		Blow per Ft.	Grain Size Distribution						
							Texture	AASHTO		Gravel	Sand	Silt	Clay	LL	PL	PI
3	US 224	1	44 + 91	14RT	788.5	0.0 - 1.5	Silt		5							
"	Bridge over Steele Ditch	2	"	"	"	1.5 - 3.0	Loam	A-6(4)	8	1	39	40	20	30	19	11
"	"	3	"	"	"	3.0 - 4.5	"	"	10							
"	"	4	"	"	"	4.5 - 6.0	"	"	11							
"	"	5	"	"	"	6.0 - 7.5	"	"	11							
"	"	6	"	"	"	7.5 - 9.0	Silt	A-4	9							
"	"	7	"	"	"	9.0 - 10.5	Clay	"	9							
"	"	8	"	"	"	10.5 - 12.0	"	"	23							
"	"	9	"	"	"	12.0 - 13.5	"	"	18							
"	"	10	"	"	"	13.5 - 15.0	Silt	"	9							
"	"	11	"	"	"	15.0 - 16.5	"	"	12							
"	"	12	"	"	"	18.5 - 20.0	Loam	"	12							
"	"	13	"	"	"	23.5 - 25.0	"	"	22							
"	"	14	"	"	"	28.5 - 30.0	"	"	28							
"	"	15	"	"	"	33.5 - 35.0	Sand	A-3(0)	44	0	95	5	0			
"	"	16	"	"	"	38.5 - 38.7	Limestone Gravel	-	600							
4	Winchester Road	1	12 + 00	14.5LT	797.0	0.0 - 1.5	Clay Loam	A-6	10							
"	"	2	"	"	"	1.5 - 3.0	"	"	13							
"	Improvement in Decatur	3	"	"	"	3.0 - 4.5	"	"	7							
"	"	4	"	"	"	4.5 - 6.0	"	"	10							
"	"	5	"	"	"	6.0 - 7.5	"	"	11							
5	"	1	17 + 00	Centerline	798.3	0.5 - 1.5	Sand & Gravel	A-6	76							
"	"	2	"	"	"	1.5 - 3.0	Clay Loam	"	15							
"	"	3	"	"	"	3.0 - 4.5	"	"	16							
"	"	4	"	"	"	4.5 - 6.0	"	"	15							
"	"	5	"	"	"	6.0 - 7.5	Silty Loam	A-4(0)	18	0	30	53	17	23	20	3
6	"	1	23 + 52	25LT	798.3	0.0 - 1.5	Clay Loam	A-6(9)	5							
"	"	2	"	"	"	1.5 - 3.0	"	"	7							
"	"	3	"	"	"	3.0 - 4.5	"	"	8							
"	"	4	"	"	"	4.5 - 6.0	"	"	12	0	32	40	28	33	17	16
"	"	5	"	"	"	6.0 - 7.5	"	"	12							
"	"	6	"	"	"	7.5 - 9.0	"	"	20							
"	"	7	"	"	"	9.0 - 10.5	"	"	23							
"	"	BAG	"	"	"	3.0 - 5.0	"	A-6(12)	-	0	27	49	24	36	17	19

APPENDIX A. (CONTINUED)

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description		Blow per Ft.	Grain Size Distribution				
							Texture	AASHTO		Gravel	Sand	Silt	Clay	LL PL PI
7	Winchester Road	1	31 + 00	20LT	793.3	0.0 - 1.5	Silt	-	43					
"	"	2	"	"	"	1.5 - 3.0	Silty Loam	A-4	9					
"	improvement in Decatur	3	"	"	"	3.0 - 4.5	"	"	6					
"	"	4	"	"	"	4.5 - 6.0	Clay Loam	A-6	17					
"	"	5	"	"	"	6.0 - 7.5	"	"	33					
"	"	6	"	"	"	7.5 - 9.0	"	"	30					
"	"	7	"	"	"	9.0 - 10.5	"	"	36					
"	"	8	"	"	"	10.5 - 12.0	"	"	24					
"	"	9	"	"	"	12.0 - 13.5	"	"	21					
"	"	10	"	"	"	13.5 - 15.0	"	"	20					
8	"	1	127 + 00	35RT	796.1	0.0 - 1.5	Silty Loam	A-4	2					
"	"	2	"	"	"	1.5 - 3.0	Clay Loam	A-6(9)	17					
"	"	3	"	"	"	3.0 - 4.5	"	"	26					
"	"	4	"	"	"	4.5 - 6.0	"	"	33	0	27	49	24	34 19 15
9	"	1	134 + 00	35RT	795.5	0.0 - 1.5	Clay Loam	A-6	3					
"	"	2	"	"	"	1.5 - 3.0	"	"	7					
"	"	3	"	"	"	3.0 - 4.5	"	"	8					
"	"	4	"	"	"	4.5 - 6.0	"	"	7					
"	"	5	"	"	"	6.0 - 7.5	"	A-6(10)	16					
"	"	6	"	"	"	7.5 - 9.0	"	A-6(9)	23					
"	"	7	"	"	"	9.0 - 10.5	"	A-6(10)	31	3	21	50	26	31 16 15
10	Winchester Road	1	140 + 00	40LT	793.7	0.0 - 1.5	Clay Loam	A-6	8					
"	"	2	"	"	"	1.5 - 3.0	"	"	26					
"	improvement in Decatur	3	"	"	"	3.0 - 4.5	"	"	36					
"	"	4	"	"	"	4.5 - 6.0	"	"	44					
11	"	1	38 + 10	20RT	790.10	0.5 - 1.5	Silty Loam	A-4	6					
"	"	2	"	"	"	1.5 - 3.0	Clay Loam	A-7-6(13)	7					
"	"	3	"	"	"	3.0 - 4.5	"	"	6					
"	"	4	"	"	"	4.5 - 6.0	"	"	9	0	28	44	28	44 26 18
"	"	5	"	"	"	6.0 - 7.5	"	"	16					
"	"	6	"	"	"	7.5 - 9.0	"	"	14					
"	"	7	"	"	"	9.0 - 10.5	"	"	29					
"	"	8	"	"	"	10.5 - 12.0	"	"	34					

APPENDIX A. (CONTINUED)

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation, Ft.	Sample Depth, Ft.	Soil Description		Blow per Ft.	Grain Size Distribution					
							Texture	AASHTO		Gravel	Sand	Silt	Clay	LL	PL PI
12	Patterson St	1SS	13 + 00	7RT	802.6	1.0 - 2.5	Silty Clay	A-7-6	17						
"	from CR 100 W	2SS	"	"	"	3.5 - 5.0	Clay	A-6	19						
"	to US 27 in	3SS	"	"	"	6.0 - 7.5	"	"	37						
	Decatur														
13	"	1SS	22 + 30	57LT	804.6	1.0 - 2.5	Clay	A-6	33						
"	"	2SS	"	"	"	3.5 - 5.0	"	"	42						
"	"	3SS	"	"	"	6.0 - 7.5	"	"	44						
"	"	4SS	"	"	"	8.5 - 10.0	"	"	30						
"	"	5SS	"	"	"	13.5 - 15.0	"	"	25						
14	"	1SS	28 + 05	57LT	806.0	1.0 - 2.5	Clay	A-6	26						
"	"	2SS	"	"	"	3.5 - 5.0	"	"	37						
"	"	3SS	"	"	"	6.0 - 7.5	"	"	42						
"	"	4SS	"	"	"	8.5 - 10.0	"	"	33						
"	"	5SS	"	"	"	13.5 - 15.0	"	"	29						
15	"	1SS	38 + 90	7LT	807.4	1.0 - 2.5	Silty Clay	A-7-6(22)	17	0	9	51	40	44	21 23
"	"	2SS	"	"	"	3.5 - 5.0	Clay	A-6(11)	24	3	19	44	34	35	20 15
"	"	3SS	"	"	"	6.0 - 7.5	"	"	23						
"	"	4SS	"	"	"	8.5 - 10.0	"	"	25						
"	"	5SS	"	"	"	13.5 - 15.0	"	A-6(10)	28	5	16	43	36	33	18 15
16	"	1SS	45 + 62	7LT	803.5	1.0 - 2.5	Clay	A-6	16						
"	"	2SS	"	"	"	3.5 - 5.0	"	"	23						
"	"	3SS	"	"	"	6.0 - 7.5	"	"	34						
"	"	4SS	"	"	"	8.5 - 10.0	"	"	42						
17	"	1SS	53 + 00	7LT	803.6	1.0 - 2.5	Silty Clay	A-7-6	16						
"	"	2SS	"	"	"	3.5 - 5.0	Clay	A-6	18						
"	"	3SS	"	"	"	6.0 - 7.5	"	"	26						
"	"	4SS	"	"	"	8.5 - 10.0	"	"	35						
18	"	1SS	61 + 00	13RT	803.2	1.0 - 2.5	Silty Clay - (fill)	A-7-6	14						
"	"	2SS	"	"	"	3.5 - 5.0	"	"	14						
"	"	3SS	"	"	"	6.0 - 7.5	Clay	A-6	23						
19	SR 124 over	SS1	614 + 18	36RT	813.8	1.0 - 2.5	Clay Loam	A-6(6)	0	2.7	37.2	38.4	21.7	33.4	18.3 15.1
"	Yellow Creek	SS2	"	"	"	3.5 - 5.0	Clay	A-6(12)	44	3.6	15.2	46.1	35.1	34.5	18.0 16.5
"	"	SS3	"	"	"	6.0 - 7.5	"	"	55						

APPENDIX A. (CONTINUED)

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description	Blow per Ft.	Grain Size Distribution			
									Gravel	Sand	Silt	Clay
20	SR 124 over Yellow Creek	SS1 SS2 SS3	614 + 66	42LT	814.7	1.0 - 2.5 3.5 - 5.0 6.0 - 7.5	Clay " " "	11 39 56	0.7	17.7	49.8	31.8
21	"	B-2BAG	614 + 66	40LT	814.7	0.0 - 2.0	Silty Clay Loam A-7-6(15)	-	1.0	18.8	50.5	29.7
22	SR 218 over Wagley-Farlow Ditch	1 2 3 4 5 6 7 8	224 + 48	26RT	825.0	2.5 - 5.0 5.0 - 7.5 8.0 - 10.0 10.0 - 14.0 15.0 - 20.0 20.0 - 25.0 25.0 - 28.5 28.5 - 30.0	Clay " " " " " " " "	30 18 45 28 22 21 27 28				
23	SR 218 over Wagley-Farlow Ditch	1 2 3 4 5 6 7 8 9 10 11 12 13	224 + 62	25LT	823.0	2.5 - 5.0 5.0 - 6.5 7.5 - 10.0 10.0 - 15.0 15.0 - 19.0 20.0 - 24.0 25.0 - 29.0 30.0 - 35.0 35.0 - 40.0 40.0 - 45.0 45.0 - 50.0 50.0 - 52.0 52.0 - 53.5	Clay " " " " " " " " " " " " "	24 19 17 40 26 19 29 17 18 53 35 39 35				
24	"	1 2 3 4 5 6 7 8	225 + 18	26LT	823.0	2.5 - 5.0 5.0 - 6.0 7.5 - 10.0 10.0 - 11.5 15.0 - 16.0 20.0 - 25.0 25.0 - 28.5 28.5 - 30.0	Clay " " " " " " " "	20 17 25 46 34 25 22 20				

APPENDIX A. (CONTINUED)

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description		Blow per Ft.	Grain Size Distribution			
							Texture	AASHTO		Gravel	Sand	Silt	Clay
25	SR 218 over Wagley-Farlow Ditch	1	225 + 02	25RT	825.5	2.5 - 5.0	Clay "	-	23				
"	"	2	"	"	"	5.0 - 7.5	"	-	14				
"	"	3	"	"	"	8.0 - 10.0	Silty Clay	-	23				
"	"	4	"	"	"	10.0 - 14.0	"	-	34				
"	"	5	"	"	"	15.0 - 20.0	Clay	-	22				
"	"	6	"	"	"	20.0 - 21.5	"	-	21				
26	SR 218 over Berger Ditch	1	363 + 85	24LT	822.5	1.0 - 4.0	Silty Clay	-	17				
"	"	2	"	"	"	5.0 - 7.5	"	-	19				
"	"	3	"	"	"	7.5 - 10.0	"	-	19				
"	"	4	"	"	"	10.0 - 12.5	"	-	25				
"	"	5	"	"	"	15.0 - 20.0	Silty Loam	-	20				
"	"	6	"	"	"	20.0 - 23.5	"	-	16				
"	"	7	"	"	"	25.0 - 28.5	Silty Clay	-	22				
"	"	8	"	"	"	28.5 - 30.0	"	-	19				
27	"	1	364 + 42	30LT	821.0	2.5 - 5.0	Silty Clay	-	21				
"	"	2	"	"	"	5.0 - 7.5	"	-	17				
"	"	3	"	"	"	7.5 - 9.5	"	-	21				
"	"	4	"	"	"	10.0 - 15.0	"	-	46				
"	"	5	"	"	"	15.0 - 20.0	"	-	20				
"	"	6	"	"	"	20.0 - 25.0	"	-	24				
"	"	7	"	"	"	25.0 - 30.0	"	-	20				
"	"	8	"	"	"	30.0 - 35.0	"	-	39				
"	"	9	"	"	"	35.0 - 38.0	"	-	21				
"	"	10	"	"	"	40.0 - 42.0	Sandy Loam	-	15				
"	"	11	"	"	"	45.0 - 48.5	Silty Clay	-	26				
"	"	12	"	"	"	48.5-50.0	"	-	21				
28	"	1	364 + 90	23RT	822.0	2.5 - 5.0	Silty Clay	-	16				
"	"	2	"	"	"	5.0 - 7.5	"	-	20				
"	"	3	"	"	"	7.5 - 10.0	"	-	41				
"	"	4	"	"	"	10.0 - 11.5	"	-	46				
"	"	5	"	"	"	15.0 - 20.0	"	-	26				
"	"	6	"	"	"	20.0 - 25.0	"	-	19				
"	"	7	"	"	"	25.0 - 28.5	"	-	26				
"	"	8	"	"	"	38.5 - 30.0	"	-	22				

APPENDIX A. (CONTINUED)

