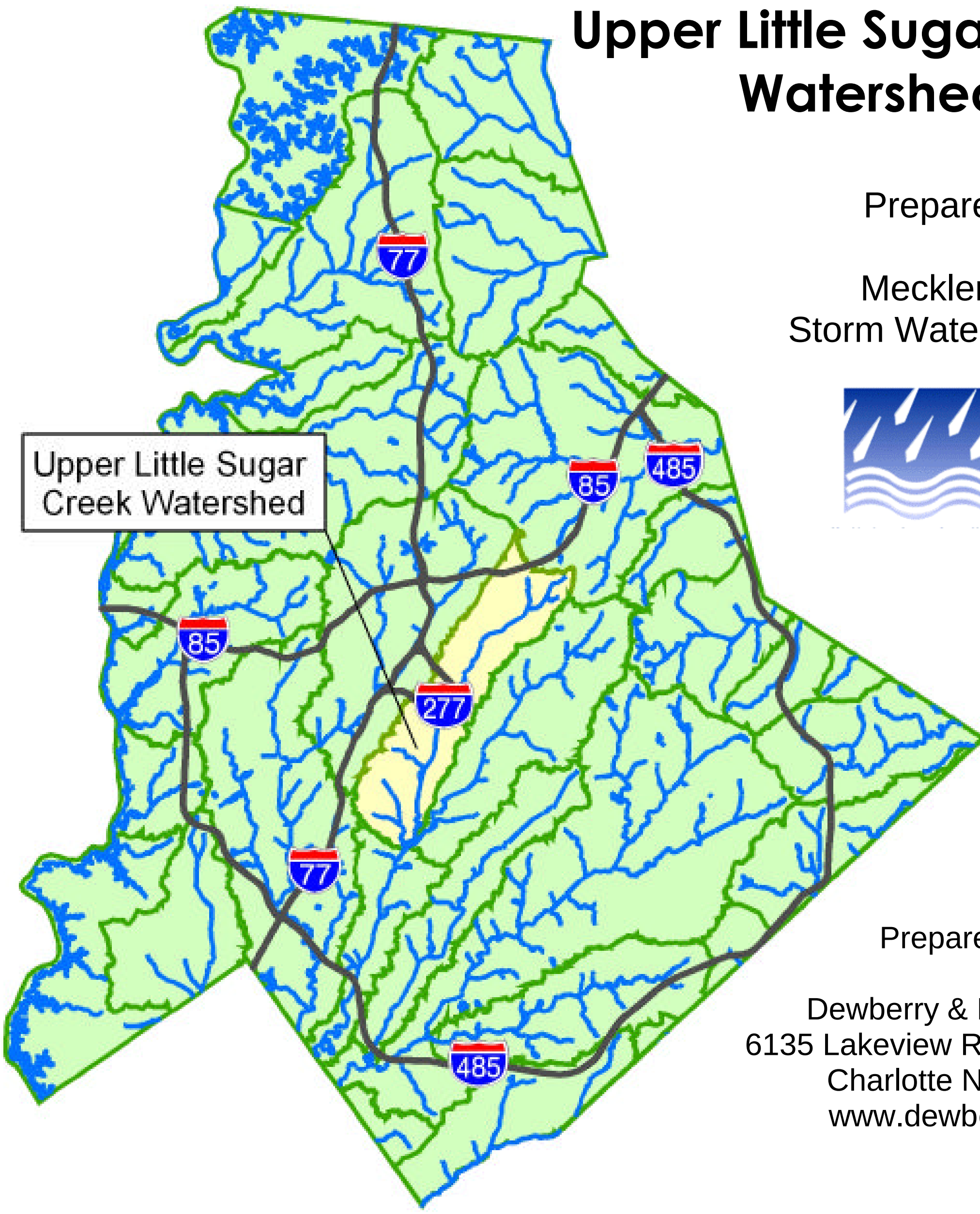
PRELIMINARY ENGINEERING REPORT

Watershed Study No. 10
Upper Little Sugar Creek Watershed



Prepared for

Mecklenburg
Storm Water Services

Charlotte-Mecklenburg STORM WATER Services

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MECKLENBURG COUNTY
STORM WATER SERVICES

PRELIMINARY ENGINEERING REPORT
FOR
WATERSHED STUDY NO. 10

UPPER LITTLE SUGAR CREEK WATERSHED

ACKNOWLEDGEMENT

The project staff of Dewberry would like to express our sincere appreciation to Mecklenburg County Storm Water Services (MCSWS) for its assistance and support during this project.

DISCLAIMER

This watershed-wide study is for planning purposes only. These study results and recommendations are preliminary and should not be used for construction without additional detailed engineering design analysis.

CERTIFICATION

I hereby certify that this Preliminary Engineering Report for Watershed Study No. 10, Upper Little Sugar Creek Watershed, for Mecklenburg County was prepared by me or under my direct supervision.

Signed, sealed, and dated this _24_ day of November 2003.

By: ______________________________
Neal Banerjee, PE
Project Engineer

(SEAL)

MECKLENBURG COUNTY
STORM WATER SERVICES
PRELIMINARY ENGINEERING REPORT
FOR
WATERSHED STUDY NO. 10

UPPER LITTLE SUGAR CREEK WATERSHED

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

GLOSSARY

1% Annual Chance Flood:	The 1% annual chance flood is the flood that has a 1% chance of being equaled or exceeded in any given year, which is referred to as the "100-year flood," in general.
Base Flood Elevation (BFE):	Water surface elevation based on the 1% annual chance flood (100-year flood).
Best Management Practice (BMP):	A structural (e.g. buffer strip) or non-structural (e.g. regulatory) measure that is implemented to improve water quality.
Future Condition Floodplain (FCF):	Floodplain delineated for the 1% chance of flood event in any given year using future land use condition. It is currently defined as Floodplain Land Use Map (FLUM) in Mecklenburg County.
Community Encroachment Floodway	The channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the community base flood, without cumulatively increasing the water surface elevation more than 0.1 feet. No structure or fill may be added without special permit.
Existing Condition Floodplain:	Floodplain delineated for the 1% chance of flood event in any given year using current land use condition. It is defined as the same as within the Flood Insurance Rate Map (FIRM).
FEMA	Federal Emergency Management Agency
FEMA Floodway	The channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the FEMA base flood, without cumulatively increasing the water surface elevation more than 0.5 feet.
MCSWS	Mecklenburg County Storm Water Services Department
WSE	Water surface elevation
WWTP	Waste water treatment plant

EXECUTIVE SUMMARY

UPPER LITTLE SUGAR CREEK WATERSHED

This Preliminary Engineering Report (PER) summarizes the methods, findings, and recommendations from a flood hazard mitigation and environmental restoration planning study for the Upper Little Sugar Creek Watershed. The primary focus of this preliminary report was to conduct a review of pertinent stream/watershed information, assess flood damages, and investigate flood hazard mitigation alternatives within the regulated future condition floodplains (FCFs) in the Upper Little Sugar Creek Watershed. A secondary focus was to provide a broad-level characterization of environmental quality in the Watershed and to offer general recommendations for environmental restoration. Per the context of this study, environmental restoration opportunities were typically only identified in conjunction with flood hazard mitigation improvement alternatives. It is important to note that the conclusions and recommendations provided in this report are based on broad planning level analysis, and thus should not be used for construction without additional detailed engineering analysis.

The Upper Little Sugar Creek Watershed encompasses a 19.2 square mile urban area in the south-central portion of the Mecklenburg County, North Carolina. The Watershed contains five County-regulated streams with FCFs that were included in this study - Upper Little Sugar Creek, Dairy Branch, Little Hope Creek, Little Hope Creek Tributary #1, and Derita Branch.

Flood Hazard Mitigation

There are 531 structures within the FCF boundaries in the Upper Little Sugar Creek Watershed. Comparison of flood information with building elevation certificates revealed that 168 of the 531 structures have their lowest finished floor below the predicted water surface elevation (WSE) of the FCF, and thus are considered “flooding” structures. Flood damages for these 168 buildings were estimated using the FEMA Full Riverine Benefit:Cost model (FEMA BC) totaled to over $28.5 million (2003 dollars). Figure E-1 shows an overall map of the Upper Little Sugar Creek Watershed and denotes problems areas identified in this study.

Several alternatives were developed to mitigate flood damages and enhance environmental quality for problem areas identified along the study streams. For general project ranking purposes, a benefit:cost (B:C) economic analysis was performed to evaluate the cost-effectiveness of the alternatives at each problem area. The alternatives were then compared for their economic, technical, and social feasibility, from which a recommended mitigation strategy was developed for each problem area. If no improvement alternatives were identified as being cost effective or technically feasible, no action was recommended (i.e. leave building as-is).

The alternative evaluation indicated that it is cost-effective (or otherwise pertinent) to provide flood protection for 109 of the 168 flooding buildings. The estimated benefits (i.e. damages reduced) and improvement costs are approximately $23.1 million and $35.2 million respectively. It is important to note that the reason why the improvement costs exceed the estimated benefits (i.e overall B:C ratio less than 1.0) is that per direction of Mecklenburg County Storm Water Services (MCSWS), all structures in the community encroachment (0.1 foot) floodway were recommended for acquisition – regardless of their B:C ratio. Public safety (the floodway is considered an especially hazardous area due to high velocities and potential debris hazards) and the fact that local floodplain regulations greatly restrict potential construction/re-construction in the floodway, were the primary considerations for the decision to recommend acquisition for all structures in the community encroachment floodway.

In the Upper Little Sugar Creek Watershed, there were a total of 101 buildings recommended for acquisition. The analysis conducted in this study estimated that 74 (73%) of these buildings are not cost-effective for acquisition. For the 35 buildings that were identified as being cost-effective for flood mitigation (=109 – 74), the estimated benefits and costs were $17.9 million and $6.9 million, yielding a B:C ratio of 2.7. Figures E-2 through E-11 show the recommended mitigation improvements within the Upper Little Sugar Creek Watershed.

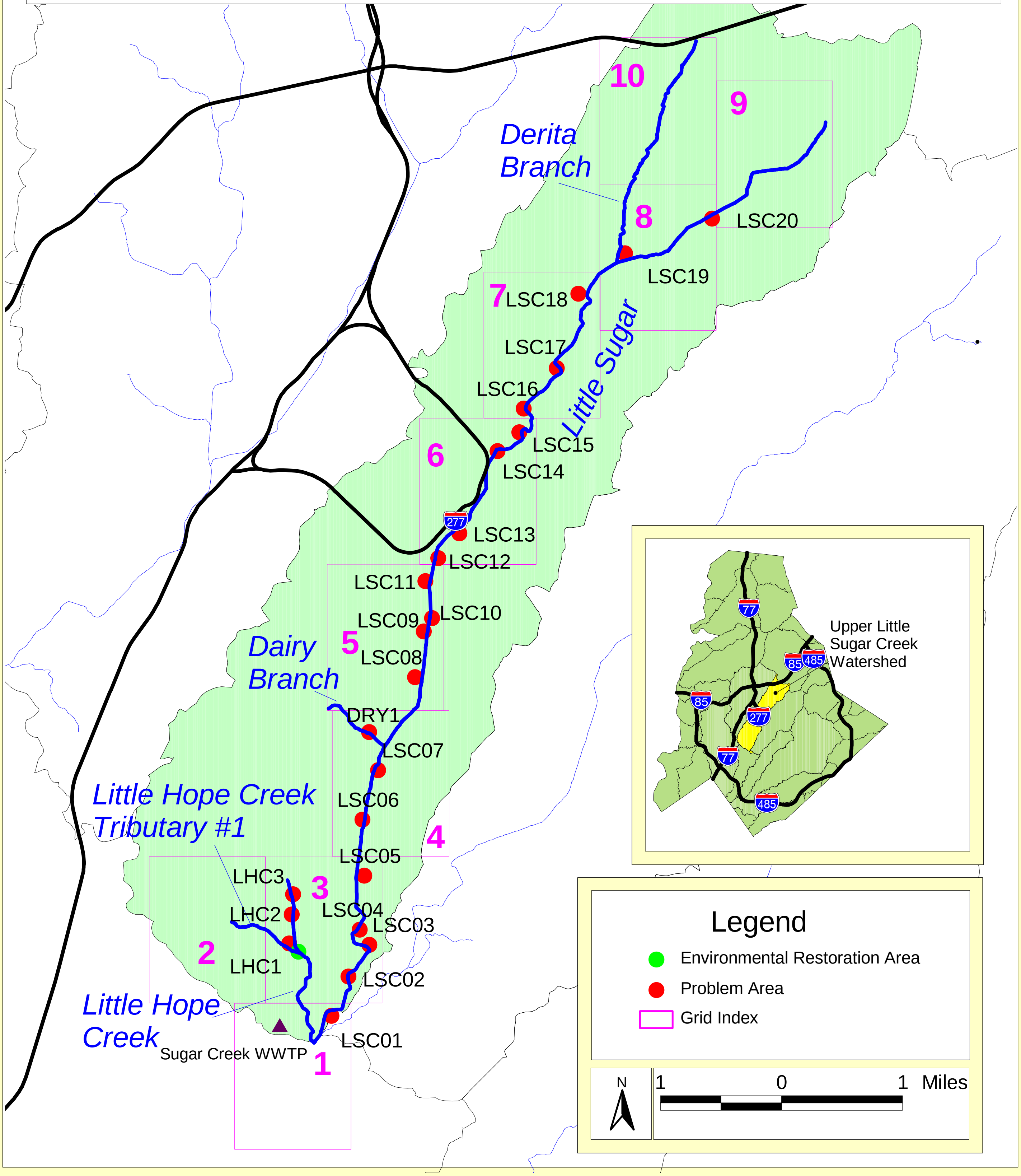
Environmental Characterization

The Upper Little Sugar Creek Watershed is located in an established, highly urbanized area within the City of Charlotte. Land use is predominately residential (75+/- %), but also includes limited commercial, industrial, vacant, and other uses. The streams in the Watershed have been modified (e.g. straightened, widened, armored, etc.) to accommodate urbanization, and thus do not exhibit natural, healthy stream characteristics. Reference to local water/biological monitoring data indicates overall "good" conditions, however, benthic sample readings were classified as "poor" at several sites.

There are currently a number of planning/design environmental restoration related projects (discussed in Sections 1.2 and 3.5.2) that are existing or planned within in the Upper Little Sugar Creek Watershed. The majority of these projects are in or adjacent to the study streams discussed in this report, and were incorporated into the proposed flood hazard mitigation recommendations. In addition, investigation of the GIS tax parcel database reveals that the County owns significant portions of vacant land adjacent to the study streams within the Upper Little Sugar Creek Watershed. This land will likely be used for proposed greenways along the Creek, which in turn will likely incorporate water quality and/or environmental restoration features.

The majority of environmental analysis included in this PER are broad in nature, however, an additional location was identified for potential environmental restoration within the Watershed (Figure E-1). However, it is recommended that more detailed analysis be conducted at a smaller scale level to investigate other environmental restoration opportunities.

Figure E-1. Upper Little Sugar Creek Watershed



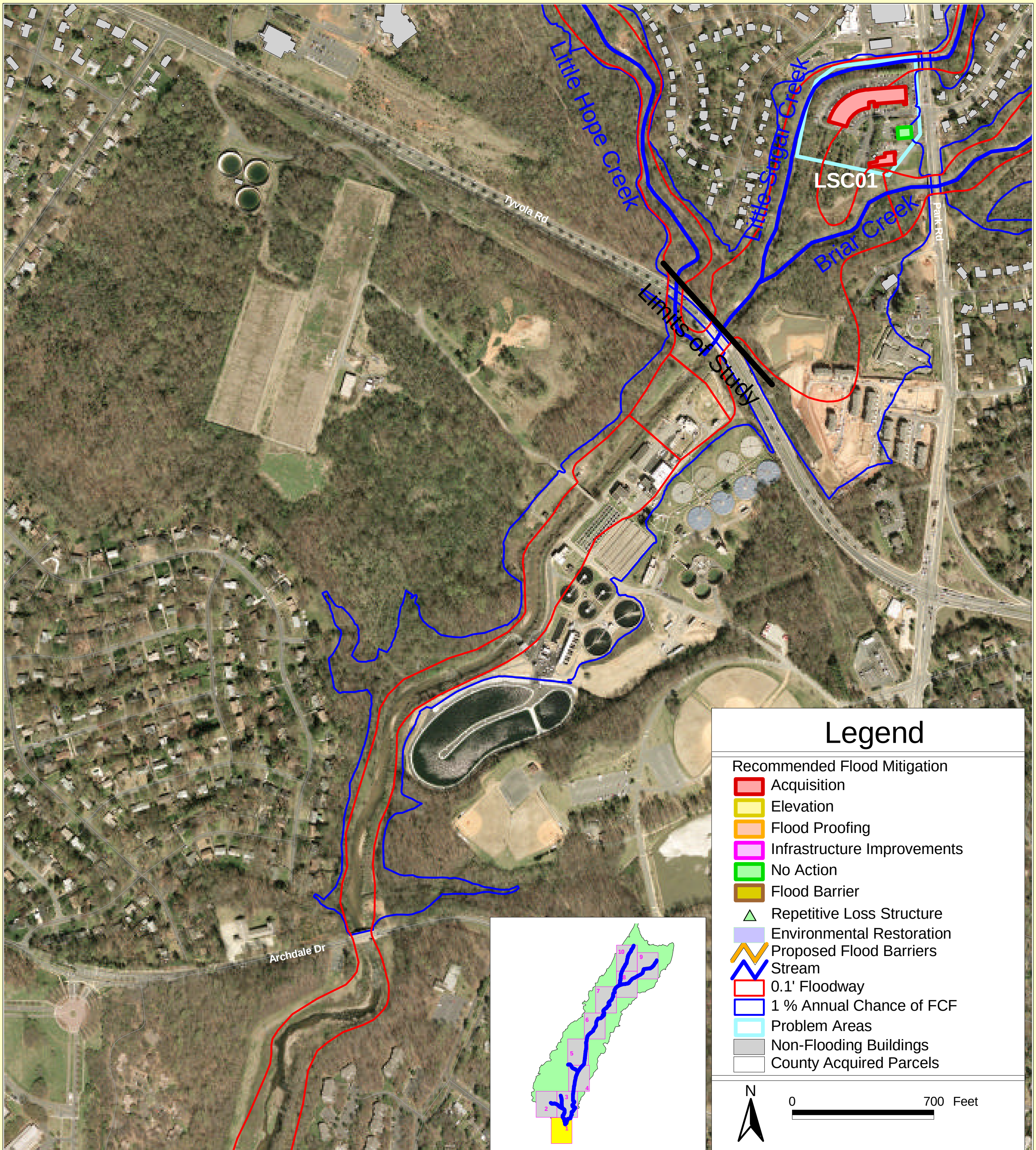


Figure E-2. Grid 1: Upper Little Sugar Creek Recommended Improvements

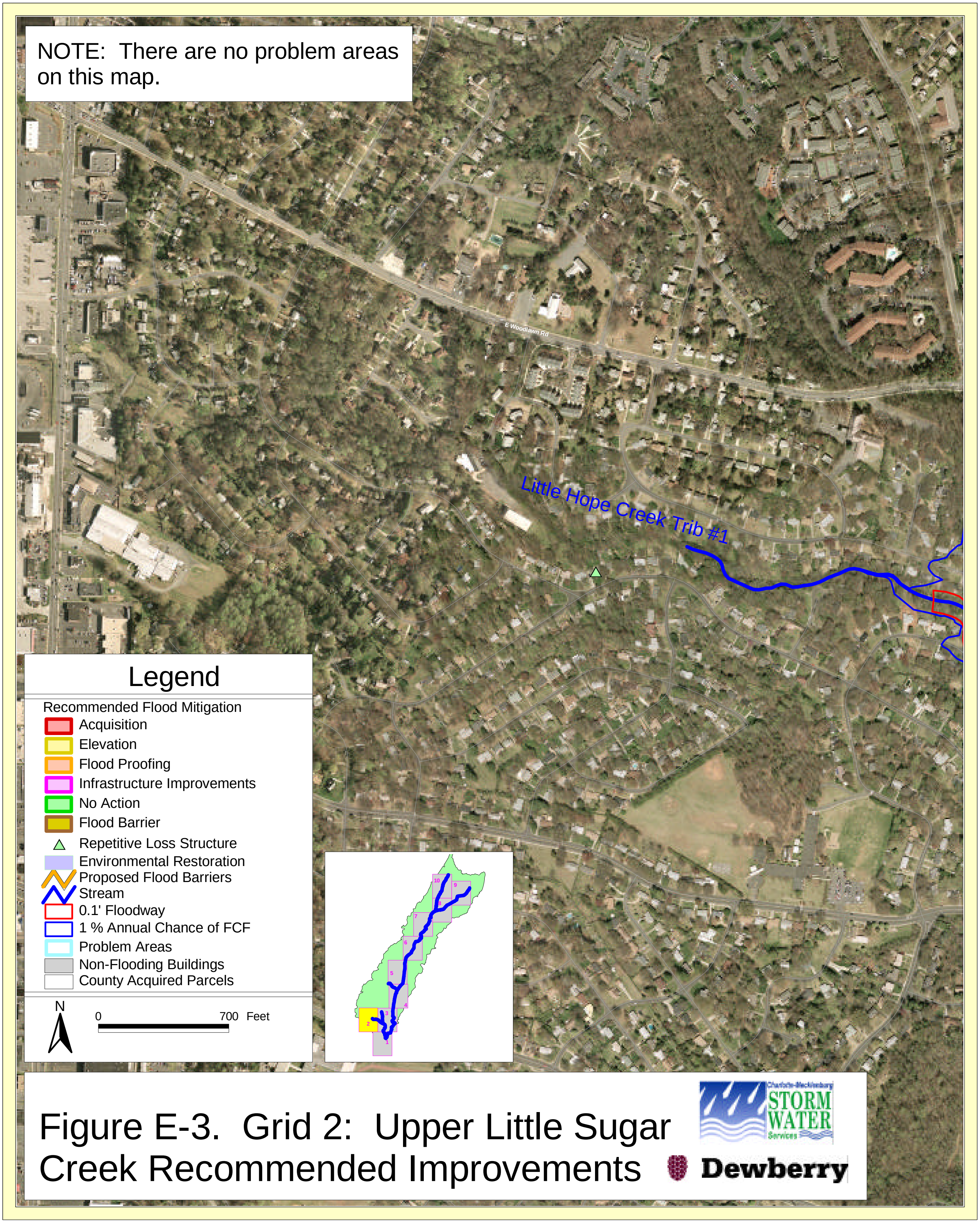


Figure E-3. Grid 2: Upper Little Sugar Creek Recommended Improvements

Figure E-4. Grid 3: Upper Little Sugar Creek Recommended Improvements

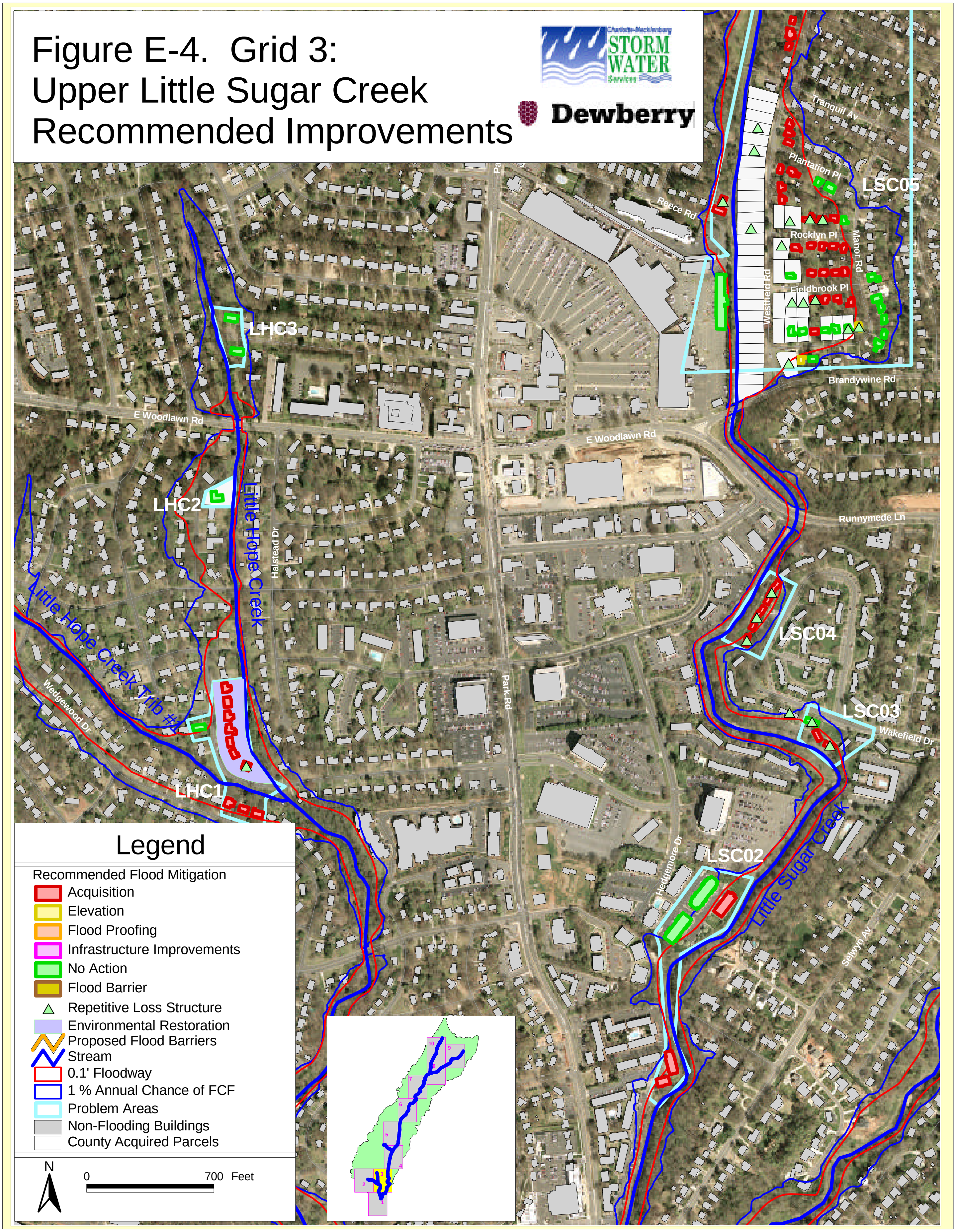
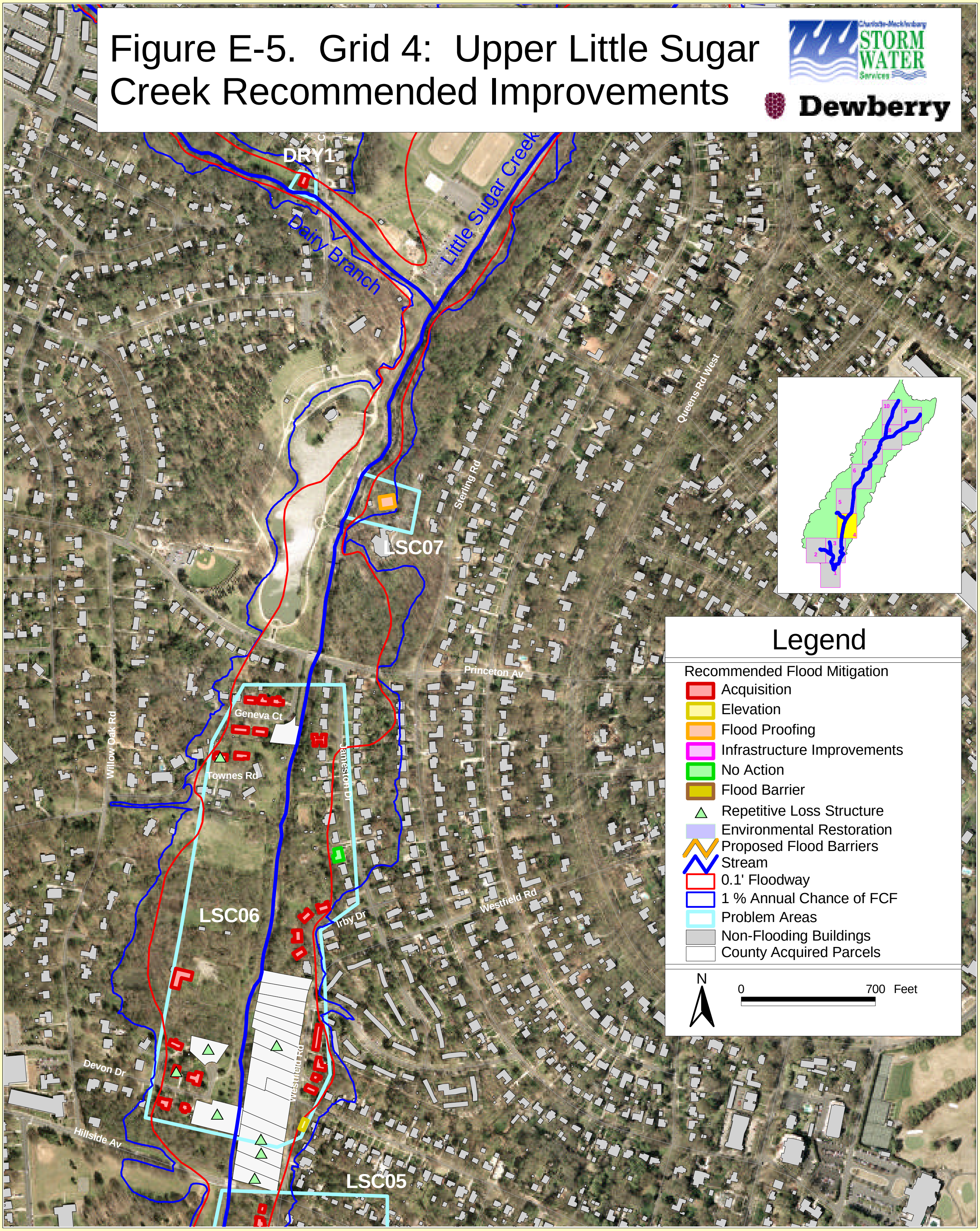


