SITE PERMITTING APPROVAL

Water and Sewer Permits (If applicable)

The City of Raleigh consents to the connection and extension of the City's **Public Sewer System** as shown on this plan. The material and Construction methods used for this project shall conform to the standards and specifications of the City's Public Utilities Handbook. **City of Raleigh Public Utilities Department Permit #** _____

The City of Raleigh consents to the connection and extension of the City's **Public Water System** as shown on this plan. The material and Construction methods used for this project shall conform to the standards and specifications of the City's Public Utilities Handbook. **City of Raleigh Public Utilities Department Permit #** _____

The City of Raleigh consents to the connection to its public sewer system and extension of the **private sewer collection** system as shown on this plan. The material and constructions methods used for this project shall conform to the standards and specifications of the City's Public Utilities Handbook.

City of Raleigh Public Utilities Department Permit # _____

CONSTRUCTION PHASE 1 FOR KALAS FALLS

SITUATED AT ROLESVILLE ROAD, ROLESVILLE WAKE, NORTH CAROLINA

EROSION AND SEDIMENT CONTROL, STORMWATER AND FLOODPLAIN MANAGEMENT APPROVED

EROSION CONTROL ☐ S-xxxx

STORMWATER MGMT. ☐ S-xxxx

FLOOD STUDY ☐ _____

DATE xx/xx/20

WAKE COUNTY NORTH CAROLINA WWW.WAKEGOV.COM

ENVIRONMENTAL CONSULTANT SIGNATURE

Public
Sewer Collection / Extension System

The City of Raleigh consents to the connection and extension of the City's public sewer system as shown on this plan. The material and construction methods used for this project shall conform to the standards and specifications of the City's Public Utilities Handbook.

City of Raleigh
Public Utilities Department Permit #_____

Authorization to Construct: _____

Public
Water Distribution / Extension System

The City of Raleigh consents to the connection and extension of the City's public water system as shown on this plan. The material and construction methods used for this project shall conform to the standards and specifications of the City's Public Utilities Handbook.

City of Raleigh
Public Utilities Department Permit #_____

Authorization to Construct: _____

PROJECT NARRATIVE

THIS PROJECT IS LOCATED IN ROLESVILLE, NORTH CAROLINA AT ROLESVILLE ROAD. IT INVOLVES THE COMBINING OF SEPARATELY PROPOSED PROJECTS KNOWN AS KALAS FALLS, ROGERS FARM AND ONE OTHER TRACT KNOWN AS THE WATKINS PROPERTY. IT DRAINS TO TRIBUTARIES OF HARRIS BRANCH WHICH IS PART OF THE NEUSE RIVER BASIN. IT IS ALSO BOUNDED ON ALL SIDES BY MOSTLY UNDEVELOPED LAND. IT IS APPROXIMATELY 0.5 MILES NORTHWEST OF THE INTERSECTION OF MITCHELL MILL ROAD AND ROLESVILLE ROAD IN WAKE COUNTY, NORTH CAROLINA. THE TOTAL AREA OF THE PROJECT IS 282.726(EXCLUDES EXISTING ROW AND CEMETERY) ACRES.THE CURRENT PHASE IS 83.68 ACRES.

ATTENTION CONTRACTORS:

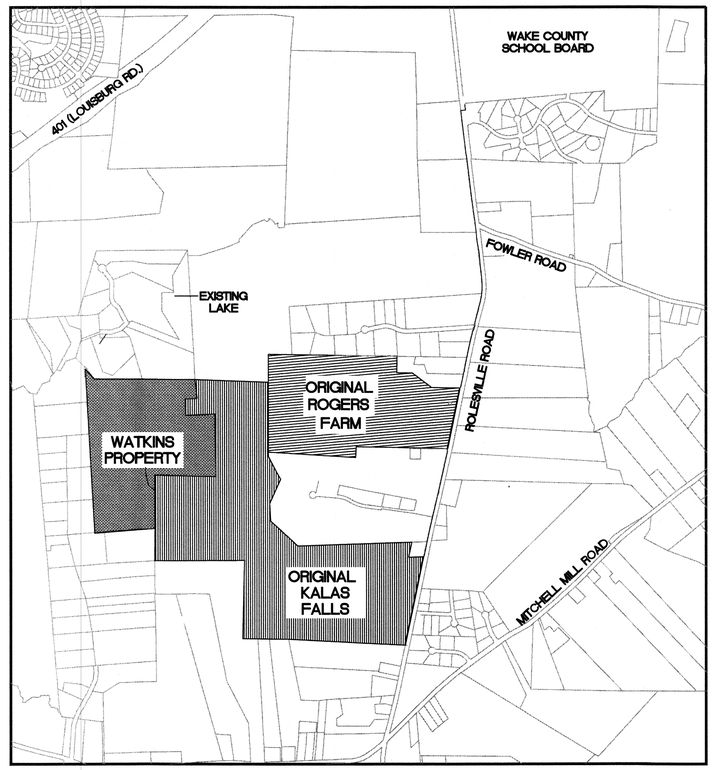
THE CONTRACTOR RESPONSIBLE FOR THE EXTENSION OF WATER, SEWER, AND / OR REUSE, AS APPROVED IN THESE PLANS, IS RESPONSIBLE FOR CONTACTING THE PUBLIC UTILITIES DEPARMENT AT (919) 996-4540 AT LEAST TWENTY FOUR HOURS PRIOR TO BEGINNING ANY OF THEIR CONSTRUCTION.

FAILURE TO NOTIFY BOTH CITY DEPARTMENTS IN ADVANCE OF BEGINNING CONSTRUCTION, WILL RESULT IN THE ISSUANCE OF MONETARY FINES, AND REQUIRE REINSTALLATION OF ANY WATER AND SEWER FACILITIES NOT INSPECTED AS A OF THE NOTIFICATION FAILURE.

FAILURE TO CALL FOR INSPECTION, INSTALL A DOWNSTEAM PLUG, HAVE PERMITTED PLANS ON THE JOB SITE, OR ANY OTHER VIOLATION OF THE CITY OF RALEIGH STANDARDS WILL RESULT IN A FINE AND POSSIBLE EXCLUSION FROM FUTURE WORK IN THE CITY OF RALEIGH.

GENERAL NOTES:

1. ALL PUBLIC WATER AND SEWER MATERIALS AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CITY OF RALEIGH STANDARDS AND SPECIFICATIONS.
2. CONTRACTOR SHALL CONTACT 811 (1-800-632-4949) TO LOCATE ALL EXISTING UTILITIES PRIOR TO THE START OF CONSTRUCTION.
3. CONTRACTOR SHALL VERIFY THE LOCATION AND DEPTH OF THE EXISTING UTILITIES AND NOTIFY THE PROJECT ENGINEER (919-469-1101) OF ANY CONFLICTS.
4. ALL BOUNDARY AND FIELD TOPOGRAPHY PROVIDED BY WITHERS & RAVENEL.



VICINITY MAP
SCALE: 1"=1000'

THESE IMPROVEMENTS SHALL BE IN ACCORDANCE WITH THE FOLLOWING DRAWINGS AND THE STANDARD SPECIFICATIONS OF THE CITY OF RALEIGH, WAKE COUNTY, AND NCDOT.

SHEET INDEX	
CVR	COVER SHEET
1.0	OVERALL EXISTING CONDITIONS
1.1-1.2	EXISTING CONDITIONS PHASE 1
2.0-2.1	EROSION CONTROL STAGE 1
2.2-2.7	EROSION CONTROL(50 SCALE)
3.0	GENERAL NOTES AND LEGENDS
3.1	SCHEDULE PLAN
4.0	DRAINAGE PLAN OVERALL
4.1-4.6	GRADING & DRAINAGE PHASE 1 (50 SCALE)
4.7	SCM 1A DETAIL
4.8	SCM 2A DETAIL
4.9	SCM 2B DETAIL
4.10	SCM 3D DETAIL
4.11	SCM 3E DETAIL
5.0	SITE PLAN OVERALL
5.1	SITE PLAN PHASE 1 OVERALL
5.2-5.7	SITE PLAN PHASE 1 (50 SCALE)
6.0	OVERALL UTILITIES PLAN
6.1-6.6	UTILITY SHEET (50 SCALE)
7.0-7.2	FALLS BLUFF DR PLAN AND PROFILE
8.0	DARTFORD GREEN PLACE AND OUTFALL A PLAN AND PROFILE
9.0	STONERIDGE BARN WAY PLAN AND PROFILE
10.0	HILL TOP CREST CT AND OUTFALL D PLAN AND PROFILE
11.0	TANSLEY CREST LOOP (E) PLAN AND PROFILE
12.0	TANSLEY CREST LOOP (W) PLAN AND PROFILE
13.0	FRIENDLY MILL LANE & OUTFALL E PLAN AND PROFILE
14.0	SANITARY SEWER OUTFALL A PLAN AND PROFILE
15.0	SANITARY SEWER OUTFALL C PLAN AND PROFILE
16.0	SANITARY SEWER OUTFALL G PLAN AND PROFILE (10+00-17+51.82)
17.0	SANITARY SEWER OUTFALL G PLAN AND PROFILE (17+51.82-24+52.54)
18.0	ROLESVILLE RD SOTHERN SECTION EXISTINAG & IMPROVEMENTS
18.1	ROLESVILLE RD NORTHERN SECTION EXISTINAG & IMPROVEMENTS
19.0	ROLESVILLE RD IMPROVEMENTS
CD1-CD3	EROSION CONTROL DETAIL
CD4-CD6	WATER DETAIL
CD7-CD9	SANITARY SEWER DETAIL
CD10-CD16	NCDOT DETAIL

PROPRTY OWNER:	MITCHELL MILL ROAD INVESTORS LLC CONTACT: KARL BLACKLEY 105 WESTON ESTATES WAY CARY, NC 27513 919-481-3000
DEVELOPER:	MITCHELL MILL ROAD INVESTORS LLC CONTACT: KARL BLACKLEY 105 WESTON ESTATES WAY CARY, NC 27513 919-481-3000
SURVEYOR:	WITHERS RAVENEL CONTACT: MATT TIMLIN 115 MACKENAN DRIVE CARY, NC 27511 919-469-3340
BUFFER/WETLAND:	WITHERS RAVENEL CONTACT: TROY BEASLEY 115 MACKENAN DRIVE CARY, NC 27511 919-469-3340

PUBLIC IMPROVMENTS	
PUBLIC WATER (12")	3,719 LF
PUBLIC WATER (8")	723.67 LF
PUBLIC WATER (6")	556.31 LF
PUBLIC SEWER (12")	1,453 LF
PUBLIC SEWER (8")	8,483.28 LF
PUBLIC STREETS	8,202.99 LF
ROAD WIDENING	2,411 LF
TOTAL NO. OF LOTS	129
TOTAL DISTURBED AREA	33.76 AC

I HEREBY CERTIFY THAT I AM A CIVIL ENGINEER, REGISTERED IN THE STATE OF NORTH CAROLINA, AND THAT THESE REVISIONS ARE IN ALL RESPECTS CORRECT AND WERE PREPARED BY ME OR UNDER MY DIRECTION.

NA

SIGNED BY: DATE

Z:\Jobs\9900\Watkins Property\dwg\Temporary\Emily\Kalas Rendering Formally The Base.dwg

No.	DATE	REVISION	DWN/CHK

COVER SHEET
FOR
KALAS FALLS
SITUATED AT
ROLESVILLE ROAD, ROLESVILLE
WAKE COUNTY, NORTH CAROLINA
FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	EDS
DATE:	9/19/2019

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511
919-469-1101

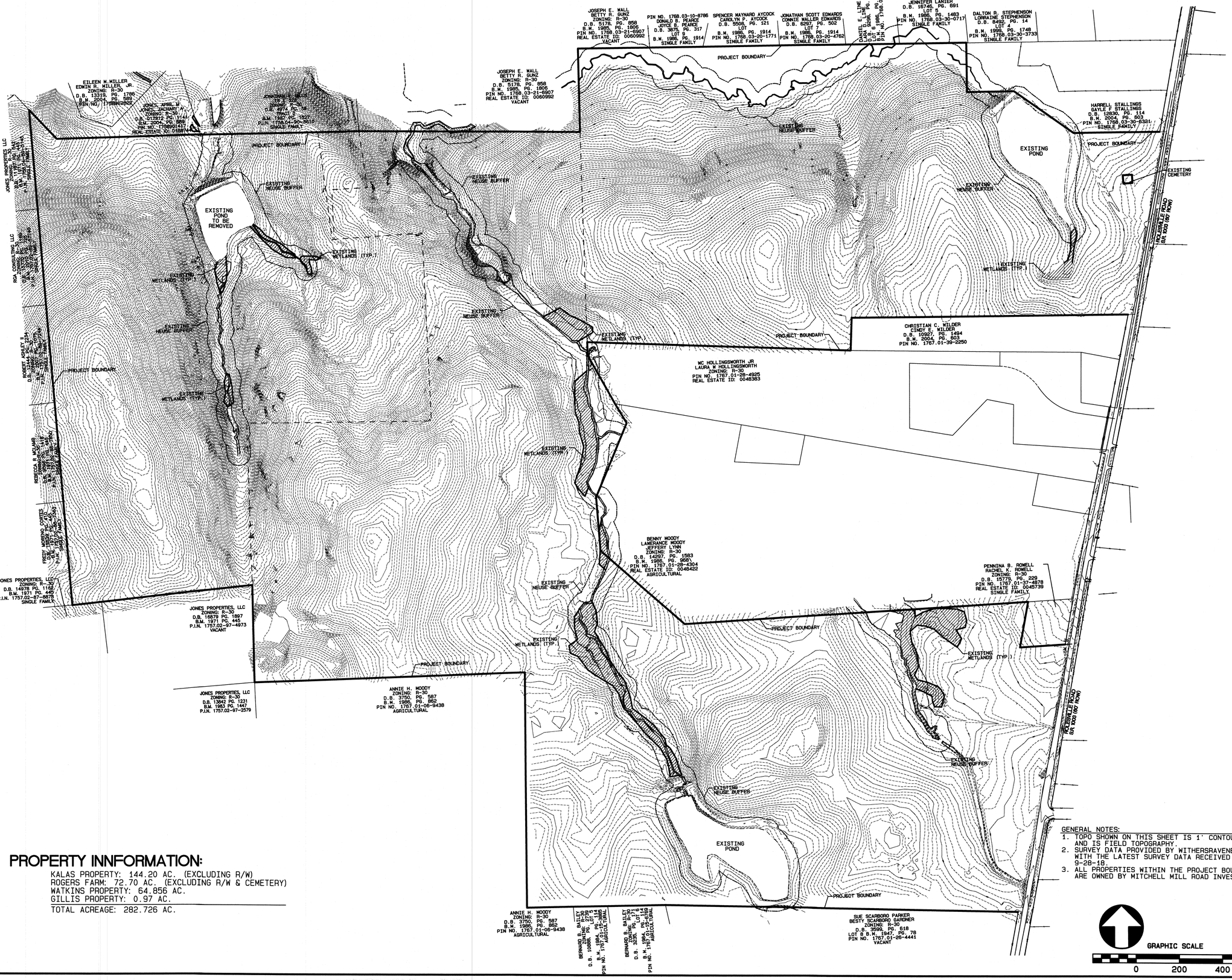
PRELIMINARY

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 9810 JOHN R. HARMAN

10-7-20

SHEET NO.

CVR



PROPERTY INNFORMATION:

KALAS PROPERTY: 144.20 AC. (EXCLUDING R/W)
ROGERS FARM: 72.70 AC. (EXCLUDING R/W & CEMETERY)
WATKINS PROPERTY: 64.856 AC.
GILLIS PROPERTY: 0.97 AC.

TOTAL ACREAGE: 282.726 AC.

GENERAL NOTES:

1. TOPO SHOWN ON THIS SHEET IS 1' CONTOURS AND IS FIELD TOPOGRAPHY.
2. SURVEY DATA PROVIDED BY WITHERSRAVENEL WITH THE LATEST SURVEY DATA RECEIVED ON 9-28-18.
3. ALL PROPERTIES WITHIN THE PROJECT BOUNDARY ARE OWNED BY MITCHELL MILL ROAD INVESTORS, LLC

No.	DATE	REVISION	DWN/CHK

EXISTING CONDITION OVERALL

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA

FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	9/19/2019

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

PRELIMINARY

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HAMAN

10.7.20

NOT FOR CONSTRUCTION

SHEET NO.

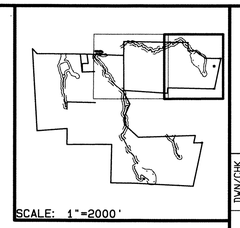
1.0

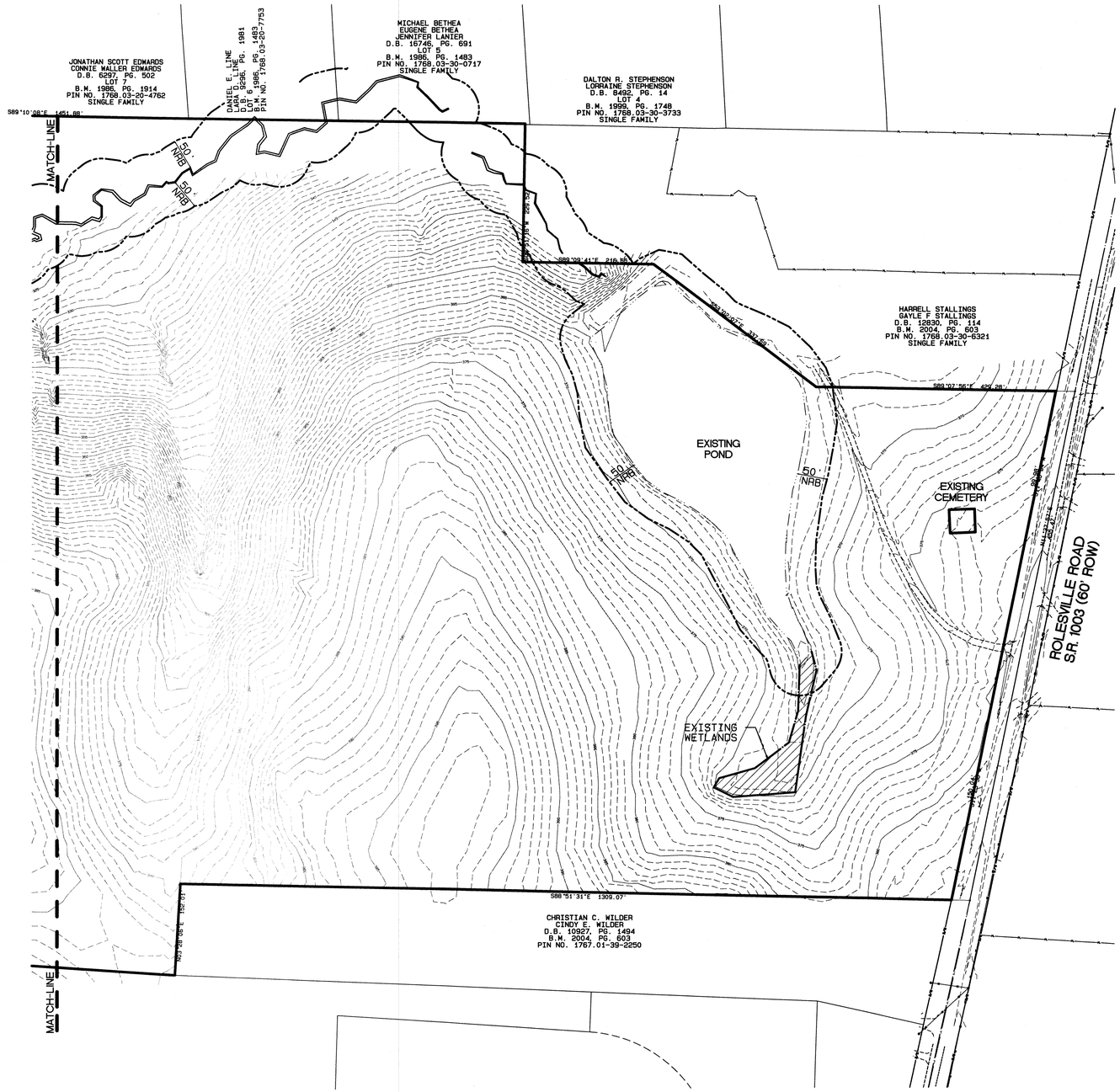
FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro

Plot Date: 10/8/2020 Time: 3:13PM

EXISTING LINETYPE LEGEND

- PROPERTY BOUNDARY
- EXISTING TREE LINE
- EXISTING WETLAND
- EXISTING 50' NRB
- CENTERLINE OF STREAM
- EXISTING WATER ELEVATION
- EXISTING RIGHT OF WAY





GENERAL NOTES:
1. TOPO SHOWN ON THIS SHEET IS 1' CONTOURS AND IS FIELD TOPOGRAPHY.

GRAPHIC SCALE 1"=100'

0 100 200 300

No.	DATE	REVISION	DWN/CHK

EXISTING CONDITION PHASE 1

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA

FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	9/19/2019

AMERICAN Engineering

American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

PRELIMINARY

NORTH CAROLINA PROFESSIONAL SEAL ENGINEER JOHN R. HARMAN

5.11.20

NOT FOR CONSTRUCTION

SHEET NO.

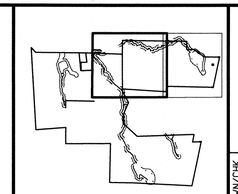
1.1

FILE: C:\Users\Bhaertling\Desktop\2020 Work Data\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro

Plot Date: 5/7/2020 Time: 3:22AM

EXISTING LINETYPE LEGEND

- PROPERTY BOUNDARY
- EXISTING TREE LINE
- EXISTING WETLAND
- EXISTING 50' NRB
- CENTERLINE OF STREAM
- EXISTING WATER ELEVATION
- EXISTING RIGHT OF WAY
- PHASE-LINE



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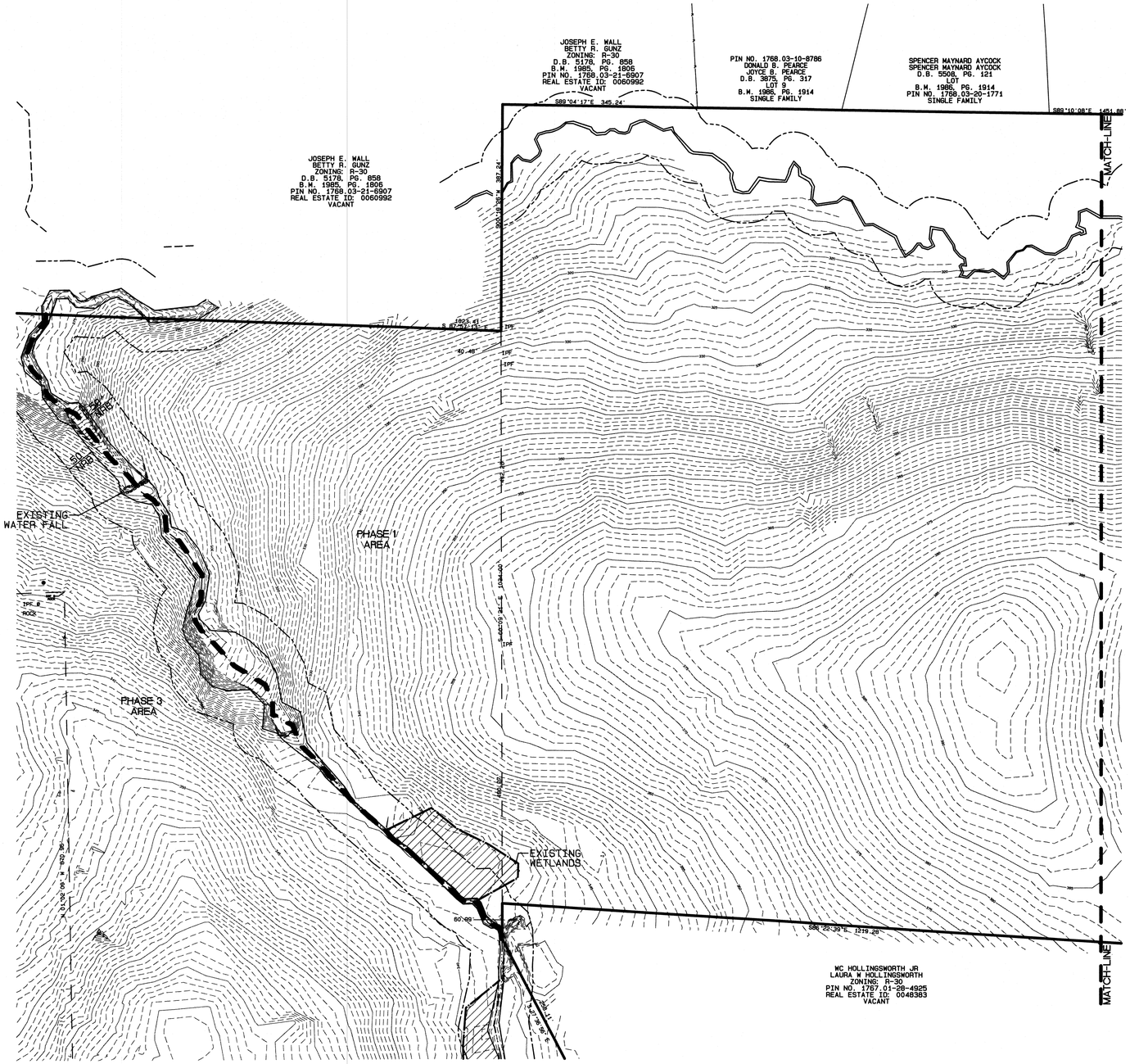


GENERAL NOTES:
1. TOPO SHOWN ON THIS SHEET IS 1' CONTOURS AND IS FIELD TOPOGRAPHY.

GRAPHIC SCALE 1"=100'
0 100 200 300

No.	DATE	REVISION	DWN/CHK

EXISTING CONDITION
FOR
KALAS FALLS
SITUATED AT
1832 ROLESVILLE ROAD
WAKE COUNTY, NORTH CAROLINA
FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	9/19/2019

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

PRELIMINARY
NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HERMAN
10.7.20
NOT FOR CONSTRUCTION

SHEET NO.
1.2

FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro
Plot Date : 10/7/2020 Time: 3:59PM

LEGEND

- PROPOSED MANHOLE OR JUNCTION BOX
- PROPOSED CATCH BASIN
- PROPOSED YARD INLET
- PROPOSED FLARED END SECTION
- INLET PROTECTION
- PROPOSED SF LOW POINT
- PROPOSED AREAS FOR 7 DAY STABILIZATION

GENERAL NOTE:

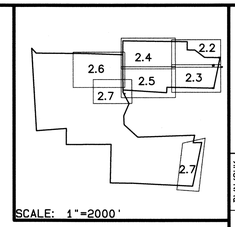
1. ALL SEDIMENT TRAP/PONDS SHALL BE STABILIZED WITHIN 7 DAYS OF INSTALLATION.

PROPOSED LINETYPE LEGEND

- PROPOSED RIGHT OF WAY
- PROPOSED ROAD CL
- PROPOSED 30" CURB AND GUTTER
- PROPOSED EASEMENT
- PROPOSED SILT FENCE
- PROPOSED SILT FENCE/CLEARING LIMITS
- PROPOSED SILT DITCH
- PROPOSED BAFFLES
- PROPOSED CLEARING LIMITS

EXISTING LINETYPE LEGEND

- PROPERTY BOUNDARY
- EXISTING TREE LINE
- EXISTING WETLAND
- EXISTING 50' NRB
- CENTERLINE OF STREAM
- EXISTING WATER ELEVATION
- EXISTING RIGHT OF WAY



GENERAL NOTES:

1. TOPO SHOWN ON THIS SHEET IS 1' CONTOURS AND IS FIELD TOPOGRAPHY.

GRAPHIC SCALE 1"=100'

0 100 200 300

No.	DATE	REVISION	DWN/CHK

EROSION CONTROL STAGE 1

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA

FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	9/19/2019

AMERICAN Engineering

American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

PRELIMINARY

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 8922 PETTON, NICHOLAS JUNIER

10/7/20

NOT FOR CONSTRUCTION

SHEET NO.

2.0

FILE: Z:\Jobs\9900\Watkins Property\Dwg\Base Map\Kalas Falls Base Phase 1.pro

Plot Date : 10/6/2020 Time: 4:44PM

LEGEND

- PROPOSED MANHOLE OR JUNCTION BOX
- PROPOSED CATCH BASIN
- PROPOSED YARD INLET
- PROPOSED FLARED END SECTION
- INLET PROTECTION
- PROPOSED SF LOW POINT
- PROPOSED AREAS FOR 7 DAY STABILIZATION

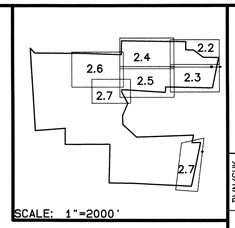
GENERAL NOTE:
1. ALL SEDIMENT TRAP/PONDS SHALL BE STABILIZED WITHIN 7 DAYS OF INSTALLATION.

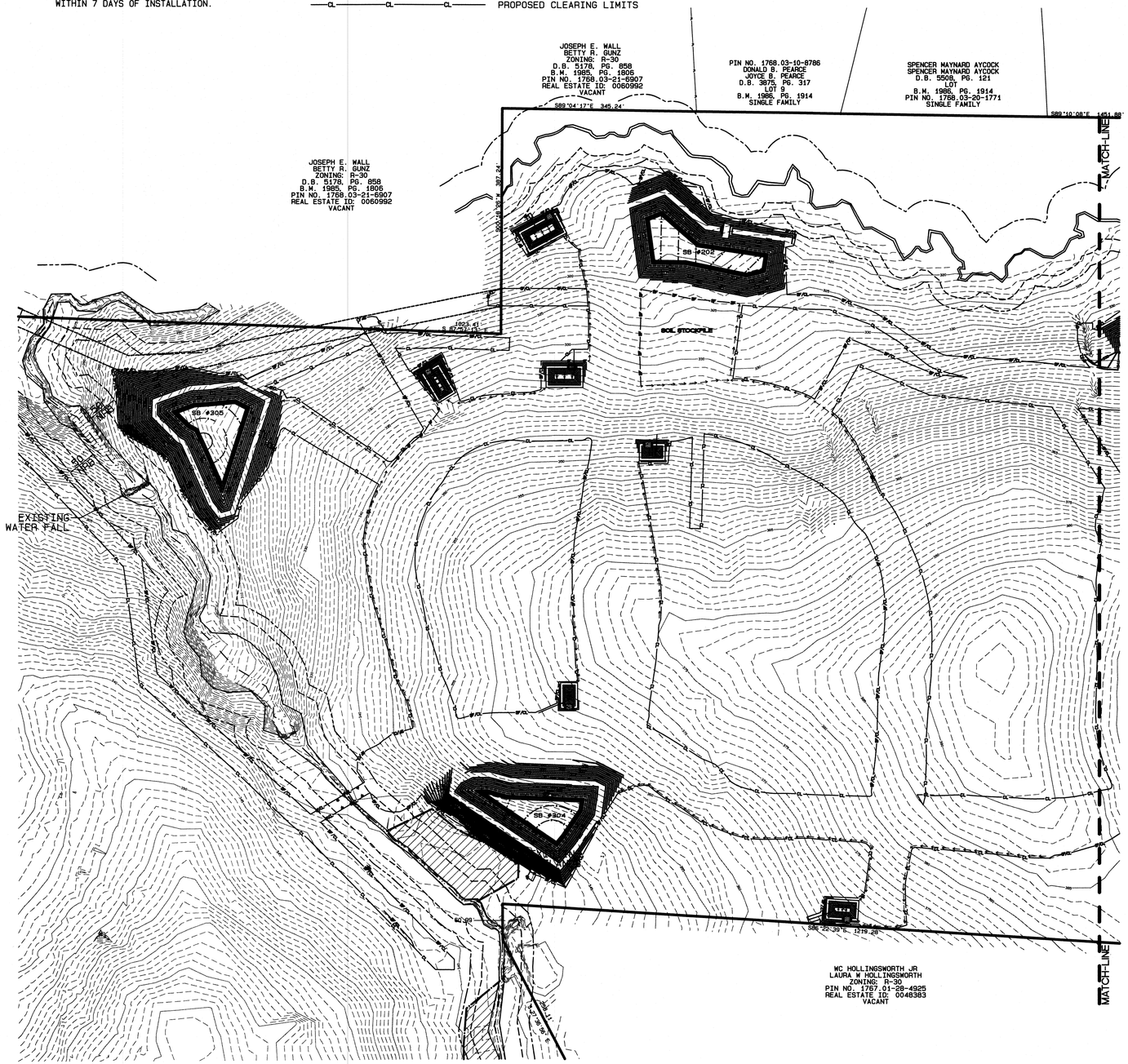
PROPOSED LINETYPE LEGEND

- PROPOSED RIGHT OF WAY
- PROPOSED ROAD CL
- PROPOSED 30" CURB AND GUTTER
- PROPOSED EASEMENT
- PROPOSED SILT FENCE
- PROPOSED SILT FENCE/CLEARING LIMITS
- PROPOSED SILT DITCH
- PROPOSED BAFFLES
- PROPOSED CLEARING LIMITS

EXISTING LINETYPE LEGEND

- PROPERTY BOUNDARY
- EXISTING TREE LINE
- EXISTING WETLAND
- EXISTING 50' NRB
- CENTERLINE OF STREAM
- EXISTING WATER ELEVATION
- EXISTING RIGHT OF WAY





GENERAL NOTES:
1. TOPO SHOWN ON THIS SHEET IS 1' CONTOURS AND IS FIELD TOPOGRAPHY.

GRAPHIC SCALE 1"=100'
0 100 200 300

No.	DATE	REVISION	DWN/CHK

EROSION CONTROL STAGE 1

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA

FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	PNJ
DRAWN BY:	BAH
DATE:	9/19/2019

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

PRELIMINARY

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 8922 PETER NICHOLAS JUVIER

10/7/20

NOT FOR CONSTRUCTION

SHEET NO.

2.1

FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro
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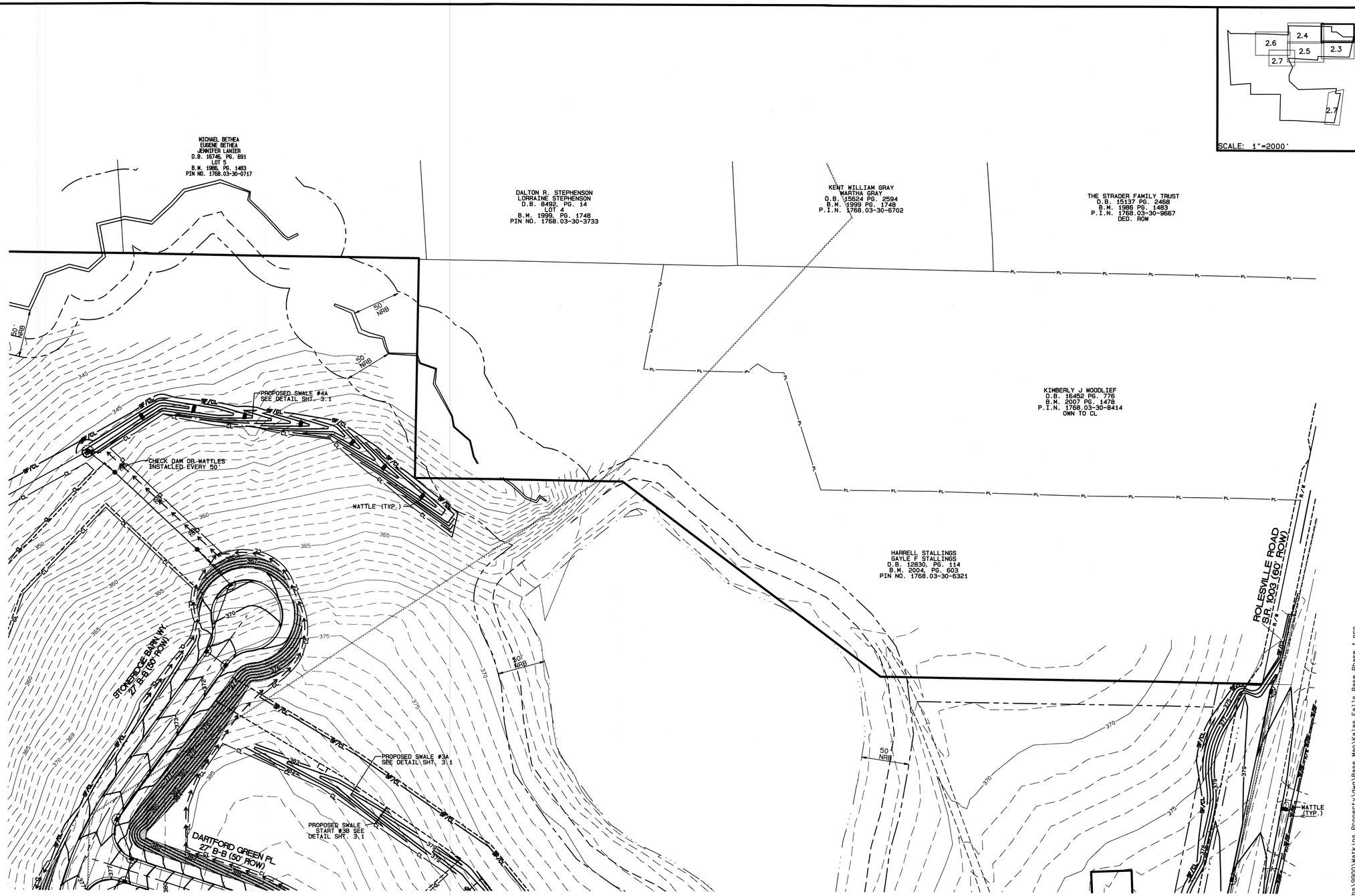

LEGEND

- PROPOSED MANHOLE OR JUNCTION BOX
- PROPOSED CATCH BASIN
- PROPOSED YARD INLET
- PROPOSED FLARED END SECTION
- INLET PROTECTION
- PROPOSED SF LOW POINT
- PROPOSED AREAS FOR 7 DAY STABILIZATION

GENERAL NOTE:
1. ALL SEDIMENT TRAP/PONDS SHALL BE STABILIZED WITHIN 7 DAYS OF INSTALLATION.

PROPOSED LINETYPE LEGEND

- PROPOSED RIGHT OF WAY
- PROPOSED ROAD CL
- PROPOSED 30" CURB AND GUTTER
- PROPOSED EASEMENT
- PROPOSED SILT FENCE
- PROPOSED SILT FENCE/CLEARING LIMITS
- PROPOSED SILT DITCH
- PROPOSED BAFFLES
- PROPOSED CLEARING LIMITS

EXISTING LINETYPE LEGEND

- PROPERTY BOUNDARY
- EXISTING TREE LINE
- EXISTING WETLAND
- EXISTING 50' NRB
- CENTERLINE OF STREAM
- EXISTING WATER ELEVATION
- EXISTING RIGHT OF WAY

GRAPHIC SCALE 1"=50'
0 50 100 150

No.	DATE	REVISION	DWN/CHK

EROSION CONTROL PLAN PHASE 1
FOR
KALAS FALLS
SITUATED AT
1832 ROLESVILLE ROAD
WAKE COUNTY, NORTH CAROLINA
FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	PNJ
DRAWN BY:	BAH
DATE:	4/24/2020

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

PRELIMINARY

NORTH CAROLINA PROFESSIONAL ENGINEER 8922 PETTON NICHOLAS JOYNER
10/7/20

NOT FOR CONSTRUCTION

SHEET NO.
2.2

FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro
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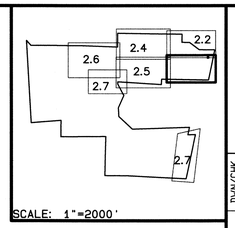

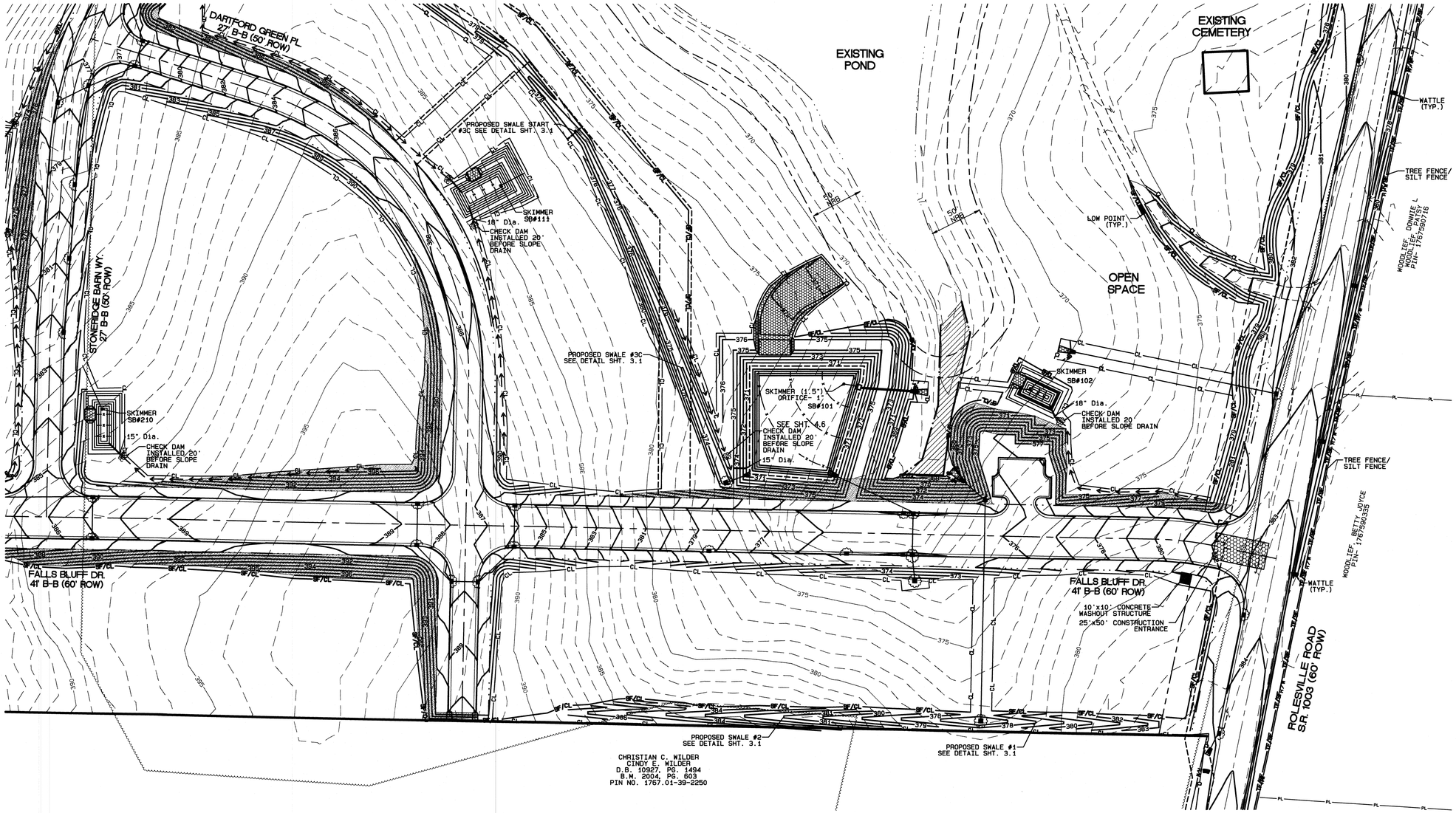

LEGEND

- PROPOSED MANHOLE OR JUNCTION BOX
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- PROPOSED BAFFLES
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EXISTING LINETYPE LEGEND

- PROPERTY BOUNDARY
- EXISTING TREE LINE
- EXISTING WETLAND
- EXISTING 50' NRB
- CENTERLINE OF STREAM
- EXISTING WATER ELEVATION
- EXISTING RIGHT OF WAY

GRAPHIC SCALE 1"=50'
0 50 100 150

No.	DATE	REVISION	DWN/CHK

EROSION CONTROL PLAN PHASE 1
FOR
KALAS FALLS
SITUATED AT
1832 ROLESVILLE ROAD
WAKE COUNTY, NORTH CAROLINA
FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

PRELIMINARY

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 8922 PETTON NICHOLAS JOYNER
10/1/20

NOT FOR CONSTRUCTION

SHEET NO.
2.3

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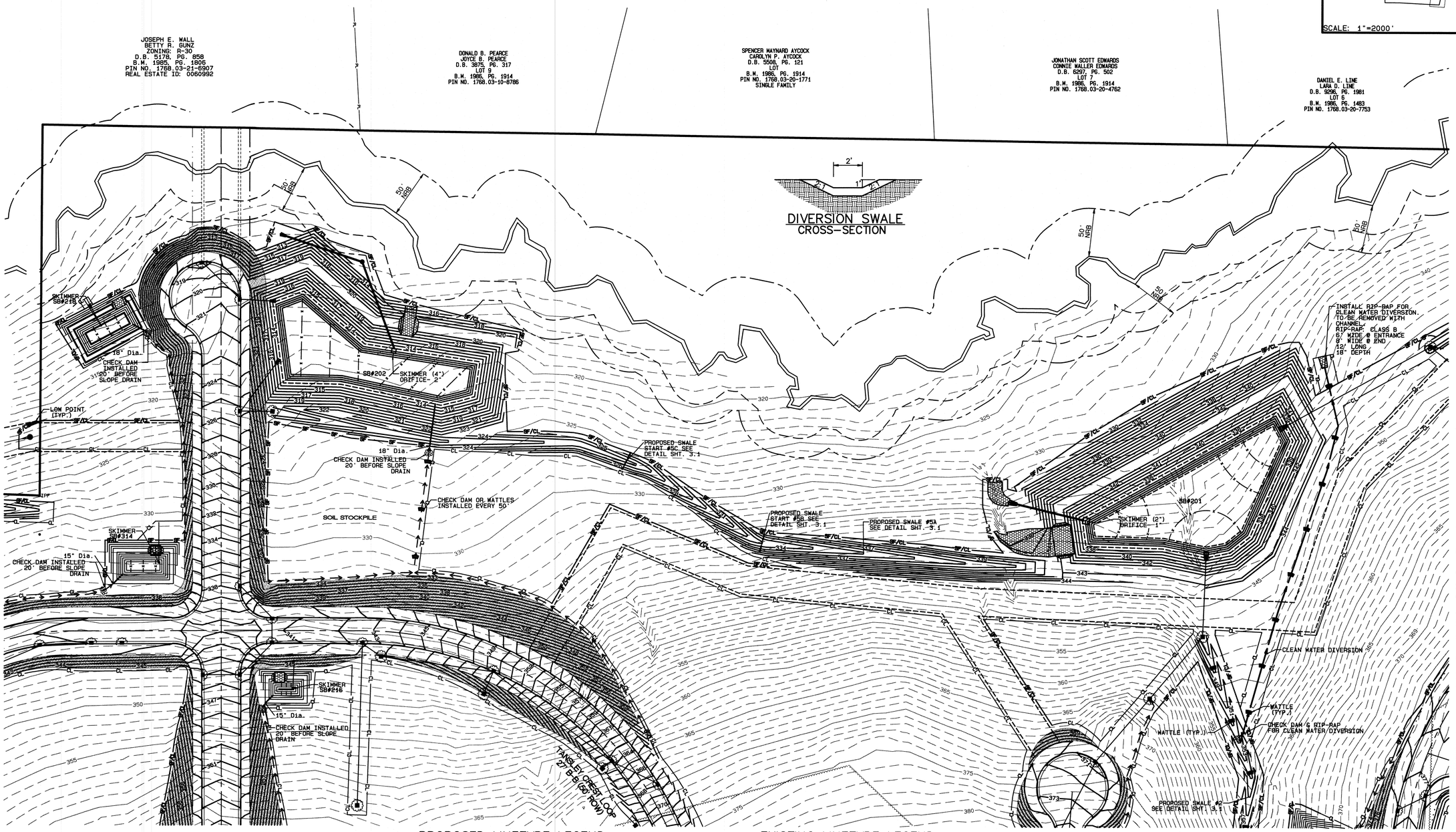
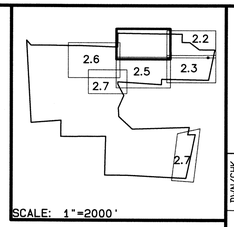
Plot Date: 10/6/2020





LEGEND

- PROPOSED MANHOLE OR JUNCTION BOX
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- PROPOSED AREAS FOR 7 DAY STABILIZATION

PROPOSED LINETYPE LEGEND

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- PROPOSED EASEMENT
- PROPOSED SILT FENCE
- PROPOSED SILT FENCE/CLEARING LIMITS
- PROPOSED SILT DITCH
- PROPOSED BAFFLES
- PROPOSED CLEARING LIMITS

EXISTING LINETYPE LEGEND

- PROPERTY BOUNDARY
- EXISTING TREE LINE
- EXISTING WETLAND
- EXISTING 50' NRB
- CENTERLINE OF STREAM
- EXISTING WATER ELEVATION
- EXISTING RIGHT OF WAY

GENERAL NOTE:
1. ALL SEDIMENT TRAP/PONDS SHALL BE STABILIZED WITHIN 7 DAYS OF INSTALLATION.

GRAPHIC SCALE 1"=50'
0 50 100 150

No.	DATE	REVISION	DWN/CHK

EROSION CONTROL PLAN PHASE 1
FOR
KALAS FALLS
SITUATED AT
1832 ROLESVILLE ROAD
WAKE COUNTY, NORTH CAROLINA
FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

PRELIMINARY

NORTH CAROLINA PROFESSIONAL ENGINEER 8922 PETTON NICHOLAS JOYNER 10/7/20

NOT FOR CONSTRUCTION

SHEET NO.
2.4

FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro
Time: 4:34PM
Plot Date: 10/6/2020

LEGEND

- PROPOSED MANHOLE OR JUNCTION BOX
- PROPOSED CATCH BASIN
- PROPOSED YARD INLET
- PROPOSED FLARED END SECTION
- INLET PROTECTION
- PROPOSED SF LOW POINT
- PROPOSED AREAS FOR 7 DAY STABILIZATION

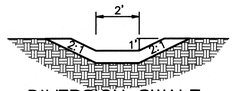
GENERAL NOTE:
1. ALL SEDIMENT TRAP/PONDS SHALL BE STABILIZED WITHIN 7 DAYS OF INSTALLATION.

PROPOSED LINETYPE LEGEND

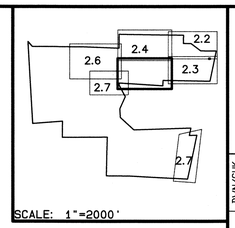
- PROPOSED RIGHT OF WAY
- PROPOSED ROAD CL
- PROPOSED 30" CURB AND GUTTER
- PROPOSED EASEMENT
- PROPOSED SILT FENCE
- PROPOSED SILT FENCE/CLEARING LIMITS
- PROPOSED SILT DITCH
- PROPOSED BAFFLES
- PROPOSED CLEARING LIMITS

EXISTING LINETYPE LEGEND

- PROPERTY BOUNDARY
- EXISTING TREE LINE
- EXISTING WETLAND
- EXISTING 50' NRB
- CENTERLINE OF STREAM
- EXISTING WATER ELEVATION
- EXISTING RIGHT OF WAY



DIVERSION SWALE
CROSS-SECTION



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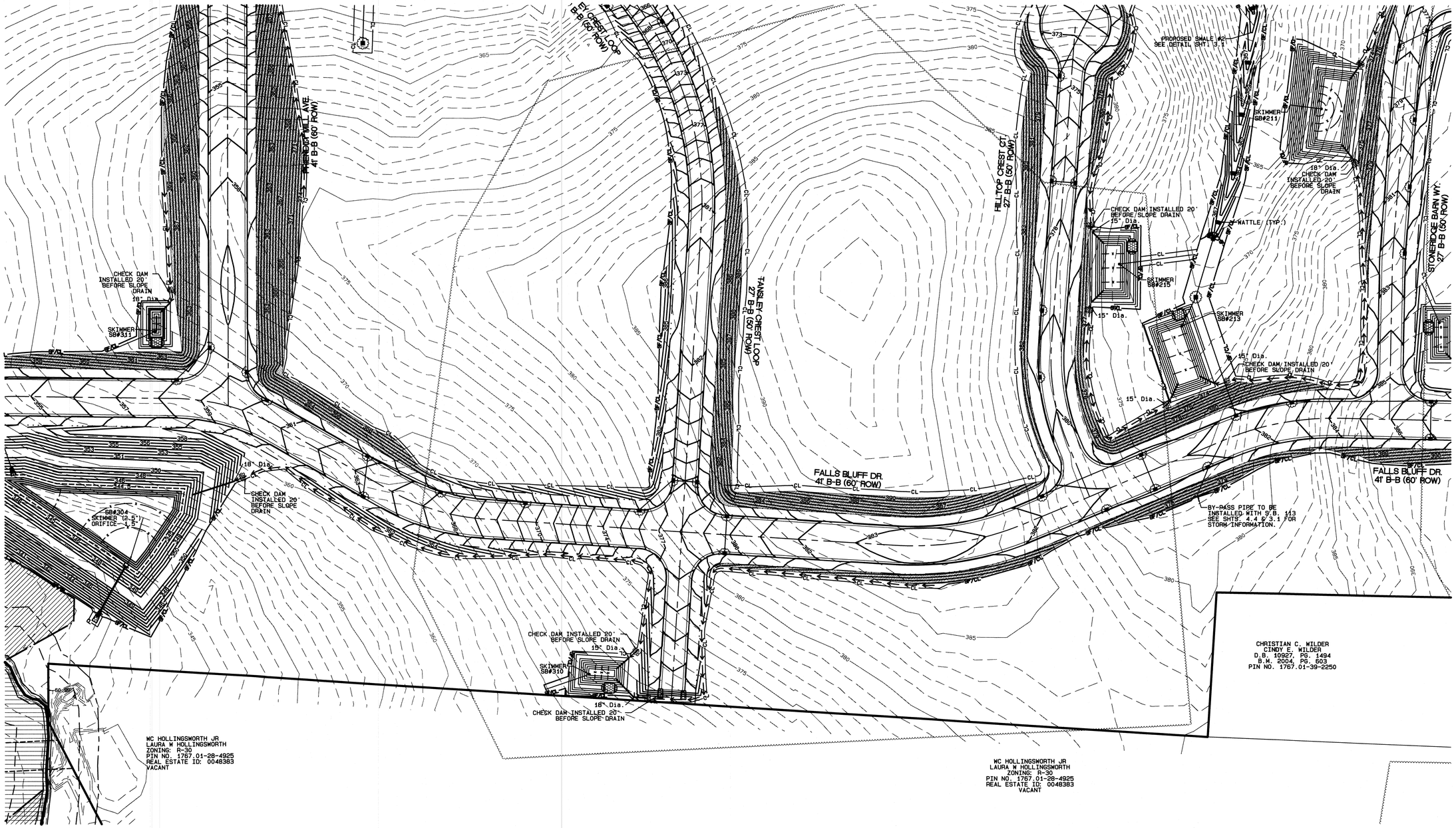


EROSION CONTROL PLAN PHASE 1

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA

FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

PRELIMINARY

NORTH CAROLINA PROFESSIONAL ENGINEER 8922 PETON NICHOLAS JOYNER

10/7/20

NOT FOR CONSTRUCTION

SHEET NO.

2.5

Plot Date : 10/6/2020 Time: 4:38PM FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro

LEGEND

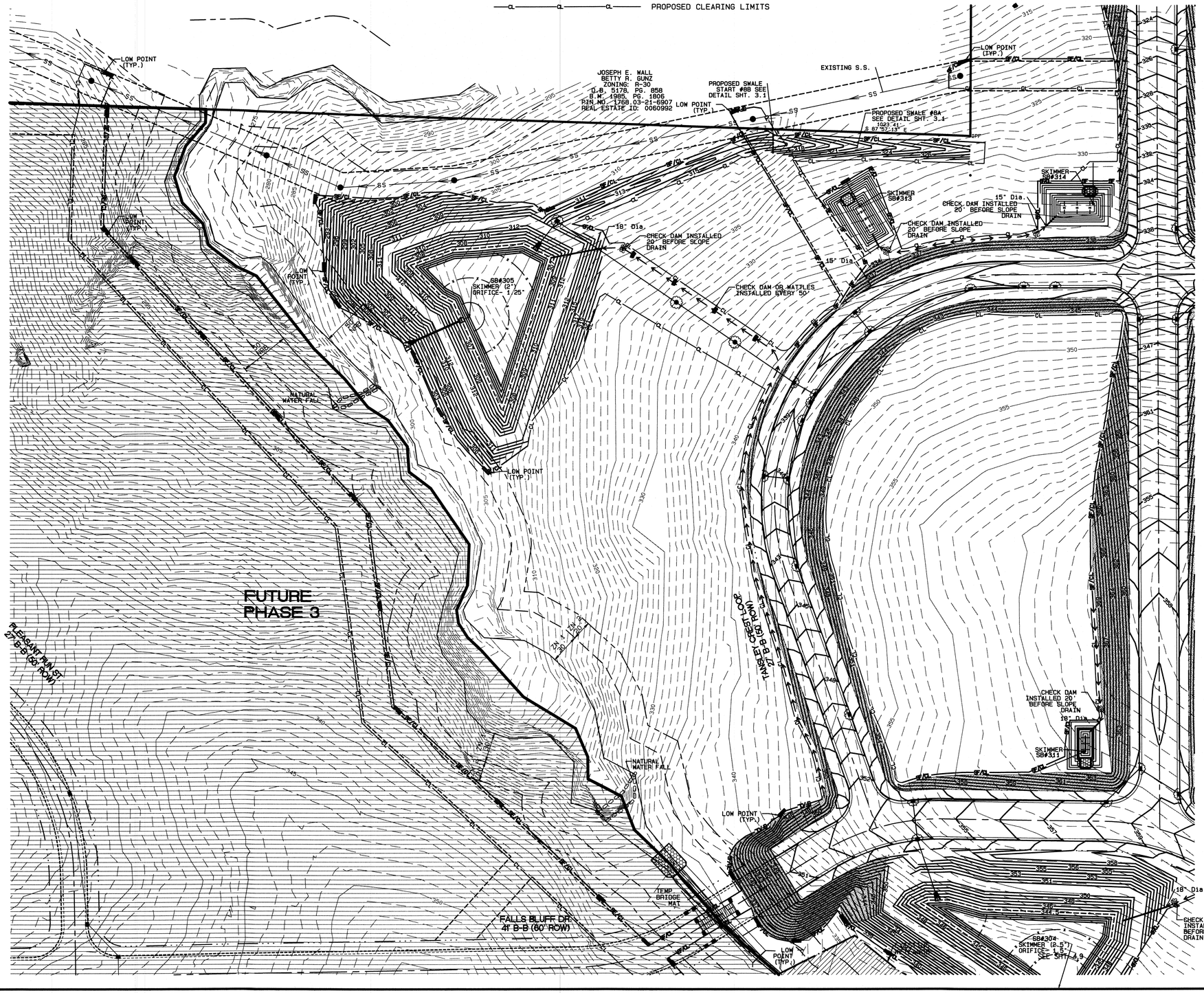
- PROPOSED MANHOLE OR JUNCTION BOX
- PROPOSED CATCH BASIN
- PROPOSED YARD INLET
- PROPOSED FLARED END SECTION
- INLET PROTECTION
- PROPOSED SF LOW POINT
- PROPOSED AREAS FOR 7 DAY STABILIZATION

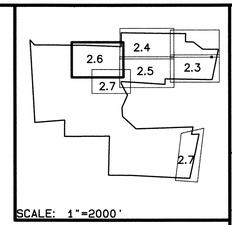
PROPOSED LINETYPE LEGEND

- PROPOSED RIGHT OF WAY
- PROPOSED ROAD CL
- PROPOSED 30" CURB AND GUTTER
- PROPOSED EASEMENT
- PROPOSED SILT FENCE
- PROPOSED SILT FENCE/CLEARING LIMITS
- PROPOSED SILT DITCH
- PROPOSED BAFFLES
- PROPOSED CLEARING LIMITS

EXISTING LINETYPE LEGEND

- PROPERTY BOUNDARY
- EXISTING TREE LINE
- EXISTING WETLAND
- EXISTING 50' NRB
- CENTERLINE OF STREAM
- EXISTING WATER ELEVATION
- EXISTING RIGHT OF WAY





GRAPHIC SCALE 1"=50'

0 50 100 150

GENERAL NOTE:

1. ALL SEDIMENT TRAP/PONDS SHALL BE STABILIZED WITHIN 7 DAYS OF INSTALLATION.
2. A SEWER OUTFALL IS TO BE CONSTRUCTED IN THE FUTURE PHASE 3 ARE TO SERVICE ANOTHER PROJECT OR FUTUTRE PHASE 2 OF THIS DEVELOPMENT. NO OTHER IMPROVEMENTS IN THE FUTURE PHASE 3 IS BEING PROPOSED.

No.	DATE	REVISION	DWN/CHK

EROSION CONTROL PLAN PHASE 1

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA

FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	PNJ
DRAWN BY:	BAH
DATE:	4/24/2020

AMERICAN Engineering

American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

PRELIMINARY

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 8922 PETTON NICHOLAS JOYNER 10/1/20

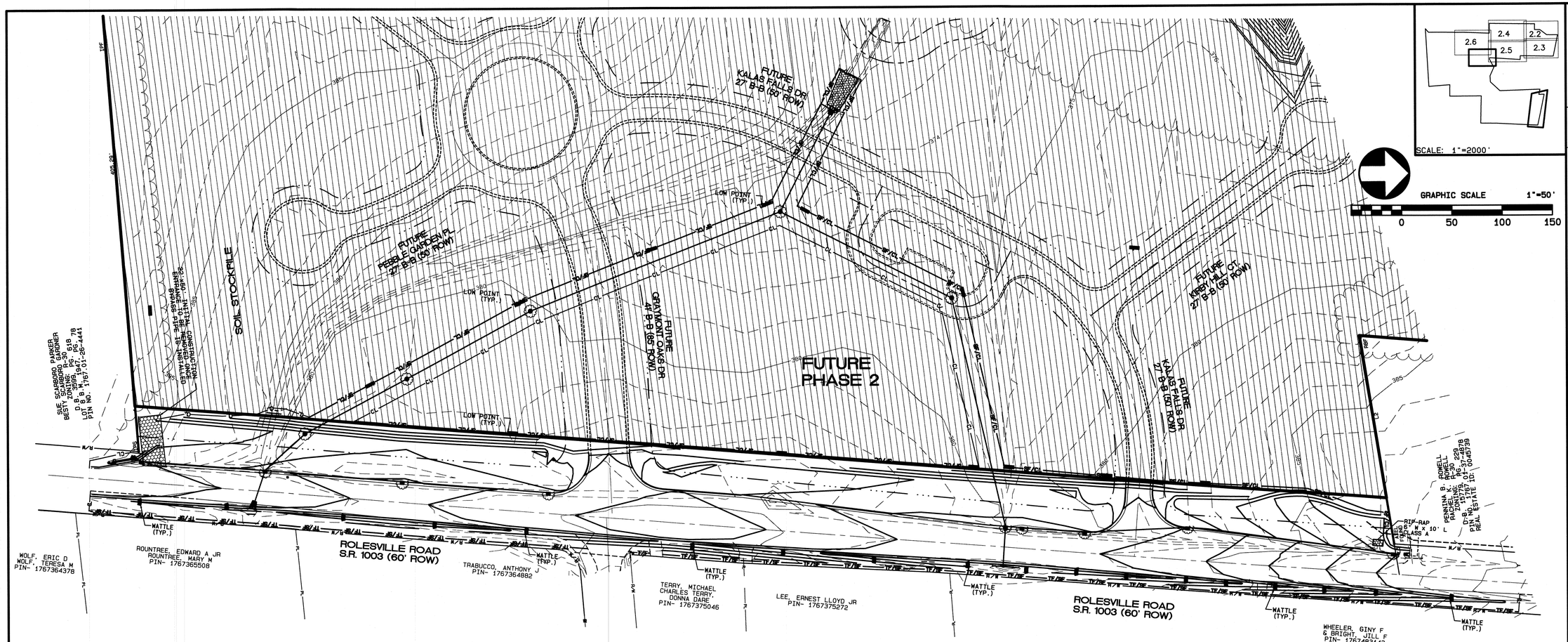
NOT FOR CONSTRUCTION

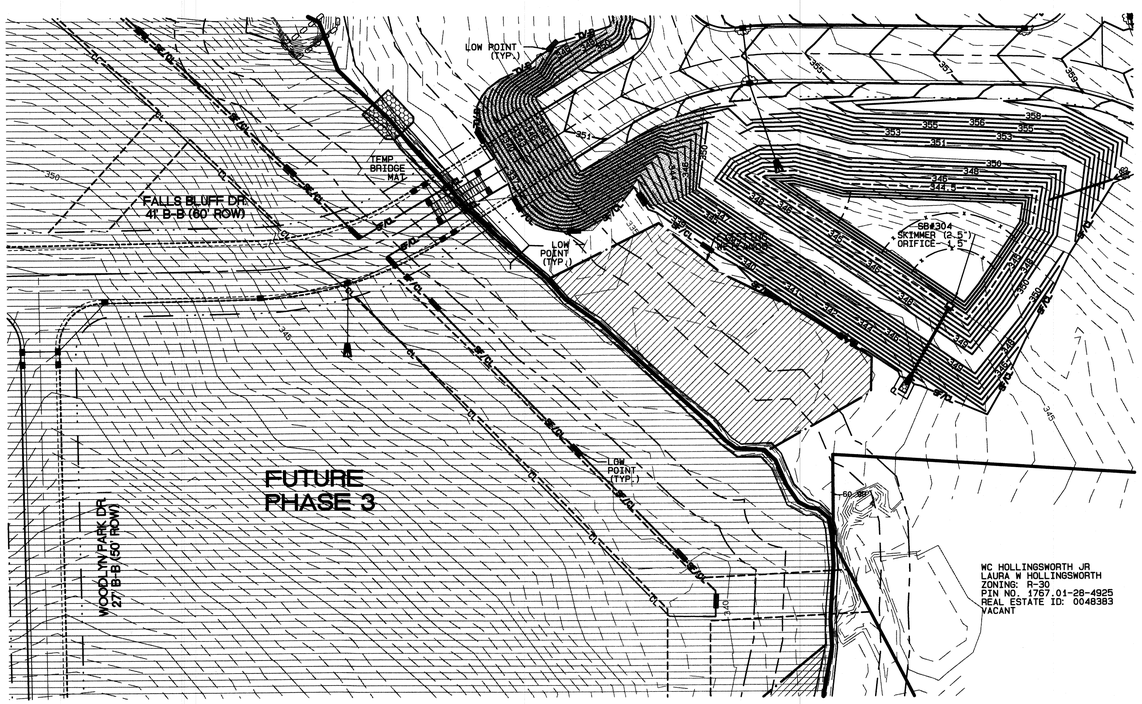
SHEET NO.

2.6

FILE: Z:\Jobs\9900\Watkins Property\Dwg\Base Map\Kalas Falls Base Phase 1.pro

Plot Date : 10/6/2020 Time: 4:45PM





LEGEND

- PROPOSED MANHOLE OR JUNCTION BOX
- PROPOSED CATCH BASIN
- PROPOSED YARD INLET
- PROPOSED FLARED END SECTION
- INLET PROTECTION
- PROPOSED SF LOW POINT
- PROPOSED AREAS FOR 7 DAY STABILIZATION

GENERAL NOTE:

1. ALL SEDIMENT TRAP/PONDS SHALL BE STABILIZED WITHIN 7 DAYS OF INSTALLATION.
2. A SEWER OUTFALL IS TO BE CONSTRUCTED IN THE FUTURE PHASE 3 AREA TO SERVICE ANOTHER PROJECT OR FUTUTRE PHASE 2 OF THIS DEVELOPMENT. NO OTHER IMPROVEMENTS IN THE FUTURE PHASE 3 IS BEING PROPOSED.
3. THE STORM OUTFALL IS TO BE CONSTRUCTED IN THE FUTURE PHASE 2 AREA TO BY-PASS THE OFF-SITE DRAINAGE.

PROPOSED LINETYPE LEGEND

- PROPOSED RIGHT OF WAY
- PROPOSED ROAD CL
- PROPOSED 30" CURB AND GUTTER
- PROPOSED EASEMENT
- PROPOSED SILT FENCE
- PROPOSED SILT FENCE/CLEARING LIMITS
- PROPOSED SILT DITCH
- PROPOSED BAFFLES
- PROPOSED CLEARING LIMITS

EXISTING LINETYPE LEGEND

- PROPERTY BOUNDARY
- EXISTING TREE LINE
- EXISTING WETLAND
- EXISTING 50' NRB
- CENTERLINE OF STREAM
- EXISTING WATER ELEVATION
- EXISTING RIGHT OF WAY

GRAPHIC SCALE 1"=50'
0 50 100 150

No.	DATE	REVISION	DWN/CHK

EROSION CONTROL PLAN PHASE 1

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA

FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	PNJ
DRAWN BY:	BAH
DATE:	9/19/2019

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

PRELIMINARY

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 89220 PETER NICHOLAS JOHNSON

10/7/20

NOT FOR CONSTRUCTION

SHEET NO.

2.7

FILE: Z:\Jobs\9900\Watkins Property\Dwg\Base Map\Kalas Falls Base Phase 1.pro

Plot Date: 10/6/2020 Time: 5:10PM

CONSTRUCTION SEQUENCE FOR PHASE 1 SHALL BE AS FOLLOWS:

1. OWNER SHALL OBTAIN NCG01 PERMIT. THERE MAY BE A FEE FOR THIS.

2. SCHEDULE A PRE-CONSTRUCTION CONFERENCE WITH THE WATERSHED MANAGER, OBTAIN LAND DISTURBING PERMIT.

3. TREE PROTECTION FENCES, SILT FENCES AND CONSTRUCTION ENTRANCE SHALL BE INSTALLED AS SHOWN ON THE EROSION CONTROL SHEETS. CLEAR ONLY AS NECESSARY TO INSTALL THESE DEVICES. SEED ALL RESULTING BARE AREAS IMMEDIATELY AFTER CONSTRUCTION.

4. CONSTRUCT EROSION CONTROL MEASURES INCLUDING SILT DITCHES LEADING TO THEM AS SHOWN ON THE EROSION CONTROL SHEETS. CONSTRUCT DIVERSION DITCHES AS SHOWN. EACH DIVERSION DITCH SHALL HAVE THE LINING INSTALLED THE SAME DAY AS THE SECTION IS CONSTRUCTED.

5. OBTAIN CERTIFICATE OF COMPLIANCE THROUGH INSPECTION BY WATERSHED MANAGER.

6. GENERAL GRADING MAY BEGIN.

7. THE GRADING OF FALLS BLUFF DR. BEYOND TANSLEY CREST LOOP (WEST INTERSECTION) SHALL BE DELAYED TO PROVIDE AN USABLE SLOPE FOR MATERIALS AND EQUIPMENT TO ACCESS THE CONSTRUCTION OF THE SEWER LINE JUST BEYOND THE CREEK. WHEN THE SEWER LINE IS FINISHED THE GRADING MAY BE DONE AS SHOWN ON THE PLANS.

8. CLEAN SEDIMENT BASINS WHEN ONE-HALF FULL.

9. SEED AND MULCH DENUDED AREA INCLUDING ANY CUT/FILL SLOPES WITHIN FOURTEEN (14) DAYS AFTER FINISHED GRADES ARE ESTABLISHED.

10. MAINTAIN SOIL EROSION CONTROL MEASURES UNTIL PERMANENT GROUND IS ESTABLISHED.

11. AS EACH CATCH BASIN OR YARD INLET IS INSTALLED, IT SHALL HAVE INLET PROTECTION INSTALLED. THIS IS TO REMAIN IN PLACE UNTIL ALL AREAS WHICH DRAIN TO IT ARE STABILIZED OR PAVED.

12. WHEN ALL CONTRIBUTARY AREAS ARE STABILIZED, OBTAIN APPROVAL FROM THE WATERSHED MANAGER TO CLOSE EACH SEDIMENT BASIN.

13. CLEAN SEDIMENT FROM SEDIMENT BASIN WHICH IS TO BE CONVERTED TO A WET POND AND REMOVE THE SKIMMER. INSTALL PLANTINGS AS REQUIRED. CLOSE THE DRAIN VALVE.

14. REQUEST FINAL APPROVAL BY WATERSHED MANAGER AFTER VEGETATION IS ESTABLISHED..

15. REMOVE SOIL EROSION CONTROL MEASURES AND STABILIZE THESE AREAS.

16. THE OWNER IS TO FINALIZE THE NCG01 PERMIT.

Y:\Jobs\9900\Watkins Property\Documents\Schedules\ConSeq. Ph1.docx 5/7/20

Maintenance Requirements For Stockpile Areas
1. Seeding or covering stockpiles with tarps or mulch is required and will reduce erosion problems. Tarps should be keyed in at the top of the slope to keep water from running underneath the plastic.
2. If a stockpile is to remain for future use after the project is complete (builders, etc.), the financial responsible party must notify Wake County of a new responsible party for that stockpile.
3. The approved plan shall provide for the use of staged seeding and mulching on a continual basis while the stockpile is in use.
4. Establish and maintain a vegetative buffer at the toe of the slope (where practical).

NOTES FOR CONSTRUCTION:

1. PLANS FOR INFRASTRUCTURE ONLY.
2. ALL CONSTRUCTION MUST BE PERFORMED IN ACCORDANCE WITH CURRENT CITY OF RALEIGH STANDARD SPECS AND DETAILS, WAKE COUNTY SPECIFICATIONS, NCDOT SPECIFICATIONS AND TOWN OF ROLESVILLE SPECIFICATIONS.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION OF EXISTING CONDITIONS. CONTRACTOR SHALL NOTIFY ENGINEER OF DISCREPANCIES BETWEEN FIELD CONDITIONS AND THESE DRAWINGS.
4. THERE ARE NO 100 YEAR FLOOD PLAINS PER FEMA MAP WITHIN PROPERTY.
5. CONTRACTOR WILL KEEP STREETS CLEAN AT ALL TIMES, OR A WASH STATION WILL BE REQUIRED.
6. ALL CATCH BASINS SHALL HAVE INLET PROTECTION.
7. ALL CUT AND FILL SLOPES MUST BE STABILIZED WITHIN 14 DAYS OF ANY PHASE OF GRADING, WITH SOME SLOPES TO BE STABALIZED WITHIN 7 DAYS AS SHOWN ON CHART TO THE LEFT AND ON THE EC SHEETS..
8. TREE PROTECTION FENCING ON THIS PROJECT WILL BE INSTALLED AND INSPECTED BEFORE THE GRADING PERMIT IS ISSUED.
9. A PRE-CONSTRUCTION CONFERENCE MAY BE REQUIRED BEFORE GRADING PERMIT IS ISSUED.
10. PERMANENT GROUND COVER WILL BE ESTABLISHED IN 15 WORKING DAYS OR 90 CALENDAR DAYS WHICHEVER IS SHORTER.
11. THE AREA DESIGNATED SHALL BE USED FOR TOPSOIL STOCKPILE.
12. THIS PROJECT IS IN THE NEUSE RIVER WATERSHED. PROJECT AREA = 144 ACRES
13. WETLANDS ON THIS PROJECT ARE AS SHOWN.
14. ALL CONSTRUCTION TO BE IN ACCORDANCE WITH CITY OF RALEIGH STANDARDS AND SPECIFICATIONS, WAKE COUNTY STAENDARDS AND WITH N.C.D.O.T.,WHERE APPLICABLE.
15. MINIMUM CORNER CLEARANCE FROM THE CURB LINE OF INTERSECTING STREETS SHALL BE AT LEAST TWENTY (20) FEET FROM THE POINT OF TANGENCY.

Required Wake County Basin Removal Sequence

1. Schedule a site meeting with the Environmental Consultant to determine if a basin can be removed. Install silt fencing or other temporary erosion control measures as needed prior to removal of the basin.
2. Remove Basin(s) and associated temporary diversion ditches. If culvert pipes need to be extended, perform this operation at this time. Fine grade area in preparation for seeding.
3. Perform seedbed preparation, seed, mulch and asphalt tack any resulting bare areas immediately.
4. Install velocity dissipators and/or level spreaders as required on the Erosion Control Plan.
5. When site is fully stabilized, call Environmental Consultant for approval of removing remaining temporary erosion control measures and advice on when site can be issued a Certificate of Completion.

Note: A meeting should also be scheduled with the Environmental Consultant to determine when a basin may be converted for stormwater use. Some municipalities may also require this.

GENERAL NOTES:

A. ALL TREE PROTECTION FENCING SHALL BE MAINTAINED UNTIL ALL SITE WORK IS COMPLETED. THE FENCING SHALL BE REMOVED PRIOR TO THE FINAL SITE INSPECTION FOR THE CERTIFICATE OF OCCUPANCY (CO).

B. ALL TREE PROTECTION FENCING SHALL BE MAINTAINED UNTIL ALL SITE WORK IS COMPLETED. THE FENCING SHALL REMAIN UNTIL ISSUANCE OF CERTIFICATE OF OCCUPANCY (CO).

C. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH ALL CITY OF RALEIGH STANDARDS AND SPECIFICATIONS.

D. WITHIN THE SIGHT TRIANGLES SHOWN ON ALL SITE PLAN AND LANDSCAPE PLAN SHEETS, NO OBSTRUCTION BETWEEN 2 FEET AND 8 FEET IN HEIGHT ABOVE THE CURB LINE ELEVATION SHALL BE LOCATED IN WHOLE OR PART. OBSTRUCTIONS INCLUDE, BUT ARE NOT LIMITED TO, ANY BERM, FOLIAGE, FENCE, WALL SIGN, PARKED CAR, OR OTHER OBJECT. ALL STREET TREES FALLING WITHIN THE SIGHT TRIANGLES SHOWN ON THIS PLAN SHALL BE LIMBED UP BETWEEN 2 FEET AND 8 FEET IN HEIGHT ABOVE THE CURB LINE ELEVATION.

E. MINIMUM CORNER CLEARANCE FROM THE CURB LINE OF INTERSECTING STREETS SHALL BE AT LEAST 20 FEET FROM THE POINT OF TANGENCY OF THE CURB. NO DRIVEWAYS SHALL ENCROACH ON THIS MINIMUM CORNER CLEARANCE.

F. ALL STREETS SHOWN ON THESE PLANS HAVE FULL WIDTH OF RIGHT-OF-WAY CLEARED AND GRADED WITHIN 50 FEET OF ALL STREET INTERSECTIONS. THE FULL WIDTH OF RIGHT-OF-WAY SHALL BE CLEARED AND GRADED ALONG ALL MAJOR, MINOR AND SENSITIVE AREA THOROUGHFARES.

G. WHEEL CHAIR ACCESS RAMPS WILL BE PROVIDED IN ACCORDANCE WITH RALEIGH STANDARD DRAWING STD. #20.11. WHERE SIDEWALK IS NOT REQUIRED ALONG THE PUBLIC RIGHT-OF-WAY, CURB IS TO BE DEPRESSED AT ALL RAMP LOCATIONS SHOWN ON STD. #20.11.

H. ALL INDIVIDUAL LOTS SHALL HAVE AN EROSION CONTROL PLAN SUBMITTED PRIOR TO CONSTRUCTION OF HOUSES THERE UPON. IF MULTIPLE LOTS WITH A TOTAL DISTURBED AREA OF MOTRE THAN 12,000 SF ARE TO BE BUILT UPON AT ONE TIME, A COORDINATED EROSION CONTROL PLAN SHALL BE SUBMITTED.

CONSTRUCTION SEQUENCE FOR THIS PROJECT SHALL BE AS FOLLOWS:

1. SCHEDULE A PRECONSTRUCTION CONFERENCE WITH THE ENVIRONMENTAL CONSULTANT, SCOTT REAMS 919 868-4986. OBTAIN A LAND-DISTURBING PERMIT.
2. INSTALL GRAVEL CONSTRUCTION ENTRANCE, SILT FENCE, TREE FENCE OR OTHER MEASURES AS SHOWN ON THE APPROVED PLAN. CLEAR ONLY AS NECESSARY TO INSTALL THESE DEVICES.
3. CALL THE ENVIRONMENTAL CONSULTANT FOR AN ONSITE INSPECTION TO OBTAIN A CERTIFICATE OF COMPLIANCE.
4. BEGIN CLEARING AND GRUBBING. MAINTAIN DEVICES AS NEEDED.
5. INSTALL SANITARY SEWER AS PER THE PLAN.
6. STABILIZE SITE AS SEWERS ARE CONSTRUCTED. SEED AND MULCH DENUDED AREAS PER GROUND STABILIZATION TIME FRAMES.
7. WHEN CONSTRUCTION IS COMPLETE AND ALL AREAS ARE STABILIZED COMPLETELY, CALL FOR AN INSPECTION BY THE ENVIRONMENTAL CONSULTANT.
8. IF SITE IS APPROVED, REMOVE SILT FENCE, TREE FENCE, AND SEED OUT OR STABILIZE ANY RESULTING BARE AREAS.
9. WHEN VEGETATION HAS BECOME ESTABLISHED, CALL FOR A FINAL SITE INSPECTION BY THE ENVIRONMENTAL CONSULTANT. OBTAIN A CERTIFICATE OF COMPLETION.

NPDES (Stormwater Discharge Permit for Construction Activities (NCGO01) NCDENR/Division of Energy, Mineral and Land Resources

STABILIZATION TIMEFRAMES
(Effective Aug. 3, 2012)

Site Area Description	Stabilization	Timeframe Exceptions
Perimeter dikes, swales, ditches, slopes	7 days	None
High Quality Water (HQW) Zones	7 days	None
Slopes steeper than 3:1	7 days	If slopes are 10' or less in length and are not steeper than 2:1, 14 days are allowed.
Slopes 3:1 or flatter	14 days	7 days for slopes greater than 50' in length.
All other areas with slopes flatter than 4:1	14 days	None, except for perimeters and HQW Zones.

SEEDBED PREPARATION

1. CHISEL COMPACTED AREAS AND SPREAD TOPSOIL 3 INCHES DEEP OVER ADVERSE SOIL CONDITIONS, IF AVAILABLE.
2. RIP THE ENTIRE AREA TO 6-INCH DEPTH.
3. REMOVE ALL LOOSE ROCK, ROOTS, AND OTHER OBSTRUCTIONS LEAVING SURFACE REASONABLY SMOOTH AND UNIFORM.
4. APPLY AGRICULTURAL LIME, FERTILIZER, AND SUPERPHOSPHATE UNIFORMLY AND MIX WITH SOIL (SEE BELOW *).
5. CONTINUE TILLAGE UNTIL A WELL-PULVERIZED, FIRM, REASONABLY UNIFORM SEEDBED IS PREPARED 4 TO 6 INCHES DEEP.
6. SEED ON FRESHLY PREPARED SEEDBED AND COVER SEED LIGHTLY WITH SEEDING EQUIPMENT OR CULTIPACK AFTER SEEDING.
7. MULCH IMMEDIATELY AFTER SEEDING AND ANCHOR MULCH.
8. INSPECT ALL SEEDED AREAS AND MAKE NECESSARY REPAIRS OR RESEEDINGS WITHIN THE PLANTING SEASON, IF POSSIBLE. IF STAND SHOULD BE OVER 60% DAMAGED, RE-ESTABLISHED FOLLOWING ORIGINAL LIME, FERTILIZER AND SEEDING RATES.
9. CONSULT CONSERVATION INSPECTOR ON MAINTENANCE TREATMENT AND FERTILIZATION AFTER PERMANENT COVER IS ESTABLISHED.

*APPLY: AGRICULTURAL LIMESTONE – 2 TONS/ACRE (3 TONS/ACRE IN CLAY SOILS)
FERTILIZER – 1,000 LB/ACRE – 10–10–10
SUPERPHOSPHATE – 500 LB/ACRE – 20% ANALYSIS
MULCH – 2 TONS/ACRE – SMALL GRAIN STRAW
ANCHOR – ASPHALT EMULSION @ 300 GALS/ACRE

SEEDING SCHEDULE

SHOULDERS, SIDE DITCHES, SLOPES
(Maximum 3:1)

Date	Type*	Planting Rate
Aug 15 – Nov 1	Tall Fescue or Hard Fescue	300 lb./acre
Nov 1 – Mar 1	Tall Fescue and Abriuzzi Rye or Annual Rye	300 lb./acre
Mar 1 – Apr 15	Tall Fescue or Hard Fescue	300 lb./acre
Apr 15 – June 30	Hulled common Bermuda grass, Weeping Love Grass	25 lb./acre
July 15 – Aug 15	Tall Fescue and ***Browntop Millet ***or Sorghum-Sudan Hybrids	35 lb./acre

Consult Erosion Control Officer or NRCS for additional alternatives for vegetating denuded areas. The above vegetation rates are those which do well under local conditions; other seeding rate combinations are possible.

***Temporary – Reseed according to optimum season for desired permanent vegetation. Do not allow temporary cover to grow over 12 inches in height before mowing to keep fescue from being shaded out.

*Bahia grass shall not be used in City maintained areas.

SHOULDERS, SIDE DITCHES, SLOPES
Slopes (3:1 and 2:1) (not mowed)

Date	Type*	Planting Rate
Mar 1 – June 1	Sericea Lespedeza (scarified) and	50 lb./acre
Mar 1 – Apr 15	Add Tall Fescue or	120 lb./acre
Mar 1 – June 30	Add Weeping Love Grass or	10 lb./acre
Mar 1 – June 30	Add Hulled Common Bermuda grass	25 lb./acre
June 1 – Sept 1	***Tall Fescue and ***Browntop Millet ***or Sorghum-Sudan Hybrids	120 lb./acre 35 lb./acre 30 lb./acre
Sept 1 – Mar 1	Sericea Lespedeza (unhulled/unscarified) and Tall Fescue Add Abruzzi Rye or Annual Rye	70 lb./acre 120 lb./acre 25 lb./acre

Consult Erosion Control Officer or NRCS for additional alternatives for vegetating denuded areas. The above vegetation rates are those which do well under local conditions; other seeding rate combinations are possible.

***Temporary – Reseed according to optimum season for desired permanent vegetation. Do not allow temporary cover to grow over 12 inches in height before mowing to keep fescue from being shaded out.

*Bahia grass shall not be used in City maintained areas.

SEEDBED PREPARATION

1. CHISEL COMPACTED AREAS AND SPREAD TOPSOIL 3 INCHES DEEP OVER ADVERSE SOIL CONDITIONS, IF AVAILABLE.
2. RIP THE ENTIRE AREA TO 6-INCH DEPTH.
3. REMOVE ALL LOOSE ROCK, ROOTS, AND OTHER OBSTRUCTIONS LEAVING SURFACE REASONABLY SMOOTH AND UNIFORM.
4. APPLY AGRICULTURAL LIME, FERTILIZER, AND SUPERPHOSPHATE UNIFORMLY AND MIX WITH SOIL (SEE BELOW *).
5. CONTINUE TILLAGE UNTIL A WELL-PULVERIZED, FIRM, REASONABLY UNIFORM SEEDBED IS PREPARED 4 TO 6 INCHES DEEP.
6. SEED ON FRESHLY PREPARED SEEDBED AND COVER SEED LIGHTLY WITH SEEDING EQUIPMENT OR CULTIPACK AFTER SEEDING.
7. MULCH IMMEDIATELY AFTER SEEDING AND ANCHOR MULCH.
8. INSPECT ALL SEEDED AREAS AND MAKE NECESSARY REPAIRS OR RESEEDINGS WITHIN THE PLANTING SEASON, IF POSSIBLE. IF STAND SHOULD BE OVER 60% DAMAGED, RE-ESTABLISHED FOLLOWING ORIGINAL LIME, FERTILIZER AND SEEDING RATES.
9. CONSULT CONSERVATION INSPECTOR ON MAINTENANCE TREATMENT AND FERTILIZATION AFTER PERMANENT COVER IS ESTABLISHED.

*APPLY: AGRICULTURAL LIMESTONE – 2 TONS/ACRE (3 TONS/ACRE IN CLAY SOILS)
FERTILIZER – 1,000 LB/ACRE – 10–10–10
SUPERPHOSPHATE – 500 LB/ACRE – 20% ANALYSIS
MULCH – 2 TONS/ACRE – SMALL GRAIN STRAW
ANCHOR – ASPHALT EMULSION @ 300 GALS/ACRE

SEEDING SCHEDULE

SHOULDERS, SIDE DITCHES, SLOPES
(Maximum 3:1)

Date	Type*	Planting Rate
Aug 15 – Nov 1	Tall Fescue or Hard Fescue	300 lb./acre
Nov 1 – Mar 1	Tall Fescue and Abriuzzi Rye or Annual Rye	300 lb./acre
Mar 1 – Apr 15	Tall Fescue or Hard Fescue	300 lb./acre
Apr 15 – June 30	Hulled common Bermuda grass, Weeping Love Grass	25 lb./acre
July 15 – Aug 15	Tall Fescue and ***Browntop Millet ***or Sorghum-Sudan Hybrids	35 lb./acre

Consult Erosion Control Officer or NRCS for additional alternatives for vegetating denuded areas. The above vegetation rates are those which do well under local conditions; other seeding rate combinations are possible.

***Temporary – Reseed according to optimum season for desired permanent vegetation. Do not allow temporary cover to grow over 12 inches in height before mowing to keep fescue from being shaded out.

*Bahia grass shall not be used in City maintained areas.

SHOULDERS, SIDE DITCHES, SLOPES
Slopes (3:1 and 2:1) (not mowed)

Date	Type*	Planting Rate
Mar 1 – June 1	Sericea Lespedeza (scarified) and	50 lb./acre
Mar 1 – Apr 15	Add Tall Fescue or	120 lb./acre
Mar 1 – June 30	Add Weeping Love Grass or	10 lb./acre
Mar 1 – June 30	Add Hulled Common Bermuda grass	25 lb./acre
June 1 – Sept 1	***Tall Fescue and ***Browntop Millet ***or Sorghum-Sudan Hybrids	120 lb./acre 35 lb./acre 30 lb./acre
Sept 1 – Mar 1	Sericea Lespedeza (unhulled/unscarified) and Tall Fescue Add Abruzzi Rye or Annual Rye	70 lb./acre 120 lb./acre 25 lb./acre

Consult Erosion Control Officer or NRCS for additional alternatives for vegetating denuded areas. The above vegetation rates are those which do well under local conditions; other seeding rate combinations are possible.

***Temporary – Reseed according to optimum season for desired permanent vegetation. Do not allow temporary cover to grow over 12 inches in height before mowing to keep fescue from being shaded out.

*Bahia grass shall not be used in City maintained areas.

