Preliminary Engineering Report
for **Stormwater Utility Master Plan**

prepared for the

TOWN COUNCIL
TOWN OF GREENTOWN, INDIANA

April 2018
Revised June 29, 2018

WESSLER ENGINEERING

More than a Project™

Preliminary Engineering Report

for

Stormwater Utility Master Plan

prepared for the

TOWN COUNCIL
GREENTOWN, INDIANA

WESSLER ENGINEERING

More than a Project™

April 2018

Revised June 29, 2018

Wessler Project No. 200017-01-001

TABLE OF CONTENTS

LIST OF TABLES

LIST OF APPENDICES

EXECUTIVE SUMMARY

Introduction

The Stormwater Utility Master Plan outlines the Town of Greentown's (Town) stormwater improvement needs, analyzes project alternatives and priorities, and identifies a proposed project to address stormwater needs in town over a 20-year planning period. Infrastructure improvements are needed for the existing storm sewer system maintained by the Town to address ponding water, undersized or deteriorated stormwater infrastructure, and runoff water quality. This study was limited to the corporate boundaries of the Town.

Six priority areas were identified for improvements. These areas include: Northwest Interceptor, East Interceptor, Meridian Street, Indiana Street, Golding Street, and Main Street. Improvements alternatives were then evaluated for the stormwater flow from the 10-year design storm.

Project Need

Northwest Interceptor: Significant ponding occurs at the intersection of Grant Street and Green Street during heavy rainfall. Heavy rain events also cause flooding along Payton Street between Howard Street and Gladstone Street. The pipe crossing the railroad appears to be creating a bottleneck. Stormwater infrastructure in this area is undersized.

East Interceptor: The East Interceptor on the east side of town serves approximately half of the study area. The existing infrastructure appears to be sized adequately, however there are ponding issues on the west side of Avalon Court, in the backyard of 627 East Hall Street, and in the yard of 611 Avalon Court during heavy rains. There is inadequate inlet capacity in the area and low spots in Walnut Street with no inlets. There is also flooding west of the Covalt Street and Main Street intersection.

Meridian Street: The intersection of Meridian Street and Holiday Drive floods during moderate rain events. There is currently no storm infrastructure at the intersection

Indiana Street: The intersections of Gladstone Street and Indiana Street with Grant Street experience ponding water during heavy rain events. Existing infrastructure is believed to be undersized and clogged with debris.

Golding Street: During heavy rain events, Golding Street experiences standing water along the road.

Main Street: Main Street floods during heavy rain events due to inlets being clogged, incorrectly located, or nonexistent.

Stormwater Quality: Runoff from agricultural, commercial, industrial and residential land uses within the Study Area contains pollution including fertilizer, herbicides, pesticides, bacteria, nutrients, sediment, oil, debris, and trash. These pollutants are concentrated in the

stormwater system before discharge into a waterbody, and the highest concentration of pollutants occur during the initial stages of storm runoff. Pollution in stormwater runoff can affect public health and quality of life in town.

Proposed Project

The following six priority projects are recommended for action as the Proposed Project. These projects include the Northwest Interceptor, East Interceptor, Meridian Street, Indiana Street, Golding Street, and Main Street Inlet Improvements Projects.

Northwest Interceptor: This project includes replacement of existing storm sewers along Grant Street, Meridian Street, and Payton Street. Increased capacity will alleviate the flooding and prevent back-ups of the system. The new storm sewer will outlet to the J Loop Legal Drain and will implement stormwater quality management practices.

East Interceptor: This project includes new inlets and perforated pipe along the utility easements south of 627 East Hall Street and southwest of 611 Avalon Court, a storm sewer connecting new improvements to the interceptor, new inlets in low spots of the roads and problematic areas near the roads and intersections, and new stormwater quality management practices.

Meridian Street: This project includes installing new inlets in the low spots in the intersection, new storm sewers, an end section at an outfall location to the nearby Henry Brunk Legal Drain, and new stormwater quality management practices.

Indiana Street: This project includes replacement of existing storm sewers along Indiana Street and Grant Street, new inlets, an outfall connection to the INDOT Main Street (US 35/SR 22) project, and new stormwater quality management practices.

Golding Street: This project includes replacement of existing storm sewers along Golding Street, new inlets, an outfall connection to the INDOT Main Street (US 35/SR 22) project, and new stormwater quality management practices.

Main Street Inlet: This project includes installing new inlets in the low spots in along Main Street, storm sewers connecting new inlets to the INDOT Main Street (US 35/SR 22) project, and new stormwater quality management practices.

Project Costs and Funding: The estimated total pre-design cost of the Proposed Project is $4,373,000. Funding is anticipated through a combination of a construction grant from the Indiana Office of Community and Rural Affairs (OCRA) and a loan from the Indiana Finance Authority (IFA) State Revolving Fund (SRF) loan program. Project construction is estimated to occur between April and August 2019.

1.0 PROJECT LOCATION

The Town of Greentown is located in Liberty Township of Howard County at the intersection of State Road 22/ US 35 and State Road 213. The nearest major cities are Kokomo located 9 miles to the west and Tipton located 14 miles to the southwest. The closest major metropolitan area is Indianapolis, which is approximately 55 miles to the south.

1.1 Service Area

The existing service area for the Town's stormwater system includes the Town corporate limits. A contributing drainage watershed is located to the north and east of town which flows into the Town's stormwater system. The Town does not anticipate growth during the 20-year study period beyond the current service area.

1.2 Study Area

The Study Area includes the Town corporate limits and is located within USGS Greentown Quadrangle: T23N R5E Section 4, and T24N R5E Section 33. Refer to **Figure A-1** in **Appendix A** for an overview of the Study Area.

1.3 Project Area

The proposed project includes work throughout the Study Area located within the Greentown Quadrangle: T23N R5E Section 4, and T24N R5E Section 33.

The proposed project will be constructed in Town right of way, existing easements and a new easement. All improvements are within the Town's corporate limits and are generally located as follows:

- Northwest Interceptor: From the J Loop Legal Drain along Grant Street and north to Payton Street and the county fairgrounds
- East Interceptor: From the Henry Brunk Legal Drain between Meridian Street and Maple Street, north through the residential area to Mill Street, Hunt Street and Covalt Street.
- Meridian Street: Near the intersection of Meridian Street and Holiday Drive.

Refer to **Appendix A, Figure A-1** for the location of the proposed Project Area.

2.0 CURRENT SITUATION

2.1 Existing Drainage Watersheds

The Study Area is approximately one square mile and is located within two watersheds: J Loop and Henry Brunk Legal Drains.

The J Loop Legal Drain runs along the west portion of town from north to south and discharges to the Wildcat Creek. The northwest portion of the Study Area drains to the J Loop Legal Drain, and this watershed consists of residential, commercial, industrial, and agricultural land uses. The watershed is bisected by an active railroad and is generally bounded on the south by US 35. The J Loop Legal Drain is a county legal drain and is maintained by Howard County, including the portions of the drain within the Town corporate limits. Contributing drainage area on the far north end of this watershed is located outside the Town corporate limits.

The Henry Brunk Legal Drain runs along the south-central portion of town from east to west and discharges to Wildcat Creek. The east and south portions of the Study Area drain to the Henry Brunk Legal Drain, and this watershed consists of residential, commercial, industrial, and agricultural land uses. Two state roads (SR 35 and SR213) and one active railroad cross through this watershed. The Henry Brunk Legal Drain is a county legal drain and is maintained by Howard County, including the portions of the drain within the Town corporate limits. Contributing drainage area on the far north and east end of this watershed is located outside the Town corporate limits.

The watersheds were further divided into six drainage sub-areas corresponding to the specific project areas discussed in **Chapter 2.0** and **4.0**. Refer to **Figure A-2** in **Appendix A** for a drainage area map.

2.2 Soils

The soils within the Study Area consist mostly of silt loam and silty clay loam with some areas with clayey soils according to the United States Department of Agriculture (USDA) Web Soil Survey. The Soil Survey Map is included as **Figure A-3** in **Appendix A.**

The northern portion of the Study Area is primarily Blount silt loam, which is rated as a "somewhat poorly drained" soil. The majority of the soils within the Study Area are classified as hydrologic group D soils. Group D soils have very slow infiltration rates and high runoff potential. The erosion factor (K-factor) for the majority of Study Area ranges from 0.37 to 0.43 (out of a possible range of 0.02 to 0.69). A higher K-factor indicates that the soil is more susceptible to sheet and rill erosion by runoff.

These soil conditions affect the amount of stormwater runoff generated during a storm event, limits the amount of runoff pollution that is filtered into the ground, and increase the amount of runoff pollution that is concentrated in the stormwater system.

2.3 Existing Stormwater System

The existing stormwater system is maintained by the Town, and it consists of a series of storm sewers and open ditches within the Town's right-of-way or drainage easements. The existing system is entirely within the Town corporate limits.

Two legal drains, the J Loop and Henry Brunk Legal Drains, are also located within the Study Area. Because these legal drains are maintained by Howard County, they were excluded from this stormwater evaluation.

2.3.1 Condition of Existing Facilities

Most of the existing storm inlets, structures and sewers are old and appear undersized. A complete evaluation of each existing storm structure was not completed as part of this study. Instead, this evaluation focused on identifying areas with drainage problems and documenting the cause of the drainage issue.

During the field investigation completed by Wessler in November and December 2017, several inlets were observed to be full of debris and in deteriorating condition (see Photo 2-1 and Photo 2-2). Many of the streets in the downtown area include curbs, with no visible gutters.

Photo 2-1: Curb inlet at intersection of Walnut Street and Mill Street full of debris

Photo 2-2: Curb inlet at intersection of Grant Street and Indiana Street full of debris

2.3.2 Existing Drainage Problems

After the field investigation of existing facilities was completed by Wessler in November and December 2017, a photo log was compiled with a record of all photos taken and a description of findings with each. Refer to **Appendix B** for the Photo Log.

Generally, undersized sewers and inadequate placement of storm inlets contribute to the major drainage problems in town. In order to prioritize the drainage needs, six priority areas were identified for a detailed evaluation.

2.3.2.1 Priority Area 1: Northwest Interceptor

An existing storm sewer system originates on Payton Street near Indiana Street and flows southwest along Meridian Street, across the railroad and continues across SR 35 to the south. This existing storm system is deficient for several reasons and standing water during heavy rains is common.

The north end of the drainage area that flows to this storm system originates in the county fairgrounds property and from this beginning point, the storm sewers are significantly undersized. As a result, a large area of standing water is formed during wet weather near Payton Street at Indiana Street.

