Cover Page

Hydraulics Unit Pre-Design Report (Pre-Scoping) for Structure #: 220034

Date: 10/12/2016

County: Cleveland **Stream:** MUDDY FORK CREEK

Road #: SR 2033 **Road Name:** OAK GROVE RD

Division: 12 **Location:** 0.2 M E JCT SR 2044

Latitude: 35.27286 **Longitude:** -81.44693 Decimal degrees, a min of 5 decimal points

Assigned to:

Prepared By: wsh/SJS

Hydro Mgr: PFF Hydro Reviewer: MTS

Project Type:

Existing Structure

Structure Type: RC Deck/I Beams Yr Built: 1954

Span Arrangement: 4 @ 40' OAL (ft): 161.0 Skew: 90 Abutment Type: RC CAPS ON TIMBER PILI

Number of Barrels: @ Span (ft): x Rise (ft):

Bed to Crown (ft): 21.0 Clear Roadway (ft): Water Depth (ft) 1.0 Superstructure Depth:

ADT: 3800 Year ADT: 2013 Scour Code (item113): 3 Prior Survey Completed: ☑ Survey Date:

Drainage Area: 32.3 Sq. Mi. Drainage Area Source: USGS Stream Stats Roadway Overtops at Q100: ☐

Discharge Method: USGS Regression Equations USGS Region: 1- Piedmon Stream Gage Number(if applicable):

Q10 (cfs): Q25 (cfs): 4,400 Q50 (cfs): 5,300 Q100 (cfs): 6,200 QBFE (cfs):

☐ Structure in Flood Hazard Zone Panel #: 2566 Panel Date: 02/20/2008 Type of FIS: DETAILED Date of FIS:

Enviromental

Quad Map: WACO, NC River Basin: Broad Buffer Rule:

Primary Stream Classification

☐ Class B ☑ Class C ☐ SA ☐ SB

☐ SC ☐ SWL ☐ WL ☐ WS I

☐ WS II ☐ WS III ☐ WS IV ☐ WS V

Supplemental Stream Classification

☐ FWS ☐ HQW ☐ NSW ☐ ORW

☐ Sw ☐ Tr ☐ UWL ☐ w/in 0.5mi. of CA

Other Stream Classification

☐ Anadromous Fish ☐ Area of Envronmental Concern

☐ CAMA County ☐ Federal Wild & Scenic Rivers

☐ HSB Requried ☐ NC Natural & Scenic Rivers

☐ Impaired [303d] ☐ Primary Nursery Area

☐ TVA ☐ Designated Shellfish Harvesting Area

☐ Designated Public Mountain Trout Waters

Up/Down Stream Features

Upstream Feature: Bridge

Location: 0.5 M N JCT SR 2033

Structure #: 220035 Route: SR 1001

Latitude: 35.27974 Longitude: -81.43021

Prior Survey Completed: ☐ Survey Date: Bed to Crown (ft): 26.0 Year Built: 1999

Structure Type:

Span Arrangement: 1@ 35', 1@ 60', 1@ 40' OAL (ft): 136.0

Number of Barrels: @ Span (ft): x Rise (ft):

Downstream Feature: Confluence w/ Stream(s)

Location: 1.65 M D/S ALONG FLOW LINE

Structure #: Route:

Latitude: 35.25932 Longitude: -81.45652

Prior Survey Completed: ☐ Survey Date: Bed to Crown (ft) Year Built:

Structure Type: NONE

Span Arrangement: OAL (ft):

Number of Barrels: @ Span (ft): x Rise (ft):

Preliminary Structure Estimate [Office Estimate]

Structure Type: Skew:

Dimensions/Spans:

Notes

Stream Assigned #: 9-53-6

OFFICE ESTIMATE: _____

Project# _____
TIP# _____
Let Date _____
WBS# _____

PREDESIGN-SCOPING REPORT

A-15

County CLEVELAND (DIV. 12)
Bridge# 220034
Road# SR 2033 / OAK GROVE RD.
Stream MUDDY FORK CREEK

Type Of Request: POC Force Account TIP NCMA

Date 10-6-16 Name WSH Assigned To PFF / MTS
Checked By SJS 10-12-16
Prior Survey Date YES-ATTACHED (attach copy of prior survey) BRN. BK.: 4@40' (9-256) CO. FILE ATTACHED
Study By Scour Section YES ATTACHED
Flood Zone AE Detail Study Detailed (HEC-RAS) Date 2/20/08 Panel# 25066
B.M. Info N/A
Quad Map WACO Drainage Area 32.3 SQ MI From STREAM STATS
Q25 4400 cfs Q50 5300 cfs Q100 6200 cfs Method REGION 1 RURAL
LONG.: -81.446929
LAT.: 35.272857
NEW REG. EQU.
IA = 2.11%

EXISTING BRIDGE INFORMATION

Location 0.2 MI E. JCT. SR 2044
Average Daily Traffic 3800, 2013, 7% TRK YEAR BUILT: 1954
Length 160' Bed-To Crown 21' Water Depth 1'
Type Structure REINFORCED CONC. DECK ON I-BEAMS / TIMBER PILES / RC POST & BEAM
Type Spans 4@40'

Upstream Structure 220035 (1@35', 1@60', 1@40') YR. BUILT: 1999
Location SR 1001 / 0.5 M N JCT. SR 2033 LONG: -81.430206 (RC DECK STEEL PILES DRILLED PIERS)
Bed-To Crown 26' (H_2O = 2' DEEP) Prior Survey N/A LAT: 35.279742

Downstream Structure CONVERGES W/ BUFFALO CREEK YR. BUILT: N/A
Location D/S 1.65 MILES ALONG FE
Bed-To Crown N/A Prior Survey N/A LONG: -81.456520
LAT: 35.259323