LINETYPE LEGEND

EXISTING	NAME	PROPOSED
	WATER LINE	
G G	GAS LINE	G G
OE OE	OVERHEAD ELECTRIC	OE OE
UE UE	UNDERGROUND ELECTRIC	UE UE
OT OT	OVERHEAD TELEPHONE	OT OT
UT UT	UNDERGROUND TELEPHONE	UT UT
	STORM DRAIN	
S S	SANITARY SEWER	
	FORCE MAIN	FM
	CURB & GUTTER LINE	
	SWALE/DITCH LINE	
	STREAM LINE	
	FENCE LINE	
	TREE LINE	
	FLOW LINE	
	TEMP DIVERSION LINE	
	CLEARING LIMITS	CL CL
	TREE FENCE	TF TF
	SILT FENCE LINE	SF SF
	MINOR CONTOUR LINE	
320	INDEX CONTOUR LINE	320
	CENTERLINE	
	ADJACENT PROPERTY LINE	
	PROPERTY LINE	
	RIGHT-OF-WAY LINE	
	EASEMENT LINE	
	BUFFER ZONE LINE	
	RIPARIAN BUFFER	
	100 YR. FLOOD ELEV.	
	BUILDING RESTRICTION FLOOD LINE	
	MATCH LINE	
	PHASE LINE	
	LEVEL SPREADER	

UTILITY LEGEND SYMBOL

ABBREV.	SYMBOL	NAME
ARV		AIR RELEASE VALVE
PP		UTILITY POLE
WVPR	WV	PROPOSED WATER VALVE
WVEX		EXISTING WATER VALVE
BOAPR	BOAO	PROPOSED BLOW OFF ASSEMBLY
BOA EX		EXISTING BLOW OFF ASSEMBLY
WLCROSS		WATERLINE CROSS
WLTEE		WATERLINE TEE
FHPR		PROPOSED FIRE HYDRANT
FHEX		EXISTING FIRE HYDRANT
MHPR		PROPOSED MAN HOLE
MHEX		EXISTING MAN HOLE
FESPR		PROPOSED FLARED END SECTION
FESEX		EXISTING FLARED END SECTION
REDPR		PROPOSED REDUCER
REDEX		EXISTING REDUCER
SANSERV		EXIST. SAN SEWER SERV
SANSERV	C.O.	PROPOSED SAN SEWER SERV CLEAN OUT
WSPR	WM	PROPOSED WATER SERVICE
	PP	PROPOSED POWER POLE
		PROPOSED LIGHT POLE

No.	DATE	REVISION	DWN/CHK

GENERAL NOTES AND LEGENDS

FOR

KALAS FALLS

SITUATED AT
ROLESVILLE RD, ROLESVILLE
WAKE COUNTY, NORTH CAROLINA
FIRM # C-3881

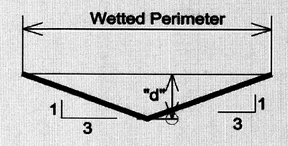
JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	EDS
DATE:	9/19/2019

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Wainut Street, Suite 360
Cary, NC 27511
919-469-1101

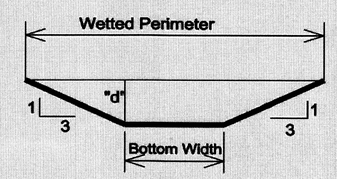
PRELIMINARY
NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMAN
5.11.20
NOT FOR CONSTRUCTION

SHEET NO.
3.0

Y:\Jobs\9900\Watkins Property\dwg\Temporary\Emily\Kalas Base.dwg



Ditch Section (For Bottom Width = 0)
(Not To Scale)



Trapezoidal Ditch / Swale Section
(Not To Scale)

RIP-RAP PADS

Date: 4/29/20 Kalas Falls, Phase 1

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Using NYSDOT Method

OUTLET NO.	PIPE DIA. (IN.)	VELOCITY (FPS)	ZONE	STONE SIZE	STONE CLASS	WIDTH (FT.)*	LENGTH (FT.)	DEPTH (IN.)
FES5	18	8.49	2	6"	B	6	9	18
FES101	24	6.48	2	6"	B	8	12	18
FES130	15	6.39	1	3"	A	4.75	5	12
FES200	24	7.34	2	6"	B	8	12	18
FES210	24	7.96	2	6"	B	8	12	18
FES220	24	6.26	2	6"	B	8	12	18
FES250	15	4.60	1	3"	A	4.75	5	12
FES250A	24	13.20	3	13"	1	8.75	16	24
FES301	24	6.81	2	6"	B	8	12	18
FES314	24	10.11	2	6"	B	8	12	18
FES770	18	7.24	2	6"	B	6	9	18
FES SCM1A	18	10.78	2	6"	B	6	9	18
FES SCM2A	42	8.71	3	13"	1	15.25	28	24
FES SCM2B	24	2.90	2**	6"	B	8	12	18
FES SCM3D	18	5.73	1	3"	A	5.5	6	12
FES SCM3E	18	4.61	1	3"	A	5.5	6	12
FES750	48	9.65	3	13"	1	17.5	32	24

*DS width, use 3 x pipe diameter US. **Next higher zone due to steep ground slope

Phase 1 Lot Areas

LOT NUMBER	SQUARE FOOTAGE(SF)	LOT NUMBER	SQUARE FOOTAGE(SF)	LOT NUMBER	SQUARE FOOTAGE(SF)	LOT NUMBER	SQUARE FOOTAGE(SF)
1	12,302	38	26,069	75	13,603	252	6,603
2	11,823	39	13,268	76	13,659	253	7,912
3	12,685	40	11,807	77	14,283	254	7,743
4	11,860	41	11,611	78	14,098	255	7,745
5	12,472	42	11,416	79	12,800	256	7,750
6	11,215	43	11,387	80	12,800	257	7,750
7	10,485	44	9,386	81	12,549	258	7,750
8	9,760	45	10,035	82	10,868	259	7,753
9	12,514	46	9,087	83	11,715	260	7,747
10	12,859	47	9,103	84	13,687	261	9,168
11	23,369	48	10,702	85	11,867	262	11,491
12	23,748	49	13,150	86	12,952	263	10,075
13	14,031	50	13,304	87	15,621	264	10,075
14	10,240	51	14,902	88	16,829	265	10,075
15	10,668	52	16,621	89	20,972	266	10,075
16	11,948	53	22,782	90	26,460	267	10,075
17	12,191	54	30,245	91	23,983	268	10,075
18	12,530	55	20,316	92	25,886	269	10,075
19	11,660	56	16,282	93	16,970		159,937
20	12,445	57	15,912	94	13,478		
21	13,301	58	15,280	95	13,514		
22	11,703	59	15,719	236	14,310		
23	12,106	60	17,893	237	13,261		
24	12,401	61	17,189	238	13,988		
25	13,653	62	21,253	239	12,571		
26	11,390	63	23,387	240	9,789		
27	11,536	64	24,741	241	9,769		
28	13,024	65	21,648	242	11,085		
29	10,884	66	10,644	243	9,616		
30	12,218	67	9,322	244	8,250		
31	11,794	68	10,220	245	8,250		
32	11,492	69	11,248	246	8,950		
33	12,321	70	16,193	247	9,988		
34	10,672	71	15,691	248	11,480		
35	12,289	72	15,229	249	12,244		
36	22,066	73	13,593	250	12,929		
37	21,627	74	12,671	251	11,150		

Sediment Basin/Sediment Trap Schedule
Kalas Falls Phase 1, Part 1

Basin No.	Bottom Elev.	Top of Dam Elev.	Top of Riser Elev.	Spillway Elev.	Weir Length	Riser/ Barrel Size	Basin Dimensions At Top of Dam	At Emerg. Spillway	At Bott. of Basin	Skimmer Size	Skimmer Hole Size	Anti-Flotation Size*
SB102	369.00	374.00	N/A	372.50	10	N/A	23'x40'	17'x34'	3'x20'	1.5"	0.75"	N/A
SB110	396.00	401.00	N/A	399.50	10	N/A	21'x36'	15'x30'	1'x16'	1.5"	0.5"	N/A
SB111	384.00	389.00	386.50	387.50	10	15"/24"	31'x55'	25'x49'	11'x35'	1.5"	0.75"	24"x24"x7.5"
SB210	387.00	391.00	N/A	389.50	10	N/A	22'x47'	16'x33'	2'x19'	1.5"	0.5"	N/A
SB211	367.00	372.00	369.50	370.50	10	24"/30"	45'x86'	39'x80'	25'x66'	1.5"	1"	30"x30"x12"
SB212	359.50	364.50	362.00	363.00	10	15"/24"	30'x55'	24'x39'	10'x35'	1.5"	0.75"	24"x24"x7.5"
SB213	368.00	373.00	370.50	371.50	10	18"/24"	42'x80'	36'x74'	22'x60'	1.5"	0.75"	24"x24"x10.5"
SB215	370.00	375.00	372.50	373.50	10	18"/24"	36'x66'	30'x60'	16'x46'	1.5"	0.75"	24"x24"x10.5"
SB216	345.00	350.00	N/A	348.50	10	N/A	21'x36'	15'x30'	1'x16'	1.5"	0.5"	N/A
SB218	303.00	308.00	305.50	306.50	10	15"/24"	32'x65'	28'x59'	14'x45'	2"	1"	24"x24"x7.5"

*Side x side x depth

Sediment Basin/Sediment Trap Schedule
Kalas Falls Phase 1, Part 2

Basin No.	Bottom Elev.	Top of Dam Elev.	Top of Riser Elev.	Spillway Elev.	Weir Length	Riser/ Barrel Size	Basin Dimensions At Top of Dam	At Emerg. Spillway	At Bott. of Basin	Skimmer Size	Skimmer Hole Size	Anti-Flotation Size*
SB310	365.00	370.00	N/A	368.50	10	N/A	27'x49'	21'x43'	7'x29'	1.5"	0.75"	N/A
SB311	363.00	368.00	N/A	366.50	10	N/A	21'x36'	15'x30'	1'x16'	1.5"	0.5"	N/A
SB313	330.00	335.00	N/A	333.50	10	N/A	26'x49'	20'x43'	6'x29'	1.5"	0.5"	N/A
SB314	331.50	336.50	334.00	335.00	10	15"/24"	29'x55'	23'x49'	9'x36'	1.5"	0.75"	24"x24"x7.5"

*Side x side x depth

KALAS- PHASE ONE ONLY-STORM DRAINAGE
CURRENT AS OF 04/23/20
Time of Concentration = 10.0 Min per NCDOT Inlet Design

STORMWATER PIPING SUMMARY KALAS P.U.D. -PHASE ONE

Down Stream Structure	Up Stream Structure	Area (Acres)	Runoff Coef.	Tc (min)	Q(10)I Flow (cfs)	Pipe Size (in)	Length (ft)	Slope (%)	DS Rim Elev (ft)	US Rim Elev (ft)	DS Invert (ft)	US Invert (ft)	DS Velocity (fps)
FES 5	JB 6	0.00	0.50	10.00	7.66	18	26.58	2.00	370.50	374.96	369.00	369.53	8.49
JB 6	YI 7	2.50	0.50	10.00	7.66	18	208.42	0.95	374.96	377.90	370.60	372.58	6.37
FES 101	CB 104	0.24	0.78	10.00	15.39	24	81.57	0.40	369.64	375.40	370.50	370.83	6.48
CB 104	CB 113	0.20	0.54	10.00	13.38	24	41.00	0.41	375.40	375.40	370.93	371.09	4.48
CB 104	CB 104 A	0.24	0.76	10.00	1.12	15	9.00	0.54	375.40	375.41	371.49	371.54	0.96
CB 113	FES 114	2.25	0.50	10.00	3.24	18	23.50	0.39	375.40	372.07	371.72	371.82	2.03
CB 113	CB 113 A	0.20	0.76	10.00	6.45	24	9.00	0.36	375.40	375.41	371.19	371.23	2.16
CB 113 A	CB 114A	0.10	0.72	10.00	5.64	18	53.16	0.41	375.41	375.75	371.73	371.94	3.35
CB 114A	CB 115	0.15	0.72	10.00	5.33	18	130.00	2.00	375.75	378.69	372.04	374.64	3.34
CB 115	CB 116	0.09	0.82	10.00	4.80	15	184.00	3.40	378.69	386.20	374.84	381.09	4.80
CB 116	CB 120	0.53	0.50	10.00	1.62	15	41.00	0.50	386.20	386.20	381.39	381.60	2.16
CB 116	CB 117	0.10	0.63	10.00	2.82	15	45.96	1.00	386.20	388.01	381.29	381.75	3.10
CB 117	CB 118	0.44	0.56	10.00	2.45	15	27.00	1.00	388.01	388.01	381.95	382.22	3.34
CB 118	CB 119	0.16	0.64	10.00	0.99	15	45.96	1.00	388.01	388.76	382.42	382.88	1.94
CB 119	CB 119 A	0.07	0.86	10.00	0.37	15	41.00	1.00	388.76	388.76	383.08	383.49	1.98
FES 130	DI 131	2.33	0.50	10.00	7.14	15	17.67	0.51	374.38	375.40	370.50	370.59	6.39
FES 200	JB 200 A	0.00	0.50	10.00	12.18	24	173.19	1.00	339.09	346.39	337.50	339.23	7.34
JB 200 A	JB 200 B	0.00	0.50	10.00	12.16	24	67.00	7.85	346.39	352.76	341.33	346.59	15.59
JB 200 B	JB 200 C	0.00	0.50	10.00	12.16	24	67.00	9.72	352.76	361.45	348.79	355.30	16.83
JB 200 C	CB 201	0.25	0.56	10.00	12.16	24	69.16	5.71	361.45	369.19	357.50	361.43	13.90
CB 201	CB 201 A	0.14	0.69	10.00	11.46	24	74.47	4.86	369.19	371.70	362.52	366.14	4.06
CB 201 A	CB 202	0.44	0.50	10.00	10.94	24	27.00	1.25	371.70	371.70	366.34	366.68	3.84
CB 202	CB 202 A	0.09	0.78	10.00	9.92	24	196.53	1.47	371.70	375.74	366.88	369.76	3.71
CB 202 A	CB 202 B	0.22	0.76	10.00	9.55	24	42.53	0.53	375.74	378.16	370.16	370.39	4.58
CB 202 B	CB 202 C	0.48	0.56	10.00	8.59	24	27.00	1.02	378.16	378.17	370.59	370.86	4.00
CB 202 C	CB 203	0.62	0.39	10.00	7.01	18	44.42	2.03	378.17	377.11	371.36	372.26	4.49
CB 203	CB 205	0.58	0.43	10.00	4.53	15	97.02	1.29	377.11	379.65	372.46	373.72	3.80
CB 203	CB 204	0.25	0.72	10.00	1.10	15	36.28	0.44	377.11	378.11	371.90	372.06	0.90
CB 205	CB 206	0.49	0.50	10.00	3.04	15	70.24	1.51	379.65	381.08	373.92	374.97	2.96
CB 206	CB 207	0.51	0.50	10.00	1.56	15	70.24	1.49	381.08	382.52	375.17	376.22	2.07
FES 210	YI 211	3.30	0.50	10.00	17.37	24	82.81	1.00	340.80	346.00	337.50	338.33	7.96
YI 211	YI 212	0.00	0.50	10.00	7.84	18	84.74	7.76	346.00	364.69	344.53	351.11	14.05
YI 212	CB 213	0.30	0.78	10.00	7.84	18	86.00	6.12	364.69	371.13	357.31	362.57	12.90
CB 213	CB 214	0.30	0.78	10.00	6.52	18	92.63	3.89	371.13	374.87	365.87	369.48	10.40
CB 214	CB 215	0.56	0.50	10.00	5.23	18	110.85	3.34	374.87	377.69	368.68	373.38	3.96
CB 215	CB 218	0.26	0.60	10.00	0.96	15	27.00	0.41	377.69	377.69	373.58	373.69	1.15
CB 215	CB 216	0.37	0.50	10.00	2.70	15	136.23	1.15	377.69	379.16	373.78	375.34	3.89
CB 216	CB 217	0.45	0.58	10.00	1.60	15	69.92	0.75	379.16	379.84	375.54	376.06	2.87
FES 220	YI 221	0.57	0.58	10.00	14.21	24	64.00	0.50	368.07	370.40	366.00	366.32	6.26
YI 221	CB 222	0.04	0.80	10.00	13.04	24	330.00	1.22	370.40	381.79	366.52	368.10	4.68
CB 222	CB 225	0.10	0.80	10.00	2.78	15	60.00	7.50	381.79	383.00	374.20	378.70	10.52
CB 222	CB 223	0.16	0.78	10.00	10.17	18	62.62	1.84	381.79	381.17	374.20	375.35	8.78
CB 223	FES 224	3.25	0.38	10.00	7.57	18	31.74	2.99	381.17	376.96	375.55	376.50	5.22
CB 223	CB 228	0.08	0.80	10.00	2.26	18	59.69	1.50	381.17	380.88	375.55	376.45	1.82
CB 225	CB 226	0.16	0.65	10.00	2.37	15	146.54	2.50	383.00	387.31	378.90	382.56	3.36
CB 226	CB 230	0.13	0.82	10.00	1.19	15	41.00	1.01	380.88	380.88	376.65	377.06	2.88
CB 228	CB 229	0.17	0.70	10.00	0.27	15	55.11	0.65	380.88	381.13	376.85	377.20	1.74
CB 226	CB 227	0.36	0.79	10.00	1.74	15	41.00	1.58	387.31	387.31	382.76	383.41	2.82
CB 230	CB 231	0.12	0.78	10.00	0.57	15	112.70	0.50	380.88	381.90	377.26	377.82	2.13
FES 250	CB 251	0.10	0.72	10.00	1.95	15	30.18	0.99	315.56	320.61	313.50	313.80	4.60
CB 251	CB 252	0.30	0.83	10.00	1.53	15	57.16	0.51	320.61	318.10	314.01	314.30	3.43
FES 250 A	CB 254	0.13	0.76	10.00	28.63	24	59.36	2.76	318.97	325.70	313.50	315.14	13.20
CB 254	DI 254 A	5.74	0.35	10.00	12.32	24	33.11	1.00	325.70	319.00	316.34	316.67	4.11
CB 254	CB 255	0.10	0.76	10.00	16.49	24	182.54	5.20	325.70	338.10	320.50	330.00	14.63
CB 255	CB 256	0.26	0.76	10.00	16.12	24	45.96	3.89	338.10	341.00	330.80	332.59	5.19
CB 256	CB 257	0.37	0.50	10.00	15.00	24	27.00	4.46	341.00	341.00	332.99	334.19	5.58
CB 257	CB 260	0.08	0.72	10.00	10.46	24	94.58	2.00	341.00	342.84	336.19	338.08	9.12
CB 257	CB 258	0.54	0.58	10.00	3.60	15	45.96	8.06	341.00	345.38	336.19	339.90	11.63
CB 258	CB 259	0.44	0.64	10.00	1.73	15	41.00	0.50	345.38	345.58	340.10	340.31	1.71
CB 260	YI 262	0.66	0.34	10.00	8.19	18	23.71	0.49	342.84	343.55	338.58	338.70	5.85
CB 260	YI 261	0.78	0.42	10.00	2.01	15	168.55	5.43	342.84	362.62	339.46	348.62	8.54
YI 262	CB 263	0.13	0.59	10.00	6.96	18	118.34	1.85	343.55	349.99	338.90	341.09	4.48
CB 263	YI 264	0.30	0.50	10.00	0.92	15	25.16	0.49	349.99	345.84	341.33	341.46	0.92
CB 263	CB 265	0.23	0.65	10.00	5.66	15	154.37	9.37	349.99	363.87	343.29	357.76	13.93
CB 265	YI 266	1.10	0.38	10.00	2.56	15	11.81	1.15	363.87	364.27	357.96	358.09	2.69
CB 265	CB 267	0.55	0.65	10.00	2.19	15	55.36	7.29	363.87	368.39	358.97	363.00	9.72
FES 301	DI 301-A	1.45	0.50	10.00	17.13	24	30.32	0.49	313.98	309.00	306.50	306.65	6.81
DI 301-A	JB 301-B	0.00	0.50	10.00	13.19	24	146.37	5.58	309.00	328.09	307.05	315.22	4.61
JB 301-B	JB 301-C	0.00	0.50	10.00	13.19	24	72.00	8.37	328.09	335.64	317.32	323.35	16.33
JB 301-C	CB 302	0.11	0.72	10.00	13.19	24	71.36	9.33	335.64	339.11	324.75	331.41	4.38
CB 302	CB 303	0.18	0.46	10.00	12.76	24	27.00	0.52	339.11	339.11	333.61	333.75	5.98
CB 303	CB 308	0.51	0.40	10.00	4.55	18	84.35	1.48	339.11	339.56	334.25	335.50	3.02
CB 303	CB 303 A	0.18	0.50	10.00	7.82	18	9.00	0.50	339.11	339.12	334.25	334.30	4.86
CB 303 A	CB 304	0.19	0.50	10.00	7.31	18	20.09	3.01	339.12	339.25	334.50	335.10	4.51
CB 308	CB 310	0.24	0.48	10.00	2.62	15	110.55	0.41	339.56	340.21	335.70	336.15	3.29
CB 308	CB 309	0.17	0.76	10.00	0.79	15	27.00	0.50	339.56	339.56	335.70	335.84	1.09
CB 304	CB 305	0.32	0.50	10.00	6.81	18	60.43	1.24	339.25	340.42	335.30	336.05	4.79
CB 310	CB 311	0.17	0.71	10.00	1.95	15	54.00	0.59	340.21	340.52	336.35	336.67	3.04
CB 305	CB 307	0.92	0.54	10.00	4.99	15	88.24	4.18	340.42	343.78	336.25	339.94	4.60
CB 305	CB 306	0.26	0.61	10.00	0.97	15	27.00	0.50	340.42	340.42	336.25	336.39	1.02
CB 311	CB 312	0.28	0.71	10.00	1.22	15	31.99	0.40	340.52	340.70	336.87	337.00	3.00
CB 307	CB 313	0.57	0.60	10.00	2.10	15	160.00	3.00	343.78	349.80	340.14	344.84	2.37
FES 314	CB 315	0.29	0.78	10.00	15.44	24	57.61	2.00	350.15	354.12	344.50	345.65	10.11
CB 315	CB 316	0.35	0.69	10.00	14.25	24	41.00	0.75	354.12	354.11	348.75	349.06	6.82
CB 316	CB 317	0.06	0.81	10.00	13.17	24	196.59	1.76	354.11	358.45	349.26	352.72	4.46
CB 317	CB 318	0.08	0.52	10.00	12.95	24	38.72	1.51	358.45	358.66	352.92	353.50	5.04
CB 318	CB 319	0.33	0.50	10.00	12.76	24	42.29	1.13	358.66	358.67	353.70	354.18	5.03
CB 319	CB 320	0.37	0.56	10.00	11.89	24	47.54	1.46	358.67	360.47	354.38	355.08	4.49
CB 320	CB 321	0.68	0.47	10.00	10.82	18	120.75	1.75	360.47	363.13	355.58	357.69	6.35
CB 321	CB 323	0.52	0.56	10.00	8.05	18	85.22	1.99	363.13	365.47	357.89	359.59	4.81
CB 321	CB 322	0.22	0.80	10.00	1.08	15	44.32	0.73	363.13	363.51	357.89	358.22	0.89
CB 323	CB 324	0.24	0.69	10.00	6.43	18	89.57	4.00	365.47	369.41	359.79	363.37	4.31
CB 324	CB 325	0.09	0.84	10.00	5.55	18	119.73	5.25	369.41	376.01	363.57	369.86	4.43
CB 325	CB 326	0.13	0.59	10.00	5.13	18	45.79	2.75	376.01	377.17	370.06	371.32	3.65
CB 326	CB 327	0.61	0.53	10.00	4.69	18	27.00	1.00	377.17	377.17	371.52	371.79	3.61
CB 327	CB 328	0.51	0.66	10.00	2.77	18	45.96	3.00	377.17	379.89	371.99	373.37	2.63
CB 328	CB 329	0.18	0.67	10.00	0.74	15	41.00	0.50	379.89	379.89	373.57	373.78	1.54
CB 753	HW 760	13.90	0.50	10.00	42.60	24	40.74	0.97	383.64	380.78	378.40	378.80	13.89
CB 753	CB 753 A	0.18	0.80	10.00	5.13	18	16.50	0.72	383.64	383.60	376.18	376.30	3.75
JB 755	JB 756	0.00	0.50	10.00	42.09	36	115.52	1.54	380.82	385.67	373.98	375.75	6.92
CB 753 A	CB 761	0.27	0.80	10.00	4.33	18	62.46	0.75	383.60	383.93	376.50	376.97	3.71
JB 756	CB 757	0.12	0.80	10.00	42.09	36	53.83	0.73	385.67	384.76	375.95	376.34	6.70
CB 761	CB 762	0.21	0.80	10.00	3.12	18	102.70	1.25	383.93	384.50	377.17	378.45	3.43
CB 757	FES 757 A	15.90	0.50	19.00	37.63	36	39.53	3.92	384.76	383.06	378.69	380.24	16.13
CB 757	CB 759	0.28	0.75	10.00	2.18	15	136.87	1.07	384.76	383.88	378.09	379.56	3.48
CB 757	CB 758	0.00	0.40	10.00	2.99	15	122.86	2.24	384.76	385.53	378.09	380.84	3.33
CB 762	CB 763	0.45	0.80	10.00	2.21	18	206.12	1.25	384.50	388.38	378.65	381.23	3.29
CB 758	DI 758 A	1.22	0.40	10.00	2.99	15	11.74	1.78	385.53	385.80	381.04	381.25	3.22
CB 759	CB 760	0.21	0.75	10.00	0.97	15	145.97	0.60	383.88	384.85	379.76	380.64	2.30
FES 770	CB 771	0.22	0.80	10.00	8.42	18	200.00	1.25	369.91	381.90	368.50	371.00	7.24
CB 771	CB 778	0.33	0.80	10.00	2.49	18	325.30	0.50	381.90	379.57	371.20	372.83	1.47
CB 771	CB 772	0.12	0.80	10.00	5.32	15	210.54	1.00	381.90	383.92	377.40	379.51	5.89
CB 772	CB 773	0.21	0.80	10.00	4.87	15	114.57	0.60	383.92	384.81	379.71	380.40	4.95
CB 778	CB 779	0.20	0.80	10.00	0.98	15	200.00	0.48	379.57	378.09	373.08	374.03	2.58
CB 778	CB 774	0.26	0.80	10.00	4.06	15	203.06	0.55	384.81	386.15	380.60	381.72	3.93
CB 774	CB 775	0.26	0.80	10.00	3.02	15	250.00	1.25	386.15	389.64	381.92	385.05	3.77
CB 775	CB 776	0.20	0.80	10.00	1.93	15	249.72	1.25	389.64	392.75	385.25	388.37	3.06
CB 776	CB 777	0.21	0.80	10.00	1.03	15	200.00	0.30	392.75	393.04	388.57	389.17	2.67
FES 800	CB 801	0.10	0.89	10.00	9.03	18	35.14	1.99	363.30	366.71	357.50	358.20	8.82
FES OS 1A	OS 1A	0.00	0.50	10.00	18.10	18	54.00	0.50	367.32	372.25	366.60	366.87	10.49
FES SCM 2A	OS SCM 2A	0.00	0.50	10.00	49.20	42	80.04	0.62	336.00	340.50	332.50	333.00	8.71
FES SCM 2B	JB SCM 2B	0.00	0.50	10.00	3.00	24	90.08	0.50	311.00	311.67	309.00	309.45	3.91
JB SCM 2B	OS SCM 2B	0.00	0.50	10.00	3.00	24	100.00	0.50	311.67	317.50	309.50	310.00	2.90
FES SCM 3D	OS SCM 3D	0.00	0.50	10.00	1.00	18	60.00	3.33	339.31	348.75	339.00	341.00	5.73
FES SCM 3E	OS SCM 3E	0.00	0.50	10.00	1.00	18	56.00	1.79	303.50	310.00	302.00	303.00	4.61

Z:\Jobs\9900\Watkins Property\dwg\Temporary\Emily\Kalas Rendering Formally The Base.dwg

No.	DATE	REVISION	DWN/CHK

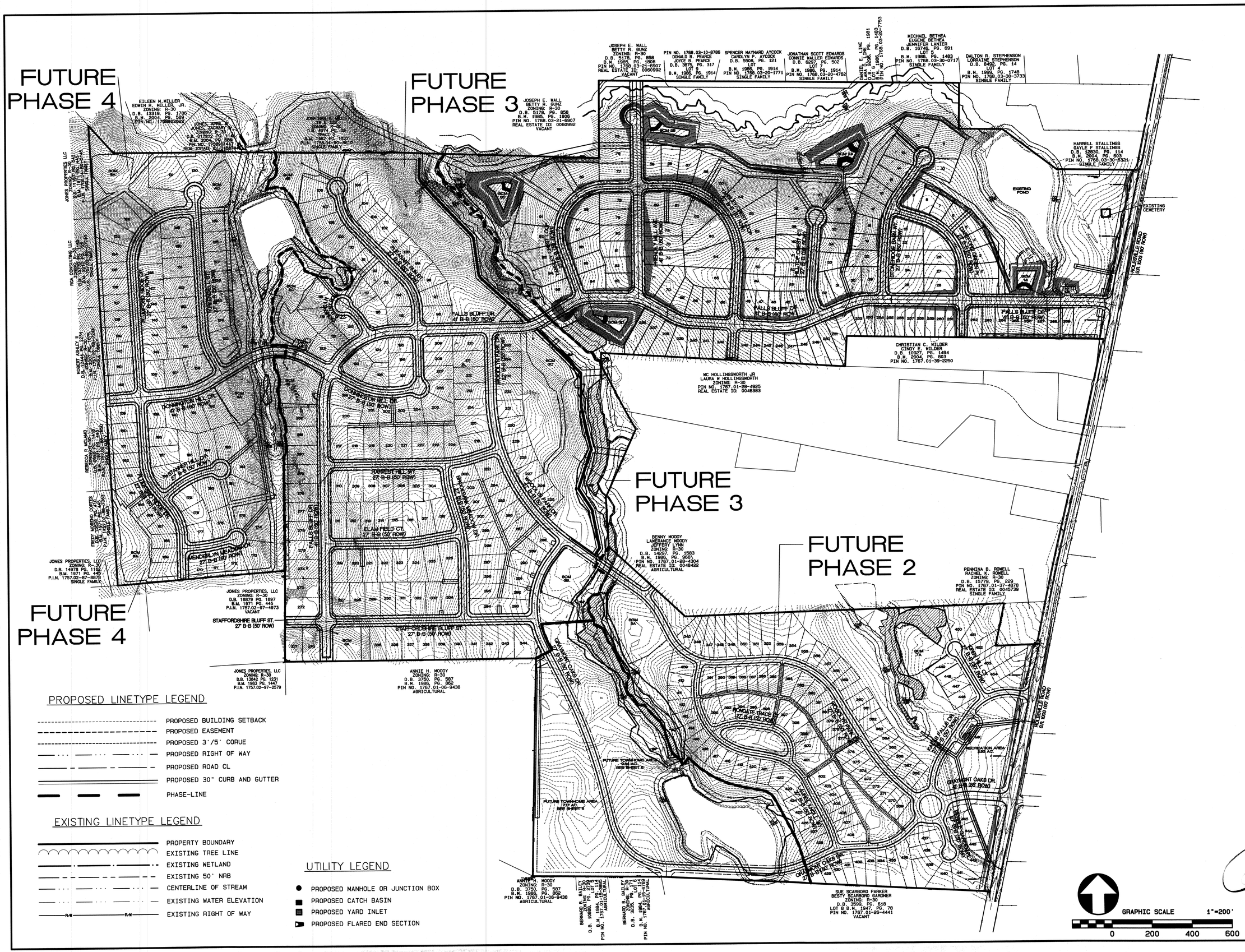
SCHEDULE PLAN
FOR
KALAS FALLS
SITUATED AT
ROLESVILLE RD, ROLESVILLE
WAKE COUNTY, NORTH CAROLINA
FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	EDS
DATE:	9/19/2019

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511
919-469-1101

NORTH CAROLINA PROFESSIONAL SEAL 8922 ENGINEER EDWARD NICHOLAS JOYNER
10/7/20

SHEET NO.
3.1



No.	DATE	REVISION	DWN/CHK

GRADING AND DRAINAGE OVERALL PLAN

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA

FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

PRELIMINARY

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 19810 JOHN R. HARMAN

10.7.20

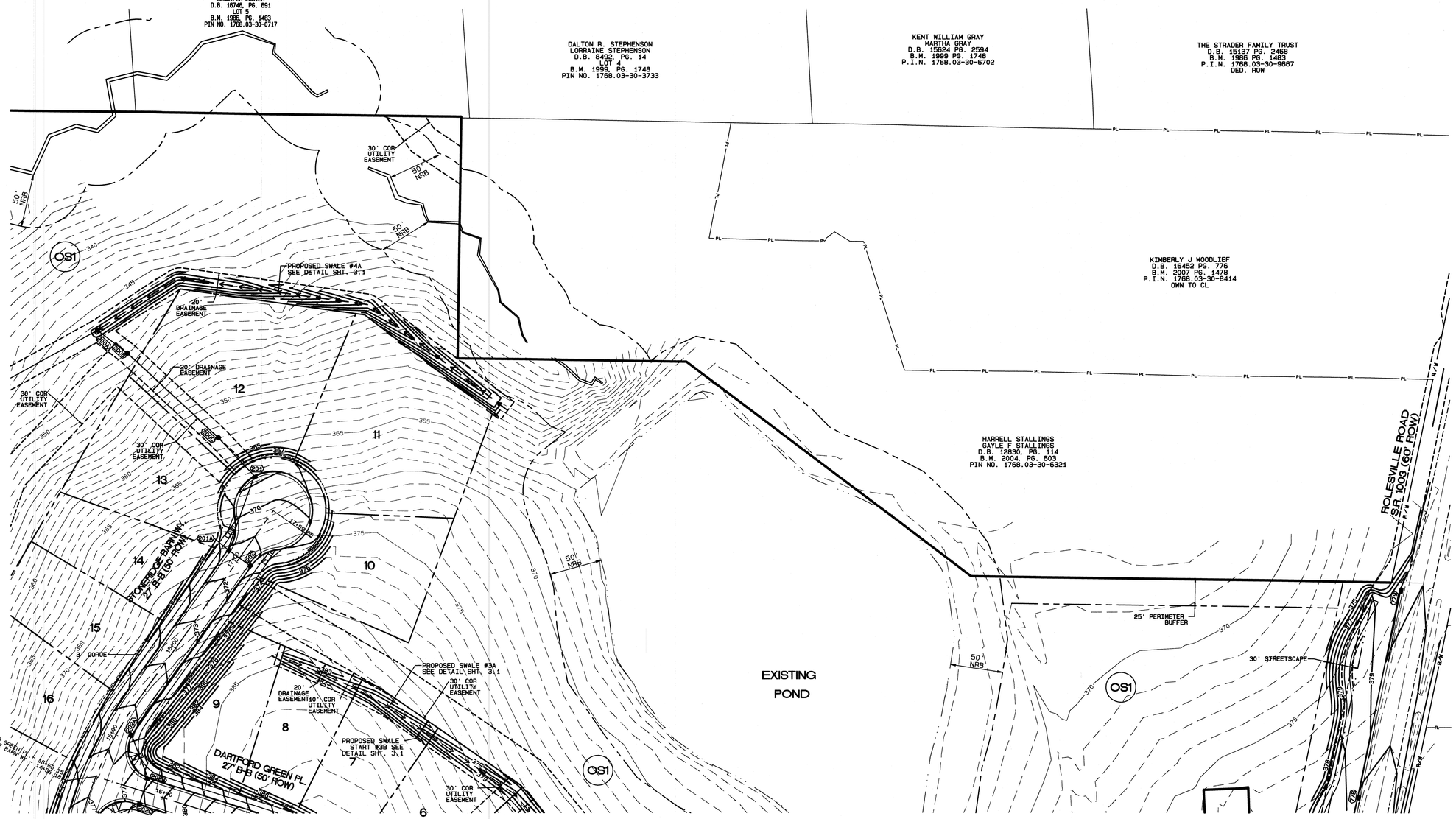
NOT FOR CONSTRUCTION

SHEET NO.

4.0

FILE: Z:\Jobs\9900\Watkins Property\Dwg\Base Map\Kalas Falls Base Phase 1.pro

Plot Date: 10/7/2020, Time: 6:59AM



PROPOSED LINETYPE LEGEND

- PROPOSED BUILDING SETBACK
- PROPOSED EASEMENT
- PROPOSED 3'/5' CORUE
- PROPOSED RIGHT OF WAY
- PROPOSED ROAD CL
- PROPOSED 30" CURB AND GUTTER
- PROPOSED SWALES
- PROPOSED 100 YR.
- PROPOSED 2' BLDG. RESTRICTION LINE

EXISTING LINETYPE LEGEND

- PROPERTY BOUNDARY
- EXISTING TREE LINE
- EXISTING WETLAND
- EXISTING 50' NRB
- CENTERLINE OF STREAM
- EXISTING WATER ELEVATION
- EXISTING RIGHT OF WAY

UTILITY LEGEND

- PROPOSED MANHOLE OR JUNCTION BOX
- PROPOSED CATCH BASIN
- PROPOSED YARD INLET
- PROPOSED FLARED END SECTION

GRAPHIC SCALE 1"=50'

0 50 100 150

No.	DATE	REVISION	DWN/CHK

GRADING AND DRAINAGE PHASE 1

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA

FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

AMERICAN Engineering
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875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

PRELIMINARY

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMON

10-7-20

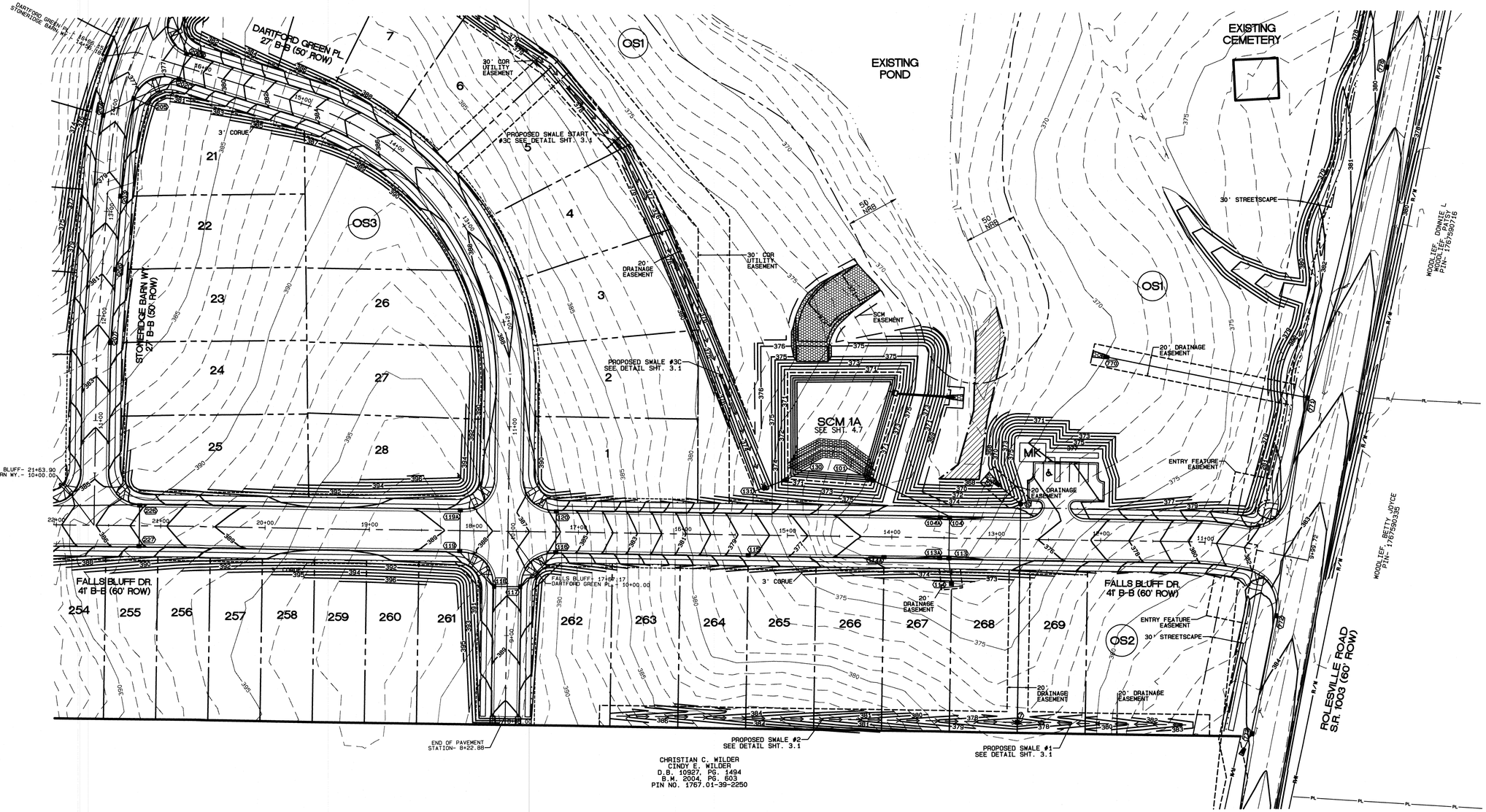
NOT FOR CONSTRUCTION

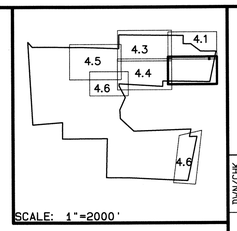
SHEET NO.

4.1

FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro

Plot Date: 10/7/2020 Time: 7:02AM





PROPOSED LINETYPE LEGEND

- PROPOSED BUILDING SETBACK
- PROPOSED EASEMENT
- PROPOSED 3'/5' CORUE
- PROPOSED RIGHT OF WAY
- PROPOSED ROAD CL
- PROPOSED 30" CURB AND GUTTER
- PROPOSED SWALES
- PROPOSED 100 YR.
- PROPOSED 2' BLDG. RESTRICTION LINE

EXISTING LINETYPE LEGEND

- PROPERTY BOUNDARY
- EXISTING TREE LINE
- EXISTING WETLAND
- EXISTING 50' NRB
- CENTERLINE OF STREAM
- EXISTING WATER ELEVATION
- EXISTING RIGHT OF WAY

UTILITY LEGEND

- PROPOSED MANHOLE OR JUNCTION BOX
- PROPOSED CATCH BASIN
- PROPOSED YARD INLET
- PROPOSED FLARED END SECTION

GRAPHIC SCALE 1"=50'

0 50 100 150

No.	DATE	REVISION	DWN/CHK

GRADING AND DRAINAGE PHASE 1

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA

FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

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Cary, NC 27511 919-469-1101

PRELIMINARY

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMON

10-7-20

NOT FOR CONSTRUCTION

SHEET NO.

4.2

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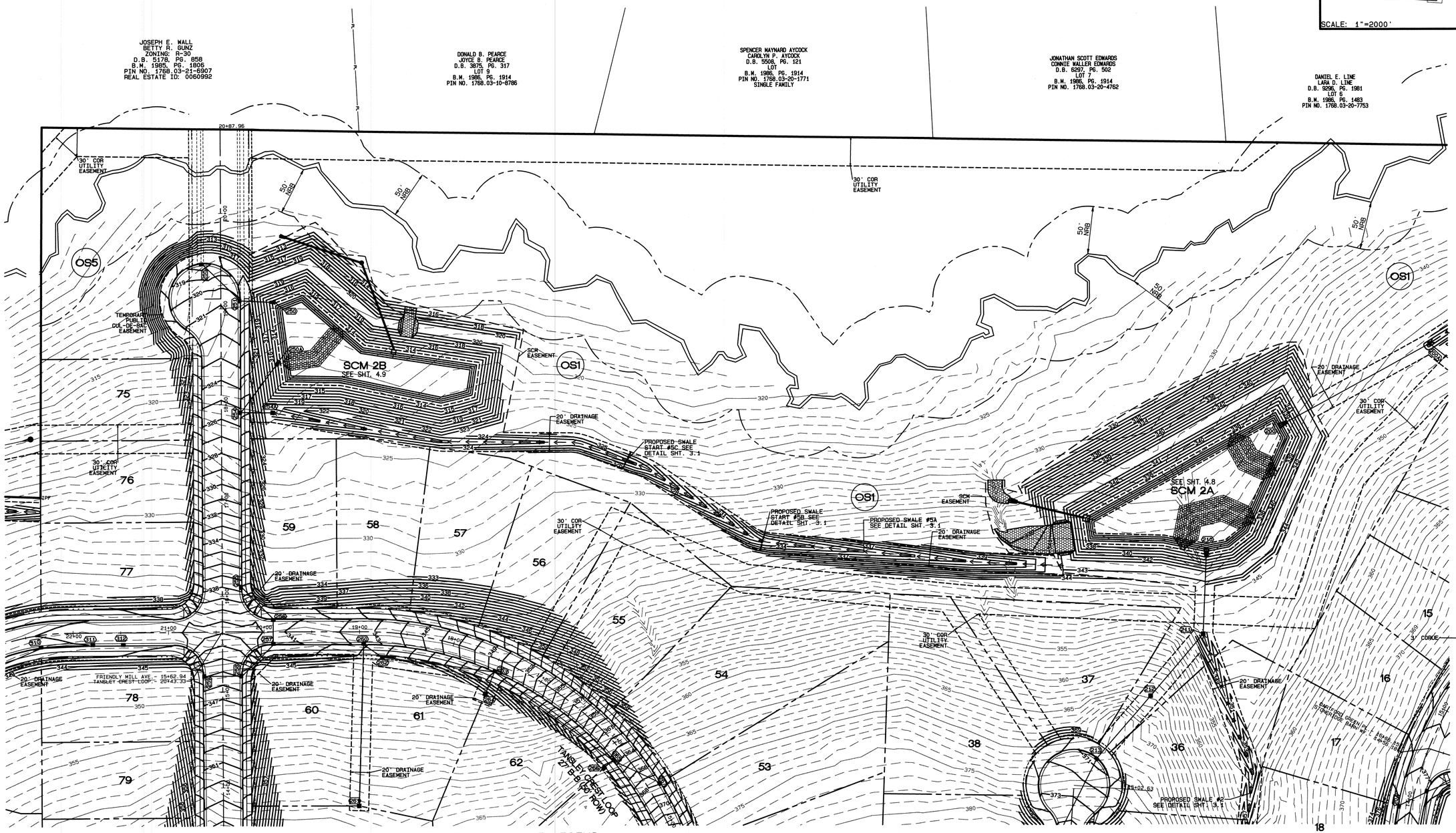

PROPOSED LINETYPE LEGEND

- PROPOSED BUILDING SETBACK
- PROPOSED EASEMENT
- PROPOSED 3'/5' CORUE
- PROPOSED RIGHT OF WAY
- PROPOSED ROAD CL
- PROPOSED 30" CURB AND GUTTER
- PROPOSED SWALES
- PROPOSED 100 YR.
- PROPOSED 2' BLDG. RESTRICTION LINE

EXISTING LINETYPE LEGEND

- PROPERTY BOUNDARY
- EXISTING TREE LINE
- EXISTING WETLAND
- EXISTING 50' NRB
- CENTERLINE OF STREAM
- EXISTING WATER ELEVATION
- EXISTING RIGHT OF WAY

UTILITY LEGEND

- PROPOSED MANHOLE OR JUNCTION BOX
- PROPOSED CATCH BASIN
- PROPOSED YARD INLET
- PROPOSED FLARED END SECTION

GRAPHIC SCALE 1"=50'

0 50 100 150

No.	DATE	REVISION	DWN/CHK

GRADING AND DRAINAGE PHASE 1

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA

FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

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PRELIMINARY

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 19810 JOHN R. HARMAN

10.7.20

NOT FOR CONSTRUCTION

SHEET NO.

4.3

FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro

Time: 7:16AM

Plot Date : 10/7/2020

PROPOSED LINETYPE LEGEND

- PROPOSED BUILDING SETBACK
- PROPOSED EASEMENT
- PROPOSED 3'/5' CORUE
- PROPOSED RIGHT OF WAY
- PROPOSED ROAD CL
- PROPOSED 30" CURB AND GUTTER
- PROPOSED SWALES
- PROPOSED 100 YR.
- PROPOSED 2' BLDG. RESTRICTION LINE

EXISTING LINETYPE LEGEND

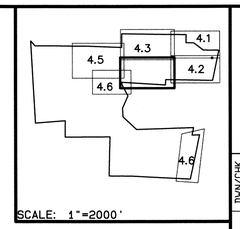
- PROPERTY BOUNDARY
- EXISTING TREE LINE
- EXISTING WETLAND
- EXISTING 50' NRB
- CENTERLINE OF STREAM
- EXISTING WATER ELEVATION
- EXISTING RIGHT OF WAY

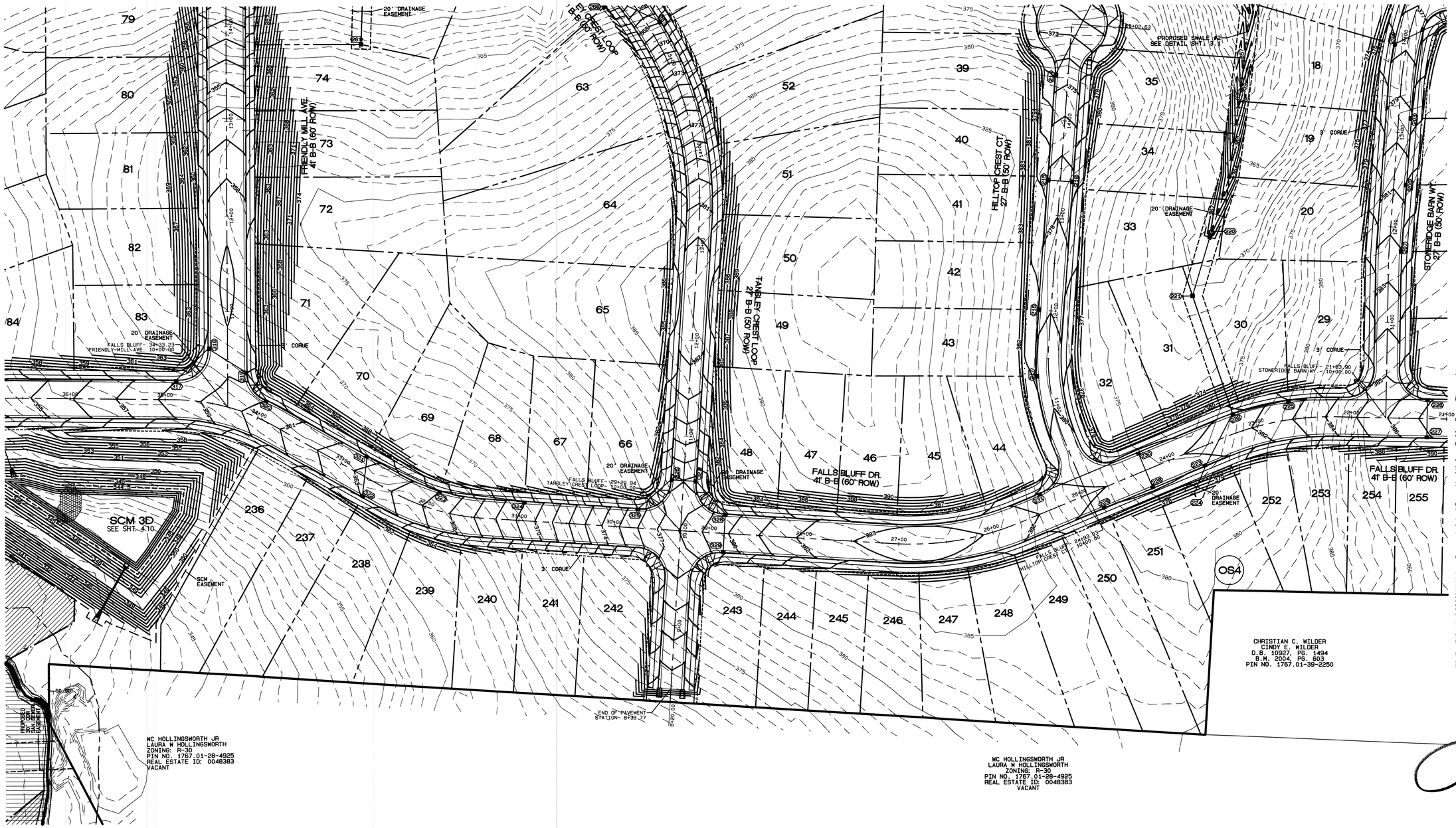
UTILITY LEGEND

- PROPOSED MANHOLE OR JUNCTION BOX
- PROPOSED CATCH BASIN
- PROPOSED YARD INLET
- PROPOSED FLARED END SECTION

GRAPHIC SCALE 1"=50'

0 50 100 150





No.	DATE	REVISION	DWN/CHK

GRADING AND DRAINAGE PHASE 1

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA

FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

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PRELIMINARY

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 19810 JOHN R. HARMON

10-7-20

NOT FOR CONSTRUCTION

SHEET NO.

4.4

FILE: Z:\Jobs\9900\Watkins Property\Dwg\Base Map\Kalas Falls Base Phase 1.pro

Time: 7:17AM

Plot Date : 10/7/2020

PROPOSED LINETYPE LEGEND

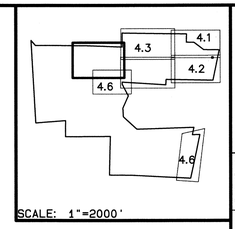
- PROPOSED BUILDING SETBACK
- PROPOSED EASEMENT
- PROPOSED 3'/5' CORUE
- PROPOSED RIGHT OF WAY
- PROPOSED ROAD CL
- PROPOSED 30" CURB AND GUTTER
- PROPOSED SWALES
- PROPOSED 100 YR.
- PROPOSED 2' BLDG. RESTRICTION LINE

EXISTING LINETYPE LEGEND

- PROPERTY BOUNDARY
- EXISTING TREE LINE
- EXISTING WETLAND
- EXISTING 50' NRB
- CENTERLINE OF STREAM
- EXISTING WATER ELEVATION
- EXISTING RIGHT OF WAY

UTILITY LEGEND

- PROPOSED MANHOLE OR JUNCTION BOX
- PROPOSED CATCH BASIN
- PROPOSED YARD INLET
- PROPOSED FLARED END SECTION

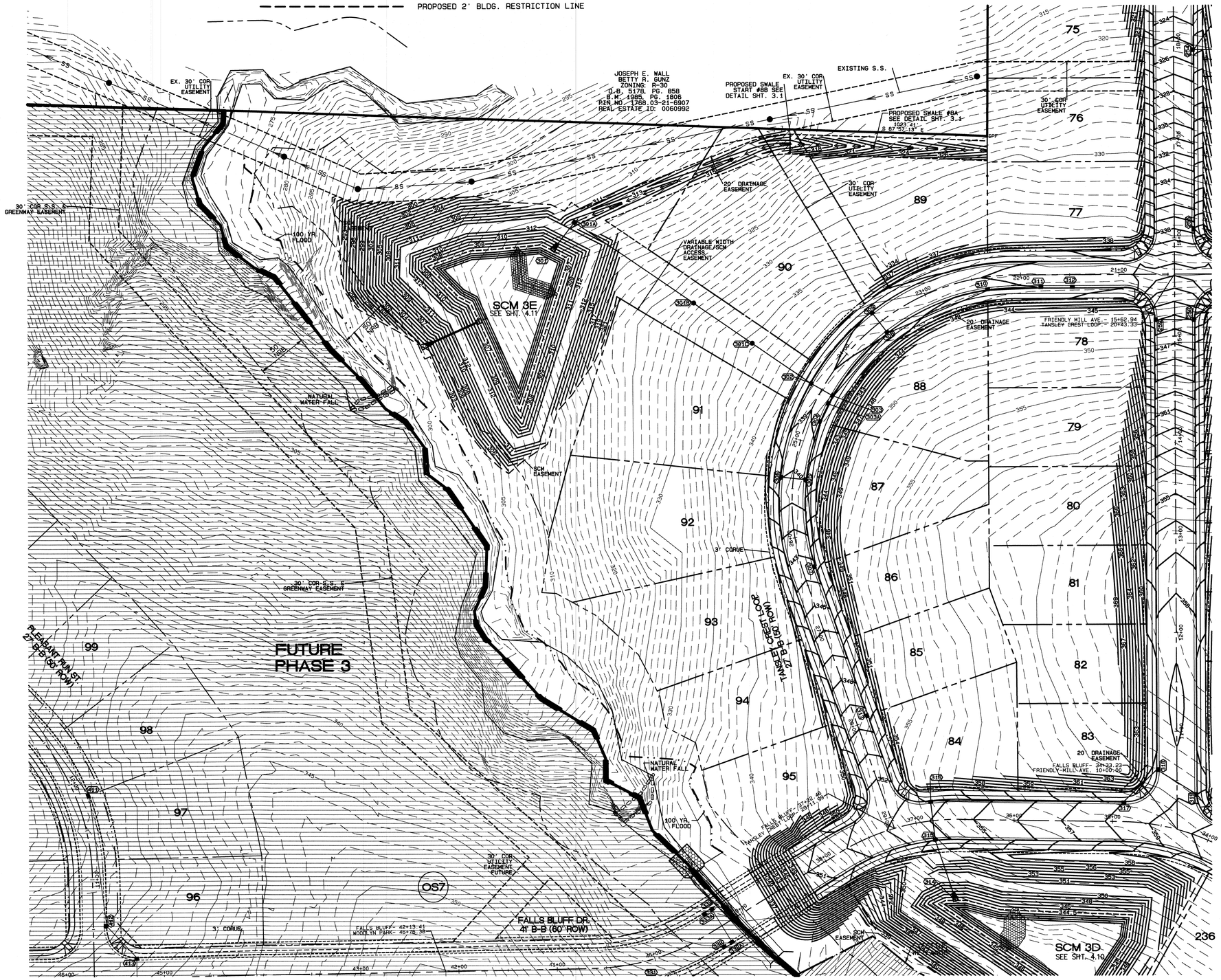


GRAPHIC SCALE 1"=50'

0 50 100 150

GENERAL NOTE:

1. NO DRAINAGE IN THE PHASE 3 AREA WHICH INCLUDES THE CULVERT CROSSING IS TO BE CONSTRUCTED WITH THIS PHASE.



No.	DATE	REVISION	DWN/CHK

GRADING AND DRAINAGE PHASE 1

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA

FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

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Cary, NC 27511 919-469-1101

PRELIMINARY

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 019810 JOHN R. HARMAN

10-7-20

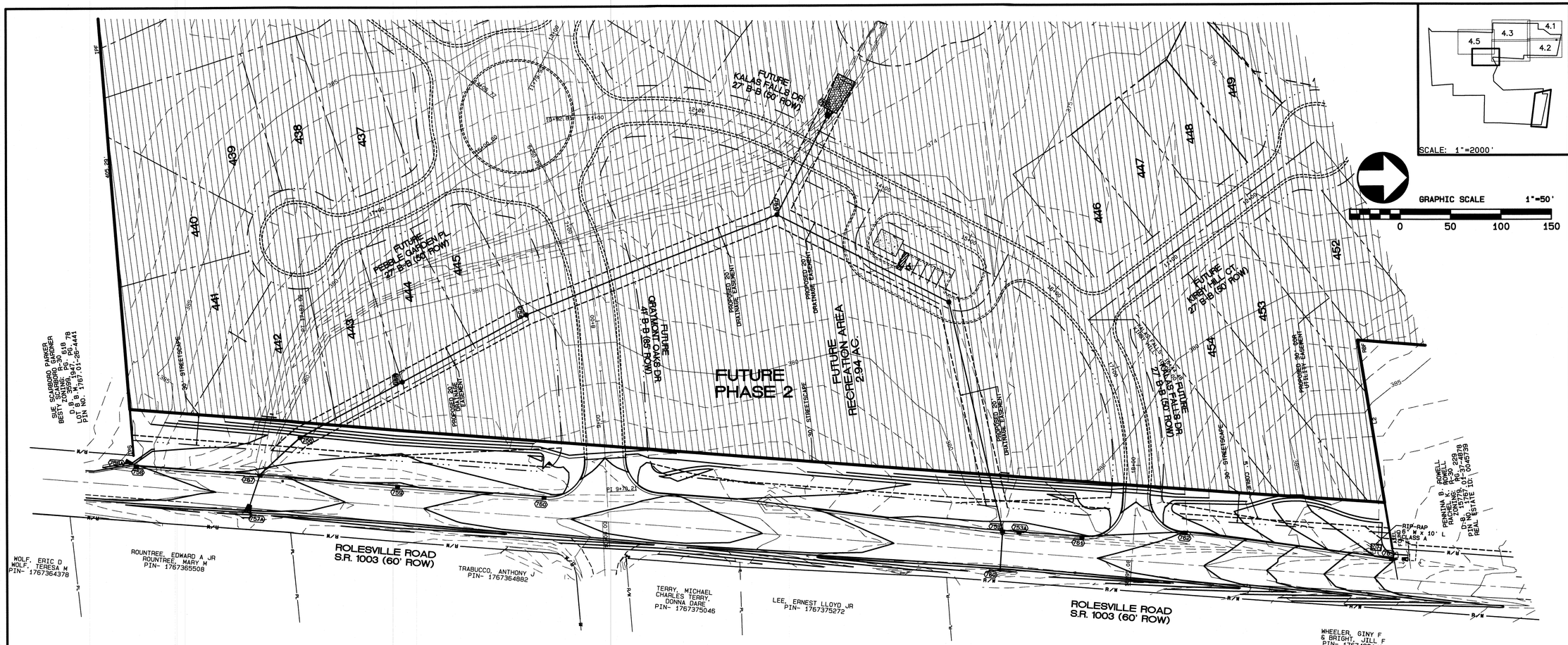
NOT FOR CONSTRUCTION

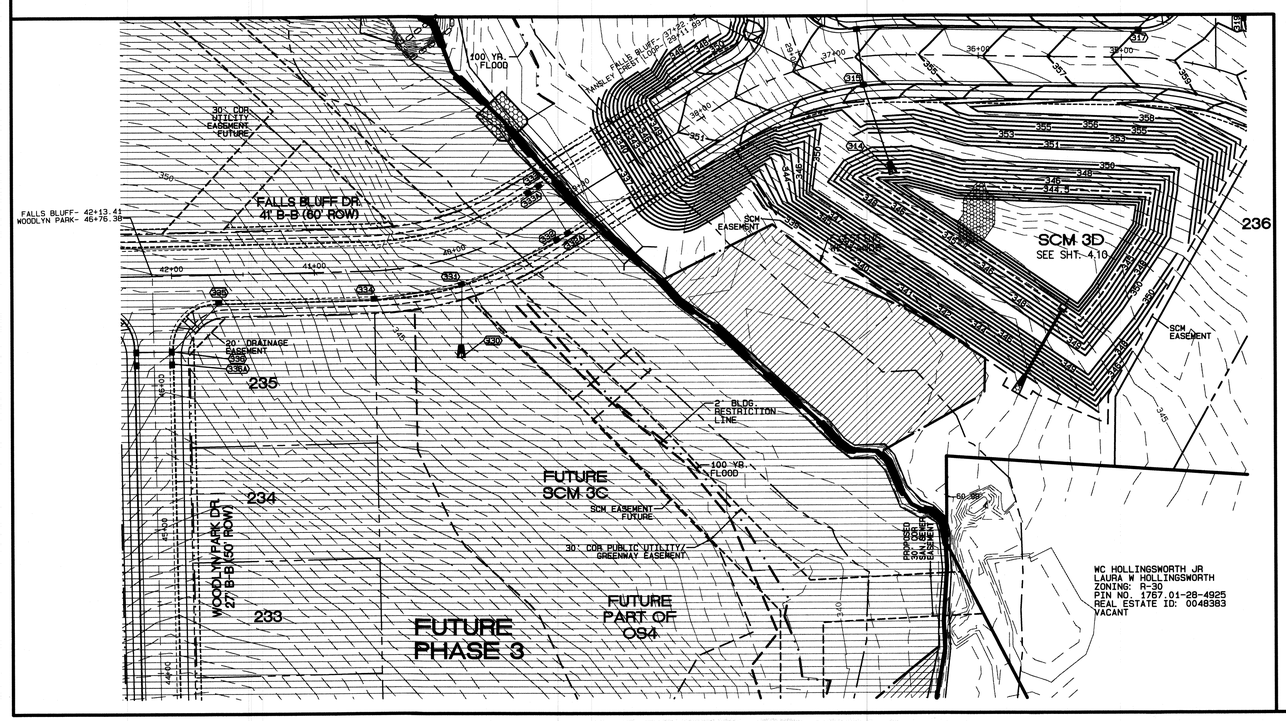
SHEET NO.

4.5

FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro

Plot Date : 10/7/2020 Time: 7:20AM





PROPOSED LINETYPE LEGEND

- PROPOSED BUILDING SETBACK
- PROPOSED EASEMENT
- PROPOSED 3'/5' CORUE
- PROPOSED RIGHT OF WAY
- PROPOSED ROAD CL
- PROPOSED 30" CURB AND GUTTER
- PROPOSED SWALES
- PROPOSED 100 YR.
- PROPOSED 2' BLDG. RESTRICTION LINE

EXISTING LINETYPE LEGEND

- PROPERTY BOUNDARY
- EXISTING TREE LINE
- EXISTING WETLAND
- EXISTING 50' NRB
- CENTERLINE OF STREAM
- EXISTING WATER ELEVATION
- EXISTING RIGHT OF WAY

GENERAL NOTE:

1. NO DRAINAGE IN THE PHASE 3 AREA WHICH INCLUDES THE CULVERT CROSSING IS TO BE CONSTRUCTED WITH PHASE 1.
2. NO ADDITIONAL IMPROVEMENTS IN THE PHASE 2 AREA EXCEPT FOR ROLESVILLE RD. IMPROVMENTS AND THE DRAINAGE OUTFALL ARE TO BE CONSTRUCTED WITH PHASE 1.

UTILITY LEGEND

- PROPOSED MANHOLE OR JUNCTION BOX
- PROPOSED CATCH BASIN
- PROPOSED YARD INLET
- PROPOSED FLARED END SECTION

No.	DATE	REVISION	DWN/CHK

GRADING AND DRAINAGE PHASE 1

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA

FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

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PRELIMINARY

NORTH CAROLINA PROFESSIONAL SEAL 19810 ENGINEER JOHN R. HARMAN

10-7-20

NOT FOR CONSTRUCTION

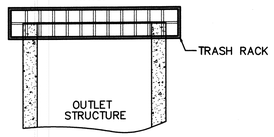
SHEET NO.

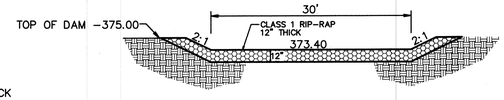
4.6

FILE: Z:\Jobs\9900\Watkins Property\Dwg\Base Map\Kalas Falls Base Phase 1.pro

Plot Date: 10/7/2020 Time: 7:20AM

TRASH RACK DETAIL
N.T.S.

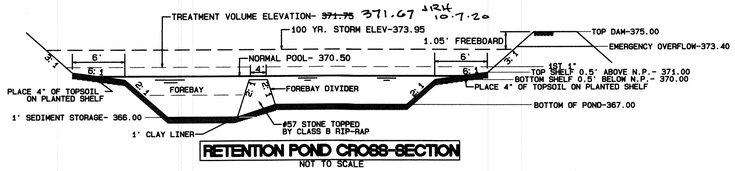




EMERGENCY SPILLWAY
CROSS-SECTION

TRASH RACK NOTES
1. TRASH RACK SHALL BE 6" CLEAR OF STRUCTURE TOP AND SIDES. THE TRASH RACK NEED NOT COVER THE TREATMENT OUTLET PIPE.
2. IF STRUCTURE FEATURES ANY WEIR NOTCHES THE TRASH RACK WILL EXTEND 5" BELOW THE NOTCHES. (SEE CROSS-SECTION OF THE OUTLET STRUCTURE.)
3. TRASH RACK SHALL BE FASTENED TO EACH SIDE OF THE STRUCTURE AT AT LEAST 2 POINTS. IT SHALL BE EASILY REMOVED FOR MAINTENANCE OR ENTRY INTO THE STRUCTURE.
4. TRASH RACK SHALL ACCOMMODATE VALVE SHAFT THOUGH AN OPENING.
5. TRASH RACK SHALL BE MADE OF DURABLE MATERIAL WHICH WILL NOT RUST OR DETERIORATE IN SUNLIGHT.
6. MAX. OPENING IN TRASH RACK SHALL BE 6"x6".
7. TOP OF TRASH RACK SHALL HAVE A GRID OF BARS (MAX. 5"x5").

WET POND #1A
BOTTOM EL- 367.00
NORMAL POOL- 370.50
TOP OF DAM- 375.00



RETENTION POND CROSS-SECTION
NOT TO SCALE

PLANT LIST LITTORAL SHELF PLANT SCHEDULE:

SHALLOW LAND (HERB.)

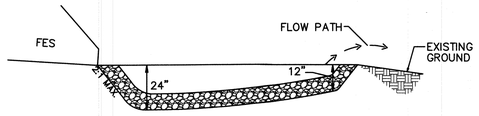
EF	EUPATORUIM FISTRULOSUM	JOE PYE WEED	4-6" POT @ 3' SPACING
HC	HIBICUS COCCINEA	SCARLET ROSE MALLOW	4-6" POT @ 3' SPACING
CG	CHELONE GLABRA	WHITE TURTLEHEAD	4-6" POT @ 3' SPACING
LC	LOBELIA CARDINALIS	CARDINAL FLOWER	4-6" POT @ 3' SPACING

SHALLOW WATER (HERB.)

JE	JUNCUS EFFUSES	SOFTRUSH	4-6" POT @ 3' SPACING
AS	ACORUS SPP	SWEET FLAG	4-6" POT @ 3' SPACING
IV	IRIS VERSICOLOR	BLUE FLAG IRIS	4-6" POT @ 3' SPACING
PC	PONTEDERIA CORDATA	PECKEREL WEED	4-6" POT @ 3' SPACING
PV	PELTANDRA VIRGINICA	ARROW ARUM	4-6" POT @ 3' SPACING

LANDSCAPE PLAN:
SHALLOW LAND= 1,241 sf (USE 310 PLANTS FROM LIST ABOVE)
SHALLOW WATER= 1,170 sf (USE 292 PLANTS FROM LIST ABOVE)
USE EQUAL NUMBER OF PLANTS FROM LIST ABOVE

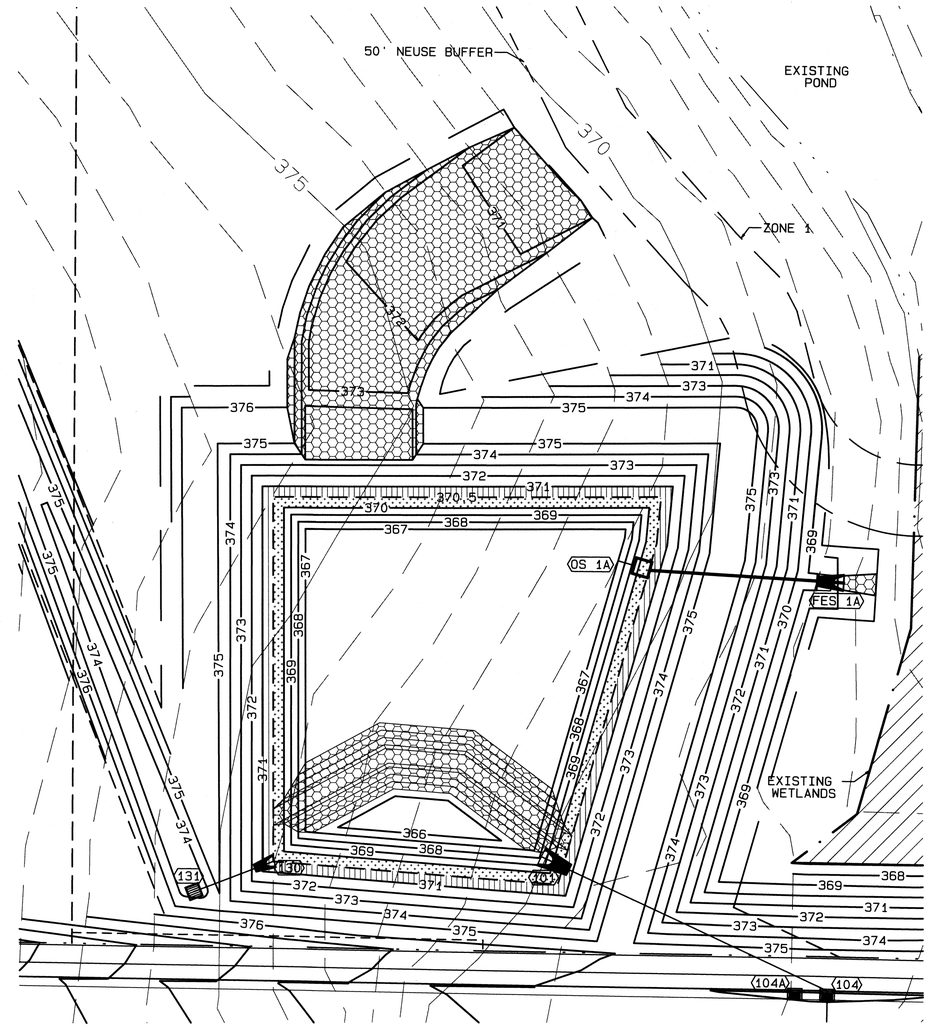
CALCULATION: 50 PLANTS PER 200 SF



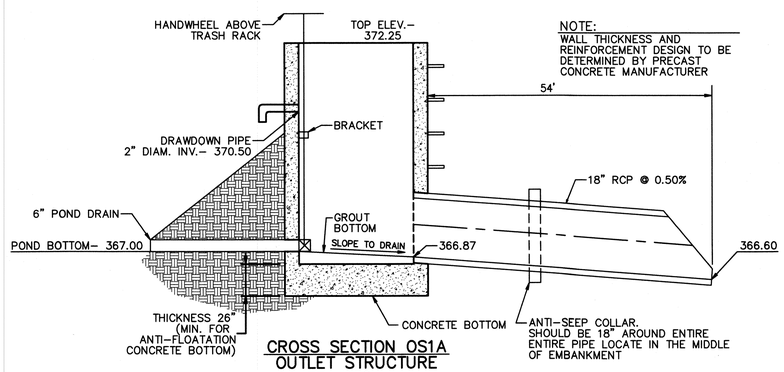
OS1A RIP-RAP OUTLET DETAIL
N.T.S.

OUTLET STRUCTURE GENERAL NOTES
1. OUTLET STRUCTURE ELEVATIONS SHOWN ON THE DETAILS ON THIS SHEET ARE CRITICAL AND MUST BE WITHIN 0.02' OF THAT SHOWN. IF OUTLET STRUCTURES ARE PRE-CAST OFF-SITE, THE HOLE FOR THE OUTLET PIPE SHALL BE ENLARGED TO ALLOW UP TO 0.3' OF VERTICAL MOVEMENT. WHEN INSTALLED, THE EXCESS OPENING SHALL BE FILLED WITH GROUT.
2. THE OUTLET STRUCTURE SHALL HAVE A TRASH RACK COVERING THE OPENINGS. SUCH TRASH RACK SHALL BE 6" OUT FROM THE OPENING AND SHALL HAVE A MAXIMUM OPENING OF 6"x6". IT SHALL BE SECURELY FASTENED TO THE STRUCTURE BUT REMOVEABLE FOR MAINTENANCE.
3. OUTLET PIPES SHALL HAVE AN ANTI-SEEP COLLAR OF CONCRETE LOCATED APPROXIMATELY UNDER THE MIDDLE OF THE DAM IN WHICH IT IS LOCATED. IT SHALL CONSIST OF CONCRETE POURED AROUND THE PIPE IN A VERTICAL DIRECTION. THE COLLAR SHALL BE A SQUARE 8" THICK AND SHALL EXTEND 18" BEYOND THE OUTSIDE OF THE PIPE IN EACH DIRECTION.
4. TREATMENT OUTLET PIPE SHALL NOT BE PVC BUT OTHER MATERIAL SUCH AS GSP WHICH IS NOT SUBJECT TO DETERIORATION IN SUNLIGHT.

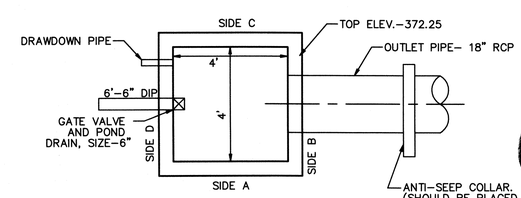
POND NOTES
1. SEE SHEET 3.0 FOR BMP CONVERSION SEQUENCE.
2. FOREBAY DIVIDERS ARE TO BE INSTALLED WHILE CONVERTING FROM SEDIMENT BASIN TO WET POND.



GRAPHIC SCALE 1"=20'
0 20 40 60



CROSS SECTION OS1A
OUTLET STRUCTURE
N.T.S.



PLAN VIEW OS1A
PRIMARY OUTLET STRUCTURE
N.T.S.

No.	DATE	REVISION	DWN/CHK

SCM 1A DETAILS
FOR
KALAS FALLS PHASE 1
SITUATED AT
1832 ROLESVILLE ROAD
WAKE COUNTY, NORTH CAROLINA
FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

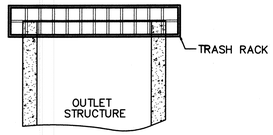
AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

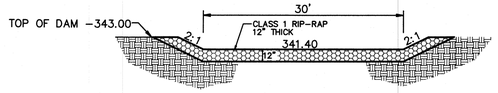
PRELIMINARY
NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HAGAN
10-7-20
NOT FOR CONSTRUCTION

SHEET NO.
4.7

FILE: Z:\Jobs\9900\Watkins Property\Dwg\Base Map\Kalas Falls Base Phase 1.pro

TRASH RACK DETAIL
N.T.S.

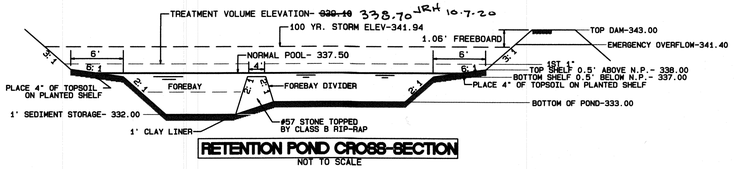




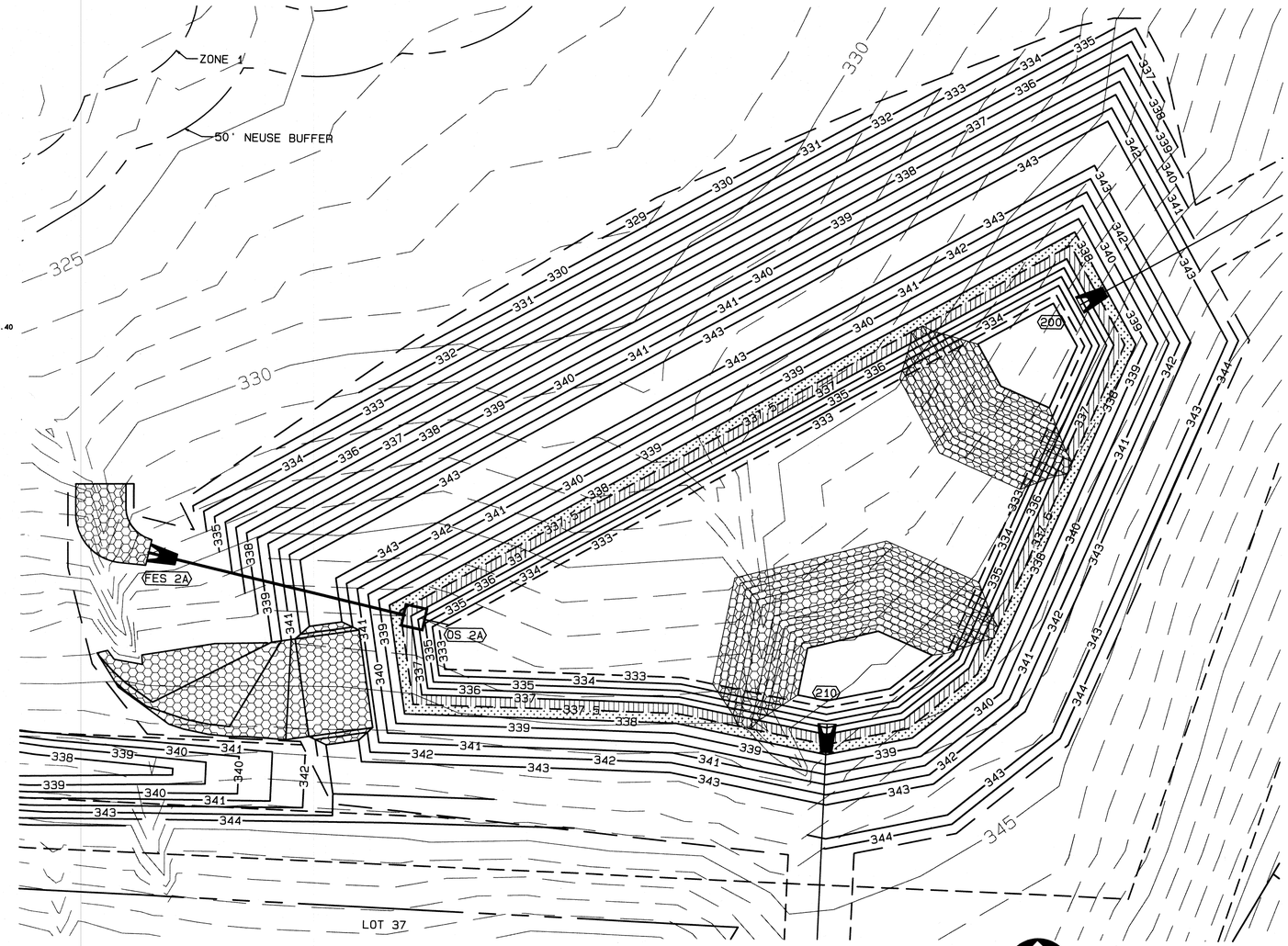
EMERGENCY SPILLWAY
CROSS-SECTION

WET POND #2A
BOTTOM EL- 333.00
NORMAL POOL- 337.50
TOP OF DAM- 343.00

TRASH RACK NOTES
1. TRASH RACK SHALL BE 6" CLEAR OF STRUCTURE TOP AND SIDES. THE TRASH RACK NEED NOT COVER THE TREATMENT OUTLET PIPE.
2. IF STRUCTURE FEATURES ANY WEIR NOTCHES THE TRASH RACK WILL EXTEND 5" BELOW THE NOTCHES. (SEE CROSS-SECTION OF THE OUTLET STRUCTURE.)
3. TRASH RACK SHALL BE FASTENED TO EACH SIDE OF THE STRUCTURE AT AT LEAST 2 POINTS. IT SHALL BE EASILY REMOVED FOR MAINTENANCE OR ENTRY INTO THE STRUCTURE.
4. TRASH RACK SHALL ACCOMMODATE VALVE SHAFT THOUGH AN OPENING.
5. TRASH RACK SHALL BE MADE OF DURABLE MATERIAL WHICH WILL NOT RUST OR DETERIORATE IN SUNLIGHT.
6. MAX. OPENING IN TRASH RACK SHALL BE 6"x6".
7. TOP OF TRASH RACK SHALL HAVE A GRID OF BARS (MAX. 5"x5").



RETENTION POND CROSS-SECTION
NOT TO SCALE



GRAPHIC SCALE 1"=20'
0 20 40 60

PLANT LIST LITTORAL SHELF PLANT SCHEDULE:

SHALLOW LAND (HERB.)

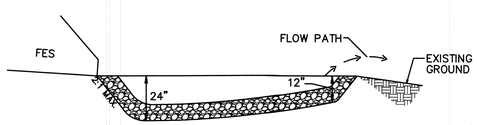
EF	EUPATORUIM FISTRULOSUM	JOE PYE WEED	4-6" POT @ 3' SPACING
HC	HIBICUS COCCINEA	SCARLET ROSE MALLOW	4-6" POT @ 3' SPACING
CG	CHELONE GLABRA	WHITE TURTLEHEAD	4-6" POT @ 3' SPACING
LC	LOBELIA CARDINALIS	CARDINAL FLOWER	4-6" POT @ 3' SPACING

SHALLOW WATER (HERB.)

JE	JUNCUS EFFUSES	SOFTRUSH	4-6" POT @ 3' SPACING
AS	ACORUS SPP	SWEET FLAG	4-6" POT @ 3' SPACING
IV	IRIS VERSICOLOR	BLUE FLAG IRIS	4-6" POT @ 3' SPACING
PC	PONTEDERIA CORDATA	PECKEREL WEED	4-6" POT @ 3' SPACING
PV	PELTANDRA VIRGINICA	ARROW ARUM	4-6" POT @ 3' SPACING

LANDSCAPE PLAN:
SHALLOW LAND= 1,784 sf (USE 446 PLANTS FROM LIST ABOVE)
SHALLOW WATER= 1,718 sf (USE 430 PLANTS FROM LIST ABOVE)
USE EQUAL NUMBER OF PLANTS FROM LIST ABOVE

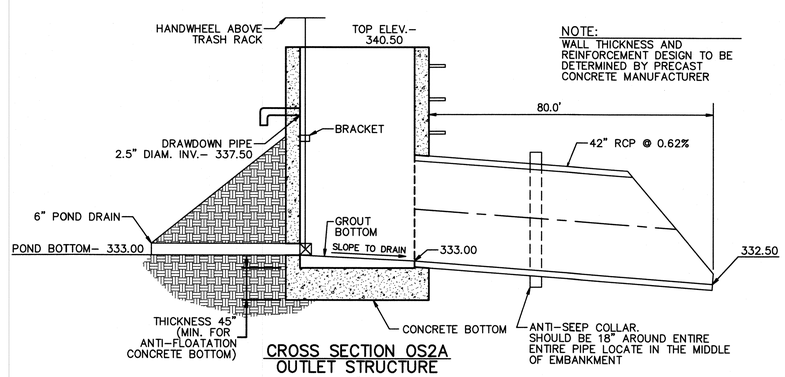
CALCULATION: 50 PLANTS PER 200 SF



OS2A RIP-RAP OUTLET DETAIL
N.T.S.

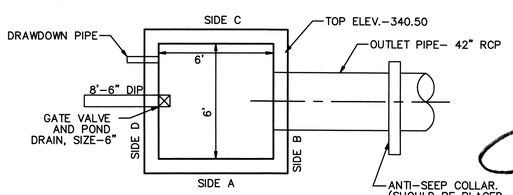
OUTLET STRUCTURE GENERAL NOTES
1. OUTLET STRUCTURE ELEVATIONS SHOWN ON THE DETAILS ON THIS SHEET ARE CRITICAL AND MUST BE WITHIN 0.02' OF THAT SHOWN. IF OUTLET STRUCTURES ARE PRE-CAST OFF-SITE, THE HOLE FOR THE OUTLET PIPE SHALL BE ENLARGED TO ALLOW UP TO 0.3' OF VERTICAL MOVEMENT. WHEN INSTALLED, THE EXCESS OPENING SHALL BE FILLED WITH GROUT.
2. THE OUTLET STRUCTURE SHALL HAVE A TRASH RACK COVERING THE OPENINGS. SUCH TRASH RACK SHALL BE 6" OUT FROM THE OPENING AND SHALL HAVE A MAXIMUM OPENING OF 6"x6". IT SHALL BE SECURELY FASTENED TO THE STRUCTURE BUT REMOVEABLE FOR MAINTENANCE.
3. OUTLET PIPES SHALL HAVE AN ANTI-SEEP COLLAR OF CONCRETE LOCATED APPROXIMATELY UNDER THE MIDDLE OF THE DAM IN WHICH IT IS LOCATED. IT SHALL CONSIST OF CONCRETE POURED AROUND THE PIPE IN A VERTICAL DIRECTION. THE COLLAR SHALL BE A SQUARE 8" THICK AND SHALL EXTEND 18" BEYOND THE OUTSIDE OF THE PIPE IN EACH DIRECTION.
4. TREATMENT OUTLET PIPE SHALL NOT BE PVC BUT OTHER MATERIAL SUCH AS GSP WHICH IS NOT SUBJECT TO DETERIORATION IN SUNLIGHT.

POND NOTES
1. SEE SHEET 3.0 FOR BMP CONVERSION SEQUENCE.
2. FOREBAY DIVIDERS ARE TO BE INSTALLED WHILE CONVERTING FROM SEDIMENT BASIN TO WET POND.
3. GROUNDWATER NOT ENCOUNTERED.



NOTE:
WALL THICKNESS AND REINFORCEMENT DESIGN TO BE DETERMINED BY PRECAST CONCRETE MANUFACTURER

CROSS SECTION OS2A
OUTLET STRUCTURE
N.T.S.



PLAN VIEW OS2A
PRIMARY OUTLET STRUCTURE
N.T.S.

No.	DATE	REVISION	DWN/CHK

SCM 2A DETAILS
FOR
KALAS FALLS PHASE 1
SITUATED AT
1832 ROLESVILLE ROAD
WAKE COUNTY, NORTH CAROLINA
FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

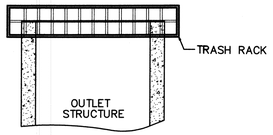
AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

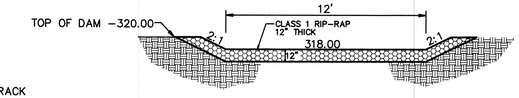
FILE: Z:\Jobs\9900\Watkins Property\Dwg\Base Map\Kalas Falls Base Phase 1.pro

PRELIMINARY
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 9818 JOHN R. HARMAN
10-7-20
NOT FOR CONSTRUCTION

SHEET NO.
4.8

TRASH RACK DETAIL
N.T.S.





EMERGENCY SPILLWAY
CROSS-SECTION

WET POND #2B
BOTTOM EL- 310.00
NORMAL POOL- 313.50
TOP OF DAM- 320.00

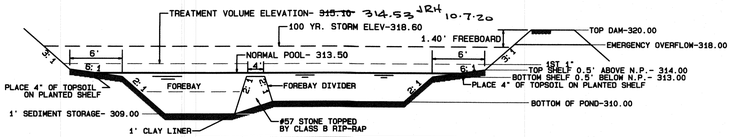
PLANT LIST LITTORAL SHELF PLANT SCHEDULE:

SHALLOW LAND (HERB.)				
EF	EUPATORUIM FISTRULOSUM	JOE PYE WEED		4-6" POT @ 3' SPACING
HC	HIBICUS COCCINEA	SCARLET ROSE MALLOW		4-6" POT @ 3' SPACING
CG	CHELONE GLABRA	WHITE TURTLEHEAD		4-6" POT @ 3' SPACING
LC	LOBELIA CARDINALIS	CARDINAL FLOWER		4-6" POT @ 3' SPACING
SHALLOW WATER (HERB.)				
JE	JUNCUS EFFUSES	SOFTRUSH		4-6" POT @ 3' SPACING
AS	ACORUS SPP	SWEET FLAG		4-6" POT @ 3' SPACING
IV	IRIS VERSICOLOR	BLUE FLAG IRIS		4-6" POT @ 3' SPACING
PC	PONTEDERIA CORDATA	PECKEREL WEED		4-6" POT @ 3' SPACING
PV	PELTANDRA VIRGINICA	ARROW ARUM		4-6" POT @ 3' SPACING

LANDSCAPE PLAN:
SHALLOW LAND= 1,731 sf (USE 433 PLANTS FROM LIST ABOVE)
SHALLOW WATER= 1,663 sf (USE 416 PLANTS FROM LIST ABOVE)
USE EQUAL NUMBER OF PLANTS FROM LIST ABOVE

CALCULATION: 50 PLANTS PER 200 SF

TRASH RACK NOTES
1. TRASH RACK SHALL BE 6" CLEAR OF STRUCTURE TOP AND SIDES. THE TRASH RACK NEED NOT COVER THE TREATMENT OUTLET PIPE.
2. IF STRUCTURE FEATURES ANY WEIR NOTCHES THE TRASH RACK WILL EXTEND 5" BELOW THE NOTCHES. (SEE CROSS-SECTION OF THE OUTLET STRUCTURE.)
3. TRASH RACK SHALL BE FASTENED TO EACH SIDE OF THE STRUCTURE AT AT LEAST 2 POINTS. IT SHALL BE EASILY REMOVED FOR MAINTENANCE OR ENTRY INTO THE STRUCTURE.
4. TRASH RACK SHALL ACCOMMODATE VALVE SHAFT THOUGH AN OPENING.
5. TRASH RACK SHALL BE MADE OF DURABLE MATERIAL WHICH WILL NOT RUST OR DETERIORATE IN SUNLIGHT.
6. MAX. OPENING IN TRASH RACK SHALL BE 6"x6".
7. TOP OF TRASH RACK SHALL HAVE A GRID OF BARS (MAX. 5"x5").



RETENTION POND CROSS-SECTION
NOT TO SCALE

OUTLET STRUCTURE GENERAL NOTES
1. OUTLET STRUCTURE ELEVATIONS SHOWN ON THE DETAILS ON THIS SHEET ARE CRITICAL AND MUST BE WITHIN 0.02' OF THAT SHOWN. IF OUTLET STRUCTURES ARE PRE-CAST OFF-SITE, THE HOLE FOR THE OUTLET PIPE SHALL BE ENLARGED TO ALLOW UP TO 0.3' OF VERTICAL MOVEMENT. WHEN INSTALLED, THE EXCESS OPENING SHALL BE FILLED WITH GROUT.
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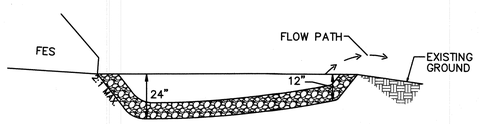
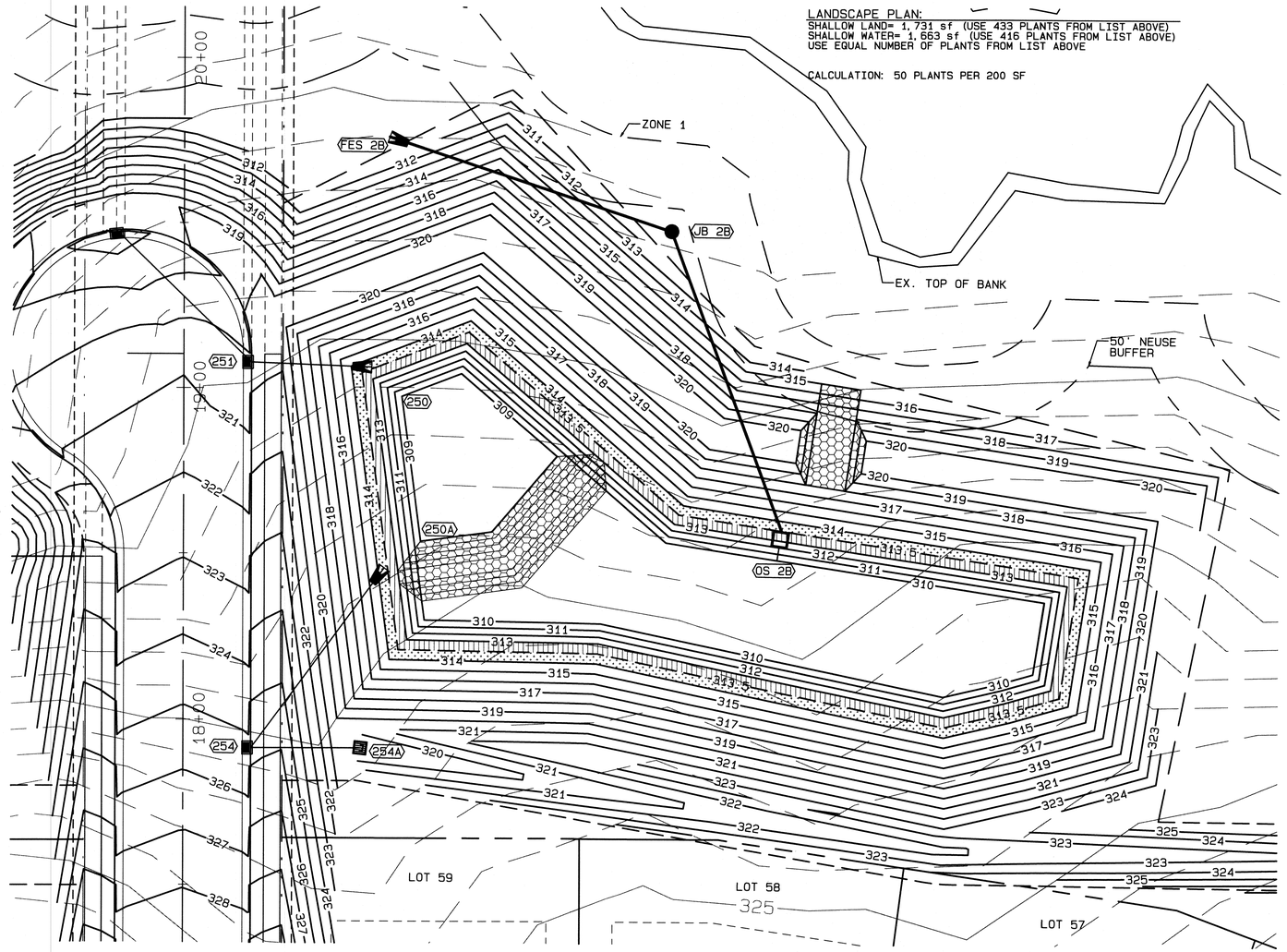
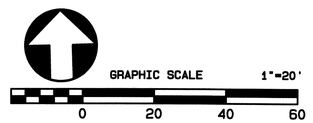
4. TREATMENT OUTLET PIPE SHALL NOT BE PVC BUT OTHER MATERIAL SUCH AS GSP WHICH IS NOT SUBJECT TO DETERIORATION IN SUNLIGHT.

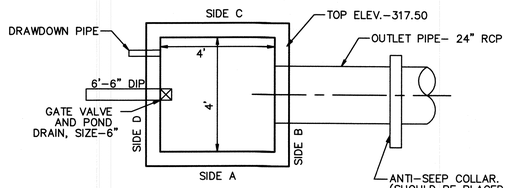
POND NOTES
1. SEE SHEET 3.0 FOR BMP CONVERSION SEQUENCE.
2. FOREBAY DIVIDERS ARE TO BE INSTALLED WHILE CONVERTING FROM SEDIMENT BASIN TO WET POND.