There are three key locations with significant stormwater issues within this area:

1. Water ponds at the intersection of Grant Street and Green Street during heavy rainfall (see Photo 2-3). The inlets appear to be incorrectly placed and stormwater runoff does not flow to the downstream curb inlet south of the intersection of Grant Street and Green Street. Ponding water continues further west along Grant Street between Harrison Street and Green Street. The yard and driveway at 418 West Grant Street consistently floods during heavy rainfall.
2. The pipe crossing the railroad just west of Meridian Street appears to act as a bottleneck in the system (see Photo 2-4). Because that pipe is undersized, flooding occurs in areas upstream.
3. Heavy rain events cause significant flooding along Payton Street between Howard Street and Gladstone Street on the north side of town. In particular, the home at 219 East Payton Street has experienced water damage due to excessive standing water. Existing storm sewer pipes appear to run directly adjacent to residential homes. Based upon preliminary hydraulic calculations, the storm sewer pipe and inlets are undersized in this area. (see Photo 2-5 and Photo 2-6).

Photo 2-3: Ponding water next to inlet in intersection of Grant Street and Green Street

Photo 2-4: Bottleneck of west storm system at railroad crossing, causing ponding water upstream

Photo 2-5: Ponding water in yard of 230 East Payton Street

Photo 2-6: Ponding water in front yard of 219 East Payton Street

2.3.2.2 Priority Area 2: East Interceptor

The East Interceptor serves approximately half of the Study Area. The upstream segment of the interceptor begins on the northeast side of the Study Area and conveys stormwater runoff southwest through the east portion of the town. The East Interceptor ultimately discharges to the Henry Brunk Legal Drain through two 48-inch outfall pipes. Based on preliminary hydraulic calculations, the East Interceptor is sized appropriately to serve the current drainage area. Ponding water issues within the drainage area do not seem to be caused by an undersized storm sewer.

There areas of concern were identified within the Study Area.

1. Water ponds in the west cul-de-sac of Avalon Court during heavy rain events. There are three curb inlets within the cul-de-sac that do not appear to be clogged or

undersized. There is only one inlet serving Hall Street between Covalt Street and Maple Street (see Photo 2-7, Photo 2-8, and Photo 2-9). The cause of flooding at Avalon Court could be a result of inadequate inlet capacity in the area. Ponding water has also been reported in the backyard of 627 East Hall Street with flooding occasionally impacting the house. A resident of Avalon Court reported that 611 Avalon Court experiences flooding on their property as well.

2. Heavy rainfall along Walnut Street just west of Mill Street causes water to pond at low points along the curb line of the road. The curb inlets do not appear to be located at the low points in the road and do not adequately drain Walnut Street (see Photo 2-10).
3. Just west of the intersection of Covalt Street and Main Street, water ponds during heavy rain events. The low spots are along the existing storm sewer path, but the existing inlets do not appear to adequately serve the drainage area.

Photo 2-7: Ponding water along Hall Street overtopping driveways and crown of road

Photo 2-8: Ponding water along Hall Street overtopping driveways and crown of road

Photo 2-9: Ponding water along Hall Street and the yard of 325 S Maple Street

Photo 2-10: Ponding water along Walnut Street, inlet is not located in the low spot

2.3.2.3 Priority Area 3: Meridian Street

Water ponds throughout the intersection of Meridian Street and Holiday Drive during moderate rain events (see Photo 2-11 and Photo 2-12). There are no inlets in the intersection.

Photo 2-11: Ponding water in intersection of Meridian Street and Holiday Drive

Photo 2-12: Ponding water in intersection of Meridian Street and Holiday Drive

2.3.2.4 Priority Area 4: Indiana Street

Standing water is present at the intersections of Gladstone Street and Indiana Street with Grant Street during heavy rain events. The existing storm sewer pipe and inlets are believed to be undersized or clogged with debris at this location (see Photo 2-13). Inlet castings are sunken below grade due to pavement overlays (see Photo 2-14).

Photo 2-13: Curb inlet at intersection of Indiana Street and Grant Street

Photo 2-14: Inlet below grade at intersection of Indiana Street and Grant Street

2.3.3 Stormwater Quality

Urban land use contributes pollutants to the surface water runoff in town. Non-point sources, such as yards, roads, parking lots and fields, are the primary source of these pollutants. Primary pollutants in stormwater runoff include fertilizer, herbicides, pesticides, bacteria, nutrients, sediment, oil, debris and trash. When the runoff is collected in the stormwater system, these pollutants are concentrated and become a point source at the receiving stream of the system. The highest concentration of pollution occurs during the initial stages of storm runoff, known as the first-flush.

According to the *US EPA National Urban Runoff Program*, urban runoffs average a total suspended solids level of 101 mg/L. Solids, sediments, and floatables are the most common contaminants. Prolonged ponding increases the risk of exposure to pathogens and other harmful pollutants found in the runoff.

The Indiana Department of Environmental Management's (IDEM) 303(d) List of Impaired Waters indicates high levels of E. Coli and erosion issues along Wildcat Creek, the receiving stream of more than half of the Town's drainage area.

Physical impacts of runoff result from erosion and shear of soils and deposit sediment in receiving waterways.

2.3.4 Financial Status of Existing Facilities

The Town established a stormwater utility in 2012 to fund stormwater management activities within the Town. The Town Council is responsible for overseeing the stormwater utility.

The stormwater utility began collecting stormwater user fees in 2012 The stormwater user fees are collected by the Town Council monthly and are maintained in a separate fund for stormwater-related expenses.

2.4 Sanitary Sewer System

The Town was previously under the restriction of a sanitary sewer ban, imposed by the Indiana Department of Environmental Management (IDEM) in September 1997. As a result, significant improvements have been made to the sanitary sewer collection system and wastewater treatment plant. Infiltration and Inflow (I&I) into the collection system have been identified by smoke testing, manhole inspections, and sewer televising and then addressed by sewer lining, manhole rehabilitation, and stormwater connection removal. However, I&I in the system remains, and ponding water in town contributes to this hydraulic load on the wastewater collection system and wastewater treatment plant.

2.5 Summary of Need for Project

The Town experiences localized drainage problems throughout the Study Area during heavy rain events. Frequent flooding and ponding occur due to a lack of or undersized infrastructure.

2.5.1 Health and Safety

Areas of standing water can pose a health risk since they tend to be a breeding ground and harbor for mosquitoes. In paved areas, large puddles can be an obstruction to pedestrians and motor vehicles and become a safety hazard. Ponding water can contain pollutants, and exposure to the ponding water can be harmful.

2.5.2 Aging Infrastructure

Most of the storm sewer system downtown is aged and deteriorating, with some portions of storm sewer failing or potentially collapsed. Segments of the existing storm sewer system are on private property and may even be located under existing homes and other structures. The system has had a history of major drainage issues on the north side of town, primarily comprised of areas with significant standing water.

2.5.3 Stormwater Quality

The existing stormwater management system contains some catch basins to provide limited stormwater quality treatment, but these existing structures have filled with sediment and debris over time and are no longer functioning properly. Therefore, the existing system effectively provides no stormwater quality treatment to the stormwater runoff it collects and conveys. As a result, stormwater runoff containing pollution is discharged into downstream waterways.

3.0 FUTURE SITUATION

3.1.1 Current Population

The 2010 Census Data lists the total population of Howard County to be 82,752 and the population of the Greentown to be 2,415. *STATS Indiana*[1] estimates the current (2015) population of Howard County to be 82,250 and the population of Greentown to be 2,400.

3.1.2 Population Projection

The historical population data (1980-2010) and the population projections (2015-2040) were obtained from *STATS Indiana*. The historical population change of Howard County was down 4.8% from 1980 to 2010 while the Town experienced 6.6% growth during that same period.

The population of Howard County is projected to decrease by 7.6% from 2010 to 2040. *STATS Indiana* predicted that Greentown's population would begin to decline in 2015. Therefore, it was assumed that the ratio of historical growth rates of Howard County and the Town would be consistent for projected population.

The Town's population was projected based on the ratio of Greentown's 2015 historical population and Howard County's projected population change as shown in **Table 3-1** below.

Table 3-1: Historical and Projected Populations

Year	*Population*	
	Howard County	*Greentown*
1980	86,896	2,265
1990	80,827	2,172
2000	84,964	2,546
2010	82,752	2,415
2015	*82,250*	*2,400*
2020	*81,543*	*2,379*
2025	*80,706*	*2,355*
2030	*79,522*	*2,320*
2035	*78,059*	*2,277*
2040	*76,482*	*2,231*

3.1.3 20-Year System Needs

The Town's population is not expected to grow during the 20-year planning period, therefore the future stormwater service area remains the same as the existing service area.

[1] http://www.stats.indiana.edu/

4.0 EVALUATION OF ALTERNATIVES

4.1 Design Criteria

The following design criteria, based upon industry standards and the INDOT Storm Drainage Standards, were implemented as guidelines to evaluate the identified alternatives. Key standards for evaluation were:

- Runoff should be calculated using the SCS Hydrograph Routing Method.
- The storm sewer system should handle peak flows by gravity from the 10-year storm event.
- The minimum size storm sewer shall be 12-inch diameter.
- Storm sewers should have a minimum cover of one foot; two feet of cover is preferred.
- Stormwater systems with a drainage area greater than one acre should provide stormwater quality treatment for the removal of common pollutants (e.g. 80% removal of total suspended solids (TSS)).

4.2 Stormwater Goals

The Master Plan will help the Town guide decisions and meet long-term goals. This Master Plan covers a planning period from 2018 to 2038. Stormwater Management Goals over this planning period include the following:

- Significantly reduce the occurrence of local flooding due to wet weather events.
- Reduce or prevent property damage due to flooding from a wet weather event.
- Improve access to properties during and following wet weather events.
- Reduce ponding stormwater that propagates insects, is a public nuisance, and creates a health risk.
- Improve ground water quality through the filtration of surface water.
- Reduce or prevent non-point source pollution to downstream waterways.
- Reduce the inflow of stormwater to the sanitary sewer system.

The goals stated above, as well as budget constraints, provide guidance for developing and evaluating project alternatives and priorities.

4.3 No Action Alternative

This alternative involves utilizing the existing storm sewer system within the Study Area without making any improvements to address flooding, drainage, or stormwater quality concerns. This alternative does not address the flooding problems that exist, and customer complaints can be expected to continue if no improvements are made. This alternative also fails to address storm sewer system facilities located on private property. The No Action alternative is considered infeasible and is not recommended.