Figure E-5. Grid 4: Upper Little Sugar Creek Recommended Improvements



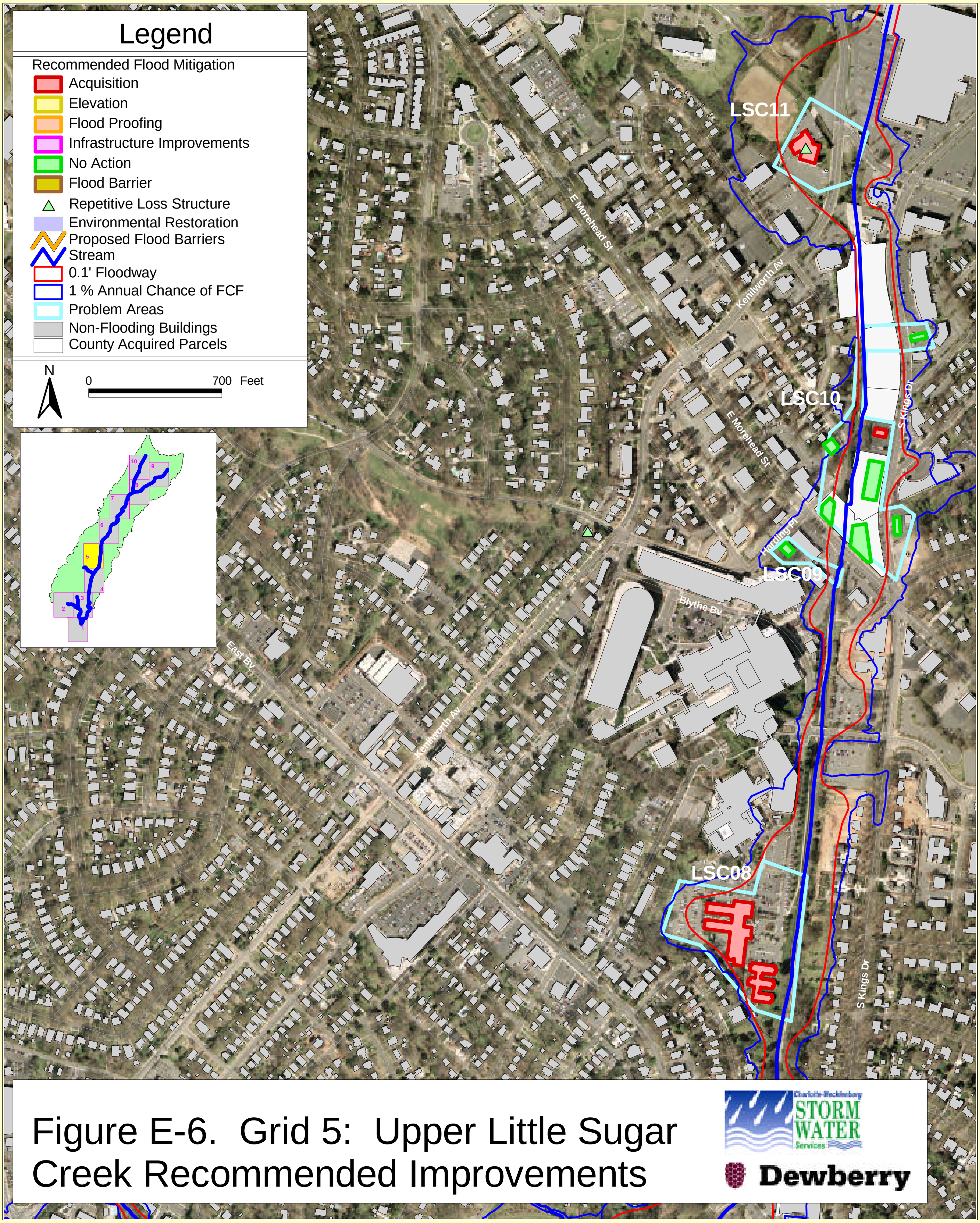


Figure E-6. Grid 5: Upper Little Sugar Creek Recommended Improvements

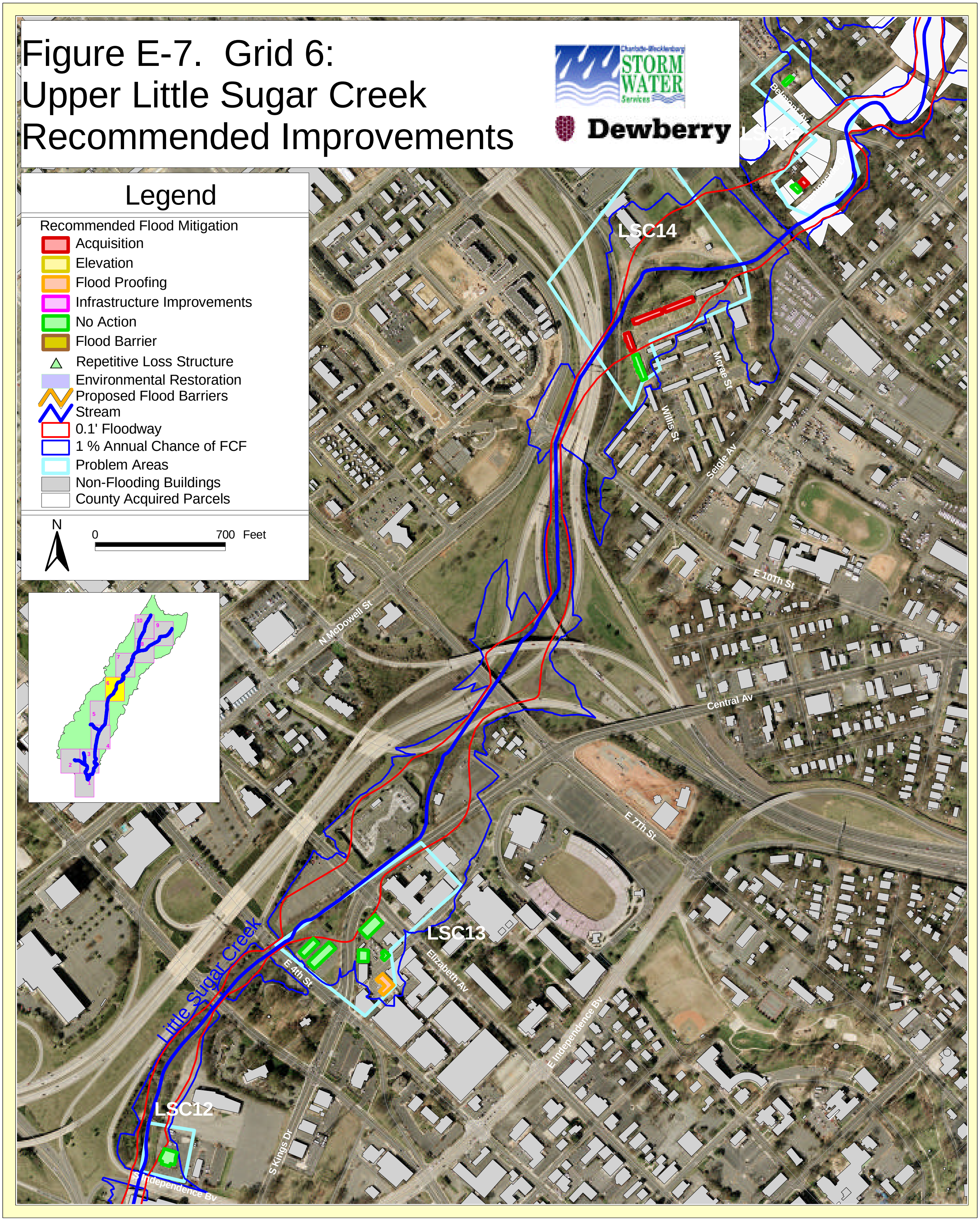


Figure E-7. Grid 6:
Upper Little Sugar Creek
Recommended Improvements
Charlotte-Mecklenburg STORM WATER Services
Dewberry
Legend
Recommended Flood Mitigation
Acquisition
Elevation
Flood Proofing
Infrastructure Improvements
No Action
Flood Barrier
Repetitive Loss Structure
Environmental Restoration
Proposed Flood Barriers
Stream
0.1' Floodway
1 % Annual Chance of FCF
Problem Areas
Non-Flooding Buildings
County Acquired Parcels
N
0
700 Feet
LSC14
LSC13
LSC12
Little Sugar Creek
N McDowell St
Mcrae St
Willis St
Seigle Av
E 10Th St
Central Av
E 7Th St
E 4th St
Elizabeth Av
E Independence Bv
S Kings Dr
S Independence Bv
Belmont Av

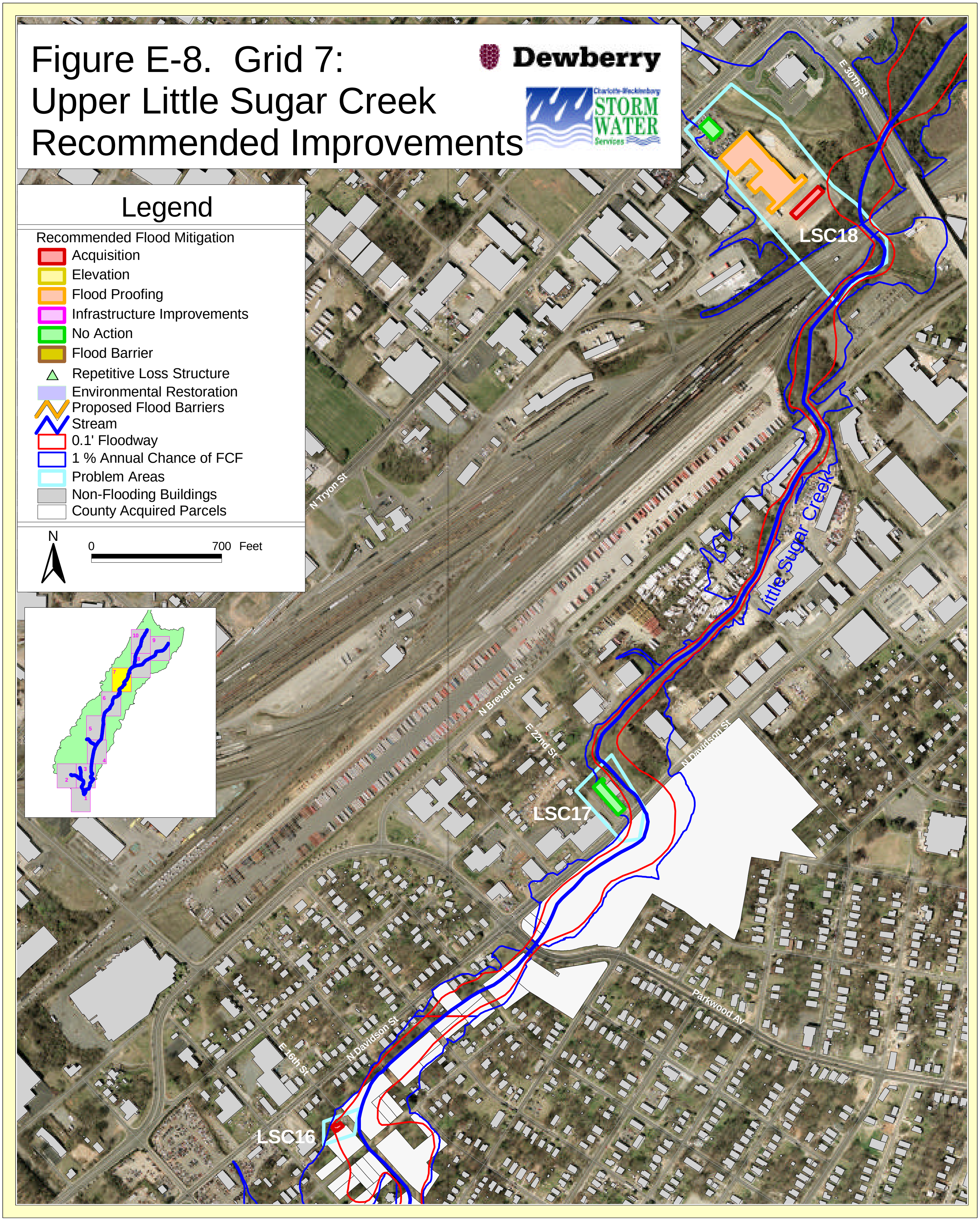


Figure E-8. Grid 7:
Upper Little Sugar Creek
Recommended Improvements
Dewberry
Charlotte-Mecklenburg STORM WATER Services
Legend
Recommended Flood Mitigation
Acquisition
Elevation
Flood Proofing
Infrastructure Improvements
No Action
Flood Barrier
Repetitive Loss Structure
Environmental Restoration
Proposed Flood Barriers
Stream
0.1' Floodway
1 % Annual Chance of FCF
Problem Areas
Non-Flooding Buildings
County Acquired Parcels
N
0
700 Feet
LSC18
LSC17
LSC16
Little Sugar Creek
E 30th St
N Tryon St
N Brevard St
E 22nd St
N Davidson St
Parkwood Av
E 16th St

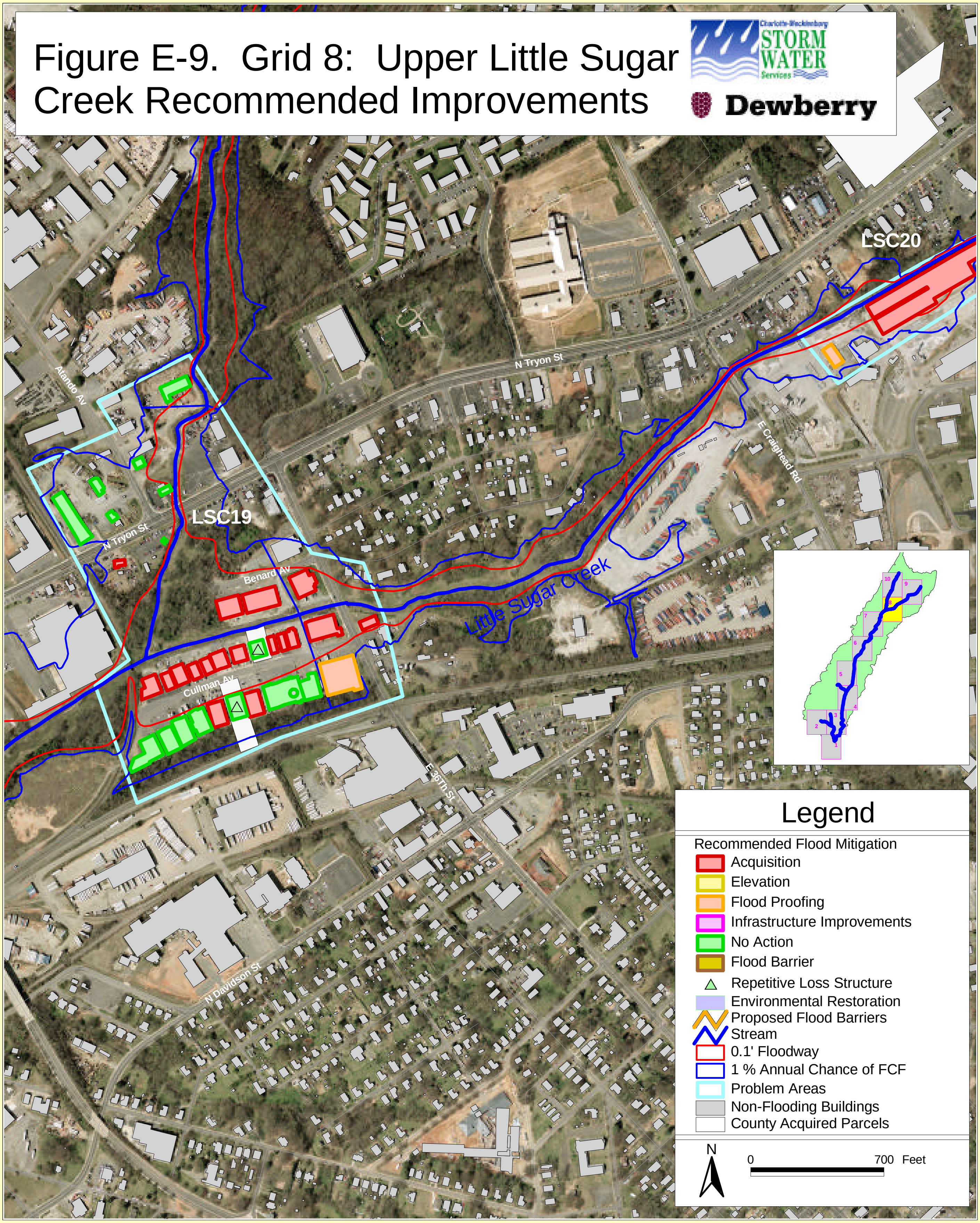


Figure E-9. Grid 8: Upper Little Sugar Creek Recommended Improvements

Figure E-10. Grid 9: Upper Little Sugar Creek Recommended Improvements

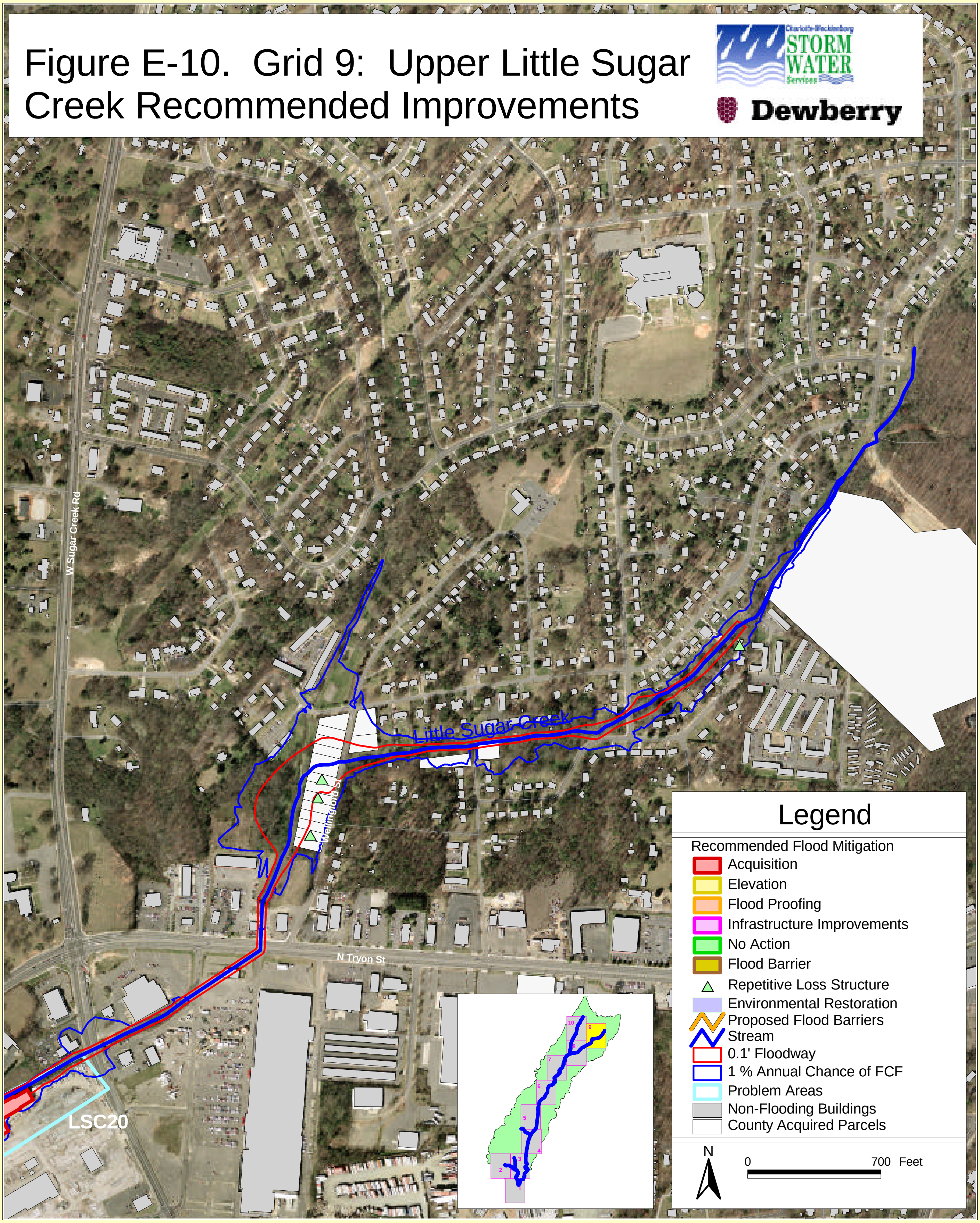
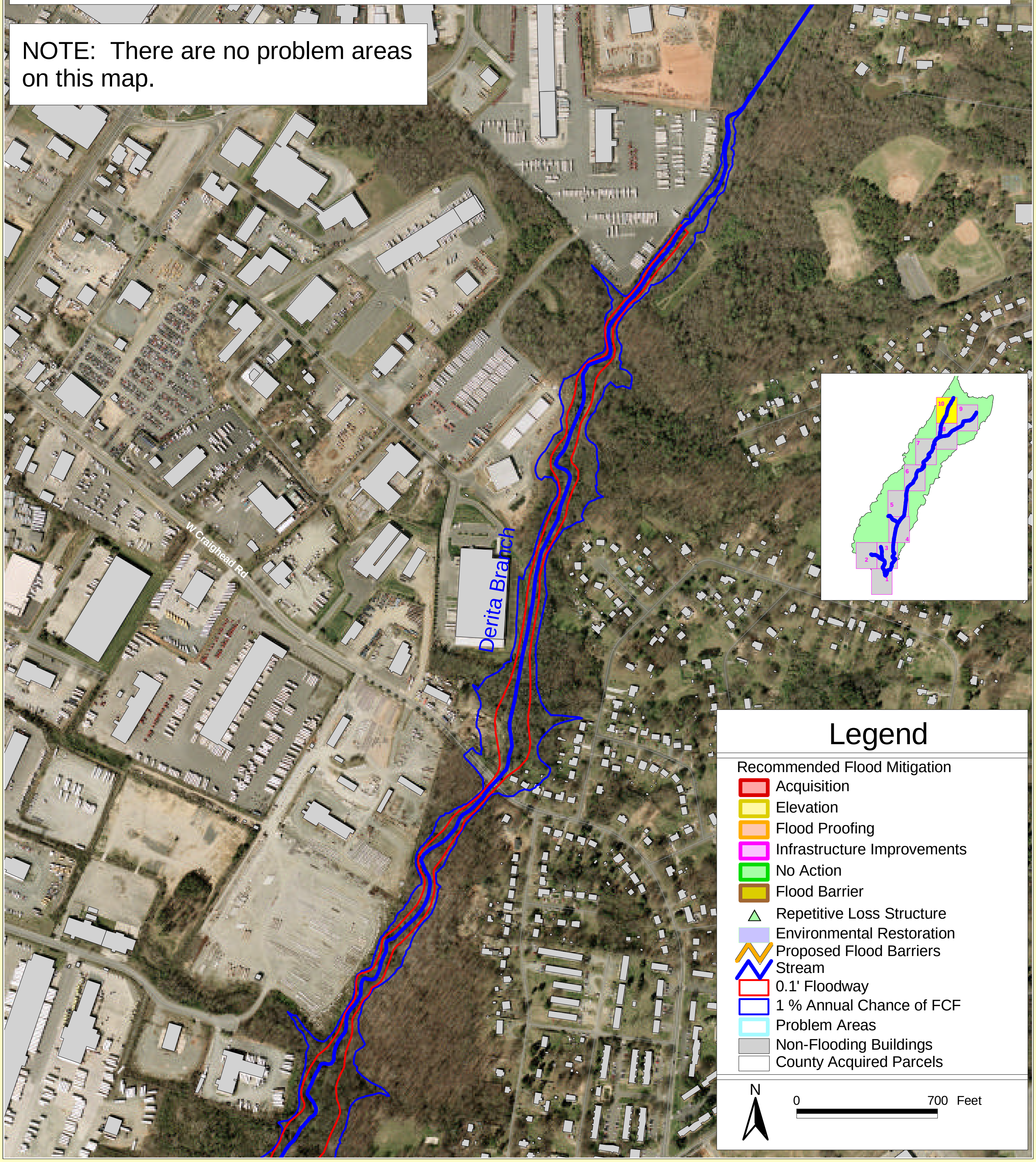


Figure E-11. Grid 10: Upper Little Sugar Creek Recommended Improvements



1. GENERAL WATERSHED CONDITIONS

1.1. Watershed Characteristics

Upper Little Sugar Creek Watershed encompasses a 19.2 square mile urban area in the south-central portion of the Mecklenburg County, North Carolina. The Watershed is one of thirty-three major watersheds in the County and drains in a southwestern direction towards the Catawba River. Upper Little Sugar Creek Watershed is located entirely within the City of Charlotte municipal limits, and is generally bounded by Tyvola Road to the southwest, Tryon Street and The Plaza to the northeast, I-85 and North Graham Street to the northwest, and Selwyn Road to the southeast.

The topography of the Upper Little Sugar Creek Watershed is generally characterized by relatively steep upland slopes and well-defined drainage features, as are typical of Piedmont areas. The Watershed is relatively narrow and uniform in shape, which is indicative of the fact that there are few named tributaries to the main stem of Upper Little Sugar Creek. Soils in the Watershed are predominately NRCS Hydrologic Group B soils, which have relatively low runoff potential.

The Upper Little Sugar Creek Watershed contains five streams that have mapped, County-regulated, future condition floodplains (FCFs, also referred to as FLUM floodplains) - Upper Little Sugar Creek, Dairy Branch, Little Hope Creek, an unnamed tributary to Little Hope Creek, hereafter referred to as Little Hope Creek Tributary #1, and an unnamed tributary to Upper Little Sugar Creek, hereafter referred to as Derita Branch. These streams were considered in this Preliminary Engineering Report (PER) for potential flood hazard mitigation and environmental restoration alternatives, and are described below.

Upper Little Sugar Creek

The Upper Little Sugar Creek study reach flows southwest from just east of Cinderella Road, to its confluence with Briar Creek - a distance of approximately 10.1 miles. The Creek runs through commercial, industrial, and commercial areas for almost its entire length, crossing fifty roadways/pathways, and outlets near the Sugar Creek Waste Water Treatment Plant (WWTP) off of Tyvola Road.

Figure 1. Little Sugar Creek – Looking downstream from Princeton Avenue

The Upper Little Sugar Creek main channel exhibits different characteristics along its length, but can be generally described as a straight, relatively wide, trapezoidal channel with steep banks, and a relatively shallow normal flow depth. The upper reaches tend to exhibit narrower banks and steeper channel slopes, whereas, the lower reaches have wider banks, milder slopes and finer bed materials. The width of the main channel typically ranges from 20 to 60 feet wide in the upper stream reaches, and transitions to widths of 60 to 90 feet around the Belmont Avenue crossing (River Station 80292).

With the exception of scattered heavily vegetated areas, the channel banks of Little Sugar Creek are lightly vegetated (e.g. grass-lined) and/or armored (e.g. riprap, gabions, etc.) for much of its length. The channel bed is generally comprised of sand, gravel, and cobble in the upper reaches, and transitions to almost entirely sand and silt in the downstream reaches. Significant bed rock outcrops are present at scattered locations (e.g. between Woodlawn Road and Brandywine Road).

Dairy Branch

The Dairy Branch study reach is located in the lower portion of the Upper Little Sugar Creek Watershed, approximately 2.5 miles upstream of the watershed outlet. The mapped section flows in a southeastern direction from upstream of Kenilworth Avenue to its confluence with Upper Little Sugar Creek (in Freedom Park), for a distance of approximately 0.6 miles. The tributary runs through almost all residential land use. There are four roadway/pathway crossings along the tributary.

Figure 2. Dairy Branch – Looking downstream near apartments off Salem Drive.

The Dairy Branch channel is similar in shape to the upper portions of the Upper Little Sugar Creek channel, having an average top width of approximately 40 feet. The channel is grassed with a silt-rock bed and armored with riprap for much of its length.

Little Hope Creek

The Little Hope Creek study reach is located in the lower portion of the Upper Little Sugar Creek Watershed, immediately upstream of the watershed outlet. The Creek flows in a southeastern direction from upstream of Woodlawn Road to its confluence with Upper Little Sugar Creek, for a distance of approximately 1.5 miles. The tributary runs through almost all residential land use along the back edge of property lines. There are five roadway crossings along the tributary.

Figure 3. Little Hope Creek – Looking downstream from pedestrian bridge near Heather Lane.

The Little Hope Creek channel is similar in shape to the upper portions of the Upper Little Sugar Creek channel, with a top width ranging from 20 to 50 feet. Unlike the main stem of Little Sugar Creek, the channel banks are heavily vegetated in many places.

Little Hope Creek Tributary #1

The Little Hope Creek Tributary #1 study reach is located in the lower portion of the Upper Little Sugar Creek Watershed. The mapped section flows in a southeastern direction from Currituck Drive to its confluence with Little Hope Creek, immediately downstream of Mockingbird Lane. The tributary runs through almost all residential land use for a distance of approximately 0.7 miles. There is one roadway crossing along the tributary.

Figure 4. Little Hope Creek Trib #1 – Looking downstream from Bradbury Drive.

The Little Hope Creek channel is similar in shape to the Little Hope Creek main channel, having an average top width of approximately 30 feet.

Derita Branch

The Derita Branch study reach is an approximate 2.1 stretch of stream located in the upper portion of the Upper Little Sugar Creek Watershed. The mapped section flows in a southwestern direction from I-85 to its confluence with Upper Little Sugar Creek, immediately downstream of Tryon Street. The Tributary is bordered by an industrial area on the west, and a residential area to the east. There are three roadway crossings along the tributary.

Figure 5. Derita Branch – Looking upstream from Craighead Road

The Derita Branch channel is similar in shape to the upper portions of the Upper Little Sugar Creek channel, having an average top width of approximately 40 feet. The channel banks are generally heavily vegetated as an established riparian zone lines much of the creek.

1.2. Development in the Watershed

Identifying existing and future development conditions and activities is an important part of watershed-wide planning. Many of these issues can have a direct or indirect impact in evaluating the feasibility of potential flood mitigation and environmental restoration measures. Examples of pertinent development issues include: land development patterns, land use characteristics, proposed new development, existing and proposed utilities, and proposed capital improvement projects (CIPs). These issues are further discussed in the following paragraphs.

As noted in the previous section, the Upper Little Sugar Creek Watershed is located in an urbanized area within Mecklenburg County, thus much of the Watershed has been developed. Tax parcel information indicates that the majority of development in the watershed occurred prior to 1960. However, significant localized development is still occurring. Mecklenburg County GIS (2002) shows preliminary plans for new development at two locations within the Upper Little Sugar Creek Watershed:

- a 11 unit multi-family residential development along Little Sugar Creek off of Arbor Lane
- a 52 unit multi-family residential development near Little Sugar Creek in the middle portion of the Watershed, off of 11th Street and Davidson Street

Land use in the Upper Little Sugar Creek Watershed is predominately residential (approximately 80%), however there are significant sections of commercial, office, industrial, and open/vacant land. The majority of residential land use is medium to high density (i.e. 1/5 – 1/2 acre lot size), single-family properties, and is primarily located in the southern and eastern portions of the Watershed. Commercial/Industrial land uses are most prevalent in the north central portion of the Watershed (e.g. Tryon Street, Graham Street, etc.). In addition, the eastern half of the central business district (center city bounded by I-277 and I-77) is within the Little Sugar Creek Watershed. Open/vacant areas such as parks, undisturbed parcels, and school lands are scattered throughout the Watershed. A summary of development patterns and current land use conditions is provided in Table 1 below.

Table 1. Development in the Upper Little Sugar Creek Watershed

	Year Developed					Vacant/	
	Before 1961	1961-1970	1971-1980	1981-1990	1991-2000	Unclassified	Total
Parcels	14,243	3,611	1,120	2,164	1,818	2,369	25,325
Percentage	56.2%	14.3%	4.4%	8.5%	7.2%	9.4%	100.0%

	Land Use as of 2002				
	Single Family	Other Residential	Non-Residential	Vacant/ Unclassified	Total
Parcels	14,868	4,590	3,498	2,369	25,325
Percentage	58.7%	18.1%	13.8%	9.4%	100.0%

Note: Includes entire Upper Little Sugar Creek Watershed within Mecklenburg County, including all tributaries (19.2 sq mi).

Being an urbanized area, infrastructure utilities are present throughout the Upper Little Sugar Creek Watershed. Sanitary sewers are typically the most pertinent utility in relation to stream projects since they often run adjacent to stream channels and may have several crossings. Sanitary sewers are present along Upper Little Sugar Creek and several small tributaries. A major interceptor generally runs along the northwest overbank of Upper Little Sugar Creek. The interceptor collects sewage from the smaller system components and transports it to the Sugar Creek WWTP, just downstream of Tyvola Road. Although, the Sugar Creek WWTP is not in specifically in the study basin, WWTP representatives were contacted to better understand flood hazard issues at the plant. A copy of the meeting minutes is included in Appendix D of this report for informational use. The reader is referred to the PER for the Lower Little Sugar Creek watershed for more details on the WWTP.

The Charlotte-Mecklenburg Utilities (CMU) 5-year capital improvement project map does not indicate any proposed sanitary sewer capital improvements in the Upper Little Sugar Creek Watershed, although several projects are proposed for the Sugar Creek Wastewater Treatment Plant (at the outlet of the Watershed).