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description	Blow per Ft.	Grain Size Distribution				
									Gravel	Sand	Silt	Clay	LL PL PI
29	SR 218 over	1	364 + 23	15RT	825.0	2.5 - 7.5	Silty Clay	-	-	-	-	-	-
"	"	2	"	"	"	7.5 - 9.5	"	-	-	-	-	-	-
"	"	3	"	"	"	10.0 - 15.0	"	-	-	-	-	-	-
"	"	4	"	"	"	15.0 - 20.0	"	-	-	-	-	-	-
"	"	5	"	"	"	20.0 - 25.0	"	-	-	-	-	-	-
"	"	6	"	"	"	25.0 - 28.5	"	-	-	-	-	-	-
"	"	7	"	"	"	25.0 - 30.0	"	-	-	-	-	-	-
30	SR 116 over	1SS	555 + 47	18LT	828.73	0.0 - 1.5	Sandy Loam	7	3.5	20.8	46.7	29.0	39.4 19.8 19.6
"	"	2SS	"	"	"	2.5 - 4.0	Clay Loam	7	2.3	40.1	32.7	24.9	34.3 21.3 13.0
"	"	3SS	"	"	"	5.0 - 6.5	"	-	-	-	-	-	-
"	"	1RC	"	"	"	7.5 - 12.5	Limestone	-	-	-	-	-	-
"	"	2RC	"	"	"	12.5 - 17.5	"	-	-	-	-	-	-
31	"	1RC	555 + 78	20RT	821.07	0.3 - 11.0	Limestone	-	-	-	-	-	-
32	"	1SS	556 + 06	18LT	827.68	0.0 - 1.5	Loam	21	-	-	-	-	-
"	"	2SS	"	"	"	2.5 - 4.0	Clay Loam	4	-	-	-	-	-
"	"	3SS	"	"	"	4.5 - 5.8	"	53	-	-	-	-	-
"	"	1RC	"	"	"	6.0 - 16.0	Limestone	-	-	-	-	-	-
33	"	1SS	556 + 34.5	17RT	827.08	0.0 - 1.5	Loam	7	-	-	-	-	-
"	"	2SS	"	"	"	2.5 - 4.0	-	17	-	-	-	-	-
"	"	3SS	"	"	"	5.0 - 5.6	-	50	-	-	-	-	-
"	"	1RC	"	"	"	6.0 - 11.0	Silty Clay	-	-	-	-	-	-
"	"	2RC	"	"	"	11.0 - 16.0	Limestone	-	-	-	-	-	-
"	"	1CBR	556 + 35	30RT	822.7	1.5 - 2.0	Clay	-	3.4	25.3	36.8	34.5	39.9 20.1 19.8
34	"	-	555 + 51.5	20RT	827.45	0.0 - 3.0	Silt	-	-	-	-	-	-
"	"	-	"	"	"	3.0 - 4.5	Silty Loam	-	-	-	-	-	-
"	"	-	"	"	"	4.5 - 6.5	Silty Clay Loam	-	9.1	16.4	52.0	22.5	40.5 23.9 16.6
35	"	1SS	554 + 56	37.5RT	834.02	0.0 - 1.5	Silty Clay Loam	10	-	-	-	-	-
"	"	2SS	"	"	"	2.5 - 4.0	"	35	-	-	-	-	-
"	"	3SS	"	"	"	5.0 - 6.5	"	10	-	-	-	-	-
"	"	4SS	"	"	"	6.5 - 8.0	Clay Loam	20	-	-	-	-	-

APPENDIX A. (CONTINUED)

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description		Blow per ft.	Grain Size Distribution							
							Texture	AASHTO		Gravel	Sand	Silt	Clay	LL	PL	PI	
36	SR 116 over Three Mile Creek, 1.5 miles south of SR 218	1SS 2SS 3SS	557 + 00	45RT	824.63	0.0 - 1.5 2.5 - 4.0 5.0 - 5.5	Silty Clay Loam	A-7-6	10								
37	CR 350 W over St. Mary's River	SS1 SS2 SS3 SS4 SS5 SS6 SS7 SS8 SS9	24 + 61	15LT A	780.4	1.0 - 2.5 3.5 - 5.0 6.0 - 7.5 8.5 - 10.0 13.5 - 15.0 18.5 - 20.0 23.5 - 25.0 28.5 - 30.0 33.5 - 35.0	Clay	A-6	6								

APPENDIX A. (CONTINUED)

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description	Blow per Ft.	Grain Size Distribution				LL	PL	PI
									Gravel	Sand	Silt	Clay			
40	CR 350 W over St. Mary's River	SS1	27 + 60.5	12.5RT A	780.4	1.5 - 2.5	Silty Clay	-	-	-	-	-	-	-	-
"	"	SS2	"	"	"	3.5 - 5.0	"	-	-	-	-	-	-	-	-
"	"	SS3	"	"	"	6.0 - 7.5	Clay	A-6	-	-	-	-	-	-	-
"	"	SS4	"	"	"	8.5 - 10.0	"	"	-	-	-	-	-	-	-
"	"	SS5	"	"	"	13.5 - 15.0	"	"	-	-	-	-	-	-	-
"	"	SS6	"	"	"	18.5 - 20.0	"	"	-	-	-	-	-	-	-
"	"	SS7	"	"	"	23.5 - 25.0	Sandy Loam	A-4(0)	-	-	-	-	-	-	-
"	"	SS8	"	"	"	28.5 - 30.0	"	"	-	-	-	-	-	-	-
"	"	SS9	"	"	"	33.5 - 35.0	Clay	A-6	-	-	-	-	-	-	-
"	"	SS10	"	"	"	38.5 - 40.0	Weathered Limestone	-	-	-	-	-	-	-	-
"	"	RC1	"	"	"	40.0 - 44.5	Limestone	-	-	-	-	-	-	-	-
41	"	SS1	30 + 50	15LT B	773.0	1.0 - 2.5	Clay	A-6	-	-	-	-	-	-	-
"	"	SS2	"	"	"	3.5 - 5.0	Loam	A-4	-	-	-	-	-	-	-
"	"	SS3	"	"	"	6.0 - 7.5	Clay	A-6	-	-	-	-	-	-	-
"	"	SS4	"	"	"	8.5 - 10.0	"	"	-	-	-	-	-	-	-
42	"	SS1	36 + 16	49LT A	770.0	1.0 - 2.5	Clay	A-6	-	-	-	-	-	-	-
"	"	SS2	"	"	"	3.5 - 5.0	Loam	A-4	-	-	-	-	-	-	-
"	"	SS3	"	"	"	6.0 - 7.5	Clay	A-6(14)	-	-	-	-	-	-	-
43	Nonmouth Road over St. Mary's River	SS1	18 + 27	12RT	788.2	1.0 - 2.5	Silty Loam (fill)	-	-	-	-	-	-	-	-
"	"	SS2	"	"	"	3.5 - 5.0	"	-	-	-	-	-	-	-	-
"	"	SS3	"	"	"	6.0 - 7.5	Clay Loam	A-6(10)	-	-	-	-	-	-	-
"	"	SS4	"	"	"	8.5 - 10.0	"	A-6(10)	-	-	-	-	-	-	-
"	"	SS5	"	"	"	13.5 - 15.0	Clay	A-6(14)	-	-	-	-	-	-	-
"	"	SS6	"	"	"	18.5 - 20.0	"	"	-	-	-	-	-	-	-
"	"	SS7	"	"	"	23.5 - 25.0	Sand	A-1-b(0)	-	-	-	-	-	-	-
"	"	RC1	"	"	"	26.0 - 31.0	Dolomite	-	-	-	-	-	-	-	-
44	"	SS1	19 + 13	10LT	760.5	1.0 - 2.5	Silty Clay	A-6	-	-	-	-	-	-	-
"	"	SS2	"	"	"	3.5 - 5.0	Sand	A-1-b	-	-	-	-	-	-	-
"	"	RC1	"	"	"	5.2 - 10.2	Dolomite	-	-	-	-	-	-	-	-
45	"	SS1	19 + 79	10RT	770.3	1.0 - 2.5	Silty Clay	A-6(17)	-	-	-	-	-	-	-
"	"	SS2	"	"	"	3.5 - 5.0	"	"	-	-	-	-	-	-	-
"	"	SS3	"	"	"	6.0 - 7.5	"	"	-	-	-	-	-	-	-
"	"	SS4	"	"	"	8.5 - 10.0	Sand	A-1-b	-	-	-	-	-	-	-
"	"	RC1	"	"	"	11.0 - 16.0	Dolomite	-	-	-	-	-	-	-	-
"	"	BAG	"	"	"	1.0 - 5.0	Silty Clay	A-6(17)	-	-	-	-	-	-	-
									0.0	3.2	54.2	42.6	35	17	18

APPENDIX A. (CONTINUED)

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description		AASHTO	Blow per Ft.	Grain Size Distribution			
							Texture				Gravel	Sand	Silt	Clay
46	Monmouth Road over St. Mary's River	SS1	20 + 60	10LT	783.0	1.0 - 2.5	Silty Loam (fill)		-	17				
"	"	SS2	"	"	"	3.5 - 5.0	"		-	16				
"	"	SS3	"	"	"	6.0 - 7.5	Clay (fill)		-	6				
"	"	SS4	"	"	"	8.5 - 10.0	"		-	18				
"	"	SS5	"	"	"	13.5 - 15.0	Clay Loam		A-6	21				
"	"	SS6	"	"	"	18.5 - 20.0	"		"	22				
"	"	SS7	"	"	"	23.5 - 25.0	Sand		A-1-b	50				
"	"	RC1	"	"	"	25.0 - 28.7	Dolomite		-	-				
47	"	SS1	21 + 26	15RT	785.0	1.0 - 2.5	Silty Loam (fill)		-	10				
"	"	SS2	"	"	"	3.5 - 5.0	"		-	9				
"	"	SS3	"	"	"	6.0 - 7.5	Clay Loam (fill)		-	11				
"	"	SS4	"	"	"	8.5 - 10.0	Clay Loam		A-6	16				
"	"	SS5	"	"	"	13.5 - 15.0	Clay		A-6	26				
"	"	SS6	"	"	"	18.5 - 20.0	"		"	29				
"	"	SS7	"	"	"	23.5 - 25.0	Sand		A-1-b	28				
"	"	RC1	"	"	"	25.5 - 30.5	Dolomite		-	-				
48	"	SS1	16 + 00	32RT	784.8	1.0 - 2.5	Silty Loam (fill)		-	18				
"	"	SS2	"	"	"	3.5 - 5.0	Sandy Loam (fill)		-	11				
"	"	SS3	"	"	"	6.0 - 7.5	Clay		A-6	21				
"	"	SS4	"	"	"	8.5 - 10.0	"		A-6	12				
49	SR 101 over Drake Ditch	SS1	161 + 53.5	10LT	789.0	3.5 - 5.0	Subgrade fill		-	9				
"	"	SS2	"	"	"	6.0 - 7.5	"		-	6				
"	"	SS3	"	"	"	8.5 - 10.0	Silty Loam (fill)		A-4	8				
"	"	SS4	"	"	"	13.5 - 15.0	Silty Loam		-	13				
"	"	SS5	"	"	"	18.5 - 19.5	Limestone		-	-				
50	"	SS1	161 + 82	9RT	789.4	3.5 - 5.0	Subgrade fill		-	8				
"	"	SS2	"	"	"	6.0 - 7.5	Sandy Loam (fill)		-	4				
"	"	SS3	"	"	"	8.5 - 10.0	Silty Loam		A-4	8				
"	"	SS4	"	"	"	13.5 - 15.0	"		-	10				
"	"	SS5	"	"	"	18.5 - 18.8	Limestone		-	-				
"	"	SS6	"	"	"	23.5 - 24.1	"		-	-				
"	"	RC1	"	"	"	24.9 - 29.9	"		-	-				
											6.4	29.1	53.2	11.3
												19.8	15.9	3.9

APPENDIX A. (CONTINUED)

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description		Blow per Ft.	Grain Size Distribution			
							Texture	AASHTO		Gravel	Sand	Silt	Clay
51	SR 101 over Drake	SS1	161 + 18	8.5RT	789.2	3.5 - 5.0	Subgrade fill	-	16				
"	"	SS2	"	"	"	6.0 - 7.5	Sandy Loam (fill)	-	5				
"	"	SS3	"	"	"	8.5 - 10.0	"	-	5				
"	"	SS4	"	"	"	13.5 - 15.0	Silty Loam	A-4	21				
"	"	SS5	"	"	"	18.5 - 19.4	"	"	125				
"	"	SS6	"	"	"	23.5 - 24.1	Limestone	-	-				
52	"	SS1	162 + 37	10RT	788.8	3.5 - 5.0	Subgrade fill	-	4				
"	"	SS2	"	"	"	6.0 - 7.5	Silty Loam (fill)	A-4	7				
"	"	SS3	"	"	"	8.5 - 10.0	Silty Loam	"	9				
"	"	SS4	"	"	"	13.5 - 14.85	"	-	182				
"	"	SS5	"	"	"	18.5 - 18.9	Limestone	-	-				
53	"	CBR	163 + 40	30RT	783.4	1.0 - 3.0	Silty Clay Loam	A-6(9)	-	4.5	19.4	55.9	20.2 35.5 22.7 12.8
54	US 27 over Wabash River	1	185 + 85	20LT	821.3	0.0 - 2.5	Silty Clay Loam	-	8				
"	"	2	"	"	"	2.5 - 5.0	"	-	16				
"	"	3	"	"	"	6.0 - 10.0	Sand	-	8				
"	"	4	"	"	"	11.0 - 15.0	Silty Clay Loam	-	3				
"	"	5	"	"	"	15.5 - 20.0	Sand	-	7				
"	"	6	"	"	"	20.5 - 25.0	Clay	-	33				
"	"	7	"	"	"	25.0 - 29.0	Silty Clay	-	37				
"	"	8	"	"	"	31.0 - 35.0	Clay	-	11				
"	"	9	"	"	"	36.0 - 38.0	Sandy Loam	-	19				
"	"	10	"	"	"	40.0 - 45.0	Silty Clay Loam	-	28				
"	"	11	"	"	"	45.0 - 50.0	"	-	30				
"	"	12	"	"	"	50.0 - 51.5	"	-	28				

APPENDIX A. (CONTINUED)

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description		Blow per Ft.	Grain Size Distribution			
							Texture	AASHTO		Gravel	Sand	Silt	Clay
55	US 27 over Wabash River	1	186 + 40	20RT	822.5	0.0 - 2.5	Silty Clay Loam	-	3				
"	"	2	"	"	"	2.5 - 5.0	"	-	8				
"	"	3	"	"	"	5.0 - 10.0	"	-	10				
"	"	4	"	"	"	10.5 - 14.0	Sand & Gravel	-	7				
"	"	5	"	"	"	15.5 - 20.0	"	-	11				
"	"	6	"	"	"	20.0 - 25.0	Sand	-	20				
"	"	7	"	"	"	25.5 - 30.0	Silty Clay	-	11				
"	"	8	"	"	"	30.0 - 35.0	"	-	15				
"	"	9	"	"	"	35.0 - 38.0	Sand	-	20				
"	"	10	"	"	"	40.0 - 42.5	Silty Clay	-	30				
"	"	11	"	"	"	45.0 - 50.0	Silty Clay Loam	-	17				
"	"	12	"	"	"	50.5 - 53.0	Sand	-	3				
"	"	13	"	"	"	53.0 - 55.0	Silty Clay Loam	-	17				
"	"	14	"	"	"	55.0 - 60.0	"	-	26				
"	"	15	"	"	"	60.0 - 65.0	"	-	17				
"	"	16	"	"	"	65.0 - 68.0	"	-	35				
"	"	17	"	"	"	70.0 - 71.5	Sand	-	27				
56	"	1	186 + 75	20LT	809.0	0.0 - 1.0	Silty Loam	-	-				
"	"	2	"	"	"	2.5 - 5.0	Silty Clay Loam	-	7				
"	"	3	"	"	"	7.5 - 12.5	Silty Loam	-	12				
"	"	4	"	"	"	12.5 - 16.5	"	-	15				
"	"	5	"	"	"	17.5 - 22.0	Sand	-	22				
"	"	6	"	"	"	22.5 - 26.0	Silty Clay	-	42				
"	"	7	"	"	"	28.5 - 30.0	Sand	-	35				
"	"	8	"	"	"	30.0 - 31.5	"	-	29				
57	"	1	187 + 60	25RT	811.4	0.8 - 6.0	Sand & Gravel	-	-				
"	"	2	"	"	"	6.5 - 8.0	Sand	-	6				
"	"	3	"	"	"	10.0 - 13.0	Snd & Gravel	-	11				
"	"	4	"	"	"	15.0 - 17.5	Sand	-	13				
"	"	5	"	"	"	20.0 - 25.0	Silty Clay Loam	-	28				
"	"	6	"	"	"	25.0 - 30.0	"	-	18				
"	"	7	"	"	"	31.0 - 35.0	Sand	-	39				
"	"	8	"	"	"	35.0 - 36.5	Clay	-	42				

