

Office Estimate 65' Bridge
MOA Required Yes

Project#
TIP#
Let Date
WBS# 17BP.13.R.62

PREDESIGN-PRESURVEY REPORT

County McDowell

Bridge# 580338
Road# SR 1760
Name Harmony Grove

Stream Walton Crowley
Branch

Type Of Request: POC Force Account TIP NCMA
Date 8/12/11 Name MLH (Mulkey, Inc.)
Checked By KBA (Mulkey, Inc.)
Prior Survey Date N/A (attach copy of prior survey)
Study By Scour Section U

Assigned To Mulkey, Inc.

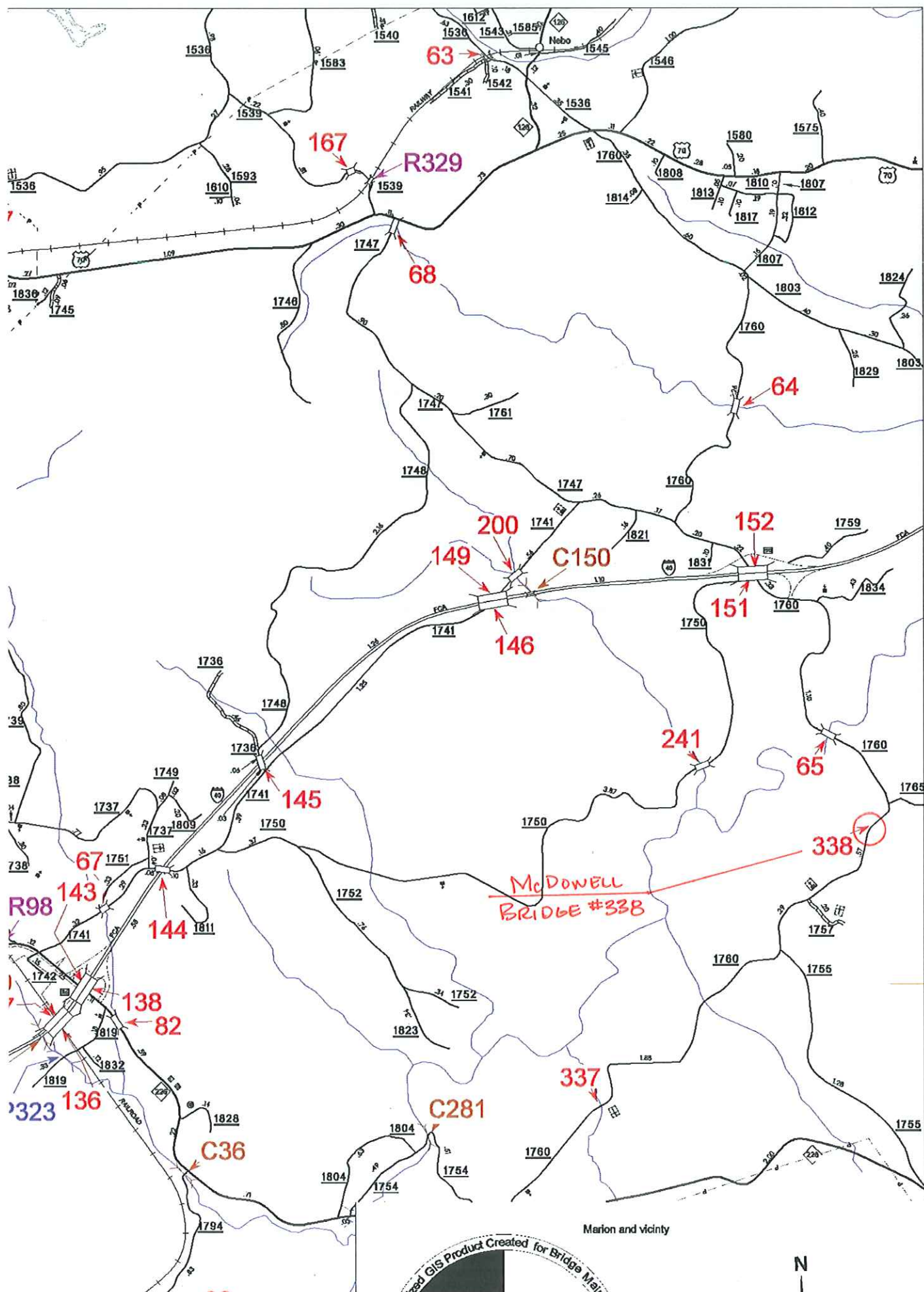
Flood Zone Yes Detail Study Limited Date October 2, 2008 Panel# 1720
B.M. Info J 183 FA1062
Quad Map Marion East Drainage Area 1.7 Sq. Mi. From USGS Quad Map
Q25 750 cfs Q50 900 cfs Q100 1000 cfs Method USGS Regression