Storm sewers are another significant feature in flood mitigation, since they exist throughout the Upper Little Sugar Creek Watershed, and discharge to the study creeks at numerous locations. Due to its central location and past storm water problems, Upper Little Sugar Creek has been targeted for numerous recent, active, and future planned improvement projects. City SWS currently has five active design CIP projects, as well as several pending planning/design projects (Figure 6). MCSWS is coordinating a variety of projects in the Watershed, ranging from small culvert cleanout and minor repair projects to large-scale stream restoration and water quality/wetland improvements. Several notable projects include:

- Three stream restoration projects (two in design, one in construction) along Little Sugar Creek between East Boulevard and Tyvola Road (3+ mile reach).

- Automated flood warning system station near Medical Center Drive
- Property acquisition at numerous locations
- Wellingford Street regional water quality basin.

The reader is referred to MCSWS (www.stormwaterservices.com) for more detailed information on existing and future projects in the Upper Little Sugar Creek Watershed.

Other utilities (storm, water, power, phone, etc.) are scattered throughout the Upper Little Sugar Creek Watershed, as well. Waterlines and gas lines cross the creeks in the Watershed along several of the thoroughfares. Mecklenburg County GIS does not indicate any major transmission lines within the Watershed. However, smaller power lines and utilities poles are present near the study streams at many locations.

Greenways are multi-purpose systems that can be used to assist in floodplain management and environmental restoration/protection, as well as, provide recreational and other benefits. Similarly, flood mitigation and environmental restoration improvements (e.g. acquisition, wetland creation, etc.) are often coordinated with greenway development to maximize overall benefits.

The existing Mecklenburg County greenway system includes only one section of greenway in the Upper Little Sugar Creek Watershed. The existing greenway runs along Little Sugar Creek between Morehead Street and Princeton Avenue. However, the 1999 Mecklenburg County Greenway Master Plan recommends that the greenway be extended for a total length of approximately 5.3 miles. The Plan calls for the existing segment to be extended northeast from East Morehead Street to Cordelia Park (2.9 miles), and southwest from Princeton Avenue to the Watershed boundary (2.4 miles). The proposed greenway would continue on through Lower Little Sugar Creek and go all the way to the Mecklenburg County-South Carolina border.

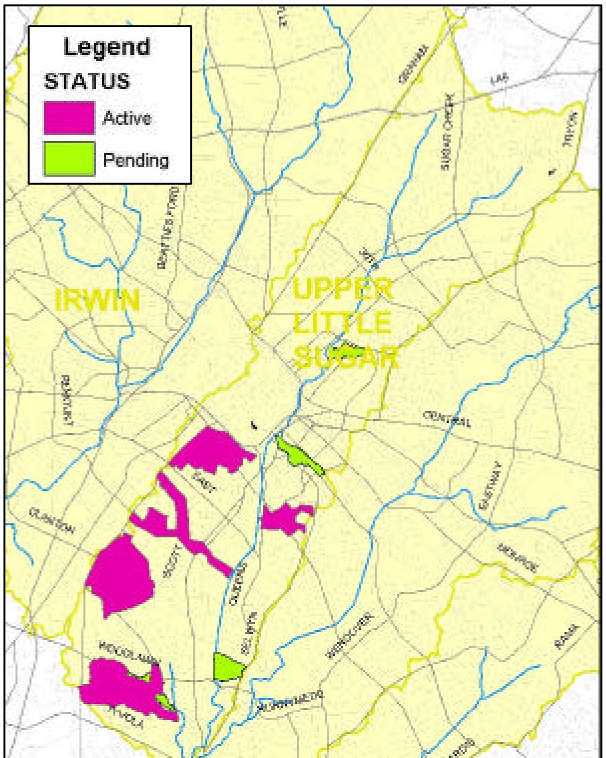


Figure 6. City of Charlotte Storm Water Services Capital Improvement Projects (CIPs)

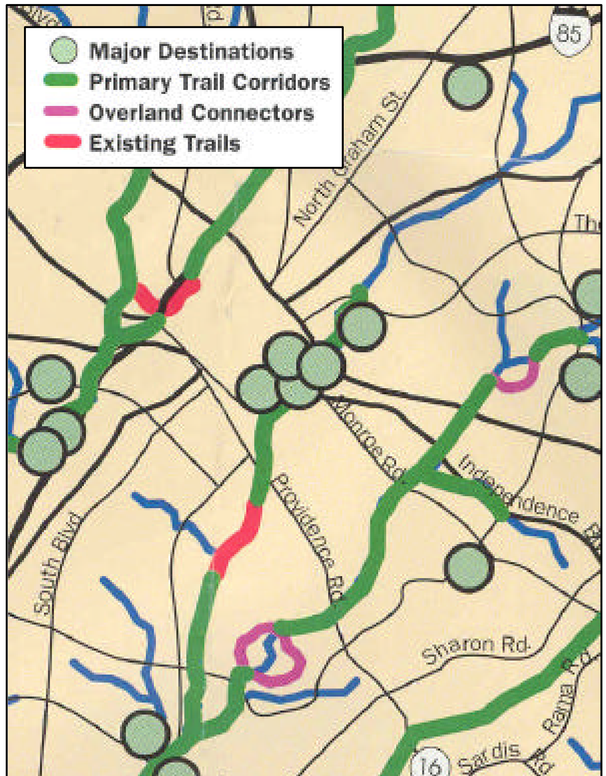


Figure 7. Existing/Proposed Greenway System in Upper Little Sugar Creek Watershed (from 1999 Greenway Master Plan).

1.3. Aquatic Habitat and Environmental Monitoring

When available, monitoring data can be one of the best sources of information for evaluating site environmental conditions in a watershed. In addition to providing specific information on existing conditions, monitoring data may provide insight to patterns over time. Patterns identified in the monitoring data can be coupled with records of development and/or other activities to help develop a cause-effect relationship between activities in the watershed and environmental stressors (problems) that currently exist, or are likely to develop, based on current watershed patterns. Although a full environmental watershed assessment and data analysis is beyond the scope of this planning project, available monitoring data is identified and summarized below.

Mecklenburg County has a water quality program which maintains a system of approximately 49 water quality monitoring stations throughout the County. There are three basic types of environmental monitoring conducted at the stations:
1) Benthic macroinvertebrate sampling (i.e. taxa richness (EPT method))
2) Fish sampling (i.e. North Carolina Index of Biotic Integrity (NCIBI))
3) Ambient sampling (e.g. dissolved oxygen, nitrates, metals, oils, etc. – reported as composite Water Quality Index (WQI)).

Biological (fish and macroinvertebrate) sampling is used to assess a streams ability to support abundant and diverse populations of aquatic life, and thus, is a direct measure of the aquatic health of a stream. Generally biological sampling protocols are based on the presence or non-presence of indicator species sensitive to pollutants or environmental stressors. A principal advantage of biological sampling is that it is generally less sensitive to short-term environmental changes, and represents a more composite, longer-term view of aquatic health. A limitation of biological sampling is that although it answers the direct question of "how/what" is the aquatic health of the stream, it does not indicate "why" it is such.

Ambient sampling is used to assess the chemical and physical properties of the stream flow, and to indirectly assess the aquatic health of a stream. When coupled with the biological sampling, ambient data can help answer the question to as "why" the aquatic health of a stream is the status that it is. Ambient sampling is also helpful in evaluating whether the water meets water quality standards (e.g. enough dissolved oxygen, appropriate temperature, etc.), as well as, identifying the presence of potential pollutants that may hinder healthy conditions (e.g. excess metals, oil, etc.). One limitation of ambient sampling is that since it is representative of in-stream conditions at a given point(s) in time, it is highly variable – constituent levels are often sensitive and are affected by changes in environmental conditions (e.g. diurnal and seasonal patterns, wet versus dry weather, etc.). To help assess the data from the many sampled constituents, Mecklenburg County uses a "Water Quality Index" (WQI). The WQI integrates samples from the individual constituent samples to provide a composite or overall rating of the ambient water quality.

Organized monitoring of the stations began in the late 1980's and continues today. The frequency of monitoring at each station is dependent on purpose of the station (i.e. project specific or general) and the type of information collected (i.e. chemical versus biological). Ambient chemical water quality data is generally collected every quarter, whereas macroinvertebrate is sampled annually. Fish sampling for the entire County was collected on a "one-time" basis between 1995 and 1999. However, the County has started conducting a new round of fish sampling that is expected to finish in the near future.

The Mecklenburg County Water Quality Program (MCWQP) maintains eight monitoring stations in the Upper Little Sugar Creek Watershed – stations MC28A, MC28D, MC29, MC29A, MC29B, MC60, MC61, and MC62. The five MC28 and MC29 sites are located on Little Sugar Creek, MC60 is on Derita Branch, MC61 is on Dairy Branch, and MC62 is on Little Hope Creek.

Macroinvertebrate/Benthic sampling over the last eight years has consistently produced “Poor” ratings at all monitoring stations, with the exception of one “Fair” rating at Site MC29 in 2001. Fish sampling between 1995 and 2001 ranged between “Poor” and “Fair/Good” ratings. More importantly, two sites on Little Sugar Creek (MC28A and MC28D) with multiple samples, show a decline in fish habitat ratings, indicating worsening conditions.

Conversely, ambient water quality sampling of on Upper Little Sugar Creek has consistently provided “Fair/Good” or better water quality rankings. Detailed analysis (beyond the scope of this study) is needed to better assess the reason for the conflicting water quality ratings. One possible hypothesis is that although the WQI, which is a composite ambient water quality rating, is good, one or more ambient constituents that are important for healthy aquatic life are at unsuitable levels. Table 2 summarizes the MCWQP monitoring data.

Table 2. MCDEP Water Quality Monitoring Summary

NC Piedmont Macroinver-tebrate Taxa Richness		Sep-94		Sep-96		Aug-98		Sep-00		Jul-01	
Site	**Location**	S_{EPT}	**WQ Rating**	S_{EPT}	**WQ Rating**	S_{EPT}	**WQ Rating**	S_{EPT}	**WQ Rating**	S_{EPT}	**WQ Rating**
MC28A	Little Sugar Creek - Wellingford Street	-	-	2	Poor	4	Poor	-	-	-	-
MC28D	Little Sugar Creek - E 12th Street	-	-	3	Poor	2	Poor	-	-	-	-
MC29	Little Sugar Creek - Park Road	3	Poor	-	-	-	-	5	Poor	6	Fair
MC29A	Little Sugar Creek - N Tryon Street	-	-	-	-	-	-	-	-	4	Poor
MC29B	Little Sugar Creek - E 36th Street	4	Poor	3	Poor	4	Poor				
MC60	Derita Branch - N Tryon Street	0	Poor	-	-	-	-	-	-	-	-
MC61	Dairy Branch - Cumberland Avenue	4	Poor	-	-	-	-	-	-	-	-
MC62	Little Hope Creek - Mockingbird Lane	4	Poor	-	-	-	-	-	-	-	-

Fish Bioassessment		Sep-95		Jul-96		May-97		Jun-98		Oct-01	
Site	**Location**	**NCIBI**	**WQ Rating**	**NCIBI**	**WQ Rating**	**NCIBI**	**WQ Rating**	**NCIBI**	**WQ Rating**	**NCIBI**	**WQ Rating**
MC28A	Little Sugar Creek - Wellingford Street	-	-	-	-	40	Fair	34	Poor	-	-
MC28D	Little Sugar Creek - E 12th Street	-	-	-	-	40	Fair	36	Poor	-	-
MC29	Little Sugar Creek - Park Road	44	Fair	-	-	-	-	-	-	42	Fair
MC29A	Little Sugar Creek - N Tryon Street	-	-	-	-	-	-	-	-	-	-
MC29B	Little Sugar Creek - E 36th Street	-	-	44	Fair	40	Fair	42	Fair		
MC60	Derita Branch - N Tryon Street	-	-	34	Poor	-	-	-	-	-	-
MC61	Dairy Branch - Cumberland Avenue	-	-	-	-	-	-	-	-	-	-
MC62	Little Hope Creek - Mockingbird Lane	-	-	34	Poor	-	-	-	-	-	-

Water Quality Index		Sep-95		Sep-96		Oct-98		Oct-00		Apr-01	
Site	Location	WQI	WQI Rating	WQI	WQI Rating	WQI	WQI Rating	WQI	WQI Rating	WQI	WQI Rating
MC28A	Little Sugar Creek - Wellingford Street	-	-	-	-	-	-	-	-	-	-
MC28D	Little Sugar Creek - E 12th Street	-	-	-	-	-	-	-	-	-	-
MC29	Little Sugar Creek - Park Road	77.24	Good/Exc.	67.33	Good	69.51	Good	76.56	Good/Exc.	71.71	Good
MC29A	Little Sugar Creek - N Tryon Street	66.94	Good	55.71	Fair/Good	70.45	Good	73.34	Good	75.25	Good/Exc.
MC29B	Little Sugar Creek - E 36th Street	-	-	-	-	-	-	-	-	-	-
MC60	Derita Branch - N Tryon Street	-	-	-	-	-	-	-	-	-	-
MC61	Dairy Branch - Cumberland Avenue	-	-	-	-	-	-	-	-	-	-
MC62	Little Hope Creek - Mockingbird Lane	-	-	-	-	-	-	-	-	-	-

In additional to the MCWQP monitoring stations, there are two USGS flow stations and five rain gages within the Upper Little Sugar Creek Watershed. A list of these stations and gages are provided below for general reference.

Table 3. USGS Stations and Mecklenburg County Rain Gages

Station/Gage ID	Type	Location
02146409	USGS (flow,water quality)	Little Sugar Creek at Medical Center Drive
02146409	USGS (flow)	Little Hope Creek at Seneca Place
351320080502645	County (rainfall)	CMGC 600 E. Fourth St.
351132080504145	County (rainfall)	Freedom park, Cumberland Dr.
351604080470845	County (rainfall)	Hidden Valley Elementary School
351441080481545	County (rainfall)	Highland Elementary School
351104080521845	County (rainfall)	Collinswood Elementary School

1.4. Rosgen Stream Morphology Assessment

Stream classification is a process where subject streams are analyzed and are grouped into discrete categories based on similar characteristics. Classification is beneficial and often used in stream restoration projects since it provides a consistent baseline for organizing, comparing, and managing streams. In addition, classification can offer insight on existing behavior and future trends of the stream.

There are several types of stream classification systems that categorize streams using different parameters (e.g. channel stability, sediment transport, etc.). This study utilized the Rosgen Stream Classification System, which is a hierarchical classification system (Levels I – IV) based on increasingly detailed morphological information. For the purposes of watershed-wide planning, the Level I (i.e. the most generalized classification) classification is appropriate. Detailed planning and/or design generally merit a Level II assessment or above.

A Rosgen Level I Assessment was conducted on the study streams within the Upper Little Sugar Creek Watershed to obtain a course geomorphic characterization for each study stream. The Rosgen Assessment qualitatively classifies a stream based on broad-scale quantitative assessments of basin relief, landform, and valley morphology characteristics. For this Level I analysis, topographic data, aerial photos, and HEC-RAS models were used to calculate stream sinuosity (i.e. a measure of how much a stream meanders) and channel slope for each study stream. These calculated values are presented below in the table.

Table 4. Rosgen Level 1 Assessment: Geomorphic Characterization

	Channel Length (mi)	Valley Length (mi)	Channel Sinuosity	Channel Slope (percent)
Upper Little Sugar Creek	10.10	9.24	1.09	0.28
Dairy Branch	0.63	0.55	1.15	1.19
Little Hope Creek	1.52	1.40	1.09	0.57
Little Hope Creek Tributary #1	0.67	0.55	1.22	0.49
Derita Branch	2.09	1.95	1.07	0.56

The information presented above and several previous more detailed studies (Dames & Moore, 2001) indicate that the main stem of Little Sugar Creek can be classified as a Type E channel (although less steep and sinuous). Type E channels are generally characterized by slight entrenchment, low width to depth ratios, and relatively high sinuosity within a broad valley. A natural Type E stream is generally considered to be very efficient and stable, although in the case of Little Creek there are many exceptions to this generalization.

The tributaries to Little Creek are generally more steeply sloped than the main stem, and thus may be classified as Type G channels (again, less steep and sinuous). Type G channels are generally characterized by a low sinuosity, mild slopes, and a low bankfull width/depth ratio. These conditions often lend to undesirable high bank erosion rates, and channel instability. This is consistent with the fact that the creek banks have been armored along numerous sections with riprap to reduce bank erosion.

It is important to note that the urban development of Charlotte has significantly altered the natural stream system (i.e. straightening, widening, armoring, etc), which has diminished the influence that the general geomorphic information (used in a Level 1 analysis) has on channel morphology. In addition, stream morphology can vary considerably between different reaches, especially in urban areas. These factors can complicate classifying streams, since the calculated numbers may not fit perfectly into any one distinct category (as was the case for both study streams). In this situation, judgment and/or further study is used to approximate the "best fit".

1.5. Bank Stability Problem Identification

Channel bank stability is an important issue in urban floodplain/stormwater management, since it can have a significant impact on the quality of a stream for both localized areas and as a whole. Unstable channels with eroding banks destroy valuable property, expose and/or weaken existing infrastructure (e.g. utilities), and lessen the efficiency of ponds and reservoirs. In addition, the increased sedimentation can cause significant water quality problems. Sediment in streams negatively impacts aquatic life by burying and suffocating aquatic habitat, and providing a host for harmful bacteria and other pollutants to attach to.

Channel instability problems typically fall into two general categories: isolated areas of bank erosion and long-term equilibrium adjustments to changes in the watershed and stream system. The former may be caused by rapid inflow from tributaries, unstable banks, or encroachment of development. The latter is related to larger scale changes in the land use of the watershed and flows in the stream, which manifest in the form of changes to the channel bottom level.

MCSWS and others have identified a number of bank stability problems in the Watershed. However, many of these issues have been or are being addressed. As noted in Section 1.2, the County is coordinating three major stream stabilization/restoration projects. Cursory bank stability assessment for this study did identify both localized scour and the presence of mid-channel sand bars (which indicate long-term equilibrium adjustments) at several locations. However, since most visible channel bank areas near road crossings have been armored, no major problems were identified. Other problem areas may exist at areas not visible from road crossings.

2. BENEFIT:COST ECONOMIC ANALYSIS

2.1. Benefit:Cost Analysis Overview

The benefit:cost (B:C) analysis is an economic based analysis that is commonly used in mitigation projects to evaluate the cost-effectiveness of one or more proposed improvement alternatives. The B:C analysis compares the benefits (in dollars) obtained by a proposed improvement versus the cost to implement the improvement.

In the context of flood hazard mitigation, the benefits are primarily comprised of the estimated flood damages that are avoided by implementing an improvement. For example, if a proposed improvement project (e.g. elevating a building above the floodplain) protects (i.e. eliminates flood damages) a floodprone building that incurs an average of $1,000/yr in flood damages, the $1,000/yr is considered the benefit. The cost equals the cost to implement (and maintain) the alternative.

The results of the B:C analysis is typically expressed in a simple ratio of the benefits over the costs – referred to as the B:C ratio. A B:C ratio of greater than 1.0 implies that the benefit of implementing a proposed project is greater than the cost to implement the project. Thus, the given alternative is considered an economically feasible solution. Subsequently, a B:C ratio of less than 1.0 indicates that the costs associated with a proposed alternative are more than its benefits, so the alternative is not cost-effective. It should be noted that the B:C ratio is based solely on economic considerations, whereas in reality, there are often many other considerations that cannot be directly quantified (for both benefits and costs). Examples of other considerations include: water quality benefit, aesthetic benefit, public safety issues, political environment, disruptions in traffic patterns, and others. For this reason, it can be acceptable to implement an alternative with a benefit/cost ratio of less than 1.0. In this study, per direction of MCSWS, buildings in the community encroachment (0.1 foot) floodway were in almost all cases recommended for acquisition (regardless of their B:C ratio) due to potential public safety issues and regulatory requirements.

2.2. Flood Damage Assessment Model

The FEMA "Riverine Flood, Full Data Module (Version 5.2.3, 1999)" Benefit:Cost model, hereafter referred to as FEMA BC, was used for estimating flood damages in this study. The FEMA BC is an EXCEL spreadsheet-based program that has built-in functions to compute probability based damages, given user-entered information, such as economic and physical building information, and flood information. As noted in the previous section, the estimated damages represent the benefit in the B:C analysis. To increase efficiency and accuracy in inputting data into the FEMA BC model, a custom import application was developed in Visual Basic for Applications (VBA). This import application took data that had been compiled into tables, and automatically created FEMA BC models. Appendix A presents the import tables used to create the FEMA BC models. As indicated previously, the damage estimates presented in this report are for planning and general ranking purposes only. A more detailed B:C analysis should be performed before further mitigation action is taken.

2.3. Building Data

The amount of damage incurred by a flooded building is a function of the economic and physical characteristics of the building. A brief description of the building parameters used by the FEMA BC program for the flood damage assessment is provided below. The reader is referred to the FEMA BC User's Guide for a more detailed description.

Building Type: The building type provides physical style information (i.e. number of stories, presence of basements, etc.) for a building. FEMA BC categorizes building types into six general building types. Each building type has a unique, built-in, flood depth to damage relationship that the program uses to estimate the damages to a given building (e.g. a house with a basement incurs damage at a higher rate than an identical house without a basement).

Building Value: The building value refers to the economic value of the building. It is required by FEMA BC since flood damages are a function of the economic value of the building. Building values were estimated from Mecklenburg County tax parcel data and were assumed to equal 125% of the "improvement value" (i.e. TOT_IMP_VA field). This assumption is consistent with the six previous watershed-wide studies completed in 2001.

Content Value: Content value is the estimated value of the contents in a building. Damages to building contents often represent a significant portion of total flood damage for a given structure. In large-scale studies such as this, the content value is often expressed as a percentage of the building value (e.g. contents in a residence are worth 25% of building value). For this study, flooded buildings were grouped into five categories based on their use (i.e. residential, commercial, etc.). Content to building value percentages were then developed for each category and used in the FEMA BC model. It should be noted that this methodology differs from that used in the previous six watershed studies completed in 2001, which used a content to building value of 25% for all structures.

Floor Elevation: Floor elevation refers to the elevation of the lowest finished floor. The model uses this to determine the elevation at which flood damage commences. Floor elevations were obtained from surveyed elevation certificates obtained from Mecklenburg County. Elevation certificates were surveyed/created for buildings not having existing ones.

Displacement Cost: The displacement cost represents the cost that is incurred when occupants of a building are displaced and thus must live/operate in a temporary location while damage is being repaired. Flat displacement costs of $5,250/month for single-family residential buildings and $12,000/month for multi-family residential buildings were used in this study. These estimates were based on per diem information provided by the NC Department of Emergency Management. Non-residential buildings were assumed to have a $0 displacement cost. Costs related to being displaced were assumed to be accounted for in lost revenue estimates discussed below. It should be noted that this methodology differs from that used in the previous six watershed studies completed in 2001, which used a single flat displacement cost ($5,250/month) for all structures.

Business Loss Cost: The business loss cost is an estimate of the amount of loss revenue incurred by a business when normal operations are disturbed (or halted) due to a flood. Business costs are highly building specific and difficult to estimate. However, for the purposes of the watershed-wide planning study losses of $10,000, $18,800, and $37,500 per month were used for general commercial, warehouse, and offices, respectively. Residential properties were given a business loss of $0. These estimates were developed from economic information obtained the Charlotte

Chamber of Commerce and internet business sites. It should be noted that this methodology differs from that used in the previous six watershed studies completed in 2001, which did not account for business loss cost.

2.4. Hydraulic Data

Hydraulic data specifies the frequency and magnitude of flooding at a given building. It is used in conjunction with physical building data to assess flood depths, and subsequent flood damages, for a given building. FEMA BC requires water surface elevations (WSEs) from four storm events: 10%, 2%, 1%, and 0.2% annual chance flood events, which are typically defined as 10-, 50-, 100-, and 500-year storm events, respectively.

This study used future condition WSEs in the FEMA BC program for each of the storm events. The 100-yr WSEs used in this study were previously developed in HEC-RAS (Version 2.2) for the County by Watershed Concepts. Since the County's HEC-RAS models did not have future condition WSEs for the other storm events (i.e. 10-, 50-, and 500-yr), they were created separately. First, future condition flows were developed by applying the previously developed built-out land use conditions to the 10-, 50-, and 500-yr HEC-1 hydrology models. The future condition WSEs were then calculated by running the future condition flows through the HEC-RAS models. WSEs were calculated at each floodprone building by applying a station to each building and then interpolating the HEC-RAS output to obtain a WSE for the station of the building.

2.5. Modeling Process

The FEMA BC model utilizes the above information to produce an estimated annual cost of flood damage. This expected annual damage cost takes into account damages from all frequency storms inputted into the model, and is calculated in a multiple-step process. First, raw damages for building, contents, displacement, and business losses are computed. Building and content damages are estimated by comparing flood depths associated with each storm event with built-in (or user specified) depth-damage functions (DDFs). Building and content DDFs used in this study are given in Appendix C. Displacement and business costs are estimated by using built-in (or user specified) curves to assess the amount of time the structure is unusable for a given flood depth, and then multiplying this "downtime" by monthly displacement/business loss costs. Next, a probability-based curve is developed from user-entered discharges and WSEs that accounts for probability of each storm event. Lastly, the raw damage functions (DDFs) are compared with the probability curve of to calculate the average annual damage. A detailed description of flood damage assessment statistics is beyond the context of this report. The reader is referred to the FEMA BC Users Guide for more information.

The flood damage assessment portion of this study was conducted on buildings located in the 100-yr Future Condition Floodplain (FCF), with finished floor elevations below the predicted 100-yr future condition WSE. It should be noted that since the FEMA BC includes the 500-yr storm event (i.e. the 0.2% chance event), computed damages include damages from storms larger than the 100-yr. However, improvement alternatives were design based on the 100-yr storm event.

2.6. Economic Analysis

Once the floodprone buildings in a study area are identified and their flood related damages assessed, the next step in a benefit:cost analysis is to identify potential mitigation alternatives and then develop a cost to implement these alternatives. The cost to implement a given improvement alternative represents the "cost" portion of the B:C ratio. Before the a B:C ratio is calculated, all benefits and costs must be in the same time reference (e.g. present lump sum cost, annual cost, etc.). As noted above, the FEMA BC calculates damages (i.e. benefits) as an average annual cost. Conversely, cost estimates for improvement alternatives are typically developed as a present worth lump sum (or a combination lump sum and annual cost), as they were in this project. For clarity, all benefits and costs were standardized to present value lump sum terms. The annualized benefits calculated in the FEMA BC were transformed to present value lump sum using standard engineering economic equations with a 50-yr project life and a 7% interest rate.

The final step in the B:C analysis is to make a mitigation recommendation. B:C ratios are calculated for all the proposed improvement alternatives, from which alternatives that are cost-effective (i.e. B:C > 1.0) are identified. Any additional, non-quantitative factors are then considered in conjunction with the B:C ratios, to identify a recommended action for the building or group of buildings. If the B:C ratio is less than 1.0 for all improvement alternatives and there are no significant non-quantitative benefits (i.e. water quality, public recreation, etc.), then a “no-action” option is recommended.

2.7. Improvements

A number of flood damage mitigation improvement alternatives were considered for each flooded building or group of flooded buildings. General options for improvement alternatives included: property acquisition, structure elevation, flood proofing, construction of floodwalls/levees, channel improvements, infrastructure improvements, detention, and a no action option.

Costs and subsequent B:C ratios (as described above) were developed for each improvement alternative that was deemed as a feasible alternative. More detailed information on the improvements investigated in this study and the economic analysis results are presented in Sections 3.5.1 and 3.5.2, respectively.

3. FLOOD HAZARD MITIGATION

3.1. Storm Water Service Requests

Mecklenburg County and the City of Charlotte maintain a joint City/County storm water service request hotline where residents can call and request service for storm water related issues/problems. Requests can be made for any storm water related issues (e.g. pipe repair, inoperable structure, yard flooding, etc.), and are thus typically associated with localized issues (which are not addressed in this study), rather than stream overbank flooding. However, presenting this information can be useful for identifying chronic problems.

Information provided by MCSWS indicates that there have been four (4) recent storm water service requests. All the requests were for properties along Upper Little Sugar Creek, one of which was identified as flooding in the 100-yr FCF (i.e. included in the B:C analysis). The addresses of the outstanding requests are provided below for general reference:

- 1646 Jameston Drive (December 1996)
- 1700 Jameston Drive (February 1990)
- 3406 Carowill Circle (June 1993 * included in the B:C analysis)
- 3928 Selwyn Avenue (August 2000).

3.2. Repetitive Loss Structures

A repetitive loss structure is defined as any structure that has had two or more flood-related insurance claims during a 10-year period. Repetitive loss structures are of special interest in local mitigation planning since they are being targeted by FEMA for mitigation assistance, and thus are generally the most eligible for federal funding.

Information provided by MCSWS indicates that there are forty-one (41) repetitive loss properties within the Upper Little Sugar Creek Watershed. A total of ninety-two (92) claims amounting to approximately $1.9 million have been paid to these properties between 1979 and 2003. Similarly to the storm water service requests, repetitive loss structure claims may be the result of localized issues as well as, stream overbank flooding.

Many of the repetitive loss properties have been acquired by MCSWS for flood hazard mitigation. The reader is directed to the figures in the executive summary which show both repetitive loss structures and properties that have been acquired by the County. The addresses of the repetitive loss structures are provided below. Addresses that were included in the B:C analysis are denoted with an asterisk (*).

- 537 Burroughs Street
- 3401 Carowill Circle
- 3154 Cullman Avenue*
- 3201 Cullman Avenue*
- 1456 Devon Drive
- 313 Fieldbrook Place*
- 317 Fieldbrook Place
- 321 Fieldbrook Place
- 700 Kenilworth Avenue*
- 608 Kenlough Drive
- 3000 Manor Road*
- 3004 Manor Road*
- 3021 Manor Road
- 3411 Mar Vista Circle*
- 1131 Mockingbird Lane*
- 5217 Murrayhill Road
- 1121 Myrtle Avenue
- 511 Queens Road
- 1321 Reece Road*
- 308 Rocklyn Place*
- 312 Rocklyn Place*
- 320 Rocklyn Place
- 325 Rocklyn Place
- 1242-1244 Romany Road
- 1449 Townes Road*
- 237 Wakefield Drive*
- 301 Wakefield Drive*
- 349 Wakefield Drive*
- 307-15 Wakefield Drive
- 401-09 Wakefield Drive*
- 415-421 Wakefield Dr*
- 145 Wellingford Street
- 209 Wellingford Street
- 217 Wellingford Street
- 2920 Westfield Road
- 3020 Westfield Road
- 3026 Westfield Road
- 3038 Westfield Road
- 3216 Westfield Road
- 3224 Westfield Road
- 3252 Westfield Road

3.3. Permanent Storm Water Easements

Based on GIS database information obtained from City SWS, there are seven permanent storm water easements in the Upper Little Sugar Creek Watershed that provide access to Upper Little Sugar Creek, Dairy Branch, Little Hope Creek, Little Hope Creek Tributary #1, or Derita Branch. The addresses are:

- 3510 Benard Avenue
- 1614 North Davidson Street
- 2112 Hassell Place
- 2116 Hassell Place
- 2641 Idlewood Circle
- 1646 Jameston Drive
- 1007 McAden Street

3.4. Roadway Overtopping Locations

Roadway overtopping refers to the situation where the calculated WSE in a stream is above the top of the roadway surface. Although this study focused on the mitigation of floodprone buildings, overtopping depths were identified at each road crossing, since overtopping can represent a significant hazard during large storm events. For example, motor vehicles can be swept away in as little as 24 inches of flood flow depths over a road.

Roadway culverts/bridges are typically designed to pass a certain frequency storm event without overtopping, based on their level of service. For example a residential road is often designed to be protected from a 10-yr and smaller storm events, where as an interstate may be designed to be protected from a 100-yr and smaller storm events. Storms larger than the design frequency are "allowed" to overtop the road, and thus not considered to be a problem. However, it is considered a problem if a storm event equal to or smaller than the design frequency overtops the roadway (ex. a 2-yr or 10-yr event overtops a residential roadway).