APPENDIX A. (CONTINUED)

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description		Blow per Ft.	Grain Size Distribution				LL	PL	PI
							Texture	AASHTO		Gravel	Sand	Silt	Clay			
61	CR 150 W over Wabash River	SS1	16 + 23	8RT	815.8	1.0 - 2.5	Clay Loam	A-4	2							
"	"	SS2	"	"	"	3.5 - 5.0	Silty Loam	"	3							
"	"	SS3	"	"	"	6.0 - 7.5	"	"	15							
"	"	SS4	"	"	"	8.5 - 10.0	"	"	20							
"	"	SS5	"	"	"	13.5 - 15.0	Sandy Loam	A-4(0)	13							
"	"	SS6	"	"	"	18.5 - 20.0	Clay Loam	A-4(4)	8							
"	"	SS7	"	"	"	23.5 - 25.0	"	"	18							
"	"	SS8	"	"	"	28.5 - 30.0	"	"	48							
"	"	SS9	"	"	"	33.5 - 35.0	Sand	A-3(0)	35							
"	"	SS10	"	"	"	38.5 - 40.0	"	"	30							
"	"	SS11	"	"	"	43.5 - 45.0	"	"	30							
"	"	SS12	"	"	"	48.5 - 50.0	"	"	27							
62	"	SS1	17 + 00	15LT	818.7	1.0 - 2.5	Clay	A-7-6(31)	8							
"	"	SS2	"	"	"	3.5 - 5.0	Sand	A-3	6							
"	"	SS3	"	"	"	6.0 - 7.5	"	"	10							
"	"	SS4	"	"	"	8.5 - 10.0	"	A-2-4(0)	14							
"	"	SS5	"	"	"	13.5 - 15.0	Clay Loam	A-4	13							
"	"	SS6	"	"	"	18.5 - 20.0	"	"	19							
"	"	SS7	"	"	"	23.5 - 25.0	"	"	22							
"	"	SS8	"	"	"	28.5 - 30.0	"	"	33							
"	"	BAG	"	"	"	0.5 - 3.0	Clay	A-7-6(31)	-							
63	CR 300 W over Wabash River	SS1	17 + 06	7LT A	824.0	3.5 - 5.0	Clay Loam	-	10							
"	"	SS2	"	"	"	8.5 - 10.0	Sand	-	18							
"	"	SS3	"	"	"	13.5 - 15.0	Silty Clay Loam	-	45							
"	"	SS4	"	"	"	18.5 - 20.0	Weathered Lime-stone	-	167							
"	"	RC1	"	"	"	20.0 - 25.3	Limestone	-	-							
64	"	SS1	17 + 73	11RT A	811.3	1.0 - 2.5	Gravelly Sand	-	13							
"	"	SS2	"	"	"	3.5 - 5.0	Silty Clay Loam	-	19							
"	"	SS3	"	"	"	6.0 - 7.5	"	-	24							
"	"	SS4	"	"	"	8.5 - 10.0	"	-	29							
"	"	SS5	"	"	"	11.0 - 12.2	Weathered Lime-stone	-	250							
"	"	RC1	"	"	"	12.2 - 17.2	Limestone	-	-							
										0.0	3.5	44.6	51.9	53	25	28

APPENDIX A. (CONTINUED)

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description		Blow per Ft.	Grain Size Distribution			
							Texture	AASHTO		Gravel	Sand	Silt	Clay
65	CR 300 W over Wabash River	SS1	18 + 23	6LT A	808.8	1.0 - 2.5	Silty Clay Loam	-	17				
"	"	SS2	"	"	"	3.5 - 5.0	"	-	18				
"	"	SS3	"	"	"	6.0 - 7.5	"	-	21				
"	"	SS4	"	"	"	8.5 - 9.5	Silty Clay Loam	-	250				
"	"	RC1	"	"	"	10.0 - 15.0	Limestone	-	-				
66	"	SS1	18 + 82	11RT A	826.0	3.5 - 5.0	Silty Loam	-	19				
"	"	SS2	"	"	"	8.5 - 10.0	"	-	27				
"	"	SS3	"	"	"	13.5 - 15.0	Silty Clay Loam	-	23				
"	"	SS4	"	"	"	18.5 - 20.0	"	-	48				
"	"	SS5	"	"	"	22.0 - 22.5	"	-	-				
67	SR 116 over Wabash River 1.0 mile East of US 27	SS1	992 + 37	16LT	832.5	1.0 - 2.5	Clay Loam (fill)	-	10				
"	"	SS2	"	"	"	3.5 - 4.5	Silty Clay Loam (fill)	-	10				
"	"	SS3	"	"	"	6.0 - 7.5	Clay	A-6	16				
"	"	SS4	"	"	"	8.5 - 10.0	"	"	16				
"	"	SS5	"	"	"	13.5 - 15.0	Sandy Loam	-	6				
"	"	SS6	"	"	"	18.5 - 20.0	Sand & Gravel	A-1-b	11				
"	"	SS7	"	"	"	23.5 - 25.0	"	"	32				
"	"	SS8	"	"	"	28.5 - 30.0	"	"	27				
"	"	SS9	"	"	"	33.5 - 35.0	"	"	25				
"	"	SS10	"	"	"	38.5 - 40.0	"	"	43				
"	"	SS11	"	"	"	43.5 - 45.0	Sand	-	40				
68	"	SS1	993 + 24	26RT	817.9	1.0 - 2.5	Silty Clay Loam	-	7				
"	"	SS2	"	"	"	3.5 - 5.0	Sand	A-1-b	14				
"	"	SS3	"	"	"	6.0 - 7.5	"	"	14				
"	"	SS4	"	"	"	8.5 - 10.0	"	"	18				
"	"	SS5	"	"	"	13.5 - 15.0	"	A-1-b(0)	36				
"	"	SS6	"	"	"	19.0 - 20.0	Silty Clay	-	63				
"	"	SS7	"	"	"	23.5 - 25.0	Sand	A-1-b	17				
"	"	SS8	"	"	"	28.5 - 30.0	Clay	A-6	23				
"	"	SS9	"	"	"	34.0 - 35.0	Sand	A-1-b	28				
"	"	SS10	"	"	"	38.5 - 40.0	Silt	A-4(0)	16				
"	"	SS11	"	"	"	43.5 - 45.0	"	"	19				
"	"	SS12	"	"	"	48.5 - 50.0	"	"	18				
										16.9	75.8	7.3	
										0.0	7.6	80.7	11.7

APPENDIX A. (CONTINUED)

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description		Blow per Ft.	Grain Size Distribution			
							Texture	AASHTO		Gravel	Sand	Silt	Clay
69	SR 116 over Wabash River 1.0 mile East of US 27	SS1	993 + 98	13LT	822.7	1.0 - 2.5	Clay Loam	-	6				
"	"	SS2	"	"	"	3.5 - 4.5	"	-	6				
"	"	SS3	"	"	"	6.0 - 6.5	Clay	A-6	3				
"	"	SS4	"	"	"	8.5 - 10.0	Gravelly Sand	A-1-b(0)	16	31.0	60.4	8.6	
"	"	SS5	"	"	"	13.5 - 15.0	"	"	30				
"	"	SS6	"	"	"	18.5 - 19.5	"	"	37				
"	"	SS7	"	"	"	23.5 - 25.0	Sand & Gravel	A-1-b	49				
"	"	SS8	"	"	"	28.5 - 30.0	Sand	"	18				
70	"	SS1	994 + 85	33RT	825.5	1.0 - 2.5	Clay	A-6(9)	18				
"	"	SS2	"	"	"	3.5 - 5.0	"	"	16				
"	"	SS3	"	"	"	6.5 - 7.5	Sandy Loam	-	5				
"	"	SS4	"	"	"	8.5 - 10.0	Silty Clay Loam	-	3				
"	"	SS5	"	"	"	13.5 - 15.0	Sand & Gravel	A-1-b(0)	18	47.7	45.8	6.5	
"	"	SS6	"	"	"	18.5 - 20.0	"	"	34				
"	"	SS7	"	"	"	23.5 - 24.5	Clay	A-6	36				
"	"	SS8	"	"	"	29.0 - 30.0	"	"	31				
"	"	SS9	"	"	"	33.5 - 35.0	Sand & Gravel	A-1-b	28				
"	"	BS1	"	"	"	3.0 - 5.0	Clay	A-6(9)	-	0.2	28.2	41.2	30.4
71	"	SS1	991 + 00	36LT	827.2	1.0 - 2.5	Clay	A-6	14				
"	"	SS2	"	"	"	3.5 - 5.0	"	"	26				
"	"	SS3	"	"	"	6.5 - 7.5	Sand	A-1-b	9				
72	"	SS1	997 + 00	71LT	826.0	1.0 - 2.5	Clay Loam	-	7				
"	"	SS2	"	"	"	3.5 - 5.0	Clay	A-6	17				
"	"	SS3	"	"	"	6.0 - 7.5	"	"	13				

APPENDIX A. (CONTINUED)

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description		Blow per Ft.	Grain Size Distribution			
							Texture	AASHTO		Gravel	Sand	Silt	Clay
73	US 27 over	1	59 + 45	25LT	826.8	0.0 - 2.5	Silty Clay Loam	-	7				
"	Loblolly Creek	2	"	"	"	2.5 - 5.0	"	-	8				
"	"	3	"	"	"	5.0 - 8.0	"	-	8				
"	"	4	"	"	"	10.0 - 15.4	"	-	5				
"	"	5	"	"	"	15.4 - 20.0	Silty Loam	-	14				
"	"	6	"	"	"	20.0 - 23.0	"	-	14				
"	"	7	"	"	"	25.0 - 28.0	Loam	-	19				
"	"	8	"	"	"	30.0 - 35.0	Silty Clay Loam	-	19				
"	"	9	"	"	"	35.0 - 40.0	"	-	14				
"	"	10	"	"	"	40.0 - 45.0	Sand	-	26				
"	"	11	"	"	"	45.0 - 48.0	"	-	21				
"	"	12	"	"	"	50.0 - 51.5	"	-	57				
74	"	1	60 + 00	20RT	824.0	0.0 - 2.5	Silty Clay Loam	-	4				
"	"	2	"	"	"	2.5 - 5.0	"	-	6				
"	"	3	"	"	"	5.0 - 10.0	"	-	11				
"	"	4	"	"	"	10.0 - 15.0	"	-	10				
"	"	5	"	"	"	15.0 - 20.0	"	-	14				
"	"	6	"	"	"	20.5 - 24.0	Sand	-	20				
"	"	7	"	"	"	25.0 - 30.0	Silty Clay Loam	-	24				
"	"	8	"	"	"	30.0 - 35.0	"	-	17				
"	"	9	"	"	"	36.0 - 40.0	Sand	-	18				
"	"	10	"	"	"	40.0 - 41.5	Sand	-	19				
75	"	1	60 + 60	30LT	823.9	0.0 - 2.0	Silty Loam	-	-				
"	"	2	"	"	"	2.5 - 4.5	Silty Clay Loam	-	14				
"	"	3	"	"	"	5.0 - 8.0	Silty Clay	-	15				
"	"	4	"	"	"	10.0 - 13.0	Silty Clay Loam	-	8				
"	"	5	"	"	"	15.0 - 20.0	Silty Loam	-	11				
"	"	6	"	"	"	20.0 - 23.0	"	-	11				
"	"	7	"	"	"	25.0 - 30.0	Silty Clay Loam	-	23				
"	"	8	"	"	"	30.0 - 35.0	"	-	10				
"	"	9	"	"	"	35.0 - 38.0	"	-	17				
"	"	10	"	"	"	40.0 - 45.0	Silty Clay	-	16				
"	"	11	"	"	"	45.5 - 48.0	Sand & Gravel	-	337				
"	"	12	"	"	"	51.0 - 53.0	Silt	-	337				
"	"	13	"	"	"	55.0 - 56.5	Silty Clay	-	51				

APPENDIX A. (CONTINUED)

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description		Blow per Ft.	Grain Size Distribution			
							Texture	AASHTO		Gravel	Sand	Silt	Clay
76	US 27 over Loblolly Creek	1	61 + 00	15RT	827.8	0.0 - 2.5	Silty Loam	-	-				
"	"	2	"	"	"	2.5 - 5.0	"	-	10				
"	"	3	"	"	"	5.0 - 10.0	"	-	6				
"	"	4	"	"	"	10.5 - 13.0	Silty Clay Loam	-	5				
"	"	5	"	"	"	15.0 - 18.0	Clay	-	9				
"	"	6	"	"	"	20.0 - 24.5	Clay Loam	-	15				
"	"	7	"	"	"	25.5 - 28.0	Sandy Loam	-	11				
"	"	8	"	"	"	30.0 - 35.0	Silty Clay Loam	-	16				
"	"	9	"	"	"	35.0 - 40.0	"	-	15				
"	"	10	"	"	"	40.5 - 45.0	Sand	-	10				
"	"	11	"	"	"	46.0 - 48.0	Sandy Loam	-	13				
"	"	12	"	"	"	50.0 - 53.0	Sand	-	59				
"	"	13	"	"	"	55.0 - 60.0	Loam	-	92				
"	"	14	"	"	"	60.5 - 63.0	Sandy Loam	-	47				
"	"	15	"	"	"	65.0 - 66.5	Sand	-	54				
77	SR 116 over Brewster Ditch	SS1	1200 + 01	17RT	840.4	1.0 - 2.5	Clay Loam (fill)	A-7-6	10				
"	"	SS2	"	"	"	3.5 - 5.0	Clay	A-6(14)	10				
"	"	SS3	"	"	"	6.0 - 7.5	"	"	17				
"	"	SS4	"	"	"	8.5 - 10.0	"	"	35				
"	"	SS5	"	"	"	13.5 - 15.0	"	"	22				
"	"	SS6	"	"	"	18.5 - 20.0	Clay Loam	A-6(5)	23				
"	"	SS7	"	"	"	23.5 - 25.0	Limestone	-	-				
"	"	SS8	"	"	"	28.5 - 30.0	"	-	-				
"	"	SS9	"	"	"	32.0 - 32.2	"	-	-				
78	"	SS1	1200 + 50	8.5LT	842.6	3.5 - 5.0	Subgrade fill	-	13				
"	"	SS2	"	"	"	6.0 - 7.5	Clay	A-6(14)	16				
"	"	SS3	"	"	"	8.5 - 10.0	Silt and Clay	-	10				
"	"	SS4	"	"	"	13.5 - 15.0	Loam	A-4(0)	34				
"	"	SS5	"	"	"	18.5 - 20.0	Limestone	-	22				
"	"	SS6	"	"	"	23.5 - 25.0	"	-	16				
"	"	SS7	"	"	"	28.5 - 30.0	"	-	22				

APPENDIX A. (CONTINUED)