ENVIRONMENTAL

TVA: NO

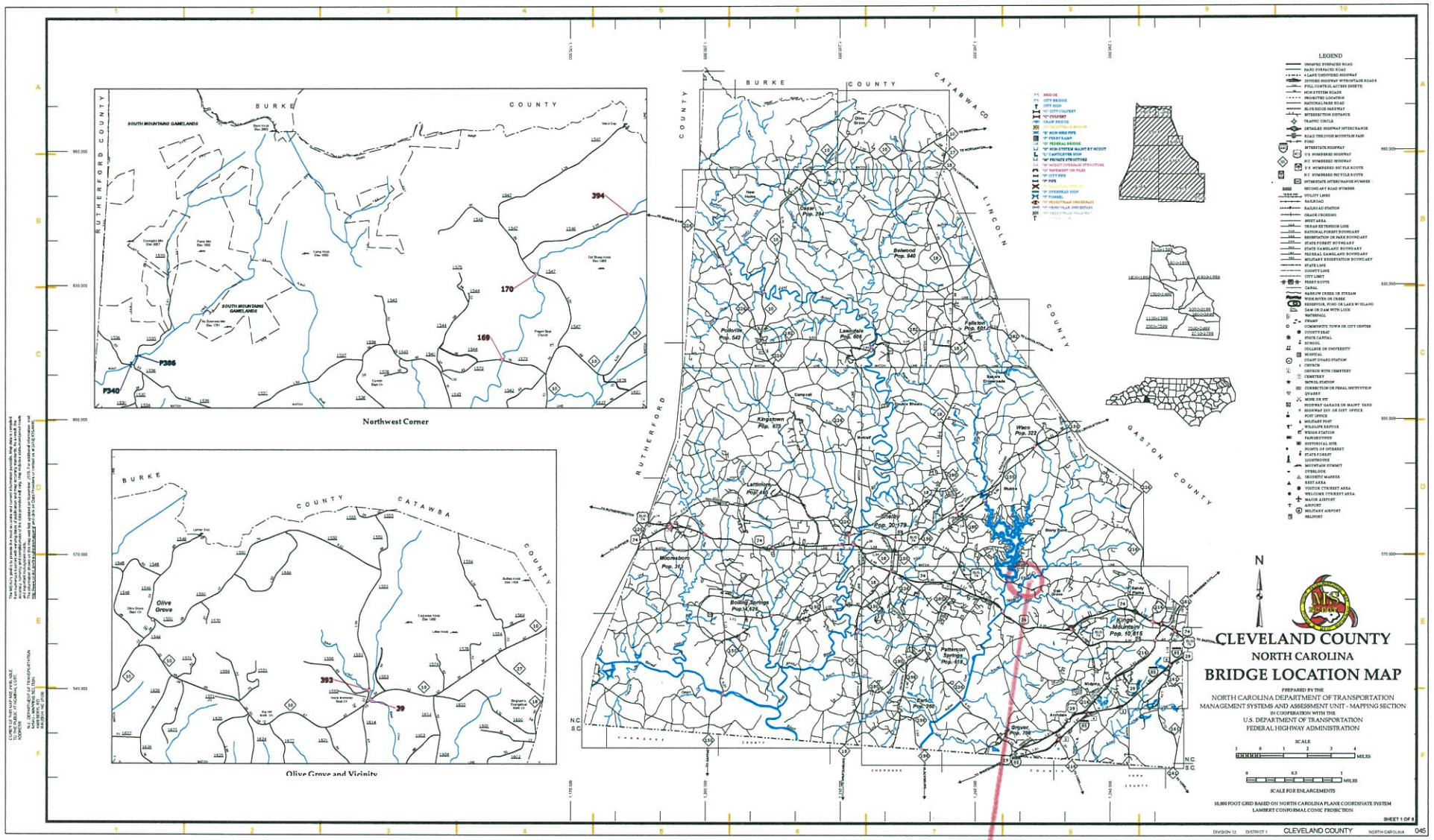
Trout Stream NO Anadromous Fish NO Primary Nursery Area NO
High Quality Waters NO. Nutrient Sensitive Waters NO
Near Water Supply Intake NO CAMA County NO
Stream Classification C STREAM #: 9-53-6
DENR River Basin Info. BROAD

1, 37, 40, 64
U/S 30

PSR ✓ PDR in S DRIVE ✓

SCANNED 10/12

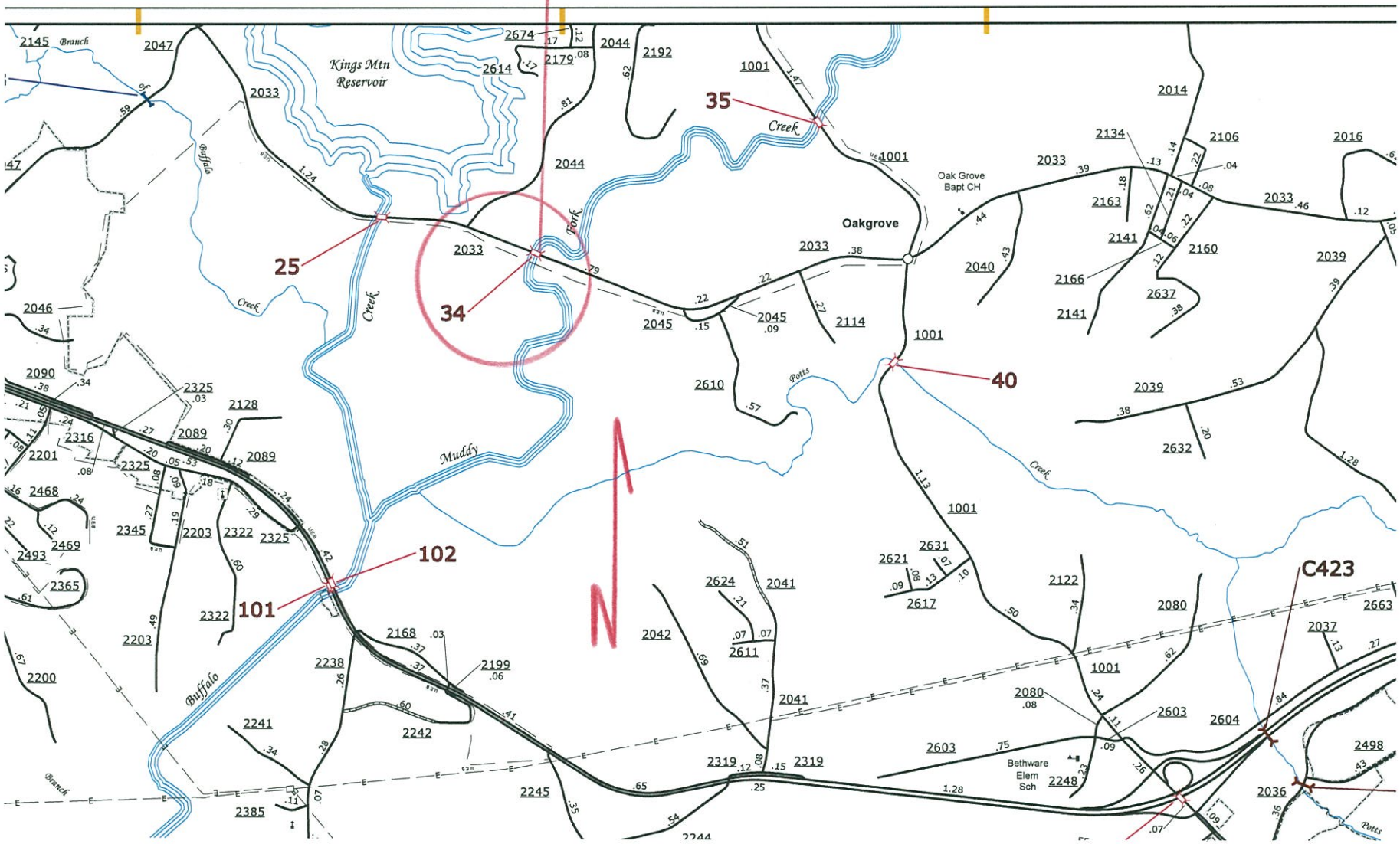
220034


Northwest Corner
Olive Grove and Vicinity
CLEVELAND COUNTY
NORTH CAROLINA
BRIDGE LOCATION MAP
PREPARED BY THE
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
MANAGEMENT SYSTEMS AND ASSESSMENT UNIT - MAPPING SECTION
IN COOPERATION WITH THE
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
SCALE
SCALE FOR ENLARGEMENTS
10,000 FOOT GRID BASED ON NORTH CAROLINA PLANE COORDINATE SYSTEM
LAMBERT CONFORMAL CONIC PROJECTION
SHEET 1 OF 8
DIVISION 12
DISTRICT 1
CLEVELAND COUNTY
NORTH CAROLINA
045