4.4 Optimization of Existing System Alternative

This alternative involves isolated rehabilitation of the existing storm sewer system within the Study Area without replacing or installing new infrastructure to address flooding, drainage,

or stormwater quality concerns. This alternative fails to address areas lacking stormwater infrastructure and does not address undersized facilities. Flooding problems and customer complaints can be expected to continue. This alternative also fails to address storm sewer system facilities located on private property. The Optimization of Existing System alternative is considered infeasible and is not recommended.

However, restoration and optimization of the existing stormwater infrastructure should be considered in selected locations. An overall condition assessment of existing inlets is recommended, and a restoration plan should be developed as a result.

4.5 Regionalization Alternative

This alternative involves expanding the study area outside of Town limits to consider regionalizing stormwater infrastructure. Because there are no major storm sewer systems surrounding the Town and there are two legal drains already flowing through Town limits, regionalization is neither cost effective nor feasible. The Regionalization Alternative is not recommended.

4.6 Capital Improvements Alternative

This alternative involves replacing undersized and underperforming infrastructure with new, appropriately-sized facilities and installing new facilities where no stormwater infrastructure currently exists. This alternative will be best able to address known flooding and drainage concerns throughout the Study Area. New stormwater facilities should be located within the Town's existing right-of-way, wherever possible. In areas that are impractical to relocate or redirect stormwater facilities, the Town should obtain permanent drainage easements. This alternative will best address the Town's needs and goals and is the recommended alternative. Detailed project descriptions, impacts, concerns, and costs are outlined in the following paragraphs.

Primarily "gray" infrastructure alternatives are described for all improvements. Stormwater quality treatment measures and green infrastructure alternatives or additions should be considered and implemented during design. Refer to **Appendix C** for a "toolbox" of green infrastructure options that may be incorporated into the proposed improvements.

4.6.1 Northwest Interceptor Improvements Project

Two sewer route options were considered to address the lack of adequate stormwater infrastructure in the Northwest Interceptor Project Area.

<u>Option 1</u>

- Install 60-inch storm sewer along Grant Street from the J Loop Legal Drain to Green Street
- Install inlets in low spots of intersections along Grant Street
- Install 54-inch storm sewer along Green Street and railroad from Grant Street to Meridian Street

- Connect existing storm sewer system to proposed storm sewer at intersection of Green Street and the alley between Grant Street and Main Street
- Install a stormwater quality unit (SWQU) south of the intersection of Carter Street and Grant Street along the proposed storm sewer (refer to the list below for SWQU options and **Appendix C** and **Appendix D** for water quality benefits and maintenance considerations)
    - Stormceptor,
    - Hydrodynamic separator,
    - Wet pond, or
    - Subsurface detention
- Replace pavement disturbed by improvements
- Replace existing storm sewer with 42-inch storm sewer along Meridian Street from the railroad crossing to Payton Street
- Install 42-inch storm sewer along Payton Street from Meridian Street to Indiana Street
- Install inlets in low spots along Meridian Street and Payton Street
- Install 12-inch storm sewer and inlets to serve low spots along existing alignment between Payton Street and Blaine Street
- Replace pavement disturbed by improvements

<u>Option 2</u>

- Install 60-inch storm sewer along Carter Street and Grant Street from the J Loop Legal Drain to Green Street
- Install inlets in low spots of intersections along Grant Street
- Install 54-inch storm sewer along Green Street and railroad from Grant Street to Meridian Street
- Connect existing storm sewer system to proposed storm sewer at intersection of Green Street and the alley between Grant Street and Main Street
- Replace pavement disturbed by improvements
- Replace existing storm sewer with 42-inch storm sewer along Meridian Street from the railroad crossing to Payton Street
- Install 42-inch storm sewer along Payton Street from Meridian Street to Indiana Street
- Install inlets in low spots along Meridian Street and Payton Street
- Install 12-inch storm sewer and inlets to serve low spots along existing alignment between Payton Street and Blaine Street
- Replace pavement disturbed by improvements

Although Option 2 is expected to be located entirely within the Town's right-of-way, this option is not recommended. The orientation of the outfall will result in a discharge angle that is not ideal hydraulically and will require additional bank stabilization measures at the discharge to the J Loop Legal Drain. Option 2 will also require additional pavement

restoration and therefore will result in higher construction costs. For these reasons, Option 1 is recommended for the Northwest Interceptor Improvements Project.

Refer to **Figure A-4** in **Appendix A** for a map of the existing infrastructure and the proposed improvements for the Northwest Interceptor area.

The following are environmental impacts specific to the Northwest Interceptor Improvements Project. A full discussion of environmental impacts is in **Chapter 5.0**.

- If land disturbance is one acre or more, a Rule 5 Permit with a Stormwater Pollution Prevention Plan (SWPPP) for construction is required.
- Disturbed/Undisturbed Land – No archaeological resources or prime farmland will be disturbed by the 15 FT proposed permanent easement or other proposed work.
- Historical – No historical properties will be affected by the proposed project.
- Wetlands – Project Area includes a riverine wetland (J Loop Legal Drain). If possible, outlet protection will be installed above the ordinary high water mark of the ditch avoiding the riverine wetland.
- Surface Waters – If an outfall protection is required for J Loop Legal Drain, potentially 500 SF of the legal drain and bank could be impacted.
- Plants and Animals – Project Area may include Indiana Bat Habitat.

According to the Howard County GIS website, the locations chosen for the proposed improvements do not all appear to be within the Town's right-of-way. Land acquisition will be required to implement recommended improvements. Additional right-of-way research may be needed to determine the exact right-of-way limits to verify that additional easements or land acquisition is not required.

The greatest potential for construction problems would likely come from utility conflicts. Installing or rehabilitating stormwater infrastructure within the right-of-way often involves work near and around existing facilities and service lines. According to utility mapping provided by the Town and observation of existing utility facilities, the segment of improvements along Grant Street should remain on the south side of the street to avoid water and electric utilities on the north side. Additional investigation and utility coordination should be performed during the design phase to minimize or eliminate utility conflicts.

A summary of the construction and non-construction costs associated with the Northwest Interceptor Improvements Project are shown in **Table 4-1** below. For a detailed cost analysis, refer to **Appendix E**.

Table 4-1: Northwest Interceptor Improvements Project Cost Summary

	Option 1
Construction Costs	$2,521,000
Non-Construction Costs	$338,000
Total Project Cost	**$2,859,000**

4.6.2 East Interceptor Improvements Project

One improvement option was considered to address the lack of adequate stormwater infrastructure in the East Interceptor Improvements Project Area.

Option 1

- Install 12-inch perforated storm sewer or hybrid ditch along the north side of Hall Street between Maple Street and 806 East Hall Street
- Replace existing 24-inch with new 30-inch storm sewer from 627 East Hall Street to connection to 48-inch interceptor
- Install an inlet in the utility easement south of 627 East Hall Street
- Install 12-inch perforated storm sewer or hybrid ditch in the utility easement south of 627 East Hall street to connect to the East Interceptor to the west
- Install an inlet in the utility easement southwest of 611 Avalon Court
- Install 12-inch perforated storm sewer or hybrid ditch in the utility easement south of 611 Avalon Court
- Install 12-inch storm sewer from the utility easement to the intersection of Holiday Drive and Holiday Court and along Holiday Drive to the northwest to connect to the East Interceptor
- Install inlets in low spots west of the intersection of Mill Street and Walnut Street and connect to existing storm sewer
- Install inlets in low spots west of the intersection of Covalt Street and Main Street and connect to existing storm sewer
- Install an inlet north of the sidewalk in the west yard of 806 East Grant Street
- Replace pavement disturbed by improvements

Refer to **Figure A-5** and **Figure A-6** in **Appendix A** for maps of the existing infrastructure and the proposed improvements for the East Interceptor area.

The following are environmental impacts specific to the East Interceptor Improvements Project:

- If land disturbance is one acre or more, a Rule 5 Permit with a Stormwater Pollution Prevention Plan (SWPPP) for construction is required.
- Groundwater (Pipeline) – A natural gas pipeline is located adjacent to Project Area.
- Plants and Animals – Project Area may include Indiana Bat Habitat.

According to the Howard County GIS website, the locations chosen for the proposed improvements do not all appear to be within the Town's right-of-way. Land acquisition will be required to implement recommended improvements. Additional right-of-way research may be needed to determine the exact right-of-way limits to verify that additional easements or land acquisition is not required.

The greatest potential for construction problems would likely come from utility conflicts and accessibility. Installing or rehabilitating stormwater infrastructure within the right-of-way often involves work near and around existing facilities and service lines. Additional investigation and utility coordination should be performed during the design phase to minimize or eliminate utility conflicts. Additionally, a portion of the proposed improvements is located within private yards. Existing fences, sheds, landscaping, and other obstructions may pose access and installation challenges during construction.

A summary of the construction and non-construction costs associated with the East Interceptor Improvements Project are shown in **Table 4-2** below. For a detailed cost analysis, refer to **Appendix E**.

Table 4-2: East Interceptor Improvements Project Cost Summary

	Option 1
Construction Costs	$438,000
Non-Construction Costs	$140,000
Total Project Cost	**$578,000**

4.6.3 Meridian Street Improvements Project

One improvement option was considered to address the lack of adequate stormwater infrastructure in the Meridian Street Improvements Project Area.

Option 1

- Install inlets in low spots of the Meridian Street and Holiday Drive intersection
- Install 12-inch storm sewer from proposed inlets to outfall to Henry Brunk Legal Drain
- Install a stormwater quality unit prior to the outfall location along the proposed storm sewer (refer to the list below for SWQU options and **Appendix C** and **Appendix D** for water quality benefits and maintenance considerations)
    - Stormceptor, or
    - Hydrodynamic separator
- Install end section at outfall location to Henry Brunk Legal Drain
- Replace pavement disturbed by improvements

Refer to **Figure A-7** in **Appendix A** for a map of the existing infrastructure and the proposed improvements for the Meridian Street area.

The following are environmental impacts specific to the Meridian Street Improvements Project:

- Disturbed/Undisturbed Land – No archaeological resources or prime farmland will be disturbed by the proposed work..
- Wetlands – Project Area includes a riverine wetland (Henry Brunk Legal Drain). If possible, outlet protection will be installed above the ordinary high water mark of the ditch avoiding the riverine wetland.
- Surface Waters – If outfall protection is required for Henry Brunk Legal Drain, potentially 230 SF of the legal drain and bank could be impacted.
- Groundwater (Pipeline) – A natural gas pipeline is located adjacent to Project Area.
- Plants and Animals – Project Area may include Indiana Bat Habitat.