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description	Blow per Ft.	Grain Size Distribution			
									Gravel	Sand	Silt	Clay
84	US 33	SS1	94 + 00	34LT	799.0	0.0 - 1.5	Topsoil	-				
"	Connector	SS2	"	"	"	1.5 - 3.0	Clay	A-7-6(19)				
"	from US 27	SS3	"	"	"	3.5 - 5.0	"	"				
"	to existing	SS4	"	"	"	6.0 - 7.5	"	"				
"	US 33	BS1	"	"	"	1.1 - 3.0	"	"				
85	"	SS1	100 + 70	55LT	805.0	0.0 - 1.5	Topsoil	-				
"	"	SS2	"	"	"	1.5 - 3.0	Clay	A-7-6				
"	"	SS3	"	"	"	3.5 - 5.0	"	"				
"	"	SS4	"	"	"	6.0 - 8.0	"	"				
86	"	SS1	105 + 00	10LT	805.9	0.0 - 1.5	Topsoil	-				
"	"	SS2	"	"	"	1.5 - 3.0	Clay	A-7-6				
"	"	SS3	"	"	"	3.5 - 5.0	"	"				
"	"	SS4	"	"	"	6.0 - 7.5	"	"				
87	"	SS1	118 + 00	10RT	805.4	0.0 - 1.5	Topsoil	-				
"	"	SS2	"	"	"	1.5 - 3.0	Clay	A-7-6				
"	"	SS3	"	"	"	3.5 - 5.0	"	"				
"	"	SS4	"	"	"	6.0 - 7.5	"	"				
88	"	SS1	124 + 67	94LT	787.3	0.0 - 1.5	Sandy Loam	-				
"	"	SS2	"	"	"	1.5 - 3.0	Silty Clay Loam	A-6				
"	"	SS3	"	"	"	3.5 - 5.0	"	"				
"	"	SS4	"	"	"	6.0 - 7.5	Clay Loam	A-4				
"	"	SS5	"	"	"	8.5 - 10.0	"	"				
"	"	SS6	"	"	"	13.5 - 15.0	Sandy Loam	"				
"	"	SS7	"	"	"	18.5 - 20.0	Silty Clay Loam	A-6				
"	"	SS8	"	"	"	23.5 - 25.0	Loam	A-4				
"	"	SS9	"	"	"	28.5 - 30.0	"	A-4				

0.6 16.8 44.8 37.8 43 20 23

APPENDIX A. (CONTINUED)

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description		Blow per Ft.	Grain Size Distribution			
							Texture	AASHTO		Gravel	Sand	Silt	Clay
89	US 33	SS1	124 + 85	47RT	793.9	0.0 - 1.5	Topsoil	-	6				
"	Connector	SS2	"	"	"	1.5 - 3.0	Clay	A-7-6	12				
"	from US 27	SS3	"	"	"	3.5 - 5.0	"	"	7				
"	to existing	SS4	"	"	"	6.0 - 7.5	"	"	9				
"	US 33	SS5	"	"	"	8.5 - 10.0	"	"	13				
"	"	SS6	"	"	"	13.5 - 15.0	Clay Loam	A-4	7				
"	"	SS7	"	"	"	18.5 - 20.0	Loam	A-4(0)	19				
"	"	SS8	"	"	"	23.5 - 25.0	Sand	A-3(0)	8				
"	"	SS9	"	"	"	28.0 - 30.0	"	"	18				
90	"		142 + 30	100LT	800.9	0.0 - 1.0	Topsoil	-	-				
"	"		"	"	"	1.0 - 6.5	Clay	-	-				
91	"	SS1	152 + 36	65RT	802.3	0.0 - 1.5	Silty Clay Loam (fill)	-	8				
"	"	SS2	"	"	"	1.5 - 3.0	"	-	12				
"	"	SS3	"	"	"	3.5 - 5.0	Clay	A-7-6	11				
"	"	SS4	"	"	"	6.0 - 7.5	"	"	28				
92	"	SS1	160 + 00	82LT	803.9	0.0 - 1.5	Topsoil	-	4				
"	"	SS2	"	"	"	1.5 - 3.0	Silty Clay Loam	A-6	16				
"	"	SS3	"	"	"	3.5 - 5.0	Clay	A-7-6	25				
"	"	SS4	"	"	"	6.0 - 7.5	"	"	27				
93	"	SS1	169 + 00	86LT	805.3	0.0 - 1.5	Silty Clay Loam	A-6	6				
"	"	SS2	"	"	"	1.5 - 3.0	"	"	9				
"	"	SS3	"	"	"	3.5 - 5.0	"	"	5				
"	"	SS4	"	"	"	6.0 - 7.5	Clay	A-7-6	25				
94	"	SS2	178 + 90	10RT	802.9	0.0 - 1.5	Topsoil	-	4				
"	"	SS2	"	"	"	1.5 - 3.0	Clay	A-7-6	8				
"	"	SS3	"	"	"	3.5 - 5.0	"	"	8				
"	"	SS4	"	"	"	6.0 - 7.5	"	"	13				
95	"	SS1	187 + 00	12RT	802.0	0.0 - 1.5	Topsoil	-	6				
"	"	SS2	"	"	"	1.5 - 3.0	Clay	A-7-6	9				
"	"	SS3	"	"	"	3.5 - 5.0	"	"	8				
"	"	SS4	"	"	"	6.0 - 7.5	"	"	8				

10.0 38.5 37.5 14.0 18 14 4
1.0 89.5 9.6

APPENDIX A. (CONTINUED)

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample		Soil Description	Blow per Ft.	Grain Size Distribution			
						Depth	Texture			Gravel	Sand	Silt	Clay
96	US 33	SS1	193 + 00	CL AA	801.6	0.0 - 1.5	Topsoil	-	7				
"	Connector	SS2	"	"	"	1.5 - 3.0	Clay	A-7-6	12				
"	from US 27	SS3	"	"	"	3.5 - 5.0	"	"	6				
"	to existing	SS4	"	"	"	6.0 - 7.5	"	"	8				
	U.S. 33												
97	"	SS1	200 + 55	CL AA	801.5	0.0 - 1.5	Silty Clay Loam	A-6(10)	4	0.8	11.2	62.0	26.0
"	"	SS2	"	"	"	1.5 - 3.0	"	"	5				
"	"	SS3	"	"	"	3.5 - 5.0	Clay Loam	A-4	8				
"	"	SS4	"	"	"	6.0 - 7.5	Clay	A-7-6	16				
98	"	SS1	209 + 00	63RT	799.7	0.0 - 1.5	Silty Loam	-	5				
"	"	SS2	"	"	"	1.5 - 3.0	Clay (fill)	A-7-6	14				
"	"	SS3	"	"	"	3.5 - 5.0	Clay Loam	A-4	22				
"	"	SS4	"	"	"	6.0 - 7.5	"	"	26				
"	"	SS5	"	"	"	7.5 - 9.0	"	"	30				
99	"	SS1	214 + 65	23LT	782.1	0.0 - 1.5	Sandy Loam	A-4	10				
"	"	SS2	"	"	"	1.5 - 3.0	Clay	A-7-6	25				
"	"	SS3	"	"	"	3.5 - 5.0	Clay Loam	A-4	26				
"	"	SS4	"	"	"	6.0 - 7.5	"	"	21				
"	"	SS5	"	"	"	8.5 - 10.0	Clay	A-7-6	19				
"	"	SS6	"	"	"	13.5 - 15.0	Loam	A-4	54				
"	"	SS7	"	"	"	18.5 - 20.0	"	"	33				
"	"	SS8	"	"	"	23.5 - 25.0	Clay Loam	A-6	33				
"	"	SS9	"	"	"	28.5 - 30.0	Silty Clay	-	17				
100	"	SS1	215 + 00	23RT	787.4	0.0 - 1.5	Clay Loam	A-6	6				
"	"	SS2	"	"	"	1.5 - 3.0	"	"	7				
"	"	SS3	"	"	"	3.5 - 5.0	Clay	A-7-6	11				
"	"	SS4	"	"	"	6.0 - 7.5	"	"	20				
"	"	SS5	"	"	"	8.5 - 10.0	"	"	28				
"	"	SS6	"	"	"	13.5 - 15.0	Clay Loam	A-6	18				
"	"	SS7	"	"	"	18.5 - 20.0	"	"	55				
"	"	SS8	"	"	"	23.5 - 25.0	"	"	34				
"	"	SS9	"	"	"	28.5 - 30.0	"	"	33				

APPENDIX A. (CONTINUED)

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description	Blow per Ft.	Grain Size Distribution					LL	PL	PI
									AASHTO				Gravel			
101	US 33 Connector from US 27 to existing US 33	SS1	222 + 00	48RT	801.9	0.0 - 1.5	Clay Loam	A-6	3							
"		2SS	"	"	"	1.5 - 3.0	Clay	A-7-6	11							
"		3SS	"	"	"	3.5 - 5.0	"	"	22							
"		4SS	"	"	"	6.0 - 7.5	Clay Loam	A-4	28							
"		5SS	"	"	"	8.5 - 10.0	"	"	31							
102	"	SS1	229 + 12	CL AA	795.6	0.0 - 1.5	Topsoil	-	7							
"		SS2	"	"	"	1.5 - 3.0	Clay	A-7-6	5							
"		SS3	"	"	"	3.5 - 5.0	"	"	11							
"		SS4	"	"	"	6.0 - 7.5	"	"	23							
103	"	SS1	239 + 00	CL AA	799.0	0.0 - 1.5	Topsoil	-	6							
"		SS2	"	"	"	1.5 - 3.0	Clay	A-7-6	7							
"		SS3	"	"	"	3.5 - 5.0	"	"	10							
"		SS4	"	"	"	6.0 - 7.5	"	"	18							
104	"	SS1	248 + 00	25LT	799.8	0.0 - 1.5	Topsoil	-	5							
"		SS2	"	"	"	1.5 - 3.0	Clay	A-7-6	11							
"		SS3	"	"	"	3.5 - 5.0	"	"	12							
"		SS4	"	"	"	6.0 - 7.5	"	"	24							
105	"	SS1	255 + 00	42LT	782.0	1.0 - 1.5	Clay Loam	A-6(10)	7	1.1	25.2	47.2	26.5	38	24	14
"		SS2	"	"	"	1.5 - 3.0	"	"	11							
"		SS3	"	"	"	3.5 - 5.0	"	"	7							
"		SS4	"	"	"	6.0 - 7.5	"	A-4	22							
106	"	SS1	276 + 00	52LT	810.2	0.0 - 1.5	Clay Loam	A-6	6							
"		SS2	"	"	"	1.5 - 3.0	Clay	A-7-6	15							
"		SS3	"	"	"	3.5 - 5.0	"	"	27							
"		SS4	"	"	"	6.0 - 7.5	Clay	A-4	39							
107	"	SS1	39 + 62	20RT	792.9	0.0 - 1.5	Clay Loam	A-6	5							
"		SS2	"	"	"	1.5 - 3.0	"	"	5							
"		SS3	"	"	"	3.5 - 5.0	Clay	A-7-6	12							
"		SS4	"	"	"	6.0 - 7.5	"	"	21							
"		SS5	"	"	"	8.5 - 10.0	"	"	22							
"		SS6	"	"	"	12.5 - 14.0	Clay Loam	A-4	9							

APPENDIX A. (CONTINUED)

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description		Blow per Ft.	Grain Size Distribution			
							Texture	AASHTO		Gravel	Sand	Silt	Clay
108	US 33	SS1	45 + 00	31RT	802.0	0.0 - 1.5	Clay Loam	A-6	5				
"	Connector	SS2	"	"	"	1.5 - 3.0	"	"	8				
"	from US 27	SS3	"	"	"	3.5 - 5.0	Clay	A-7-6	12				
"	to existing	SS4	"	"	"	6.0 - 7.5	"	"	32				
	US 33												
109	"	SS1	51 + 58	CLT-400-AA	798.2	0.0 - 1.5	Silty Loam (fill)	-	7				
"	"	SS2	"	"	"	1.5 - 3.0	Clay (fill)	A-7-6	5				
"	"	SS3	"	"	"	3.5 - 5.0	Clay	"	7				
"	"	SS4	"	"	"	6.0 - 7.5	"	"	28				
110	"	SS1	48 + 00	16RT	795.9	1.0 - 1.5	Clay Loam	A-6	5				
"	"	SS2	"	"	"	1.5 - 3.0	Clay	A-7-6	8				
"	"	SS3	"	"	"	3.5 - 5.0	"	"	9				
"	"	SS4	"	"	"	6.0 - 7.5	"	"	15				
111	"	SS1	126 + 50	15RT	787.7	0.0 - 1.5	Silty Loam	-	2				
"	"	SS2	"	"	"	1.5 - 3.0	Clay	A-7-6	6				
"	"	SS3	"	"	"	3.5 - 5.0	"	"	8				
"	"	SS4	"	"	"	6.0 - 7.5	"	"	14				
112	"	SS1	132 + 00	8LT	795.6	1.0 - 1.5	Silty Clay Loam	-	5				
"	"	SS2	"	"	"	1.5 - 3.0	Clay	A-7-6	14				
"	"	SS3	"	"	"	3.5 - 5.0	"	"	17				
"	"	SS4	"	"	"	6.0 - 8.0	"	"	27				
113	"	SS1	52 + 45	25RT	802.9	1.0 - 1.5	Clay Loam	A-6	2				
"	"	SS2	"	"	"	1.5 - 3.0	Clay	A-7-6	8				
"	"	SS3	"	"	"	3.5 - 5.0	"	"	25				
"	"	SS4	"	"	"	6.0 - 7.5	"	"	37				
114	SR 124 over Blue Creek	SS1	976 + 62	21.5RT	796.0	1.0 - 2.5	Clay Loam (fill)	-	8				
"	"	SS2	"	"	"	3.5 - 5.0	"	-	12				
"	"	SS3	"	"	"	6.0 - 7.5	"	-	13				
"	"	SS4	"	"	"	8.5 - 10.0	Clay Loam	A-6	15				
"	"	SS5	"	"	"	13.5 - 15.0	Clay	A-7-6	20				
"	"	SS6	"	"	"	18.5 - 20.0	Sand	-	44				
"	"	SS7	"	"	"	23.5 - 25.0	Loam	-	64				
"	"	RC1	"	"	"	28.5 - 33.5	Limestone	-	-				

APPENDIX B

PHYSICAL AND CHEMICAL PROPERTIES OF AGRICULTURAL SOILS IN ADAMS COUNTY

APPENDIX B. PHYSICAL AND CHEMICAL PROPERTIES OF AGRICULTURAL SOILS IN ADAMS COUNTY (1).