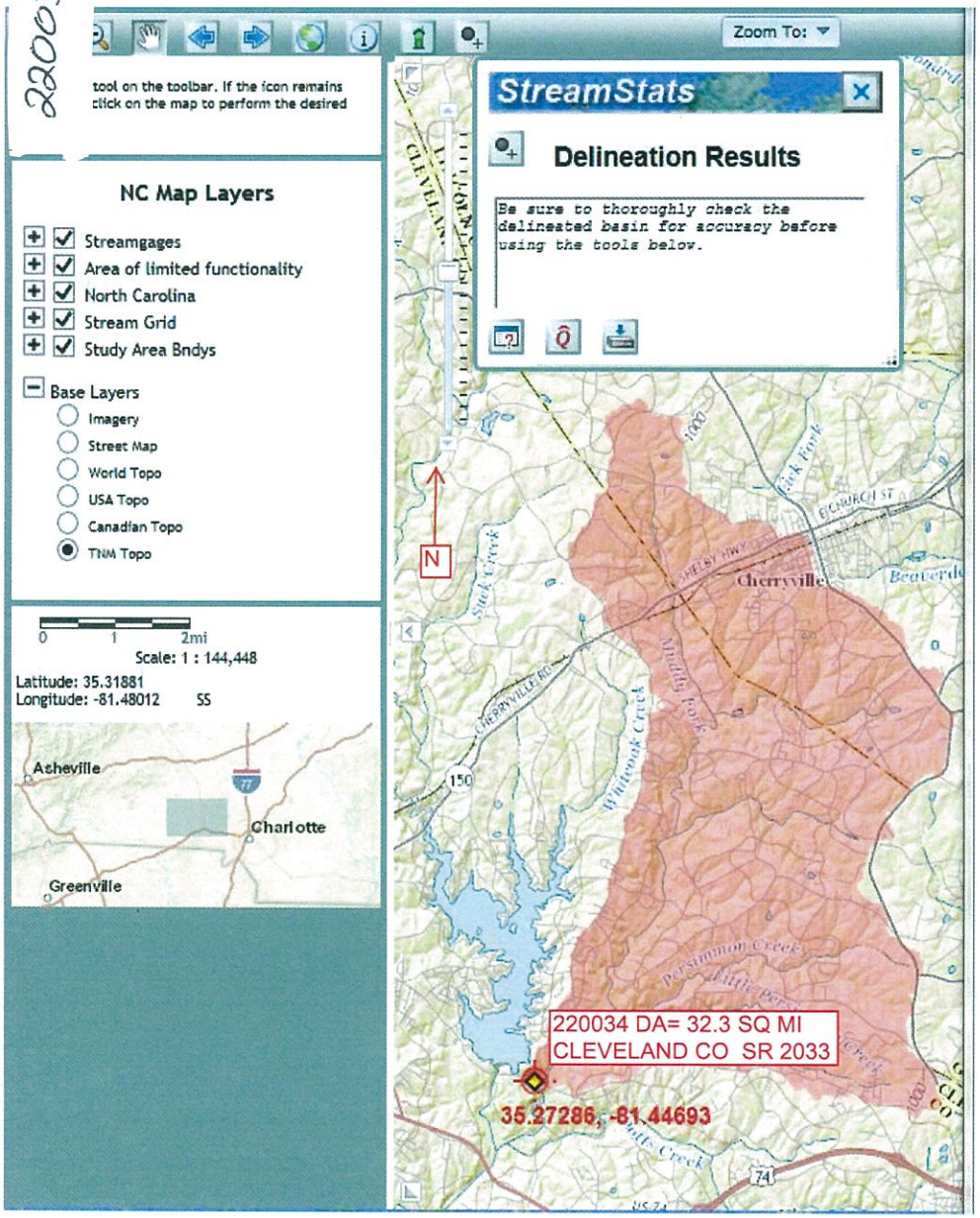
#34

220034

#34


Kings Mtn Reservoir
Oakgrove
Oak Grove Bapt CH
Bethware Elem Sch
Buffalo Creek
Muddy Creek
Potts Creek
Branch
Fork
25
34
35
40
101
102
C423
N

220034



Flow Statistics Ungaged Site Report

Date: Fri Oct 7, 2016 8:07:24 AM GMT-4
Study Area: North Carolina
NAD 1983 Latitude: 35.2729 (35 16 22)
NAD 1983 Longitude: -81.4468 (-81 26 49)
Drainage Area: 32.3 mi2

Peak Flows Region Grid Basin Characteristics			
100% Peak Southeast US over 1 sqmi 2009 5158 (32.3 mi2)			
Parameter	Value	Regression Equation Valid Range	
		Min	Max
Drainage Area (square miles)	32.3	1	9000
Percent Area in Region 1 (percent)	100.000	0	100
Percent Area in Region 2 (percent)	0.000	0	100
Percent Area in Region 3 (percent)	0.000	0	100
Percent Area in Region 4 (percent)	0.000	0	100
Percent Area in Region 5 (percent)	0.000	0	100

Urban Flows Region Grid Basin Characteristics			
Area in square miles=32.3			
Percent imperviousness of basin area 2006 NLCD=2.11			
100% Region 1 Urban over 3 sqmi 2014 5030 (32.3 mi2)			
Parameter	Value	Regression Equation Valid Range	
		Min	Max
Drainage Area (square miles)	32.3	3	436
Percent Impervious NLCD2006 (percent)	2.11	0	47.9

Peak Flows Region Grid Statistics						
Statistic	Value	Unit	Prediction Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
					Min	Max
PK2	1510	ft3/s	35		872	2620
PK5	2610	ft3/s	34		1520	4490
PK10	3400	ft3/s	35		1940	5940
PK25	4410	ft3/s	38		2440	7990
PK50	5320	ft3/s	40		2840	9940
PK100	6120	ft3/s	42		3160	11800
PK200	6900	ft3/s	44		3450	13800
PK500	8130	ft3/s	48		3870	17100

http://pubs.usgs.gov/sir/2009/5158/
Weaver_ J.C._ Feaster_ T.D._ and Gotvald_ A.J._ 2009_ Magnitude and frequency of rural floods in the Southeastern



220034

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE MANAGEMENT UNIT

ATTENTION: PRIORITY MAINTENANCE ON BEAMS, TEMPORARY REPAIRS

Structure Safety Report

Routine Element Inspection - Contract

COUNTY: CLEVELAND **STRUCTURE NUMBER:** 220034 **FREQUENCY:** 24 MONTHS

FACILITY CARRIED: SR2033 **MILE POST:**

LOCATION: 0.2 MI. E. JCT. SR2044

FEATURE INTERSECTED: MUDDY FORK CREEK

LATITUDE: 35° 16' 22.24" **LONGITUDE:** 81° 26' 49.06"

SUPERSTRUCTURE: REINFORCED CONCRETE DECK ON I-BEAMS

SUBSTRUCTURE: END BENTS:RC CAPS & TIMBER PILES, INT. BENTS:RC POST & BEAM

SPANS: 4@40'-0" 4@40"0"

☐ FRACTURE CRITICAL ☐ TEMPORARY SHORING ☐ SCOUR CRITICAL ☐ SCOUR PLAN OF ACTION

PRESENT CONDITION: Poor **INSPECTION DATE:** 12/17/2014

POSTED SV: 34 **POSTED TTST:** 39

OTHER SIGNS PRESENT: 4 DELINEATORS



LOOKING EAST

Sign noticed issued for		Number Required
NO	WEIGHT LIMIT	0
NO	DELINEATORS	0
NO	NARROW BRIDGE	0
NO	ONE LANE BRIDGE	0
NO	LOW CLEARANCE	0

INSPECTED BY	SIGNATURE	ASSISTED BY
Greg Poole	Greg Poole	Bryan Jackson

220034

Structure: 220034 County: CLEVELAND Date: 12/17/2014 Structure Photos



SOUTH APPROACH LOOKING NORTH



BENT 2

220034

BRIDGE MANAGEMENT UNIT

DATA ON EXISTING STRUCTURE Run Date: 06/08/2015

COUNTY :	DIVISION :	DISTRICT:	STRUCTURE NUMBER :	LENGTH :
CLEVELAND	12	1	220034	160 FEET

ROUTE CARRIED : SR2033

FEATURE INTERSECTED : MUDDY FORK CREEK

LOCATED : 0.2 MI. E. JCT. SR2044

BRIDGE NAME :