OS2B RIP-RAP OUTLET DETAIL
N.T.S.

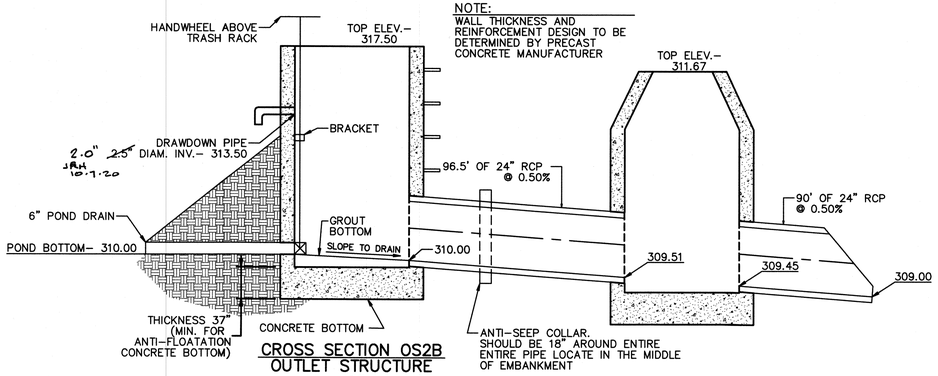






PLAN VIEW OS2B
PRIMARY OUTLET STRUCTURE
N.T.S.

NOTE:
WALL THICKNESS AND REINFORCEMENT DESIGN TO BE DETERMINED BY PRECAST CONCRETE MANUFACTURER



CROSS SECTION OS2B
OUTLET STRUCTURE
N.T.S.

No.	DATE	REVISION	DWN/CHK

SCM 2B DETAILS
FOR
KALAS FALLS PHASE 1
SITUATED AT
1832 ROLESVILLE ROAD
WAKE COUNTY, NORTH CAROLINA
FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

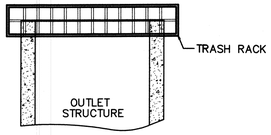
PRELIMINARY
NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMAN
10.7.20
NOT FOR CONSTRUCTION

SHEET NO.
4.9

FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro

TRASH RACK DETAIL

N.T.S.



TRASH RACK NOTES

1. TRASH RACK SHALL BE 6" CLEAR OF STRUCTURE TOP AND SIDES. THE TRASH RACK NEED NOT COVER THE TREATMENT OUTLET PIPE.
2. IF STRUCTURE FEATURES ANY WEIR NOTCHES THE TRASH RACK WILL EXTEND 5" BELOW THE NOTCHES. (SEE CROSS-SECTION OF THE OUTLET STRUCTURE.)
3. TRASH RACK SHALL BE FASTENED TO EACH SIDE OF THE STRUCTURE AT AT LEAST 2 POINTS. IT SHALL BE EASILY REMOVED FOR MAINTENANCE OR ENTRY INTO THE STRUCTURE.
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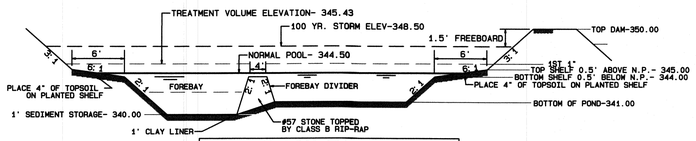
6. MAX. OPENING IN TRASH RACK SHALL BE 6"x6".
7. TOP OF TRASH RACK SHALL HAVE A GRID OF BARS (MAX. 5"x5").



RETENTION POND CROSS-SECTION

NOT TO SCALE

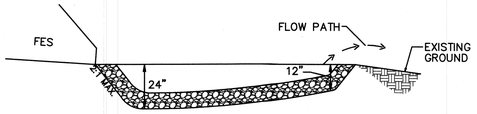
PLANT LIST LITTORAL SHELF PLANT SCHEDULE:

SHALLOW LAND (HERB.)				
EF	EUPATORUIM FISTRULOSUM	JOE PYE WEED		4-6" POT @ 3' SPACING
HC	HIBICUS COCCINEA	SCARLET ROSE MALLOW		4-6" POT @ 3' SPACING
CG	CHELONE GLABRA	WHITE TURTLEHEAD		4-6" POT @ 3' SPACING
LC	LOBELIA CARDINALIS	CARDINAL FLOWER		4-6" POT @ 3' SPACING
SHALLOW WATER (HERB.)				
JE	JUNCUS EFFUSES	SOFTRUSH		4-6" POT @ 3' SPACING
AS	ACORUS SPP	SWEET FLAG		4-6" POT @ 3' SPACING
IV	IRIS VERSICOLOR	BLUE FLAG IRIS		4-6" POT @ 3' SPACING
PC	PONTEDERIA CORDATA	PECKEREL WEED		4-6" POT @ 3' SPACING
PV	PELTANDRA VIRGINICA	ARROW ARUM		4-6" POT @ 3' SPACING

LANDSCAPE PLAN:

SHALLOW LAND= 1,486 sf (USE 372 PLANTS FROM LIST ABOVE)
SHALLOW WATER= 1,409 sf (USE 352 PLANTS FROM LIST ABOVE)
USE EQUAL NUMBER OF PLANTS FROM LIST ABOVE

CALCULATION: 50 PLANTS PER 200 SF



OS3D RIP-RAP OUTLET DETAIL

N.T.S.

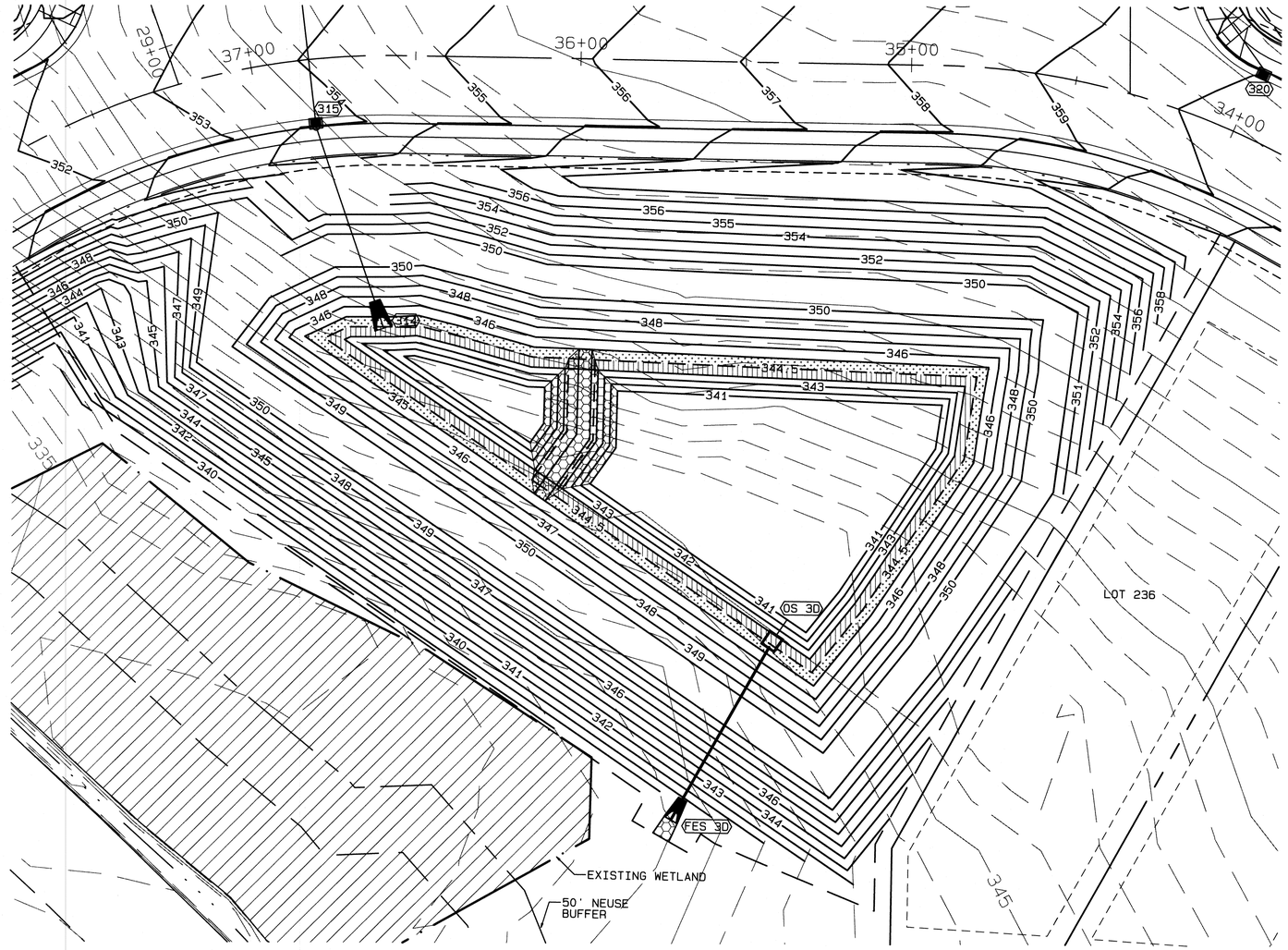
OUTLET STRUCTURE GENERAL NOTES

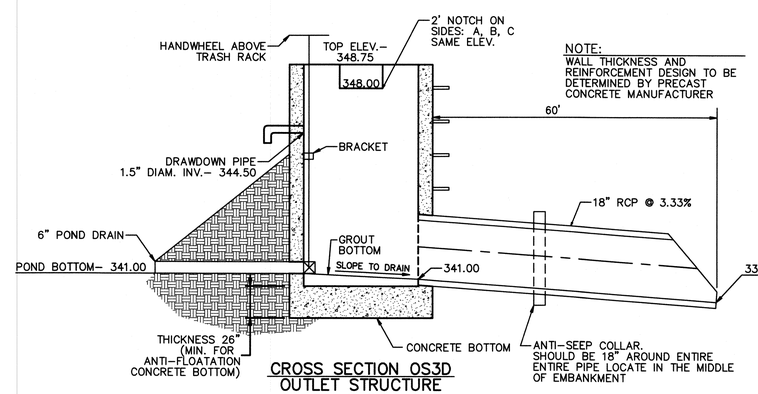
1. OUTLET STRUCTURE ELEVATIONS SHOWN ON THE DETAILS ON THIS SHEET ARE CRITICAL AND MUST BE WITHIN 0.02' OF THAT SHOWN. IF OUTLET STRUCTURES ARE PRE-CAST OFF-SITE, THE HOLE FOR THE OUTLET PIPE SHALL BE ENLARGED TO ALLOW UP TO 0.3' OF VERTICAL MOVEMENT. WHEN INSTALLED, THE EXCESS OPENING SHALL BE FILLED WITH GROUT.
2. THE OUTLET STRUCTURE SHALL HAVE A TRASH RACK COVERING THE OPENINGS. SUCH TRASH RACK SHALL BE 6" OUT FROM THE OPENING AND SHALL HAVE A MAXIMUM OPENING OF 6"x6". IT SHALL BE SECURELY FASTENED TO THE STRUCTURE BUT REMOVEABLE FOR MAINTENANCE.
3. OUTLET PIPES SHALL HAVE AN ANTI-SEEP COLLAR OF CONCRETE LOCATED APPROXIMATELY UNDER THE MIDDLE OF THE DAM IN WHICH IT IS LOCATED. IT SHALL CONSIST OF CONCRETE POURED AROUND THE PIPE IN A VERTICAL DIRECTION. THE COLLAR SHALL BE A SQUARE 8" THICK AND SHALL EXTEND 18" BEYOND THE OUTSIDE OF THE PIPE IN EACH DIRECTION.
4. TREATMENT OUTLET PIPE SHALL NOT BE PVC BUT OTHER MATERIAL SUCH AS GSP WHICH IS NOT SUBJECT TO DETERIORATION IN SUNLIGHT.

POND NOTES

1. SEE SHEET 3.0 FOR BMP CONVERSION SEQUENCE.
2. FOREBAY DIVIDERS ARE TO BE INSTALLED WHILE CONVERTING FROM SEDIMENT BASIN TO WET POND.

WET POND #3D
BOTTOM EL- 341.00
NORMAL POOL- 344.50
TOP OF DAM- 350.00

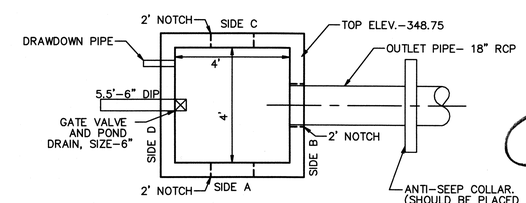




NOTE:
WALL THICKNESS AND REINFORCEMENT DESIGN TO BE DETERMINED BY PRECAST CONCRETE MANUFACTURER

CROSS SECTION OS3D
OUTLET STRUCTURE
N.T.S.

GRAPHIC SCALE 1"=20'
0 20 40 60



PLAN VIEW OS3D
PRIMARY OUTLET STRUCTURE
N.T.S.

No.	DATE	REVISION	DWN/CHK

SCM 3D DETAILS

FOR

KALAS FALLS PHASE 1

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA
FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

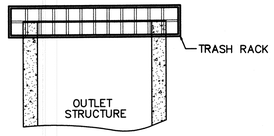
PRELIMINARY
NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMON
10.7.20
NOT FOR CONSTRUCTION

SHEET NO.
4.10

FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro

TRASH RACK DETAIL

N.T.S.

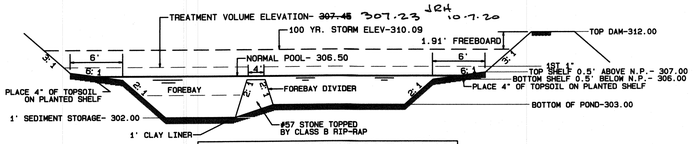


TRASH RACK NOTES

1. TRASH RACK SHALL BE 6" CLEAR OF STRUCTURE TOP AND SIDES. THE TRASH RACK NEED NOT COVER THE TREATMENT OUTLET PIPE.
2. IF STRUCTURE FEATURES ANY WEIR NOTCHES THE TRASH RACK WILL EXTEND 5" BELOW THE NOTCHES. (SEE CROSS-SECTION OF THE OUTLET STRUCTURE.)
3. TRASH RACK SHALL BE FASTENED TO EACH SIDE OF THE STRUCTURE AT AT LEAST 2 POINTS. IT SHALL BE EASILY REMOVED FOR MAINTENANCE OR ENTRY INTO THE STRUCTURE.
4. TRASH RACK SHALL ACCOMMODATE VALVE SHAFT THOUGH AN OPENING.
5. TRASH RACK SHALL BE MADE OF DURABLE MATERIAL WHICH WILL NOT RUST OR DETERIORATE IN SUNLIGHT.
6. MAX. OPENING IN TRASH RACK SHALL BE 6"x6".
7. TOP OF TRASH RACK SHALL HAVE A GRID OF BARS (MAX. 5"x5").

WET POND #3E

BOTTOM EL- 303.00
NORMAL POOL- 306.50
TOP OF DAM- 312.00



RETENTION POND CROSS-SECTION

NOT TO SCALE

PLANT LIST LITTORAL SHELF PLANT SCHEDULE:

SHALLOW LAND (HERB.)

EF	EUPATORUIM FISTRULOSUM	JOE PYE WEED	4-6" POT @ 3' SPACING
HC	HIBICUS COCCINEA	SCARLET ROSE MALLOW	4-6" POT @ 3' SPACING
CG	CHELONE GLABRA	WHITE TURTLEHEAD	4-6" POT @ 3' SPACING
LC	LOBELIA CARDINALIS	CARDINAL FLOWER	4-6" POT @ 3' SPACING

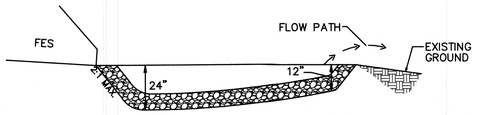
SHALLOW WATER (HERB.)

JE	JUNCUS EFFUSES	SOFTRUSH	4-6" POT @ 3' SPACING
AS	ACORUS SPP	SWEET FLAG	4-6" POT @ 3' SPACING
IV	IRIS VERSICOLOR	BLUE FLAG IRIS	4-6" POT @ 3' SPACING
PC	PONTEDERIA CORDATA	PECKEREL WEED	4-6" POT @ 3' SPACING
PV	PELTANDRA VIRGINICA	ARROW ARUM	4-6" POT @ 3' SPACING

LANDSCAPE PLAN:

SHALLOW LAND= 1,241 sf (USE 310 PLANTS FROM LIST ABOVE)
SHALLOW WATER= 1,170 sf (USE 292 PLANTS FROM LIST ABOVE)
USE EQUAL NUMBER OF PLANTS FROM LIST ABOVE

CALCULATION: 50 PLANTS PER 200 SF



OS3E RIP-RAP OUTLET DETAIL

N.T.S.

OUTLET STRUCTURE GENERAL NOTES

1. OUTLET STRUCTURE ELEVATIONS SHOWN ON THE DETAILS ON THIS SHEET ARE CRITICAL AND MUST BE WITHIN 0.02' OF THAT SHOWN. IF OUTLET STRUCTURES ARE PRE-CAST OFF-SITE, THE HOLE FOR THE OUTLET PIPE SHALL BE ENLARGED TO ALLOW UP TO 0.3' OF VERTICAL MOVEMENT. WHEN INSTALLED, THE EXCESS OPENING SHALL BE FILLED WITH GROUT.
2. THE OUTLET STRUCTURE SHALL HAVE A TRASH RACK COVERING THE OPENINGS. SUCH TRASH RACK SHALL BE 6" OUT FROM THE OPENING AND SHALL HAVE A MAXIMUM OPENING OF 6"x6". IT SHALL BE SECURELY FASTENED TO THE STRUCTURE BUT REMOVEABLE FOR MAINTENANCE.
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4. TREATMENT OUTLET PIPE SHALL NOT BE PVC BUT OTHER MATERIAL SUCH AS GSP WHICH IS NOT SUBJECT TO DETERIORATION IN SUNLIGHT.

POND NOTES

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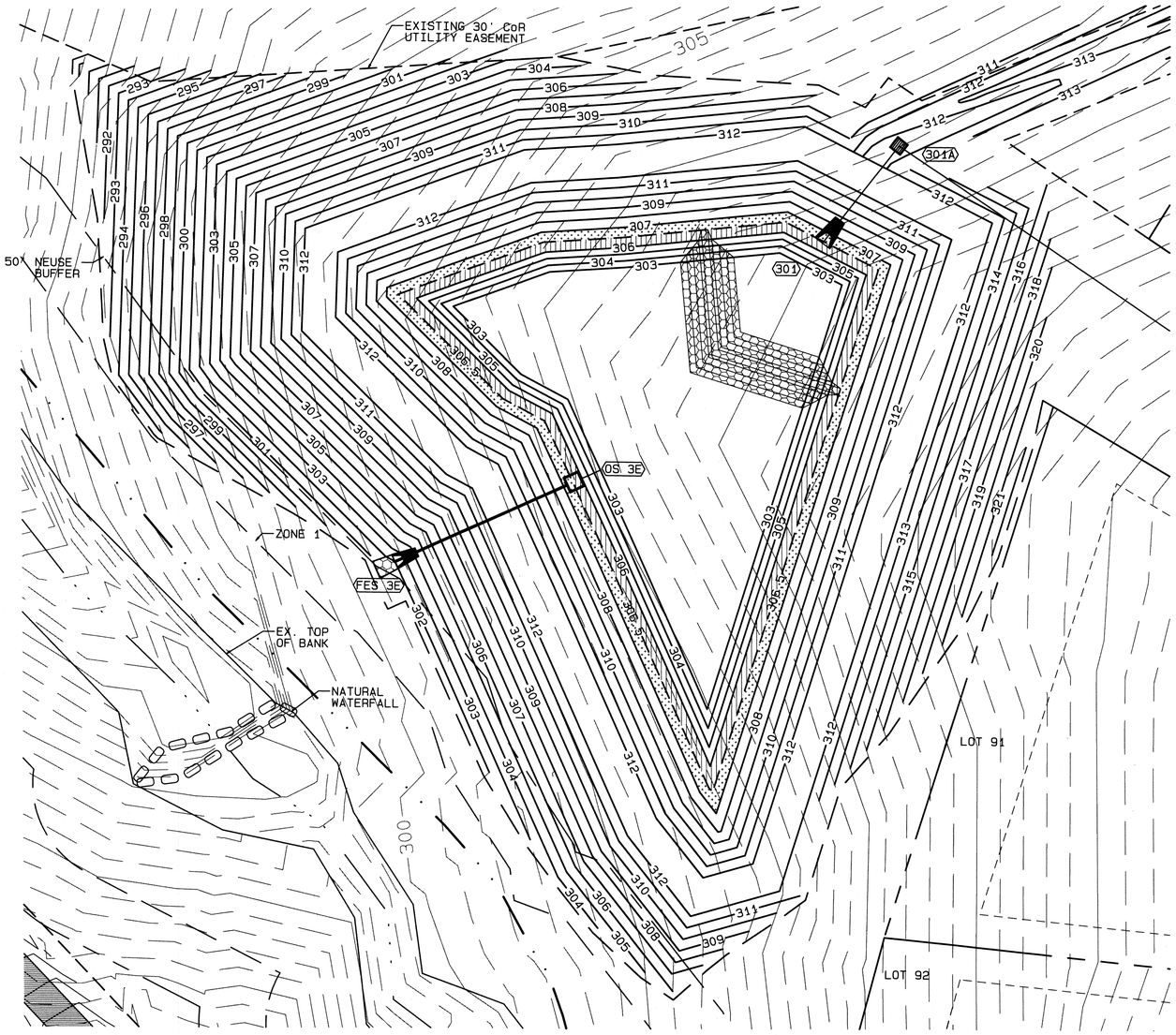
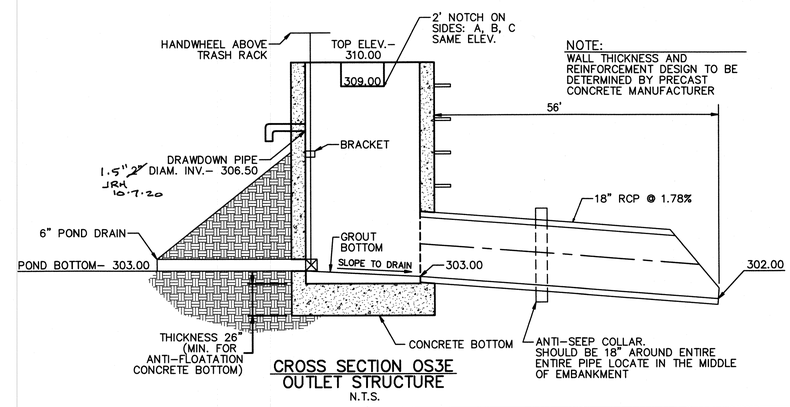
2. FOREBAY DIVIDERS ARE TO BE INSTALLED WHILE CONVERTING FROM SEDIMENT BASIN TO WET POND.

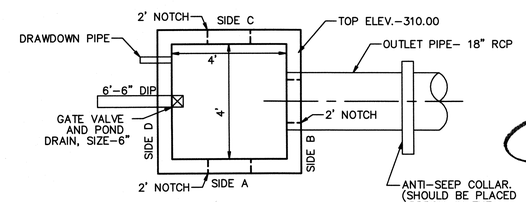




NOTE:
WALL THICKNESS AND REINFORCEMENT DESIGN TO BE DETERMINED BY PRECAST CONCRETE MANUFACTURER

CROSS SECTION OS3E
OUTLET STRUCTURE
N.T.S.

GRAPHIC SCALE 1"=20'
0 20 40 60



PLAN VIEW OS3E
PRIMARY OUTLET STRUCTURE
N.T.S.

No.	DATE	REVISION	DWN/CHK

SCM 3E DETAILS
FOR
KALAS FALLS PHASE 1
SITUATED AT
1832 ROLESVILLE ROAD
WAKE COUNTY, NORTH CAROLINA
FIRM # C-3881

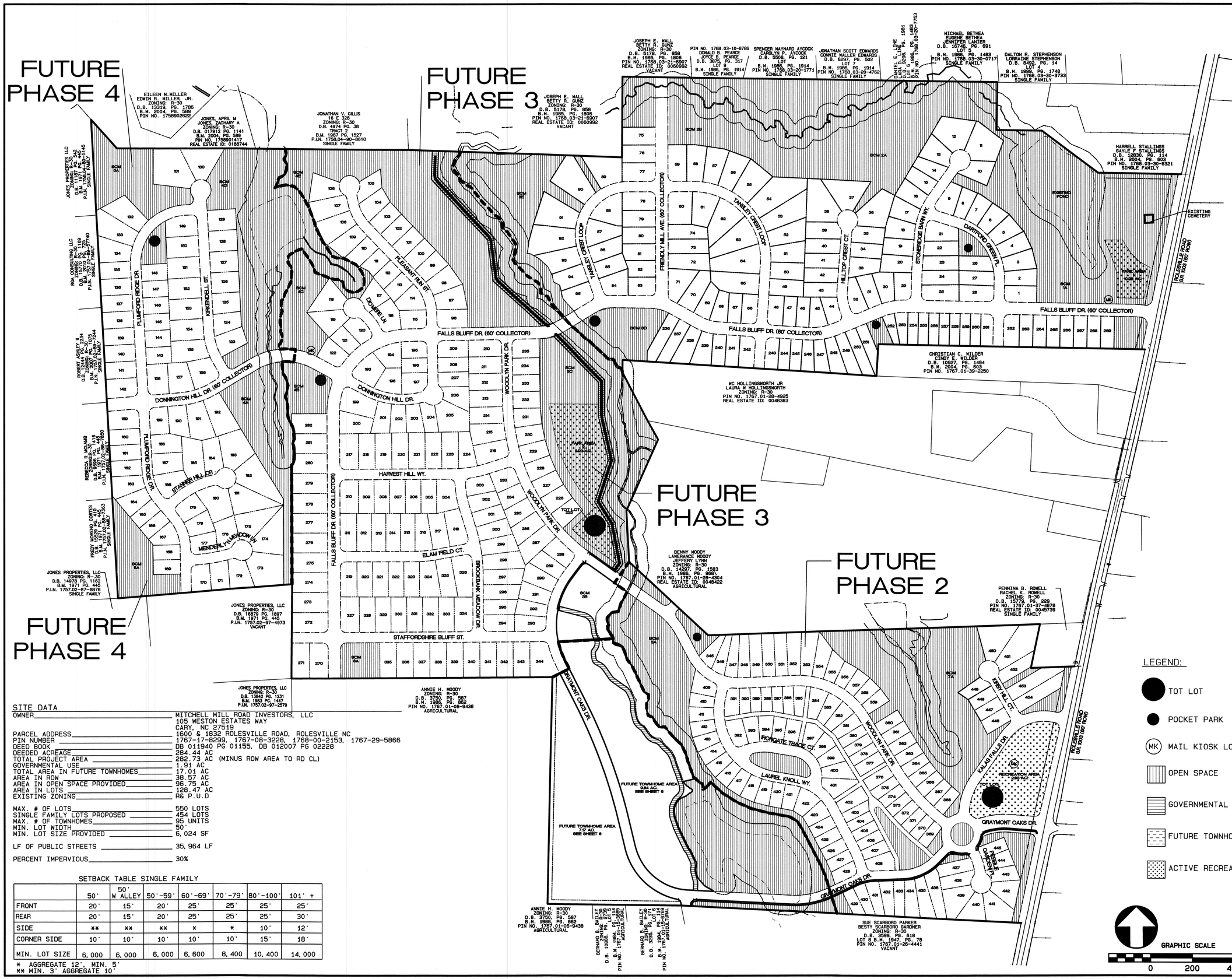
JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

PRELIMINARY
NORTH CAROLINA PROFESSIONAL SEAL 19810 ENGINEER JOHN R. HAYMAN
10.7.20
NOT FOR CONSTRUCTION

SHEET NO.
4.11

FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro



SITE DATA

OWNER	MITCHELL MILL ROAD INVESTORS, LLC 105 WESTON ESTATES WAY CARY, NC 27519
PARCEL ADDRESS	1600 & 1832 ROLESVILLE ROAD, ROLESVILLE NC
PIN NUMBER	1767-17-8299, 1767-08-3228, 1768-00-2153, 1767-29-5866
DEED BOOK	DB 011940 PG 01155, DB 012007 PG 02228
DEEDED ACREAGE	284.44 AC
TOTAL PROJECT AREA	282.73 AC (MINUS ROW AREA TO RD CL)
GOVERNMENTAL USE	1.91 AC
TOTAL AREA IN FUTURE TOWNHOMES	17.01 AC
AREA IN ROW	38.57 AC
AREA IN OPEN SPACE PROVIDED	95.75 AC
AREA IN LOTS	128.47 AC
EXISTING ZONING	R6 P.U.D
MAX. # OF LOTS	550 LOTS
SINGLE FAMILY LOTS PROPOSED	454 LOTS
MAX. # OF TOWNHOMES	95 UNITS
MIN. LOT WIDTH	50'
MIN. LOT SIZE PROVIDED	6,024 SF
LF OF PUBLIC STREETS	35,964 LF
PERCENT IMPERVIOUS	30%

SETBACK TABLE SINGLE FAMILY

	50'	50' W ALLEY	50'-59'	60'-69'	70'-79'	80'-100'	101' +
FRONT	20'	15'	20'	25'	25'	25'	25'
REAR	20'	15'	20'	25'	25'	25'	30'
SIDE	**	**	**	*	*	10'	12'
CORNER SIDE	10'	10'	10'	10'	10'	15'	18'
MIN. LOT SIZE	6,000	6,000	6,000	6,600	8,400	10,400	14,000

* AGGREGATE 12', MIN. 5'
** MIN. 3' AGGREGATE 10'

No.	DATE	REVISION	DWN/CHK

SITE PLAN OVERALL

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA

FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	9/19/2019

AMERICAN Engineering
American Engineering Associates--Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

PRELIMINARY

SEAL 9810 ENGINEER JOHN R. HARMAN

10.7.20

NOT FOR CONSTRUCTION

SHEET NO.

5.0

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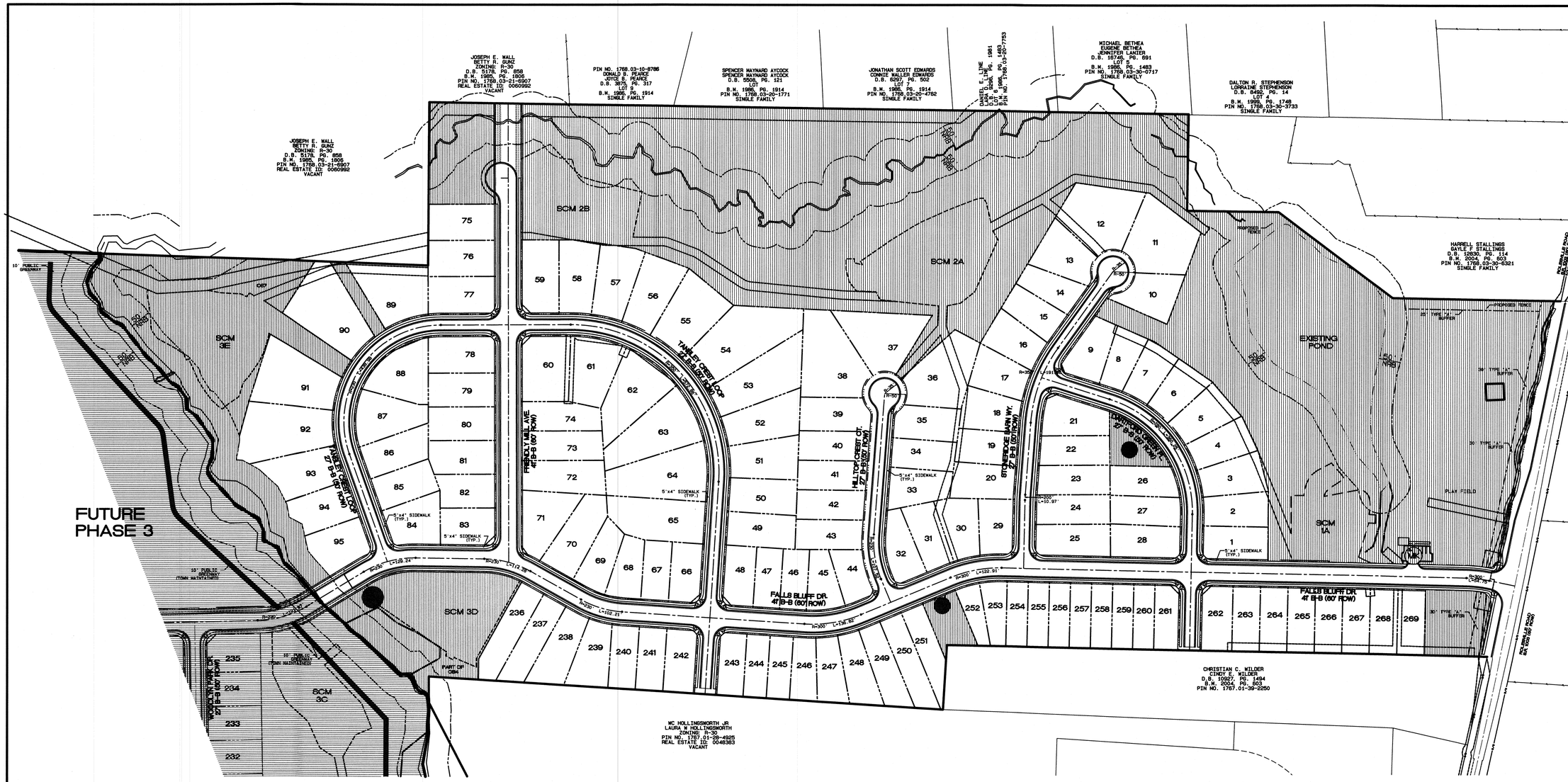
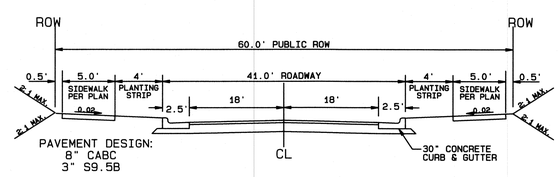
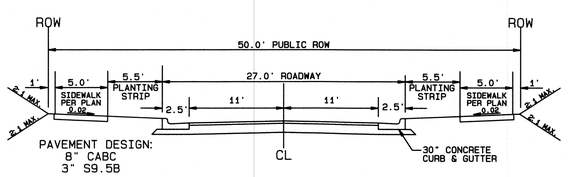




NOTE:
1. NORMAL CROWN OF 0.02 UNLESS OTHERWISE DIRECTED BY TOWN ENGINEER.
2. ASPHALT WILL BE INSTALLED AT A MIN. 1.5" LIFTS.

41' B-B ON A 60' R/W
TYPICAL SECTION



NOTE:
1. NORMAL CROWN OF 0.02 UNLESS OTHERWISE DIRECTED BY TOWN ENGINEER.
2. ASPHALT WILL BE INSTALLED AT A MIN. 1.5" LIFTS.

27' B-B ON A 50' R/W
TYPICAL SECTION

SITE DATA

OWNER	MITCHELL MILL ROAD INVESTORS, LLC 105 WESTON ESTATES WAY CARY, NC 27519
PARCEL ADDRESS	1600 ROLESVILLE ROAD, ROLESVILLE NC
PIN NUMBER	1767-29-5866, 1767-17-8299 (PARTIAL)
DEED BOOK	DB 011940 PG 01155, DB 016997 PG 02217
DEEDED ACREAGE	284.44 AC
TOTAL PHASE 1 AREA	83.66 AC (MINUS ROW AREA TO RD CL)
AREA IN ROW	10.51 AC
AREA IN OPEN SPACE PROVIDED	33.65 AC
AREA IN LOTS	39.50 AC
EXISTING ZONING	R6 P.U.D
MAX. # OF LOTS	550 LOTS
SINGLE FAMILY LOTS PHASE 1	129 LOTS
MIN. LOT WIDTH	50'
MIN. LOT SIZE PROVIDED	6,603 SF
LF OF PUBLIC STREETS	7,922 LF
PERCENT IMPERVIOUS	44.6%

OPEN SPACE

FUTURE PHASE 3

SETBACK TABLE SINGLE FAMILY

	50'	50' W ALLEY	50'-59'	60'-69'	70'-79'	80'-100'	101' +
FRONT	20'	15'	20'	25'	25'	25'	25'
REAR	20'	15'	20'	25'	25'	25'	30'
SIDE	**	**	**	*	*	10'	12'
CORNER SIDE	10'	10'	10'	10'	10'	15'	18'
MIN. LOT SIZE	6,000	6,000	6,000	6,600	8,400	10,400	14,000

* AGGREGATE 12', MIN. 5'
** MIN. 3' AGGREGATE 10'

GENERAL NOTES:
1. SEE SHEET 5.2-5.6 FOR TOTAL NUMBER OF LOTS AND LOT SIZING.

GRAPHIC SCALE 1"=120'
0 120 240 360

No.	DATE	REVISION	DVN/CHK

PHASE 1 SITE PLAN OVERALL

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA

FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	9/19/2019

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

PRELIMINARY
NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMAN
10-7-20
NOT FOR CONSTRUCTION

SHEET NO.
5.1

FILE: Z:\Jobs\9900\Watkins Property\Dwg\Base Map\Kalas Falls Base Phase 1.pro
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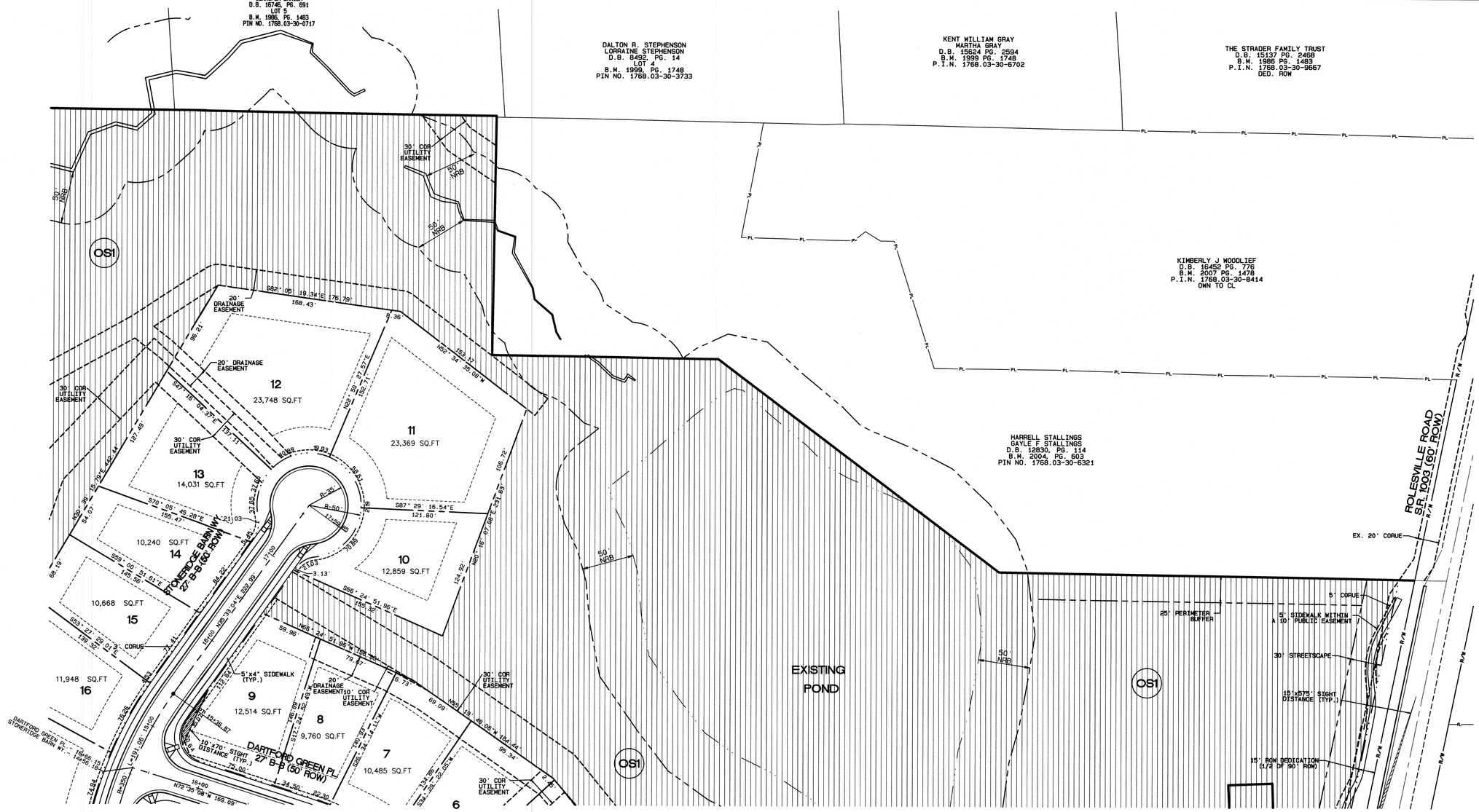

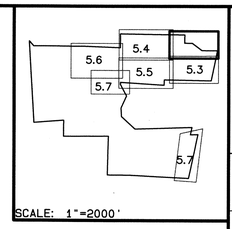

ABBREVIATION

NRB- NEUSE RIVER BUFFER

COR/CORUE- CITY OF RALEIGH UTILITY EASEMENT

OPEN SPACE

GENERAL NOTE:

1. SIGHT DISTANCE TRIANGLES ARE 10'x70'. WHERE SIGHT LINES ENCROACH ONTO A PRIVATE LOT A SIGHT EASEMENT IS REQUIRED.
2. BACK OF CURB RADIUS AT INTERSECTIONS-
   RESIDENTIAL-RESIDENTIAL- 28'
   RESIDENTIAL-COLLECTOR- 30'
   COLLECTOR-COLLECTOR- 30'
   ENTRANCE AT CUL-DE-SAC- 32.5
   ENTRY ROADS-ROLESVILLE RD.- 35'

EXISTING LINETYPE LEGEND

- PROPERTY BOUNDARY
- EXISTING TREE LINE
- EXISTING WETLAND
- EXISTING 50' NRB
- CENTERLINE OF STREAM
- EXISTING WATER ELEVATION
- EXISTING RIGHT OF WAY

PROPOSED LINETYPE LEGEND

- PROPOSED PROPERTY-LINE
- PROPOSED BUILDING SETBACK
- PROPOSED EASEMENT
- PROPOSED 3'/5' CORUE
- PROPOSED RIGHT OF WAY
- PROPOSED ROAD CL
- PROPOSED 30" CURB AND GUTTER
- PROPOSED 100 YR.
- PROPOSED 2' BLDG. RESTRICTION LINE

SETBACK TABLE SINGLE FAMILY

	50'	50' W ALLEY	50'-59'	60'-69'	70'-79'	80'-100'	101' +
FRONT	20'	15'	20'	25'	25'	25'	25'
REAR	20'	15'	20'	25'	25'	25'	30'
SIDE	**	**	**	*	*	10'	12'
CORNER SIDE	10'	10'	10'	10'	10'	15'	18'
MIN. LOT SIZE	6,000	6,000	6,000	6,600	8,400	10,400	14,000

* AGGREGATE 12', MIN. 5'
** MIN. 3' AGGREGATE 10'

GRAPHIC SCALE 1"=50'

0 50 100 150

No.	DATE	REVISION	DWN/CHK

SITE PLAN PHASE 1

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA

FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

PRELIMINARY

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 9810 JOHN R. HARMAN

10.7.20

NOT FOR CONSTRUCTION

SHEET NO.

5.2

FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro

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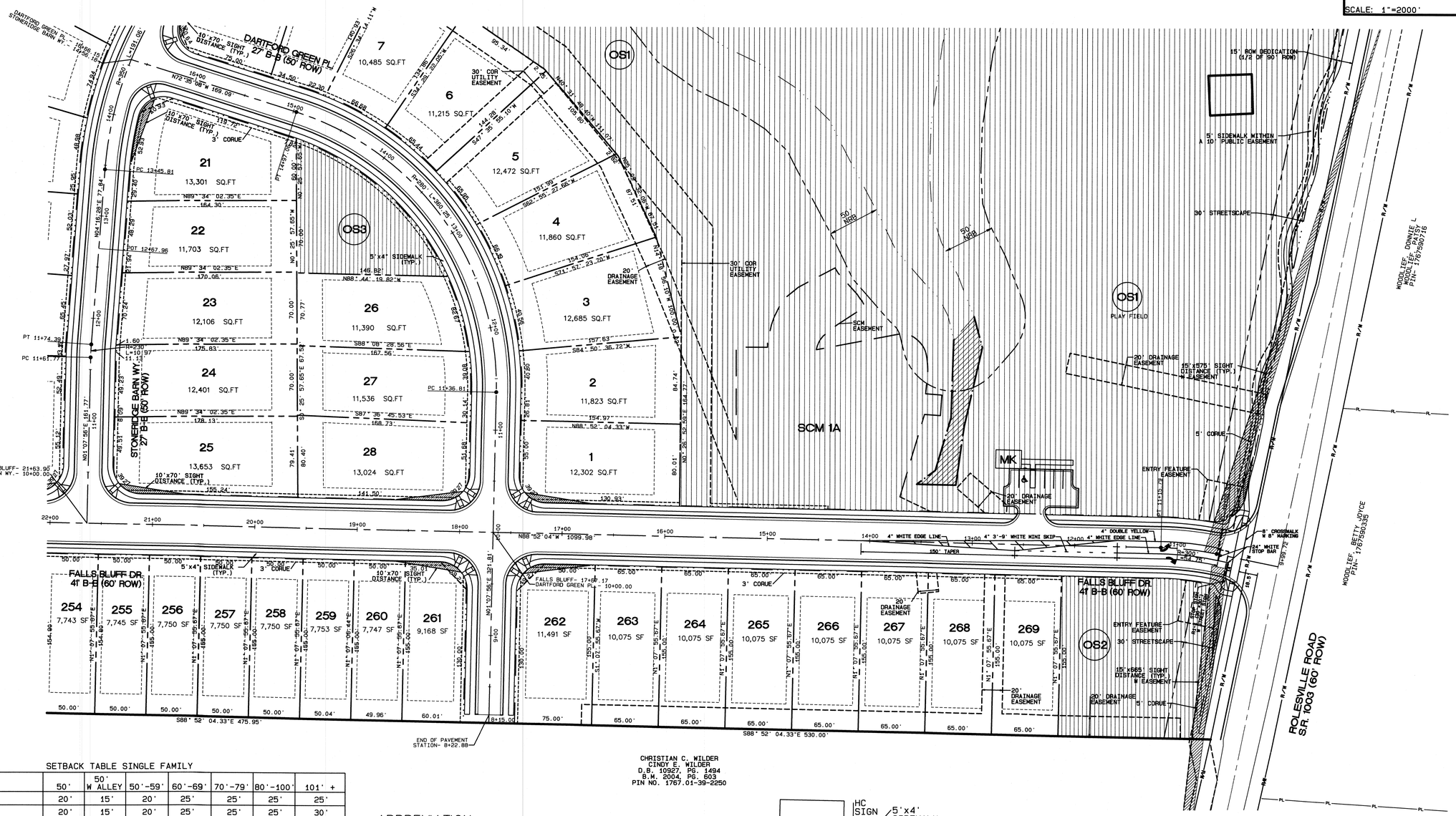
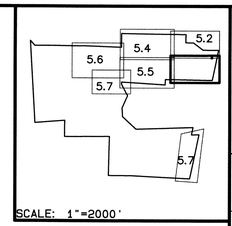




SETBACK TABLE SINGLE FAMILY

	50'	50' W ALLEY	50'-59'	60'-69'	70'-79'	80'-100'	101' +
FRONT	20'	15'	20'	25'	25'	25'	25'
REAR	20'	15'	20'	25'	25'	25'	30'
SIDE	**	**	**	*	*	10'	12'
CORNER SIDE	10'	10'	10'	10'	10'	15'	18'
MIN. LOT SIZE	6,000	6,000	6,000	6,600	8,400	10,400	14,000

* AGGREGATE 12', MIN. 5'
** MIN. 3' AGGREGATE 10'

ABBREVIATION

NRB- NEUSE RIVER BUFFER

COR/CORUE- CITY OF RALEIGH UTILITY EASEMENT

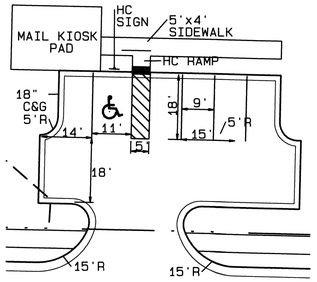
OPEN SPACE

EXISTING LINETYPE LEGEND

- PROPERTY BOUNDARY
- EXISTING TREE LINE
- EXISTING WETLAND
- EXISTING 50' NRB
- CENTERLINE OF STREAM
- EXISTING WATER ELEVATION
- EXISTING RIGHT OF WAY

PROPOSED LINETYPE LEGEND

- PROPOSED PROPERTY-LINE
- PROPOSED BUILDING SETBACK
- PROPOSED EASEMENT
- PROPOSED 3'/5' CORUE
- PROPOSED RIGHT OF WAY
- PROPOSED ROAD CL
- PROPOSED 30" CURB AND GUTTER
- PROPOSED 100 YR.
- PROPOSED 2' BLDG. RESTRICTION LINE



MAIL KIOSK EXHIBIT

KIOSK PARKING REQUIREMENTS:
454 LOTS/3 KIOSKS= 151.3 OR 152 MAIL BOXES
6 STALLS REQUIRED
6 STALL PROVIDED

GENERAL NOTE:
1. SIGHT DISTANCE TRIANGLES ARE 10'x70', WHERE SIGHT LINES ENCROACH ONTO A PRIVATE LOT A SIGHT EASEMENT IS REQUIRED.
2. BACK OF CURB RADIUS AT INTERSECTIONS-
   RESIDENTIAL-RESIDENTIAL- 28'
   RESIDENTIAL-COLLECTOR- 30'
   COLLECTOR-COLLECTOR- 30'
   ENTRANCE AT CUL-DE-SAC- 32.5
   ENTRY ROADS-ROLESVILLE RD.- 35'

GRAPHIC SCALE 1"=50'
0 50 100 150

No.	DATE	REVISION	DWN/CHK

SITE PLAN PHASE 1
FOR
KALAS FALLS
SITUATED AT
1832 ROLESVILLE ROAD
WAKE COUNTY, NORTH CAROLINA
FIRM # C-3881

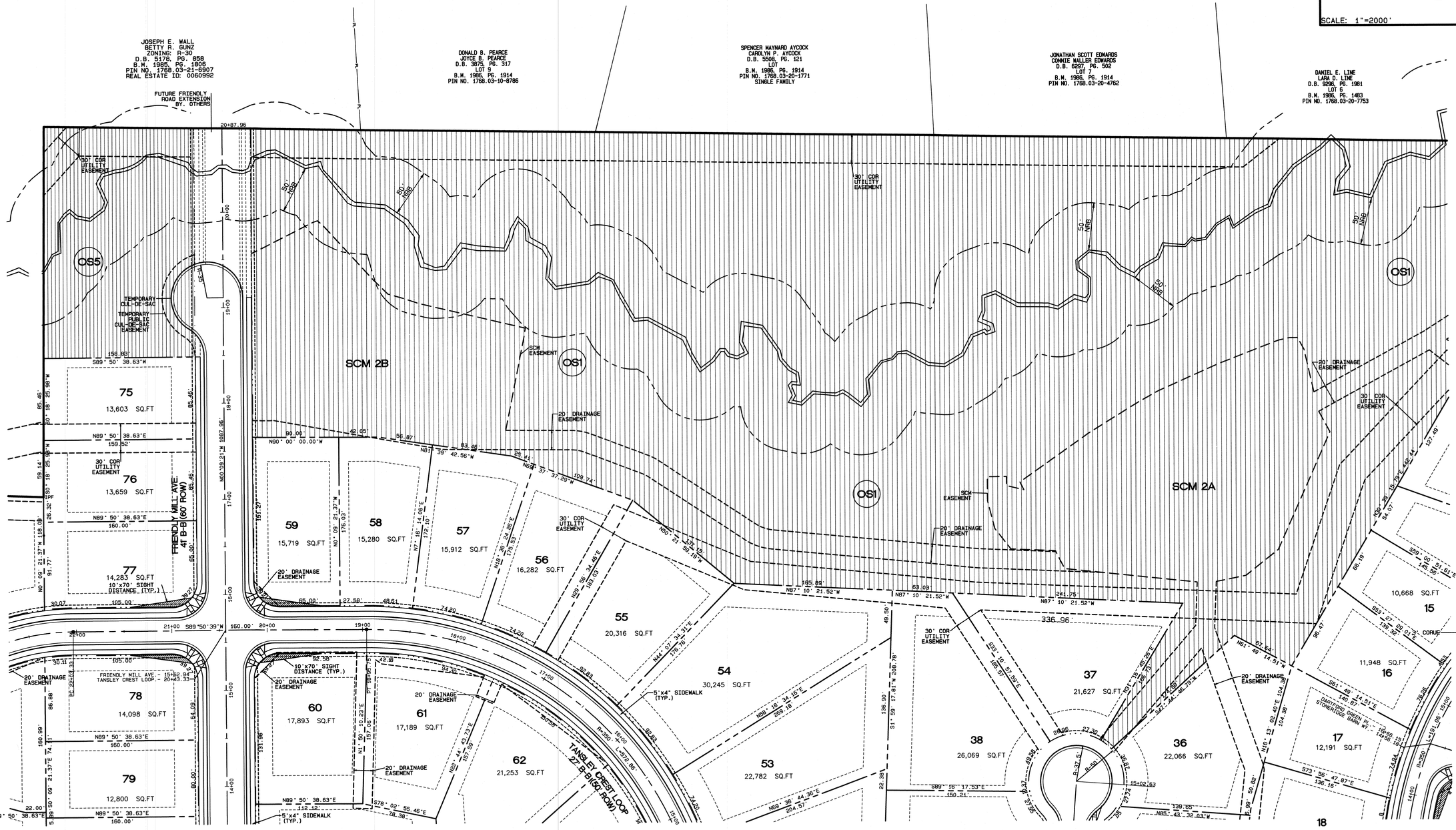
JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

PRELIMINARY
NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMAN
10.7.20
NOT FOR CONSTRUCTION

SHEET NO.
5.3

FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro
Plot Date : 10/7/2020 Time 7:45AM



EXISTING LINETYPE LEGEND

- PROPERTY BOUNDARY
- EXISTING TREE LINE
- EXISTING WETLAND
- EXISTING 50' NRB
- CENTERLINE OF STREAM
- EXISTING WATER ELEVATION
- EXISTING RIGHT OF WAY

PROPOSED LINETYPE LEGEND

- PROPOSED PROPERTY-LINE
- PROPOSED BUILDING SETBACK
- PROPOSED EASEMENT
- PROPOSED 3'/5' CORUE
- PROPOSED RIGHT OF WAY
- PROPOSED ROAD CL
- PROPOSED 30" CURB AND GUTTER
- PROPOSED 100 YR.
- PROPOSED 2' BLDG. RESTRICTION LINE

SETBACK TABLE SINGLE FAMILY

	50'	50' W ALLEY	50'-59'	60'-69'	70'-79'	80'-100'	101' +
FRONT	20'	15'	20'	25'	25'	25'	25'
REAR	20'	15'	20'	25'	25'	25'	30'
SIDE	**	**	**	*	*	10'	12'
CORNER SIDE	10'	10'	10'	10'	10'	15'	18'
MIN. LOT SIZE	6,000	6,000	6,000	6,600	8,400	10,400	14,000

* AGGREGATE 12', MIN. 5'
** MIN. 3' AGGREGATE 10'

ABBREVIATION

NRB- NEUSE RIVER BUFFER

COR/CORUE- CITY OF RALEIGH UTILITY EASEMENT

GENERAL NOTE:

1. SIGHT DISTANCE TRIANGLES ARE 10'x70', WHERE SIGHT LINES ENCROACH ONTO A PRIVATE LOT A SIGHT EASEMENT IS REQUIRED.
2. BACK OF CURB RADIUS AT INTERSECTIONS-
   RESIDENTIAL-RESIDENTIAL- 28'
   RESIDENTIAL-COLLECTOR- 30'
   COLLECTOR-COLLECTOR- 30'
   ENTRANCE AT CUL-DE-SAC- 32.5
   ENTRY ROADS-ROLESVILLE RD.- 35'

OPEN SPACE

GRAPHIC SCALE 1"=50'

0 50 100 150

No.	DATE	REVISION	DWN/CHK

SITE PLAN PHASE 1

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA

FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

PRELIMINARY

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMAN

10-7-20

NOT FOR CONSTRUCTION

SHEET NO.

5.4

FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro

Plot Date : 10/7/2020 Time: 7:47AM

PROPOSED LINETYPE LEGEND

- PROPOSED PROPERTY-LINE
- PROPOSED BUILDING SETBACK
- PROPOSED EASEMENT
- PROPOSED 3'/5' CORUE
- PROPOSED RIGHT OF WAY
- PROPOSED ROAD CL
- PROPOSED 30" CURB AND GUTTER
- PROPOSED 100 YR.
- PROPOSED 2' BLDG. RESTRICTION LINE

EXISTING LINETYPE LEGEND

- PROPERTY BOUNDARY
- EXISTING TREE LINE
- EXISTING WETLAND
- EXISTING 50' NRB
- CENTERLINE OF STREAM
- EXISTING WATER ELEVATION
- EXISTING RIGHT OF WAY

ABBREVIATION

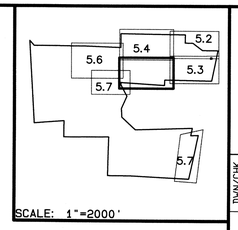
NRB- NEUSE RIVER BUFFER

COR/CORUE- CITY OF RALEIGH UTILITY EASEMENT

GENERAL NOTE:

1. SIGHT DISTANCE TRIANGLES ARE 10'x70'. WHERE SIGHT LINES ENCROACH ONTO A PRIVATE LOT A SIGHT EASEMENT IS REQUIRED.
2. BACK OF CURB RADIUS AT INTERSECTIONS-
   RESIDENTIAL-RESIDENTIAL- 28'
   RESIDENTIAL-COLLECTOR- 30'
   COLLECTOR-COLLECTOR- 30'
   ENTRANCE AT CUL-DE-SAC- 32.5
   ENTRY ROADS-ROLESVILLE RD.- 35'

OPEN SPACE



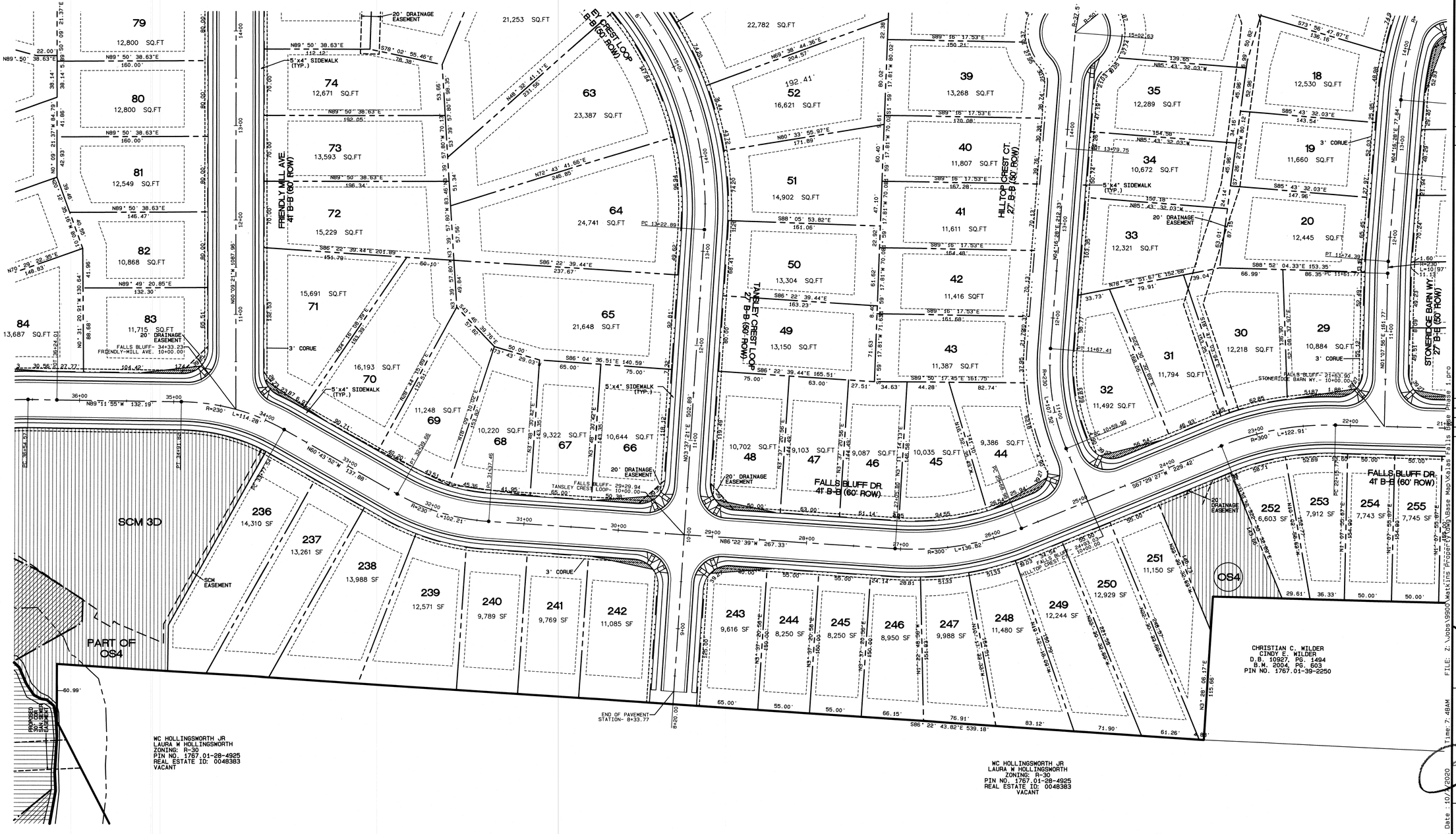
GRAPHIC SCALE 1"=50'

0 50 100 150

SETBACK TABLE SINGLE FAMILY

	50'	50' W ALLEY	50'-59'	60'-69'	70'-79'	80'-100'	101' +
FRONT	20'	15'	20'	25'	25'	25'	25'
REAR	20'	15'	20'	25'	25'	25'	30'
SIDE	**	**	**	*	*	10'	12'
CORNER SIDE	10'	10'	10'	10'	10'	15'	18'
MIN. LOT SIZE	6,000	6,000	6,000	6,600	8,400	10,400	14,000

* AGGREGATE 12', MIN. 5'
** MIN. 3' AGGREGATE 10'



No.	DATE	REVISION	DWN/CHK

SITE PLAN PHASE 1

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA

FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

AMERICAN Engineering

American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

PRELIMINARY

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMAN

10.7.20

NOT FOR CONSTRUCTION

SHEET NO.

5.5

FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro

Plot Date: 10/7/2020 Time: 7:48AM

PROPOSED LINETYPE LEGEND

- PROPOSED PROPERTY-LINE
- PROPOSED BUILDING SETBACK
- PROPOSED EASEMENT
- PROPOSED 3'/5' CORUE
- PROPOSED RIGHT OF WAY
- PROPOSED ROAD CL
- PROPOSED 30" CURB AND GUTTER
- PROPOSED 100 YR.
- PROPOSED 2' BLDG. RESTRICTION LINE

EXISTING LINETYPE LEGEND

- PROPERTY BOUNDARY
- EXISTING TREE LINE
- EXISTING WETLAND
- EXISTING 50' NRB
- CENTERLINE OF STREAM
- EXISTING WATER ELEVATION
- EXISTING RIGHT OF WAY

OPEN SPACE

FUTURE PHASE 3

SETBACK TABLE SINGLE FAMILY

	50'	50' W ALLEY	50'-59'	60'-69'	70'-79'	80'-100'	101' +
FRONT	20'	15'	20'	25'	25'	25'	25'
REAR	20'	15'	20'	25'	25'	25'	30'
SIDE	**	**	**	*	*	10'	12'
CORNER SIDE	10'	10'	10'	10'	10'	15'	18'
MIN. LOT SIZE	6,000	6,000	6,000	6,600	8,400	10,400	14,000

* AGGREGATE 12', MIN. 5'
** MIN. 3' AGGREGATE 10'

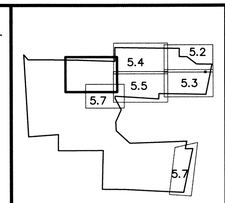
GENERAL NOTE:

1. ANY LOT NUMBER WITH AN * COULD REQUIRE A PRIVATE PUMP TO THE PUBLIC SEWER SERVICE. THIS WILL BE DETERMINED BY THE BUILDER AT THE TIME OF PERMITTING. ANY OF THESE LOTS THAT HAVE A BASEMENT AND ARE SEWERED FROM THE FRONT MAY REQUIRE A PRIVATE PUMP FOR THE LOWEST FLOOR.
2. SIGHT DISTANCE TRIANGLES ARE 10'x70'. WHERE SIGHT LINES ENCROACH ONTO A PRIVATE LOT A SIGHT EASEMENT IS REQUIRED.
3. BACK OF CURB RADIUS AT INTERSECTIONS-
   RESIDENTIAL-RESIDENTIAL- 28'
   RESIDENTIAL-COLLECTOR- 30'
   COLLECTOR-COLLECTOR- 30'
   ENTRANCE AT CUL-DE-SAC- 32.5
   ENTRY ROADS-ROLESVILLE RD.- 35'

ABBREVIATION

NRB- NEUSE RIVER BUFFER

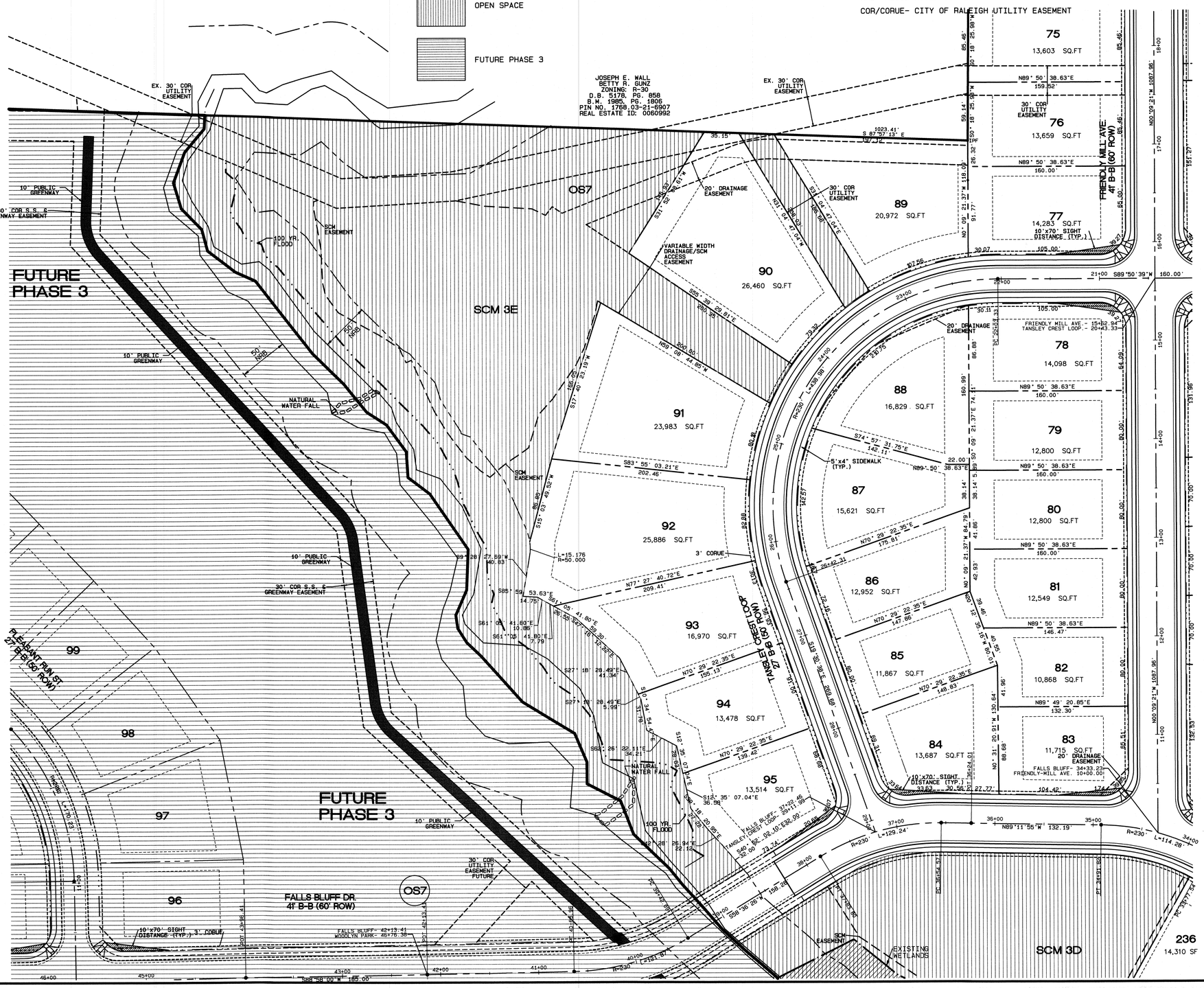
COR/CORUE- CITY OF RALEIGH UTILITY EASEMENT



SCALE: 1"=2000'

GRAPHIC SCALE 1"=50'

0 50 100 150



No.	DATE	REVISION	DWN/CHK

SITE PLAN PHASE 1

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA

FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

AMERICAN Engineering

American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

PRELIMINARY

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMAN

10.7.20

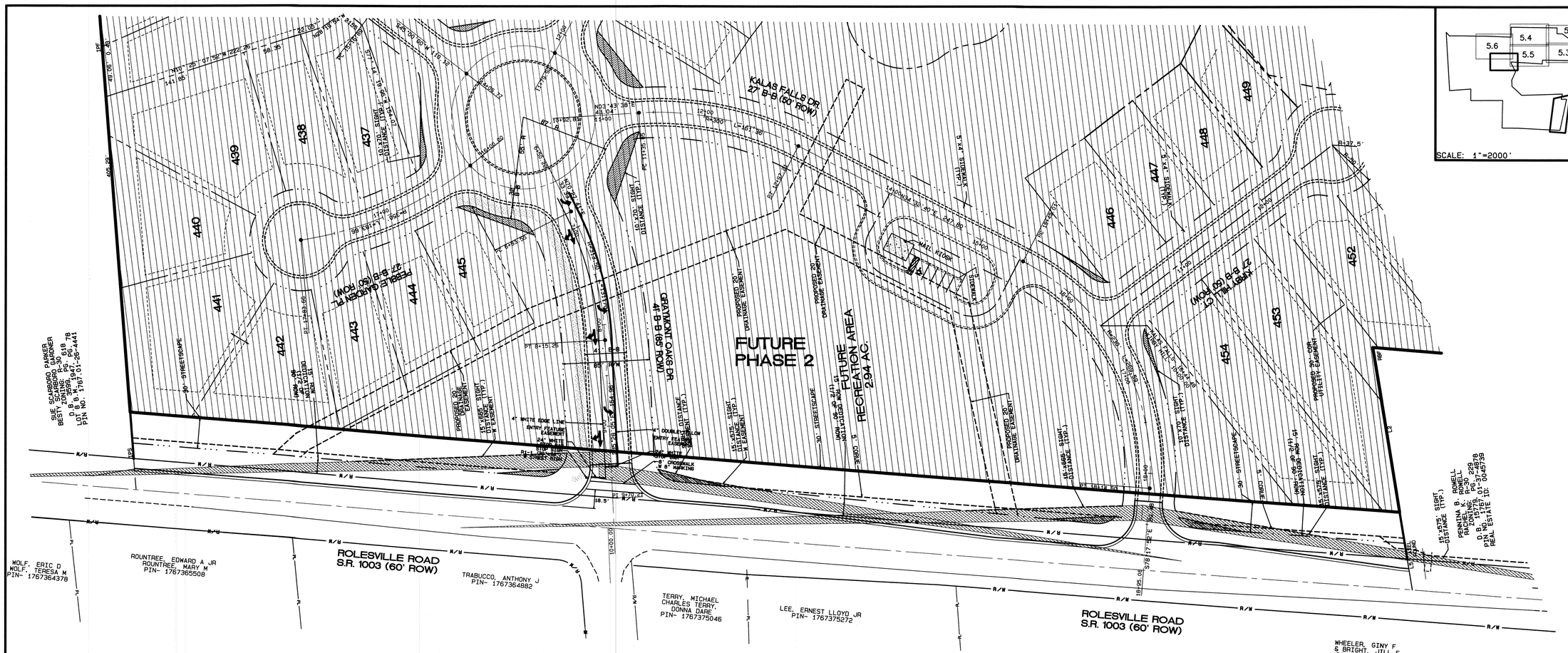
NOT FOR CONSTRUCTION

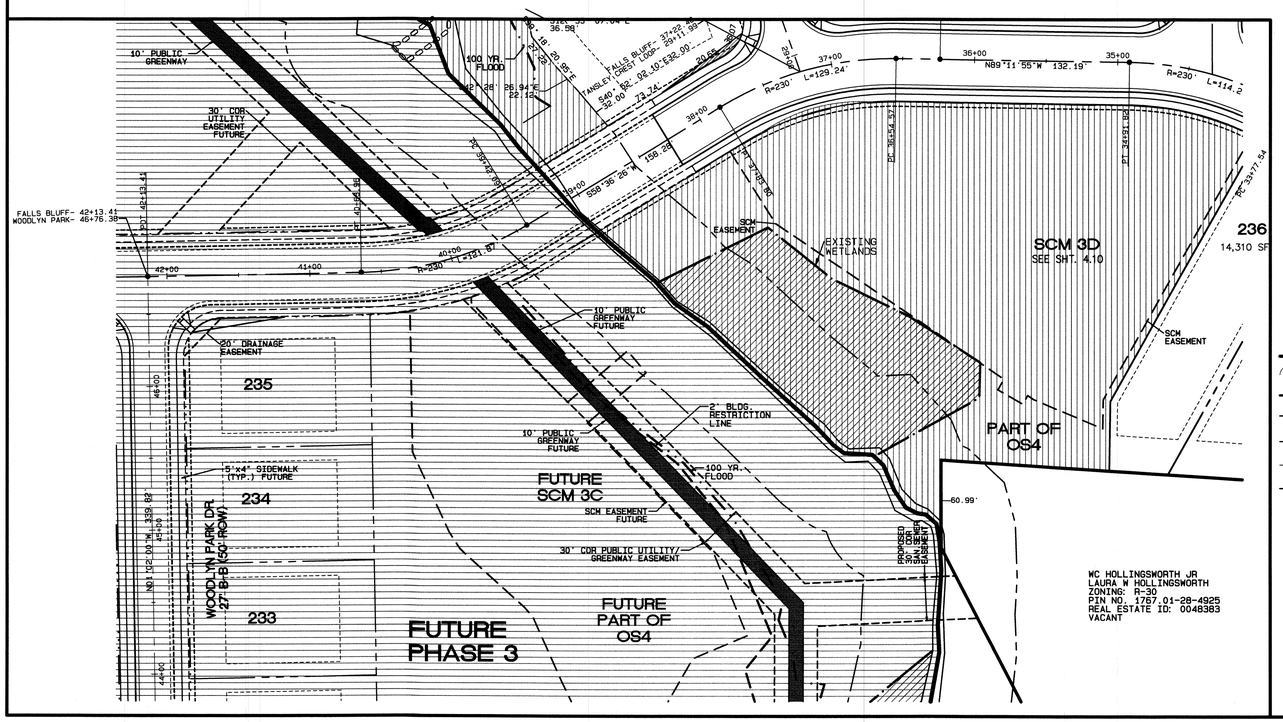
SHEET NO.

5.6

FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro

Plot Date: 10/7/2020 Time: 7:50AM





SETBACK TABLE SINGLE FAMILY

	50'	50' W ALLEY	50'-59'	60'-69'	70'-79'	80'-100'	101' +
FRONT	20'	15'	20'	25'	25'	25'	25'
REAR	20'	15'	20'	25'	25'	25'	30'
SIDE	**	**	**	*	*	10'	12'
CORNER SIDE	10'	10'	10'	10'	10'	15'	18'
MIN. LOT SIZE	6,000	6,000	6,000	6,600	8,400	10,400	14,000

* AGGREGATE 12', MIN. 5'
** MIN. 3' AGGREGATE 10'

ABBREVIATION

NRB- NEUSE RIVER BUFFER

COR/CORUE- CITY OF RALEIGH UTILITY EASEMENT

EXISTING LINETYPE LEGEND

- PROPERTY BOUNDARY
- EXISTING TREE LINE
- EXISTING WETLAND
- EXISTING 50' NRB
- CENTERLINE OF STREAM
- EXISTING WATER ELEVATION
- EXISTING RIGHT OF WAY

PROPOSED LINETYPE LEGEND

- PROPOSED PROPERTY-LINE
- PROPOSED BUILDING SETBACK
- PROPOSED EASEMENT
- PROPOSED 3'/5' CORUE
- PROPOSED RIGHT OF WAY
- PROPOSED ROAD CL
- PROPOSED 30" CURB AND GUTTER
- PROPOSED 100 YR.
- PROPOSED 2' BLDG. RESTRICTION LINE

GRAPHIC SCALE 1"=50'

0 50 100 150

GENERAL NOTE:

1. NO DRAINAGE IN THE PHASE 3 AREA WHICH INCLUDES THE CULVERT CROSSING IS TO BE CONSTRUCTED WITH PHASE 1.
2. NO ADDITIONAL IMPROVEMENTS IN THE PHASE 2 AREA EXCEPT FOR ROLESVILLE RD. IMPROVMENTS AND THE DRAINAGE OUTFALL ARE TO BE CONSTRUCTED WITH PHASE 1.

No.	DATE	REVISION	DWN/CHK

SITE PLAN PHASE 1

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA

FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

AMERICAN Engineering

American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

PRELIMINARY

NORTH CAROLINA SEAL 9810 ENGINEER JOHN R. HARMAN

10.7.20

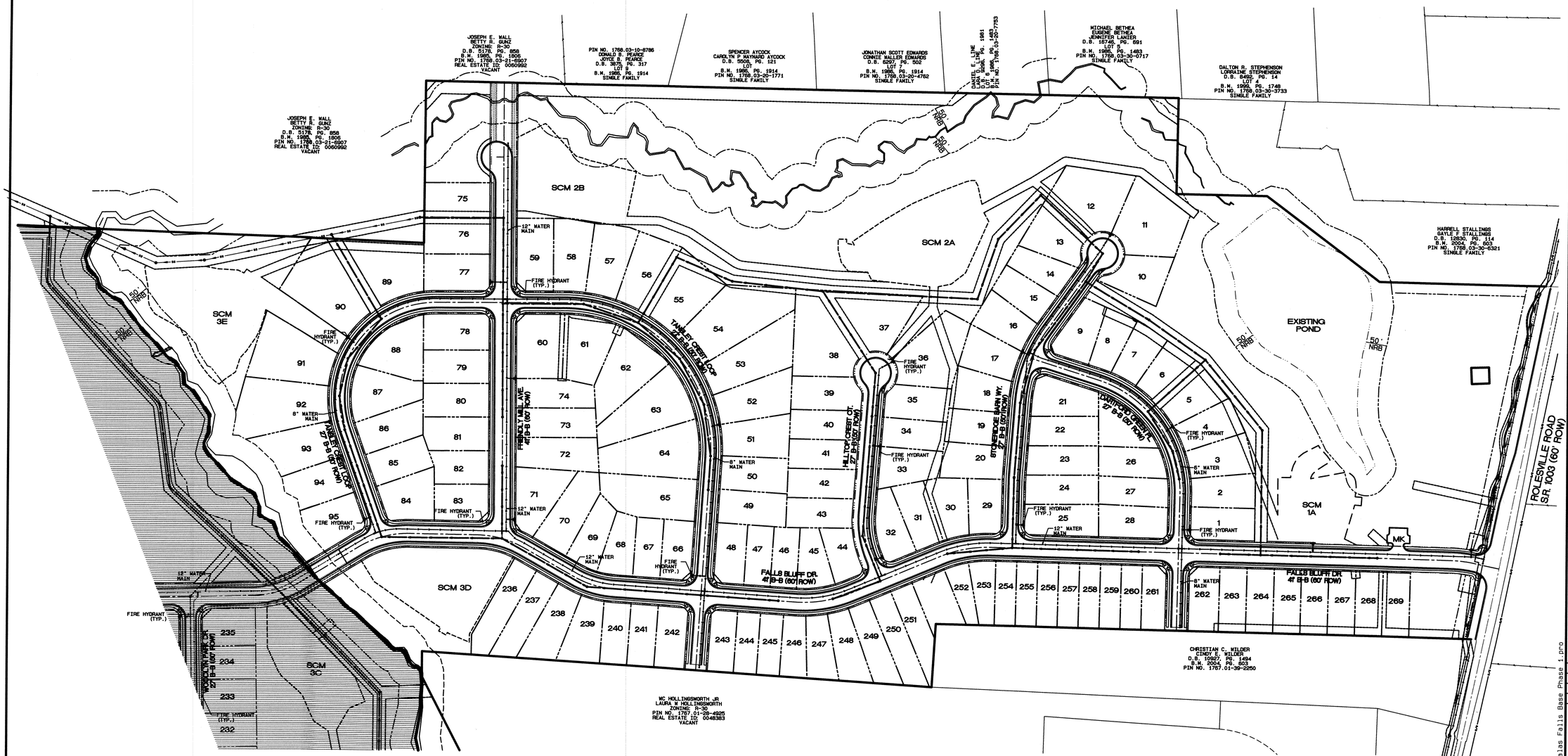
NOT FOR CONSTRUCTION

SHEET NO.

5.7

FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro

Plot Date : 10/7/2020 Time: 7:57AM



EXISTING LINETYPE LEGEND

- PROPERTY BOUNDARY
- EXISTING SANITARY SEWER
- EXISTING WETLAND
- EXISTING 50' NRB
- CENTERLINE OF STREAM
- EXISTING WATER ELEVATION
- EXISTING RIGHT OF WAY

PROPOSED LINETYPE LEGEND

- PROPOSED BUILDING SETBACK
- PROPOSED EASEMENT
- PROPOSED 3'/5' CORUE
- PROPOSED RIGHT OF WAY
- PROPOSED ROAD CL
- PROPOSED 30" CURB AND GUTTER
- PROPOSED SANITARY SEWER
- PROPOSED WATERLINE
- PROPOSED STORM DRAINAGE
- PROPOSED DRAINAGE DITCH

UTILITY LEGEND

- PROPOSED MANHOLE OR JUNCTION BOX
- PROPOSED SEWER SERVICE
- PROPOSED CATCH BASIN
- PROPOSED YARD INLET
- PROPOSED FLARED END SECTION
- PROPOSED FIRE HYDRANT
- PROPOSED WATER SERVICE
- PROPOSED WATER VALVE
- PROPOSED WATERMAIN REDUCER

GRAPHIC SCALE 1"=120'

0 120 240 360

Public
Sewer Collection / Extension System

The City of Raleigh consents to the connection and extension of the City's public sewer system as shown on this plan. The material and construction methods used for this project shall conform to the standards and specifications of the City's Public Utilities Handbook.

City of Raleigh
Public Utility Department # _____

Authorization to Construct: _____

Date: _____

Public
Water Distribution / Extension System

The City of Raleigh consents to the connection and extension of the City's public water system as shown on this plan. The material and construction methods used for this project shall conform to the standards and specifications of the City's Public Utilities Handbook.

City of Raleigh
Public Utility Department # _____

Authorization to Construct: _____

Date: _____

No.	DATE	REVISION	DWN/CHK

UTILITY PLAN
PHASE 1 OVERALL
FOR
KALAS FALLS
SITUATED AT
1832 ROLESVILLE ROAD
WAKE COUNTY, NORTH CAROLINA
FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

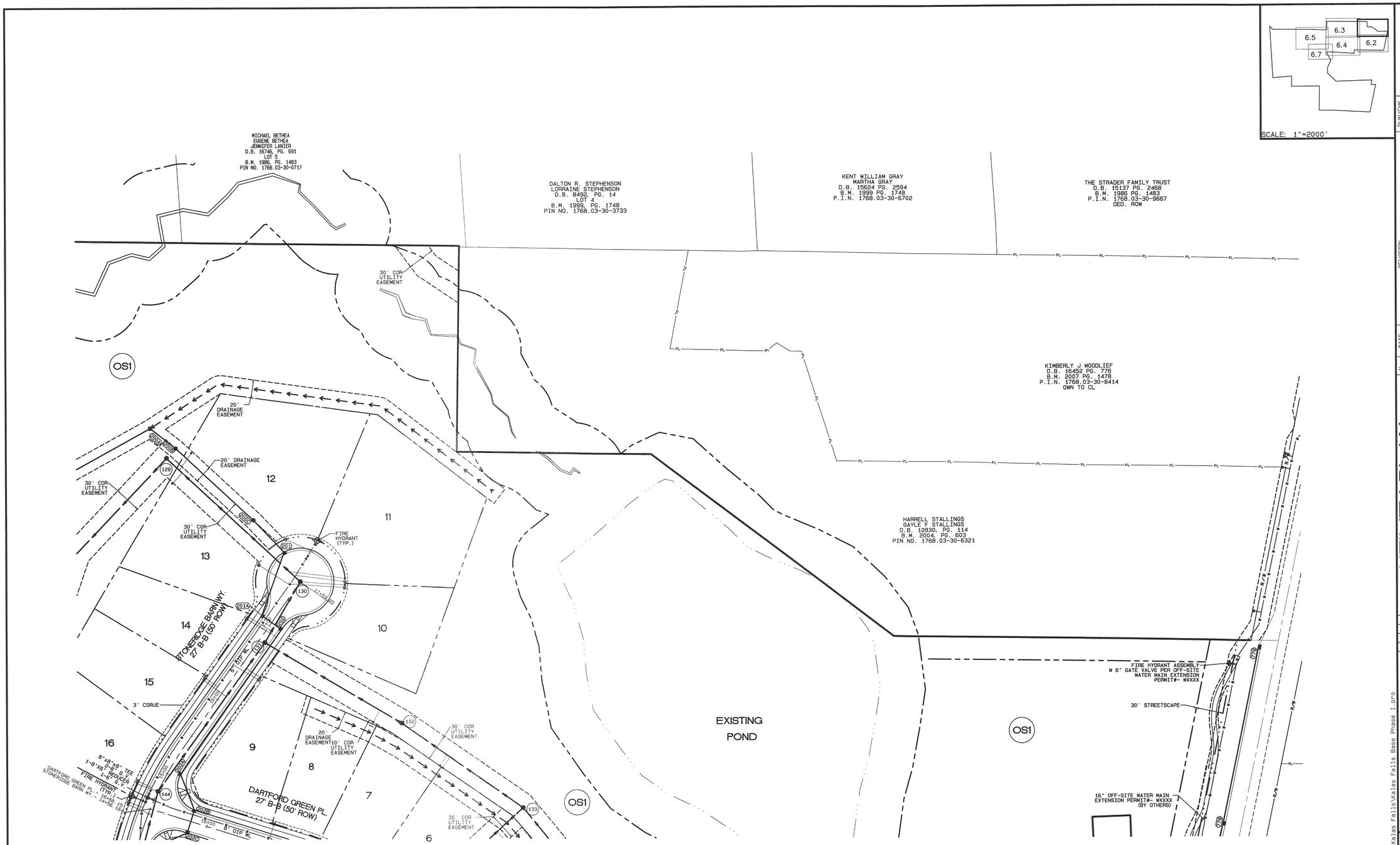
AMERICAN Engineering
American Engineering Associates–Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

PRELIMINARY
NOT FOR CONSTRUCTION

5.11.20

SHEET NO.
6.0

FILE: C:\Users\user\Desktop\Work Data\Watkins\Kalas Falls Base Phase 1.pro
Plot Date : 9/1/2020 Time: 0:28PM



PROPOSED LINETYPE LEGEND

- PROPOSED BUILDING SETBACK
- PROPOSED EASEMENT
- PROPOSED 3'/5' CORUE
- PROPOSED RIGHT OF WAY
- PROPOSED ROAD CL
- PROPOSED 30" CURB AND GUTTER
- PROPOSED SANITARY SEWER
- PROPOSED WATERLINE
- PROPOSED STORM DRAINAGE
- PROPOSED DRAINAGE DITCH

EXISTING LINETYPE LEGEND

- PROPERTY BOUNDARY
- EXISTING SANITARY SEWER
- EXISTING WETLAND
- EXISTING 50' NRB
- CENTERLINE OF STREAM
- EXISTING WATER ELEVATION
- EXISTING RIGHT OF WAY

UTILITY LEGEND

- PROPOSED MANHOLE OR JUNCTION BOX
- PROPOSED SEWER SERVICE
- PROPOSED CATCH BASIN
- PROPOSED YARD INLET
- PROPOSED FLARED END SECTION
- PROPOSED FIRE HYDRANT
- PROPOSED WATER SERVICE
- PROPOSED WATER VALVE
- PROPOSED WATERMAIN REDUCER

Public Sewer Collection / Extension System

The City of Raleigh consents to the connection and extension of the City's public sewer system as shown on this plan. The material and construction methods used for this project shall conform to the standards and specifications of the City's Public Utilities Handbook.

City of Raleigh
Public Utility Department # _____

Authorization to Construct: _____

Date: _____

Public Water Distribution / Extension System

The City of Raleigh consents to the connection and extension of the City's public water system as shown on this plan. The material and construction methods used for this project shall conform to the standards and specifications of the City's Public Utilities Handbook.

City of Raleigh
Public Utility Department # _____

Authorization to Construct: _____

Date: _____

No.	DATE	REVISION	DWN/CHK

UTILITY PLAN PHASE 1

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA

FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

PRELIMINARY

NORTH CAROLINA PROFESSIONAL SEAL 9910 ENGINEER JOHN R. HARMAN

5.11.20

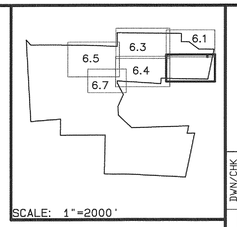
NOT FOR CONSTRUCTION

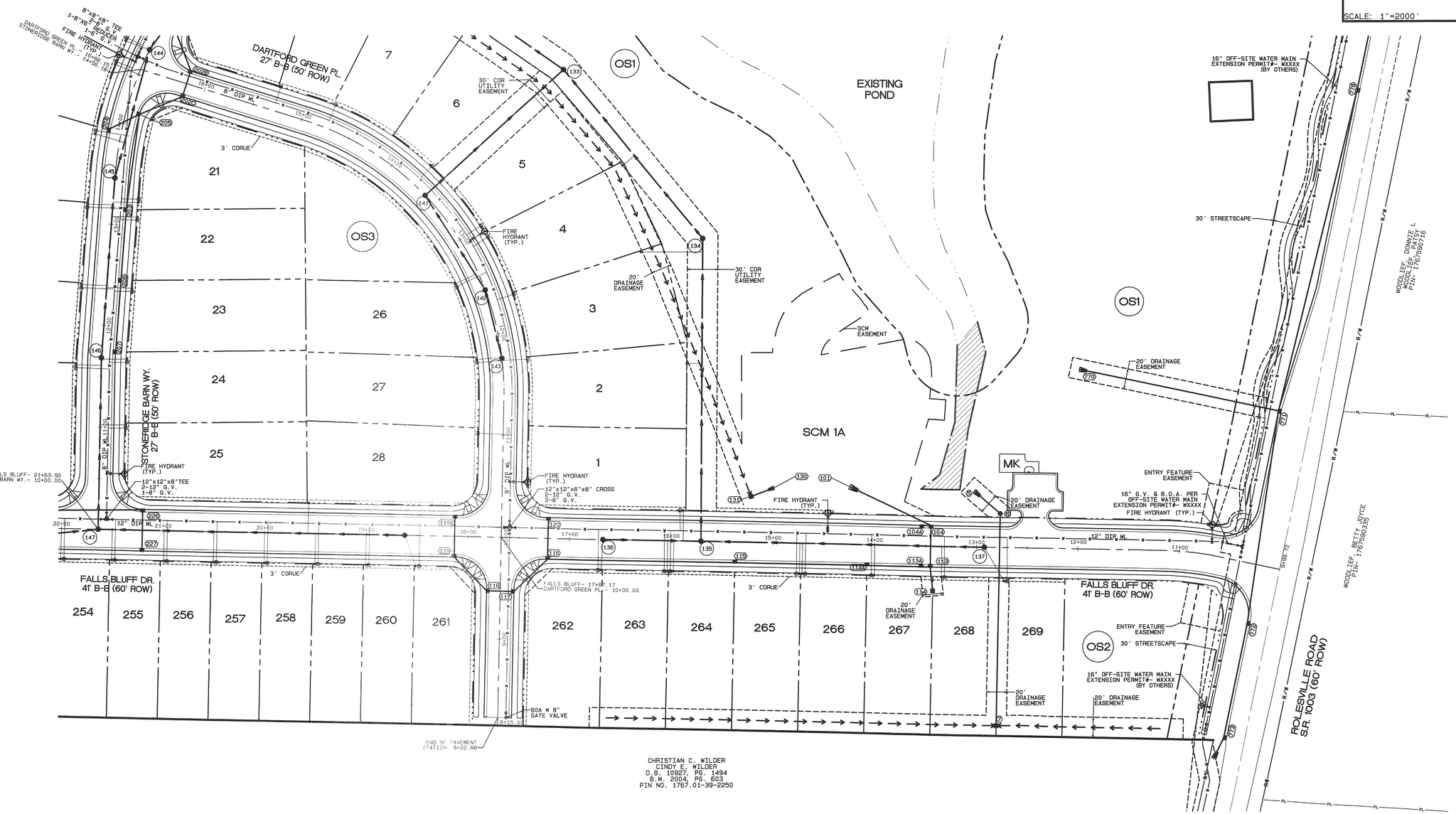
SHEET NO.