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cm ³	In/hr	In/in	pH					Pct
Am----- Armiesburg	0-20	25-35	1.30-1.45	0.6-2.0	0.21-0.23	6.1-7.3	Moderate-----	0.28	5	6	2-4
	20-60	30-35	1.30-1.45	0.6-2.0	0.18-0.20	6.1-7.8	Moderate-----	0.28			
BcA, BcB----- Blount	0-9	22-27	1.35-1.55	0.6-2.0	0.20-0.24	5.1-7.3	Low-----	0.43	3	6	2-3
	9-39	35-50	1.40-1.70	0.06-0.2	0.12-0.19	4.5-6.5	Moderate-----	0.43			
	39-60	27-38	1.60-1.85	0.06-0.2	0.07-0.10	7.4-8.4	Moderate-----	0.43			
Ch----- Chagrin	0-10	10-27	1.20-1.40	0.6-2.0	0.20-0.24	5.6-7.3	Low-----	0.32	5	5	2-4
	10-45	18-30	1.20-1.50	0.6-2.0	0.14-0.20	5.6-7.3	Low-----	0.32			
	45-60	5-25	1.20-1.40	0.6-2.0	0.08-0.20	5.6-7.3	Low-----	0.32			
GoB----- Glynwood	0-8	16-27	1.25-1.50	0.6-2.0	0.20-0.24	5.6-7.3	Low-----	0.43	3	6	1-3
	8-34	35-55	1.45-1.75	0.06-0.2	0.11-0.18	4.5-7.8	Moderate-----	0.32			
	34-60	27-36	1.65-1.85	0.06-0.2	0.06-0.10	7.4-8.4	Moderate-----	0.32			
HaA----- Haskins	0-9	12-20	1.30-1.45	0.6-2.0	0.18-0.22	5.1-7.3	Low-----	0.37	4	5	1-4
	9-27	18-35	1.45-1.70	0.6-2.0	0.12-0.16	4.5-7.3	Low-----	0.37			
	27-60	27-40	1.60-1.80	0.06-0.2	0.08-0.12	6.1-8.4	Moderate-----	0.37			
Ho----- Houghton	0-60	---	0.15-0.45	0.2-6.0	0.35-0.45	5.6-7.8	-----	---	2	2	>70
McA, McB----- Martinsville	0-10	14-18	1.40-1.55	0.6-2.0	0.15-0.18	5.6-6.5	Low-----	0.24	5	3	1-2
	10-26	22-33	1.50-1.60	0.6-2.0	0.14-0.19	4.5-5.5	Moderate-----	0.32			
	26-41	14-18	1.40-1.60	0.6-2.0	0.12-0.15	4.5-5.5	Low-----	0.24			
	41-44	8-12	1.60-1.75	6.0-20	0.09-0.11	4.5-6.5	Low-----	0.17			
	44-65	10-25	1.45-1.65	0.6-2.0	0.13-0.15	5.6-7.3	Low-----	0.28			
	65-80	0-7	1.70-1.90	6.0-20	0.02-0.04	7.4-8.4	Low-----	0.10			
Mh----- Milford	0-11	35-42	1.30-1.50	0.6-2.0	0.12-0.23	5.6-7.3	High-----	0.28	5	4	5-6
	11-43	35-42	1.40-1.65	0.2-0.6	0.18-0.20	5.6-7.8	Moderate-----	0.43			
	43-60	20-30	1.50-1.70	0.2-0.6	0.20-0.22	6.6-8.4	Moderate-----	0.43			
Mk----- Montgomery	0-12	40-48	1.40-1.60	0.2-0.6	0.12-0.14	6.1-7.8	High-----	0.37	5	4	3-6
	12-27	40-55	1.45-1.65	0.06-0.2	0.11-0.18	6.1-7.8	High-----	0.37			
	27-60	35-48	1.50-1.70	0.06-0.2	0.18-0.20	7.4-8.4	Moderate-----	0.37			
MoC2, MoD2----- Morley	0-9	27-35	1.40-1.60	0.2-0.6	0.18-0.22	5.1-6.5	Moderate-----	0.43	2	7	1-3
	9-20	35-50	1.55-1.70	0.2-0.6	0.11-0.15	6.1-7.8	Moderate-----	0.43			
	20-29	27-50	1.60-1.80	0.06-0.2	0.07-0.12	6.1-8.4	Moderate-----	0.43			
	29-60	27-40	1.60-1.80	0.06-0.2	0.07-0.12	6.1-8.4	Moderate-----	0.43			
Na----- Nappanee	0-8	20-27	1.30-1.50	0.6-2.0	0.20-0.24	5.1-7.3	Low-----	0.43	3	6	1-3
	8-25	45-60	1.40-1.80	0.06-0.2	0.08-0.14	5.1-7.8	Moderate-----	0.32			
	25-60	35-50	1.60-1.85	0.06-0.2	0.06-0.12	7.4-8.4	Moderate-----	0.32			
Pm----- Pewamo	0-12	40-45	1.35-1.55	0.2-0.6	0.12-0.20	6.1-7.3	Moderate-----	0.24	5	4	3-5
	12-55	35-50	1.40-1.70	0.2-0.6	0.12-0.20	5.6-7.8	Moderate-----	0.24			
	55-60	30-40	1.50-1.75	0.2-0.6	0.14-0.18	7.4-8.4	Moderate-----	0.24			
Px Pits											
RdB----- Rawson	0-8	12-20	1.35-1.50	0.6-2.0	0.18-0.22	4.5-7.3	Low-----	0.32	4-3	5	1-3
	8-24	18-35	1.50-1.70	0.6-2.0	0.12-0.16	5.1-7.8	Low-----	0.32			
	24-60	35-55	1.60-1.85	0.06-0.2	0.08-0.12	6.6-8.4	Moderate-----	0.32			
SaB2----- St. Clair	0-8	27-40	1.50-1.60	0.2-2.0	0.17-0.23	5.6-7.3	Moderate-----	0.37	2	7	1-3
	8-36	35-55	1.35-1.70	0.06-0.2	0.10-0.12	4.5-7.3	High-----	0.37			
	36-60	35-55	1.60-1.75	0.06-0.2	0.09-0.11	7.4-8.4	High-----	0.37			

APPENDIX B (CONTINUED)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cm ³	In/hr	In/in	pH					Pct
Sc----- Saranac	0-12	40-50	0.90-1.50	0.2-0.6	0.12-0.20	6.1-7.3	Moderate----	0.24	5	4	4-6
	12-38	27-60	1.30-1.80	0.2-0.6	0.10-0.20	6.1-7.3	Moderate----	0.24			
	38-60	10-35	1.40-1.95	0.2-0.6	0.10-0.20	6.1-7.3	Low-----	0.24			
Sh----- Shoals	0-9	27-32	1.35-1.55	0.6-2.0	0.21-0.23	6.1-7.8	Moderate----	0.37	5	7	2-5
	9-57	18-33	1.35-1.55	0.6-2.0	0.17-0.22	6.1-7.8	Low-----	0.37			
	57-60	12-25	1.35-1.60	0.6-2.0	0.12-0.21	6.6-8.4	Low-----	0.37			
Sl----- Sloan	0-13	15-27	1.20-1.40	0.6-2.0	0.20-0.24	6.1-7.8	Low-----	0.37	5	6	3-6
	13-33	22-35	1.25-1.55	0.6-2.0	0.15-0.19	6.1-8.4	Moderate----	0.37			
	33-60	10-30	1.20-1.50	0.6-2.0	0.13-0.18	6.6-8.4	Low-----	0.37			
Tc----- Tice	0-12	22-35	1.25-1.45	0.6-2.0	0.21-0.24	6.1-7.8	Moderate----	0.32	5	7	2-3
	12-51	27-35	1.30-1.50	0.6-2.0	0.18-0.20	5.6-7.8	Moderate----	0.32			
	51-60	15-30	1.40-1.60	0.6-2.0	0.11-0.18	6.1-7.8	Moderate----	0.32			
Ud Udorthents											
Wh----- Whitaker	0-11	8-19	1.30-1.45	0.6-2.0	0.20-0.24	5.6-7.3	Low-----	0.37	5	5	1-3
	11-53	18-30	1.40-1.60	0.6-2.0	0.15-0.19	5.1-6.0	Moderate----	0.37			
	53-60	3-18	1.50-1.70	0.6-6.0	0.19-0.21	6.1-8.4	Low-----	0.37			

APPENDIX C

ENGINEERING INDEX PROPERTIES OF AGRICULTURAL SOILS IN ADAMS COUNTY

APPENDIX C. ENGINEERING INDEX PROPERTIES OF AGRICULTURAL SOILS IN ADAMS COUNTY (1).

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches Pet	Percentage passing sieve number--				Liquid limit Pet	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
Am----- Armiesburg	0-20	Silty clay loam	CL, CH	A-6, A-7	0	100	100	95-100	85-95	35-55	20-35
	20-60	Silty clay loam	CL, CH	A-6, A-7	0	100	100	95-100	85-95	35-55	20-35
BcA, BcB----- Blount	0-9	Silt loam-----	CL	A-6, A-4	0-5	95-100	95-100	90-100	80-95	25-40	8-20
	9-39	Silty clay loam, silty clay, clay loam, clay.	CH, CL	A-7, A-6	0-5	95-100	90-100	80-90	75-85	35-60	15-35
	39-60	Silty clay loam, clay loam.	CL	A-6, A-7	0-10	90-100	90-100	80-100	70-90	30-45	10-25
Ch----- Chagrin	0-10	Loam-----	ML, CL, CL-ML	A-4	0	95-100	85-100	80-100	70-90	20-35	2-10
	10-45	Silt loam, loam, sandy loam, sandy clay loam.	ML, SM	A-4, A-2, A-6	0	90-100	75-100	55-90	30-80	20-40	NP-14
	45-60	Stratified silt loam to fine sand.	ML, SM	A-4, A-2	0	85-100	75-100	50-85	15-80	20-40	NP-10
GoB----- Glywood	0-8	Silt loam-----	CL-ML, CL	A-4, A-6	0	95-100	90-100	80-100	55-90	23-40	4-15
	8-34	Clay, clay loam, silty clay loam.	CL, CH	A-7, A-6	0-5	95-100	85-100	75-100	65-95	35-55	15-30
	34-60	Clay loam, silty clay loam.	CL	A-6, A-4	0-5	95-100	80-100	75-95	65-90	25-40	7-18
HaA----- Haskins	0-9	Loam-----	CL-ML, CL	A-4, A-6	0	95-100	85-100	70-100	55-90	25-40	5-20
	9-27	Clay loam, gravelly sandy clay loam, loam.	SC, CL	A-6, A-4, A-2	0	85-100	70-100	55-85	30-65	20-40	7-20
	27-60	Clay, silty clay, clay loam.	CH, CL	A-7, A-6	0	100	85-100	80-100	70-95	35-65	15-40
Ho----- Houghton	0-50	Sapric material	PT	A-8	0	---	---	---	---	---	---
McA, McB----- Martinsville	0-10	Loam-----	CL-ML, CL	A-4	0	100	90-100	70-100	60-90	20-25	5-9
	10-26	Clay loam, loam	CL	A-6, A-4	0	100	90-100	90-100	70-80	25-40	8-16
	26-41	Sandy loam, sandy clay loam.	SC, SM-SC, CL, CL-ML	A-2, A-4	0	100	90-100	60-90	30-80	20-25	5-9
	41-44	Sandy loam-----	SM-SC, SM, ML, CL-ML	A-2, A-4	0	100	90-100	60-70	30-70	<20	NP-4
	44-65	Gravelly sandy clay loam, sandy clay loam, sandy loam, loam.	SC, SM-SC, SM	A-4, A-2	0	80-100	70-100	60-80	30-50	15-30	3-10
	65-80	Stratified gravelly sandy loam to gravelly sand.	SP, SP-SM	A-1	0	60-80	50-75	15-40	2-10	---	NP
Mh----- Milford	0-11	Silty clay loam	CL, CH	A-7	0	100	95-100	90-100	75-95	40-60	20-35
	11-43	Silty clay, silty clay loam, clay loam.	CH, CL	A-7	0	100	95-100	90-100	75-100	40-60	20-40
	43-60	Stratified clay to sandy loam.	CL, SC	A-6, A-7	0	97-100	95-100	90-100	45-100	25-50	10-30
Mk----- Montgomery	0-12	Silty clay-----	CH, CL	A-7	0	100	100	95-100	85-100	45-60	25-35
	12-27	Silty clay loam, silty clay.	CH	A-7	0	100	100	95-100	90-100	50-65	30-42
	27-60	Stratified clay to silty clay loam.	CL, CH	A-7	0	100	100	90-100	85-100	40-55	20-32

APPENDIX C (CONTINUED)

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	<u>In</u>				<u>Pct</u>					<u>Pct</u>	
MoC2, MoD2----- Morley	0-9	Silty clay loam	CL	A-6, A-7	0-5	95-100	90-100	85-95	80-90	30-45	15-25
	9-20	Silty clay, clay loam, clay.	CL, CH	A-7	0-10	95-100	90-100	85-95	80-90	40-60	15-35
	20-29	Silty clay loam, clay loam, silty clay.	CL, CH	A-6, A-7	0-10	95-100	90-100	85-95	80-90	30-60	15-30
	29-60	Silty clay loam, clay loam.	CL	A-6, A-7	0-10	95-100	90-100	85-95	80-90	30-50	15-30
Na----- Nappanee	0-8	Silt loam-----	ML, CL	A-4, A-6	0-5	95-100	95-100	85-100	55-90	25-40	3-15
	8-25	Silty clay, silty clay loam, clay.	CH	A-7	0-5	95-100	95-100	85-100	70-95	50-70	25-45
	25-60	Silty clay, clay, clay loam.	CL, CH	A-7	0-5	95-100	95-100	85-100	70-95	40-60	20-35
Pm----- Pewamo	0-12	Silty clay-----	CH	A-7	0-5	90-100	80-100	80-100	75-95	50-55	25-30
	12-55	Clay loam, clay, silty clay.	CL, CH	A-7, A-6	0-5	95-100	90-100	90-100	75-95	35-55	15-30
	55-60	Clay loam, silty clay loam.	CL	A-7	0-5	95-100	90-100	90-100	70-90	40-50	15-25
Px Pita											
RdB----- Rawson	0-8	Loam-----	CL-ML, CL	A-4, A-6	0	90-100	80-100	65-100	50-100	25-40	4-16
	8-24	Clay loam, sandy clay loam, sandy loam, gravelly sandy clay loam.	SC, CL	A-4, A-6, A-2-4, A-2-6	0	65-100	55-95	45-90	25-75	20-40	7-20
	24-60	Clay, silty clay, silty clay loam.	CH, CL	A-7, A-6	0	90-100	85-100	85-100	75-95	35-65	15-40
SaB2----- St. Clair	0-8	Clay loam-----	CL	A-6, A-7	0-5	95-100	90-100	80-100	60-95	30-45	10-20
	8-36	Clay, silty clay	CH, MH	A-7	0-5	95-100	90-100	75-100	65-95	50-70	20-40
	36-60	Clay, silty clay, silty clay loam.	CH	A-7	0-5	95-100	90-100	70-100	60-95	50-60	25-35
Sc----- Saranac	0-12	Clay-----	CL, CH, ML, MH	A-7	0	100	95-100	90-100	80-95	40-55	15-25
	12-38	Clay, clay loam	CL, CH	A-6, A-7	0	100	95-100	90-100	70-90	30-60	10-30
	38-60	Stratified sandy loam to clay loam.	CL, CL-ML, ML	A-4, A-6	0	100	85-100	75-90	65-85	15-40	3-20
Sh----- Shoals	0-9	Clay loam-----	CL	A-6	0	100	100	95-100	80-90	30-40	10-15
	9-57	Silt loam, loam, clay loam, sandy clay loam.	CL, CL-ML	A-4, A-6	0	100	100	90-100	75-85	25-40	5-15
	57-60	Stratified silty clay loam to fine sand.	ML, CL, CL-ML	A-4	0-3	90-100	85-100	60-80	50-70	<30	4-10
Sl----- Sloan	0-13	Loam-----	CL, ML, CL-ML	A-6, A-4	0	100	95-100	85-100	70-95	20-40	3-15
	13-33	Silty clay loam, clay loam, silt loam.	CL, ML	A-6, A-7, A-4	0	100	90-100	85-100	75-95	30-45	8-18
	33-60	Stratified gravelly sandy loam to silty clay loam.	ML, CL	A-4, A-6	0	95-100	70-100	60-95	50-90	25-40	3-15
Tc----- Tice	0-12	Silty clay loam	CL	A-6, A-7	0	100	100	90-100	80-95	30-45	10-20
	12-51	Silty clay loam	CL, CH	A-7	0	100	100	95-100	85-95	40-55	15-30
	51-60	Stratified silty clay loam to fine sand.	CL-ML, CL	A-4, A-6, A-7	0	100	100	60-95	55-80	25-45	5-20
Ud Udorthents											

APPENDIX C (CONTINUED)

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	<u>In</u>				<u>Pct</u>					<u>Pct</u>	
Wh----- Whitaker	0-11	Silt loam-----	CL, CL-ML, ML	A-4, A-6	0	100	95-100	80-100	60-90	15-35	2-15
	11-53	Clay loam, silty clay loam, sandy clay loam, loam.	CL, CL-ML	A-6, A-4	0	100	95-100	90-100	70-80	20-35	5-15
	53-60	Stratified coarse sand to clay.	ML, SM, CL-ML, SM-SC	A-4	0	98-100	98-100	60-85	40-60	<25	NP-7

APPENDIX D

STATISTICAL STREAM FLOW DATA FOR SELECTED STREAMS IN ADAMS COUNTY

APPENDIX D-1. STATISTICAL STREAM FLOW DATA FOR ST. MARYS RIVER (43).