CITY : *SHELBY

FUNC. CLASS :	SYST.ON :	SYST.UNDER :	ADT & YR :	RAIL TYPE :
17	FA	NFA	3800 2013	LT 141 RT 141

BUILT :	BY :	PROJ :	FED.AID PROJ :	DESIGN LOAD :
1954	SHPWC	9-256	S-739(1)	H 15

REHAB :	BY :	PROJ :	ALIGNMENT :	SKEW :	LANES :
			TAN	90	ON 2 UNDER 0

NAVIGATION :	HT. CRN. TO BED :	WATER DEPTH :
VC 0 FT HC 0 FT	21 FT	1 FT

SUPERSTRUCTURE : REINFORCED CONCRETE DECK ON I-BEAMS

SUBSTRUCTURE : END BENTS:RC CAPS & TIMBER PILES, INT. BENTS:RC POST & BEAM

SPANS : 4@40'0"

BEAMS OR GIRDERS : 4 LINES OF W27X102 I-BEAMS @ 7'0" CENTERS

FLOOR :	ENCROACHMENT :	DECK (OUT TO OUT) :
6.5" RC SLAB	1 1/4" CONDUIT	26.417 FT

CLEAR ROADWAY :	BETWEEN RAILS :	SIDEWALK OR CURB :
24 FT	26.25 FT	LT 1.125 FT RT 1.125 FT

VERT.CL.OVER : 999.9 FT

INV.RTG. :	OPE.RTG. :	CONTR.MEMBER :	POSTED :
HS-14	HS-24	intbm	SV 34 TTST 39 DATE 10/16/2008

SYSTEM : Secondary S.R. Route

GREEN LINE ROUTE : N

UNDER ROUTES AND CLEARANCES

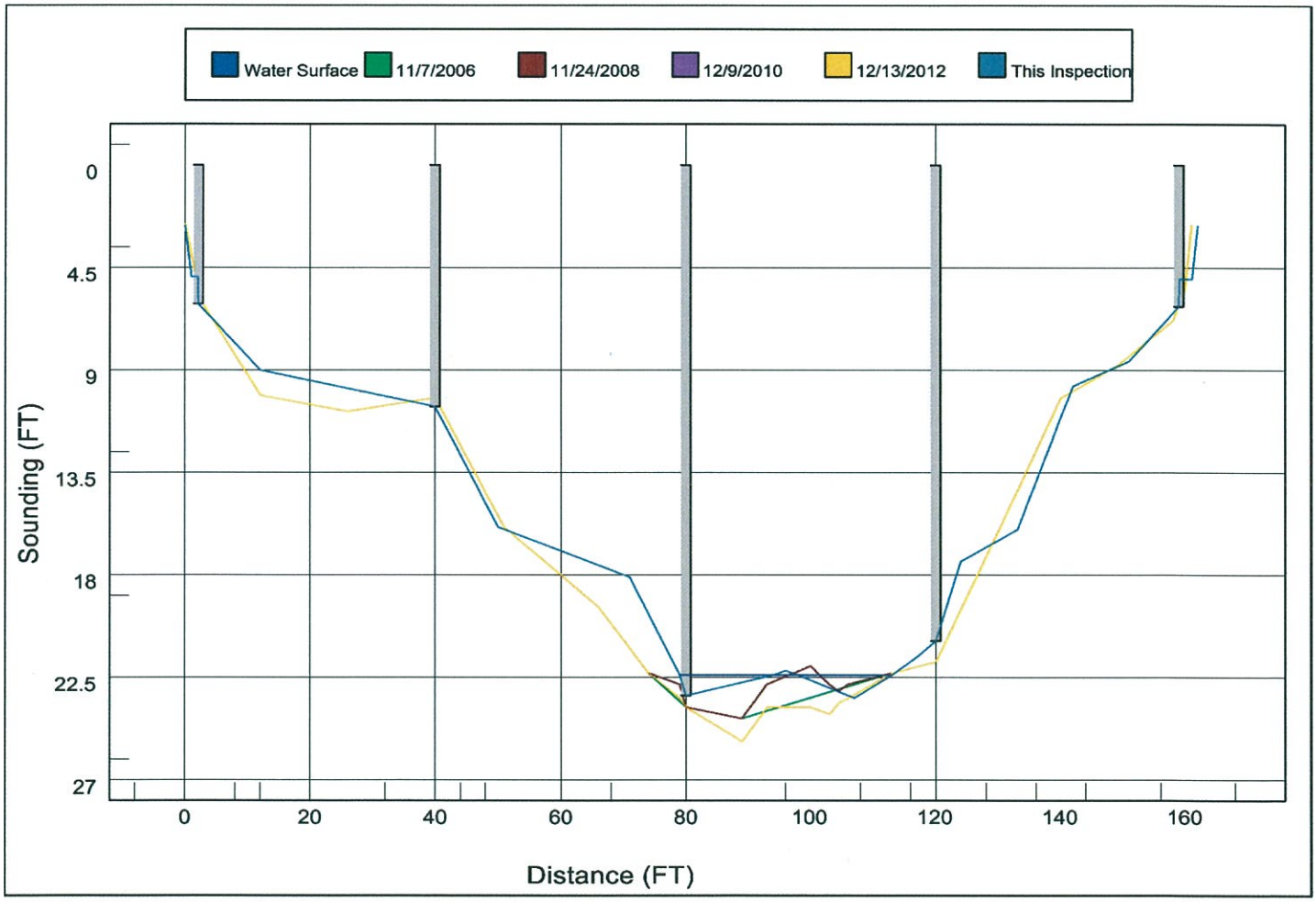
REMARKS :

220034

Bridge: 220034 County CLEVELAND Date:

STREAMBED PROFILE (Downstream)

Top of Rail = 0 FT (Sounding)



*D/S STR

220034

Structure: 220035 County: CLEVELAND Date: 08/03/2016 Structure Photos



West profile looking East



typical underside of deck

REV. 03/95

BRIDGE SCOUR EVALUATION ASSESSMENT AND DATA SUMMARY REPORT

ASSESSED 12 - 2 - 96
BY: HSMM
CODE 8 - 600
CLASSIFIED Low Risk

* FULL SCOUR REPORT AVAILABLE IN HYDRAULIC UNIT SCOUR FILES 10-12-16

SITE IDENTIFICATION:

COUNTY CLEVELAND CITY/TOWN Shelby BRIDGE NO. 34
ROUTE SR 2033 STREAM MUDDY FORK CREEK ROAD MILE _____
DUAL BRIDGE NO. ____ IS US/DS
ORIG. PROJECT NO. 9-256 YEAR BUILT 1954
REHAB. PROJECT NO. _____ YEAR REHAB. _____
CURRENT ADT _____ YEAR _____ FUTURE ADT _____ YEAR _____

INFORMATION RESOURCES AVAILABLE:

HYDRAULIC STUDY REPORT (DATE)	None
AS-BUILT CONSTRUCTION PLANS (DATE)	4/54
FOUNDATION REPORT (DATE)	None
OTHER AGENCY STUDIES (DATE)	
(FEMA, CORPS, T.V.A., SCS)	
QUAD MAPS (NAME & DATE)	
AERIAL PHOTOGRAPHY (DATE)	
GAGE DATA (TYPE, NO., DRAINAGE AREA)	
DISTANCE TO SITE (UP/DN STREAM)	
BRIDGE INSPECTION REPORT (DATE)	11/30/94
UNDERWATER INSPECTION (DATE, CYCLE)	None
STRUCTURE DATA FILE (DATE)	11/30/94

HYDRAULIC DATA:

DRAINAGE AREA _____ SQ. MI. SOURCE _____
100 YR. WATERWAY OPENING (NORMAL TO FLOW) _____ SQ. FT.