6.1

FILE: I:\Kalas Falls\Kalas Falls Base Phase 1.pro

Plot Date : 5/11/2020 Time: 4:09AM





PROPOSED LINETYPE LEGEND

- PROPOSED BUILDING SETBACK
- PROPOSED EASEMENT
- PROPOSED 3'/5' CORUE
- PROPOSED RIGHT OF WAY
- PROPOSED ROAD CL
- PROPOSED 30" CURB AND GUTTER
- PROPOSED SANITARY SEWER
- PROPOSED WATERLINE
- PROPOSED STORM DRAINAGE
- PROPOSED DRAINAGE DITCH

EXISTING LINETYPE LEGEND

- PROPERTY BOUNDARY
- EXISTING SANITARY SEWER
- EXISTING WETLAND
- EXISTING 50' NRB
- CENTERLINE OF STREAM
- EXISTING WATER ELEVATION
- EXISTING RIGHT OF WAY

UTILITY LEGEND

- PROPOSED MANHOLE OR JUNCTION BOX
- PROPOSED SEWER SERVICE
- PROPOSED CATCH BASIN
- PROPOSED YARD INLET
- PROPOSED FLARED END SECTION
- PROPOSED FIRE HYDRANT
- PROPOSED WATER SERVICE
- PROPOSED WATER VALVE
- PROPOSED WATERMAIN REDUCER

GRAPHIC SCALE 1"=50'

0 50 100 150

Public
Sewer Collection / Extension System

The City of Raleigh consents to the connection and extension of the City's public sewer system as shown on this plan. The material and construction methods used for this project shall conform to the standards and specifications of the City's Public Utilities Handbook.

City of Raleigh
Public Utility Department #_____

Authorization to Construct:_____

Date:_____

Public
Water Distribution / Extension System

The City of Raleigh consents to the connection and extension of the City's public water system as shown on this plan. The material and construction methods used for this project shall conform to the standards and specifications of the City's Public Utilities Handbook.

City of Raleigh
Public Utility Department #_____

Authorization to Construct:_____

Date:_____

No.	DATE	REVISION	DWN/CHK

UTILITY PLAN
PHASE 1
FOR
KALAS FALLS
SITUATED AT
1832 ROLESVILLE ROAD
WAKE COUNTY, NORTH CAROLINA
FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

PRELIMINARY

5.11.20

NOT FOR CONSTRUCTION

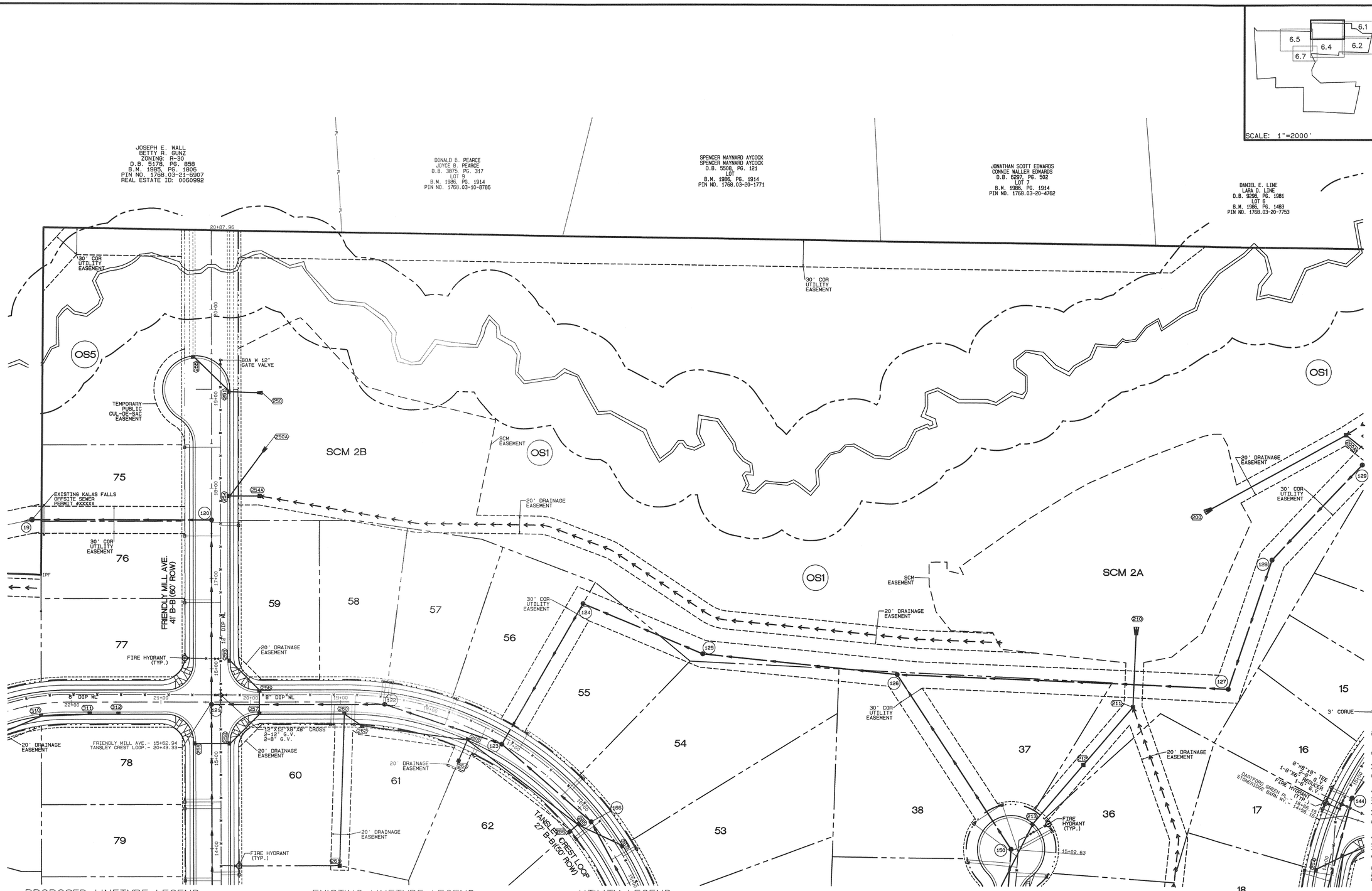
SHEET NO.

6.2

FILE: I:\Kalas Falls\Kalas Falls Base Phase 1.pro

Time: 4:09AM

Plot Date: 5/11/2020



PROPOSED LINETYPE LEGEND

- PROPOSED BUILDING SETBACK
- PROPOSED EASEMENT
- PROPOSED 3'/5' CORUE
- PROPOSED RIGHT OF WAY
- PROPOSED ROAD CL
- PROPOSED 30" CURB AND GUTTER
- PROPOSED SANITARY SEWER
- PROPOSED WATERLINE
- PROPOSED STORM DRAINAGE
- PROPOSED DRAINAGE DITCH

EXISTING LINETYPE LEGEND

- PROPERTY BOUNDARY
- EXISTING SANITARY SEWER
- EXISTING WETLAND
- EXISTING 50' NRB
- CENTERLINE OF STREAM
- EXISTING WATER ELEVATION
- EXISTING RIGHT OF WAY

UTILITY LEGEND

- PROPOSED MANHOLE OR JUNCTION BOX
- PROPOSED SEWER SERVICE
- PROPOSED CATCH BASIN
- PROPOSED YARD INLET
- PROPOSED FLARED END SECTION
- PROPOSED FIRE HYDRANT
- PROPOSED WATER SERVICE
- PROPOSED WATER VALVE
- PROPOSED WATERMAIN REDUCER

GRAPHIC SCALE 1"=50'

0 50 100 150

Public
Sewer Collection / Extension System

The City of Raleigh consents to the connection and extension of the City's public sewer system as shown on this plan. The material and construction methods used for this project shall conform to the standards and specifications of the City's Public Utilities Handbook.

City of Raleigh
Public Utility Department #_____

Authorization to Construct:_____

Date:_____

Public
Water Distribution / Extension System

The City of Raleigh consents to the connection and extension of the City's public water system as shown on this plan. The material and construction methods used for this project shall conform to the standards and specifications of the City's Public Utilities Handbook.

City of Raleigh
Public Utility Department #_____

Authorization to Construct:_____

Date:_____

No.	DATE	REVISION	DWN/CHK

UTILITY PLAN PHASE 1

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA

FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	9/19/2019

AMERICAN Engineering

American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

FILE: I:\Kalas Falls\Kalas Falls Base Phase 1.pro

Plot Date: 5/11/2020 Time: 4:09AM

PRELIMINARY

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMAN

5.11.20

NOT FOR CONSTRUCTION

SHEET NO.

6.3

PROPOSED LINETYPE LEGEND

- PROPOSED PHASE-LINE
- PROPOSED BUILDING SETBACK
- PROPOSED EASEMENT
- PROPOSED 3'/5' CORUE
- PROPOSED RIGHT OF WAY
- PROPOSED ROAD CL
- PROPOSED 30" CURB AND GUTTER
- PROPOSED SANITARY SEWER
- PROPOSED WATERLINE
- PROPOSED STORM DRAINAGE
- PROPOSED DRAINAGE DITCH

EXISTING LINETYPE LEGEND

- PROPERTY BOUNDARY
- EXISTING SANITARY SEWER
- EXISTING WETLAND
- EXISTING 50' NRB
- CENTERLINE OF STREAM
- EXISTING WATER ELEVATION
- EXISTING RIGHT OF WAY

UTILITY LEGEND

- PROPOSED MANHOLE OR JUNCTION BOX
- PROPOSED SEWER SERVICE
- PROPOSED CATCH BASIN
- PROPOSED YARD INLET
- PROPOSED FLARED END SECTION
- PROPOSED FIRE HYDRANT
- PROPOSED WATER SERVICE
- PROPOSED WATER VALVE
- PROPOSED WATERMAIN REDUCER

GRAPHIC SCALE 1"=50'

0 50 100 150

Public Water Distribution / Extension System

The City of Raleigh consents to the connection and extension of the City's public water system as shown on this plan. The material and construction methods used for this project shall conform to the standards and specifications of the City's Public Utilities Handbook.

City of Raleigh
Public Utility Department #_____

Authorization to Construct:_____

Date:_____

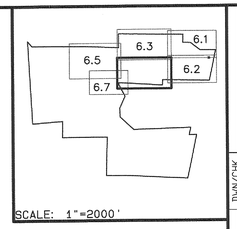
Public Sewer Collection / Extension System

The City of Raleigh consents to the connection and extension of the City's public sewer system as shown on this plan. The material and construction methods used for this project shall conform to the standards and specifications of the City's Public Utilities Handbook.

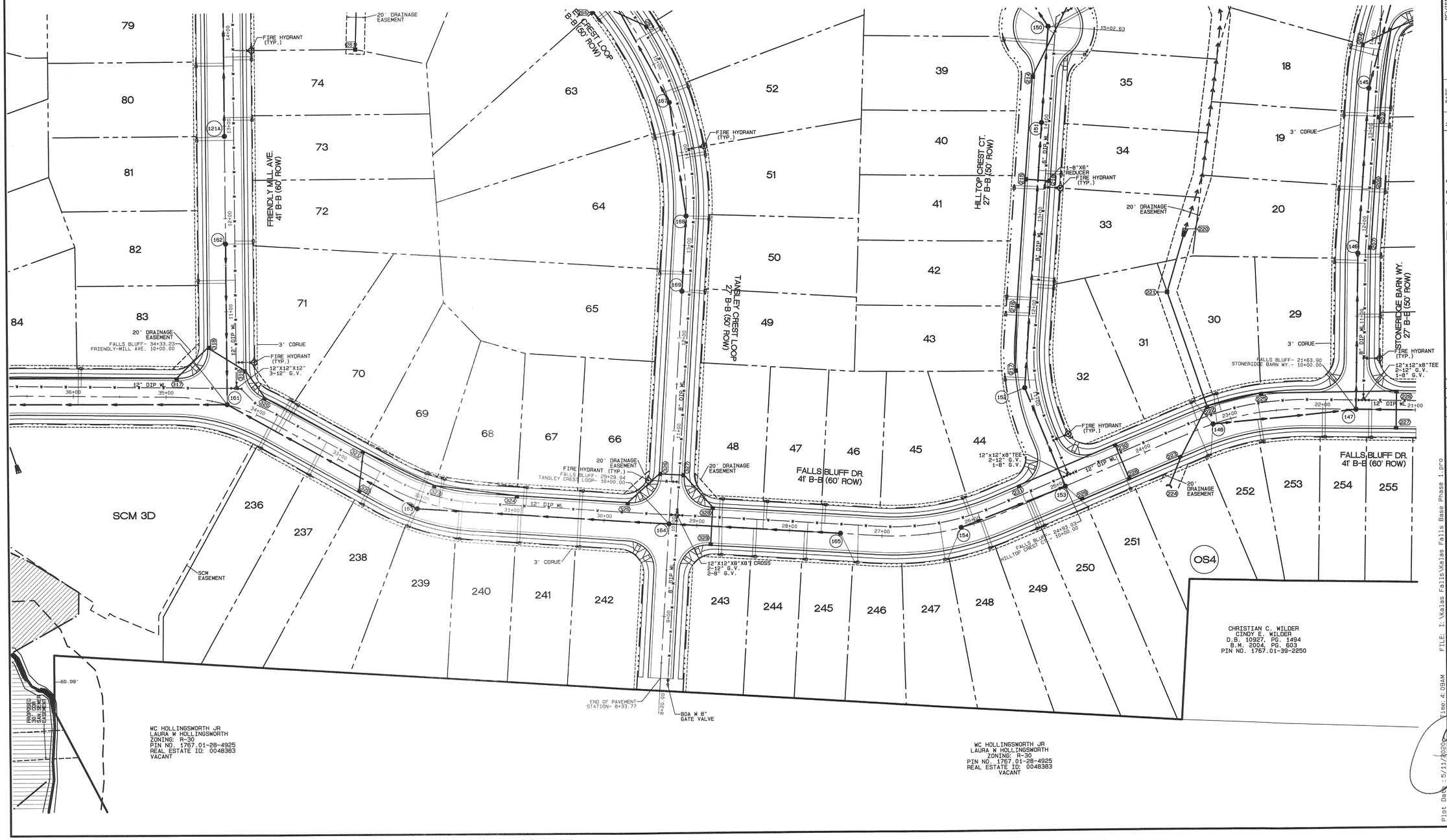
City of Raleigh
Public Utility Department #_____

Authorization to Construct:_____

Date:_____



SCALE: 1"=2000'



No.	DATE	REVISION	DWN/CHK

UTILITY PLAN PHASE 1

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA

FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	9/19/2019

AMERICAN Engineering

American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

PRELIMINARY

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 9810 JOHN R. HARMAN

5.11.20

NOT FOR CONSTRUCTION

SHEET NO.

6.4

FILE: I:\Kalas Falls\Kalas Falls Base Phase 1.pro

Plot Date: 5/11/2020 Time: 4:09AM

PROPOSED LINETYPE LEGEND

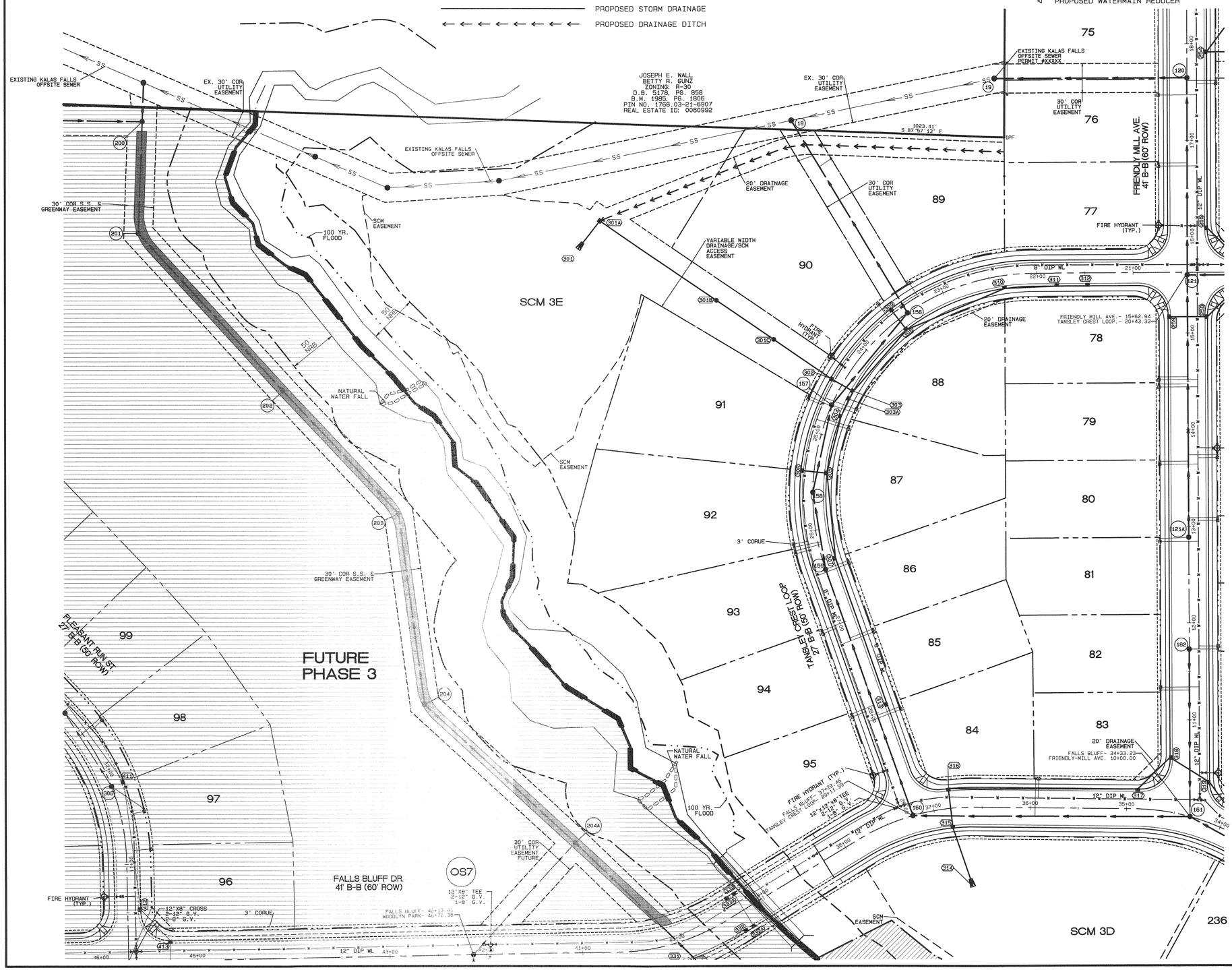
- PROPOSED PHASE-LINE
- PROPOSED BUILDING SETBACK
- PROPOSED EASEMENT
- PROPOSED 3'/5' CORUE
- PROPOSED RIGHT OF WAY
- PROPOSED ROAD CL
- PROPOSED 30" CURB AND GUTTER
- PROPOSED SANITARY SEWER
- PROPOSED WATERLINE
- PROPOSED STORM DRAINAGE
- PROPOSED DRAINAGE DITCH

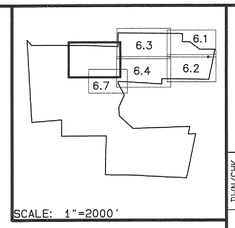
EXISTING LINETYPE LEGEND

- PROPERTY BOUNDARY
- EXISTING TREE LINE
- EXISTING WETLAND
- EXISTING 50' NRB
- CENTERLINE OF STREAM
- EXISTING WATER ELEVATION
- EXISTING RIGHT OF WAY

UTILITY LEGEND

- PROPOSED MANHOLE OR JUNCTION BOX
- PROPOSED SEWER SERVICE
- PROPOSED CATCH BASIN
- PROPOSED YARD INLET
- PROPOSED FLARED END SECTION
- PROPOSED FIRE HYDRANT
- PROPOSED WATER SERVICE
- PROPOSED WATER VALVE
- PROPOSED WATERMAIN REDUCER





SCALE: 1"=2000'

GENERAL NOTE:

1. NO DRAINAGE IN THE PHASE 3 AREA WHICH INCLUDES THE CULVERT CROSSING IS TO BE CONSTRUCTED WITH PHASE 1.
2. NO ADDITIONAL UTILITY EXTENSIONS IN THE PHASE 3 AREA ARE INCLUDED WITH THIS PHASE. THE ONLY UTILITY EXTENSION IN THE PHASE 3 AREA TO BE CONSTRUCTED WITH PHASE 1 IS MH200-MH206.

Public Water Distribution / Extension System

The City of Raleigh consents to the connection and extension of the City's public water system as shown on this plan. The material and construction methods used for this project shall conform to the standards and specifications of the City's Public Utilities Handbook.

City of Raleigh
Public Utility Department #_____

Authorization to Construct:_____

Date:_____

Public Sewer Collection / Extension System

The City of Raleigh consents to the connection and extension of the City's public sewer system as shown on this plan. The material and construction methods used for this project shall conform to the standards and specifications of the City's Public Utilities Handbook.

City of Raleigh
Public Utility Department #_____

Authorization to Construct:_____

Date:_____

GRAPHIC SCALE 1"=50'

0 50 100 150

No.	DATE	REVISION	DWN/CHK

UTILITY PLAN PHASE 1

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA

FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	9/19/2019

AMERICAN Engineering

American Engineering Associates–Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

PRELIMINARY

NORTH CAROLINA PROFESSIONAL SEAL 9910 ENGINEER JOHN R. HARMAN

5.11.20

NOT FOR CONSTRUCTION

SHEET NO.

6.5

Plot Date: 5/11/2020 Time: 4:09AM FILE: I:\Kalas Falls\Kalas Falls Base Phase 1.pro

PROPOSED LINETYPE LEGEND

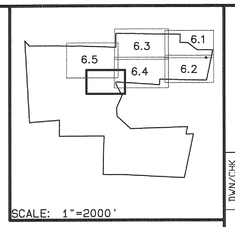
- PROPOSED BUILDING SETBACK
- PROPOSED EASEMENT
- PROPOSED 3'/5' CORUE
- PROPOSED RIGHT OF WAY
- PROPOSED ROAD CL
- PROPOSED 30" CURB AND GUTTER
- PROPOSED SANITARY SEWER
- PROPOSED WATERLINE

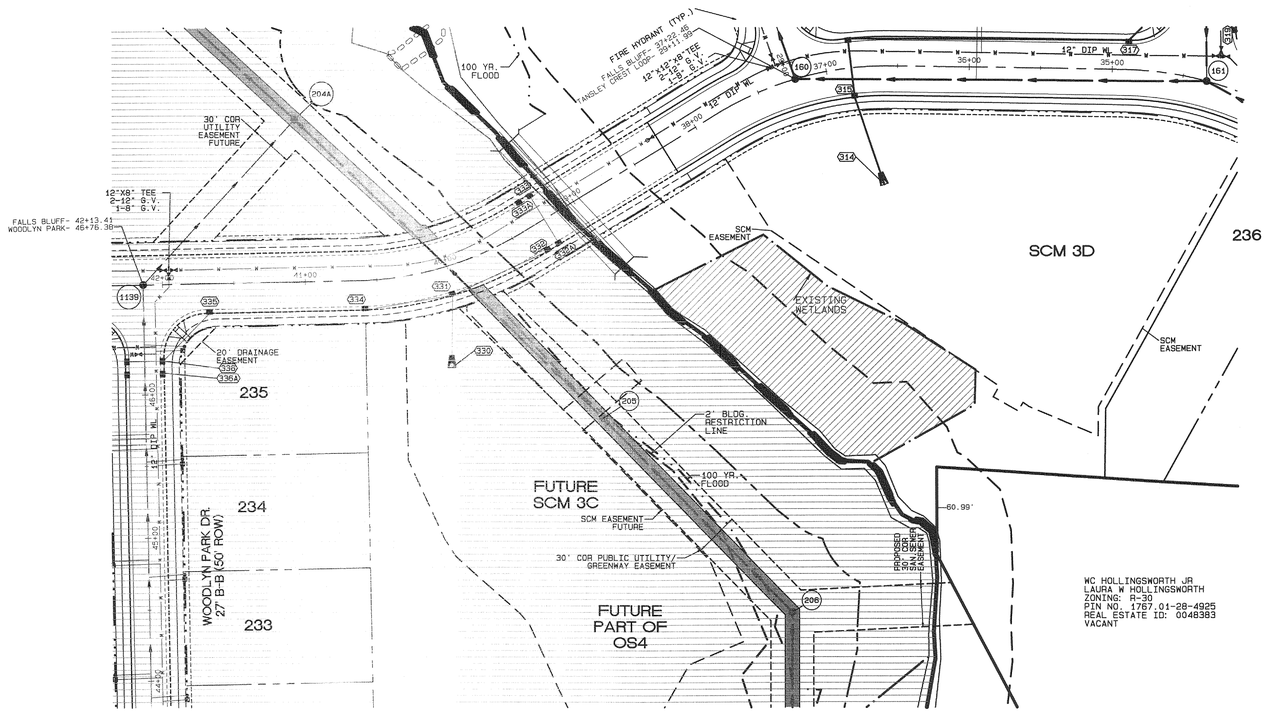
EXISTING LINETYPE LEGEND

- PROPERTY BOUNDARY
- EXISTING TREE LINE
- EXISTING WETLAND
- EXISTING 50' NRB
- CENTERLINE OF STREAM
- EXISTING WATER ELEVATION
- EXISTING RIGHT OF WAY

UTILITY LEGEND

- PROPOSED MANHOLE OR JUNCTION BOX
- PROPOSED SEWER SERVICE
- PROPOSED CATCH BASIN
- PROPOSED YARD INLET
- PROPOSED FLARED END SECTION
- PROPOSED FIRE HYDRANT
- PROPOSED WATER SERVICE
- PROPOSED WATER VALVE





GENERAL NOTE:

1. NO DRAINAGE IN THE PHASE 3 AREA WHICH INCLUDES THE CULVERT CROSSING IS TO BE CONSTRUCTED WITH PHASE 1.
2. NO ADDITIONAL UTILITY EXTENSIONS IN THE PHASE 3 AREA ARE INCLUDED WITH THIS PHASE. THE ONLY UTILITY EXTENSION IN THE PHASE 3 AREA TO BE CONSTRUCTED WITH PHASE 1 IS MH200-MH206.

Public
Water Distribution / Extension System

The City of Raleigh consents to the connection and extension of the City's public water system as shown on this plan. The material and construction methods used for this project shall conform to the standards and specifications of the City's Public Utilities Handbook.

City of Raleigh
Public Utility Department # _____

Authorization to Construct: _____

Date: _____

Public
Sewer Collection / Extension System

The City of Raleigh consents to the connection and extension of the City's public sewer system as shown on this plan. The material and construction methods used for this project shall conform to the standards and specifications of the City's Public Utilities Handbook.

City of Raleigh
Public Utility Department # _____

Authorization to Construct: _____

Date: _____

GRAPHIC SCALE 1"=50'

0 50 100 150

No.	DATE	REVISION	DWN/CHK

UTILITY PLAN
PHASE 1
FOR
KALAS FALLS
SITUATED AT
1832 ROLESVILLE ROAD
WAKE COUNTY, NORTH CAROLINA
FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	9/19/2019

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

PRELIMINARY

NORTH CAROLINA PROFESSIONAL SEAL 030787 ENGINEER JOHN R. HARMAN

5.11.20

NOT FOR CONSTRUCTION

SHEET NO.

6.6

FILE: I:\Kalas Falls\Kalas Falls Base Phase 1.pro

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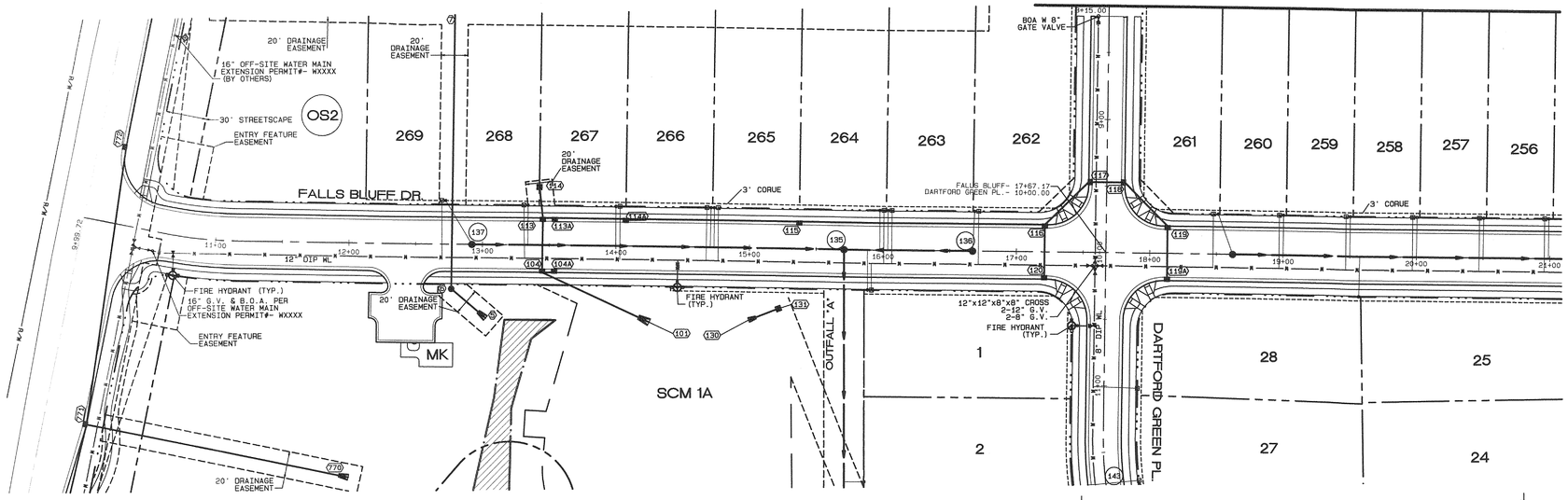
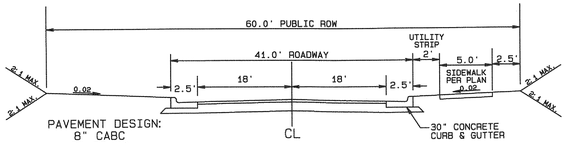


Public Water Distribution / Extension System	Public Sewer Collection / Extension System
The City of Raleigh consents to the connection and extension of the City's public water system as shown on this plan. The material and construction methods used for this project shall conform to the standards and specifications of the City's Public Utilities Handbook.	The City of Raleigh consents to the connection and extension of the City's public sewer system as shown on this plan. The material and construction methods used for this project shall conform to the standards and specifications of the City's Public Utilities Handbook.
City of Raleigh Public Utility Department #	City of Raleigh Public Utility Department #
Authorization to Construct:	Authorization to Construct:
Date:	Date:

GRAPHIC SCALE 1"=200'

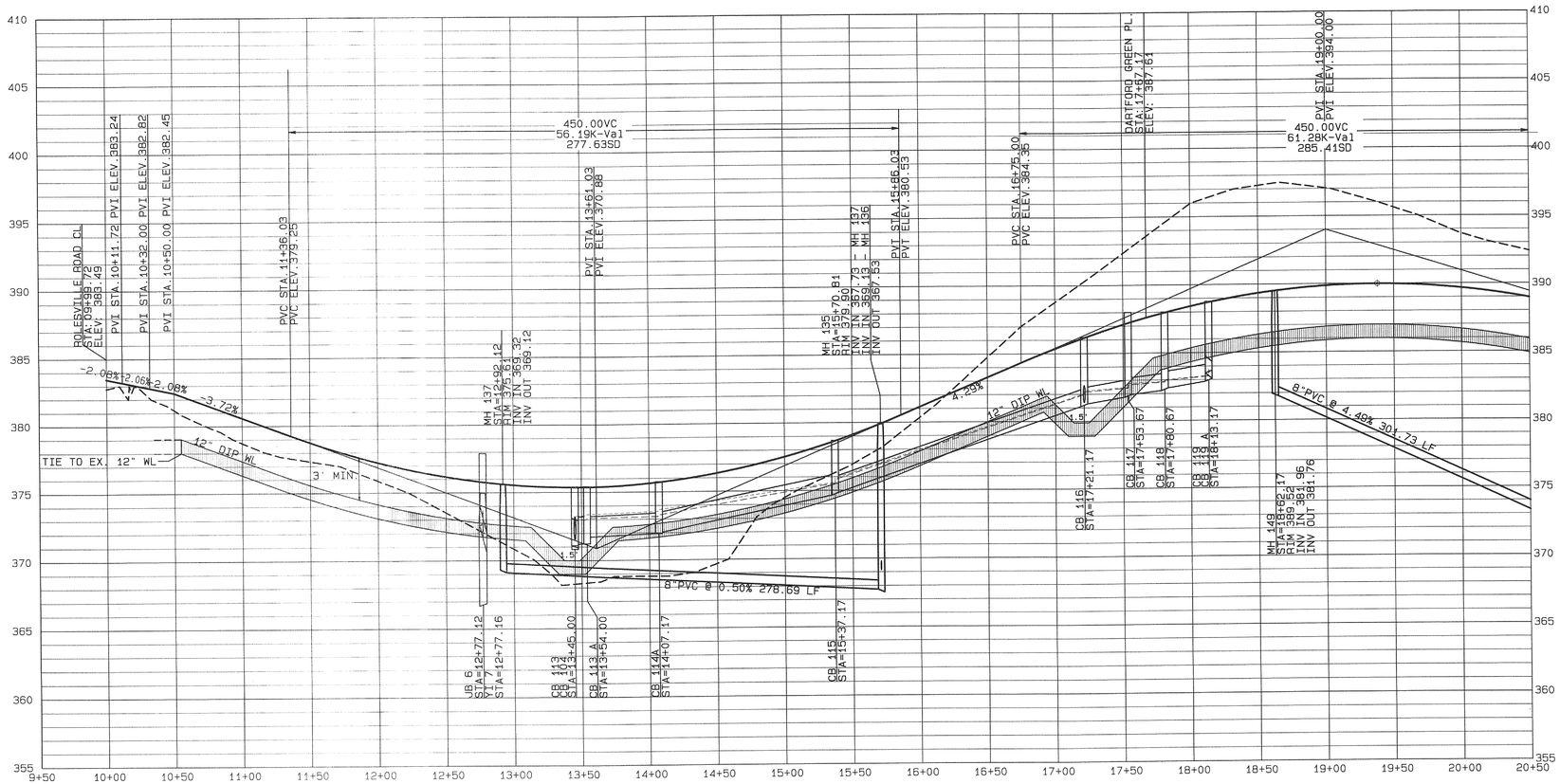
0 200 400 600

FALLS BLUFF DR.
41' B-B (60' ROW)
STA. 9+99.72-20+50



NOTE:
1. NORMAL CROWN OF 0.02 UNLESS OTHERWISE DIRECTED BY TOWN ENGINEER.
2. ASPHALT WILL BE INSTALLED AT A MIN. 1.5" LIFTS.

TYPICAL SECTION



No.	DATE	REVISION	DWN/CHK

FALLS BLUFF DRIVE PLAN AND PROFILE

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA

FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

AMERICAN Engineering

American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

PRELIMINARY

NORTH CAROLINA PROFESSIONAL SEAL 9870 ENGINEER JOHN R. HARMAN

5.11.20

NOT FOR CONSTRUCTION

SHEET NO.

7.0

FILE: I:\Kalas Falls\Kalas Falls Base Phase 1.pro

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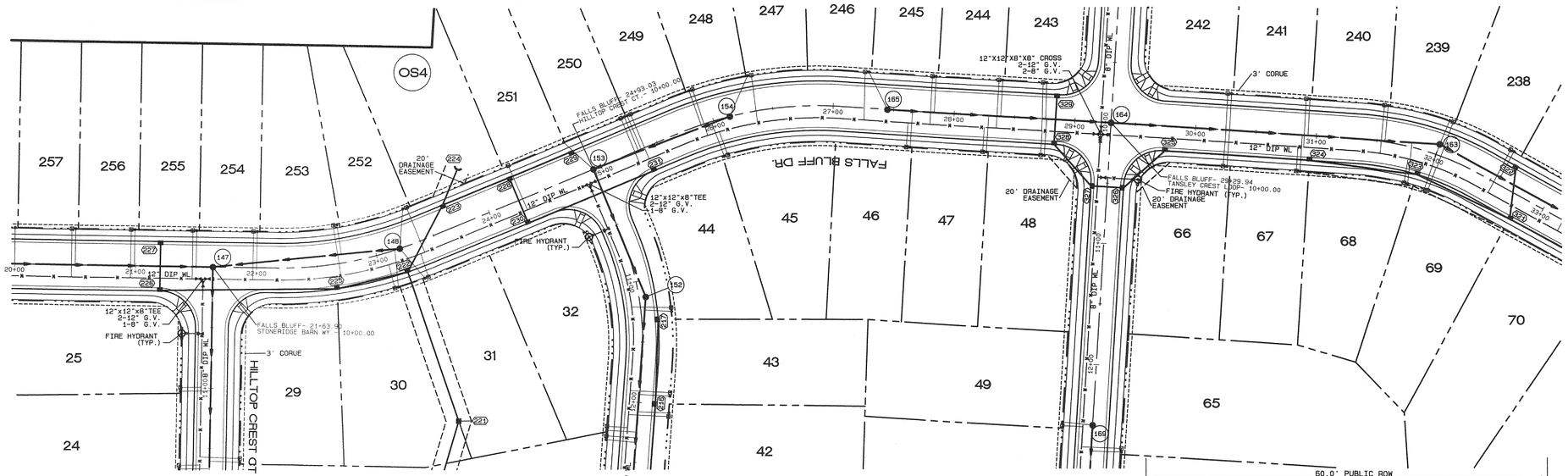
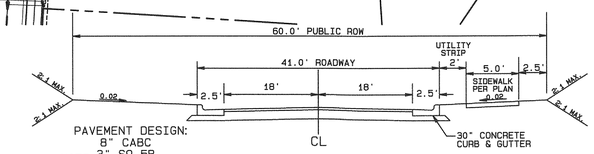


FALLS BLUFF DR.
41' B-B (60' ROW)
STA. 20+50-33+00

GRAPHIC SCALE 1"=200'

0 200 400 600



PAVEMENT DESIGN:
8" CABC
3" S9.5B

NOTE:
1. NORMAL CROWN OF 0.02 UNLESS OTHERWISE DIRECTED BY TOWN ENGINEER.
2. ASPHALT WILL BE INSTALLED AT A MIN. 1.5" LIFTS.

TYPICAL SECTION

Public Water Distribution / Extension System

The City of Raleigh consents to the connection and extension of the City's public water system as shown on this plan. The material and construction methods used for this project shall conform to the standards and specifications of the City's Public Utilities Handbook.

City of Raleigh
Public Utility Department #_____

Authorization to Construct:_____

Date:_____

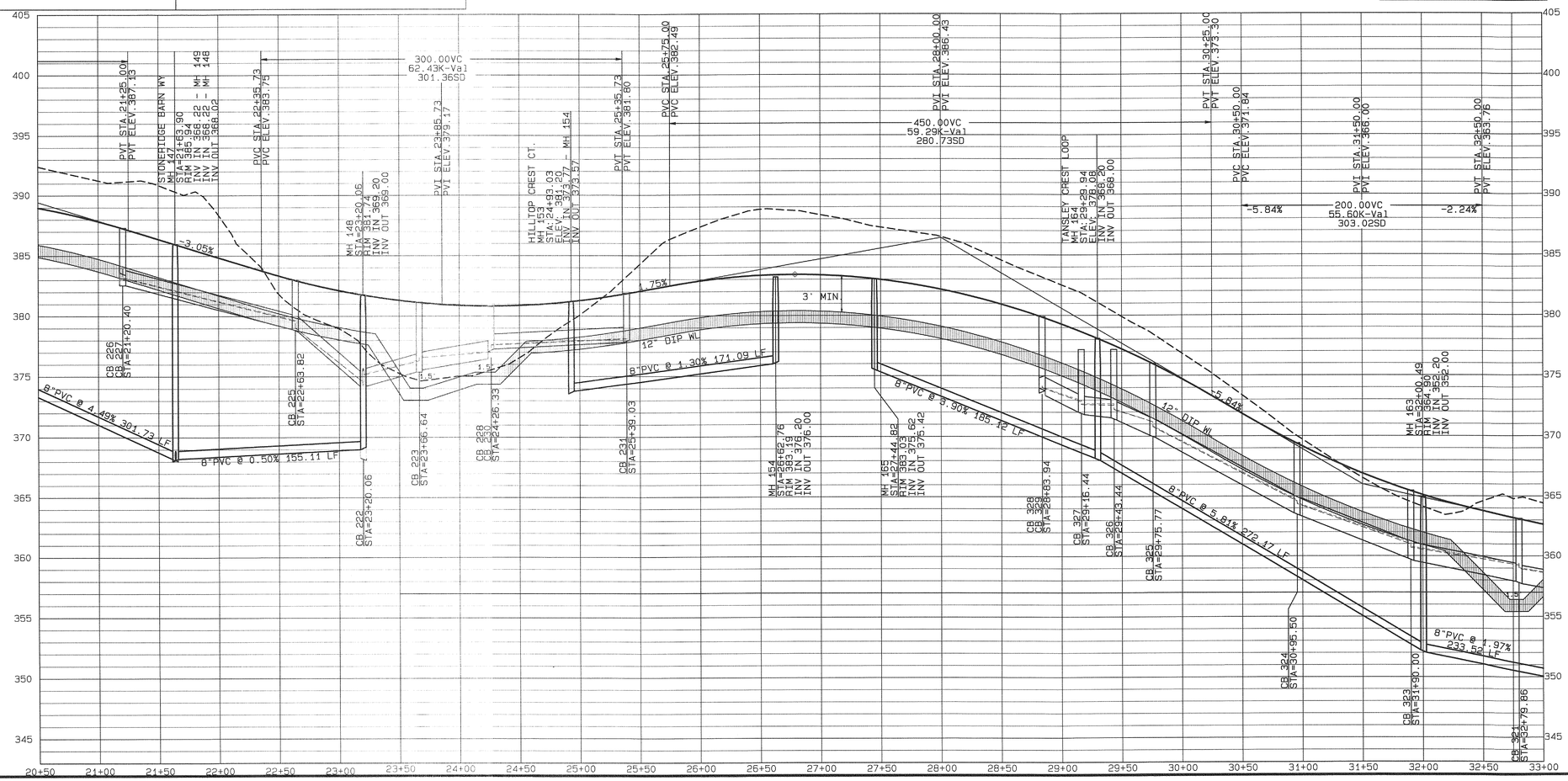
Public Sewer Collection / Extension System

The City of Raleigh consents to the connection and extension of the City's public sewer system as shown on this plan. The material and construction methods used for this project shall conform to the standards and specifications of the City's Public Utilities Handbook.

City of Raleigh
Public Utility Department #_____

Authorization to Construct:_____

Date:_____



No.	DATE	REVISION	DWN/CHK

FALLS BLUFF DRIVE PLAN AND PROFILE

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA

FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

PRELIMINARY

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 3810 JOHN R. HARMAN

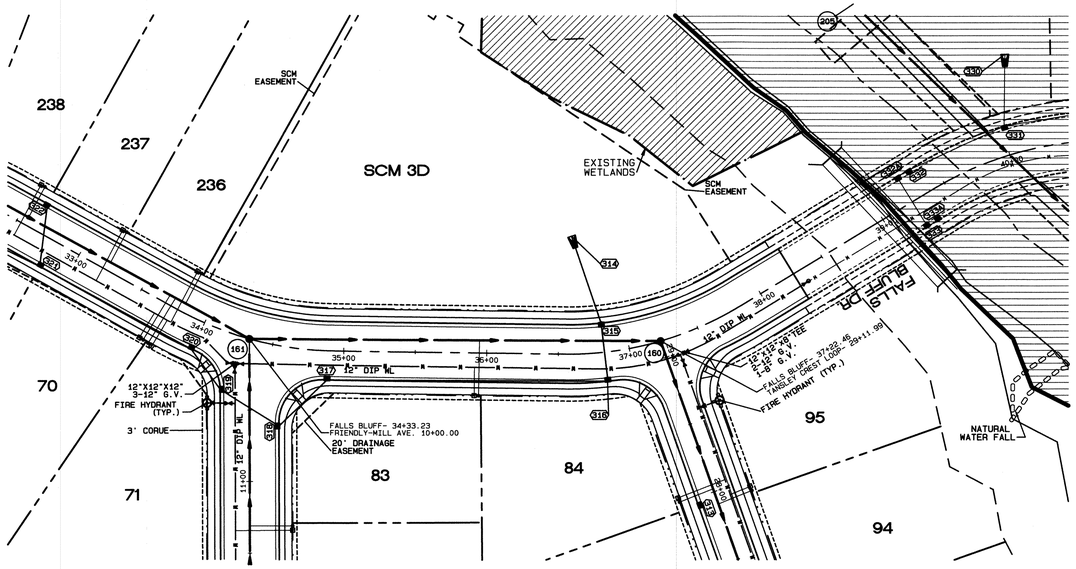
5.11.20

NOT FOR CONSTRUCTION

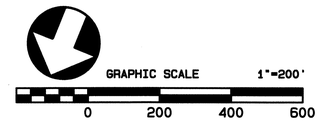
SHEET NO.

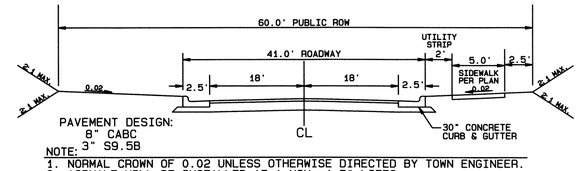
7.1

Plot Date: 5/11/2020 Time: 4:14AM FILE: I:\Kalas Falls\Kalas Falls Base Phase 1.pro



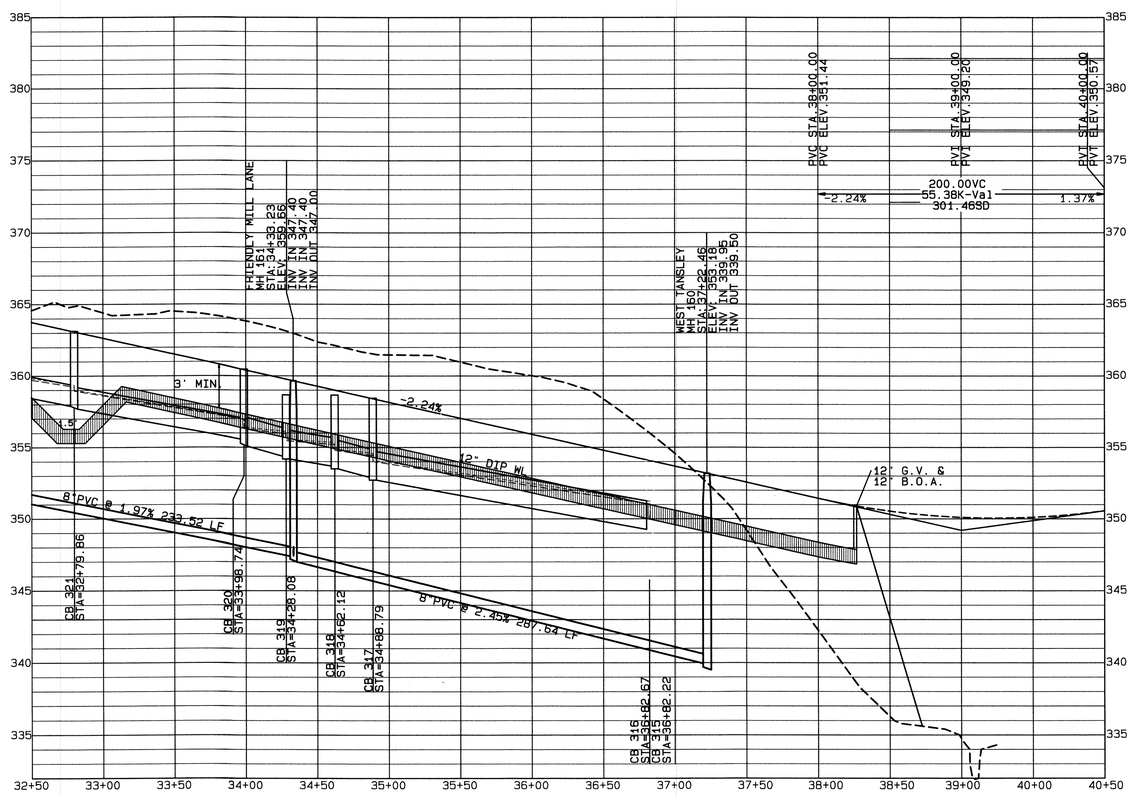
FALLS BLUFF DR.
41' B-B (60' ROW)
STA. 33+00-40+00





NOTE:
1. NORMAL CROWN OF 0.02 UNLESS OTHERWISE DIRECTED BY TOWN ENGINEER.
2. ASPHALT WILL BE INSTALLED AT A MIN. 1.5' LIFTS.

TYPICAL SECTION



Public Water Distribution / Extension System	Public Sewer Collection / Extension System
The City of Raleigh consents to the connection and extension of the City's public water system as shown on this plan. The materiel and construction methods used for this project shall conform to the standards and specifications of the City's Public Utilities Handbook.	The City of Raleigh consents to the connection and extension of the City's public sewer system as shown on this plan. The material and construction methods used for this project shall conform to the standards and specifications of the City's Public Utilities Handbook.
City of Raleigh Public Utility Department # _____	City of Raleigh Public Utility Department # _____
Authorization to Construct: _____	Authorization to Construct: _____
Date: _____	Date: _____

No.	DATE	REVISION	DWN/CHK

FALLS BLUFF DRIVE PLAN AND PROFILE

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA

FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

PRELIMINARY

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 9810 JOHN R. HERMAN

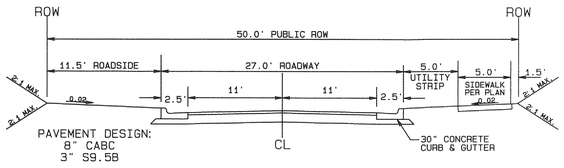
5.11.20

NOT FOR CONSTRUCTION

SHEET NO.

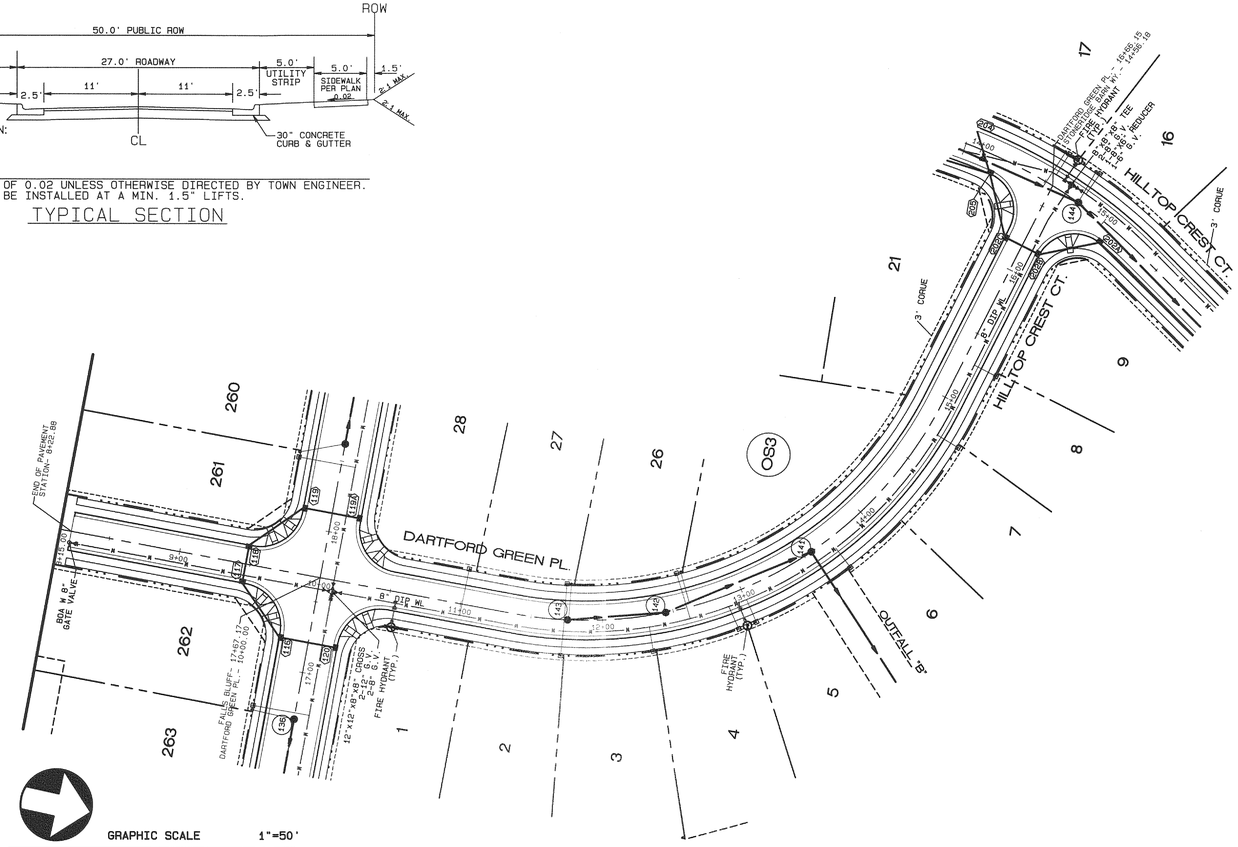
7.2

FILE: C:\Users\user\Desktop\Work Data\Watkins\Kalas Falls Base Phase 1.pro Time: 0:39PM Plot Date : 9/1/2020

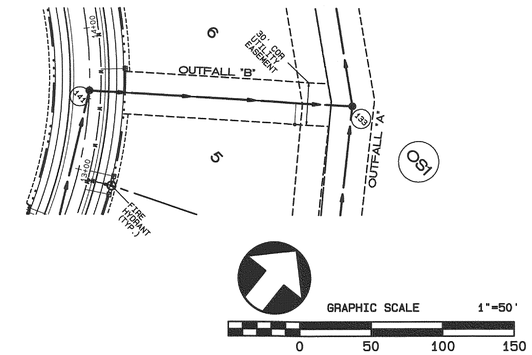


NOTE:
1. NORMAL CROWN OF 0.02 UNLESS OTHERWISE DIRECTED BY TOWN ENGINEER.
2. ASPHALT WILL BE INSTALLED AT A MIN. 1.5" LIFTS.

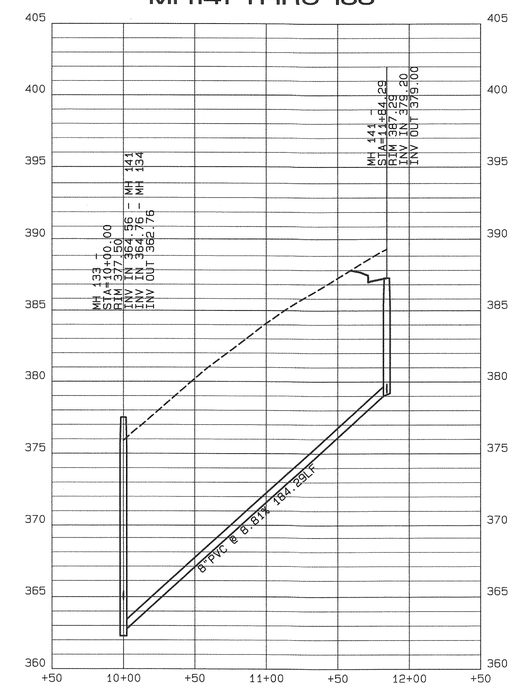
TYPICAL SECTION

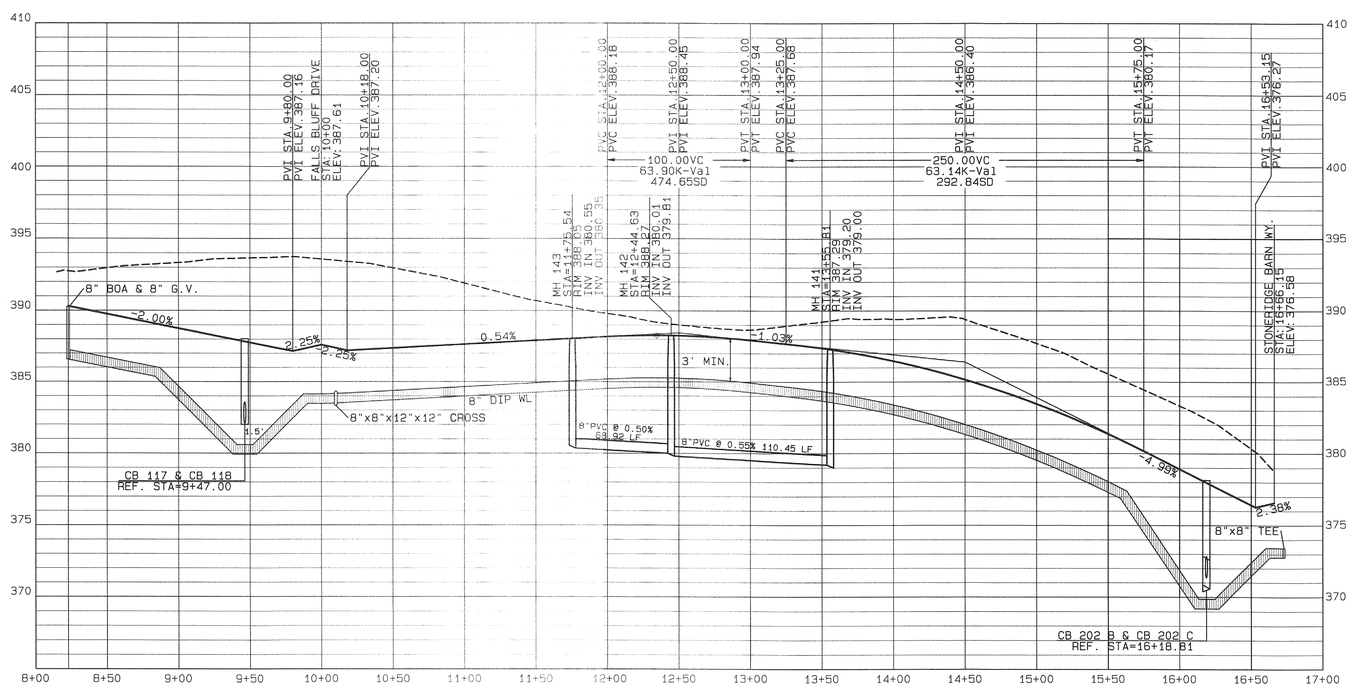


DARTFORD GREEN PL.
27' B-B (50' ROW)



OUTFALL "A"
MH141 THRU 133





Public
Sewer Collection / Extension System

The City of Raleigh consents to the connection and extension of the City's public sewer system as shown on this plan. The material and construction methods used for this project shall conform to the standards and specifications of the City's Public Utilities Handbook.

City of Raleigh
Public Utility Department # _____

Authorization to Construct: _____

Date: _____

Public
Water Distribution / Extension System

The City of Raleigh consents to the connection and extension of the City's public water system as shown on this plan. The material and construction methods used for this project shall conform to the standards and specifications of the City's Public Utilities Handbook.

City of Raleigh
Public Utility Department # _____

Authorization to Construct: _____

Date: _____

No.	DATE	REVISION	DWN/CHK

DARTFORD GREEN PLACE AND
OUTFALL A PLAN AND PROFILE
FOR
KALAS FALLS
SITUATED AT
1832 ROLESVILLE ROAD
WAKE COUNTY, NORTH CAROLINA
FIRM # C-3881

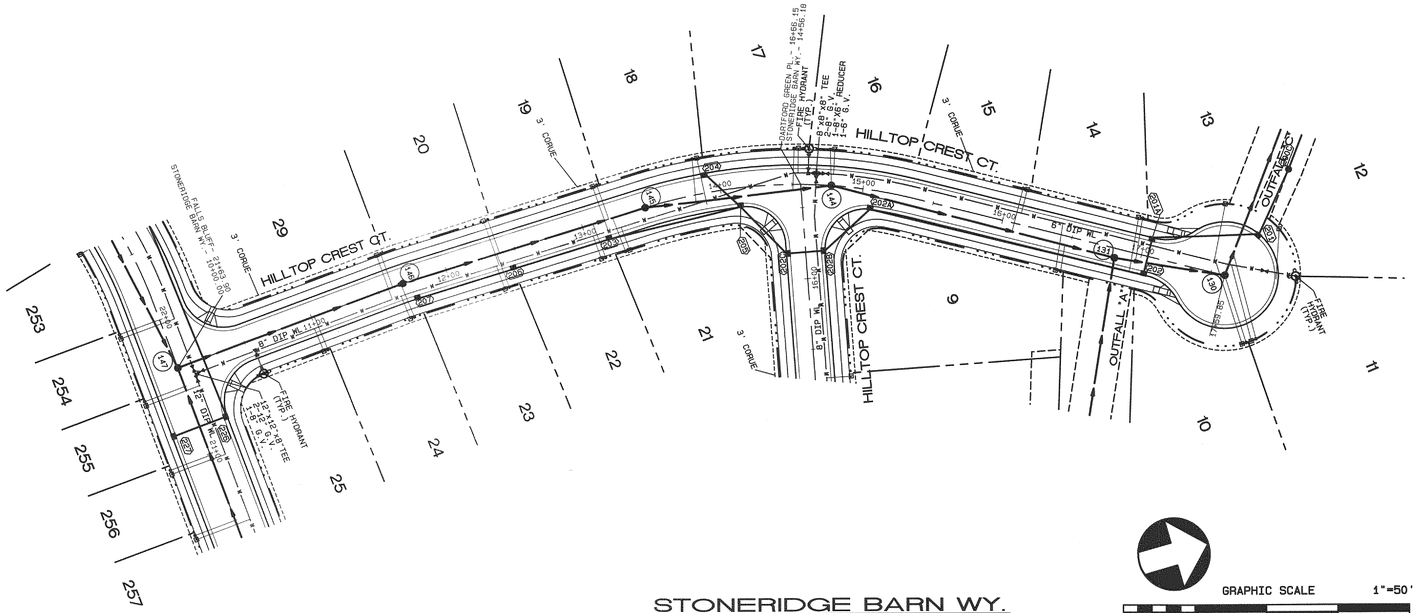
JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

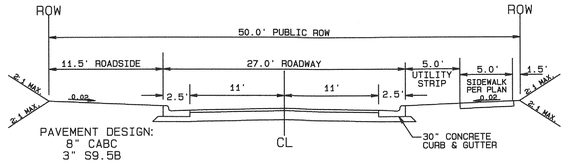
AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

PRELIMINARY
NORTH CAROLINA PROFESSIONAL SEAL 19810 ENGINEER JOHN R. HARMAN
5.11.20
NOT FOR CONSTRUCTION

SHEET NO.
8.0

FILE: I:\Kalas Falls\Kalas Falls Base Phase 1.pro
Time: 4:14AM
Plot Date: 5/11/2020



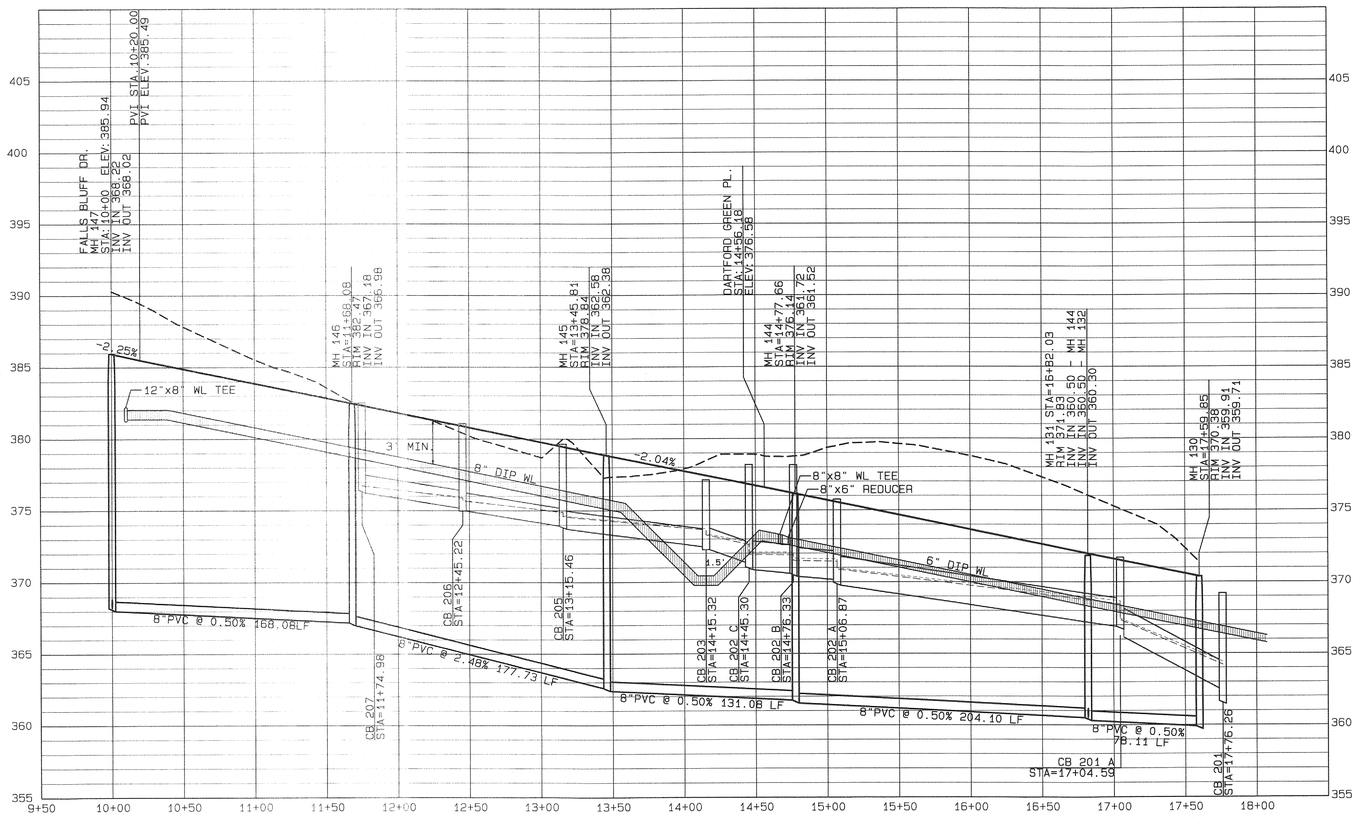


NOTE:
1. NORMAL CROWN OF 0.02 UNLESS OTHERWISE DIRECTED BY TOWN ENGINEER.
2. ASPHALT WILL BE INSTALLED AT A MIN. 1.5" LIFTS.

TYPICAL SECTION

STONERIDGE BARN WY.
27' B-B (50' ROW)

GRAPHIC SCALE 1"=50'
0 50 100 150



Public
Sewer Collection / Extension System

The City of Raleigh consents to the connection and extension of the City's public sewer system as shown on this plan. The material and construction methods used for this project shall conform to the standards and specifications of the City's Public Utilities Handbook.

City of Raleigh
Public Utility Department #_____

Authorization to Construct:_____

Date:_____

Public
Water Distribution / Extension System

The City of Raleigh consents to the connection and extension of the City's public water system as shown on this plan. The material and construction methods used for this project shall conform to the standards and specifications of the City's Public Utilities Handbook.

City of Raleigh
Public Utility Department #_____

Authorization to Construct:_____

Date:_____

No.	DATE	REVISION	DWN/CHK

STONERIDGE BARN WY. PLAN AND PROFILE

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA

FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

PRELIMINARY

NORTH CAROLINA PROFESSIONAL SEAL 19810 ENGINEER JOHN R. HARMAN

5-11-20

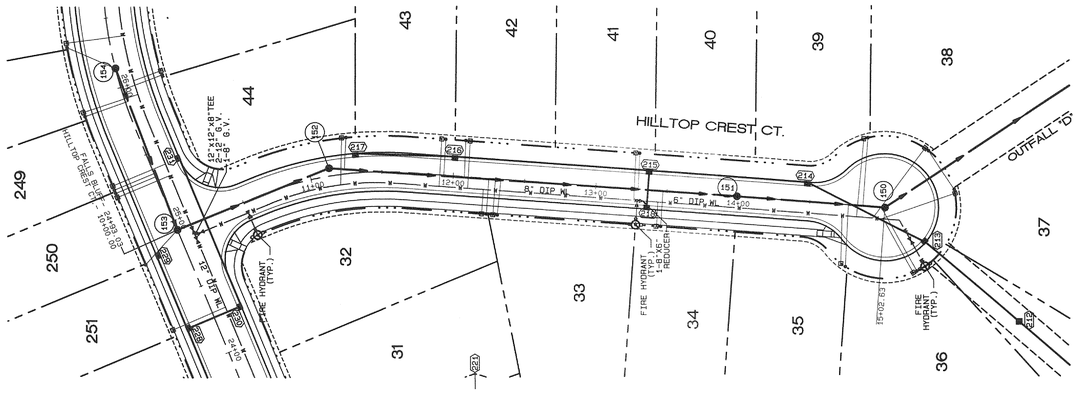
NOT FOR CONSTRUCTION

SHEET NO.

9.0

FILE: I:\Kalas Falls\Kalas Falls Base Phase 1.pro

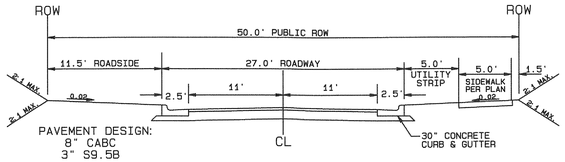
Plot Date : 5/11/2020 Time: 4:14AM



HILL TOP CREST COURT
27' B-B (50' ROW)

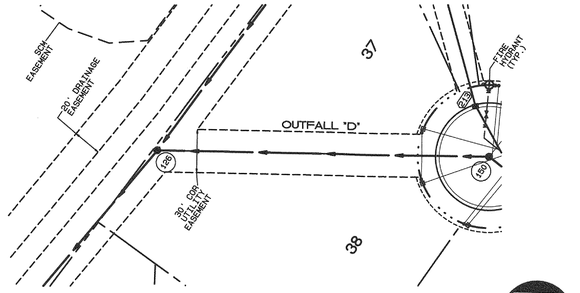
GRAPHIC SCALE 1"=50'

0 50 100 150

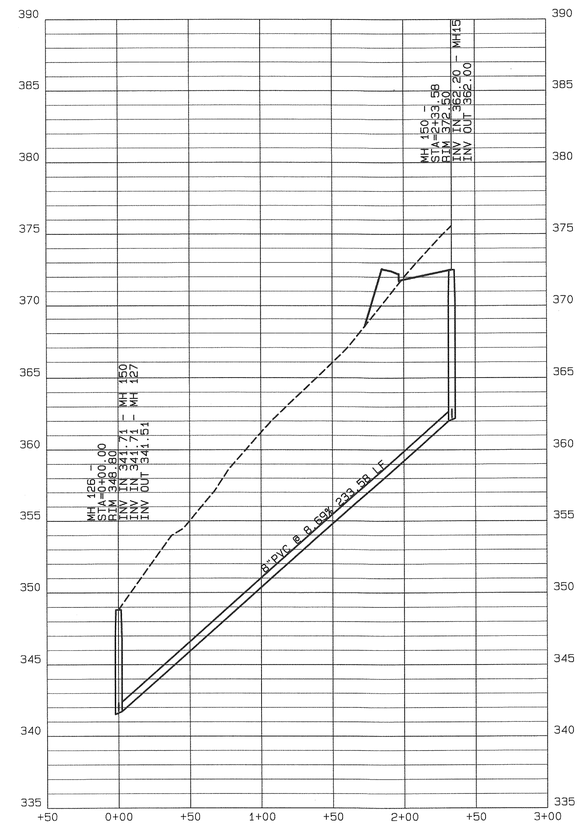


NOTE:
1. NORMAL CROWN OF 0.02 UNLESS OTHERWISE DIRECTED BY TOWN ENGINEER.
2. ASPHALT WILL BE INSTALLED AT A MIN. 1.5" LIFTS.

TYPICAL SECTION



OUTFALL "D"
MH150 THRU 126



Public
Sewer Collection / Extension System

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City of Raleigh
Public Utility Department #_____

Authorization to Construct:_____

Date:_____

Public
Water Distribution / Extension System

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City of Raleigh
Public Utility Department #_____

Authorization to Construct:_____

Date:_____

No.	DATE	REVISION	DWN/CHK

HILL TOP CREST COURT AND OUTFALL D PLAN AND PROFILE

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA

FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

PRELIMINARY

NORTH CAROLINA PROFESSIONAL SEAL 8610 ENGINEER JOHN R. HARMAN

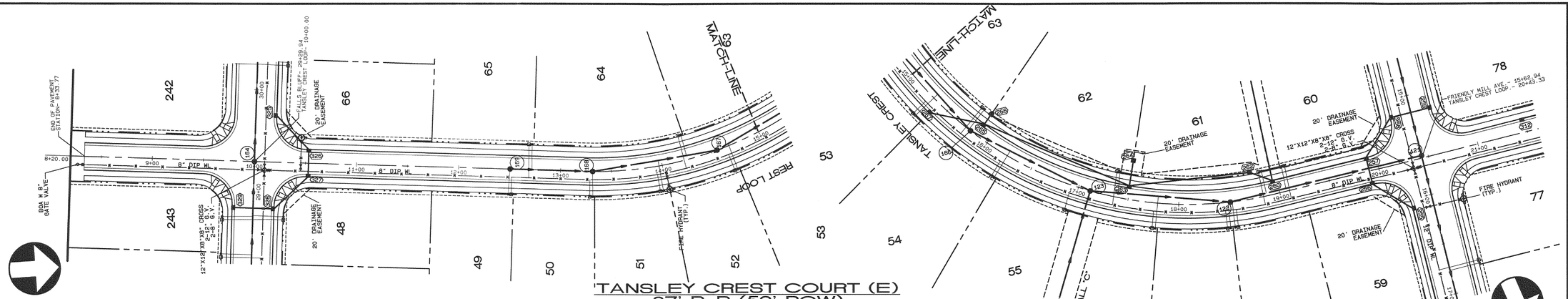
5.11.20

NOT FOR CONSTRUCTION

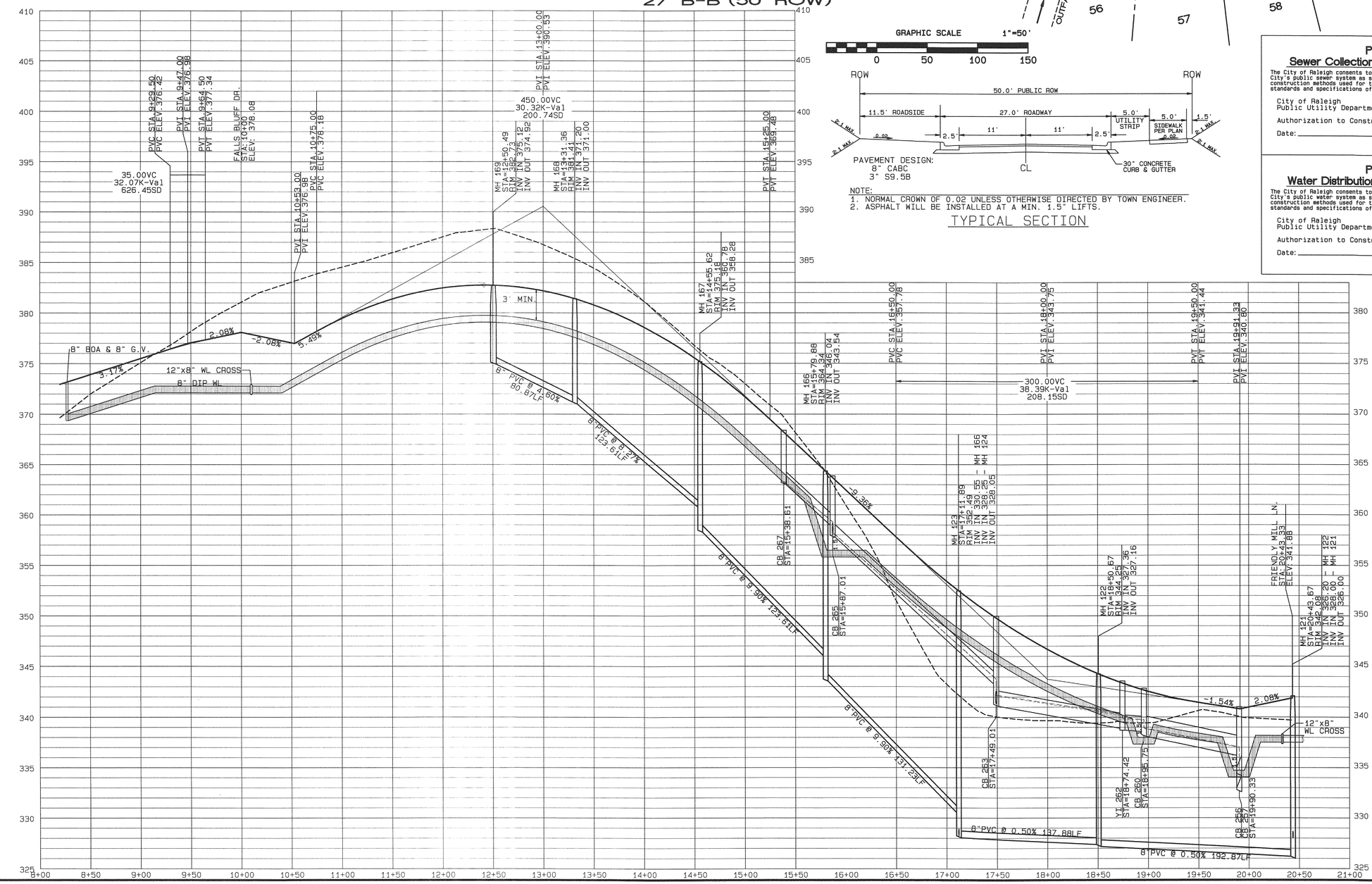
SHEET NO.

10.0

Plot Date: 5/11/2020 Time: 4:14AM FILE: I:\Kalas Falls\Kalas Falls Base Phase 1.pro



TANSLEY CREST COURT (E)
27' B-B (50' ROW)



GRAPHIC SCALE 1"=50'

0 50 100 150

NOTE:
1. NORMAL CROWN OF 0.02 UNLESS OTHERWISE DIRECTED BY TOWN ENGINEER.
2. ASPHALT WILL BE INSTALLED AT A MIN. 1.5" LIFTS.

TYPICAL SECTION

Public
Sewer Collection / Extension System

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City of Raleigh
Public Utility Department #_____

Authorization to Construct:_____

Date:_____

Public
Water Distribution / Extension System

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City of Raleigh
Public Utility Department #_____

Authorization to Construct:_____

Date:_____

No.	DATE	REVISION	DWN/CHK

TANSLEY CREST LOOP (E)
PLAN AND PROFILE
FOR
KALAS FALLS
SITUATED AT
1832 ROLESVILLE ROAD
WAKE COUNTY, NORTH CAROLINA
FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

AMERICAN Engineering
American Engineering Associates–Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

PRELIMINARY

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 9810 JOHN R. HARMAN

5.11.20

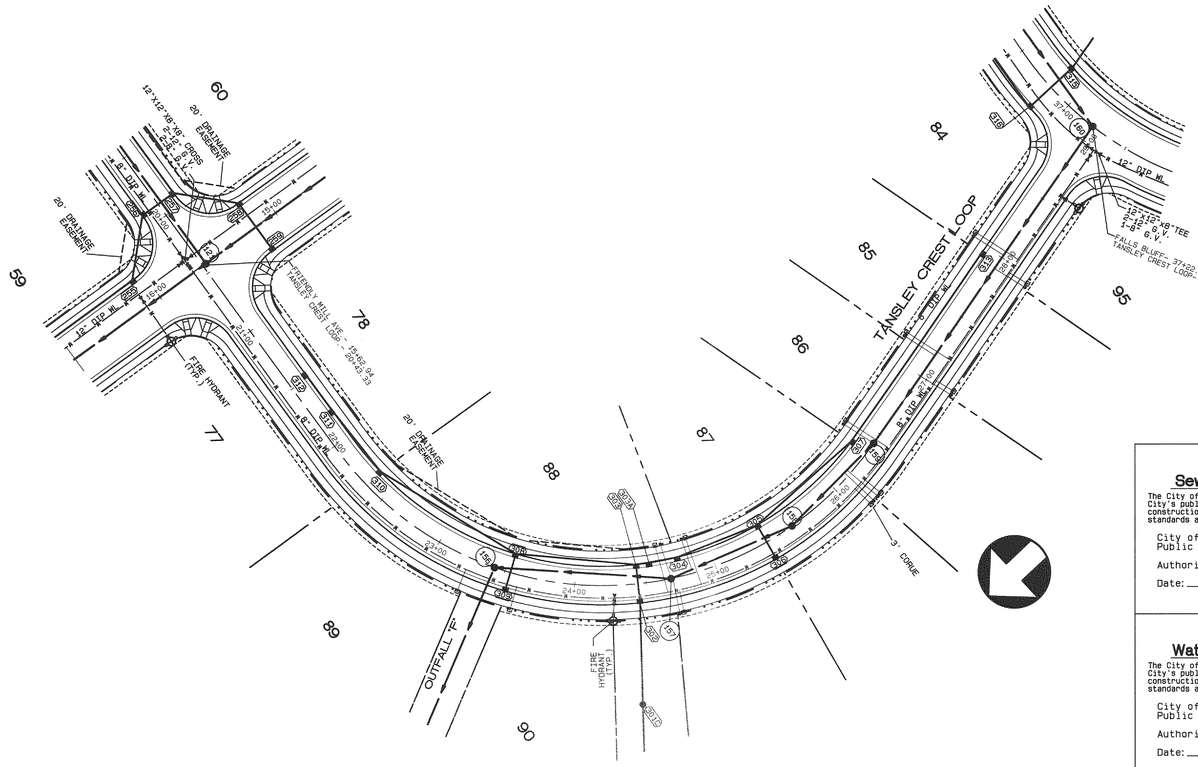
NOT FOR CONSTRUCTION

SHEET NO.

11.0

FILE: Y:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro

Plot Date : 5/11/2020 Time: 5:33AM



Public
Sewer Collection / Extension System

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City of Raleigh
Public Utility Department # _____

Authorization to Construct: _____

Date: _____

Public
Water Distribution / Extension System

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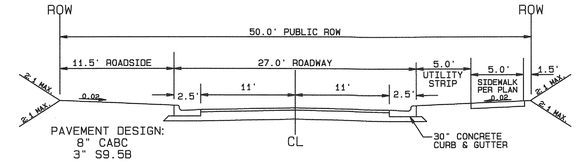
City of Raleigh
Public Utility Department # _____

Authorization to Construct: _____

Date: _____

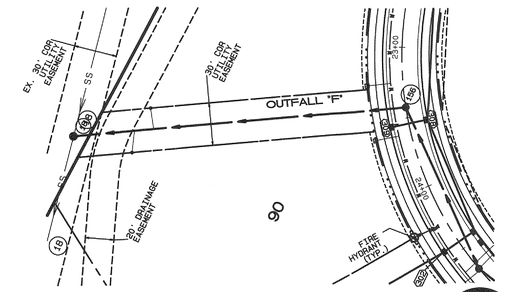
GRAPHIC SCALE 1"=50'

0 50 100 150

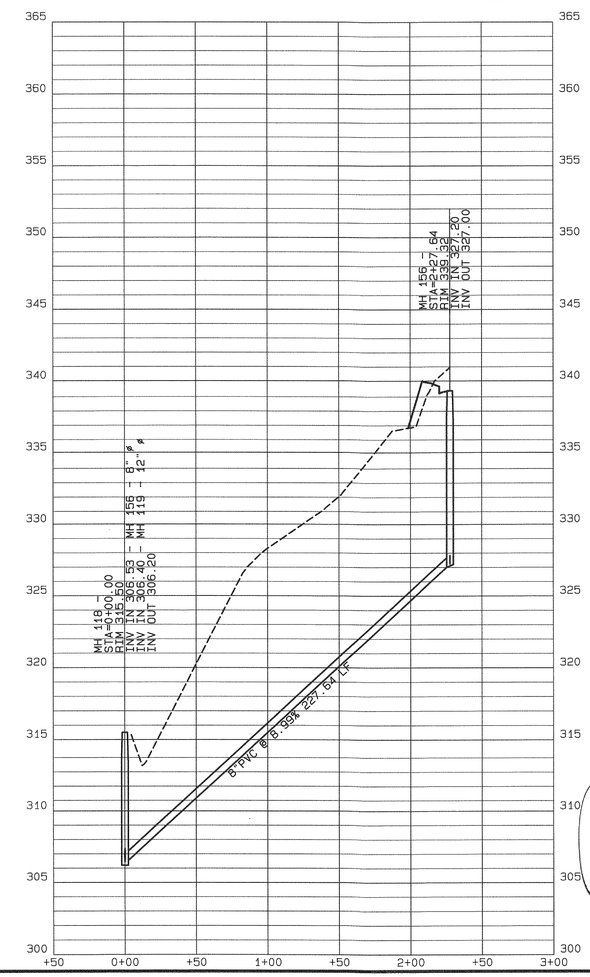


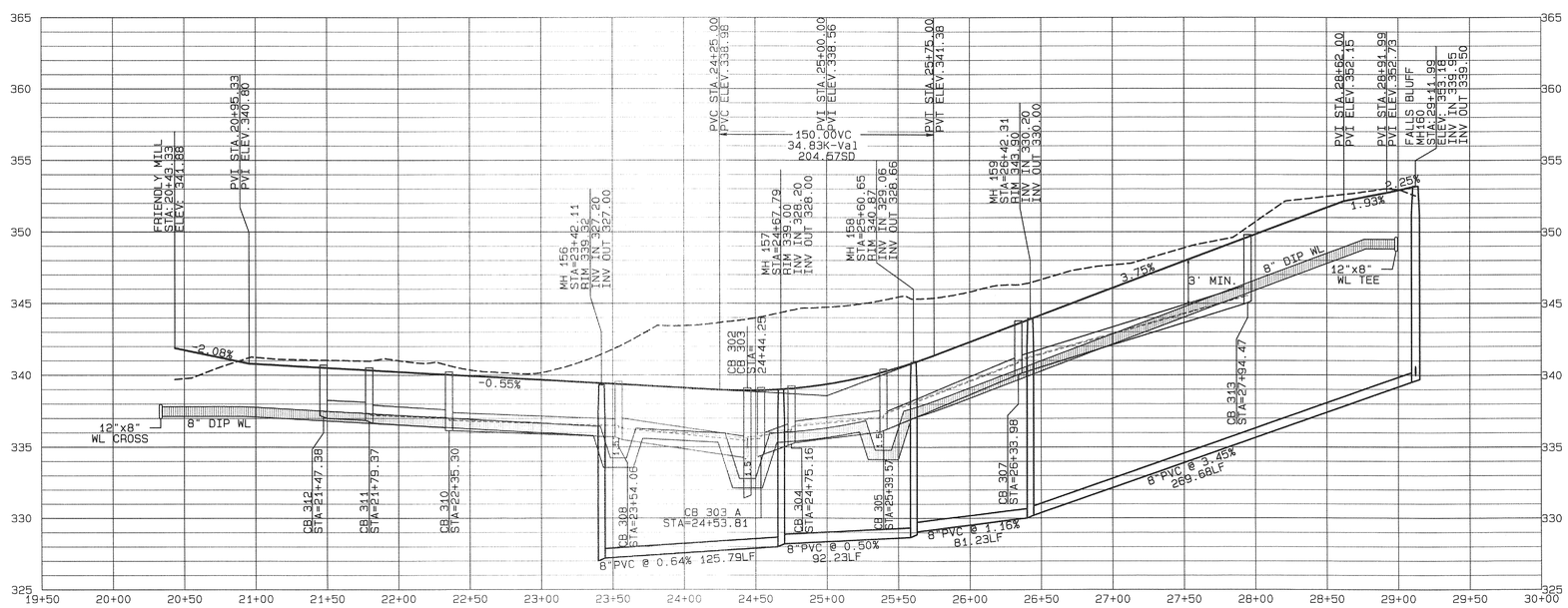
NOTE:
1. NORMAL CROWN OF 0.02 UNLESS OTHERWISE DIRECTED BY TOWN ENGINEER.
2. ASPHALT WILL BE INSTALLED AT A MIN. 1.5" LIFTS.

TYPICAL SECTION



OUTFALL "F"
MH156 THRU 18





TANSLEY CREST COURT (W)
27' B-B (50' ROW)

No.	DATE	REVISION	DWN/CHK

TANSLEY CREST LOOP (W) AND OUTFALL F PLAN AND PROFILE

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA

FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

PRELIMINARY

NORTH CAROLINA PROFESSIONAL SEAL 045361 ENGINEER JOHN R. HARMAN

5.11.20

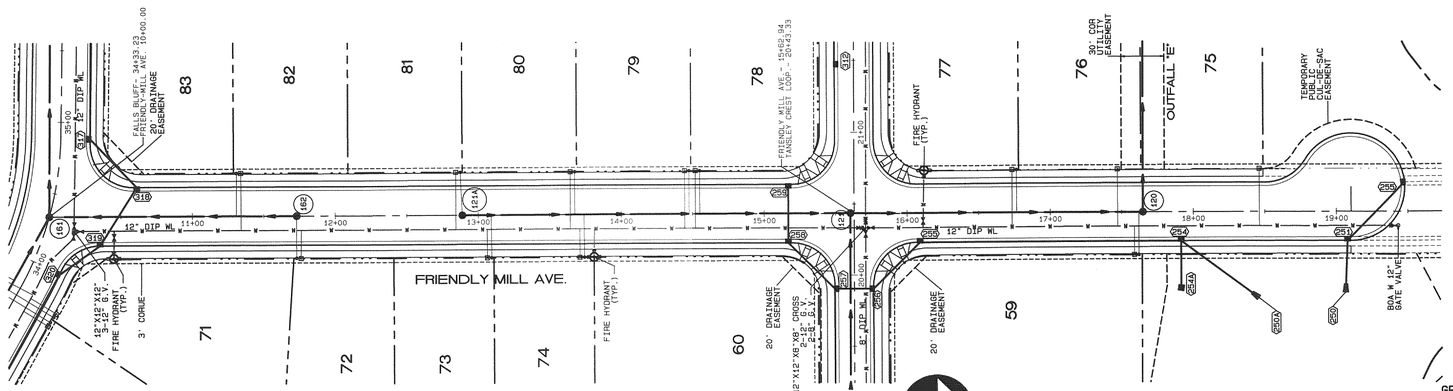
NOT FOR CONSTRUCTION

SHEET NO.

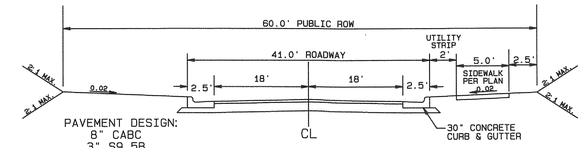
12.0

FILE: I:\Kalas Falls\Kalas Falls Base Phase 1.pro

Plot Date: 5/11/2020 Time: 9:45AM



FRIENDLY MILL
41' B-B (60' ROW)

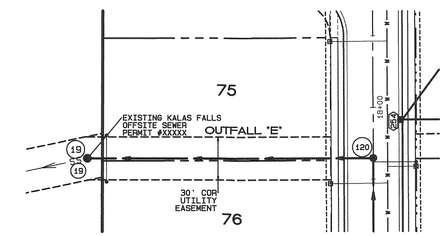


NOTE:
1. NORMAL CROWN OF 0.02 UNLESS OTHERWISE DIRECTED BY TOWN ENGINEER.
2. ASPHALT WILL BE INSTALLED AT A MIN. 1.5" LIFTS.

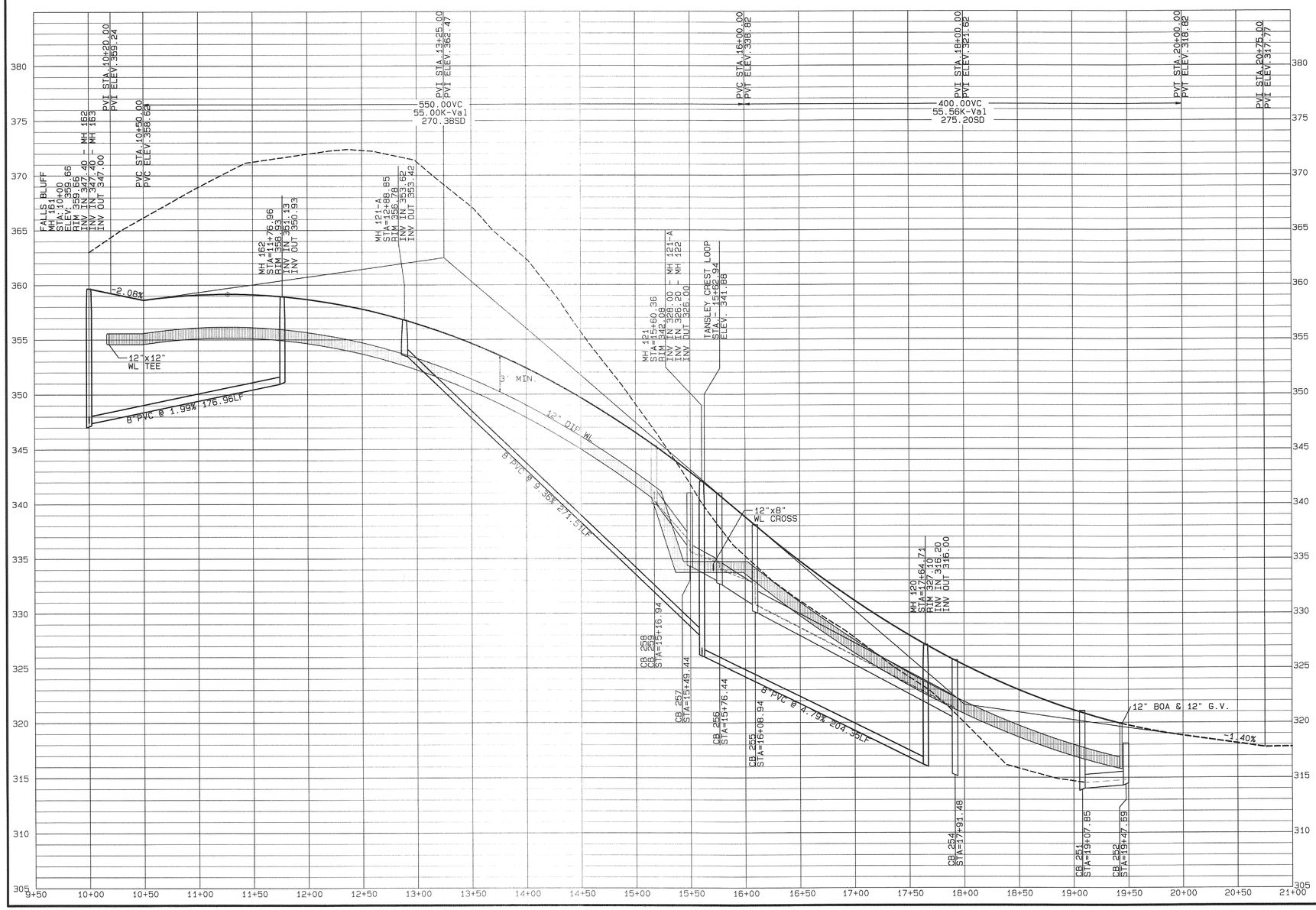
TYPICAL SECTION

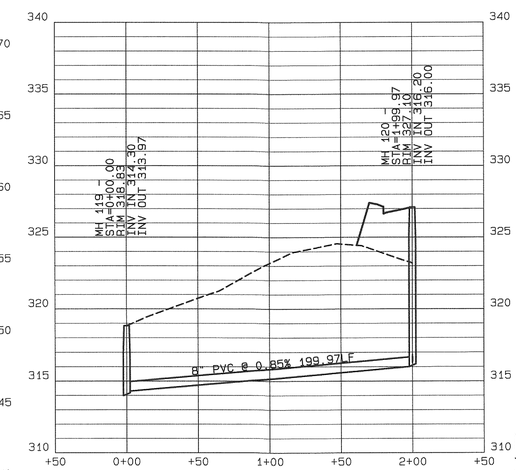
GRAPHIC SCALE 1"=50'

0 50 100 150



OUTFALL "E"
MH120 THRU 19





Public
Sewer Collection / Extension System

The City of Raleigh consents to the connection and extension of the City's public sewer system as shown on this plan. The material and construction methods used for this project shall conform to the standards and specifications of the City's Public Utilities Handbook.