According to the Howard County GIS website, the locations chosen for the proposed improvements all appear to be within the Town's right-of-way. Additional right-of-way research may be needed to determine the exact right-of-way limits to verify that additional easements or land acquisition is not required.

The greatest potential for construction problems would likely come from utility conflicts. Installing or rehabilitating stormwater infrastructure within the right-of-way often involves work near and around existing facilities and service lines. Additional investigation and utility coordination should be performed during the design phase to minimize or eliminate utility conflicts.

A summary of the construction and non-construction costs associated with the Meridian Street Improvements Project are shown in **Table 4-3** below. For a detailed cost analysis, refer to **Appendix E**.

Table 4-3: Meridian Street Improvements Project Cost Summary

	Option 1
Construction Costs	$87,000
Non-Construction Costs	$55,000
Total Project Cost	**$142,000**

4.6.4 Indiana Street Improvements Project

One improvement option was considered to address the lack of adequate stormwater infrastructure in the Indiana Street Improvements Project Area. The proposed improvements are planned to connect into the new storm sewer as part of INDOT's Main Street (US 35/SR 22) project. The Indiana Street Improvements Project cannot be completed until the new storm sewer has been installed along Main Street.

Option 1

- Install 30-inch storm sewer along Indiana Street from Main Street to midpoint between Main Street and Grant Street
- Install 24-inch storm sewer along Indiana Street and Grant Street from midpoint between Main Street and Grant Street to Gladstone Street
- Install inlets in low spots of along Indiana Street and Grant Street
- Replace pavement disturbed by improvements

Refer to **Figure A-8** in **Appendix A** for a map of the existing infrastructure and the proposed improvements for the Indiana Street area.

The following are environmental impacts specific to the Indiana Street Improvements Project:

- Historical – No historical resources will be impacted by the project.

According to the Howard County GIS website, the locations chosen for the proposed improvements do not all appear to be within the Town's right-of-way. Land acquisition will be required to implement recommended improvements. Additional right-of-way research should be performed during the design phase to determine the exact right-of-way limits to verify that additional easements or land acquisition is not required.

The greatest potential for construction problems would likely come from utility conflicts. Installing or rehabilitating stormwater infrastructure within the right-of-way often involves work near and around existing facilities and service lines. Additional investigation and utility coordination should be performed during the design phase to minimize or eliminate utility conflicts.

A summary of the construction and non-construction costs associated with the Indiana Street Improvements Project are shown **Table 4-4** table below. For a detailed cost analysis, refer to **Appendix E**.

Table 4-4: Indiana Street Improvements Project Cost Summary

	Option 1
Construction Costs	$280,000
Non-Construction Costs	$90,000
Total Project Cost	**$370,000**

4.6.5 Golding Street Improvements Project

One improvement option was considered to address the lack of adequate stormwater infrastructure in the Golding Street Improvements Project Area. The Golding Street Improvements Project cannot be completed until the new storm sewer has been installed along Main Street.

Option 1

- Replace existing storm sewer with 18-inch storm sewer and reroute to the north along Golding Street from just south of Hammer Street to Main Street
- Install inlets in low spots along Golding Street
- Replace pavement along proposed improvements alignment

Refer to **Figure A-9** in **Appendix A** for a map of the existing infrastructure and the proposed improvements for the Golding Street area.

The following are environmental impacts specific to the Golding Street Improvements Project:

- Groundwater (Pipeline) – A natural gas pipeline is located adjacent to Project Area.
- Plants and Animals – Project Area may include Indiana Bat Habitat.

According to the Howard County GIS website, the locations chosen for the proposed improvements all appear to be within the Town's right-of-way. Additional right-of-way research should be performed during the design phase to determine the exact right-of-way limits to verify that additional easements or land acquisition is not required.

The greatest potential for construction problems would likely come from utility conflicts and accessibility. Installing or rehabilitating stormwater infrastructure within the right-of-way often involves work near and around existing facilities and service lines. Additional investigation and utility coordination should be performed during the design phase to minimize or eliminate utility conflicts.

A summary of the construction and non-construction costs associated with the Golding Street Improvements Project are shown in **Table 4-5** below. For a detailed cost analysis, refer to **Appendix E**.

Table 4-5: Golding Street Improvements Project Cost Summary

	Option 1
Construction Costs	$144,000
Non-Construction Costs	$65,000
Total Project Cost	**$209,000**

4.6.6 Main Street Inlet Improvements Project

One improvement option was considered to address the lack of adequate stormwater infrastructure in the Main Street Inlet Improvements Project Area. The Main Street Inlet Improvements Project cannot be completed until the new storm sewer has been installed along Main Street. Proposed inlet layouts should be incorporated into the upcoming INDOT Main Street (US 35/SR 22) project, which will include new storm sewers.

Option 1

- Install inlets in low spots of intersections along Main Street and connect to future INDOT storm sewer main

Refer to **Figure A-10** in **Appendix A** for a map of the existing infrastructure, the anticipated route of INDOT's future storm sewer, and the proposed improvements along Main Street.

The following are environmental impacts specific to the Main Street Inlet Improvements Project:

- If land disturbance is one acre or more, a Rule 5 Permit with a Stormwater Pollution Prevention Plan (SWPPP) for construction is required.
- Historical – No historical resources will be impacted by the project.

According to the Howard County GIS website, the locations chosen for the proposed improvements all appear to be within the Town's or INDOT's right-of-way. Additional right-of-way research may be needed to determine the exact right-of-way limits to verify that additional easements or land acquisition is not required.

The greatest potential for construction problems would likely come from utility conflicts including the future INDOT storm sewer main along Main Street (US 35/SR 22). Installing or rehabilitating stormwater infrastructure within the right-of-way often involves work near and around existing facilities and service lines. Additional investigation and utility coordination should be performed during the design phase to minimize or eliminate utility conflicts.

A summary of the construction and non-construction costs associated with the Main Street Inlet Improvements Project are shown in **Table 4-6** below. For a detailed cost analysis, refer to **Appendix E**.

Table 4-6: Main Street Inlet Improvements Project Cost Summary

	Option 1
Construction Costs	$104,000
Non-Construction Costs	$45,000
Total Project Cost	**$149,000**

4.7 Selection of an Alternative

Construction and non-construction capital costs, annual operation and maintenance (O&M) expenses, and infrastructure salvage values were considered during the alternative evaluation.

4.7.1 Non-Monetary Factors

All alternatives evaluated will have similar impacts to social and environmental factors. Frequency of issues, duration of standing water/flooding, and the number of properties

impacted are social and environmental factors considered in the project priority ranking evaluation.

4.7.2 Project Priority Ranking

In order to select a recommended project, the following characteristics were evaluated in addition to the preliminary total project costs summarized in **Chapter 4.5**. These factors were determined to best demonstrate the need and feasibility of each drainage improvements project. Each factor was assigned a value and projects with the highest total were given top priority. Refer to **Appendix F** for detailed breakdown for each proposed project.

Type of Issue
4 – Safety
3 – Erosion
2 – Standing Water/Flooding
1 – Other

Location
6 – Within 5 feet of structures (home, businesses, etc.)
5 – At/Over Street Pavement (high traffic)
4 – At/Over Street Pavement (low, local traffic)
3 – At/Over Street Pavement (driveway, parking lot)
2 – Yards
1 – Fields, Other

Frequency of Occurrence
4 – Every Rain
3 – Most Rains (>6 times per year)
2 – Some Rains (1-5 times per year)
1 – Heavy Rains (<1 time per year)
0 – N/A (for safety and erosion issues)

Properties Impacted
4 – >25
3 – 13-25
2 – 6-12
1 – 1-5

Duration
4 – >5 days
3 – 3-5 days
2 – 1-2 days
1 – <24 hours
0 – N/A (for safety and erosion issues)

Project Cost
4 – $0 to $500,000
3 – $500,001 to $1,000,000
2 – $1,000,001 to $1,500,000
1 – >$1,500,000

The projects were ranked based on their overall priority score. The ranking is intended to help the Town with order of constructing projects as funds become available. Refer to **Table 4-7** for a summary of the project prioritization results.

Table 4-7: Summary of Project Priority Ranking

Project Area	*Priority Score*	*Construction Costs*
East Interceptor Improvements	36	$578,000
Northwest Interceptor Improvements	34	$2,918,000
Indiana Street Improvements	32	$370,000
Main Street Inlet Improvements	32	$149,000
Meridian Street Improvements	30	$142,000
Golding Street Improvements	28	$209,000

5.0 EVALUATION OF ENVIRONMENTAL IMPACTS

Environmental resources located within the Study Area were identified and are discussed below.

5.1 Disturbed and Undisturbed Land

Portions of land on which construction activities will occur may be located in previously disturbed and undisturbed lands. Construction activities located in previously disturbed lands include road rights-of-way, areas previously disturbed by home construction (utility installation and yards), portions of sidewalks and existing roadways. Construction activities located in previously undisturbed lands include areas adjacent to existing road rights-of-way and along Howard County Legal Drains.

Soil excavation will be required during the construction process; therefore, land will be disturbed. Borrow soil will not be needed during construction. Sediment removed during construction will be stockpiled and used as backfill. Excess soil that remains from excavation activities will be disposed of properly. The total land disturbance for the stormwater improvements will vary from project to project. A Construction/Land Disturbance Stormwater Permit (Rule 5 Permit) will be obtained in accordance with 327 IAC 15-5 for stormwater runoff associated with construction activities that disturb greater than one acre of land. Silt fencing, erosion control blankets and other appropriate measures, if necessary, will be utilized to prevent erosion in the areas of construction activity. Based on aerial photography, tree removal may be required for the 15 FT easement that is part of the Northwest Interceptor project. Potentially, 2,600 SF of trees could be removed. The area is not located in a wetland or floodway. Disturbed land will be temporarily seeded if permanent seeding is delayed.