HISTORICAL FLOODS

DATE	ELEV. (FT.)	APPROX. FREQ. (YRS.)	APPROX. DISCH.	ADJUSTED TO SITE

SOURCE _____

FLOOD FREQUENCY (YRS.)	Q___	Q___	Q___	Q___
ELEVATION (FT.)				
DISCHARGE (CFS)				
AVG. VELOCITY (Q/A)				

SOURCE: _____

COMMENTS: _____

DECISION:

CLASSIFIED AS:
SCOUR CRITICAL
UNKNOWN FOUNDATION
LOW RISK ✓

RECOMMENDED SCOUR CODE 8

ASSESSMENT COMMENTS: Plans contain as-built information. Plans call for footings to be keyed 6" into rock, and as-built excavation quantities indicate that this occurred. Creosoted timber piles used in end bents. Some scour reported in BIK at B-2 and along the banks. Inspector recommended placing additional scour protection. Since the footings are keyed in rock but have embedments ≤ 7', a low risk category seems reasonable with geotech concurrence.

SCHEDULE FOR DETAILED STUDY
SCHEDULE FOR FURTHER IN-HOUSE STUDY

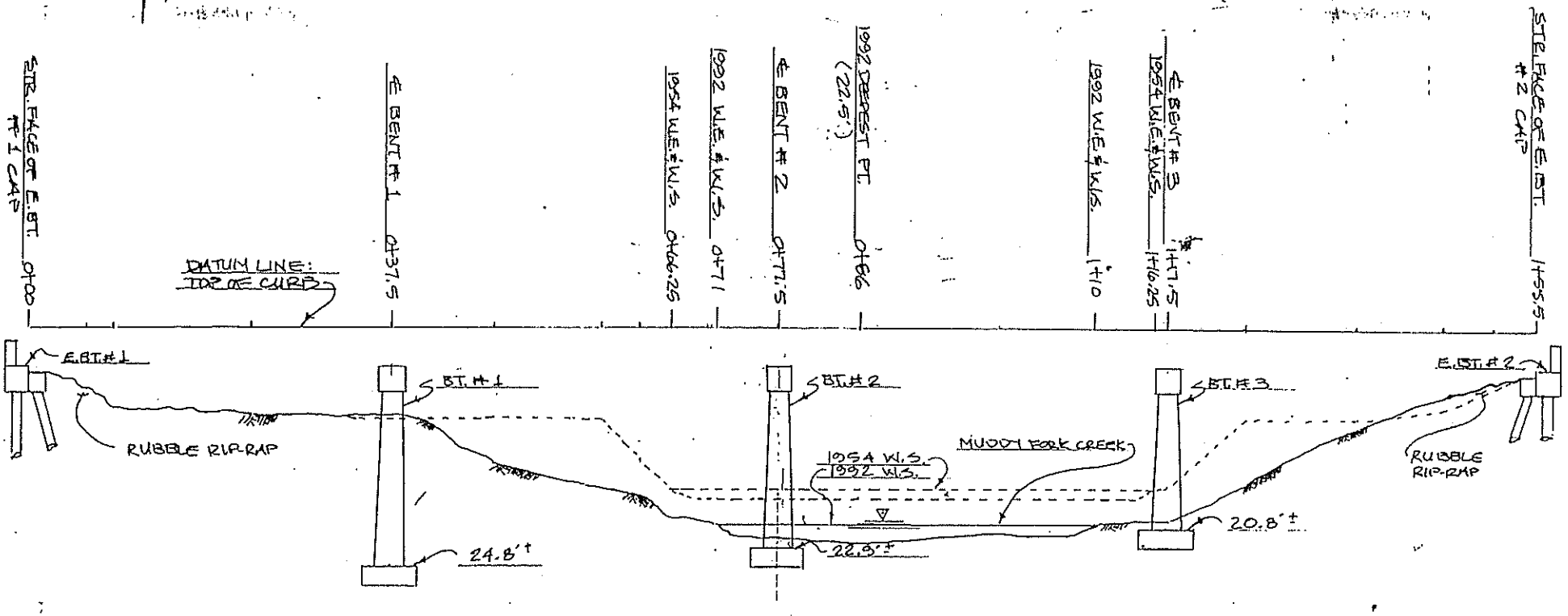
ASSESSED BY: John Fisher, PE
FIRM: Hayes, Seay, Mattern & Mattern
DATE: 12/2/96
CHECKED BY: C. Bush
FIRM: D+D
DATE: 12-6-96

APPROVED BY:
DATE:

FINAL COMMENTS: The Soundings from 1994 and 1954 Plans indicate the thalweg has degraded by 4.7'. Scour critical condition depends on the material that the spread footings are founded on. Geotech should confirm that the footings are founded on scour resistant material.

STREAMBED PROFILE SKETCH
(DOWNSTREAM SIDE)

BR.# 34 CLEVELAND CO.
SR-2033
11-30-94 GLS



LEGEND:
1994 WATER & BEDLINE
1992 WATER & BEDLINE
℄ 1994

NOTES:
- TOP OF FOOTINGS SHOWN AS DISTANCE FROM DATUM LINE
- PILE TIP ELEVATIONS (AT END BTS.) NOT LEGIBLE ON PLANS

SCALE: 3/32" = 1'

220034
(1 of 4)

S-1510(1)

3-9-54

BRIDGE DEPARTMENT
N. C. STATE HIGHWAY & PUBLIC WORKS COMMISSION
RALEIGH, N. C.

130

BRIDGE SURVEY REPORT

OJECT NO. 9-256, CLEVELAND COUNTY, STA. 12 129+00
JDGE OVER MUDDY FORK CREEK Known as Br 34
Co. Rd between Shelby and Oakgrove
commended Width of Roadway 24' ✓ Skew. 90°
commended Structure 4 @ 40' C to C I-beams & concrete
90° End Bents

H15

Rip Rap is reqd up to Elev 644.0
Temporary Crossing is not reqd.
Present Structure Remove
New Location is 600' UP ~~Up~~, ~~Down~~ Stream from Crossing on Present Road
Nearest Shipping Point Shelby On Sou. R.R. R. R.
Distance from Shipping Point to Bridge Site is 6.3 miles.
Elevations From B. M. #20 Nail in base 7" Pine 100' Lt. Sta. 132+37 Elev. 647.63

USE THIS SPACE FOR PHOTOGRAPH OF PROPOSED SITE, SHOWING CENTER LINE, DIRECTION OF FLOW AND OTHER IMPORTANT POINTS ON PHOTOGRAPH.

Surveyed by H.C. Townsend Assisted by D.E.D. Date 1-7-54

240-29

NF 63716

22 0034 1954 NO TIP STA_12900 MUDDY FORK CR CO RD
WO_9-256 .PDF

220034
(2 of 4)

Drainage Area 33 Sq. Mi. Obtained from Soil Map

Character of Drainage Area Hilly, Clay

Waterway Required by Formula 1240 Sq. Ft. Formula Used Tal C = 0.7

Maximum Stream Discharge ____ Sec. ft. Date ____

Discharge Data Obtained From ____

Period Covered by Discharge Records ____

Discharge Used for Design of Waterway ____ Sec. Ft.