City of Raleigh
Public Utility Department #_____

Authorization to Construct:_____

Date:_____

Public
Water Distribution / Extension System

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City of Raleigh
Public Utility Department #_____

Authorization to Construct:_____

Date:_____

No.	DATE	REVISION	DWN/CHK

FRIENDLY MILL LN. AND OUTFALL E PLAN AND PROFILE

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA

FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

AMERICAN Engineering

American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

PRELIMINARY

NORTH CAROLINA PROFESSIONAL SEAL 018 ENGINEER JOHN R. HARMAN

5.11.20

NOT FOR CONSTRUCTION

SHEET NO.

13.0

FILE: I:\Kalas Falls\Kalas Falls Base Phase 1.pro

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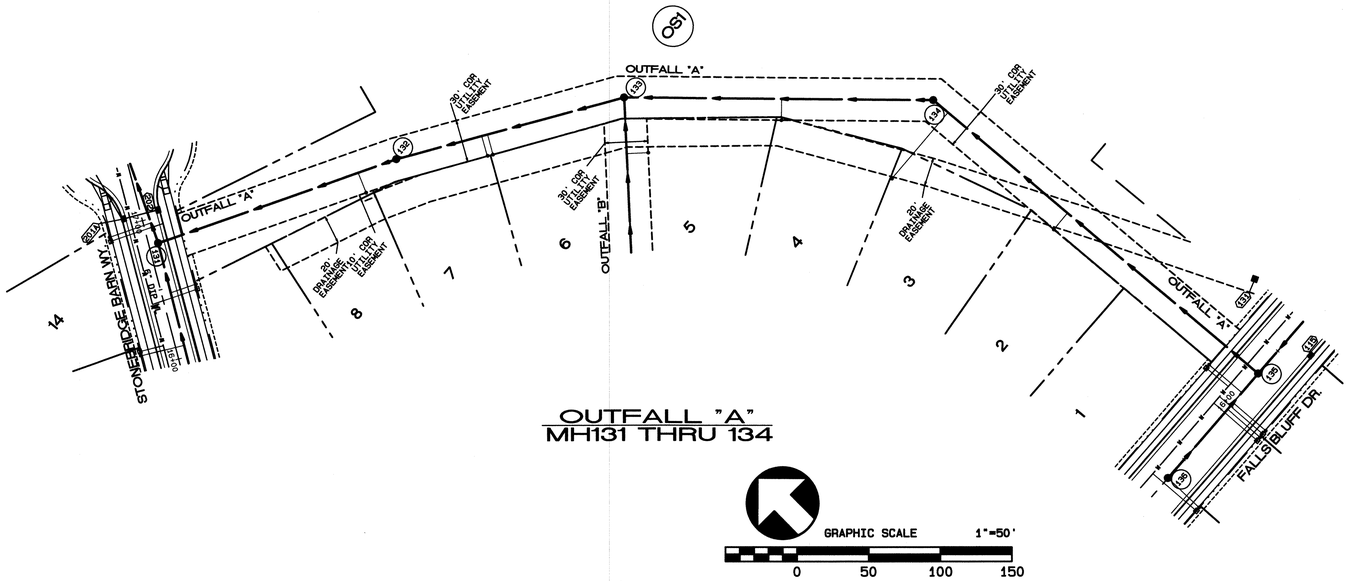
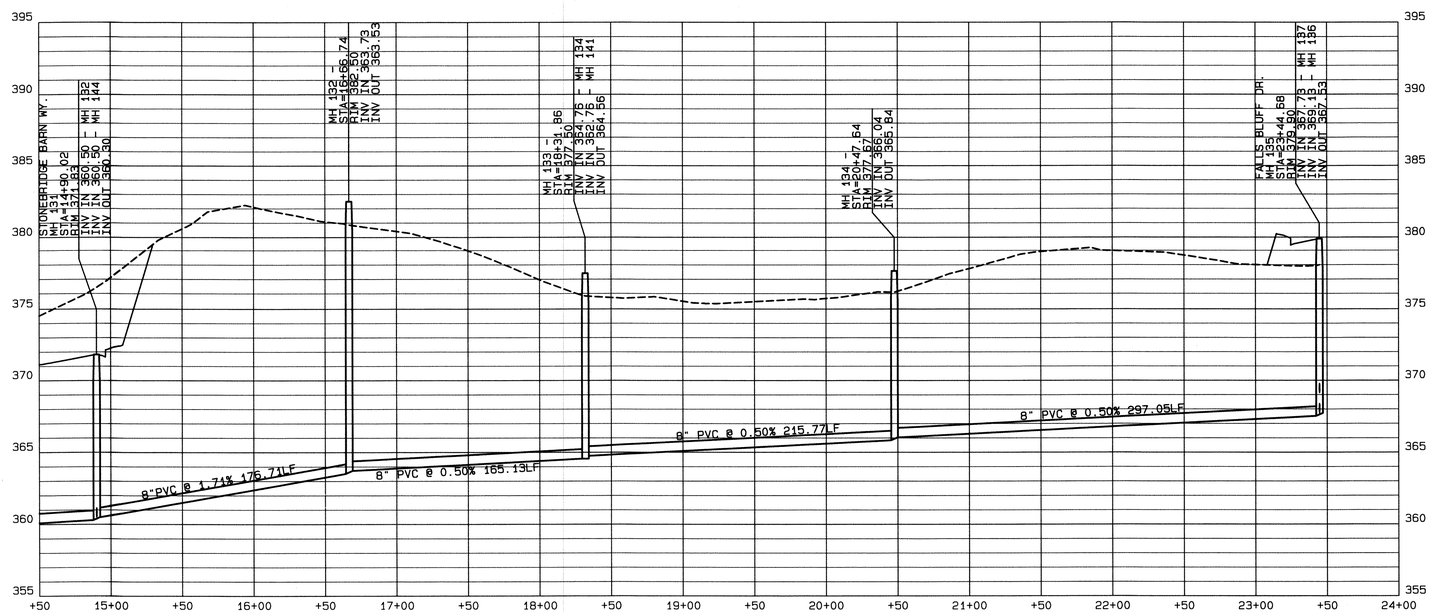


OUTFALL "A"
MH131 THRU 134



Public
Sewer Collection / Extension System

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City of Raleigh
Public Utility Department #_____
Authorization to Construct:_____
Date:_____

Public
Water Distribution / Extension System

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City of Raleigh
Public Utility Department #_____
Authorization to Construct:_____
Date:_____

No.	DATE	REVISION	DWN/CHK

SANITARY SEWER OUTFALL A PLAN AND PROFILE

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA
FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

PRELIMINARY

NORTH CAROLINA PROFESSIONAL ENGINEER 5310 JOHN R. HARMAN

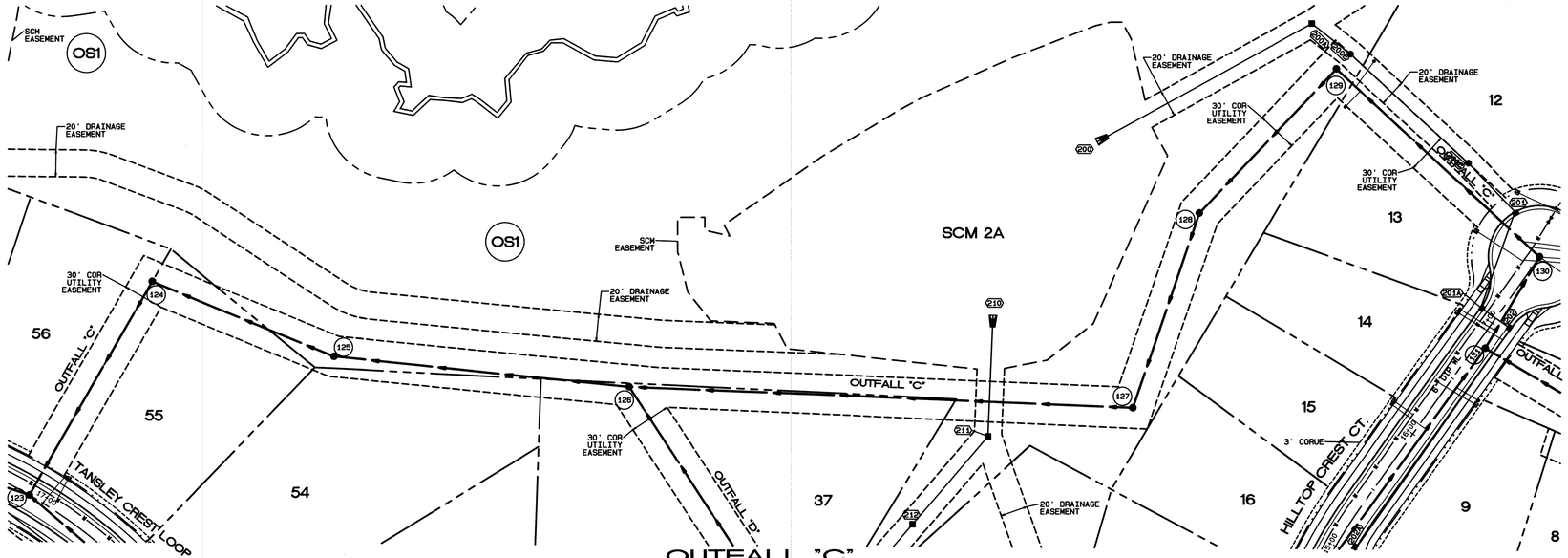
5.11.20

NOT FOR CONSTRUCTION

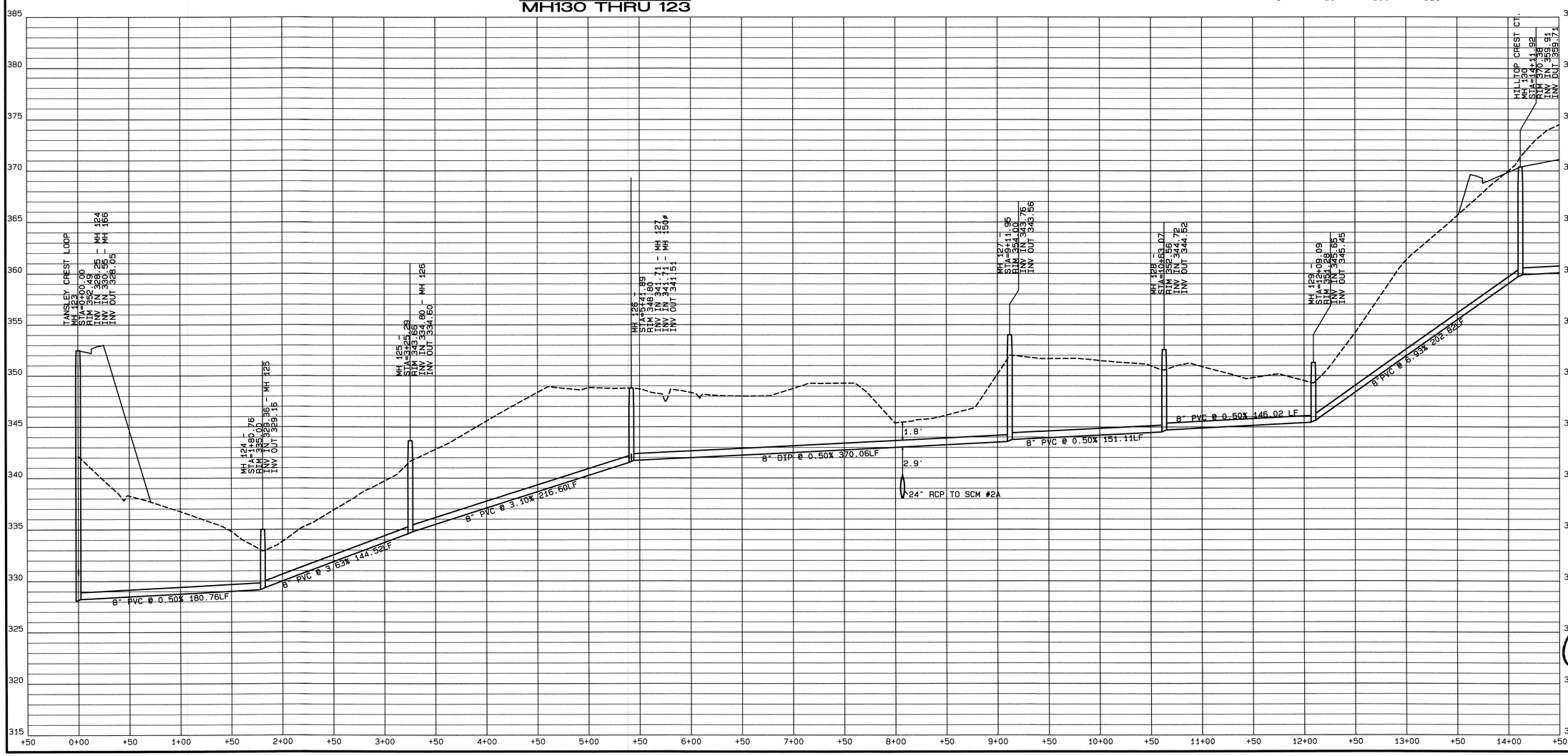
SHEET NO.

14.0

Plot Date: 5/11/2020 Time: 0:48PM FILE: C:\Users\user\Desktop\Work Data\Watkins\Kalas Falls Base Phase 1.pro



OUTFALL "C"
MH130 THRU 123



Public
Sewer Collection / Extension System

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City of Raleigh
Public Utility Department #_____

Authorization to Construct:_____

Date:_____

Public
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City of Raleigh
Public Utility Department #_____

Authorization to Construct:_____

Date:_____

GRAPHIC SCALE 1"=50'
0 50 100 150

No.	DATE	REVISION	DWN/CHK

SANITARY SEWER OUTFALL C PLAN AND PROFILE
FOR
KALAS FALLS
SITUATED AT
1832 ROLESVILLE ROAD
WAKE COUNTY, NORTH CAROLINA
FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

PRELIMINARY
NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMAN
5.11.20
NOT FOR CONSTRUCTION

SHEET NO.
15.0

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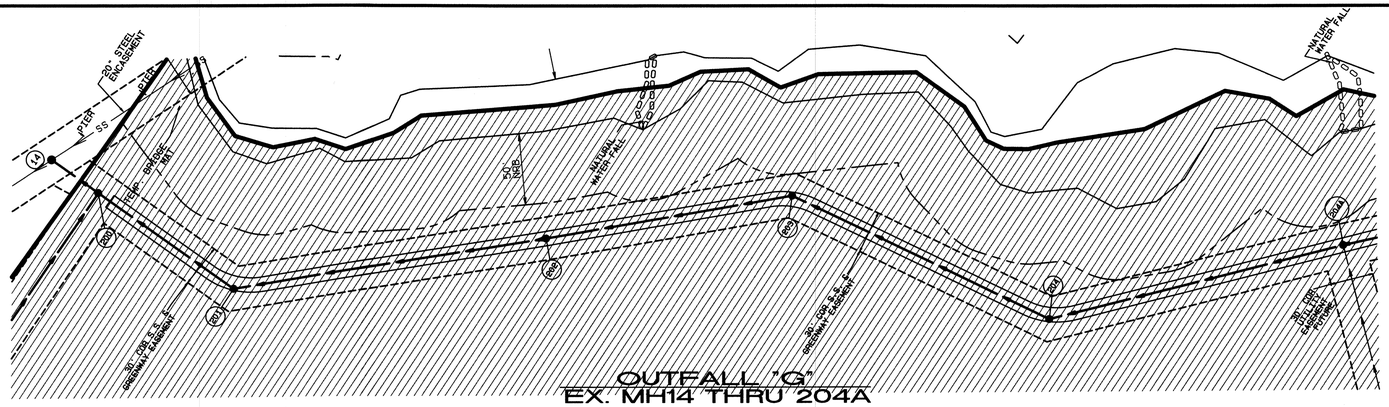
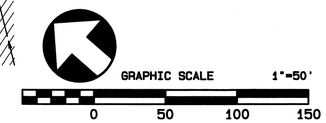
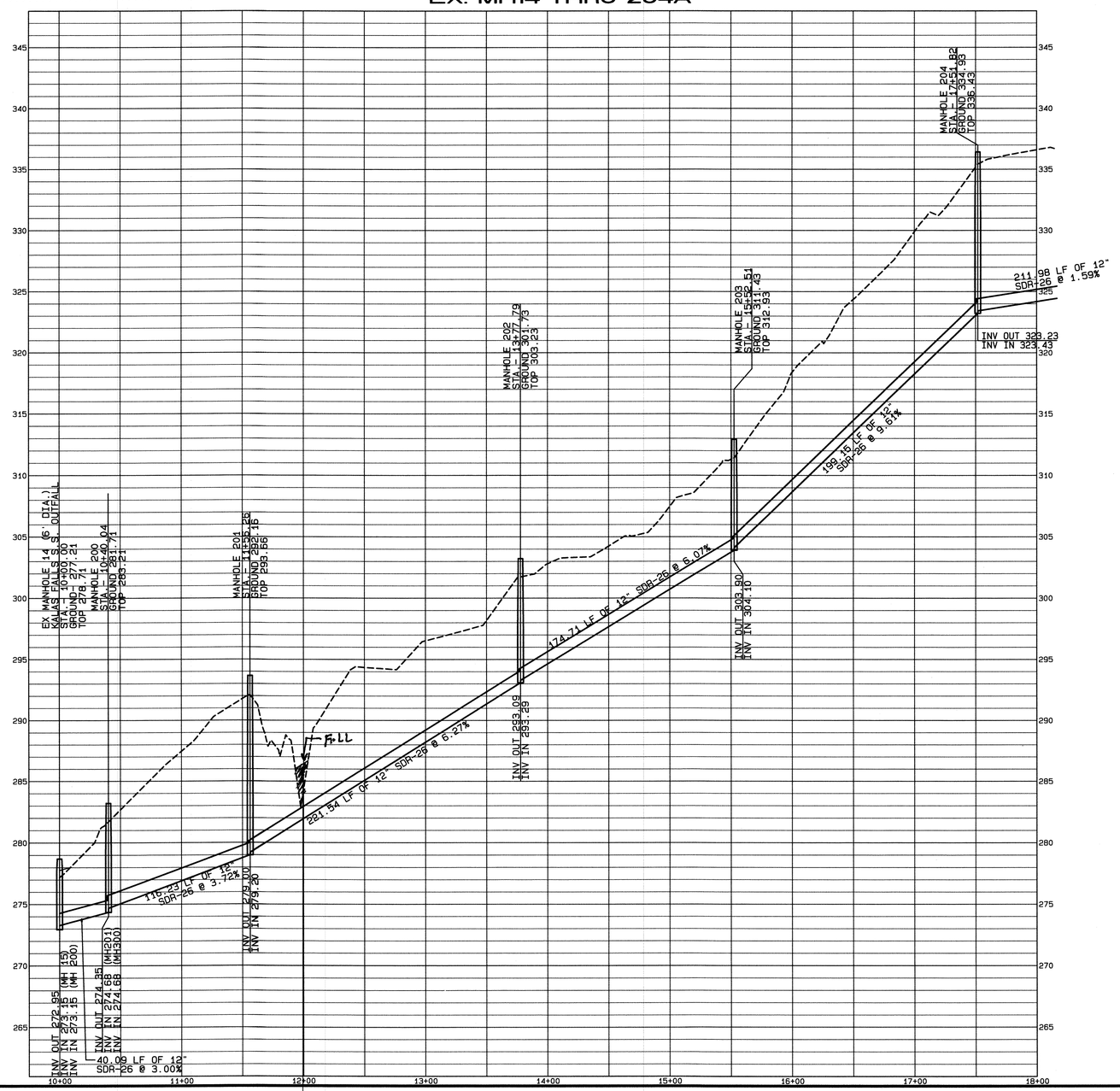


OUTFALL "G"
EX. MH14 THRU 204A





Public
Sewer Collection / Extension System

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City of Raleigh
Public Utility Department #_____

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Date:_____

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City of Raleigh
Public Utility Department #_____

Authorization to Construct:_____

Date:_____

No.	DATE	REVISION	DWN/CHK

SANITARY SEWER OUTFALL G
PLAN AND PROFILE

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA
FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

PRELIMINARY

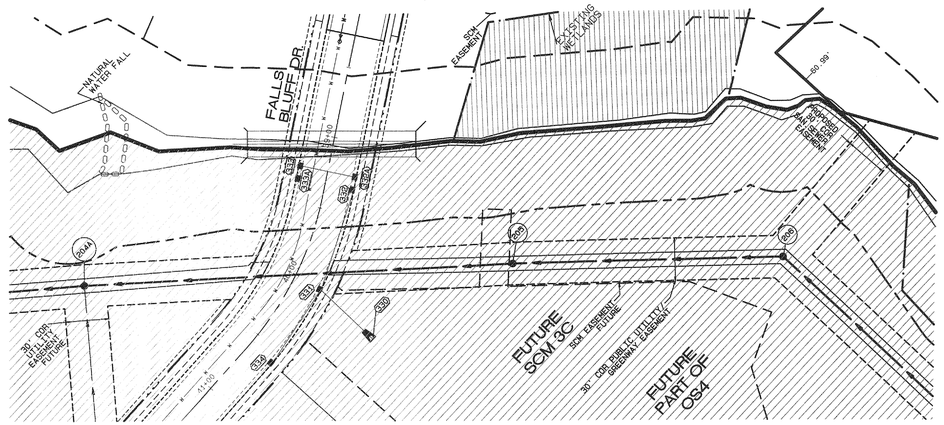
5.11.20

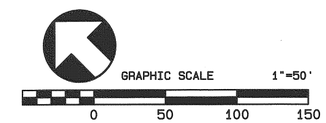
NOT FOR CONSTRUCTION

SHEET NO.

16.0

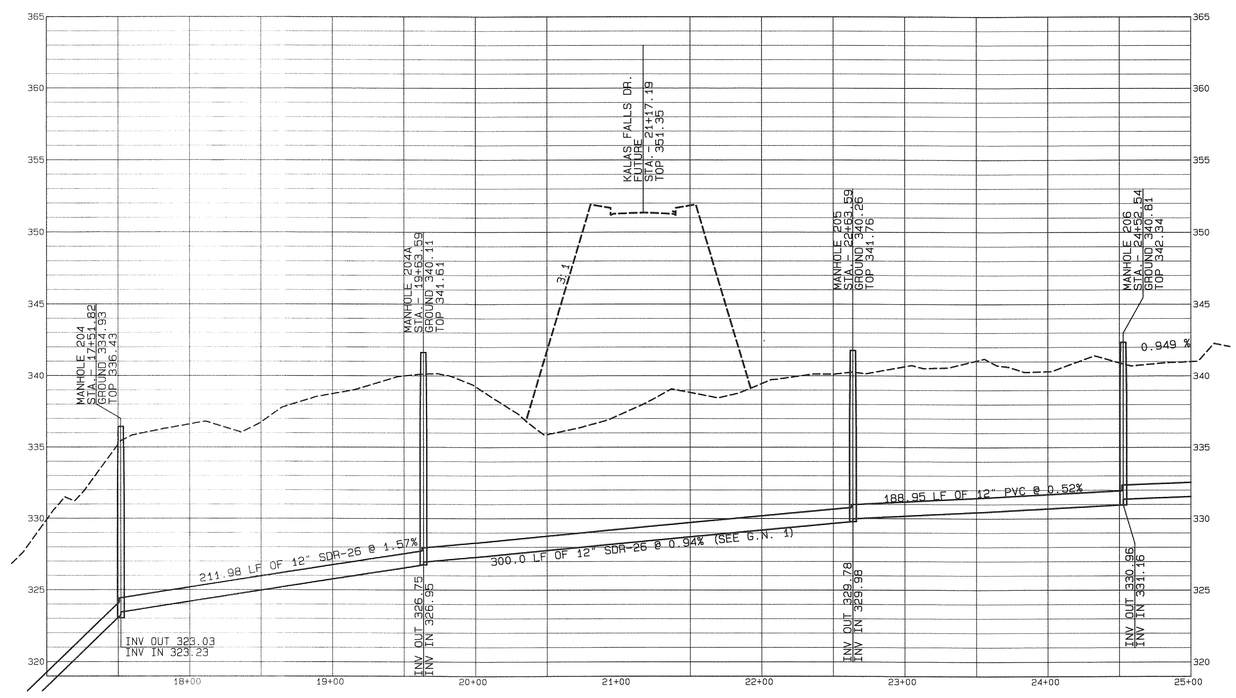
Plot Date : 9/11/2020 Time: 1:49PM FILE: C:\Users\user\Desktop\Work Data\Watkins\Kalas Falls Base Phase 1.pro





OUTFALL "G"
MH204A THRU 206

GENERAL NOTE:
1. ALL SANITARY SEWER PIPE GREATER THAN 12' DEPTH IS TO BE SDR 26 WITH #67 STONE FOR THE FIRST FOOT OF BACKFILL ABOVE THE PIPE CROWN UNLESS OTHERWISE NOTED.



Public
Sewer Collection / Extension System

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City of Raleigh
Public Utility Department # _____

Authorization to Construct: _____

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City of Raleigh
Public Utility Department # _____

Authorization to Construct: _____

Date: _____

No.	DATE	REVISION	DWN/CHK

SANITARY SEWER OUTFALL G
PLAN AND PROFILE
FOR
KALAS FALLS
SITUATED AT
1832 ROLESVILLE ROAD
WAKE COUNTY, NORTH CAROLINA
FIRM # C-3881

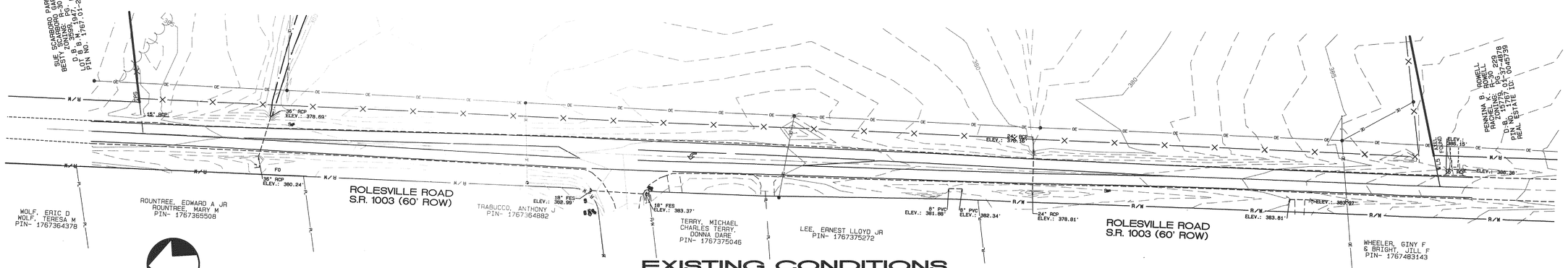
JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

AMERICAN Engineering
American Engineering Associates–Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

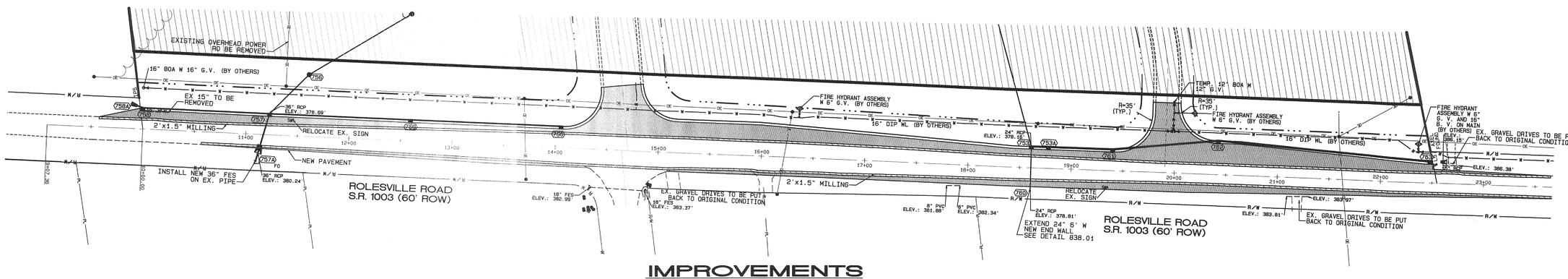
PRELIMINARY
NORTH CAROLINA PROFESSIONAL SEAL 9840 ENGINEER JOHN R. HARMAN
5.11.20
NOT FOR CONSTRUCTION

SHEET NO.
17.0

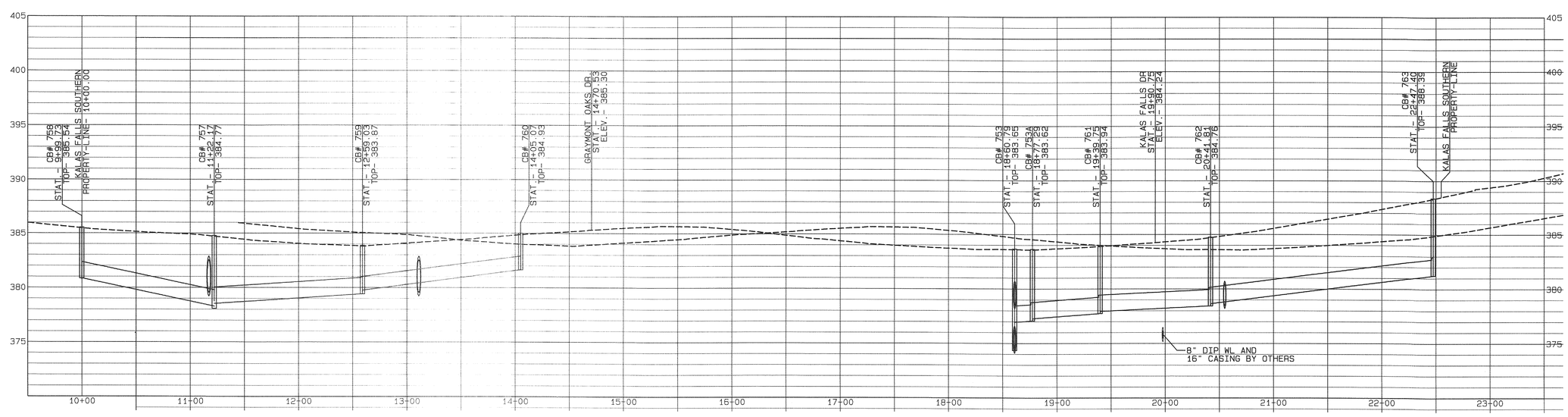
FILE: Y:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pnc
Plot Date : 5/11/2020 Time: 5:38AM



EXISTING CONDITIONS



IMPROVEMENTS



No.	DATE	REVISION	DWN/CHK

ROLESVILLE ROAD SOUTHERN SECTION
EXISTING AND IMPROVEMENTS
FOR
KALAS FALLS
SITUATED AT
1832 ROLESVILLE ROAD
WAKE COUNTY, NORTH CAROLINA
FIRM # C-3881

JOB NUMBER:
CHECKED BY:
DRAWN BY:
DATE:

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

PRELIMINARY

NORTH CAROLINA PROFESSIONAL SEAL 8810 ENGINEER JOHN R. HARMAN

5.11.20

NOT FOR CONSTRUCTION

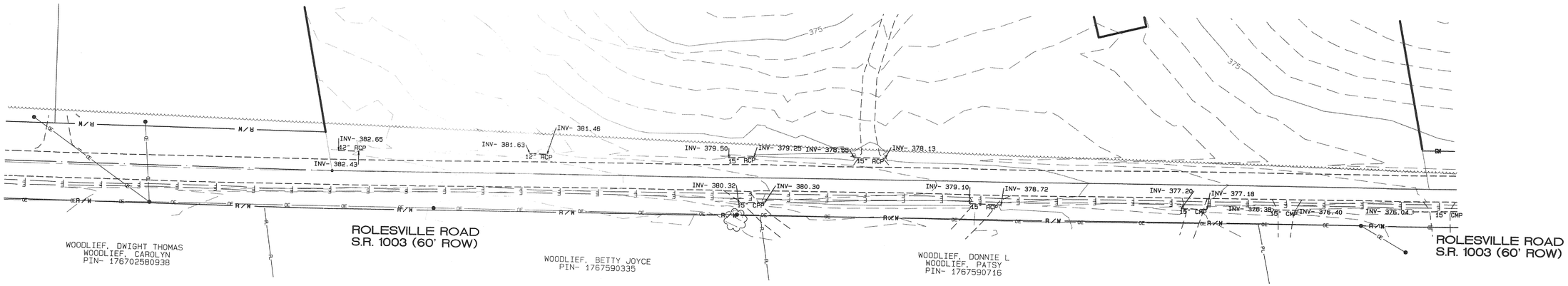
SHEET NO.

18.0

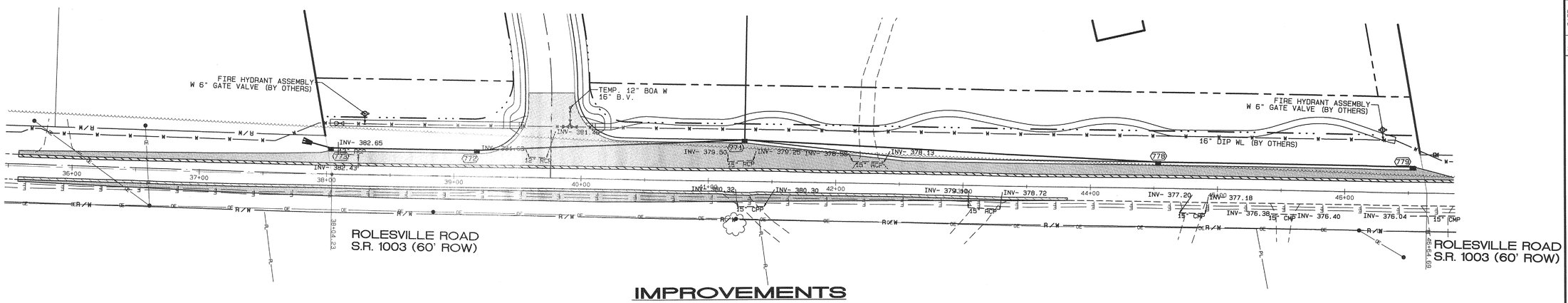
FILE: I:\Kalas Falls\Kalas Falls Base Phase 1.pro

Time: 4:16AM

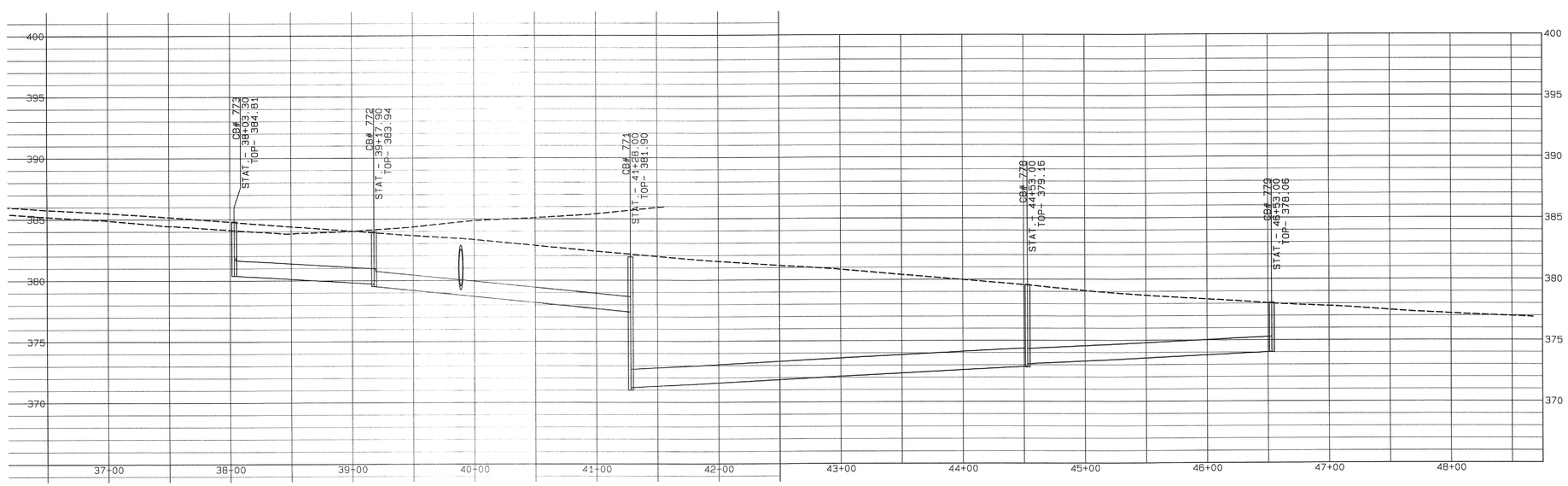
Plot Date: 5/11/2020



EXISTING CONDITIONS



IMPROVEMENTS



No.	DATE	REVISION	DWN/CHK

ROLESVILLE ROAD NORTHERN SECTION
EXISTING AND IMPROVEMENTS
FOR
KALAS FALLS
SITUATED AT
1832 ROLESVILLE ROAD
WAKE COUNTY, NORTH CAROLINA
FIRM # C-3881

JOB NUMBER:
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Cary, NC 27511 919-469-1101

PRELIMINARY

NORTH CAROLINA PROFESSIONAL SEAL 9840 ENGINEER J. R. HARMAN

5.11.20

NOT FOR CONSTRUCTION

SHEET NO.

18.1

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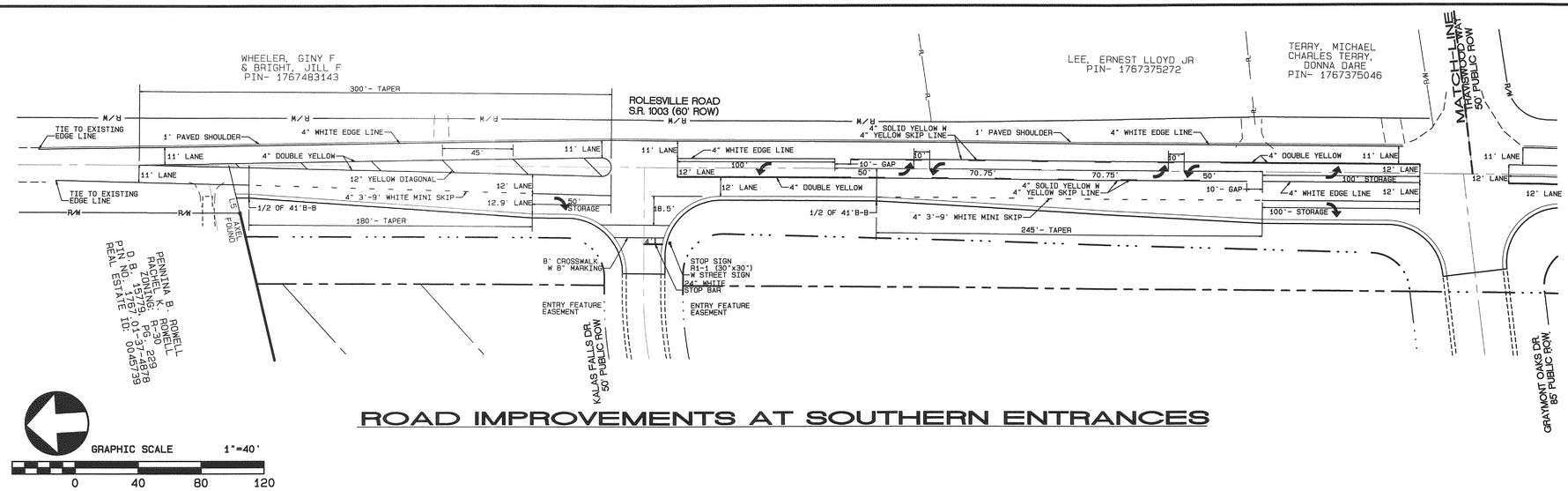
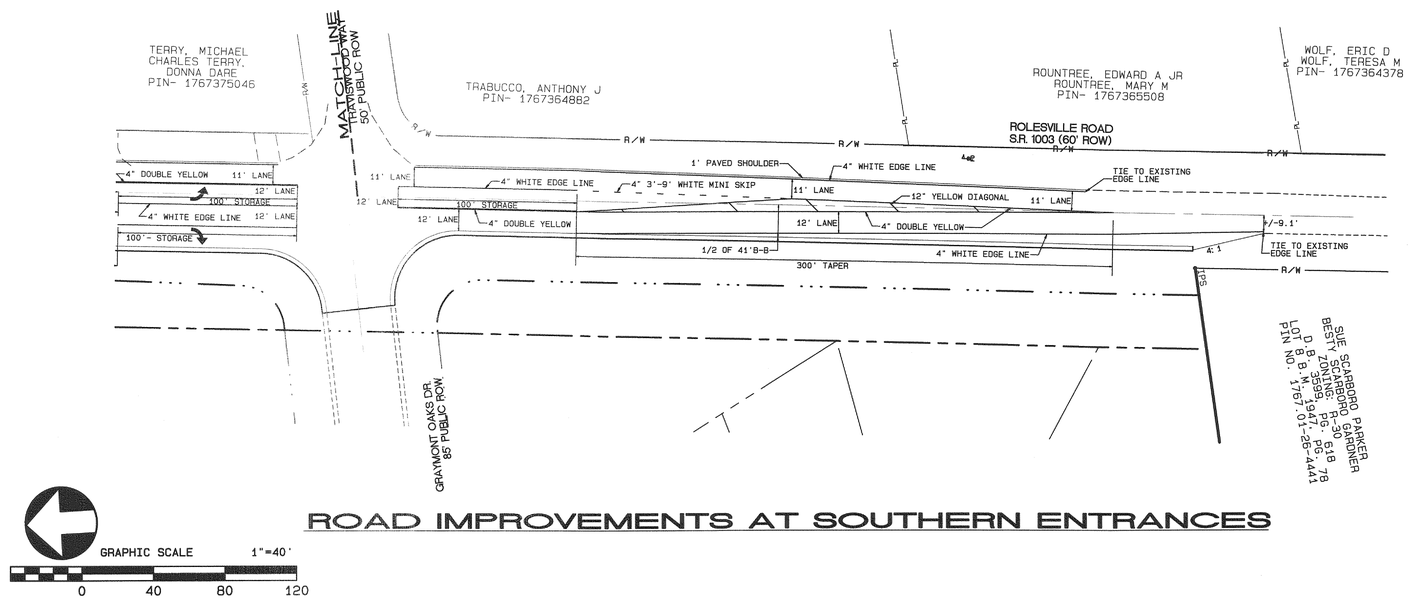


ROAD IMPROVEMENTS AT SOUTHERN ENTRANCES



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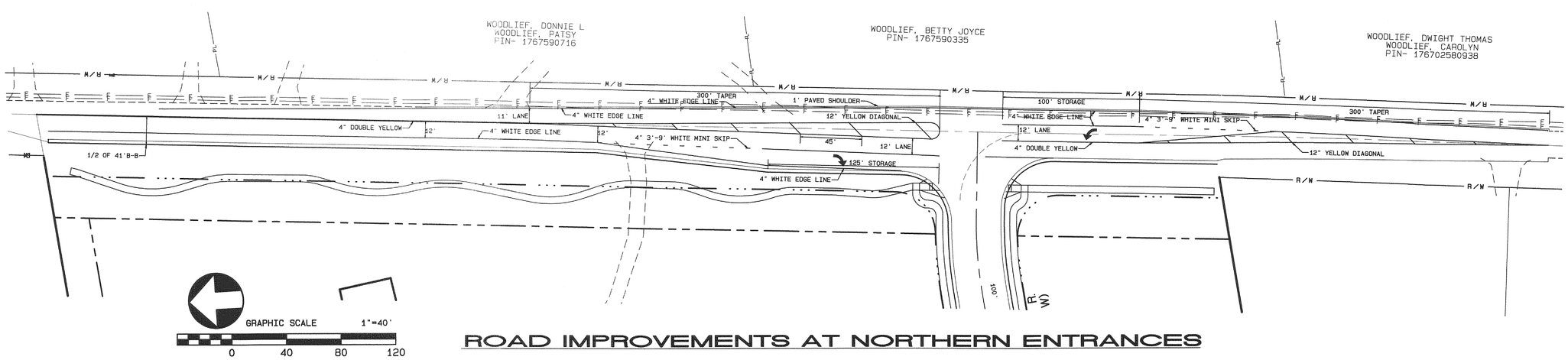

ROAD IMPROVEMENTS AT NORTHERN ENTRANCES

No.	DATE	REVISION	DWN/CHK

ROLESVILLE ROAD IMPROVEMENTS

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA

FIRM # C-3881

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Cary, NC 27511 919-469-1101

PRELIMINARY

NORTH CAROLINA PROFESSIONAL SEAL 9806 ENGINEER KEVIN R. HARMAN

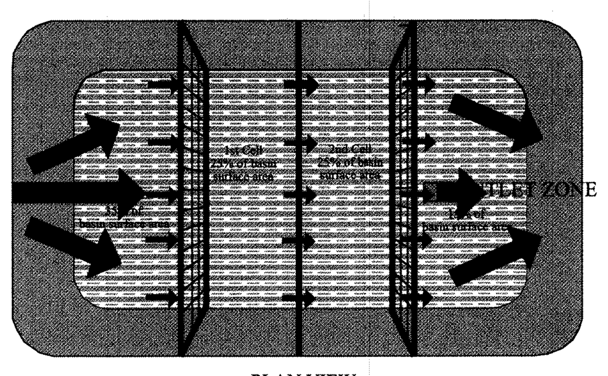
5.16.20

NOT FOR CONSTRUCTION

SHEET NO.

19.0

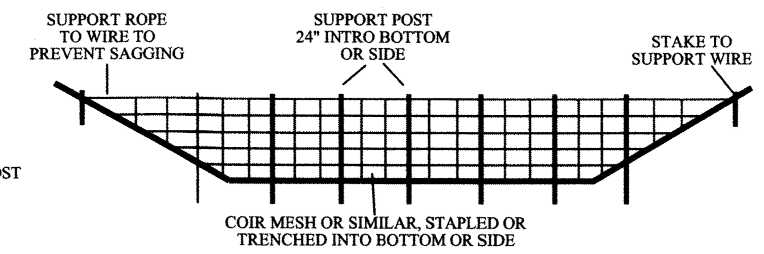
Plot Date: 5/11/2020 Time: 4:17AM FILE: I:\Kalas Falls\Kalas Falls Base Phase 1.pro

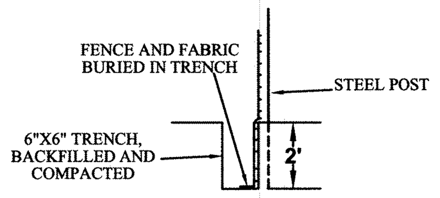


PLAN VIEW

NOTES:
1. BAFFLE MATERIAL SHOULD BE SECURED AT THE BOTTOM AND SIDES USING STAPLES OR BY TRENCHING AS FOR SILT FENCE.
2. MOST OF THE SEDIMENT WILL ACCUMULATE IN THE 1ST BAY, WHICH SHOULD BE READILY ACCESSIBLE FOR MAINTENANCE.
3. PROVIDE 3 BAFFLES (USE TWO IF LESS THAN 20 FEET IN LENGTH). PROVIDE 5 BAFFLES FOR DRAINAGE AREAS GREATER THAN 10 ACRES.
4. BAFFLE SHALL BE 700 G/M2 COIR EROSION BLANKET.
5. TOPS OF BAFFLES SHOULD BE 2 INCHES LOWER THAN THE TOP OF THE BERMS
6. INSPECT BAFFLES FOR REPAIR ONCE A WEEK AND AFTER EACH RAINFALL

CROSS SECTION

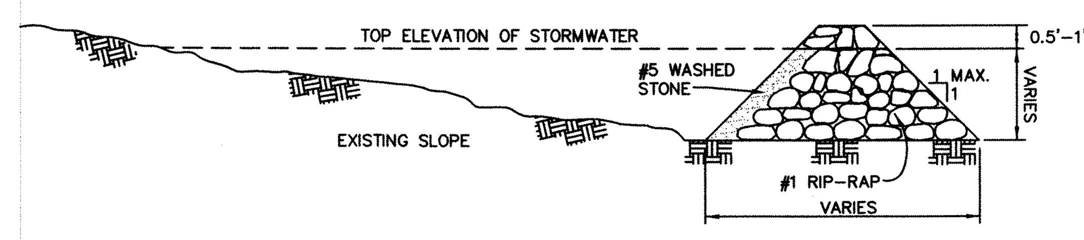




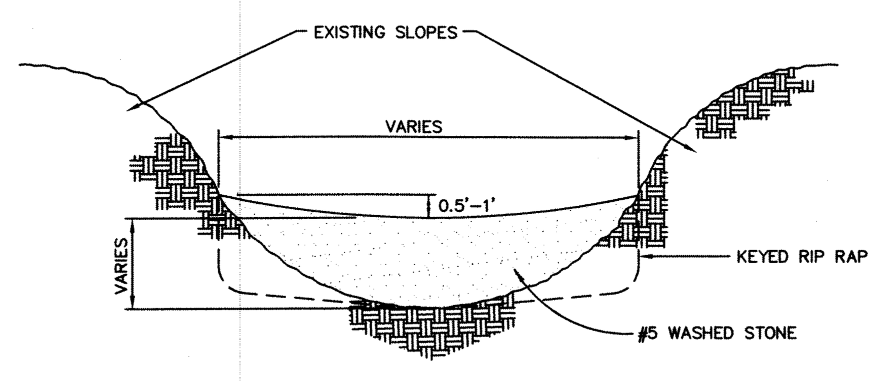
SECTION VIEW AT OPENING

EFFECTIVE: 01/31/08

STANDARD BAFFLES DETAIL



SIDE VIEW



FRONT VIEW

CONSTRUCTION NOTES:

HEIGHT & WIDTH DETERMINED BY EXISTING TOPOGRAPHY AND SEDIMENT STORAGE REQUIRED.

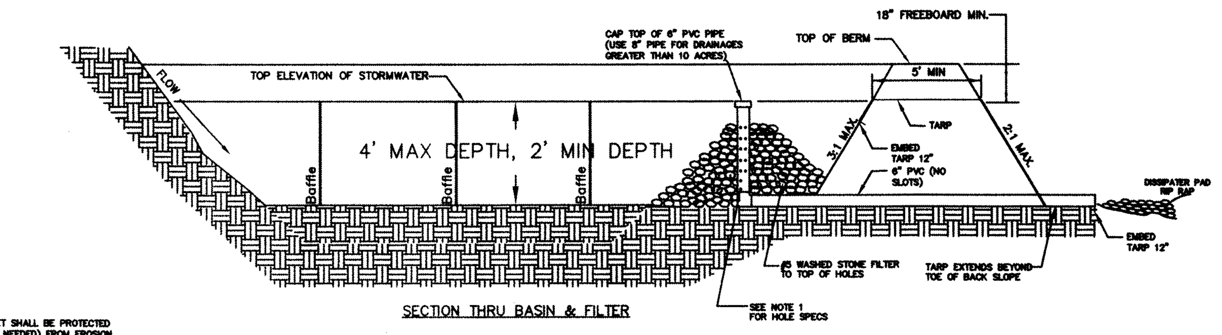
KEY RIP RAP INTO THE DAM FOR STABILIZATION.

STEP SEQUENCE

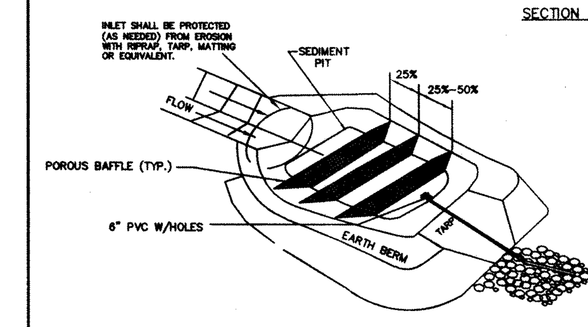
NOTE: REMOVE SEDIMENT ACCUMULATION FROM BEHIND CHECK DAMS TO PREVENT DAMAGE TO CHANNEL VEGETATION. FLOW SHOULD BE MAINTAINED THROUGH THE DAM.

EFFECTIVE: 01/31/08

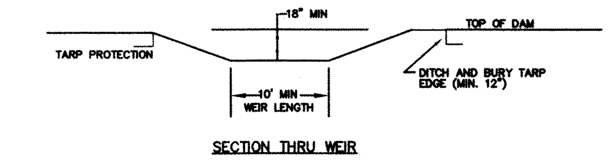
STANDARD CHECK DAM



SECTION THRU BASIN & FILTER



PERSPECTIVE VIEW



SECTION THRU WEIR

GENERAL NOTES

1. DRAW DOWN RISER & BARREL SHALL BE 6" SCH. 40 PVC WITH CLEAN–OUT CAP AND 3/4" HOLES. SEE NOTE 1 FOR NUMBER AND SPACING OF HOLES.
2. THE TARP USED TO PROTECT THE WEIR SHALL BE THE WIDTH SPECIFIED. THE LENGTH OF THE TARP SHALL BE ACCORDING TO AVAILABLE SUPPLY. IF MULTIPLE TARPS ARE TO BE USED, THEN TARPS SHALL BE OVERLAPPED AT LEAST 12". THE UPSTREAM 12" TARP SHALL OVERLAP THE DOWNSTREAM TARP. THE TARP SHALL BE 50 MIL. HEAVY DUTY SILVER TARPAULINS OR EQUIVALENT FOR U.V. RESISTANCE.
3. MAINTENANCE: SEDIMENT TO BE REMOVED AND PROPERLY DISPOSED OF WHEN BASIN IS HALF FULL. GRAVEL FILTER AROUND RISER SHOULD BE REPLACED AS NEEDED TO ENSURE DEWATERING.

NOTE 1

HOLE SPECS:

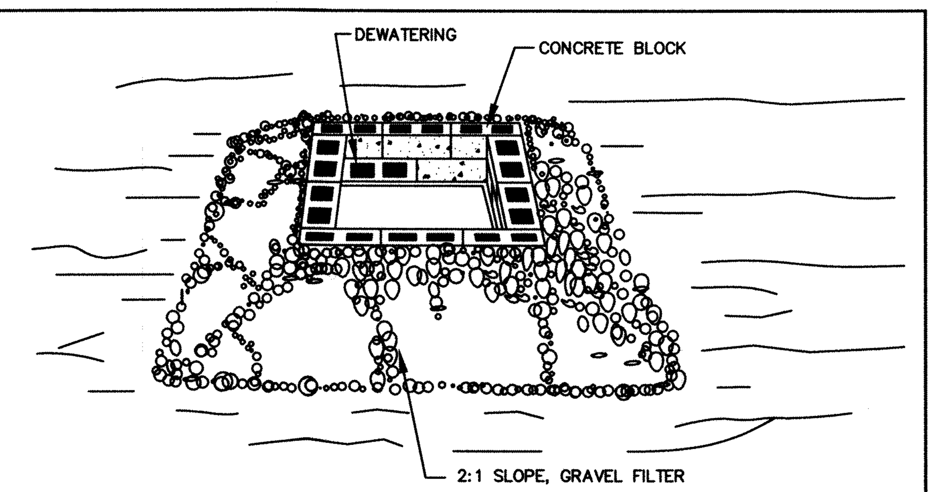
DEWATERING HOLES WILL BE INSTALLED IN SETS OF HORIZONTAL RINGS. THE FIRST SET OF HOLES WILL BE SET 6 INCHES FROM THE BOTTOM OF THE RISER. RINGS WILL CONTINUE UP THE RISER IN INTERVALS OF 3 INCHES. HOLES WILL BE 3/4 INCH IN DIAMETER AND WILL BE SPACED EQUALLY AROUND THE RISER. THE NUMBER OF HOLES PER RING WILL EQUAL TO THE DRAINAGE AREA.

EXAMPLE
A BASIN DRAINING 2.0 ACRES SHOULD HAVE 2 HOLES PER RING EVERY 3 INCHES ON THE RISER PIPE. THE FIRST RING (2 HOLES) WILL BE SET 6 INCHES FROM THE BOTTOM OF THE RISER.

NOTE: ROUND DRAINAGE AREA TO THE NEAREST WHOLE NUMBER TO DETERMINE NUMBER OF HOLES.

EFFECTIVE: 01/31/08

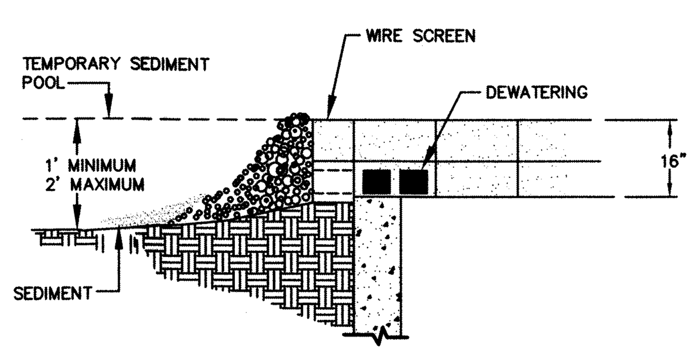
STANDARD CUSTOM BASIN



CONSTRUCTION SPECIFICATIONS

1. LAY ONE BLOCK ON EACH SIDE OF THE STRUCTURE ON ITS SIDE IN THE BOTTOM ROW TO ALLOW POOL DRAINAGE. THE FOUNDATION SHOULD BE EXCAVATED AT LEAST 2 INCHES BELOW THE CREST OF THE STORM DRAIN. PLACE THE BOTTOM ROW OF BLOCKS AGAINST THE EDGE OF THE STORM DRAIN FOR LATERAL SUPPORT AND TO AVOID WASHOUTS WHEN OVERFLOW OCCURS. IF NEEDED, GIVE LATERAL SUPPORT TO SUBSEQUENT ROWS BY PLACING 2x4 WOOD STUDS THROUGH BLOCK OPENINGS.
2. CAREFULLY FIT HARDWARE CLOTH OR COMPARABLE WIRE MESH WITH 1/2 INCH OPENINGS OVER ALL BLOCK OPENINGS TO HOLD GRAVEL IN PLACE.
3. USE CLEAN GRAVEL, 3/4 TO 1/2 INCH IN DIAMETER, PLACED 2 INCHES BELOW THE TOP OF THE BLOCK ON A 2:1 SLOPE OR FLATTER AND SMOOTH IT TO AN EVEN GRADE. DOT #57 WASHED STONE IS RECOMMENDED.

MAINTENANCE: INSPECT INLET PROTECTION AND REMOVE SEDIMENT AFTER EACH RAIN EVENT. GRAVEL SHOULD BE REPLACED AND REPAIRS MADE AS NEEDED.

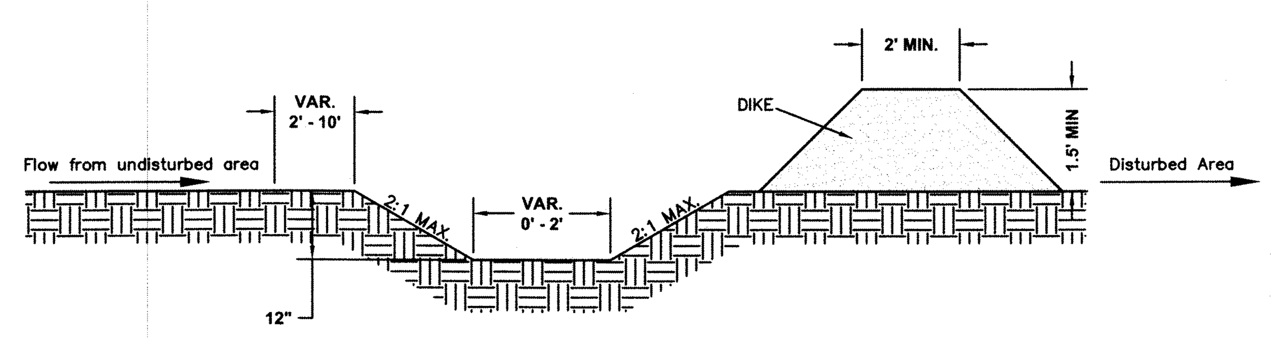


EFFECTIVE: 01/31/08

STANDARD BLOCK & GRAVEL DROP INLET PROTECTION

NOTES:

1. DIVERSION TO BE USED UPSLOPE OF A CONSTRUCTION SITE TO PREVENT STORM RUNOFF FROM ENTERING THE DISTURBED AREA.
2. IMMEDIATELY LINE AND STABILIZE BEFORE ANY DOWNSLOPE GRADING BEGINS (STABILIZATION MUST OCCUR BEFORE ISSUANCE OF A CERTIFICATE OF COMPLIANCE). STABILIZATION METHOD IS BASED ON VELOCITY OF OFFSITE DRAINAGE.
3. DIVERSIONS SHOULD ONLY BE USED FOR DRAINAGES 5 ACRES OR LESS.
4. ANY SEDIMENT LADEN WATER PRIOR TO STABILIZATION OF THE DIVERSION MUST BE DIVERTED INTO AN APPROVED EROSION AND SEDIMENT CONTROL BMP. CLEAN WATER SHOULD EMPTY INTO AN APPROVED OUTLET DEVICE.



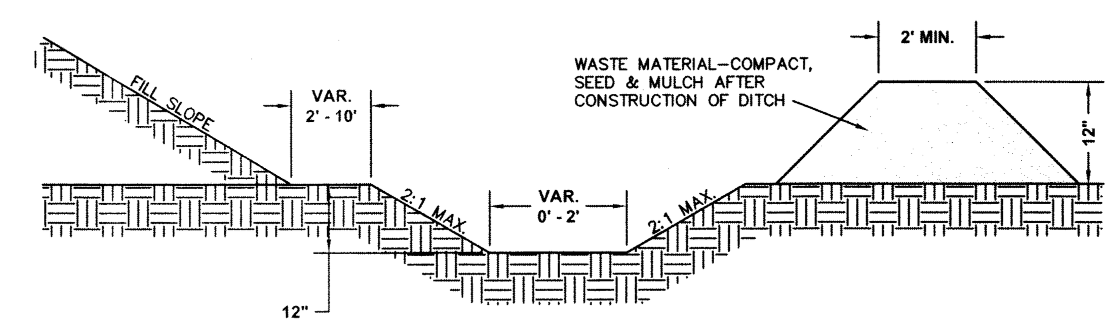
CROSS SECTIONAL VIEW

EFFECTIVE: 01/31/08

STANDARD CLEAN WATER DIVERSION

NOTES:

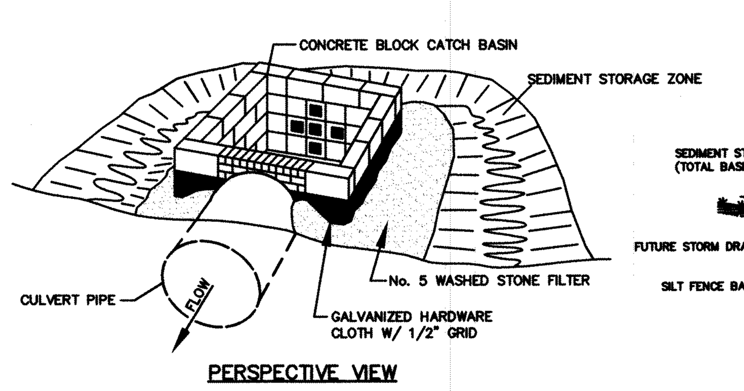
1. TEMPORARY DIVERSION DITCH TO BE USED TO INTERCEPT FLOW AND/OR DIVERT TO A SEDIMENT CONTROL MEASURE OR BMP.
2. SILT SHALL BE REMOVED WHEN DITCH IS ONE–HALF FULL.
3. DITCH SHALL BE RECONSTRUCTED WHEN DAMAGED BY EQUIPMENT OR COVERED BY FILL.
4. STABILIZE DIVERSION DITCH BERM WITH TEMPORARY SEEDING, MULCH WITH TAC, AND/OR EROSION CONTROL NETTING.



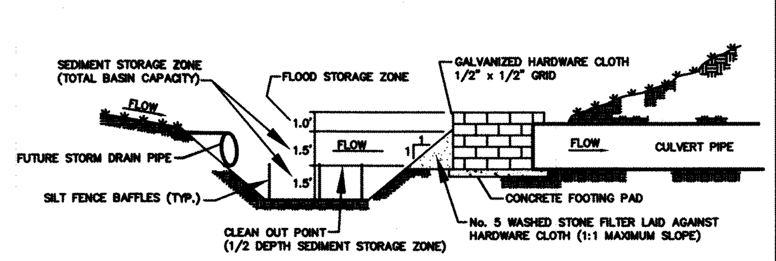
CROSS SECTIONAL VIEW

EFFECTIVE: 01/31/08

STANDARD TEMPORARY DIVERSION DITCH

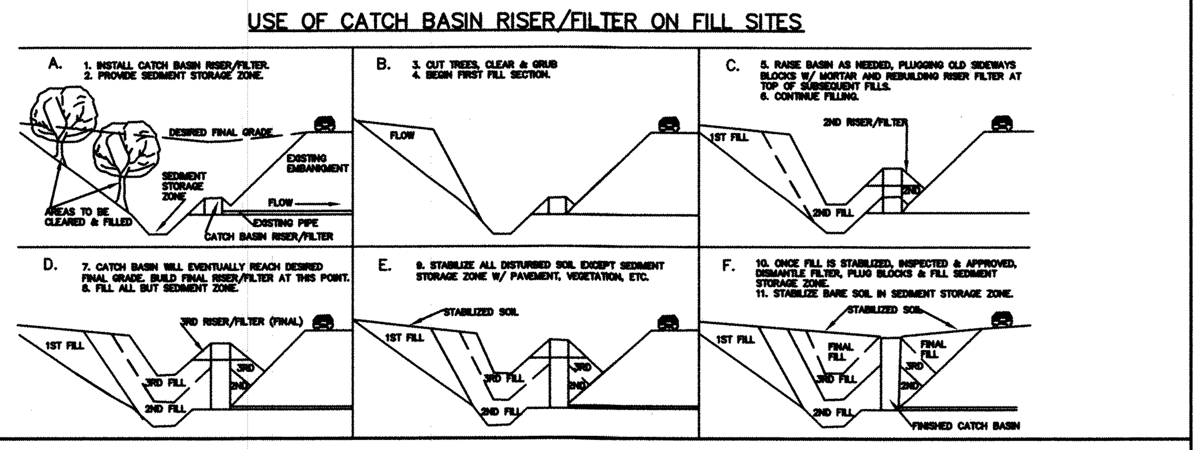


PERSPECTIVE VIEW



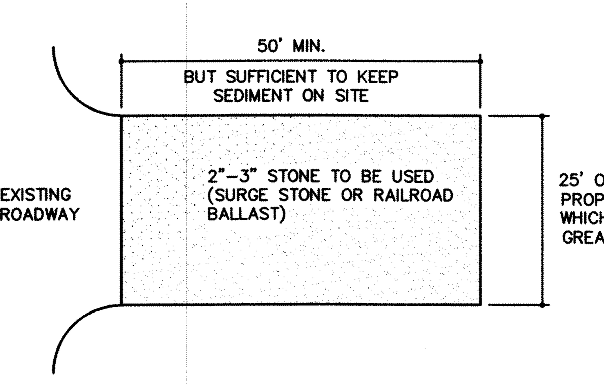
SECTION VIEW

USE OF CATCH BASIN RISER/FILTER ON FILL SITES



EFFECTIVE: 01/31/08

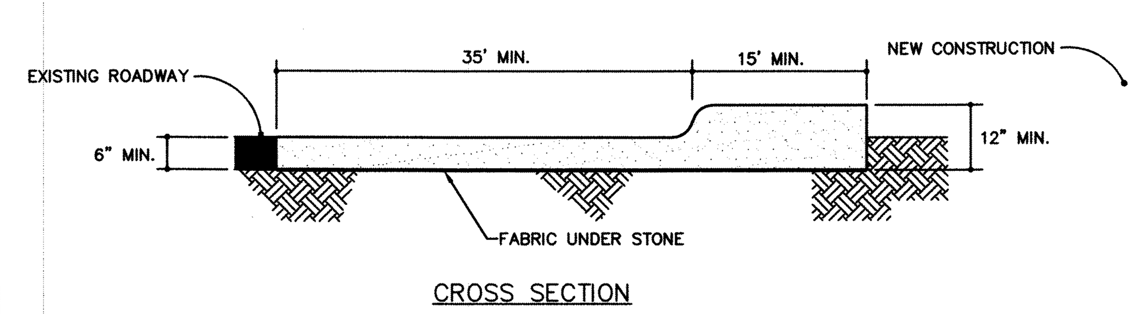
STANDARD CATCH BASIN RISER/FILTER



PLAN VIEW

NOTES:

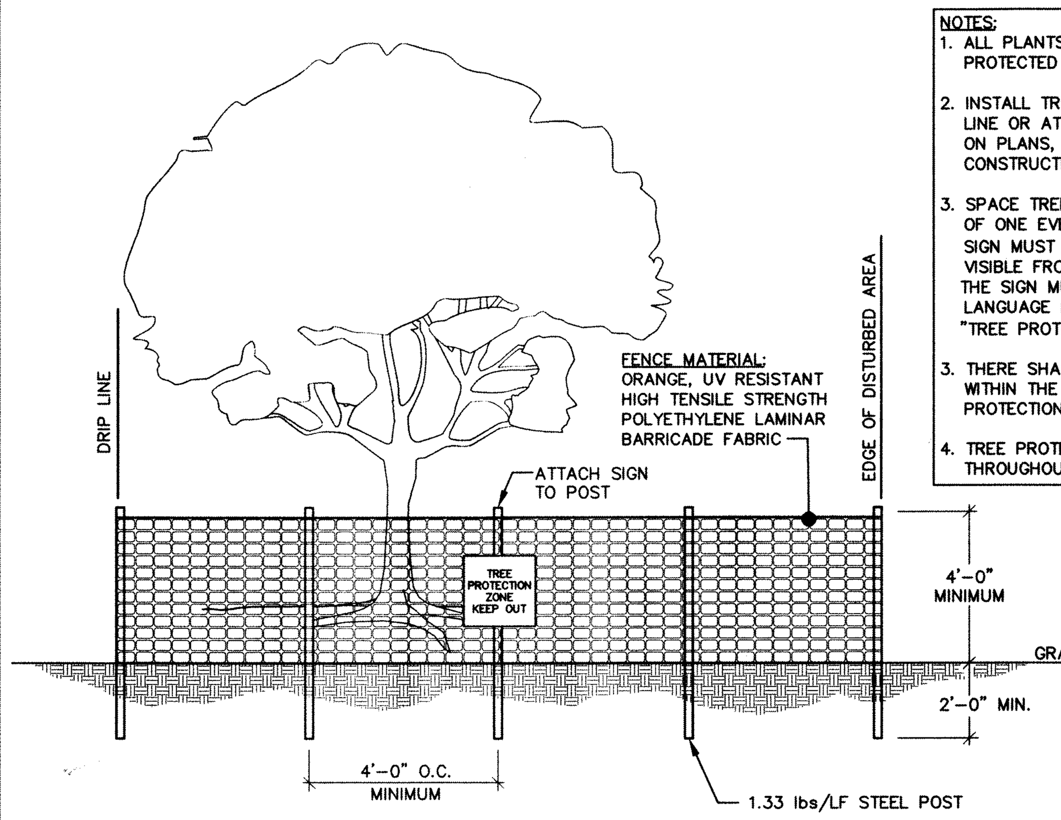
1. PUT SILT FENCE OR TREE PROTECTION FENCE UP TO ENSURE CONSTRUCTION ENTRANCE IS USED.
2. IF CONSTRUCTION ON THE SITES ARE SUCH THAT THE MUD IS NOT REMOVED BY THE VEHICLE TRAVELING OVER THE STONE, THEN THE TIRES OF THE VEHICLES MUST BE WASHED BEFORE ENTERING THE PUBLIC ROAD.
3. MAINTAIN GRAVEL PAD IN A CONDITION TO PREVENT MUD OR SEDIMENT FROM LEAVING CONSTRUCTION SITE. ENTRANCE WILL REQUIRE PERIODIC REMOVAL OF SEDIMENT–LADEN STONE AND REPLACEMENT WITH FRESH STONE.



CROSS SECTION

EFFECTIVE: 01/31/08

STANDARD CONSTRUCTION ENTRANCE



NOTES:
1. ALL PLANTS DESIGNATED TO BE SAVED SHALL BE PROTECTED BY FENCING, AS ILLUSTRATED.
2. INSTALL TREE PROTECTION FENCE AT TREE DRIP LINE OR AT EDGE OF DISTURBED AREA, AS SHOWN ON PLANS, PRIOR TO COMMENCEMENT OF CONSTRUCTION.
3. SPACE TREE PROTECTION ZONE SIGNS A MINIMUM OF ONE EVERY 300 FEET. THE SIZE OF EACH SIGN MUST BE A MINIMUM OF 2' x 2' AND BE VISIBLE FROM BOTH SIDES OF THE FENCE. THE SIGN MUST CONTAIN THE FOLLOWING LANGUAGE IN BOTH ENGLISH & SPANISH: "TREE PROTECTION ZONE, KEEP OUT".
3. THERE SHALL BE NO STORAGE OF MATERIAL WITHIN THE BOUNDARIES OF THE TREE PROTECTION FENCING.
4. TREE PROTECTION FENCING SHALL BE MAINTAINED THROUGHOUT THE DURATION OF THE PROJECT.

TREE PROTECTION FENCE

No.	DATE	REVISION	DWN/CHK

EROSION CONTROL DETAILS

FOR

KALAS FALLS

SITUATED AT
ROLESVILLE ROAD,ROLESVILLE
WAKE COUNTY, NORTH CAROLINA
FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	EDS
DATE:	9/19/2019

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511
919-469-1101

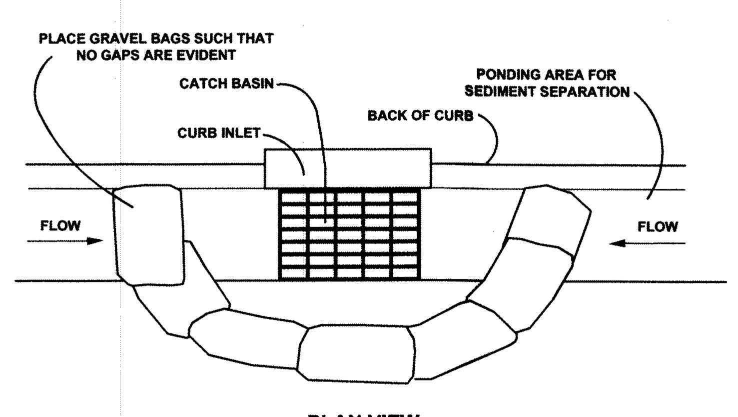
Detail Selection Only

NORTH CAROLINA PROFESSIONAL SEAL 8922 ENGINEER PEYTON NICHOLAS JOYNER
5/11/20

SHEET NO.

CD1

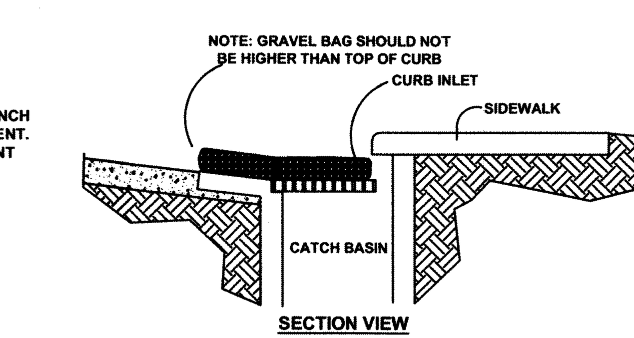
Y:\Jobs\9900\Watkins Property\dwg\Temporary\Emily\Rogers Farm Full Set Details.dwg



PLAN VIEW

NOTES:

1. PLACE GRAVEL BAG BARRIER ON GENTLY SLOPING STREET, WHERE WATER CAN POND AND ALLOW SEDIMENT TO SEPARATE FROM RUNNOFF.
2. USE SAND BAGS OF WOVEN GEOTEXTILE FABRIC (NOT BURLAP) AND FILL WITH ½ INCH (OR SMALLER) GRAVEL. BAGS MUST BE LAYERED SUCH THAT NO GAPS ARE EVIDENT.
3. INSPECT BARRIERS AND REMOVE SEDIMENT AFTER EACH STORM EVENT, SEDIMENT AND GRAVEL MUST BE REMOVED FROM THE TRAVELED WAY IMMEDIATELY.
4. WHEN INSTALLING CURB INLET PROTECTION DEVICES, NEVER BLOCK THE CURB INLET.

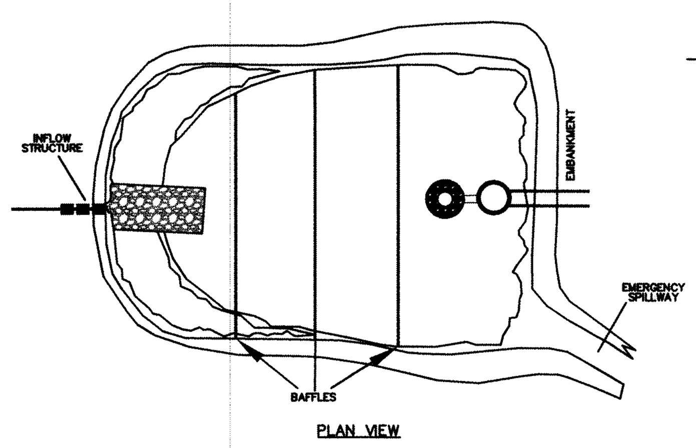


SECTION VIEW

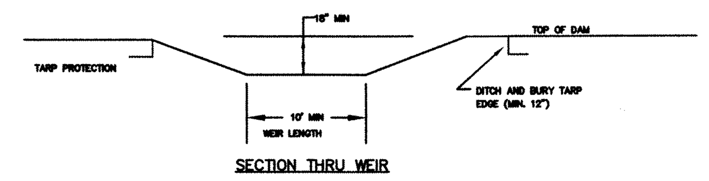
WAKE COUNTY NORTH CAROLINA

EFFECTIVE: 01/31/08

STANDARD GRAVEL BAG CURB INLET PROTECTION



PLAN VIEW



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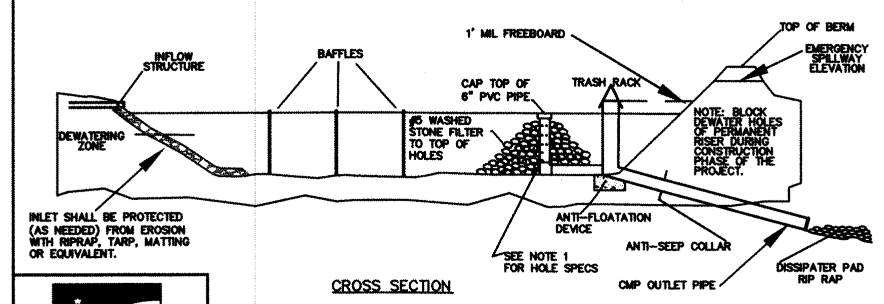

CROSS SECTION

NOTE 1

HOLE SPECS:

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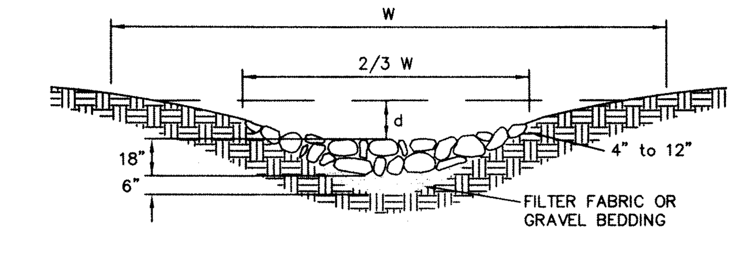
NOTE: ROUND DRAINAGE AREA TO THE NEAREST WHOLE NUMBER TO DETERMINE NUMBER OF HOLES.

GENERAL NOTES:
1) BASIN SHOULD BE CLEANED OUT WHEN CAPACITY REACHES AN ELEVATION REPRESENTING THAT THE BASIN IS HALF-FULL.
2) PROVIDE A MINIMUM OF THREE POROUS BAFFLES TO EVENLY DISTRIBUTE FLOW ACROSS THE BASIN, REDUCING TURBULENCE.
3) BAFFLE MATERIAL MUST BE SECURED AT THE BOTTOM AND SIDES USING STAPLES OR BY TRENCHING AS FOR A SILT FENCE.
4) MOST OF THE SEDIMENT WILL ACCUMULATE IN THE FIRST BAY, SO THIS SHOULD BE READILY AVAILABLE FOR MAINTENANCE.
5) THE TARP USED TO PROTECT THE WEIR SHALL BE THE WIDTH SPECIFIED. THE LENGTH OF THE TARP SHALL BE ACCORDING TO AVAILABLE SUPPLY. IF MULTIPLE TARPS ARE TO BE USED, THEN TARPS SHALL BE OVERLAPPED AT LEAST 12". THE UPSTREAM 12" TARP SHALL OVERLAP THE DOWNSTREAM TARP. THE TARP SHALL BE 50 MIL. HEAVY DUTY SILVER TARPAULINS OR EQUIVALENT FOR U.V. RESISTANCE.
6) DURING THE CONSTRUCTION PHASE OF THE PROJECT, PERMANENT STORMWATER RISER SHALL ONLY DEWATER FROM THE TOP OF PIPE.
7) POND SHALL NOT BE CONVERTED FOR STORMWATER USE UNTIL APPROVED BY ENVIRONMENTAL ENGINEER.

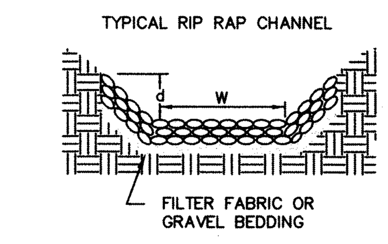
WAKE COUNTY NORTH CAROLINA

EFFECTIVE: 01/31/08

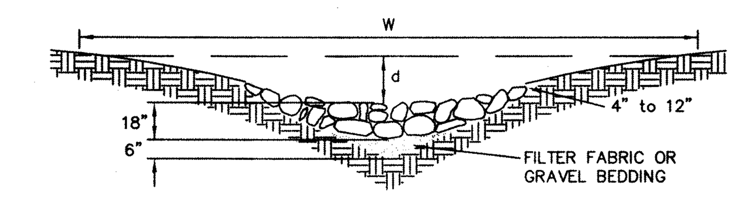
STANDARD CUSTOM BASIN ATTACHED TO PERMANENT RISER



PARABOLIC–SHAPED WATERWAY WITH STONE CENTER DRAIN
(SHAPED BY BULLDOZER)



TRAPEZOIDAL



V–SHAPED WATERWAY WITH STONE CENTER DRAIN
(SHAPED BY MOTOR GRADER)

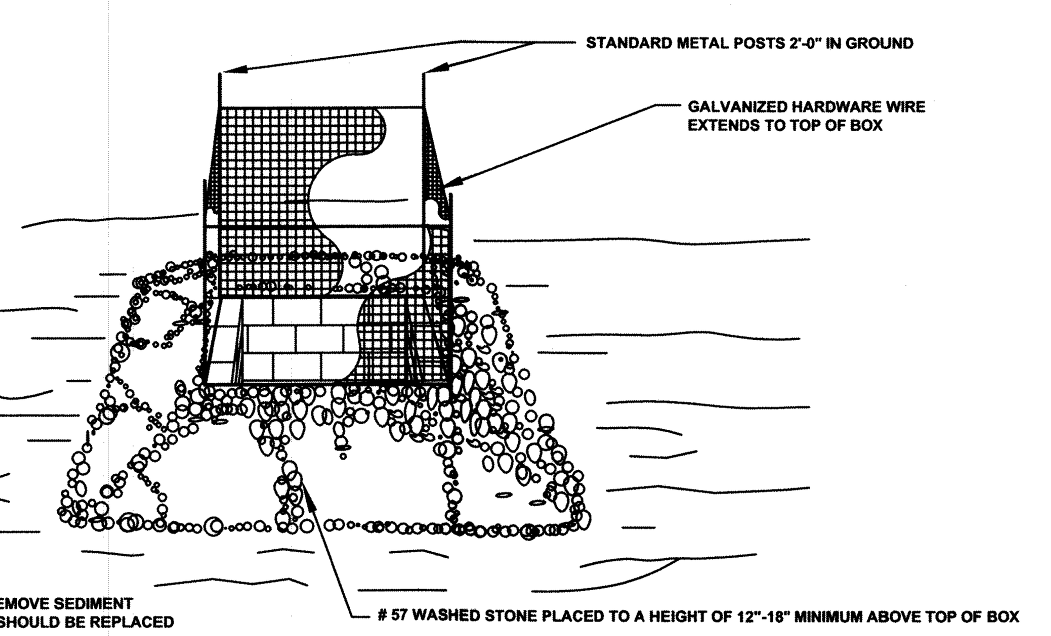
NOTES:

- TO BE USED WHERE EXCESSIVE STORMWATER VELOCITIES PROHIBIT VEGETATIVE LININGS.
- SIZE OF STONE MUST BE DETERMINED BY APPROPRIATE DESIGN PROCEDURE.
- DIMENSIONS FOR d & W VARIES ACCORDING TO DESIGN.

WAKE COUNTY NORTH CAROLINA

EFFECTIVE: 01/31/08

STANDARD RIP-RAP LINED CHANNELS



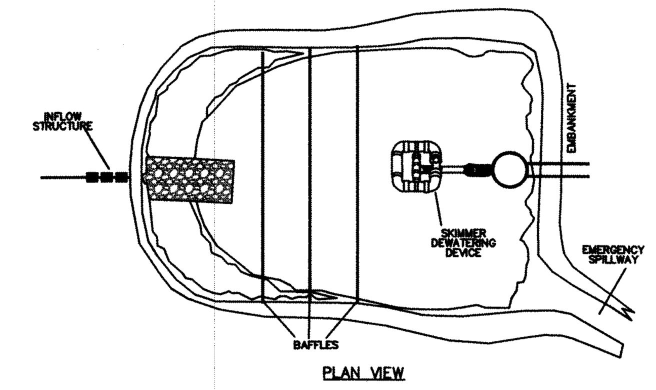
NOTE:

1. INSPECT INLET PROTECTION AND REMOVE SEDIMENT AFTER EACH RAIN EVENT. GRAVEL SHOULD BE REPLACED AND REPAIRS MADE AS NEEDED.

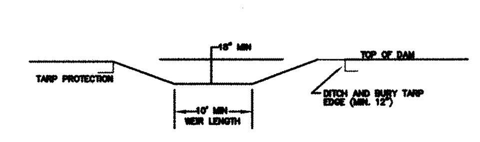
WAKE COUNTY NORTH CAROLINA

EFFECTIVE: 01/31/08

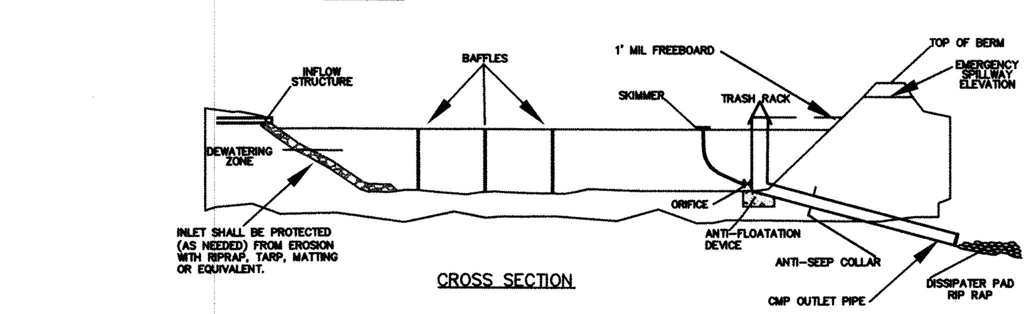
STANDARD GRAVEL YARD INLET PROTECTION



PLAN VIEW



SECTION THRU WEIR



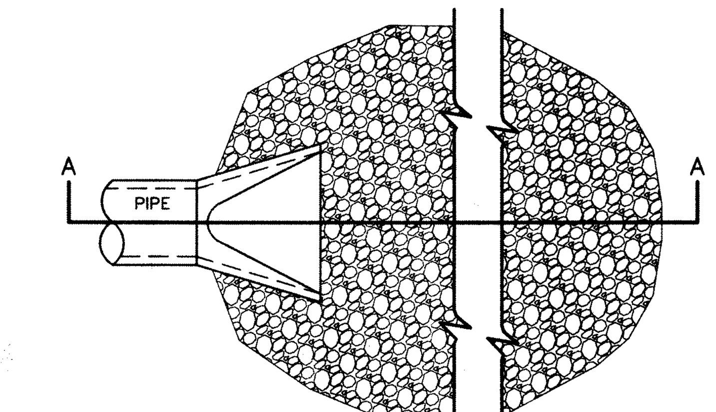
CROSS SECTION

NOTES:
1) BASIN SHOULD BE CLEANED OUT WHEN CAPACITY REACHES AN ELEVATION REPRESENTING THAT THE BASIN IS HALF-FULL.
2) THE TARP USED TO PROTECT THE WEIR SHALL BE THE WIDTH SPECIFIED. THE LENGTH OF THE TARP SHALL BE ACCORDING TO AVAILABLE SUPPLY. IF MULTIPLE TARPS ARE TO BE USED, THEN TARPS SHALL BE OVERLAPPED AT LEAST 12". THE UPSTREAM 12" TARP SHALL OVERLAP THE DOWNSTREAM TARP. THE TARP SHALL BE 50 MIL. HEAVY DUTY SILVER TARPAULINS OR EQUIVALENT FOR U.V. RESISTANCE.
3) PROVIDE A MINIMUM OF THREE POROUS BAFFLES TO EVENLY DISTRIBUTE FLOW ACROSS THE BASIN, REDUCING TURBULENCE.
4) BAFFLE MATERIAL MUST BE SECURED AT THE BOTTOM AND SIDES USING STAPLES OR BY TRENCHING AS FOR A SILT FENCE.
5) MOST OF THE SEDIMENT WILL ACCUMULATE IN THE FIRST BAY, SO THIS SHOULD BE READILY AVAILABLE FOR MAINTENANCE.
6) DURING THE CONSTRUCTION PHASE OF THE PROJECT, PERMANENT STORMWATER RISER SHALL ONLY DEWATER FROM THE TOP OF PIPE.
7) POND SHALL NOT BE CONVERTED FOR STORMWATER USE UNTIL APPROVED BY ENVIRONMENTAL ENGINEER.

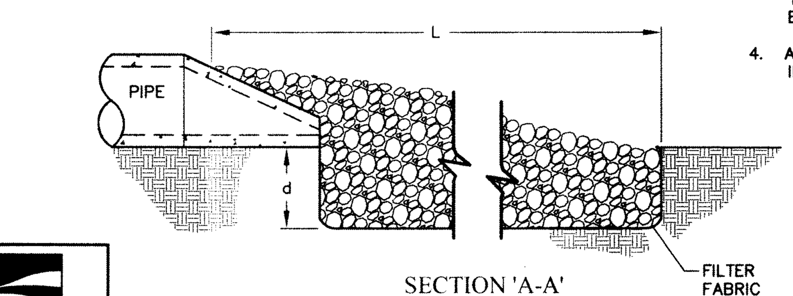
WAKE COUNTY NORTH CAROLINA

EFFECTIVE: 01/31/08

STANDARD SKIMMER ATTACHED TO PERMANENT RISER



PLAN VIEW



SECTION 'A-A'

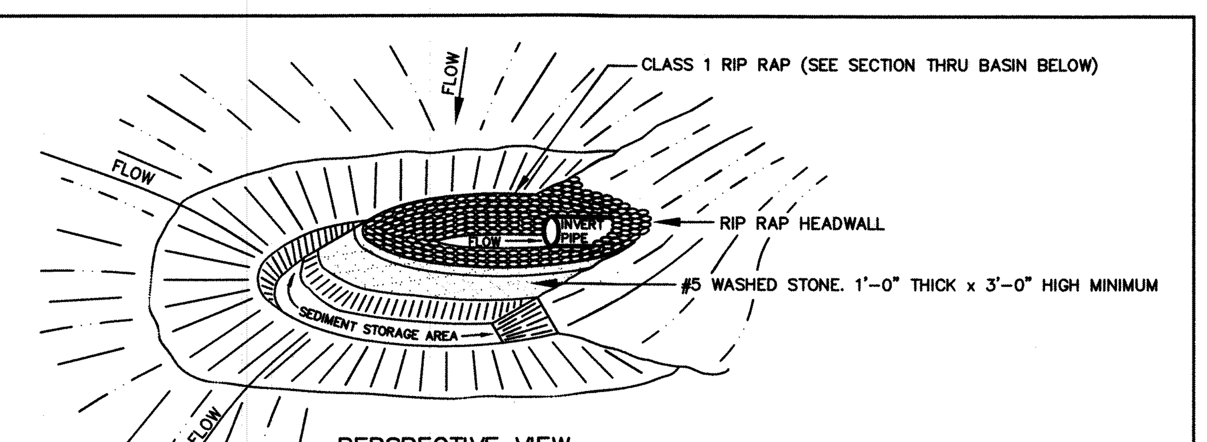
NOTES:

1. L = THE LENGTH OF THE RIPRAP APRON.
2. d = 1.5 TIMES THE MAXIMUM STONE DIAMETER BUT NOT LESS THAN 6" (INCHES).
3. IN A WELL–DEFINED CHANNEL EXTEND THE APRON UP THE CHANNEL BANKS TO AN ELEVATION OF 6" (INCHES) ABOVE THE MAXIMUM TAILWATER DEPTH OR TO THE TOP OF THE BANK, WHICHEVER IS LESS.
4. A FILTER BLANKET OR FILTER FABRIC SHOULD BE INSTALLED BETWEEN THE RIPRAP AND SOIL FOUNDATION.