04181500 ST. MARYS RIVER AT DECATUR, IN

LOCATION.--Lat 40°50'55", long 84°56'16", in SW1/4 sec.27, T.28 N., R.14 E., Adams County, Hydrologic Unit 04100004, on right bank 10 ft downstream from bridge on U.S. Highway 27, 0.5 mi upstream from Hothouse ditch, 1.3 mi north of Decatur, and at mile 29.1.

DRAINAGE AREA.--621 mi².

PERIOD OF RECORD.--October 1946 to September 1985. Monthly discharge only for some periods, published in WSP 1307. Gage-height records collected at site 0.5 mi upstream January 1932 to November 1954, and at present site thereafter are contained in reports of National Weather Service.

GAGE.--Water-stage recorder. Datum of gage is 760.44 ft above National Geodetic Vertical Datum of 1929. Prior to July 27, 1948, nonrecording gage at same site and datum.

REMARKS.--Flow regulated by Grand Lake. Slight diversion from or into Wabash River basin and into Miami and Erie Canal.

AVERAGE DISCHARGE.--39 years, 494 ft³/s, 10.80 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 11,300 ft³/s Feb. 10, 11, 1959; maximum gage height, 24.40 ft Mar. 14, 1982; minimum daily discharge, 5.4 ft³/s Oct. 18, 1960.

DURATION TABLE OF DAILY MEAN DISCHARGES FOR YEAR ENDING SEPTEMBER 30

CLASS YEAR	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34				
	NUMBER OF DAYS IN CLASS																																						
1948						4	24	19	25	17	18	29	14	16	28	28	14	20	12	7	12	8	3	14	9	20	9	9	2	3	2								
1949						2	13	26	10	5	30	27	10	24	16	15	20	24	24	20	12	9	22	8	24	9	8	7											
1950						1	21	31	34	21	18	19	14	21	19	19	11	17	7	9	12	7	19	9	12	12	1	8	10	9	1	2	1						
1951						8	24	16	11	11	11	13	18	8	23	6	23	16	15	15	21	12	17	22	18	23	15	8	4	4	3								
1952						1	23	36	26	25	20	15	8	13	8	12	19	18	11	11	15	13	8	10	14	15	16	6	2	3									
1953						7	23	54	39	6	18	11	16	14	14	29	19	15	14	11	16	9	9	12	11	10	4	1	3										
1954						1	39	61	58	17	15	19	11	15	15	12	15	15	9	7	9	6	9	12	10	8	2												
1955						3	15	10	16	17	19	26	10	22	21	37	12	13	17	13	10	9	4	16	6	8	18	10	16	6	6	2		2	1				
1956										1	26	40	22	30	24	26	19	26	15	13	12	15	10	13	13	8	15	12	13	8	4	1							
1957						1	8	11	64	18	11	7	11	12	23	17	23	16	10	16	10	8	7	8	11	17	9	11	10	10	5	5	2	4					
1958										3	12	18	25	24	16	31	23	21	18	23	22	31	16	11	15	10	15	10	6	10	3	2							
1959										15	27	30	28	11	21	14	5	17	6	6	13	9	20	16	17	14	15	13	16	12	7	9	5	9	1	2	4	2	1
1960						1	20	16	22	13	20	10	14	45	32	14	18	14	16	13	12	9	11	9	10	5	10	8	4	2									
1961						3	7	4	13	47	43	26	10	22	20	14	8	10	9	16	10	7	16	9	5	3	6	2	12	9	6	6	8	9	2		3		
1962						6	24	19	22	24	40	32	41	14	12	10	20	10	4	9	9	5	5	10	5	9	5	9	10	4	5	2							
1963						25	45	54	46	15	13	20	15	22	23	8	7	11	4	7	5	12	7	3	2	4	5	5	1	1	2	3							
1964						12	11	7	35	69	33	28	19	12	15	11	11	13	4	8	2	6	6	2	6	8	7	3	6	2	4	5	6	7	4	4			
1965						8	12	13	36	71	38	17	10	16	11	12	7	7	12	9	7	7	6	4	6	6	6	13	6	9	8	4	4						
1966						2	32	34	51	37	22	34	15	16	13	10	16	12	13	10	10	11	9	10	3	4		1											
1967						9	47	36	16	7	13	15	15	17	16	6	17	11	10	16	13	10	10	8	8	11	13	9	9	14	4	2	3						
1968						3	13	7	5	15	16	23	26	17	57	14	21	15	9	7	7	7	14	21	8	14	8	17	6	9	4	1	2						
1969						7	15	46	14	4	5	8	6	18	16	37	22	20	17	21	22	19	18	6	11	7	5	9	7	1	4								
1970						12	13	17	7	5	41	26	21	14	10	27	17	15	12	20	12	15	19	9	11	12	10	10	7	3									
1971						18	42	32	23	28	21	25	32	16	19	10	6	11	10	13	8	9	10	13	4	7	2	5	1										
1972						2	8	12	28	27	12	29	22	14	18	13	14	16	17	18	24	13	10	12	17	11	9	7	8	1	2	2							
1973										12	9	4	8	6	10	14	8	26	24	19	18	19	13	16	20	28	31	19	24	15	6	14	2						
1974						1	25	39	23	21	13	12	18	24	12	15	23	14	12	12	5	12	14	10	8	6	14	7	14	7					2	2			
1975						10	16	11	6	4	7	11	18	27	15	22	23	17	18	18	23	25	21	9	18	15	16	8	1	2	2	2							
1976										11	42	25	21	30	20	29	11	13	11	25	26	11	17	11	19	6	6	5	8	1	3	6	5	1	3				
1977						39	109	41	20	17	12	13	13	5	17	7	7	10	5	4	2	6	7	13	4	9	3	2											
1978						1	15	29	32	29	16	21	56	20	18	13	13	8	8	9	11	7	7	2	5	3	8	5	7	8	2	4	3	4	1				
1979						3	21	19	36	29	28	17	15	25	17	25	7	21	18	10	12	9	8	7	8	7	9	4	3	2	1	1	3						
1980						1	13	17	15	39	30	35	28	15	31	12	9	10	7	11	16	4	9	9	6	15	12	11	4	3			3	1					
1981						1	8	8	27	42	40	18	21	21	16	17	11	20	10	7	13	9	5	12	5	7	11	13	9	3	3	2	2	2	2				
1982						1	4	12	23	36	28	16	19	7	21	11	16	10	12	10	10	12	20	16	11	12	10	14	10	7	6	3	5	1	1	1			
1983						1	2	5	13	54	21	15	23	15	8	18	16	19	30	16	15	16	13	17	11	1	9	4	9	6	5	3							
1984										13	32	22	13	26	25	22	10	26	13	13	19	15	8	15	12	11	11	11	14	8	11	14	2						
1985						2	22	44	26	20	26	25	33	22	22	10	15	11	14	8	12	10	6	7	4	7	5	5	3	1	1			3	1				

APPENDIX D-1 (CONTINUED)

CLASS	VALUE	TOTAL	ACCUM	PERCT	CLASS	VALUE	TOTAL	ACCUM	PERCT	CLASS	VALUE	TOTAL	ACCUM	PERCT
0	0.0	0	13880	100.00	12	67.0	725	8484	61.12	24	1000.0	469	2053	14.79
1	5.4	15	13880	100.00	13	84.0	807	7759	55.90	25	1300.0	324	1584	11.41
2	6.8	26	13865	99.89	14	110.0	461	6952	50.09	26	1600.0	420	1260	9.08
3	8.5	28	13839	99.70	15	130.0	752	6491	46.77	27	2100.0	264	840	6.05
4	11.0	135	13811	99.50	16	170.0	559	5739	41.35	28	2600.0	226	576	4.15
5	13.0	464	13676	98.53	17	210.0	491	5180	37.32	29	3300.0	174	350	2.52
6	17.0	705	13212	95.19	18	260.0	513	4689	33.78	30	4100.0	69	176	1.27
7	21.0	1075	12507	90.11	19	330.0	469	4176	30.09	31	5100.0	55	107	0.77
8	27.0	843	11432	82.36	20	420.0	430	3707	26.71	32	6500.0	32	52	0.37
9	34.0	714	10589	76.29	21	520.0	485	3277	23.61	33	8100.0	15	20	0.14
10	42.0	729	9875	71.15	22	660.0	425	2792	20.12	34	10000.0	5	5	0.04
11	53.0	662	9146	65.89	23	830.0	314	2367	17.05					

LOWEST MEAN DISCHARGE AND RANKING FOR THE FOLLOWING NUMBER OF CONSECUTIVE DAYS IN YEAR ENDING MARCH 31

YEAR	1	3	7	14	30	60	90	120	183
1948	25.00 36	28.00 36	35.00 37	37.00 36	70.00 38	102.00 37	107.00 36	117.00 29	170.00 28
1949	19.00 28	20.00 29	21.00 28	22.00 25	23.00 22	27.00 18	30.00 17	44.00 19	101.00 21
1950	24.00 33	28.00 37	28.00 34	30.00 34	32.00 32	54.00 30	94.00 31	97.00 26	151.00 27
1951	34.00 38	36.00 38	39.00 38	41.00 38	52.00 36	67.00 32	94.00 32	111.00 28	214.00 30
1952	16.00 22	18.00 23	18.00 21	20.00 21	25.00 25	32.00 23	33.00 18	35.00 14	85.00 18
1953	18.00 25	19.00 26	20.00 23	25.00 28	25.00 26	29.00 21	37.00 19	37.00 15	53.00 13
1954	12.00 10	13.00 9	14.00 10	15.00 11	15.00 6	17.00 5	18.00 5	19.00 4	23.00 4
1955	13.00 14	14.00 16	16.00 16	17.00 14	29.00 28	61.00 31	102.00 34	184.00 35	241.00 33
1956	9.20 4	10.00 4	11.00 4	11.00 4	13.00 4	27.00 19	47.00 23	50.00 23	61.00 14
1957	14.00 19	16.00 20	20.00 24	22.00 26	23.00 23	25.00 16	27.00 15	38.00 16	74.00 17
1958	12.00 11	13.00 10	15.00 11	17.00 15	21.00 19	82.00 35	101.00 33	172.00 34	396.00 37
1959	24.00 34	25.00 33	26.00 33	27.00 31	30.00 29	93.00 36	103.00 35	286.00 38	418.00 38
1960	13.00 15	14.00 17	16.00 17	17.00 16	19.00 13	22.00 11	29.00 16	48.00 22	101.00 22
1961	5.40 1	6.20 2	6.70 2	8.10 2	10.00 3	13.00 3	14.00 3	15.00 3	17.00 2
1962	19.00 29	19.00 27	20.00 25	25.00 29	37.00 34	38.00 26	61.00 27	72.00 25	103.00 23
1963	11.00 7	12.00 7	13.00 8	13.00 6	17.00 9	23.00 13	23.00 10	24.00 8	27.00 5
1964	6.00 2	6.10 1	6.20 1	6.60 1	7.40 1	10.00 1	11.00 1	12.00 1	16.00 1
1965	7.00 3	7.50 3	7.90 3	8.30 3	9.60 2	12.00 2	13.00 2	14.00 2	20.00 3
1966	14.00 16	14.00 18	17.00 18	17.00 17	18.00 10	19.00 7	21.00 8	22.00 6	30.00 6
1967	12.00 12	13.00 11	13.00 9	14.00 8	15.00 7	18.00 6	19.00 6	20.00 5	51.00 12
1968	11.00 8	12.00 8	12.00 5	13.00 7	14.00 5	16.00 4	17.00 4	24.00 9	40.00 8
1969	14.00 17	14.00 12	15.00 12	18.00 18	21.00 14	27.00 17	50.00 25	126.00 30	215.00 31
1970	16.00 20	17.00 21	17.00 19	19.00 19	22.00 20	34.00 25	92.00 29	127.00 31	233.00 32
1971	14.00 18	14.00 13	15.00 13	15.00 9	18.00 11	21.00 8	23.00 9	26.00 10	41.00 9
1972	19.00 30	22.00 31	25.00 31	28.00 32	30.00 30	52.00 29	94.00 30	106.00 27	137.00 26
1973	18.00 26	19.00 28	24.00 30	25.00 30	35.00 33	68.00 33	230.00 38	235.00 37	318.00 36
1974	18.00 27	18.00 24	20.00 26	20.00 22	27.00 27	31.00 22	37.00 20	134.00 32	256.00 35
1975	13.00 13	14.00 14	15.00 14	16.00 12	18.00 12	29.00 20	47.00 24	41.00 17	71.00 16
1976	24.00 35	26.00 34	31.00 36	33.00 35	67.00 37	142.00 38	189.00 37	186.00 36	243.00 34
1977	17.00 23	18.00 25	19.00 22	20.00 23	21.00 15	21.00 9	21.00 7	23.00 7	30.00 7
1978	17.00 24	17.00 22	21.00 27	23.00 27	25.00 24	40.00 27	46.00 22	47.00 20	62.00 15
1979	16.00 21	16.00 19	18.00 20	19.00 20	21.00 16	22.00 12	25.00 12	26.00 11	45.00 10
1980	26.00 37	27.00 35	30.00 35	40.00 37	49.00 35	68.00 34	85.00 28	153.00 33	193.00 29
1981	10.00 5	11.00 5	12.00 6	12.00 5	17.00 8	21.00 10	24.00 11	26.00 12	51.00 11
1982	12.00 9	14.00 15	16.00 15	17.00 13	21.00 17	52.00 28	59.00 26	69.00 24	115.00 24
1983	10.00 6	11.00 6	12.00 7	15.00 10	21.00 18	24.00 14	27.00 13	33.00 13	117.00 25
1984	20.00 31	21.00 30	22.00 29	22.00 24	22.00 21	24.00 15	27.00 14	44.00 18	89.00 19
1985	23.00 32	24.00 32	26.00 32	29.00 33	30.00 31	33.00 24	40.00 21	47.00 21	93.00 20

APPENDIX D-1 (CONTINUED)