Waterway Area Considered Necessary ____ Sq. Ft.

Waterway Area Provided by Recommended Structure ____ Sq Ft.

Data on Existing Structure Bridge #34 OA Lon 226.6 - Cl. Rdwy 11.1
1 @ 26 & 5 @ 40' I-bms on Conc Abuts, 4 I-bms & Pcd Bents
& 1 Conc Pier

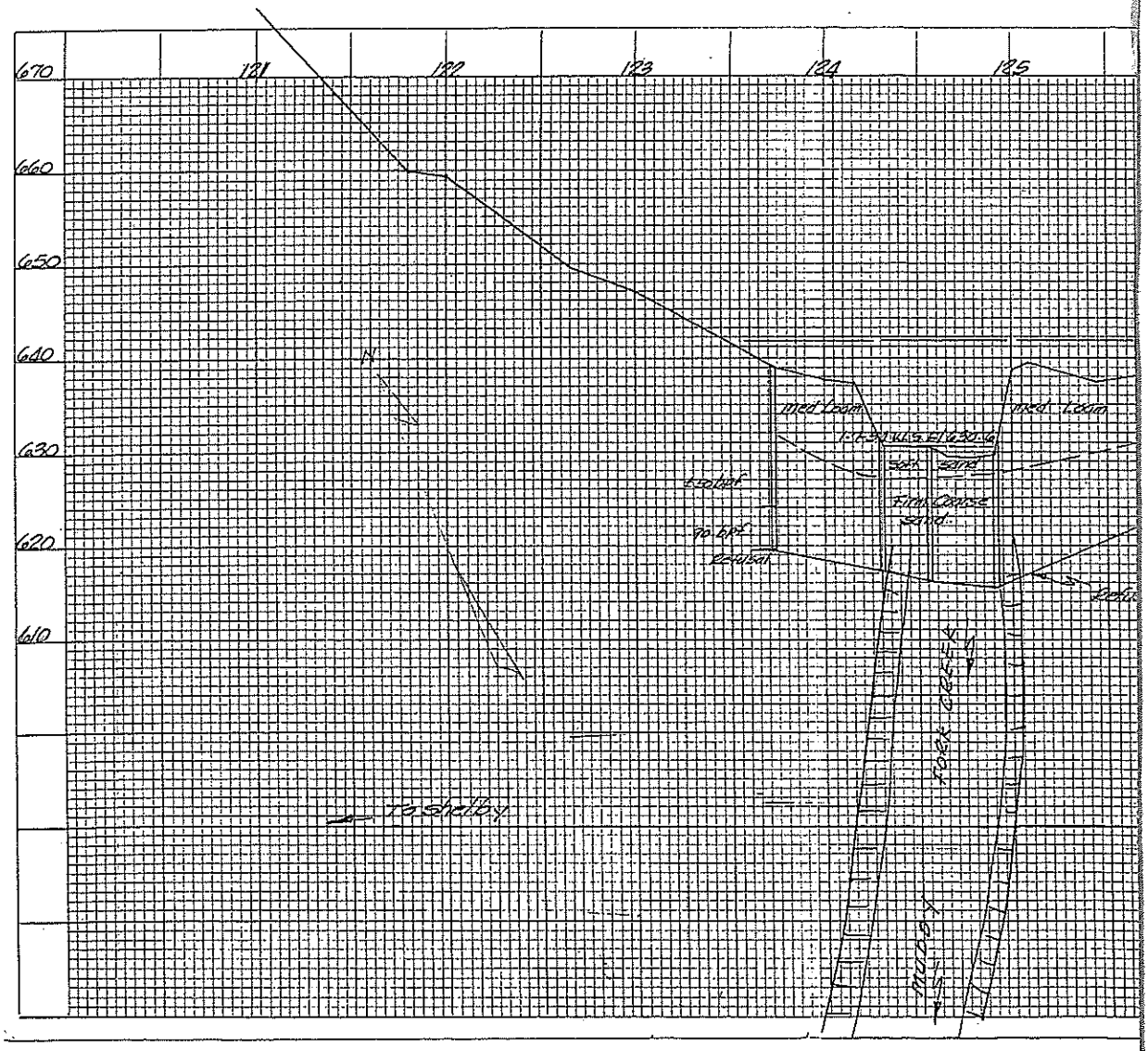
Data on other Structures Up or Down Stream ____

Method Used in Determining Foundation Material Driving 1/2 Rod

Is Additional Foundation Investigation Considered Advisable No

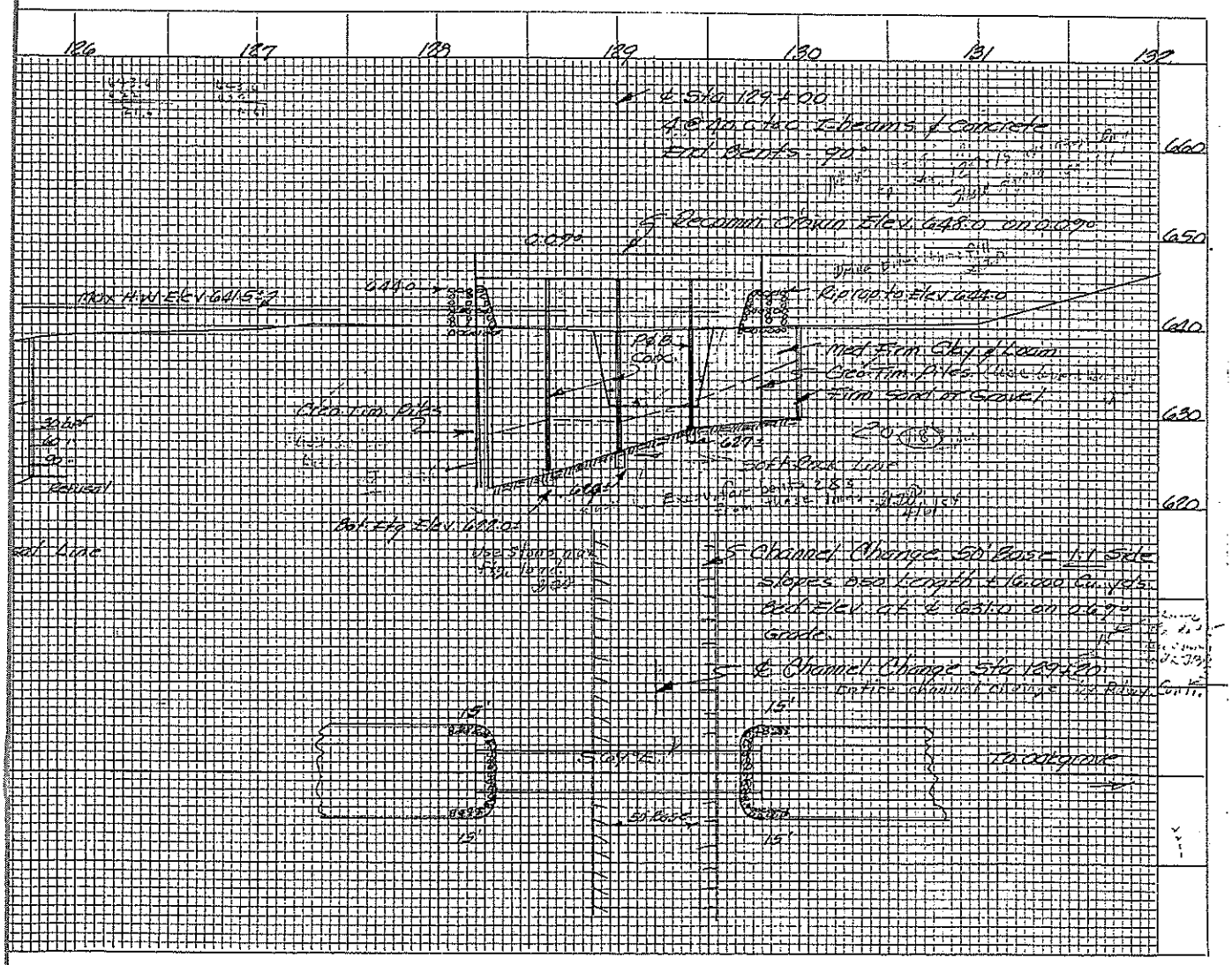
Other Information ____

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(3 of 4)