5.2 Archaeological Resources

Archaeological remains are a limited, finite and non-renewable resource, and in many cases, are highly fragile and vulnerable to damage and destruction. Archaeological sites provide a record of human interaction with the environment. The majority of proposed construction activities will occur along residential streets and are assumed to be previously disturbed. The remainder of the proposed construction activities, along Howard County Legal Drains, have the potential to affect archaeological sites. A Phase I Archaeological Reconnaissance was completed for two previously undisturbed areas for the Northwest Interceptor and the Meridian Street improvements. The reconnaissance was completed by a qualified professional archaeologist that complied with the report guidelines established by the Indiana Department of Natural Resources (DNR), Division of Historic Preservation and Archeology (DHPA). The report concluded that no archaeological sites were located within the two Project Areas. The Archaeological Report was submitted to the Indiana State Historic Preservation Officer (SHPO) for analysis. SHPO concluded that there are no known archaeological resources eligible for inclusion in the National Register of Historic Places. Thus, the project will not impact archaeology resources. In any instance, if during excavation,

artifacts, human remains, or other items of archaeological significance are encountered, construction must stop and the DNR DHPA must be contacted. The Archaeological Report is provided in **Appendix G**.

5.3 Historic Sites and Structures Inventory

To preserve the historical and cultural foundation of the nation, the proposed projects were assessed for their effects on historic properties within the Study Area. The Howard County Interim Report (May 2003) was reviewed for historic properties within the Study Area. Fifty-three historic properties were identified within the Study Area. Of the 53 historic properties identified, ten are located near the proposed projects. The proposed projects will not require the relocation, purchase or demolition of any buildings or structures. Impacts to historical properties should be temporary in nature and may affect curbs, sidewalks, yards and/or street-side plantings/trees. The Howard County Interim Report is provided in **Appendix H**.

The Indiana State Historic Architectural and Archaeological Research Database (SHAARD) mapping tool (SHAARDGIS) allows users to search information on known historic and prehistoric resources throughout Indiana and is updated as new information is received. Refer to the SHAARDGIS Map in **Appendix A, Figure A-11**. The following websites were checked for historic sites near the Study Area.

- The SHAARDGIS from the DNR DHPA viewed online (http://gis.in.gov/apps/dnr/SHAARDGIS/) – The tool identified the following historic properties near the proposed projects:
    - (067-254-06016) House located at 518 W. Grant Street.
    - (067-254-06015) House located at 412 W. Grant Street.
    - (067-254-06014) House located at 205 N. Green Street.
    - (067-254-06005) United Brethren Church located at 328 N. Meridian Street.
    - (067-254-06003) House located at 412 N. Meridian Street.
    - (067-254-06031) Congregational Christian Church located at 224 E. Main Street.
    - (067-254-06018) House located at 212 W. Main Street.
    - (067-254-06037) House located at 227 E. Main Street.
    - (067-254-06038) House located at 213 E. Main Street.
- The National Park Services' National Historic Landmark Survey information for Indiana, viewed online (http://www.nps.gov/subjects/nnlandmarks/state.htm?State=IN) – No National Natural Landmark sites were identified in or near the Study Area.
- The DNR DHPA Indiana Properties Recently Listed in the National and State Registers (dated May 2014), viewed online (http://www.in.gov/dnr/historic/files/hp-Recent_listings.pdf) – No properties were identified in or near the Study Area.

The DNR DHPA conducted a Federal Section 106 Review of historic properties within the Project Area. The review identified the House at 518 West Grant Street (067-254-06016) within the probable area of potential effects. SHPO does not believe the characteristics that qualify

the property for inclusion on the National Register will be diminished as a result of the project. The Town agrees that no historic properties will be affected by the project.

5.4 Wetlands

Wetlands are areas that are inundated or saturated by water for a period of time that allows vegetation to grow that is adapted for such soil conditions. Wetlands are identified by having hydric soils, wetland hydrology and hydrophytic vegetation. Wetlands are important because they provide wildlife habitat, filter nutrients and sediments, and control flooding. Wetlands information obtained from the IndianaMAP Viewer is provided as **Figure A-12** in **Appendix A**. According to the Wetlands Map, the proposed projects may potentially impact portions of the riverine wetlands of the J Loop and Henry Brunk Legal Drains. Tree removal will not occur within the riverine wetland. If wetlands cannot be avoided, a wetland delineation must be completed to determine the boundaries of the wetland. A Section 404 Permit under the Clean Water Act (CWA) through the U.S. Army Corps of Engineers (USACE) will be required for disturbances within wetland areas. Additionally, a Section 401 Water Quality Certification through the Indiana Department of Environmental Management (IDEM) will be required. All required USACE and IDEM Permits are to be obtained prior to disturbances within wetland areas.

5.5 Surface Waters

Surface waters include rivers, streams, creeks, lakes and reservoirs. Surface waters are important sources of drinking water, irrigation, power generation and recreation. The IndianaMAP Viewer was used to identify any ephemeral, intermittent and perennial (permanent) streams. The surface waters identified can be found on the Topographic Map included as **Figure A-13** in **Appendix A**. The proposed projects will not adversely impact any waterways identified in the list below:

- Waters of limited use listed in 327 IAC 2-1.5-19(a) and 327 IAC 2-1-11(a)
- Exceptional use streams listed in 327 IAC 2-1-11 (b)
- Natural, Scenic Recreational Rivers and Streams listed in 312 IAC 7-2
- Salmonid Streams listed in 327 IAC 2-1.5-5(a)(3)
- Outstanding River list (Natural Resource Commission Non-Policy Document)

For construction activities occurring below the ordinary high-water mark of any waterway, a Section 404 Permit under the CWA through the USACE will be required. Additionally, a Section 401 Water Quality Certification Permit through IDEM would be required. All required USACE and IDEM permits are to be obtained prior to disturbances with a jurisdictional waterway. Project activities that impact the J Loop or Henry Brunk Legal Drains will require coordination with Howard County for possible impact to these Legal Drains.

5.6 100-Year Floodplains and Floodway

A floodway is the river and the adjacent land reserved to carry and discharge flood waters. A 100-year floodplain consists of a floodway and a floodway fringe; it has a 1% chance of flooding in any given year. Floodplains help reduce flooding and recharge groundwater.

Floodplain data obtained from the IndianaMAP Viewer is provided as **Figure A-14** in **Appendix A**. The identified floodplain for the Henry Brunk Legal Drain does not extend to the Meridian Street Improvements Project Area; thus, floodplains and floodways will not be impacted.

5.7 Groundwater

The Web Soil Survey program (http://websoilsurvey.ncrs.usda.gov/app/HomePage.htm) developed and maintained by the Natural Resource Conservation Service (NRCS) provided information on the soil types and depth to the water table within the Study Area. The soils within the Study Area are predominantly Blount silt loam (BgmA) with a depth to the water table of 23 centimeters and Patton silty clay loam (Pa) with a depth to the water table of 15 centimeters. The Soil Survey Map is included as **Figure A-3** in **Appendix A**.

Dewatering may be required to temporarily lower the groundwater table in some areas. Minor fluctuations in groundwater levels should be temporary in nature. Discharge from dewatering activities should be filtered or settled to remove sediment and should not be directly discharged to any waterway, wetland, or stormwater conveyance. Notes to this effect should be included in the project plans and specifications. Soil borings may be obtained as necessary to evaluate soil suitability and determine actual soil conditions and groundwater depths.

The Wellhead Protection Program was implemented in Indiana to protect the groundwater drinking supplies from pollution and implemented strategies for municipalities to prevent the contamination of the drinking water sources. Based on the type of project, some additional construction practices may apply when a project is located with a Wellhead Protection (WHP) Area. IDEM's WHP Proximity Determinator (http://www.in.gov/idem/cleanwater/pages/wellhead/) was viewed and determined that the proposed projects are not located within a WHP Area.

Oil and gas borings in the ground are used to extract petroleum hydrocarbons and natural gas. The wells are direct openings to the ground and groundwater and are susceptible to contamination from oil spills. The IndianaMAP Viewer indicated that no oil or gas wells are identified near or adjacent to the Study Area; a natural gas pipeline was identified in the Study Area and is included on **Figure A-13** in **Appendix A**. The gas utilities will be contacted during the utility coordination phase of the proposed projects.

A Sole Source Aquifer is a groundwater supply designated by the U.S. Environmental Protection Agency (USEPA) as the principal source of drinking water for an area. Due to the limited alternatives of drinking water in these areas, additional project approval by the USEPA is required. According to the USEPA Region 5 Designated Sole Source Aquifer Map (https://www.epa.gov/dwssa), the proposed projects are not located in the counties associated with a Sole Source Aquifer.

Karst is a landscape formed from the dissolution of limestone and is characterized by sinkholes, caves and underground aquifers are susceptible to pollution and contamination from infiltrating surface waters. These underground features are not prevalent for the Study Area nor for Howard County according to the IndianaMAP Viewer.

5.8 Plants and Animals

Endangered, threatened and rare (ETR) species are evaluated by the Indiana DNR or the U.S. Fish and Wildlife Service (USFWS) to protect significant natural areas and the species that depend on those areas. Protecting these areas and species is important to biodiversity, agriculture and ecosystems. Residential and commercial land uses make up the Study Area. The construction and operation of the proposed projects are not expected to pose a threat to or negatively impact State or Federal-listed endangered species and their habitat. Tree removal for the Northwest Interceptor will be minimized. DNR will be contacted immediately if it is determined that a species from the Indiana or Federal List is found to be disturbed by construction activities. The proposed projects will be implemented to minimize impacts to non-endangered species and their habitat.

The Indiana Bat (*Myotis Sodalis*) is a Federal and State listed endangered species that migrates into Indiana in the summer months. The Study Area may include Indiana Bat habitat. Tree removal is expected to be minimal for the construction of the proposed projects. If is recommended by the USFWS or DNR, tree removal will not be conducted between April 1 and September 30 to avoid potential impacts to the Indiana Bat. Other mitigation measures suggested by DNR, USFWS or other environmental permits or early coordination letters will be implemented.

Emerald Ash Borer (*Agrilus planipennis Fairmaire*) is an exotic beetle that damages all species of ash trees (genus *Fraxinus*) and other hardwood trees. Howard County is designated as an Emerald Ash Borer Quarantined County by DNR. In accordance with State (327 IAC 18-3-18) and Federal (7 CFR 301.53-1 through 301.53-9) regulations, all trees potentially containing Emerald Ash Borer will be managed appropriately.

5.9 Prime Farmland

The loss of farmland as a natural resource due to construction activities, may threaten the ability to produce food in sufficient quantities for the United States. The proposed projects will not impact farmland; therefore, National Resource Conservation Service (NRCS) coordination is not required. NRCS Farmland Conversion correspondence is provided in **Appendix I**.