EXISTING BRIDGE INFORMATION

Location 0.15 Mi. S. Jct. SR 1765
Average Daily Traffic 2400 - Yr 2008
Length 15 Ft. Bed- To Crown 9 Ft. Water Depth 2 Ft.
Type Structure Reinforced Concrete Slab Widened With Continous I-Beams; E. BTS: RC Abutments
Type Spans 1@9'-7.27, 1@5'-6.75
Upstream Structure N/A
Location
Bed- To Crown Prior Survey
Downstream Structure N/A
Location
Bed- To Crown Prior Survey
SCS Watershed N/A

ENVIRONMENTAL

Trout Stream No Anadromous Fish No Primary Nursery Area No
High Quality Waters No Nutrient Sensitive Waters No
Near Water Supply Intake No CAMA County No
Stream Classification C
DENR River Basin Info. Catawba
State Stormwater Permit Required No





NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
BRIDGE MANAGEMENT UNIT

ATTENTION

BRIDGE INSPECTION REPORT

INSPECTION TYPE: Routine Inspection

COUNTY MCDOWELL BRIDGE NUMBER 580338 INSPECTION CYCLE 2 YRS
ROUTE SR1760 ACROSS CREEK M.P. 0

LOCATION .15 MI.S.JCT.SR1765

SUPERSTRUCTURE REINFORCED CONCRETE SLAB WIDENED W/CONTINUOUS I-BEAMS

SUBSTRUCTURE E.BTS:RC ABUMENTS;(TIMBER CRUTCH BT.UNDER I-BEAMS ONLY)

SPANS 1 @ 9'-7.27, 1 @ 5'-6.75

LONGITUDE 81° 54' 9.1"

LATITUDE 35° 40' 11.2"

PRESENT CONDITION FAIR

INVENTORY RATING

INSPECTION DATE 06/10/2010

OPERATING RATING

PRESENT POSTING Not Posted

PROPOSED POSTING

COMPUTER UPDATE

ANALYSIS DATE

POSTING LETTER DATE

SUFFICIENCY RATING

OTHER SIGNS PRESENT NONE



LOOKING NORTH

SIGN NOTICE
ISSUED FOR

NUMBERED
REQUIRED

No WEIGHT LIMIT

No DELINEATORS

No NARROW BRIDGE

No ONE LANE BRIDGE

No LOW CLEARANCE

BRIDGE MANAGEMENT UNIT
DATA ON EXISTING STRUCTURE

Run Date: 07/29/2010

COUNTY : MCDOWELL		DIV : 13		DIST : 1		STRUCTURE NUMBER : 580338		LENGTH : 15 FEET	
ROUTE CARRIED : SR1760				FEATURE INTERSECTED : CREEK					
LOCATED : .15 MI.S.JCT.SR1765				BRIDGE NAME :				CITY :	
FUNC. CLASS : 08		SYST.ON : NFA		SYST.UNDER : NFA		ADT & YR : 2400 2008		RAIL TYPE : LT 009 RT 009	
BUILT : 1920		BY : CNTY		PROJ :		FED.AID PROJ :		DESIGN LOAD : Other or Unknown	
REHAB : 1992		BY : BMU		PROJ :		ALIGNMENT : TAN		SKEW : 100	
								LANES : ON 2 UNDER	
NAVIGATION : VC 0.0 FT HC 0.0 FT				HT. CRN. TO BED : 9 FT				WATER DEPTH : 2 FT	
SUPERSTRUCTURE :		REINFORCED CONCRETE SLAB WIDENED W/CONTINOUS I-BEAMS							
SUBSTRUCTURE :		E.BTS:RC ABUMENTS;(TIMBER CRUTCH BT.UNDER I-BEAMS ONLY)							
SPANS :		1 @ 9'-7.27, 1 @ 5'-6.75							
BEAMS OR GIRDERS :		REINFORCED CONCRETE SLAB WIDENED W/10 LINES 8 I-BEAMS							
FLOOR : RC SLAB/5.5 AWS		ENCROACHMENT :				DECK (OUT TO OUT) : 32.5 FT			
CLEAR ROADWAY : 30.8 FT		BETWEEN RAILS : 0.0 FT				SIDEWALK OR CURB : LT 0.5 FT RT 1.5 FT			
VERT.CL.OVER : 99 FT 99 IN		VERT.CL.UNDER : 00 FT 00 IN				HOR.CL.UNDER : 0.0 FT			
INV.RTG. : HS-1		OPE.RTG. : HS-1		CONTR.MEMBER : Cap-Cr.bent		POSTED : SV		TTST DATE 08/11/1992	
SYSTEM : Secondary S.R. Route						GREEN LINE ROUTE : N			
2ND OPENING :		3RD OPENING :		4TH OPENING :		5TH OPENING :			
REMARKS :									

Stream Bed Soundings

(See next sheet for profile sketch)