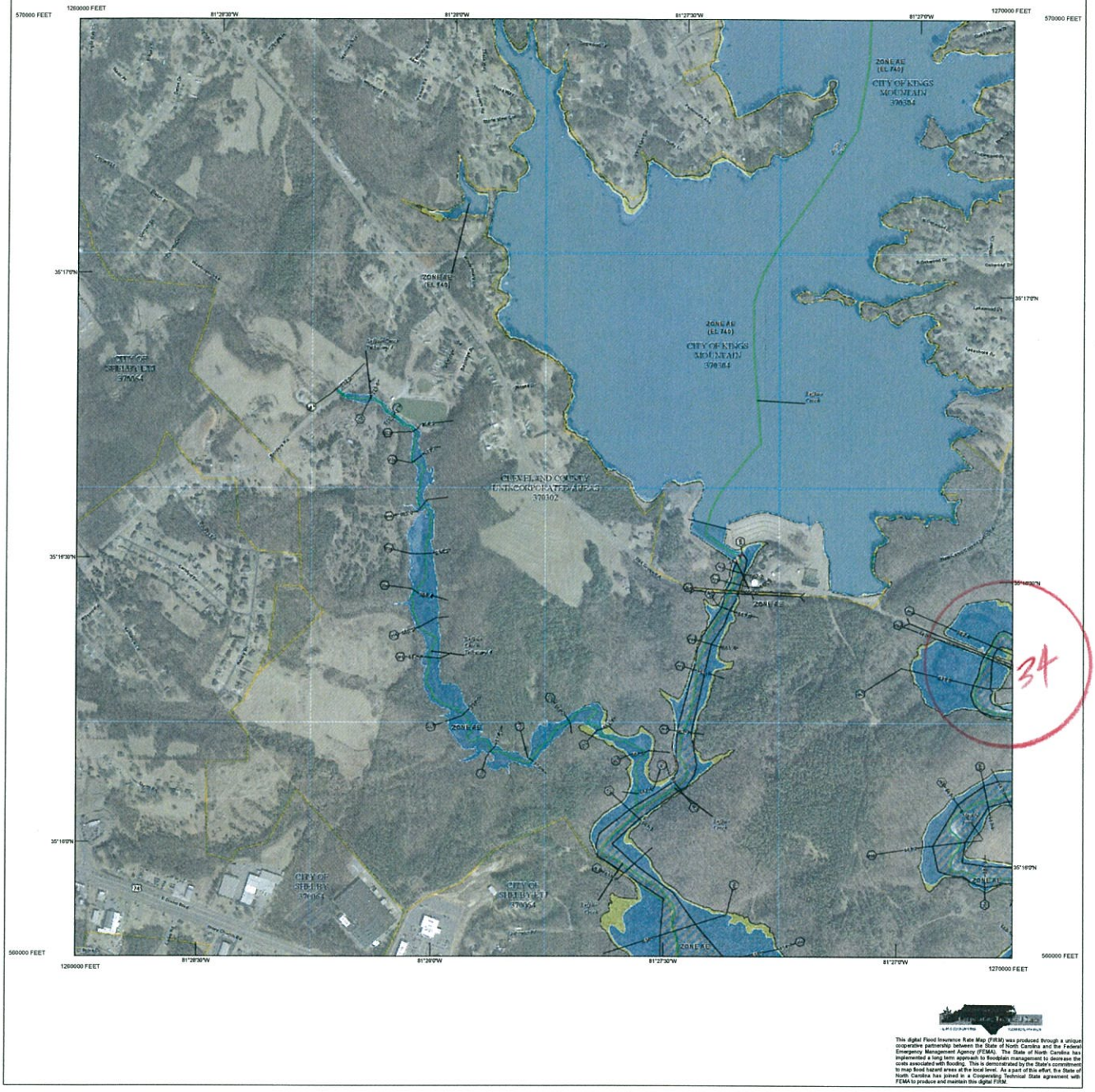


220034

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(4 of 4)


126
127
128
129
130
131
132
660
650
640
630
620
600
℄ Sta 129+00
Recomm. Chan. Elev. 648.0 on 0.07%
Rip rap to Elev 644.0
Mod. Firm Clay & Loam
Geo-Fim. Pics
Firm Sand or Gravel
Geo-Fim. Pics
Bot. Elg Elev. 622.0±
Channel Change Sta 129+00
Grade
Channel Change Sta 129+00
Notice channel change
Riprap
15'
50' R/W

220034



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 to floodplain management to decrease the costs associated with flooding. This is demonstrated by the State's commitment to map flood hazard areas at the local level. As a part of this effort, the State of North Carolina has joined in a Cooperating Technical State agreement with FEMA to produce and maintain this digital FIRM.

FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT HTTP://FRIS.NC.GOV/FRIS

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% Annual Chance Flood with Average Depth Less Than One Foot or With Drainage Areas of Less Than One Square Mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee See Notes *Zone X*

OTHER AREAS
- Areas Determined to be Outside the 0.2% Annual Chance Floodplain *Zone X*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Accredited or Provisionally Accredited Levee, Dike, or Floodwall
- Non-accredited Levee, Dike, or Floodwall
- BM5510 North Carolina Geodetic Survey bench mark
- BM5510 National Geodetic Survey bench mark
- BM5510 Contractor Est. NCFMP Survey bench mark
- 512 18.2 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
- (B) Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

OTHER FEATURES
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange at 1-877-FEMA MAP (1-877-336-2627) or visit the FEMA Map Service Center website at http://msc.fema.gov. An accompanying Flood Insurance Study report, Letter of Map Revision (LOMR) or Letter of Map Amendment (LOMA) revising portions of 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.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Map Service Center at the number listed above.

For community and countywide map dates refer to the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in the community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on this FIRM was provided in digital format by the North Carolina Floodplain Mapping Program (NCFMP). The source of this information can be determined from the metadata available in the digital FLOOD database and in the Technical Support Data Notebook (TSDN).

ACCREDITED LEVEE NOTES TO USERS: If an accredited levee note appears on this panel check with your local community to obtain more information, such as the estimated level of protection provided (which may exceed the 1-percent-annual-chance level) and Emergency Action Plan, on the levee system(s) shown as providing protection. To mitigate flood risk in residual risk areas, property owners and residents are encouraged to consider flood insurance and floodproofing or other protective measures. For more information on flood insurance, interested parties should visit the FEMA Website at http://www.fema.gov/business/nfip/index.shtm.