Roadway overtopping depths were identified within the Upper Little Sugar Creek Watershed by comparing results of the HEC-RAS models to roadway geometry. Evaluating the level of service and an appropriate "designed" capacity for road crossings was beyond the scope of this study, therefore roadway overtopping "problems" were not specifically identified. However, since public roads are designed for a 10-yr event or greater, any roadway which is overtopped in the 10-yr event can be considered as problematic. Overtopping depths for the future condition 10-, 50-, and 100-yr storms at all study stream roadway crossings, are presented in Table 5 below.

Table 5. Roadway Overtopping Depths

Upper Little Sugar Creek	Crossing Structure Type/Size	FC 100-yr WSE (FT. NAVD)	FC 10-yr Overtopping Depth (FT)	FC 50-yr Overtopping Depth (FT)	FC 100-yr Overtopping Depth (FT)
Tyvola Road	Bridge	593.4	-8.38	-5.43	-3.01
Park Road	Bridge	595.66	-5.9	-3.03	-1.05
East Woodlawn Road	4-12’x15’ Box	606.5	-8.76	-6.24	-4.64
Brandywine Road	Bridge	608.06	-3.66	-1.45	-0.72
Access Road	Bridge	611.53	2.22	3.6	4.18
Hillside Avenue	Bridge	612.92	1.2	2.68	3.61
Princeton Avenue	Bridge	617.72	-1.94	0.15	1.21
Stream crossing	Bridge	618.48	4.51	6.29	7.41
Stream crossing	Bridge	618.49	-1.17	0.74	1.98
Stream crossing	Bridge	621.1	0.91	2.27	3.09
Stream crossing	Bridge	623.63	4.01	5.79	6.27
East Boulevard	Bridge	627.62	1.01	1.14	1.61
Stream crossing	Bridge	627.3	10.59	13.31	13.46
Stream crossing	Bridge	630.02	10.6	13.26	13.68
Medical Center Drive	Bridge	632.1	-1.16	1.32	1.79
Stream crossing	Bridge	633.12	11.77	13.69	14.13
East Morehead Street	1-30’x13’ Ellipse	634.47	2.43	3.33	3.47
Stream crossing	Bridge	634.98	3.14	4.23	4.44
Stream crossing	1-42’x16’ Box	637.88	-0.79	1.35	1.56
Stream crossing	Bridge	639.35	3.54	6.2	6.54
Baxter Street	Bridge	639.62	5.73	8.21	8.57
Stream crossing	Bridge	640.61	-0.37	1.59	2.15
Independence Boulevard	Bridge	641.12	-2.67	-0.31	0.29
East 3rd Street	3-12’x14’ Box	644.76	-5.31	-1.42	-0.05
4th Street	3-12’x14’ Box	647.3	-4.95	0.36	1.59
Elizabeth Avenue	3-12’x14’ Box	647.64	-2.06	2.36	2.92
I-277	3-12’x12’ Box	654.51	-3.5	1.02	1.89
I-277 Ramp	3-12’x12’ Box	657.48	-3.67	2.26	3.35
12th Street	3-12’x12’ Box	657.97	0.75	4.97	5.76
Stream crossing	Bridge	658.05	5.04	9.03	9.82
CSX Transportation Railroad	Bridge	658.62	-36.05	-32.14	-31.39
Belmont Avenue	3-12’x12’ Box	659.9	-4.09	-0.07	0.68
Stream crossing	Bridge	661.38	-0.74	2.54	3.07
Stream crossing	Bridge	661.91	0.5	1.48	1.75
Stream crossing	Bridge	664.9	1.87	2.23	2.36
18th Street	Bridge	666.92	-1.27	-0.57	-0.34
Stream crossing	Bridge	668.19	4.1	4.98	5.15
Parkwood Avenue	3-11’x12’ Box	669.7	-5.4	-3.83	-3.51
Stream crossing	Bridge	670.16	3.58	5.32	5.65

Davidson Street	3-12'x10' Box	671.43	-1.91	0.36	0.65
Brevard Street	1-25'x11' CMPA	678.67	-1.5	1.33	1.66
Norfolk Southern Railroad	1-15'x16' CMPA	690.25	-13.09	-9.19	-6.91
East 30th Street	2-4.7'x11.2' & 2-10'x12' Box	692.33	-10.63	-5.98	-3.18
Norfolk Southern Railroad	1-15'x17' CMPA	692.56	0.88	3.62	5.83
East 36th Street	2-10'x9' Box	692.56	1.65	3.97	6.21
West Craighead Road	3-9'x9' Box	695.5	-2.77	-1.12	0.17
East Sugar Creek Road	2-12'x8' Ellipse	703.6	0.99	2.03	2.21
North Tryon Street	2-9'x9' Box	709.46	-10.61	-8.13	-7.45
Wellingford Street	Bridge	710.36	0.1	2.21	2.71
Kentbrook Drive	Bridge	718.56	-1.99	0.58	0.95
Dairy Branch	**Crossing Structure Type/Size**	**FC 100-yr WSE (FT. NAVD)**	**FC 10-yr Overtopping Depth (FT)**	**FC 50-yr Overtopping Depth (FT)**	**FC 100-yr Overtopping Depth (FT)**
DS Cumberland Avenue	1-16'x7' CMPA	622.07	2.25	3.19	3.50
Cumberland Avenue	3-6' RCP	627.62	1.22	1.69	1.85
D/S Scott Avenue	Bridge	644.94	0.11	1.94	2.15
Scott Avenue	1-11'x12' Box	657.34	-0.50	0.67	0.84
Little Hope Creek					
Tyvola Road	3-10'x10' Box	593.28	-12.84	-8.59	-6.99
Seneca Place	Bridge	610.48	-6.09	-4.15	-3.53
Mockingbird Lane	3-7'x6' Box	615.81	1.94	3.60	4.11
Montford Drive	1-8'x6' Box	618.83	0.97	1.24	1.30
Woodlawn Road	1-10'x10' Box	627.27	-0.89	1.17	1.42
Little Hope Creek Tributary #1					
Bradbury Drive	1-8'x7' Box	622.84	0.88	1.23	1.31
Derita Branch					
North Tryon Street	1-13'x8' Ellipse	689.44	0.94	1.71	1.88
Stream crossing	1-10'x6' Box	690.50	2.13	3.01	3.35
West Craighead Street	3-10'x4' Box	712.93	-1.09	1.65	2.00

For those roadways which do indicate significant overtopping the following general items may wish to be considered for future action:

- Signage of roadway overtopping warning for avoiding road crossing during flood event.
- Coordination with Police Dept. and Fire Dept. for special attention during flood event.
- Routine inspection for bridge/culvert scour and safety conditions, such as a lack of guardrail (or handrail). Guardrail post would give indication of the edge of the structure when inundated during flood flows.

3.5. Flood Mitigation Improvement Analysis

The flood damage assessment, discussed in Section 2, identified a total of 531 floodprone buildings (i.e. buildings whose footprint intersects the 100-yr FCF) within the Upper Little Sugar Creek Watershed. This figure excludes miscellaneous accessory buildings such as garages, sheds, park shelters, and similar. Further analysis, survey, and comparison with existing County elevation certificates, revealed that 168 (32%) of these 531 buildings have a finished floor elevation below the predicted 100-yr future condition WSE, and thus are expected to incur flood damage. Figure 8 provides a conceptual illustration of the floodprone and flooding buildings.

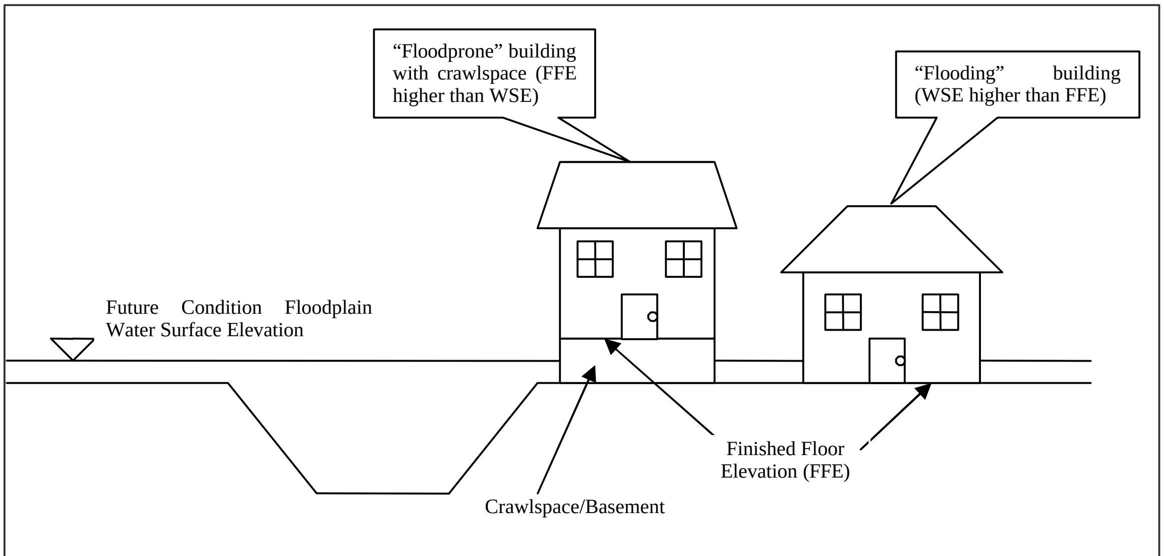


Figure 8. "Floodprone" versus "Flooding" Building Concept Illustration

Since local flood mitigation efforts are often undertaken with the goal of receiving financial assistance from FEMA, additional information was organized to facilitate receiving funding. FEMA considers a number of criteria in evaluating flood mitigation assistance (FMA) and Hazard Mitigation Grant Fund (HMGP) requests. One such criterion – repetitive loss structure information, was previously discussed in this section. Another FMA criterion that is used, relates to whether or not floodprone structures were build before Flood Insurance Rate Maps (FIRMs) were available. Buildings constructed prior to available FIRM maps are termed as "pre-FIRM" structures – those built after firm maps are termed "post-FIRM" structures. FIRM maps for Mecklenburg County were first produced in 1978. In addition to FMA, pre- and post-FIRM information is also used in the Community Rating System (CRS) evaluation, which can provide additional assistance to municipalities and property owners. Table 6 provides a summary of floodprone building and pre-/post-FIRM information for the study streams in the Upper Little Sugar Creek Watershed.

Flood mitigation of buildings predicted to incur flood damage is the primary focus of this report. Thus, mitigation improvement alternatives were investigated for these 168 "flooding" buildings, and are discussed in the following sub-sections.

Table 6. Flooding Structures Summary						
	Floodprone Buildings*			Flooding Buildings**		
Stream Name	Pre-FIRM	Post-FIRM	Sub-Total	Pre-FIRM	Post-FIRM	Sub-Total
Upper Little Sugar Creek	399	36	435	143	10	153
Dairy Branch	3	0	3	1	0	1
Little Hope Creek	61	1	62	14	0	14
Little Hope Creek Trib #1	28	0	28	0	0	0
Derita Branch	3	0	3	0	0	0
WATERSHED TOTALS	494	37	531	158	10	**168**

* Buildings that are within the 100-yr future condition floodplain
** Buildings with a finished floor elevation below the 100-yr future condition water surface elevation

Note: Pre-FIRM structures were constructed before 1978; Post-FIRM structures were constructed in 1978 or later.

3.5.1. Overview of Mitigation Improvement Alternatives

Several potential improvement alternatives were evaluated to eliminate/reduce flooding damage along the study streams. These alternatives were generally evaluated for flood reduction capability, constructability, social/environmental impact, downstream impact, and economic feasibility. The evaluation was a planning level evaluation only - no design calculations, survey, or detailed analysis were used. The alternatives evaluated included: "no action", property acquisition, structure elevation, flood proofing, construction of levees/floodwalls, infrastructure modification, channel modification, and upstream detention. An overview and preliminary evaluation of each alternative is discussed below.

Alternative 1 – No Action

In any flood mitigation study, where public safety or other concern is not a critical issue, there is the "no action" alternative (i.e. leaving the flooding situation as it is). This is the default alternative that is used when there is no other feasible option, or when the damages associated with periodic flooding do not justify the costs associated with implementing any of the other alternatives (i.e. B:C < 1.0 for all other alternatives). The "no action" option was considered as a feasible alternative, and is further discussed in the evaluation of specific problem areas in the next sub-section.

Alternative 2 – Property Acquisition

Property acquisition is a process in which floodprone properties are purchased and converted to wetland detention, park area, or some other open space which would allow flood waters to naturally expand. Acquisition is a simple and practical solution since it physically removes the structure from the floodplain, rather than trying to engineer a solution, which always has risk associated with it. In addition, this method provides environmental and aesthetic benefits, and downstream flooding relief.

Another advantage of property acquisition is that Mecklenburg County has significant experience with it for flood mitigation. The County has acquired over 130 floodprone properties for other projects, and thus gone through the many aspects associated with buyout (i.e. funding, real estate, technical, etc.). The County has used the acquired land for water quality enhancements, stream restoration, and other beneficial uses.

The primary constraints of property acquisition are economic feasibility and social impacts. The cost of acquisition is often high in urban areas, and thus economics may favor other improvement alternatives. In addition, sometimes flood-prone areas have historical, sentimental, or other significance that generates strong public opposition.

For the purposes of this planning study, property acquisition was assumed to consist of property buyout and building demolition. The cost associated with property buyout, for each parcel, was obtained from the County tax database (2002). A unit cost for demolition of $0.25 per cubic foot of building was added to the market value to estimate total property acquisition costs. Property acquisition was considered as a feasible alternative at appropriate locations, and is further discussed in the evaluation of specific problem areas in the next sub-section.

Alternative 3 – Structure Elevation

Structure elevation is a mitigation alternative in which a floodprone structure is physically elevated above the predicted flood elevations. Standard practice is to elevate a structure to one foot (1-ft) above the 100-yr WSE (i.e. 1-ft freeboard). This is typically accomplished on existing structures by extending foundation walls, or using piles, columns, or fill, to elevate the structure.

One benefit of structure elevation is that there is minimal change in natural of flood flows. Although, it is possible to elevate almost any structure, it is most appropriate for smaller structures (e.g. residential buildings), especially those with crawlspaces or basements. A limitation of elevation is that although the living area of the structure is protected during a flood event, the surrounding area is inundated, and thus evacuation of the structure may be necessary.

Structure elevation costs were estimated from unit costs provided in FEMA Publication 259 (2001). The original unit costs were adjusted to reflect current economic conditions (i.e. ENR Construction Index) and geographic conditions (i.e. locality adjustment). Adjusted unit costs ranged from $14 to $39 per square foot, depending on building conditions (i.e. wood vs. brick, built on crawl space vs. slab, etc.). A 20% contingency was applied to all unit costs to derive final elevation costs. Structure elevation was considered as a feasible alternative at appropriate locations, and is further discussed in the evaluation of specific problem areas in the next sub-section.

Alternative 4 – Flood Proofing

Flood proofing can refer to several flood damage reduction techniques, however, in this context flood proofing refers to watertight reconstruction of buildings, or "dry" flood proofing. Watertight construction can include sealing building walls with waterproof substances and using flood shields or doors to protect building openings from floodwaters. Flood proofing is generally only applicable for flood depths less than 3 feet, as depths greater than 3 feet generally require structural reinforcement due to the increased hydrostatic and uplift forces caused by the floodwaters (USACE, 1993).

Similar to structure elevation, flood proofing can be implemented on most types of structures, however, it is most appropriate for masonry buildings built with slab-on-grade construction (e.g. warehouses, industrial/commercial buildings, etc.). Generally, these types of structures are sturdy and are more capable of withstanding greater forces associated with floodwaters. In addition, flood-proofing construction, such as watertight doors and flood shields are generally less aesthetically obtrusive on industrial buildings.

The costs associated with flood proofing are a function of the number/type of openings a building has, construction materials, and properties of the buildings utilities. Since this information is very building specific, a flat cost of $50,000 per structure was assumed for this project. This estimate is based on previous flood proofing experience in Mecklenburg County. A 20% contingency was applied to the flat rate to estimate final costs for flood proofing. Flood proofing was considered as a feasible alternative at appropriate locations, and is further discussed in the evaluation of specific problem areas in the next sub-section.

Alternative 5 – Construction of Levees/Floodwalls

Floodwalls and levees are constructed to create a physical barrier between floodwaters and low-lying structures. The primary difference between a levee and a floodwall is that a levee is an earthen embankment with sloped sides, whereas, a floodwall is a concrete or brick wall with vertical sides. Unlike the alternatives mentioned above, floodwalls and levees usually provide protection on a general area, rather than on individual structures.

Floodwalls are often preferred in urban settings because they are thinner, occupy less space, and generally require less maintenance than levees. The primary drawback of floodwalls and levees is that they can greatly constrict the natural flow of water. This constriction can subsequently increase stream velocities, remove natural storage, and increase upstream and downstream water surface elevations. High velocities can increase erosion potential, as well as have adverse environmental effects. The removal of natural storage and the increase in downstream water surface elevations can create increased flooding conditions downstream. In addition, levees also impede the path of natural drainage to a creek, thus requiring an additional drainage system to be constructed.

Costs for constructing levees and floodwalls are highly project dependent, since there are many site specific factors in design (i.e. soils, conflicts with utilities, local permitting, etc.). For purposes of this planning study, costs for levees/floodwalls were estimated from unit costs provided in FEMA Publication 259 (2001). The original unit costs were adjusted to reflect current economic conditions (i.e. ENR Construction Index) and geographic conditions (i.e. locality adjustment). Adjusted unit costs ranged from $31 to $370 per linear foot, depending on the height and type of structure (i.e. levee vs. floodwall). A 30% contingency was applied to all unit costs to estimate final construction costs. Construction of levees/floodwalls was considered as a feasible alternative at appropriate locations, and is further discussed in the evaluation of specific problem areas in the next sub-section.

Alternative 6 **–** Infrastructure Modification

Infrastructure modification refers to making adjustments to bridges, culvert, and/or roadways to protect floodprone structures and/or to eliminate roadway overtopping. Inadequately sized bridges/roadways are often are a cause of many urban drainage problems. When hydraulic capacity of a bridge/roadway is exceeded, flood waters can build up behind the abutments and cause upstream flooding. The potential effectiveness of increasing the capacity of bridges/roadways can be seen by examining the flood profile. The flood profile displays the difference in the water surface elevation between the downstream and upstream sides. If the profile shows a large difference in upstream and downstream water surface elevations, increasing the size of the pipe or culvert will reduce the backwater effect. However, if there is little difference in the water surface elevations, the significance of enlarging the pipe or culvert will have little effect. It is important to consider the potential downstream impact for any infrastructure modification in order to ensure that increasing flow capacity in one location will not create or worsen flood hazards downstream.

Costs for infrastructure modification are highly project dependent, since they depend on the type and magnitude of improvements being made (e.g. upsizing culverts, raising roadways, adding bridges, etc.).

Due to the wide variety of modifications, costs were developed using general estimating procedures and state bid tables. Infrastructure modification was considered as a feasible alternative at appropriate locations, and is further discussed in the evaluation of specific problem areas in the next sub-section.

Alternative 7 – Channel Modification

Modifications to an existing channel can provide a means of reducing flooding, and can include: widening channel banks, clearing of channel sections, lowering channel inverts and cutting back side slopes. The basic mechanism for these improvements is increasing channel conveyance, thus allowing more water flow through the channel boundaries. Channel improvements are generally more applicable to controlling higher frequency, smaller magnitude storms, rather than providing protection against larger magnitude storms, as is the case in this study. This is because flow in the higher magnitude storms is generally spread out in the floodplain area, rather than contained within the channel. In addition, improvements to the channel in highly urban areas are more complex, due to the numerous roadway decks, small work area, and the presence of a stream junction.

Channel modification for flood control has become less popular in recent years due to adverse environmental and aesthetic effects that modification can cause. Examples of adverse effects include an increase in flow velocities, erosion potential, sedimentation, habitat degradation, and downstream flooding. Channel modification for flood control is indeed contradictory to many of the recent efforts of Mecklenburg County to restore previously modified streams to a more natural, healthy state (e.g. Freedom Park Stream Restoration Project). Due to these factors, channel modification will not be further evaluated in this report.

Alternative 8 – Upstream Detention

Upstream detention is another option for mitigating floodprone areas. Unlike the previous alternatives which involve modifications directly in the floodprone area, detention is generally implemented upstream of the problem location, where there may or may not be any flooding problems. The basic of idea of a detention facility is to reduce peak flood flows (and thus reduce peak WSEs) by temporarily storing the flood flows, and releasing them at a designed rate. The impact of detention is typically attenuation or "flattening" of the flood hydrograph. Similar to channel improvements, detention is often used for smaller magnitude storms, and in new land development. Detention can be used for large magnitude floods, but the amount of land required for holding the larger volume of floodwater is often a limiting factor, especially in highly urban areas such as the study watershed. Detention ponds can have adverse environmental effects as well as bring opposition from the public. Due to these factors, detention will not be further evaluated in this report.

3.5.2. Problem Area Evaluation

As previously noted in this section (Table 6), there were a total of 168 buildings identified within the Upper Little Sugar Creek Watershed for which potential mitigation alternatives were investigated. For clarity in analysis and presentation, the identified buildings were categorized into flood problem areas based on study stream, geographic proximity, and cause/magnitude of flooding. A total of 153 buildings along Upper Little Sugar Creek were grouped into 20 individual flood problem areas (LSC01 – LSC20). Fourteen flooding buildings along Little Hope Creek were grouped into 3 flood problem areas (LHC1 – LHC3). One flooding building along Dairy Branch was referenced as flood problem area DRY1.

B:C ratios were calculated for each building and for each problem area as a whole. In general, alternatives that produced a B:C ratio greater than 1.0 were considered for recommendation. It is common in benefit-cost analyses to recommend the alternative that produces the highest B:C. However, per direction from MCSWS, this study gave a greater emphasis on acquisition. As indicated in Section 2.1, building structures that were located within the community encroachment (0.1 foot) floodway were in almost all cases recommended for acquisition (regardless of B:C ratio). In addition, for buildings in the floodplain fringe, acquisition was generally recommended over other mitigation alternatives, as long as it had a B:C greater than or equal to 1.0. For example, if mitigation of a residential structure produced a B:C ratio of 1.3 for acquisition and 2.5 for elevation, generally acquisition would be recommended. If all alternatives produced a B:C ratio of less than 1.0, the "no-action" option was recommended.

Results of the mitigation improvement alternative analysis for the individual flood problem areas are summarized below. Figure E-1 is an overall map that shows locations of the problem areas. Figures E-2 through E-11 illustrate the specific location of recommended improvements for each problem area. All E-figures are located in the Executive Summary. In addition, a summary of the B:C analysis, which includes addresses and parcel identification numbers for each individual structure, is presented in Appendix B.

LSC01 – Park Road (Figure E-2)

Problem area LSC01 includes two (2) medical buildings and one (1) office building on Park Road along Little Sugar Creek, near the confluence with Briar Creek. The office building (5200 Park Road) is located within the community encroachment (0.1 foot) floodway. Flooding depths in the future condition 100-yr storm range from 0.1 ft to 7.6 ft, with an average depth of 3.1 ft. Three alternatives were evaluated for LSC01 – no action, property acquisition, and structure elevation. The building with the 7.6 foot flood depth (Parcel ID 17118143) had B:C ratios of 1.3 and 3.9 for acquisition and elevation, respectively. This building is an animal hospital that is predicted to incur significant flooding in the 10-year and larger future condition events. The other two buildings had B:C ratios ranging of 0.1 or less. Although the office building has an acquisition B:C ratio less than 1.0 (i.e. 0.1), it is recommended for acquisition since it is located in the 0.1 foot floodway. The recommendation for LSC01 is acquisition of two buildings, and "no action" for the remaining building.

Table 7. Problem Area LSC01 Mitigation Summary

	Total # of Buildings Flooding	Average Flood Depth	Max Flood Depth	Total Flood Damage	Recommended Mitigation	Buildings Protected by Mitigation	Benefit From Mitigation	Total Mitigation Cost	Overall B:C Ratio for Mitigation
Floodway	1	1.5	1.5	$239,195	Acquisition*	1	$239,195	$2,915,977	0.1
Non-Floodway	2	3.9	7.6	$466,507	Acquisition/ No Action	1	$456,032	$346,938	1.3
Totals	3	3.1	7.6	$705,701	Acquisition/ No Action	2	$695,227	$3,262,915	0.2

*building has a B:C ratio less than 1.0

LSC02 – Park Road/Hedgemore Drive (Figure E-4)

Problem area LSC02 includes two (2) apartment buildings (within Stratford Apartment Complex) on Park Road and three (3) condominium buildings on Hedgemore Drive, along an approximate 1400 foot reach of Little Sugar Creek. One condominium building (Building #8) and the two apartment buildings are located within the community encroachment (0.1 foot) floodway. Flooding depths in the future condition 100-yr storm range from 0.4 ft to 2.7 ft, with an average depth of 1.2. Three alternatives were evaluated for LSC02 – no action, property acquisition, and structure elevation. Individual B:C ratios for the buildings ranged from less than 0.1 to 0.5. Although the acquisition B:C ratio was less than 1.0, per the County's direction acquisition is recommended for the three buildings in the 0.1 foot floodway. The recommendation for LSC02 is acquisition of three buildings and "no action" for two buildings.

Table 8. Problem Area LSC02 Mitigation Summary

	Total # of Buildings Flooding	Average Flood Depth	Max Flood Depth	Total Flood Damage	Recommended Mitigation	Buildings Protected by Mitigation	Benefit From Mitigation	Total Mitigation Cost	Overall B:C Ratio for Mitigation
Floodway	3	1.3	2.7	$328,485	Acquisition*	3	$328,485	$1,316,786	0.2
Non-Floodway	2	1.1	1.7	$271,502	No Action	0	-	-	-
Totals	5	1.2	2.7	$599,987	Acquisition/ No Action	3	$328,485	$1,316,786	0.2

*all three buildings have a B:C ratio less then 1.0

LSC03 – Wakefield Drive-1 (Figure E-4)

Problem area LSC03 includes three (3) condominium buildings on Wakefield Drive, along a 250 foot reach of Little Sugar Creek. Two of the three buildings are repetitive loss structures. Flooding depths in the future condition 100-yr storm range from 0.5 ft to 3.3 ft, with an average depth of 2.3 ft. Two of the three buildings lie within the community encroachment (0.1 foot) floodway. Three alternatives were evaluated for LSC03 – no action, property acquisition, and structure elevation. The repetitive loss structure at 237 Wakefield Drive had an acquisition B:C ratio of 1.0 (actually less than 1, but rounded up to 1.0). The building at 241 Wakefield Drive had a cost-effective elevation B:C ratio, however, it was recommended for acquisition since the building is in the floodway. The remaining building, which is also a repetitive loss structure, did not have a cost effective alternative and is recommended for no action. The recommendation for LSC03 is acquisition of two buildings and "no action" for one building.

Table 9. Problem Area LSC03 Mitigation Summary

	Total # of Buildings Flooding	Average Flood Depth	Max Flood Depth	Total Flood Damage	Recommended Mitigation	Buildings Protected by Mitigation	Benefit From Mitigation	Total Mitigation Cost	Overall B:C Ratio for Mitigation
Floodway	2	3.0	3.3	$414,657	Acquisition*	2	$414,657	$515,528	0.8
Non-Floodway	1	0.5	0.5	$31,590	No Action	0	-	-	-
Totals	3	2.2	3.3	$446,247	Acquisition	2	$414,657	$515,528	0.8

* 1 of the 2 buildings have a B:C ratio less then 1.0

LSC04 – Wakefield Drive-2 (Figure E-4)

Problem area LSC04 includes three (3) condominium complex buildings located on Wakefield Drive downstream of Woodlawn Road, along a 380 foot reach of Little Sugar Creek. Flooding depths in the future condition 100-yr storm range from 2.3 ft to 3.1 ft, with an average depth of 2.6 ft. All three buildings are repetitive loss structures, two of which are also located within the community encroachment (0.1 foot) floodway. Three alternatives were evaluated for LSC04 – no action, property acquisition, and structure elevation. Individual B:C ratios for the buildings ranged from 0.4 to 2.7, with all buildings have elevation values of greater than 1.0. The building located at 349 Wakefield Drive has a B:C ratio of 1.0 for property acquisition (actually less than 1, but rounded up to 1.0). Although the remaining two properties have acquisition B:C ratios of less than 1.0, they are recommended for acquisition since they are located in the floodway. The recommendation for LSC04 is acquisition of three buildings.

Table 10. Problem Area LSC04 Mitigation Summary

	Total # of Buildings Flooding	Average Flood Depth	Max Flood Depth	Total Flood Damage	Recommended Mitigation	Buildings Protected by Mitigation	Benefit From Mitigation	Total Mitigation Cost	Overall B:C Ratio for Mitigation
Floodway	2	2.4	2.4	$542,632	Acquisition*	2	$542,632	$1,229,970	0.4
Non-Floodway	1	3.1	3.1	$252,968	Acquisition	1	$252,968	$259,480	1.0
Totals	3	2.6	3.1	$795,599	Acquisition	3	$795,599	$1,489,450	0.5

* both buildings have a B:C ratio less then 1.0

LSC05 – Brandywine Road to Hillside Avenue (Figure E-4)

Problem area LSC05 includes forty-eight (48) building structures in a predominantly residential area located on a 2100 foot reach of Little Sugar Creek between Brandywine Road and Hillside Avenue. The area includes two apartment buildings off Reece Road, one commercial building behind Park Road Shopping Center, one multi-family building, and forty-four single family homes. This area is has been targeted by MCSWS in recent years for flood hazard mitigation and environmental restoration. The County had acquired 35 properties adjacent to the Creek (not included in the flood damage analysis for this study) at the commencement of this study, and has since acquired 8 more properties for a total of 43. Six of the eight more recently acquired County properties were included in this study, however, all were recommended for no action, since they have been acquired. In addition to the acquisition project, the County is presently coordinating an environmental restoration project – known as the "Westfield Environmental Restoration and Greenway Trail" Project, hereafter referred to as the Westfield Project. The buildings that are still predicted to flood are set back from the Creek and are not included in the restoration project.

Flooding depths in the future condition 100-yr storm range from less than 0.1 ft to 4.7 ft, with an average depth of 2.1 ft. Thirty-five of the forty-eight buildings are located within the community encroachment (0.1 foot) floodway. Three alternatives were evaluated for LSC05 – no action, property acquisition, and structure elevation. Initially infrastructure improvements to the Brandywine Road crossing were investigated since there is a significant backwater effect in this problem area. However, infrastructure improvements were discarded since the actual channel section between Brandywine Road and Woodlawn Road is deep and constricted, and thus is a controlling factor. This assessment was confirmed by the fact that by completely removing the Brandywine bridge and re-analyzing the HEC-RAS model only resulted in approximately a 0.1 foot reduction in WSE. It is also noted, that a levee option would have normally been included in the alternative analysis for this area. However, the levee option was not evaluated due to the anticipated conflicts with the existing project.

Seven houses produced an acquisition B:C ratio of greater than 1.0, two of which have already purchased by the County. Twenty-four additional houses with acquisition B:C ratios ranging from 0.1 to 0.9 are also recommended for acquisition, since they are located in the 0.1 foot floodway. Two houses on Manor Road had elevation B:C ratios of 2.2 and 3.2 for structure elevation. The remaining seventeen buildings had B:C ratios of less than 1.0 for all investigated improvements. The recommendation for LSC05 is acquisition of twenty-nine houses, elevation of two houses, and "no action" for the remaining 18 building structures.