Bridge No: 580338 County: MCDOWELL Date: 06/10/2010 By: MER

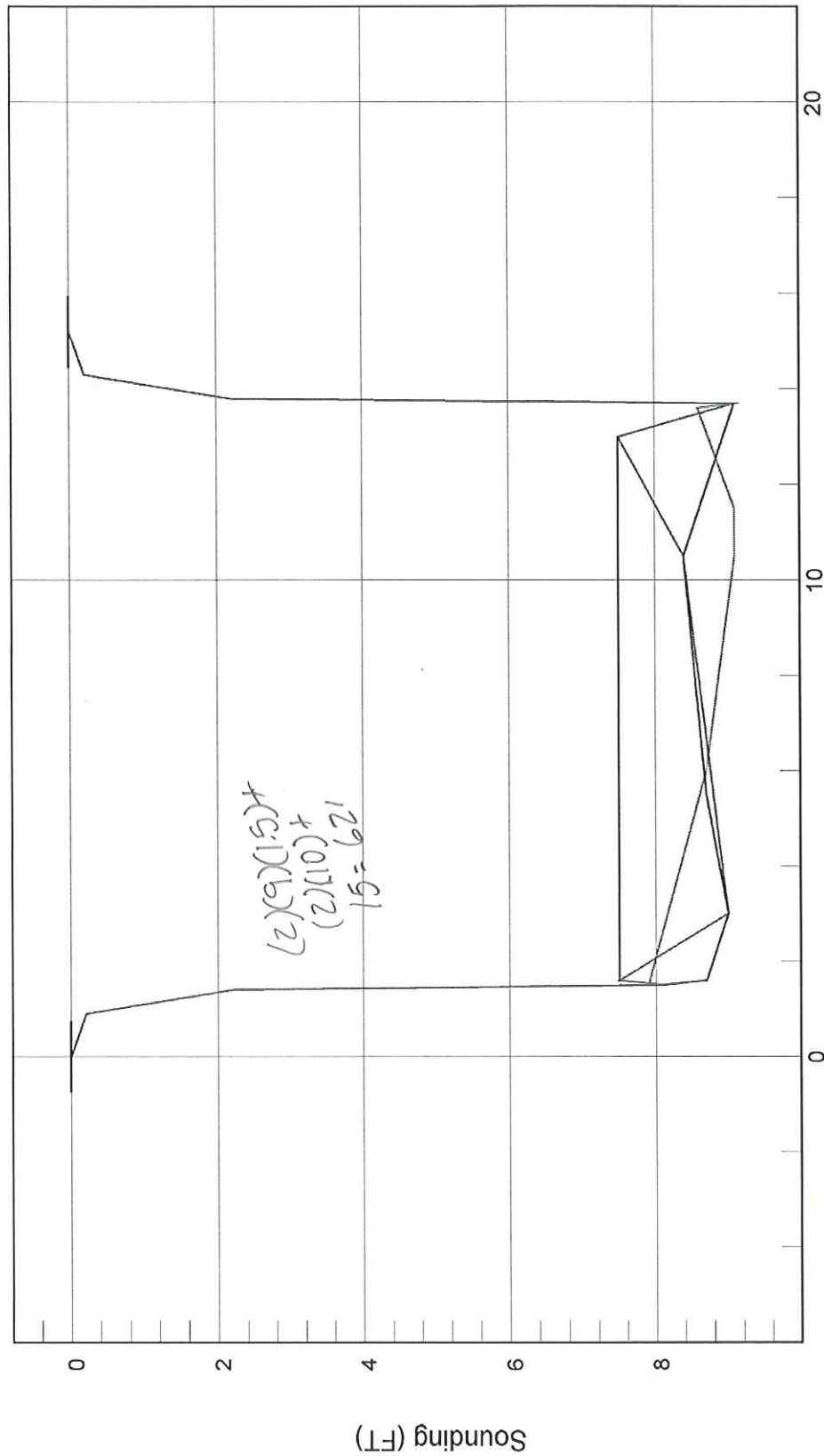
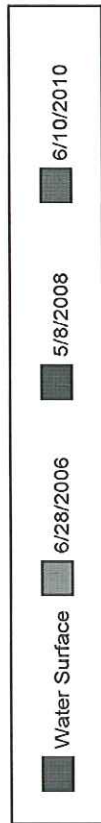
Record sounding from top of rail. Other location if needed:

Distance from Highwater Mark to top of rail: Location of Highwater Mark:

DOWNSTREAM			UPSTREAM		
Distance (Station) (ft)	Sounding (ft)	Description	Distance (Station) (ft)	Sounding (ft)	Description
0	0	FF END BENT 1			
0.9	0.2				
1.4	2.2	RAIL TO CAP			
1.5	8.1	S.F.	1.5	9.2	
1.6	7.5	Water Surface/Water Edge (WSWE)			
3	9				
10.5	8.4		10.5	8.1	
13	7.5	Water Surface/Water Edge (WSWE)			
13.7	9.1	S.F.	13.7	7.8	
13.8	2.2	RAIL TO CAP			
14.3	0.2				
15.2	0	FF END BENT 2			

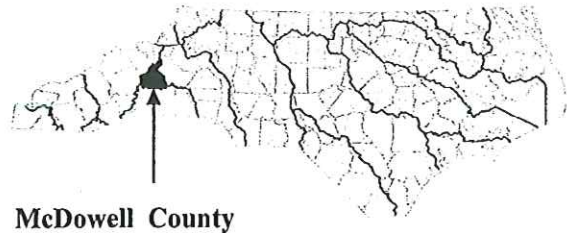
STREAMBED PROFILE (Downstream)