5.10 Air Quality

Air pollution is generated from factories, vehicles, equipment and naturally occurring sources such as windblown dust. Short-term air quality impacts are possible as a result of the proposed projects, as construction activities may generate dust and noise. Mitigation measures include limiting construction activity to daylight hours on weekdays to minimize noise effects. Construction specifications will require proper control measures be utilized to

control wind erosion from construction areas. Proper cleanup practices will be required to reduce the generation of dust and other construction debris. When impacts cannot be avoided, appropriate measures will be utilized. Open burning of trees and brush is not allowed for the proposed projects according to 326 IAC 4.

The USEPA has established ambient air quality standards for criteria pollutants (carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter and sulfur dioxide) to protect the environment and public welfare. Counties and populated areas are designated as attainment or non-attainment areas. If a pollutant level is above the regulated level, then the air quality is worse than the established acceptable standards (non-attainment area). The air quality for an attainment area is equal to or less than the established level for a pollutant. Howard County is considered an attainment area for the criteria pollutants that may affect public health and welfare (http://www.in.gov/idem/airquality/2339.htm). Long-term air quality impacts are not expected for the proposed projects.

5.11 Open Space and Recreational Opportunities

Open and recreational spaces are non-developed areas for public use that enhance the environmental quality of neighborhoods or communities. According to available local and county websites and a review of recent aerial photographs, the Town operates a public park southeast of the U.S. 35 bridge over Wildcat Creek. This area will not be impacted by the proposed projects. Construction activities will neither create nor destroy open space or recreational opportunities.

5.12 Lake Michigan Coastal Program

The Lake Michigan Coastal Program is based on a watershed approach. The boundary for the Coastal Program Area includes those areas that drain into Indiana's portion of Lake Michigan. The purpose of the Lake Michigan Coastal Program is to enhance the State's role in planning for and managing natural and cultural resources in the coastal region and to support partnerships between federal, state and local agencies and organizations. The Study Area is not located in the Lake Michigan Coastal Zone; therefore, the proposed projects will not affect the Lake Michigan Coastal Program.

5.13 National Natural Landmarks

The National Parks Service protects areas recognized as containing outstanding biological and geological resources or examples of natural history. The Indiana National Natural Landmarks website (http://www.nature.nps.gov/nnl/state.cfm?State=IN) did not identify any National Natural Landmarks within the Study Area or Howard County; therefore, the construction and operation of the proposed projects will not affect National Natural Landmarks.

5.14 Mitigation Measures

Erosion control measures should be implemented during construction. Areas disturbed by construction activities should be restored and revegetated with seeding and other measures such as erosion control blankets, as necessary. If it is recommended by the USFWS, DNR, or

if required as a permit condition, tree removal will not be conducted between April 1 and September 30 to avoid potential impacts to the Indiana Bat. A Rule 5 Permit for erosion control will be obtained from IDEM prior to construction for projects disturbing an area of one acre or more. Section 401 and 404 Permits will be obtained prior to disturbances to waterways and/or wetlands, if required. DNR Construction in a Floodway Permits will be obtained for disturbances within floodways, if required.

6.0 SELECTED PLAN

It is recommended the Town pursue each of the stormwater improvement projects as well as the optimization of the existing system, as funds become available.

6.1 Description

Due to the need for the INDOT Main Street (US 35/SR 22) project completion for a sufficient outlet, the top three priority projects are recommended for immediate implementation: Grant Street Improvements Project, East Interceptor Improvements Project, and Meridian Street Improvements Project. The bottom three priority projects: Indiana Street Improvements Project, Golding Street Improvements Project, and the Main Street Inlet Improvements Project, are recommended for completion in conjunction with the INDOT Main Street (US 35/SR 22) project, which is currented scheduled for a spring 2020 letting.

The total estimated project cost for the six priority projects is $4,373,000. A detailed estimate of construction and non-construction costs is included in **Appendix E**.

6.2 Project Schedule

The estimated project timeline and completion for construction is based on project financing through the Indiana Finance Authority's (IFA) State Revolving Fund (SRF) low-interest loan program and the Indiana Office of Community and Rural Affairs (OCRA) Community Development Block Grant (CDBG) Stormwater Improvements Program (SIP) construction grants. The proposed schedule is shown in **Table 6-1** below:

Table 6-1: Estimated Project Timeline

Date	*Activity*
May 2018	Submit PER to SRF and OCRA
May 2018	Submit OCRA Grant Proposal
May 2018	Notice to Proceed with Design
June 2018	Receive SRF and OCRA PER Approval
July 2018	Submit OCRA Grant Application
September 2018	Receive OCRA Grant Award
September 2018	Execute Grant Agreement with OCRA
September 2018	Submit Permits
October 2018	Submit Final Engineering Drawings and Specifications
November 2018	Receive Permits
November 2018	Bidding
December 2018	SRF Loan Closing & OCRA Release of Funds
January 2019	Begin Construction
June 2020	Complete Construction
August 2020	Project Closeout

6.3 Permit Requirements

The following permits may be required before construction:

- Construction/Land Disturbance Storm Water Permit (327 IAC 15-5, Rule 5 Permit)
- Phase I Archaeological Reconnaissance Field Report
- Historic Preservation and Archeology (Federal Section 106 Review)
- U.S. Army Corps of Engineers (Section 404 Permit)
- IDEM - Water Quality Certification (Section 401 Permit)

6.4 Sustainability Considerations

A consideration to the Town for the design and construction of the proposed improvements is the efficient use of energy, water, and materials to create a sustainable project having a minimum impact to the environment both during and after construction. A list of potential design elements has been assembled for possible incorporation into the project design, construction, and operation.

As discussed in **Chapter 4.0**, the recommended project includes the installation of stormwater quality measures which could include green infrastructure or other standalone stormwater quality units to remove trash, debris, and other common pollutants from stormwater runoff. The specific stormwater quality measures are to be determined during design. Additional best management practice (BMP) options are described in **Appendix C,** Green Infrastructure Toolbox.

Diesel emissions from heavy construction equipment are a significant source of fine particulate matter, nitrous oxides, and other known carcinogenic substances. Clean fuel construction equipment is equipment that uses Ultra Low Sulfur Diesel (ULSD) or biodiesel (or a mix of both) for diesel equipment, which may be used on the project.

Products that feature recycled contents are commercially available for new construction projects and can be incorporated into the design of the project. Examples of such materials include reclaimed concrete (to replace new riprap), fly ash (to be specified where appropriate in new concrete mix specifications), recycled asphalt (for paving improvements), reusable forms and lumber, recyclable PVC, ground tires, and ground glass.

During construction, efforts will be made to utilize locally sourced and manufactured materials and to recycle construction waste. The recycled waste can then be re-used on the same project or future projects directed by the Town.

6.5 Conclusions and Recommendations

It is recommended that the Town proceed with pursuing available grants and low-interest funding for the construction of the proposed project.

7.0 LEGAL, FINANCIAL, AND MANAGERIAL CAPABILITIES

The Town established a stormwater utility in 2012 to fund stormwater management activities within the Town. The Town Council is responsible for overseeing the stormwater utility. The Greentown Town Council consists of five members including the Town Council President. The stormwater utility began collecting stormwater user fees in 2012 The stormwater user fees are collected by the Town Council monthly and are maintained in a separate fund for stormwater-related expenses. The Town's stormwater rates are included in **Appendix J**.

The Town plans to finance the improvement costs through the State Revolving Fund (SRF) Loan Program, which would provide for a 20-year, low-interest loan.

A completed Signatory Authorization Resolution Form, PER Acceptance Resolution Form, and SRF Financial Information Form will be included in **Appendix J**.

8.0 PUBLIC PARTICIPATION

A copy of the Preliminary Engineering Report dated April 2018 was delivered to the Town of Greentown Town Hall on April 30, 2018 for the public to view prior to the public hearing and for five days after the public hearing.

A public Hearing was held at the Town of Greentown Town Hall on May 15, 2018 at 6:30 P.M. It was advertised in the Kokomo Tribune. The following items related to public participation will be provided in **Appendix K**:

- Copy of the Publisher's Affidavit from the newspaper for the public hearing notice;
- Public Hearing attendance record;
- Public Hearing meeting minutes;
- Copy of the mailing labels for public hearing attendees and other parties that might be interested in receiving copies of the Environmental Impact Statement.

No written comments were received during the public comment period.