HIGHEST MEAN DISCHARGE AND RANKING FOR THE FOLLOWING NUMBER OF CONSECUTIVE DAYS IN YEAR ENDING SEPTEMBER 30

YEAR	1	3	7	15	30	60	90	120	183
1948	5400.00 23	4880.00 23	3570.00 26	2750.00 25	2430.00 12	1770.00 13	1490.00 12	1240.00 12	961.00 15
1949	4000.00 29	3780.00 28	2980.00 30	2810.00 23	2310.00 15	1840.00 12	1500.00 10	1300.00 10	1020.00 13
1950	10600.00 1	9620.00 2	6850.00 4	4970.00 2	4000.00 2	3190.00 1	2560.00 1	2220.00 1	1550.00 1
1951	5620.00 21	5180.00 22	4470.00 18	2780.00 24	1970.00 22	1440.00 22	1460.00 13	1350.00 8	1260.00 5
1952	5740.00 20	5450.00 18	4020.00 22	2900.00 20	2360.00 13	1740.00 14	1630.00 8	1500.00 7	1160.00 8
1953	3220.00 35	3010.00 35	2220.00 36	1730.00 34	1330.00 35	860.00 36	794.00 32	657.00 34	530.00 34
1954	1510.00 38	1080.00 38	990.00 37	741.00 37	590.00 37	404.00 37	335.00 37	296.00 37	285.00 37
1955	6960.00 13	5930.00 15	4170.00 21	2860.00 22	2010.00 21	1280.00 28	1180.00 24	1010.00 22	824.00 21
1956	3580.00 31	3090.00 34	2230.00 35	1980.00 31	1770.00 27	1320.00 27	965.00 29	808.00 30	646.00 29
1957	7540.00 11	7330.00 10	6400.00 6	4430.00 4	3440.00 4	2260.00 4	1750.00 4	1540.00 5	1210.00 6
1958	6030.00 17	5360.00 19	4580.00 17	3280.00 15	1960.00 23	1590.00 18	1300.00 18	1070.00 21	857.00 19
1959	10100.00 4	8680.00 6	6530.00 5	3780.00 10	3300.00 5	2230.00 5	1660.00 7	1640.00 3	1270.00 4
1960	4080.00 28	3550.00 30	2550.00 33	1680.00 35	1350.00 33	987.00 34	824.00 31	787.00 31	606.00 32
1961	7650.00 10	7600.00 8	5740.00 9	4340.00 6	2740.00 9	2200.00 6	1690.00 5	1300.00 9	902.00 17
1962	4300.00 26	4130.00 25	3450.00 27	2320.00 28	1850.00 26	1530.00 20	1280.00 19	987.00 24	688.00 27
1963	6170.00 16	5540.00 17	4590.00 16	3010.00 19	1960.00 24	1140.00 30	793.00 33	640.00 35	440.00 35
1964	6310.00 15	6220.00 14	5030.00 14	3220.00 16	2780.00 8	2120.00 7	1500.00 11	1150.00 19	769.00 24
1965	3490.00 34	3430.00 31	3150.00 28	2240.00 29	1460.00 32	1360.00 25	1120.00 25	886.00 29	615.00 31
1966	1610.00 37	1200.00 37	954.00 38	626.00 38	520.00 38	301.00 38	277.00 38	295.00 38	247.00 38
1967	5850.00 18	5590.00 16	4800.00 15	3040.00 18	2070.00 19	1360.00 26	1200.00 22	1170.00 18	1030.00 12
1968	5840.00 19	5340.00 21	4390.00 19	2870.00 21	1610.00 29	1370.00 23	1110.00 26	995.00 23	833.00 20
1969	4740.00 24	4520.00 24	3880.00 24	2700.00 27	1890.00 25	1260.00 29	964.00 30	931.00 27	764.00 25
1970	3570.00 32	3190.00 33	2810.00 32	1950.00 32	1330.00 34	1030.00 32	1110.00 27	979.00 25	782.00 23
1971	3540.00 33	3250.00 32	3000.00 29	2130.00 30	1520.00 30	976.00 35	736.00 36	703.00 32	532.00 33
1972	7280.00 12	6610.00 12	5200.00 12	4240.00 9	2900.00 7	1900.00 8	1400.00 15	1180.00 16	1040.00 11
1973	4200.00 27	4100.00 26	3940.00 23	3330.00 14	2310.00 16	1690.00 16	1330.00 17	1190.00 15	1280.00 3
1974	9660.00 6	8850.00 5	6240.00 7	4320.00 7	2360.00 14	1850.00 10	1690.00 6	1500.00 6	1120.00 9
1975	5540.00 22	5350.00 20	4320.00 20	2730.00 26	1740.00 28	1370.00 24	1250.00 20	1170.00 17	909.00 16
1976	7990.00 8	7410.00 9	5730.00 10	4390.00 5	3040.00 6	1860.00 9	1460.00 14	1200.00 14	857.00 18
1977	3180.00 36	2770.00 36	2280.00 34	1630.00 36	1290.00 36	1000.00 33	786.00 34	603.00 36	413.00 36
1978	10000.00 5	9700.00 1	8610.00 1	6210.00 1	4210.00 1	2470.00 3	1760.00 3	1560.00 4	1210.00 7
1979	7830.00 9	7090.00 11	5420.00 11	3490.00 11	2060.00 20	1540.00 19	1090.00 28	915.00 28	683.00 28
1980	8630.00 7	8110.00 7	6230.00 8	3200.00 17	2240.00 17	1520.00 21	1390.00 16	1230.00 13	982.00 14
1981	6830.00 14	6450.00 13	5080.00 13	3360.00 13	2080.00 18	1610.00 17	1240.00 21	959.00 26	757.00 26
1982	10200.00 2	9210.00 4	7080.00 3	4720.00 3	3980.00 3	2610.00 2	2010.00 2	1750.00 2	1310.00 2
1983	3630.00 30	3570.00 29	2900.00 31	1790.00 33	1520.00 31	1080.00 31	780.00 35	668.00 33	639.00 30
1984	4430.00 25	4080.00 27	3870.00 25	3460.00 12	2470.00 11	1840.00 11	1540.00 9	1290.00 11	1080.00 10
1985	10100.00 3	9440.00 3	7270.00 2	4300.00 8	2520.00 10	1740.00 15	1190.00 23	1120.00 20	803.00 22

ANNUAL VALUES

ANNUAL MEAN DISCHARGE AND RANKING
IN YEAR ENDING MARCH 31

1948	737.00 33
1949	657.00 30
1950	826.00 35
1951	729.00 32
1952	636.00 29
1953	374.00 12
1954	110.00 1
1955	534.00 23
1956	358.00 10
1957	231.00 6
1958	799.00 34
1959	877.00 37
1960	477.00 19
1961	269.00 7
1962	624.00 28
1963	208.00 4
1964	187.00 2
1965	446.00 15
1966	216.00 5
1967	447.00 16
1968	489.00 20
1969	456.00 17
1970	463.00 18

ANNUAL MEAN DISCHARGE AND RANKING
IN YEAR ENDING SEPTEMBER 30

1948	531.00 17
1949	619.00 10
1950	832.00 1
1951	747.00 3
1952	607.00 12
1953	287.00 34
1954	164.00 37
1955	466.00 21
1956	410.00 25
1957	643.00 7
1958	671.00 6
1959	690.00 4
1960	361.00 30
1961	467.00 20
1962	367.00 29
1963	233.00 35
1964	392.00 27
1965	318.00 32
1966	140.00 38
1967	542.00 16
1968	515.00 18
1969	463.00 22
1970	460.00 23

APPENDIX D-1 (CONTINUED)

ANNUAL VALUES--Continued

ANNUAL MEAN DISCHARGE AND RANKING IN YEAR ENDING MARCH 31

1971	361.00	11
1972	385.00	13
1973	945.00	38
1974	697.00	31
1975	530.00	21
1976	595.00	27
1977	195.00	3
1978	553.00	24
1979	390.00	14
1980	530.00	22
1981	321.00	9
1982	856.00	36
1983	317.00	8
1984	594.00	26
1985	553.00	25

ANNUAL MEAN DISCHARGE AND RANKING IN YEAR ENDING SEPTEMBER 30

1971	300.00	33
1972	629.00	9
1973	828.00	2
1974	594.00	14
1975	552.00	15
1976	484.00	19
1977	229.00	36
1978	635.00	8
1979	390.00	28
1980	603.00	13
1981	402.00	26
1982	686.00	5
1983	353.00	31
1984	616.00	11
1985	449.00	24

NORMAL MONTHLY MEANS (ALL DAYS)

YEAR	OCT	NOV	DEC	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEPT
1947												
1948	87.20	148.00	218.00	865.00	924.00	1713.0	1352.0	1491.0	1495.0	317.00	113.00	137.00
1949	34.50	367.00	840.00	2236.0	1342.0	673.00	474.00	571.00	627.00	173.00	149.00	32.70
1950	192.00	36.60	206.00	3834.0	2546.0	1222.0	1167.0	364.00	423.00	286.00	126.00	84.20
1951	640.00	800.00	1480.0	1194.0	1663.0	983.00	980.00	806.00	164.00	78.60	70.60	213.00
1952	26.80	95.40	603.00	2098.0	1045.0	1495.0	1228.0	447.00	324.00	74.50	33.10	42.40
1953	25.10	56.50	251.00	642.00	453.00	1149.0	300.00	379.00	91.30	65.50	28.80	59.80
1954	15.50	18.10	23.30	53.10	103.00	245.00	516.00	179.00	73.80	48.80	35.20	20.70
1955	866.00	260.00	399.00	915.00	554.00	1872.0	435.00	59.70	192.00	29.60	551.00	37.00
1956	107.00	881.00	98.60	70.00	1329.0	1175.0	374.00	258.00	50.60	94.50	42.70	14.20
1957	23.50	27.20	102.00	402.00	559.00	361.00	3409.0	353.00	580.00	219.00	69.10	48.90
1958	276.00	301.00	1667.0	364.00	252.00	427.00	406.00	1074.0	1870.0	1055.0	39.20	133.00
1959	44.60	745.00	187.00	1456.0	2540.0	977.00	1237.0	325.00	1870.0	1110.0	848.00	165.00
1960	99.90	241.00	578.00	907.00	967.00	458.00	404.00	975.00	248.00	69.00	24.00	21.50
1961	11.40	14.60	15.60	21.00	204.00	1836.0	2523.0	494.00	314.00	96.50	24.70	17.10
1962	41.30	156.00	49.50	1307.0	866.00	1592.0	104.00	126.00	120.00	130.00	171.00	67.20
1963	17.60	40.20	24.40	36.80	74.90	1862.0	345.00	97.20	101.00	33.30	18.20	33.60
1964	7.52	14.60	12.80	49.50	30.50	1396.0	2742.0	101.00	169.00	71.20	15.50	12.60
1965	11.30	13.70	25.70	150.00	591.00	1405.0	1277.0	297.00	102.00	38.70	15.70	14.00
1966	59.20	24.50	56.00	238.00	360.00	242.00	79.30	248.00	54.80	20.60	18.40	25.90
1967	14.80	177.00	1607.0	284.00	796.00	1760.0	829.00	492.00	69.20	27.30	16.90	25.30
1968	18.70	73.50	1554.0	587.00	1154.0	625.00	433.00	879.00	64.90	50.80	18.10	15.00
1969	21.60	238.00	556.00	1314.0	894.00	309.00	929.00	489.00	49.00	193.00	479.00	36.10
1970	217.00	740.00	200.00	293.00	1168.0	754.00	1281.0	535.00	380.00	218.00	24.40	174.00
1971	23.90	34.80	78.40	62.70	1280.0	713.00	101.00	511.00	268.00	122.00	30.40	22.40
1972	172.00	46.90	1118.0	751.00	118.00	888.00	2882.0	620.00	401.00	159.00	32.30	169.00
1973	334.00	1985.0	1353.0	633.00	480.00	2106.0	1120.0	425.00	401.00	567.00	40.60	376.00
1974	32.30	264.00	823.00	2282.0	911.00	1020.0	1104.0	642.00	495.00	462.00	32.20	32.20
1975	17.90	131.00	887.00	1027.0	1711.0	886.00	548.00	410.00	130.00	29.70	30.60	93.30
1976	245.00	129.00	639.00	702.00	2506.0	965.00	132.00	534.00	306.00	104.00	201.00	276.00
1977	30.50	25.20	21.00	21.20	299.00	1238.0	593.00	306.00	41.80	59.30	55.20	32.80
1978	50.50	55.00	1851.0	138.00	75.10	3263.0	1548.0	246.00	72.80	91.70	55.90	122.00
1979	21.40	33.80	156.00	207.00	271.00	1877.0	969.00	367.00	156.00	191.00	32.80	25.70
1980	54.60	685.00	1023.0	295.00	295.00	1891.0	898.00	181.00	1658.0	316.00	97.40	97.40
1981	17.60	25.90	38.70	34.10	690.00	125.00	462.00	64.90	64.90	168.00	28.30	28.30
1982	57.50	73.20	269.00	1065.0	1820.0	3099.0	845.00	2075.0	537.00	143.00	41.50	117.00
1983	21.60	174.00	887.00	224.00	356.00	238.00	1175.0	369.00	127.00	105.00	33.00	26.50
1984	80.40	628.00	1207.0	89.40	925.00	1869.0	1745.0	881.00	184.00	99.60	26.60	23.30
1985	35.80	195.00	456.00	619.00	1792.0	1047.0	802.00	520.00	308.00	83.20	51.30	31.50

APPENDIX D-1 (CONTINUED)

OCT	NOV	DEC	JAN	FEB	MARCH
TWENTY FIFTH PERCENTILE					
20.69	34.50	72.80	126.00	298.00	661.00
FIFTIETH PERCENTILE					
35.10	130.00	334.00	500.00	831.00	1098.00
SEVENTY FIFTH PERCENTILE					
102.00	273.00	921.00	1037.00	1292.00	1779.00
APRIL	MAY	JUNE	JULY	AUG	SEPT
TWENTY FIFTH PERCENTILE					
433.00	248.00	102.00	51.80	26.60	24.60
FIFTIETH PERCENTILE					
898.00	389.00	184.00	94.50	37.30	33.60
SEVENTY FIFTH PERCENTILE					
1277.00	571.00	423.00	191.00	113.00	117.00

APPENDIX D-2. STATISTICAL STREAM FLOW DATA FOR WABASH RIVER (43).

03322900 WABASH RIVER AT LINN GROVE, IN

LOCATION.--Lat 40°39'22", long 85°01'58", in SE1/4 sec.34, T.26 N., R.13 E., Adams County, Hydrologic Unit 05120101, on right bank 10 ft downstream from bridge on State Highway 218, 800 ft downstream from Shoemaker ditch, 0.8 mi north of Linn Grove, and 2.2 mi upstream from Rice ditch.

DRAINAGE AREA.--453 mi².

PERIOD OF RECORD.--September 1964 to September 1985.

GAGE.--Water-stage recorder. Datum of gage is 808.00 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Occasional regulation of Grand Lake, diversion from or into St. Marys River basin, and into Miami and Erie Canal.

AVERAGE DISCHARGE.--21 years, 376 ft³/s, 11.27 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,560 ft³/s Mar. 17, 1978, gage height, 13.87 ft; minimum daily, 5.1 ft³/s Oct. 8, 1964.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in April 1964 reached a stage of 13.13 ft, from floodmark, discharge, 6,900 ft³/s.