Top of Rail = 0 FT (Sounding)



FLOOD INSURANCE STUDY

A Report of Flood Hazards in
MCDOWELL COUNTY,
NORTH CAROLINA
AND INCORPORATED AREAS



Community Name	Community Number	River Basin
Marion, City of	370266	Catawba
McDowell County (Unincorporated Areas)	370148	Broad and Catawba
Old Fort, Town of	370149	Catawba



October 2, 2008

Federal Emergency Management Agency
State of North Carolina

Flood Insurance Study Number
37111CV000A

www.fema.gov and www.ncfloodmaps.com



Section 5.0 – Engineering Methods

Table 7—Summary of Discharges

Flooding Source	Location	Drainage Area (square miles)	Discharges (cfs)			
			10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Walton Crowley Branch	At the confluence with North Muddy Creek	1.8	*	*	1,310	*
	Just upstream of the confluence with Ferguson Branch	1.3	*	*	1,080	*
West Fork Cove Creek	At the confluence with Cove Creek and Morgan Creek (near Sugar Kill)	4.1	*	*	2,190	*
	Approximately 0.6 mile upstream of SR 1001	3.4	*	*	1,930	*
	Just upstream of confluence of Bright Branch	2.5	*	*	1,600	*
Youngs Fork	At the confluence with North Muddy Creek	9.0	*	*	3,960	*
	Just upstream of the confluence of Jacktown Creek	6.7	*	*	3,330	*
	Just downstream of I-40	5.0	*	*	2,810	*
	Just upstream of SR 1737	4.4	*	*	2,600	*
	Approximately 0.5 mile upstream of SR 1737	3.4	*	*	2,210	*
	Approximately 0.7 mile upstream of Business US Highway 221	2.0	*	*	1,920	*
	Approximately 1,600 feet downstream of Glenview Street	1.5	*	*	1,630	*

*Data Not Available

5.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the flood elevations for the selected recurrence intervals. Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles. For stream segments for which BFEs were computed, selected cross-section locations are also shown on the FIRM. Flood profiles were developed showing computed water-surface elevations for floods of the selected recurrence intervals.

Users should be aware that flood elevations shown on the FIRM represent rounded whole-foot elevations and may not exactly reflect the elevations shown on the Flood Profiles or in the

Section 5.0 – Engineering Methods

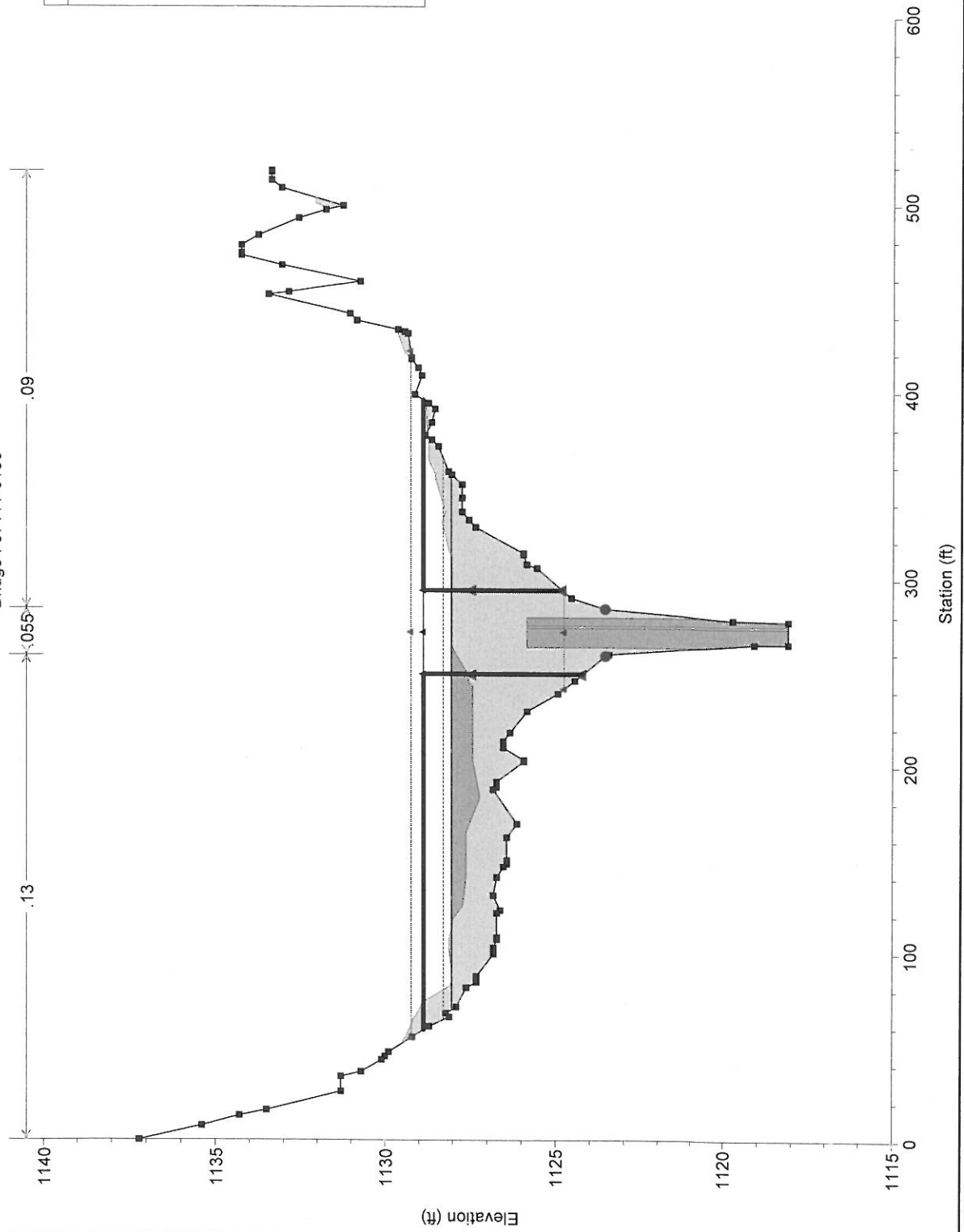
Table 9—Limited Detailed Flood Hazard Data