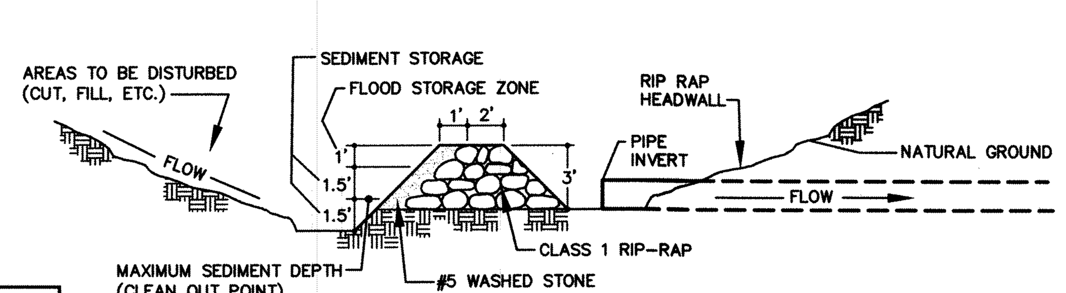
WAKE COUNTY NORTH CAROLINA

EFFECTIVE: 01/31/08

STANDARD PIPE OUTLET TO WELL-DEFINED CHANNEL



PERSPECTIVE VIEW
NO SCALE

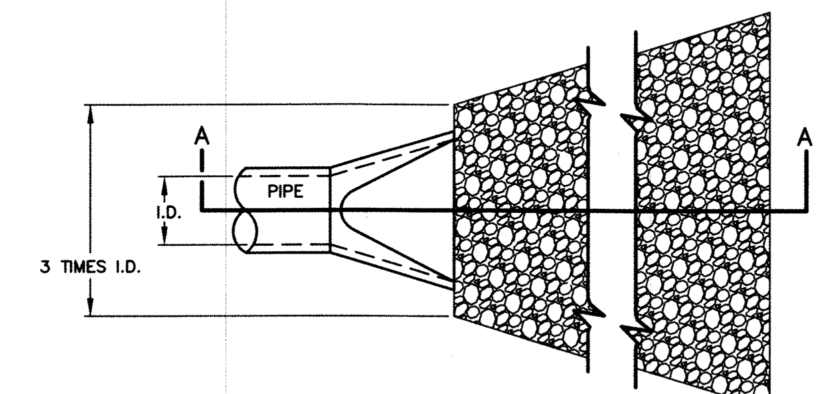


SECTION THRU CATCH BASIN, FILTER AND CULVERT PIPE
NO SCALE

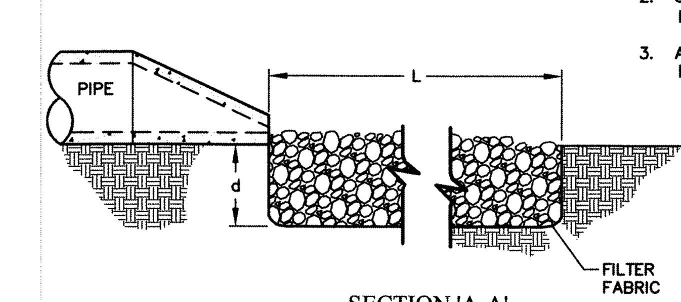
WAKE COUNTY NORTH CAROLINA

EFFECTIVE: 01/31/08

STANDARD HORSESHOE INLET PROTECTION



PLAN VIEW



SECTION 'A-A'

NOTES:

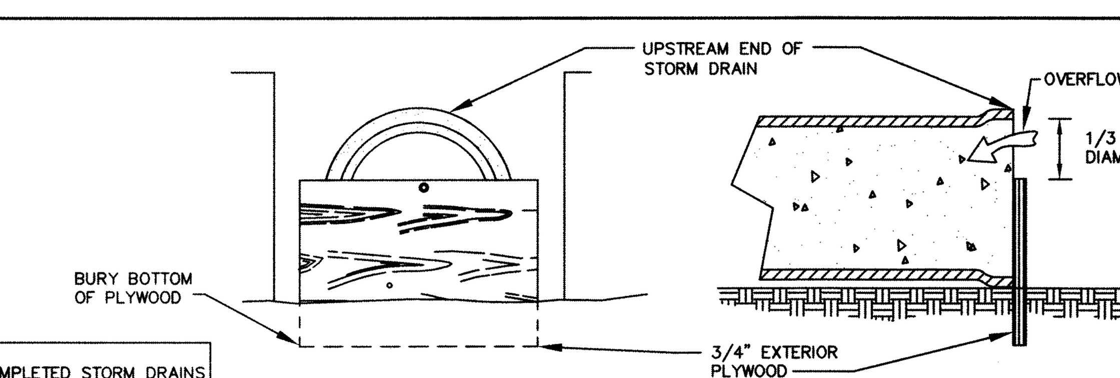
1. L = THE LENGTH OF THE RIPRAP APRON.
2. d = 1.5 TIMES THE MAXIMUM STONE DIAMETER BUT NOT LESS THAN 6" (INCHES).
3. A FILTER BLANKET OR FILTER FABRIC SHOULD BE INSTALLED BETWEEN THE RIPRAP AND SOIL FOUNDATION.

WAKE COUNTY NORTH CAROLINA

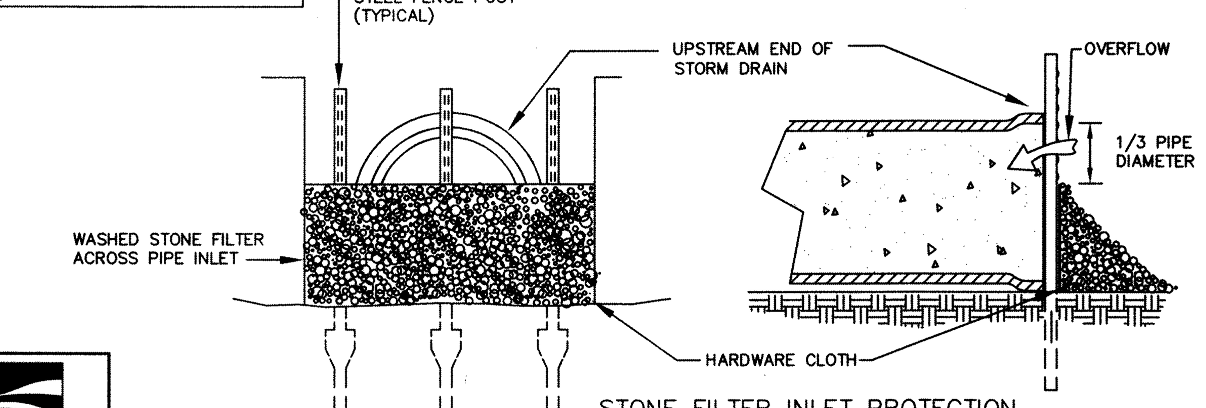
EFFECTIVE: 01/31/08

STANDARD PIPE OUTLET TO FLAT AREA
NO WELL-DEFINED CHANNEL

NOTE:
ALL PARTIALLY COMPLETED STORM DRAINS SHALL BE PROTECTED AT THE END OF EACH DAY IN ACCORDANCE WITH THESE DETAILS.



PLYWOOD INLET PROTECTION



STONE FILTER INLET PROTECTION

WAKE COUNTY NORTH CAROLINA

EFFECTIVE: 01/31/08

STANDARD PIPE INLET PROTECTION (PLYWOOD & STONE)

Y:\Jobs\9900\Watkins Property\dwg\Temporary\Emily\Rogers Farm Full Set Details.dwg

No.	DATE	REVISION	DWN/CHK

EROSION CONTROL DETAILS
FOR
KALAS FALLS
SITUATED AT
ROLESVILLE ROAD, ROLESVILLE
WAKE COUNTY, NORTH CAROLINA
FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	EDS
DATE:	9/19/2019

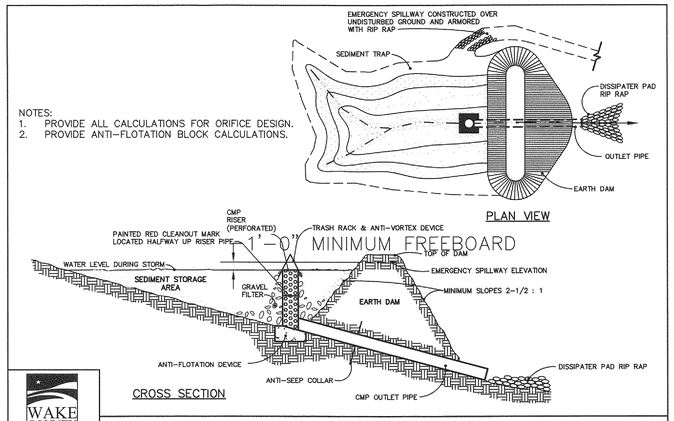
AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511
919-469-1101

Detail Selection Only

NORTH CAROLINA PROFESSIONAL SEAL 8922 ENGINEER PEYTON NICHOLAS JOYNER
Peyton N. Joyner 5/11/20

SHEET NO.

CD2

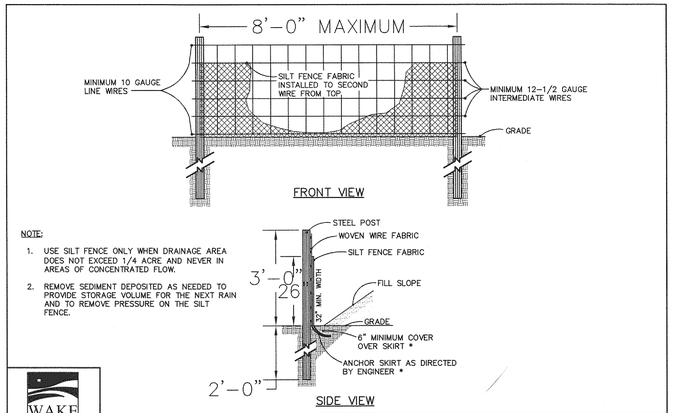


NOTES:
1. PROVIDE ALL CALCULATIONS FOR ORIFICE DESIGN.
2. PROVIDE ANTI-FLOTATION BLOCK CALCULATIONS.

WAKE COUNTY NORTH CAROLINA

EFFECTIVE: 01/31/08

STANDARD RISER-BARREL SEDIMENT BASIN

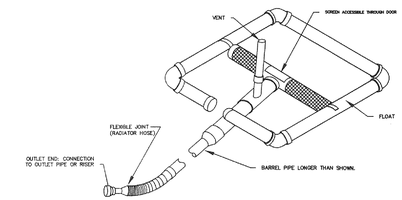


NOTE:
1. USE SILT FENCE ONLY WHEN DRAINAGE AREA DOES NOT EXCEED 1/4 ACRE AND NEVER IN AREAS OF CONCENTRATED FLOW.
2. REMOVE SEDIMENT DEPOSITED AS NEEDED TO PROVIDE STORAGE VOLUME FOR THE NEXT RAIN AND TO REMOVE PRESSURE ON THE SILT FENCE.

WAKE COUNTY NORTH CAROLINA

EFFECTIVE: 01/31/08

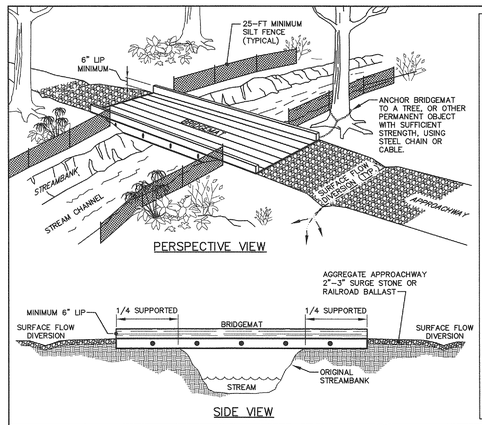
STANDARD TEMPORARY SILT FENCE



WAKE COUNTY NORTH CAROLINA

EFFECTIVE: 01/31/08

STANDARD SKIMMER DETAIL

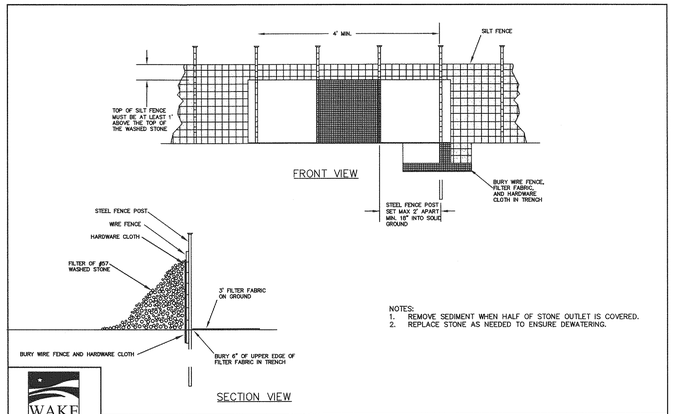


INSTALLATION NOTES:
1. REFER TO "NORTH CAROLINA DIVISION OF FOREST RESOURCES" LITERATURE, INSTALLATION MAINTENANCE GUIDELINES, & "NORTH CAROLINA FORESTRY BMP MANUAL-2006".
2. INSTALL WATER DIVERSION DEVICES (WATER BARS, TURNOUTS, BROAD-BASED DIPS, ETC.) ON BOTH SIDES OF THE MATS.
3. STABILIZE EXPOSED MINERAL SOIL WITH TREE TOPS OR BRUSH DURING MAT INSTALLATION, AND SEEDING/MULCH AFTER MAT REMOVAL.
4. INSTALL MATS TO CREATE A MINIMUM TEN FOOT BRIDGE WIDTH.
5. INCLUDE COARSE AGGREGATE ON THE APPROACHWAY FOR A MINIMUM OF 25 FEET AND SILT FENCE ALONG STREAMBANKS ADJACENT TO CROSSING FOR A MINIMUM OF 25 FEET.

MAINTENANCE NOTES:
1. KEEP MATS' SURFACE FREE OF MINERAL SOIL AND DEBRIS THAT COULD ENTER STREAM.
2. PERIODICALLY CHECK MAT HARDWARE; RETIGHTEN NUTS & CABLE CLAMPS AS NECESSARY TO MAINTAIN BRIDGE STRENGTH AND INTEGRITY.
3. IMMEDIATELY REMOVE ANY DEBRIS WHICH ENTERS THE STREAM AT THE CROSSING LOCATION.

REMOVAL NOTES:
1. CLEAN OFF BRIDGE SURFACE.
2. REMOVE MATS BY USING MAT CABLE LOOP OR SKIDDER GRAPPLE.
3. PERMANENTLY STABILIZE DISTURBED PORTIONS OF STREAMBANK AND APPROACH ROADS WITH PERENNIAL GRASSES/MULCH (OR WETLAND MIX WHEN APPLICABLE).
4. LEAVE APPROPRIATE WATER DIVERSION STRUCTURES IN PLACE ON BOTH SIDES OF STREAM.
5. RESTORE THE STREAM CHANNEL TO ITS ORIGINAL CROSS-SECTION, AND SMOOTH AND APPROPRIATELY STABILIZE ALL DISTURBED AREAS.

STANDARD TEMPORARY STREAM CROSSING OPTION



NOTES:
1. REMOVE SEDIMENT WHEN HALF OF STONE OUTLET IS COVERED.
2. REPLACE STONE AS NEEDED TO ENSURE DEWATERING.

WAKE COUNTY NORTH CAROLINA

EFFECTIVE: 01/31/08

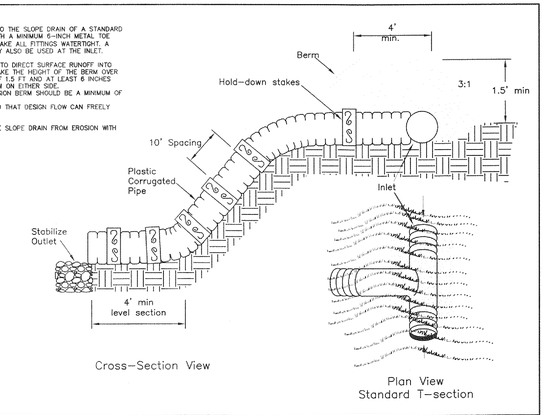
STANDARD SILT FENCE OUTLET

NOTES:

1. CONSTRUCT THE ENTRANCE TO THE SLOPE DRAIN OF A STANDARD FLARED-END SECTION OF PIPE WITH A MINIMUM 6-INCH METAL TOE PLATE (CROSS-SECTION VIEW). MAKE ALL FITTINGS WATERTIGHT. A STANDARD T-SECTION FITTING MAY ALSO BE USED AT THE INLET.

2. USE AN EARTHEN DIVERSION TO DIRECT SURFACE RUNOFF INTO THE TEMPORARY SLOPE DRAIN. MAKE THE HEIGHT OF THE BERM OVER THE DRAIN CONDUIT A MINIMUM OF 1.5 FT AND AT LEAST 6 INCHES HIGHER THAN THE ADJOINING BERM ON EITHER SIDE. THE LOWEST POINT OF THE DIVERSION BERM SHOULD BE A MINIMUM OF 1 FT ABOVE THE TOP OF THE DRAIN SO THAT DESIGN FLOW CAN FREELY ENTER THE PIPE.

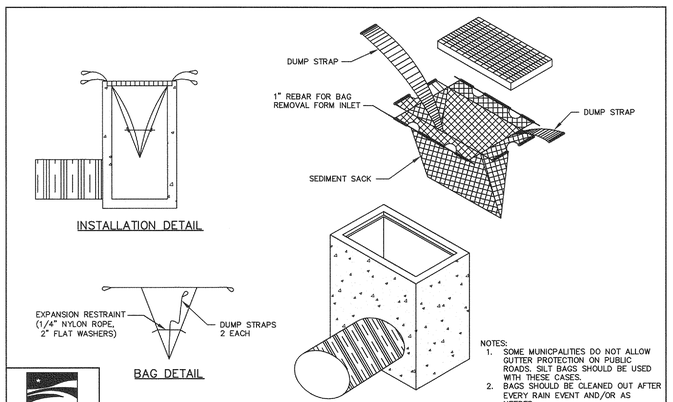
3. PROTECT THE OUTLET OF THE SLOPE DRAIN FROM EROSION WITH RIPRAP DISSIPATOR.



WAKE COUNTY NORTH CAROLINA

EFFECTIVE: 01/31/08

STANDARD TEMPORARY SLOPE DRAIN

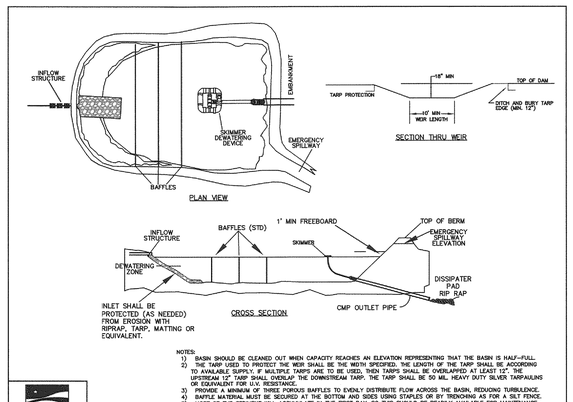


NOTES:
1. SOME MUNICPALITIES DO NOT ALLOW GUTTER PROTECTION ON PUBLIC ROADS. SILT BAGS SHOULD BE USED WITH THESE CASES.
2. BAGS SHOULD BE CLEANED OUT AFTER EVERY RAIN EVENT AND/OR AS NEEDED.

WAKE COUNTY NORTH CAROLINA

EFFECTIVE: 01/31/08

STANDARD SILT BAG - INLET SEDIMENT CONTROL DEVICE

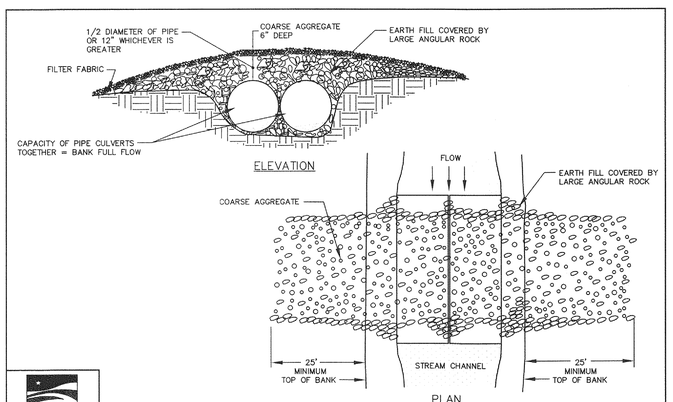


NOTES:
1) BASIN SHOULD BE CLEANED OUT WHEN CAPACITY REACHES AN ELEVATION REPRESENTING THAT THE BASIN IS HALF-FULL.
2) THE TARP USED TO PROTECT THE WEIR SHALL BE THE WIDTH SPECIFIED. THE LENGTH OF THE TARP SHALL BE ACCORDING TO AVAILABLE SUPPLY. IF MULTIPLE TARPS ARE TO BE USED, THEN TARPS SHALL BE OVERLAPPED AT LEAST 12". THE UPSTREAM 12" TARP SHALL OVERLAP THE DOWNSTREAM TARP. THE TARP SHALL BE 50 MIL. HEAVY DUTY SILVER TARPAULINS OR EQUIVALENT. TAPE ALL SEAMS.
3) PROVIDE A MINIMUM OF THREE POROUS BAFFLES TO EVENLY DISTRIBUTE FLOW ACROSS THE BASIN, REDUCING TURBULENCE.
4) BAFFLE MATERIAL MUST BE SECURED AT THE BOTTOM AND SIDES USING STAPLES OR BY TRENCHING AS FOR A SILT FENCE.
5) MOST OF THE SEDIMENT WILL ACCUMULATE IN THE FIRST BAY, SO THIS SHOULD BE READILY AVAILABLE FOR MAINTENANCE.
6) DURING THE CONSTRUCTION PHASE OF THE PROJECT, PERMANENT STORMWATER RISER SHALL ONLY DEWATER FROM THE TOP OF PIPE.
7) POND SHALL NOT BE CONVERTED FOR STORMWATER USE UNTIL APPROVED BY ENVIRONMENTAL ENGINEER.

WAKE COUNTY NORTH CAROLINA

EFFECTIVE: 01/31/08

STANDARD SKIMMER BASIN



WAKE COUNTY NORTH CAROLINA

EFFECTIVE: 01/31/08

STANDARD TEMPORARY STREAM CROSSING

No.	DATE	REVISION	DWN/CHK

EROSION CONTROL DETAILS

FOR

KALAS FALLS

SITUATED AT

ROLESVILLE ROAD, ROLESVILLE

WAKE COUNTY, NORTH CAROLINA

FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	EDS
DATE:	9/19/2019

AMERICAN Engineering

American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511
919-469-1101

Detail Selection Only

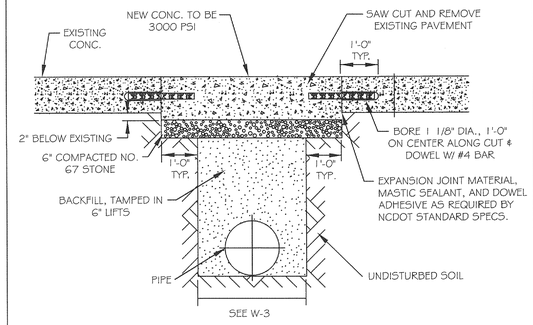
NORTH CAROLINA PROFESSIONAL ENGINEER 8922 ROBIN NICHOLAS JONES

5/14/20

SHEET NO.

CD3

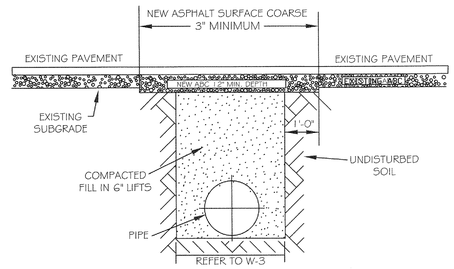
Y:\Jobs\9900\Watkins Property\dwg\Temporary\Emily\Rogers Farm Full Set Details.dwg



NOTES:
1. SEE CITY OF RALEIGH STANDARDS FOR TRENCHES AND PIPE BEDDING W-3 FOR ADDITIONAL DETAILS
2. PAVEMENT CUTS WITHIN NCDOT ROW SHALL CONFORM TO THE APPROVED ON SITE ENCROACHMENT PERMIT.
3. THE PAVEMENT CUT SHALL BE DEFINED BY A STRAIGHT EDGE AND CUT WITH AN APPROVED SAW CUT MACHINE.
4. THE TRENCH SUBGRADE MATERIAL SHALL BE BACKFILLED WITH SUITABLE MATERIAL AND COMPACTED TO A DENSITY OF AT LEAST 95% OF THAT OBTAINED BY COMPACTING A SAMPLE OF THE MATERIAL IN ACCORDANCE WITH AASHTO T-99 AS MODIFIED BY NCDOT. 5. THE FINAL 6" OF FILL SHALL CONSIST OF ABC MATERAIL COMPACTED TO A DENSITY EQUAL TO 100% OF THAT OBTAINED BY COMPACTING A SAMPLE OF THE MATERIAL IN ACCORDANCE WITH AASHTO T-80 AS MODIFIED BY NCDOT .

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
STANDARD CONCRETE PAVEMENT PATCH DETAIL

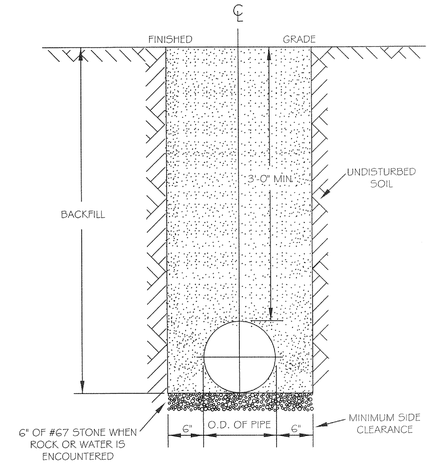
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-1	RRH	3-31-00	A.B.B.	10-29-10
	A.B.B.	2-8-05	MAB	10-31-13



NOTES:
1. THE PAVEMENT CUT SHALL BE DEFINED BY A STRAIGHT EDGE AND CUT WITH AN APPROPRIATE SAW CUT MACHINE.
2. THE TRENCH SUBGRADE MATERIAL SHALL BE BACKFILLED WITH SUITABLE MATERIAL AND COMPACTED TO A DENSITY OF AT LEAST 95% OF THAT OBTAINED BY COMPACTING A SAMPLE OF THE MATERIAL IN ACCORDANCE WITH AASHTO T-99 AS MODIFIED BY NCDOT.
3. THE FINAL 1' OF FILL SHALL CONSIST OF ABC MATERIAL COMPACTED TO A DENSITY EQUAL TO 100% OF THAT OBTAINED BY COMPACTING A SAMPLE OF THE MATERIAL IN ACCORDANCE WITH AASHTO T-80 AS MODIFIED BY NCDOT.
4. THE ENTIRE THICKNESS/ VERTICAL EDGE OF CUT SHALL BE TACKED.
5. THE SAME DEPTH OF PAVEMENT MATERIAL WHICH EXISTS SHALL BE REINSTALLED, BUT IN NO CASE SHALL THE ASPHALT BE LESS THAN 3" THICK.
6. THE ASPHALT PAVEMENT MATERIAL SHALL BE INSTALLED AND COMPACTED THOROUGHLY WITH A SMOOTH DRUM ROLLER TO ACHIEVE A SMOOTH LEVEL PATCH.
7. REFER TO CITY OF RALEIGH STANDARDS FOR TRENCHES AND PIPE BEDDING, W-3. FOR ADDITIONAL DETAILS.
8. NO HAND PATCHING ALLOWED.
9. PAVEMENT CUTS WITHIN NCDOT ROW SHALL CONFORM TO THE APPROVED ON SITE ENCROACHMENT PERMIT.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
STANDARD ASPHALT PAVEMENT PATCH DETAIL

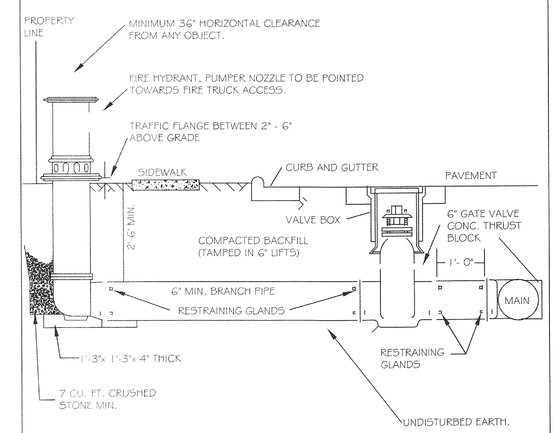
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-2	RRH	3-31-00	A.B.B.	4-16-04
	D.W.C.	11-1-99	J.P.S.	10-29-10



NOTES:
1. TRENCHES REQUIRING SHORING AND BRACING, DIMENSIONS SHALL BE TAKEN FROM THE INSIDE FACE OF THE SHORING AND BRACING.
2. NO ROCKS OR BOULDERS 4" OR LARGER TO BE USED IN BACKFILL.
3. ALL BACKFILL MATERIAL SHALL BE SUITABLE NATIVE MATERIAL.
4. BACKFILL SHALL BE TAMPED IN 6" LIFTS.
5. ACHIEVE 95% COMPACTION IN BACKFILL.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
TRENCH BOTTOM DIMENSIONS & BACKFILLING REQUIREMENTS FOR DUCTILE IRON

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-3	D.W.C.	9-3-99	ABB	2-15-05
	RRH	3-31-00	J.P.S.	10-29-10

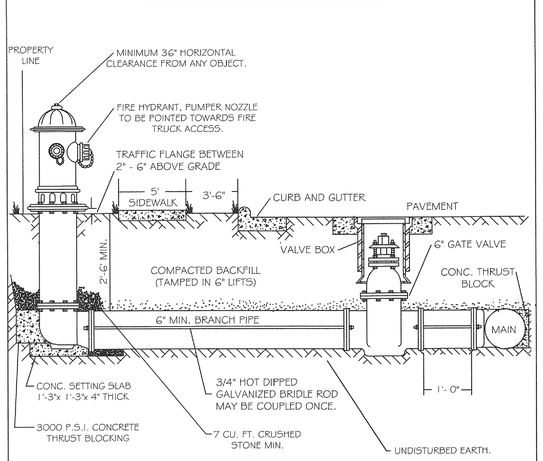


NOTES:
1. FIRE HYDRANT SHALL BE AS MANUFACTURED: MUELLER, AMERICAN DARLING, KENNEDY, M&H, WATEROUS, CLOW, EAST JORDAN IRON WORKS, OR US PIPE.
2. BRANCH PIPE SHALL BE DUCTILE IRON AWWA C150-96
3. 6" GATE VALVE SHALL BE AWWA C500-86 OPEN LEFT
4. STEEL RODS AND BOLTS SHALL BE ¾" HOT DIPPED GALVANIZED
5. FIRE HYDRANTS WILL BE INSTALLED IN TRUE VERTICAL POSITION
RODS SHALL NOT BE COUPLED MORE THAN ONCE. IF THE LENGTH FROM THE VALVE TO THE HYDRANT EXCEEDS 20' THEN A MECHANICAL RESTRAINING GLAND WITH A REBAR CAGE SHALL BE INSTALLED NO MORE THAN 10' FROM HYDRANT AND POURED IN CONCRETE.
FIRE HYDRANTS TO BE LOCATED IN ROW OR 2 FOOT EASEMENT ADJACENT TO ROW

ANYTIME SITE WORK, CONSTRUCTION, ROAD WORK, OR ANY OTHER WORK CHANGES THE GRADE OF THE FIRE HYDRANT, THE PERSON RESPONSIBLE FOR THE WORK IS RESPONSIBLE FOR ADJUSTING THE FIRE HYDRANT TO STAY WITHIN COMPLIANCE.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
STANDARD FIRE HYDRANT INSTALLATION DETAIL

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-4	ABB	4-6-04	PAP	2/17/09
	DHL	2/14/08		



NOTES:
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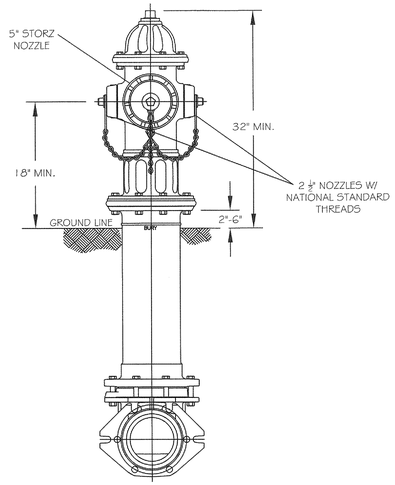
FIRE HYDRANTS TO BE LOCATED IN ROW OR 2 FOOT EASEMENT ADJACENT TO ROW

ANYTIME SITE WORK, CONSTRUCTION, ROAD WORK, OR ANY OTHER WORK CHANGES THE GRADE OF THE FIRE HYDRANT, THE PERSON RESPONSIBLE FOR THE WORK IS RESPONSIBLE FOR ADJUSTING THE FIRE HYDRANT TO STAY WITHIN COMPLIANCE.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
STANDARD FIRE HYDRANT INSTALLATION DETAIL

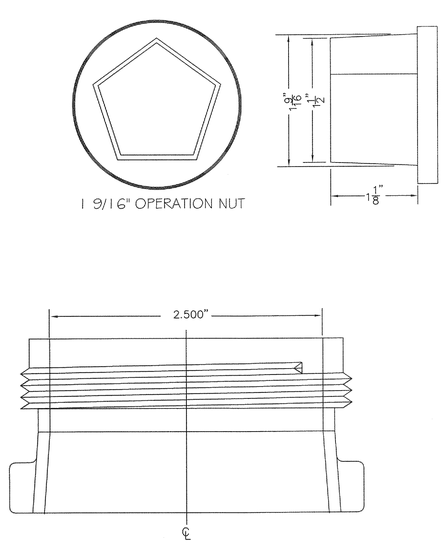
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-4a	ABB	4-6-04		



NOTES:
1. ALL PUBLIC FIRE HYDRANTS IN THE CITY OF RALEIGH AND THE MERGER TOWNS OF GARNER, ROLESVILLE, WAKE FOREST, KNIGHTDALE, WENDELL AND ZEBULON SHALL BE PAINTED CHROME YELLOW WITH HIGH REFLECTIVE ALUMINUM SILVER CAPS, BONNETS AND OPERATING NUTS.

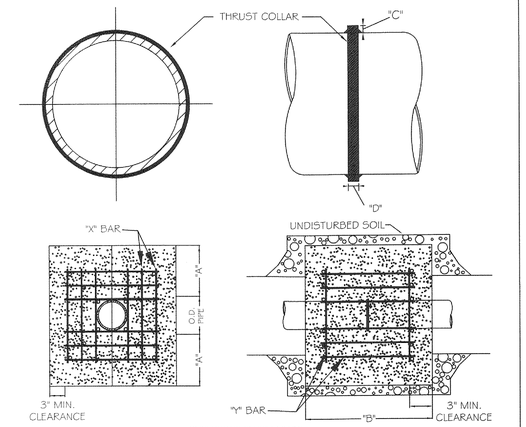
CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
RALEIGH, GARNER, KNIGHTDALE, ROLESVILLE, WAKE FOREST, WENDELL & ZEBULON
STANDARD FIRE HYDRANT WITH 5" STORZ PUMPER NOZZLE

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-5	MAB	6-30-16		



CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
HYDRANT OPERATING NUT AND 2 1/2" OUTLET THREADS

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-6	RRH	3-31-00	DHL	2-18-08
	A.B.B	4-13-04	J.P.S	11-1-10



REINFORCING REQUIREMENTS

I.D. PIPE	REBAR SIZE	"X" BAR LENGTH	"X" BAR WEIGHT	"Y" BAR LENGTH	"Y" BAR WEIGHT	NO. REQUIRED
6" - 36"	#5	2'-2"+ O.D. PIPE	1.043 LBS/FT	1'-1"	1.1 LBS. EACH	X-24, Y-12
48" & greater	#6	3'-0"+ O.D. PIPE	1.502 LBS/FT	1'-3"	1.9 LBS. EACH	X-24, Y-12

THRUST COLLAR, AND THRUST SCHEDULE

I.D. PIPE	"A"	"B"	"C"	"D"
6" - 16"	1'-4"	1'-7"	2"	3/8"
20" - 24"	1'-4"	1'-7"	3"	1/2"
30" - 36"	1'-4"	1'-7"	4"	5/8"
48" & greater	1'-8"	1'-9"	6"	7/8"

NOTES:
1. SEE STANDARD DETAIL W-9 FOR THRUST BLOCK LOCATIONS.
2. CONCRETE SHALL BE 3000 PSI AND TRANSIT MIXED.
3. REINFORCING BARS SHALL BE DEFORMED AND TIED TOGETHER.
4. TRENCH BOTTOM WIDTH IN VICINITY OF THRUST BLOCK INSTALLATION SHALL BE THE MINIMUM WIDTH AS SHOWN ON STANDARD DETAIL W-3.
5. BACKFILL TAMPED IN 6" LIFTS PER STANDARD DETAIL W-3.
6. THRUST COLLAR MUST BE FACTORY WELDED ON BOTH SIDES ALONG BOTH EDGES OF COLLAR AROUND CIRCUMFERENCE.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
THRUST BLOCKING DESIGN DATA FOR WATER MAINS

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-7	RRH	1-21-00	J.P.S.	11-1-10
	D.H.L.	6-18-08		

No.	DATE	REVISION	DWN/CHK

WATER DETAILS
FOR
KALAS FALLS
SITUATED AT
ROLESVILLE ROAD, ROLESVILLE
WAKE COUNTY, NORTH CAROLINA
FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	EDS
DATE:	9/19/2019

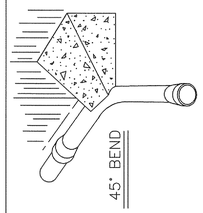
AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511
919-469-1101

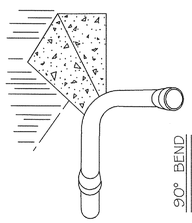
NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMAN
5-11-20
NOT FOR CONSTRUCTION

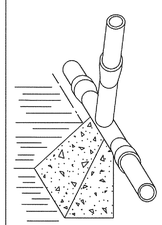
SHEET NO.
CD4

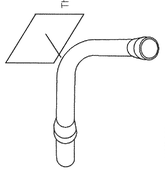
Y:\Jobs\9900\Watkins Property\dwg\Temporary\Emily\Rogers Farm Full Set Details.dwg

THRUST BLOCKING









NOTES:
1. CONCRETE SHALL BE 3000 PSI.
2. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL JOINT FITTINGS.
3. TRENCHES SHALL CONFORM TO STANDARD DETAIL W-3.
4. SEE STANDARD THRUST BLOCK TABLES, W-10 THRU W-11, FOR AREA OF CONCRETE REQUIRED.
5. ALL BENDS AND INTERSECTIONS SHALL HAVE CONCRETE THRUST BLOCKING.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
STANDARD THRUST BLOCKING VIEWS

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-9	D.W.C.	3-1-87	RRH	3-31-00
		9-7-99	D.H.L.	6-18-08

REACTION BEARING AREAS FOR HORIZONTAL WATER PIPE BENDS
BASED ON TEST PRESSURE OF 200 P.S.I.

ALL AREAS GIVEN IN SQUARE FEET.

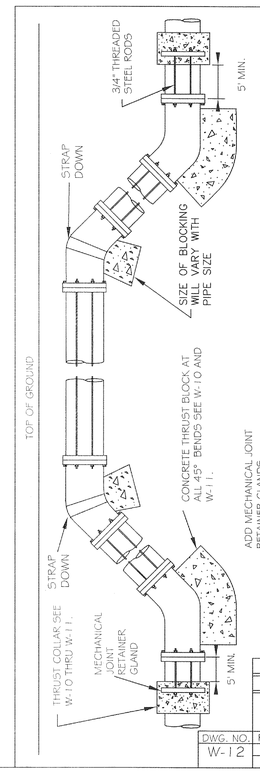
SIZE AND DEGREE OF BEND	STATIC THRUST IN POUNDS	MODERATELY DRY CLAY 4000 LBS/FT²	SOFT CLAY 2000 LBS/FT²	1000 LBS/FT² GRAVEL / COARSE SAND	2000 LBS/FT² DRY CLAY - ALWAYS DRY	SAND - COMPACT FIRM 8000 LBS/FT²	SAND - CLEAN DRY 4000 LBS/FT²	SOIL 1000 LBS/FT² QUICKSAND - VERY POOR	ROCK - POOR 10,000 LBS/FT²
6"									
11 1/4°	1,108	1	1	1	1	1	1	2	1
22 1/2°	2,207	1	2	2	1	1	1	3	1
45°	4,328	2	3	3	1	1	2	5	1
90°	7,996	2	4	5	1	1	2	8	1
PLUG	5,655	2	3	4	1	1	2	6	1
8"									
11 1/4°	1,970	1	1	2	1	1	1	2	1
22 1/2°	3,922	1	2	3	1	1	1	4	1
45°	7,694	2	4	5	1	1	2	8	1
90°	14,215	4	8	9	2	2	4	15	2
PLUG	10,053	3	5	6	2	2	3	10	1
12"									
11 1/4°	4,433	2	3	3	1	1	2	5	1
22 1/2°	8,826	3	5	6	2	2	3	9	1
45°	17,312	5	9	11	3	3	5	18	2
90°	31,983	8	16	19	4	4	8	32	4
PLUG	22,619	6	12	14	3	3	6	23	3
16"									
11 1/4°	7,881	2	4	5	1	1	2	8	1
22 1/2°	15,691	4	8	10	2	2	4	16	2
45°	30,779	8	16	19	4	4	8	31	4
90°	56,861	15	29	35	8	8	15	57	6
PLUG	40,213	10	21	25	5	5	10	41	5

REACTION BEARING AREAS ARE IN SQUARE FEET MEASURED IN A VERTICAL PLANE IN THE TRENCH SIDE AT AN ANGLE OF 90° TO THE THRUST VECTOR.

USE 6" - 90 BEND VALUE FOR HYDRANTS FOR ADDITIONAL SAFETY FACTOR.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
THRUST BLOCKING DESIGN QUANTITY TABLE

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-10	D.W.C.	6-23-99		



ROD REQUIREMENTS

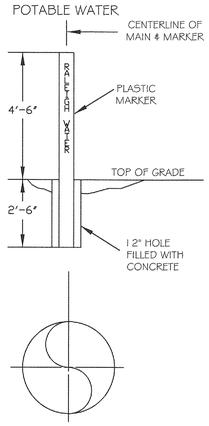
SIZE OF 45 BEND	STATIC THRUST IN POUNDS	NO. OF RODS REQUIRED
6"	4,328	2
8"	7,694	4
12"	17,312	4
16"	30,779	8
24"	69,252	8

GENERAL NOTES:
1. STEEL RODS AND BOLTS SHALL BE 3/4" HOT DIPPED GALVANIZED.
2. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL JOINT BENDS.
3. RESTRAINED MECHANICAL GLANDS TO BE USED AT ALL FITTINGS.
4. MUST USE DUCTILE IRON EYE BOLTS WHERE NECESSARY.
5. 3' MINIMUM COVER MUST BE MAINTAINED ON ALL WATER MAINS

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
STANDARD VERTICAL BEND

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-12	ABB	4-6-04	J.P.S.	11-1-10
	D.H.L.	6-18-08		

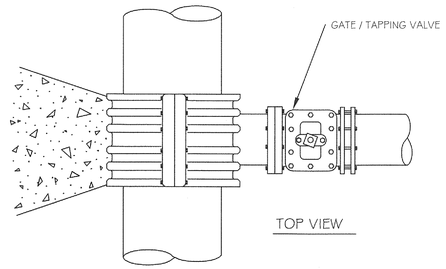
POTABLE WATER



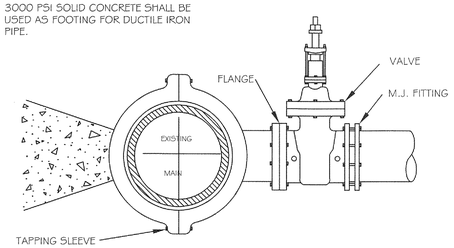
NOTES
1. POTABLE WATER MARKER TO BE BLUE IN COLOR.
2. POTABLE WATER MARKER TO BE LABELED "RALEIGH WATER".
3. TO BE SPACED ALONG CENTERLINE OF MAIN EVERY 300 FEET.
4. MARKERS TO BE ROUND AND 4" IN DIAMETER.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
STANDARD MAIN & VALVE MARKERS FOR POTABLE & REUSE WATER IN EASEMENTS

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-13	D.W.C.	9-7-99	DHL	8-16-07
	RRH	3-31-00	J.P.S.	11-1-10



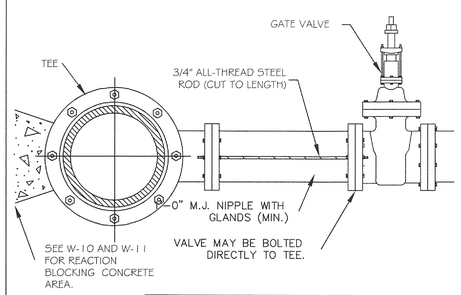
3000 PSI SOLID CONCRETE SHALL BE USED AS FOOTING FOR DUCTILE IRON PIPE.



NOTES:
1. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL JOINT FITTINGS.
2. SEE STANDARD REACTION BLOCK TABLES, W-10 AND W-11 FOR AREA OF CONCRETE REQUIRED.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
4" - 24" STANDARD TAPPING SLEEVE AND VALVE ASSEMBLY

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-14	Y.C.A.	12-31-91	RRH	3-31-00
	D.W.C.	9-7-99	J.P.S.	11-1-10



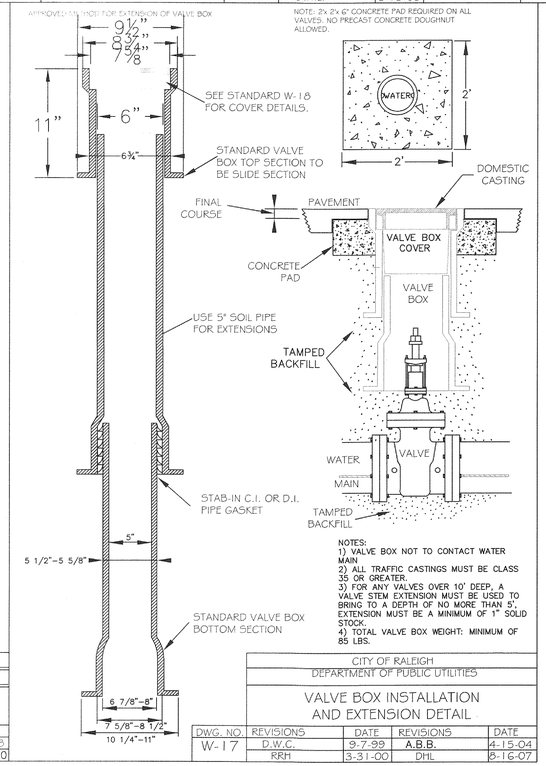
ROD REQUIREMENTS

NO. OF RODS	BRANCH SIZE
4"	2
6"	2
8"	4
12"	4
16"	6
24"	6
30"	8
36"	8

NOTES:
1. STEEL RODS AND BOLTS SHALL BE 3/4" HOT DIPPED GALVANIZED.
2. SEE STANDARD THRUST BLOCK, TABLES W-10 AND W-11 FOR CONCRETE.
3. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL FITTINGS.
4. THIS RODDING REQUIREMENT DOES NOT APPLY TO FIRE HYDRANTS.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
VALVE RESTRAINT AT TEES AND CROSSES FOR LINES (4"-24")

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-15	RRH	3-31-00	D.H.L.	6-16-08
	A.B.B.	4-19-04	J.P.S.	11-1-10



NOTE: 2'x 2'x 6" CONCRETE PAD REQUIRED ON ALL VALVES. NO PRECAST CONCRETE DOUGHNUT ALLOWED.

NOTES:
1) VALVE BOX NOT TO CONTACT WATER MAIN
2) ALL TRAFFIC CASTINGS MUST BE CLASS 35 OR GREATER.
3) FOR ANY VALVES OVER 10' DEEP, A VALVE STEM EXTENSION MUST BE USED TO BRING TO A DEPTH OF NO MORE THAN 5', EXTENSION MUST BE A MINIMUM OF 1" SOLID STOCK.
4) TOTAL VALVE BOX WEIGHT: MINIMUM OF 85 LBS.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
VALVE BOX INSTALLATION AND EXTENSION DETAIL

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-17	D.W.C.	9-7-99	A.B.B.	4-15-04
	RRH	3-31-00	DHL	8-16-07

No.	DATE	REVISION	DWN/CHK

WATER DETAILS
FOR
KALAS FALLS
SITUATED AT
ROLESVILLE ROAD, ROLESVILLE
WAKE COUNTY, NORTH CAROLINA
FIRM # C-3881

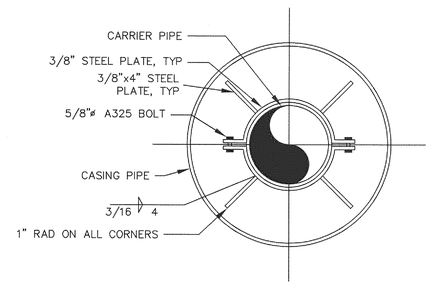
JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	EDS
DATE:	9/19/2019

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511
919-469-1101

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMAN
5-11-20
NOT FOR CONSTRUCTION

SHEET NO.
CD5

Y:\Jobs\9900\Watkins Property\dwg\Temporary\Emily\Rogers Farm Full Set Details.dwg



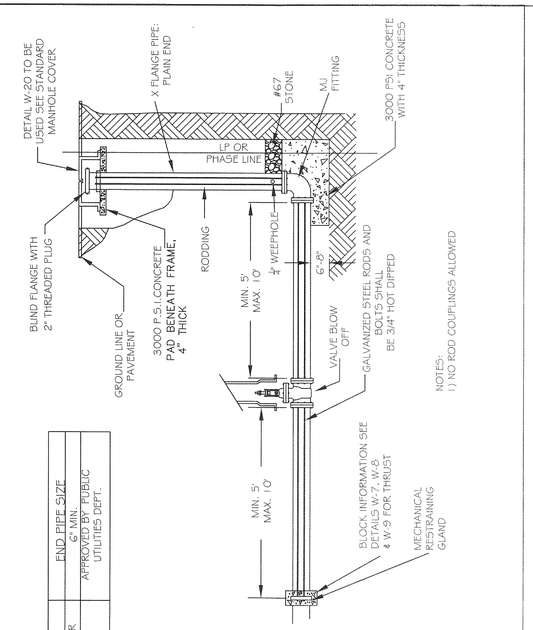
NOTE:

1) USE A MINIMUM OF TWO SPIDERS PER PIPE JOINT ONE FOURTH OF THE PIPE JOINT LENGTH IN FROM BOTH THE BELL AND SPIGOT ENDS.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES

PIPE ALIGNMENT GUIDE

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-40	RRH	3-31-00		
	A.B.B.	4-16-04		

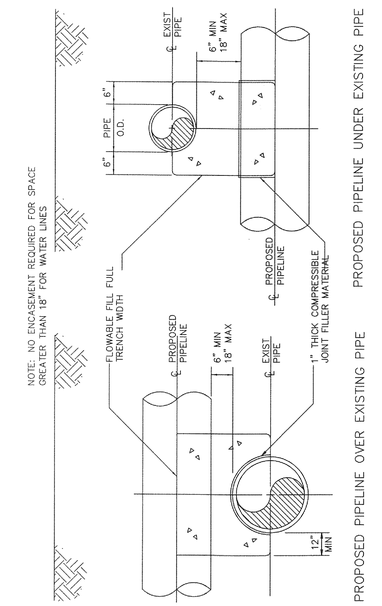


MAIN SIZE	END PIPE SIZE
16" & GREATER	6" MIN.
6" - 12"	APPROVED BY PUBLIC UTILITIES DEPT.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES

TEMPORARY WATER MAIN BLOW OFF ASSEMBLY

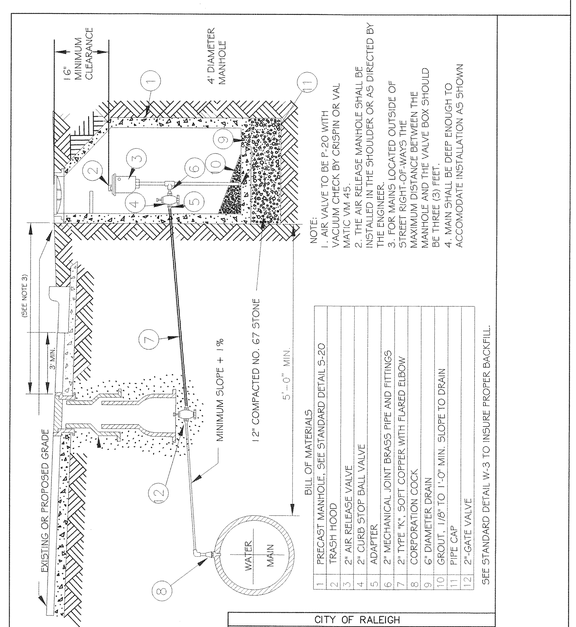
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-21	D.W.C.	12-28-99	A.B.B.	4-12-04
	RRH	3-31-00	DHL	8-16-07



CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES

CONCRETE CRADLE PROTECTION FOR WATER LINE CROSSINGS

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-41	DHL	2-20-08		



NOTE:
1. AIR VALVE TO BE P-20 WITH VACUUM CHECK BY CRISPIN OR VAL MATIC VALVE.
2. THE AIR RELEASE MANHOLE SHALL BE INSTALLED IN THE SHOULDER OR AS DIRECTED BY THE ENGINEER.
3. IF PLACED LOCATED OUTSIDE OF STREET RIGHT OF WAYS THE MAXIMUM DISTANCE BETWEEN THE MANHOLE AND THE VALVE BOX SHOULD BE THREE (3) FEET.
4. MAIN SHALL BE DEEP ENOUGH TO ACCOMODATE INSTALLATION AS SHOWN

BILL OF MATERIALS

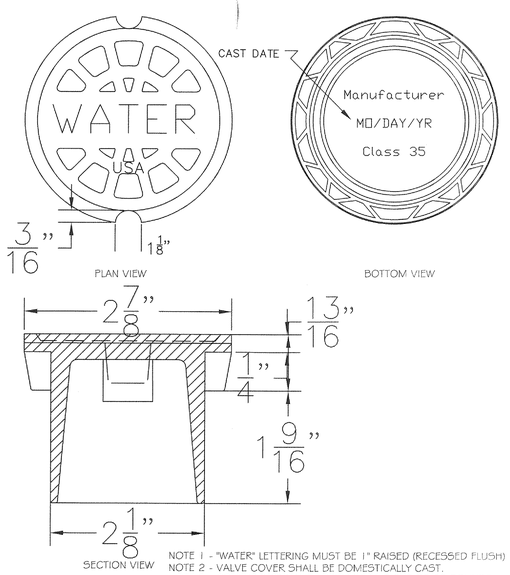
1	PRECAST MANHOLE, SEE STANDARD DETAIL 5-20
2	TRASH HOOD
3	2" AIR RELEASE VALVE
4	2" CURB STOP BALL VALVE
5	ADAPTER
6	2" MECHANICAL JOINT BRASS PIPE AND FITTINGS
7	2" TYPE "K", SOFT COPPER WITH FLARED ELBOW.
8	CORPORATION COCK
9	6" DIAMETER DRAIN
10	GROUT, 1/8" TO 1'-0" MIN. SLOPE TO DRAIN
11	PIPE CAP
12	2"-GATE VALVE

SEE STANDARD DETAIL W-3 TO INSURE PROPER BACKFILL.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES

STANDARD WATER AIR RELEASE VALVE

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-19	ABB	10-4-04		2-31-91
	J.P.S.	11-1-10	RRH	6-7-00



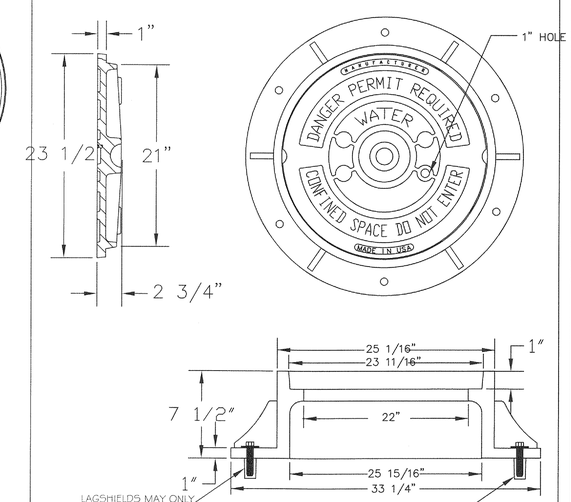
NOTE 1 - "WATER" LETTERING MUST BE 1" RAISED (RECESSED FLUSH)
NOTE 2 - VALVE COVER SHALL BE DOMESTICALLY CAST.
NOTE 3 - COVER MUST HAVE A MINIMUM WEIGHT OF 25 POUNDS.
NOTE 4 - COVER MUST BE CLASS 35 OR GREATER.
NOTE 5 - COVER MUST MEET OR EXCEED AASHTO H-20 LOAD REQUIREMENTS.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES

5 1/4" VALVE BOX DROP LID WITH 4" SKIRT

DWG. NO.	REVISIONS	DATE		
W-18				

MANHOLE FRAME AND COVER
COVER 120 LBS. MINIMUM



NOTES:
1) ALL MANHOLE FRAMES SHALL BE BE DOMESTICALLY CAST
2) FRAME SHALL BE A MINIMUM WEIGHT OF 182 LBS.
3) COVER SHALL WEIGH A MIN. OF 120 LBS.
4) MANHOLES WITHIN PAVED SURFACES SHALL BE CONSTRUCTED IN ACCORDANCE WITH S-29.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES

STANDARD MANHOLE COVER

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-20	A.B.B.	4-8-04		
	D.H.L.	6-18-08		

No.	DATE	REVISION	DWN/CHK

WATER DETAILS
FOR
KALAS FALLS
SITUATED AT
ROLESVILLE ROAD, ROLESVILLE
WAKE COUNTY, NORTH CAROLINA
FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	EDS
DATE:	9/19/2019

AMERICAN Engineering
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875 Walnut Street, Suite 360
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NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMON
5-11-20

SHEET NO.
CD6

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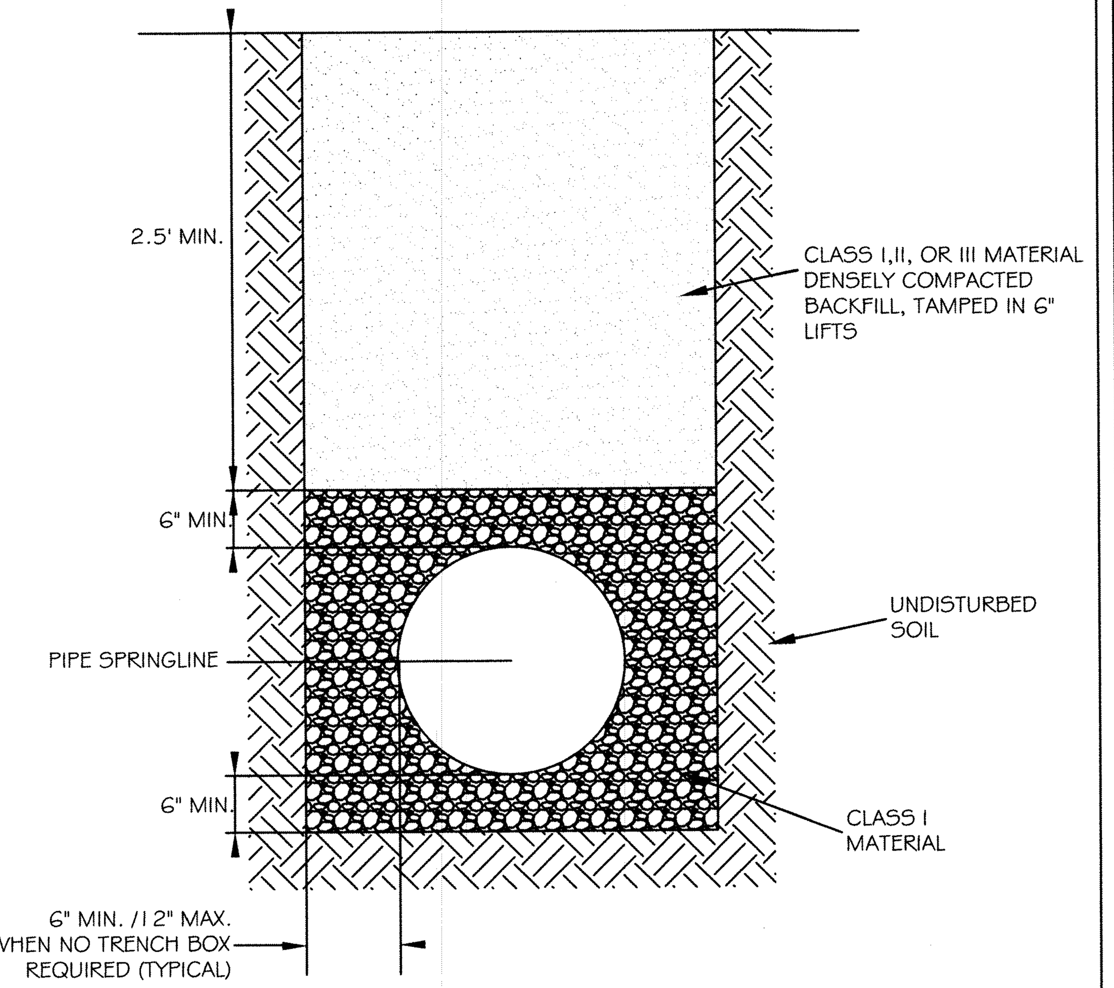
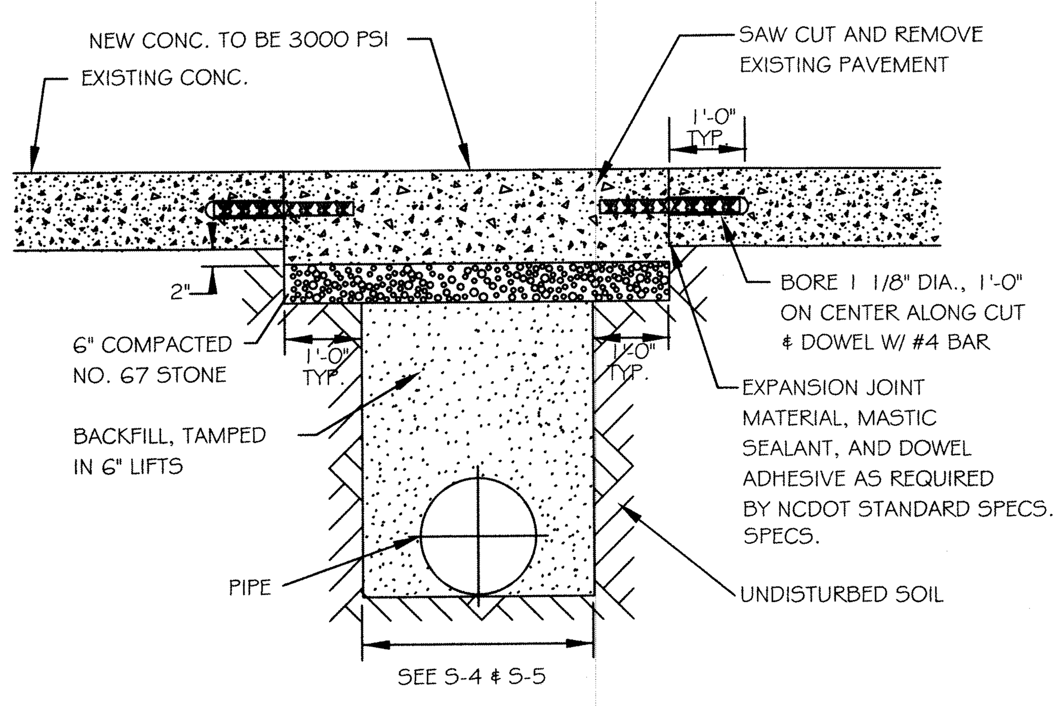
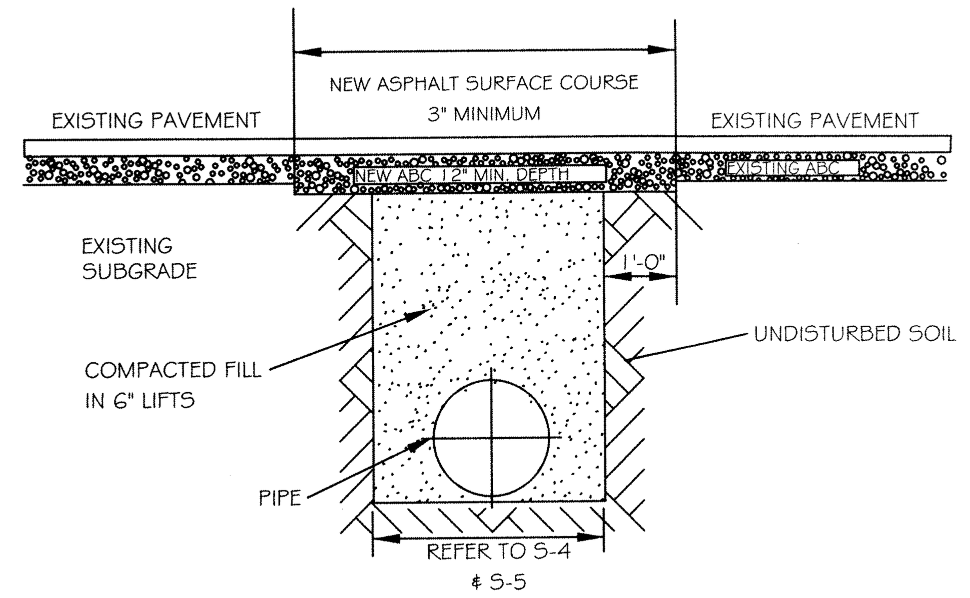


DWG. NO.	CITY OF RALEIGH DEPARTMENT OF PUBLIC UTILITIES STANDARD BEDDING DETAILS FOR CCFRPM PIPES			
	REVISIONS	DATE	REVISIONS	DATE
S-1	J.P.S	10-8-10		



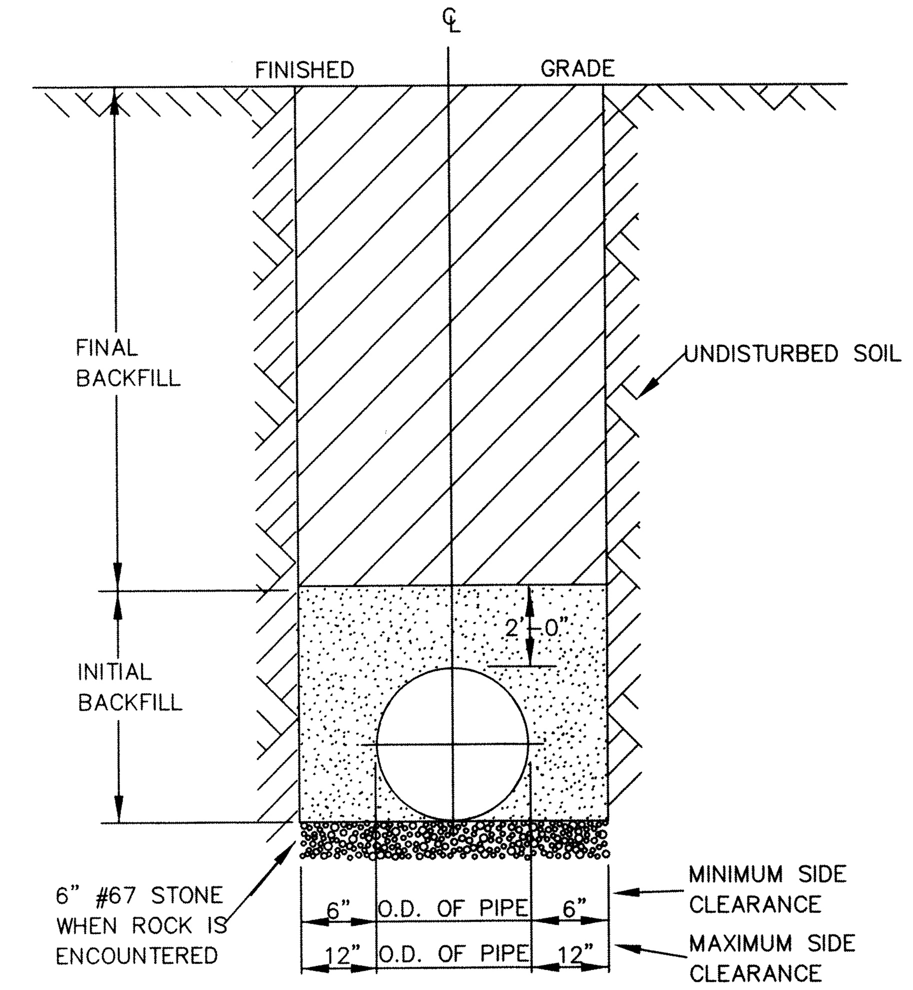
NOTES:
1. See City of Raleigh standards for trenches and pipe bedding (S-4 & S-5) for additional details.
2. Pavement cuts over 5'-0" in width shall be reinforced to N.C.D.O.T. standards.
3. Pavement cuts shall be made with an appropriate saw cut machine.
4. Pavement cuts within NCDOT ROW shall conform to the approved on site encroachment permit.

DWG. NO.	CITY OF RALEIGH DEPARTMENT OF PUBLIC UTILITIES STANDARD CONCRETE PAVEMENT PATCH DETAIL			
	REVISIONS	DATE	REVISIONS	DATE
S-2	D.W.C.	6-23-99	A.B.B.	4-19-04
	RRH	3-30-00	J.P.S	10-8-10



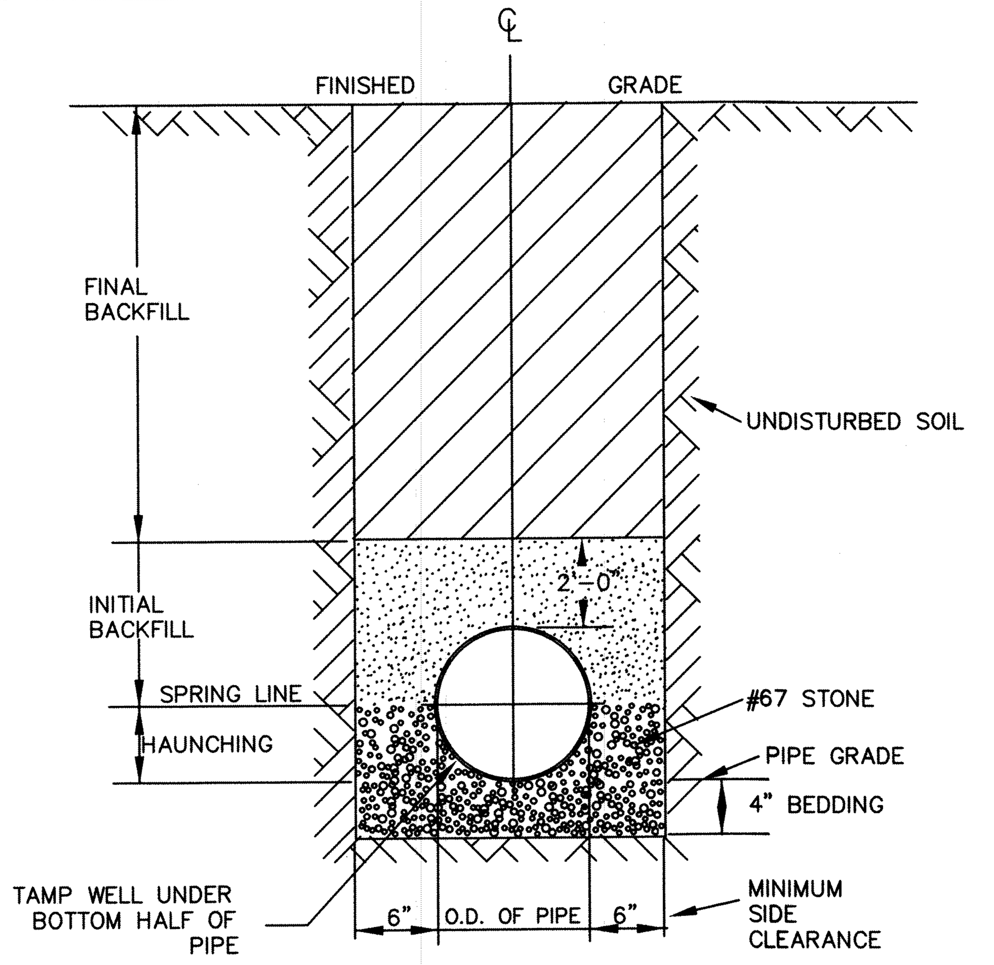
NOTES:
1. IN NCDOT MAINTAINED ROADWAYS ENCROACHMENT PAVEMENT PATCH REQUIREMENTS SHALL TAKE PRECEDENCE.
2. THE PAVEMENT CUT SHALL BE DEFINED BY A STRAIGHT EDGE AND CUT WITH AN APPROPRIATE SAWCUT MACHINE.
3. THE TRENCH SUBGRADE MATERIAL SHALL BE BACKFILLED WITH SUITABLE MATERIAL AND COMPACTED TO A DENSITY OF AT LEAST 95% OF THAT OBTAINED BY COMPACTING A SAMPLE OF THE MATERIAL IN ACCORDANCE WITH AASHTO T-99 AS MODIFIED BY NCDOT.
4. THE FINAL 1' OF FILL SHALL CONSIST OF ABC MATERIAL COMPACTED TO A DENSITY EQUAL TO 100% OF THAT OBTAINED BY COMPACTING A SAMPLE OF THE MATERIAL IN ACCORDANCE WITH AASHTO T-80 AS MODIFIED BY NCDOT.
5. THE ENTIRE THICKNESS AND VERTICAL EDGE OF CUT SHALL BE TACKED.
6. THE SAME DEPTH OF PAVEMENT MATERIAL WHICH EXISTS SHALL BE REINSTALLED, BUT IN NO CASE SHALL THE ASPHALT BE LESS THAN 3" THICK.
7. THE ASPHALT PAVEMENT MATERIAL SHALL BE INSTALLED AND COMPACTED THOROUGHLY WITH A SMOOTH DRUM ROLLER TO ACHIEVE A SMOOTH LEVEL PATCH.
8. REFER TO CITY OF RALEIGH STANDARDS FOR TRENCHES AND PIPE BEDDING (S-4 & S-5) FOR ADDITIONAL DETAILS.
9. NO HAND PATCHING ALLOWED.
10. PAVEMENT CUTS WITHIN NCDOT ROW SHALL CONFORM TO THE APPROVED ON SITE ENCROACHMENT PERMIT.

DWG. NO.	CITY OF RALEIGH DEPARTMENT OF PUBLIC UTILITIES STANDARD ASPHALT PAVEMENT PATCH DETAIL			
	REVISIONS	DATE	REVISIONS	DATE
S-3	D.W.C.	11-1-99	A.B.B.	4-19-04
	RRH	3-30-00	J.P.S.	10-8-10



NOTES:
1. TRENCHES REQUIRING SHORING AND BRACING, DIMENSIONS SHALL BE TAKEN FROM THE INSIDE FACE OF THE SHORING AND BRACING.
2. NO ROCKS OR BOULDERS 4" OR LARGER TO BE USED IN INITIAL BACKFILL.
3. ALL BACKFILL MATERIAL SHALL BE SUITABLE NATIVE MATERIAL.
4. BACKFILL SHALL BE TAMPED IN 6" LIFTS IN TRAFFIC AREAS, 12" IN NON-TRAFFIC AREAS.
5. ACHIEVE 80% COMPACTION IN NON-TRAFFIC AREAS, AND 95% COMPACTION IN TRAFFIC AREAS.
6. IF IN EASEMENT 4" TOPSOIL, AND 12" CLEAN SELECT FILL MAY BE REQUIRED.
7. NO BOULDERS 8" IN DIAMETER OR GREATER ALLOWED IN FINAL BACKFILL.

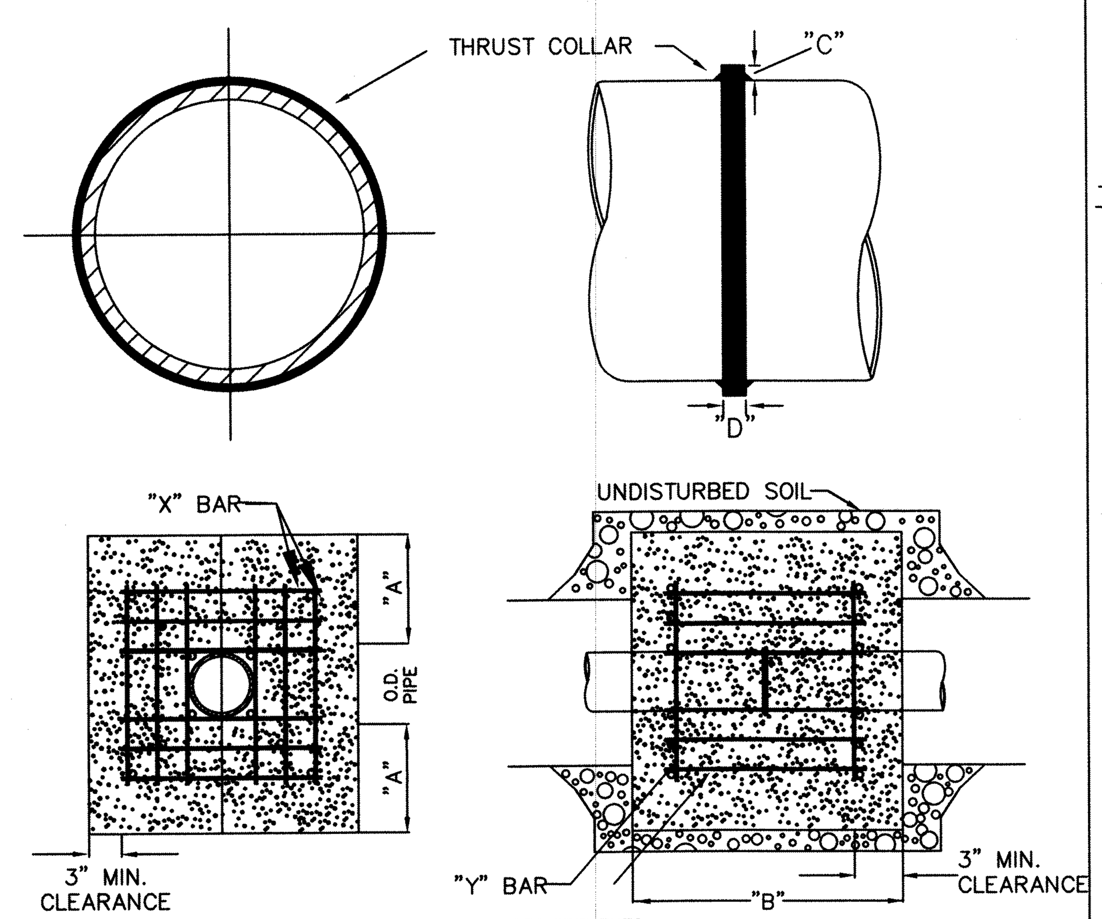
DWG. NO.	CITY OF RALEIGH DEPARTMENT OF PUBLIC UTILITIES TRENCH BOTTOM DIMENSIONS & BACKFILLING REQUIREMENTS FOR DUCTILE IRON			
	REVISIONS	DATE	REVISIONS	DATE
S-4	D.W.C.	9-3-99		
	RRH	3-30-00		



TYPICAL TRENCH BOTTOM DIMENSIONS FOR SDR 35 PVC GRAVITY PIPE

NOTES:
1. FOR TRENCHES REQUIRING SHORING AND BRACING, DIMENSIONS SHALL BE TAKEN FROM THE INSIDE FACE OF THE SHORING AND BRACING.
2. NO ROCKS OR BOULDERS 4" OR LARGER TO BE USED IN INITIAL BACKFILL.
3. ALL BACKFILL MATERIAL SHALL BE SUITABLE NATIVE MATERIAL.
4. BACKFILL SHALL BE TAMPED IN 6" LIFTS IN TRAFFIC AREAS, 12" IN NON-TRAFFIC AREAS.

DWG. NO.	CITY OF RALEIGH DEPARTMENT OF PUBLIC UTILITIES TRENCH BOTTOM DIMENSIONS AND BACKFILLING REQUIREMENTS FOR PVC GRAVITY SEWER MAIN			
	REVISIONS	DATE	REVISIONS	DATE
S-5	TO NOTES	3-1-87	D.W.C.	9-3-99
		7-2-82	RRH	3-30-00



REINFORCING REQUIREMENTS

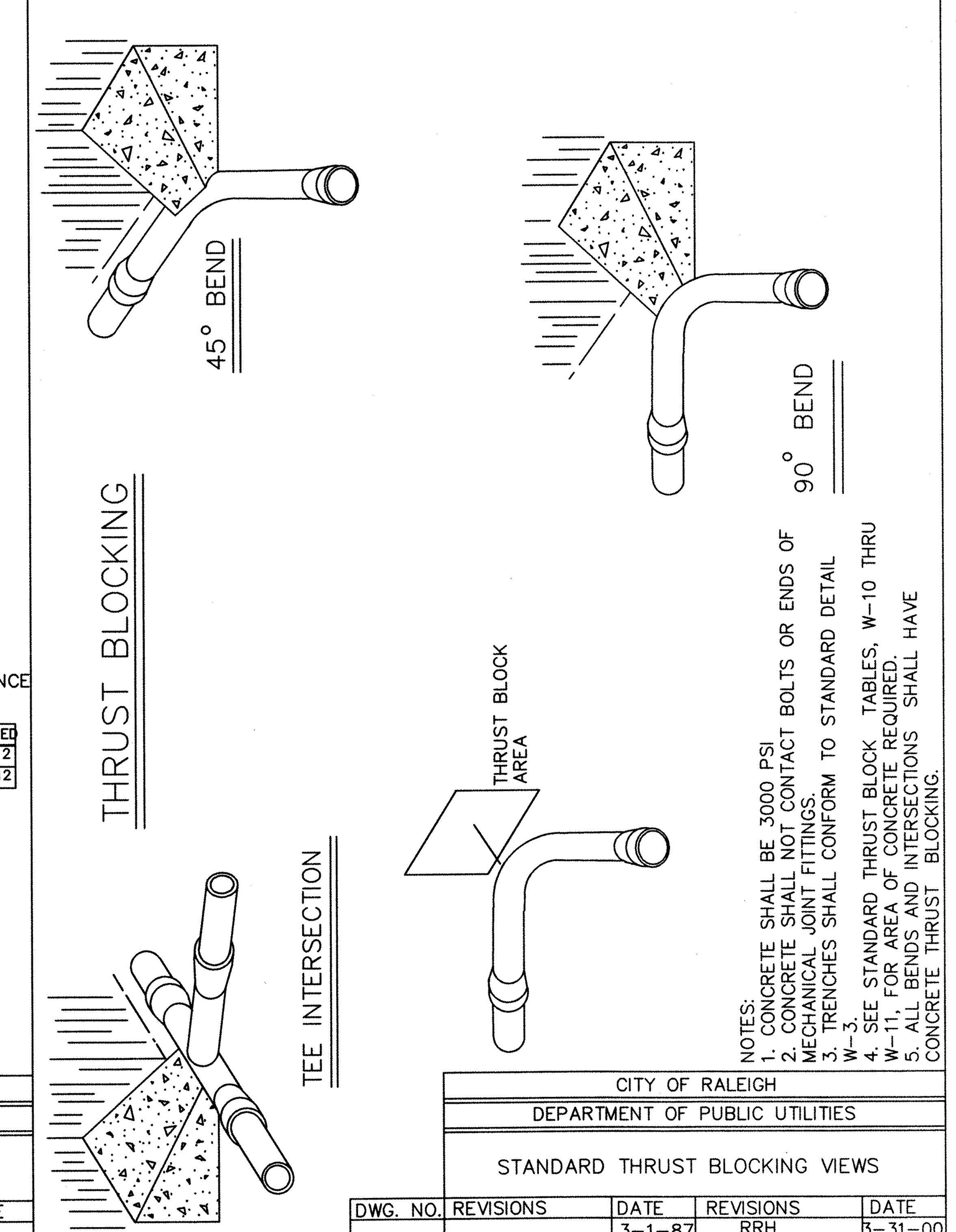
I.D. PIPE	REBAR SIZE	"X" BAR LENGTH	"X" BAR WEIGHT	"Y" BAR LENGTH	"Y" BAR WEIGHT	NO. REQUIRED
6" - 36"	#5	2'-2"+ O.D. PIPE	1.043 LBS/FT	1'-1"	1.1 LBS. EACH	X-24, Y-12
48" & greater	#6	3'-0"+ O.D. PIPE	1.502 LBS/FT	1'-3"	1.9 LBS. EACH	X-24, Y-12

THRUST COLLAR, AND THRUST SCHEDULE

I.D. PIPE	"A"	"B"	"C"	"D"
6" - 16"	1'-4"	1'-7"	2"	3/8"
20" - 24"	1'-4"	1'-7"	3"	1/2"
30" - 36"	1'-4"	1'-7"	4"	5/8"
48" & greater	1'-8"	1'-9"	6"	7/8"

NOTES:
1. CONCRETE SHALL BE 3000 PSI AND TRANSIT MIXED.
2. REINFORCING BARS SHALL BE DEFORMED AND TIED TOGETHER.
3. TRENCH BOTTOM WIDTH IN VICINITY OF THRUST BLOCK INSTALLATION SHALL BE THE MINIMUM WIDTH AS SHOWN ON STANDARD DETAIL W-3.
4. BACKFILL TAMPED IN 6" LIFTS PER STANDARD DETAIL W-3.
5. THRUST COLLAR MUST BE FACTORY WELDED ON BOTH SIDES ALONG BOTH EDGES OF COLLAR AROUND CIRCUMFERENCE.

DWG. NO.	CITY OF RALEIGH DEPARTMENT OF PUBLIC UTILITIES RESTRAINING COLLAR DESIGN DATA FOR SEWER FORCE MAIN			
	REVISIONS	DATE	REVISIONS	DATE
S-6	RRH		1-21-00	
	D.H.L.		6-18-08	



NOTES:
1. CONCRETE SHALL BE 3000 PSI
2. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL JOINT FITTINGS.
3. TRENCHES SHALL CONFORM TO STANDARD DETAIL W-3.
4. SEE STANDARD THRUST BLOCK TABLES, W-10 THRU W-11, FOR AREA OF CONCRETE REQUIRED.
5. ALL BENDS AND INTERSECTIONS SHALL HAVE CONCRETE THRUST BLOCKING.

DWG. NO.	CITY OF RALEIGH DEPARTMENT OF PUBLIC UTILITIES STANDARD THRUST BLOCKING VIEWS			
	REVISIONS	DATE	REVISIONS	DATE
S-7		3-1-87	RRH	3-31-00
	D.W.C.	9-7-99	D.H.L.	6-18-08

AERIAL PIPE CROSSING
GENERAL NOTES:

1. ALL MATERIALS UTILIZED ON THESE DETAIL SHEETS SHALL CONFORM TO THE APPROPRIATE SECTIONS OF THE CITY OF RALEIGH PUBLIC UTILITIES HANDBOOK UNLESS NOTED OTHERWISE HEREIN.

2. RESTRAINED JOINT PIPE AND FITTINGS SHALL CONSIST OF BOLTED RETAINER RINGS AND WELDED RETAINER BARS OR BOLTLESS TYPE WHICH INCLUDE DUCTILE IRON LOCKING SEGMENTS AND RUBBER RETAINERS. BOLTS FOR RESTRAINED JOINTS (IF APPLICABLE) SHALL CONFORM TO ANSI B18.2. RESTRAINED PIPE AND FITTINGS SHALL BE FLEX-RING OR LOK-RING TYPE JOINTS AS MANUFACTURED BY AMERICAN CAST IRON PIPE CO.; TR FLEX AS MANUFACTURED BY US PIPE, SUPER-LOCK AS MANUFACTURED BY CLOW, BOLT-LOK OR SNAP-LOK AS MANUFACTURED BY GRIFFIN PIPE PRODUCTS, OR EQUAL.

3. CONCRETE PROPERTIES SHALL BE AS FOLLOWS:
CONCRETE COMPRESSIVE STRENGTH = 4000 PSI
NOMINAL SLUMP = 4 INCHES
WATER/CEMENTITOUS MATERIALS RATIO = 0.45 (MAX)
AIR CONTENT = 6% * 1.5%

4. CONCRETE SHALL BE COMPOSED OF CEMENT, WATER, COARSE AGGREGATES, FINE AGGREGATES AND AIR. CEMENT SHALL BE TYPE I/II OR II IN ACCORDANCE WITH ASTM C-150. MATERIAL REQUIREMENTS FOR ALL FINE AND COARSE AGGREGATES SHALL CONFORM TO ASTM C-33. COARSE AGGREGATE SHALL BE SIZE No. 57 OR 67. AN APPROVED CLASS 'F' FLYASH MAY BE SUBSTITUTED FOR AN EQUAL AMOUNT OF CEMENT BY WEIGHT UP TO 25%.

5. ALL EXPOSED CONCRETE CORNERS SHALL BE CHAMFERED 3/4".

6. CONVENTIONAL REINFORCING STEEL SHALL CONFORM TO ASTM A615 GRADE 60 AND SHALL BE PLACED IN ACCORDANCE WITH "RECOMMENDED PRACTICE FOR PLACING REINFORCING BARS" (LATEST EDITION) AS PUBLISHED BY THE CONCRETE REINFORCING INSTITUTE. SPLICES SHALL BE CLASS 'B' CONFORMING TO THE

7. PROVISIONS OF ACI 318 - "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE".

NEOPRENE BEARING PADS SHALL BE FORMED FROM PREVIOUSLY UNVULCANIZED, 100% VIRGIN NEOPRENE, WITH DUROMETER HARDNESS = 50.

PILES SHALL BE STRUCTURAL STEEL HP12x53 PILES AND SHALL CONFORM TO THE REQUIREMENTS OF ASTM A36. PILES SHALL BE DRIVEN TO DEPTHS REQUIRED TO OBTAIN AN ULTIMATE BEARING CAPACITY OF NOT LESS THAN TWO TIMES THE DESIGN LOADING OF 30 TONS. PILES SHALL PENETRATE A MINIMUM OF FIFTEEN FEET INTO UNDISTURBED SOIL. IN DRIVING PILES, A METHOD APPROVED BY THE ENGINEER SHALL BE USED WHEREBY THE HEAD OF THE PILE IS NOT DAMAGED. IF REQUESTED BY THE ENGINEER, PILES SHALL BE TESTED TO DETERMINE THE ULTIMATE CAPACITY OF THE PILES. THE METHOD OF LOAD TESTING SHALL CONFORM TO ASTM D1143 AND THE NORTH CAROLINA STATE BUILDING CODE. WHERE PILES ARE EXPOSED, PILES SHALL BE PAINTED AND/OR COATED IN ACCORDANCE WITH THE CITY SPECIFICATIONS.

DWG. NO.	CITY OF RALEIGH DEPARTMENT OF PUBLIC UTILITIES AERIAL PIPE CROSSING GENERAL NOTES			
	REVISIONS	DATE	REVISIONS	DATE
S-10	D.H.L.	6/16/08		

UTILITY INSTALLATIONS AND OTHER PUBLIC FACILITIES INCLUDING SIDEWALKS AND HANDICAP RAMPS ARE TO BE CONSTRUCTED ON ALL STREETS AS SPECIFIED BY CITY CODE. THESE FACILITIES HAVE BEEN APPROVED BY THE CITY OF RALEIGH AND SHALL BE SO INSTALLED UNLESS A CHANGE IS AUTHORIZED BY WRITTEN APPROVAL. PUBLIC SANITARY SEWER EASEMENTS ARE TO BE RECORDED PRIOR TO FINAL ACCEPTANCE.