DURATION TABLE OF DAILY MEAN DISCHARGES FOR YEAR ENDING SEPTEMBER 30

CLASS YEAR	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	
1965	NUMBER OF DAYS IN CLASS																																			
1966	27	47	50	29	41	16	8	15	13	9	8	4	6	9	2	5	3	5	6	9	10	7	5	3	5	4	10	7	2							
1967	16	42	75	16	26	16	13	29	16	10	7	16	13	12	9	6	9	9	3	7	4	5	2	2	2											
1968	21	31	12	24	18	19	9	17	14	22	12	7	11	6	9	11	13	12	15	7	11	10	8	9	6	11	12	3	2	1	2					
1969	5	3	6	14	22	20	11	21	25	17	21	26	19	8	10	35	10	8	6	10	7	7	14	8	12	4	9	5	2	1						
1970		1	12	36	18	11	5	5	5	6	17	30	35	16	28	23	22	17	13	7	10	7	9	8	7	6	3	4	1	2	1					
		19	19	13	3	6	4	10	20	12	9	18	24	13	35	29	26	15	14	9	16	9	6	11	11	5	3	3	1	1	1					
1971			11	18	46	18	22	30	34	17	21	12	12	16	8	14	8	9	15	7	6	11	3	9	8	1	2	2	2	3						
1972				34	24	20	12	8	14	7	16	16	23	21	14	26	24	16	18	6	14	14	9	8	10	6	2	1	3							
1973				5	4	6	5	8	6	10	28	11	26	29	12	15	28	24	25	18	30	24	12	10	13	8	5	3								
1974		24	19	50	16	16	6	6	8	7	16	5	5	6	9	25	14	24	18	13	10	12	14	8	8	9	6	4	4	2	1					
1975			13	26	13	20	11	9	8	11	14	14	22	9	20	15	14	17	20	22	13	16	15	9	11	10	9	1	2	1						
1976		4	14	8	17	12	22	31	24	34	17	11	9	14	7	12	14	23	23	11	8	7	6	8	4	5	5	2	4	3	6	1				
1977	27	27	52	30	43	19	23	17	9	10	9	10	11	13	8	4	6	4	4	8	8	4	6	3	3	4	1	1								
1978		3	7	8	21	16	22	11	30	27	12	17	16	14	2	26	30	10	11	11	8	5	7	5	10	6	6	5	5	1	8	2	2	1		
1979			12	11	15	2	11	14	31	16	16	15	23	21	18	19	32	14	17	9	11	12	6	7	12	6	6	2	3	1	2	1				
1980				3	4	7	9	9	17	9	10	11	36	15	35	48	24	27	18	14	5	7	8	15	7	9	5	9	3	2						
1981				3	30	24	19	14	23	41	30	15	21	15	9	8	11	3	9	8	14	9	12	12	10	7	2	5	6	3	1	1				
1982			15	5	30	16	17	8	7	7	9	8	33	22	12	17	16	24	17	4	7	13	15	15	10	8	7	4	7	5	6	1				
1983		7	28	21	33	14	17	2	9	8	13	22	10	24	21	27	30	10	14	13	7	6	4	5	10	3	4	1	1	1						
1984		4	1	1	28	11	25	18	9	14	10	7	11	6	7	25	19	13	19	28	23	17	8	15	8	5	12	10	6	5	1					
1985		1	8	8	26	29	21	16	8	15	19	30	29	15	4	9	11	8	23	22	9	5	11	10	4	7	5	2	4	1	2	1	2			

CLASS	VALUE	TOTAL	ACCUM	PERCT	CLASS	VALUE	TOTAL	ACCUM	PERCT	CLASS	VALUE	TOTAL	ACCUM	PERCT
0	0.0	0	7670	100.00	12	59.0	286	4485	58.47	24	860.0	212	975	12.71
1	5.1	70	7670	100.00	13	74.0	322	4199	54.75	25	1100.0	192	763	9.95
2	6.4	161	7600	99.09	14	93.0	377	3877	50.55	26	1400.0	139	571	7.44
3	8.0	351	7439	96.99	15	120.0	207	3500	45.63	27	1700.0	132	432	5.63
4	10.0	239	7088	92.41	16	140.0	367	3293	42.93	28	2100.0	111	300	3.91
5	12.0	522	6849	89.30	17	180.0	425	2926	38.15	29	2600.0	83	189	2.46
6	16.0	287	6327	82.49	18	230.0	281	2501	32.61	30	3300.0	44	106	1.38
7	19.0	358	6040	78.75	19	280.0	322	2220	28.94	31	4100.0	41	62	0.81
8	24.0	288	5682	74.08	20	350.0	293	1898	24.75	32	5200.0	16	21	0.27
9	30.0	316	5394	70.33	21	440.0	237	1605	20.93	33	6400.0	4	5	0.07
10	38.0	322	5078	66.21	22	550.0	216	1368	17.84	34	8100.0	1	1	0.01
11	48.0	271	4756	62.01	23	690.0	177	1152	15.02					

APPENDIX D-2 (CONTINUED)

LOWEST MEAN DISCHARGE AND RANKING FOR THE FOLLOWING NUMBER OF CONSECUTIVE DAYS IN YEAR ENDING MARCH 31

YEAR	1	3	7	14	30	60	90	120	183
1966	6.00 3	6.00 3	6.10 3	6.60 3	7.40 3	8.50 3	10.00 2	11.00 2	12.00 1
1967	5.30 1	5.40 1	5.60 1	6.40 2	7.10 2	8.20 2	10.00 3	15.00 4	33.00 5
1968	6.40 4	6.80 4	7.20 4	7.30 4	7.60 4	9.60 4	11.00 4	18.00 6	29.00 4
1969	11.00 14	12.00 16	13.00 16	13.00 14	14.00 12	17.00 10	29.00 11	65.00 14	125.00 15
1970	9.90 11	10.00 11	11.00 11	11.00 11	12.00 10	29.00 14	72.00 18	119.00 18	201.00 18
1971	8.00 9	8.10 9	8.40 9	9.40 9	10.00 8	11.00 5	12.00 5	12.00 3	22.00 3
1972	18.00 18	18.00 18	20.00 18	22.00 18	27.00 19	45.00 17	61.00 17	68.00 15	100.00 14
1973	20.00 19	21.00 19	22.00 19	23.00 19	24.00 18	106.00 19	143.00 19	206.00 19	385.00 20
1974	11.00 12	11.00 12	12.00 12	12.00 12	13.00 11	15.00 9	54.00 15	115.00 17	154.00 17
1975	8.20 10	8.40 10	8.70 10	9.50 10	9.90 6	29.00 15	61.00 16	56.00 12	89.00 11
1976	12.00 15	13.00 17	14.00 17	15.00 17	18.00 17	49.00 18	53.00 14	70.00 16	97.00 12
1977	5.50 2	5.60 2	5.80 2	5.90 1	6.00 1	7.20 1	8.00 1	9.60 1	12.00 2
1978	6.80 5	7.10 5	8.10 7	8.40 6	16.00 15	21.00 12	24.00 9	24.00 9	44.00 6
1979	7.50 8	7.70 8	8.20 8	8.80 7	11.00 9	12.00 8	20.00 8	23.00 7	63.00 8
1980	31.00 20	34.00 20	37.00 20	46.00 20	76.00 20	116.00 20	151.00 20	282.00 20	280.00 19
1981	11.00 13	11.00 13	12.00 13	13.00 13	15.00 13	23.00 13	29.00 10	28.00 10	65.00 9
1982	12.00 16	12.00 14	13.00 14	14.00 15	16.00 16	36.00 16	50.00 13	61.00 13	128.00 16
1983	6.90 6	7.10 6	7.50 5	8.30 5	9.80 5	11.00 6	14.00 7	17.00 5	76.00 10
1984	7.10 7	7.50 7	7.90 6	9.40 8	10.00 7	11.00 7	13.00 6	24.00 8	61.00 7
1985	12.00 17	12.00 15	13.00 15	14.00 16	15.00 14	20.00 11	33.00 12	42.00 11	97.00 13

HIGHEST MEAN DISCHARGE AND RANKING FOR THE FOLLOWING NUMBER OF CONSECUTIVE DAYS IN YEAR ENDING SEPTEMBER 30

YEAR	1	3	7	15	30	60	90	120	183
1965	2640.00 20	2570.00 19	2270.00 18	1560.00 18	1160.00 17	1040.00 14	832.00 15	653.00 16	440.00 17
1966	1250.00 21	1090.00 21	674.00 21	371.00 21	305.00 21	176.00 21	163.00 21	172.00 21	139.00 21
1967	6370.00 3	5780.00 3	4150.00 4	2330.00 12	1600.00 10	1030.00 15	941.00 10	889.00 9	795.00 8
1968	4340.00 16	3770.00 15	3100.00 12	1910.00 14	1330.00 15	1030.00 16	895.00 11	774.00 13	646.00 12
1969	5370.00 11	4330.00 11	2990.00 14	2420.00 10	1580.00 11	1050.00 12	794.00 16	721.00 15	572.00 16
1970	5500.00 10	4300.00 12	2910.00 15	1700.00 17	1140.00 18	843.00 17	851.00 14	741.00 14	606.00 14
1971	3740.00 17	3410.00 17	3060.00 13	1890.00 15	1250.00 16	827.00 18	571.00 18	525.00 18	404.00 18
1972	5740.00 6	5480.00 4	4020.00 5	3040.00 3	2140.00 3	1350.00 8	1080.00 9	872.00 10	805.00 6
1973	4870.00 13	4220.00 13	2910.00 16	2680.00 7	1860.00 7	1520.00 4	1270.00 3	1080.00 4	1130.00 1
1974	5900.00 4	5020.00 7	3950.00 6	2820.00 5	1720.00 9	1370.00 7	1200.00 5	1110.00 3	818.00 5
1975	5640.00 7	4870.00 9	3230.00 10	2140.00 13	1460.00 13	1180.00 10	1100.00 8	1070.00 5	796.00 7
1976	5630.00 6	4880.00 8	3810.00 7	3030.00 4	2130.00 4	1470.00 5	1180.00 6	962.00 7	665.00 11
1977	3500.00 18	2300.00 20	1580.00 20	1180.00 19	788.00 20	561.00 20	430.00 20	329.00 20	225.00 20
1978	8400.00 1	7620.00 1	6220.00 1	4610.00 1	3120.00 1	1920.00 2	1400.00 2	1130.00 2	921.00 3
1979	5810.00 5	5270.00 5	3750.00 8	2420.00 11	1380.00 14	1040.00 13	747.00 17	640.00 17	579.00 15
1980	4610.00 14	3850.00 14	2740.00 17	1740.00 16	1520.00 12	1070.00 11	862.00 13	780.00 12	684.00 9
1981	5260.00 12	4590.00 10	3530.00 9	2570.00 8	1970.00 5	1450.00 6	1130.00 7	903.00 8	682.00 10
1982	5600.00 9	5270.00 6	4240.00 3	3050.00 2	2760.00 2	1930.00 1	1530.00 1	1280.00 1	956.00 2
1983	3360.00 19	2940.00 18	1940.00 19	1090.00 20	950.00 19	644.00 19	470.00 19	425.00 19	398.00 19
1984	4420.00 15	3710.00 16	3160.00 11	2520.00 9	1900.00 6	1550.00 3	1220.00 4	1010.00 6	880.00 4
1985	7390.00 2	6700.00 2	4740.00 2	2780.00 6	1750.00 8	1270.00 9	873.00 12	845.00 11	635.00 13

APPENDIX D-2 (CONTINUED)

ANNUAL VALUES

ANNUAL MEAN DISCHARGE AND RANKING IN YEAR ENDING MARCH 31

1966	148.00	2
1967	333.00	8
1968	380.00	12
1969	343.00	9
1970	359.00	10
1971	279.00	6
1972	271.00	5
1973	857.00	20
1974	514.00	18
1975	462.00	16
1976	416.00	13
1977	117.00	1
1978	373.00	11
1979	320.00	7
1980	488.00	17
1981	226.00	4
1982	688.00	19
1983	223.00	3
1984	419.00	14
1985	461.00	15

ANNUAL MEAN DISCHARGE AND RANKING IN YEAR ENDING SEPTEMBER 30

1965	225.00	17
1966	77.00	21
1967	418.00	9
1968	375.00	10
1969	356.00	15
1970	365.00	11
1971	223.00	18
1972	514.00	2
1973	710.00	1
1974	443.00	7
1975	443.00	8
1976	363.00	12
1977	125.00	20
1978	499.00	4
1979	341.00	16
1980	472.00	6
1981	362.00	13
1982	505.00	3
1983	221.00	19
1984	494.00	5
1985	358.00	14

NORMAL MONTHLY MEANS (ALL DAYS)

YEAR	OCT	NOV	DEC	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEPT
1965	6.84	7.87	9.39	92.80	407.00	902.00	1150.0	96.50	21.60	11.70	8.55	13.10
1966	18.40	7.52	10.10	118.00	207.00	144.00	76.70	258.00	38.20	32.50	8.20	10.20
1967	14.10	157.00	1202.0	257.00	495.00	1426.0	591.00	738.00	45.50	52.90	12.30	7.64
1968	12.70	48.20	1279.0	510.00	862.00	403.00	269.00	475.00	379.00	60.30	182.00	19.60
1969	14.50	193.00	451.00	1190.0	680.00	220.00	528.00	313.00	282.00	291.00	22.20	110.00
1970	268.00	491.00	240.00	409.00	859.00	538.00	892.00	362.00	267.00	53.60	42.30	11.60
1971	11.50	13.30	34.50	45.20	1199.0	505.00	68.20	283.00	369.00	85.70	35.90	110.00
1972	97.30	26.90	796.00	584.00	195.00	577.00	2085.0	567.00	152.00	312.00	28.80	753.00
1973	515.00	1853.0	1165.0	759.00	533.00	1578.0	899.00	188.00	503.00	111.00	306.00	107.00
1974	13.60	173.00	760.00	1563.0	765.00	788.00	708.00	197.00	127.00	40.00	39.70	157.00
1975	12.30	169.00	893.00	925.00	1415.0	936.00	438.00	171.00	259.00	31.10	88.50	43.20
1976	114.00	59.90	465.00	914.00	1717.0	741.00	71.80	50.50	171.00	67.90	22.40	12.20
1977	15.20	11.20	9.25	6.19	430.00	557.00	208.00	123.00	19.80	31.20	24.70	86.40
1978	69.20	39.20	1145.0	182.00	86.00	2397.0	1261.0	410.00	77.70	203.00	41.40	15.40
1979	13.80	32.50	107.00	249.00	252.00	1175.0	715.00	221.00	205.00	494.00	518.00	88.80
1980	145.00	792.00	673.00	318.00	331.00	1335.0	655.00	155.00	816.00	158.00	261.00	24.30
1981	22.10	42.70	31.50	30.70	488.00	80.50	323.00	980.00	1914.0	343.00	53.80	72.40
1982	35.90	85.10	202.00	722.00	1528.0	2070.0	769.00	292.00	335.00	60.20	19.70	14.00
1983	9.83	124.00	484.00	177.00	291.00	121.00	659.00	601.00	82.60	79.60	13.00	10.40
1984	47.90	491.00	896.00	178.00	573.00	1388.0	1634.0	405.00	117.00	146.00	53.50	16.20
1985	27.70	240.00	523.00	465.00	1214.0	772.00	672.00	100.00	294.00	31.90	18.30	11.70

APPENDIX D-2 (CONTINUED)

OCT	NOV	DEC	JAN	FEB	MARCH
		TWENTY FIFTH PERCENTILE			
13.20	29.70	70.70	148.00	311.00	454.00
		FIFTIETH PERCENTILE			
18.39	85.10	484.00	318.00	533.00	772.00
		SEVENTY FIFTH PERCENTILE			
83.20	217.00	895.00	741.00	1031.00	1362.00
APRIL	MAY	JUNE	JULY	AUG	SEPT
		TWENTY FIFTH PERCENTILE			
296.00	163.00	80.10	36.20	19.00	12.00
		FIFTIETH PERCENTILE			
659.00	283.00	205.00	67.90	35.90	19.60
		SEVENTY FIFTH PERCENTILE			
896.00	443.00	352.00	181.00	71.10	97.90

No Map Required

COVER DESIGN BY ALDO GIORGINI