APPENDIX A

FIGURES

Table of Contents

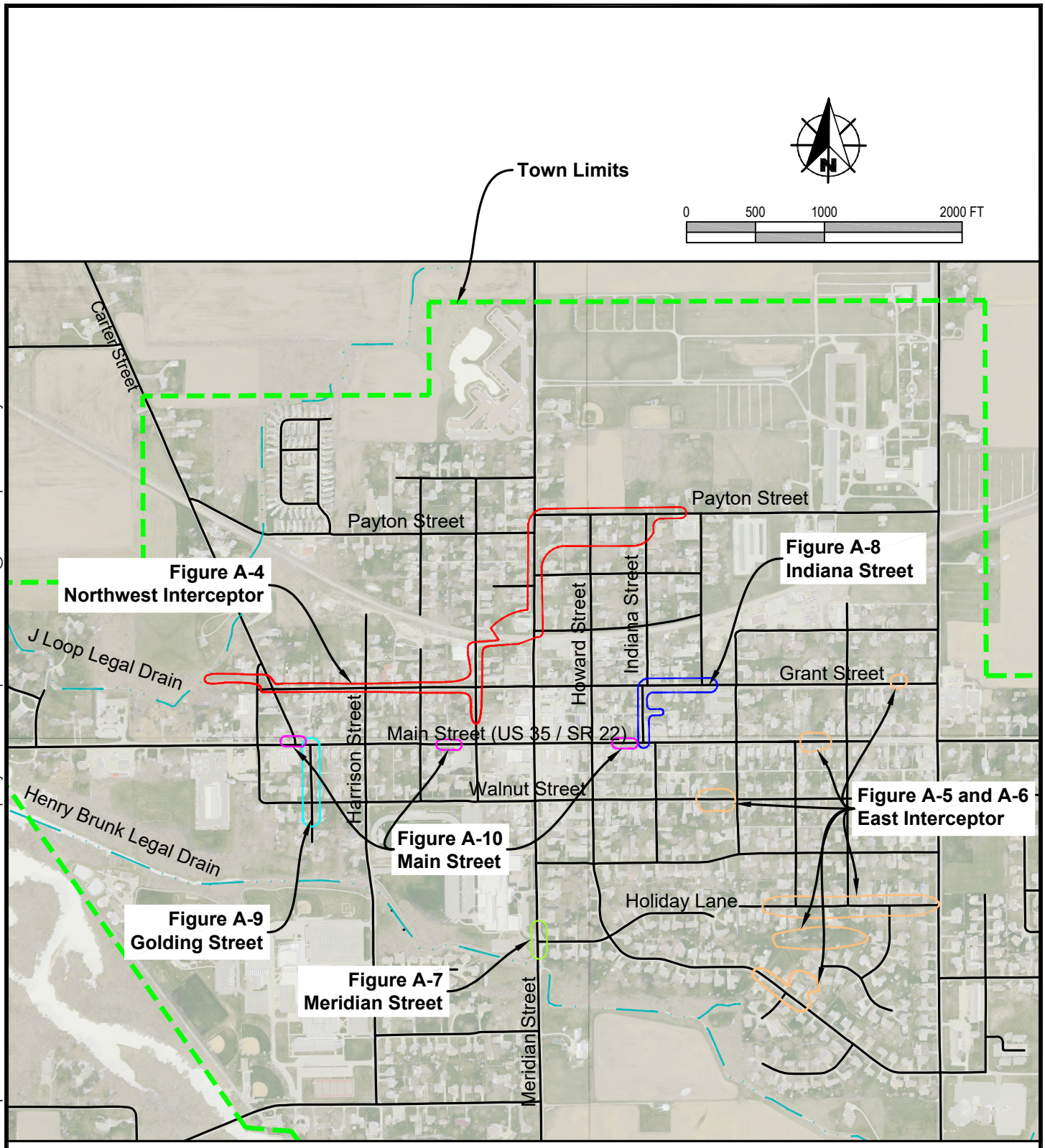


FIGURE A-1
PROJECT OVERVIEW MAP

Town of Greentown, Indiana
Greentown Stormwater
Master Plan

WESSLER ENGINEERING
More than a Project™

June 2018
200017-01-001
PG. A-1

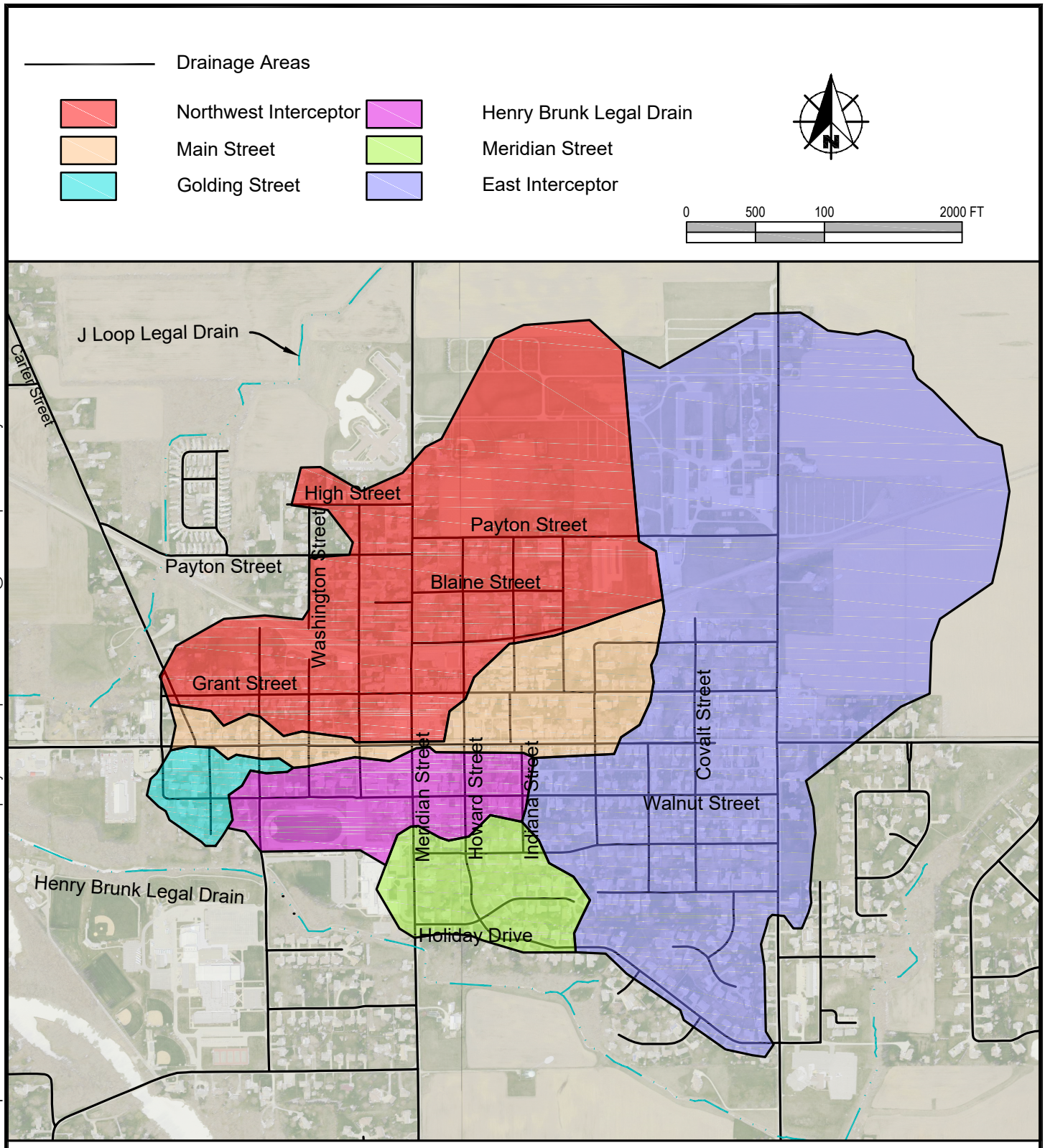


FIGURE A-2
DRAINAGE AREAS

Town of Greentown, Indiana
Greentown Stormwater
Master Plan

WESSLER ENGINEERING
More than a Project™

June 2018
200017-01-001
PG. A-2

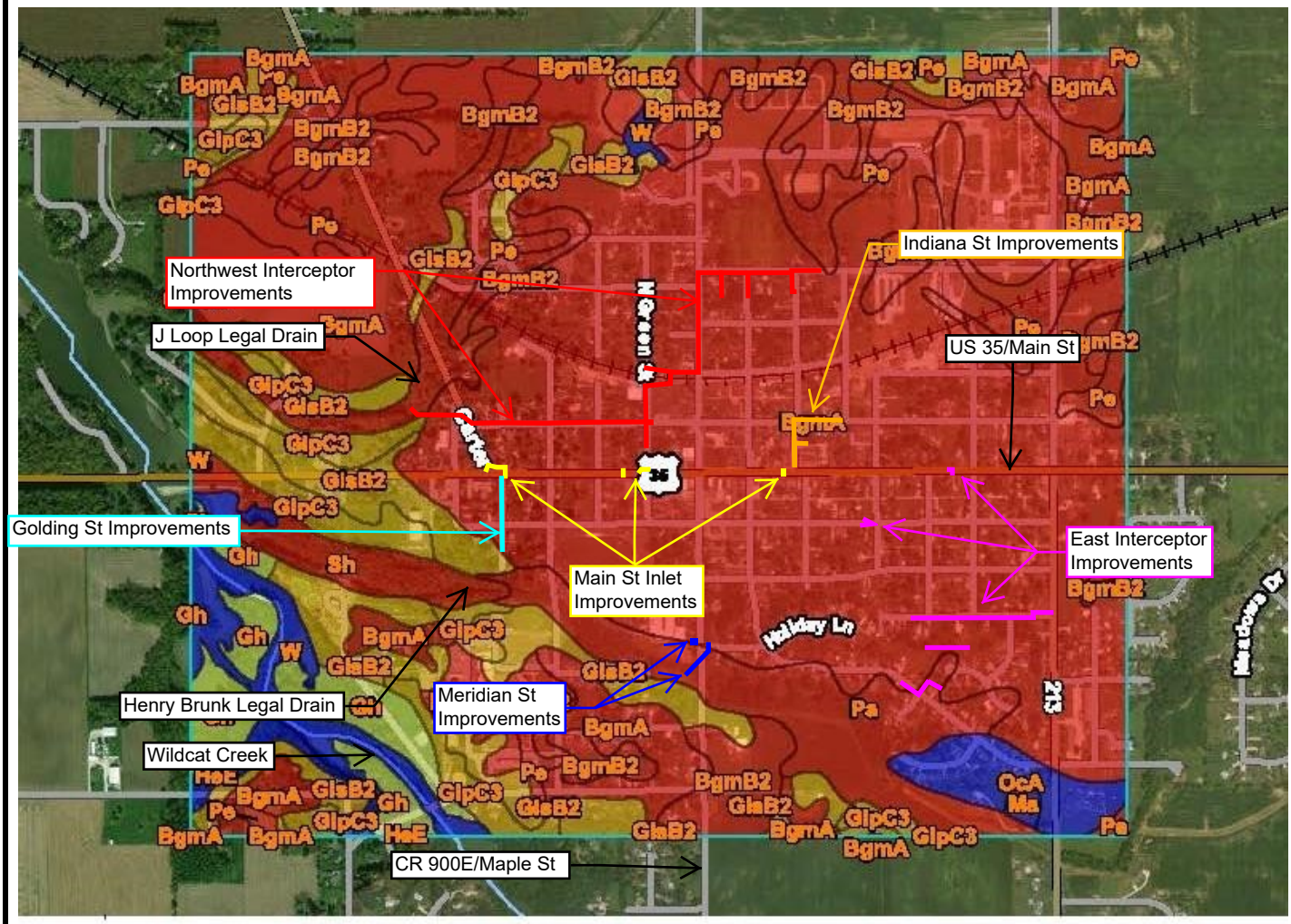


Image Source: Web Soil Survey
USDA - NRCS

Note:
See Map Legend on next page for Depth to Water Table Ratings (map color designations).

FIGURE A-3: SURVEY SOIL MAP

WESSLER ENGINEERING
More than a Project™

Town of Greentown, Indiana
Greentown Stormwater Master Plan

June 2018
200017-01-001

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- 0 - 25
- 25 - 50
- 50 - 100
- 100 - 150
- 150 - 200
- > 200
- Not rated or not available

Soil Rating Lines
- 0 - 25
- 25 - 50
- 50 - 100
- 100 - 150
- 150 - 200
- > 200
- Not rated or not available

Soil Rating Points
- 0 - 25
- 25 - 50
- 50 - 100
- 100 - 150
- 150 - 200
- > 200
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Howard County, Indiana
Survey Area Data: Version 22, Oct 2, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Oct 12, 2013—Feb 16, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

FIGURE A-3: SURVEY SOIL MAP

Depth to Water Table

Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
BgmA	Blount silt loam, ground moraine, 0 to 2 percent slopes	23	512.1	54.9%
BgmB2	Blount silt loam, ground moraine, 1 to 4 percent slopes, eroded	23	68.4	7.3%
Gh	Genesee silt loam, 0 to 2 percent slopes, occasionally flooded	81	30.2	3.2%
GlpC3	Glynwood clay loam, 6 to 12 percent slopes, severely eroded	46	37.6	4.0%
GlsB2	Glynwood silt loam, ground moraine, 2 to 6 percent slopes, eroded	46	84.8	9.1%
HeE	Hennepin loam, 25 to 50 percent slopes	>200	6.1	0.7%
Ma	Made land	>200	1.5	0.2%
OcA	Ockley silt loam, 0 to 2 percent slopes	>200	14.9	1.6%
Pa	Patton silty clay loam, 0 to 2 percent slopes	15	46.7	5.0%
Pe	Pewamo silty clay loam, 0 to 1 percent slopes	15	89.9	9.6%
Sh	Shoals silt loam, 0 to 2 percent slopes, frequently flooded, brief duration	15	16.3	1.8%
W	Water	>200	23.4	2.5%
Totals for Area of Interest			**932.0**	**100.0%**

Description

"Water table" refers to a saturated zone in the soil. It occurs during specified months. Estimates of the upper limit are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

This attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

Rating Options

Units of Measure: centimeters

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

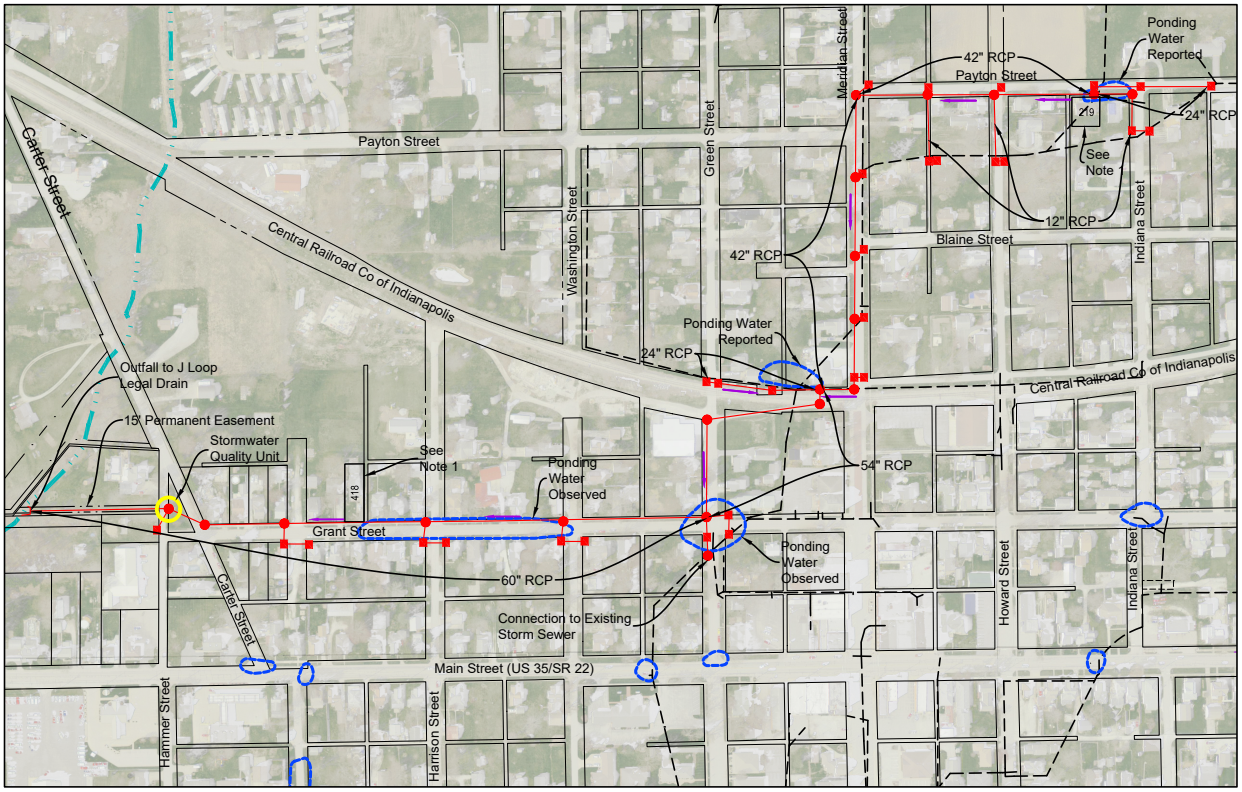
Tie-break Rule: Lower

Interpret Nulls as Zero: No

Beginning Month: January

Ending Month: December

FIGURE A-3: SURVEY SOIL MAP



WESSLER ENGINEERING
More than a Project℠

LEGEND:

- Proposed Manhole
- Proposed Curb Inlet
- Proposed Storm Pipe
- Existing Storm Pipe
- Flow Arrows
- Ponding Area

NOTES:

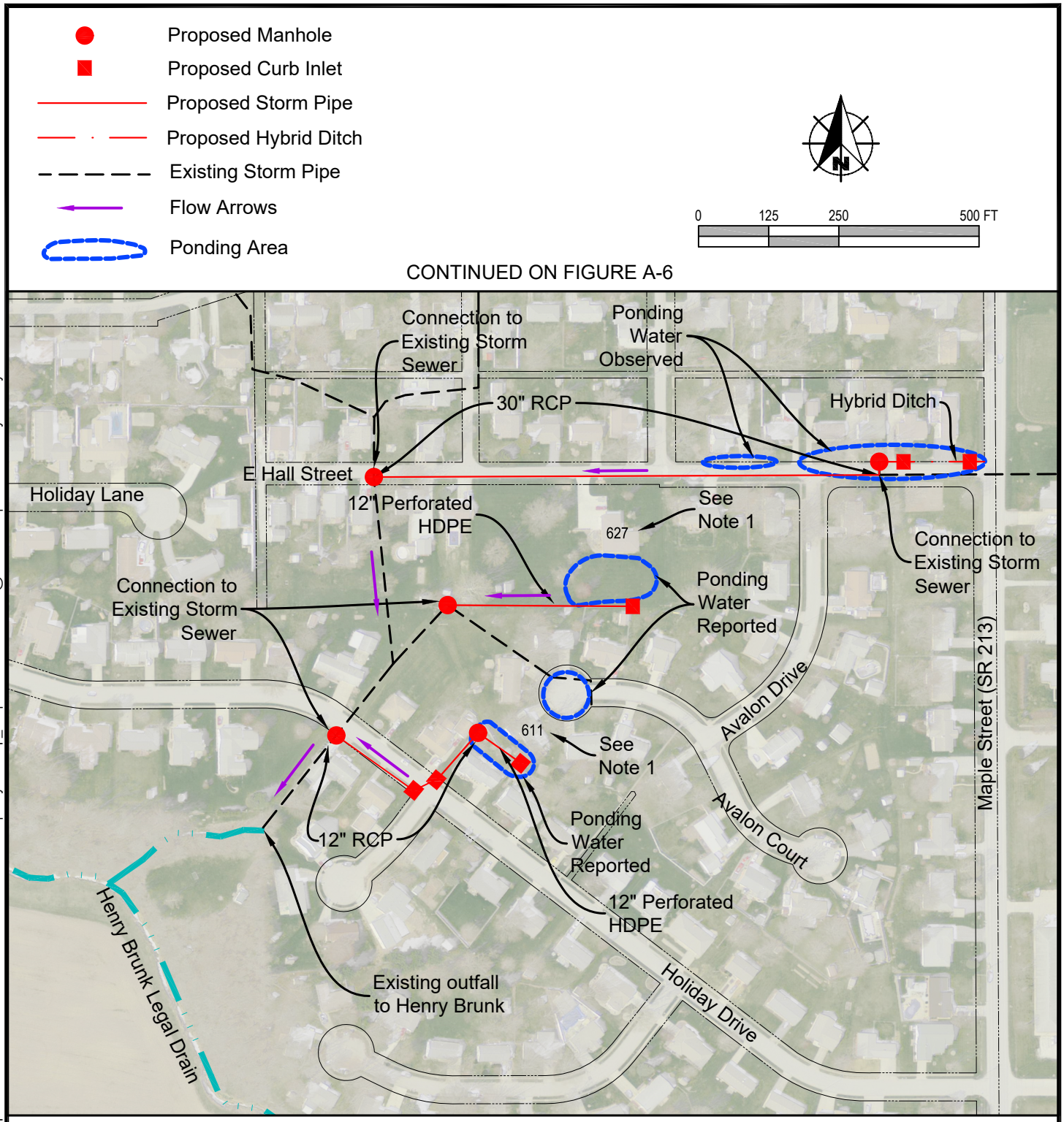
1. RESIDENT REPORTED FLOODING IMPACTED HOUSE.

0 125 250 500 FT

FIGURE A-4
NORTHWEST INTERCEPTOR IMPROVEMENTS

Town of Greentown, Indiana
Greentown Stormwater
Master Plan

June 2018
200017-01-001
PG. A-4



NOTES:

1. RESIDENT REPORTED FLOODING IMPACTED HOUSE.

Key Map

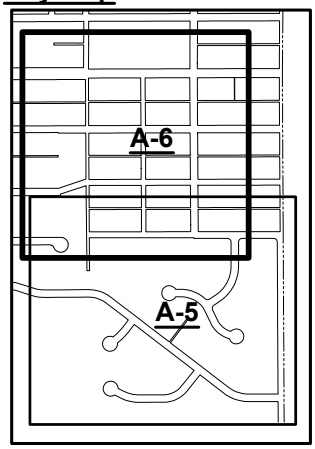


FIGURE A-5
EAST INTERCEPTOR SOUTH IMPROVEMENTS

Town of Greentown, Indiana
Greentown Stormwater Master Plan

June 2018
200017-01-001
PG. A-5

WESSLER ENGINEERING
More than a Project™