TRANSPORTATION SERVICES________
PUBLIC UTILITIES________
CONSERVATION ENGINEER________
PLANNING________

Y:\Jobs\9900\Watkins Property\dwg\Temporary\Emily\Rogers Farm Full Set Details.dwg

No.	DATE	REVISION	DWN/CHK

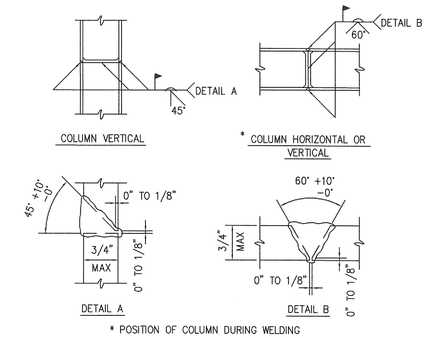
SANITARY SEWER DETAILS
FOR
KALAS FALLS
SITUATED AT
ROLESVILLE ROAD, ROLESVILLE
WAKE COUNTY, NORTH CAROLINA
FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	EDS
DATE:	9/19/2019

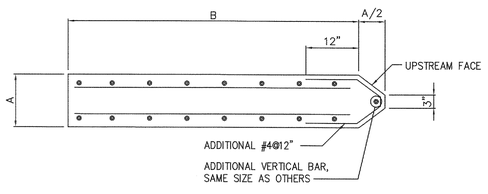
AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511
919-469-1101

NORTH CAROLINA PROFESSIONAL SEAL ENGINEER R. HARMAN
5.11.20

SHEET NO.
CD7



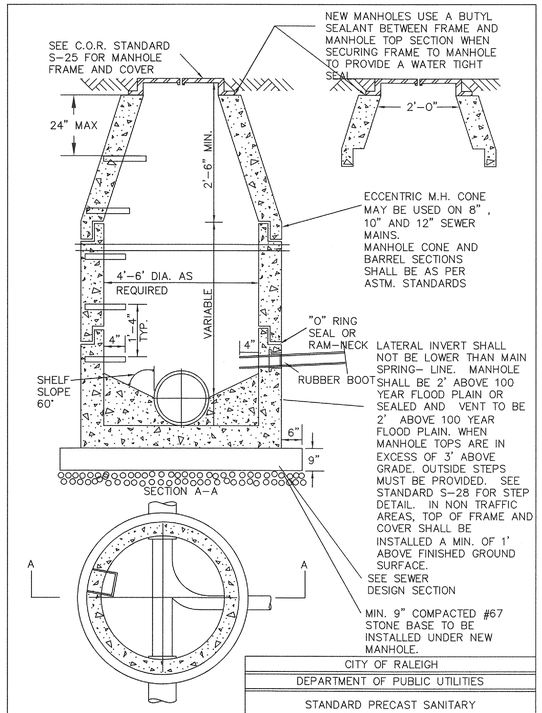
STEEL PILE SPLICE



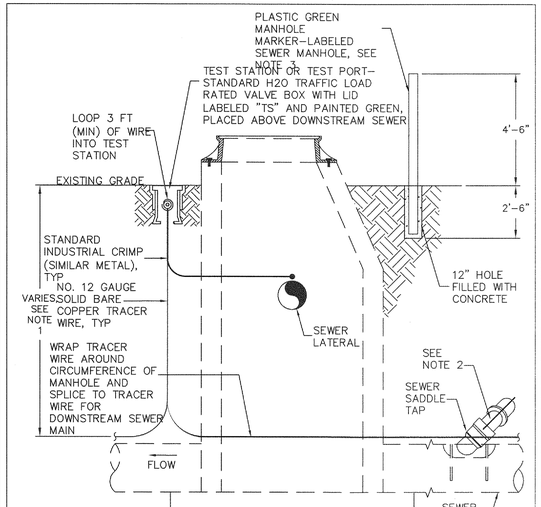
PLAN – CONCRETE SUPPORT NOSING

(WHEN EXPOSED TO STREAM FLOW)

CITY OF RALEIGH			
DEPARTMENT OF PUBLIC UTILITIES			
AERIAL PIPE CROSSING CONCRETE SUPPORT DETAILS			
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-19	D.H.L.	6/16/08		



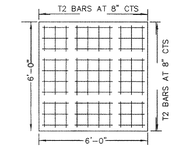
CITY OF RALEIGH				
DEPARTMENT OF PUBLIC UTILITIES				
STANDARD PRECAST SANITARY SEWER MANHOLE				
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-20	Y.C.A.	12-31-92	ABB	2-21-05
	RRH	3-30-00	D.H.L.	6-16-08



NOTES:

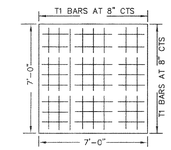
1. THE TRACER WIRE SHALL BE CONTINUOUS TO THE GREATEST EXTENT POSSIBLE. FOR GRAVITY MAIN AND OR LATERAL INSTALLATIONS LESS THAN 8 FT, THE TRACING WIRE SHALL BE ATTACHED TO THE PIPE. TRACER WIRE SHALL BE LAID FLAT AND SECURELY AFFIXED TO THE PIPE AT 10 FOOT INTERVALS. FOR GRAVITY MAIN AND OR LATERAL INSTALLATION DEEPER THAN 8 FT, THE TRACING WIRE SHALL BE INSTALLED AT A DEPTH OF 7-8 FT. THE WIRE SHALL BE PROTECTED FROM DAMAGE DURING THE EXECUTION OF THE WORK. NO BREAKS OF CUTS IN THE TRACER WIRE SHALL BE PERMITTED.
2. WHERE LATERAL TAPS ARE MADE BY SERVICE SADDLES, THE TRACER WIRE SHALL NOT BE ALLOWED TO TO BE PLACED BETWEEN THE SADDLE AND MAIN.
3. MANHOLE MARKERS SHALL BE PLACED ADJACENT TO MANHOLES AT THE DISCRETION OF OWNER OR OWNER'S REPRESENTATIVE.

CITY OF RALEIGH				
DEPARTMENT OF PUBLIC UTILITIES				
GRAVITY SEWER MAIN TRACER WIRE AND MANHOLE MARKER				
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-20A	WKD	09-14		



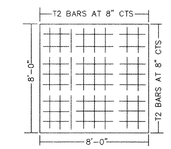
REINFORCED CONC. FOOTING FOR 4' PRECAST MANHOLE

BILL OF MATERIAL FOR 4' MANHOLE				
BAR	SIZE	LENGTH	NO.	WT. LBS.
T2	#5	5'-6"	18	103
CL. "A" CONCRETE TOTAL CU. YDS. 1,000				



REINFORCED CONC. FOOTING FOR 5' PRECAST MANHOLE

BILL OF MATERIAL FOR 4' MANHOLE				
BAR	SIZE	LENGTH	NO.	WT. LBS.
T1	#5	6'-6"	20	136
CL. "A" CONCRETE TOTAL CU. YDS. 1,361				



REINFORCED CONC. FOOTING FOR 6' PRECAST MANHOLE

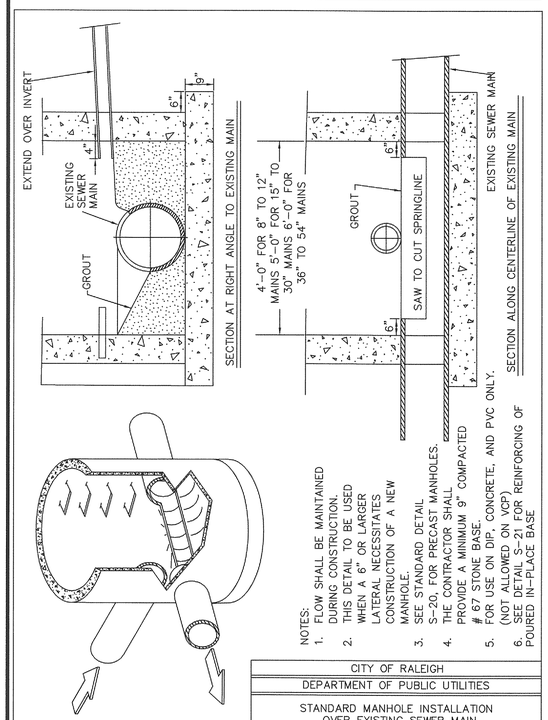
T1 OR T2 BAR

STRAIGHT BAR

BILL OF MATERIAL FOR 4' MANHOLE				
BAR	SIZE	LENGTH	NO.	WT. LBS.
T2	#5	7'-6"	24	165
CL. "A" CONCRETE TOTAL CU. YDS. 1,778				

* ALL BASES ARE MINIMUM 9" THICK

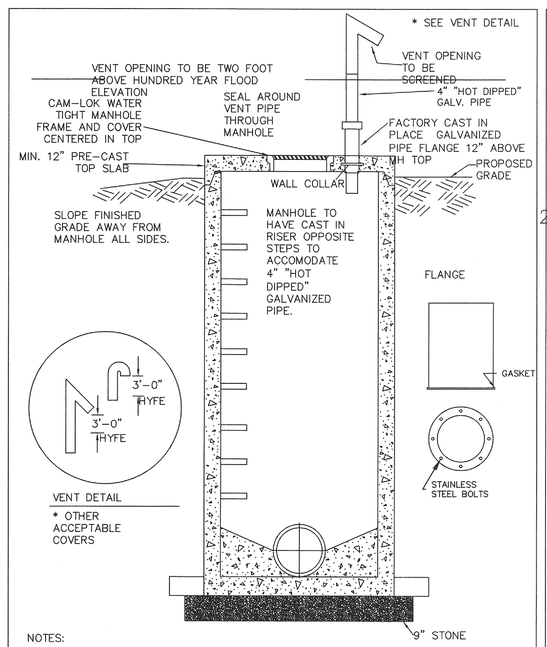
CITY OF RALEIGH				
DEPARTMENT OF PUBLIC UTILITIES				
EXTENDED BASE OR CAST-IN-PLACE REINFORCED CONCRETE BASE				
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-21		3-1-87	ABB	2-9-05
	RRH	3-30-00		



NOTES:

1. FLOW SHALL BE MAINTAINED DURING CONSTRUCTION. THIS DETAIL TO BE USED WHEN A 6" OR LARGER LATERAL NECESSITATES CONSTRUCTION OF A NEW MANHOLE.
3. SEE STANDARD DETAIL S-20, FOR PRECAST MANHOLES.
4. THE CONTRACTOR SHALL PROVIDE A MINIMUM 9" COMPACTED # 67 STONE BASE.
5. FOR USE ON DIP, CONCRETE, AND PVC ONLY. (NOT ALLOWED ON VCP)
6. SEE DETAIL S-21 FOR REINFORCING OF POURED IN-PLACE BASE

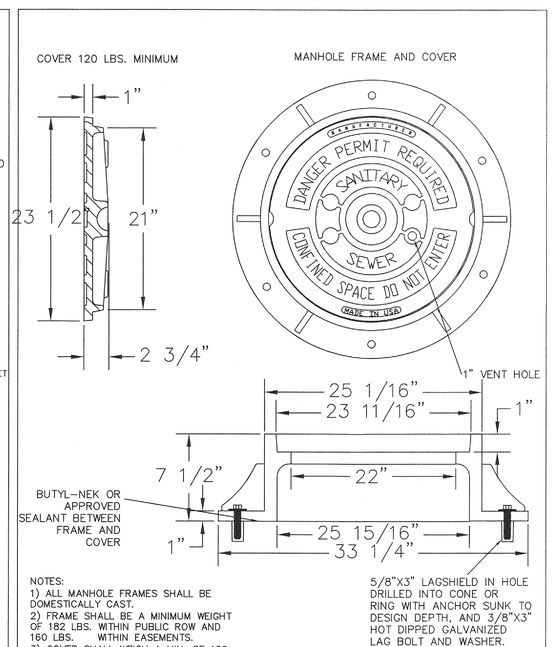
CITY OF RALEIGH				
DEPARTMENT OF PUBLIC UTILITIES				
STANDARD MANHOLE INSTALLATION OVER EXISTING SEWER MAIN				
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-22	Y.C.A.	12-31-91	A.B.B.	1-19-05
	RRH	3-30-00	D.H.L.	6/16/08



NOTES:

1. VENT MUST BE FACTORY WELDED FABRICATED AND "HOT DIPPED" GALVANIZED.
2. HYFE- Hundred Year Flood elevation

CITY OF RALEIGH				
DEPARTMENT OF PUBLIC UTILITIES				
STANDARD SEAL TIGHT MANHOLE WITH VENTED STACK				
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-24	D.W.C.	6-7-99	A.B.B.	4-15-04
	RRH	3-30-00	D.H.L.	6/16/08



NOTES:

1) ALL MANHOLE FRAMES SHALL BE DOMESTICALLY CAST.
2) FRAME SHALL BE A MINIMUM WEIGHT OF 182 LBS. WITHIN PUBLIC ROW AND 160 LBS. WITHIN EASEMENTS.
3) COVER SHALL WEIGH A MIN. OF 120 LBS.
4) ALL MANHOLE FRAMES OUTSIDE OF PAVED SURFACES SHALL BE BOLTED TO THE CONE SECTION OR RING WITH A MINIMUM OF 4 BOLTS PER FRAME.

CITY OF RALEIGH				
DEPARTMENT OF PUBLIC UTILITIES				
STANDARD MANHOLE COVER				
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-25	3-1-87	3-1-87	A.B.B.	2-9-05
	RRH	3-30-00	D.H.L.	6-18-08

UTILITY INSTALLATIONS AND OTHER PUBLIC FACILITIES INCLUDING SIDEWALKS AND HANDICAP RAMPS ARE TO BE CONSTRUCTED ON ALL STREETS AS SPECIFIED BY CITY CODE. THESE FACILITIES HAVE BEEN APPROVED BY THE CITY OF RALEIGH AND SHALL BE SO INSTALLED UNLESS A CHANGE IS AUTHORIZED BY WRITTEN APPROVAL. PUBLIC SANITARY SEWER EASEMENTS ARE TO BE RECORDED PRIOR TO FINAL ACCEPTANCE.

TRANSPORTATION SERVICES_____

PUBLIC UTILITIES_____

CONSERVATION ENGINEER_____

PLANNING_____

Y:\Jobs\9900\Watkins Property\dwg\Temporary\Emily\Rogers Farm Full Set Details.dwg

No.	DATE	REVISION	DWN/CHK

SANITARY SEWER DETAILS

FOR

KALAS FALLS

SITUATED AT

ROLESVILLE ROAD, ROLESVILLE

WAKE COUNTY, NORTH CAROLINA

FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	EDS
DATE:	9/19/2019

AMERICAN Engineering

American Engineering Associates-Southeast, P.A.

875 Walnut Street, Suite 360

Cary, NC 27511

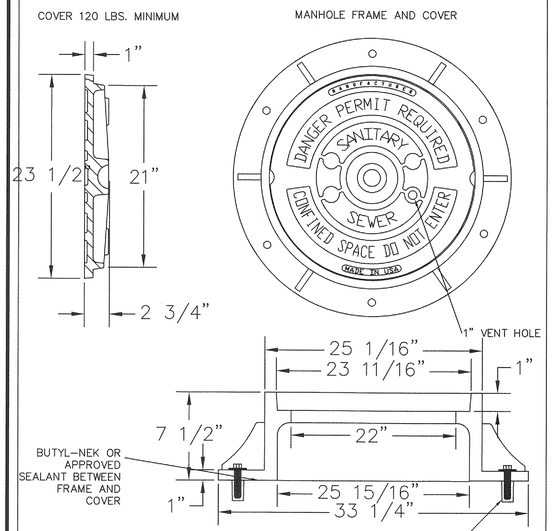
919-469-1101

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 8610 JAMES R. HARMAN

5/1/20

SHEET NO.

CD8

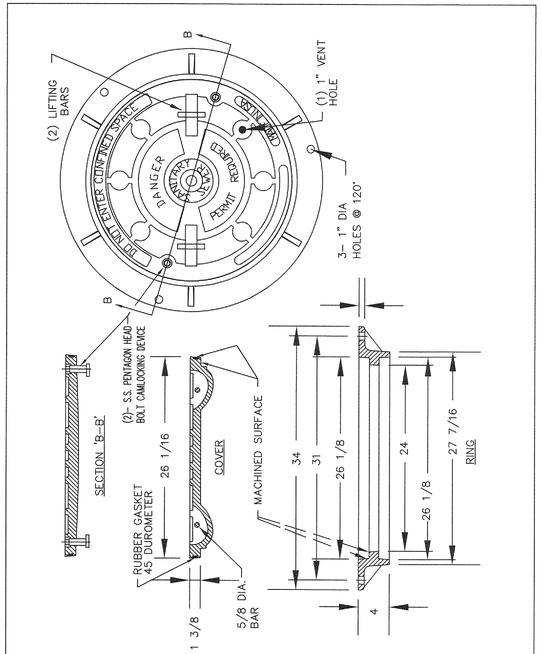


NOTES:
1) ALL MANHOLE FRAMES SHALL BE DOMESTICALLY CAST.
2) FRAME SHALL BE A MINIMUM WEIGHT OF 182 LBS. WITHIN PUBLIC ROW AND 160 LBS. WITHIN EASEMENTS.
3) COVER SHALL WEIGH A MIN. OF 120 LBS.
4) ALL MANHOLE FRAMES OUTSIDE OF PAVED SURFACES SHALL BE BOLTED TO THE CONE SECTION OR RING WITH A MINIMUM OF 4 BOLTS PER FRAME.

5/8"X3" LAGSHIELD IN HOLE DRILLED INTO CONE OR RING WITH ANCHOR SUNK TO DESIGN DEPTH, AND 3/8"X3" HOT DIPPED GALVANIZED LAG BOLT AND WASHER.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
STANDARD MANHOLE COVER

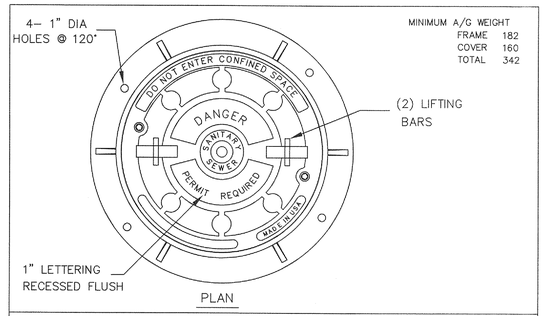
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-25	3-1-87	3-1-87	A.B.B.	2-9-05
	RRH	3-30-00	D.H.L.	6-18-08

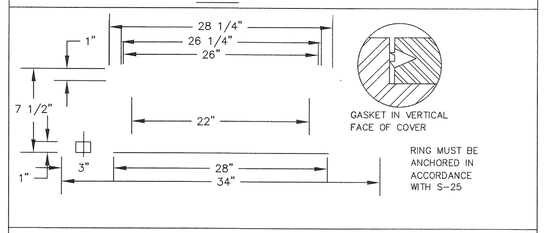


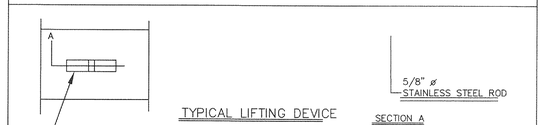
Note: solid cover required when water tight manhole specified.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
FLAT TOP MANHOLE COVER

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-25a	3-1-87	3-1-87	A.B.B.	2-9-05
	RRH	3-30-00	D.H.L.	6-18-08

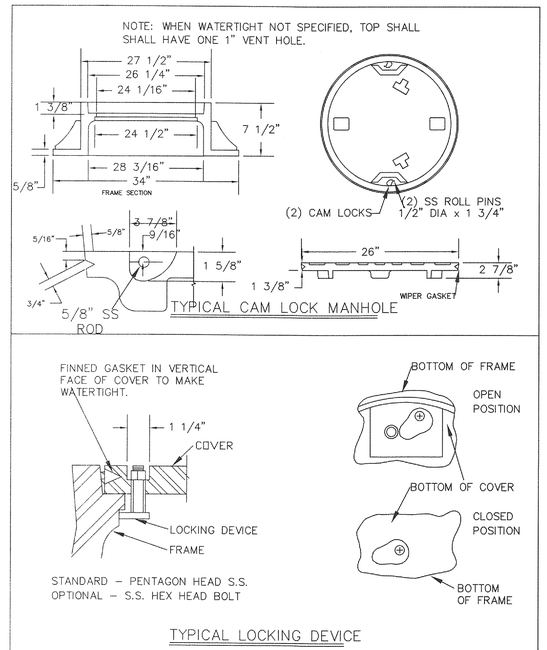






CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
MANHOLE FRAME AND WATERTIGHT COVER

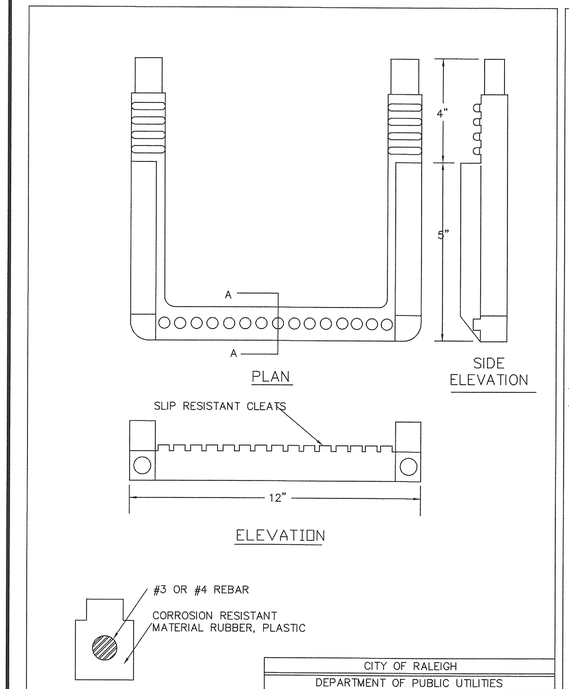
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-26	3-1-87	3-1-87	ABB	8-29-05
	RRH	3-30-00	D.H.L.	6/18/08



RING MUST BE ANCHORED IN ACCORDANCE WITH S-25

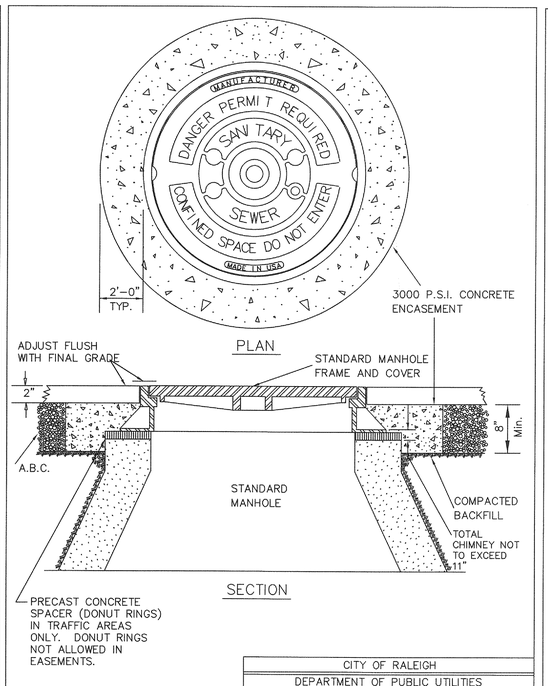
CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
WATER-TIGHT MANHOLE FRAME WITH CAM LOCK COVER

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-27	RRH	3-30-00		
	DHL	6-18-08		



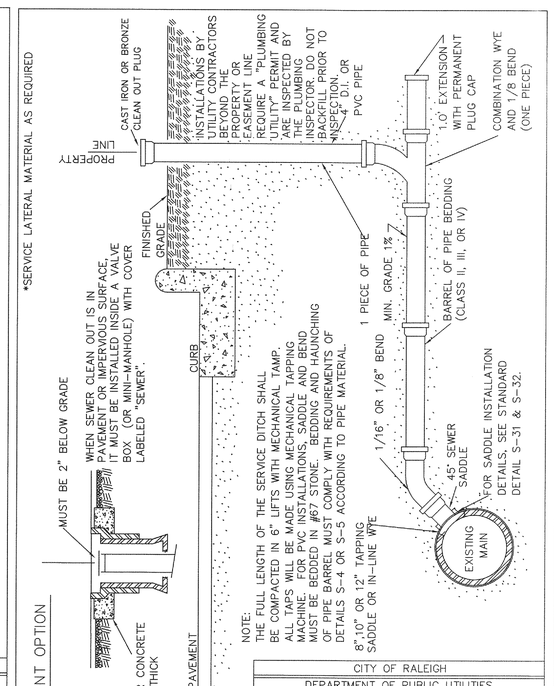
CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
STANDARD SLIP RESISTANT MANHOLE STEP DETAIL

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-28	RRH	3-30-00		



CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
STANDARD MANHOLE FRAME AND COVER DETAIL WITHIN PAVED SURFACES

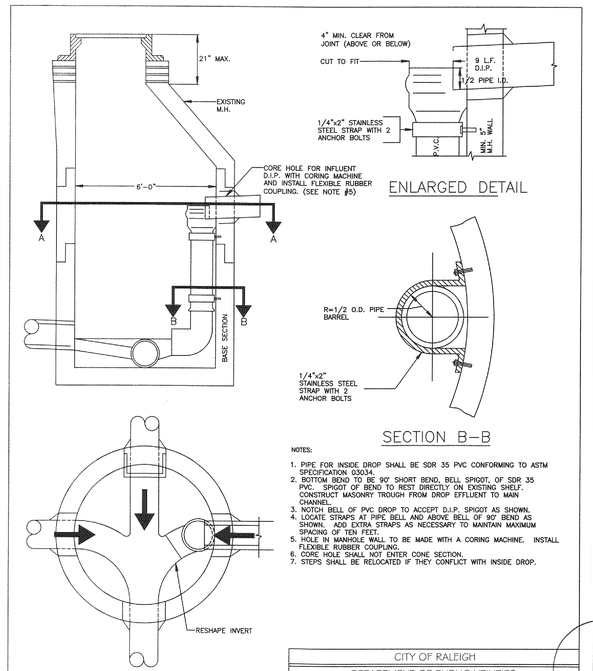
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-29	Y.C.A.	12-31-91	ABB	9-20-04
	RRH	3-30-00	DHL	11-29-07



NOTE:
THE FULL LENGTH OF THE SERVICE DITCH SHALL BE COMPACTED IN 6" LIFTS WITH MECHANICAL TAMP. ALL TAPS WILL BE MADE USING MECHANICAL TAPPING MACHINE. FOR PVC INSTALLATIONS, SADDLE AND BEND MUST BE BEDDED IN #67 STONE. BEDDING AND HAUNCHING OF PIPE BARREL MUST COMPLY WITH REQUIREMENTS OF DETAILS S-4 OR S-5 ACCORDING TO PIPE MATERIAL.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
TYPICAL SANITARY SEWER LATERAL CONNECTION

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-30	Y.C.A.	6-92	A.B.B.	4-8-04
	RRH	3-30-00	D.H.L.	6-18-08



NOTES:
1. PIPE FOR INSIDE DROP SHALL BE SDR 35 PVC CONFORMING TO ASTM SPECIFICATION D3034.
2. BOTTOM BEND TO BE 90° SHORT BEND, BELL SPIGOT, OF SDR 35 PVC. SPIGOT OF BEND TO REST DIRECTLY ON EXISTING SHELF. CONSTRUCT MASONRY TROUGH FROM DROP EFFLUENT TO MAIN CHANNEL.
3. NOTCH BELL OF PVC DROP TO ACCEPT D.I.P. SPIGOT AS SHOWN.
4. LOCATE STRAPS AT PIPE BELL AND ABOVE BELL OF 90° BEND AS SHOWN. ADD EXTRA STRAPS AS NECESSARY TO MAINTAIN MAXIMUM SPACING OF TEN FEET.
5. HOLE IN MANHOLE WALL TO BE MADE WITH A CORING MACHINE. INSTALL FLEXIBLE RUBBER COUPLING.
6. CORE HOLE SHALL NOT ENTER CONE SECTION.
7. STEPS SHALL BE RELOCATED IF THEY CONFLICT WITH INSIDE DROP.

CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
INSIDE DROP MANHOLE

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-53	MAB	11-6-13		

No.	DATE	REVISION	DWN/CHK

SANITARY SEWER DETAILS
FOR
KALAS FALLS
SITUATED AT
ROLESVILLE ROAD, ROLESVILLE
WAKE COUNTY, NORTH CAROLINA
FIRM # C-3881

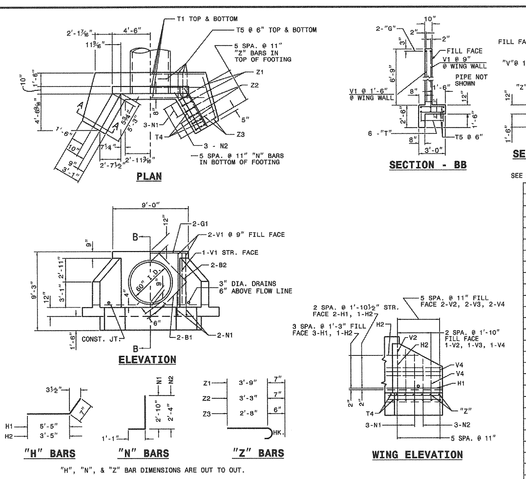
JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	EDS
DATE:	9/19/2019

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511
919-469-1101

NORTH CAROLINA PROFESSIONAL SEAL 040 ENGINEER JAMES R. HARMAN
5.11.20

SHEET NO.
CD9

Y:\Jobs\9900\Watkins Property\dwg\Temporary\Emily\Rogers Farm Full Set Details.dwg



SEE STD. # 838.45 FOR GENERAL NOTES.

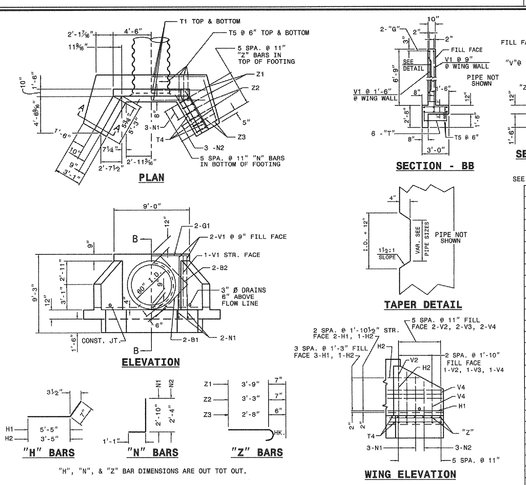
BILL OF MATERIAL FOR ENDWALL				
REINF. STEEL			1 PIPE	
BAR	SIZE	LENGTH	NO.	WEIGHT
B1	#4	5'-6"	4	15
B2	#4	4'-6"	4	12
G1	#7	8'-8"	2	35
H1	#4	6'-0"	10	40
H2	#4	4'-0"	4	11
N1	#5	3'-11"	10	41
N2	#4	3'-5"	6	14
T1	#4	12'-8"	6	51
T4	#4	5'-6"	6	22
T5	#4	2'-6"	36	60
V1	#4	6'-3"	6	25
V2	#4	5'-1"	6	20
V3	#4	3'-11"	6	16
V4	#4	2'-9"	6	11
Z1	#5	4'-4"	4	18
Z2	#4	3'-10"	4	10
Z3	#4	3'-2"	4	8
REINF. STEEL LBS.				409
CON./R.C. CU. YDS				5.6

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR
REINFORCED CONCRETE ENDWALL
FOR SINGLE 60" PIPE - 90° SKEW

SHEET 1 OF 2
838.27



SEE STD. # 838.45 FOR GENERAL NOTES.

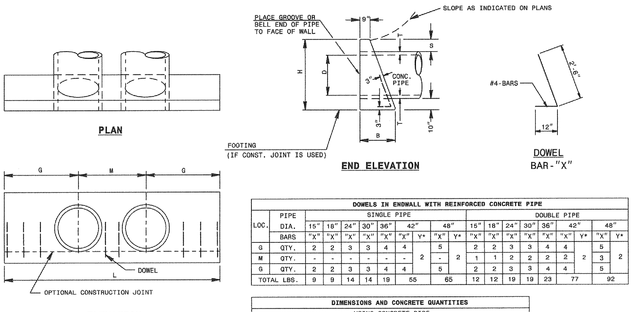
BILL OF MATERIAL FOR ENDWALL				
REINF. STEEL			1 PIPE	
BAR	SIZE	LENGTH	NO.	WEIGHT
B1	#4	5'-6"	4	15
B2	#4	4'-6"	4	12
G1	#7	8'-8"	2	35
H1	#4	6'-0"	10	40
H2	#4	4'-0"	4	11
N1	#5	3'-11"	10	41
N2	#4	3'-5"	6	14
T1	#4	12'-8"	6	51
T4	#4	5'-6"	6	22
T4	#4	2'-6"	36	60
V1	#4	6'-3"	6	25
V2	#4	5'-1"	6	20
V3	#4	3'-11"	6	16
V4	#4	2'-9"	6	11
Z1	#5	4'-4"	4	18
Z2	#4	3'-10"	4	10
Z3	#4	3'-2"	4	8
REINF. STEEL LBS.				409
CON./C.S. CU. YDS				5.9

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR
REINFORCED CONCRETE ENDWALL
FOR SINGLE 60" PIPE - 90° SKEW

SHEET 2 OF 2
838.27



DOWELS IN ENDWALL WITH REINFORCED CONCRETE PIPE																		
LOC.	PIPE DIA.	SINGLE PIPE								DOUBLE PIPE								
		15"	18"	24"	30"	36"	42"		48"		15"	18"	24"	30"	36"	42"		48"	
	BARS	"X"	"X"	"X"	"X"	"X"	"X"	Y+	"X"	Y+	"X"	"X"	"X"	"X"	"X"	"X"	Y+	"X"	Y+
G	QTY.	2	2	3	3	4	4		5		2	2	3	3	4	4		5	
M	QTY.	-	-	-	-	-	-	2	-	2	1	1	2	2	2	2	2	3	2
S	QTY.	2	2	3	3	4	4		5		2	2	3	3	4	4		5	
TOTAL LBS.		9	9	14	14	19	55		65		12	12	19	19	23	77		92	

DIMENSIONS AND CONCRETE QUANTITIES											
	USING CONCRETE PIPE										
	COMMON DIMENSIONS					SINGLE PIPE		DOUBLE PIPE			
D	H	B	G	T	S	L	YD*	M	L	YD*
15"	3'-3"	1'-8"	2'-9"	2¼"	9½"	5'-6"	0.7	2'-2"	7'-8"	1.0
18"	3'-7"	1'-10"	2'-2"	2½"	10"	6'-4"	1.0	2'-7"	8'-11"	1.3
24"	4'-2"	2'-1"	4'-0"	3"	10"	8'-0"	1.6	3'-5"	11'-5"	2.0
30"	5'-0"	2'-6"	4'-7"	4¼"	11½"	9'-2"	2.3	4'-3"	13'-5"	3.1
36"	5'-8"	2'-8"	5'-6"	4¾"	11½"	11'-0"	3.4	5'-0"	16'-0"	4.5
42"	6'-2"	3'-1"	6'-4"	5¼"	11½"	12'-8"	4.5	5'-10"	18'-6"	6.0
48"	6'-9"	3'-5"	7'-2"	5¾"	11½"	14'-4"	6.0	6'-8"	21'-0"	8.0

*SEE SHEET 3

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR
CONCRETE ENDWALL FOR SINGLE AND DOUBLE PIPE CULVERTS
15" THRU 48" PIPE - 90° SKEW

SHEET 1 OF 3
838.01

GENERAL NOTES:

USE CLASS "A" CONCRETE.

CHAMFER ALL EXPOSED CORNERS 1".

ALL DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING STEEL ARE TO CENTERS OF BARS.

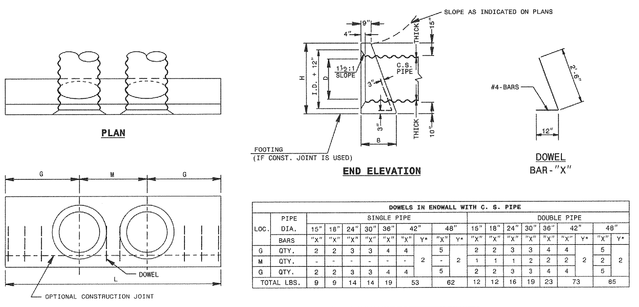
PLACE A STONE DRAIN CONSISTING OF ONE (1) CUBIC FOOT OF NUMBER 78M STONE CONTAINED IN A POROUS FABRIC AT EACH WEEP HOLE. PLACE SUBDRAIN FINE AGGREGATE BENEATH, AROUND AND OVER THE STONE DRAIN SO THE STONE DRAIN IS COMPLETELY COVERED BY A LAYER OF SUBDRAIN FINE AGGREGATE AT LEAST ONE (1) FOOT THICK. WHERE THERE IS MORE THAN ONE WEEP HOLE IN A WING WALL, PLACE A HORIZONTAL DRAIN OF SUBDRAIN FINE AGGREGATE AT LEAST ONE (1) FOOT SQUARE IN CROSS SECTION TO CONNECT ALL STONE DRAINS. PLACE A VERTICAL DRAIN OF SUBDRAIN FINE AGGREGATE AT LEAST ONE (1) FOOT SQUARE IN CROSS SECTION AT EACH WEEP HOLE TO AN ELEVATION OF TWO (2) FEET BELOW THE SURFACE OF THE EMBANKMENT.

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR
NOTES FOR REINFORCED CONCRETE ENDWALL
STANDARD DRAWINGS 838.21 THRU 838.40

SHEET 1 OF 1
838.45



DOWELS IN ENDWALL WITH C. S. PIPE																		
LOC.	PIPE DIA.	SINGLE PIPE								DOUBLE PIPE								
		15"	18"	24"	30"	36"	42"		48"		15"	18"	24"	30"	36"	42"		48"	
	BARS	"X"	"X"	"X"	"X"	"X"	"X"	Y+	"X"	Y+	"X"	"X"	"X"	"X"	"X"	"X"	Y+	"X"	Y+
G	QTY.	2	2	3	3	4	4		5		2	2	3	3	4	4		5	
M	QTY.	-	-	-	-	-	-	2	-	2	1	1	1	2	2	2	2	2	2
G	QTY.	2	2	3	3	4	4		5		2	2	3	3	4	4		5	
TOTAL LBS.		9	9	14	14	19	53		62		12	12	16	19	23	73		85	

DIMENSIONS AND CONCRETE QUANTITIES											
	USING CORRUGATED STEEL PIPE										
	COMMON					SINGLE PIPE		DOUBLE PIPE			
D	H	B	G	L	YD*	M	L	YD*
15"	3'-4"	1'-8"	2'-6"	5'-0"	0.7	1'-11"	6'-11"	1.0
18"	3'-7"	1'-10"	2'-11"	5'-10"	1.0	2'-3"	8'-1"	1.2
24"	4'-1"	2'-1"	3'-8"	7'-4"	1.4	3'-0"	10'-4"	1.9
30"	4'-7"	2'-4"	4'-5"	8'-10"	2.0	3'-9"	12'-7"	2.7
36"	5'-1"	2'-7"	5'-2"	10'-4"	2.8	4'-6"	14'-10"	3.8
42"	5'-7"	2'-10"	5'-11"	11'-10"	3.8	5'-3"	17'-1"	5.0
48"	6'-1"	3'-1"	6'-8"	13'-4"	4.9	6'-0"	19'-4"	7.5

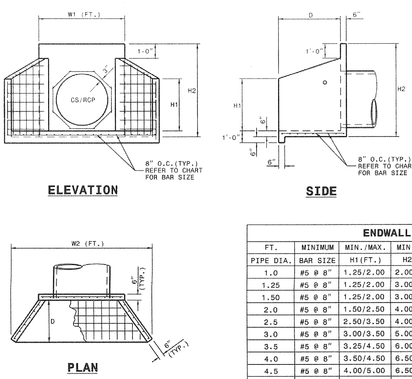
*SEE SHEET 3

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR
CONCRETE ENDWALL FOR SINGLE AND DOUBLE PIPE CULVERTS
15" THRU 48" PIPE - 90° SKEW

SHEET 3 OF 3
838.01



NOTES:

- THIS PRECAST ENDWALL MAY BE USED FOR THE FOLLOWING STANDARDS: 838.01, 838.11, 838.21, 838.27, 838.33, 838.39, 838.51, 838.57, 838.63 AND 838.69.
- INSTALL PRECAST ENDWALLS WITH WINGS AND PAY FOR IN ACCORDANCE WITH SPECIFICATION SECTION 838.
- USE 4000 PSI CONCRETE.
- PROVIDE ALL REINFORCING STEEL #HEICH MEETS ASTM A615 FOR GRADE 60 AND WELDED WIRE FABRIC CONFORMING TO ASTM A185 WITH 2" MIN. CLEARANCE.
- PLACE LIFT HOLES OR PINS IN ACCORDANCE WITH OSHA STANDARD 1926.704.
- PIPE TO BE GROUTED INTO HEADWALL AT JOB SITE BY CONTRACTOR
- ALL ELEMENTS PRECAST TO MEET ASTM C913.
- WELDED WIRE FABRIC MAY BE SUBSTITUTED FOR REBAR AS LONG AS THE SAME AREA OF STEEL IS PROVIDED.
- CHAMFER ALL CORNERS 1" OR HAVE A RADIUS OF 1".

NOTE: THE MINIMUM BAR SIZE SHALL BE #5 BARS AT 8" CTS.THE CONTRACTOR WILL HAVE THE OPTION TO INCREASE THIS BAR SIZE AS NEEDED.

ENDWALL DIMENSIONS						
FT.	MINIMUM	MIN./MAX.	MIN./MAX.	MIN./MAX.	MIN./MAX.	MIN./MAX.
PIPE DIA.	BAR SIZE	H1(FT.)	H2(FT.)	D (FT.)	W1	W2
1.0	#5 @ 8"	1.25/2.00	2.00/3.75	1.25/1.75	3.00/3.75	5.50/6.00
1.25	#5 @ 8"	1.25/2.00	3.00/3.75	1.25/2.00	3.50/3.75	6.50/6.75
1.50	#5 @ 8"	1.25/2.00	3.00/4.25	1.50/2.50	3.50/3.75	6.50/6.75
2.0	#5 @ 8"	1.50/2.50	4.00/4.75	1.75/2.50	4.00/4.25	7.50/8.25
2.5	#5 @ 8"	2.50/3.50	4.00/6.00	2.00/3.00	4.50/5.50	10.00/11.50
3.0	#5 @ 8"	3.00/3.50	5.00/6.00	2.75/3.50	5.25/5.75	11.50/11.75
3.5	#5 @ 8"	3.25/4.50	6.00/6.75	3.25/3.50	6.00/6.75	12.00/13.25
4.0	#5 @ 8"	3.50/4.50	6.50/7.00	3.25/3.50	6.50/6.75	13.00/13.25
4.5	#5 @ 8"	4.00/5.00	6.50/8.50	3.25/4.00	7.00/9.25	13.50/15.75
5.0	#5 @ 8"	4.50/5.00	7.00/8.50	3.25/4.00	7.25/9.25	13.75/15.75
5.5	#5 @ 8"	4.50/5.00	7.50/8.50	3.25/4.00	7.25/9.25	14.00/15.75
6.0	#5 @ 8"	4.50/5.00	7.50/8.50	3.25/4.00	7.75/9.25	14.75/16.75

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR
PRECAST CONCRETE ENDWALL
FOR SINGLE 12" THRU 72" PIPE - 90° SKEW

SHEET 1 OF 1
838.80

GENERAL NOTES:

CHAMFER ALL CORNERS 1" OR HAVE A RADIUS OF 1".

PLACE 2 #6 "Y" BARS IN THE TOP OF ALL ENDWALL FOR PIPE CULVERTS 42" AND OVER WITH A MINIMUM OF 3" COVER AND A LENGTH OF 6" LESS THAN ENDWALL LENGTH.

CONSTRUCT BOTTOM SLAB WITH FORMS.

DO NOT INTERPRET WALL THICKNESS (T) SHOWN FOR THE THICKNESS ACCEPTABLE, BUT IS USED IN COMPUTING ENDWALL QUANTITIES.

WHEN THE CONTRACTOR ELECTS TO USE A CONSTRUCTION JOINT AT THE BOTTOM OF THE PIPE, PLACE BAR "X" DOWELS IN THE BASE AS SHOWN ON PLANS. SPACE BARS APPROXIMATELY ON 12" CENTERS UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

WHEN THE CONTRACTOR ELECTS TO USE A CONSTRUCTION JOINT AT THE BOTTOM OF THE PIPE AND POUR THE BASE SEPARATELY LEAVE THE POUR ROUGH.

USE CLASS "B" CONCRETE.

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR
CONCRETE ENDWALL FOR SINGLE AND DOUBLE PIPE CULVERTS
15" THRU 48" PIPE - 90° SKEW

SHEET 3 OF 3
838.01

Y:\Jobs\9900\Watkins Property\dwg\Temporary\Emily\Rogers Farm Full Set Details.dwg

SHEET NO.
CD10

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511 919-469-1101

DATE: 9/19/2019
DRAWN BY: EDS
CHECKED BY: JRH
JOB NUMBER: 9900

NCDOT DETAILS

FOR

KALAS FALLS

SITUATED AT

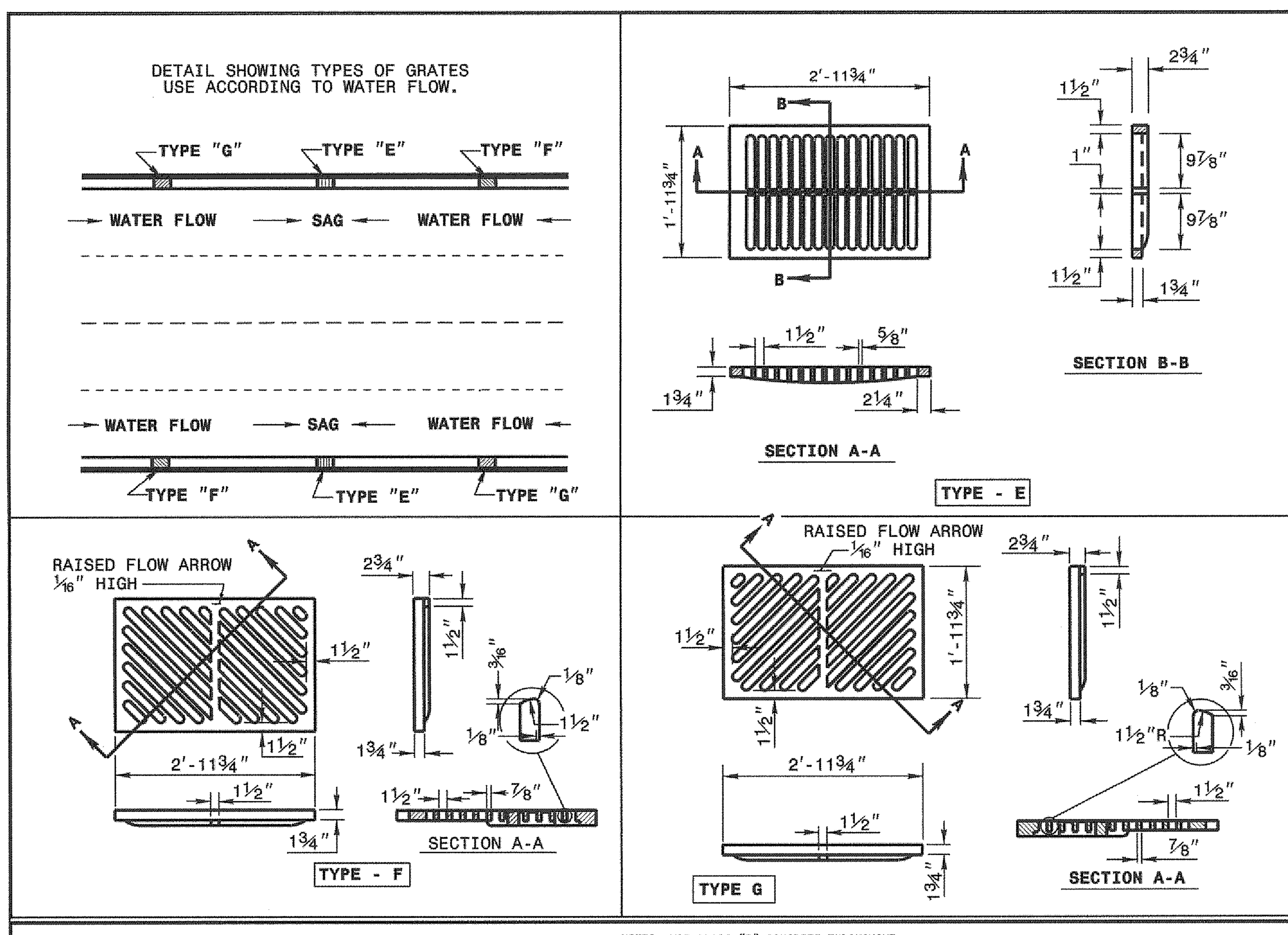
ROLESVILLE ROAD,ROLESVILLE

WAKE COUNTY, NORTH CAROLINA

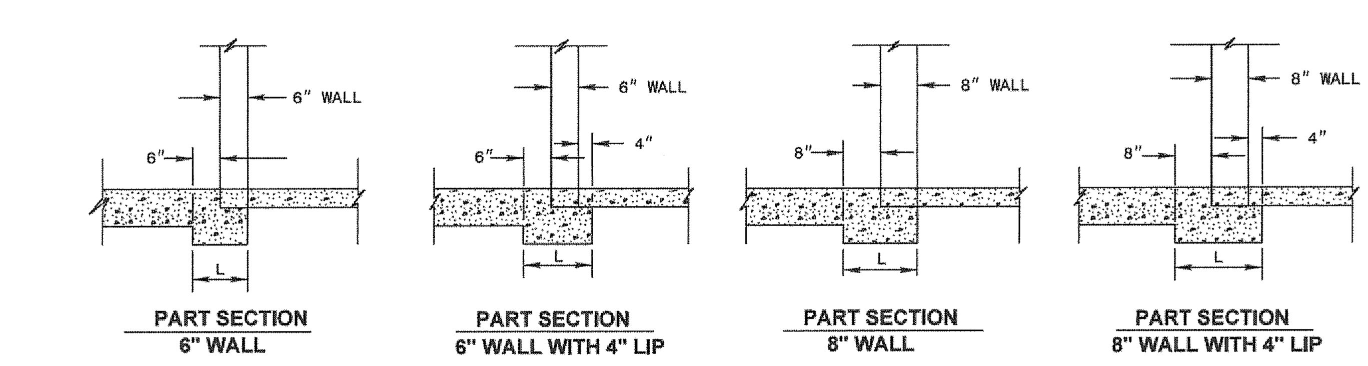
FIRM # C-3881

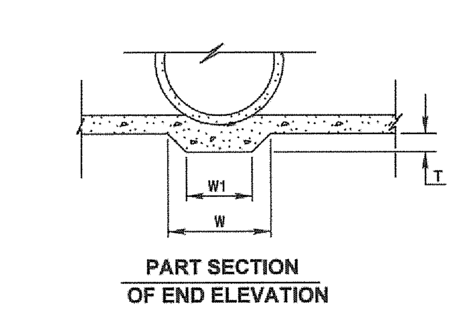
No.	DATE	REVISION	DWN/CHK

ROADWAY STANDARD DRAWING FOR
FRAME, GRATES, AND HOOD
FOR USE ON STANDARD CATCH BASIN
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. 1-18
SHEET 2 OF 2 840.03



ROADWAY STANDARD DRAWING FOR
CONCRETE BASE PAD FOR DRAINAGE STRUCTURES
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. 1-18
SHEET 1 OF 1 840.00



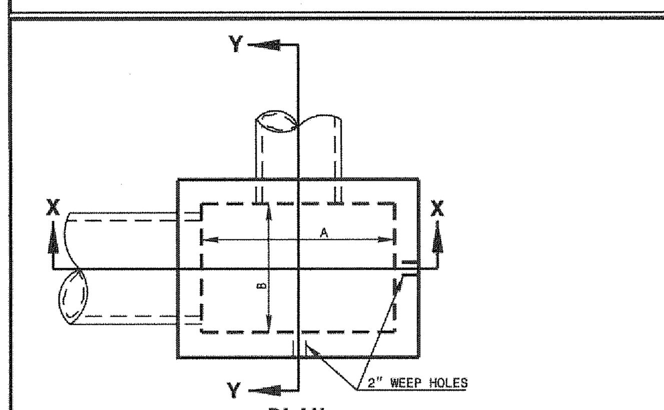


GENERAL NOTES:
USE THIS STANDARD WITH ALL DRAINAGE STRUCTURES USING REINFORCED CONCRETE PIPE SET IN BASE SLAB.

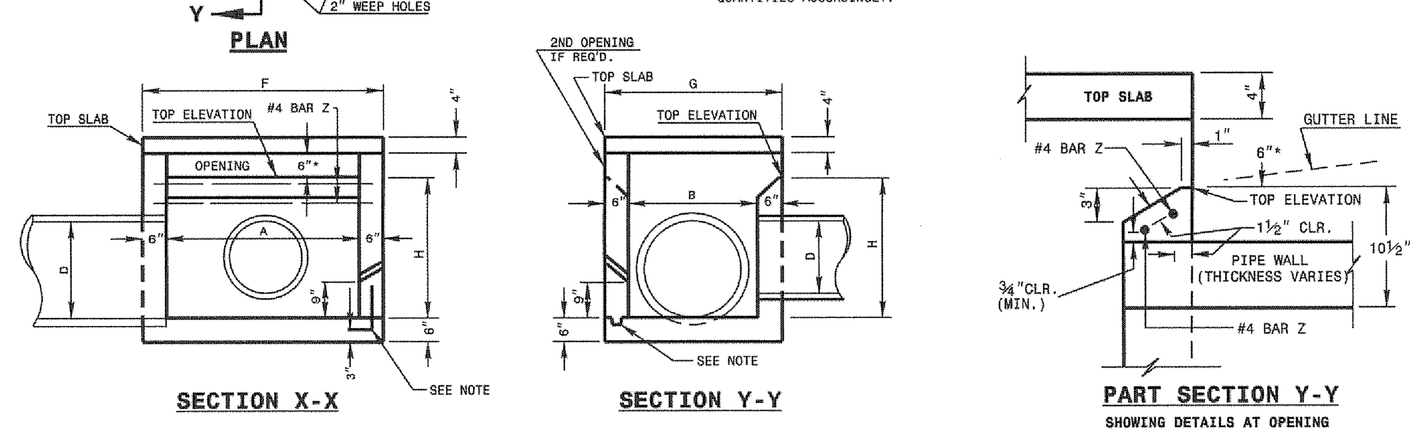
TABLES OF QUANTITIES FOR PIPE SET IN PAD

PIPE D	"W" DIM	"W1" DIM	"T" DIM	C.Y. QUANTITIES WHEN L IS 12"	16"	20"
12"	1'-1 7/8"	0'-7 7/8"	0'-2"	0.005	0.007	0.008
15"	1'-3 5/8"	0'-9 1/8"	0'-2"	0.006	0.008	0.010
18"	1'-5 1/4"	0'-10 3/8"	0'-2"	0.007	0.010	0.012
24"	1'-8 3/4"	1'-0 1/8"	0'-3"	0.011	0.014	0.018
30"	2'-0 1/4"	1'-2 3/4"	0'-3 1/2"	0.014	0.018	0.023
36"	2'-3 3/4"	1'-5 3/8"	0'-4"	0.017	0.023	0.025
42"	2'-7 1/8"	1'-7"	0'-5 1/4"	0.025	0.030	0.038
48"	2'-10 5/8"	1'-8 3/4"	0'-5 3/4"	0.028	0.038	0.047
54"	3'-2 1/8"	1'-10 1/2"	0'-6 1/4"	0.035	0.047	0.058
60"	3'-5 5/8"	2'-0 1/4"	0'-6 3/4"	0.042	0.056	0.071
66"	3'-9"	2'-2 1/4"	0'-7 1/4"	0.050	0.067	0.084
72"	4'-0 1/2"	2'-3 3/4"	0'-7 3/4"	0.059	0.078	0.098

ROADWAY STANDARD DRAWING FOR
CONCRETE OPEN THROAT CATCH BASIN
12" THRU 48" PIPE
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. 1-18
SHEET 1 OF 2 840.04



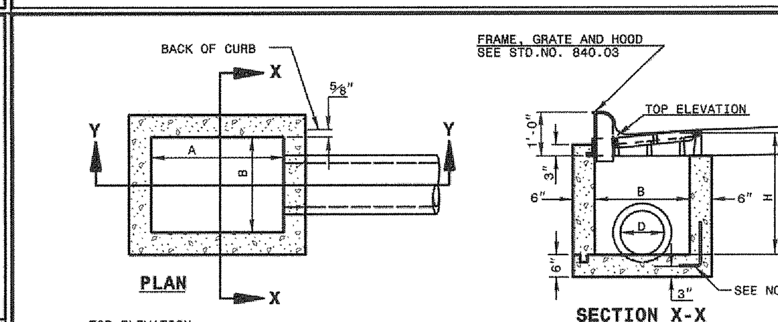
NOTES: USE CLASS "B" CONCRETE THROUGHOUT.
PROVIDE ALL CATCH BASINS OVER 3'-6" IN DEPTH WITH STEPS 12" ON CENTER. USE STEPS WHICH COMPLY WITH STD. DRAWING 840.66.
OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2" KEYWAY, OR #4 BAR DOWELS AT 12" CENTERS AS DIRECTED BY THE ENGINEER.
USE FORMS FOR THE CONSTRUCTION OF THE BOTTOM SLAB.
IF REINFORCED CONCRETE PIPE IS SET IN BOTTOM SLAB OF BOX, ADD TO SLAB AS SHOWN ON STD. NO. 840.00.
FOR 8'-0" IN HEIGHT OR LESS USE 6" WALLS AND BOTTOM SLAB. OVER 8'-0" TO 16'-0" IN HEIGHT USE 8" WALLS AND BOTTOM SLAB. ADJUST QUANTITIES ACCORDINGLY.
CONSTRUCT WITH PIPE CROWNS MATCHING.
INSTALL 2" WEEPHOLES AS DIRECTED BY THE ENGINEER.
INSTALL STONE DRAINS, OF A MINIMUM OF 1 CUBIC FOOT OF NO. 78M STONE IN A POROUS FABRIC BAG OR WRAP, AT EACH WEEP HOLE OR AS DIRECTED BY THE ENGINEER.
CHAMFER ALL EXPOSED CORNERS 1".
DRAWING NOT TO SCALE.
* INCREASE THE SIZE OF THE 6" OPENING TO 8" MAX., AS DIRECTED BY THE ENGINEER BY ADDING 2" TO THE WALL HIEGHT ABOVE THE TOP ELEVATION. ADJUST QUANTITIES ACCORDINGLY.



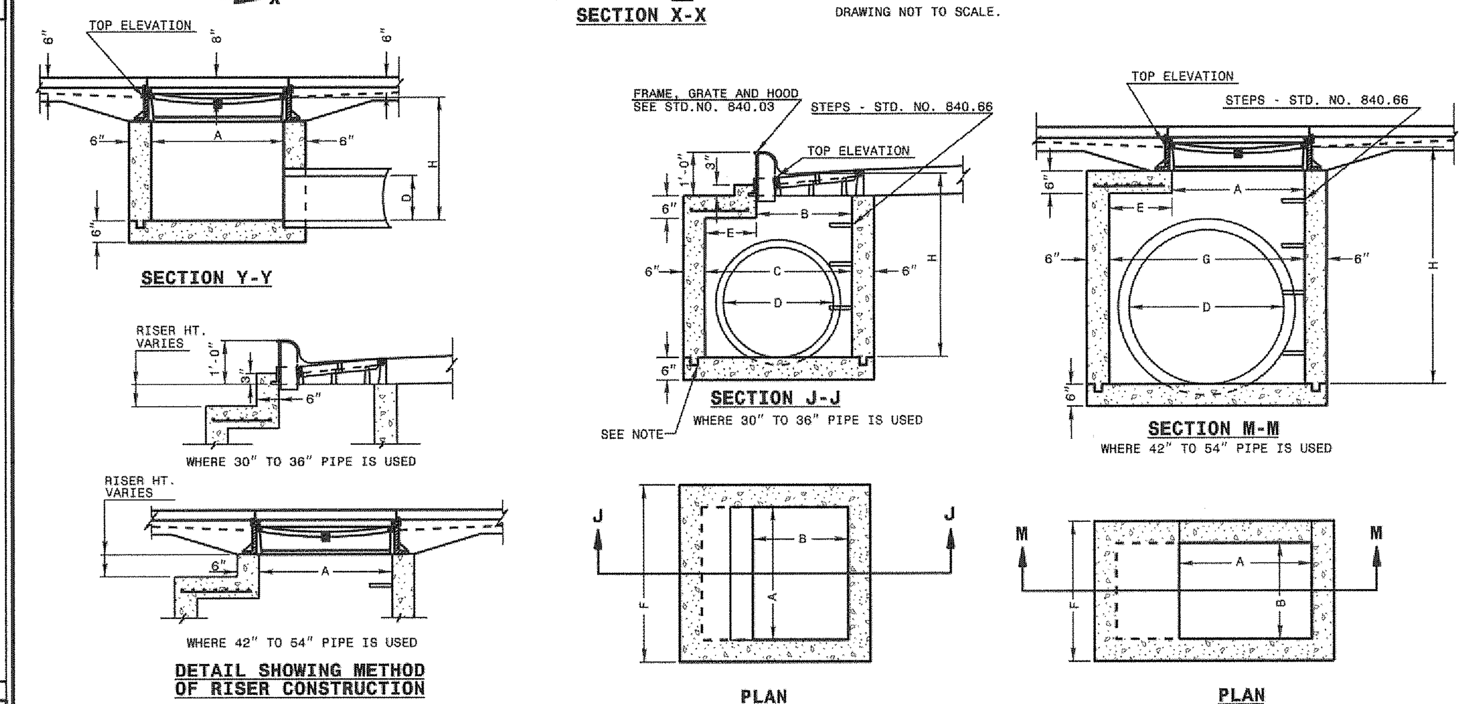
MIN. DIMENSIONS AND QUANTITIES FOR CONCRETE CATCH BASIN (BASED ON MIN. HEIGHT, H)

PIPE D	SPAN A	WIDTH B	HEIGHT H	BARS - X NO.	BARS - X LENGTH	BARS - Y NO.	BARS - Y LENGTH	BARS - Z NO.	BARS - Z LENGTH	TOP & BOT. SLAB F	TOP & BOT. SLAB G	CU. YDS. CONC. IN BOX TOP SLAB	BOT. SLAB	WALL/FT. HT.	TOTAL QUANTITIES LBS. REINF.	YD³ (MIN H)	DEDUCTION ONE PIPE C.S.	R.C.	DED. ONE 6" THROAT OPENING YD³
12"	3'-6"	2'-3"	1'-10"	4	3'-0"	6	4'-3"	2	4'-3"	4'-6"	3'-3"	0.181	0.271	0.250	27	1.046	0.015	0.032	0.046
15"	3'-6"	2'-3"	2'-1"	4	3'-0"	6	4'-3"	2	4'-3"	4'-6"	3'-3"	0.181	0.271	0.250	27	1.108	0.023	0.036	0.046
18"	4'-0"	2'-8"	2'-4"	5	3'-5"	7	4'-9"	2	4'-9"	5'-0"	3'-8"	0.226	0.340	0.284	35	1.379	0.033	0.049	0.053
24"	4'-0"	2'-8"	2'-10"	5	3'-5"	7	4'-9"	2	4'-9"	5'-0"	3'-8"	0.226	0.340	0.284	35	1.521	0.059	0.085	0.053
30"	4'-0"	3'-6"	3'-4"	5	4'-3"	9	4'-9"	2	4'-9"	5'-0"	4'-6"	0.278	0.417	0.315	43	1.916	0.092	0.127	0.053
36"	4'-6"	4'-0"	3'-10"	5	4'-9"	10	5'-3"	2	5'-3"	5'-6"	5'-0"	0.340	0.510	0.352	51	2.390	0.132	0.178	0.059
42"	5'-0"	4'-6"	4'-4"	5	5'-3"	12	5'-9"	2	5'-9"	6'-0"	5'-6"	0.407	0.611	0.389	64	2.914	0.180	0.243	0.066
48"	5'-0"	5'-0"	4'-10"	5	5'-8"	13	5'-9"	2	5'-9"	6'-0"	6'-0"	0.444	0.666	0.407	68	3.298	0.235	0.317	0.066

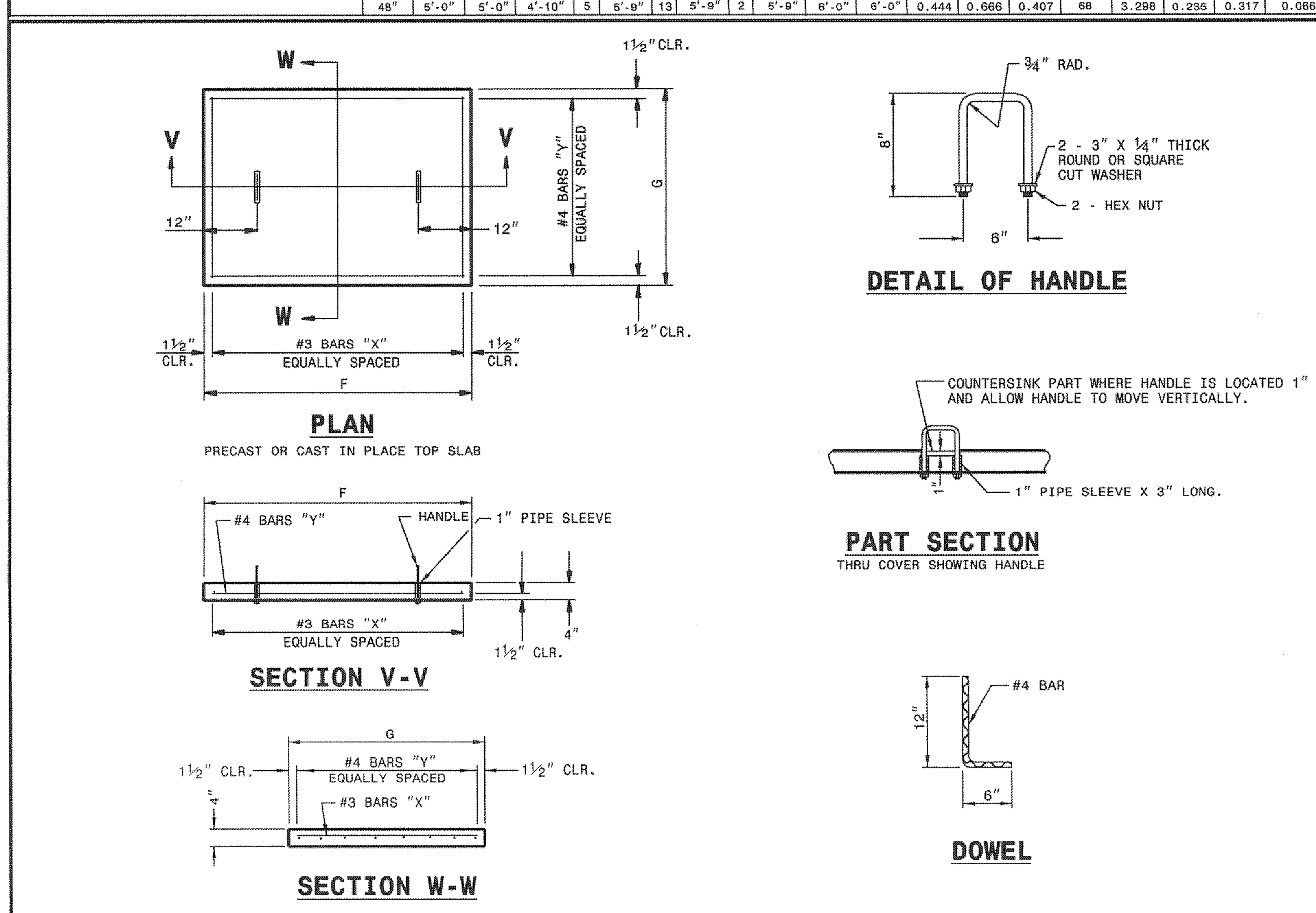
ROADWAY STANDARD DRAWING FOR
CONCRETE CATCH BASIN
12" THRU 54" PIPE
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. 1-18
SHEET 1 OF 2 840.02



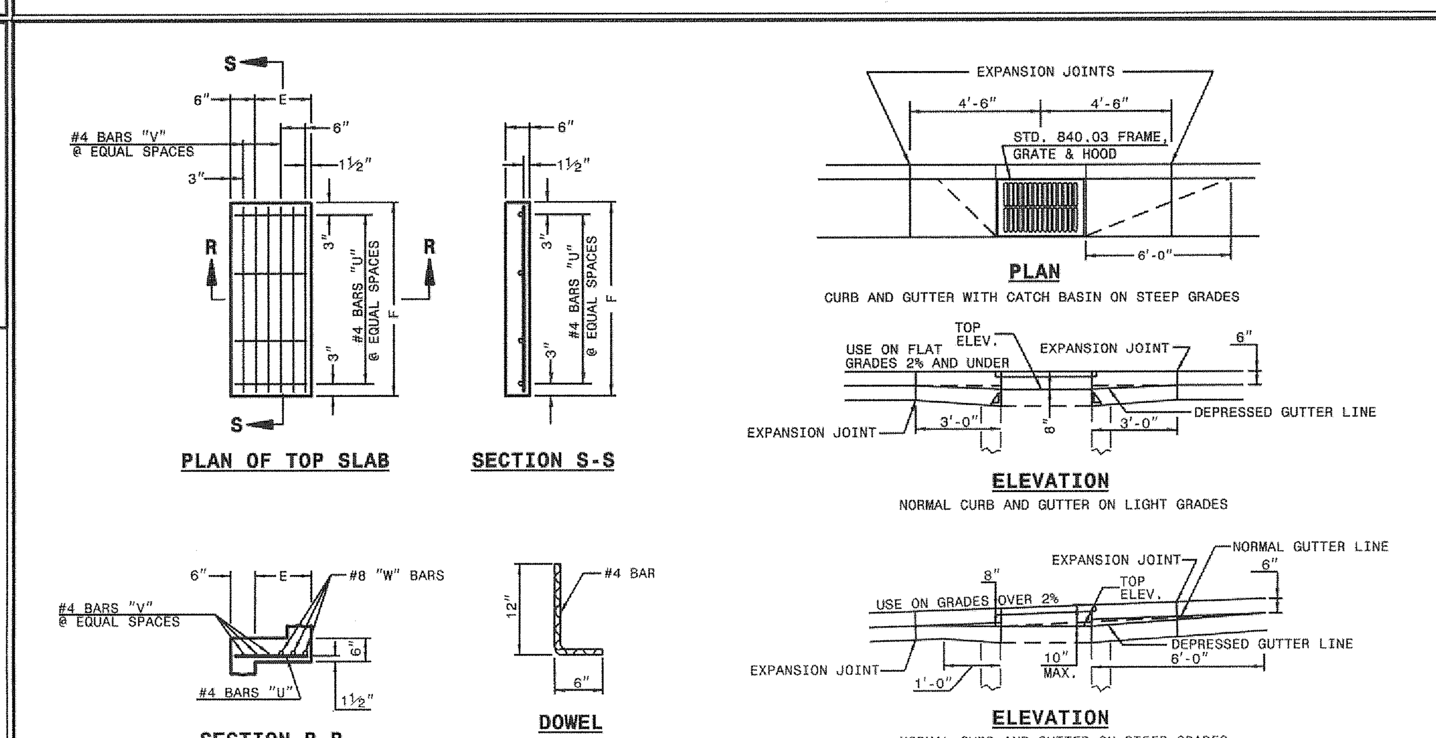
GENERAL NOTES:
USE CLASS "B" CONCRETE THROUGHOUT.
PROVIDE ALL CATCH BASINS OVER 3'-6" IN DEPTH WITH STEPS 12" ON CENTER. USE STEPS WHICH COMPLY WITH STD. DRAWING 840.66.
OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2" KEYWAY, OR #4 BAR DOWELS AT 12" CENTERS AS DIRECTED BY THE ENGINEER.
USE FORMS FOR THE CONSTRUCTION OF THE BOTTOM SLAB.
IF REINFORCED CONCRETE PIPE IS SET IN BOTTOM SLAB OF BOX, ADD TO SLAB AS SHOWN ON STD. NO. 840.00.
USE TYPE "E", "F" AND "G" GRATES UNLESS OTHERWISE INDICATED.
FOR 8'-0" IN HEIGHT OR LESS USE 6" WALLS AND BOTTOM SLAB. OVER 8'-0" TO 16'-0" IN HEIGHT USE 8" WALLS AND BOTTOM SLAB. ADJUST QUANTITIES ACCORDINGLY.
CONSTRUCT WITH PIPE CROWNS MATCHING.
CHAMFER ALL EXPOSED CORNERS 1".
DRAWING NOT TO SCALE.



ROADWAY STANDARD DRAWING FOR
CONCRETE OPEN THROAT CATCH BASIN
12" THRU 48" PIPE
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. 1-18
SHEET 2 OF 2 840.04



ROADWAY STANDARD DRAWING FOR
CONCRETE CATCH BASIN
12" THRU 54" PIPE
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. 1-18
SHEET 2 OF 2 840.02

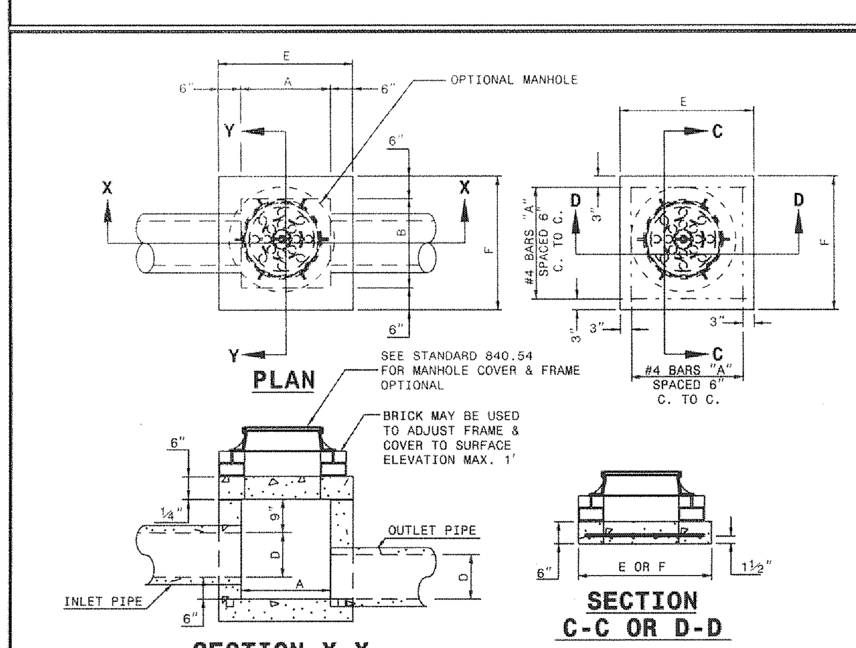


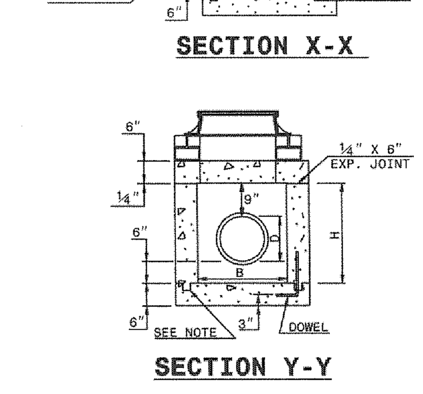
MINIMUM DIMENSIONS AND QUANTITIES FOR CONCRETE CATCH BASIN (BASED ON MIN. HEIGHT, H, WITH NO RISER) *

PIPE D	SPAN A	WIDTH B	WIDTH C	SPAN G	MIN. HEIGHT H	COVER DIMENSION E	F	BARS-U NO.	BARS-U LENGTH	BARS-V NO.	BARS-V LENGTH	BARS-W NO.	BARS-W LENGTH	TOTAL LBS.	CU. YDS. CONC. IN BOX TOP SLAB	BOTTOM SLAB	TOT. CONC. FOR MINIMUM HEIGHT H	DEDUCTIONS ONE PIPE C.M.	R.C.
12"	3'-0"	2'-2"	--	--	2'-9"											0.235	0.772	0.015	0.026
15"	3'-0"	2'-2"			3'-0"											0.235	0.829	0.023	0.036
18"	3'-0"	2'-2"			3'-3"											0.235	0.887	0.033	0.049
24"	3'-0"	2'-2"			3'-9"											0.235	1.001	0.059	0.085
30"	3'-0"	2'-2"	3'-4"		4'-3"	1'-2"	4'-0"	4	1'-5"	2	3'-9"	3	3'-9"	39	0.123	0.321	1.433	0.092	0.127
36"	3'-0"	2'-2"	3'-10"		4'-9"	1'-8"	4'-0"	4	1'-11"	3	3'-9"	3	3'-9"	43	0.161	0.358	1.714	0.132	0.178
42"	3'-0"	2'-2"		4'-5"	5'-3"	1'-5"	3'-2"	4	1'-8"	2	2'-11"	3	2'-11"	32	0.112	0.318	1.738	0.180	0.243
48"	3'-0"	2'-2"		5'-0"	5'-9"	2'-0"	3'-2"	4	2'-3"	3	2'-11"	3	2'-11"	35	0.145	0.352	2.052	0.235	0.317
54"	3'-0"	2'-2"		5'-7"	6'-3"	2'-7"	3'-2"	4	2'-10"	5	2'-11"	3	2'-11"	41	0.180	0.386	2.387	0.297	0.401

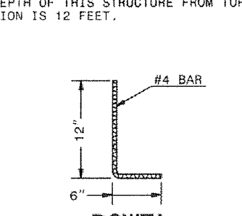
* RISER HAS .228 CUBIC YARDS OF CONCRETE PER FOOT HEIGHT

ROADWAY STANDARD DRAWING FOR
CONCRETE JUNCTION BOX
(WITH OPTIONAL MANHOLE)
12" THRU 66" PIPE
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. 1-18
SHEET 1 OF 1 840.31





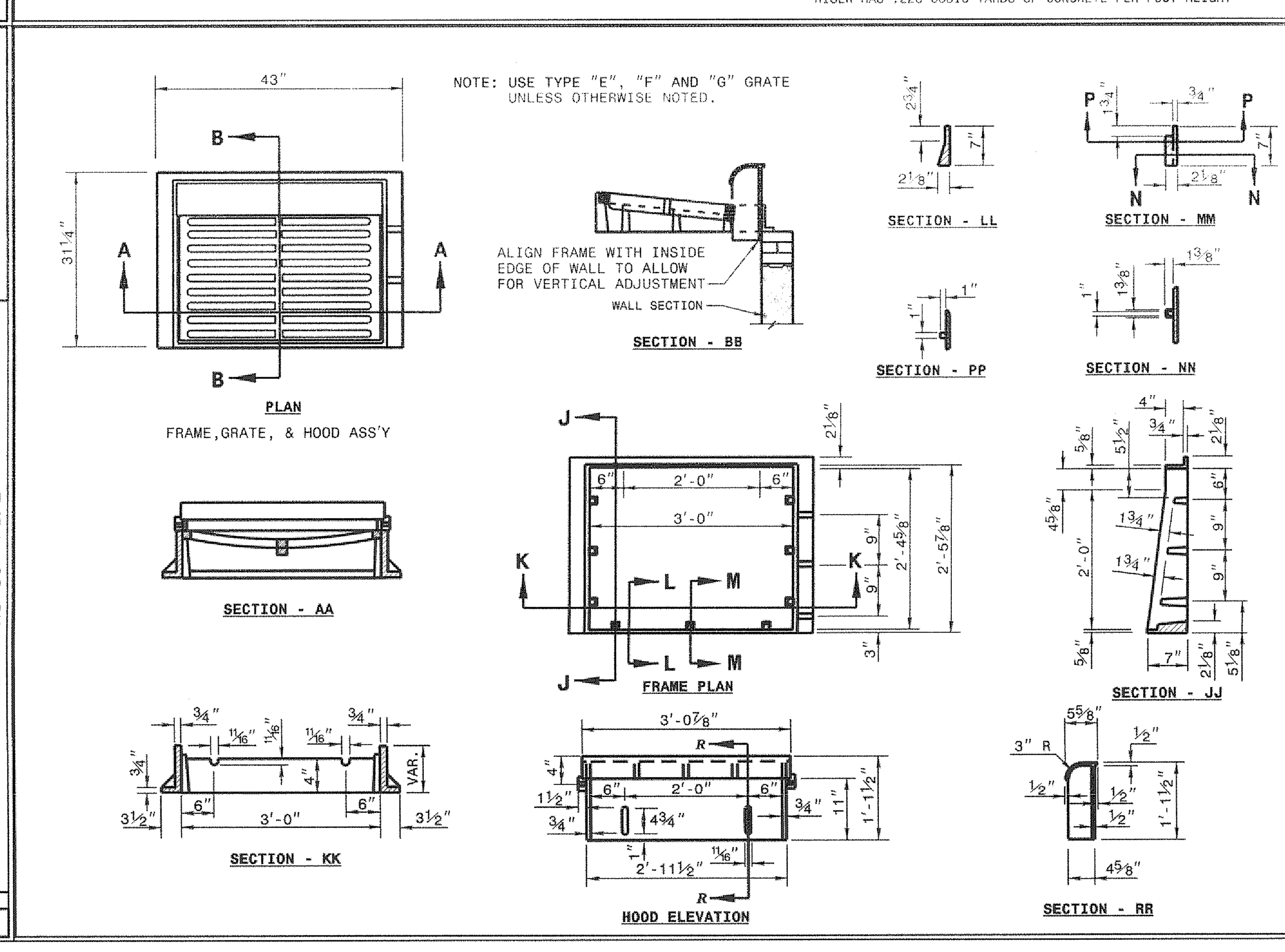
GENERAL NOTES:
CHAMFER ALL EXPOSED CORNERS 1".
USE CLASS "B" CONCRETE THROUGHOUT.
OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2" KEYWAY, OR #4 BAR DOWELS AT 12" CENTERS AS DIRECTED BY THE ENGINEER.
USE FORMS TO CONSTRUCT THE BOTTOM SLAB.
IF REINFORCED CONCRETE PIPE IS SET IN BASE SLAB OF BOX, ADD TO BASE AS SHOWN ON STANDARD NO. 840.00.
PROVIDE ALL JUNCTION BOXES OVER 3'-6" IN DEPTH WITH STEPS 12" ON CENTERS IN ACCORDANCE WITH STD. NO. 840.66.
ADJUST THE STEEL, CONCRETE AND BRICK MASONRY QUANTITIES TO INCLUDE THE ADDITION OF THE MANHOLE (I.E. DIAGONAL BARS SHORTENED AROUND OPENING IN TOP SLAB, ADDITIONAL VARIABLE HEIGHT BRICK MASONRY, OPENING IN TOP SLAB.)
MAX. DEPTH OF THIS STRUCTURE FROM TOP OF BOTTOM SLAB TO TOP ELEVATION IS 12 FEET.



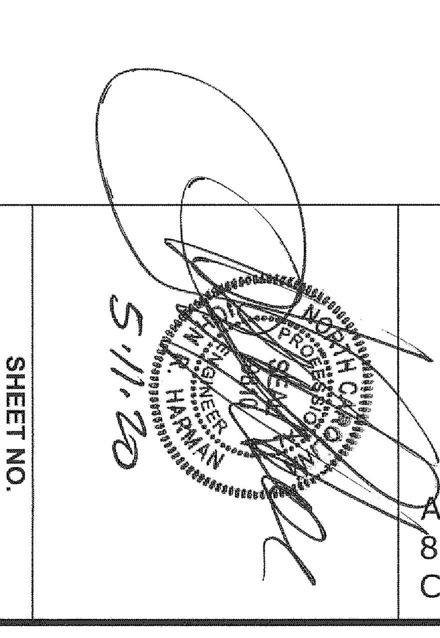
DIMENSIONS AND QUANTITIES FOR CONCRETE JUNCTION BOXES

PIPE D	SPAN A	WIDTH B	HEIGHT H	REINFORCEMENT BARS "A" NO.	LENGTH	TOP SLAB DIMENSIONS E	F	CUBIC YARDS IN BOX TOP SLAB	BOTTOM SLAB	WALL/FT. OF HT.	TOTAL QUANTITIES BOX AND SLABS LBS. REINF	CU. YDS. MIN. "H"	DEDUCTIONS FOR ONE PIPE CU.YDS. C.S.	R.C.
12"	2'-0"	2'-0"	2'-3"	12	2'-9"	3'-0"	3'-0"	0.167	0.167	0.185	22	0.750	0.015	0.024
15"	2'-3"	2'-3"	2'-6"	12	3'-0"	3'-3"	3'-3"	0.196	0.196	0.204	24	0.902	0.023	0.036
18"	2'-6"	2'-6"	2'-9"	14	3'-3"	3'-6"	3'-6"	0.227	0.227	0.222	30	1.065	0.033	0.049
24"	3'-0"	3'-0"	3'-3"	16	3'-9"	4'-0"	4'-0"	0.296	0.296	0.259	40	1.434	0.059	0.085
30"	3'-6"	3'-6"	3'-9"	18	4'-3"	4'-6"	4'-6"	0.375	0.375	0.296	51	1.860	0.092	0.127
36"	4'-0"	4'-0"	4'-3"	20	4'-9"	5'-0"	5'-0"	0.463	0.463	0.333	64	2.341	0.132	0.178
42"	4'-6"	4'-6"	4'-9"	22	5'-3"	5'-6"	5'-6"	0.560	0.560	0.370	77	2.878	0.180	0.243
48"	5'-4"	5'-4"	5'-3"	26	6'-3"	6'-4"	6'-4"	0.743	0.743	0.407	111	3.623	0.235	0.317
54"	5'-10"	5'-10"	5'-9"	28	6'-7"	6'-10"	6'-10"	0.865	0.865	0.444	126	4.283	0.297	0.401
60"	6'-6"	6'-6"	6'-3"	30	7'-3"	7'-6"	7'-6"	1.042	1.042	0.481	145	5.090	0.367	0.495
66"	7'-1"	7'-1"	6'-9"	32	7'-10"	8'-1"	8'-1"	1.210	1.210	0.518	169	5.917	0.444	0.589

ROADWAY STANDARD DRAWING FOR
FRAME, GRATES, AND HOOD
FOR USE ON STANDARD CATCH BASIN
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. 1-18
SHEET 1 OF 2 840.03



No.	DATE	REVISION	DWN/CHK



AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511
919-469-1101

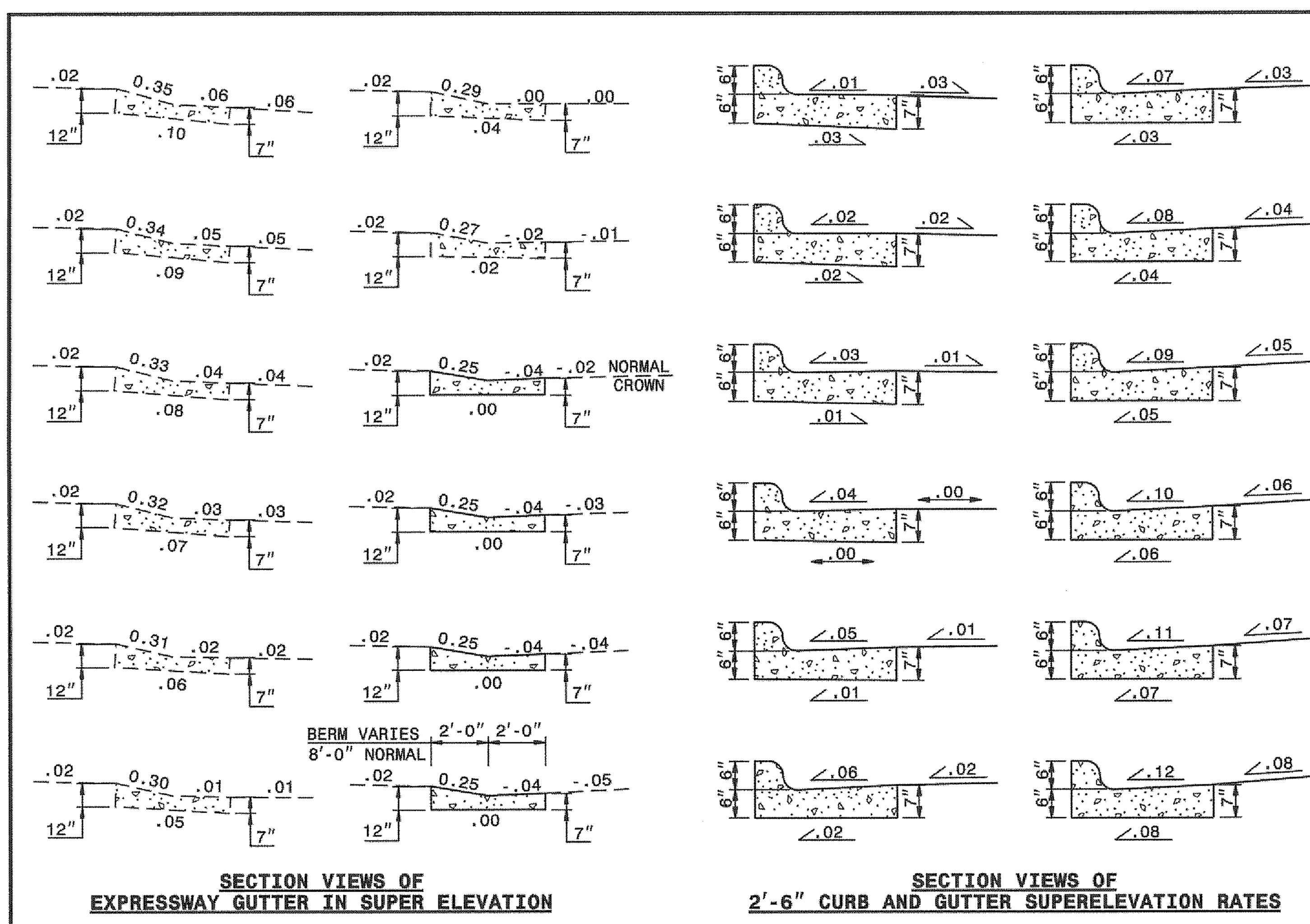
JOB NUMBER: 9900
CHECKED BY: JRH
DRAWN BY: EDS
DATE: 9/19/2019

NCDOT DETAILS
FOR
KALAS FALLS
SITUATED AT
ROLESVILLE ROAD, ROLESVILLE
WAKE COUNTY, NORTH CAROLINA
FIRM # C-3881

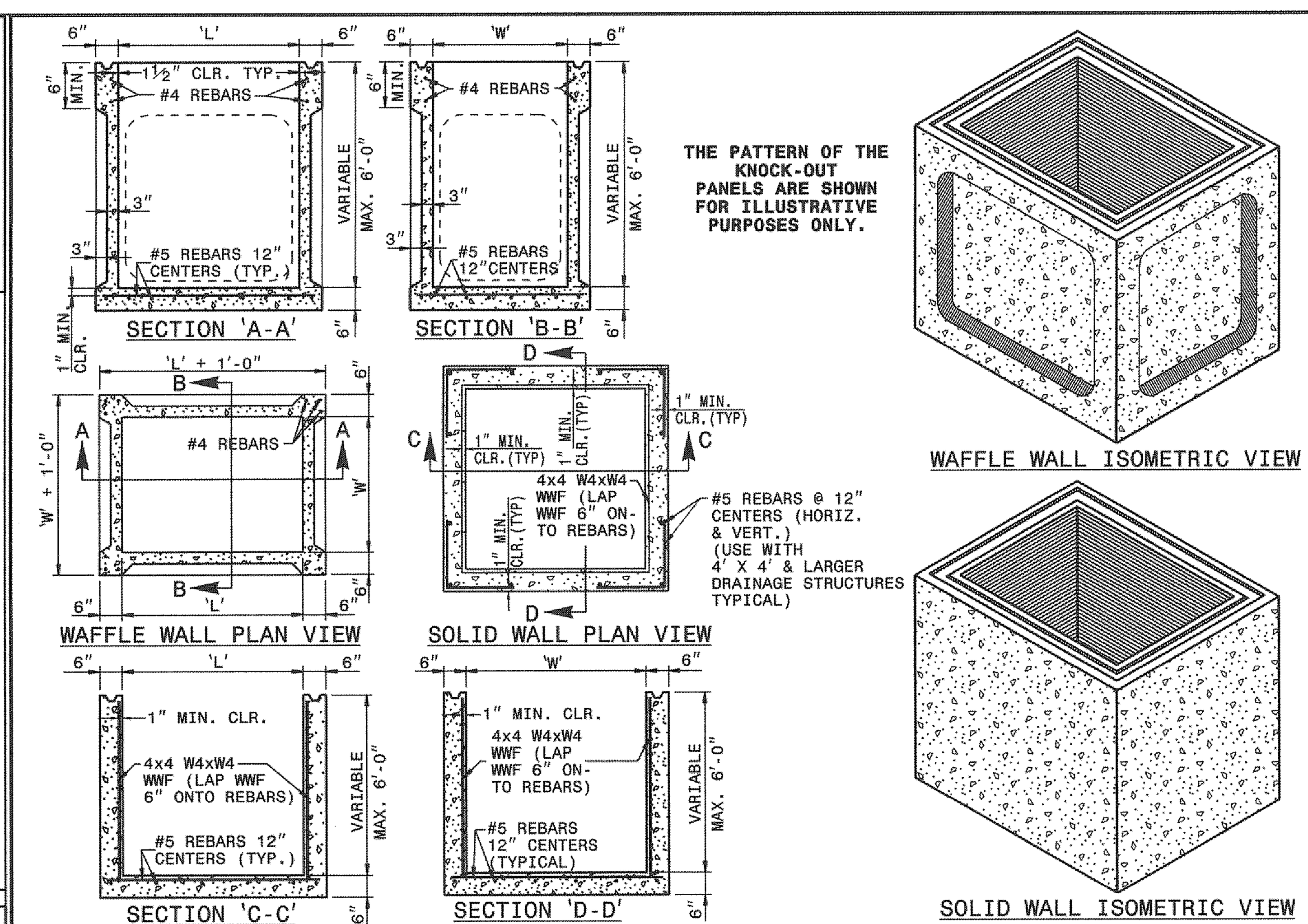
SHEET NO.
CD11

Y:\Jobs\9900\Watkins Property\dwg\Temporary\Emily\Rogers Farm Full Set Details.dwg

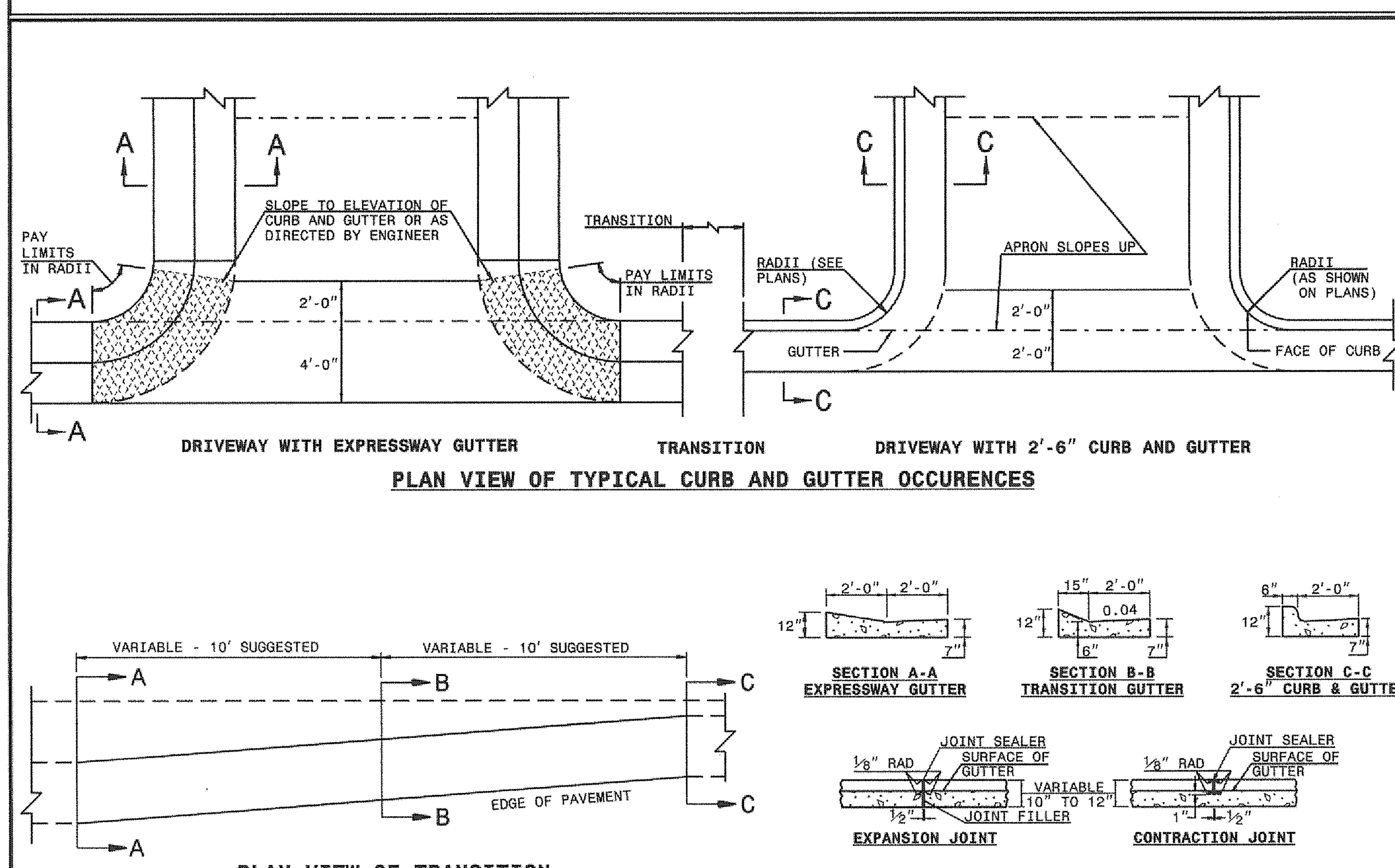
ROADWAY STANDARD DRAWING FOR CONCRETE CURB, GUTTER AND CURB & GUTTER
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. — 1-18 — SHEET 2 OF 3 — 846.01



ROADWAY STANDARD DRAWING FOR PRECAST DRAINAGE STRUCTURE (SOLID AND WAFFLE WALL)
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. — 1-18 — SHEET 1 OF 2 — 840.45



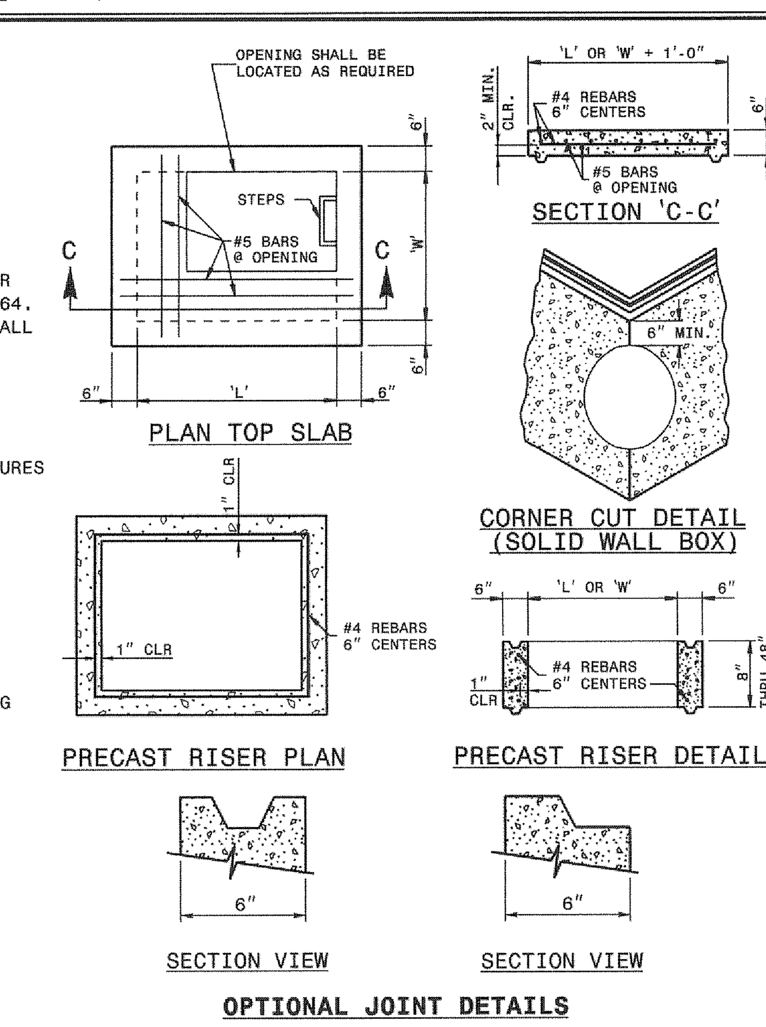
ROADWAY STANDARD DRAWING FOR CONCRETE CURB, GUTTER AND CURB & GUTTER
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. — 1-18 — SHEET 3 OF 3 — 846.01



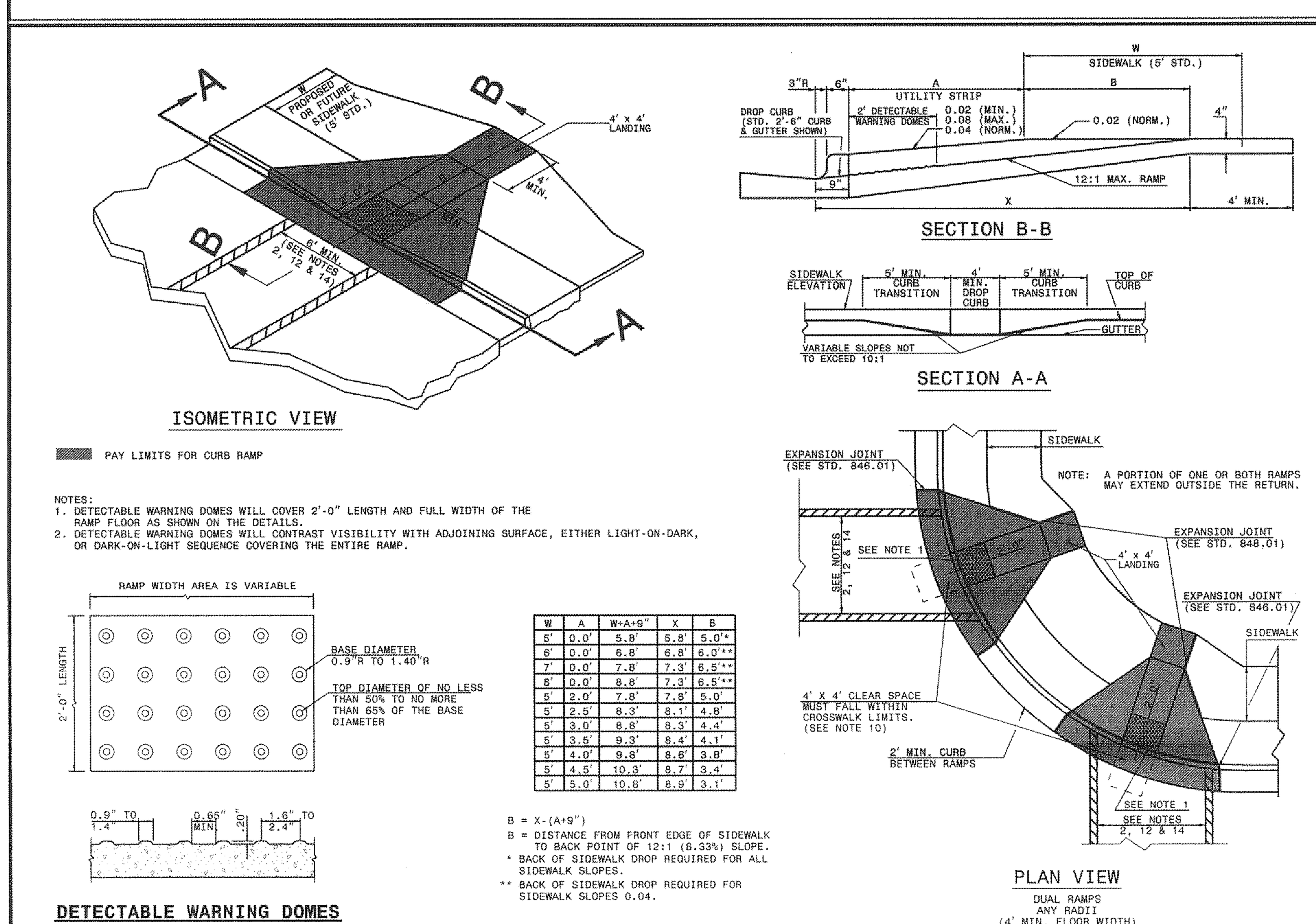
NOTES:
- IN THE TRANSITION FROM 4'-0" CONCRETE EXPRESSWAY GUTTER TO 2'-6" CONCRETE CURB AND GUTTER, PLACE ½" EXPANSION JOINTS AT 25' INTERVALS.
- PLACE GROOVE JOINTS 1" DEEP AT 12'-6" INTERVALS BETWEEN EXPANSION JOINTS.
- FILL AND SEAL THE TOP ½" OF THE EXPANSION JOINTS AND 1" OF CONTRACTION JOINTS WITH APPROVED JOINT SEALING COMPOUND.