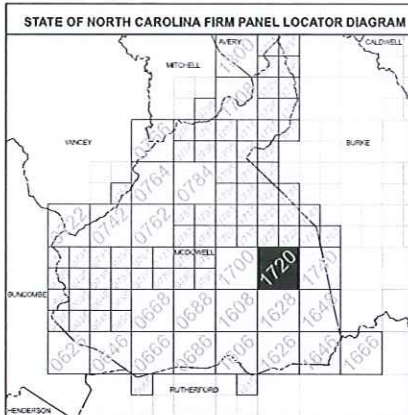
Cross Section ¹	Stream Station ²	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)	Non-Encroachment Width ³ (feet)
TOM CREEK				
317	31,678	2,050	1,562.5	106 / 44
320	32,002	2,050	1,568.6	107 / 38
323	32,278	2,050	1,574.6	215 / 26
326	32,578	2,050	1,579.4	186 / 19
328	32,809	2,050	1,584.9	79 / 31
332	33,178	2,050	1,590.8	39 / 39
336	33,592	2,050	1,599.5	25 / 30
340	34,016	960	1,608.3	21 / 30
345	34,495	960	1,621.9	15 / 54
350	34,978	960	1,637.0	22 / 23
TOM CREEK TRIBUTARY 1				
003	313	1,340	1,418.4 ³	25 / 39
005	461	1,340	1,419.4	109 / 22
006	592	1,340	1,423.9	84 / 53
010	978	1,340	1,424.3	22 / 66
014	1,378	1,340	1,427.9	22 / 22
018	1,829	1,340	1,433.1	85 / 10
024	2,422	1,340	1,440.5	69 / 50
028	2,753	1,340	1,444.0	79 / 32
028	2,843	1,340	1,447.5	63 / 35
029	2,897	1,340	1,449.5	34 / 64
031	3,147	1,340	1,465.8	10 / 16
036	3,551	1,340	1,480.7	22 / 11
038	3,797	1,340	1,485.2	22 / 19
042	4,169	1,340	1,488.0	20 / 37
WALTON CROWLEY BRANCH				
001	142	1,310	1,119.3 ³	27 / 31
003	292	1,310	1,119.3 ³	13 / 64
004	442	1,310	1,119.3 ³	21 / 31
007	742	1,310	1,119.3 ³	22 / 106
009	850	1,310	1,119.3 ³	22 / 82
009	891	1,310	1,119.3 ³	60 / 72
010	1,042	1,310	1,119.3 ³	134 / 32
013	1,342	1,310	1,119.3 ³	42 / 22
016	1,642	1,310	1,121.1	61 / 84
020	1,983	1,310	1,123.0	88 / 22
021	2,142	1,310	1,124.6	22 / 22
022	2,210	1,310	1,128.0	22 / 22
024	2,401	1,310	1,128.7	78 / 70
025	2,542	1,080	1,129.2	55 / 21
028	2,842	1,080	1,131.8	67 / 19
031	3,142	1,080	1,135.0	86 / 16
034	3,442	1,080	1,139.1	109 / 10
WEST FORK COVE CREEK				
002	173	2,190	1,196.9	208 / 42
003	322	2,190	1,197.7	366 / 33
004	401	2,190	1,198.9	342 / 476
006	597	2,190	1,199.2	281 / 79