Table 11. Problem Area LSC05 Mitigation Summary									
	Total # of Buildings Flooding	Average Flood Depth	Max Flood Depth	Total Flood Damage	Recommended Mitigation	Buildings Protected by Mitigation	Benefit From Mitigation	Total Mitigation Cost	Overall B:C Ratio for Mitigation
Floodway	35	2.4	4.7	$3,473,486	Acquisition*/ No Action	29	$2,234,920	$3,790,321	0.6
Non-Floodway	13	1.0	2.8	$355,041	Elevation/ No Action	2	$108,018	$61,021	1.8
Totals	48	2.1	4.7	$3,808,523	Acquisition/ Elevation/ No Action	31	$2,342,939	$3,851,341	0.6

*24 of the 29 buildings have a B:C ratio less than 1.0

LSC06 – Hillside Avenue to Princeton Avenue (Figure E-5)

Problem area LSC06 includes sixteen (16) single family homes, six (6) multi-family homes, one (1) apartment building, and one (1) church between the Princeton Avenue and Hillside Avenue stream crossings, along a 2400 foot reach Little Sugar Creek. Similarly to LSC05, this area has been targeted for flood mitigation and environmental restoration. This area is part of the Westfield Project, and contains nineteen properties that have already been acquired by MCSWS (not included in this study).

Flooding depths in the future condition 100-yr storm range from 0.2 ft to 2.2 ft, with an average depth of 1.1 ft. Twenty-two of the twenty-four buildings are located within the community encroachment (0.1 foot) floodway. Three alternatives were evaluated for LSC06 – no action, property acquisition, and structure elevation. Initially, several levee/floodwalls were investigated, however, these were discarded due to anticipated conflicts with existing utilities, roads, and the Westfield Project.

None of the buildings produced a cost-effective acquisition B:C ratio. However, acquisition is recommended for the twenty-two in the 0.1 foot floodway. One house on Ridgewood Avenue (Parcel ID 15114301) had a B:C ratio of 1.0 for structure elevation, while, the remaining house did not produce a cost-effective B:C ratio for any improvement alternative. The recommendation for LSC06 is acquisition of twenty-two structures, elevation of one house, and "no action" for one house.

Table 12. Problem Area LSC06 Mitigation Summary									
	Total # of Buildings Flooding	Average Flood Depth	Max Flood Depth	Total Flood Damage	Recommended Mitigation	Buildings Protected by Mitigation	Benefit From Mitigation	Total Mitigation Cost	Overall B:C Ratio for Mitigation
Floodway	22	1.1	2.1	$1,071,835	Acquisition*	22	$1,071,835	$4,364,449	0.2
Non-Floodway	2	1.3	2.2	$69,169	Elevation/ No Action	1	$54,458	$53,833	1.0
Totals	24	1.1	2.2	$1,141,004	Acquisition/ Elevation/ No Action	23	$1,126,293	$4,418,282	0.3

* all of the buildings have a B:C ratio less then 1.0

LSC07 – Sterling Road (Figure E-5)

Problem area LSC07 includes the nature museum on Sterling Road (adjacent to Freedom Park), along Little Sugar Creek. The flooding depth in the future condition 100-yr storm is 2.5 ft and is not located in the community encroachment (0.1 foot) floodway. Five alternatives were investigated for LSC07 – no action, property acquisition, structure elevation, flood proofing, and a floodwall. Mecklenburg County already owns this building, so the acquisition would likely be very in-expensive. However, this building is a museum that serves the public, so acquisition is not recommended. Elevation is not recommended due to the fact the building has various levels and attachments (e.g. observation decks, butterfly house, etc.). Similarly, a flood wall is not recommended due to conflicts with pedestrian access paths to the museum. Flood proofing indicates that it is cost effective, but further analysis is necessary to confirm this. The recommended alternative for LSC07 is flood proofing of the nature museum (contingent on further analysis of the building).

Table 13. Problem Area LSC07 Mitigation Summary

	Total # of Buildings Flooding	Average Flood Depth	Max Flood Depth	Total Flood Damage	Recommended Mitigation	Buildings Protected by Mitigation	Benefit From Mitigation	Total Mitigation Cost	Overall B:C Ratio for Mitigation
Floodway	0	-	-	-	-	-	-	-	-
Non-Floodway	1	2.5	2.5	$594,785	Flood Proofing	1	$594,785	$60,000	9.9
Totals	1	2.5	2.5	$594,785	Flood Proofing*	1	$594,785	$60,000	9.9

* flood proofing recommendation is contingent on further analysis of building

LSC08 – Charlotte-Mecklenburg Hospital/Blythe Boulevard (Figure E-6)

Problem area LSC08 includes two (2) medical office buildings that are part of the Charlotte-Mecklenburg Hospital complex, along Little Sugar Creek. Both buildings are located within the community encroachment (0.1 foot) floodway. Flooding depths in the future condition 100-yr storm range from 1.2 ft to 1.5 ft, with an average depth of 1.4 feet. Four alternatives were evaluated for LSC08 – no action, property acquisition, structure elevation, and flood proofing. B:C ratios for flood proofing the two buildings are 6.2 and 9.4. B:C ratios for the other alternatives are less than 1.0. Although it is cost effective for flood proofing both of these buildings are in the floodway and are consequently recommended for acquisition. The recommendation for LSC08 is acquisition of two buildings.

Table 14. Problem Area LSC08 Mitigation Summary

	Total # of Buildings Flooding	Average Flood Depth	Max Flood Depth	Total Flood Damage	Recommended Mitigation	Buildings Protected by Mitigation	Benefit From Mitigation	Total Mitigation Cost	Overall B:C Ratio for Mitigation
Floodway	2	1.4	1.5	$938,754	Acquisition*	2	$938,754	$12,403,903	0.1
Non-Floodway	0	-	-	-	-	-	-	-	-
Totals	2	1.4	1.5	$938,754	Acquisition	2	$938,754	$12,403,903	0.1

* both of these buildings have B:C ratios less than 1.0

LSC09 – Harding Place (Figure E-6)

Problem area LSC09 includes one (1) commercial building on Harding Place, along Little Sugar Creek. The flooding depth in the future condition 100-yr storm is 0.1 feet. This building is located within the floodplain fringe. Three alternatives were evaluated for LSC09 – no action, property acquisition, and structure elevation. Due to the low amount of damage to this building, B:C ratios for all the alternatives were 0.1 or less. The recommendation for LSC09 is “no action” for one building.

Table 15. Problem Area LSC09 Mitigation Summary									
	Total # of Buildings Flooding	Average Flood Depth	Max Flood Depth	Total Flood Damage	Recommended Mitigation	Buildings Protected by Mitigation	Benefit From Mitigation	Total Mitigation Cost	Overall B:C Ratio for Mitigation
Floodway	0	-	-	-	-	-	-	-	-
Non-Floodway	1	0.1	0.1	$4,609	No Action	0	-	-	-
Totals	1	0.1	0.1	$4,609	No Action	0	-	-	-

LSC10 – Morehead Street/Kings Drive/Harding Place (Figure E-6)

Problem area LSC10 includes three (3) commercial buildings, two (2) office buildings, one (1) restaurant, and one (1) service garage on Morehead Street, Harding Place, and Kings Drive, along Little Sugar Creek. Flooding depths in the future condition 100-yr storm range from less than 0.1 ft to 1.9 ft, with an average depth of 0.9 feet. Two buildings on Morehead Street and two building on Kings Drive are located within the community encroachment (0.1 foot) floodway. The County has recently acquired the two buildings on Morehead Street and one property along Kings Drive (Parcel ID 12521310) for future greenway/environmental restoration. The three buildings are still in operation at the time of this report, however, it is anticipated that they will be demolished for greenway/environmental restoration project at a later date.

Three alternatives were evaluated for LSC10 – no action, property acquisition, structure elevation, and flood proofing. One building on Kings Drive (Parcel ID 12521329) is recommended for acquisition (despite B:C ratios less than 1.0) since it is in the floodway. The B:C ratios for the Crown Service Station on Kings Drive for property acquisition and structure elevation were 0.7 and 1.3, respectively, indicating elevation would be a cost effective mitigation alternative. However, elevation is not recommended due to the many potential issues associated with trying to elevate a gas station. The three buildings recently acquired by the County are recommended for no action. The remaining buildings had B:C ratios less than 1.0 for all investigated alternatives. The recommendation for LSC10 is acquisition of one office building on Kings Drive and "no action" for the remaining six buildings.

Table 16. Problem Area LSC10 Mitigation Summary									
	Total # of Buildings Flooding	Average Flood Depth	Max Flood Depth	Total Flood Damage	Recommended Mitigation	Buildings Protected by Mitigation	Benefit From Mitigation	Total Mitigation Cost	Overall B:C Ratio for Mitigation
Floodway	4	0.6	1.8	$1,126,168	Acquisition*/ No Action	1	$21,998	$461,540	0.0
Non-Floodway	3	1.3	1.9	$270,067	No Action	0	-	-	-
Totals	7	0.9	1.9	$1,396,235	Acquisition/ No Action	1	$21,998	$461,540	0.0

*building has a B:C ratio less than 1.0

LSC11 –Kenilworth Avenue (Figure E-6)

Problem area LSC11 includes one (1) office/restaurant building (Midtown Sundries building) on Kenilworth Avenue, along Little Sugar Creek. The flooding depth in the future condition 100-yr storm is 4.7 ft. This building is located within the community encroachment (0.1 foot) floodway and is a repetitive loss structure. Three alternatives were evaluated for LSC11 – no action, property acquisition, and structure elevation. The B:C ratios for property acquisition and structure elevation are 7.0 and 5.5, respectively. The recommendation for LSC11 is property acquisition for one office building.

Table 17. Problem Area LSC11 Mitigation Summary									
	Total # of Buildings Flooding	Average Flood Depth	Max Flood Depth	Total Flood Damage	Recommended Mitigation	Buildings Protected by Mitigation	Benefit From Mitigation	Total Mitigation Cost	Overall B:C Ratio for Mitigation
Floodway	1	4.7	4.7	$5,734,500	Acquisition	1	$5,734,500	$816,470	7.0
Non-Floodway	0	-	-	-	-	-	-	-	-
Totals	1	4.7	4.7	$5,734,500	Acquisition	1	$5,734,500	$816,470	7.0

LSC12 –Independence Boulevard (Figure E-7)

Problem area LSC12 includes one (1) restaurant (not currently in use) on Independence Boulevard, along Little Sugar Creek. This building is not located in the community encroachment (0.1 foot) floodway. The flooding depth in the future condition 100-yr storm is 0.4 ft. Four alternatives were evaluated for LSC12 – no action, property acquisition, structure elevation, and flood proofing. B:C ratios ranged from 0.0 to 0.6 for the three mitigation alternatives. The recommendation for LSC12 is "no action."

Table 18. Problem Area LSC12 Mitigation Summary									
	Total # of Buildings Flooding	Average Flood Depth	Max Flood Depth	Total Flood Damage	Recommended Mitigation	Buildings Protected by Mitigation	Benefit From Mitigation	Total Mitigation Cost	Overall B:C Ratio for Mitigation
Floodway	0	-	-	-	-	-	-	-	-
Non-Floodway	1	0.4	0.4	$30,320	No Action	0	-	-	-
Totals	1	0.4	0.4	$30,320	No Action	0	-	-	-

LSC13 – 4th Street/Elizabeth Avenue (Figure E-7)

Problem area LSC13 includes three (3) office buildings, two (2) warehouses, and one (1) service garage on 4th Street and Elizabeth Avenue, along Little Sugar Creek. Flooding depths in the future condition 100-yr storm range from 1.3 ft to 4.3 ft, with an average depth of 2.9 ft. No buildings lie within the community encroachment (0.1 foot) floodway. Four alternatives were evaluated for LSC13 – no action, property acquisition, structure elevation, and flood proofing. Although predicted flood depths are relatively high in the FCF 100-yr event, the majority of the buildings in this problem area have B:C ratios less than 1.0 for each of the evaluated alternatives. This is primarily due to the fact that the buildings are valued relatively low and that they do not flood in the 10-year storm (which is an often indicator of whether or not flood mitigation will be cost-effective). The warehouse building on East 4th Street (Parcel ID 12510106) has a B:C ratio of 1.4 for flood proofing. The recommendation for LSC13 is flood proofing for one warehouse building and "no action" for the remaining five buildings.

Table 19. Problem Area LSC13 Mitigation Summary									
	Total # of Buildings Flooding	Average Flood Depth	Max Flood Depth	Total Flood Damage	Recommended Mitigation	Buildings Protected by Mitigation	Benefit From Mitigation	Total Mitigation Cost	Overall B:C Ratio for Mitigation
Floodway	0	-	-	-	-	-	-	-	-
Non-Floodway	6	2.9	4.3	$292,893	Flood Proofing/ No Action	1	$69,073	$60,000	1.2
Totals	6	2.9	4.3	$292,893	Flood Proofing/ No Action	1	$69,073	$60,000	1.2

LSC14 – Willis Street (Piedmont Courts) (Figure E-7)

Problem area LSC14 includes four apartment buildings on Willis Street, along Little Sugar Creek. The four apartment buildings are part of a City housing project apartment complex (Piedmont Courts) with approximately twenty buildings off of Seigle Avenue. Three of the four buildings are located within the community encroachment (0.1 foot) floodway. Flooding depths in the future condition 100-yr storm range from 1.5 ft to 4.4 ft, with an average depth of 3.3 ft. Three alternatives were evaluated for LSC14 – no action, property acquisition, and structure elevation. One building had an acquisition B:C ratio of 1.0. However, two other buildings are also recommended for acquisition since they are in the floodway. The remaining building has B:C ratios less than 1.0 for all alternatives evaluated. The recommendation for LSC14 is acquisition of three buildings, and "no action" for one building.

Table 20. Problem Area LSC14 Mitigation Summary									
	Total # of Buildings Flooding	Average Flood Depth	Max Flood Depth	Total Flood Damage	Recommended Mitigation	Buildings Protected by Mitigation	Benefit From Mitigation	Total Mitigation Cost	Overall B:C Ratio for Mitigation
Floodway	3	3.4	4.4	$377,644	Acquisition*	3	$377,644	$565,633	0.7
Non-Floodway	1	3.2	3.2	$106,183	No Action	0	-	-	-
Totals	4	3.3	4.4	$483,827	Acquisition/ No Action	3	$377,644	$565,633	0.7

*2 of 3 buildings have a B:C ratio less than 1.0

LSC15 – Eveningside Drive/Belmont Avenue (Figure E-7)

Problem area LSC15 two (2) single family homes on Eveningside Drive and one (1) commercial building on Belmont Avenue, along Little Sugar Creek. Flooding depths in the future condition 100-yr storm range from 0.3 ft to 1.8 ft, with an average depth of 1.0 feet. The two houses on Eveningside Drive are located in the community encroachment (0.1 foot) floodway. The County has recently acquired one house on Eveningside Drive (Parcel ID 08108309), therefore it is recommended for "no action". Four alternatives were evaluated for LSC15 – no action, property acquisition, structure elevation, and flood proofing. The B:C ratios for the three buildings (including the County owned building) are less than 1.0 for each of the evaluated alternatives. However, the other house on Eveningside Drive is recommended for acquisition since it is in the 0.1 floodway. The recommendation for LSC 15 is acquisition of one house and "no action" for the remaining two structures.

Table 21. Problem Area LSC15 Mitigation Summary									
	Total # of Buildings Flooding	Average Flood Depth	Max Flood Depth	Total Flood Damage	Recommended Mitigation	Buildings Protected by Mitigation	Benefit From Mitigation	Total Mitigation Cost	Overall B:C Ratio for Mitigation
Floodway	2	0.6	0.9	$13,967	Acquisition*/ No Action	1	$4,872	$23,180	0.2
Non-Floodway	1	1.8	1.8	$6,680	No Action	0	-	-	-
Totals	3	1.0	1.8	$20,647	Acquisition/ No Action	1	$4,872	$23,180	0.2

* building has a B:C ratio less than 1.0

LSC16 – 16th Street (Figure E-8)

Problem area LSC16 includes one (1) single family home on 16th Street, along Little Sugar Creek. The flooding depth in the future condition 100-yr storm is 0.4 ft. This house is located within the community encroachment (0.1 foot) floodway. Three alternatives were evaluated for LSC16 – no action, property acquisition, and structure elevation. The B:C ratios for the investigated alternatives were all less than 1.0. However, since the building is in the 0.1 floodway, the recommendation for LSC16 is acquisition of one building.

Table 22. Problem Area LSC16 Mitigation Summary									
	Total # of Buildings Flooding	Average Flood Depth	Max Flood Depth	Total Flood Damage	Recommended Mitigation	Buildings Protected by Mitigation	Benefit From Mitigation	Total Mitigation Cost	Overall B:C Ratio for Mitigation
Floodway	1	0.4	0.4	$7,245	Acquisition*	1	$7,245	$31,490	0.2
Non-Floodway	0	-	-	-	-	-	-	-	-
Totals	1	0.4	0.4	$7,245	Acquisition	1	$7,245	$31,490	0.2

* building has a B:C ratio less than 1.0

LSC17 – North Davidson Street (Figure E-8)

Problem area LSC17 includes one warehouse building on North Davidson Street that is located within the floodplain fringe of Little Sugar Creek. The flooding depth in the future condition 100-yr storm is 0.4 ft. Four alternatives were evaluated for LSC17 – no action, property acquisition, structure elevation, and flood proofing. The B:C ratios for property acquisition, structure elevation, and flood proofing are all 0.1 or less. The recommendation for LSC17 is “no action” for one warehouse building. since the B:C ratios are significantly less than 1.0.

Table 23. Problem Area LSC17 Mitigation Summary									
	Total # of Buildings Flooding	Average Flood Depth	Max Flood Depth	Total Flood Damage	Recommended Mitigation	Buildings Protected by Mitigation	Benefit From Mitigation	Total Mitigation Cost	Overall B:C Ratio for Mitigation
Floodway	0	-	-	-	-	-	-	-	-
Non-Floodway	1	0.4	0.4	$6,942	No Action	0	-	-	-
Totals	1	0.4	0.4	$6,942	No Action	0	-	-	-

LSC18 – Tryon Street/28th Street (Figure E-8)

Problem area LSC18 includes two (2) warehouse buildings and one (1) office building at the intersection of Tryon Street and 28th Street, along Little Sugar Creek. Flooding depths in the future condition 100-yr storm range from less than 0.1 ft to 7.3 ft, with an average depth of 3.0 ft. The buildings are outside of the community encroachment (0.1 foot) floodway. Six alternatives were evaluated for LSC18 – no action, property acquisition, structure elevation, flood proofing, a floodwall, and infrastructure improvements.

Of the two buildings off of 28th Street, the office building closest to the creek (Parcel ID 08302305) has a property acquisition B:C ratio of 1.9. The warehouse building on the same parcel has B:C ratios for property acquisition, structure elevation, and flood proofing of 0.2, 0.1, and 5.8, respectively. A floodwall was evaluated for the two warehouses, but was considered cost prohibitive. In addition, since the Norfolk Southern Railroad (just downstream of the flooded buildings) causes a significant increase in the future conditions 100-year WSE, infrastructure improvements consisting of jacking two additional 8-foot concrete pipes were evaluated in HEC-RAS. The additional culverts, which were estimated to cost approximately $470,000, resulted in an approximate 6-foot drop in WSE. The infrastructure improvements appear to be feasible, but were not recommended since they did not mitigate all damage, other less-complex solutions are available, and “opening” the constriction may increase flooding for downstream structures (which violates County and FEMA policy).

The warehouse on Tryon Street has very little flooding and damage, therefore “no action” is the best alternative for that building. The recommendation for LSC18 is acquisition for one office building, flood proofing for one warehouse, and “no action” for the warehouse on Tryon Street.

Table 24. Problem Area LSC18 Mitigation Summary									
	Total # of Buildings Flooding	Average Flood Depth	Max Flood Depth	Total Flood Damage	Recommended Mitigation	Buildings Protected by Mitigation	Benefit From Mitigation	Total Mitigation Cost	Overall B:C Ratio for Mitigation
Floodway	0	-	-	-	-	-	-	-	-
Non-Floodway	3	3.0	7.3	$730,998	Acquisition/ Flood Proofing/ No Action	2	$709,745	$246,170	2.6
Totals	3	3.0	7.3	$730,998	Acquisition/ Flood Proofing/ No Action	2	$709,745	$246,170	2.6

LSC19 – Cullman Avenue/36th Street/Tryon Street (Figure E-9)

Problem area LSC19 includes twenty-eight (28) warehouse buildings, three (3) office buildings, one (1) medical building, one (1) service garage, and one (1) truck terminal off of 36th Street and Tryon Street, along Little Sugar Creek and Derita Branch. Twenty-six of the twenty-eight warehouse buildings are located on Cullman Avenue and Benard Avenue, along Little Sugar Creek. Eight of the thirty-four buildings are actually located on Derita Branch, but incur flooding from backwater of Little Sugar Creek. Sixteen buildings are within the community encroachment (0.1 foot) floodway. The County has recently acquired two buildings (3154 and 3201 Cullman Avenue), which are repetitive loss structures, for flood mitigation.

Flooding depths in the future condition 100-yr storm range from 0.7 ft to 8.1 ft, with an average depth of 5.0 ft. Five alternatives were evaluated for LSC19 – no action, property acquisition, structure elevation, flood proofing, and a floodwall. A floodwall was considered to protect seven buildings on Derita Branch off Tryon Road. Due to site constraints such as crossing Tryon Road, the floodwall was considered infeasible. Seventeen structures (including the two purchased by the County) had property acquisition B:C ratios ranging from 1.1 to 8.6. Three buildings with acquisition B:C ratios less than 1.0 are also recommended for acquisition, since they are in the floodway. The building on the corner of 36th Street and Cullman Avenue (Parcel ID 08303104) had a cost-effective B:C ratio for flood proofing. The remaining buildings had B:C ratios less than 1.0 for all investigated alternatives. The recommendation for LSC19 is property acquisition for eighteen warehouse buildings, flood proofing for one warehouse building, and "no action" for the remaining fifteen buildings.

Table 25. Problem Area LSC19 Mitigation Summary

	Total # of Buildings Flooding	Average Flood Depth	Max Flood Depth	Total Flood Damage	Recommended Mitigation	Buildings Protected by Mitigation	Benefit From Mitigation	Total Mitigation Cost	Overall B:C Ratio for Mitigation
Floodway	16	6.4	8.1	$6,110,681	Acquisition*/ No Action	15	$5,640,765	$2,195,030	2.6
Non-Floodway	18	3.7	7.1	$2,172,375	Acquisition/ Flood Proofing/ No Action	4	$870,096	$524,443	1.7
Totals	34	5.0	8.1	$8,283,056	Acquisition/ Flood Proofing/ No Action	19	$6,510,860	$2,719,473	2.4

* 3 of 16 buildings have a B:C ratio less than 1.0

LSC20 – Raleigh Street/Sugar Creek Road (Figure E-9)

Problem area LSC20 includes two warehouse buildings on Raleigh Street and Sugar Creek Road, along Little Sugar Creek. Flooding depths in the future condition 100-yr storm range from 1.8 ft to 1.9 ft, with an average depth of 1.8 ft. The building on Sugar Creek Road is located with the community encroachment (0.1 foot) floodway. Four alternatives were evaluated for LSC20 – no action, property acquisition, structure elevation, and flood proofing. The building on Sugar Creek Road (Parcel ID 09108106) had an acquisition B:C ratio of 1.2, whereas, the other building had a cost-effective value (i.e. 4.9) for flood proofing. The recommendation for LSC20 is acquisition of one warehouse building and flood proofing for other building.

Table 26. Problem Area LSC20 Mitigation Summary									
	Total # of Buildings Flooding	**Average Flood Depth**	**Max Flood Depth**	**Total Flood Damage**	**Recommended Mitigation**	**Buildings Protected by Mitigation**	**Benefit From Mitigation**	**Total Mitigation Cost**	**Overall B:C Ratio for Mitigation**
Floodway	1	1.9	1.9	$1,916,786	Acquisition	1	$1,916,786	$1,568,527	1.2
Non-Floodway	1	1.8	1.8	$293,252	Flood Proofing	1	$293,252	$60,000	4.9
Totals	2	1..8	1.9	$2,210,038	Acquisition/ Flood Proofing	2	$2,210,038	$1,628,527	1.4

LHC1 – Wedgewood Drive/Mockingbird Lane (Figure E-4)

Problem area LHC1 includes eleven residential houses near Wedgewood Drive and Mockingbird Lane, along Little Hope Creek. Flooding depths in the future condition 100-yr storm range from 0.1 ft to 1.1 ft, with an average depth of 0.4 ft. All but one house (1216 Terrence Place) are within the community encroachment (0.1 foot) floodway. Three alternatives were evaluated for LHC1 – no action, property acquisition, and structure elevation. B:C ratios for the eleven houses were all less than 1.0, ranging from 0.1 to 0.9. However, acquisition is recommended for the houses that are in the floodway. Similar to what the County has done for other buyout project areas (e.g. Whitehurst, Westfield, etc.) the vacant land resulting from acquisition and the previous buyout project could be used for streamside water quality enhancements, such as pocket wetlands, vegetative buffers, and/or storm water best management practices (BMPs). The recommendation for LHC1 is acquisition of ten houses, "no action" for one house, and further investigation of water quality enhancements.

Table 27. Problem Area LHC1 Mitigation Summary									
	Total # of Buildings Flooding	**Average Flood Depth**	**Max Flood Depth**	**Total Flood Damage**	**Recommended Mitigation**	**Buildings Protected by Mitigation**	**Benefit From Mitigation**	**Total Mitigation Cost**	**Overall B:C Ratio for Mitigation**
Floodway	10	0.5	1.1	$115,071	Acquisition*/Water Quality Enhancements	10	$115,071	$1,122,916	0.1
Non-Floodway	1	0.2	0.2	$8,170	No Action	0	-	-	-
Totals	11	0.4	1.1	$123,241	Acquisition/ Water Quality Enhancements/No Action	10	$115,071	$1,122,916	0.1

*all buildings have a B:C ratio less than 1.0

LHC2 – Wedgewood Drive/Mockingbird Lane (Figure E-4)

Problem area LHC2 includes one residential house on Wentworth Place, along Little Hope Creek which occupies the community encroachment (0.1 foot) floodway. The flooding depth in the future condition 100-yr storm is 0.8 ft. This house was been recently purchased by MCSWS for flood hazard mitigation purposes. Therefore, the recommendation for LHC2 is "no action" for one house.

Table 28. Problem Area LHC2 Mitigation Summary									
	Total # of Buildings Flooding	Average Flood Depth	Max Flood Depth	Total Flood Damage	Recommended Mitigation	Buildings Protected by Mitigation	Benefit From Mitigation	Total Mitigation Cost	Overall B:C Ratio for Mitigation
Floodway	1	0.8	0.8	$23,033	No Action	0	-	-	-
Non-Floodway	0	-	-	-	-	-	-	-	-
Totals	1	0.8	0.8	$23,033	No Action	0	-	-	-

LHC3 – Drexel Place (Figure E-4)

Problem area LHC3 includes two residential houses on Drexel Place, within the floodplain fringe area of Little Hope Creek. Flooding depths in the future condition 100-yr storm range from 1.1 ft to 1.3 ft, with an average depth of 1.2 ft. Three alternatives were evaluated for LHC3 – no action, property acquisition, and structure elevation. B:C ratios for the house range from 0.2 to 0.5. The recommendation for LHC3 is "no action" for two houses.

Table 29. Problem Area LHC3 Mitigation Summary									
	Total # of Buildings Flooding	Average Flood Depth	Max Flood Depth	Total Flood Damage	Recommended Mitigation	Buildings Protected by Mitigation	Benefit From Mitigation	Total Mitigation Cost	Overall B:C Ratio for Mitigation
Floodway	0	-	-	-	-	-	-	-	-
Non-Floodway	2	1.2	1.3	$46,757	No Action	0	-	-	-
Totals	2	1.2	1.3	$46,757	No Action	0	-	-	-

DRY1 – Drexel Place (Figure E-5)

Problem area DRY1 includes one residential house on Cumberland Avenue, along Dairy Branch which is within the community encroachment (0.1 foot) floodway. The flooding depth in the future condition 100-yr storm is 0.7 ft.. Three alternatives were evaluated for LHC3 – no action, property acquisition, and structure elevation. B:C ratios for the house are 0.5 and 2.0 for property acquisition and structure elevation, respectively. The house is recommended for acquisition since it is in the floodway. The recommendation for LHC3 is acquisition of one house.

Table 30. Problem Area DRY1 Mitigation Summary

	Total # of Buildings Flooding	Average Flood Depth	Max Flood Depth	Total Flood Damage	Recommended Mitigation	Buildings Protected by Mitigation	Benefit From Mitigation	Total Mitigation Cost	Overall B:C Ratio for Mitigation
Floodway	1	0.7	0.7	$92,424	Acquisition*	1	$92,424	$178,184	0.5
Non-Floodway	0	-	-	-	-	-	-	-	-
Totals	1	0.7	0.7	$92,424	Acquisition	1	$92,424	$178,184	0.5

*building has a B:C ratio less than 1.0

CONCLUSIONS AND RECOMMENDATIONS

The Upper Little Sugar Creek Watershed encompasses a 19.2 square mile urban area in the south-central portion of the Mecklenburg County, North Carolina. The Watershed contains five County-regulated streams with FCFs that were included in this study - Upper Little Sugar Creek, Dairy Branch, Little Hope Creek, Little Hope Creek Tributary #1, and Derita Branch.

Flood Hazard Mitigation

There are 531 structures within the FCF boundaries in the Upper Little Sugar Creek Watershed. Comparison of flood information with building elevation certificates revealed that 168 of the 531 structures have their lowest finished floor below the predicted water surface elevation (WSE) of the FCF, and thus are considered “flooding” structures. Flood damages for these 168 buildings were estimated using the FEMA Full Riverine Benefit:Cost model (FEMA BC) totaled to over $28.5 million (2003 dollars). Figure E-1 shows an overall map of the Upper Little Sugar Creek Watershed and displays locations of problem areas identified in this study.

Several alternatives were developed to mitigate flood damages and enhance environmental quality for problem areas identified along the study streams. A benefit:cost (BC) economic analysis was performed to evaluate cost-effectiveness of the alternatives at each problem area. The alternatives were then compared for their economic, technical, and social feasibility, from which a recommended mitigation strategy was developed for each problem area. If no improvement alternatives were identified as being cost effective or technically feasible, no action was recommended (i.e. leave building as-is).

The alternative evaluation indicated that it is cost-effective (or otherwise pertinent) to provide flood protection for 109 of the 168 flooding buildings. The estimated benefits (i.e. damages reduced) and improvement costs are approximately $23.1 million and $35.2 million respectively. It is important to note that the reason why the improvement costs exceed the estimated benefits (i.e overall B:C ratio less than 1.0) is that per direction of Mecklenburg County Storm Water Services (MCSWS), all structures in the community encroachment (0.1 foot) floodway were recommended for acquisition – regardless of their B:C ratio. Public safety (the floodway is considered an especially hazardous area due to high velocities and potential debris hazards) and the fact that local floodplain regulations greatly restrict potential construction/re-construction in the floodway, were the primary considerations for the decision to recommend acquisition for all structures in the community encroachment floodway.

In the Upper Little Sugar Creek Watershed, there were a total of 101 buildings recommended for acquisition. The analysis conducted in this study estimated that 74 (73%) of these buildings are not cost-effective for acquisition. For the 35 buildings that were identified as being cost-effective for flood mitigation (=109 – 74), the estimated benefits and costs were $17.9 million and $6.9 million, yielding a B:C ratio of 2.7. Figures E-2 through E-11 show the recommended mitigation improvements within the Upper Little Sugar Creek Watershed.

Environmental Characterization

The Upper Little Sugar Creek Watershed is located in an established, highly urbanized area within the City of Charlotte. Land use is predominately residential (75+/- %), but also includes limited commercial, industrial, vacant, and other uses. The streams in the Watershed have been modified (e.g. straightened, widened, armored, etc.) to accommodate urbanization, and thus do not exhibit natural, healthy stream characteristics. Reference to local water/biological monitoring data indicates overall “good” conditions, however, benthic sample readings were classified as “poor” at several sites.

There are currently a number of planning/design environmental restoration related projects (discussed in Sections 1.2 and 3.5.2) that are existing or planned within in the Upper Little Sugar Creek Watershed. The majority of these projects are in or adjacent to the study streams discussed in this report, and were incorporated into the proposed flood hazard mitigation recommendations. In addition, investigation of the GIS tax parcel database reveals that the County owns significant portions of vacant land adjacent to the study streams within the Upper Little Sugar Creek Watershed. This land will likely be used for proposed greenways along the Creek, which in turn will likely incorporate water quality and/or environmental restoration features.

The majority of environmental analysis included in this PER are broad in nature, however, an additional location was identified for potential environmental restoration within the Watershed (Figure E-1). However, it is recommended that more detailed analysis be conducted at a smaller scale level to investigate other environmental restoration opportunities.

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APPENDIX A

UPPER LITTLE SUGAR CREEK WATERSHED FEMA BC IMPORT SPREADSHEET
UPDATED 11/22/03

UNQBLD_ID	STRM_NAME	STRM_STA	BANK	PID	SITUS1	SITUS2	OWNER_NAME	CNTVAL_PCT	BLDG_USE	STYLE_TYPE	BLDG_TYPE	FFE_88	YEAR_BUILT	HIST_FLAG	HEATD_AREA	BLDG_VAL	ESCRIP	Q010yr	Q050yr	Q100yr	Q500yr	WSE010yr	WSE050yr	WSE100yr	WSE500yr	PLCMNTCS	TREVNCS	MANUAL	IFLDWAY	IFLDWAYC	COMMNTS
157	Little Sugar Creek	95106.446	L	09108106	200 E SUGAR CREEK ROAD	CHARLOTTE, NC	TROMONT PRESTRESS COMPA	1	AREHOUS	tory, w/o Basen	2	695.76	1954	N	82538	$950,838		1440	2074	2242	2648	696.6	697.3	697.6	699.4	$0	$18,800	Y	Y	Y	
165	Little Sugar Creek	94471.916	L	09108105	3823 RALEIGH STREET	CHARLOTTE, NC	CONCRETE SUPPLY CO	1	AREHOUS	tory, w/o Basen	1	694.49	1940	N	6050	$725,630		1440	2074	2242	2648	693.5	695.3	696.3	699.0	$0	$18,800	N	N	N	
168	Little Sugar Creek	90741.117	R	08502210	144 ATANDO AV	CHARLOTTE, NC	HATCHER TRUCKING CO INC	1	CK TERMI	1.0 STORY	1	688.86	1952	N	8940	$58,750	k wareho	1692	2108	2238	2911	687.7	690.4	692.6	698.3	$0	$10,000	N	N	N	
184	Little Sugar Creek	90521.624	R	08502302	118 ATANDO AV	CHARLOTTE, NC	ZARRABZADEH HOSSEIN	0.75	ICAL BUIL	1.0 STORY	1	691.26	1958	N	1800	$63,910	ck, vide	1692	2108	2238	2911	687.7	690.4	692.6	698.3	$0	$10,000	N	N	N	
192	Little Sugar Creek	90443.777	R	08502102	3027 N TRYON ST	CHARLOTTE, NC	McLOED , T BRAGG	0.75	OFFICE	tory, w/o Basen	2	690.46	1950	N	467	$12,333		1979	2681	3077	4223	687.7	690.4	692.6	698.2	$0	$37,500	Y	N	N	
197	Little Sugar Creek	90708.834	R	08502303	3101N TRYON ST	CHARLOTTE, NC	AROLINA NATIONAL INVESTMEI	0.75	OFFICE	1.0 STORY	1	689.06	1948	N	1740	$43,890	k w/blacl	1692	2108	2238	2911	687.7	690.4	692.6	698.3	$0	$37,500	N	N	N	
201	Little Sugar Creek	90296.617	R	08502101	3027N TRYON ST	CHARLOTTE, NC	MCLEOD T BRAGG	0.75	VICE GAR	2.0 STORIES	2	691.86	1954	N	17770	$272,590	w/yellow	1692	2108	2238	2911	687.6	690.4	692.6	698.2	$0	$10,000	N	N	N	
214	Little Sugar Creek	90411.545	R	08502102	3027 N TRYON ST	CHARLOTTE, NC	McLOED , T BRAGG	0.75	OFFICE	tory, w/o Basen	2	689.86	1950	N	467	$12,333		1979	2681	3077	4223	687.7	690.4	692.6	698.2	$0	$37,500	Y	N	N	
225	Little Sugar Creek	90486.185	R	08303141	000 NORTH TRYON STREE	CHARLOTTE, NC	COTHRAN BOBBY HARRISON	1	AREHOUS	tory, w/o Basen	1	690.76	1939	N	788	$7,171		1979	2681	3077	4223	687.7	690.4	692.6	698.2	$0	$18,800	Y	N	N	
236	Little Sugar Creek	90403.072	R	08303141	000 NORTH TRYON STREE	CHARLOTTE, NC	COTHRAN BOBBY HARRISON	1	AREHOUS	tory, w/o Basen	1	685.46	1939	N	788	$7,171		1979	2681	3077	4223	687.7	690.4	692.6	698.2	$0	$18,800	Y	N	N	
243	Little Sugar Creek	91234.834	R	08303138	200E 36TH ST	CHARLOTTE, NC	CAROLINA FOODS INC	1	AREHOUS	1.0 STORY	1	689.66	1965	N	13092	$118,030	k wareho	1692	2108	2238	2911	687.7	690.4	692.6	698.3	$0	$18,800	N	N	Y	
249	Little Sugar Creek	90976.85	R	08303137	3224 BENARD AV	CHARLOTTE, NC	CAROLINA FOODS INC	1	AREHOUS	1.0 STORY	1	686.56	1968	N	18000	$193,690	office bu	1692	2108	2238	2911	687.7	690.4	692.6	698.3	$0	$18,800	N	Y	Y	
251	Little Sugar Creek	90818.739	R	08303136	3212 BENARD AV	CHARLOTTE, NC	CAROLINA FOODS INC	1	AREHOUS	1.0 STORY	1	686.16	1972	N	12000	$182,390	house,	1692	2108	2238	2911	687.7	690.4	692.6	698.3	$0	$18,800	N	Y	Y	
256	Little Sugar Creek	91247.725	L	08303127	240E 36TH ST	CHARLOTTE, NC	CAROLINA FOODS INC	1	AREHOUS	1.0 STORY	1	688.16	1951	N	13868	$128,280	ck tiresh	1692	2108	2238	2911	687.7	690.4	692.6	698.3	$0	$18,800	N	Y	Y	
257	Little Sugar Creek	91489.465	L	09111229	315 EAST 36TH ST	CHARLOTTE, NC	RRIN BROTHERS COAL & ICE	1	AREHOUS	tory, w/o Basen	1	690.36	1989	N	3321	$65,324		1692	2108	2238	2911	688.0	690.3	692.6	698.3	$0	$18,800	Y	N	Y	
265	Little Sugar Creek	91094.76	L	08303126	3215 CULLMAN AV	CHARLOTTE, NC	CAROLINA FOODS INC	1	AREHOUS	1.0 STORY	1	685.76	1961	N	4500	$66,190	-story br	1692	2108	2238	2911	687.7	690.4	692.6	698.3	$0	$18,800	N	Y	Y	
267	Little Sugar Creek	91040.301	L	08303125	3211 CULLMAN AV	CHARLOTTE, NC	WEBB G HOWARD	1	AREHOUS	1.0 STORY	1	685.26	1957	N	3150	$57,420	w/white	1692	2108	2238	2911	687.7	690.4	692.6	698.3	$0	$18,800	N	Y	Y	
270	Little Sugar Creek	90985.715	L	08303124	3209 CULLMAN AV	CHARLOTTE, NC	SEVENSON PROPERTIES LLC	1	AREHOUS	1.0 STORY	1	685.16	1957	N	3135	$36,030	portable	1692	2108	2238	2911	687.7	690.4	692.6	698.3	$0	$18,800	N	Y	Y	
273	Little Sugar Creek	90900.493	L	08303123	3201 CULLMAN AV	CHARLOTTE, NC	YOUNG DONALD NELSON	1	AREHOUS	1.0 STORY	1	685.26	1958	N	6000	$76,610	Red brick	1692	2108	2238	2911	687.7	690.4	692.6	698.3	$0	$18,800	N	Y	Y	
276	Little Sugar Creek	90796.111	L	08303122	3157 CULLMAN AV	CHARLOTTE, NC	CHURCH OF PENTECOST INC	1	AREHOUS	1.0 STORY	1	685.36	1957	N	6000	$69,960	Red brick	1692	2108	2238	2911	687.7	690.4	692.6	698.3	$0	$18,800	N	Y	Y	
279	Little Sugar Creek	90673.893	L	08303121	3147 CULLMAN AV	CHARLOTTE, NC	URLEE EVERETTE B FAMILY L	1	AREHOUS	1.0 STORY	1	684.86	1958	N	6978	$81,550	, Caroli	1692	2108	2238	2911	687.7	690.4	692.6	698.3	$0	$18,800	N	Y	Y	
285	Little Sugar Creek	91285.913	L	08303104	300E 36TH ST	CHARLOTTE, NC	RRISH & LEONARD TIRE CO I	1	AREHOUS	1.0 STORY	1	691.06	1953	N	30940	$349,530	ry brick	1692	2108	2238	2911	687.7	690.4	692.6	698.3	$0	$18,800	N	N	N	
287	Little Sugar Creek	90605.765	L	08303120	3143 CULLMAN AV	CHARLOTTE, NC	URLEE EVERETTE B FAMILY L	1	AREHOUS	1.0 STORY	1	684.66	1957	N	4000	$51,170	rick ware	1692	2108	2238	2911	687.7	690.4	692.6	698.3	$0	$18,800	N	Y	Y	
289	Little Sugar Creek	90543.76	L	08303119	3139 CULLMAN AV	CHARLOTTE, NC	URLEE EVERETTE B FAMILY L	1	AREHOUS	1.0 STORY	1	684.46	1957	N	4000	$48,230	rick ware	1692	2108	2238	2911	687.7	690.4	692.6	698.3	$0	$18,800	N	Y	Y	
291	Little Sugar Creek	90454.442	L	08303118	3123 CULLMAN AV	CHARLOTTE, NC	MORGAN BARBARA S	1	AREHOUS	1.0 STORY	1	685.56	1957	N	7000	$79,630	, 6 front	1692	2108	2238	2911	687.7	690.4	692.6	698.3	$0	$18,800	N	Y	Y	
295	Little Sugar Creek	90386.703	L	08303117	3115 CULLMAN AV	CHARLOTTE, NC	WILLIAMS L SCOTT	1	AREHOUS	1.0 STORY	1	685.66	1961	N	4450	$93,580	rick, whit	1692	2108	2238	2911	687.7	690.4	692.6	698.2	$0	$18,800	N	Y	Y	
298	Little Sugar Creek	91118.873	L	08303105	3214 CULLMAN AV	CHARLOTTE, NC	CAROLINA FOODS INC	1	AREHOUS	1.0 STORY	1	688.56	1964	N	10000	$108,320	y, brick	1692	2108	2238	2911	687.7	690.4	692.6	698.3	$0	$18,800	N	N	N	
300	Little Sugar Creek	90294.375	L	08303116	3103 CULLMAN AV	CHARLOTTE, NC	ASA PROPERTIES LLC	1	AREHOUS	1.0 STORY	1	685.96	1961	N	9000	$117,890	brick, wh	1692	2108	2238	2911	687.6	690.4	692.6	698.2	$0	$18,800	N	Y	Y	
301	Little Sugar Creek	90967.428	L	08303107	3200 CULLMAN AV	CHARLOTTE, NC	INX INTERNATIONAL INK	1	AREHOUS	1.0 STORY	1	687.56	1960	N	10000	$157,340	an brick	1692	2108	2238	2911	687.7	690.4	692.6	698.3	$0	$18,800	N	N	N	
311	Little Sugar Creek	90810.013	L	08303108	3162 CULLMAN AV	CHARLOTTE, NC	WATSON DAVID W JR	1	AREHOUS	1.0 STORY	1	686.46	1960	N	10000	$142,680	k w/gree	1692	2108	2238	2911	687.7	690.4	692.6	698.3	$0	$18,800	N	N	N	
315	Little Sugar Creek	90689.246	L	08303109	3154 CULLMAN AV	CHARLOTTE, NC	IN OPERATED AMUSEMENTS	1	AREHOUS	1.0 STORY	1	687.06	1960	N	10000	$136,260	w/white	1692	2108	2238	2911	687.7	690.4	692.6	698.3	$0	$18,800	N	N	N	
320	Little Sugar Creek	90573.153	L	08303110	3144 CULLMAN AV	CHARLOTTE, NC	SHAW PROPERTIES	1	AREHOUS	1.0 STORY	1	687.06	1960	N	10000	$121,120	k w/blue	1692	2108	2238	2911	687.7	690.4	692.6	698.3	$0	$18,800	N	N	N	
323	Little Sugar Creek	90471.637	L	08303111	3124 CULLMAN AV	CHARLOTTE, NC	DETREX CORPORATION	1	AREHOUS	1.0 STORY	1	687.46	1962	N	10000	$141,020	ck w/bla	1692	2108	2238	2911	687.7	690.4	692.6	698.3	$0	$18,800	N	N	N	
327	Little Sugar Creek	90365.215	L	08303112	3114 CULLMAN AV	CHARLOTTE, NC	DETREX CORP	1	AREHOUS	1.0 STORY	1	687.76	1964	N	10880	$217,070	k w/blac	1692	2108	2238	2911	687.6	690.4	692.6	698.2	$0	$18,800	N	N	N	
333	Little Sugar Creek	90278.845	L	08303113	3110 CULLMAN AV	CHARLOTTE, NC	SPECKMAN PATRICK	1	AREHOUS	1.0 STORY	1	689.56	1963	N	10080	$118,960	rehouse	1692	2108	2238	2911	687.6	690.4	692.6	698.2	$0	$18,800	N	N	N	
337	Little Sugar Creek	90245.756	L	08303114	3100 CULLMAN AV	CHARLOTTE, NC	CAROLINA FOODS INC	1	AREHOUS	1.0 STORY	1	689.66	1962	N	15529	$130,720	rick, blu	1692	2108	2238	2911	687.6	690.4	692.6	698.2	$0	$18,800	N	N	N	
377	Little Sugar Creek	88542.316	R	08302304	2504N TRYON ST	CHARLOTTE, NC	HOEY WILLIAM O	1	AREHOUS	1.0 STORY	4	690.26	1954	N	4199	$113,110	Hannas	1979	2681	3077	4223	684.1	688.0	690.3	697.5	$0	$18,800	N	N	N	
381	Little Sugar Creek	88486.933	R	08302305	201 EAST 28TH ST	CHARLOTTE, NC	WEYERHAEUSER CO	1	AREHOUS	tory, w/o Basen	2	688.76	1963	N	57008	$1,123,058		1979	2681	3077	4223	684.1	688.0	690.3	697.5	$0	$18,800	Y	N	N	
393	Little Sugar Creek	88358.474	R	08302305	201 EAST 28TH ST	CHARLOTTE, NC	WEYERHAEUSER CO	0.75	OFFICE	tory, w/o Basen	1	682.96	1985	N	8200	$161,540		1979	2681	3077	4223	684.1	688.0	690.3	697.5	$0	$37,500	Y	N	N	
556	Little Sugar Creek	84368.63	R	08304507	1901 NORTH DAVIDSON ST	CHARLOTTE, NC	DIAMOND HARVEY J	1	AREHOUS	tory, w/o Basen	1	670.95	1959	N	10000	$190,400		2056	2945	3100	3839	668.8	671.0	671.3	672.3	$0	$18,800	Y	N	N	
678	Little Sugar Creek	81887.536	R	08109212	614E 16TH ST	CHARLOTTE, NC	WITNESS FOR JESUS CHURCH	0.25	AMILY RES	1.0 STORY	1	661.85	1929	N	860	$26,410	ling chur	2056	2945	3100	3839	661.1	662.1	662.3	663.4	$5,250	$0	N	N	Y	
797	Little Sugar Creek	80355.038	R	08109406	709 BELMONT AV	CHARLOTTE, NC	SSIONARY MINISTER APOSTO	0.75	OMMERCI	1.0 STORY	1	658.15	1945	N	928	$13,360	church,	2056	2945	3100	3839	655.2	659.2	659.9	661.3	$0	$10,000	N	N	N	
865	Little Sugar Creek	79836.148	R	08108303	1009 EVENINGSIDE DR	CHARLOTTE, NC	STIKELEATHER GARY L	0.25	AMILY RES	1.0 STORY	1	658.65	1930	N	820	$18,220	ling w/br	2056	2945	3100	3839	654.7	658.2	658.9	660.7	$5,250	$0	N	Y	Y	
868	Little Sugar Creek	79790.244	R	08108309	1005 EVENINGSIDE DR	CHARLOTTE, NC	CORNELISON E FRANK	0.25	AMILY RES	1.0 STORY	4	657.95	1930	N	936	$30,840	rticle bo	2056	2945	3100	3839	654.6	658.2	658.9	660.7	$5,250	$0	N	Y	Y	
885	Little Sugar Creek	78878.915	L	08108610	900 EAST WILLIS STREET	CHARLOTTE, NC	CITY OF CHARLOTTE	0.25	PARTMEN	tory, w/o Basen	2	656.65	1940	N	7280	$173,046		3009	4688	5264	6661	653.4	657.3	658.1	659.9	$12,000	$0	Y	Y	Y	
887	Little Sugar Creek	78598.083	L	08108610	910 EAST WILLIS STREET	CHARLOTTE, NC	CITY OF CHARLOTTE	0.25	PARTMEN	tory, w/o Basen	2	653.75	1940	N	7280	$173,046		3009	4688	5264	6661	653.0	657.2	658.0	659.8	$12,000	$0	Y	Y	Y	
889	Little Sugar Creek	78412.638	L	08108610	914 EAST WILLIS STREET	CHARLOTTE, NC	CITY OF CHARLOTTE	0.25	PARTMEN	tory, w/o Basen	2	653.55	1940	N	4992	$118,660		3009	4688	5264	6661	652.8	657.1	658.0	659.8	$12,000	$0	Y	Y	Y	
891	Little Sugar Creek	78341.865	L	08108610	926 EAST WILLIS STREET	CHARLOTTE, NC	CITY OF CHARLOTTE	0.25	PARTMEN	tory, w/o Basen	2	654.75	1940	N	7280	$173,046		3009	4688	5264	6661	652.7	657.1	658.0	659.8	$12,000	$0	Y	N	N	
1019	Little Sugar Creek	74863.146	L	12510110	1140 ELIZABETH AV	CHARLOTTE, NC	ENTRAL PEIDMONT COMMUNIT	0.75	OFFICE	1.0 STORY	1	646.25	1950	N	6818	$190,480	Red brick	3478	5383	6063	7705	641.3	646.3	647.5	649.2	$0	$37,500	N	N	N	
1034	Little Sugar Creek	74515.638	L	12509502	1125E 4TH ST	CHARLOTTE, NC	MECKLENBURG COUNTY	0.75	VICE GAR	1.0 STORY	1	643.05	1950	N	4400	$34,190	ront, bric	3478	5383	6063	7705	641.1	646.2	647.4	649.1	$0	$10,000	N	N	N	
1036	Little Sugar Creek	74536.994	L	12509503	1131E 4TH ST	CHARLOTTE, NC	DODO INC	0.75	OFFICE	1.0 STORY	1	644.25	1950	N	7550	$211,270	grey bric	3478	5383	6063	7705	641.1	646.2	647.4	649.1	$0	$37,500	N	N	N	
1042	Little Sugar Creek	74639.304	L	12510106	106 SOUTH KINGS DRIVE	CHARLOTTE, NC	CPCC	0.75	OFFICE	tory, w/o Basen	2	644.05	1950	N	1760	$54,666		3478	5383	6063	7705	641.2	646.3	647.5	649.2	$0	$37,500	N	N	N	
1045	Little Sugar Creek	74666.065	L	12510106	1305 EAST 4TH ST	CHARLOTTE, NC	CPCC	1	AREHOUS	tory, w/o Basen	1	645.35	1955	N	1350	$41,918		3478	5383	6063	7705	641.3	646.3	647.5	649.2	$0	$18,800	N	N	N	
1061	Little Sugar Creek	74615.156	L	12510106	EAST 4TH ST	CHARLOTTE, NC	CPCC	1	AREHOUS	tory, w/o Basen	1	644.65	1954	N	5100	$158,406		3478	5383	6063	7705	641.2	646.3	647.5	649.2	$0	$18,800	Y	N	N	
1114	Little Sugar Creek	73048.308	L	12509305	440S INDEPENDENCE BV	CHARLOTTE, NC	HOME DEPOT U S A INC	0.75	STAURAN	1.0 STORY	1	640.8	1979	N	5514	$296,390	Byron Ha	3478	5383	6063	7705	638.5	640.6	641.2	642.1	$0	$10,000	N	N	N	
1194	Little Sugar Creek	71883.092	R	12520147	618 KENLIWORTH AVE	CHARLOTTE, NC	UNITY RESEARCH & DEVELOP	0.75	OFFICE	tory, w/o Basen	1	634.75	1963	N	20644	$754,538		4524	6495	7023	8885	636.8	639.1	639.5	640.6	$0	$37,500	Y	Y	Y	
1305	Little Sugar Creek	70992.19	L	12521428	701S KINGS DR	CHARLOTTE, NC	HARRIS CAROLYN A	0.75	STAURAN	1.0 STORY	1	634.65	1956	N	2280	$56,260	red awn	4524	6495	7023	8885	634.6	636.1	636.3	637.0	$0	$10,000	N	N	N	
1379	Little Sugar Creek	70509.342	L	12521329	812S KINGS DR	CHARLOTTE, NC	PENNZOIL PRODUCTS CO	0.75	VICE GAR	1.0 STORY	1	634.75	1981	N	3060	$122,000	ube, whit	4524	6495	7023	8885	633.8	634.9	635.1	635.8	$0	$10,000	N	N	Y	
1387	Little Sugar Creek	70388.898	R	12521110	1400 HARDING PL	CHARLOTTE, NC	HARDING PLACE LLC	0.75	OFFICE	2.0 STORIES	2	634.7	1969	N	6930	$265,120	brick off	4524	6495	7023	8885	633.8	634.9	635.1	635.8	$0	$37,500	N	N	N	
1398	Little Sugar Creek	70252.76	L	12521310	920S KINGS DR	CHARLOTTE, NC	HOME REALTY & MANAGEMENT	0.75	OFFICE	1.0 STORY	1	633.25	1958	N	11901	$303,080	brick &	4524	6495	7023	8885	633.7	634.8	635.1	635.8	$0	$37,500	N	Y	Y	
1413	Little Sugar Creek	70005.725	R	12521307	1401 EAST MOREHEAD ST	CHARLOTTE, NC	UNITY RESEARCH & DEVELOP	0.75	OMMERCI	tory, w/o Basen	1	634.95	1986	N	5518	$215,919		4524	6495	7023	8885	633.7	634.8	635.0	635.7	$0	$10,000	Y	N	Y	
1425	Little Sugar Creek	70039.318	L	12524372	923 SOUTH KINGS DR	CHARLOTTE, NC	CROWN CENTRAL FINANCE	0.75	OMMERCI	tory, w/o Basen	1	633.1	1969	N	2668	$28,041		4524	6495	7023	8885	633.7	634.8	635.0	635.7	$0	$10,000	Y	N	N	
1426	Little Sugar Creek	69937.788	L	12521307	1437 EAST MOREHEAD ST	CHARLOTTE, NC	TAFT THOMAS F SR	0.75	OMMERCI	tory, w/o Basen	2	634.95	1986	N	19786	$774,424		4524	6495	7023	8885	633.6	634.7	635.0	635.7	$0	$10,000	Y	Y	Y	
1431	Little Sugar Creek	69702.087	R	15301112	1515 HARDING PL	CHARLOTTE, NC	ERCY EQUIPMENT CORPORATI	0.75	OMMERCI	1.0 STORY	1	633.15	1931	N	2520	$36,520	e ends,	4524	6495	7023	8885	630.9	632.8	633.2	634.6	$0	$10,000	N	N	N	
1628	Little Sugar Creek	67770.729	R	15302327	1200 BLYTHE BVLD	CHARLOTTE, NC	RLOTTE MECKLENBURG HOSP	0.75	HOSPITAL	tory, w/o Basem	1	628.24	1959	N	42250	$2,027,578		4524	6495	7023	8885	626.6	629.3	629.7	631.2	$0	$10,000	Y	N	Y	
1640	Little Sugar Creek	67505.379	R	15302327	1300 BLYTHE BVLD	CHARLOTTE, NC	RLOTTE MECKLENBURG HOSP	0.75	STITUTION	tory, w/o Basem	2	628.14	1988	N	33914	$1,627,533		4524	6495	7023	8885	626.2	629.0	629.4	630.7	$0	$10,000	Y	Y	Y	
1685	Dairy Branch	930.833	L	15103354	2318 CUMBERLAND AV	CHARLOTTE, NC	SCHWIEMAN DAVID R	0.25	AMILY RES	1.0 STORY	1	626.94	1953	N	1318	$94,230	/black s	1476	1902	2099	3015	627.0	627.5	627.6	628.2	$5,250	$0	N	Y	Y	
1723	Little Sugar Creek	63118.768	L	15104101	1658 STERLING ROAD	CHARLOTTE, NC	MECKLENBURG COUNTY	0.75	OFFICE	1.0 STORY	4	616.34	1964	N	2860	$1,759,117		5280	6759	7609	9760	616.2	617.9	618.8	620.4	$0	$37,500	Y	N	N	
1786	Little Sugar Creek	61920.613	R	15111312	1629 GENEVA CT	CHARLOTTE, NC	REIMANIS DZIDRA	0.25	AMILY RES	1.0 STORY	1	614.24	1953	N	1615	$104,980	w/black	5280	6759	7609	9760	613.5	614.9	615.4	616.8	$5,250	$0	N	Y	Y	
1788	Little Sugar Creek	61930.799	R	15111313	1635 GENEVA CT	CHARLOTTE, NC	KARRES JAMES MATTHEW	0.25	AMILY RES	1.0 STORY	1	614.64	1955	N	1745	$106,650	te bench	5280	6759	7609	9760	613.5	614.9	615.4	616.8	$5,250	$0	N	Y	Y	
1789	Little Sugar Creek	61914.645	R	15111311	1623 GENEVA CT	CHARLOTTE, NC	LANE FEFFREY ALAN	0.25	AMILY RES	1.0 STORY	1	614.34	1953	N	1476	$106,330	n door, b	5280	6759	7609	9760	613.5	614.9	615.4	616.8	$5,250	$0	N	N	Y	
1808	Little Sugar Creek	61759.006	R	15111305	1622 GENEVA CT	CHARLOTTE, NC	MCCURRY MICKEY LEE	0.25	AMILY RES	1.0 STORY	1	614.44	1959	N	1602	$110,970	rown doo	5280	6759	7609	9760	613.2	614.6	615.1	616.6	$5,250	$0	N	N	Y	
1810	Little Sugar Creek	61762.21	R	15111304	1628 GENEVA CT	CHARLOTTE, NC	MCCURRY MICKEY L	0.25	AMILY RES	1.0 STORY	1	614.04	1959	N	1176	$82,980	w/red sh	5280	6759	7609	9760	613.2	614.6	615.1	616.6	$5,250	$0	N	Y	Y	
1815	Little Sugar Creek	61757.013	L	15111232	1628 JAMESTON DR	CHARLOTTE, NC	LYNCH WILLIAM L JR	0.25	AMILY RES	1.0 STORY	1	614.34	1959	N	1980	$86,140	story, bri	5280	6759	7609	9760	613.2	614.6	615.1	616.6	$5,250	$0	N	Y	Y	
1837	Little Sugar Creek	61606.487	R	15111340	1449 TOWNES RD	CHARLOTTE, NC	PHILLIPP SCOTT FREDERICK	0.25	AMILY RES	1.0 STORY	1	614.54	1954	N	2376	$134,540	door, bla	5280	6759	7609	9760	613.0	614.3	614.8	616.3	$5,250	$0	N	N	Y	
1838	Little Sugar Creek	61626.846	R	15111341	1457 TOWNES RD	CHARLOTTE, NC	THOMPSON BRUCE D	0.25	AMILY RES	1.0 STORY	1	613.94	1956	N	1570	$96,990	hite door	5280	6759	7609	9760	613.0	614.3	614.8	616.4	$5,250	$0	N	N	Y	
1903	Little Sugar Creek	61167.665	L	15111226	1720 JAMESTON DR	CHARLOTTE, NC	COSPER CHERRYL G	0.25	AMILY RES	1.0 STORY	1	613.74	1960	N	2016	$103,580	honeyco	5280	6759	7609	9760	612.4	613.7	614.2	615.9	$5,250	$0	N	N	N	
1928	Little Sugar Creek	60888.351	L	15111222	2814 IRBY DR	CHARLOTTE, NC	STAFF FRANCIS R	0.25	PLEX/TRIP	1.0 STORY	1	613.14	1963	N	1918	$74,580	uplex 281	5280	6759	7609	9760	612.0	613.5	614.0	615.7	$5,250	$0	N	N	Y	
1934	Little Sugar Creek	60832.562	L	15111221	2820 IRBY DR	CHARLOTTE, NC	DWELLE JOHN M JR	0.25	PLEX/TRIP	1.0 STORY	1	613.54	1962	N	1900	$70,770	uplex 282	5280	6759	7609	9760	612.0	613.4	614.0	615.7	$5,250	$0	N	Y	Y	
1947	Little Sugar Creek	60740.944	L	15111220	2826 IRBY DR	CHARLOTTE, NC	DWELLE JOHN M JR	0.25	PLEX/TRIP	1.0 STORY	1	613.14	1962	N	1918	$72,870	uplex, 28	5280	6759	7609	9760	612.0	613.4	613.9	615.6	$5,250	$0	N	Y	Y	
1957	Little Sugar Creek	60656.931	L	15111219	2832 IRBY DR	CHARLOTTE, NC	DWELLE JOHN M JR	0.25	PLEX/TRIP	1.0 STORY	1	613.64	1956	N	1733	$60,110	uplex, 28	5280	6759	7609	9760	611.9	613.4	613.9	615.6	$5,250	$0	N	N	Y	
1965	Little Sugar Creek	60393.011	R	15111354	3409 CAROWILL CR	CHARLOTTE, NC	CHURCH OF THE OPEN DOOR	0.75	CHURCH	1.0 STORY	1	611.64	1974	N	5216	$318,920	, brick w	5280	6759	7609	9760	611.8	613.2	613.7	615.5	$0	$10,000	N	Y	Y	
1986	Little Sugar Creek	60203.993	L	15114201	2909 WESTFIELD RD	CHARLOTTE, NC	DAVIS CUTTER D	0.25	PARTMEN	tory, w/o Basem	1	611.7	1950	N	3300	$60,126		5280	6759	7609	9760	611.6	613.1	613.6	615.4	$12,000	$0	Y	N	Y	
1989	Little Sugar Creek	60057.723	R	15111360	3401 MAR VISTA CR	CHARLOTTE, NC	CALDWELL MARY M	0.25	AMILY RES	1.0 STORY	1	611.64	1964	N	1352	$90,860	k, blue d	5280	6759	7609	9760	611.5	613.0	613.5	615.3	$5,250	$0	N	N	Y	
2002	Little Sugar Creek	60098.236	L	15114202	2921 WESTFIELD RD	CHARLOTTE, NC	BRENDEL RICHARD	0.25	AMILY RES	1.0 STORY	1	612.6	1947	N	1773	$109,880	artment	5280	6759	7609	9760	611.5	613.0	613.6	615.4	$5,250	$0	N	N	Y	
2011	Little Sugar Creek	59884.843	R	15111361	3411 MAR VISTA CR	CHARLOTTE, NC	WATERBURY DREW	0.25	AMILY RES	2.0 STORIES	2	612.04	1964	N	2216	$129,740	, upper fl	5280	6759	7609	9760	611.4	612.9	613.4	615.3	$5,250	$0	N	N	Y	
2016	Little Sugar Creek	59876.942	R	15111362	3406 CAROWILL CR	CHARLOTTE, NC	HALL BRYAN R	0.25	AMILY RES	2.0 STORIES	2	612.14	1964	N	2752	$179,670	rick w/br	5280	6759	7609	9760	611.4	612.9	613.4	615.2	$5,250	$0	N	Y	Y	
2020	Little Sugar Creek	60002.606	L	15114203	2925 WESTFIELD RD	CHARLOTTE, NC	FORTUNE RALPH B	0.25	AMILY RES	1.0 STORY	1	612.6	1949	N	720	$37,910	artment	5280	6759	7609	9760	611.5	613.0	613.5	615.3	$5,250	$0	N	N	Y	
2027	Little Sugar Creek	59938.616	L	15114204	386 RIDGEWOOD AV	CHARLOTTE, NC	WHITNEY PROPERTIES LLC	0.25	PLEX/TRIP	1.0 STORY	1	611.97	1949	N	1404	$50,480		5280	6759	7609	9760	611.4	613.0	613.5	615.3	$5,250	$0	N	N	Y	
2038	Little Sugar Creek	59685.128	R	15111367	1438 DEVON DR	CHARLOTTE, NC	DEHORITY DIXON R	0.25	AMILY RES	1.5 STORIES	2	612.54	1967	N	2656	$188,830	w/yellow	5280	6759	7609	9760	611.2	612.8	613.3	615.2	$5,250	$0	N	N	Y	
2043	Little Sugar Creek	59692.461	R	15111366	1448 DEVON DR	CHARLOTTE, NC	BRAUN PETER C	0.25	AMILY RES	2.0 STORIES	2	611.34	1964	N	1800	$108,620	& yellow	5280	6759	7609	9760	611.2	612.8	613.3	615.2	$5,250	$0	N	Y	Y	
2053	Little Sugar Creek	59777.32	L	15114301	385 RIDGEWOOD AV	CHARLOTTE, NC	BEASLEY WILSON GLENN	0.25	PLEX/TRIP	1.0 STORY	1	611.2	1949	N	1512	$34,170	ick 1 sto	5280	6759	7609	9760	611.3	612.9	613.4	615.2	$5,250	$0	N	N	N	
2077	Little Sugar Creek	59304.789	L	17517205	3108 WESTFIELD RD	CHARLOTTE, NC	LEONARD PHYLLIS	0.25	AMILY RES	1.0 STORY	1	609.74	1950	N	916	$38,610	ck w/blac	5280	6759	7609	9760	610.0	611.5	612.1	614.7	$5,250	$0	N	N	Y	
2080	Little Sugar Creek	59215.219	L	17517204	3114 WESTFIELD RD	CHARLOTTE, NC	HALPERN MARCELO A	0.25	AMILY RES	1.0 STORY	1	610.24	1940	N	1138	$58,340	siding w/	5280	6759	7609	9760	609.8	611.3	612.0	614.6	$5,250	$0	N	N	Y	
2082	Little Sugar Creek	59150.001	L	17517203	3120 WESTFIELD RD	CHARLOTTE, NC	HALPERN MARCELO A	0.25	AMILY RES	1.5 STORIES	2	610.84	1940	N	3019	$141,080	rick w/br	5280	6759	7609	9760	609.7	611.2	611.9	614.5	$5,250	$0	N	N	Y	
2094	Little Sugar Creek	58682.664	L	17517716	3213 WESTFIELD RD	CHARLOTTE, NC	HASIAN BARBARA J	0.25	AMILY RES	1.0 STORY	1	608.94	1945	N	1210	$46,870	ding w/wh	5280	6759	7609	9760	608.1	609.7	610.3	613.5	$5,250	$0	N	N	Y	
2097	Little Sugar Creek	58637.588	L	17517717	3217 WESTFIELD RD	CHARLOTTE, NC	ROTHACKER RICHARD J	0.25	AMILY RES	1.0 STORY	1	609.04	1945	N	1050	$47,090	ing w/wh	5280	6759	7609	9760	608.0	609.6	610.2	613.5	$5,250	$0	N	N	Y	
2099	Little Sugar Creek	58576.861	L	17517701	3221 WESTFIELD RD	CHARLOTTE, NC	JOHNSTON JACK CRAVEN &	0.25	AMILY RES	1.0 STORY	1	609.54	1947	N	1138	$48,560	ng w/whi	5280	6759	7609	9760	607.9	609.5	610.1	613.4	$5,250	$0	N	Y	Y	
2107	Little Sugar Creek	58440.174	L	17517613	3229 WESTFIELD RD	CHARLOTTE, NC	STEVENS MARC G	0.25	AMILY RES	1.0 STORY	1	607.34	1945	N	1050	$49,960	ng w/bla	5280	6759	7609	9760	607.7	609.3	610.0	613.4	$5,250	$0	N	Y	Y	
2108	Little Sugar Creek	58430.553	L	17517612	325 PLANTATION PL	CHARLOTTE, NC	BARBER BARBARA W	0.25	PLEX/TRIP	1.0 STORY	1	607.24	1947	N	1638	$32,070	g w/gree	5280	6759	7609	9760	607.6	609.3	610.0	613.4	$5,250	$0	N	Y	Y	
2112	Little Sugar Creek	58383.247	L	17517611	313 PLANTATION PL	CHARLOTTE, NC	PEARSON FLORENCE V	0.25	AMILY RES	1.0 STORY	1	608.94	1947	N	1050	$49,410	e shutter	5280	6759	7609	9760	607.6	609.2	609.9	613.4	$5,250	$0	N	N	N	
2116	Little Sugar Creek	58364.53	L	17517610	309 PLANTATION PL	CHARLOTTE, NC	WISEMAN LORI R	0.25	AMILY RES	1.0 STORY	1	608.64	1947	N	1914	$83,020	reen doo	5280	6759	7609	9760	607.5	609.2	609.9	613.3	$5,250	$0	N	N	N	
2118	Little Sugar Creek	58337.691	L	17517614	3239 WESTFIELD RD	CHARLOTTE, NC	LONON IRMA LOUISE JOHNSON	0.25	AMILY RES	1.0 STORY	1	606.54	1945	N	1146	$47,200	w/green s	5280	6759	7609	9760	607.5	609.2	609.9	613.3	$5,250	$0	N	Y	Y	
2122	Little Sugar Creek	58273.21	L	17517615	3243 WESTFIELD RD	CHARLOTTE, NC	BAKER LYLE A	0.25	AMILY RES	1.0 STORY	1	606.84	1945	N	1170	$50,440	ng w/blac	5280	6759	7609	9760	607.4	609.1	609.8	613.3	$5,250	$0	N	Y	Y	
2123	Little Sugar Creek	58248.072	R	17518225	1317 REECE ROAD	CHARLOTTE, NC	GS-MOREHEAD STREET VENTU	0.25	PARTMEN	tory, w/o Basem	2	606.84	1970	N	2640	$86,946		5280	6759	7609	9760	607.3	609.0	609.7	613.2	$12,000	$0	Y	Y	Y	
2132	Little Sugar Creek	58195.205	R	17518225	1317 REECE RD	CHARLOTTE, NC	GS-MOREHEAD STREET VENTU	0.25	PARTMEN	tory, w/o Basem	2	607.2	1970	N	3640	$86,960		5280	6759	7609	9760	607.2	608.9	609.6	613.2	$12,000	$0	Y	Y	Y	
2136	Little Sugar Creek	58169.326	L	17517603	312 ROCKLYN PL	CHARLOTTE, NC	TOURTELLOT WILLIAM L	0.25	AMILY RES	1.0 STORY	1	606.34	1947	N	1382	$67,350	/black do	5280	6759	7609	9760	607.2	608.9	609.7	613.3	$5,250	$0	N	Y	Y	

Prepared By:
Neal Banerjee, PE
Dewberry
November 2003

UNQBLD_ID	STRM_NAME	STRM_STA	BANK	PID	SITUS1	SITUS2	OWNER_NAME	CNTVAL_PCT	BLDG_USE	STYLE_TYPE	BLDG_TYPE	FFE_88	YEAR_BUILT	HIST_FLAG	HEATD_AREA	BLDG_VAL	ESCRIP	Q010yr	Q050yr	Q100yr	Q500yr	WSE010yr	WSE050yr	WSE100yr	WSE500yr	PLCMNTCS	STREVNCS	MANUAL	IFLDWAY0	IFLDWAY0	COMMNTS
2140	Little Sugar Creek	58174.807	L	17517607	304 ROCKLYN PL	CHARLOTTE, NC	CUNNINGHAM CHRISTOPHER J	0.25	AMILY RES	1.0 STORY	1	608.44	1946	N	1050	$48,660	g w/blac	5280	6759	7609	9760	607.2	608.9	609.7	613.3	$5,250	$0	N	N	Y	
2141	Little Sugar Creek	58172.064	L	17517605	308 ROCKLYN PL	CHARLOTTE, NC	HALL JOHN DAVIS	0.25	AMILY RES	1.0 STORY	1	606.34	1946	N	1050	$49,980	g w/blacl	5280	6759	7609	9760	607.2	608.9	609.7	613.3	$5,250	$0	N	N	Y	
2142	Little Sugar Creek	58166.434	L	17517608	300 ROCKLYN PL	CHARLOTTE, NC	MASOTTI MICHAEL JR	0.25	AMILY RES	1.0 STORY	1	609.14	1946	N	1050	$53,650	ing w/wh	5280	6759	7609	9760	607.2	608.9	609.7	613.3	$5,250	$0	N	N	N	
2154	Little Sugar Creek	58018.604	L	17517510	313 ROCKLYN PL	CHARLOTTE, NC	TOURTELLOT WILLIAM L	0.25	AMILY RES	1.0 STORY	1	606.44	1950	N	1012	$45,940	w/pink sh	5280	6759	7609	9760	606.9	608.8	609.5	613.2	$5,250	$0	N	N	Y	
2155	Little Sugar Creek	58017.27	L	17517509	309 ROCKLYN PL	CHARLOTTE, NC	TOURTELLOT WILLIAM L	0.25	AMILY RES	1.0 STORY	1	606.74	1946	N	1050	$43,530	ng w/bla	5280	6759	7609	9760	606.9	608.8	609.5	613.2	$5,250	$0	N	N	Y	
2156	Little Sugar Creek	58022.766	L	17517508	305 ROCKLYN PL	CHARLOTTE, NC	HOLLIDGE DOUGLAS	0.25	AMILY RES	1.0 STORY	1	608.74	1946	N	1178	$50,640	ng w/gre	5280	6759	7609	9760	606.9	608.8	609.5	613.2	$5,250	$0	N	N	Y	
2158	Little Sugar Creek	58010.131	L	17517507	301 ROCKLYN PL	CHARLOTTE, NC	GOFORTH JANIE O	0.25	AMILY RES	1.0 STORY	1	608.64	1946	N	1050	$48,960	g w/brow	5280	6759	7609	9760	606.9	608.7	609.5	613.2	$5,250	$0	N	N	Y	
2159	Little Sugar Creek	58005.829	L	17517511	319 ROCKLYN PL	CHARLOTTE, NC	STONE CAROLYN MCCREADY	0.25	AMILY RES	1.0 STORY	1	605.64	1950	N	1169	$54,860	above, b	5280	6759	7609	9760	606.9	608.7	609.5	613.2	$5,250	$0	N	Y	Y	
2178	Little Sugar Creek	57867.066	L	17517506	300 FIELDBROOK PL	CHARLOTTE, NC	HOWARD NANCY SUTTON	0.25	AMILY RES	1.0 STORY	1	608.54	1950	N	1046	$48,390	w/white	5280	6759	7609	9760	606.7	608.6	609.4	613.2	$5,250	$0	N	N	Y	
2183	Little Sugar Creek	57864.242	L	17517504	312 FIELDBROOK PL	CHARLOTTE, NC	BROWN WAYNE LUCIAN	0.25	AMILY RES	1.0 STORY	1	608.24	1952	N	1108	$51,640	w/grey sh	5280	6759	7609	9760	606.6	608.6	609.4	613.2	$5,250	$0	N	N	Y	
2184	Little Sugar Creek	57861.528	L	17517505	304 FIELDBROOK PL	CHARLOTTE, NC	DEBLOCK DOUGLAS A	0.25	AMILY RES	1.0 STORY	1	608.54	1952	N	1030	$58,010	/black s	5280	6759	7609	9760	606.6	608.6	609.4	613.2	$5,250	$0	N	N	Y	
2185	Little Sugar Creek	57854.569	L	17517503	316 FIELDBROOK PL	CHARLOTTE, NC	SILER NANCY LUCILLE	0.25	AMILY RES	1.0 STORY	1	607.44	1950	N	998	$47,690	/black s	5280	6759	7609	9760	606.6	608.6	609.4	613.1	$5,250	$0	N	N	Y	
2187	Little Sugar Creek	57836.441	L	17517502	320 FIELDBROOK PL	CHARLOTTE, NC	DILLON B ELAINE	0.25	AMILY RES	1.0 STORY	1	604.64	1946	N	1050	$45,000	siding w	5280	6759	7609	9760	606.6	608.6	609.3	613.1	$5,250	$0	N	Y	Y	
2188	Little Sugar Creek	57826.543	L	17517842	2913 MANOR RD	CHARLOTTE, NC	WASHINGTON ELEANOR Y	0.25	AMILY RES	2.0 STORIES	2	608.54	1947	N	1656	$89,530	brick w/bl	5280	6759	7609	9760	606.6	608.6	609.3	613.1	$5,250	$0	N	N	N	
2189	Little Sugar Creek	57703.001	R	17518101	540 BRANDYWINE DR	CHARLOTTE, NC	PARK ROAD SHOPPING CENTER	0.75	OMMERCIA	tory, w/o Basem	1	608	1987	N	7862	$212,308		5280	6759	7609	9760	606.4	608.4	609.2	613.1	$0	$10,000	Y	N	N	
2196	Little Sugar Creek	57775.288	L	17517843	2921 MANOR RD	CHARLOTTE, NC	COPELAND DEREK L	0.25	AMILY RES	1.5 STORIES	2	608.44	1999	N	2098	$158,700	ng w/whi	5280	6759	7609	9760	606.5	608.5	609.3	613.1	$5,250	$0	N	N	N	
2197	Little Sugar Creek	57687.822	L	17517410	305 FIELDBROOK PL	CHARLOTTE, NC	TURTON DAVID A	0.25	AMILY RES	1.0 STORY	1	606.24	1946	N	1021	$55,790	an awnin	5280	6759	7609	9760	606.3	608.4	609.2	613.1	$5,250	$0	N	N	Y	
2198	Little Sugar Creek	57690.674	L	17517411	309 FIELDBROOK PL	CHARLOTTE, NC	AMON FREDERICK A JR	0.25	AMILY RES	1.0 STORY	1	606.64	1946	N	1154	$50,690	g w/whit	5280	6759	7609	9760	606.3	608.4	609.2	613.1	$5,250	$0	N	N	Y	
2199	Little Sugar Creek	57685.003	L	17517412	313 FIELDBROOK PL	CHARLOTTE, NC	SWARTZ JOHN THOMAS	0.25	AMILY RES	1.0 STORY	1	606.74	1950	N	1211	$59,290	/white s	5280	6759	7609	9760	606.3	608.4	609.2	613.1	$5,250	$0	N	N	Y	
2202	Little Sugar Creek	57666.773	L	17517409	2920 MANOR RD	CHARLOTTE, NC	ALLEN KENNETH WILSON	0.25	AMILY RES	1.0 STORY	1	606.44	1946	N	1242	$56,870	iding w/g	5280	6759	7609	9760	606.3	608.4	609.2	613.1	$5,250	$0	N	N	Y	
2206	Little Sugar Creek	57769.097	L	17517844	2925 MANOR RD	CHARLOTTE, NC	ROGERS REBECCA CATHERINE	0.25	AMILY RES	1.0 STORY	1	609.24	1947	N	1122	$57,270	rey sidin	5280	6759	7609	9760	606.5	608.5	609.3	613.1	$5,250	$0	N	N	N	
2209	Little Hope Creek	7068	L	14920337	1301 DREXEL PL	CHARLOTTE, NC	BICKETT PAULA JEAN	0.25	AMILY RES	1.0 STORY	1	626.3	1955	N	1492	$71,530	brick	1030	1614	1865	2433	625.0	627.2	627.4	627.9	$5,250	$0	N	N	N	
2210	Little Sugar Creek	57572.503	L	17517845	2929 MANOR RD	CHARLOTTE, NC	ANTONIAK AMY ELIZABETH	0.25	AMILY RES	1.0 STORY	1	608.64	1947	N	1050	$57,020	/hite bric	5280	6759	7609	9760	606.1	608.3	609.1	613.0	$5,250	$0	N	N	N	
2214	Little Sugar Creek	57551.292	L	17517408	3000 MANOR RD	CHARLOTTE, NC	FLOCK CELIA A	0.25	AMILY RES	1.0 STORY	1	606.24	1946	N	1050	$54,440	ng w/gre	5280	6759	7609	9760	606.1	608.3	609.1	613.0	$5,250	$0	N	N	N	
2216	Little Sugar Creek	57540.039	L	17517406	3008 MANOR RD	CHARLOTTE, NC	MCNAMARA EILEEN M	0.25	AMILY RES	1.0 STORY	1	605.54	1946	N	1146	$53,500	siding w/	5280	6759	7609	9760	606.1	608.3	609.1	613.0	$5,250	$0	N	N	Y	
2217	Little Sugar Creek	57545.631	L	17517407	3004 MANOR RD	CHARLOTTE, NC	MURPHY ELIZABETH W	0.25	AMILY RES	1.0 STORY	1	605.94	1946	N	1050	$54,080	ding w/w	5280	6759	7609	9760	606.1	608.3	609.1	613.0	$5,250	$0	N	N	Y	
2219	Little Sugar Creek	57528.947	L	17517402	3024 MANOR RD	CHARLOTTE, NC	DONOHOE DAVID	0.25	AMILY RES	1.0 STORY	1	604.54	1946	N	1050	$52,790	hite sidi	5280	6759	7609	9760	606.0	608.3	609.1	613.0	$5,250	$0	N	Y	Y	
2220	Little Sugar Creek	57534.414	L	17517405	3012 MANOR RD	CHARLOTTE, NC	MCGEE AMY ROXANNE	0.25	AMILY RES	1.0 STORY	1	605.74	1946	N	1050	$53,890	siding w/	5280	6759	7609	9760	606.1	608.3	609.1	613.0	$5,250	$0	N	N	Y	
2221	Little Sugar Creek	57524.706	L	17517403	3020 MANOR RD	CHARLOTTE, NC	LOEFFLER MICHAEL C	0.25	AMILY RES	1.0 STORY	1	605.64	1950	N	1065	$52,770	k w/brow	5280	6759	7609	9760	606.0	608.3	609.1	613.0	$5,250	$0	N	N	Y	
2223	Little Sugar Creek	57522.034	L	17517404	3016 MANOR RD	CHARLOTTE, NC	TOM RAYMOND JOHN	0.25	AMILY RES	1.0 STORY	1	606.24	1950	N	1050	$53,690	w/white	5280	6759	7609	9760	606.0	608.2	609.1	613.0	$5,250	$0	N	N	Y	
2224	Little Sugar Creek	57484.345	L	17517846	2933 MANOR RD	CHARLOTTE, NC	JEWELL DAVID R	0.25	AMILY RES	1.0 STORY	1	608.94	1947	N	1050	$48,320	ng w/bla	5280	6759	7609	9760	606.0	608.2	609.0	613.0	$5,250	$0	N	N	N	
2227	Little Sugar Creek	57446.116	L	17517847	2937 MANOR RD	CHARLOTTE, NC	COOKE CAMERON H	0.25	AMILY RES	1.0 STORY	1	608.04	1950	N	1520	$70,880	/green s	5280	6759	7609	9760	605.9	608.1	608.9	613.0	$5,250	$0	N	N	N	
2230	Little Hope Creek	7068	L	14920336	1300 DREXEL PL	CHARLOTTE, NC	SMITH JUDITH M	0.25	AMILY RES	1.0 STORY	1	626.1	1955	N	1442	$73,940	ue shutte	1030	1614	1865	2433	625.0	627.2	627.4	627.9	$5,250	$0	N	N	N	
2236	Little Sugar Creek	57382.785	L	17517804	3017 MANOR RD	CHARLOTTE, NC	LOFTON THOMAS W III	0.25	AMILY RES	1.0 STORY	1	607.84	1950	N	985	$40,550	w/brown	5280	6759	7609	9760	605.7	608.0	608.8	612.9	$5,250	$0	N	N	N	
2237	Little Sugar Creek	57377.192	L	17517848	MANOR RD	CHARLOTTE, NC	ROMANOFF LISA JO	0.25	AMILY RES	1.0 STORY	1	606.14	1947	N	1146	$46,770	iing w/br	5280	6759	7609	9760	605.7	608.0	608.7	612.9	$5,250	$0	N	N	N	
2276	Little Hope Creek	6478.375	R	17104221	4507 WENTWORTH PL	CHARLOTTE, NC	FOSTER JOHN B	0.25	AMILY RES	1.0 STORY	1	620.24	1954	N	1647	$74,070	od vertic	1030	1614	1865	2433	619.7	620.7	621.1	621.8	$5,250	$0	N	Y	Y	
2311	Little Sugar Creek	55934.109	L	17513C97	5, 419, & 421 WAKEFIELD D	CHARLOTTE, NC	OWNER VARIES	0.25	CONDOS	tory, w/o Basem	1	599.54	1945	N	6364	$601,907	5/419/42	5280	6759	7609	9760	599.0	600.8	601.9	603.7	$12,000	$0	Y	Y	Y	
2320	Little Sugar Creek	55767.572	L	17513C97	1, 405, & 409 WAKEFIELD D	CHARLOTTE, NC	OWNER VARIES	0.25	CONDOS	tory, w/o Basem	1	599.34	1945	N	6364	$589,879	1/405/40	5280	6759	7609	9760	598.9	600.6	601.8	603.6	$12,000	$0	Y	Y	Y	
2332	Little Sugar Creek	55650.672	L	17513C97	349 WAKEFIELD DR	CHARLOTTE, NC	OWNER VARIES	0.25	CONDOS	tory, w/o Basem	1	598.44	1945	N	2600	$251,680	it 349 (A	5280	6759	7609	9760	598.6	600.3	601.5	603.3	$12,000	$0	Y	N	N	
2343	Little Hope Creek	5420.343	R	17108216	1015 MOCKINGBIRD LN	CHARLOTTE, NC	FURR HELEN	0.25	AMILY RES	1.0 STORY	1	616.04	1956	N	1641	$79,930	k, no shu	1030	1614	1865	2433	614.2	615.6	616.1	617.3	$5,250	$0	N	Y	Y	
2355	Little Hope Creek	5354.348	R	17108217	1021 MOCKINGBIRD LN	CHARLOTTE, NC	SCOTT VANN B &W JUDY	0.25	AMILY RES	1.0 STORY	1	615.24	1956	N	1777	$86,860	shutters	1030	1614	1865	2433	614.1	615.6	616.1	617.2	$5,250	$0	N	Y	Y	
2361	Little Hope Creek	5272.287	R	17108218	1101 MOCKINGBIRD LN	CHARLOTTE, NC	HUGHES VICKY ANN	0.25	AMILY RES	1.0 STORY	1	615.34	1956	N	1360	$73,220	e siding	1030	1614	1865	2433	614.0	615.5	616.0	617.2	$5,250	$0	N	Y	Y	
2367	Little Sugar Creek	54556.766	L	17513C97	301 WAKEFIELD DR	CHARLOTTE, NC	OWNER VARIES	0.25	CONDOS	tory, w/o Basem	1	599.14	1945	N	3000	$284,370	it 301 (A	5280	6759	7609	9760	596.5	598.3	599.7	601.4	$12,000	$0	Y	N	N	
2368	Little Hope Creek	5213.405	R	17108219	1109 MOCKINGBIRD LN	CHARLOTTE, NC	REYNOLDS DIANNE E	0.25	AMILY RES	1.0 STORY	1	615.24	1956	N	1572	$65,990	/tan brick	1030	1614	1865	2433	613.9	615.5	616.0	617.2	$5,250	$0	N	Y	Y	
2369	Little Hope Creek	5250.871	R	17109161	1216 TERRENCE PL	CHARLOTTE, NC	SIMERVILLE KEELY M	0.25	AMILY RES	1.0 STORY	1	615.84	1955	N	1735	$85,910	/green s	1030	1614	1865	2433	614.0	615.5	616.0	617.2	$5,250	$0	N	N	N	
2376	Little Sugar Creek	54501.757	L	17513C97	241 WAKEFIELD DR	CHARLOTTE, NC	OWNER VARIES	0.25	CONDOS	tory, w/o Basem	1	596.74	1945	N	2600	$248,248	it 241 (A	5280	6759	7609	9760	596.4	598.2	599.6	601.3	$12,000	$0	Y	N	Y	
2378	Little Hope Creek	5148.942	R	17108220	1115 MOCKINGBIRD LN	CHARLOTTE, NC	VICKERS JOSEPH S	0.25	AMILY RES	1.0 STORY	1	615.84	1956	N	1354	$70,710	w/dark sh	1030	1614	1865	2433	613.9	615.4	615.9	617.1	$5,250	$0	N	Y	Y	
2381	Little Sugar Creek	54447.987	L	17513C97	237 WAKEFIELD DR	CHARLOTTE, NC	OWNER VARIES	0.25	CONDOS	tory, w/o Basem	1	596.24	1945	N	2600	$251,680	it 237 (A	5280	6759	7609	9760	596.4	598.1	599.5	601.2	$12,000	$0	Y	N	Y	
2385	Little Hope Creek	5083.909	R	17108221	1121 MOCKINGBIRD LN	CHARLOTTE, NC	NEWSOME TRACY H	0.25	AMILY RES	1.0 STORY	1	615.64	1956	N	1174	$62,530	/green s	1030	1614	1865	2433	613.8	615.4	615.9	617.1	$5,250	$0	N	Y	Y	
2395	Little Hope Creek	5000.633	R	17108222	1131 MOCKINGBIRD LN	CHARLOTTE, NC	STEELE RICHARD S &WF	0.25	AMILY RES	1.0 STORY	1	615.34	1956	N	1161	$75,950	/white s	1030	1614	1865	2433	613.7	615.3	615.8	617.1	$5,250	$0	N	Y	Y	
2416	Little Hope Creek	4923.705	R	17109109	5745 WEDGEWOOD DR	CHARLOTTE, NC	MORROW TIMOTHY C	0.25	AMILY RES	1.0 STORY	1	615.44	1956	N	1436	$76,420	w/green	1030	1614	1865	2433	613.7	615.3	615.8	617.1	$5,250	$0	N	N	Y	
2420	Little Hope Creek	4841.562	R	17109110	5801 WEDGEWOOD DR	CHARLOTTE, NC	GIBSON JOHN PORTER &W	0.25	AMILY RES	1.0 STORY	1	615.74	1955	N	1673	$84,140	ght greer	1030	1614	1865	2433	613.6	615.3	615.8	617.0	$5,250	$0	N	N	Y	
2422	Little Hope Creek	4816.948	R	17109111	5809 WEDGEWOOD DR	CHARLOTTE, NC	MOOREFIELD HUBERT LEE JR	0.25	AMILY RES	1.0 STORY	1	614.74	1955	N	1254	$68,960	ling, bric	1030	1614	1865	2433	613.6	615.3	615.8	617.0	$5,250	$0	N	N	Y	
2434	Little Sugar Creek	53313.639	R	17514C98	4741 HEDGEMORE DR	CHARLOTTE, NC	OWNER VARIES	0.25	CONDOS	tory, w/o Basem	1	597.24	1969	N	24640	$1,173,850	6 w/ 20	5280	6759	7609	9760	594.6	596.3	597.8	599.1	$12,000	$0	Y	N	N	
2435	Little Sugar Creek	53332.309	R	17514C98	4741 HEDGEMORE DR	CHARLOTTE, NC	OWNER VARIES	0.25	CONDOS	tory, w/o Basem	1	595.14	1969	N	11584	$681,760	5 w/ 16	5280	6759	7609	9760	594.6	596.3	597.9	599.1	$12,000	$0	Y	Y	Y	
2436	Little Sugar Creek	53044.582	R	17514C98	4741 HEDGEMORE DR	CHARLOTTE, NC	OWNER VARIES	0.25	CONDOS	tory, w/o Basem	1	595.94	1969	N	22000	$1,086,200	4 w/ 20	5280	6759	7609	9760	594.3	596.0	597.6	598.9	$12,000	$0	Y	N	N	
2461	Little Sugar Creek	52260.843	R	17512105	5019 PARK RD	CHARLOTTE, NC	VILLA HERMOSA LTD	0.25	PARTMENT	tory, w/o Basem	2	594.84	1970	N	7862	$198,751		5280	6759	7609	9760	591.6	593.1	595.5	595.9	$12,000	$0	Y	Y	Y	
2470	Little Sugar Creek	52133.881	R	17512105	5023 PARK RD	CHARLOTTE, NC	VILLA HERMOSA LTD	0.25	PARTMENT	tory, w/o Basem	2	594.84	1970	N	7862	$198,751		5280	6759	7609	9760	591.1	592.7	595.2	595.5	$12,000	$0	Y	N	Y	
2494	Little Sugar Creek	50767.19	L	17118144	5200 PARK RD	CHARLOTTE, NC	JGL I LLC	0.75	OFFICE	1.0 STORY	1	593.54	1975	N	48109	$1,674,370	k, leasing	5280	6759	7609	9760	589.9	592.8	595.1	595.6	$0	$37,500	N	Y	Y	
2496	Little Sugar Creek	50940.549	L	17118140	5208 PARK RD	CHARLOTTE, NC	CHARLOTTE MEDICAL BUILDING	0.75	ICAL BUILI	1.0 STORY	1	595.1	1983	N	3159	$217,580	rs office,	5280	6759	7609	9760	590.1	593.0	595.2	595.8	$0	$10,000	N	N	N	
2500	Little Sugar Creek	50789.19	L	17118143	5240 PARK RD	CHARLOTTE, NC	HAGAMAN J ROYCE	0.75	ICAL BUILI	1.0 STORY	1	587.44	1950	N	2156	$68,500	ck base,	5280	6759	7609	9760	589.9	592.8	595.1	595.7	$0	$10,000	N	N	N	

APPENDIX B

Interest Rate 7.0%
Project Life 50

UPPER LITTLE SUGAR CREEK WATERSHED INDIVIDUAL BENEFIT:COST ANALYSIS SPREADSHEET

Mecklenburg County Flood Hazard Mitigation Project
Upper Little Sugar, Briar, Irwin, and McMullen Creek Watersheds