ROADWAY STANDARD DRAWING FOR PRECAST DRAINAGE STRUCTURE (GENERAL NOTES AND DETAILS)
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. — 1-18 — SHEET 2 OF 2 — 840.45

GENERAL NOTES:
- * THIS PRECAST BOX MAY BE USED FOR THE FOLLOWING STANDARDS: 840.01, 840.02, 840.04, 840.05, 840.13, 840.14, 840.15, 840.17, 840.18, 840.19, 840.26, 840.27, 840.28, 840.31, 840.32 AND 840.41.
- * INSTALL PRECAST DRAINAGE STRUCTURES AND PAY FOR IN ACCORDANCE WITH SPECIFICATION SECTION 840.
- * DO NOT PLACE PRECAST DRAINAGE STRUCTURES UNDER TRAFFIC OR WHERE TRAFFIC WILL BE DETOURED.
- * USE 4000 PSI CONCRETE.
- * PROVIDE ALL REINFORCING STEEL WHICH MEETS ASTM A615 FOR GRADE 60 AND WELDED WIRE FABRIC CONFORMING TO ASTM A1064.
- * LIMIT MAXIMUM DEPTH TO TOP OF BOTTOM SLAB FOR WAFFLE WALL STRUCTURE TO 10'-0"; LIMIT SOLID WALL STRUCTURE TO 15'-0".
- * PLACE LIFT HOLES OR PINS IN ACCORDANCE WITH OSHA STANDARD 1926.704.
- * CUT OR FORM OPENINGS FOR PIPE TO PROVIDE REQUIRED SIZE AND LOCATION. ORIENT WAFFLE WALL STRUCTURES SO THAT PIPES ENTER THROUGH THE KNOCKOUT/WAFFLE PANELS ONLY. PIPES MAY ENTER THROUGH THE CORNERS OF SOLID WALL BOXES IF A MINIMUM OF 6" OF WALL IS PROVIDED ABOVE THE HOLE.
- * ALL ELEMENTS PRECAST TO MEET ASTM C913.
- * FRAME AND GRATE HEIGHT MAY BE ADJUSTED WITH CONCRETE OR BRICK IN ACCORDANCE WITH STANDARD 840.25.
- * PROVIDE PRECAST STRUCTURES OVER 4'-0" IN DEPTH WITH STEPS AS DIRECTED BY THE ENGINEER.
- * WELDED WIRE FABRIC MAY BE SUBSTITUTED FOR REBAR AS LONG AS THE SAME AREA OF STEEL IS PROVIDED.
- * SEAL JOINTS WITH A FLEXIBLE BUTYL RUBBER BASE CONFORMING TO FEDERAL SPECIFICATION SS-S-21A, AASHTO M-198, TYPE B - BUTYL RUBBER.
- * LIMIT MAXIMUM STRUCTURE SIZE TO INSIDE CLEAR DIMENSIONS OF 5'-0" X 5'-0".
- * THE OUTSIDE PIPE DIAMETER PLUS 2" OR THE OPENING REQUIRED FOR FRAME AND GRATE IS THE MINIMUM STRUCTURE SIZE WHICHEVER IS GREATER.
- * USE MANHOLE FRAME AND COVER AS INDICATED ON THE PLANS. REINFORCE OPENING AS SHOWN ON THIS SHEET.



ROADWAY STANDARD DRAWING FOR CURB RAMP — PROPOSED CURB AND GUTTER
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. — 1-18 — SHEET 1 OF 3 — 848.05



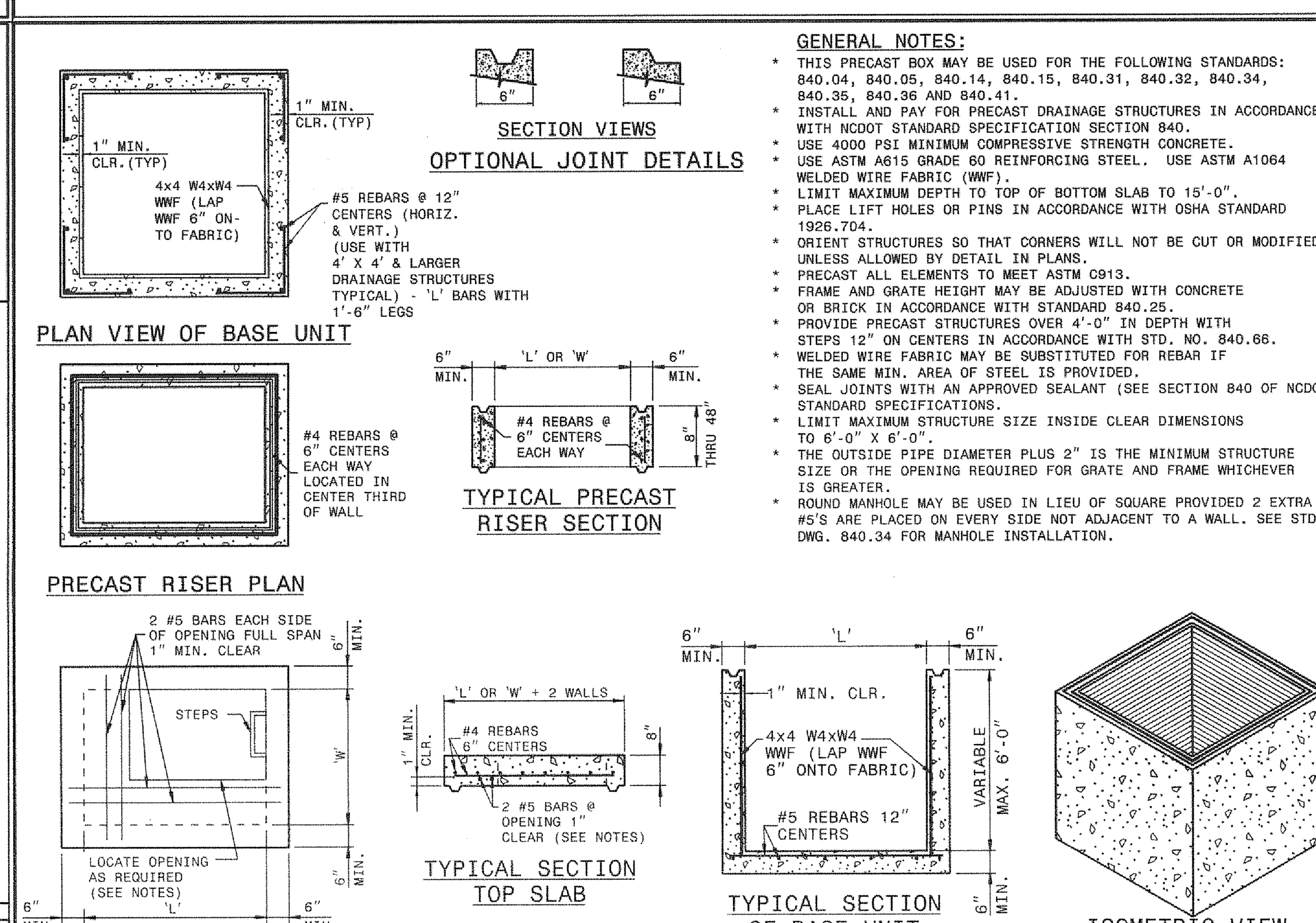
NOTES:
1. DETECTABLE WARNING DOMES WILL COVER 2'-0" LENGTH AND FULL WIDTH OF THE RAMP FLOOR AS SHOWN ON THE DETAILS.
2. DETECTABLE WARNING DOMES WILL CONTRAST VISIBILITY WITH ADJOINING SURFACE, EITHER LIGHT-ON-DARK, OR DARK-ON-LIGHT SEQUENCE COVERING THE ENTIRE RAMP.

W	A	W+A+9"	X	B
5'	0.0'	5.8'	5.8'	5.0'*
6'	0.0'	6.8'	6.8'	6.0'**
7'	0.0'	7.8'	7.3'	6.5'**
8'	0.0'	8.8'	7.3'	6.5'**
5'	2.0'	7.8'	7.8'	5.0'
5'	2.5'	8.3'	8.1'	4.8'
5'	3.0'	8.8'	8.3'	4.4'
5'	3.5'	9.3'	8.4'	4.1'
5'	4.0'	9.8'	8.6'	3.8'
5'	4.5'	10.3'	8.7'	3.4'
5'	5.0'	10.8'	8.9'	3.1'

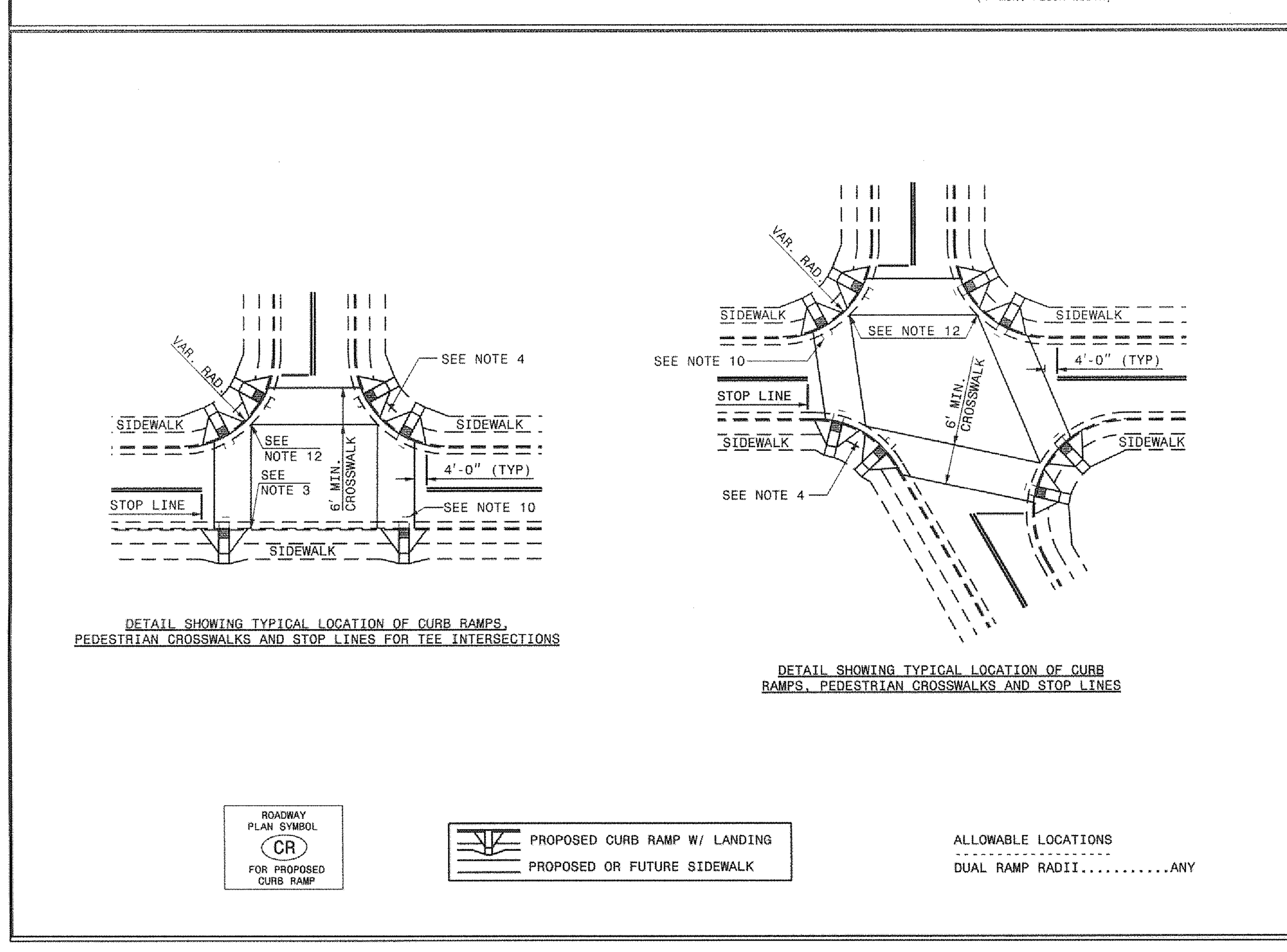
B = X-(A+9")
B = DISTANCE FROM FRONT EDGE OF SIDEWALK TO BACK POINT OF 12:1 (8.33%) SLOPE.
* BACK OF SIDEWALK DROP REQUIRED FOR ALL SIDEWALK SLOPES.
** BACK OF SIDEWALK DROP REQUIRED FOR SIDEWALK SLOPES 0.04.

ROADWAY STANDARD DRAWING FOR TRAFFIC BEARING PRECAST DRAINAGE STRUCTURE
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. — 1-18 — SHEET 1 OF 1 — 840.46

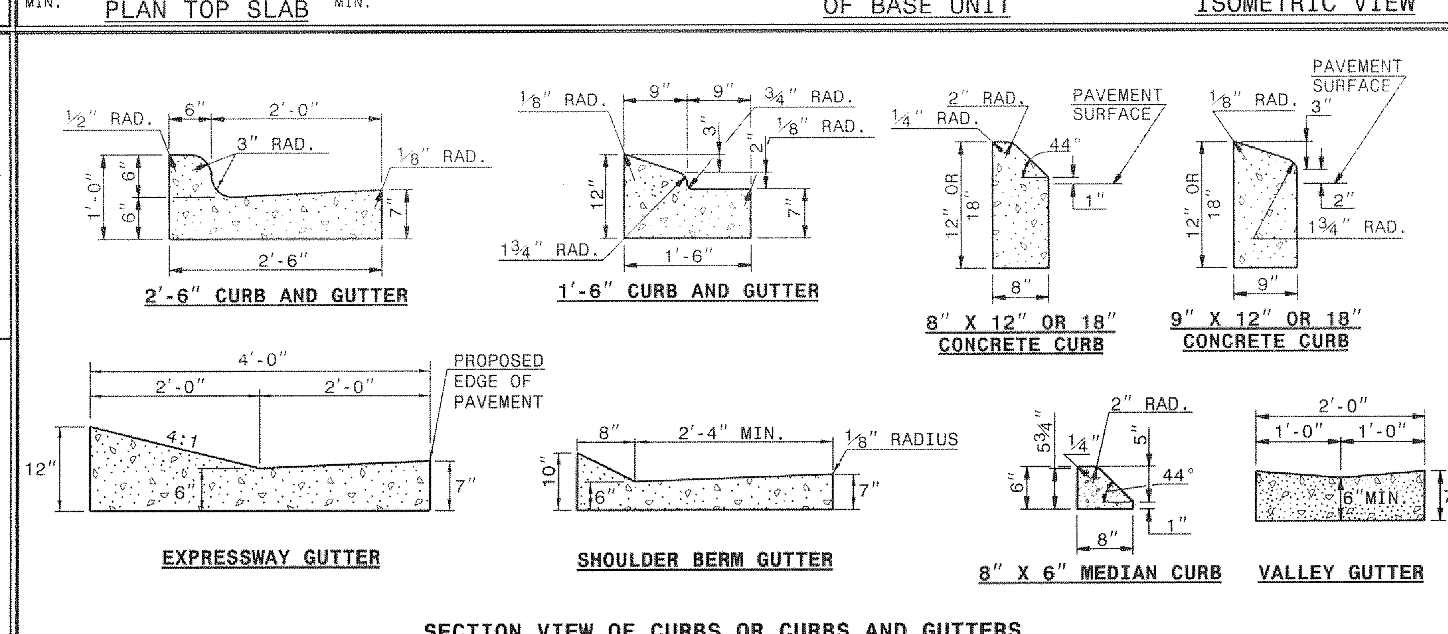
GENERAL NOTES:
- * THIS PRECAST BOX MAY BE USED FOR THE FOLLOWING STANDARDS: 840.04, 840.05, 840.14, 840.15, 840.31, 840.32, 840.34, 840.35, 840.36 AND 840.41.
- * INSTALL AND PAY FOR PRECAST DRAINAGE STRUCTURES IN ACCORDANCE WITH NCDOT STANDARD SPECIFICATION SECTION 840.
- * USE 4000 PSI MINIMUM COMPRESSIVE STRENGTH CONCRETE.
- * USE ASTM A615 GRADE 60 REINFORCING STEEL. USE ASTM A1064 WELDED WIRE FABRIC (WWF).
- * LIMIT MAXIMUM DEPTH TO TOP OF BOTTOM SLAB TO 15'-0".
- * PLACE LIFT HOLES OR PINS IN ACCORDANCE WITH OSHA STANDARD 1926.704.
- * ORIENT STRUCTURES SO THAT CORNERS WILL NOT BE CUT OR MODIFIED UNLESS ALLOWED BY DETAIL IN PLANS.
- * PRECAST ALL ELEMENTS TO MEET ASTM C913.
- * FRAME AND GRATE HEIGHT MAY BE ADJUSTED WITH CONCRETE OR BRICK IN ACCORDANCE WITH STANDARD 840.25.
- * PROVIDE PRECAST STRUCTURES OVER 4'-0" IN DEPTH WITH STEPS 12" ON CENTERS IN ACCORDANCE WITH STD. NO. 840.66.
- * WELDED WIRE FABRIC MAY BE SUBSTITUTED FOR REBAR IF THE SAME MIN. AREA OF STEEL IS PROVIDED.
- * SEAL JOINTS WITH AN APPROVED SEALANT (SEE SECTION 840 OF NCDOT STANDARD SPECIFICATIONS.
- * LIMIT MAXIMUM STRUCTURE SIZE INSIDE CLEAR DIMENSIONS TO 6'-0" X 6'-0".
- * THE OUTSIDE PIPE DIAMETER PLUS 2" IS THE MINIMUM STRUCTURE SIZE OR THE OPENING REQUIRED FOR GRATE AND FRAME WHICHEVER IS GREATER.
- * ROUND MANHOLE MAY BE USED IN LIEU OF SQUARE PROVIDED 2 EXTRA #5'S ARE PLACED ON EVERY SIDE NOT ADJACENT TO A WALL. SEE STD. DWG. 840.34 FOR MANHOLE INSTALLATION.



ROADWAY STANDARD DRAWING FOR CURB RAMP — PROPOSED CURB AND GUTTER
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. — 1-18 — SHEET 2 OF 3 — 848.05



ROADWAY STANDARD DRAWING FOR CONCRETE CURB, GUTTER AND CURB & GUTTER
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. — 1-18 — SHEET 1 OF 3 — 846.01



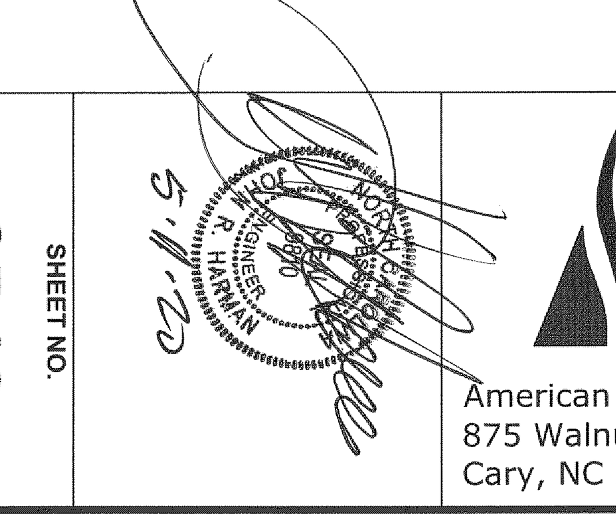
GENERAL NOTES:
- PLACE CONTRACTION JOINTS AT 10' INTERVALS, EXCEPT THAT A 15' SPACING MAY BE USED WHEN A MACHINE IS USED OR WHEN SATISFACTORY SUPPORT FOR THE FACE FORM CAN BE OBTAINED WITHOUT THE USE OF TEMPLATES AT 10' INTERVALS.
- JOINT SPACING MAY BE ALTERED IF REQUIRED BY THE ENGINEER.
- CONTRACTION JOINTS MAY BE INSTALLED WITH THE USE OF TEMPLATES OR FORMED BY OTHER APPROVED METHODS. CONSTRUCT NON-TEMPLATE FORMED JOINTS A MIN. OF 1½" DEEP.
- FILL ALL CONSTRUCTION JOINTS, EXCEPT IN 8"x6" MEDIAN CURB, WITH JOINT FILLER AND SEALER.
- SPACE EXPANSION JOINTS AT 90' INTERVALS AND ADJACENT TO ALL RIGID OBJECTS.

NCDOT DETAILS
FOR
KALAS FALLS
SITUATED AT
ROLESVILLE ROAD,ROLESVILLE
WAKE COUNTY, NORTH CAROLINA
FIRM # C-3881

No.	DATE	REVISION	DWN/CHK

JOB NUMBER: 9900
CHECKED BY: JRH
DRAWN BY: EDS
DATE: 9/19/2019

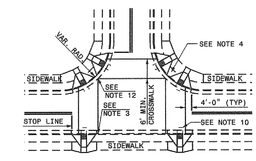
AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511
919-469-1101



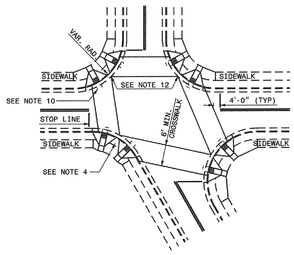
SHEET NO.
CD12

Y:\Jobs\9900\Watkins Property\dwg\Temporary\Emily\Rogers Farm Full Set Details.dwg

CURB RAMPS AND EXISTING SIDEWALK



DETAIL SHOWING TYPICAL LOCATION OF CURB RAMPS, PEDESTRIAN CROSSWALKS AND STOP LINES FOR TEE INTERSECTIONS



DETAIL SHOWING TYPICAL LOCATION OF CURB RAMPS, PEDESTRIAN CROSSWALKS AND STOP LINES

RESURFACING PROJECTS

PROPOSED CURB RAMP W/ LANDING FOR RESURFACING PROJECTS

EXISTING SIDEWALK

ALLOWABLE LOCATIONS
DUAL RAMP RADII.....ANY

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR
CURB RAMP
EXISTING CURB AND GUTTER

SHEET 4 OF 5
848.06

NOTES:

1. CONSTRUCT THE RAMP SURFACE TO BE STABLE, FIRM, AND SLIP RESISTANT. CONSTRUCT THE CURB RAMP TYPE AS SHOWN IN THE PAVEMENT MARKING PLANS OR AS DIRECTED BY THE ENGINEER.
2. LOCATE CURB RAMPS AND PLACE PEDESTRIAN CROSSWALK MARKINGS AS SHOWN IN THE PAVEMENT MARKING PLANS. WHEN FIELD ADJUSTMENTS REQUIRE MOVING CURB RAMPS OR MARKINGS AS SHOWN, CONTACT THE SIGNING AND DELINEATION UNIT OR LOCATE AS DIRECTED BY THE ENGINEER.
3. COORDINATE THE CURB RAMP AND THE PEDESTRIAN CROSSWALK MARKINGS SO A 4'x4' CLEAR SPACE AT THE BASE OF THE CURB RAMP WILL FALL WITHIN THE PEDESTRIAN CROSSWALK LINES.
4. SET BACK DISTANCE FROM INSIDE CROSSWALK MARKING TO NEAREST EDGE OF TRAVEL LANE IS 4' MINIMUM.
5. REFER TO THE PAVEMENT MARKING PLANS FOR STOP BAR LOCATIONS AT SIGNALIZED INTERSECTIONS. IF A PAVEMENT MARKING PLAN IS NOT PROVIDED, CONTACT THE SIGNAL DESIGN SECTION FOR THE STOP BAR LOCATIONS OR LOCATE AS DIRECTED BY THE ENGINEER.
6. TERMINATE PARKING A MINIMUM OF 20' BACK OF A PEDESTRIAN CROSSWALK.
7. CONSTRUCT CURB RAMPS A MINIMUM OF 4' WIDE.
8. CONSTRUCT THE RUNNING SLOPE OF THE RAMP 8.33% MAXIMUM.
9. ALLOWABLE CROSS SLOPE ON SIDEWALKS AND CURB RAMPS WILL BE 2% MAXIMUM.
10. CONSTRUCT THE SIDE FLARE SLOPE A MAXIMUM OF 10% MEASURED ALONG THE CURB LINE.
11. CONSTRUCT THE COUNTER SLOPE OF THE GUTTER OR STREET AT THE BASE OF THE CURB RAMP A MAXIMUM OF 5% AND MAINTAIN A SMOOTH TRANSITION.
12. CONSTRUCT LANDINGS FOR SIDEWALK A MINIMUM OF 4'x4' WITH A MAXIMUM SLOPE OF 2% IN ANY DIRECTION. CONSTRUCT LANDINGS FOR MEDIAN ISLANDS A MINIMUM OF 5'x5' WITH A MAXIMUM SLOPE OF 2% IN ANY DIRECTION.
13. TO USE A MEDIAN ISLAND AS A PEDESTRIAN REFUGE AREA, MEDIAN ISLANDS WILL BE A MINIMUM OF 6' WIDE. CONSTRUCT MEDIAN ISLANDS TO PROVIDE PASSAGE OVER OR THROUGHT THE ISLAND.
14. SMALL CHANNELIZATION ISLANDS THAT CAN NOT PROVIDE A 5'X5' LANDING AT THE TOP OF A RAMPS, WILL BE CUT THROUGH LEVEL WITH THE SURFACE STREET.
15. CURB RAMPS WITH RETURNED CURBS MAY BE USED ONLY WHERE PEDESTRIANS WOULD NOT NORMALLY WALK ACROSS THE RAMP. THE ADJACENT SURFACE IS PLANTING OR OTHER NON-WALKING SURFACE OR THE SIDE APPROACH IS SUBSTANTIALLY OBSTRUCTED.
16. PLACE A ½" EXPANSION JOINT WHERE THE CONCRETE CURB RAMP JOINS THE CURB AS SHOWN IN ROADWAY STANDARD DRAWING 848.01
17. PLACE ALL PEDESTRIAN PUSH BUTTON ACTUATORS AND CROSSING SIGNALS AS SHOWN IN THE PLANS OR AS SHOWN IN THE MUTCD.
18. CURB RAMPS THROUGH MEDIAN ISLANDS, SINGLE RAMPS AT DUAL CROSSWALKS OR LIMITED R/W SITUATIONS, WILL BE HANDLED BY SPECIAL DETAILS. CONTACT THE CONTRACT STANDARDS AND DEVELOPMENT UNIT FOR THE DETAILS OR FOR A SPECIAL DESIGN.

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR
CURB RAMPS
NOTES

SHEET 3 OF 3
848.05

CURB RAMP AND EXISTING SIDEWALK

NOTES:

1. CONSTRUCT THE RAMP SURFACE TO BE STABLE, FIRM, AND SLIP RESISTANT. CONSTRUCT THE CURB RAMP TYPE AS SHOWN IN THE PAVEMENT MARKING PLANS OR AS DIRECTED BY THE ENGINEER.
2. LOCATE CURB RAMPS AND PLACE PEDESTRIAN CROSSWALK MARKINGS AS SHOWN IN THE PAVEMENT MARKING PLANS. WHEN FIELD ADJUSTMENTS REQUIRE MOVING CURB RAMPS OR MARKINGS AS SHOWN, CONTACT THE SIGNING AND DELINEATION UNIT OR LOCATE AS DIRECTED BY THE ENGINEER.
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4. SET BACK DISTANCE FROM INSIDE CROSSWALK MARKING TO NEAREST EDGE OF TRAVEL LANE IS 4' MINIMUM.
5. REFER TO THE PAVEMENT MARKING PLANS FOR STOP BAR LOCATIONS AT SIGNALIZED INTERSECTIONS. IF A PAVEMENT MARKING PLAN IS NOT PROVIDED, CONTACT THE SIGNAL DESIGN SECTION FOR THE STOP BAR LOCATIONS OR LOCATE AS DIRECTED BY THE ENGINEER.
6. TERMINATE PARKING A MINIMUM OF 20' BACK OF A PEDESTRIAN CROSSWALK.
7. CONSTRUCT CURB RAMPS A MINIMUM OF 4' WIDE.
8. CONSTRUCT THE RUNNING SLOPE OF THE RAMP 8.33% MAXIMUM.
9. ALLOWABLE CROSS SLOPE ON SIDEWALKS AND CURB RAMPS WILL BE 2% MAXIMUM.
10. CONSTRUCT THE SIDE FLARE SLOPE A MAXIMUM OF 10% MEASURED ALONG THE CURB LINE.
11. CONSTRUCT THE COUNTER SLOPE OF THE GUTTER OR STREET AT THE BASE OF THE CURB RAMP A MAXIMUM OF 5% AND MAINTAIN A SMOOTH TRANSITION.
12. CONSTRUCT LANDINGS FOR SIDEWALK A MINIMUM OF 4'x4' WITH A MAXIMUM SLOPE OF 2% IN ANY DIRECTION. CONSTRUCT LANDINGS FOR MEDIAN ISLANDS A MINIMUM OF 5'x5' WITH A MAXIMUM SLOPE OF 2% IN ANY DIRECTION.
13. TO USE A MEDIAN ISLAND AS A PEDESTRIAN REFUGE AREA, MEDIAN ISLANDS WILL BE A MINIMUM OF 6' WIDE. CONSTRUCT MEDIAN ISLANDS TO PROVIDE PASSAGE OVER OR THROUGHT THE ISLAND.
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16. PLACE A ½" EXPANSION JOINT WHERE THE CONCRETE CURB RAMP JOINS THE CURB AS SHOWN IN ROADWAY STANDARD DRAWING 848.01
17. PLACE ALL PEDESTRIAN PUSH BUTTON ACTUATORS AND CROSSING SIGNALS AS SHOWN IN THE PLANS OR AS SHOWN IN THE MUTCD.
18. CURB RAMPS THROUGH MEDIAN ISLANDS, SINGLE RAMPS AT DUAL CROSSWALKS OR LIMITED R/W SITUATIONS, WILL BE HANDLED BY SPECIAL DETAILS. CONTACT THE CONTRACT STANDARDS AND DEVELOPMENT UNIT FOR THE DETAILS OR FOR A SPECIAL DESIGN.

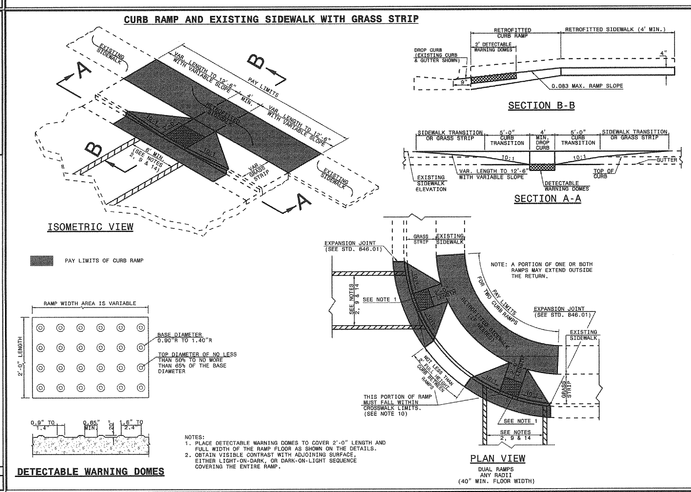
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

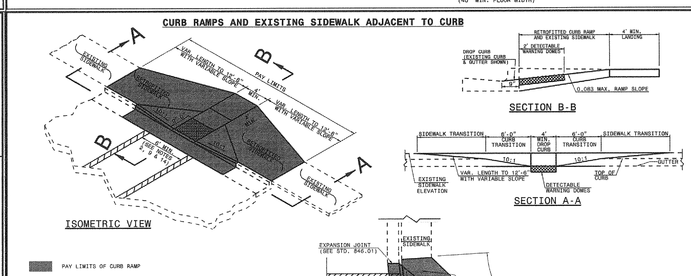
1-18

ROADWAY STANDARD DRAWING FOR
CURB RAMP
EXISTING CURB AND GUTTER

SHEET 5 OF 5
848.06

CURB RAMP AND EXISTING SIDEWALK WITH GRASS STRIP





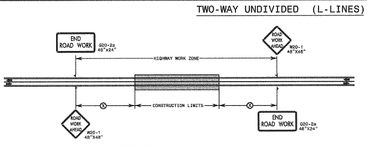
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR
CURB RAMP
EXISTING CURB AND GUTTER

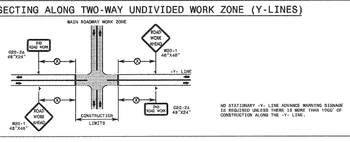
SHEET 1 OF 5
848.06

TWO-WAY UNDIVIDED (L-LINES)



POSTED SPEED LIMIT (MPH)	RECOMMENDED MINIMUM SIGN SPACING (X)
≤ 55	500'
56	1000'

ROADWAYS INTERSECTING ALONG TWO-WAY UNDIVIDED WORK ZONE (Y-LINES)



NO STATIONARY +Y- LINE ADVANCE WARNING SIGNAGE IS REQUIRED UNLESS THERE IS MORE THAN 1700' OF CONSTRUCTION ALONG THE +Y- LINE.

GENERAL NOTES

1- DO NOT INSTALL ADVANCE WARNING SIGNS MORE THAN 3 DAYS PRIOR TO BEGINNING OF WORK UNLESS COVERED.

2- SIGNS SHOWN ARE REQUIRED FOR WORK ZONES THAT WILL REMAIN IN EFFECT LONGER THAN 3 CONSECUTIVE DAYS.

3- ALL SIGN SPACING DIMENSIONS ARE APPROXIMATE, FIELD ADJUST AS NECESSARY OR AS DIRECTED.

4- ERECT SIGNS PER RSD 1110.01. PAYMENT FOR WOOD POSTS, 3LB STEEL U-CHANNEL AND SQUARE STEEL TUBING POSTS WITH SIGNS WILL BE MADE ACCORDING TO STANDARD SPECIFICATIONS FOR WORK ZONE SIGNS.

5- WHEN NECESSARY, USE SPLICING IN ACCORDANCE WITH RSD. 1110.01.

6- DO NOT BACK BRACE SIGN SUPPORTS.

LEGEND
STATIONARY SIGN
DIRECTION OF TRAFFIC FLOW

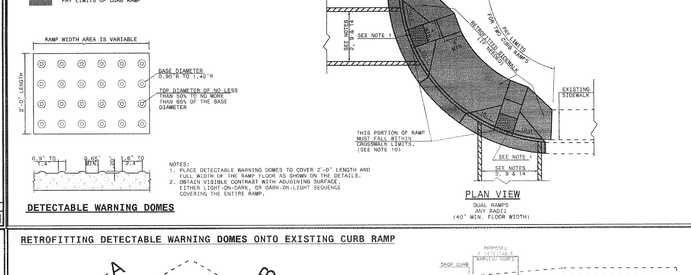
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR
WORK ZONE ADVANCE WARNING SIGNS FOR TWO-WAY UNDIVIDED FACILITIES

SHEET 3 OF 3
1101.01

CURB RAMPS AND EXISTING SIDEWALK ADJACENT TO CURB

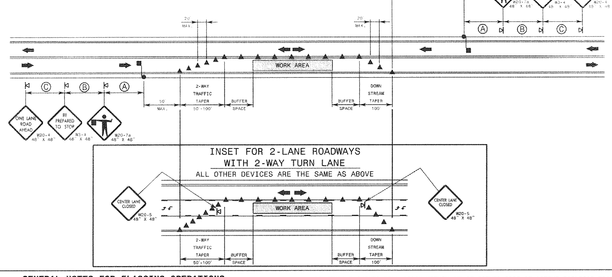


STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR
CURB RAMP
EXISTING CURB AND GUTTER

SHEET 2 OF 5
848.06



GENERAL NOTES FOR FLAGGING OPERATIONS

1- REFER TO RSD. 1101.11, SHEETS 1 & 4, FOR "L" DISTANCE AND SIGN SPACING.

2- INSTALL LANE CLOSURES WITH THE TRAFFIC FLOW, BEGINNING WITH DEVICES ON THE UPSTREAM SIDE OF TRAFFIC.

3- REMOVE LANE CLOSURES AGAINST THE TRAFFIC FLOW, BEGINNING WITH DEVICES ON THE DOWNSTREAM SIDE OF TRAFFIC.

4- PLACE CONES TWO THE WORK AREA AT THE MAXIMUM SPACING EQUAL IN FEET TO 2 TIMES THE POSTED SPEED LIMIT.

5- EXTEND LANE CLOSURES AT THE BUFFER SPACE SUCH THAT STOPPING SIGHT DISTANCE IS PROVIDED TO THE FLAGGER (REFER TO RSD. 1101.11, SHEET 2).

6- DO NOT STOP TRAFFIC IN ANY ONE DIRECTION FOR MORE THAN 5 MINUTES AT A TIME.

7- DRUMS OR SKINNY DRUMS MAY BE USED IN LIEU OF CONES. REFER TO RSD. 1180.01 FOR SKINNY DRUM REQUIREMENTS.

8- USE FLAGGERS TO CONTROL TRAFFIC AT INTERSECTIONS AFFECTED BY THE LANE CLOSURE. SUPPLEMENT FLAGGERS LOCATED AT INTERSECTIONS WITH FLASHER SPACE SIGNS (R00-75) PLACED APPROXIMATELY 500 FT. IN ADVANCE OF THE FLAGGER, FOR SIGNALIZED INTERSECTIONS PLACE SIGNALS IN THE FLASH MODE AND USE LAW ENFORCEMENT.

9- REFER TO THE CURRENT MUTCD FOR FLAGGER CONTROL, REQUIREMENTS, AND PROCEDURES.

10- DO NOT EXCEED A 1 MILE LANE CLOSURE LENGTH UNLESS OTHERWISE SHOWN IN THE TMP OR AS DIRECTED BY THE ENGINEER.

11- IF VEHICLE QUEUES WILL REACH WITHIN 15' OF EITHER SIDE OF ACTIVE RAILROAD TRACKS, PROVIDE A UNIFORMED LAW ENFORCEMENT OFFICER OR FLAGGER TO PREVENT VEHICLES FROM STOPPING WITHIN THE GRADE CROSSING. PROVIDE OFFICER OR FLAGGER EVEN IF AUTOMATIC WARNING MEASURES ALREADY EXIST.

GENERAL NOTES FOR PILOT CAR OPERATIONS

1- USE PILOT CARS WHEN DIRECTED BY THE ENGINEER.

2- IF ROADWAY WIDTH IS LESS THAN 22 FEET (TOP TO TOP), CONES MAY NOT BE REQUIRED ALONG WORK AREA, AND AT THE DISCRETION OF THE ENGINEER, CONES MAY BE OMITTED ALONG THE WORK AREA IF USING A PILOT CAR.

3- CONES ARE ALWAYS REQUIRED IN THE UPSTREAM AND DOWNSTREAM TAPERS.

4- PLACE A VEHICLE "PILOT CAR FOLLOW ME" AT A CONSPICUOUS POSITION ON THE REAR OF THE PILOT VEHICLE.

5- DO NOT INSTALL MORE THAN ONE (1) MILE OF LANE CLOSURE AHEAD OF THE PILOT CAR. DURING THE BEGINNING OF THE MERGE TAPER TO THE END OF THE LANE CLOSURE.

6- ADVISE RESIDENTS AND BUSINESSES WITHIN THE LANE CLOSURE LIMITS ABOUT METHODS OF SAFE EGRESS AND INGRESS FROM DRIVEWAYS DURING FLAGGING AND PILOT CAR OPERATIONS.

LEGEND
FLAGGER
CONE
PORTABLE SIGN
DIRECTION OF TRAFFIC FLOW

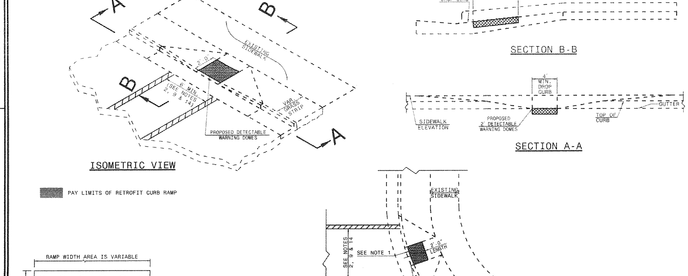
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

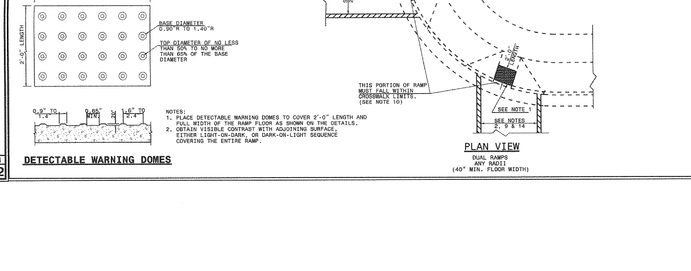
1-18

ROADWAY STANDARD DRAWING FOR
TEMPORARY LANE CLOSURES
2-LANE, 2-WAY ROADWAY-1 LANE CLOSED

SHEET 1 OF 14
1101.02

RETROFITTING DETECTABLE WARNING DOMES ONTO EXISTING CURB RAMP





STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR
CURB RAMP
EXISTING CURB AND GUTTER

SHEET 3 OF 5
848.06

Y:\Jobs\9900\Watkins Property\dwg\Temporary\Emily\Rogers Farm Full Set Details.dwg

SHEET NO.
CD13

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511
919-469-1101

DATE:	9/19/2019
DRAWN BY:	EDS
CHECKED BY:	JRH
JOB NUMBER:	9900

NCDOT DETAILS

FOR

KALAS FALLS

SITUATED AT

ROLESVILLE ROAD,ROLESVILLE

WAKE COUNTY, NORTH CAROLINA

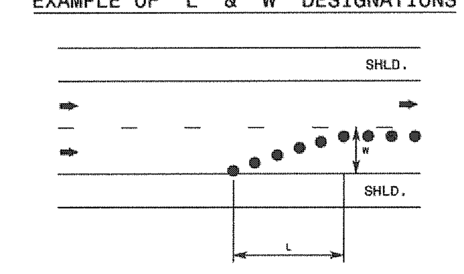
FIRM # C-3881

No.	DATE	REVISION	DWN/CHK

ROADWAY STANDARD DRAWING FOR TRAFFIC CONTROL DESIGN TABLES — "L" DISTANCE AND CHANNELIZING DEVICE TAPER CRITERIA

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. — 1-18 — SHEET 1 OF 4 — 1101.11

EXAMPLE OF "L" & "W" DESIGNATIONS



TAPER LENGTH CRITERIA FOR CHANNELIZING DEVICES IN WORK ZONES

TYPES OF TAPERS	TAPER LENGTH
UPSTREAM TAPER	
MERGING TAPER	L MINIMUM
SHIFTING TAPER	½ L MINIMUM
SHOULDER TAPER	⅓ L MINIMUM
TWO-WAY TRAFFIC TAPER	50 - 100 FEET MAXIMUM
DOWNSTREAM TAPER	100 FEET MAXIMUM

DO NOT INTRODUCE A MERGING OR SHIFTING TAPER WITHIN A CURVE OF THE ROADWAY

QUICK REFERENCE - "L" DISTANCE TABLE

MINIMUM LONGITUDINAL DISTANCE "L" (FEET) (ROUNDED VALUES)

POSTED SPEED "S" (MPH)	LATERAL WIDTH "W" (FEET) 1	2	3	4	5	6	7	8	9	10	11	12
20	10	15	20	30	35	40	50	55	60	70	75	80
25	15	25	35	45	55	65	75	85	95	105	115	125
30	15	30	45	60	75	90	105	120	135	150	165	180
35	25	45	65	85	105	125	145	165	185	205	225	245
40	30	55	80	110	135	160	190	215	240	270	295	320
45	45	90	135	180	225	270	315	360	405	450	495	540
50	50	100	150	200	250	300	350	400	450	500	550	600
55	55	110	165	220	275	330	385	440	495	550	605	660
60	60	120	180	240	300	360	420	480	540	600	660	720
65	65	130	195	260	325	390	455	520	585	650	715	780
70	70	140	210	280	350	420	490	560	630	700	770	840

GENERAL NOTES

1- TABLE FOR "L" DISTANCE IS BASED ON CHANNELIZATION TAPER FORMULA FROM THE MUTCD. WHERE:

SPEED LIMIT	FORMULA
40 MPH OR LESS	$L_{MIN} = \frac{W \times S^2}{60}$
45 MPH OR GREATER	$L_{MIN} = W \times S$

L = MINIMUM TAPER LENGTH IN FEET (LONGITUDINAL DISTANCE)
W = WIDTH OF OFFSET IN FEET (LATERAL DISTANCE)
S = POSTED SPEED LIMIT, OR OFF-PEAK 85 PERCENTILE SPEED IN MPH PRIOR TO WORK STARTING, OR THE ANTICIPATED OPERATING SPEED IN MPH

2- "L" DISTANCE IS FOR APPLICATION WITH CHANNELIZING DEVICE AND PAVEMENT MARKING TAPERS AND TRANSITIONS. CHANNELIZING DEVICES INCLUDE DRUMS, CONES, TUBULAR MARKERS, BARRICADES, RAISED ASPHALT ISLANDS, AND VERTICAL PANELS.

ROADWAY STANDARD DRAWING FOR TRAFFIC CONTROL DESIGN TABLES — BUFFER SPACE & SIGHT DISTANCE

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. — 1-18 — SHEET 2 OF 4 — 1101.11

DESIGN SPEED (MPH)	MINIMUM SIGHT DISTANCE: STOPPING SIGHT DISTANCE (FEET)	PASSING SIGHT DISTANCE (FEET)	MINIMUM LONGITUDINAL BUFFER SPACE (FEET)
30	200	1090	85
35	250	1280	120
40	305	1470	155
45	360	1625	195
50	425	1835	240
55	495	1985	290
60	570	2135	345
65	645	2285	405
70	730	2480	470
75	820	2580	540
80	910	2680	615

GENERAL NOTES

1- TABLES ARE BASED ON THE AASHTO GREEN BOOK "A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AND THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES". MINIMUM SIGHT DISTANCE VALUES ARE FOR PASSENGER CAR VEHICLES ON WET AND LEVEL ROADWAYS. CONSULT THE AASHTO GREEN BOOK TO MAKE FINAL DETERMINATION OF STOPPING SIGHT DISTANCE REQUIREMENTS.

2- BUFFER SPACE TABLE IS BASED ON THE BRAKING DISTANCE PORTION OF STOPPING SIGHT DISTANCE FOR WET AND LEVEL PAVEMENTS.

3- USE OF STOPPING SIGHT DISTANCE IN TRAFFIC CONTROL PLAN APPLICATIONS INCLUDES PROVIDING SIGHT DISTANCE FOR TRAFFIC APPROACHING A LANE CLOSURE. PROVIDE 2-LANE, 2-WAY ROADWAYS STOPPING SIGHT DISTANCE TO THE FLAGGER. FOR LANE CLOSURES ON MULTILANE ROADWAYS PROVIDE STOPPING SIGHT DISTANCE TO THE BEGINNING OF THE LANE CLOSURE MERGE TAPER, OR FLASHING ARROW BOARD. EXTEND LANE CLOSURES AT THE BUFFER SPACE SUCH THAT STOPPING SIGHT DISTANCE IS PROVIDED.

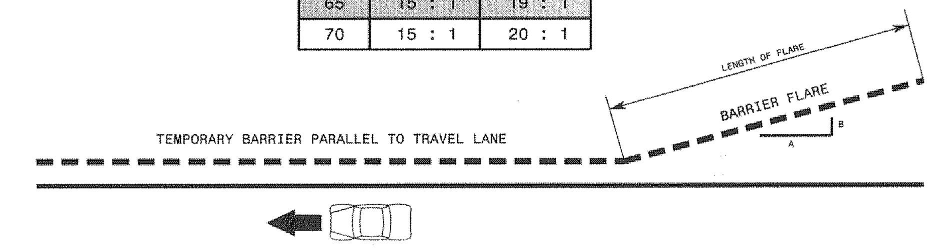
4- USE OF MINIMUM PASSING SIGHT DISTANCE TABLE IN TRAFFIC CONTROL PLAN APPLICATIONS INCLUDES PROVIDING SIGHT DISTANCE REQUIREMENTS FOR PLACEMENT OF PAVEMENT MARKING PASSING/NO-PASSING ZONES FOR 2-LANE, 2-WAY ROADWAYS.

ROADWAY STANDARD DRAWING FOR TRAFFIC CONTROL DESIGN TABLES — TEMPORARY BARRIER FLARE RATES

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. — 1-18 — SHEET 3 OF 4 — 1101.11

TEMPORARY BARRIER FLARE RATES

POSTED SPEED LIMIT (MPH)	UNANCHORED (A:B)	ANCHORED (A:B)
≤ 30	7 : 1	8 : 1
35	8 : 1	9 : 1
40	8 : 1	10 : 1
45	10 : 1	12 : 1
50	11 : 1	14 : 1
55	12 : 1	16 : 1
60	14 : 1	18 : 1
65	15 : 1	19 : 1
70	15 : 1	20 : 1



GENERAL NOTES

1- REFER TO THE 2011 ROADSIDE DESIGN GUIDE OR THE LATEST EDITION.

2- A BARRIER IS CONSIDERED FLARED WHEN IT IS NOT PARALLEL TO THE EDGE OF THE TRAVELWAY.

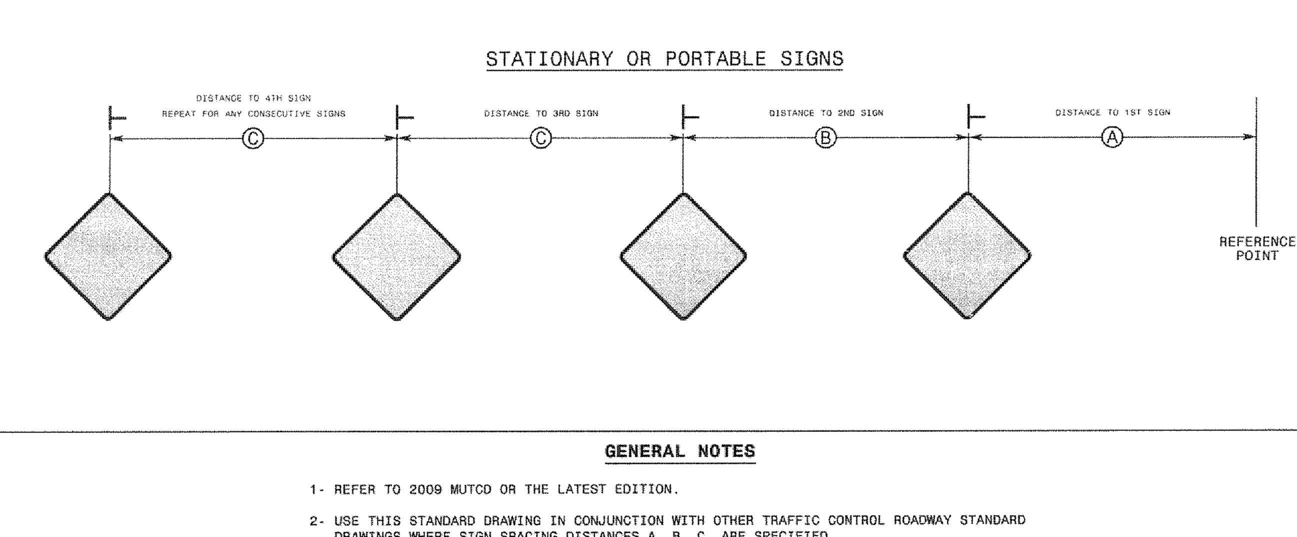
ROADWAY STANDARD DRAWING FOR TRAFFIC CONTROL DESIGN TABLES — SPACING OF TEMPORARY SIGNS IN SERIES

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. — 1-18 — SHEET 4 OF 4 — 1101.11

ADVANCE WARNING SIGN SPACING CHART

POSTED SPEED LIMIT (MPH)	RECOMMENDED DISTANCE BETWEEN SIGNS (FEET)±: Ⓐ	Ⓑ	Ⓒ
≤ 35	200	200	200
40-50	350	350	350
55	500	500	500
CONTROLLED ACCESS ROADS (≥ 55)	1000	1500	2700

STATIONARY OR PORTABLE SIGNS



GENERAL NOTES

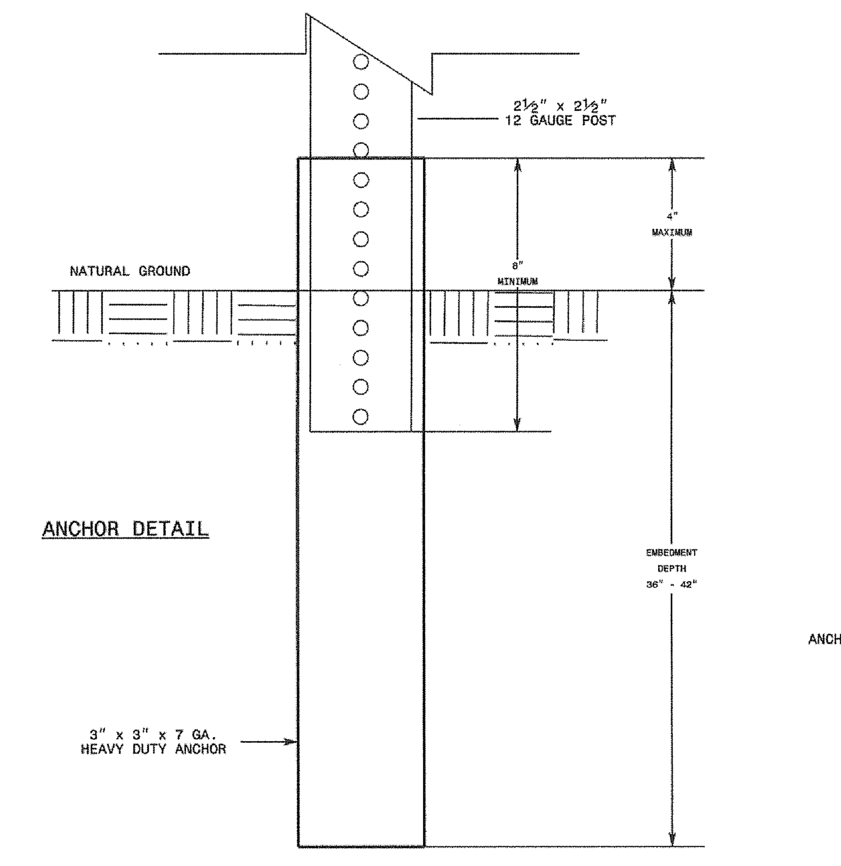
1- REFER TO 2009 MUTCD OR THE LATEST EDITION.

2- USE THIS STANDARD DRAWING IN CONJUNCTION WITH OTHER TRAFFIC CONTROL ROADWAY STANDARD DRAWINGS WHERE SIGN SPACING DISTANCES A, B, C, ARE SPECIFIED.

3- APPLY THE ADVANCE WARNING SIGN SPACING CHART WHERE A SERIES OF 2 OR MORE SIGNS ARE USED. ALL SIGN SPACING DIMENSIONS ARE APPROXIMATE. FIELD ADJUST AS VARIOUS CONDITIONS OCCUR, SUCH AS LIMITED SIGHT DISTANCE, OBSTRUCTION INTERFERENCE, ETC.

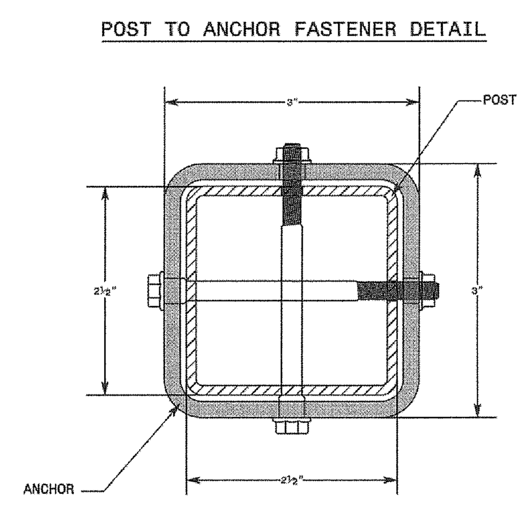
ROADWAY STANDARD DRAWING FOR STATIONARY WORK ZONE SIGNS — PERFORATED SQUARE STEEL TUBING

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. — 1-18 — SHEET 3 OF 3 — 1110.01



ANCHOR DETAIL

POST TO ANCHOR FASTENER DETAIL



GENERAL NOTES

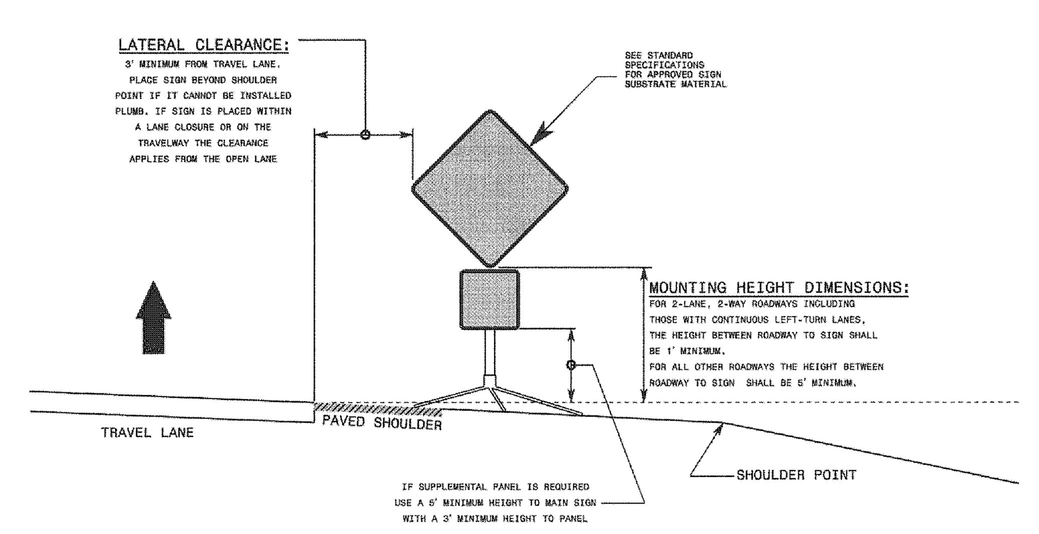
1- POSTS SHALL BE 2½" X 2½" 12 GAUGE STEEL.

2- ANCHORS SHALL BE 3" X 3" 7 GAUGE STEEL.

3- CONNECTIONS SHALL BE AS RECOMMENDED BY THE MANUFACTURER.

ROADWAY STANDARD DRAWING FOR PORTABLE WORK ZONE SIGNS — MOUNTING HEIGHT & LATERAL CLEARANCE

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. — 1-18 — SHEET 1 OF 1 — 1110.02



GENERAL NOTES

1- DIMENSIONS SHOWN ARE MINIMUM VALUES. MOUNT SIGNS SO THEY WILL BE CLEARLY VISIBLE TO APPROACHING TRAFFIC EVEN WHEN SIGNS ARE MOUNTED BEHIND TRAFFIC CONTROL DEVICES SUCH AS DRUMS, BARRIER, OR OTHER OBJECTS.

2- ALL PORTABLE SIGNS AND STANDS MUST MEET OR EXCEED THE REQUIREMENTS OF NCHRP 350 FOR CATEGORY II DEVICES. USE PORTABLE WORK ZONE SIGNS AND STANDS SPECIFICALLY DESIGNED FOR ONE ANOTHER.

3- ALL PORTABLE WORK ZONE SIGNS AND STANDS MUST BE LISTED ON THE DEPARTMENT'S APPROVED PRODUCTS LIST.

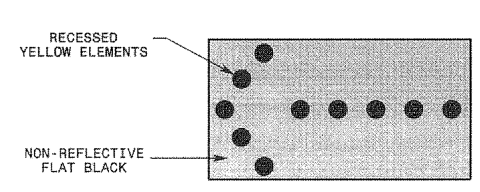
ROADWAY STANDARD DRAWING FOR FLASHING ARROW BOARDS

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. — 1-18 — SHEET 1 OF 1 — 1115.01

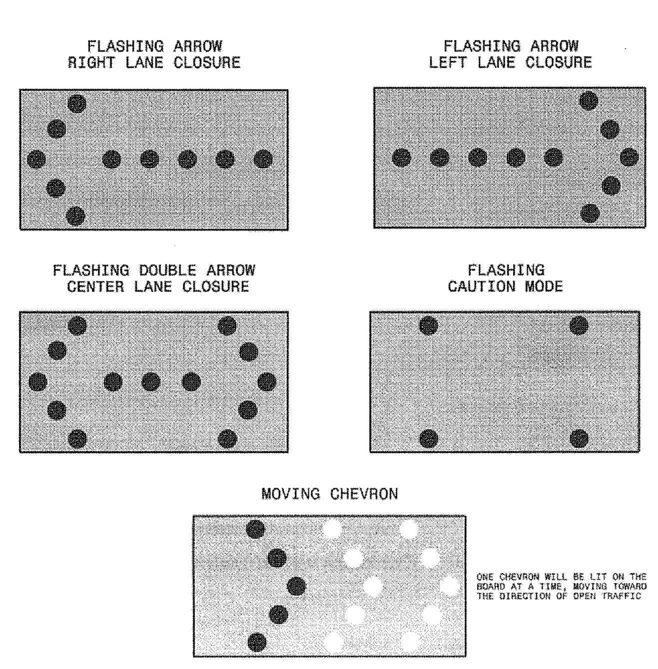
FLASHING ARROW BOARD TYPE

PANEL TYPE	MINIMUM SIZE (W x H INCHES)	MINIMUM LEGIBILITY DISTANCE (MILES)	MINIMUM NUMBER OF ELEMENTS
C	96 X 48	1	15

TYPICAL FLASHING ARROW BOARD



FLASHING ARROW BOARD MODES



GENERAL NOTES

1- DO NOT USE STRAIGHT-LINE CAUTION OR STATIC CHEVRON DISPLAYS.

2- USE A MINIMUM MOUNTING HEIGHT OF 7 FEET FROM GROUND LEVEL TO THE BOTTOM OF THE PANEL FOR TRAILER-MOUNTED ARROW BOARDS, EXCEPT ON VEHICLE-MOUNTED PANELS WHICH SHOULD BE AS HIGH AS PRACTICAL.

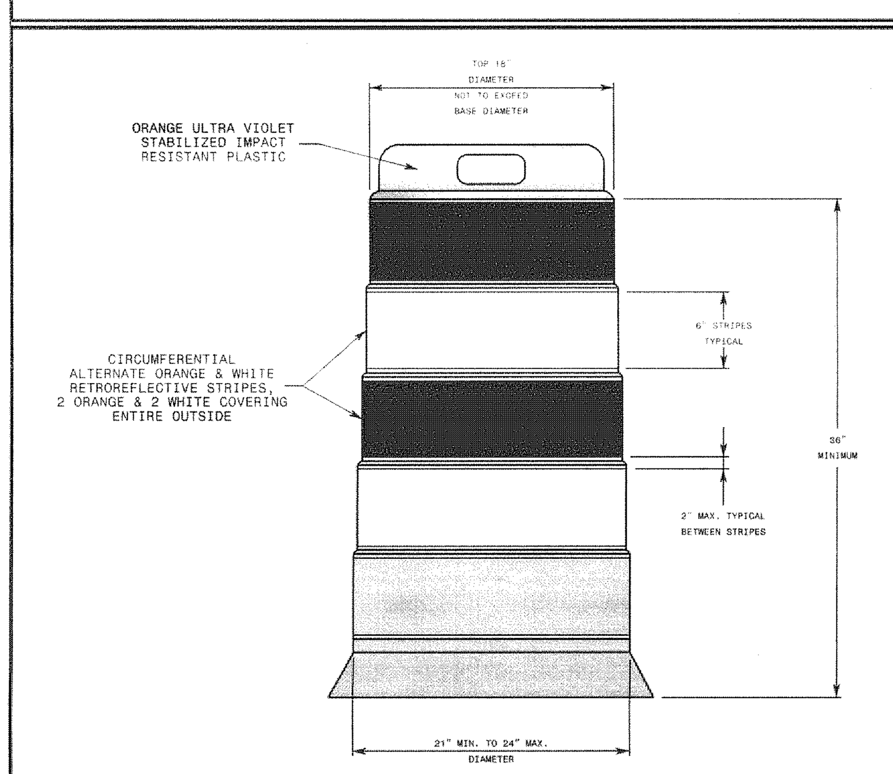
3- USE ARROW BOARD ELEMENTS CAPABLE OF A MINIMUM 50 PERCENT DIMMING FROM THEIR FULL RATED LAMP VOLTAGE. USE FULL LAMP VOLTAGE DURING THE DAY, AND USE THE DIMMED MODE AT NIGHT.

4- DO NOT USE ARROW BOARDS IN FLASHING ARROW MODE ON A 2-LANE, 2-WAY ROADWAY DURING A ONE LANE OPERATION, NOR ON MULTILANE ROADWAYS WHEN SHIFTING ALL TRAFFIC LANES LATERALLY.

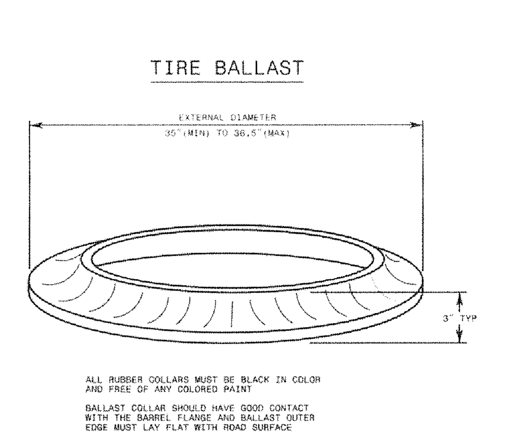
5- ALL FLASHING ARROW BOARDS MUST BE LISTED ON THE THE DEPARTMENT'S APPROVED PRODUCTS LIST.

ROADWAY STANDARD DRAWING FOR DRUMS

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. — 1-18 — SHEET 1 OF 1 — 1130.01



TIRE BALLAST



GENERAL NOTES

1- BALLASTING SHALL BE ACHIEVED BY THE SAND BAG, TIRE-SIDEWALL, OR PREFORMED WEIGHTED BASE METHODS. USE THE TIRE BALLAST AS SPECIFIED BY THE MANUFACTURER. DO NOT PLACE BALLAST ON TOP OF THE DRUM.

2- IF NECESSARY PLACE THE NAME OF THE AGENCY, CONTRACTOR, OR SUPPLIER ON NON-RETROREFLECTIVE DRUM SURFACES. SHOW THE LETTERS AND NUMBERS USING A NON-RETROREFLECTIVE COLOR AND NOT OVER 2" IN HEIGHT.

3- ALL DRUMS MUST BE LISTED ON THE DEPARTMENT'S APPROVED PRODUCT LIST.

4- REFER TO THE STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES FOR ADDITIONAL INFORMATION.

Y:\Jobs\9900\Watkins Property\dwg\Temporary\Emily\Rogers Farm Full Set Details.dwg

No.	DATE	REVISION	DWN/CHK

NCDOT DETAILS

FOR

KALAS FALLS

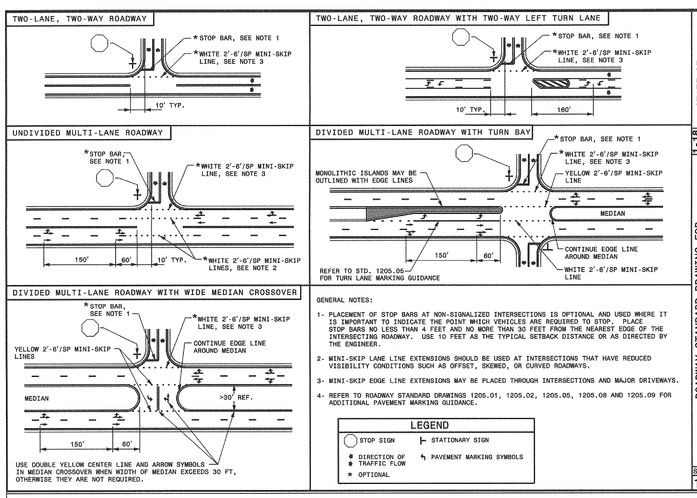
SITUATED AT
ROLESVILLE ROAD,ROLESVILLE
WAKE COUNTY, NORTH CAROLINA
FIRM # C-3881

JOB NUMBER: 9900
CHECKED BY: JRH
DRAWN BY: EDS
DATE: 9/19/2019

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511
919-469-1101

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL — R. HARMAN — 5-11-20

SHEET NO.
CD14



GENERAL NOTES:

1- PLACEMENT OF STOP BARS AT NON-SIGNALIZED INTERSECTIONS IS OPTIONAL AND USED WHERE IT IS IMPORTANT TO INDICATE THE POINT WHICH VEHICLES ARE REQUIRED TO STOP. PLACE STOP BARS NO LESS THAN 4 FEET AND NO MORE THAN 30 FEET FROM THE NEAREST EDGE OF THE INTERSECTING ROADWAY. USE 10 FEET AS THE TYPICAL SETBACK DISTANCE OR AS DIRECTED BY THE ENGINEER.

2- MINI-SKIP LANE LINE EXTENSIONS SHOULD BE USED AT INTERSECTIONS THAT HAVE REDUCED VISIBILITY CONDITIONS SUCH AS OFFSET, SKEWED, OR CURVED ROADWAYS.

3- MINI-SKIP EDGE LINE EXTENSIONS MAY BE PLACED THROUGH INTERSECTIONS AND MAJOR DRIVEWAYS.

4- REFER TO ROADWAY STANDARD DRAWINGS 1205.01, 1205.02, 1205.05, 1205.06 AND 1205.09 FOR ADDITIONAL PAVEMENT MARKING GUIDANCE.

LEGEND

- STOP SIGN
- STATIONARY SIGN
- DIRECTION OF TRAFFIC FLOW
- PAVEMENT MARKING SYMBOLS
- OPTIONAL

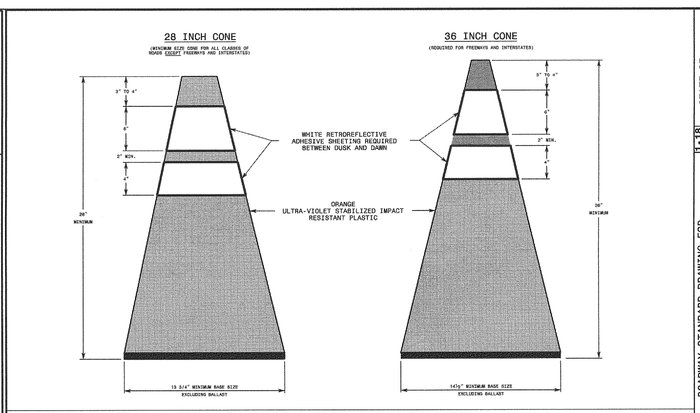
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR **PAVEMENT MARKINGS** INTERSECTIONS

SHEET 2 OF 2

1205.04



GENERAL NOTES

1- ACHIEVE BALLASTING BY USING SPECIAL WEIGHTED BASES SUCH AS SAND BAG RINGS, DOUBLING CONES, OR BASES THAT CAN BE FILLED WITH BALLAST. SEVENTY PERCENT OF THE WEIGHT OF THE CONE MUST BE IN THE BASE. USE BALLAST'S THAT DO NOT PRESENT A HAZARD WHEN STRUCK.

2- ALL CONES MUST BE LISTED ON THE DEPARTMENT'S APPROVED PRODUCTS LIST.

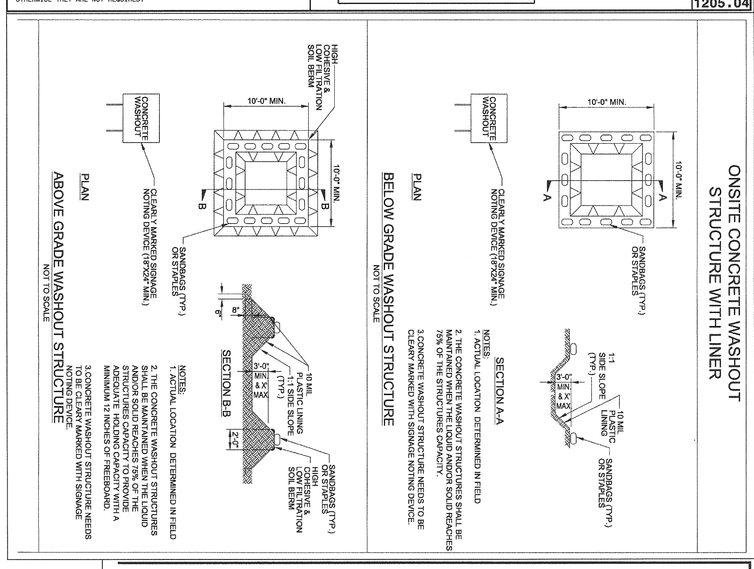
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR **CONES**

SHEET 1 OF 1

1135.01



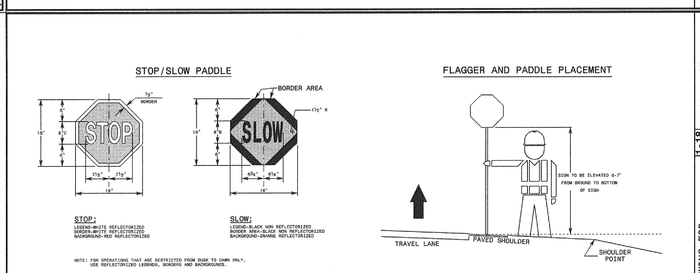
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR **FLAGGERS**

SHEET 1 OF 1

1150.01



GENERAL NOTES

1- USE HAND SIGNALING DEVICES SUCH AS STOP-SLOW PADDLES, FLASHLIGHTS TO CONTROL TRAFFIC. USE STOP-SLOW PADDLES AS THE PRIMARY DEVICE.

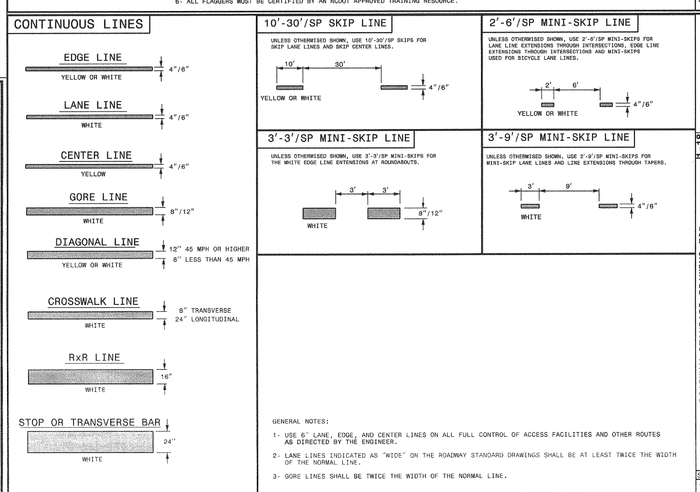
2- FABRICATE STOP-SLOW PADDLES FROM SHEET METAL OR OTHER LIGHT SEMI RIGID MATERIAL. PROVIDE A RIGID HANDLE OF SUFFICIENT LENGTH SO THE PADDLE IS HELD AT 6-7' ABOVE GROUND LEVEL.

3- PROVIDE STOPPING SIGHT DISTANCE TO EACH FLAGGER STATION. REFER TO RSD. 1101.11, SHEET 2.

4- ILLUMINATE FLAGGER STATIONS DURING NIGHT OPERATIONS.

5- FOLLOW FLAGGER QUALIFICATIONS AND METHODS OF HAND-SIGNALING PROCEDURES IN ACCORDANCE WITH PART VI OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

6- ALL FLAGGERS MUST BE CERTIFIED BY AN NCDOT APPROVED TRAINING RESOURCE.



GENERAL NOTES:

1- USE 6" LANE, EDGE, AND CENTER LINES ON ALL FULL CONTROL OF ACCESS FACILITIES AND OTHER ROUTES AS DIRECTED BY THE ENGINEER.

2- LANE LINES INDICATED AS "WIDE" ON THE ROADWAY STANDARD DRAWINGS SHALL BE AT LEAST TWICE THE WIDTH OF THE NORMAL LINE.

3- GORE LINES SHALL BE TWICE THE WIDTH OF THE NORMAL LINE.

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR **PAVEMENT MARKINGS** LINE TYPES AND OFFSETS

SHEET 1 OF 2

1205.01

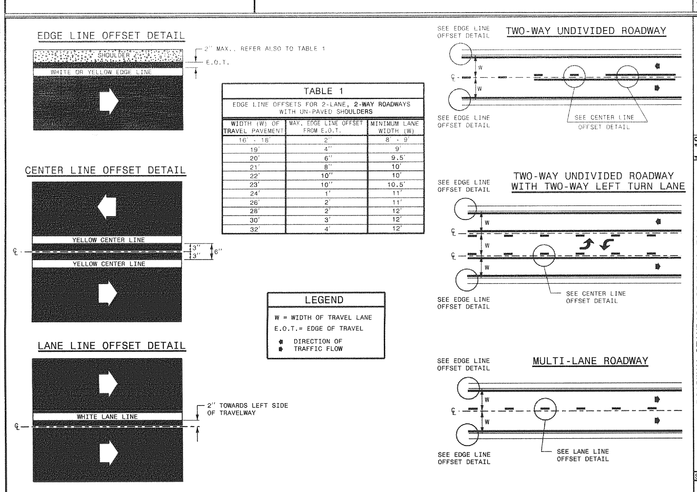


TABLE 1

EDGE LINE OFFSETS FOR 2-LANE, 2-WAY ROADWAYS WITH UN-PAVED SHOULDERS

WIDTH (W) OF TRAVEL PAVEMENT	MAX. EDGE LINE OFFSET FROM E.O.T.	MINIMUM LANE WIDTH (W)
16' - 18'	2'	8' - 9'
19'	4'	9'
20'	6'	9.5'
21'	8'	10'
22'	10"	10'
23'	10"	10.5'
24'	1'	11'
26'	2'	11'
28'	2'	12'
30'	3'	12'
32'	4'	12'

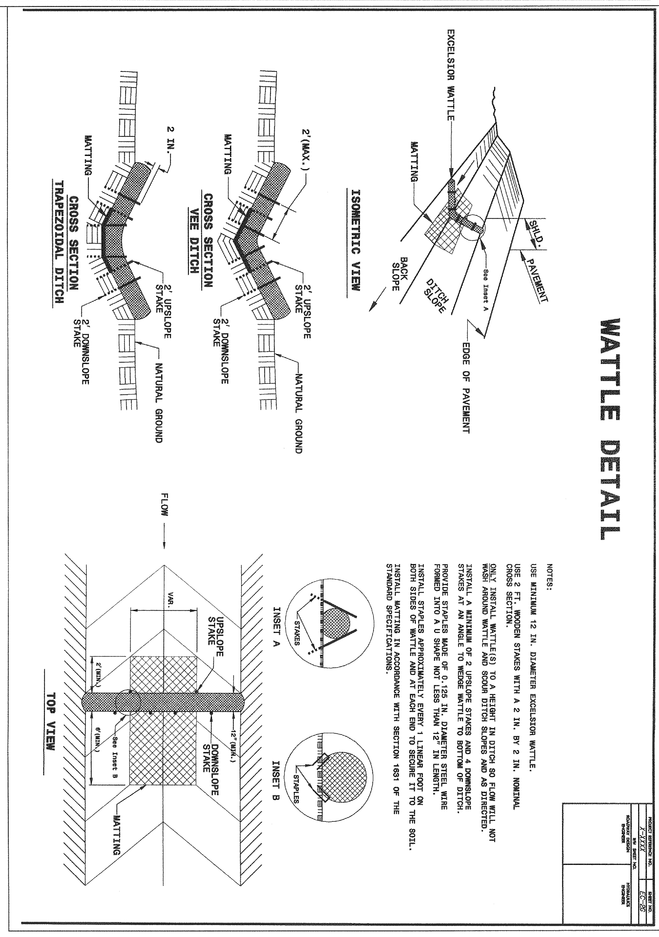
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR **PAVEMENT MARKINGS** LINE TYPES AND OFFSETS

SHEET 2 OF 2

1205.01



No.	DATE	REVISION	DWN/CHK

JOB NUMBER: 9900
CHECKED BY: JRH
DRAWN BY: EDS
DATE: 9/19/2019

NCDOT DETAILS

FOR

KALAS FALLS

SITUATED AT

ROLESVILLE ROAD, ROLESVILLE

WAKE COUNTY, NORTH CAROLINA

FIRM # C-3881

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
Cary, NC 27511
919-469-1101

SHEET NO. **CD15**

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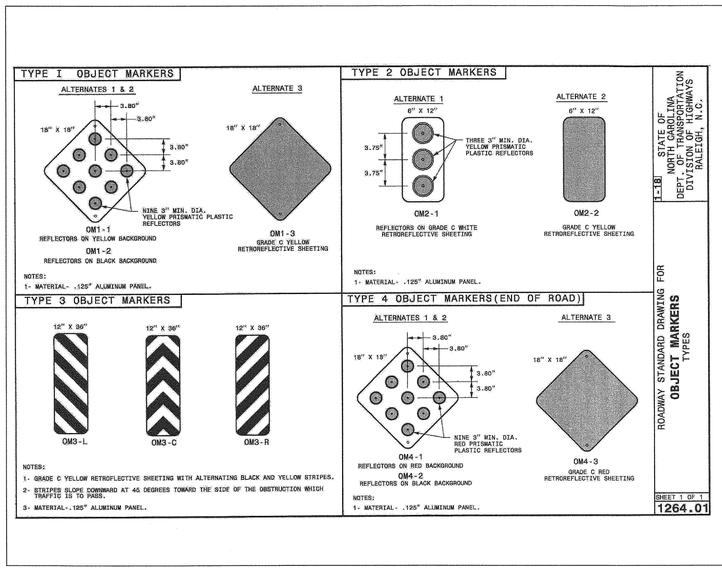

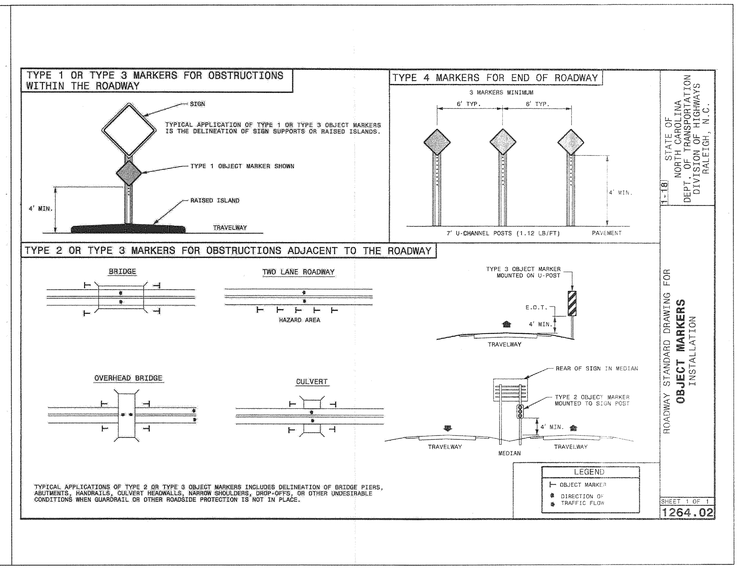

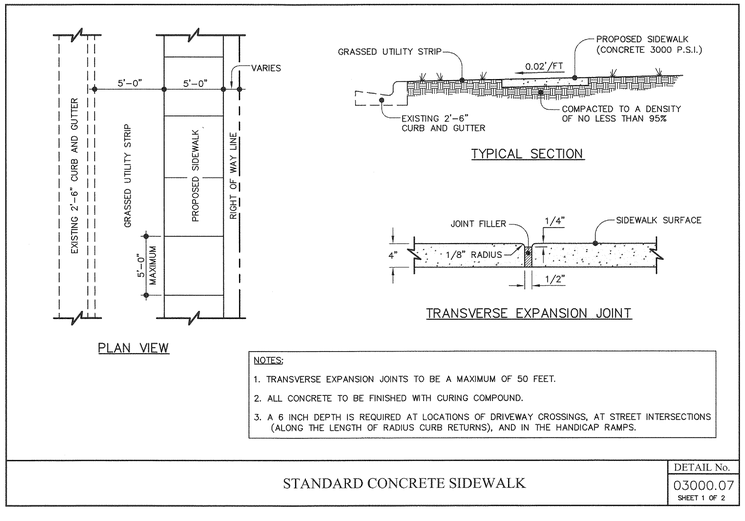

No.	DATE	REVISION	DWN/CHK

NCDOT DETAILS

FOR

KALAS FALLS

SITUATED AT

ROLESVILLE ROAD, ROLESVILLE

WAKE COUNTY, NORTH CAROLINA

FIRM # C-3881

JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	EDS
DATE:	9/19/2019

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
875 Walnut Street, Suite 360
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919-469-1101

NORTH CAROLINA PROFESSIONAL SEAL 9416 ENGINEER JOHN R. HARMAN

5.11.20

SHEET NO.

CD16

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