WaltonCrowley	Plan: Plan 02	11/2/2005
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WaltonCrowley	Plan: Plan 02	11/2/2005
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WaltonCrowley	Plan: Plan 02	11/2/2005
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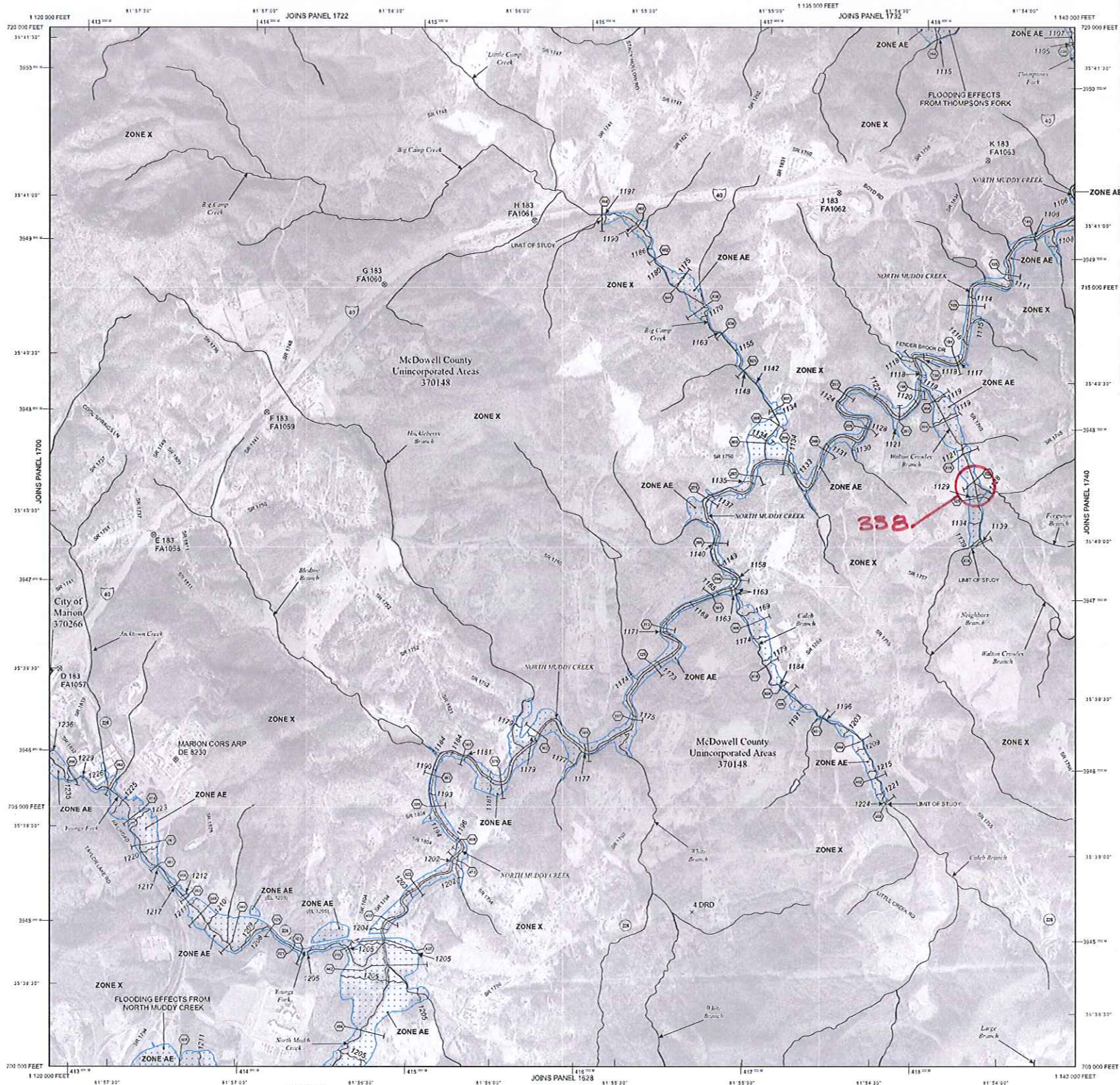
DATUM INFORMATION

The projection used in the preparation of this map was the North Carolina State Plane (NAD83). The horizontal datum was the North American Datum of 1983, NAD83 ellipsoid. Differences in datum, ellipsoid, projection, or Universal Transverse Mercator zones used in the production of FIRM for adjacent jurisdictions may result in slight positional differences in map features across jurisdictional boundaries. These differences do not affect the accuracy of this FIRM. All coordinates on this map are in U.S. Survey Feet, where 1 U.S. Survey Foot = 1200/3937 Meters.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988 (NAVD 88). These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. An average offset between NAVD 88 and the National Geodetic Vertical Datum of 1929 (NGVD 29) has been computed for each North Carolina county. This offset was then applied to the NGVD 29 flood elevations that were not revised during the creation of this statewide format FIRM. The offsets for each county shown on this FIRM panel are shown in the vertical datum offset table below. Where a county boundary and a flooding source with unrevised NGVD 29 flood elevations are coincident, an individual offset has been calculated and applied during the creation of this statewide format FIRM. See Section 6.1 of the accompanying Flood Insurance Study report to obtain further information on the conversion of elevations between NAVD 88 and NGVD 29. To obtain current elevation, description, and/or location information for bench marks shown on this map, please contact the North Carolina Geodetic Survey at the address shown below. You may also contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242, or visit its website at <http://www.ngs.noaa.gov>.