PROVISIONALLY ACCREDITED LEVEE NOTES TO USERS: If a Provisionally Accredited Levee (PAL) note appears on this panel, check with your local community to obtain more information, such as the estimated level of protection provided (which may exceed the 1-percent-annual-chance level) and Emergency Action Plan, on the levee system(s) shown as providing protection. To maintain accreditation, the levee owner or community is required to submit the data and documentation necessary to comply with Section 65.10 of the NFIP regulations. If the community or owner does not provide the necessary data and documentation or if the data and documentation provided indicates the levee system does not comply with Section 65.10 requirements, FEMA will revise the flood hazard and risk information for this area to reflect de-accreditation of the levee system. To mitigate flood risk in residual risk areas, property owners and residents are encouraged to consider flood insurance and floodproofing or other protective measures. For more information on flood insurance, interested parties should visit the FEMA Website at http://www.fema.gov/business/nfip/index.shtm.

LIMIT OF MODERATE WAVE ACTION NOTES TO USERS: For some coastal flooding zones the AE Zone category has been divided by a Limit of Moderate Wave Action (LIMWA). The LIMWA represents the approximate landward limit of the 1.5-foot breaking wave. The effects of wave hazards between the VE Zone and the LIMWA (or between the shoreline and the LIMWA for areas where VE Zones are not identified) will be similar to, but less severe than those in the VE Zone.

Limit of Moderate Wave Action (LIMWA)

COASTAL BARRIER RESOURCES SYSTEM (CBRS) NOTE

This map may include approximate boundaries of the CBRS for informational purposes only. Flood insurance is not available within CBRS areas for structures that are newly built or substantially improved on or after the date(s) indicated on the map. For more information see http://www.fws.gov/habitatconservation/coastal_barrier.html, the FIS Report, or call the U.S. Fish and Wildlife Service Customer Service Center at 1-800-344-WILD.

CBRS Area | Otherwise Protected Area

SCALE

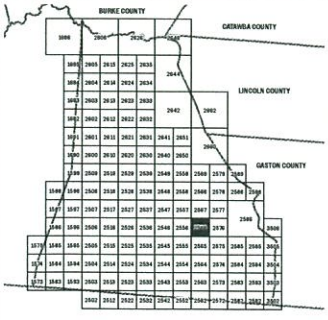
Map Projection:
North Carolina State Plane Projection Feet (Zone 3200)
Datum: NAD 1983 (Horizontal), NAVD 1988 (Vertical)

1 inch = 500 feet 1:6,000

0 250 500 1,000 Feet

0 75 150 300 Meters

PANEL LOCATOR



FEMA

National Flood Insurance Program

NORTH CAROLINA FLOODPLAIN MAPPING PROGRAM
NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

NORTH CAROLINA

PANEL 2566

Panel Contains:

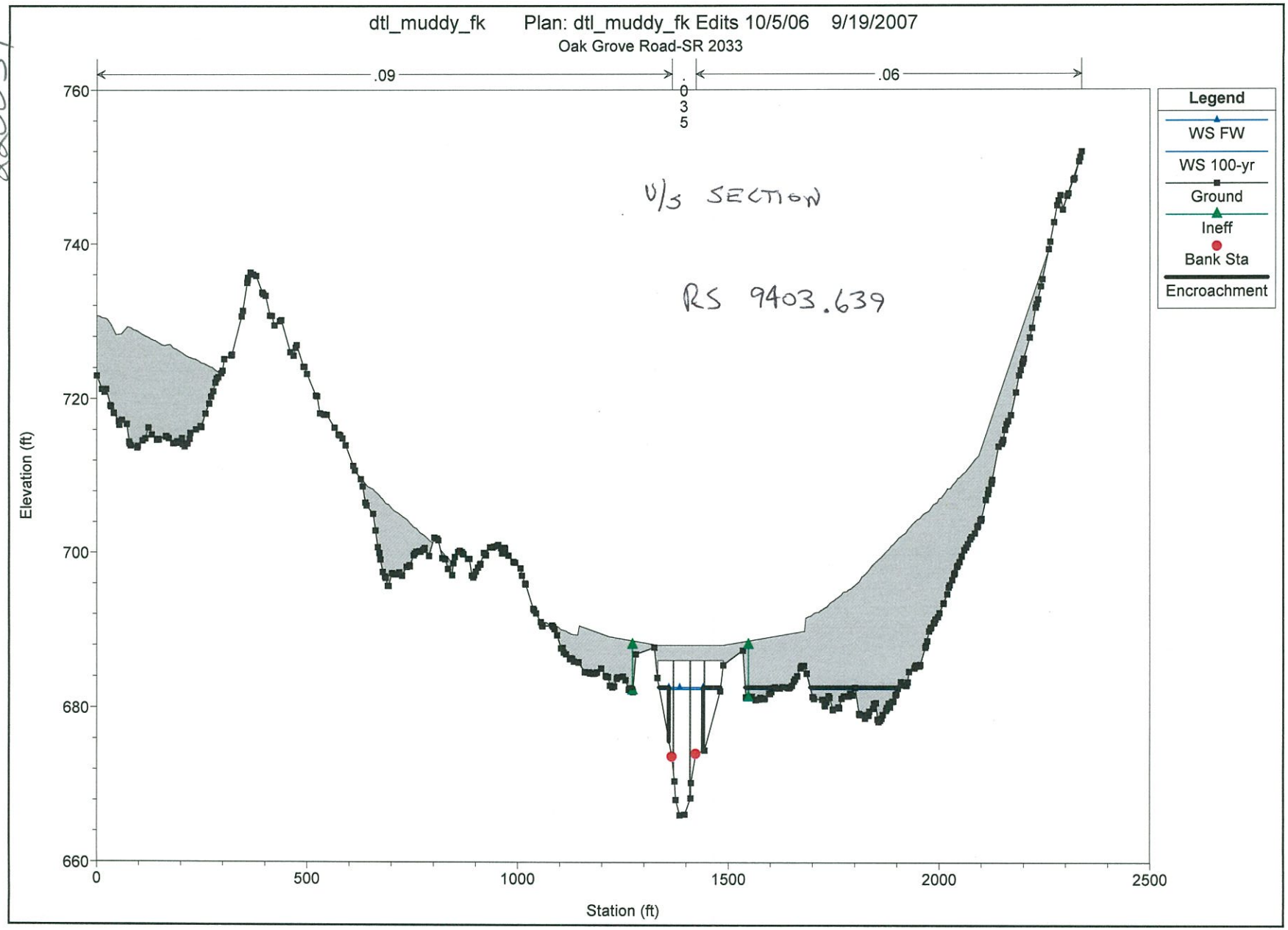
COMMUNITY	CID	PANEL	SUFFIX
CLEVELAND COUNTY	370302	2566	J
KINGS MOUNTAIN, CITY OF	370304	2566	J
SHELBY, CITY OF	370064	2566	J

MAP NUMBER
37102566 00J

MAP REVISED
2/20/2008


CLEVELAND COUNTY
UNINCORPORATED AREAS
370302
Oak Grove Rd
New Camp Creek Church Rd
35°16'30"N
ZONE AE
ZONE AE
Buffalo
Creek
Tributary 4
667.3
667.2
666.6
666.6
665.6
665.4
665.1
682.4
682.3
679.8
678.7
674.0
670.9
666.2
662.4
663.7
661.8
661.8
664.9
667.3
667.8

220034


dtl_muddy_fk Plan: dtl_muddy_fk Edits 10/5/06 9/19/2007
Oak Grove Road-SR 2033
.09
.06
0
3
5
U/S SECTION
RS 9403.639
Legend
WS FW
WS 100-yr
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
760
740
720
700
680
660
0
500
1000
1500
2000
2500
Station (ft)