BUILDING INFORMATION				BENEFIT	COSTS					B/C RATIOS							
UNQBLD_ID	PID	SITE ADDRESS	FLD_GRP	FLOOD DAMAGE	ACQUISITION	ELEVATION	FLOOD PROOFING	LEVEE/FLOOD WALL	DRAINAGE IMPRVMNTS	ACQUISITION	ELEVATION	FLOOD PROOFING	LEVEE/FLOOD WALL	DRAINAGE IMPRVMNTS	IN 0.1' FLOODWAY?	NOTES	RECOMMENDED ALTERNATIVE
1685	15103354	2318 CUMBERLAND AV	DRY1	$92,424	$178,184	$22,348	na	na	na	0.5	4.1	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2343	17108216	1015 MOCKINGBIRD LN	LHC1	$7,066	$119,853	$57,205	na	na	na	0.1	0.1	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2355	17108217	1021 MOCKINGBIRD LN	LHC1	$18,879	$127,191	$61,946	na	na	na	0.1	0.3	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2361	17108218	1101 MOCKINGBIRD LN	LHC1	$13,608	$112,300	$47,410	na	na	na	0.1	0.3	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2368	17108219	1109 MOCKINGBIRD LN	LHC1	$13,580	$105,706	$54,800	na	na	na	0.1	0.2	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2369	17109161	1216 TERRENCE PL	LHC1	$8,170	$126,115	$60,482	na	na	na	0.1	0.1	na	na	na	N		No Action
2378	17108220	1115 MOCKINGBIRD LN	LHC1	$6,624	$109,772	$47,200	na	na	na	0.1	0.1	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2385	17108221	1121 MOCKINGBIRD LN	LHC1	$7,245	$101,052	$40,926	na	na	na	0.1	0.2	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2395	17108222	1131 MOCKINGBIRD LN	LHC1	$11,151	$114,433	$40,472	na	na	na	0.1	0.3	na	na	na	Y	effective, but in floodway; repetitive loss	Acquisition
2416	17109109	5745 WEDGEWOOD DR	LHC1	$9,647	$110,728	$50,059	na	na	na	0.1	0.2	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2420	17109110	5801 WEDGEWOOD DR	LHC1	$7,259	$119,159	$58,321	na	na	na	0.1	0.1	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2422	17109111	5809 WEDGEWOOD DR	LHC1	$20,011	$102,722	$21,263	na	na	na	0.2	0.9	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2276	17104221	4507 WENTWORTH PL	LHC2	$23,033	$109,011	$77,593	na	na	na	0.2	0.3	na	na	na	Y	acquired by County 9/2003	No Action
2209	14920337	1301 DREXEL PL	LHC3	$21,046	$118,006	$52,011	na	na	na	0.2	0.4	na	na	na	N		No Action
2230	14920336	1300 DREXEL PL	LHC3	$25,711	$120,266	$50,268	na	na	na	0.2	0.5	na	na	na	N		No Action
2494	17118144	5200 PARK RD	LSC01	$239,195	$2,915,977	$2,302,304	na	na	na	0.1	0.1	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2496	17118140	5208 PARK RD	LSC01	$10,475	$442,677	$148,827	na	na	na	0.0	0.1	na	na	na	N		No Action
2500	17118143	5240 PARK RD	LSC01	$456,032	$346,938	$116,424	na	na	na	1.3	3.9	na	na	na	N		Acquisition
2434	17514C98	4741 HEDGEMORE DR	LSC02	$93,942	$1,247,770	$1,160,840	na	na	na	0.1	0.1	na	na	na	N		No Action
2435	17514C98	4741 HEDGEMORE DR	LSC02	$299,283	$716,512	$562,982	na	na	na	0.4	0.5	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2436	17514C98	4741 HEDGEMORE DR	LSC02	$177,560	$1,152,200	$1,052,832	na	na	na	0.2	0.2	na	na	na	N		No Action
2461	17512105	5019 PARK RD	LSC02	$18,562	$300,137	$370,395	na	na	na	0.1	0.1	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2470	17512105	5023 PARK RD	LSC02	$10,640	$300,137	$370,395	na	na	na	0.0	0.0	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2367	17513C97	301 WAKEFIELD DR	LSC03	$31,590	$293,370	$104,580	na	na	na	0.1	0.3	na	na	na	N	repetitive loss structure	No Action
2376	17513C97	241 WAKEFIELD DR	LSC03	$164,684	$256,048	$94,505	na	na	na	0.6	1.7	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2381	17513C97	237 WAKEFIELD DR	LSC03	$249,973	$259,480	$94,505	na	na	na	1.0	2.6	na	na	na	Y	repetitive loss structure	Acquisition
2311	17513C97	15, 419, & 421 WAKEFIELD D	LSC04	$268,259	$620,999	$226,584	na	na	na	0.4	1.2	na	na	na	Y	effective, but in floodway; repetitive loss	Acquisition
2320	17513C97	01, 405, & 409 WAKEFIELD D	LSC04	$274,373	$608,971	$226,584	na	na	na	0.5	1.2	na	na	na	Y	effective, but in floodway; repetitive loss	Acquisition
2332	17513C97	349 WAKEFIELD DR	LSC04	$252,968	$259,480	$94,505	na	na	na	1.0	2.7	na	na	na	N	repetitive loss structure	Acquisition
2077	17517205	3108 WESTFIELD RD	LSC05	$71,695	$136,358	$32,613	na	na	na	0.5	2.2	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2080	17517204	3114 WESTFIELD RD	LSC05	$38,725	$156,754	$20,143	na	na	na	0.2	1.9	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2082	17517203	3120 WESTFIELD RD	LSC05	$34,129	$245,137	$51,190	na	na	na	0.1	0.7	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2094	17517716	3213 WESTFIELD RD	LSC05	$23,227	$120,500	$20,517	na	na	na	0.2	1.1	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2097	17517717	3217 WESTFIELD RD	LSC05	$19,804	$120,240	$17,804	na	na	na	0.2	1.1	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2099	17517701	3221 WESTFIELD RD	LSC05	$12,020	$111,474	$19,296	na	na	na	0.1	0.6	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2107	17517613	3229 WESTFIELD RD	LSC05	$89,070	$123,110	$19,366	na	na	na	0.7	4.6	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2108	17517612	325 PLANTATION PL	LSC05	$77,574	$116,984	$30,211	na	na	na	0.7	2.6	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2112	17517611	313 PLANTATION PL	LSC05	$16,354	$142,560	$17,804	na	na	na	0.1	0.9	na	na	na	N		No Action
2116	17517610	309 PLANTATION PL	LSC05	$27,974	$163,762	$32,454	na	na	na	0.2	0.9	na	na	na	N		No Action
2118	17517614	3239 WESTFIELD RD	LSC05	$230,942	$120,638	$21,137	na	na	na	1.9	10.9	na	na	na	Y		Acquisition
2122	17517615	3243 WESTFIELD RD	LSC05	$113,373	$123,950	$21,579	na	na	na	0.9	5.3	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2123	17518225	1317 REECE ROAD	LSC05	$204,651	$126,887	$128,304	na	na	na	1.6	1.6	na	na	na	Y	repetitive loss structure	Acquisition
2132	17518225	1317 REECE RD	LSC05	$119,970	$129,906	$129,599	na	na	na	0.9	0.9	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2136	17517603	312 ROCKLYN PL	LSC05	$214,657	$151,496	$25,490	na	na	na	1.4	8.4	na	na	na	Y	repetitive loss structure	Acquisition
2140	17517607	304 ROCKLYN PL	LSC05	$19,528	$121,810	$17,804	na	na	na	0.2	1.1	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2141	17517605	308 ROCKLYN PL	LSC05	$176,153	$123,130	$19,366	na	na	na	1.4	9.1	na	na	na	Y	repetitive loss structure	Acquisition
2142	17517608	300 ROCKLYN PL	LSC05	$11,979	$126,800	$17,804	na	na	na	0.1	0.7	na	na	na	N		No Action
2154	17517510	313 ROCKLYN PL	LSC05	$97,254	$123,976	$18,665	na	na	na	0.8	5.2	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2155	17517509	309 ROCKLYN PL	LSC05	$68,079	$116,680	$19,366	na	na	na	0.6	3.5	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2156	17517508	305 ROCKLYN PL	LSC05	$13,870	$124,174	$19,974	na	na	na	0.1	0.7	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2158	17517507	301 ROCKLYN PL	LSC05	$14,491	$122,110	$17,804	na	na	na	0.1	0.8	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2159	17517511	319 ROCKLYN PL	LSC05	$218,204	$128,367	$43,361	na	na	na	1.7	5.0	na	na	na	Y		Acquisition
2178	17517506	300 FIELDBROOK PL	LSC05	$14,077	$121,528	$36,464	na	na	na	0.1	0.4	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2183	17517504	312 FIELDBROOK PL	LSC05	$18,038	$124,964	$38,625	na	na	na	0.1	0.5	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2184	17517505	304 FIELDBROOK PL	LSC05	$15,484	$131,100	$35,906	na	na	na	0.1	0.4	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2185	17517503	316 FIELDBROOK PL	LSC05	$30,955	$125,684	$35,533	na	na	na	0.2	0.9	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2187	17517502	320 FIELDBROOK PL	LSC05	$589,168	$111,900	$20,929	na	na	na	5.3	28.2	na	na	na	Y	acquired by County in 2003	No Action
2188	17517842	2913 MANOR RD	LSC05	$19,583	$164,498	$57,728	na	na	na	0.1	0.3	na	na	na	N		No Action
2189	17518101	540 BRANDYWINE DR	LSC05	$57,604	$408,609	$370,395	na	na	na	0.1	0.2	na	na	na	N		No Action

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BUILDING INFORMATION				BENEFIT	COSTS					B/C RATIOS							
UNQBLD_ID	PID	SITE ADDRESS	FLD_GRP	FLOOD DAMAGE	ACQUISITION	ELEVATION	FLOOD PROOFING	LEVEE/FLOOD WALL	DRAINAGE IMPRVMNTS	ACQUISITION	ELEVATION	FLOOD PROOFING	LEVEE/FLOOD WALL	DRAINAGE IMPRVMNTS	IN 0.1' FLOODWAY?	NOTES	RECOMMENDED ALTERNATIVE
2196	17517843	2921 MANOR RD	LSC05	$30,596	$234,994	$35,574	na	na	na	0.1	0.9	na	na	na	N		No Action
2197	17517410	305 FIELDBROOK PL	LSC05	$75,849	$128,853	$18,831	na	na	na	0.6	4.0	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2198	17517411	309 FIELDBROOK PL	LSC05	$51,063	$124,152	$21,284	na	na	na	0.4	2.4	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2199	17517412	313 FIELDBROOK PL	LSC05	$50,883	$132,923	$43,116	na	na	na	0.4	1.2	na	na	na	Y	ffective, but in floodway; repetitive loss	Acquisition
2202	17517409	2920 MANOR RD	LSC05	$62,600	$130,596	$22,907	na	na	na	0.5	2.7	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2206	17517844	2925 MANOR RD	LSC05	$9,730	$130,636	$19,025	na	na	na	0.1	0.5	na	na	na	N		No Action
2210	17517845	2929 MANOR RD	LSC05	$12,117	$130,170	$17,804	na	na	na	0.1	0.7	na	na	na	N		No Action
2214	17517408	3000 MANOR RD	LSC05	$61,482	$122,590	$19,366	na	na	na	0.5	3.2	na	na	na	N	repetitive loss structure	Elevation
2216	17517406	3008 MANOR RD	LSC05	$111,938	$126,938	$21,989	na	na	na	0.9	5.1	na	na	na	Y	acquired by County 9/2003	No Action
2217	17517407	3004 MANOR RD	LSC05	$78,568	$127,230	$19,366	na	na	na	0.6	4.1	na	na	na	Y	ed by County 1/2001; repetitive loss str	No Action
2219	17517402	3024 MANOR RD	LSC05	$268,563	$115,440	$20,929	na	na	na	2.3	12.8	na	na	na	Y	acquired by County 8/2003	No Action
2220	17517405	3012 MANOR RD	LSC05	$92,217	$127,040	$19,366	na	na	na	0.7	4.8	na	na	na	Y	acquired by County 9/2003	No Action
2221	17517403	3020 MANOR RD	LSC05	$98,110	$125,965	$38,711	na	na	na	0.8	2.5	na	na	na	Y	acquired by County in 2003	No Action
2223	17517404	3016 MANOR RD	LSC05	$58,557	$126,840	$38,165	na	na	na	0.5	1.5	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2224	17517846	2933 MANOR RD	LSC05	$9,205	$121,470	$17,804	na	na	na	0.1	0.5	na	na	na	N		No Action
2227	17517847	2937 MANOR RD	LSC05	$18,079	$145,440	$52,987	na	na	na	0.1	0.3	na	na	na	N		No Action
2236	17517804	3017 MANOR RD	LSC05	$13,801	$113,505	$34,337	na	na	na	0.1	0.4	na	na	na	N		No Action
2237	17517848	MANOR RD	LSC05	$46,536	$120,208	$21,137	na	na	na	0.4	2.2	na	na	na	N		Elevation
1786	15111312	1629 GENEVA CT	LSC06	$33,177	$169,825	$76,086	$60,000	na	na	0.2	0.4	0.6	na	na	Y	not cost-effective, but in floodway	Acquisition
1788	15111313	1635 GENEVA CT	LSC06	$20,701	$171,885	$60,831	na	na	na	0.1	0.3	na	na	na	Y	not cost-effective, but in floodway	Acquisition
1789	15111311	1623 GENEVA CT	LSC06	$29,396	$185,758	$51,453	na	na	na	0.2	0.6	na	na	na	Y	not cost-effective, but in floodway	Acquisition
1808	15111305	1622 GENEVA CT	LSC06	$19,266	$175,776	$55,846	na	na	na	0.1	0.3	na	na	na	Y	not cost-effective, but in floodway	Acquisition
1810	15111304	1628 GENEVA CT	LSC06	$26,001	$146,508	$40,995	na	na	na	0.2	0.6	na	na	na	Y	not cost-effective, but in floodway	Acquisition
1815	15111232	1628 JAMESTON DR	LSC06	$18,093	$212,080	$69,023	na	na	na	0.1	0.3	na	na	na	Y	not cost-effective, but in floodway	Acquisition
1837	15111340	1449 TOWNES RD	LSC06	$14,063	$226,668	$82,827	na	na	na	0.1	0.2	na	na	na	Y	ffective, but in floodway; repetitive loss	Acquisition
1838	15111341	1457 TOWNES RD	LSC06	$23,710	$186,700	$54,730	na	na	na	0.1	0.4	na	na	na	Y	not cost-effective, but in floodway	Acquisition
1903	15111226	1720 JAMESTON DR	LSC06	$14,712	$237,628	$70,278	na	na	na	0.1	0.2	na	na	na	N		No Action
1928	15111222	2814 IRBY DR	LSC06	$18,438	$175,334	$66,861	na	na	na	0.1	0.3	na	na	na	Y	not cost-effective, but in floodway	Acquisition
1934	15111221	2820 IRBY DR	LSC06	$10,930	$171,470	$66,234	na	na	na	0.1	0.2	na	na	na	Y	not cost-effective, but in floodway	Acquisition
1947	15111220	2826 IRBY DR	LSC06	$16,561	$173,624	$66,861	na	na	na	0.1	0.2	na	na	na	Y	not cost-effective, but in floodway	Acquisition
1957	15111219	2832 IRBY DR	LSC06	$8,198	$160,309	$60,412	na	na	na	0.1	0.1	na	na	na	Y	not cost-effective, but in floodway	Acquisition
1965	15111354	3409 CAROWILL CR	LSC06	$385,358	$486,368	$249,617	na	na	na	0.8	1.5	na	na	na	Y	not cost-effective, but in floodway	Acquisition
1986	15114201	2909 WESTFIELD RD	LSC06	$84,861	$147,135	$117,493	$60,000	na	na	0.6	0.7	1.4	na	na	Y	not cost-effective, but in floodway	Acquisition
1989	15111360	3401 MAR VISTA CR	LSC06	$70,784	$154,916	$48,137	na	na	na	0.5	1.5	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2002	15114202	2921 WESTFIELD RD	LSC06	$27,105	$215,199	$61,807	na	na	na	0.1	0.4	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2011	15111361	3411 MAR VISTA CR	LSC06	$48,192	$211,388	$37,574	na	na	na	0.2	1.3	na	na	na	Y	ffective, but in floodway; repetitive loss	Acquisition
2016	15111362	3406 CAROWILL CR	LSC06	$55,562	$262,926	$46,663	na	na	na	0.2	1.2	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2020	15114203	2925 WESTFIELD RD	LSC06	$13,373	$125,070	$12,208	na	na	na	0.1	1.1	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2027	15114204	386 RIDGEWOOD AV	LSC06	$29,023	$144,692	$48,943	na	na	na	0.2	0.6	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2038	15111367	1438 DEVON DR	LSC06	$32,680	$271,798	$92,588	na	na	na	0.1	0.4	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2043	15111366	1448 DEVON DR	LSC06	$86,365	$189,020	$31,860	na	na	na	0.5	2.7	na	na	na	Y	not cost-effective, but in floodway	Acquisition
2053	15114301	385 RIDGEWOOD AV	LSC06	$54,458	$133,706	$53,833	na	na	na	0.4	1.0	na	na	na	N		Elevation
1723	15104101	1658 STERLING ROAD	LSC07	$594,785	$168,445	$2,687,019	$60,000	na	na	3.5	0.2	9.9	na	na	N	um; County owns property, so B:C for a	Flood Proofing
1628	15302327	1200 BLYTHE BVLD	LSC08	$565,058	$6,840,493	$1,472,835	$60,000	na	na	0.1	0.4	9.4	na	na	Y	not cost-effective, but in floodway	Acquisition
1640	15302327	1300 BLYTHE BVLD	LSC08	$373,697	$5,563,410	$1,597,756	$60,000	na	na	0.1	0.2	6.2	na	na	Y	not cost-effective, but in floodway	Acquisition
1431	15301112	1515 HARDING PL	LSC09	$4,609	$152,080	$87,847	na	na	na	0.0	0.1	na	na	na	N		No Action
1305	12521428	701S KINGS DR	LSC10	$52,250	$325,330	$109,112	na	na	na	0.2	0.5	na	na	na	N		No Action
1379	12521329	812S KINGS DR	LSC10	$21,998	$461,540	$144,163	na	na	na	0.0	0.2	na	na	na	Y	not cost-effective, but in floodway	Acquisition
1387	12521110	1400 HARDING PL	LSC10	$53,519	$445,110	$326,486	$60,000	na	na	0.1	0.2	0.9	na	na	N		No Action
1398	12521310	920S KINGS DR	LSC10	$1,012,299	$950,873	$569,534	$60,000	na	na	1.1	1.8	16.9	na	na	Y	acquired by County (non MCSWS)	No Action
1413	12521307	1401 EAST MOREHEAD ST	LSC10	$21,129	$429,175	$259,964	$60,000	na	na	0.0	0.1	0.4	na	na	Y	acquired by County (non MCSWS)	No Action
1425	12524372	923 SOUTH KINGS DR	LSC10	$164,298	$247,201	$127,680	na	na	na	0.7	1.3	na	na	na	N	Gas station - elevation not feasible	No Action
1426	12521307	1437 EAST MOREHEAD ST	LSC10	$70,743	$1,539,283	$932,158	na	na	na	0.0	0.1	na	na	na	Y	acquired by County (non MCSWS)	No Action
1194	12520147	618 KENLIWORTH AVE	LSC11	$5,734,500	$816,470	$1,034,017	$60,000	na	na	7.0	5.5	95.6	na	na	Y	repetitive loss structure	Acquisition
1114	12509305	440S INDEPENDENCE BV	LSC12	$30,320	$752,892	$259,776	$60,000	na	na	0.0	0.1	0.5	na	na	N		No Action
1019	12510110	1140 ELIZABETH AV	LSC13	$39,636	$338,124	$321,210	na	na	na	0.1	0.1	na	na	na	N		No Action
1034	12509502	1125E 4TH ST	LSC13	$27,243	$184,010	$217,114	$60,000	na	na	0.1	0.1	0.5	na	na	N		No Action
1036	12509503	1131E 4TH ST	LSC13	$97,047	$534,850	$366,930	na	na	na	0.2	0.3	na	na	na	N		No Action
1042	12510106	106 SOUTH KINGS DRIVE	LSC13	$41,706	$82,358	$85,536	na	na	na	0.5	0.5	na	na	na	N		No Action
1045	12510106	1305 EAST 4TH ST	LSC13	$18,189	$63,154	$64,606	na	na	na	0.3	0.3	na	na	na	N		No Action
1061	12510106	EAST 4TH ST	LSC13	$69,073	$238,651	$247,860	$60,000	na	na	0.3	0.3	1.2	na	na	N		Flood Proofing
885	08108610	900 EAST WILLIS STREET	LSC14	$49,393	$210,608	$253,781	na	na	na	0.2	0.2	na	na	na	Y	not cost-effective, but in floodway	Acquisition
887	08108610	910 EAST WILLIS STREET	LSC14	$177,312	$210,608	$270,030	na	na	na	0.8	0.7	na	na	na	Y	not cost-effective, but in floodway	Acquisition
889	08108610	914 EAST WILLIS STREET	LSC14	$150,939	$144,417	$185,163	na	na	na	1.0	0.8	na	na	na	Y		Acquisition
891	08108610	926 EAST WILLIS STREET	LSC14	$106,183	$210,608	$264,613	na	na	na	0.5	0.4	na	na	na	N		No Action
797	08109406	709 BELMONT AV	LSC15	$6,680	$20,644	$44,410	$60,000	na	na	0.3	0.2	0.1	na	na	N		No Action
865	08108303	1009 EVENINGSIDE DR	LSC15	$4,872	$23,180	$13,904	na	na	na	0.2	0.4	na	na	na	Y	not cost-effective, but in floodway	Acquisition

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BUILDING INFORMATION				BENEFIT	COSTS					B/C RATIOS							
UNQBLD_ID	PID	SITE ADDRESS	FLD_GRP	FLOOD DAMAGE	ACQUISITION	ELEVATION	FLOOD PROOFING	LEVEE/FLOOD WALL	DRAINAGE IMPRVMNTS	ACQUISITION	ELEVATION	FLOOD PROOFING	LEVEE/FLOOD WALL	DRAINAGE IMPRVMNTS	IN 0.1' FLOODWAY?	NOTES	RECOMMENDED ALTERNATIVE
868	08108309	1005 EVENINGSIDE DR	LSC15	$9,095	$36,148	$15,871	na	na	na	0.3	0.6	na	na	na	Y	acquired by County (non MCSWS)	No Action
678	08109212	614E 16TH ST	LSC16	$7,245	$31,490	$14,582	na	na	na	0.2	0.5	na	na	na	Y	not cost-effective, but in floodway	Acquisition
556	08304507	1901 NORTH DAVIDSON ST	LSC17	$6,942	$220,400	$471,120	$60,000	na	na	0.0	0.0	0.1	na	na	N		No Action
377	08302304	2504N TRYON ST	LSC18	$21,253	$259,547	$197,823	$60,000	$175,417	$156,000	0.1	0.1	0.4	0.1	0.1	N		No Action
381	08302305	201 EAST 28TH ST	LSC18	$290,161	$1,502,854	$2,728,175	$60,000	$175,417	$156,000	0.2	0.1	4.8	1.7	1.9	N		Flood Proofing
393	08302305	201 EAST 28TH ST	LSC18	$419,584	$216,170	$434,731	na	na	$156,000	1.9	1.0	na	na	2.7	N		Acquisition
168	08502210	144 ATANDO AV	LSC19	$41,112	$134,710	$441,135	na	na	na	0.3	0.1	na	na	na	N		No Action
184	08502302	118 ATANDO AV	LSC19	$14,808	$82,640	$84,802	$60,000	$592,863	na	0.2	0.2	0.2	0.0	na	N		No Action
192	08502102	3027 N TRYON ST	LSC19	$12,490	$74,602	$22,349	na	$592,863	na	0.2	0.6	na	0.0	na	N		No Action
197	08502303	3101N TRYON ST	LSC19	$40,036	$139,110	$85,859	na	$592,863	na	0.3	0.5	na	0.1	na	N		No Action
201	08502101	3027N TRYON ST	LSC19	$47,323	$485,280	$837,180	$60,000	$592,863	na	0.1	0.1	0.8	0.1	na	N		No Action
214	08502102	3027 N TRYON ST	LSC19	$16,009	$74,602	$22,696	na	$592,863	na	0.2	0.7	na	0.0	na	N		No Action
225	08303141	3000 NORTH TRYON STREET	LSC19	$6,031	$47,414	$37,711	na	$592,863	na	0.1	0.2	na	0.0	na	N		No Action
236	08303141	3000 NORTH TRYON STREET	LSC19	$187,249	$47,414	$41,777	na	$592,863	na	3.9	4.5	na	0.3	na	N		Acquisition
243	08303138	200E 36TH ST	LSC19	$55,313	$216,506	$636,271	$60,000	na	na	0.3	0.1	0.9	na	na	Y	not cost-effective, but in floodway	Acquisition
249	08303137	3224 BENARD AV	LSC19	$452,913	$298,940	$914,976	na	na	na	1.5	0.5	na	na	na	Y		Acquisition
251	08303136	3212 BENARD AV	LSC19	$547,890	$253,200	$609,984	na	na	na	2.2	0.9	na	na	na	Y		Acquisition
256	08303127	240E 36TH ST	LSC19	$128,223	$214,914	$684,303	na	na	na	0.6	0.2	na	na	na	Y	not cost-effective, but in floodway	Acquisition
257	09111229	315 EAST 36TH ST	LSC19	$25,352	$138,792	$158,930	$60,000	na	na	0.2	0.2	0.4	na	na	Y	not cost-effective, but in floodway	Acquisition
265	08303126	3215 CULLMAN AV	LSC19	$293,859	$102,190	$238,572	na	na	na	2.9	1.2	na	na	na	Y		Acquisition
267	08303125	3211 CULLMAN AV	LSC19	$369,750	$78,120	$167,000	na	na	na	4.7	2.2	na	na	na	Y		Acquisition
270	08303124	3209 CULLMAN AV	LSC19	$291,720	$56,685	$166,205	na	na	na	5.1	1.8	na	na	na	Y		Acquisition
273	08303123	3201 CULLMAN AV	LSC19	$469,915	$117,110	$318,096	na	na	na	4.0	1.5	na	na	na	Y	quired by County; repetitive loss structu	No Action
276	08303122	3157 CULLMAN AV	LSC19	$407,674	$112,940	$318,096	na	na	na	3.6	1.3	na	na	na	Y		Acquisition
279	08303121	3147 CULLMAN AV	LSC19	$665,113	$126,074	$376,812	na	na	na	5.3	1.8	na	na	na	Y		Acquisition
285	08303104	300E 36TH ST	LSC19	$88,987	$553,190	$1,480,665	$60,000	na	na	0.2	0.1	1.5	na	na	N		Flood Proofing
287	08303120	3143 CULLMAN AV	LSC19	$558,792	$79,670	$216,000	na	na	na	7.0	2.6	na	na	na	Y		Acquisition
289	08303119	3139 CULLMAN AV	LSC19	$660,228	$76,730	$216,000	na	na	na	8.6	3.1	na	na	na	Y		Acquisition
291	08303118	3123 CULLMAN AV	LSC19	$381,425	$125,380	$371,112	na	na	na	3.0	1.0	na	na	na	Y		Acquisition
295	08303117	3115 CULLMAN AV	LSC19	$403,865	$124,260	$235,921	na	na	na	3.3	1.7	na	na	na	Y		Acquisition
298	08303105	3214 CULLMAN AV	LSC19	$88,822	$183,320	$493,440	na	na	na	0.5	0.2	na	na	na	N		No Action
300	08303116	3103 CULLMAN AV	LSC19	$398,648	$190,630	$477,144	na	na	na	2.1	0.8	na	na	na	Y		Acquisition
301	08303107	3200 CULLMAN AV	LSC19	$214,119	$237,290	$500,880	na	na	na	0.9	0.4	na	na	na	N		No Action
311	08303108	3162 CULLMAN AV	LSC19	$367,955	$218,620	$508,320	na	na	na	1.7	0.7	na	na	na	N		Acquisition
315	08303109	3154 CULLMAN AV	LSC19	$250,152	$212,940	$508,320	na	na	na	1.2	0.5	na	na	na	N	quired by County; repetitive loss structu	No Action
320	08303110	3144 CULLMAN AV	LSC19	$225,904	$198,410	$508,320	na	na	na	1.1	0.4	na	na	na	N		Acquisition
323	08303111	3124 CULLMAN AV	LSC19	$203,354	$218,670	$500,880	na	na	na	0.9	0.4	na	na	na	N		No Action
327	08303112	3114 CULLMAN AV	LSC19	$250,677	$293,650	$544,957	na	na	na	0.9	0.5	na	na	na	N		No Action
333	08303113	3110 CULLMAN AV	LSC19	$57,591	$190,470	$489,888	na	na	na	0.3	0.1	na	na	na	N		No Action
337	08303114	3100 CULLMAN AV	LSC19	$59,757	$227,947	$754,709	na	na	na	0.3	0.1	na	na	na	N		No Action
157	09108106	200 E SUGAR CREEK ROAD	LSC20	$1,916,786	$1,568,527	$3,949,939	$60,000	na	na	1.2	0.5	31.9	na	na	Y		Acquisition
165	09108105	3823 RALEIGH STREET	LSC20	$293,252	$1,124,990	$289,529	$60,000	na	na	0.3	1.0	4.9	na	na	N		Flood Proofing

COUNT 168 **DAMAGE** $28,517,365

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Prepared By:
Neal Banerjee, PE
Dewberry
November 2003

APPENDIX C

BUILDING DEPTH-DAMAGE FUNCTION (DDF) Mecklenburg County Flood Hazard Mitigation Project Lower Little Sugar, Briar, Irwin, and McMullen Creek Watersheds													
		Flood Depth (feet)											
Building Type	***Curve Type***	***-2***	***-1***	***0***	***1***	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***>8***
1 Story, w/o Basement	Local	0	0	9	22	35	40	45	50	55	55	55	55
2 Story, w/o Basement	Default	0	0	5	9	13	18	20	22	24	26	29	33
Split Level, w/o Basement	Default	0	0	3	9	13	25	27	28	33	34	41	43
1 or 2 Story, with Basement	Default	4	8	11	15	20	23	28	33	38	44	49	51
Split Level, with Basement	Default	3	5	6	16	19	22	27	32	35	36	44	48
Mobile Home	Default	0	0	8	44	63	73	78	80	81	82	82	82

NOTES: Local curve developed by Watershed Concepts (1998

Default curves from FEMA Full Riverine Benefit:Cost Model (V5.2.3)

CONTENTS DEPTH-DAMAGE FUNCTION (DDF) Mecklenburg County Flood Hazard Mitigation Project Lower Little Sugar, Briar, Irwin, and McMullen Creek Watersheds													
		Flood Depth (feet)											
Building Type	***Curve Type***	***-2***	***-1***	***0***	***1***	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***>8***
1 Story, w/o Basement	Local	0	0	8	18	30	50	55	60	65	70	75	75
2 Story, w/o Basement	Default	0	0	7.5	13.5	19.5	27	30	33	36	39	43.5	49.5
Split Level, w/o Basement	Default	0	0	4.5	13.5	19.5	37.5	40.5	42	49.5	51	61.5	64.5
1 or 2 Story, with Basement	Default	6	12	16.5	22.5	30	34.5	42	49.5	57	66	73.5	76.5
Split Level, with Basement	Default	4.5	7.5	9	24	28.5	33	40.5	48	52.5	54	66	72
Mobile Home	Default	0	0	12	66	90	90	90	90	90	90	90	90

NOTES: Local curve developed by Watershed Concepts (1998

Default curves from FEMA Full Riverine Benefit:Cost Model (V5.2.3)

Prepared By:
Neal Banerjee, PE
Dewberry
March 2003

APPENDIX D

MEETING MINUTES

PROJECT NAME: Sugar Creek WWTP

D&D PROJECT NO.: Meckco

MEETING LOCATION: WWTP

DATE: 11/12/02

ATTENDEES: Nikole Dalton, Dewberry & Dewberry, Inc.
Roy Pergason, Plant Supervisor, CMUD

Mr. Pergason indicated that during the last flooding event ('96-'97) there was significant flooding of the Headworks building which includes the bar screens, grit collectors, generators, and main pump station. There is a Duke Power substation between the creek and the main pump station which has a great risk of potentially flooding.

During the previous flood event the secondary clarifiers, chlorine contact tank and chlorine storage building were also flooded. The chlorine tanks will be replaced with UV processing in the next few years.

The above constitutes the writer's understanding of the events and topics at the meeting. Kindly notify this office within seven (7) business days if these minutes require amendment; otherwise they shall constitute a complete and accurate record of the meeting.

Submitted By:______________________________
Signature

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