North Carolina Geodetic Survey
121 West Jones Street
Raleigh, NC 27601
(919) 733-3435
<http://www.ncgs.state.nc.us>

County Average Vertical Datum Offset Table	
County	Vertical Datum Offset (ft.)
McDowell	-0.33
Example: NAVD 88 = NGVD 29 + (-0.33)	



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood) also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, AV, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A No Base Flood Elevations determined.

ZONE AE Base Flood Elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of shallow fan flooding, velocities also determined.

ZONE AR Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently discontinued. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE AV Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood, areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile, and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary
0.2% annual chance floodplain boundary
Floodway boundary
Zone D boundary
CBRS and OPA boundary
Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities
Base Flood Elevation line and value, elevation in feet
Base Flood Elevation value where uniform within zone; elevation in feet

Referenced to the North American Vertical Datum of 1988

Cross section line
Traverse line
Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
4275 +4
1477500 FEET
2500-foot grid values: North Carolina State Plane coordinate system (NAD83/NA 83, State Plane NAD 83 feet)
North Carolina Geodetic Survey bench mark (for more information visit <http://www.ncgs.state.nc.us>)
National Geodetic Survey bench mark (for more information visit <http://www.ngs.noaa.gov>)
NGS-40 GPS 24 cm Vertical Control Mark or Contractor Established MCM Bench Marks (for more information visit <http://www.ngs.noaa.gov>)
River Mile

GRID NORTH

MAP SCALE 1" = 1000' (1 : 12,000)

100 0 1000 2000
FEET

300 0 300 600
METERS

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The community map repository should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where Base Flood Elevations (BFEs) and/or floodways have been determined, users are encouraged to consult the Flood Profiles, Floodway Data, Limited Detailed Flood Hazard Data and/or Summary of Base Flood Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Boundaries of regulatory floodways shown on the FIRM for flooding sources studied by detailed methods were compiled at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data for flooding sources studied by detailed methods as well as non-engineered floodways for flooding sources studied by limited detailed methods are provided in the Flood Insurance Study (FIS) report for this jurisdiction. The FIS report also provides instructions for determining a floodway using non-engineered methods for flooding sources studied by limited detailed methods.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures. Refer to Section 4.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures in this jurisdiction.

FEMA recommends that a Flood Insurance Policy be purchased for structures in areas where levees are shown as providing protection from the 1% annual chance flood. Flooding is not covered by standard property/flood/leakage insurance policies nor is it covered by Homeowners Insurance, Renters Insurance, Condominium Owners Insurance, or Commercial Property Insurance. Contact your insurance agent and local floodplain administrator for further information. Visit <http://www.floodsmart.gov> for information on levees and the risk of flooding in areas shown as being protected by levees.

Base map information and geospatial data used to develop the FIRM were obtained from various organizations, including the participating local community(ies), state and federal agencies, and/or other sources. The primary base for this FIRM is aerial imagery acquired by the State of North Carolina. The time period of collection for the imagery is 2005. Information and geospatial data supplied by the local community(ies) that met FEMA base map specifications were considered the preferred source for development of the base map. See geospatial metadata for the associated digital FIRM for additional information about base map preparation.

Base map features shown on this map, such as corporate limits, are based on the most up-to-date data available at the time of publication. Changes to the corporate limits may have occurred since this map was published. Map users should consult the appropriate community official or website to verify current conditions of jurisdictional boundaries and base map features. This map may contain roads that were not considered in the hydraulic analysis of streams where the new hydraulic model was created during the production of this statewide format FIRM.

This map reflects more detailed and up-to-date stream channel configurations than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contain authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Please refer to the separately printed Map Index for an overview map of the county showing the layout of map panels, community map repository addresses, and a listing of communities with National Flood Insurance Program offices for each community as well as a listing of the panels on which each community is located.

If you have questions about this map, or questions concerning the National Flood Insurance Program in general, please call 1-877-FEMA-MAP (1-877-362-6277) or visit the FEMA website at <http://www.fema.gov>.

An accompanying Flood Insurance Study report, Letter of Map Revision (LOMR) or Letter of Map Amendment (LOMA) is available for this panel, and digital versions of this FIRM may be available. Visit the North Carolina Floodplain Mapping Program website at <http://www.ncfloodmaps.com> or contact the FEMA Map Service Center at 1-800-226-5868 for information on all related products associated with this FIRM. The FEMA Map Service Center may also be reached by Fax at 1-800-358-5626 and its website at <http://www.fema.gov>.

MAP REPOSITORY

Refer to listing of Map Repositories on Map Index or visit <http://www.ncfloodmaps.com>

EFFECTIVE DATE OF FLOOD INSURANCE RATE MAP PANEL

OCTOBER 2, 2008

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to statewide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in the community, contact your insurance agent, the North Carolina Division of Emergency Management, or the National Flood Insurance Program at the following phone numbers or websites:

NC Division of Emergency Management
(919) 716-6079 <http://www.ncemergency.com>

National Flood Insurance Program
(800) 425-6847 <http://www.floodmaps.com>



This digital Flood Insurance Rate Map (FIRM) was produced through a unique cooperative partnership between the State of North Carolina and the Federal Emergency Management Agency (FEMA). The State of North Carolina has implemented a long term approach of floodplain management to decrease the costs associated with flooding. This is demonstrated by the State's commitment to map floodplain areas at the local level. As a part of this effort, the State of North Carolina has joined in a Cooperative Technical State agreement with FEMA to produce and maintain this digital FIRM.

www.ncfloodmaps.com

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1720J

FIRM
FLOOD INSURANCE RATE MAP
NORTH CAROLINA

PANEL 1720
SEE LOCATOR DIAGRAM OR MAP INDEX FOR FIRM PANEL LAYOUT(S)

CONTAINS

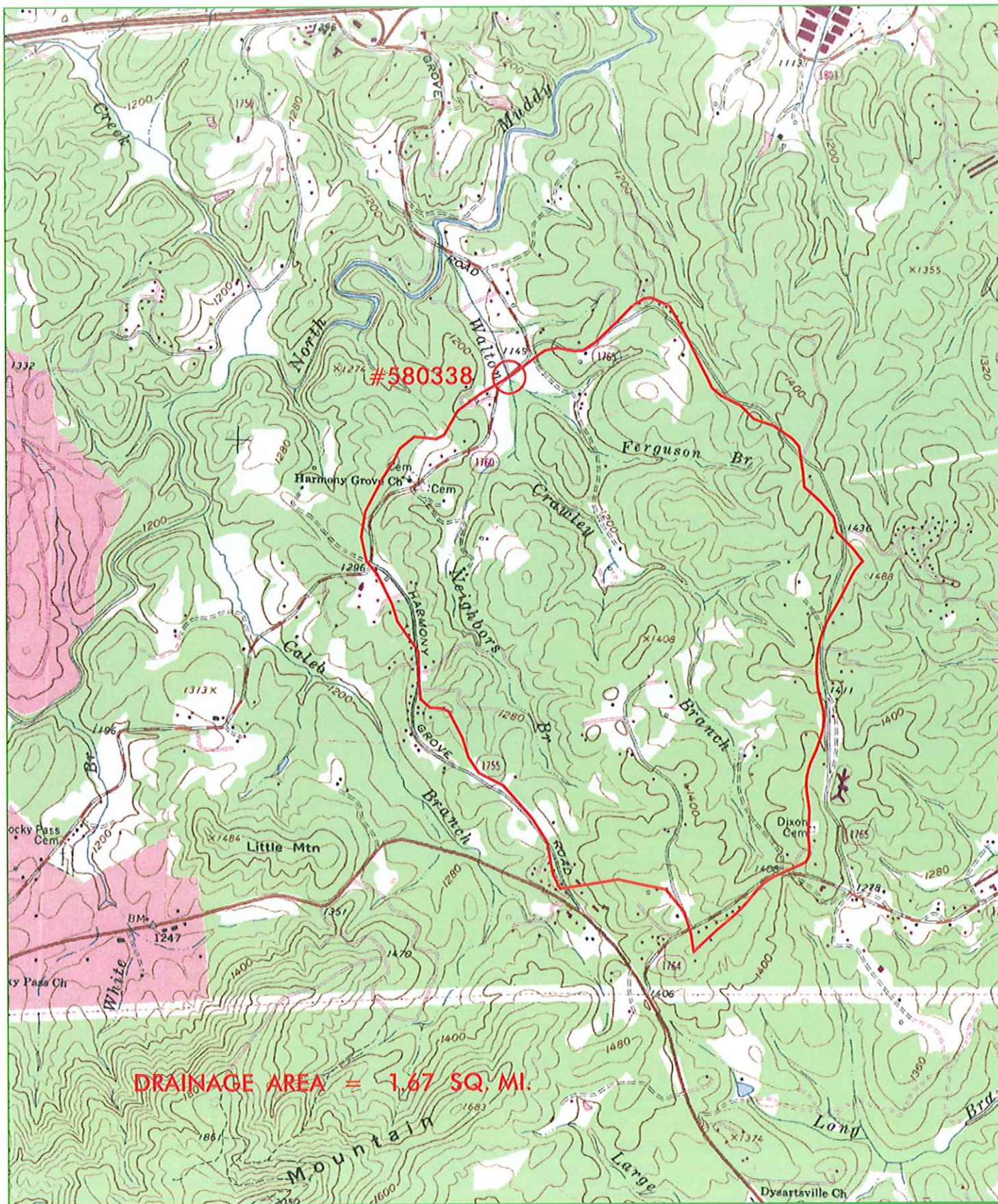
COMMUNITY	CD No.	PANEL	SUFFIX
MARION CITY OF	370266	1720	J

Notes to User: The Map Number shown below should be used when placing map orders. The Community Number shown above should be used on insurance applications for the subject community.

EFFECTIVE DATE
OCTOBER 2, 2008

MAP NUMBER
3710172000J

State of North Carolina
Federal Emergency Management Agency



QUAD MAP - BRIDGE #580338

1,000 0 1,000 2,000
SCALE:

