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 ☐ SEC-047126-2020

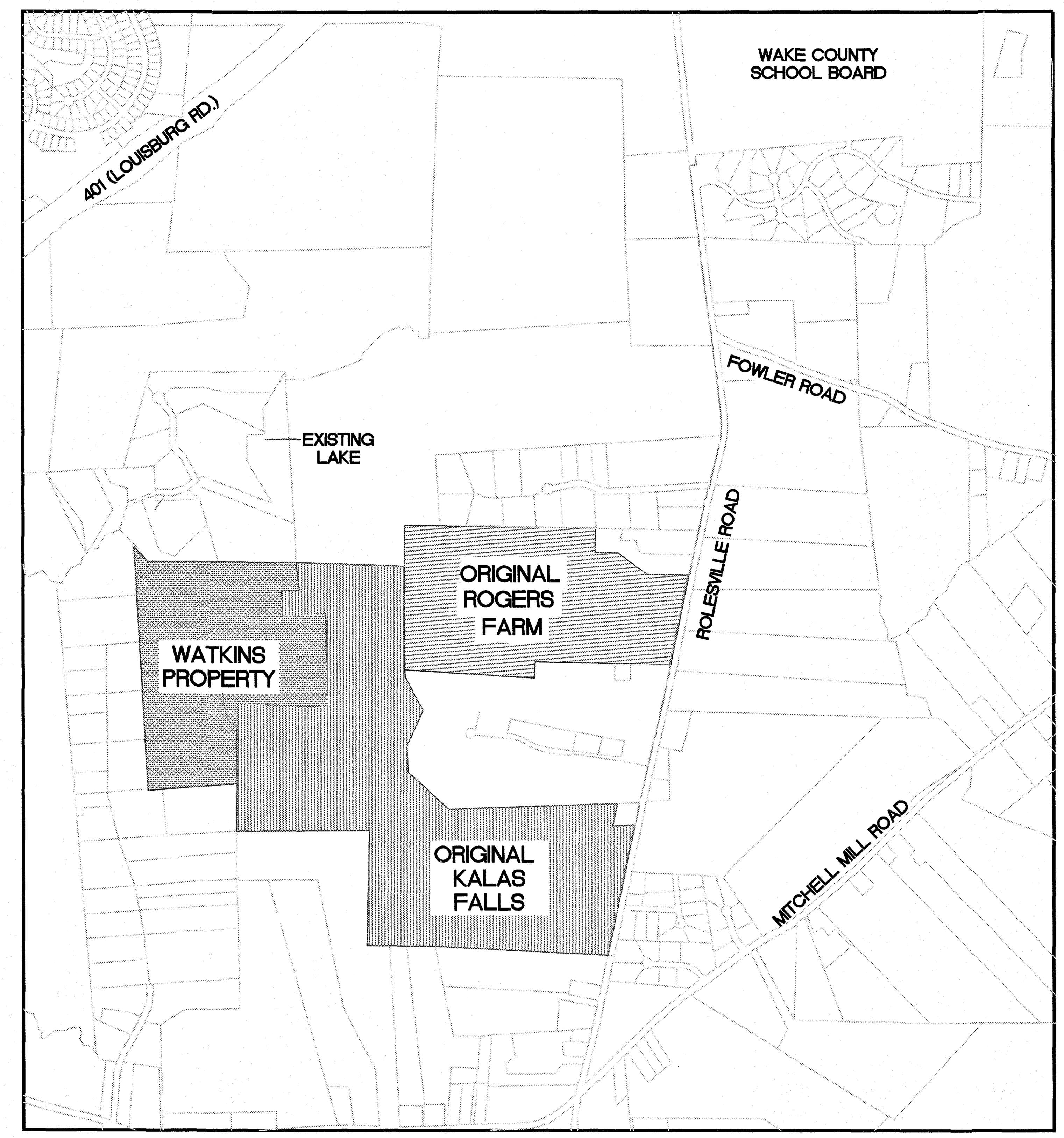
STORMWATER MGMT. ☐ SWF-047129-2020

FLOOD STUDY ☐ ________

DATE 01/26/2021

WAKE COUNTY NORTH CAROLINA
EFFECTIVE: 08/23/17

ENVIRONMENTAL CONSULTANT SIGNATURE



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.

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3.0	GENERAL NOTES AND LEGENDS
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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
18.2	ROLESVILLE RD OFF-SITE STORM PLAN AND PROFILE
18.3	ROLESVILLE RD OFF-SITE STORM PLAN AND PROFILE
19.0	ROLESVILLE RD IMPROVEMENTS
20.0	TRANSPORTATION PLAN
X1	CROSS-SECTION STA: 9+57.35 - 11+50
X2	CROSS-SECTION STA: 12+00 - 14+00
X3	CROSS-SECTION STA: 14+50 - 16+50
X4	CROSS-SECTION STA: 17+00 - 19+00
X5	CROSS-SECTION STA: 19+50 - 21+50
X6	CROSS-SECTION STA: 22+00 - 22+50
X7	CROSS-SECTION STA: 37+50 - 39+00
X8	CROSS-SECTION STA: 39+50 - 41+50
X9	CROSS-SECTION STA: 42+00 - 44+00
X10	CROSS-SECTION STA: 44+50 - 46+50
X11	CROSS-SECTION STA: 47+00
CD1-CD5	EROSION CONTROL DETAIL
CD6-CD8	WATER DETAIL
CD9-CD11	SANITARY SEWER DETAIL
CD12-CD19	STORM 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

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 83.66 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.
5. ALL CONDITIONS OF SUP 19-01 AND MA 19-02 R&PUD ARE APPLICABLE AND WILL BE MET.

Rolesville

APPROVED FOR COMPLIANCE

Case # ________ Project: ____________________

By: ____________________ Date: __________

These plans have been approved for compliance with the Town Code of Ordinance, UDO, and Standard Specifications & Construction Details, subject to statements & conditions hereby incorporated by reference.

PUBLIC IMPROVEMENTS PHASE 1	
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	33.78 AC

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 #** S-4824

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 #** W-3784

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 # ________

CITY OF RALEIGH - PLANS AUTHORIZED FOR CONSTRUCTION

Electronic Approval: This approval is being issued electronically. This approval is valid only upon the signature of a City of Raleigh Review Officer below. The City will retain a copy of the approved plans. Any work authorized by this approval must proceed in accordance with the plans kept on file with the City. This electronic approval may not be edited once issued. Any modification to this approval once issued will invalidate this approval.

City of Raleigh Development Approval ____________________ Timothy Beasley

Raleigh Water Review Officer

No.	DATE	REVISION	DWN/CHK
1	6-14-2021	FINAL SET	EDS/JRH

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

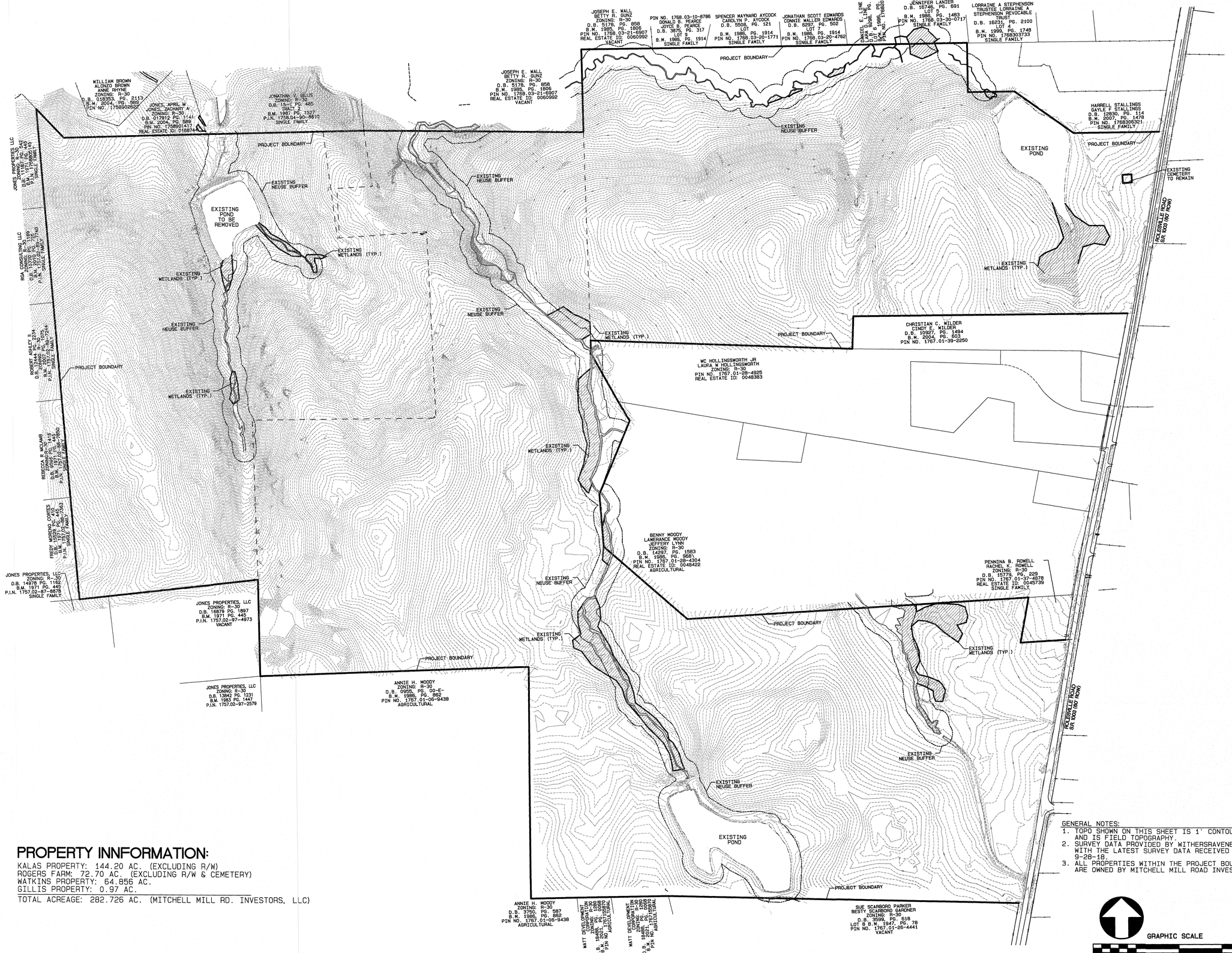
SEAL
9810
ENGINEER
R. HARMAN

[illegible]

6.28.21

SHEET NO.
CVR

Z:\Jobs\9900\Watkins Property\dwg_Working Dwgs\Phase 1\01. CVR.dwg



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. (MITCHELL MILL RD. INVESTORS, LLC)

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

GRAPHIC SCALE 1"=200'
0 200 400 600

No.	DATE	REVISION	DWN/CHK
1.	11-18-20	UPDATED WETLANDS PER THE ORIGINAL ROGERS FARM IMPACT.	BAH/JRH
2.	05-19-21	UPDATED ALIGNMENT, PROPERTY LINES & INFORMATION	BAH/JRH

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.
4020 Westchase Blvd. Suite 450
Raleigh, NC 27607 919-469-1101

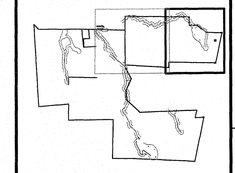
NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMAN
6.25.21

SHEET NO.
1.0

Plot Date: 6/18/2021 Time: 4:24PM FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro

EXISTING LINETYPE LEGEND

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



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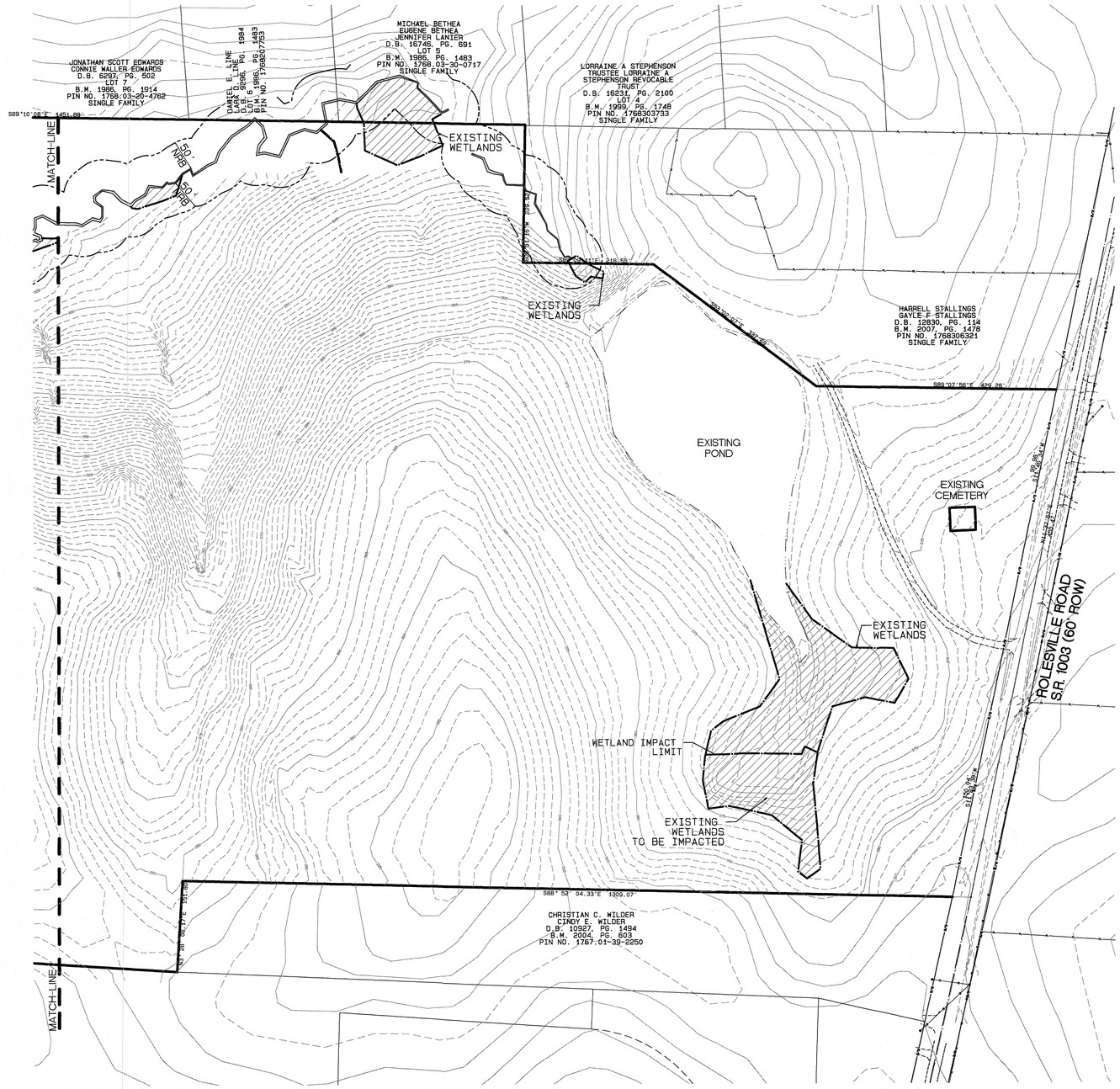

GENERAL NOTES:
1. TOPO SHOWN ON THIS SHEET IS 1' CONTOURS AND IS FIELD TOPOGRAPHY.

GRAPHIC SCALE 1"=100'

0 100 200 300

No.	DATE	REVISION
3	11-26-20	UPDATED WETLAND LIMITS LOCATED ON THE ORIGINAL ROGERS FARM TRACT.
2	06-16-21	UPDATED ADJACENT PROPERTY OWNER INFORMATION

DWN/CHK
BAH/JRH
BAH/JRH

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.
4020 Westchase Blvd. Suite 450
Raleigh, NC 27607 919-469-1101

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 9810 JOHN R. HIMAN

6-28-21

SHEET NO.

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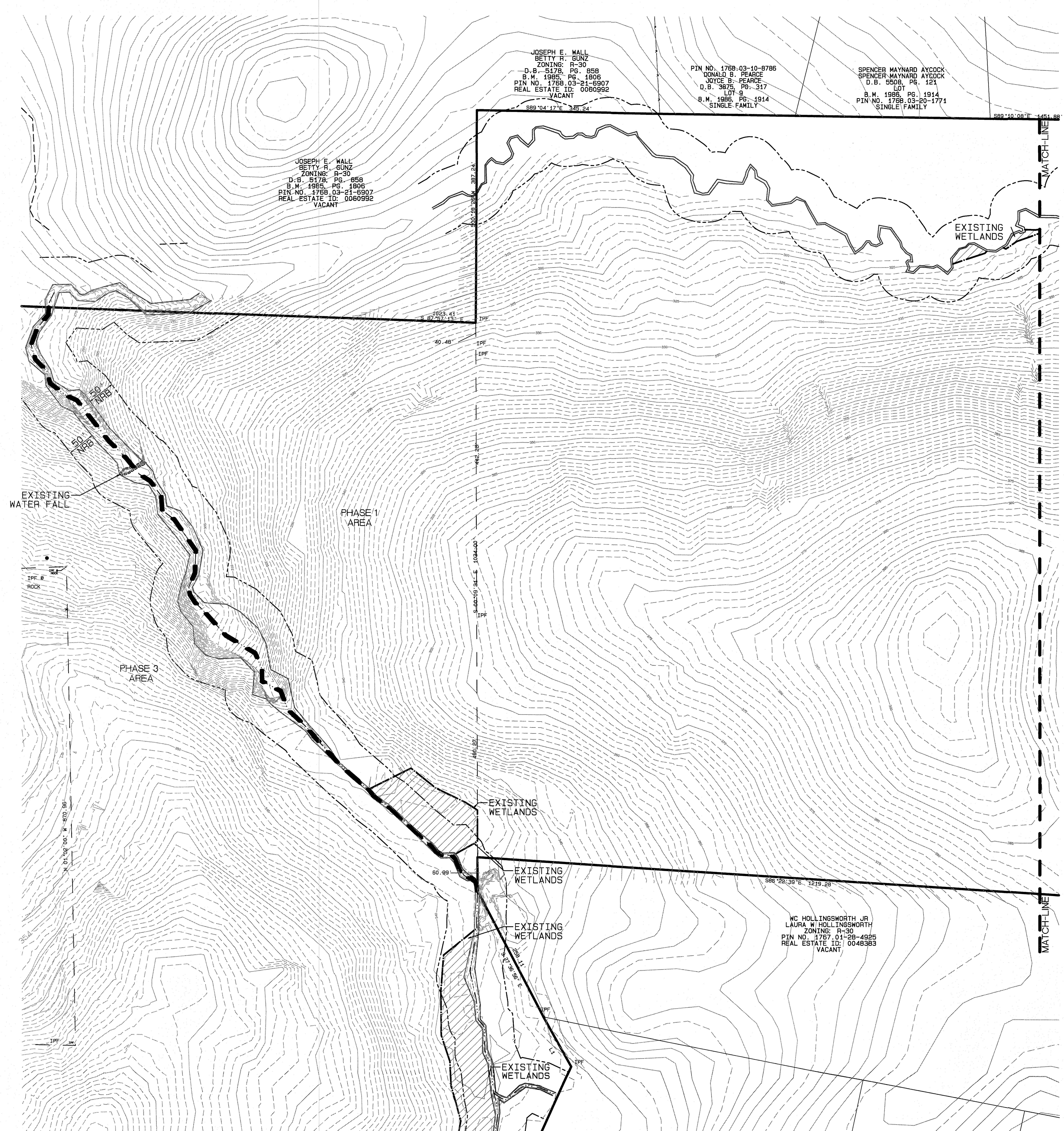
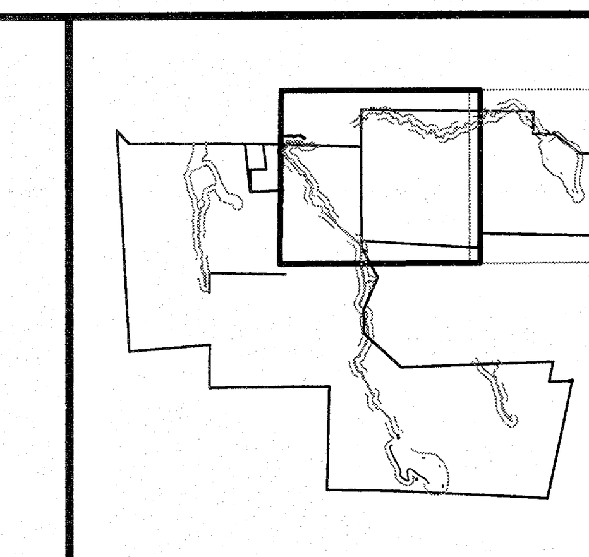
Plot Date: 6/18/2021



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



SCALE: 1"=2000'

No.	DATE	REVISION	DWN/CHK
1	11-20-20	UPDATED WETLAND LIMITS LOCATED ON THE ORIGINAL ROGERS FARM TRACT.	BAH/JRH
2	06-18-21	UPDATED ADJACENT PROPERTY OWNER INFORMATION	BAH/JRH

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.
4020 Westchase Blvd. Suite 450
Raleigh, NC 27607 919-469-1101

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMAN
6.28.21

FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro Time: 4:39PM Plot Date: 6/18/2021

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

GRAPHIC SCALE 1"=100'
0 100 200 300

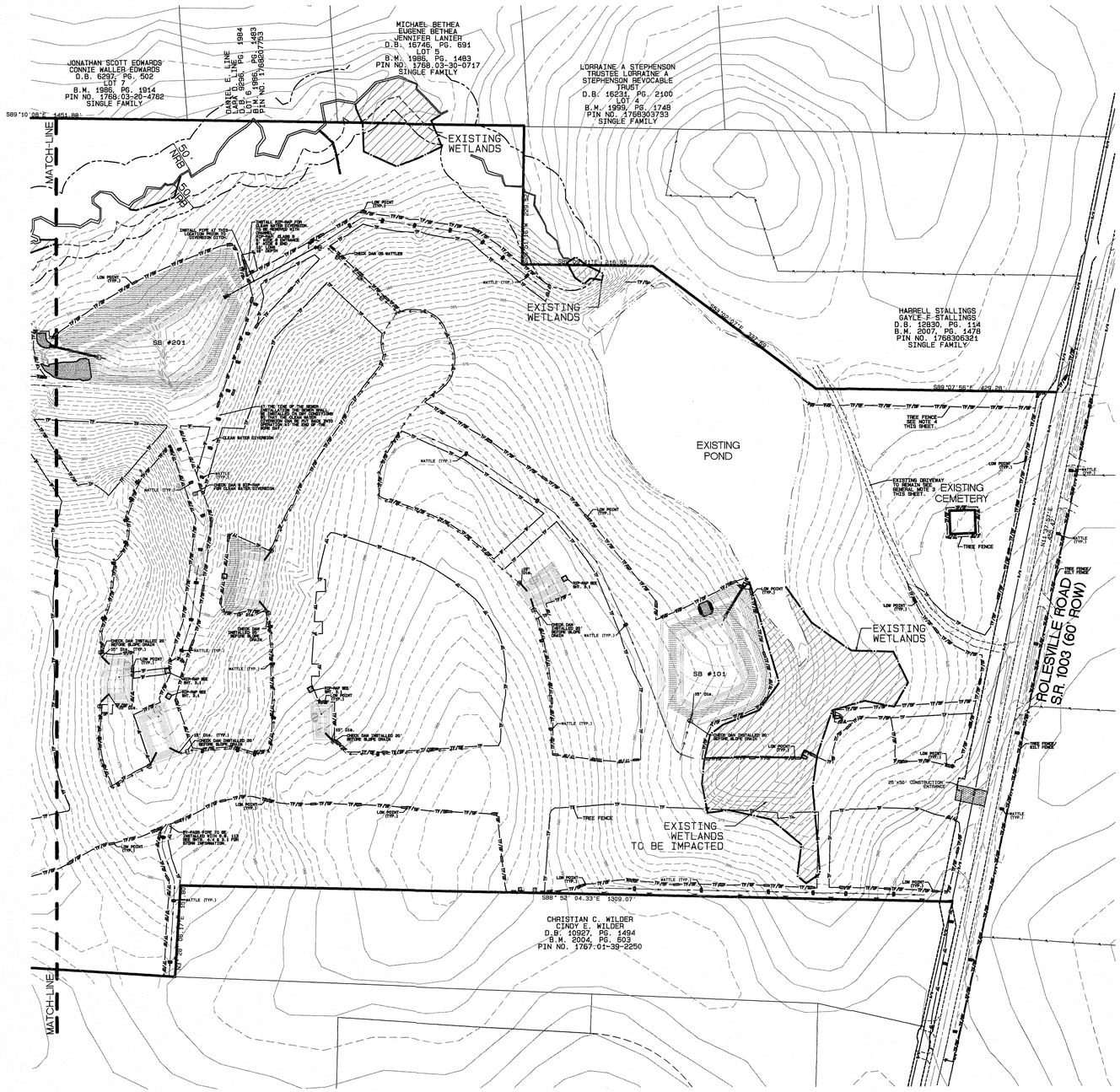
SHEET NO.
1.2

PROPOSED LINETYPE LEGEND

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

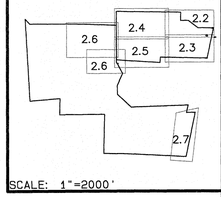
EXISTING LINETYPE LEGEND

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



LEGEND

- PROPOSED CHECK DAMS
- PROPOSED WATTLE
- 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 EROSION CONTROL BLANKET
- BASIN MAINTENANCE PAD



SCALE: 1"=2000'

GENERAL NOTE:
1. ALL SEDIMENT TRAP/PONDS SHALL BE STABILIZED WITHIN 7 DAYS OF INSTALLATION.
2. DIVERSION SWALE DESIGN, SEE SHEET 3.1 FOR DETAIL DETAIL AND REFERENCE TABLE.
3. THE SITE CONTRACTOR IS RESPONSIBLE TO COORDINATE WITH THE STALLING AND WOODLIEF TRACTS PRIOR TO STARTING WORK AT OR AROUND THE EXISTING DRIVEWAY. AT NO TIME SHALL ACCESS TO THOSE PROPERTIES BE BLOCKED WITHOUT PROVIDING FOR ANOTHER MEANS OF INGRESS/EGRESS.
4. CONTRACTOR TO COORDINATE WITH THE SITE INSPECTOR TO RELOCATE TREE FENCE AT THE TIME OF FENCE AND VEGETATION INSTALLATION IN THIS AREA.

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
1.	11-20-20	UPDATED WETLAND LIMITS LOCATED ON THE ORIGINAL ROGERS FARM TRACT	BAH/JRH
2.	05-10-21	PLAN REVISIONS PER TOR CONSULTANT REVIEW	BAH/PNJ
3.	07-08-21	FINAL SET	BAH/PNJ

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.
4020 Westchase Blvd. Ste. 450
Raleigh, NC 27607 919-469-1101

SOUTH CAROLINA PROFESSIONAL ENGINEER 18622 JEFFREY HOWELLS WATKINS
7/9/21

SHEET NO.
2.0

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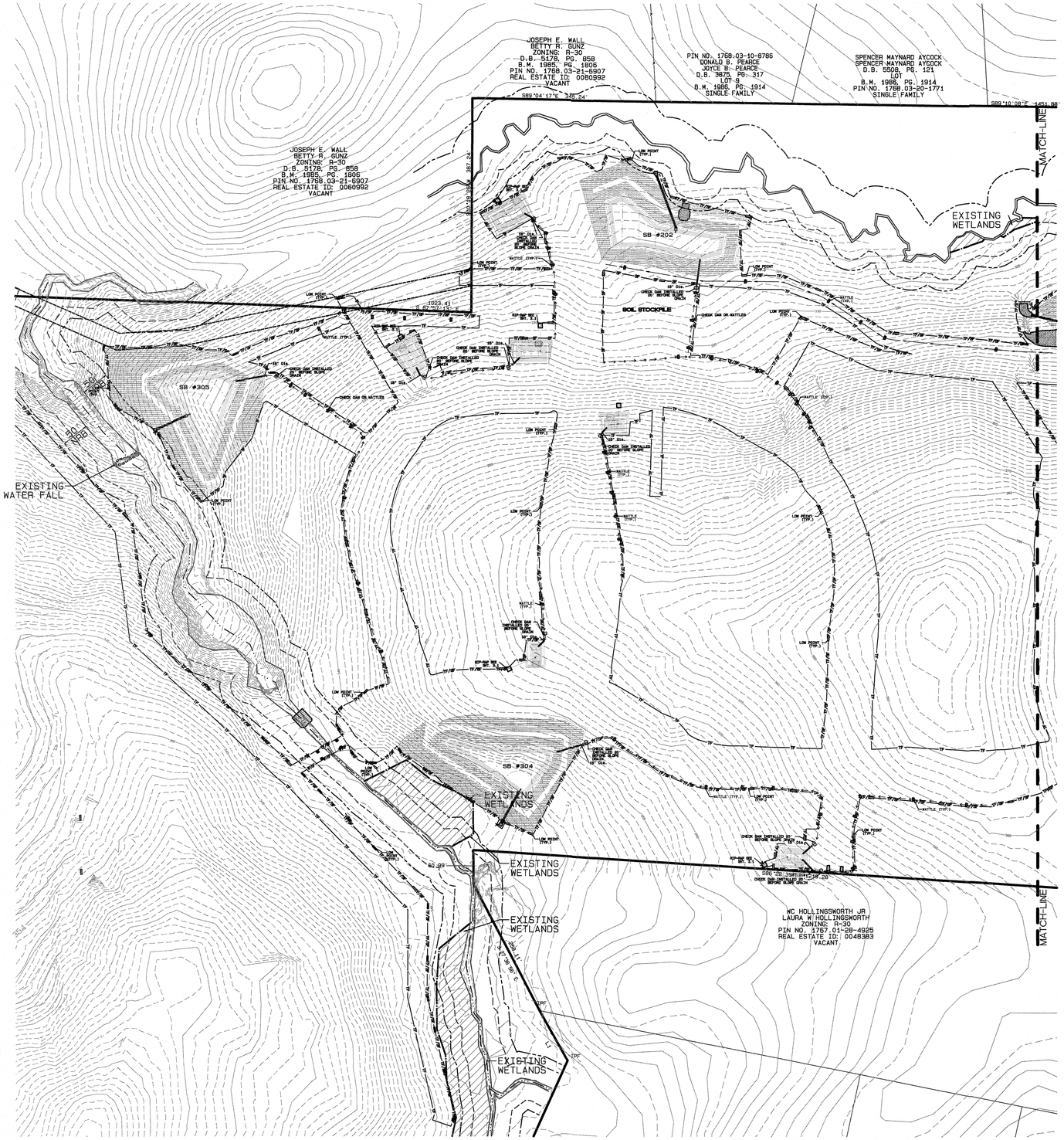
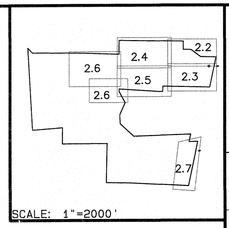
Plot Date: 7/8/2021





LEGEND

- PROPOSED CHECK DAMS
- PROPOSED WATTLE
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- PROPOSED SF LOW POINT
- PROPOSED AREAS FOR 7 DAY STABILIZATION
- PROPOSED EROSION CONTROL BLANKET
- BASIN MAINTENANCE PAD

GENERAL NOTE:
1. ALL SEDIMENT TRAP/PONDS SHALL BE STABILIZED WITHIN 7 DAYS OF INSTALLATION.
2. DIVERSION SWALE DESIGN, SEE SHEET 3.1 FOR DETAIL DETAIL AND REFERENCE TABLE.

EXISTING LINETYPE LEGEND

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

PROPOSED LINETYPE LEGEND

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

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
1	11-20-20	MINOR REVISIONS PER TGR COMMENTS	BAH/PNJ
2	03-19-21	EXISTING PER TGR CONSOLIMAT REVIEW.	BAH/PNJ
3	07-06-21	FINAL SET	BAH/PNJ

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.
4020 Westchase Blvd. Ste. 450
Raleigh, NC 27607 919-469-1101

NORTH CAROLINA PROFESSIONAL ENGINEER 8822 ENGINEER
7/9/21

SHEET NO.
2.1

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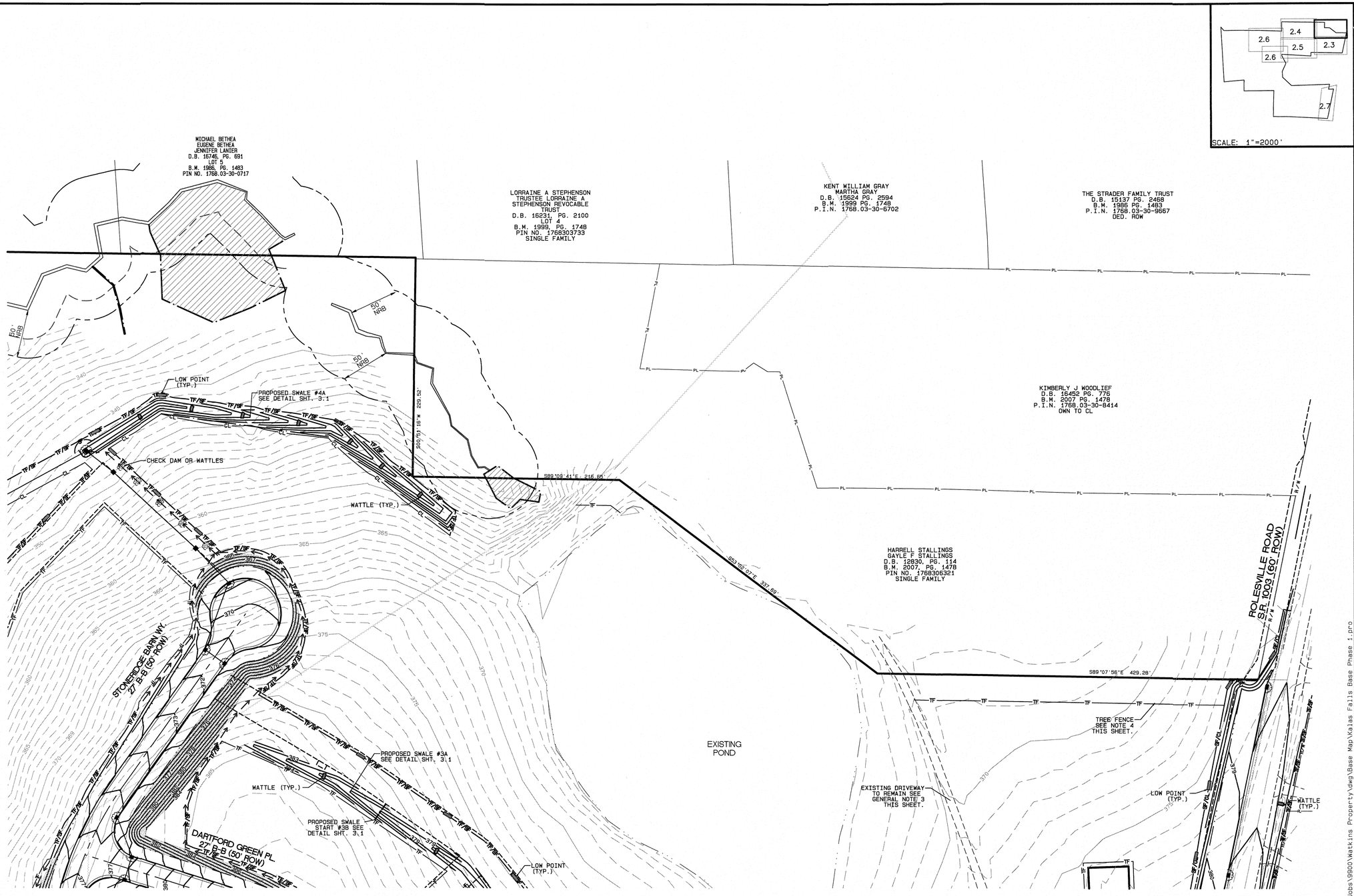
Plot Date: 7/8/2021



GENERAL NOTE:

1. ALL SEDIMENT TRAP/PONDS SHALL BE STABILIZED WITHIN 7 DAYS OF INSTALLATION.
2. DIVERSION SWALE DESIGN, SEE SHEET 3.1 FOR DETAIL DETAIL AND REFERENCE TABLE.
3. THE SITE CONTRACTOR IS RESPONSIBLE TO COORDINATE WITH THE STALLING AND WOODLIEF TRACTS PRIOR TO STARTING WORK AT OR AROUND THE EXISTING DRIVEWAY. AT NO TIME SHALL ACCESS TO THOSE PROPERTIES BE BLOCKED WITHOUT PROVIDING FOR ANOTHER MEANS OF INGRESS/EGRESS.
4. CONTRACTOR TO COORDINATE WITH THE SITE INSPECTOR TO RELOCATE TREE FENCE AT THE TIME OF FENCE AND VEGETATION INSTALLATION IN THIS AREA.

LEGEND

- PROPOSED CHECK DAMS
- PROPOSED WATTLE
- 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 EROSION CONTROL BLANKET
- BASIN MAINTENANCE PAD

PROPOSED LINETYPE LEGEND

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

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
1	11-20-20	MINOR REVISIONS PER TOR COMMENTS	BAH/PNJ
2	05-05-21	PLAN REVISIONS PER TOR/SCM/LMT REVIEW	BAH/PNJ
3	07-08-21	FINAL SET	BAH/PNJ

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.
4020 Westchase Blvd. Ste. 450
Raleigh, NC 27607 919-469-1101

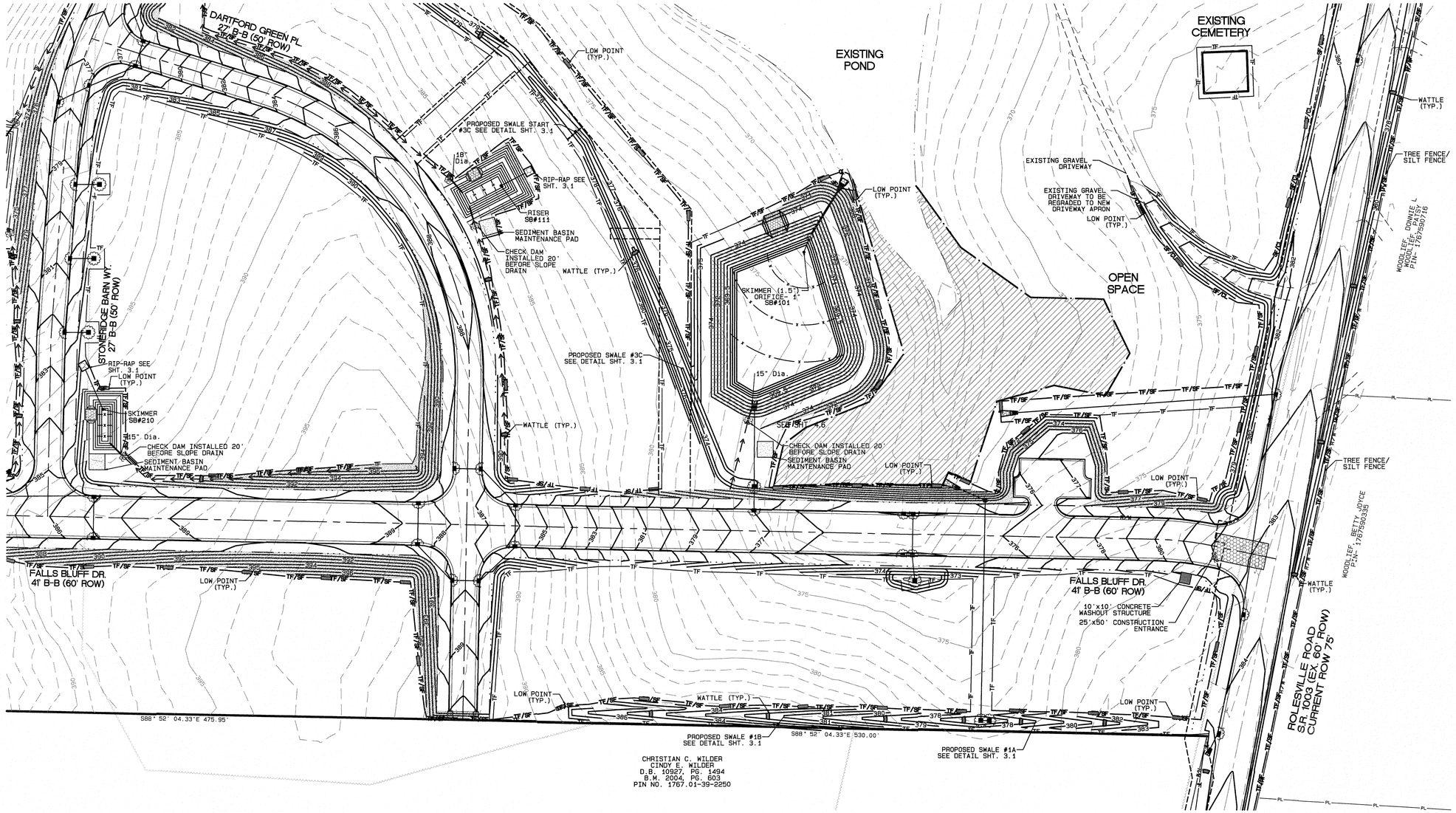
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 036281 PATTON NICHOLAS JOYNER

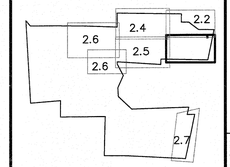
7/9/21

SHEET NO.

2.2

FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro
Time: 2:43PM
Plot Date: 7/6/2021





SCALE: 1"=2000'

GENERAL NOTE:
1. ALL SEDIMENT TRAP/PONDS SHALL BE STABILIZED WITHIN 7 DAYS OF INSTALLATION.
2. DIVERSION SWALE DESIGN, SEE SHEET 3.1 FOR DETAIL DETAIL AND REFERENCE TABLE.
3. THE SITE CONTRACTOR IS RESPONSIBLE TO COORDINATE WITH THE STALLING AND WOODLIEF TRACTS PRIOR TO STARTING WORK AT OR AROUND THE EXISTING DRIVEWAY. AT NO TIME SHALL ACCESS TO THOSE PROPERTIES BE BLOCKED WITHOUT PROVIDING FOR ANOTHER MEANS OF INGRESS/EGRESS.

LEGEND

- PROPOSED CHECK DAMS
- PROPOSED WATTLE
- 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 EROSION CONTROL BLANKET
- BASIN MAINTENANCE PAD

PROPOSED LINETYPE LEGEND

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

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
1	01-20-21	MINOR REVISIONS PER TOC COMMENTS	BAH/PNJ
2	05-10-21	ADA REVISIONS PER TOR COMMENTS	BAH/PNJ
3	07-08-21	FINAL SET	BAH/PNJ

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.
4020 Westchase Blvd. Ste. 450
Raleigh, NC 27607 919-469-1101

NORTH CAROLINA REGISTERED PROFESSIONAL ENGINEER 6822 JUSTIN NICHOLAS JOYNER
7/9/21

SHEET NO.
2.3

FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro
Time 2:43PM
Plot Date: 7/8/2021

LEGEND

- PROPOSED CHECK DAMS
- PROPOSED WATTLE
- 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 EROSION CONTROL BLANKET
- BASIN MAINTENANCE PAD

PROPOSED LINETYPE LEGEND

- PROPOSED RIGHT OF WAY
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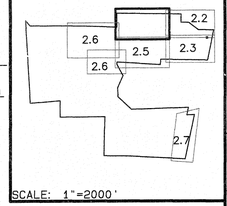
- PROPOSED SILT DITCH
- PROPOSED BAFFLES
- PROPOSED TREE FENCE

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.
2. DIVERSION SWALE DESIGN, SEE SHEET 3.1 FOR DETAIL DETAIL AND REFERENCE TABLE.



SCALE: 1"=2000'

JOSEPH E. WALL
BETTY R. GUNZ
ZONING: R-30
D.B. 5176, PG. 858
B.M. 1985, PG. 1806
PIN NO. 1768.03-21-8907
REAL ESTATE ID: 0060992

DONALD B. PEARCE
JOYCE B. PEARCE
D.B. 3875, PG. 317
LOT 9
B.M. 1986, PG. 1914
PIN NO. 1768.03-10-8786

SPENCER MAYNARD AYCOCK
CAROLYN P. AYCOCK
D.B. 5506, PG. 121
LOT
B.M. 1986, PG. 1914
PIN NO. 1768.03-20-1771
SINGLE FAMILY

JONATHAN SCOTT EDWARDS
CONNIE WALLER EDWARDS
D.B. 6297, PG. 502
LOT 7
B.M. 1986, PG. 1914
PIN NO. 1768.03-20-4762

DANIEL E. LINE
LARA D. LINE
D.B. 6296, PG. 1984
LOT 8
B.M. 1986, PG. 1483
PIN NO. 1768207753

S89°04'17"E 345.24'

S89°10'08"E 1451.88'

S02°15'25"W 393.24'

20' NRB
50' NRB
LOW POINT (TYP.)
RIP-RAP SEE SHT. 3.1
SKIMMER SB#218
18" Dia. CHECK DAM INSTALLED 20' BEFORE SLOPE DRAIN.
WATTLE (TYP.)
SB#202
SKIMMER (4") ORIFICE- 2"
18" Dia. CHECK DAM INSTALLED 20' BEFORE SLOPE DRAIN
PROPOSED SWALE START #5C SEE DETAIL SHT. 3.1
CHECK DAM OR WATTLES
SOIL STOCKPILE
RISER SB#314
15" Dia. CHECK DAM INSTALLED 20' BEFORE SLOPE DRAIN
PROPOSED SWALE START #5B SEE DETAIL SHT. 3.1
PROPOSED SWALE #5A SEE DETAIL SHT. 3.1
WATTLE (TYP.)
SKIMMER SB#215
15" Dia. CHECK DAM INSTALLED 20' BEFORE SLOPE DRAIN
TANGLED CREST LOOP 27 B-B (60' ROW)
INSTALL PIPE AT THIS LOCATION PRIOR TO DIVERSION DITCH.
INSTALL RIP-RAP FOR CLEAN WATER DIVERSION. TO BE REMOVED WITH CHANNEL.
RIP-RAP: CLASS B
6' WIDE @ ENTRANCE
9' WIDE @ END
12' LONG
18" DEPTH
SB#201
SKIMMER (2") ORIFICE- 1"
AT THE TIME OF THE SEWER INSTALLATION THE SEWER SHALL BE INSTALLED IN DRY CONDITIONS, SO THAT THE CLEAN WATER DIVERSION CAN BE PUT BACK INTO OPERATION AT THE END OF THE WORK DAY.
CLEAN WATER DIVERSION
CHECK DAM & RIP-RAP FOR CLEAN WATER DIVERSION
PROPOSED SWALE #2 SEE DETAIL SHT. 3.1

GRAPHIC SCALE 1"=50'
0 50 100 150

No.	DATE	REVISION
1	11-19-20	MINOR REVISIONS PER TOH COMMENTS
2	05-10-21	PLAN REVISIONS PER TOH CONSULTANT REVIEW.
3	07-08-21	FINAL SET

DWN/CHK
BAH/PNJ
BAH/PNJ
BAH/PNJ

EROSION CONTROL PLAN PHASE 1

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA
FIRM # C-3381

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

AMERICAN Engineering
American Engineering Associates–Southeast, P.A.
4020 Westchase Blvd. Ste. 450
Raleigh, NC 27607 919-469-1101

NORTH CAROLINA 032 ENGINEER PAYTON M. POPPER
7/9/21

SHEET NO.
2.4

Plot Date: 7/8/2021 Time: 2:51PM FILE: Z:\Jobs\9900\Watkins Project\Dwg\Base Map\Kalas Falls Base Phase 1.pro

LEGEND

- PROPOSED CHECK DAMS
- PROPOSED WATTLE
- 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 EROSION CONTROL BLANKET
- BASIN MAINTENANCE PAD

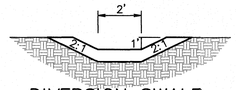
PROPOSED LINETYPE LEGEND

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

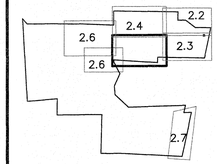
EXISTING LINETYPE LEGEND

- 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.
2. DIVERSION SWALE DESIGN, SEE SHEET 3.1 FOR DETAIL DETAIL AND REFERENCE TABLE.



DIVERSION SWALE
CROSS-SECTION



SCALE: 1"=2000'

GRAPHIC SCALE 1"=50'
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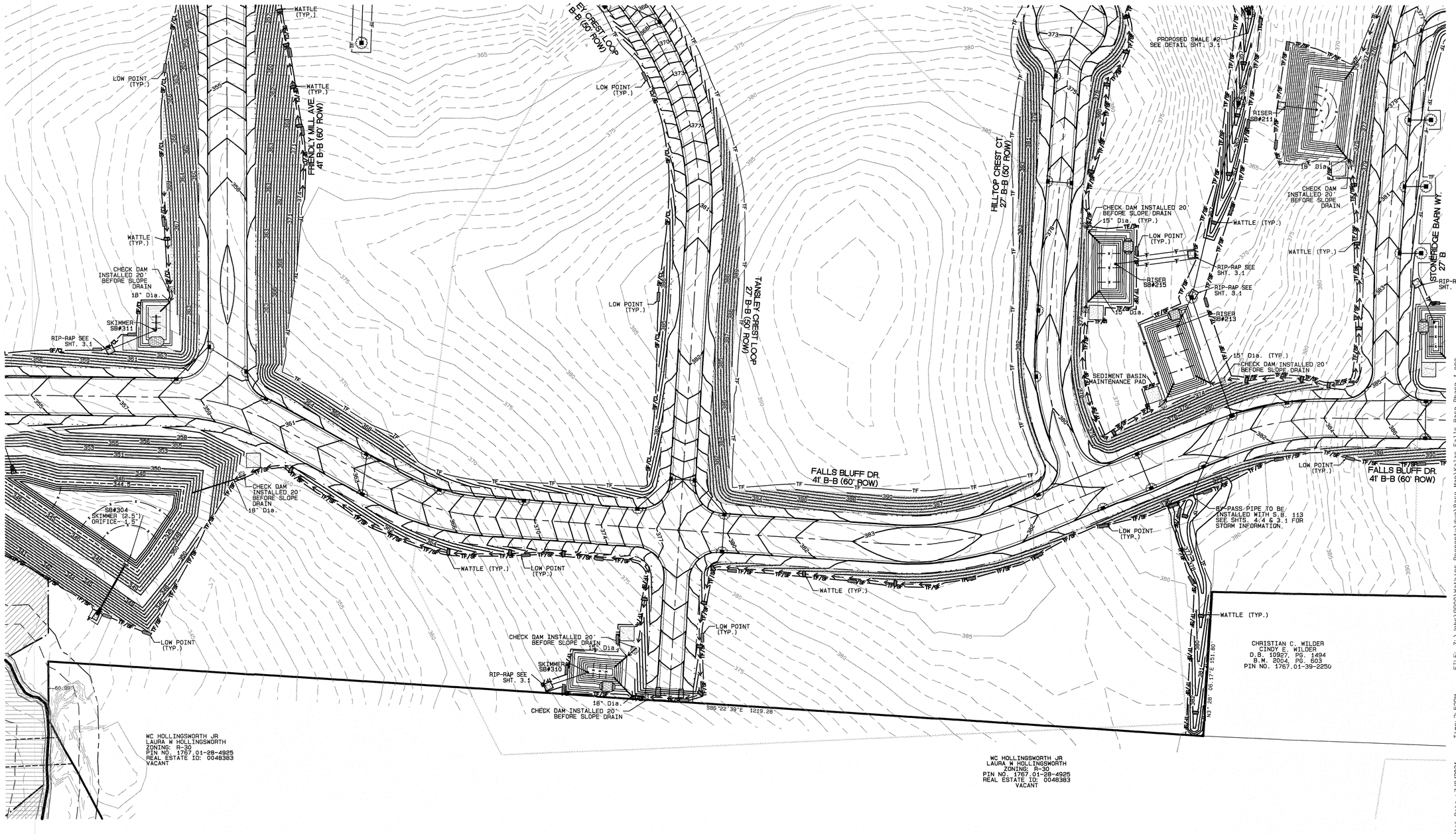


No.	DATE	REVISION
1	11-20-20	MINOR REVISIONS PER 1ST COMMENTS
2	05-10-21	PLAN REVISIONS PER 1ST CONSULTANT REVIEW.
3	07-08-21	FINAL SET

DVN/CHK
BAH/PNJ
BAH/PNJ
BAH/PNJ

EROSION CONTROL PLAN PHASE 1

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA
FIRM # C-3881

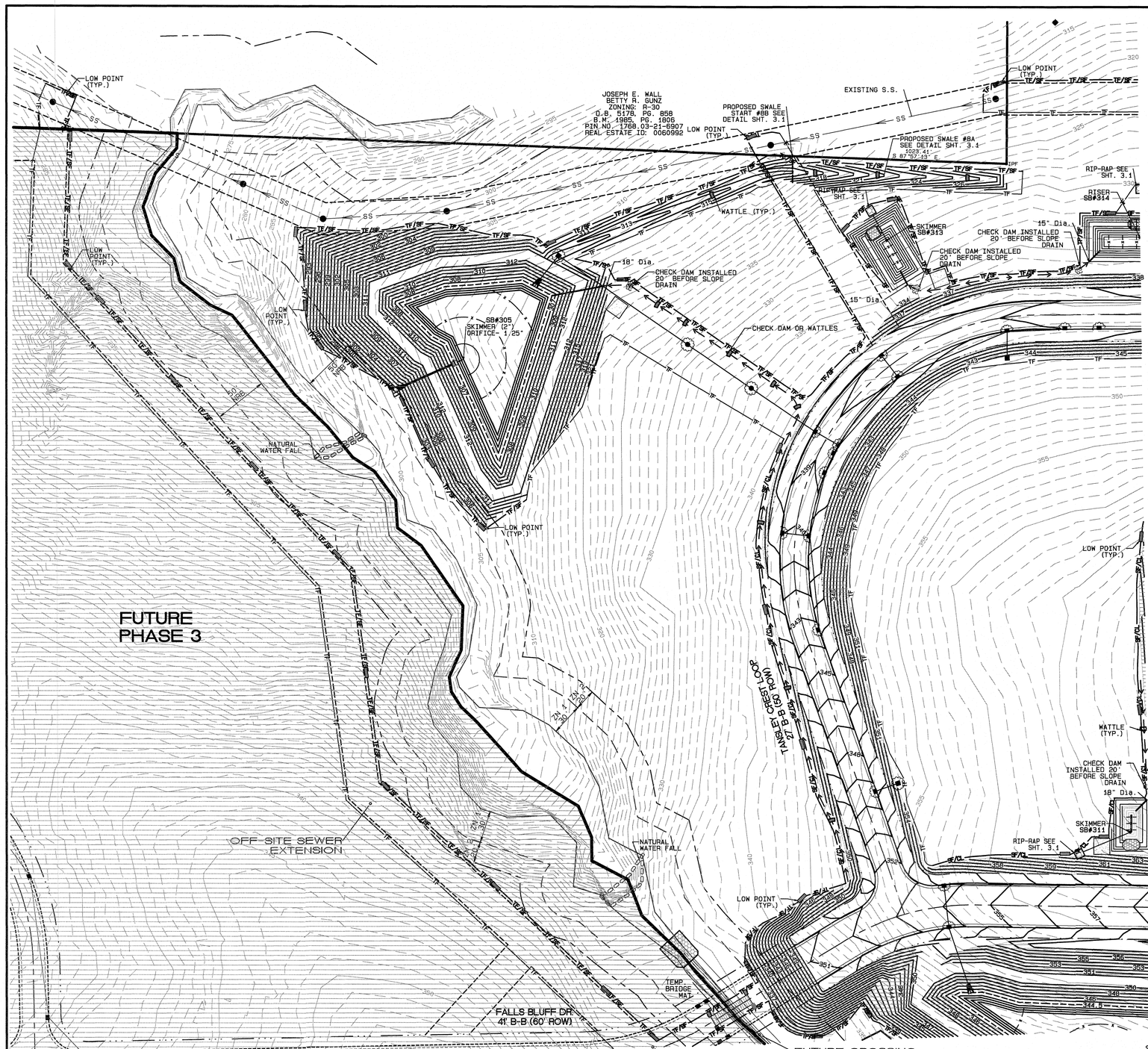
JOB NUMBER:	9900
CHECKED BY:	PNJ
DRAWN BY:	BAH
DATE:	4/24/2020

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
4020 Westchase Blvd. Ste. 450
Raleigh, NC 27607 919-469-1101

NORTH CAROLINA 8922 ENGINEER PETER NICHOLAS JANNEY
7/9/21

SHEET NO.
2.5

Plot Date: 7/8/2021 Time: 2:52PM FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro



PROPOSED LINETYPE LEGEND

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

EXISTING LINETYPE LEGEND

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

LEGEND

- PROPOSED CHECK DAMS
- PROPOSED WATTLE
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- PROPOSED SF LOW POINT
- PROPOSED AREAS FOR 7 DAY STABILIZATION
- PROPOSED EROSION CONTROL BLANKET
- BASIN MAINTENANCE PAD

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 FUTURE PHASE 2 OF THIS DEVELOPMENT. NO OTHER IMPROVEMENTS IN THE FUTURE PHASE 3 IS BEING PROPOSED.
3. TEMPORARY BRIDGING OF THE STREAM MUST BE USED TO ACCESS THE SEWER CONSTRUCTION IN THE PHASE 3 AREA. PLACING LOGS OR OTHER MATERIAL IN THE STERAM BED IS NOT PERMITTED.
4. DIVERSION SWALE DESIGN, SEE SHEET 3.1 FOR DETAIL DETAIL AND REFERENCE TABLE.

No.	DATE	REVISION	DWN/CHK
1	11-20-20	MINOR REVISIONS PER TOR COMMENTS	BAH/PNJ
2	05-19-21	FLAT REVISIONS PER TOR CONSULTANT REVIEW.	BAH/PNJ
3	07-08-21	FINAL SET	BAH/PNJ

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.
4020 Westchase Blvd. Ste. 450
Raleigh, NC 27607 919-469-1101

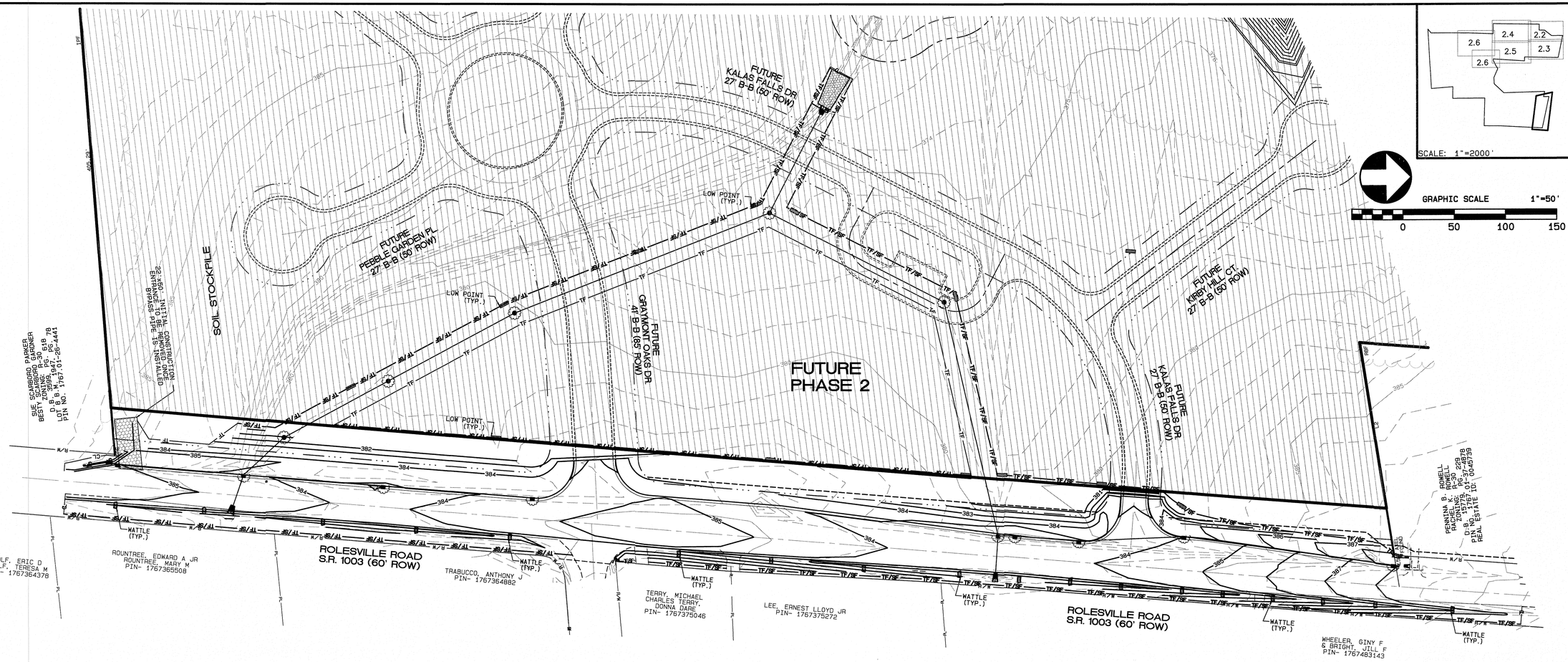
NORTH CAROLINA REGISTERED PROFESSIONAL ENGINEER 032521 PHILIP N. JOYCE

7/7/21

SHEET NO.

2.6

FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro
Time: 3:02PM
Plot Date: 7/8/2021



LEGEND

- PROPOSED CHECK DAMS
- PROPOSED WATTLE
- PROPOSED MANHOLE OR JUNCTION BOX
- PROPOSED CATCH BASIN
- PROPOSED YARD INLET
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GENERAL NOTE:

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2. A SEWER OUTFALL IS TO BE CONSTRUCTED IN THE FUTURE PHASE 3 AREA TO SERVICE ANOTHER PROJECT OR FUTURE 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.
4. DIVERSION SWALE DESIGN, SEE SHEET 3.1 FOR DETAIL DETAIL AND REFERENCE TABLE.

PROPOSED LINETYPE LEGEND

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

EXISTING LINETYPE LEGEND

- PROPERTY BOUNDARY
- EXISTING TREE LINE
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- 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
1	11-20-20	MINOR REVISIONS PER TGR COMMENTS	BAH/PNJ
2	05-10-21	PLAN REVISIONS PER TGR CONSULTANT REVIEW	BAH/PNJ
3	07-06-21	FINAL SET	BAH/PNJ

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.
4020 Westchase Blvd. Ste. 450
Raleigh, NC 27607 919-469-1101

NORTH CAROLINA REGISTERED PROFESSIONAL ENGINEER SEAL 2022 PATRICK NICHOLAS JOYCE

7/9/21

SHEET NO.

2.7

Plot Date: 7/9/2021 Time: 3:05PM FILE: Z:\Jobs\9900\Watkins Property\Dwg\Base Map\Kalas Falls Base Phase 1.pro

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. CONTACT JEEVAN NEUPANE, P. E. (919-819-8907).

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. ALL MAINTENANCE PADS SHALL BE CLEARED BUT THE STONE REQUIRED SHOULD NOT BE INSTALLED UNTIL JUST BEFORE THE PAD IS NEEDED.

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. THE PIPE FROM 200A TO 200 SHALL BE INSTALLED AT THE SAME TIME AS SB#201 TO CARRY SEDIMENT WATER UNDER FUTURE DITCH CARRYING CLEAN DIVERTED WATER.

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 11/19/20, Rev. 12/7/20

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.

REQUIRED WAKE COUNTY CONSTRUCTION SEQUENCE*

1. SCHEDULE A PRECONSTRUCTION CONFERENCE WITH THE WATERSHED MANGER,JEEVAN NEUPANE,PE (919)819-8907. OBTAIN A LAND-DISTURBING PERMIT.
2. INSTALL GRAVEL CONSTRUCTION PAD, TEMPORARY DIVERSIONS, SILT FENCE, SEDIMENT BASINS OR OTHER MEASURES AS SHOWN ON THE APPROVED PLAN. CLEAR ONLY AS NECESSARY TO INSTALL THESE DEVICES. SEED TEMPORARY DIVERSIONS, BERMS AND BASINS IMMEDIATELY AFTER CONSTRUCTION.
3. CALL JEEVAN NEUPANE,PE (919)819-8907FOR AN ONSITE INSPECTION BY THE WATERSHED MANAGER TO OBTAIN A CERTIFICATE OF COMPLIANCE.
4. BEGIN CLEARING AND GRUBBING. MAINTAIN DEVICES AS NEEDED. ROUGH GRADE SITE.
5. INSTALL STORM SEWER, IF SHOWN, AND PROTECT INLETS WITH BLOCK AND GRAVEL INLET CONTROLS, SEDIMENT TRAPS OR OTHER APPROVED MEASURES AS SHOWN ON THE PLAN. BEGIN CONSTRUCTION, BUILDING, ETC.
6. STABILIZE SITE AS AREAS ARE BROUGHT UP TO FINISH GRADE WITH VEGETATION, PAVING, DITCH LININGS, ETC. SEED AND MULCH DENUDED AREAS PER GROUND STABILIZATION TIME FRAMES.
7. WHEN CONSTRUCTION IS COMPLETE AND ALL AREAS ARE STABILIZED COMPLETELY, CALL JEEVAN NEUPANE,PE (919)819-8907 FOR AN INSPECTION BY THE WATERSHED MANAGER.
8. IF SITE IS APPROVED, REMOVE TEMPORARY DIVERSIONS, SILT FENCE, SEDIMENT BASINS, ETC., AND SEED OUT OR STABILIZE ANY RESULTING BARE AREAS. ALL REMAINING PERMANENT EROSION CONTROL DEVICES, SUCH AS VELOCITY DISSIPATORS, SHOULD NOW BE INSTALLED.
9. WHEN VEGETATION HAS BECOME ESTABLISHED, CALL FOR A FINAL SITE INSPECTION BY THE WATERSHED MANAGER, JEEVAN NEUPANE,PE (919)819-8907. OBTAIN A CERTIFICATE OF COMPLETION.

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

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. PHASE 1 AREA = 83.66 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 STANDARDS 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.

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 MORE THAN 12,000 SF ARE TO BE BUILT UPON AT ONE TIME, A COORDINATED EROSION CONTROL PLAN SHALL BE SUBMITTED.

NPDES Stormwater Discharge Permit for Construction Activities (NCG01) — NCDENR/Division of Energy, Mineral and Land Resources

STABILIZATION TIMEFRAMES
(Effective Aug. 3, 2011)

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.

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).

STOCKPILE DESIGN CRITERIA
A. A 25-FOOT TEMPORARY MAINTENANCE AND ACCESS EASEMENT SHALL BE SHOWN AROUND ALL PROPOSED STOCKPILES (EROSION CONTROL MEASURES SURROUNDING THE STOCKPILE SHALL BE SHOWN AT THE OUTER LIMIT OF THIS EASEMENT).
B. STOCKPILE FOOTPRINTS SHALL BE SETBACK A MINIMUM OF 25' FROM ADJACENT PROPERTY LINES.
C. A NOTE SHALL BE PROVIDED ON THE APPROVED PLAN THAT STOCKPILE HEIGHT SHALL NOT EXCEED 35 FEET.
D. STOCKPILE SLOPES SHALL BE 2:1 OR FLATTER.
E. APPROVED BMPS SHALL BE SHOWN ON A PLAN TO CONTROL ANY POTENTIAL SEDIMENT LOSS FROM A STOCKPILE.
F. STOCKPILING MATERIALS ADJACENT TO A DITCH, DRAINAGEWAY, WATERCOURSE, WETLAND, STREAM BUFFER, OR OTHER BODY OF WATER SHALL BE AVOIDED UNLESS AN ALTERNATIVE LOCATION IS DEMONSTRATED TO BE UNAVAILABLE.
G. ANY CONCENTRATED FLOW LIKELY TO AFFECT THE STOCKPILE SHALL BE DIVERTED TO AN APPROVED BMP.
H. OFF-SITE SPOIL OR BORROW AREAS MUST BE IN COMPLIANCE WITH WAKE COUNTY UDO AND STATE REGULATIONS. ALL SPOIL AREAS OVER AN ACRE ARE REQUIRED TO HAVE AN APPROVED SEDIMENT CONTROL PLAN. DEVELOPER/CONTRACTOR SHALL NOTIFY WAKE COUNTY OF ANY OFFSITE DISPOSAL OF SOIL, PRIOR TO DISPOSAL. FILL OF FEMA FLOODWAYS AND NON-ENCROACHMENT AREAS ARE PROHIBITED EXCEPT AS OTHERWISE PROVIDED BY SUBSECTION 14-19-2 OF THE WAKE COUNTY UNIFIED DEVELOPMENT ORDINANCE (CERTIFICATIONS AND PERMITS REQUIRED).

MAINTENANCE REQUIREMENTS TO BE NOTED ON THE PLAN

I. 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.
J. 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.
K. THE APPROVED PLAN SHALL PROVIDE FOR THE USE OF STAGED SEEDING AND MULCHING ON A CONTINUAL BASIS WHILE THE STOCKPILE IS IN USE.
L. ESTABLISH AND MAINTAIN A VEGETATIVE BUFFER AT THE TOE OF THE SLOPE (WHERE PRACTICAL).

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.

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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 Abruzzi 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)	50 lb./acre
Mar 1 – Apr 15	and Add Tall Fescue	120 lb./acre
Mar 1 – June 30	and Add Weeping Love Grass	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	
	GAS LINE	
	OVERHEAD ELECTRIC	
	UNDERGROUND ELECTRIC	
	OVERHEAD TELEPHONE	
	UNDERGROUND TELEPHONE	
	STORM DRAIN	
	SANITARY SEWER	
	FORCE MAIN	
	CURB & GUTTER LINE	
	SWALE/DITCH LINE	
	STREAM LINE	
X	FENCE LINE	
	TREE LINE	
	FLOW LINE	
	TEMP DIVERSION LINE	
	CLEARING LIMITS	
	TREE FENCE	
	SILT FENCE LINE	
	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
WV		
WVPR		PROPOSED WATER VALVE
WVEX		EXISTING WATER VALVE
BOAPR	BOA	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

LOT IMPERVIOUS AREAS

LOT SIZE:	IMPERVIOUS AREA:	LOT NUMBERS:
50'-59'	3,650 S.F.	243-261
60'-69'	3,920 S.F.	44-48,236-242,262-269
70'-79'	4,650 S.F.	1-9,21-28,29-43,66-74
80'-99'	5,400 S.F.	10-20,49-59,75-86,90-95
100'+	5,750 S.F.	60-65,87-89

SCM CONVERSION SEQUENCE

1. WHEN ALL CONTRIBUTARY AREAS TO THE STORMWATER CONTROL MEASURE (SCM) HAVE BEEN STABILIZED CONTACT THE EROSION CONTROL OFFICER FOR PERMISSION TO CONVERT THE SEDIMENT BASIN TO A SCM.
2. REMOVE ALL SEDIMENT FROM THE BASIN AND RESTORE GRADES TO DESIGNED CONFIGURATION, IF NEEDED.
3. CONSTRUCT FOREBAY DIVIDERS AS SHOWN.
4. MAKE ANY REPAIRS, ETC. NECESSARY TO THE OUTLET STRUCTURE, OUTLET PIPE, EMERGENCY OVERFLOW, ETC. EXAMINE RIP-RAP TO SEE IF REFRESHING OR CLEANING OF ROCK IS NECESSARY.
5. REMOVE SKIMMER AND CLOSE OUTLET VALVE.
6. CONTACT EROSION CONTROL OFFICER FOR APPROVAL.
7. CONTACT A LICENSED SURVEYOR FOR SURVEY OF AS-BUILT CONDITIONS. NOTIFY ENGINEER-OF-RECORD FOR PREPARATION OF AS-BUILT DRAWNGS.

Y:\Jobs\9900\Watkins Property\Documents\Reports\SCM Conversion Sequence.docx 2/15/21

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 #** S-4824

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 #** W-3784

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 # _____

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DWN/CHK EDS/JRH

No.	DATE	REVISION
1	6-14-2021	FINAL SET

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

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 032211 JAMES RAYMOND HICKMAN, III 6/14/21

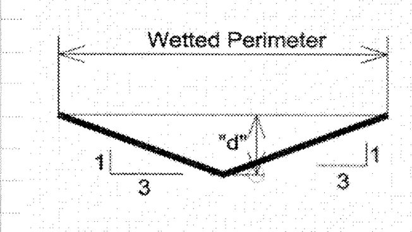
SHEET NO.

3.0

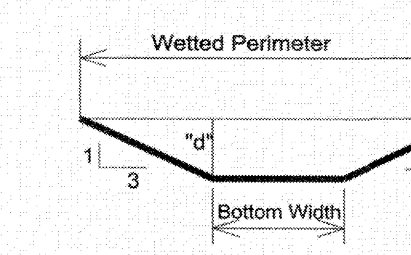
Kalas PUD Subd Ditch & Swale Calcs-

Rev. 110920 SWALES 10, & 17 REMOVED

Corrected Wetted Perimeter Equation



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



Trapezoidal Ditch / Swale Section
(Not To Scale)

SWALE DRAINAGE CHART-PHASE ONE

Ditch I.D.	D.A., Ac.	C	i_{10}, in/hr	Q_{10}, cfs	Left Side Slope, Z Z:1	Right Side Slope, Z Z:1	Avg. Ditch Slope, %	Bottom Width	Ditch Lining	Manning, n *	Q_{10} Flow Depth, ft	Flow Velocity V10, fps	Calc.Shear Stress, psf
DS 1	0.31	0.30	7.22	**0.66**	3.00	3.00	3.8	0.00	**Reinforced Mesh(Grass)**	0.022	**0.26**	**3.20**	0.62
DS 2A	1.58	0.40	7.22	**4.56**	3.00	3.00	5.5	2.00	**RipRap**	0.037	**0.38**	**3.88**	1.29
DS 2B	1.18	0.40	7.22	**3.41**	3.00	3.00	5.5	2.00	**RipRap**	0.037	**0.32**	**3.56**	1.11
DS 2C	0.74	0.40	7.22	**2.14**	3.00	3.00	4.7	2.00	**RipRap**	0.037	**0.26**	**2.93**	0.77
DS 2D	3.32	0.40	7.22	**9.59**	3.00	3.00	2.2	2.00	**RipRap**	0.037	**0.69**	**3.43**	0.94
DS 3A	0.30	0.45	7.22	**0.99**	3.00	3.00	2.5	0.00	**Reinforced Mesh(Grass)**	0.022	**0.35**	**3.18**	0.55
DS 3B	0.95	0.48	7.22	**3.29**	3.00	3.00	1.5	1.00	**Reinforced Mesh(Grass)**	0.022	**0.43**	**3.37**	0.40
DS 3C	2.20	0.44	7.22	**6.99**	3.00	3.00	0.5	4.00	**Reinforced Mesh(Grass)**	0.022	**0.50**	**2.52**	0.16
DS 4A	1.40	0.44	7.22	**4.45**	3.00	3.00	0.5	2.00	**Reinforced Mesh(Grass)**	0.022	**0.53**	**2.37**	0.16
DS 4B	0.70	0.46	7.22	**2.32**	3.00	3.00	0.7	2.00	**Reinforced Mesh(Grass)**	0.022	**0.34**	**2.22**	0.15
DS 5A	2.40	0.32	7.22	**5.54**	3.00	3.00	1.8	2.00	**Reinforced Mesh(Grass)**	0.022	**0.42**	**3.99**	0.48
DS 5B	3.60	0.32	7.22	**8.32**	3.00	3.00	5.8	2.00	**RipRap**	0.037	**0.50**	**4.69**	1.83
DS 5C	6.00	0.33	7.22	**14.30**	3.00	3.00	2.0	2.00	**RipRap**	0.037	**0.85**	**3.68**	1.06
DS 6A	1.18	0.44	7.22	**3.75**	3.00	3.00	4.5	1.00	**RipRap**	0.037	**0.45**	**3.56**	1.26
DS 6B	2.21	0.44	7.22	**7.02**	3.00	3.00	4.5	2.00	**RipRap**	0.037	**0.50**	**4.11**	1.40
DS 6C	3.95	0.46	7.22	**13.12**	3.00	3.00	1.7	3.00	**RipRap**	0.037	**0.75**	**3.32**	0.80
DS 7A	0.20	0.45	7.22	**0.65**	3.00	3.00	1.2	0.00	**Reinforced Mesh(Grass)**	0.022	**0.32**	**2.08**	0.24
DS 7B	0.51	0.48	7.22	**1.77**	3.00	3.00	12.0	0.00	**RipRap**	0.037	**0.37**	**4.29**	2.77
DS 7C	0.78	0.46	7.22	**2.59**	3.00	3.00	4.0	0.00	**RipRap**	0.037	**0.52**	**3.12**	1.30
DS 7D	2.05	0.41	7.22	**6.07**	3.00	3.00	1.2	2.00	**RipRap**	0.037	**0.55**	**3.04**	0.41
DS 8A	0.52	0.38	7.22	**1.43**	3.00	3.00	4.0	0.00	**Reinforced Mesh(Grass)**	0.022	**0.35**	**3.98**	0.86
DS 8B	1.87	0.40	7.22	**5.40**	3.00	3.00	7.0	0.00	**RipRap**	0.037	**0.57**	**4.37**	2.47
DS 9	2.18	0.34	7.22	**5.35**	3.00	3.00	1.5	1.00	**Reinforced Mesh(Grass)**	0.022	**0.54**	**3.84**	0.51
DS 10	1.25	0.48	7.22	**4.33**	3.00	3.00	5.2	1.00	**RipRap**	0.037	**0.47**	**3.93**	1.53
DS 11	0.95	0.45	7.22	**3.09**	3.00	3.00	0.8	2.00	**Reinforced Mesh(Grass)**	0.022	**0.39**	**2.54**	0.19
DS 12	2.33	0.31	7.22	**5.22**	3.00	3.00	1.0	3.00	**Reinforced Mesh(Grass)**	0.022	**0.41**	**3.07**	0.26
DS 12A	0.95	0.45	7.22	**3.09**	3.00	3.00	0.8	2.00	**Reinforced Mesh(Grass)**	0.022	**0.39**	**2.54**	0.19
DS 13	1.05	0.45	7.22	**3.41**	3.00	3.00	7.0	1.00	**RipRap**	0.037	**0.40**	**4.16**	1.75
DS 14A	0.76	0.50	7.22	**2.74**	3.00	3.00	7.0	1.00	**RipRap**	0.037	**0.35**	**3.86**	1.53
DS 14B	0.90	0.46	7.22	**2.99**	3.00	3.00	4.0	0.00	**RipRap**	0.037	**0.55**	**3.24**	1.37
DS 15A	0.05	0.20	7.22	**0.07**	3.00	3.00	1.5	0.00	**Reinforced Mesh(Grass)**	0.022	**0.15**	**1.39**	0.14
DS 15B	0.28	0.38	7.22	**0.77**	3.00	3.00	9.0	0.00	**RipRap**	0.037	**0.30**	**3.23**	1.68
DS 15C	1.07	0.48	7.22	**3.71**	3.00	3.00	1.5	1.00	**Reinforced Mesh(Grass)**	0.022	**0.46**	**3.50**	0.43
DS 16	3.56	0.42	7.22	**10.80**	3.00	3.00	4.0	3.00	**RipRap**	0.037	**0.55**	**4.29**	1.37
DS 18A	0.44	0.55	7.22	**1.75**	3.00	3.00	1.0	0.00	**Reinforced Mesh(Grass)**	0.022	**0.49**	**2.52**	0.31
DS 18B	0.61	0.49	7.22	**2.16**	3.00	3.00	6.0	0.00	**RipRap**	0.037	**0.46**	**3.52**	1.72
DS 18C	0.67	0.30	7.22	**1.45**	3.00	3.00	1.0	0.00	**Reinforced Mesh(Grass)**	0.022	**0.46**	**2.42**	0.29
DS 18D	2.58	0.29	7.22	**5.40**	3.00	3.00	5.0	1.00	**RipRap**	0.037	**0.52**	**4.08**	1.62
DS 19	0.10	0.20	7.22	**0.14**	3.00	3.00	3.5	0.00	**Reinforced Mesh(Grass)**	0.022	**0.15**	**2.12**	0.33
DS 20	0.76	0.46	7.22	**2.52**	3.00	3.00	2.5	0.00	**Reinforced Mesh(Grass)**	0.022	**0.47**	**3.88**	0.73
DS 21A	0.80	0.54	7.22	**3.12**	3.00	3.00	1.3	1.00	**RipRap**	0.037	**0.55**	**2.15**	0.45
DS 21B	1.75	0.54	7.22	**6.82**	3.00	3.00	8.0	1.00	**RipRap**	0.037	**0.52**	**5.16**	2.60
DS 21C	2.13	0.53	7.22	**8.15**	3.00	3.00	12.0	2.00	**RipRap**	0.037	**0.42**	**6.09**	3.14
DS 21D	2.22	0.51	7.22	**8.17**	3.00	3.00	20.0	2.00	**RipRap**	0.037	**0.36**	**7.26**	4.54
DS 21E	2.52	0.50	7.22	**9.10**	3.00	3.00	4.3	3.00	**RipRap**	0.037	**0.50**	**4.22**	1.34
DS 22A	0.46	0.34	7.22	**1.13**	3.00	3.00	2.3	0.00	**Reinforced Mesh(Grass)**	0.022	**0.35**	**3.05**	0.50
DS 22B	1.90	0.28	7.22	**3.84**	3.00	3.00	1.0	2.00	**Reinforced Mesh(Grass)**	0.022	**0.41**	**2.92**	0.26
DS 23A	0.20	0.2	7.22	**0.29**	3.00	3.00	15.0	0.00	**RipRap**	0.037	**0.20**	**3.17**	1.87
DS 23B	1.15	0.46	7.22	**3.82**	3.00	3.00	2.0	1.00	**Reinforced Mesh(Grass)**	0.022	**0.43**	**3.90**	0.54
DS 23C	2.20	0.49	7.22	**7.78**	3.00	3.00	6.0	1.00	**RipRap**	0.037	**0.59**	**4.80**	2.21

Shear Stress=62.4(d)(Slope)

American Green Product (SC150BN): 70% Agri Straw & 30% Coconut Fiber with net; n=.022; Alowable Shear = 1.8 lb/s.f.

*Grass-Fescue Lined; n=0.030; Good for V10 <4.0 fps Ref. Chow, V.T., Open Channel Hydraulics

*Class B Riprap, 6" size; flow d < 2'; n=.037

*Coconut Fiber with net,n=0.02 (Mesh)

* Reinforced mesh linings where required per schedule above shall be North American Green model SC150BN or engineer approved equal and stabilized per manufacturers

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		

PIPING & STRUCTURES SUMMARY-PHASE ONE

Downstream Structure	Upstream Structure	Pipe Size (in)	Length (ft)	Slope (%)	Downstream Rim Elev (ft)	Upstream Rim Elev (ft)	Downstream Invert (ft)	Upstream Invert (ft)	Q(10) Downstream Velocity (fps)
CB 104	CB 113	24	41.00	0.49	375.40	375.40	370.93	371.13	3.34
CB 104 A	CB 104	24	9.00	0.50	375.41	375.40	370.78	370.83	4.40
CB 113	FES INLET 114	18	21.22	1.77	375.40	371.96	371.63	372.00	2.48
CB 113	CB 113 A	18	9.00	0.56	375.40	375.41	371.63	371.68	0.92
CB 115	CB 120	15	225.66	3.88	377.42	386.20	371.73	380.48	10.41
CB 115	CB 104 A	24	141.50	0.42	377.42	375.41	370.08	370.68	3.86
CB 116	CB 117	15	45.96	1.00	386.20	386.82	381.29	381.75	3.35
CB 117	CB 118	15	27.00	1.00	386.82	386.82	381.95	382.22	2.92
CB 118	CB 119	15	45.96	1.00	386.82	388.76	382.42	382.88	2.11
CB 119	CB 119 A	15	41.00	1.00	388.76	388.76	383.08	383.49	2.05
CB 120	CB 121	15	45.95	0.51	386.20	386.80	381.79	382.02	4.10
CB 120	CB 116	15	41.00	1.00	386.20	386.20	380.68	381.09	2.81
CB 121	CB 122	15	27.00	0.50	386.80	386.80	382.22	382.36	2.14
CB 201	CB 201 A	24	76.81	4.71	369.20	371.70	362.52	366.14	4.04
CB 201 A	CB 202	24	27.00	1.25	371.70	371.70	366.34	366.68	3.75
CB 202	CB 202 A	24	196.53	1.47	371.70	375.74	366.88	369.76	3.76
CB 202 A	CB 202 B	24	42.53	0.53	375.74	376.16	370.16	370.39	4.53
CB 202 B	CB 202 C	24	27.00	1.02	376.16	376.26	370.59	370.86	3.91
CB 202 C	CB 203	18	44.42	2.03	376.26	377.53	371.36	372.26	4.58
CB 203	CB 205	15	97.02	1.29	377.53	379.66	372.46	373.72	4.27
CB 203	CB 204	15	36.28	0.50	377.53	378.12	371.90	372.09	0.66
CB 205	YI 205 A	15	21.57	2.00	379.66	381.32	373.92	374.35	0.69
CB 205	CB 206	15	70.24	1.51	379.66	381.10	373.92	374.97	3.42
CB 206	YI 206 A	15	21.99	2.00	381.10	383.00	374.97	375.41	0.40
CB 206	CB 207	15	70.24	1.49	381.10	382.53	375.17	376.22	2.30
CB 207	YI 207 A	15	21.57	2.00	382.53	384.00	376.42	376.86	0.74
CB 213	CB 214	18	92.63	3.89	371.13	374.86	365.87	369.48	10.22
CB 214	CB 215	18	110.85	3.34	374.86	377.62	369.68	373.38	3.76
CB 215	CB 218	15	27.00	0.50	377.62	377.62	373.58	373.72	0.96
CB 215	CB 216	15	136.23	1.15	377.62	378.98	373.78	375.34	3.45
CB 216	CB 217	15	69.92	0.75	378.98	379.59	375.54	376.06	2.18
CB 222	CB 225	15	60.00	7.50	381.79	383.00	374.20	378.70	10.45
CB 222	CB 223	18	62.62	1.84	381.79	381.17	374.20	375.35	8.74
CB 223	FES 224	18	31.74	2.99	381.17	376.96	375.55	376.50	5.27
CB 223	CB 228	18	59.69	1.50	381.17	380.88	375.55	376.45	1.84
CB 225	CB 226	15	146.54	2.50	383.00	387.31	378.90	382.56	3.30
CB 226	CB 227	15	41.00	1.58	387.31	387.31	382.76	383.41	2.22
CB 228	CB 230	15	41.00	1.01	380.88	380.88	376.65	377.06	2.88
CB 228	CB 229	15	55.11	0.65	380.88	381.13	376.85	377.20	1.75
CB 230	CB 231	15	112.70	0.50	380.88	381.90	377.26	377.82	1.87
CB 251	CB 252	15	57.16	0.51	320.61	318.10	314.01	314.30	3.64
CB 254	YI 254 A	24	33.11	2.69	325.70	319.00	315.11	316.00	5.18
CB 254	CB 255	24	182.54	5.20	325.70	338.10	320.50	330.00	14.61
CB 255	CB 256	24	45.96	3.89	338.10	341.00	330.80	332.59	5.11
CB 256	CB 257	24	27.00	4.46	341.00	341.00	332.99	334.19	5.54
CB 257	CB 260	24	94.58	2.00	341.00	342.84	336.19	338.08	9.10
CB 257	CB 258	15	45.96	8.06	341.00	345.38	336.19	339.90	11.06
CB 258	CB 259	15	41.00	0.50	345.38	345.38	340.10	340.31	1.48
CB 260	YI 262	18	23.71	0.50	342.84	343.55	338.58	338.70	5.64
CB 260	YI 261	15	168.55	5.43	342.84	362.62	339.46	348.62	8.29
CB 263	YI 264	15	25.16	0.50	349.99	345.84	341.33	341.46	0.76
CB 263	CB 265	15	154.37	9.37	349.99	363.87	343.29	357.76	13.83
CB 265	YI 266	15	11.81	1.15	363.87	364.27	357.96	358.09	1.98
CB 265	CB 267	15	55.36	7.29	363.87	368.39	358.97	363.00	8.74
CB 302	CB 303	24	27.00	0.52	339.11	339.11	333.61	333.75	5.84
CB 303	CB 308	18	84.35	1.48	339.11	339.56	334.25	335.50	2.86
CB 303	CB 303 A	18	9.00	0.50	339.11	339.12	334.25	334.30	3.94
CB 303 A	CB 304	18	20.09	3.01	339.12	339.25	334.50	335.10	3.74
CB 304	CB 305	18	60.43	1.24	339.25	340.42	335.30	336.05	4.18
CB 305	CB 307	15	88.24	4.18	340.42	343.78	336.25	339.94	3.64
CB 305	CB 306	15	27.00	0.50	340.42	340.42	336.25	336.39	0.86
CB 307	CB 313	15	160.00	3.00	343.78	349.80	340.14	344.94	2.85
CB 308	CB 310	15	110.55	0.50	339.56	340.21	335.70	336.25	3.57
CB 308	CB 309	15	27.00	0.50	339.56	339.56	335.70	335.84	0.82
CB 310	YI 310 A	15	26.79	2.00	340.21	344.00	336.25	336.79	0.58
CB 310	CB 311	15	54.00	0.59	340.21	340.52	336.35	336.67	2.42
CB 311	CB 312	15	31.99	1.13	340.52	340.70	336.57	336.93	1.26
CB 313	YI 313 A	15	21.39	2.00	349.80	352.00	345.14	345.57	2.03
CB 315	CB 316	24	41.00	0.75	354.12	354.11	348.75	349.06	6.77
CB 316	CB 317	24	196.59	1.76	354.11	358.45	349.26	352.72	4.49
CB 317	CB 318	24	38.72	1.51	358.45	358.66	352.92	353.50	5.03
CB 318	CB 319	24	42.29	1.13	358.66	358.67	353.70	354.18	4.94
CB 319	CB 320	24	47.54	1.46	358.67	360.47	354.38	355.08	3.92
CB 320	CB 321	18	120.75	1.75	360.47	363.13	355.58	357.69	6.13
CB 321	CB 323	18	85.22	1.99	363.13	365.47	357.89	359.59	4.61
CB 321	CB 322	15	44.32	0.73	363.13	363.51	357.89	358.22	0.67
CB 323	CB 324	18	89.57	4.00	365.47	369.41	359.79	363.37	4.34
CB 324	CB 325	18	119.73	5.25	369.41	376.01	363.57	369.86	4.48
CB 325	CB 326	18	45.79	2.75	376.01	377.17	370.06	371.32	3.65
CB 326	CB 327	18	27.00	1.00	377.17	377.17	371.52	371.79	3.27
CB 327	CB 328	18	45.96	3.00	377.17	379.89	371.99	373.37	2.37
CB 328	CB 329	15	41.00	0.50	379.89	379.89	373.57	373.78	1.68
FES 130	YI 131	36	71.85	0.40	374.72	373.70	369.50	369.79	6.38
FES 200	YI 200 A	24	176.35	0.98	339.09	346.43	337.50	339.23	7.30
FES 210	YI 211	36	82.81	1.00	340.80	347.32	337.50	338.33	10.31
FES 250	CB 251	15	30.18	0.99	315.56	320.61	313.50	313.80	4.90
FES 250 A	CB 254	36	59.36	1.03	318.97	325.70	313.50	314.11	9.17
FES 301	YI 301 A	24	30.32	0.50	313.98	311.96	306.50	306.65	6.66
FES 314	CB 315	24	57.61	2.00	350.15	354.12	344.50	345.65	10.04
FES 5	JB 6	18	26.54	2.00	371.24	374.96	369.00	369.53	8.49
FES OS 1	OS 1	18	48.00	2.25	368.03	371.25	365.62	365.90	4.45
FES SCM 2A	OS SCM 2A	42	80.04	0.62	336.00	340.50	332.50	333.00	8.71
FES SCM 2B	OS SCM 2B	24	99.95	0.50	311.67	317.50	309.50	310.00	3.91
FES SCM 3D	OS SCM 3D	18	60.00	3.33	339.31	348.75	339.00	341.00	5.73
FES SCM 3E	OS SCM 3E	18	56.00	1.79	303.50	310.00	302.00	303.00	4.61
JB 301-B	JB 301-C	24	72.00	8.37	328.09	335.64	317.32	323.35	16.05
JB 301-C	CB 302	24	71.36	9.33	335.64	339.11	324.75	331.41	4.31
JB 6	YI 7	18	208.42	0.95	374.96	377.90	370.60	372.58	6.37
YI 131	CB 115	36	21.54	0.40	373.70	377.42	369.89	369.98	4.86
YI 200 A	YI 200 B	24	65.95	7.98	346.43	352.71	341.33	346.59	15.70
YI 200 B	YI 200 C	24	67.06	9.71	352.71	361.32	348.79	355.30	16.84
YI 200 C	CB 201	24	70.32	5.62	361.32	369.20	357.50	361.45	13.85
YI 211	YI 219	24	154.31	5.57	347.32	354.00	340.20	348.80	5.98
YI 211	YI 212	18	84.74	9.90	347.32	364.69	341.00	349.39	15.36
YI 212	CB 213	18	86.00	6.12	364.69	371.13	357.31	362.57	12.91
YI 219	YI 220	24	95.43	6.08	354.00	361.38	349.00	354.80	5.13
YI 220	YI 221	24	210.27	5.38	361.38	370.40	355.00	366.32	5.49
YI 221	CB 222	24	130.00	1.22	370.40	381.79	366.52	368.10	4.91
YI 262	CB 263	18	118.34	1.85	343.55	349.99	338.90	341.09	4.59
YI 301 A	JB 301-B	24	146.37	5.58	311.96	328.09	307.05	315.22	4.49
CB 753	HW 760	36	44.50	0.90	383.65	381.80	377.90	378.30	9.82
CB 753	CB 753 A	18	16.50	0.72	383.65	383.39	376.18	376.30	3.75
CB 753 A	CB 761	18	62.46	0.75	383.39	383.56	376.50	376.97	3.43
CB 757	FES 757 A	36	39.53	3.92	384.77	381.50	378.69	380.24	16.13
CB 757	CB 759	15	136.87	1.07	384.77	383.87	378.09	379.56	3.00
CB 757	CB 758	15	122.86	2.24	384.77	385.54	378.09	380.84	3.33
CB 758	FES 758 A	15	11.74	1.78	385.54	385.82	381.04	381.25	3.22
CB 759	CB 760	15	145.97	0.60	383.87	384.93	379.76	380.64	2.09
CB 761	CB 762	18	102.70	1.25	383.56	384.34	377.17	378.45	3.46
CB 762	CB 763	18	206.12	1.25	384.34	388.48	378.65	381.23	2.44
CB 771	CB 778	18	325.30	0.50	381.90	379.16	371.20	372.83	1.20
CB 771	CB 772	15	210.54	1.00	381.90	383.94	377.40	379.51	5.87
CB 772	CB 773	15	114.57	0.60	383.94	384.81	379.71	380.40	4.79
CB 778	CB 779	15	200.00	0.50	379.16	378.06	373.08	374.08	2.53
FES 750	JB 751	54	108.29	0.60	373.50	376.40	369.00	369.65	9.71
FES 770	CB 771	18	250.89	1.00	369.76	381.90	368.50	371.00	6.56
JB 751	JB 754	42	267.49	0.60	376.40	381.50	369.85	371.45	5.01
JB 751	JB 752	42	191.24	0.58	376.40	378.05	370.15	371.25	5.91
JB 752	CB 753	36	233.12	1.26	378.05	383.65	371.75	374.68	6.78
JB 754	JB 755	36	140.09	1.00	381.50	381.75	371.95	373.35	7.58
JB 755	JB 756	36	115.52	1.50	381.75	384.94	373.55	375.28	6.92
JB 756	CB 757	36	53.83	1.59	384.94	384.77	375.48	376.34	6.70

RIP-RAP PADS, PHASE 1

Date: 12/7/2020

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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.)
SB#111	24	2.89	1	3"	A	7.5	8	12
SB#211	30	3.81	1	3"	A	9.25	10	12
SB#212	24	3.06	1	3"	A	7.5	8	12
SB#213	24	3.70	1	3"	A	7.5	8	12
SB#215	24	3.21	1	3"	A	7.5	8	12
SB#218	24	3.26	1	3"	A	7.5	8	12
SB#314	24	3.02	1	3"	A	7.5	8	12
Other**				3"	A	3	6	12

*Downstream width, use 3 x pipe diameter upstream.

**All sediment basins without risers but with a skimmer

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*
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'	N/A	N/A	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'	N/A	N/A	30"x30"x12"
SB212	359.50	364.50	362.00	363.00	10	15"/24"	30'x55'	24'x39'	10'x35'	N/A	N/A	24"x24"x7.5"
SB213	368.00	373.00	370.50	371.50	10	18"/24"	42'x80'	36'x74'	22'x60'	N/A	N/A	24"x24"x10.5"
SB215	370.00	375.00	372.50	373.50	10	18"/24"	36'x66'	30'x60'	16'x46'	N/A	N/A	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'	N/A	N/A	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'	N/A	N/A	24"x24"x7.5"

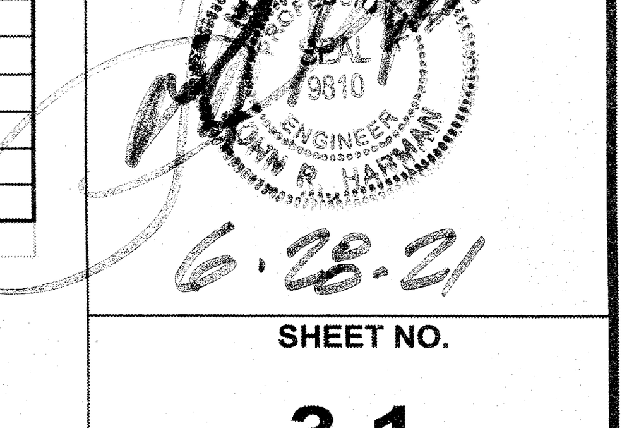
*Side x side x depth

No.	DATE	REVISION	DWN/CHK
1	6-14-2021	FINAL SET	EDS/JRH

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



SHEET NO.
3.1

Z:\Jobs\9900\Watkins Property\dwg_Working Dwgs\Phase 1\02. 3.0-3.1 General Notes And Schedules.dwg

FUTURE PHASE 4

FUTURE PHASE 3

FUTURE PHASE 2

FUTURE TOWNHOME AREA

EILEEN M MILLER
EDWIN R. MILLER, JR.
ZONING: R-30
D.B. 13315, PG. 1786
B.M. 2004, PG. 589
PIN NO. 1758902522

JONES, APRIL M.
JONES, ZACHARY K.
ZONING: R-30
D.B. 017812 PG. 1141
B.M. 2004, PG. 589
PIN NO. 1758901417
REAL ESTATE ID: 0168744

JONATHAN V. ELLIS
TR E 328
ZONING: R-30
D.B. 4974 PG. 38
TRACT 2
B.M. 1987 PG. 1522
P.I.N. 1758.04-90-8610
SINGLE FAMILY

JOSEPH E. WALL
BETTY R. GUNZ
ZONING: R-30
D.B. 5178, PG. 858
B.M. 1985, PG. 1805
PIN NO. 1768.03-21-6907
REAL ESTATE ID: 0060992
VACANT

PIN NO. 1768.03-10-8786
DONALD S. PEARCE
JOYCE B. PEARCE
D.B. 3875, PG. 317
LOT 9
B.M. 1986, PG. 1914
SINGLE FAMILY

SPENCER MAYNARD AYCOCK
CAROLYN P. AYCOCK
D.B. 5506, PG. 121
LOT 8
B.M. 1986, PG. 1914
PIN NO. 1768.03-20-1771
SINGLE FAMILY

JONATHAN SCOTT EDWARDS
CONNIE WALLER EDWARDS
D.B. 6207, PG. 502
LOT 7
B.M. 1986, PG. 1914
PIN NO. 1768.03-20-4762
SINGLE FAMILY

DANIEL E. LINE
D.B. 5386, PG. 1483
LOT 6
B.M. 1986, PG. 1914
PIN NO. 1768.03-20-7753

MICHAEL BETHEA
EUGENE BETHEA
JENNIFER LANIER
D.B. 16746, PG. 691
LOT 5
B.M. 1986, PG. 1483
PIN NO. 1768.03-30-0717
SINGLE FAMILY

DALTON R. STEPHENSON
LORRAINE STEPHENSON
D.B. 8492, PG. 14
LOT 4
B.M. 1999, PG. 1748
PIN NO. 1768.03-30-3733
SINGLE FAMILY

HARRELL STALLINGS
GAYLE F STALLINGS
D.B. 12830, PG. 114
B.M. 2004, PG. 603
PIN NO. 1768.03-30-5321
SINGLE FAMILY

EXISTING POND

EXISTING CEMETERY

POE ESTATE LLC
ZONING: R-30
D.B. 11191, PG. 240
B.M. 2004, PG. 589
P.I.N. 1758.14-80-5145
SINGLE FAMILY

RGA CONSULTING LLC
ZONING: R-30
D.B. 16188, PG. 1240
B.M. 2010, PG. 1275
P.I.N. 1757.17-89-7240
SINGLE FAMILY

ROBERT ASHLEY III
ZONING: R-30
D.B. 16188, PG. 1240
B.M. 2010, PG. 1275
P.I.N. 1757.17-89-7244
SINGLE FAMILY

REBECCA R MCLAMB
ZONING: R-30
D.B. 16188, PG. 1240
B.M. 2010, PG. 1275
P.I.N. 1757.17-89-7850
SINGLE FAMILY

FREDY MORENO CORTES
ZONING: R-30
D.B. 16188, PG. 1240
B.M. 2010, PG. 1275
P.I.N. 1757.17-89-7563
SINGLE FAMILY

JONES PROPERTIES, LLC
ZONING: R-30
D.B. 14978 PG. 1162
B.M. 1971 PG. 445
P.I.N. 1757.02-87-8878
SINGLE FAMILY

JONES PROPERTIES, LLC
ZONING: R-30
D.B. 16879 PG. 1897
B.M. 1971 PG. 445
P.I.N. 1757.02-97-4973
VACANT

JONES PROPERTIES, LLC
ZONING: R-30
D.B. 13942 PG. 1231
B.M. 1993 PG. 1447
P.I.N. 1757.02-97-2579

ANNIE M. MOODY
ZONING: R-30
D.B. 3750, PG. 587
B.M. 1986, PG. 862
PIN NO. 1767.01-06-9438
AGRICULTURAL

WC HOLLINGSWORTH JR
LAURA W HOLLINGSWORTH
ZONING: R-30
PIN NO. 1767.01-28-4925
REAL ESTATE ID: 0048383

CHRISTIAN C. WILDER
CINDY E. WILDER
D.B. 10927, PG. 1494
B.M. 2004, PG. 603
PIN NO. 1767.01-39-2250

BENNY MOODY
LAMERANCE MOODY
JEFFERY LYNN
ZONING: R-30
D.B. 14297, PG. 1583
B.M. 1986, PG. 862
PIN NO. 1767.01-28-4304
REAL ESTATE ID: 0048422
AGRICULTURAL

PENNINA B. ROWELL
RACHEL K. ROWELL
ZONING: R-30
D.B. 15779, PG. 229
PIN NO. 1767.01-37-4878
REAL ESTATE ID: 0045739
SINGLE FAMILY

SUE SCARBORO PARKER
BESTY SCARBORO GARDNER
ZONING: R-30
D.B. 3599, PG. 618
LOT B B.M. 1947, PG. 78
PIN NO. 1767.01-26-4441
VACANT

BERNARD B. BAILEY
D.B. 3234, PG. 111
B.M. 1984, PG. 1168
PIN NO. 1767.01-16-0763
AGRICULTURAL

BERNARD B. BAILEY
D.B. 10868, PG. 2795
B.M. 1984, PG. 1168
PIN NO. 1767.01-16-0763
AGRICULTURAL

FALLS BLUFF DR
41 B-B (60' ROW)

DONNINGTON HILL DR
41 B-B (60' ROW)

FLAW CROFT DR
41 B-B (60' ROW)

FRENCH MILL AVE
41 B-B (60' ROW)

STONEHOUSE FARM WY
27 B-B (50' ROW)

DARK TOP CREST PL
27 B-B (50' ROW)

DARK TOP CREST CT
27 B-B (50' ROW)

FLAW CROFT CT
27 B-B (50' ROW)

FLAW CROFT PL
27 B-B (50' ROW)

FLAW CROFT DR
27 B-B (50' ROW)

PLAW CROFT DR
27 B-B (50' ROW)

KORKERPEL DR
27 B-B (50' ROW)

PLAW CROFT RIDGE DR
27 B-B (50' ROW)

PLAW CROFT CT
27 B-B (50' ROW)

PLAW CROFT PL
27 B-B (50' ROW)

PLAW CROFT DR
27 B-B (50' ROW)

PLAW CROFT CT
27 B-B (50' ROW)

PLAW CROFT PL
27 B-B (50' ROW)

PLAW CROFT DR
27 B-B (50' ROW)

DONNINGTON HILL DR
27 B-B (50' ROW)

STANNER HILL DR
27 B-B (50' ROW)

HARVEST HILL WY
27 B-B (50' ROW)

ELAW FIELD CT
27 B-B (50' ROW)

MENDERLYN MEADOW DR
27 B-B (50' ROW)

FALLS BLUFF CT
27 B-B (50' ROW)

BROOKFIELD FARM DR
27 B-B (50' ROW)

MOODY FARM DR
27 B-B (50' ROW)

STAFFORDSHIRE BLUFF ST
27 B-B (50' ROW)

GRAYSTONE CHASE
27 B-B (50' ROW)

HONGATE TRACE PL
27 B-B (50' ROW)

HONGATE TRACE CT
27 B-B (50' ROW)

HONGATE TRACE DR
27 B-B (50' ROW)

KALAS FALLS DR
27 B-B (50' ROW)

GRAYMONT OAKS DR
27 B-B (50' ROW)

GRAYMONT OAKS PL
27 B-B (50' ROW)

POE ESTATE ROAD
SR 1000 (60' ROW)

SCM 1A
SCM 2A
SCM 2B
SCM 3D
SCM 4A
SCM 4B
SCM 4C
SCM 4D
SCM 5A
SCM 5B
SCM 6A
SCM 6B
SCM 7A
SCM 8A
SCM 8B

FUTURE TOWNHOME AREA 9.84 AC.

FUTURE TOWNHOME AREA 7.72 AC.

RECREATION AREA 2.93 AC.

PROPOSED LINETYPE LEGEND

- PROPOSED BUILDING SETBACK
- PROPOSED EASEMENT
- PROPOSED 3'/5' CORUE
- PROPOSED RIGHT OF WAY
- PROPOSED ROAD CL
- PROPOSED 30" CURB AND GUTTER
- PHASE-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"=200'
0 200 400 600

No.	DATE	REVISTION	DWN/CHK
1	11-20-20	MINOR ADJUSTMENTS PER TGR COMMENTS	BAH/JRH
2	05-10-21	ADDITIONS PER TGR CONSULTANT REVIEW	BAH/JRH
3	06-13-21	FINAL SET	BAH/JRH

GRADING AND DRAINAGE OVERALL PLAN

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA

FIRM # C-3881

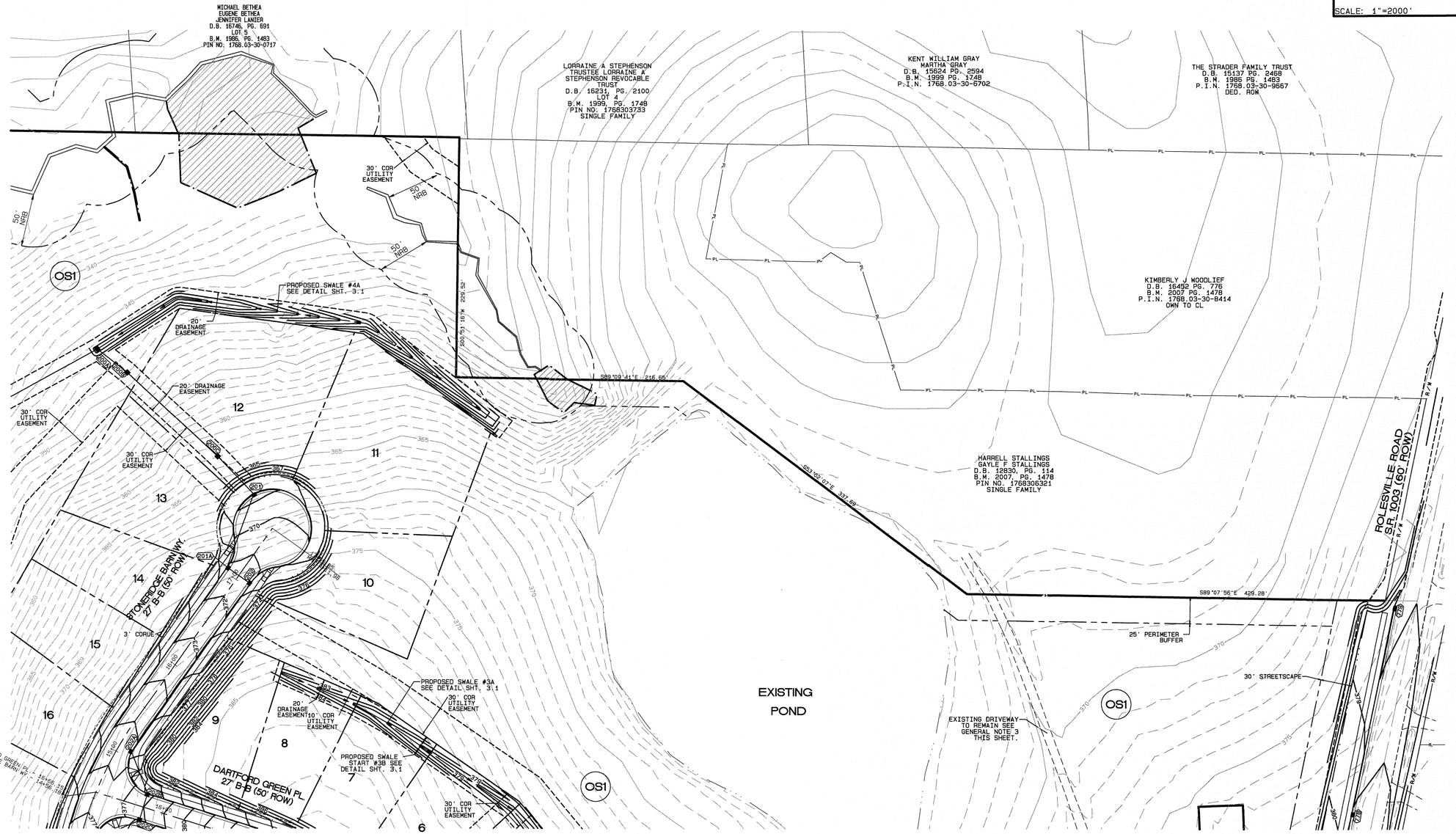
JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

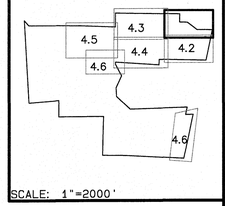
AMERICAN Engineering
American Engineering Associates—Southeast, P.A.
4020 Westchase Blvd. Ste. 450
Raleigh, NC 27607 919-469-1101

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HAMAN
6-14-21

SHEET NO.
4.0

Plot Date : 6/14/2021 Time: 7:17AM FILE: Z:\Jobs\9900\Watkins Property\Dwg\Base Map\Kalas Falls Base Phase 1.pro





SCALE: 1"=2000'

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 (AT TIME OF LOT GRADING)
- FLOWLINE OF INTITIAL SWALES CONSTRUCTED
- 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
1	11-20-20	MINOR ADJUSTMENTS PER 1ST COMMENTS	BAH/JRH
2	05-10-21	PLAN REVISIONS PER 1ST CONSULTANT REVIEW	BAH/JRH
3	06-13-21	FINAL SET	BAH/JRH

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
American Engineering Associates-Southeast, P.A.
4020 Westchase Blvd. Ste. 450
Raleigh, NC 27607 919-469-1101

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOAN R. HARMAN
6.28.21

SHEET NO.
4.1

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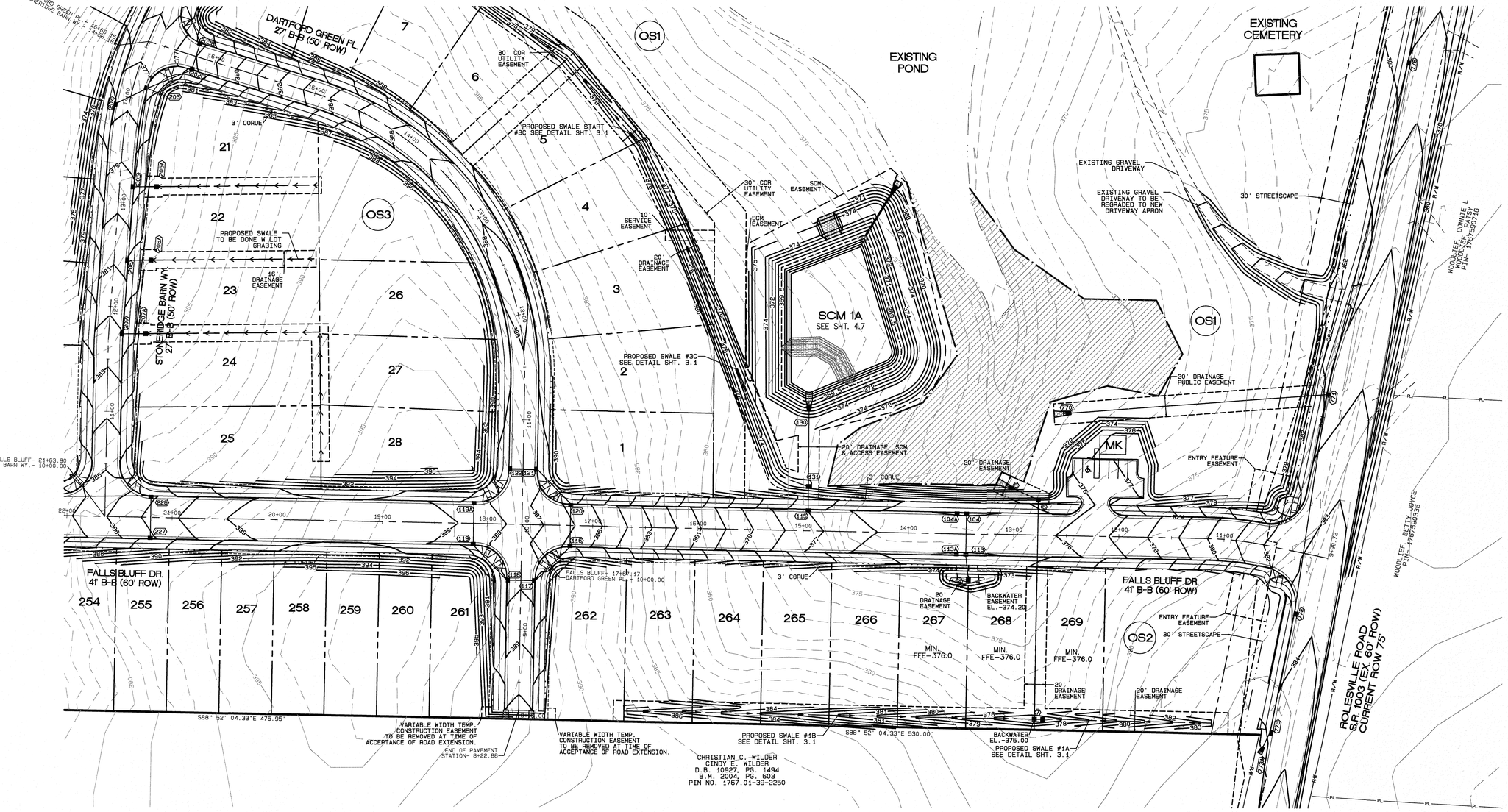

PROPOSED LINETYPE LEGEND

- PROPOSED BUILDING SETBACK
- PROPOSED EASEMENT
- PROPOSED 3'/5' CORUE
- PROPOSED RIGHT OF WAY
- PROPOSED ROAD CL
- PROPOSED 30" CURB AND GUTTER
- PROPOSED SWALES (AT TIME OF LOT GRADING)
- FLOWLINE OF INTITIAL SWALES CONSTRUCTED
- 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

GRADING AND DRAINAGE PHASE 1

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA
FIRM # C-3881

No.	DATE	REVISION	DWN/CHK
1	11-26-20	MINOR ADJUSTMENTS PER TOH COMMENTS	BAH/JRH
2	05-10-21	PLAN REVISIONS PER TOH CONSULTANT REVIEW	BAH/JRH
3	06-25-21	FINAL SET	BAH/JRH

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

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
4020 Westchase Blvd. Ste. 450
Raleigh, NC 27607 919-469-1101

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMAN
6.25.21

SHEET NO.
4.2

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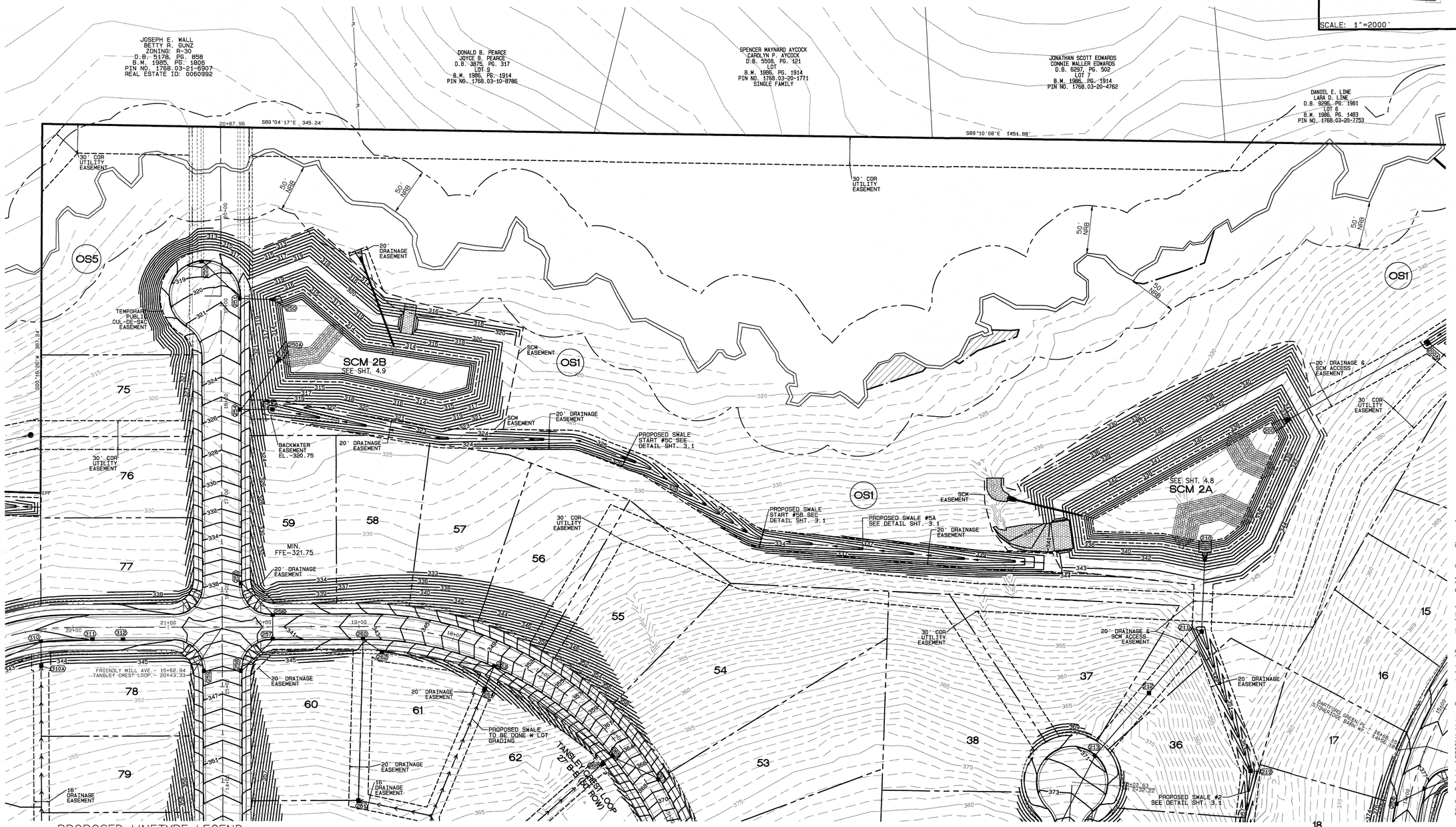


PROPOSED LINETYPE LEGEND

- PROPOSED BUILDING SETBACK
- PROPOSED EASEMENT
- PROPOSED 3'/5' CORUE
- PROPOSED RIGHT OF WAY
- PROPOSED ROAD CL
- PROPOSED 30" CURB AND GUTTER
- PROPOSED SWALES (AT TIME OF LOT GRADING)
- FLOWLINE OF INTITIAL SWALES CONSTRUCTED
- 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
1	11-20-20	MINOR ADJUSTMENTS PER ToR COMMENTS	BAH/JRH
2	05-10-21	PLAN REVISIONS PER ToR CONSULTANT REVIEW	BAH/JRH
3	06-15-21	FINAL SET	BAH/JRH

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
American Engineering Associates-Southeast, P.A.
4020 Westchase Blvd. Ste. 450
Raleigh, NC 27607 919-469-1101

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R HAYMAN
6.15.21

SHEET NO.
4.3

FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro
Time: 10:07AM
Plot Date: 6/15/2021

PROPOSED LINETYPE LEGEND

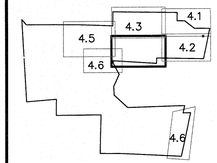
- PROPOSED BUILDING SETBACK
- PROPOSED EASEMENT
- PROPOSED 3'/5' CORUE
- PROPOSED RIGHT OF WAY
- PROPOSED ROAD CL
- PROPOSED 30" CURB AND GUTTER
- PROPOSED SWALES (AT TIME OF LOT GRADING)
- FLOWLINE OF INTITIAL SWALES CONSTRUCTED
- PROPOSED 100 YR.
- PROPOSED 2' BLDG. RESTRICTION LINE

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



SCALE: 1"=2000'

GRAPHIC SCALE 1"=50'

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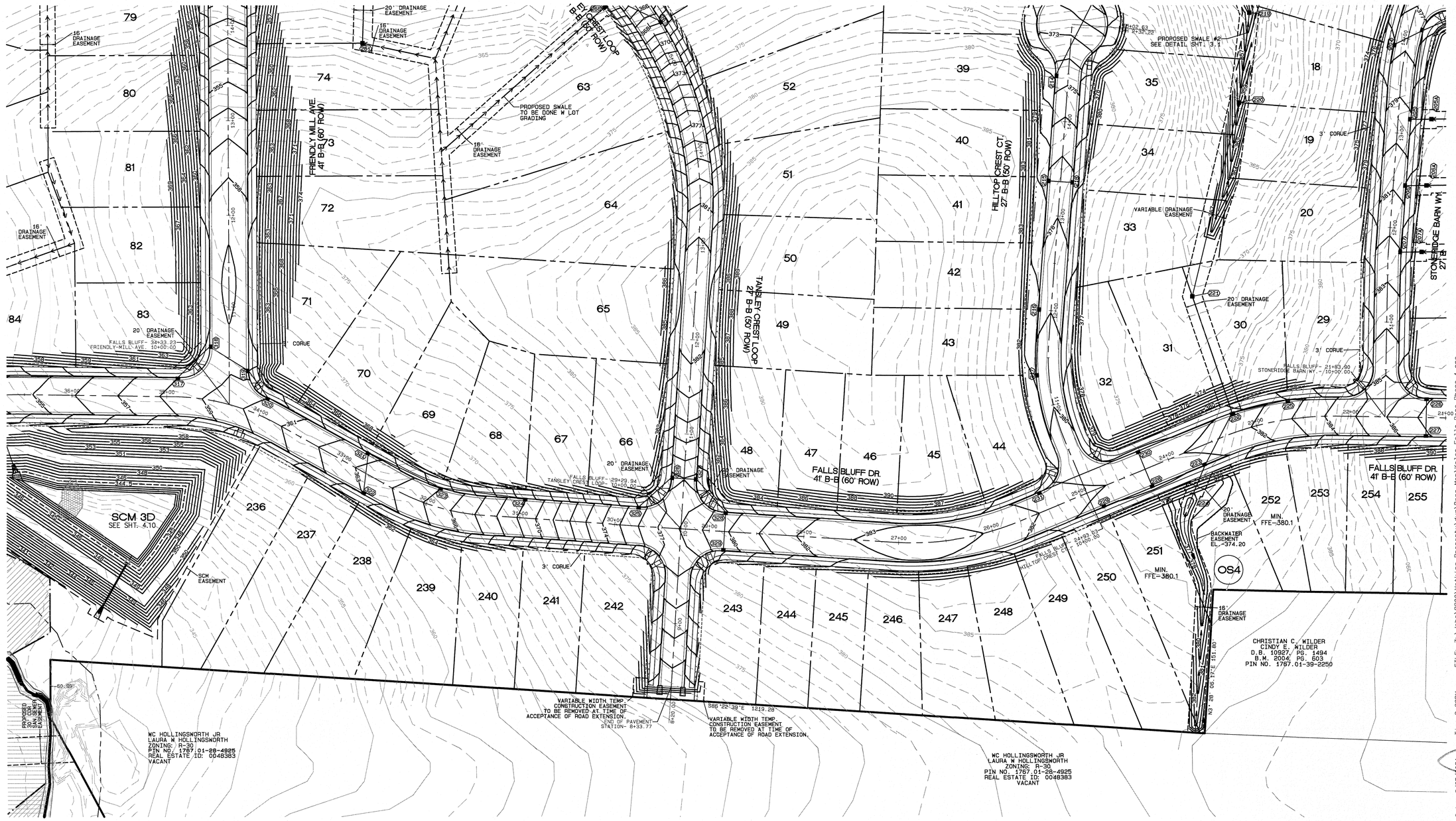


No.	DATE	REVISION
1	05-10-21	PLAN REVISIONS PER 1ST CONSULTANT REVIEW
2	06-25-21	FINAL SET

DWN/CHK
BAH/JRH
BAH/JRH

GRADING AND DRAINAGE 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.
4020 Westchase Blvd. Ste. 450
Raleigh, NC 27607 919-469-1101

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMAN

6-28-21

SHEET NO.

4.4

Plot Date: 6/25/2021 Time: 3:32PM FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro

PROPOSED LINETYPE LEGEND

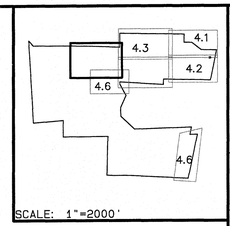
- PROPOSED BUILDING SETBACK
- PROPOSED EASEMENT
- PROPOSED 3'/5' CORUE
- PROPOSED RIGHT OF WAY
- PROPOSED ROAD CL
- PROPOSED 30" CURB AND GUTTER
- PROPOSED SWALES (AT TIME OF LOT GRADING)
- FLOWLINE OF INTITIAL SWALES CONSTRUCTED
- PROPOSED 100 YR.
- PROPOSED 2' BLDG. RESTRICTION LINE

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



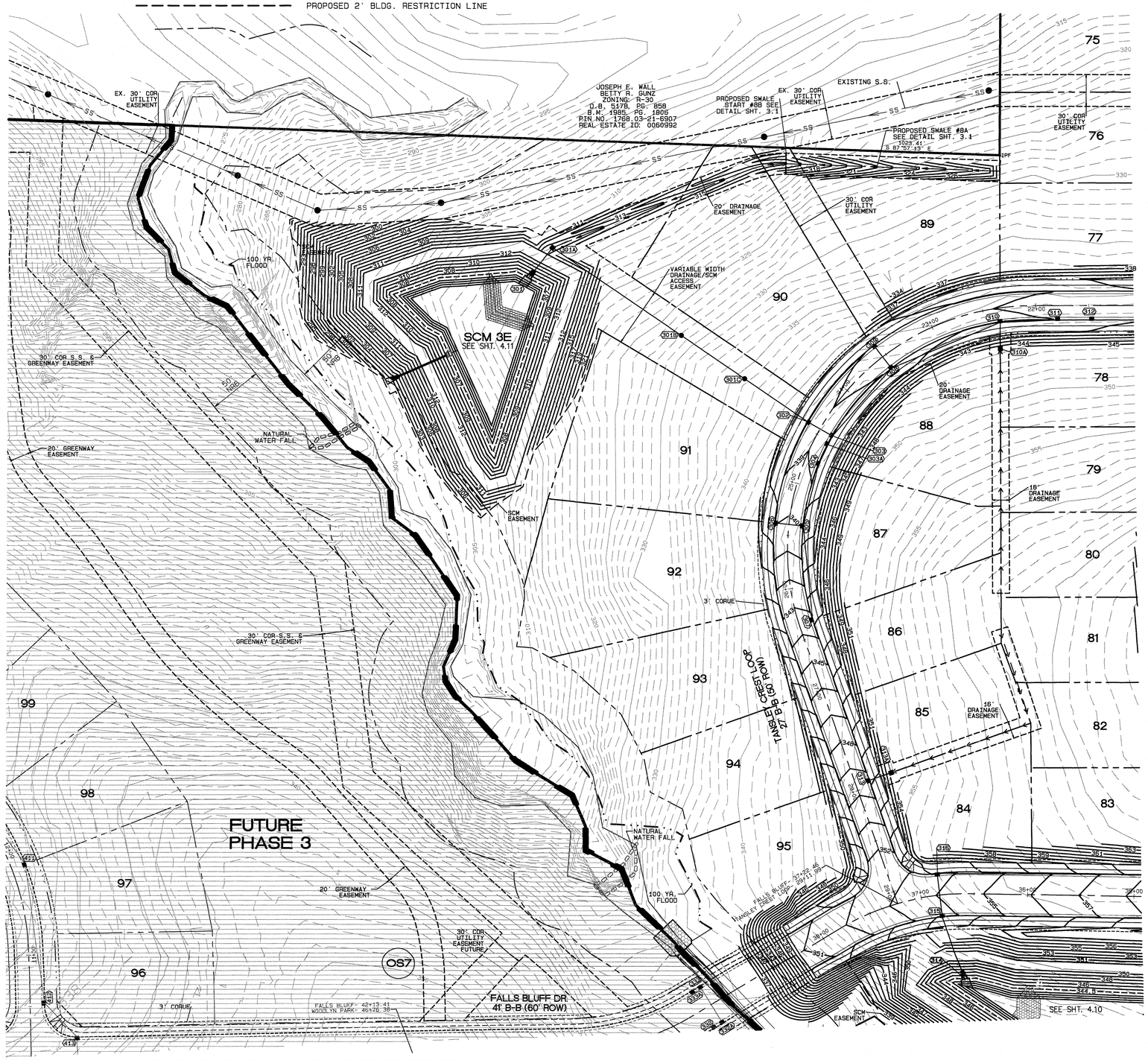
SCALE: 1"=2000'

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
1	05-10-21	PLAN REVISIONS PER TGH CONSULTANT REVIEW.
2	06-13-21	FINAL SET

DVN/CHK
BAH/JRH
BAH/JRH

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

American Engineering Associates-Southeast, P.A.
4020 Westchase Blvd. Ste. 450
Raleigh, NC 27607 919-469-1101

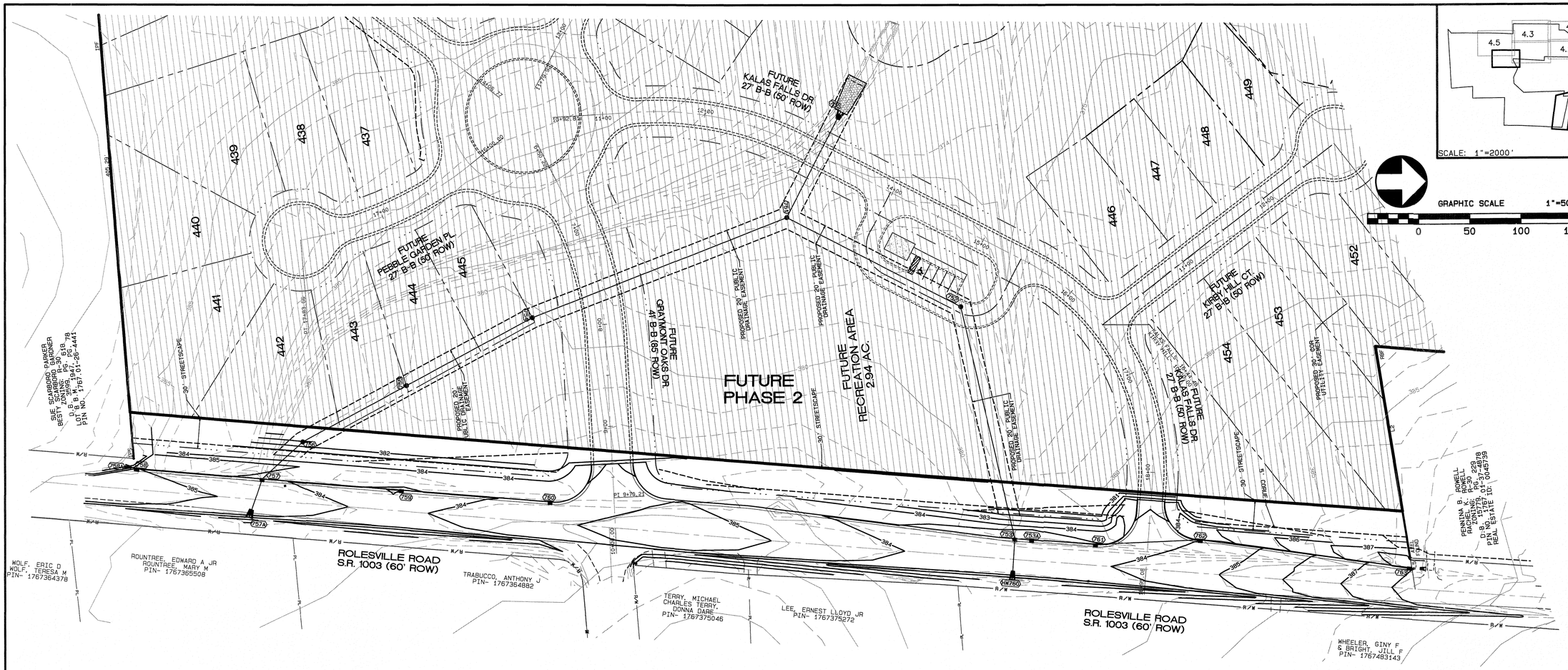
NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMAN

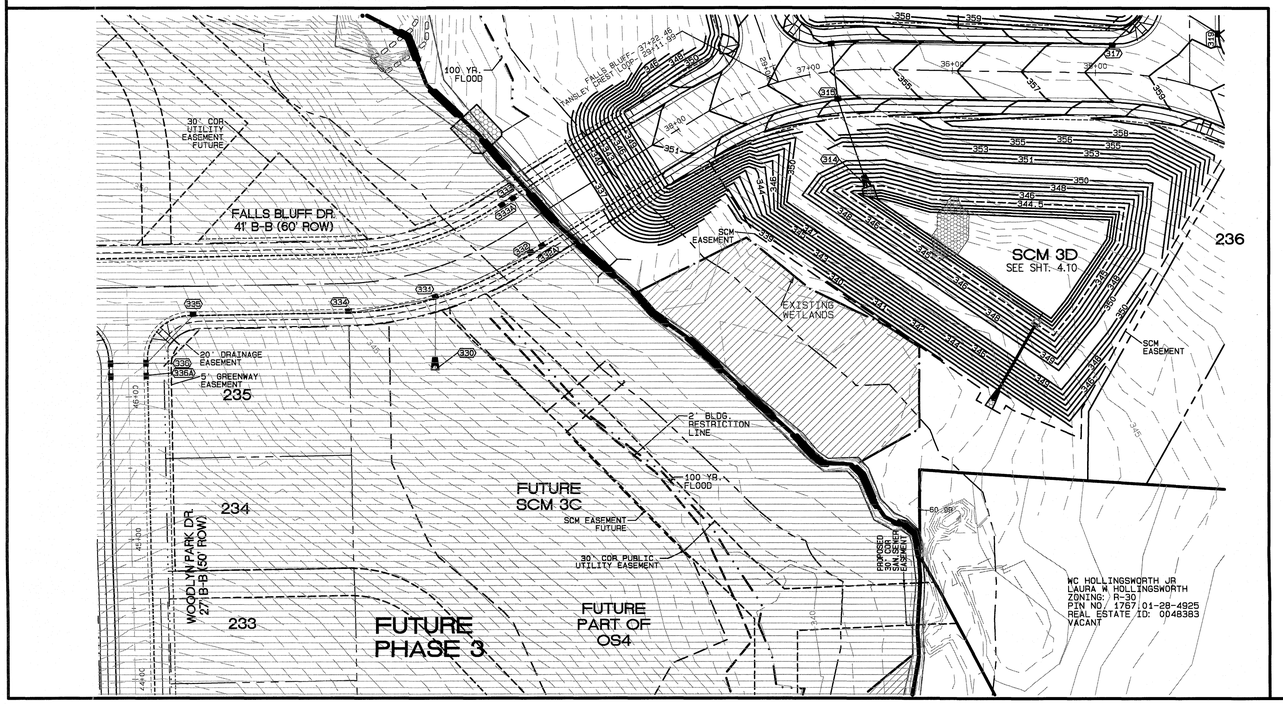
6.15.21

SHEET NO.

4.5

Plot Date : 6/15/2021 Time: 9:33AM FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pnp





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 (AT TIME OF LOT GRADING)
- FLOWLINE OF INTITIAL SWALES CONSTRUCTED
- 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. IMPROVEMENTS 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
1	05-10-21	PLAN REVISIONS PER TGR CONSULTANT REVIEW	BAH/JRH
2	05-13-21	FINAL SET	BAH/JRH

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
American Engineering Associates-Southeast, P.A.
4020 Westchase Blvd. Ste. 450
Raleigh, NC 27607 919-469-1101

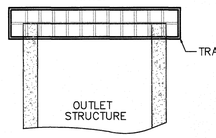
NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMAN
6.14.21

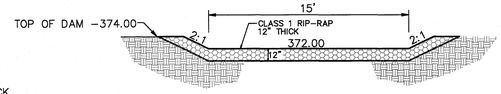
SHEET NO.

4.6

Plot Date: 6/14/2021 Time: 7:32AM FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro

TRASH RACK DETAIL
N.T.S.

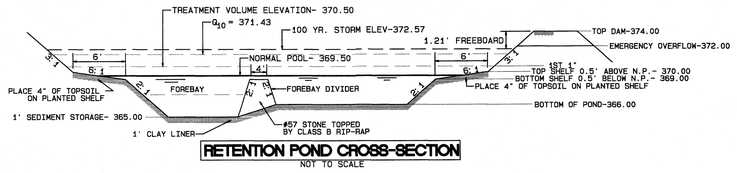




EMERGENCY SPILLWAY CROSS-SECTION

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 THROUGH 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 5"x5".
7. TOP OF TRASH RACK SHALL HAVE A GRID OF BARS (MAX. 6"x6").

WET POND #1A
BOTTOM EL= 366.00
NORMAL POOL= 369.50
TOP OF DAM= 374.00



RETENTION POND CROSS-SECTION
NOT TO SCALE

PLANT LIST LITTORAL SHELF PLANT SCHEDULE:

SHALLOW LAND (HERB.)

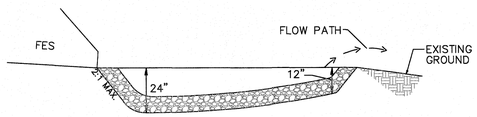
EF	EUPATORUIM FISTRULOSUM	JOE PYE WEED	4-6" POT @ 3'	SPACING
HC	HIBICUS COCCINEA	SCARLET ROSE MALLOW	4-6" POT @ 3'	SPACING
CG	CHELONE GLABRA	WHITE TURTLEHEAD	4-6" POT @ 3'	SPACING
LC	LOBELIA CARDINALIS	CARDINAL FLOWER	4-6" POT @ 3'	SPACING

SHALLOW WATER (HERB.)

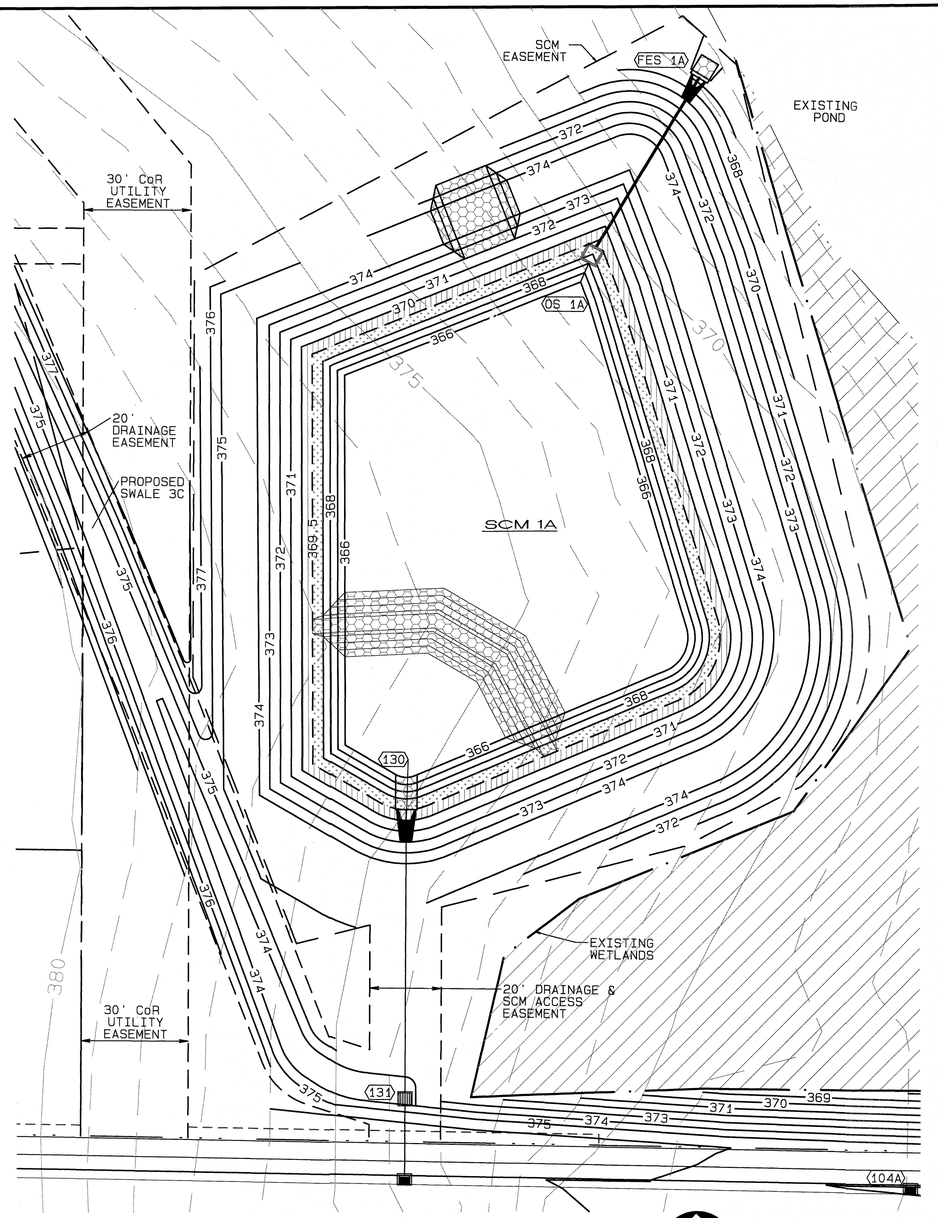
JE	JUNCUS EFFUSES	SOFTRUSH	4-6" POT @ 3'	SPACING
AS	ACORUS SPP	SWEET FLAG	4-6" POT @ 3'	SPACING
IV	IRIS VERSICOLOR	BLUE FLAG IRIS	4-6" POT @ 3'	SPACING
PC	PONTEDERIA CORDATA	PECKEREL WEED	4-6" POT @ 3'	SPACING
PV	PELTANDRA VIRGINICA	ARROW ARUM	4-6" POT @ 3'	SPACING

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



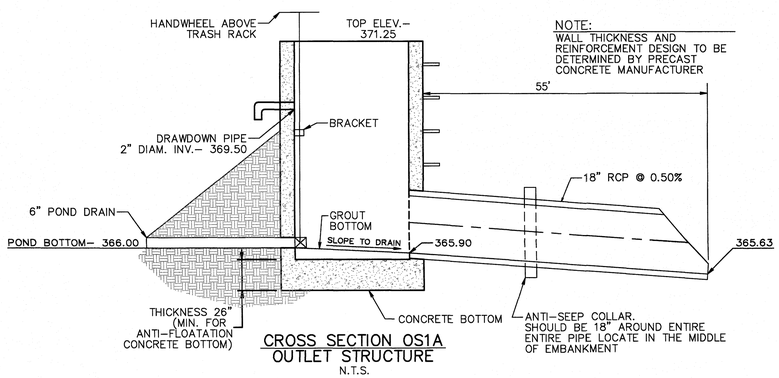
OS1A RIP-RAP OUTLET DETAIL
N.T.S.



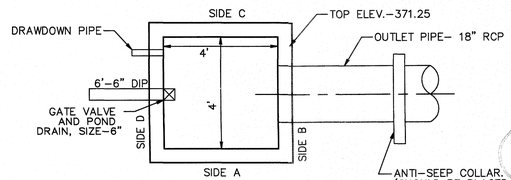
GRAPHIC SCALE 1"=20'
0 20 40 60

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.



CROSS SECTION OS1A OUTLET STRUCTURE
N.T.S.



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

No.	DATE	REVISION	DWN/CHK
1	11-20-20	UPDATED SCM LOCATION DUE TO REVISED WETLANDS, UPDATE ELEV'S	BAH/JRH
2	05-10-21	PLAN REVISIONS PER TOR CONSULTANT REVIEW	BAH/JRH
3	06-14-21	FINAL SET	BAH/JRH

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.
4020 Westchase Blvd. Ste. 450
Raleigh, NC 27607 919-469-1101

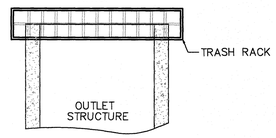
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 9810 JOHN R. HARMAN
6.15.21

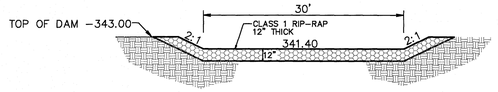
SHEET NO.
4.7

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

TRASH RACK NOTES

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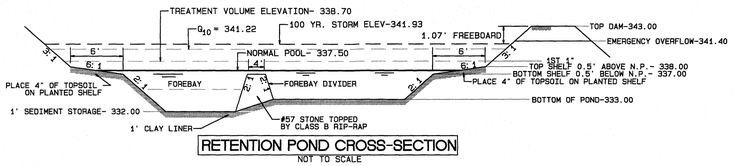
5. TRASH RACK SHALL BE MADE OF DURABLE MATERIAL WHICH WILL NOT RUST OR DETERIORATE IN SUNLIGHT.
6. MAX. OPENING IN TRASH RACK SHALL BE 5"x5".
7. TOP OF TRASH RACK SHALL HAVE A GRID OF BARS (MAX. 6"x6").



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

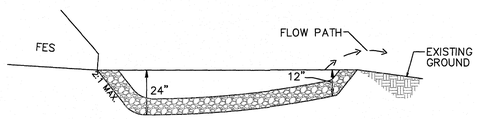
SHALLOW WATER (HERB.)

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= 1,784 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

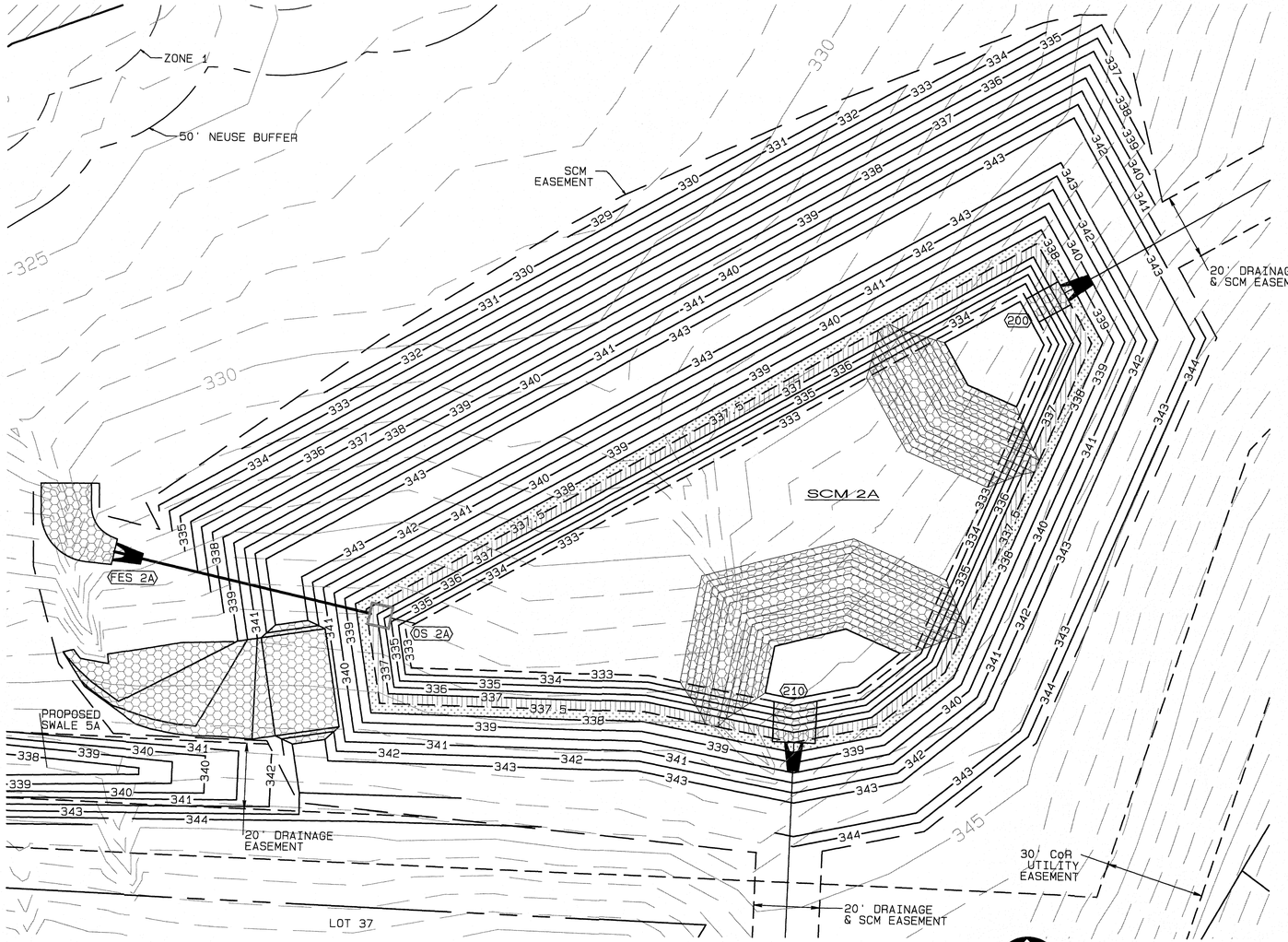


OS2A RIP-RAP OUTLET DETAIL

N.T.S.

WET POND #2A

BOTTOM EL- 333.00
NORMAL POOL- 337.50
TOP OF DAM- 343.00



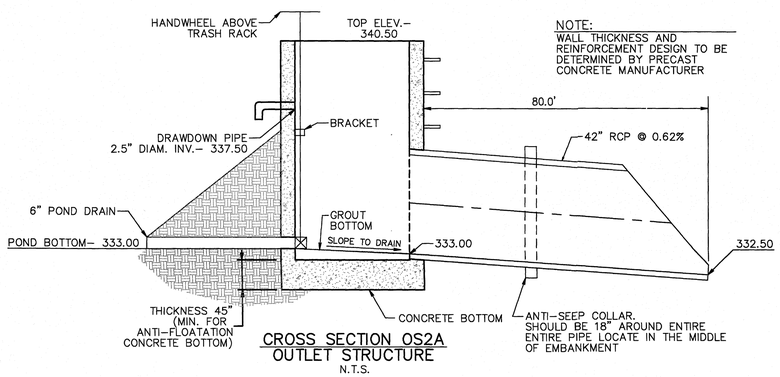
GRAPHIC SCALE 1"=20'
0 20 40 60

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

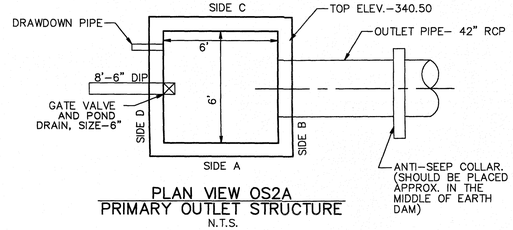
1. SEE SHEET 3.0 FOR BMP CONVERSION SEQUENCE.
2. FOREBAY DIVIDERS ARE TO BE INSTALLED WHILE CONVERTING FROM SEDIMENT BASIN TO WET POND.
3. GROUNDWATER NOT ENCOUNTERED.



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
1	11-08-20	UPDATED 100 YR. ELEVATION	BAH/JRH
2	03-12-21	PER COMMENTS FROM CONSULTANT REVIEW.	BAH/JRH
3	05-24-21	FINAL SET	BAH/JRH

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.
4020 Westchase Blvd. Ste. 450
Raleigh, NC 27607 919-469-1101

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HERMAN

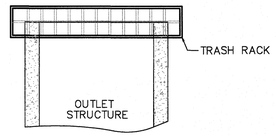
6.15.21

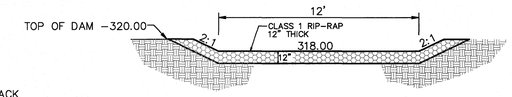
SHEET NO.

4.8

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

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.
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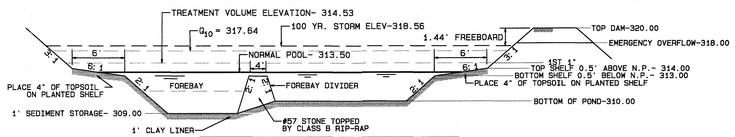
4. TRASH RACK SHALL ACCOMMODATE VALVE SHAFT THROUGH AN OPENING.
5. TRASH RACK SHALL BE MADE OF DURABLE MATERIAL WHICH WILL NOT RUST OR DETERIORATE IN SUNLIGHT.
6. MAX. OPENING IN TRASH RACK SHALL BE 6"x6".
7. TOP OF TRASH RACK SHALL HAVE A GRID OF BARS (MAX. 5"x5").



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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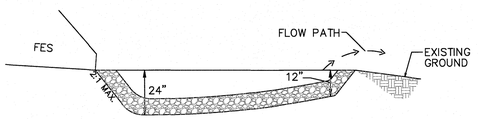
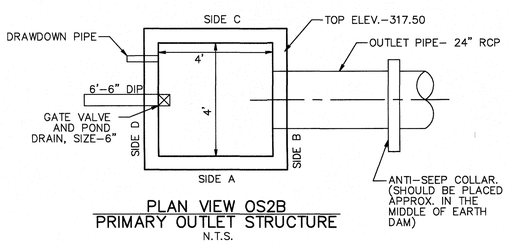
4. TREATMENT OUTLET PIPE SHALL NOT BE PVC BUT OTHER MATERIAL SUCH AS GSP WHICH IS NOT SUBJECT TO DETERIORATION IN SUNLIGHT.

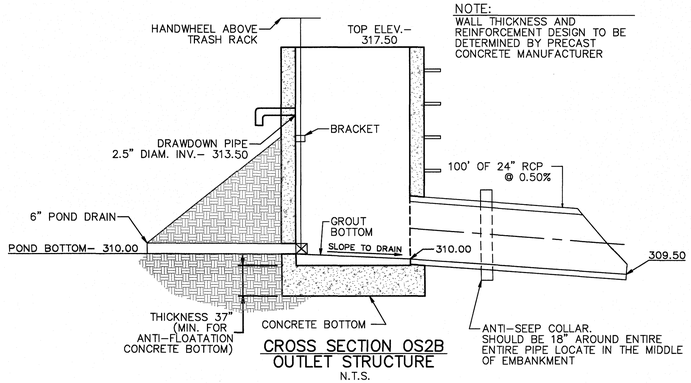
POND NOTES
1. SEE SHEET 3.0 FOR BMP CONVERSION SEQUENCE.
2. FOREBAY DIVIDERS ARE TO BE INSTALLED WHILE CONVERTING FROM SEDIMENT BASIN TO WET POND.



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

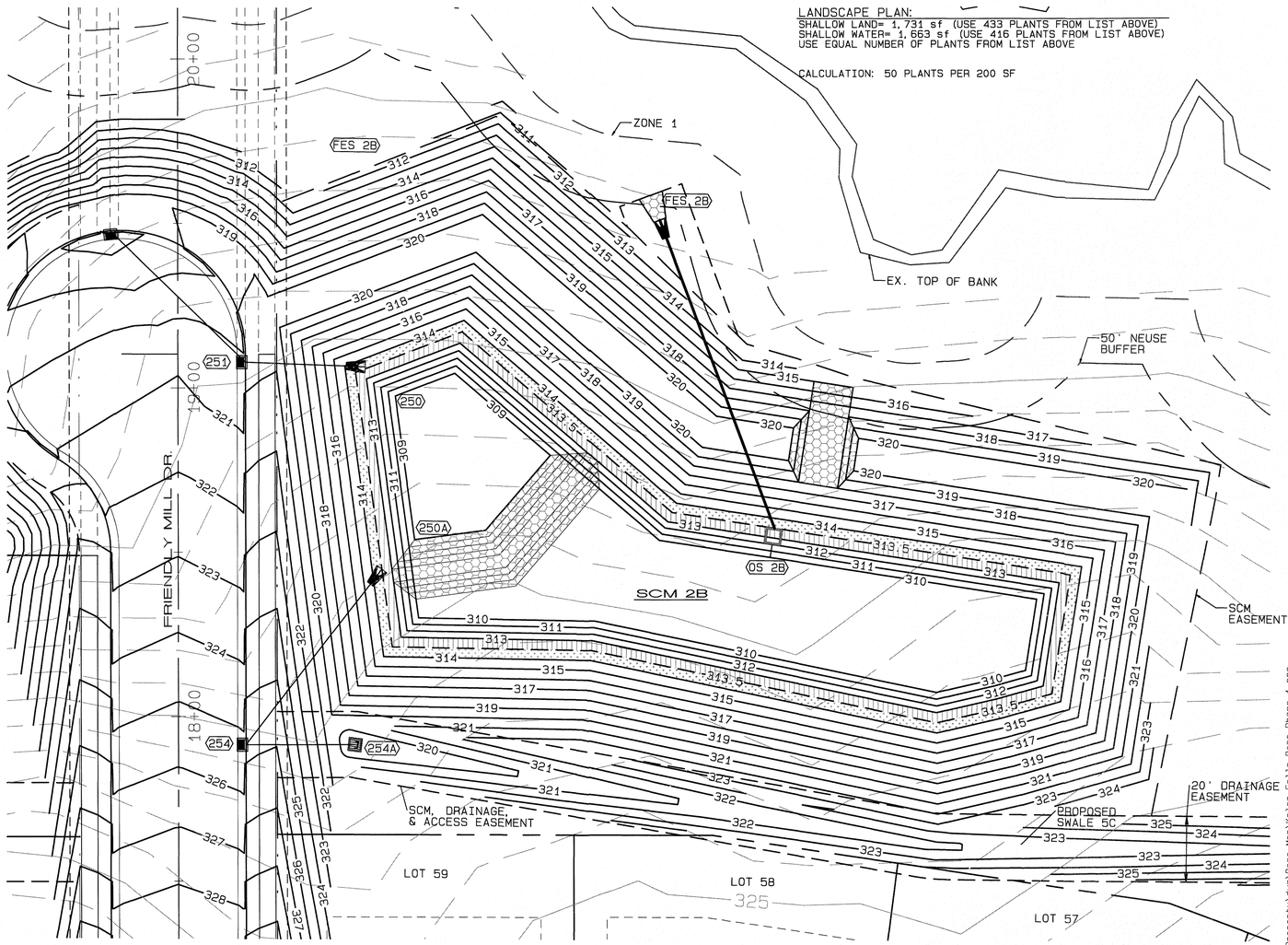
CROSS SECTION OS2B OUTLET STRUCTURE
N.T.S.

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



GRAPHIC SCALE 1"=20'
0 20 40 60

No.	DATE	REVISION	DWN/CHK
1	11-20-20	UPDATED PLAN PER TOR COMMENTS	BAH/JRH
2	05-17-21	PLAN REVISIONS PER TOR CONSULTANT REVIEW	BAH/JRH
3	05-14-21	FINAL SET	BAH/JRH

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.
4020 Westchase Blvd. Ste. 450
Raleigh, NC 27607 919-469-1101

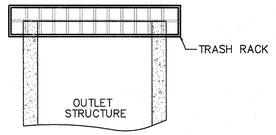
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 9810 JOHN R HARMAN
6.15.21

SHEET NO.
4.9

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

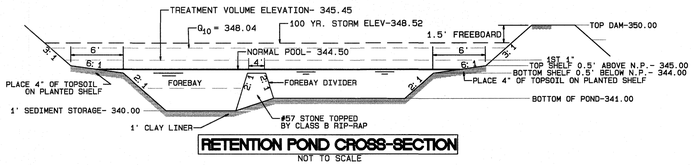
TRASH RACK DETAIL

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.
4. TRASH RACK SHALL ACCOMMODATE VALVE SHAFT THROUGH 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 5"x5".
7. TOP OF TRASH RACK SHALL HAVE A GRID OF BARS (MAX. 6"x6").



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

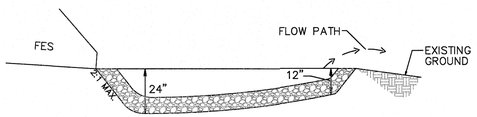
SHALLOW WATER (HERB.)

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

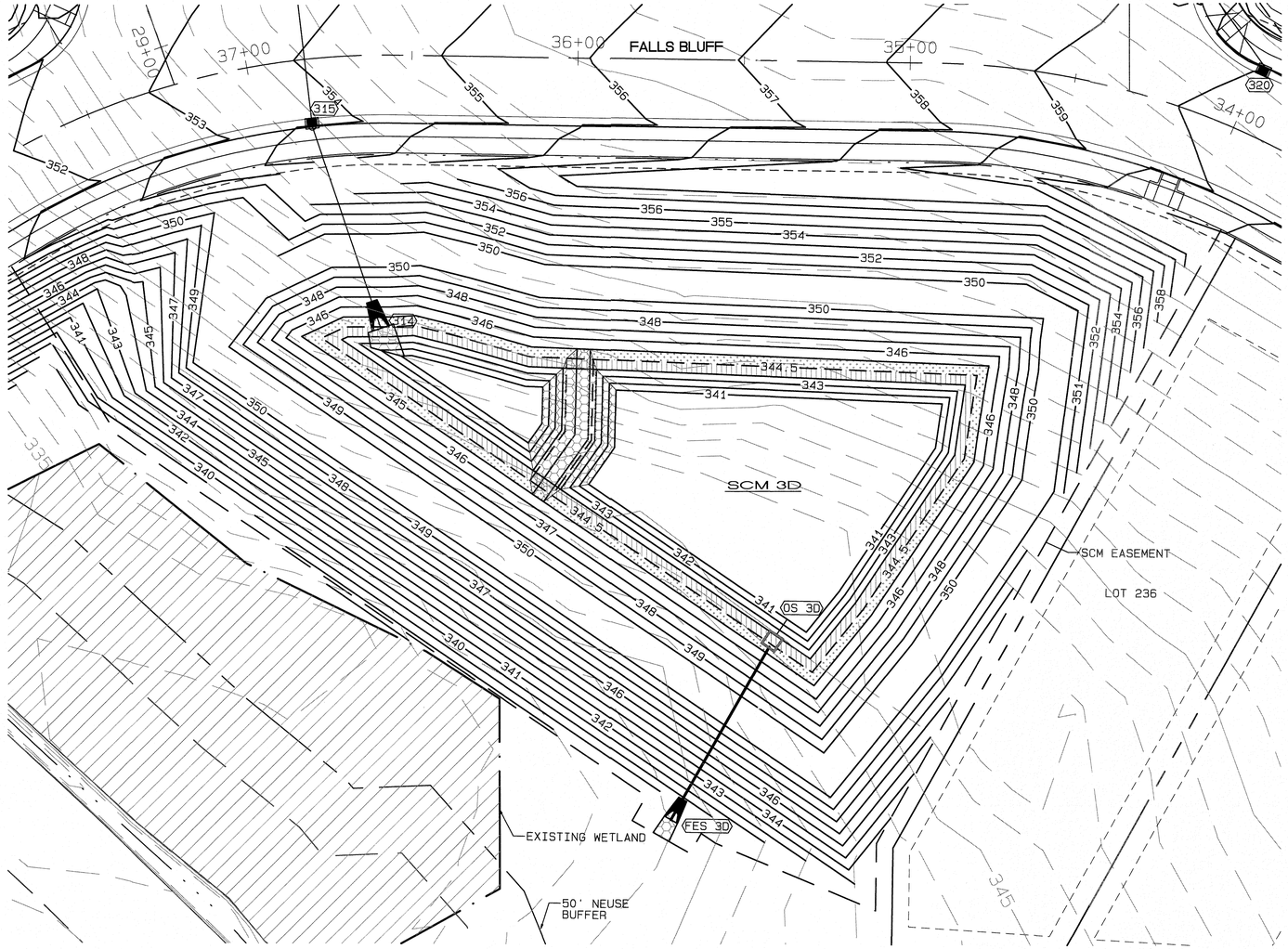


OS3D RIP-RAP OUTLET DETAIL

N.T.S.

WET POND #3D

BOTTOM EL- 341.00
NORMAL POOL- 344.50
TOP OF DAM- 350.00

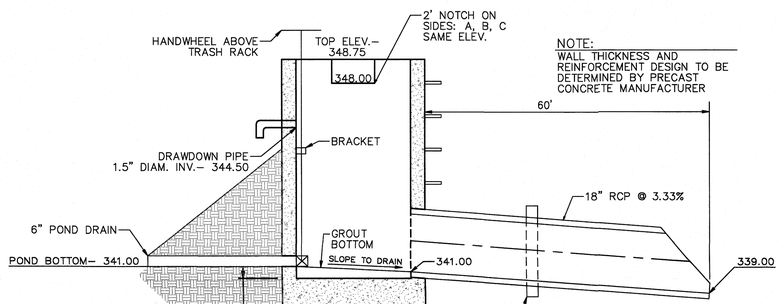


OUTLET STRUCTURE GENERAL NOTES

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

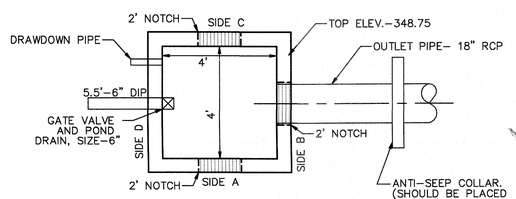
1. SEE SHEET 3.0 FOR BMP CONVERSION SEQUENCE.
2. FOREBAY DIVIDERS ARE TO BE INSTALLED WHILE CONVERTING FROM SEDIMENT BASIN TO WET POND.



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

CROSS SECTION OS3D OUTLET STRUCTURE

N.T.S.



PLAN VIEW OS3D PRIMARY OUTLET STRUCTURE

N.T.S.

No.	DATE	REVISION	DWN/CHK
1	11-20-20	UPDATED TREATMENT ELEVATION	BAH/JRH
2	05-10-21	PLAN REVISIONS PER TGR CONSULTANT REVIEW	BAH/JRH
3	06-14-21	FINAL SET	BAH/JRH

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.
4020 Westchase Blvd. Ste. 450
Raleigh, NC 27607 919-469-1101

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARDMAN

6.15.21

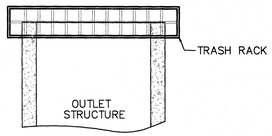
SHEET NO.

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

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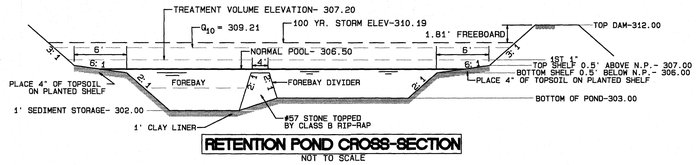
6. MAX. OPENING IN TRASH RACK SHALL BE 6"x6".
7. TOP OF TRASH RACK SHALL HAVE A GRID OF BARS (MAX. 5"x5").

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
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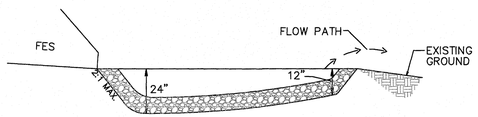
IV	IRIS VERSICOLOR	BLUE FLAG IRIS	4-6" POT @ 3'	SPACING
PC	PONTEDERIA CORDATA	PECKEREL WEED	4-6" POT @ 3'	SPACING
PV	PELTANDRA VIRGINICA	ARROW ARUM	4-6" POT @ 3'	SPACING

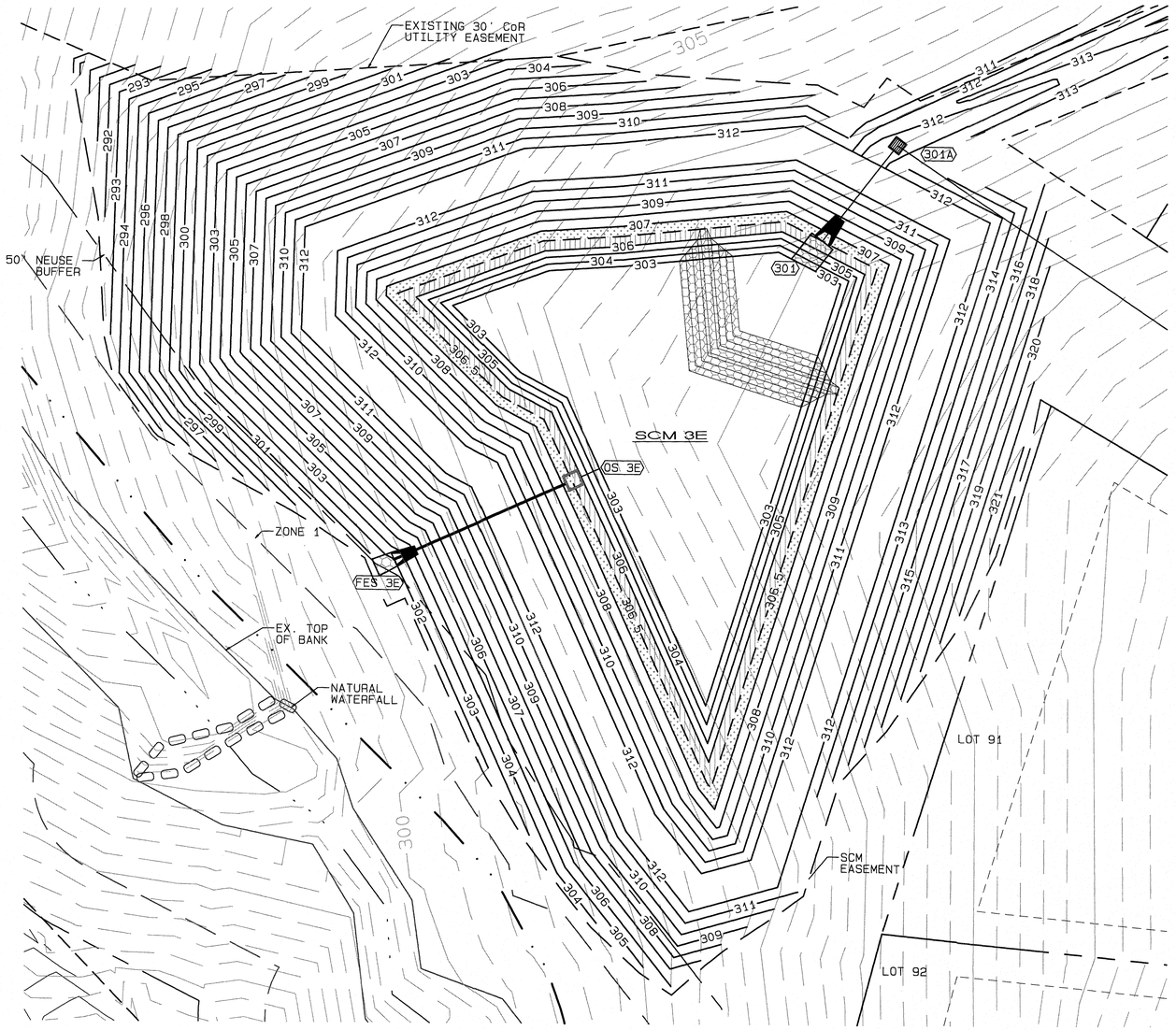
LANDSCAPE PLAN:
SHALLOW LAND= 1,241 sf (USE 310 PLANTS FROM LIST ABOVE)
SHALLOW WATER= 1,170 sf (USE 292 PLANTS FROM LIST ABOVE)
USE EQUAL NUMBER OF PLANTS FROM LIST ABOVE

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.
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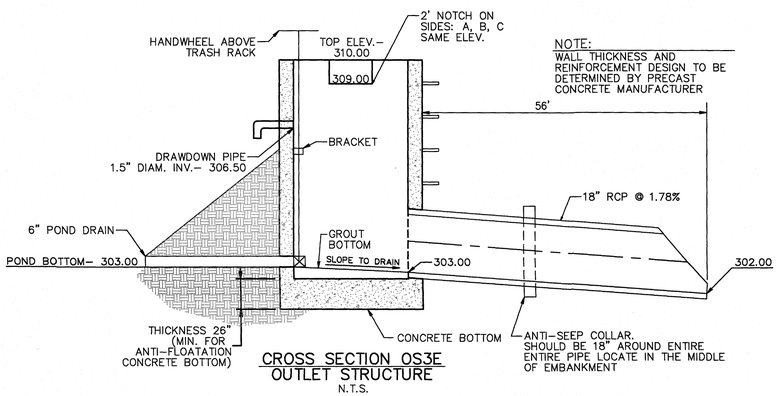
4. TREATMENT OUTLET PIPE SHALL NOT BE PVC BUT OTHER MATERIAL SUCH AS GSP WHICH IS NOT SUBJECT TO DETERIORATION IN SUNLIGHT.

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.

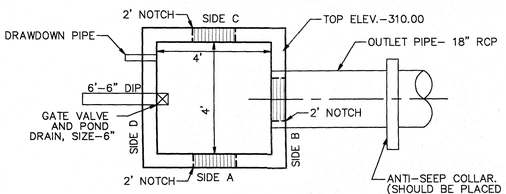


NOTE:
WALL THICKNESS AND REINFORCEMENT DESIGN TO BE DETERMINED BY PRECAST CONCRETE MANUFACTURER

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
1.	11-20-20	UPDATED TREATMENT & 100 YR. ELEVATIONS	BAH/JRH
2.	05-10-21	PLAN REVISIONS PER TOH CONSULTANT REVIEW	BAH/JRH
3.	06-14-21	FINAL SET	BAH/JRH

SCM 3E DETAILS

FOR

KALAS FALLS PHASE 1

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA

FIRM # C-3881

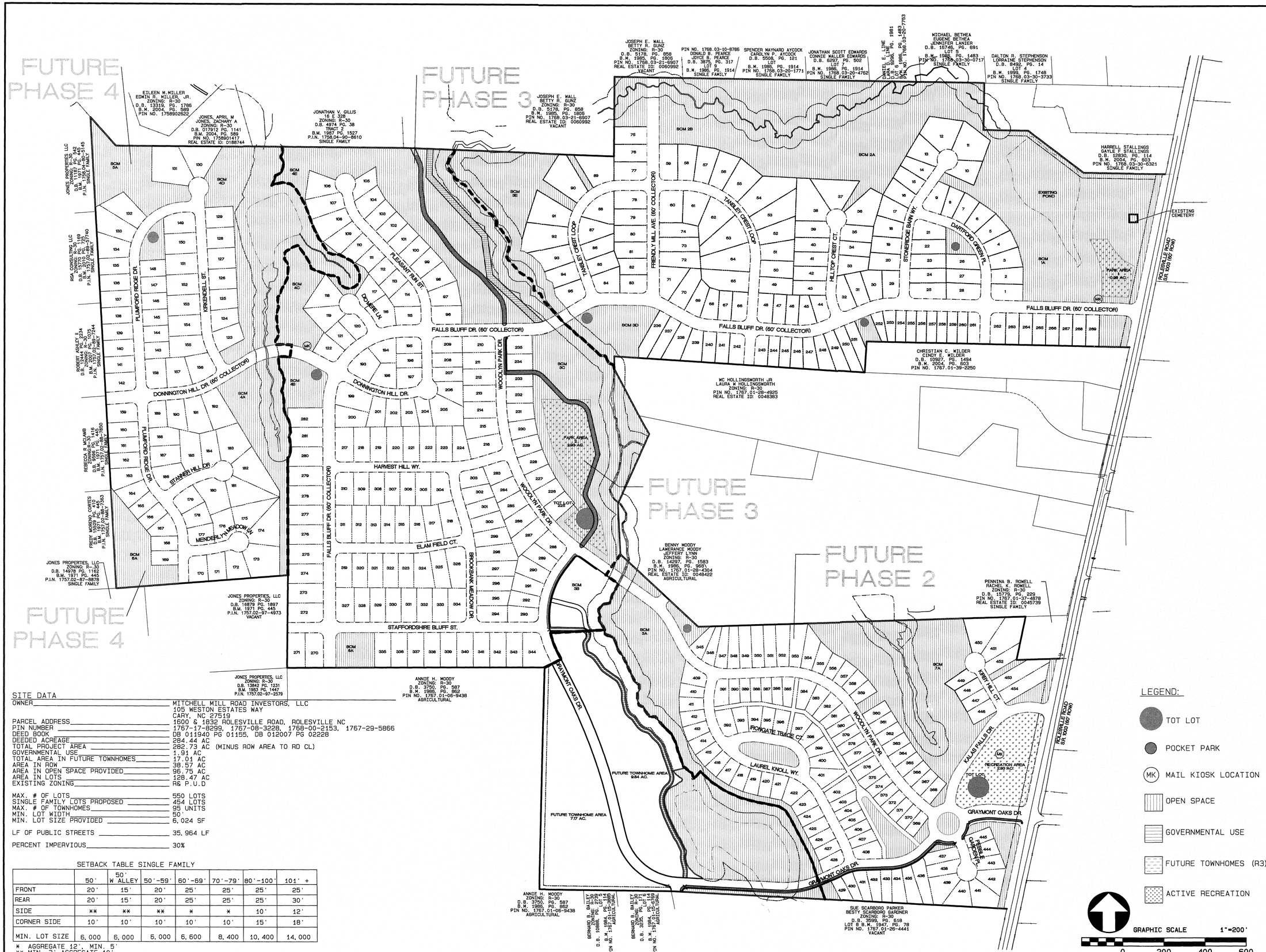
JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
4020 Westchase Blvd. Ste. 450
Raleigh, NC 27607 919-469-1101

NORTH CAROLINA PROFESSIONAL 039110 ENGINEER JOHN R. HARMON
6/15/21

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	96.75 AC
AREA IN LOTS	128.47 AC
EXISTING ZONING	R& 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'

LEGEND:

- TOT LOT
- POCKET PARK
- (MK) MAIL KIOSK LOCATION
- OPEN SPACE
- GOVERNMENTAL USE
- FUTURE TOWNHOMES (R3)
- ACTIVE RECREATION

GRAPHIC SCALE 1"=200'
0 200 400 600

No.	DATE	REVISION	DWN/CHK
1	05-10-21	PLAN REVISIONS PER TGR CONSULTANT REVIEW	BAH/JRH
2	06-14-21	FINAL SET	BAH/JRH

SITE PLAN OVERALL

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA
FIRM # C-3881

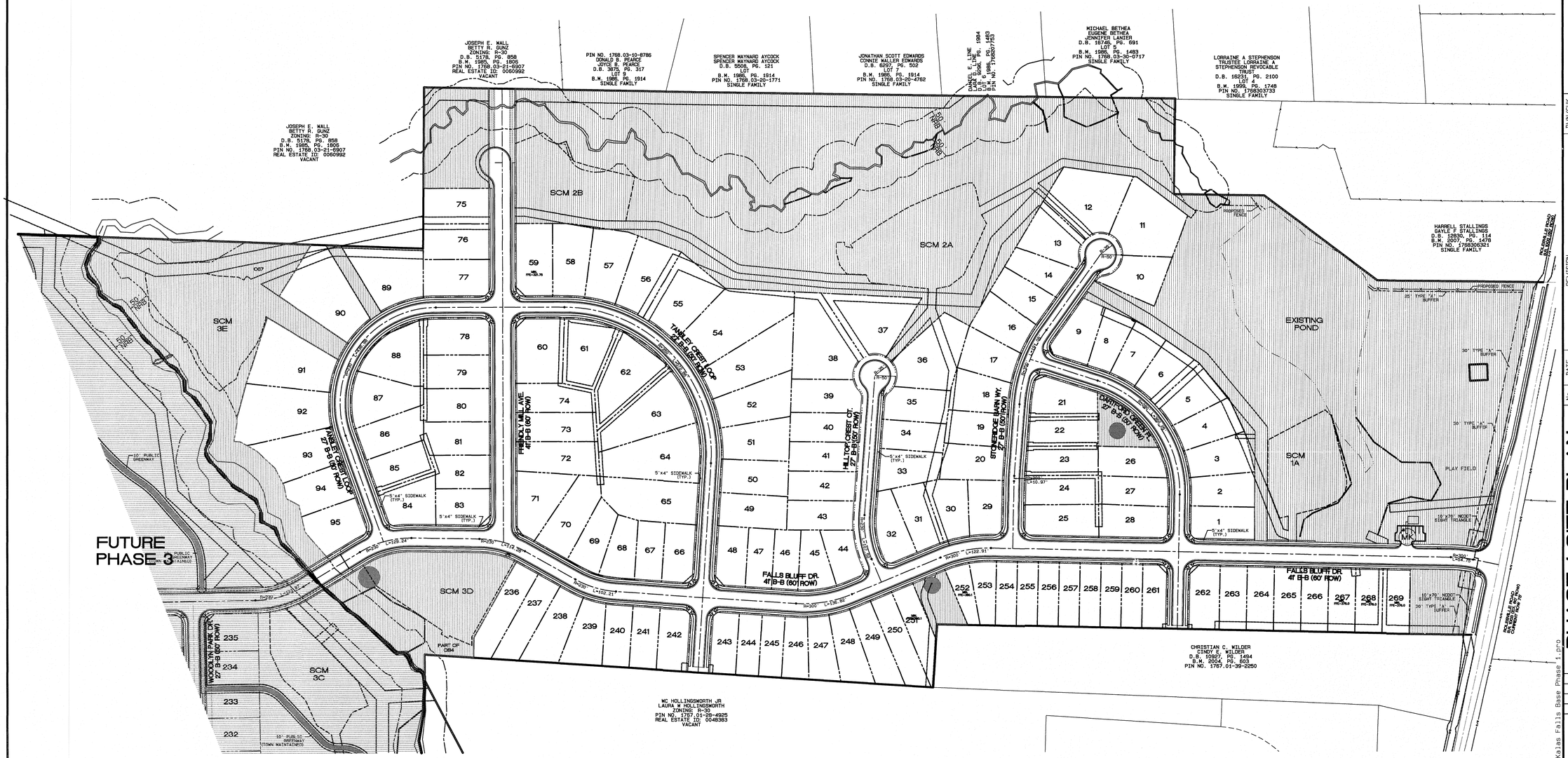
JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	9/19/2019

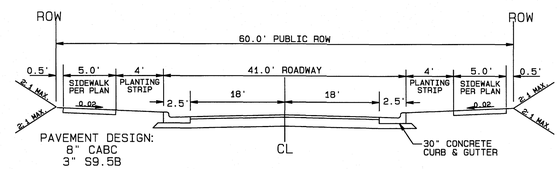
AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
4020 Westchase Blvd., Suite 450
Raleigh, NC 27607 919-469-1101

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMAN

SHEET NO.
5.0

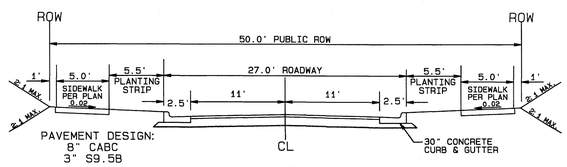
Plot Date: 6/14/2021 Time: 7:44AM FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro





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	DWN/CHK
1	11-20-20	UPDATED SCMIA LOCATION & ADJUSTMENTS PER TOH COMMENTS	BAH/JRH
2	05-10-21	PLAN REVISIONS PER TOH CONSULTANT REVIEW	BAH/JRH
3	06-28-21	FINAL SET	BAH/JRH

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

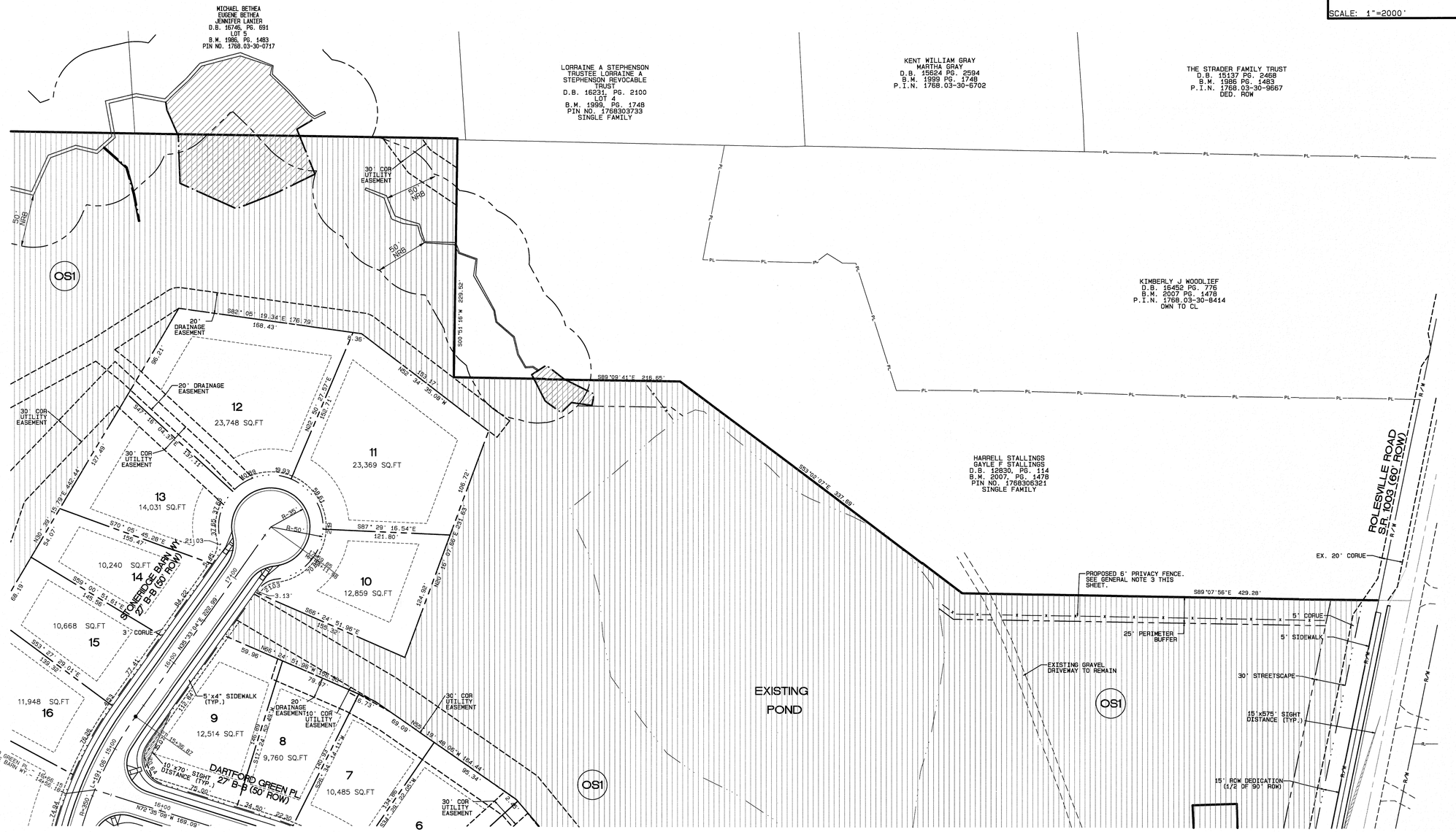
JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	9/19/2019

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
4020 Westchase Blvd., Suite 450
Raleigh, NC 27607 919-469-1101

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMAN
6.28.21

SHEET NO.
5.1

FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro
Plot Date: 6/25/2021 Time: 3:27PM



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

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. 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'
3. PRIVACY FENCE LOCATION SHOWN IS APPROXIMATE AND TO BE FIELD ADJUSTED AROUND EXISTING CONDITIONS.
4. THE CONTRACTOR IS TO COORDINATE THE LOCATION OF THE FENCE WITH THE ADJACENT PROPERTY OWNER PRIOR TO INSTALLATION.

GRAPHIC SCALE 1"=50'
0 50 100 150

No.	DATE	REVISION	DWN/CHK
1	11-20-20	UPDATED SCM/A LOCATION & ADJUSTMENTS PER TOR COMMENTS	BAH/JRH
2	05-10-21	PLAN REVISIONS PER TOR CONSULTANT REVIEW	BAH/JRH
3	06-25-21	FINAL SET	BAH/JRH

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.
4020 Westchase Blvd., Suite 450
Raleigh, NC 27607 919-469-1101

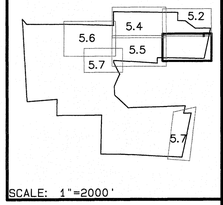
NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HAMM

6.28.21

SHEET NO.

5.2

Plot Date: 6/25/2021 Time: 3:28PM FILE: Z:\Jobs\9900\Walkins Property\Dwg\Base Map\Kalas Falls Base Phase 1.pro



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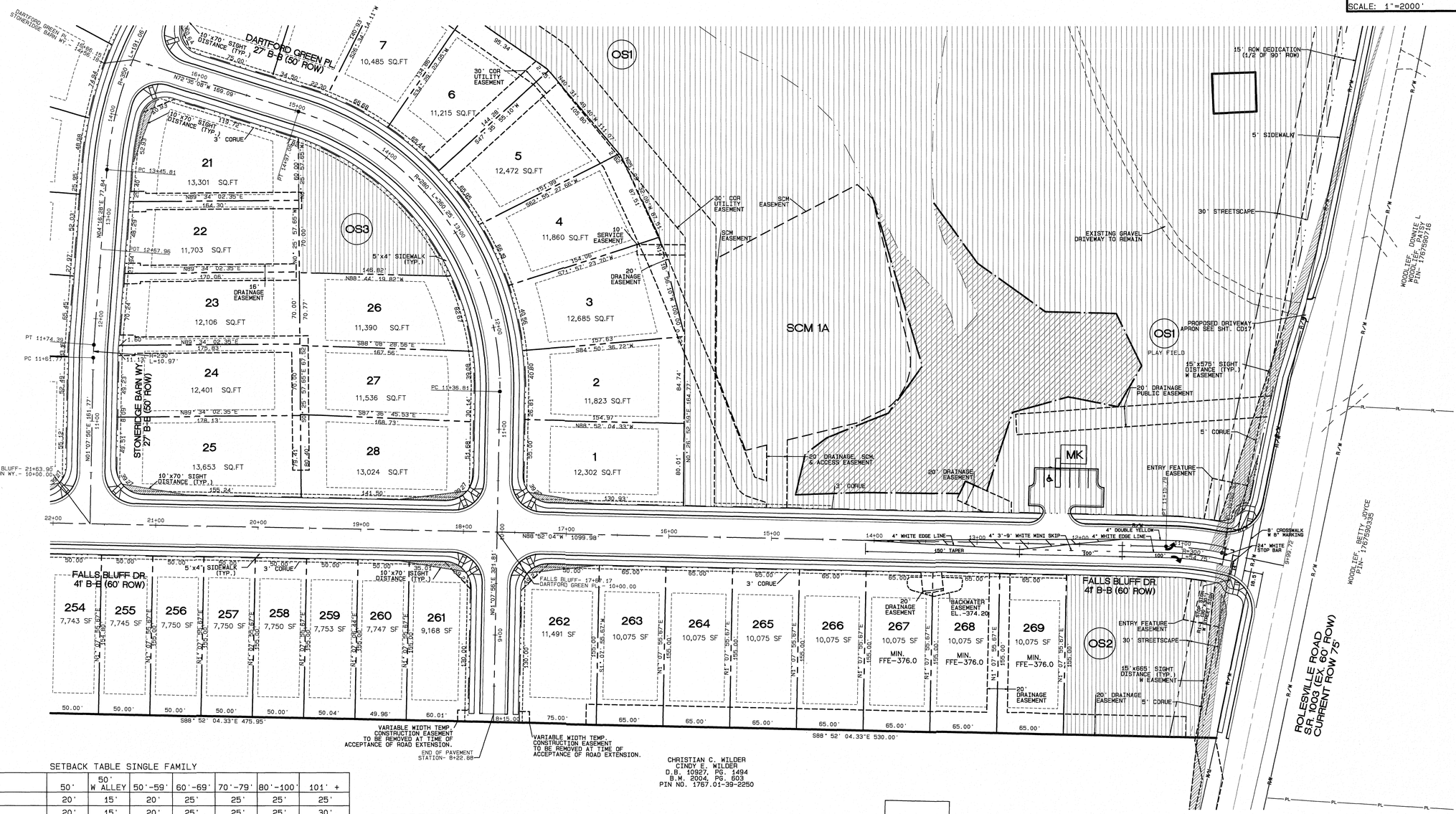


SETBACK TABLE SINGLE FAMILY

	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

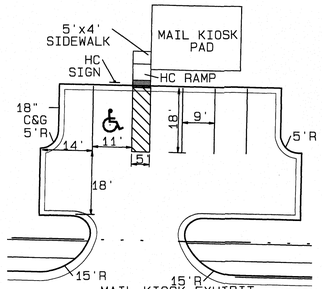
OPEN SPACE

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
1	11-20-20	UPDATED SCM/A LOCATION & ADJUSTMENTS PER ToR COMMENTS	BAH/JRH
2	05-10-21	PLAN REVISIONS PER ToR CONSULTANT REVIEW	BAH/JRH
3	06-23-21	FINAL SET	BAH/JRH

SITE PLAN PHASE 1

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA
FIRM # C-3881

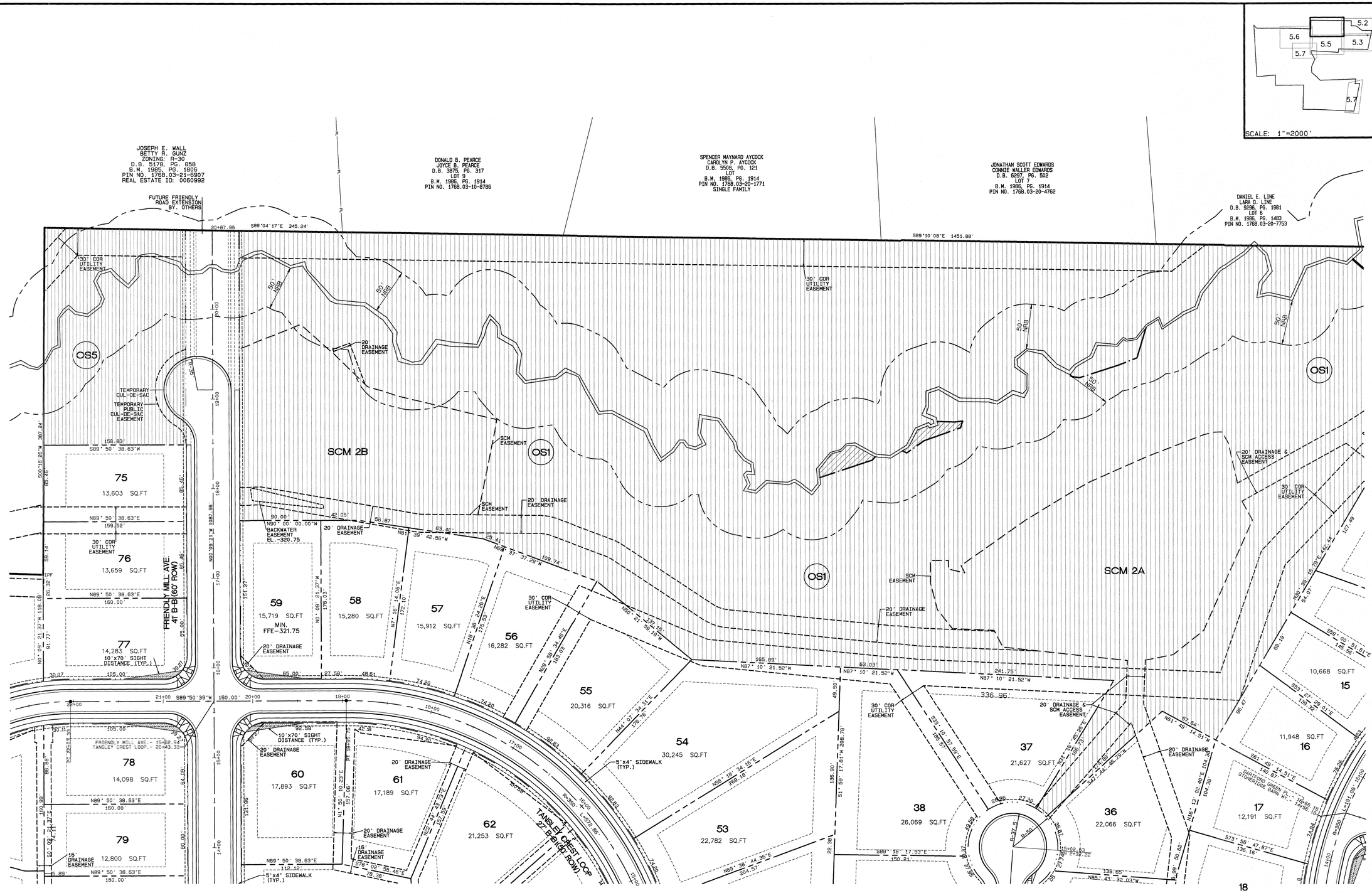
JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
4020 Westchase Blvd., Suite 450
Raleigh, NC 27607 919-469-1101

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 9810 JOHN R. HARMAN
6-23-21

SHEET NO.
5.3

Plot Date: 7/8/2021 Time: 3:19PM FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro



No.	DATE	REVISION	DMW/CHK
1	12-20	UPDATED SCM1A LOCATION & ADJUSMONTS PER TOR COMMENTS	DMW/JRH
2	05-10-21	PLAN REVISIONS PER TOR CONSULTANT REVIEW	BAH/JRH
3	06-14-21	FINAL SET	BAH/JRH

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.
4020 Westchase Blvd., Suite 450
Raleigh, NC 27607 919-469-1101

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

Plot Date: 6/14/2021 Time: 7:55AM

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMAN

SHEET NO.

5.4

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' +
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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. 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

ABBREVIATION

NRB- NEUSE RIVER BUFFER

COR/CORUE- CITY OF RALEIGH UTILITY EASEMENT

GRAPHIC SCALE 1"=50'

0 50 100 150

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

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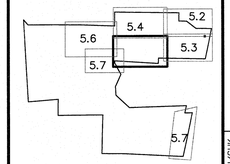
   RESIDENTIAL-RESIDENTIAL- 28'
   RESIDENTIAL-COLLECTOR- 30'
   COLLECTOR-COLLECTOR- 30'
   ENTRANCE AT CUL-DE-SAC- 32.5
   ENTRY ROADS-ROLESVILLE RD.- 35'

OPEN SPACE



SCALE: 1"=2000'

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
1	05-10-21	UPDATED SCM3 LOADING, ADJUSTMENTS PER ToR COMMENTS	BAH/JRH
2	05-20-21	PLAN REVISIONS PER toR CONSULTANT REVIEW	BAH/JRH
3	06-25-21	FINAL SET	BAH/JRH

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.
4020 Westchase Blvd., Suite 450
Raleigh, NC 27607 919-469-1101

JOSEPH CARLTON HARMAN NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMAN

6-28-21

SHEET NO.

5.5

Plot Date: 6/25/2021 Time: 3:09PM FILE: Z:\Jobs\9900\Working Property\Dwg\Base Map\Kalas Falls Base Phase 1.pro

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'

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RESIDENTIAL-RESIDENTIAL- 28'
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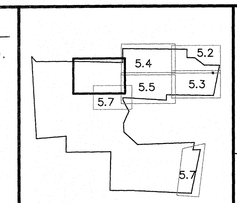
ENTRANCE AT CUL-DE-SAC- 32.5
ENTRY ROADS-ROLESVILLE RD.- 35'

ABBREVIATION

NRB- NEUSE RIVER BUFFER
COR/CORUE- CITY OF RALEIGH UTILITY EASEMENT



SCALE: 1"=2000'

GRAPHIC SCALE 1"=50'
0 50 100 150

JOSEPH E. WALL
BETTY R. GUNZ
ZONING: R-30
D.B. 5178, PG. 858
B.M. 1985, PG. 1806
PIN NO. 1768.03-21-6907
REAL ESTATE ID: 0060992

EX. 30' COR UTILITY EASEMENT

EX. 30' COR UTILITY EASEMENT

30' COR UTILITY EASEMENT

20' DRAINAGE EASEMENT

VARIABLE WIDTH DRAINAGE/SCM ACCESS EASEMENT

SCM EASEMENT

100 YR. FLOOD

50' NRB

30' COR S.S. & GREENWAY EASEMENT

10' PUBLIC GREENWAY

20' GREENWAY EASEMENT

NATURAL WATER FALL

SCM 3E

OS7

FUTURE PHASE 3

99

98

97

96

75 13,603 SQ.FT
76 13,659 SQ.FT
77 14,283 SQ.FT
78 14,098 SQ.FT
79 12,800 SQ.FT
80 12,800 SQ.FT
81 12,549 SQ.FT
82 10,868 SQ.FT
83 11,715 SQ.FT
84 13,687 SQ.FT
85 11,867 SQ.FT
86 12,952 SQ.FT
87 15,621 SQ.FT
88 16,829 SQ.FT
89 20,972 SQ.FT
90 26,460 SQ.FT
91 23,983 SQ.FT
92 25,886 SQ.FT
93 16,970 SQ.FT
94 13,478 SQ.FT
95 13,514 SQ.FT

10'x70' SIGHT DISTANCE (TYP.)

5'x4' SIDEWALK (TYP.)

16' DRAINAGE EASEMENT

TANGLEY CREST LOOP 27' B-B (50' ROW)

FALLS BLUFF DR. 41' B-B (60' ROW)

30' COR UTILITY EASEMENT FUTURE

3' CORUE

L=15.176 R=50.000

L=438.98 R=230'

L=129.24'

No.	DATE	REVISION	DWN/CHK
1	11-20-20	UPDATED SCM#4 LOCATION & ADJUSTMENTS PER TGR COMMENTS	BAH/JRH
2	05-10-21	PLAN REVISIONS PER TGR CONSULTANT REVIEW	BAH/JRH
3	06-14-21	FINAL SET	BAH/JRH

SITE PLAN PHASE 1

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA
FIRM # C-3881

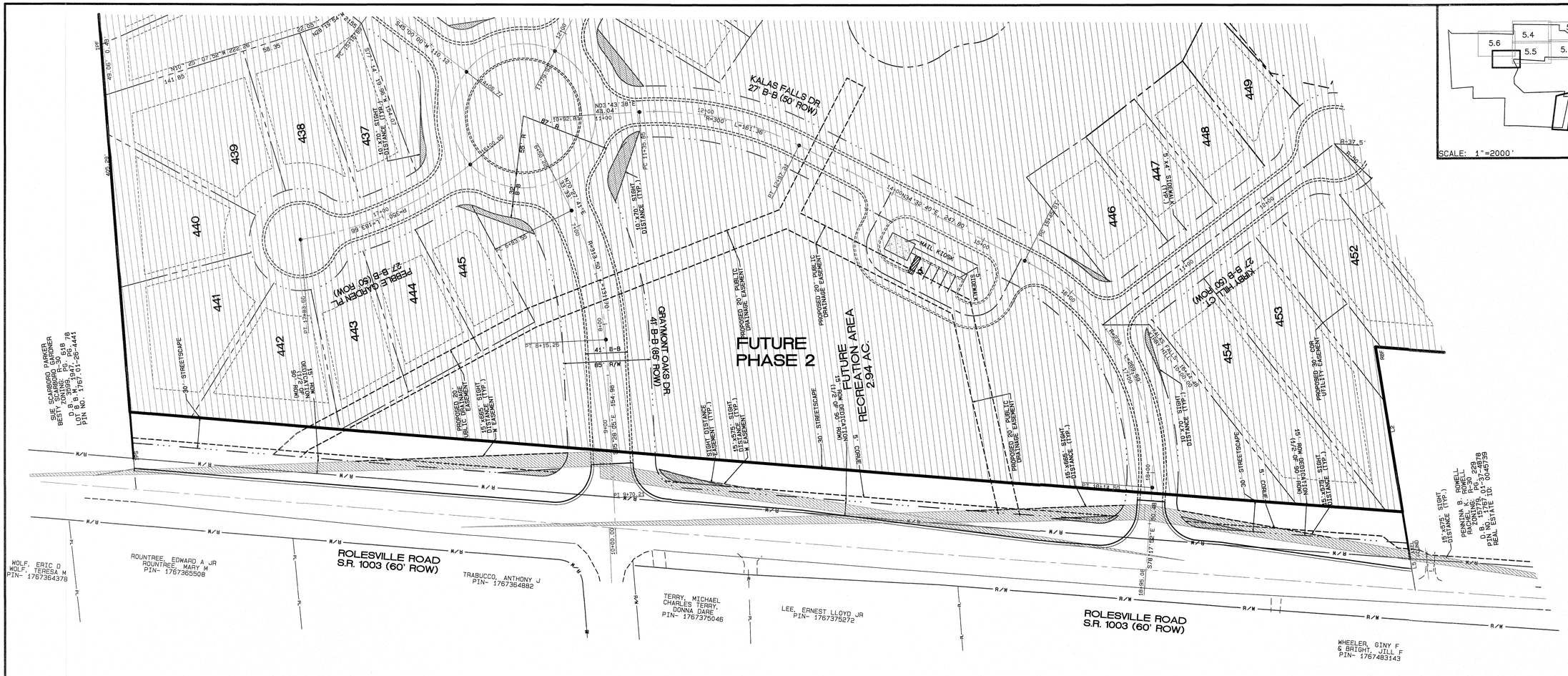
JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

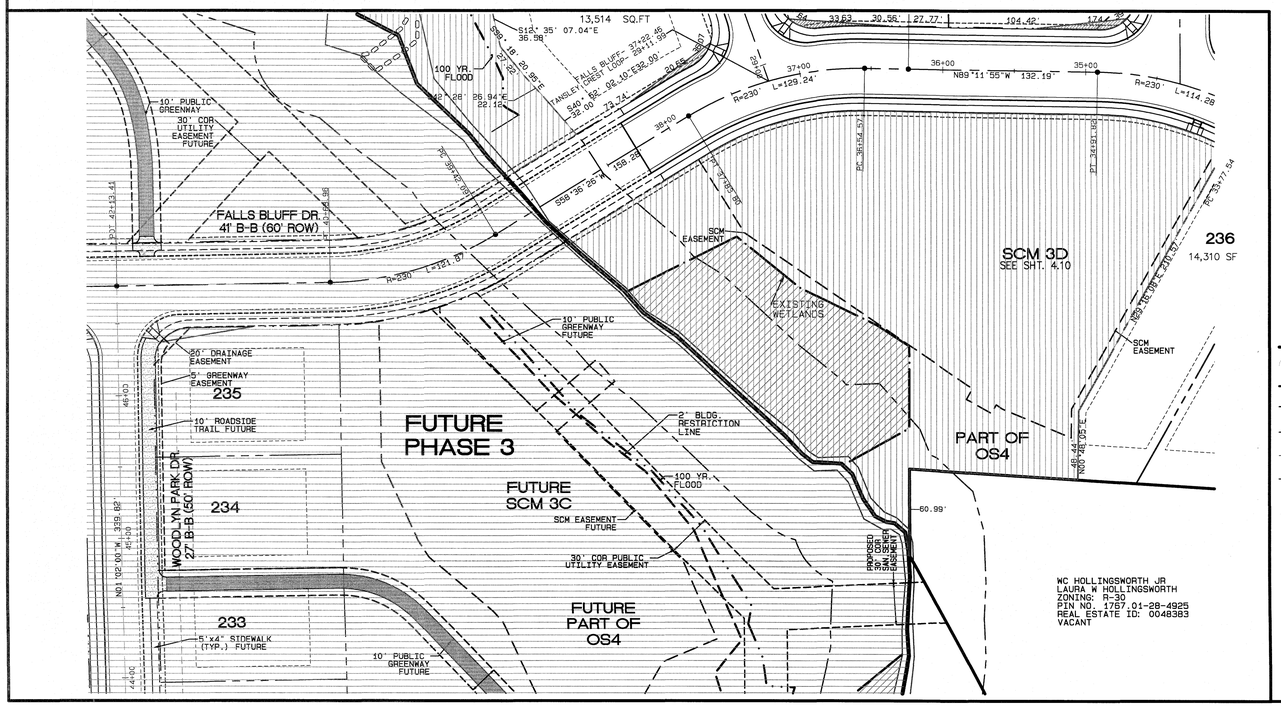
AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
4020 Westchase Blvd., Suite 450
Raleigh, NC 27607 919-469-1101

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMON
6.14.21

SHEET NO.
5.6

Plot Date: 6/14/2021 Time: 7:57AM FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro





SETBACK TABLE SINGLE FAMILY

	50'	50' W ALLEY	50'-59'	60'-69'	70'-79'	80'-100'	101' +
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** MIN. 3' AGGREGATE 10'

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- 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

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.

GRAPHIC SCALE 1"=50'
0 50 100 150

No.	DATE	REVISION	DWN/CHK
1	11-20-20	UPDATED SCM'S, LOCATION ADJUSTMENTS PER 1ST COMMENTS	BAH/JRH
2	06-28-21	ADDRESSED NCDOT COMMENTS	BAH/JRH

SITE PLAN PHASE 1

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA

FIRM # C-3881

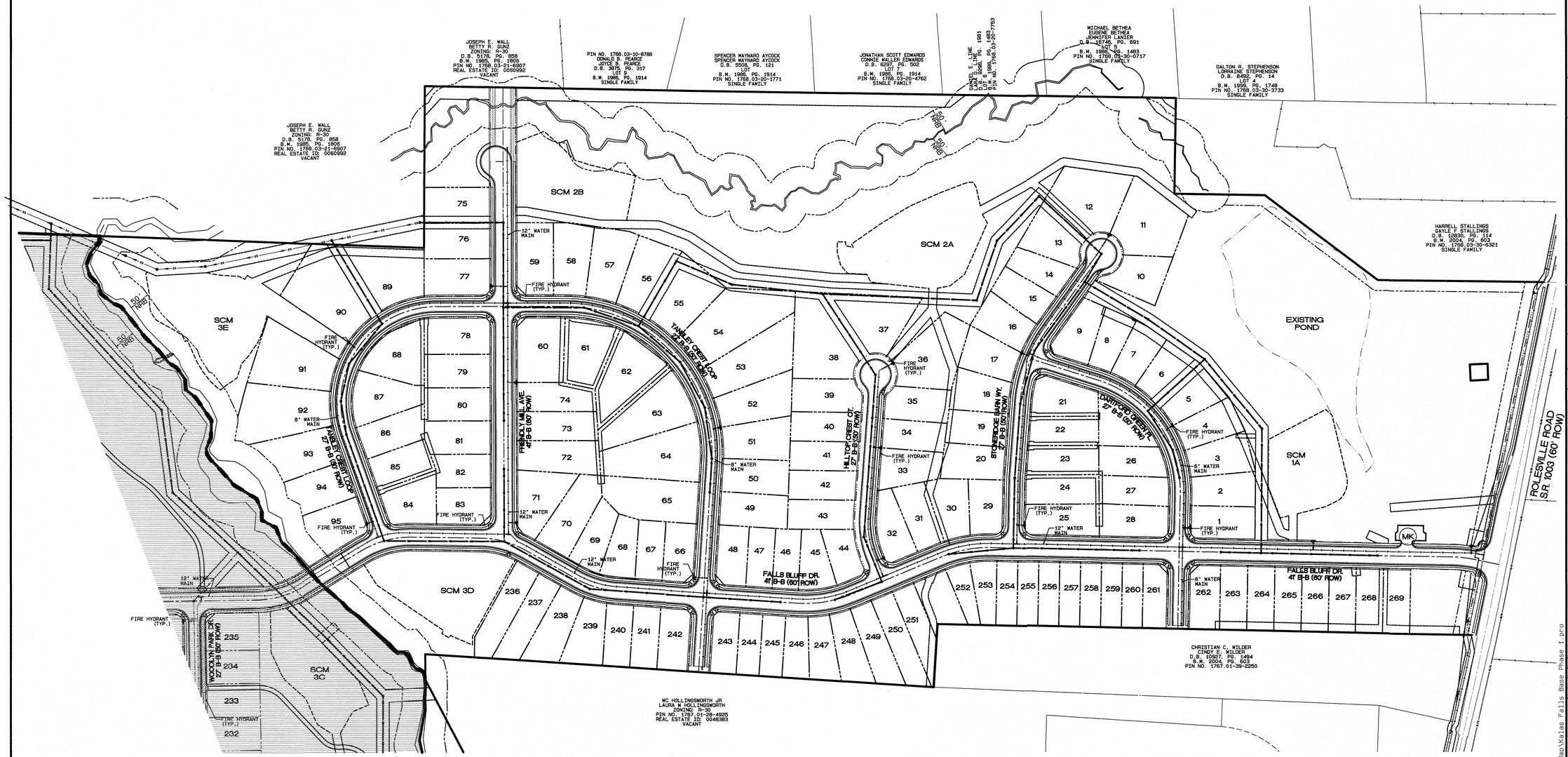
JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

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

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMAN

SHEET NO.
5.7

FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro
Plot Date: 6/28/2021 Time: 8:25AM



GRAPHIC SCALE 1"=120'

0 120 240 360

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

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 #** S-4824

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 #** W-3784

CITY OF RALEIGH - PLANS AUTHORIZED FOR CONSTRUCTION

Electronic Approval: This approval is being issued electronically. This approval is valid only upon the signature of a City of Raleigh Review Officer below. The City will retain a copy of the approved plans. Any work authorized by this approval must proceed in accordance with the plans kept on file with the City. This electronic approval may not be edited once issued. Any modification to this approval once issued will invalidate this approval.

Timothy Beasley

City of Raleigh Development Approval _____

Raleigh Water Review Officer

No.	DATE	REVISION	DWN/CHK
1	05-25-21	PLAN REVISIONS PER 1ST CONSULTANT REVIEW	BAH/JRH
2	06-14-21	FINAL SET	BAH/JRH

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.
4020 Westchase Blvd., Suite 450
Raleigh, NC 27607 919-469-1101

NORTH CAROLINA PROFESSIONAL SEAL 9815 ENGINEER JON R. HARMON

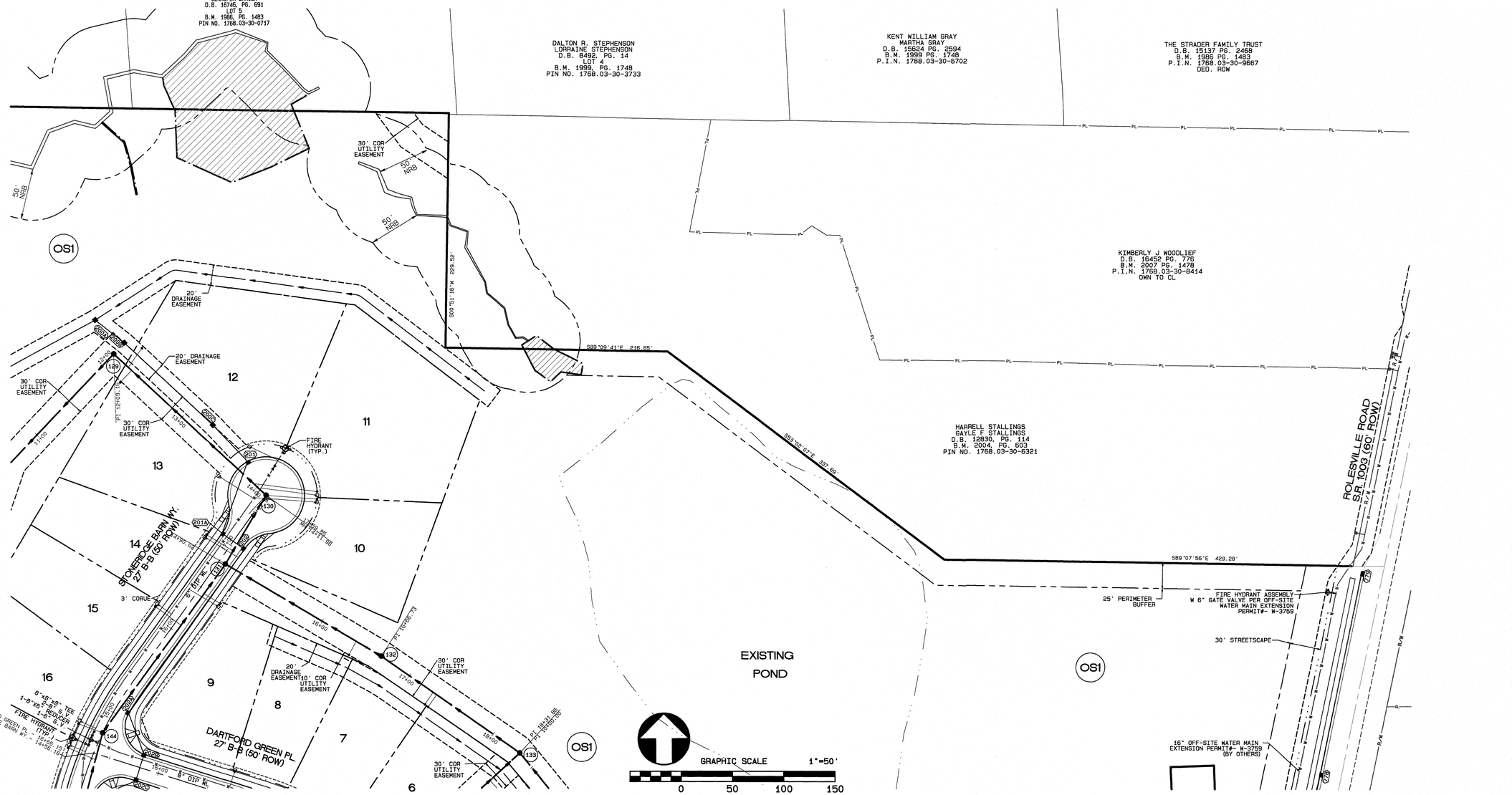
6.14.21

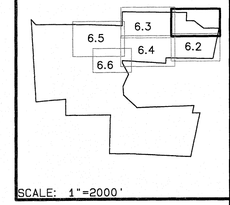
SHEET NO.

6.0

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

Plot Date - 6/14/2021 Time-8:03AM





SCALE: 1"=2000'

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

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 # S-4824**

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CITY OF RALEIGH - PLANS AUTHORIZED FOR CONSTRUCTION

Electronic Approval: This approval is being issued electronically. This approval is valid only upon the signature of a City of Raleigh Review Officer below. The City will retain a copy of the approved plans. Any work authorized by this approval must proceed in accordance with the plans kept on file with the City. This electronic approval may not be edited once issued. Any modification to this approval once issued will invalidate this approval.

Timothy Beadle

City of Raleigh Development Approval _____

Raleigh Water Review Officer

No.	DATE	REVISION	DWN/CHK
1	05-13-21	PLAN REVISIONS PER TGR CONSULTANT REVIEW	BAH/JRH
2	06-14-21	FINAL SET	BAH/JRH

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

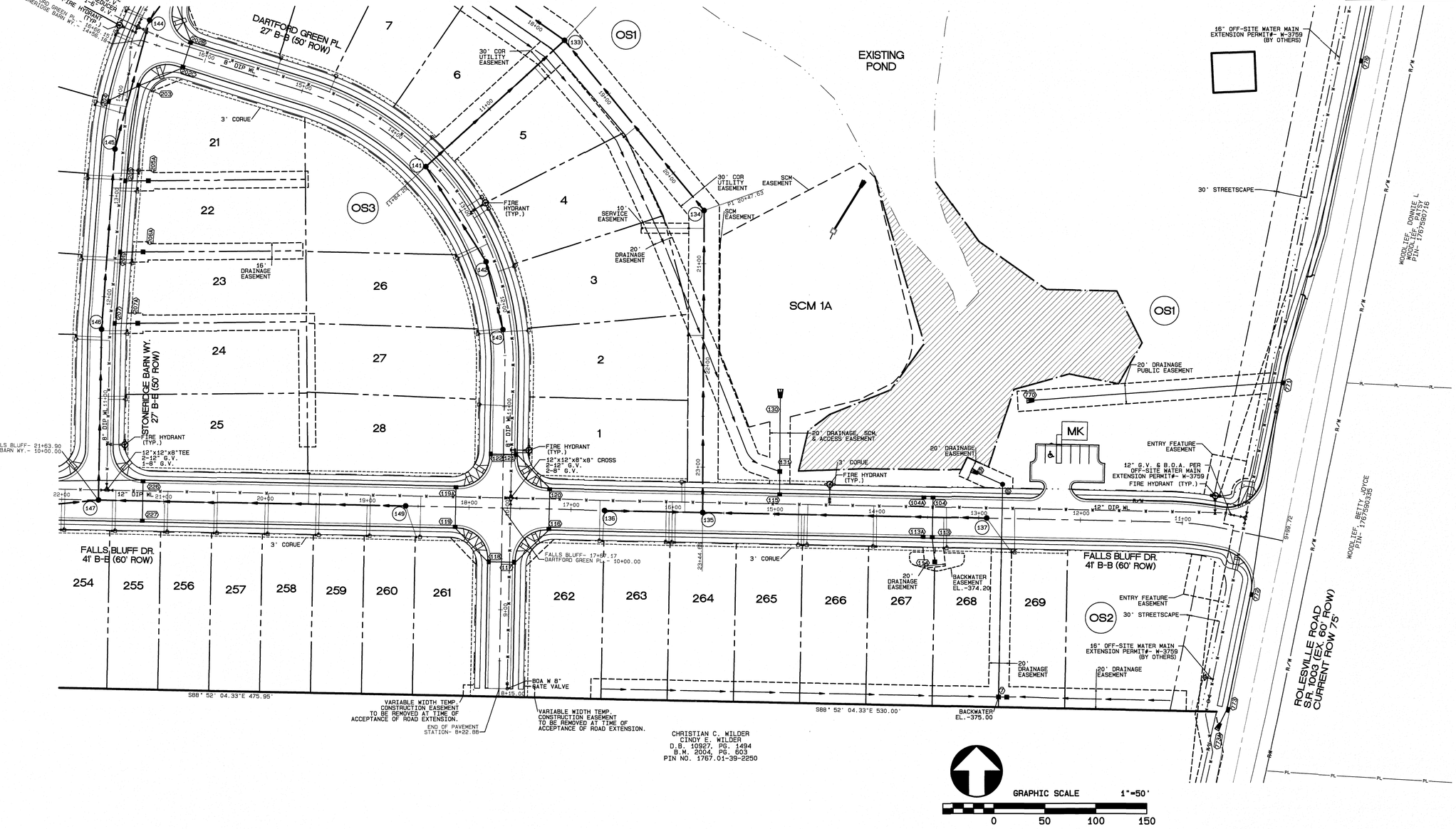
JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

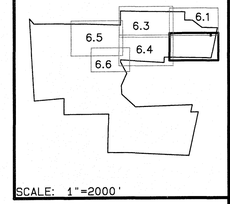
AMERICAN Engineering
American Engineering Associates–Southeast, P.A.
4020 Westchase Blvd., Suite 450
Raleigh, NC 27607 919-469-1101

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMAN
6.14.21

SHEET NO.
6.1

Plot Date: 6/14/2021 Time: 8:04AM FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\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
- 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
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Timothy Beadle, Digitally signed by Timothy Beadle, Date: 2021.06.25 16:26:04 -04'00'

City of Raleigh Development Approval _____

Raleigh Water Review Officer

Plot Date - 6/25/2021 Time: 4:26PM

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

No.	DATE	REVISION	DVN/CHK
1	05-13-21	PLAN REVISIONS PER ToR CONSULTANT REVIEW	BAH/JRH
2	06-25-21	FINAL SET	BAH/JRH

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

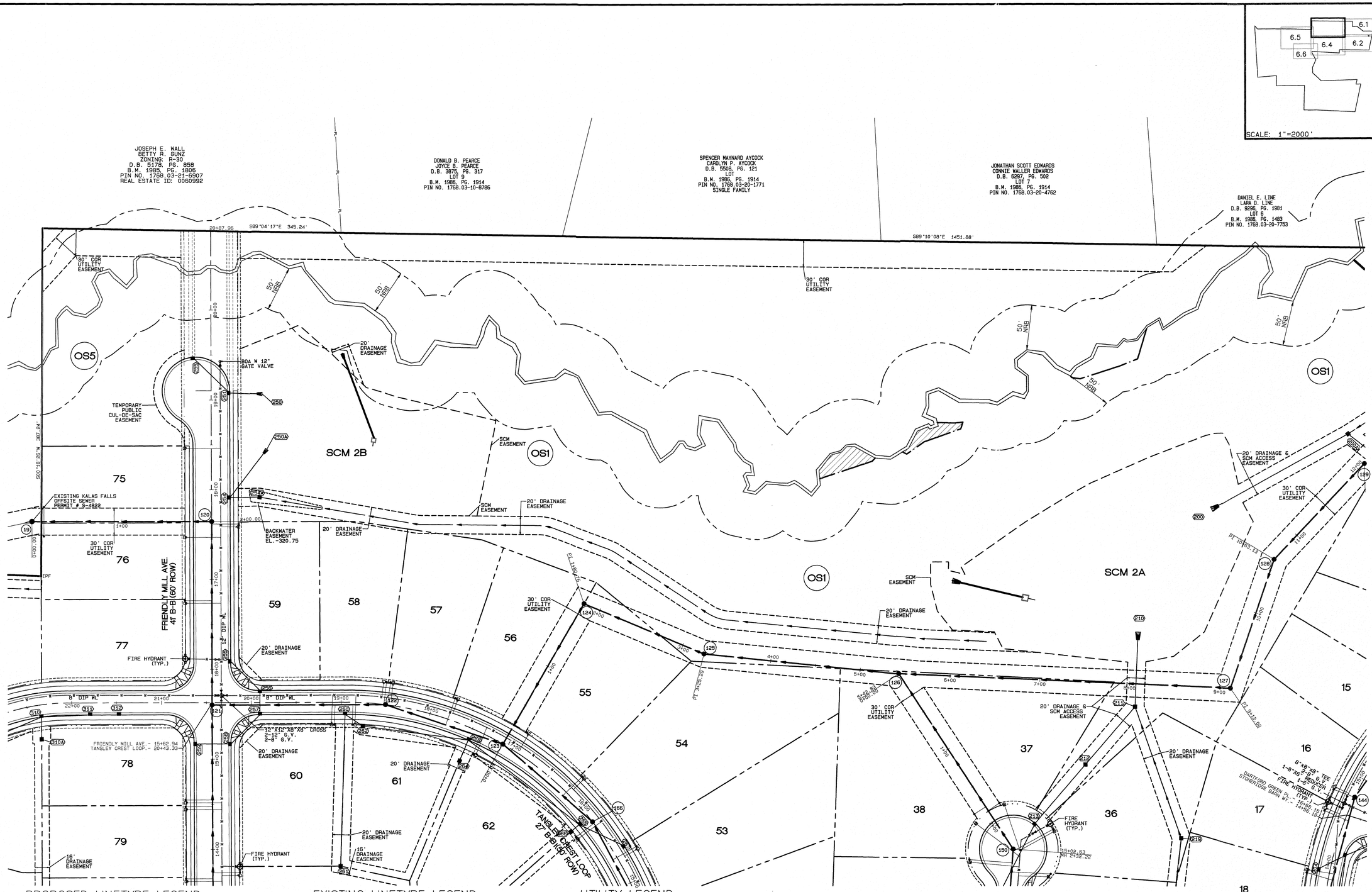
AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
4020 Westchase Blvd., Suite 450
Raleigh, NC 27607 919-469-1101

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMAN

6-25-21

SHEET NO.

6.2



SCALE: 1"=2000'

No.	DATE	REVISION	DWN/CHK
1	05-21-21	PLAN REVISIONS PER TOH COMMENTS	BAH/JRH
2	06-14-21	FINAL SET	BAH/JRH

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.
4020 Westchase Blvd., Suite 450
Raleigh, NC 27607 919-469-1101

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

Time: 8:08AM

Plot Date: 6/14/2021

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

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CITY OF RALEIGH - PLANS AUTHORIZED FOR CONSTRUCTION

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City of Raleigh Development Approval

Timothy Beasley

Raleigh Water Review Officer

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER CHRISTOPHER J. HARMON

6/14/2021

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

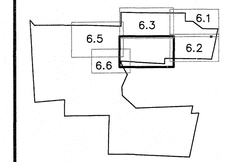
EXISTING LINETYPE LEGEND

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

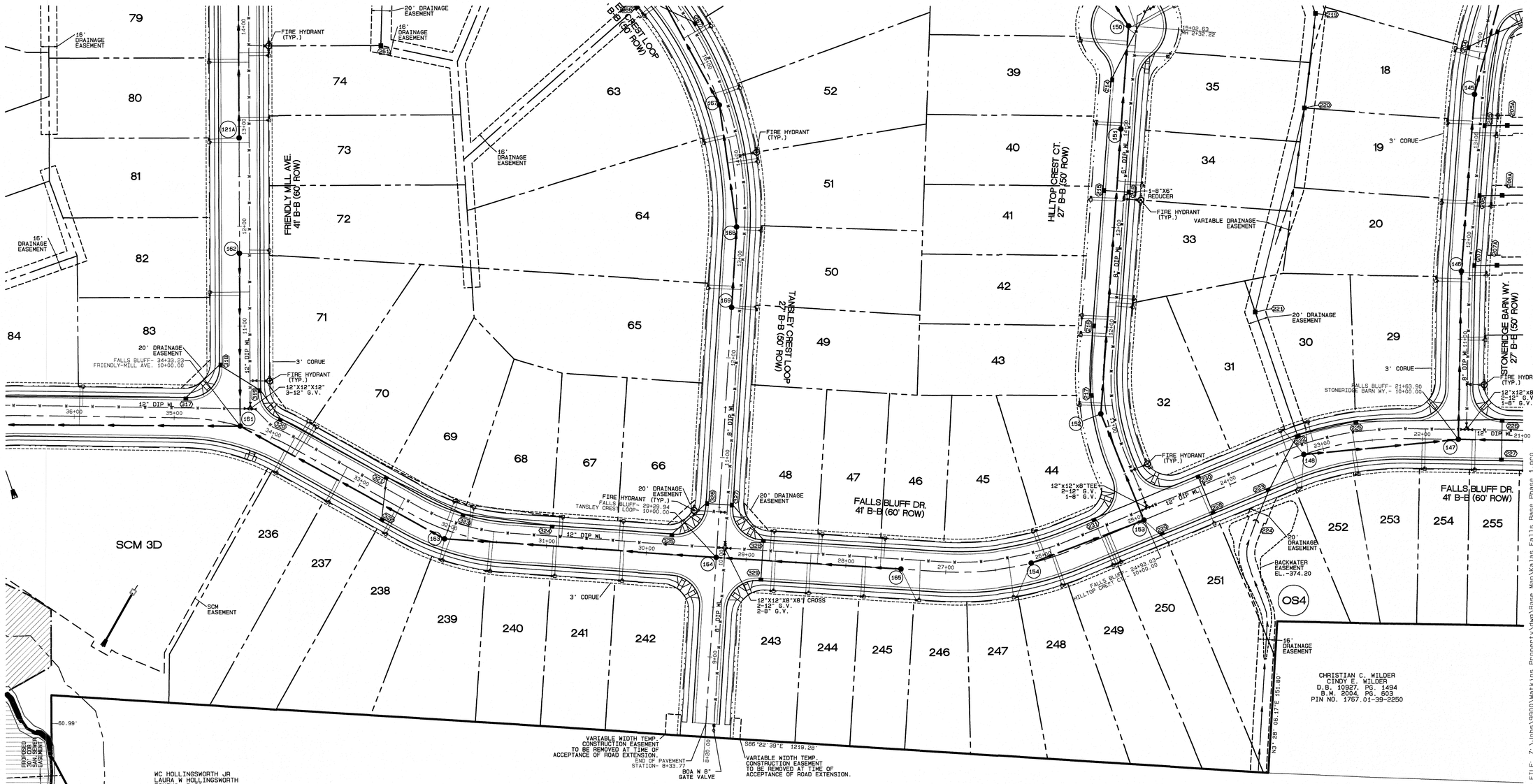
UTILITY LEGEND

- 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



SCALE: 1"=2000'



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City of Raleigh Development Approval _____

Raleigh Water Review Officer

No.	DATE	REVISION	DWN/CHK
1	05-13-21	PLAN REVISIONS PER TGR CONSULTANT REVIEW	BAH/JRH
2	06-14-21	FINAL SET	BAH/JRH

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.
4020 Westchase Blvd., Suite 450
Raleigh, NC 27607 919-469-1101

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMON

6.25.21

SHEET NO.

6.4

FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro
Plot Date: 6/25/2021 Time: 4:27PM

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
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- PROPOSED FLARED END SECTION
- PROPOSED FIRE HYDRANT
- PROPOSED WATER SERVICE
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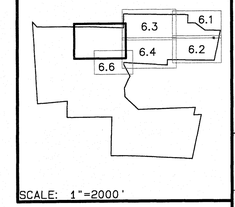
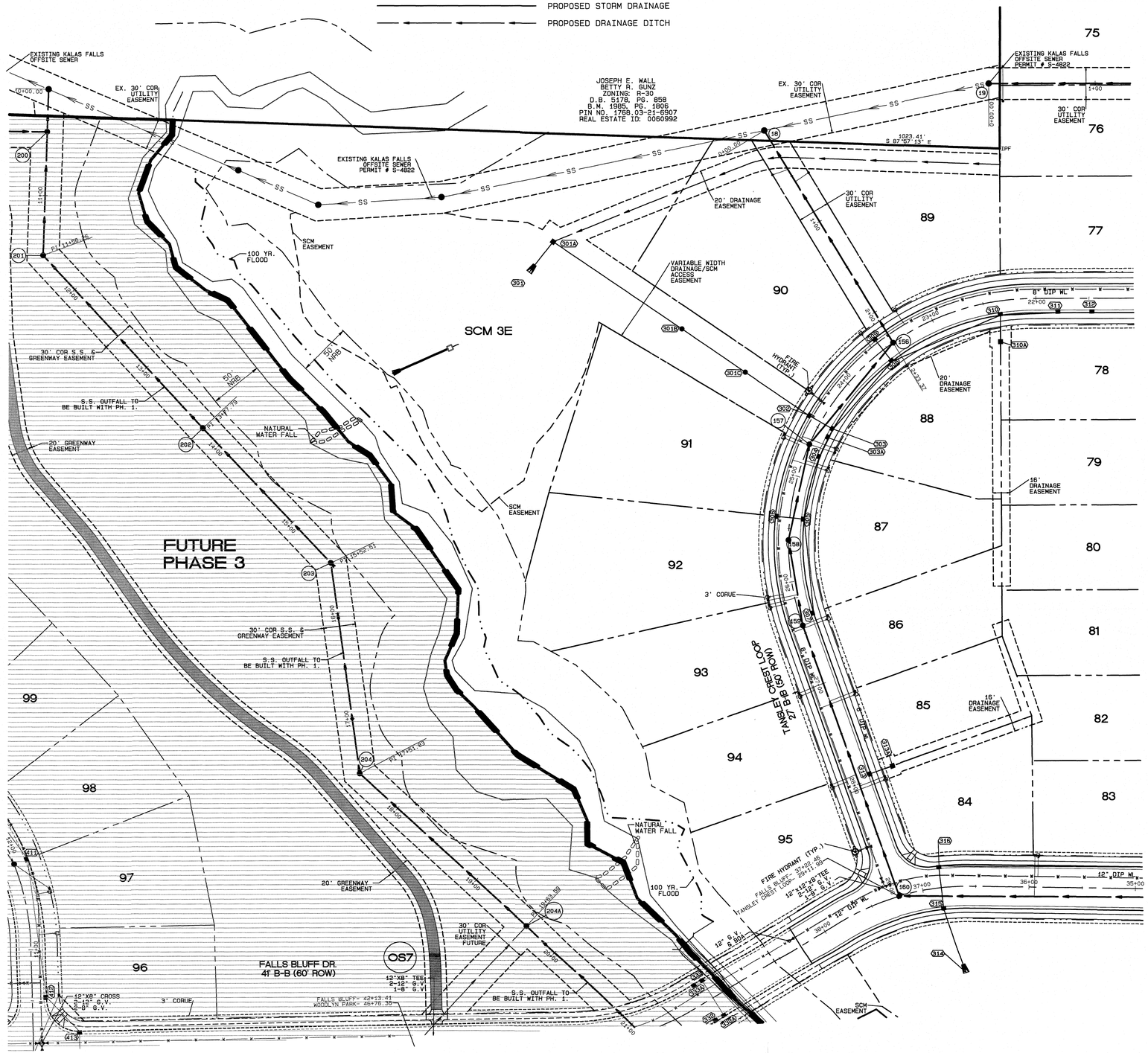


SCALE: 1"=2000'



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.

GRAPHIC SCALE 1"=50'

0 50 100 150

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Timothy Beadnell

City of Raleigh Development Approval _____

Raleigh Water Review Officer

No.	DATE	REVISION
1	05-13-21	PLAN REVISIONS PER TGR CONSULTANT REVIEW.
2	06-14-21	FINAL SET

DWN/CHK
BAH/JRH
BAH/JRH

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.
4020 Westchase Blvd., Suite 450
Raleigh, NC 27607 919-469-1101

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMAN

6.14.21

SHEET NO.

6.5

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

Plot Date: 6/14/2021 Time: 8:21AM

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
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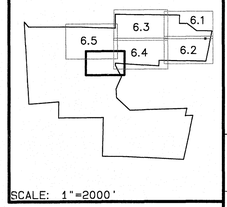
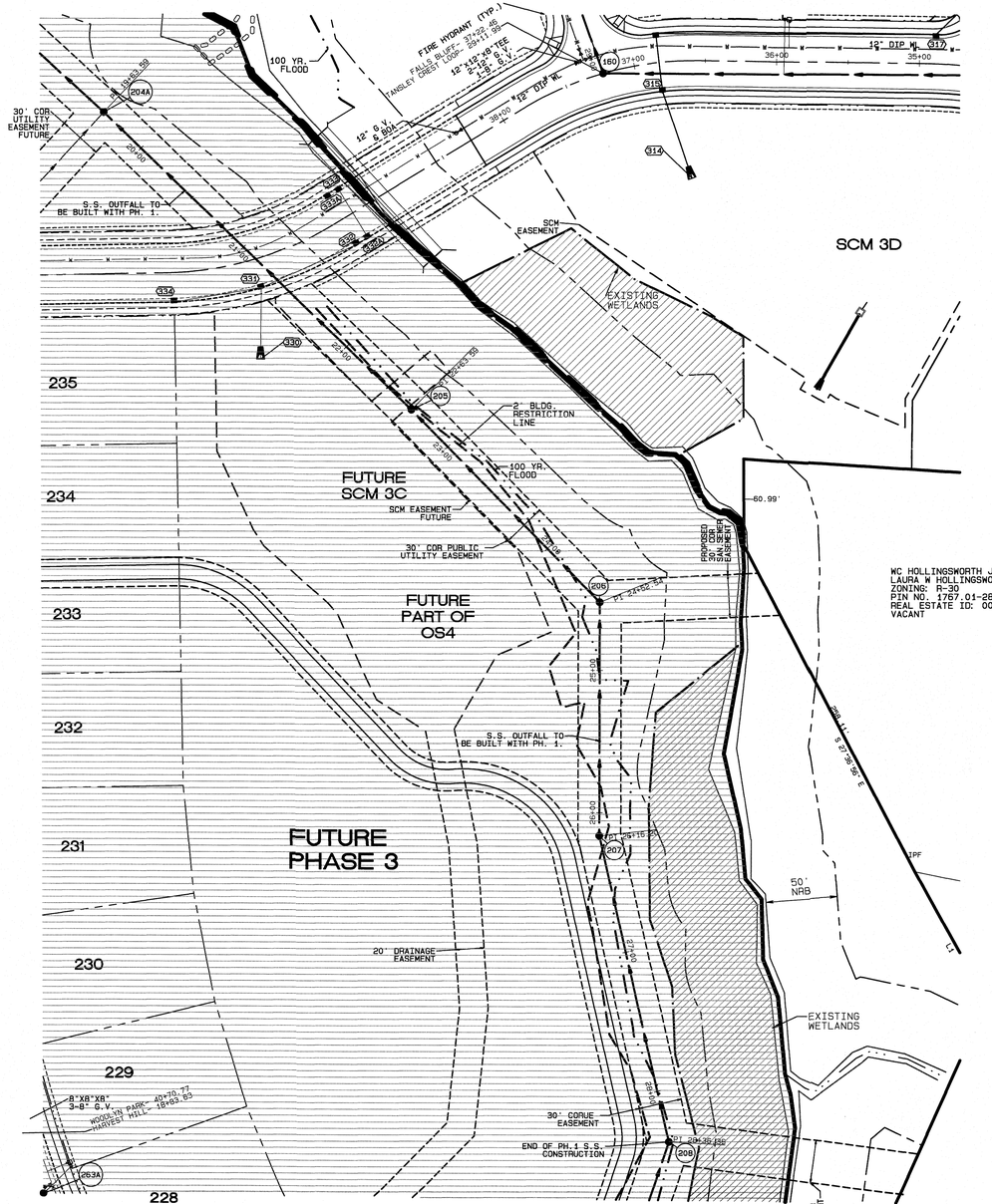
- PROPOSED WATER SERVICE
- PROPOSED WATER VALVE



SCALE: 1"=2000'



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GRAPHIC SCALE 1"=50'

0 50 100 150

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Timothy Beasley

City of Raleigh Development Approval _____

Raleigh Water Review Officer

No.	DATE	REVISION	DWN/CHK
1	05-12-21	PLAN REVISIONS PER CITY CONSULTANT REVIEW	BAH/JRH
2	06-14-21	FINAL SET	BAH/JRH

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

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4020 Westchase Blvd., Suite 450
Raleigh, NC 27607 919-469-1101

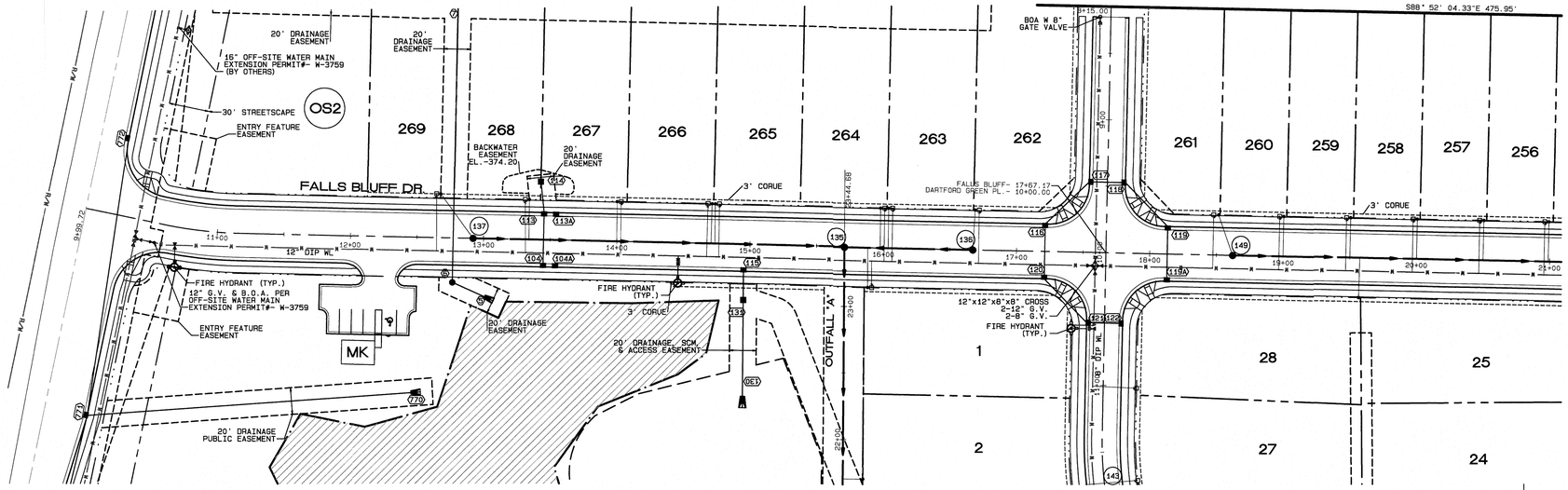
NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMAN

6.14.21

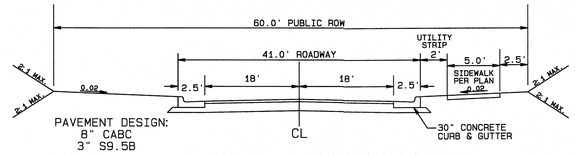
SHEET NO.

6.6

Plot Date: 6/14/2021 Time: 8:22AM FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro



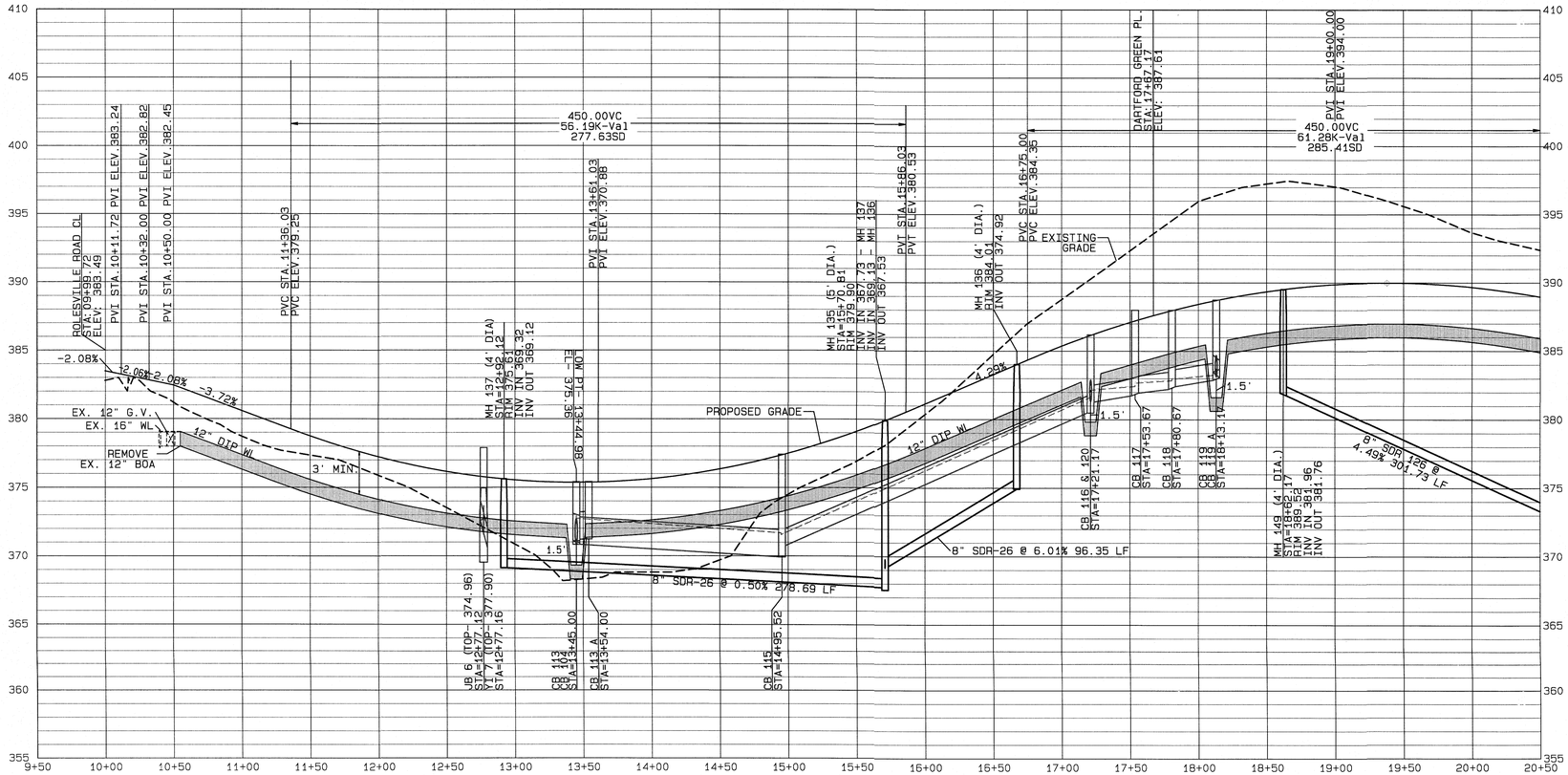
FALLS BLUFF DR.
41' B-B (60' ROW)
STA. 9+99.72-20+50



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

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.
2. AT THE START OF CONSTRUCTION THE CONTRACTOR WILL NEED TO FIELD LOCATE/VERIFY THE LOCATION OF THE EXISTING 12" G.V. AND BLOWOFF ASSEMBLY.



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Timothy Beasley

City of Raleigh Development Approval

Raleigh Water Review Officer

No.	DATE	REVISION	DWN/CHK
1	12-1-20	Addressing CoR 1ST review comments	BAH/JRH
2	05-10-21	ADDRESSING TOR CONSULTANT COMMENTS	BAH/JRH

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

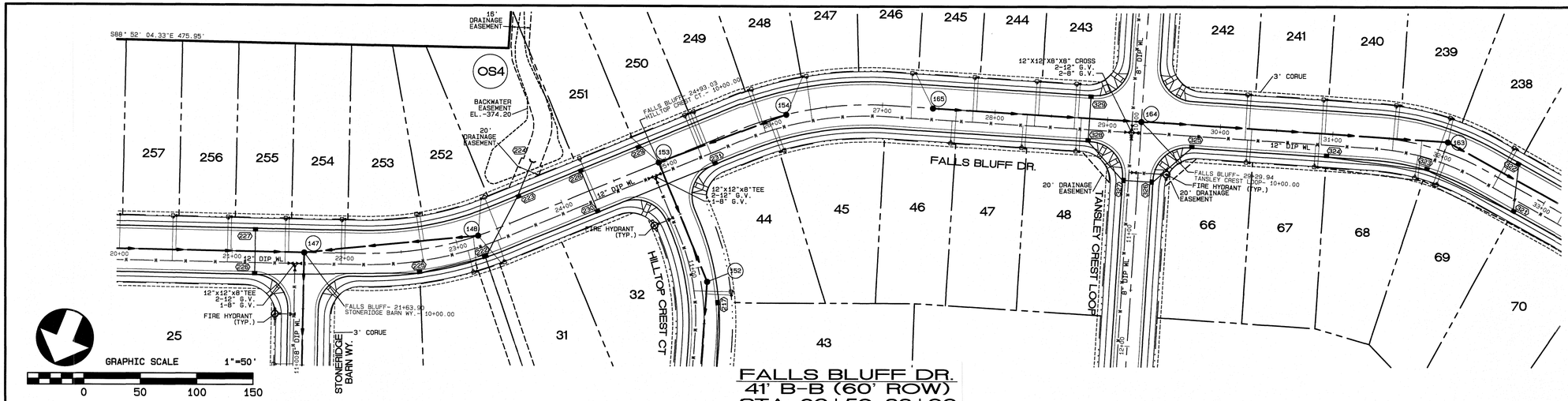
JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
4020 Westchase Blvd., Suite 450
Raleigh, NC 27607 919-469-1101

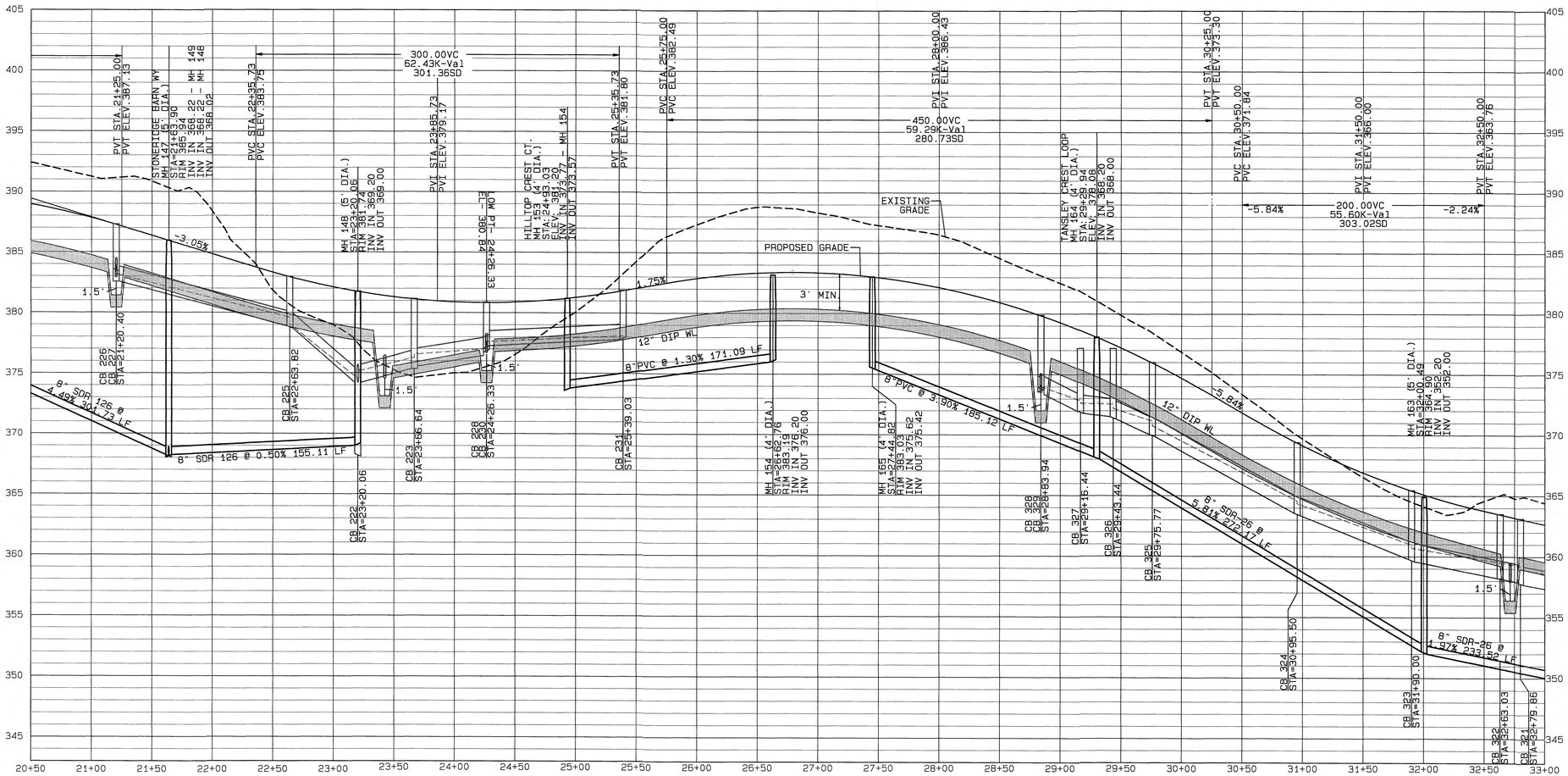
SEAL 9810 ENGINEER JOAN R. HARMAN 6.14.21

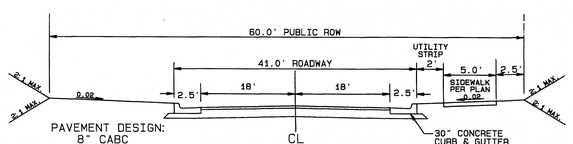
SHEET NO.
7.0

FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro
Plot Date - 6/14/2021 Time: 8:45AM



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





TYPICAL SECTION

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.

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

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 #** S-4824

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CITY OF RALEIGH - PLANS AUTHORIZED FOR CONSTRUCTION

Electronic Approval: This approval is being issued electronically. This approval is valid only upon the signature of a City of Raleigh Review Officer below. The City will retain a copy of the approved plans. Any work authorized by this approval must proceed in accordance with the plans kept on file with the City. This electronic approval may not be edited once issued. Any modification to this approval once issued will invalidate this approval.

Timothy Beadle

City of Raleigh Development Approval

Raleigh Water Review Officer

No.	DATE	REVISION	DWN/CHK
1	12-11-20	ADDRESSING COA 1ST REVIEW COMMENTS	BAH/JRH
2	05-10-21	ADDRESSING TOR CONSULTANT COMMENTS	BAH/JRH
3	06-14-21	FINAL SET	BAH/JRH

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

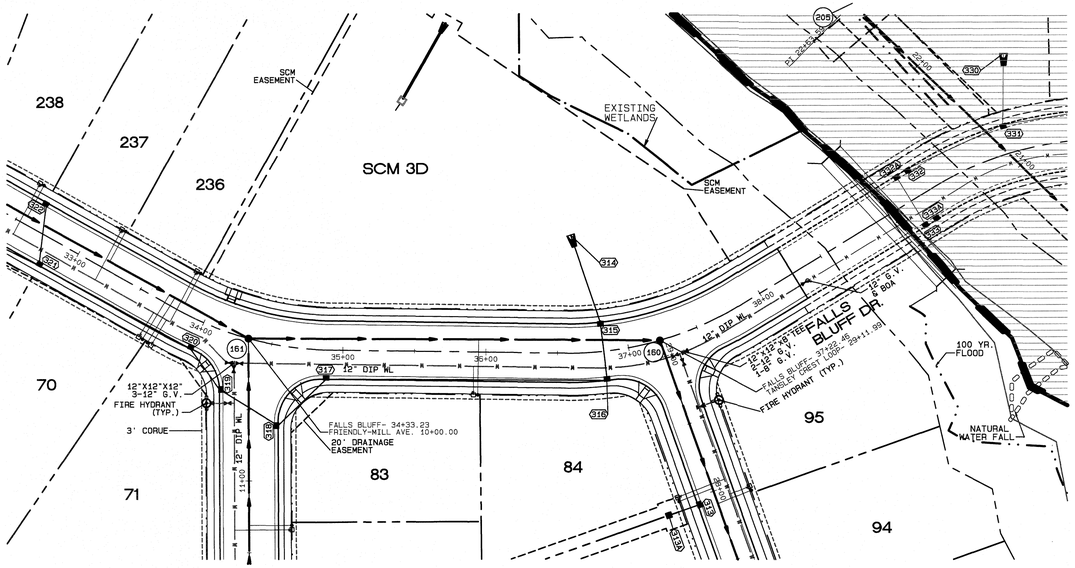
JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
4020 Westchase Blvd., Suite 450
Raleigh, NC 27607 919-469-1101

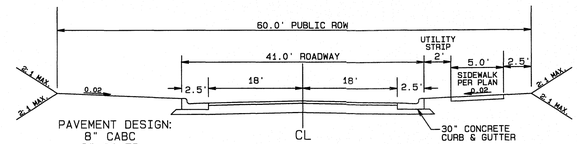
NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMAN
6/14/21

SHEET NO.
7.1

FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro
Plot Date: 6/14/2021 Time: 8:49AM



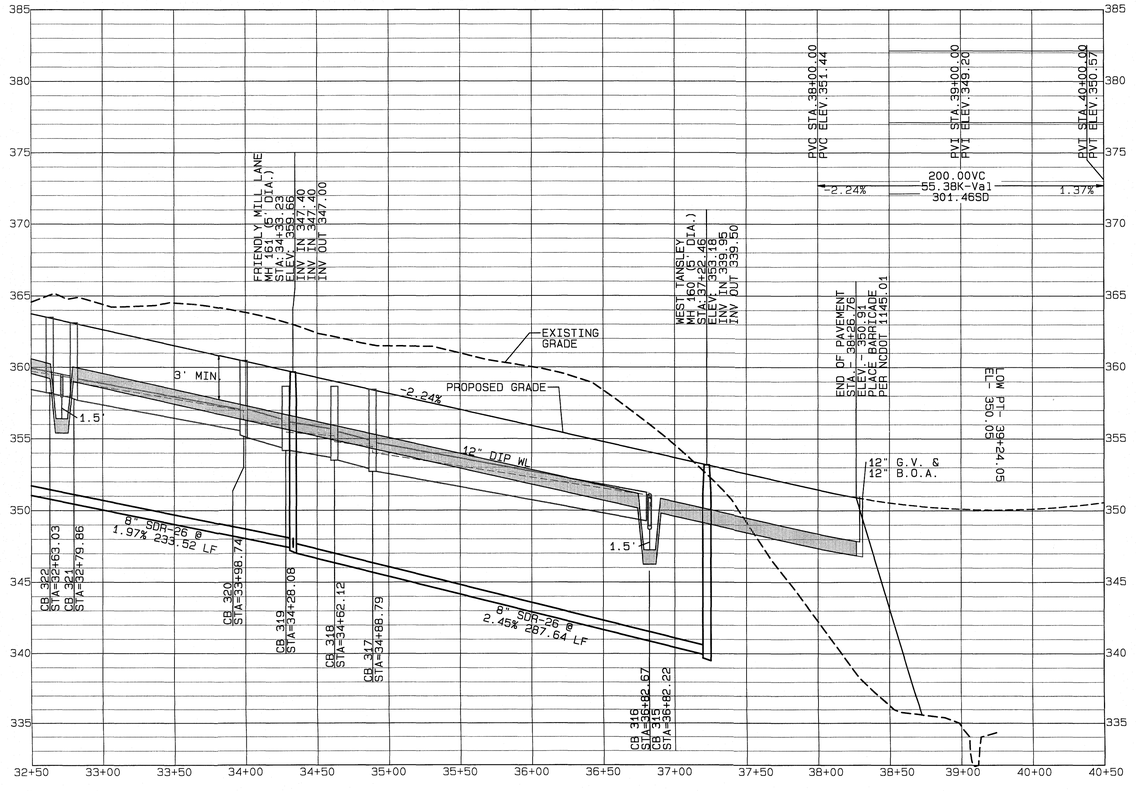
FALLS BLUFF DR.
41' B-B (60' ROW)
STA. 33+00-40+00



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

GRAPHIC SCALE 1"=50'
0 50 100 150



GENERAL NOTE:
1. ALL SANITARY SEWER PIPE GREATER THAN 12' DEPTH IS TO BE SDR 26 WITH #57 STONE FOR THE FIRST FOOT OF BACKFILL ABOVE THE PIPE CROWN UNLESS OTHERWISE NOTED.

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CITY OF RALEIGH - PLANS AUTHORIZED FORCONSTRUCTION

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City of Raleigh Development Approval

Raleigh Water Review Officer

No.	DATE	REVISION	DWN/CHK
1	12-7-20	Addressing CoR 1ST review comments.	BAH/JRH
2	02-10-21	ADDRESSING CoR CONSULTANT COMMENTS	BAH/JRH
3	05-14-21	FINAL SET	BAH/JRH

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

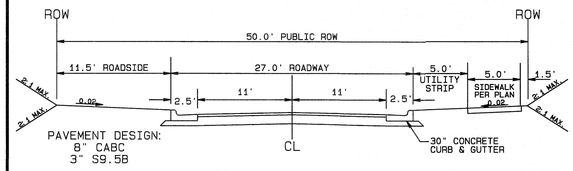
JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
4020 Westchase Blvd., Suite 450
Raleigh, NC 27607 919-469-1101

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 9810 JOHN R. HARDIN ENGINEER
6.15.21

SHEET NO.
7.2

FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro
Plot Date: 6/14/2021 Time 9:17AM



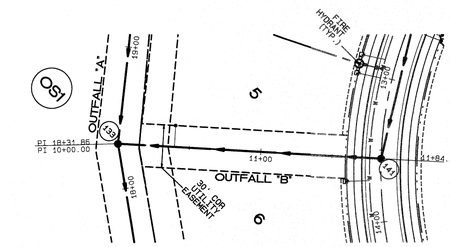
NOTE:
1. NORMAL CROWN OF 0.02 UNLESS OTHERWISE DIRECTED BY TOWN ENGINEER.
2. ASPHALT WILL BE INSTALLED AT A MIN. 1.5" LIFTS.

TYPICAL SECTION

GRAPHIC SCALE 1"=50'
0 50 100 150

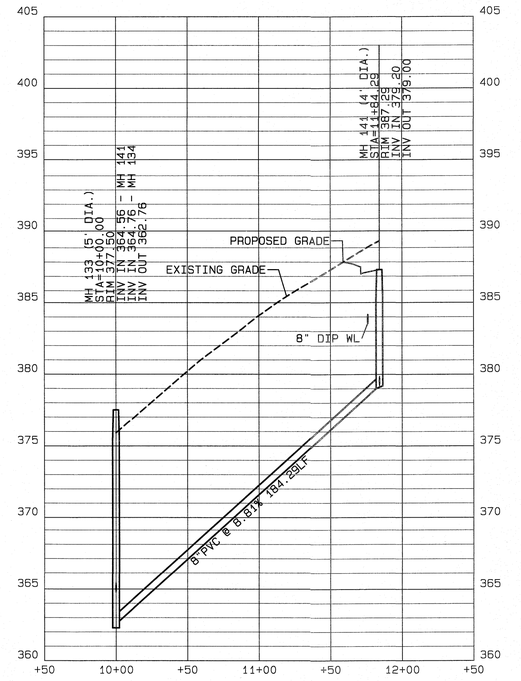
DARTFORD GREEN PL.
27' B-B (50' ROW)

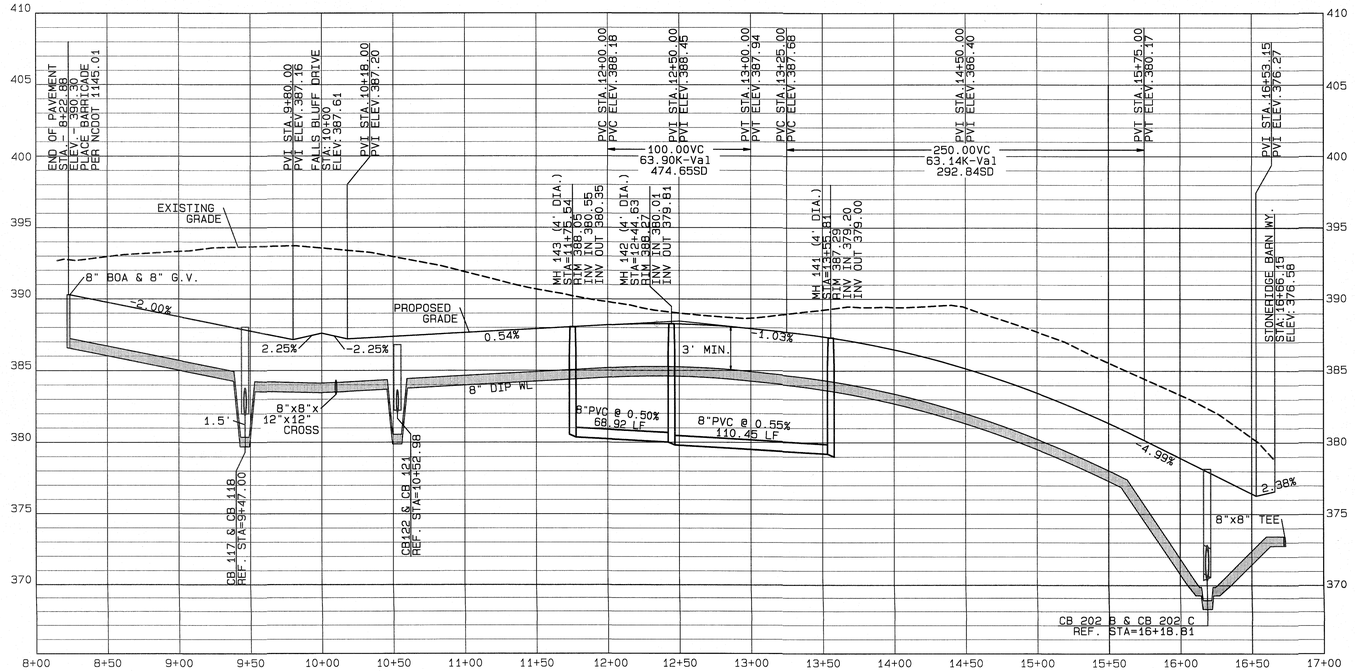
GENERAL NOTE:
1. ALL SANITARY SEWER PIPE GREATER THAN 12' DEPTH IS TO BE SDR 26 WITH #67 STONE FOR THE FIRST FOOT OF BACKFILL ABOVE THE PIPE CROWN UNLESS OTHERWISE NOTED.



GRAPHIC SCALE 1"=50'
0 50 100 150

OUTFALL "B"
MH141 THRU 133





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CITY OF RALEIGH - PLANS AUTHORIZED FOR CONSTRUCTION

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City of Raleigh Development Approval _____

Raleigh Water Review Officer

No.	DATE	REVISION	DWN/CHK
1	12-1-20	Addressing CoR 1ST review comments	BAH/JRH
2	05-10-21	ADDRESSING TOR CONSULTANT COMMENTS	BAH/JRH
3	06-14-21	FINAL SET	BAH/JRH

DARTFORD GREEN PLACE AND OUTFALL B 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.
4020 Westchase Blvd., Suite 450
Raleigh, NC 27607 919-469-1101

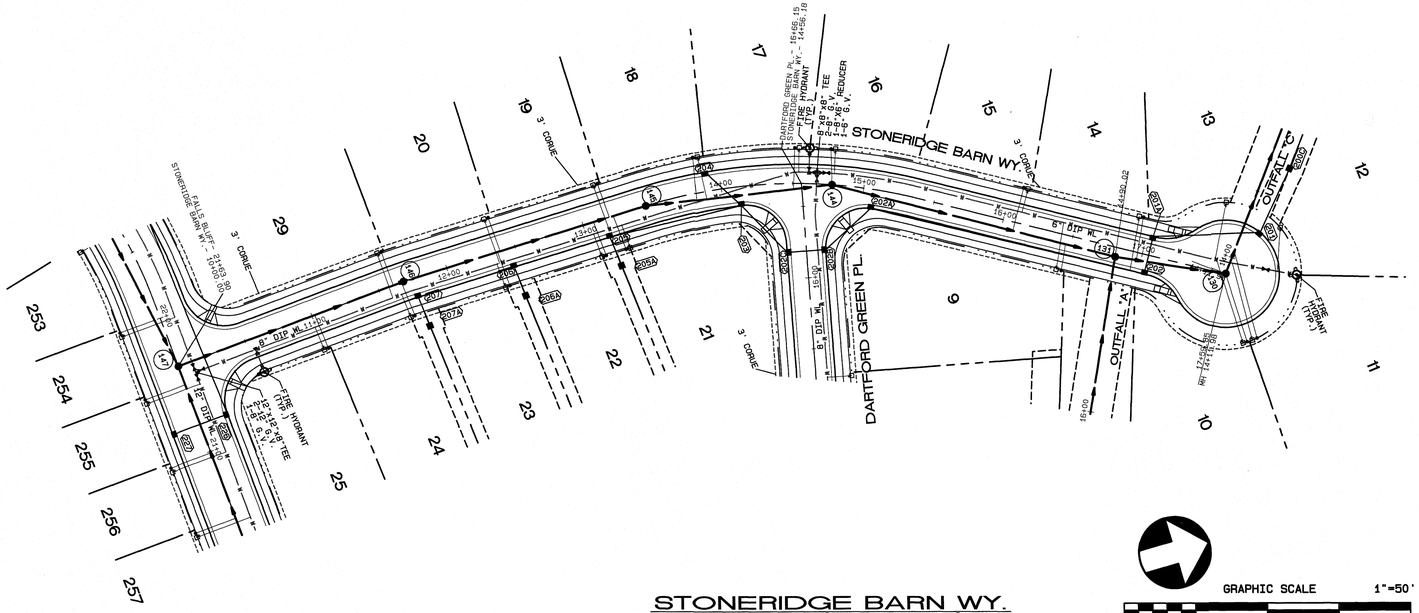
NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMAN

6.14.21

SHEET NO.

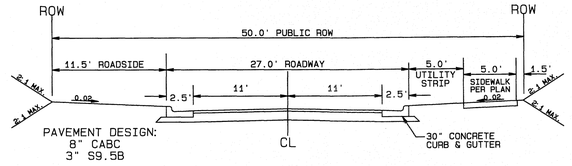
8.0

FILE: Z:\Jobs\9900\Watkins Property\Dwg\Base Map\Kalas Falls Base Phase 1.pro
Plot Date: 6/14/2021 Time: 9:22AM



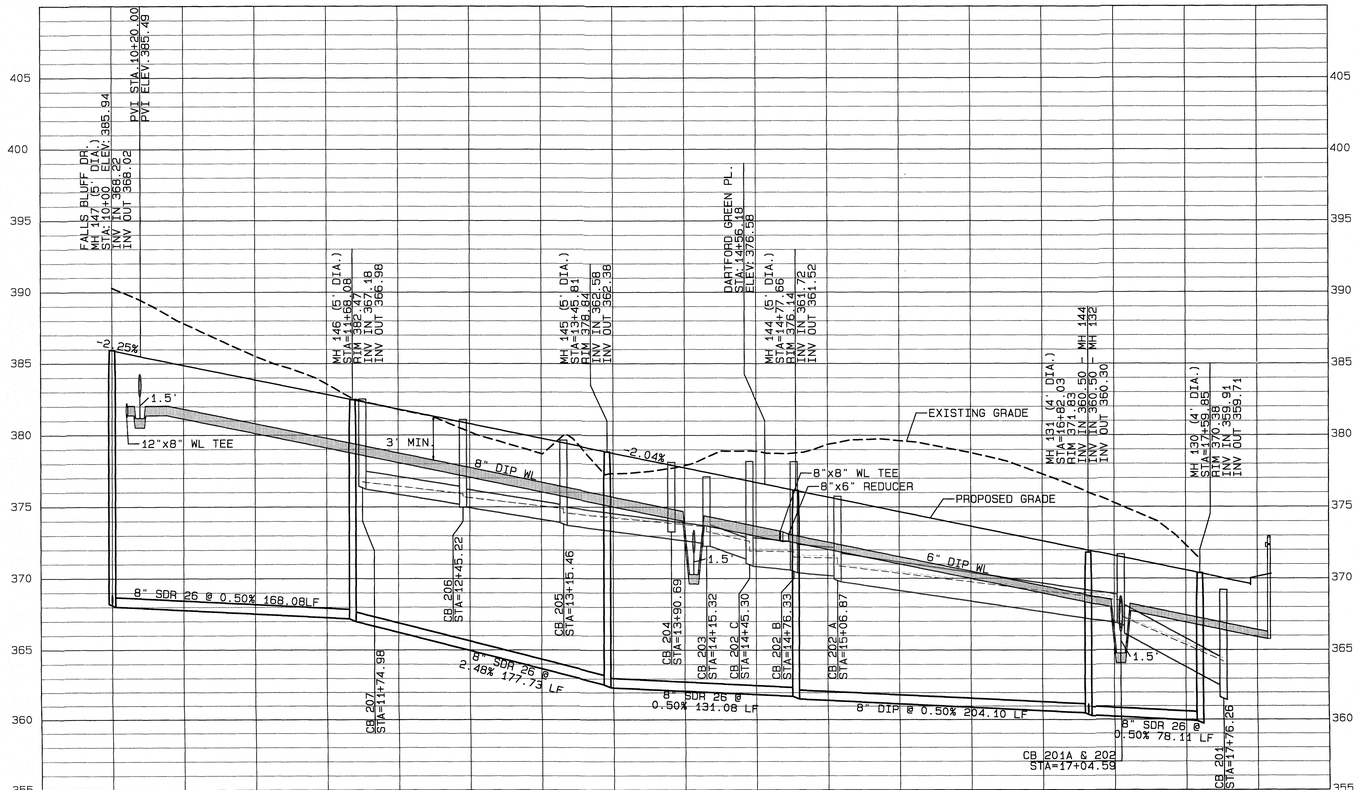
STONERIDGE BARN WY.
27' B-B (50' ROW)

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



GENERAL NOTE:
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Timothy Beasley

City of Raleigh Development Approval _____

Raleigh Water Review Officer

FILE: Z:\Jobs\9900\Watkins Property\Dwg\Base Map\Kalas Falls Base Phase 1.pro
Plot Date: 6/14/2021 Time: 8:23AM

No.	DATE	REVISION	DWN/CHK
1	12-1-20	Addressing for 1ST review comments.	BAH/JRH
2	02-10-21	ADDRESSING for CONSULTANT COMMENTS	BAH/JRH
3	06-14-21	FINAL SET	BAH/JRH

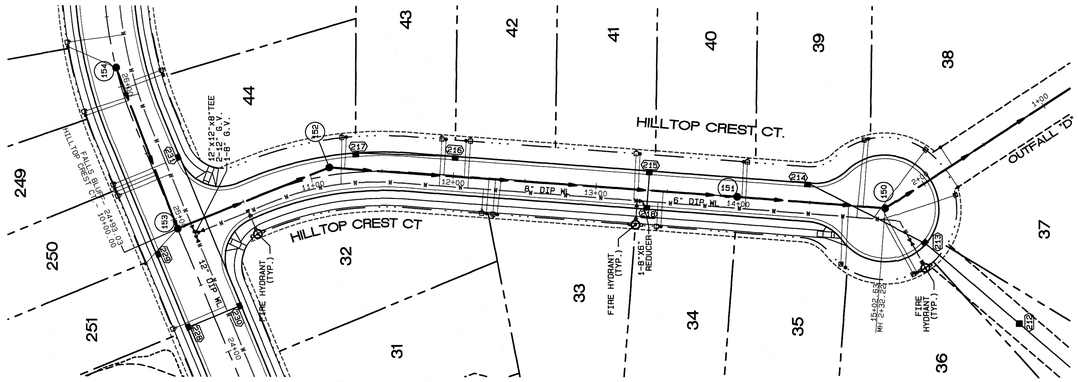
STONERIDGE BARN WY.
PLAN AND PROFILE
FOR
KALAS FALLS
SITUATED AT
1832 ROLESVILLE ROAD
WAKE COUNTY, NORTH CAROLINA
FIRM # C-3881

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

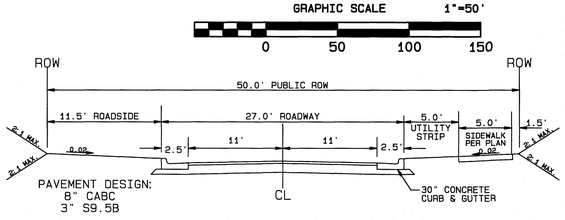
AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
4020 Westchase Blvd., Suite 450
Raleigh, NC 27607 919-469-1101

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMON
6.15.21

SHEET NO.
9.0



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



NOTE:
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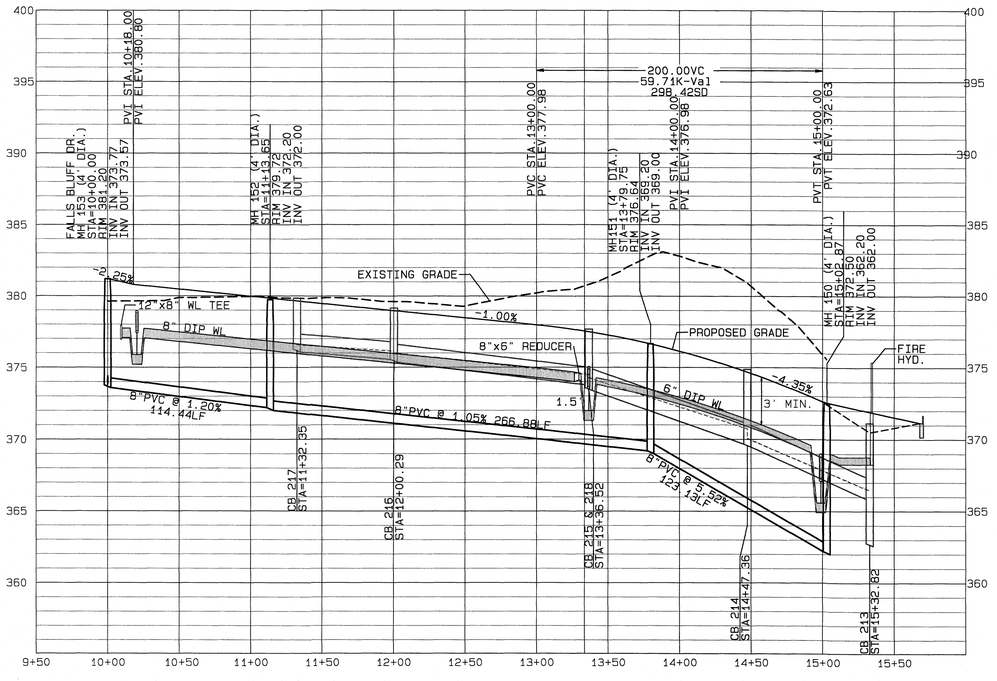
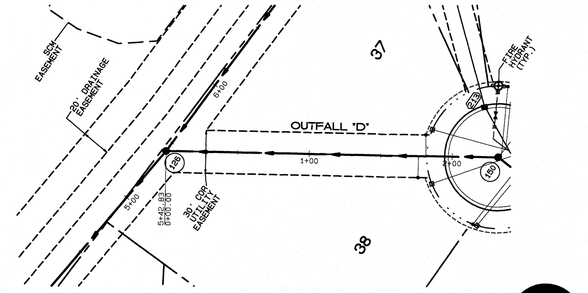
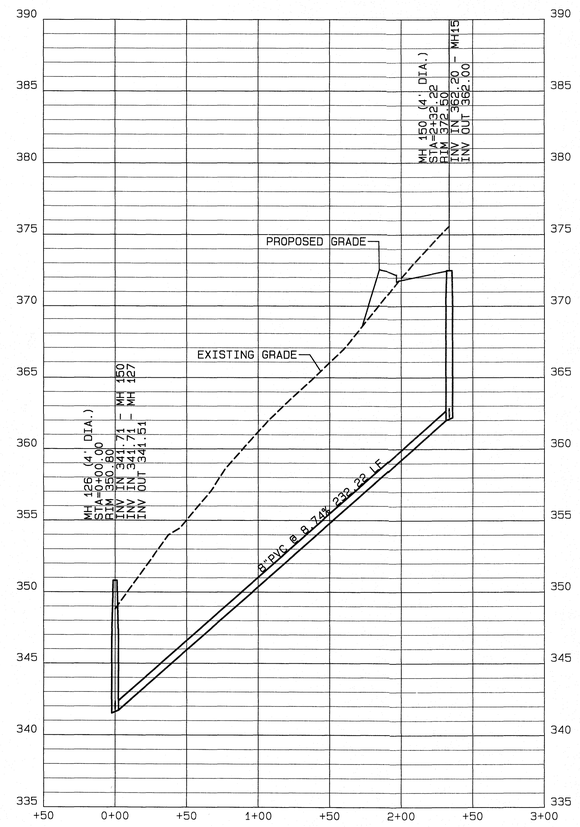
TYPICAL SECTION





OUTFALL "D"
MH150 THRU 126



GENERAL NOTE:
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Timothy Beal Digitally signed by Timothy Beal DN: cn=Timothy Beal, o=City of Raleigh, ou=Public Utilities, email=timothy.beal@raleighnc.gov, c=US Date: 2021.06.14 09:25:04 -04'00'

City of Raleigh Development Approval _____

Raleigh Water Review Officer

No.	DATE	REVISION	DWN/CHK
1	12-7-20	ADDRESSING COMMENTS	BAH/JRH
2	05-12-21	ADDRESSING CITY OF RALEIGH COMMENTS	BAH/JRH
3	06-14-21	FINAL SET	BAH/JRH

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.
4020 Westchase Blvd., Suite 450
Raleigh, NC 27607 919-469-1101

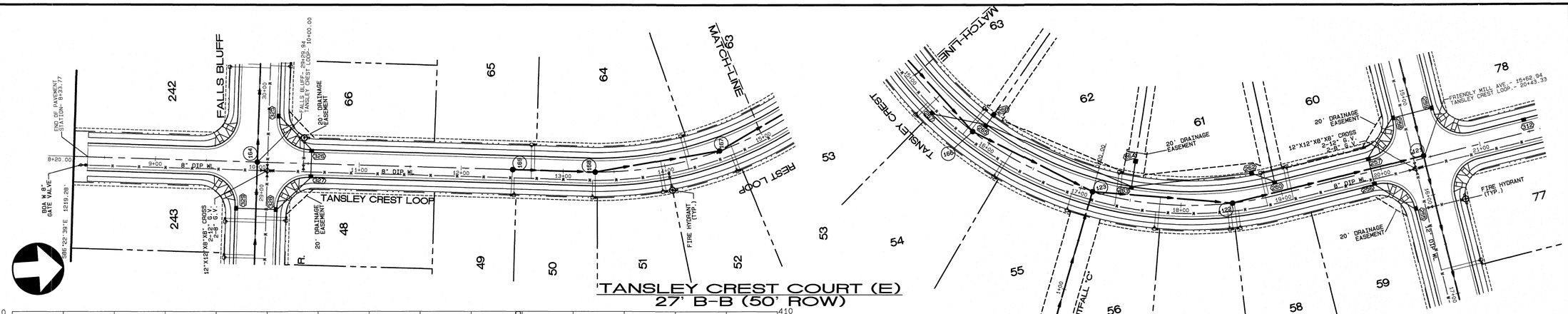
NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMAN

6.15.21

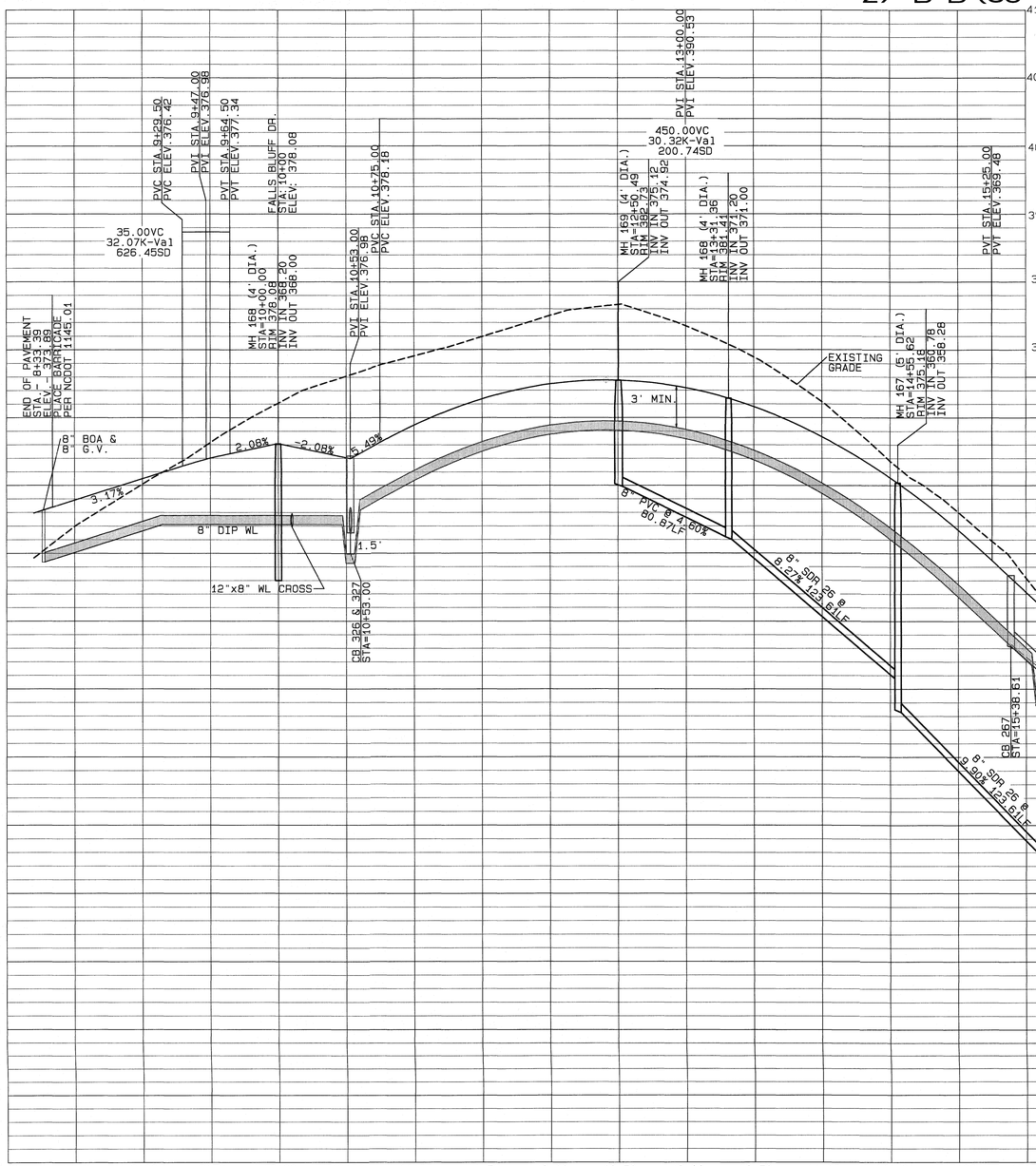
SHEET NO.

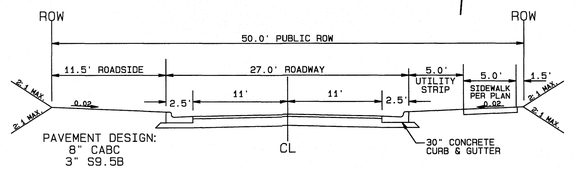
10.0

FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro
Plot Date: 6/14/2021 Time: 9:25AM



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





NOTE:
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2. ASPHALT WILL BE INSTALLED AT A MIN. 1.5" LIFTS.

TYPICAL SECTION

GENERAL NOTE:
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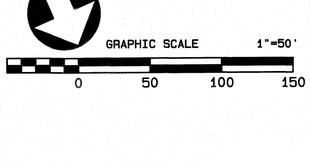

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City of Raleigh Development Approval _____

Timothy Beasley

Raleigh Water Review Officer

No.	DATE	REVISION	DWN/CHK
1	12-1-20	Addressing CoR IST review comments	BAH/JRH
2	05-10-21	ADDRESSING TOR CONSULTANT COMMENTS	BAH/JRH
3	05-24-21	FINAL SET	BAH/JRH

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
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DRAWN BY:	BAH
DATE:	4/24/2020

AMERICAN Engineering
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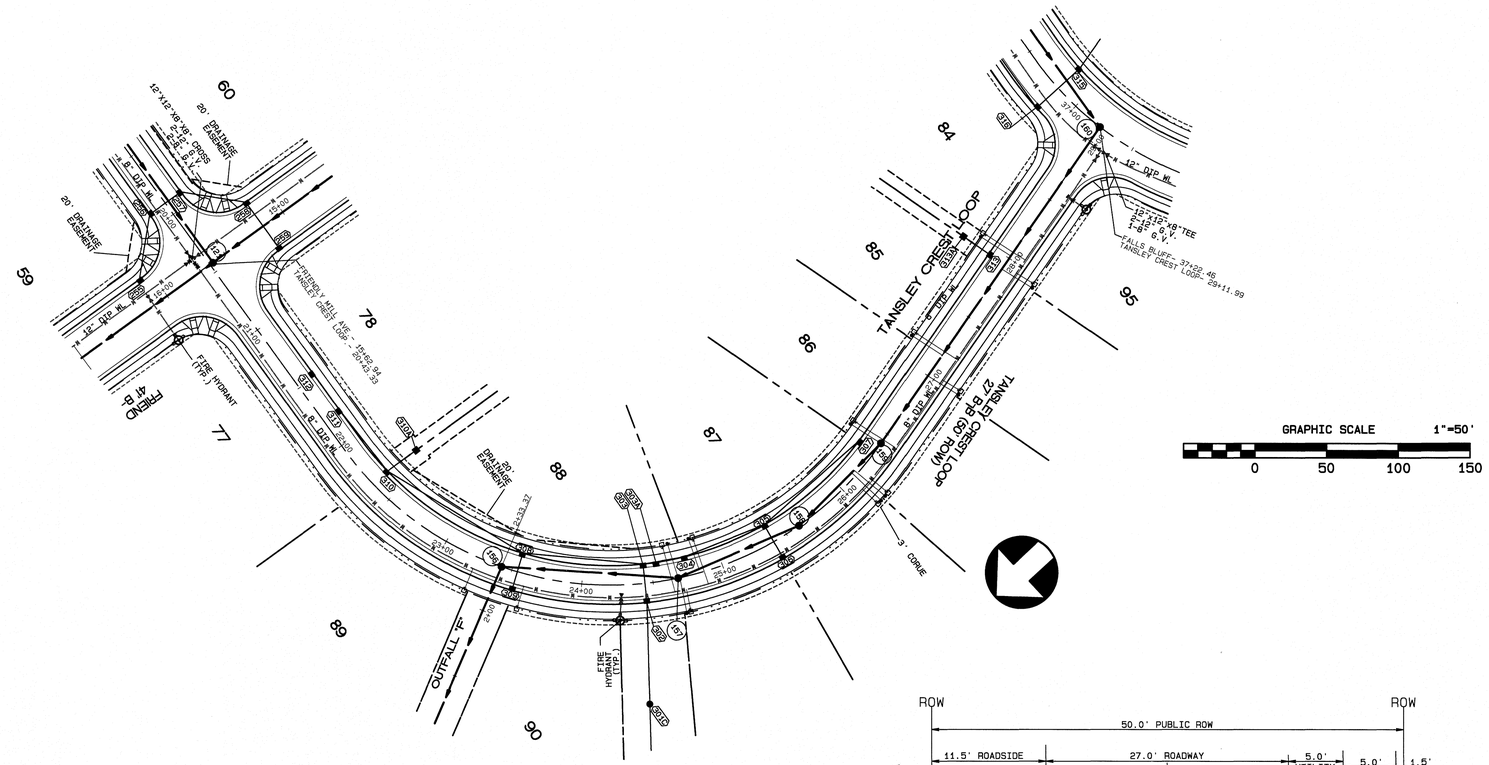
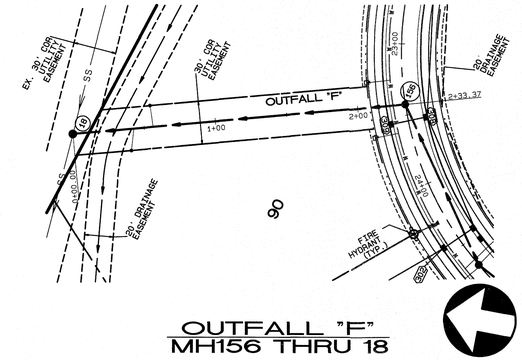
4020 Westchase Blvd., Suite 450
Raleigh, NC 27607 919-469-1101

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMAN
6.14.21

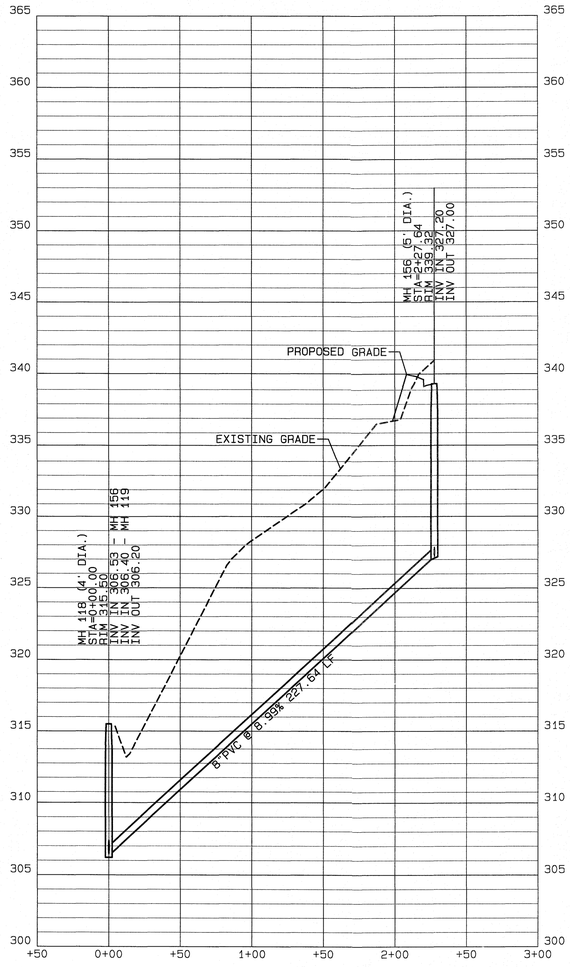
SHEET NO.
11.0

FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro
Plot Date: 6/14/2021 Time: 9:26AM

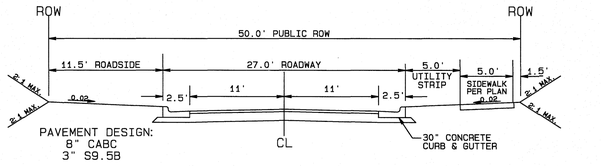




OUTFALL "F" MH156 THRU 18



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

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.

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 #** S-4824

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 #** W-3784

CITY OF RALEIGH - PLANS AUTHORIZED FOR CONSTRUCTION

Electronic Approval: This approval is being issued electronically. This approval is valid only upon the signature of a City of Raleigh Review Officer below. The City will retain a copy of the approved plans. Any work authorized by this approval must proceed in accordance with the plans kept on file with the City. This electronic approval may not be edited once issued. Any modification to this approval once issued will invalidate this approval.

City of Raleigh Development Approval

Timothy Beal

Raleigh Water Review Officer

No.	DATE	REVISION	DWN/CHK
1	12-1-20	Addressing CoR 1ST review comments	BAH/JRH
2	05-10-21	ADDRESSING, ToR CONSULTANT COMMENTS	BAH/JRH
3	06-14-21	FINAL SET	BAH/JRH

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.
4020 Westchase Blvd., Suite 450
Raleigh, NC 27607 919-469-1101

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HAMMAN

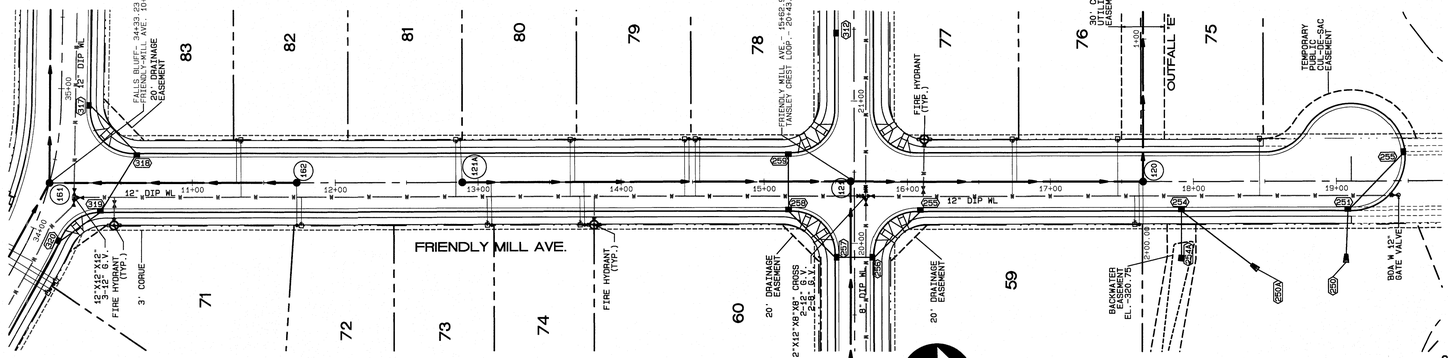
6.17.21

SHEET NO.

12.0

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

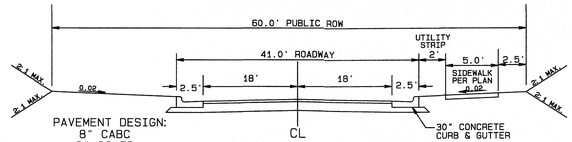
Plot Date: 6/17/2021 Time: 9:27AM



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.

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

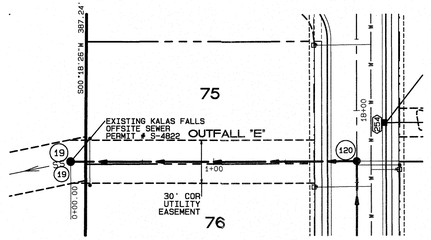
GRAPHIC SCALE 1"=50'
0 50 100 150



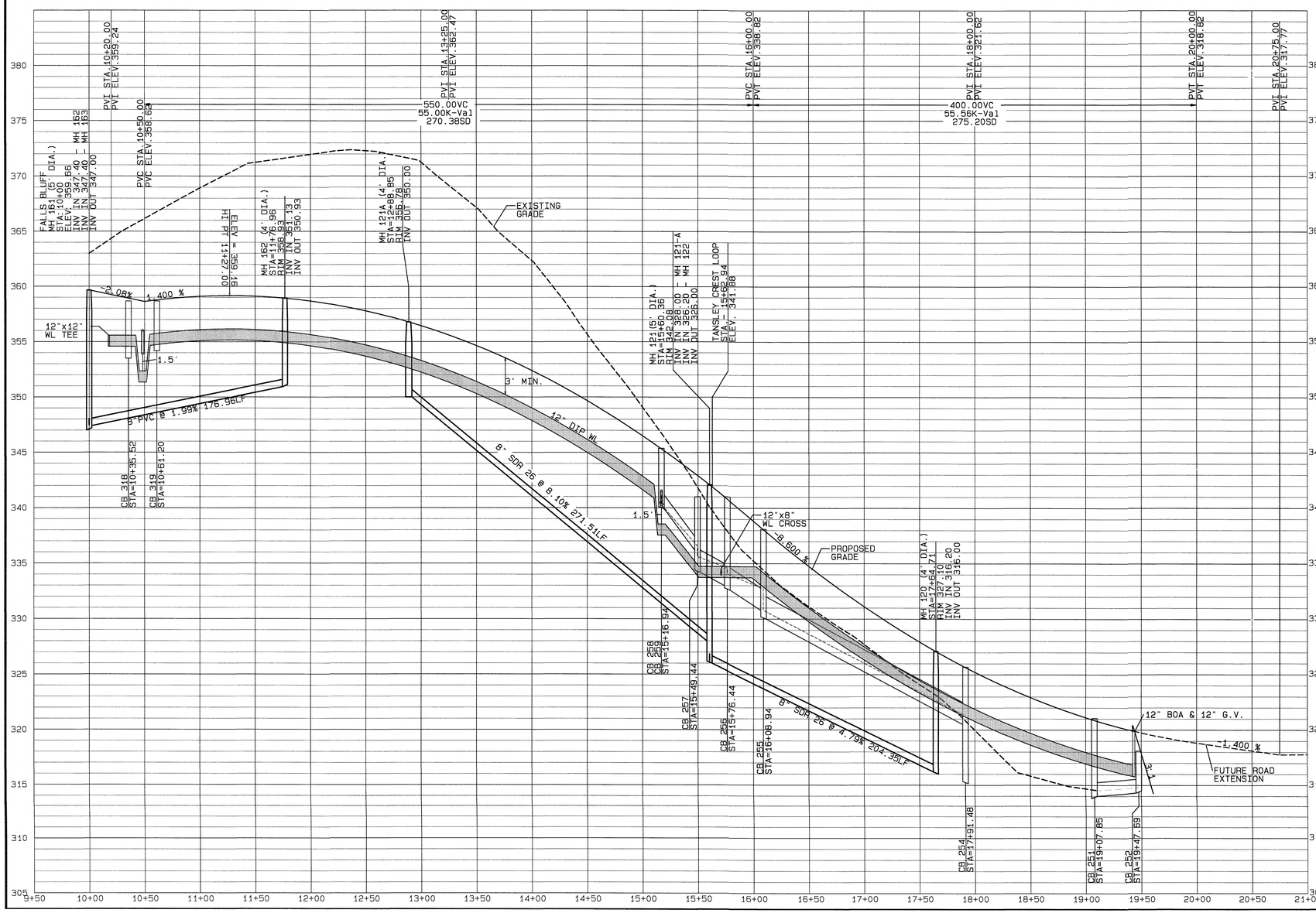
PAVEMENT DESIGN:
8" CABC
3" S9.5B

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



OUTFALL "E"
MH120 THRU 19



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 #** S-4824

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 #** W-3784

CITY OF RALEIGH - PLANS AUTHORIZED FOR CONSTRUCTION

Electronic Approval: This approval is being issued electronically. This approval is valid only upon the signature of a City of Raleigh Review Officer below. The City will retain a copy of the approved plans. Any work authorized by this approval must proceed in accordance with the plans kept on file with the City. This electronic approval may not be edited once issued. Any modification to this approval once issued will invalidate this approval.

City of Raleigh Development Approval

Raleigh Water Review Officer

No.	DATE	REVISION	DWN/CHK
1	12-1-20	Addressing CoR 1ST review comments	BAH/JRH
2	05-10-21	ADDRESSING ToR CONSULTANT COMMENTS	BAH/JRH
3	05-14-21	FINAL SET	BAH/JRH

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

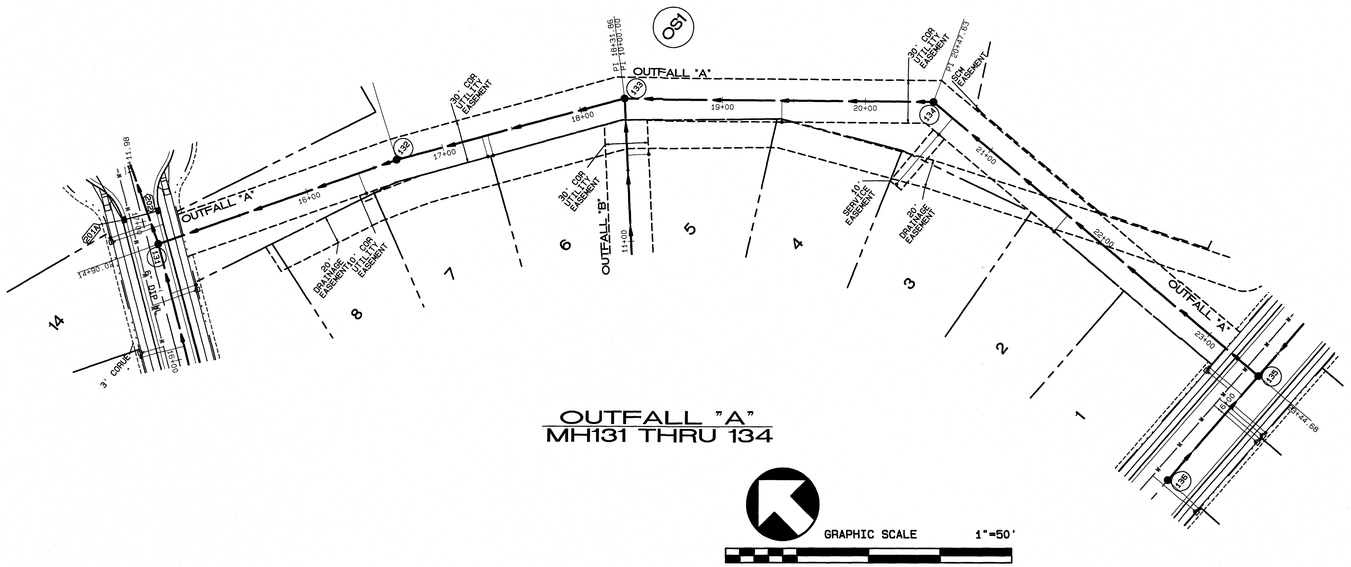
AMERICAN Engineering
American Engineering Associates–Southeast, P.A.
4020 Westchase Blvd., Suite 450
Raleigh, NC 27607 919–469–1101

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMAN
6.15.21

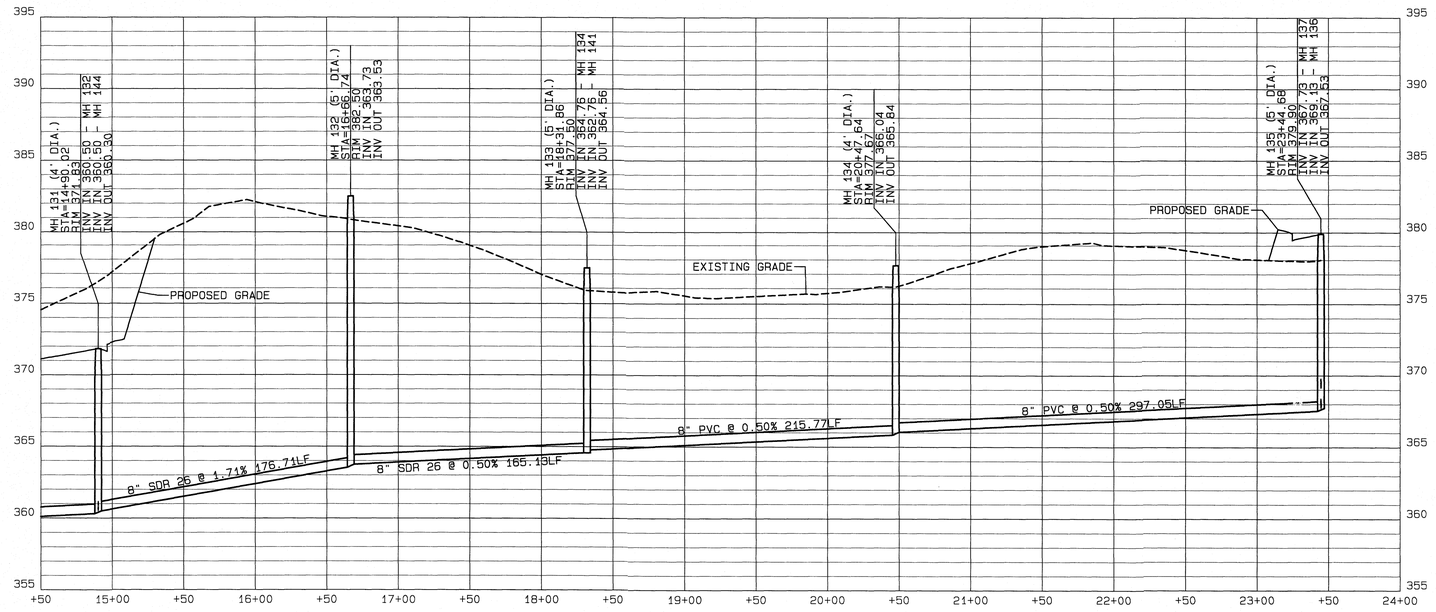
SHEET NO.
13.0

Plot Date: 6/14/2021 Time: 9:28AM
FILE: Z:\Jobs\9900\Watkins Property\Dwg\Base Map\Kalas Falls Base Phase 1.pro

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.



OUTFALL "A"
MH131 THRU 134



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 #** S-4824

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 #** W-3784

CITY OF RALEIGH - PLANS AUTHORIZED FOR CONSTRUCTION

Electronic Approval: This approval is being issued electronically. This approval is valid only upon the signature of a City of Raleigh Review Officer below. The City will retain a copy of the approved plans. Any work authorized by this approval must proceed in accordance with the plans kept on file with the City. This electronic approval may not be edited once issued. Any modification to this approval once issued will invalidate this approval.

City of Raleigh Development Approval _____

Raleigh Water Review Officer

Plot Date: 6/14/2021 Time: 9:30AM

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

No.	DATE	REVISION	DWN/CHK
1	12-1-20	ADDRESSING CDR 1ST REVIEW COMMENTS.	BAH/JRH
2	05-07-21	ADDRESSING CDR CONSULTANT COMMENTS	BAH/JRH
3	06-14-21	FINAL SET	BAH/JRH

SANITARY SEWER OUTFALL A PLAN AND PROFILE

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA

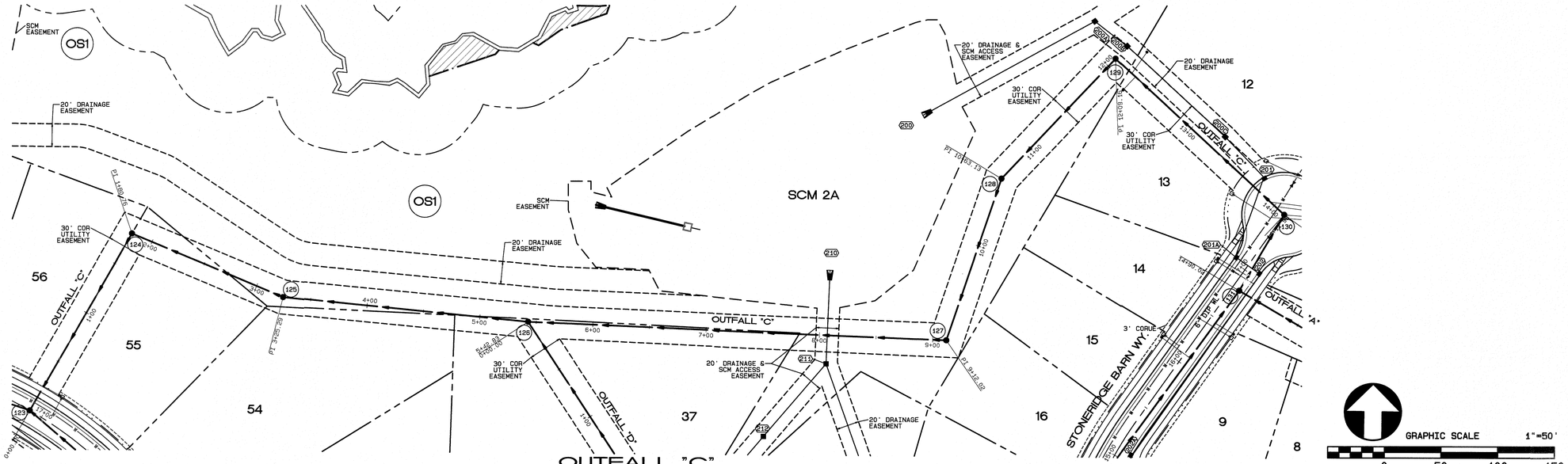
FIRM # C-3881

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

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
4020 Westchase Blvd., Suite 450
Raleigh, NC 27607 919-469-1101

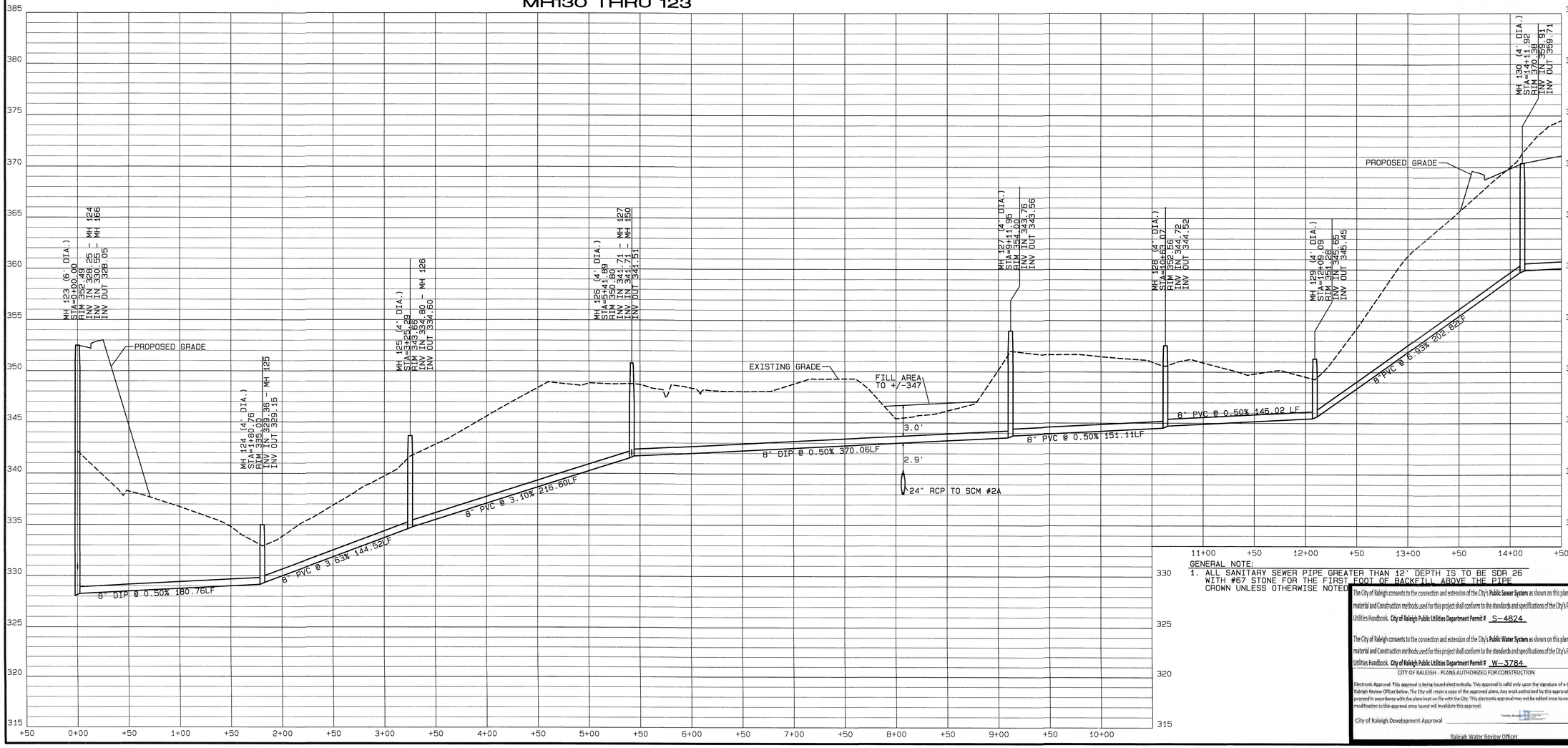
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 9810 JOAN R. HARMAN ENGINEER
6.15.21

SHEET NO.
14.0



GRAPHIC SCALE 1"=50'
0 50 100 150

OUTFALL "C"
MH130 THRU 123



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.

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 #** S-4824

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 #** W-3784

CITY OF RALEIGH - PLANS AUTHORIZED FOR CONSTRUCTION

Electronic Approval: This approval is being issued electronically. This approval is valid only upon the signature of a City of Raleigh Review Officer below. The City will retain a copy of the approved plans. Any work authorized by this approval must proceed in accordance with the plans kept on file with the City. This electronic approval may not be edited once issued. Any modification to this approval once issued will invalidate this approval.

City of Raleigh Development Approval _____

Timothy Beadle

Raleigh Water Review Officer

No.	DATE	REVISION	DWN/CHK
1	12-1-20	Addressing COR 1ST review comments.	BAH/JRH
2	05-10-21	ADDRESSING FOR CONSULTANT COMMENTS	BAH/JRH
3	05-14-21	FINAL - PIPE MATERIAL RUNNING INTO MH 123	BAH/JRH
4	06-14-21	FINAL SET	BAH/JRH

SANITARY SEWER OUTFALL C PLAN AND PROFILE

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA

FIRM # C-3881

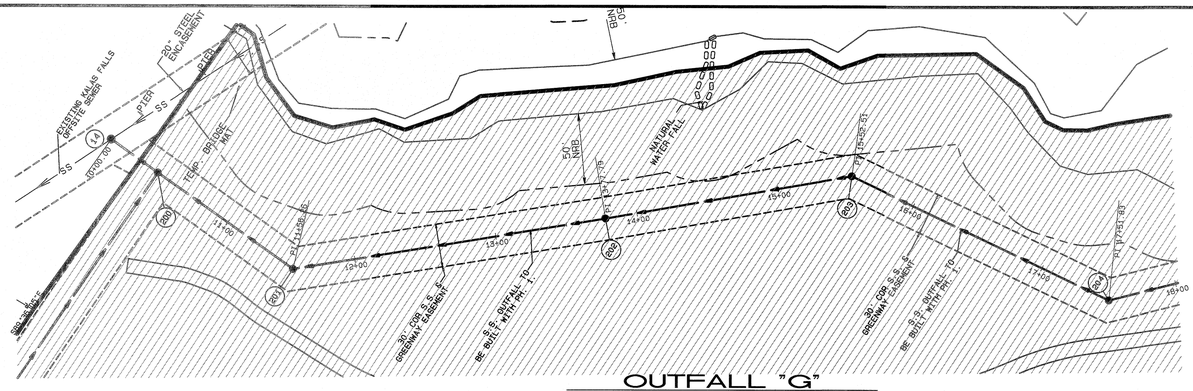
JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
4020 Westchase Blvd., Suite 450
Raleigh, NC 27607 919-469-1101

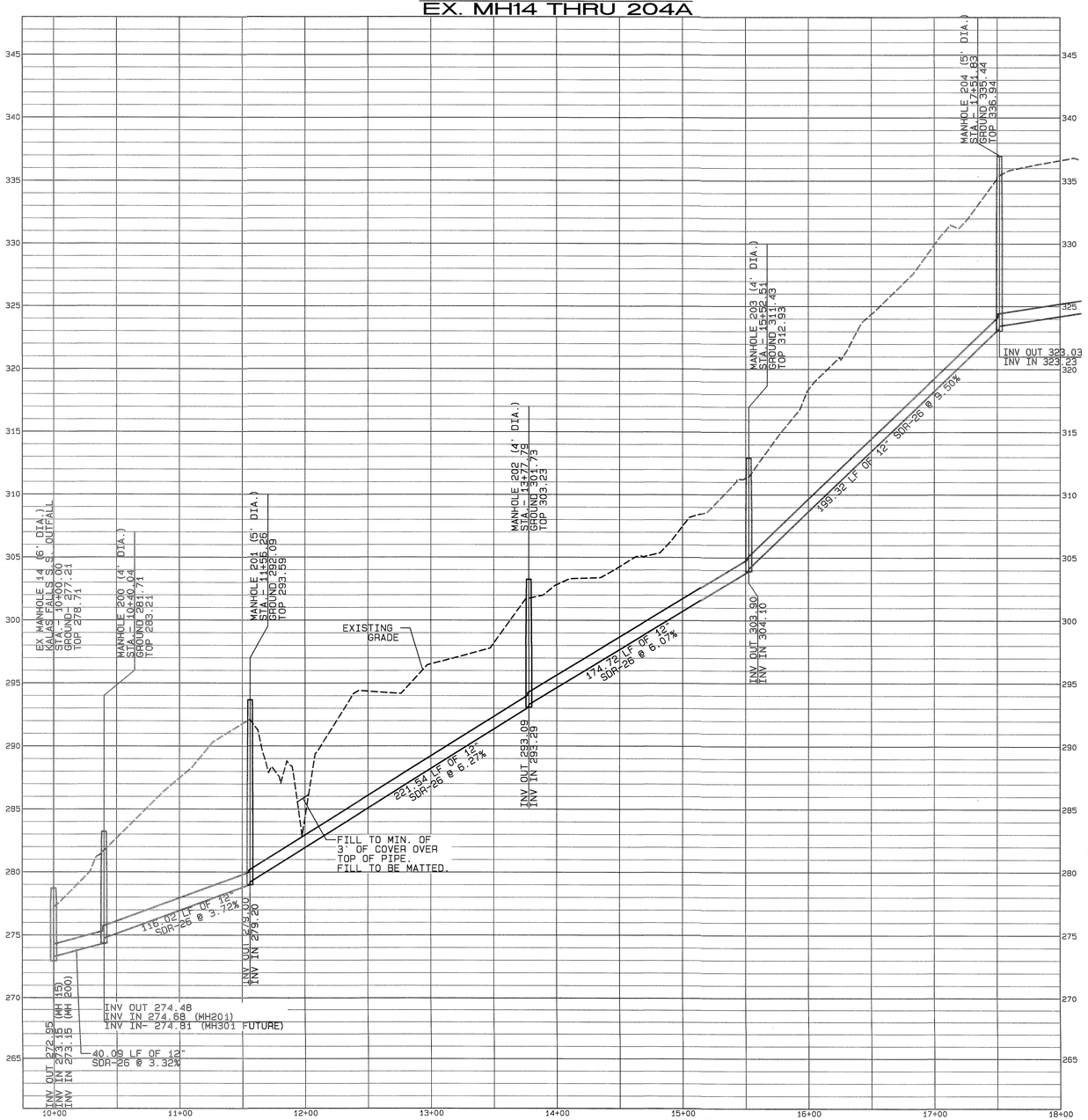
NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R HARMON
6.15.21

SHEET NO.
15.0

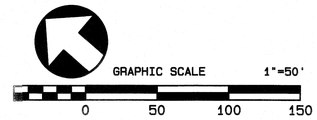
FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro
Plot Date = 6/14/2021 Time= 9:57AM



OUTFALL "G"
EX. MH14 THRU 204A



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.



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 # S-4824

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 # W-3784

CITY OF RALEIGH - PLANS AUTHORIZED FOR CONSTRUCTION

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City of Raleigh Development Approval _____

Raleigh Water Review Officer

No.	DATE	REVISION	DWN/CHK
1	12-1-20	Addressing CoR 1ST review comments.	BAH/JRH
2	05-10-21	ADDRESSING TOR CONSULTANT COMMENTS	BAH/JRH
3	06-17-21	CORRECTED RIM ELEVATION ON MH 14.	BAH/JRH
4	06-24-21	FINAL SET	BAH/JRH

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

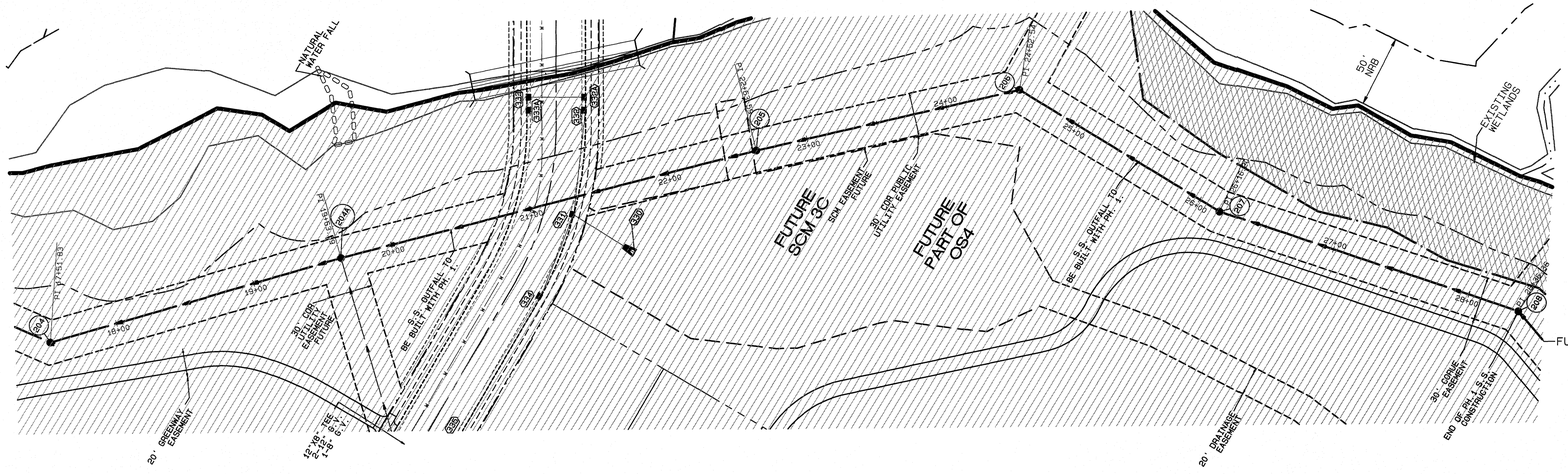
AMERICAN Engineering
American Engineering Associates–Southeast, P.A.
4020 Westchase Blvd., Suite 450
Raleigh, NC 27607 919-469-1101

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMAN

SHEET NO.
16.0

FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro
Plot Date: 6/14/2021 Time: 9:53AM

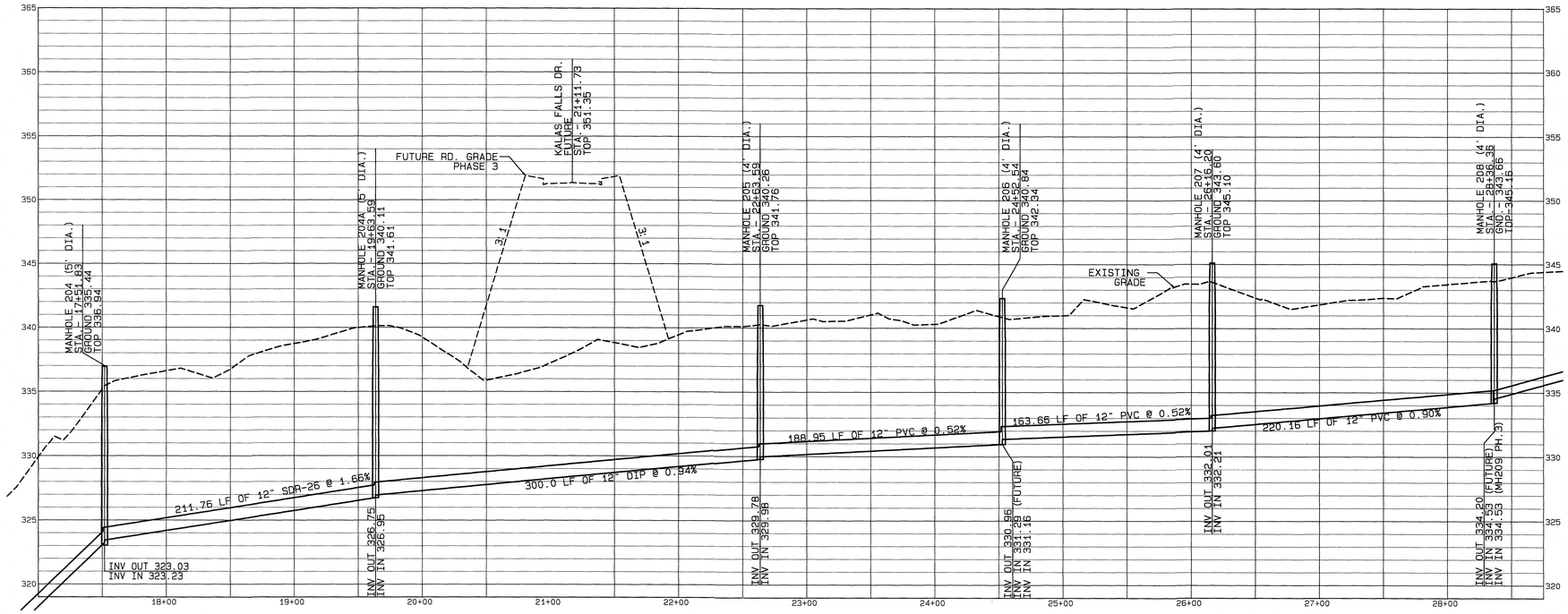
GENERAL NOTE:
1. ALL SANITARY SEWER PIPE GREATER THAN 12' DEPTH IS TO BE SDR 26 WITH #67 STONE FOR THE FIRST FOOT OF BACKFILL ABOVE THE PIPE CROWN UNLESS OTHERWISE NOTED.



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

GRAPHIC SCALE 1"=50'
0 50 100 150

OUTFALL "G"
MH204A THRU 206



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CITY OF RALEIGH - PLANS AUTHORIZED FOR CONSTRUCTION

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Timothy Beard

City of Raleigh Development Approval _____

Raleigh Water Review Officer

No.	DATE	REVISION	DWN/CHK
1	12-1-20	ADDRESSING COR ISSUES	BAH/JRH
2	05-10-21	ADDRESSING COR CONSULTANT COMMENTS	BAH/JRH
3	05-14-21	FINAL SET	BAH/JRH

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

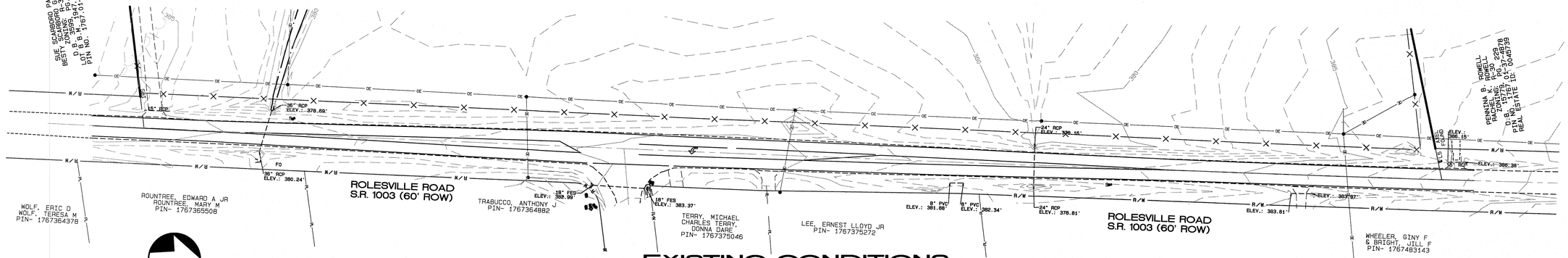
JOB NUMBER:	9900
CHECKED BY:	JRH
DRAWN BY:	BAH
DATE:	4/24/2020

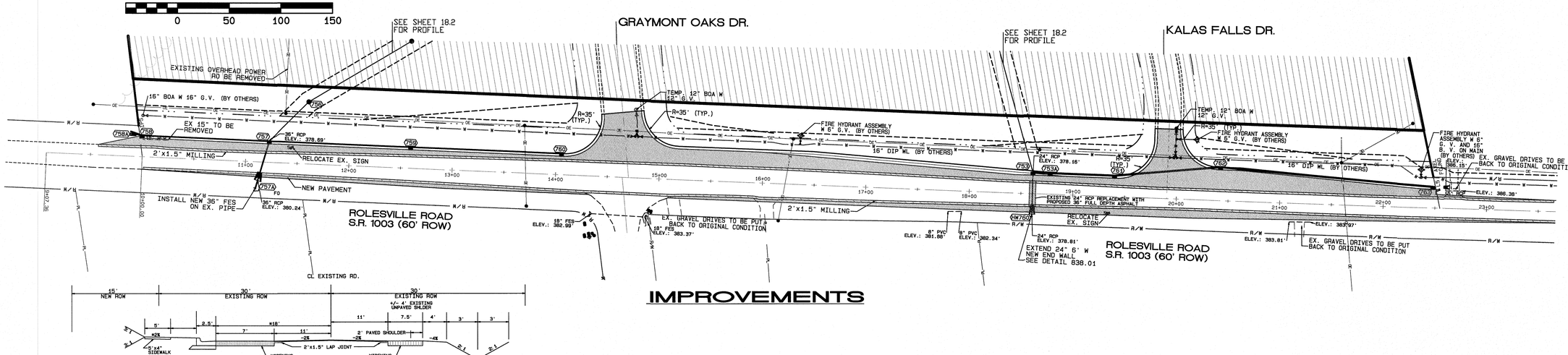
AMERICAN Engineering
American Engineering Associates–Southeast, P.A.
4020 Westchase Blvd., Suite 450
Raleigh, NC 27607 919-469-1101

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMAN
6-15-21

SHEET NO.
17.0

FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro
Plot Date: 5/14/2021 - Time: 9:52AM

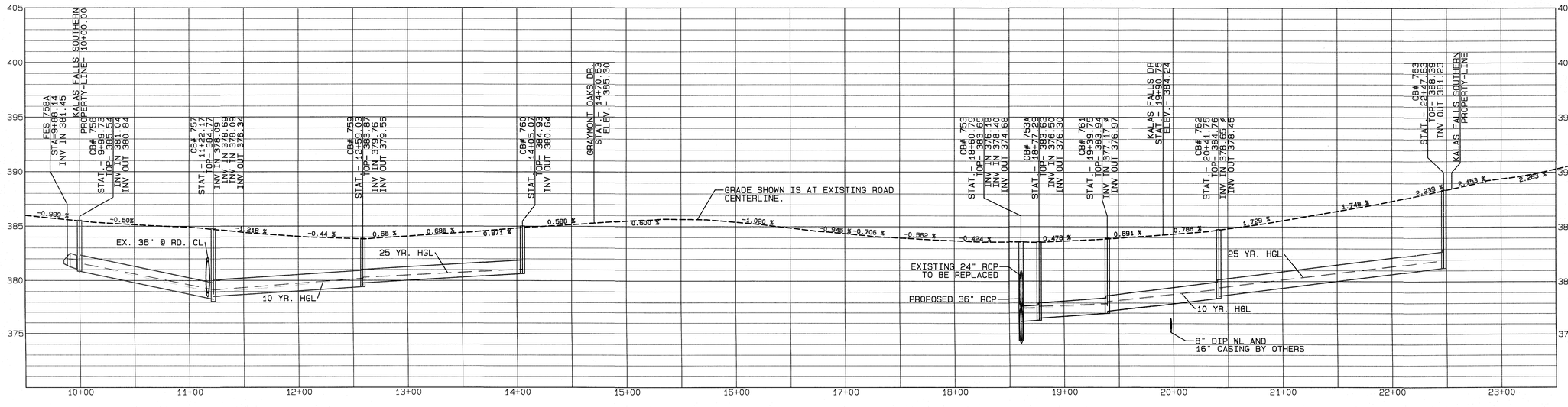




ROLESVILLE RD.
CROSS-SECTION (TYPICAL)

PAVEMENT DESIGN 6' OR LESS:	PAVEMENT DESIGN GREATER THAN 6':
3" S9.5C	3" S9.5C
4" I-19C	4" I-19C
5" B25.0C	10" ABC

GENERAL NOTES:
1. PAVEMENT DESIGN TO BE DESIGNATED BY NCDOT ENCROACHMENT AGREEMENT. OVERLAY OR LAP JOINT TO BE DETERMIMINED BY NCDOT ENCROACHMENT AGREEMENT.
2. CONTRACTOR IS RESPONSIBLE FOR CONTACTING 811 AT A MINIMUM OF 3 DAYS BEFORE STARTING TO DIG. 811 OR 1-800-632-4949.
* WIDTH TO BE 30' WITH A RIGHT TURN LANE.



No.	DATE	REVISION	DWN/CHK
1	05/10/21	ADDRESSING CoC CONSULTING COMMENTS	BAH/ARH
1	06/28/21	ADDRESSING NCDOT COMMENTS	BAH/ARH

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

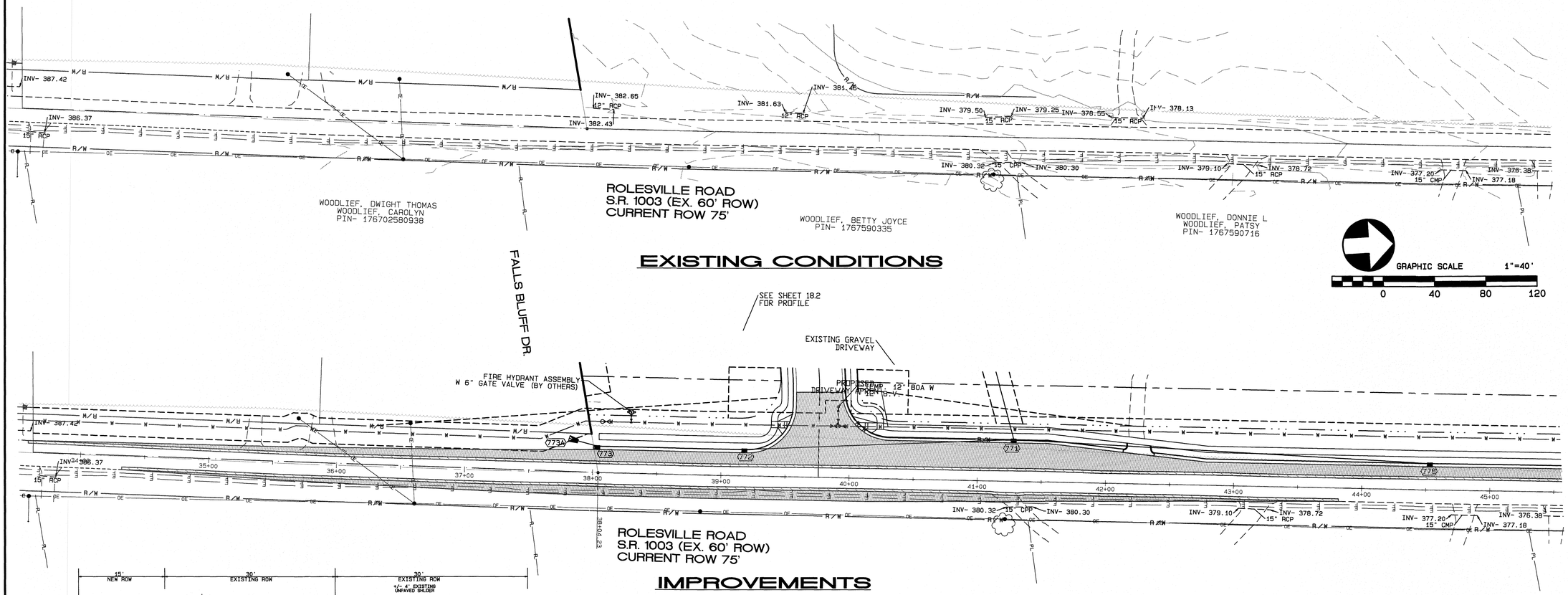
JOB NUMBER:
CHECKED BY:
DRAWN BY:
DATE:

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
4020 Westchase Blvd., Suite 450
Raleigh, NC 27607 919-469-1101

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R HARMAN
6.28.21

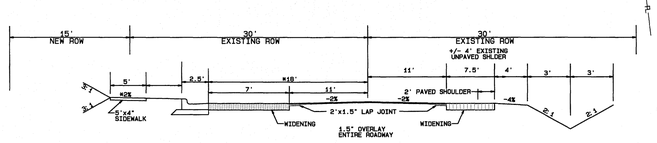
SHEET NO.
18.0

Plot Date: 6/28/2021 Time: 8:09AM FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro



EXISTING CONDITIONS

IMPROVEMENTS



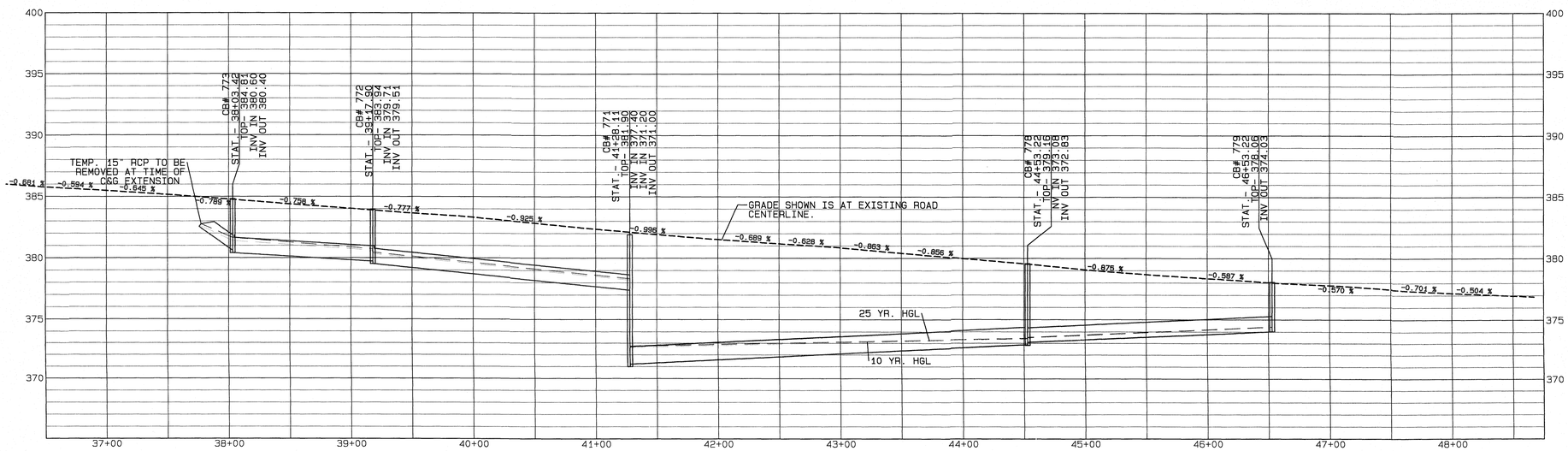
PROPOSED PAVEMENT SLOPE TO MATCH EXISTING CROSS SLOPE

ROLESVILLE RD.
CROSS-SECTION (TYPICAL)

PAVEMENT DESIGN 6' OR LESS:	PAVEMENT DESIGN GREATER THAN 6':
3" S9.5C	3" S9.5C
4" I-19C	4" I-19C
5" B25.0C	10" ABC

GENERAL NOTES:
1. PAVEMENT DESIGN TO BE DESIGNATED BY NCDOT ENCROACHMENT AGREEMENT
   OVERLAY OR LAP JOINT TO BE DETERMINED BY NCDOT ENCROACHMENT AGREEMENT.
2. CONTRACTOR IS RESPONSIBLE FOR CONTACTING 811 AT A MINIMUM OF 3 DAYS BEFORE STARTING TO DIG. 811 OR 1-800-632-4949.

* WIDTH TO BE 30' WITH A RIGHT TURN LANE.



No.	DATE	REVISION
1	05/20/21	ADDRESSING 1st CONSULTING COMMENTS
1	06/28/21	ADDRESSING NCDOT COMMENTS

DWN/CHK
BAH/JRH
BAH/JRH

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

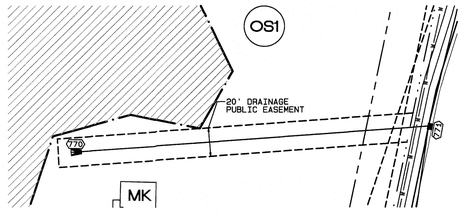
JOB NUMBER:
CHECKED BY:
DRAWN BY:
DATE:

AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
4020 Westchase Blvd., Suite 450
Raleigh, NC 27607 919-469-1101

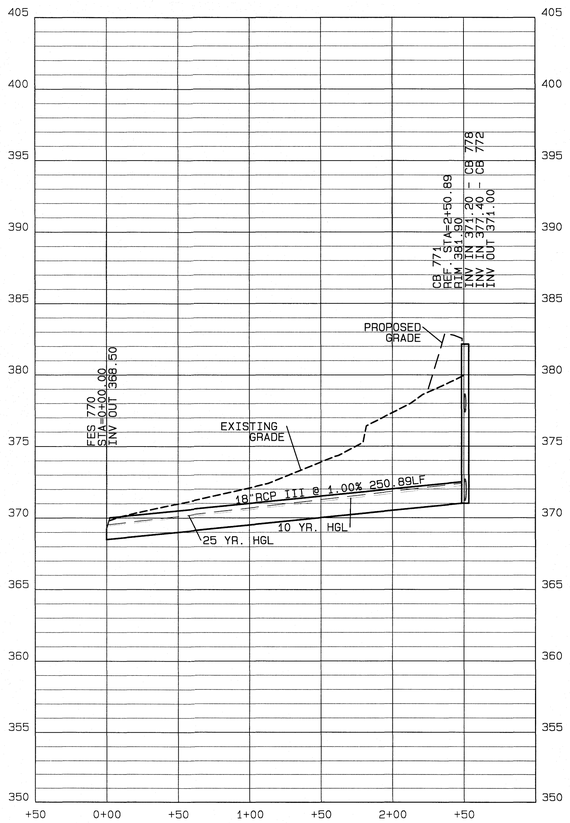
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 9810 JOHN R. HERMAN
6.28.21

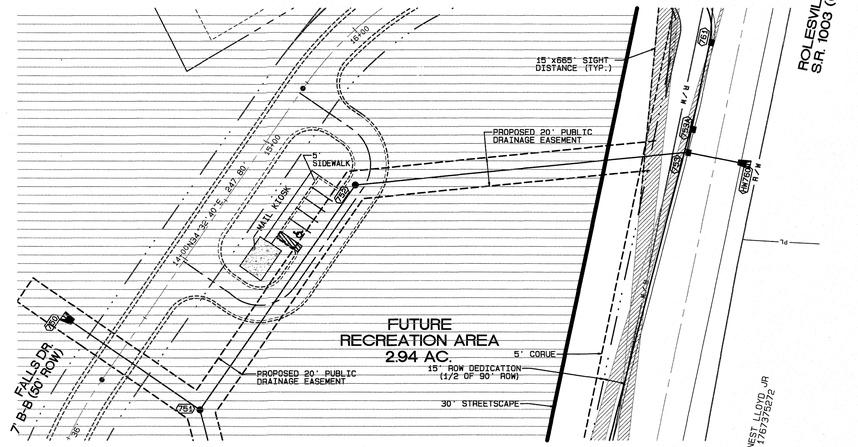
SHEET NO.
18.1

Plot Date - 6/28/2021 Time- 8:09AM FILE: Z:\Jobs\9800\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro

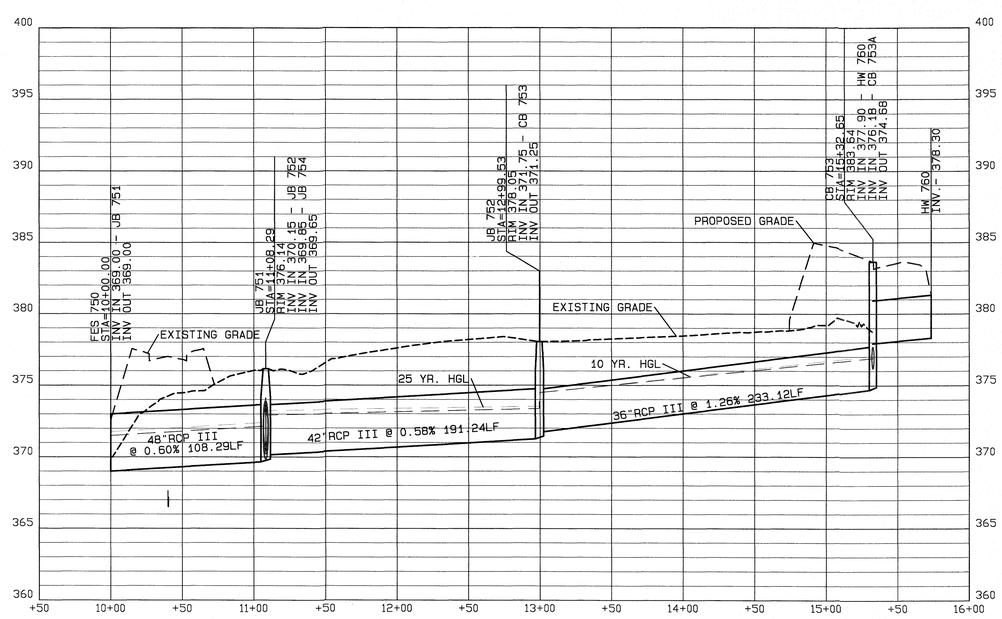


CB 771 TO FES 770





HW 760 TO JB 750



No.	DATE	REVISION	DWN/CHK
1	05/10/21	ADDRESSING TOR CONSULTING COMMENTS	BAH/JRH
1	06/28/21	ADDRESSING NCDOT COMMENTS	BAH/JRH

ROLESVILLE ROAD OFF-SITE STORM PLAN AND PROFILES

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.
4020 Westchase Blvd., Suite 450
Raleigh, NC 27607 919-469-1101

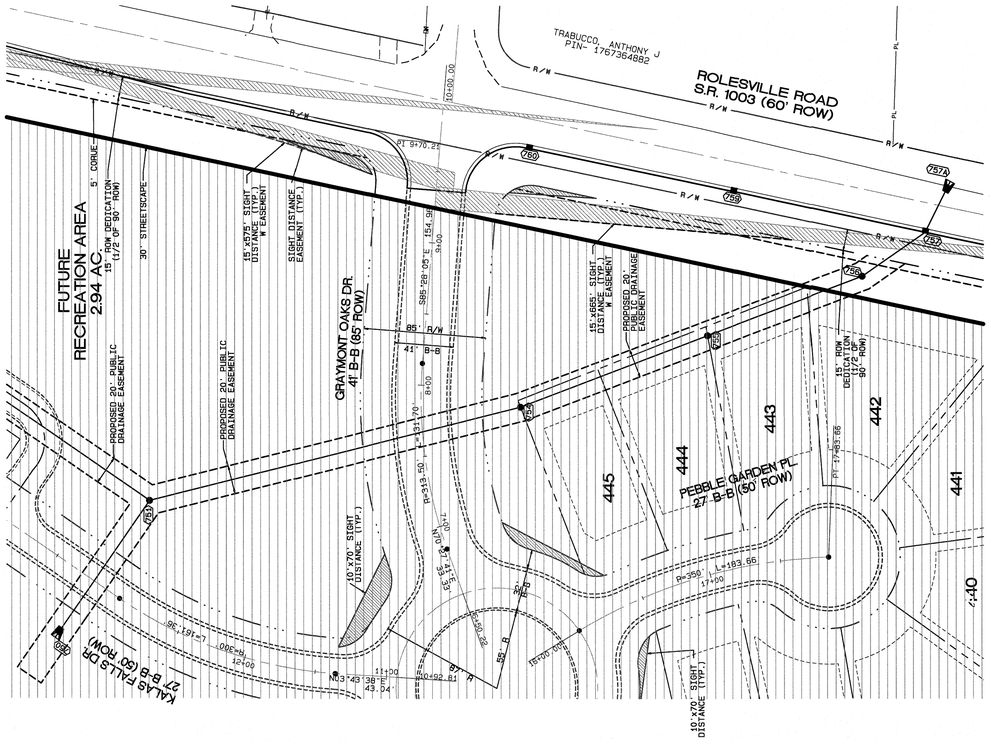
NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMAN

6.28.21

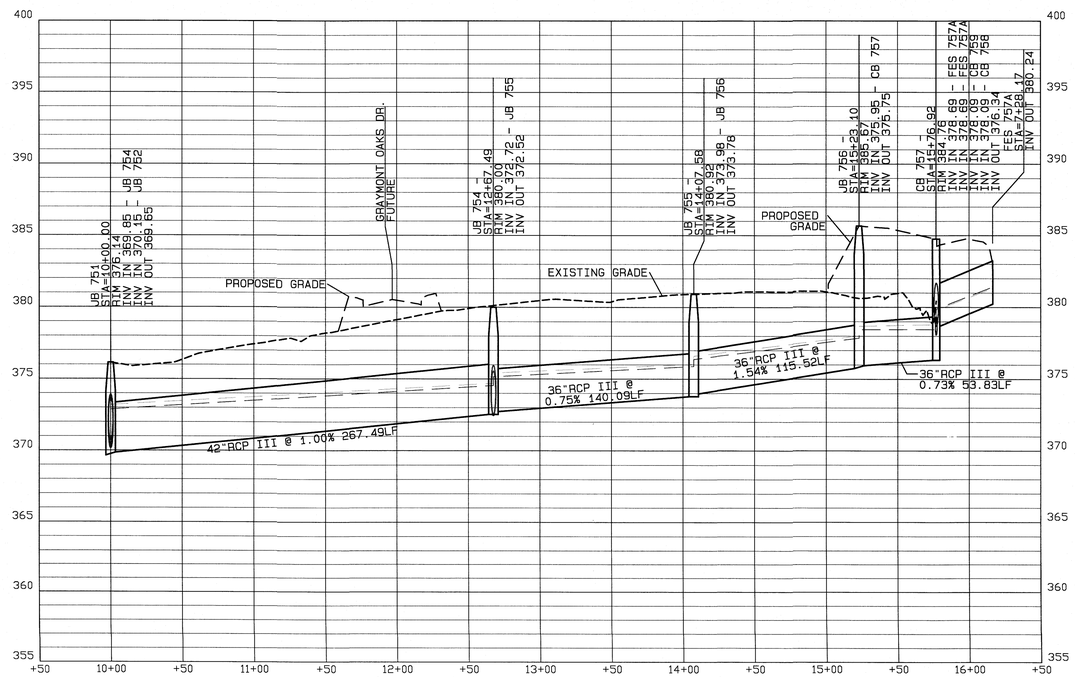
SHEET NO.

18.2

FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pno
Time: 9:55AM
Plot Date: 6/28/2021



FES 757 TO FES 750



No	DATE	REVISION	DWN/CHK
1	05/10/21	ADDRESSING T&R CONSULTING COMMENTS	BAH/JRH
1	06/28/21	ADDRESSING NCDOT COMMENTS	BAH/JRH

ROLESVILLE ROAD OFF-SITE STORM PLAN AND PROFILES

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA

FIRM # C-3881

JOB NUMBER:
CHECKED BY:
DRAWN BY:
DATE:

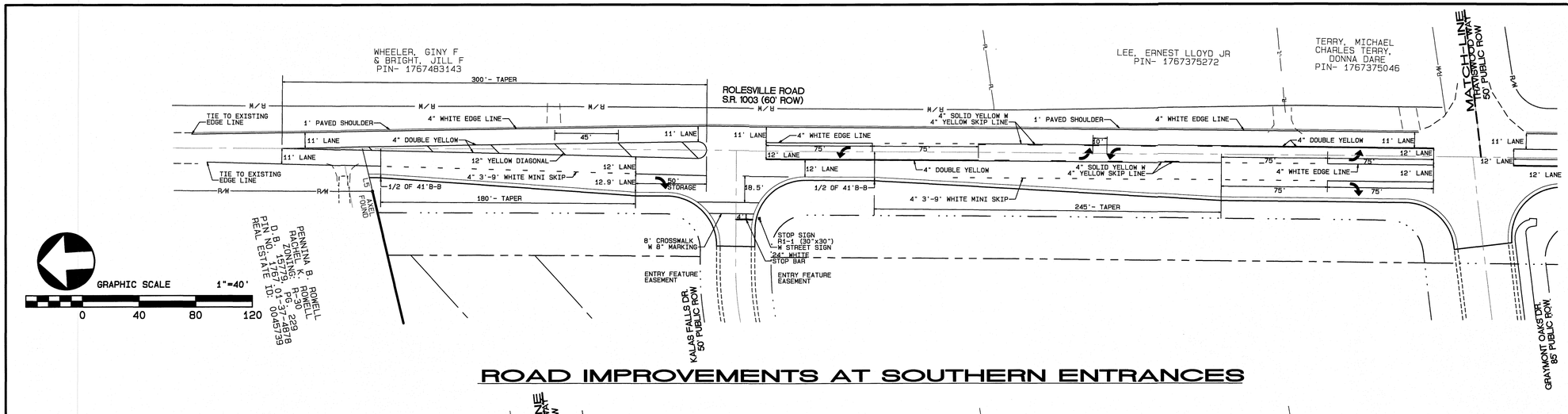
AMERICAN Engineering
American Engineering Associates-Southeast, P.A.
4020 Westchase Blvd., Suite 450
Raleigh, NC 27607 919-469-1101

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOAN R. HARMAN
6.28.21

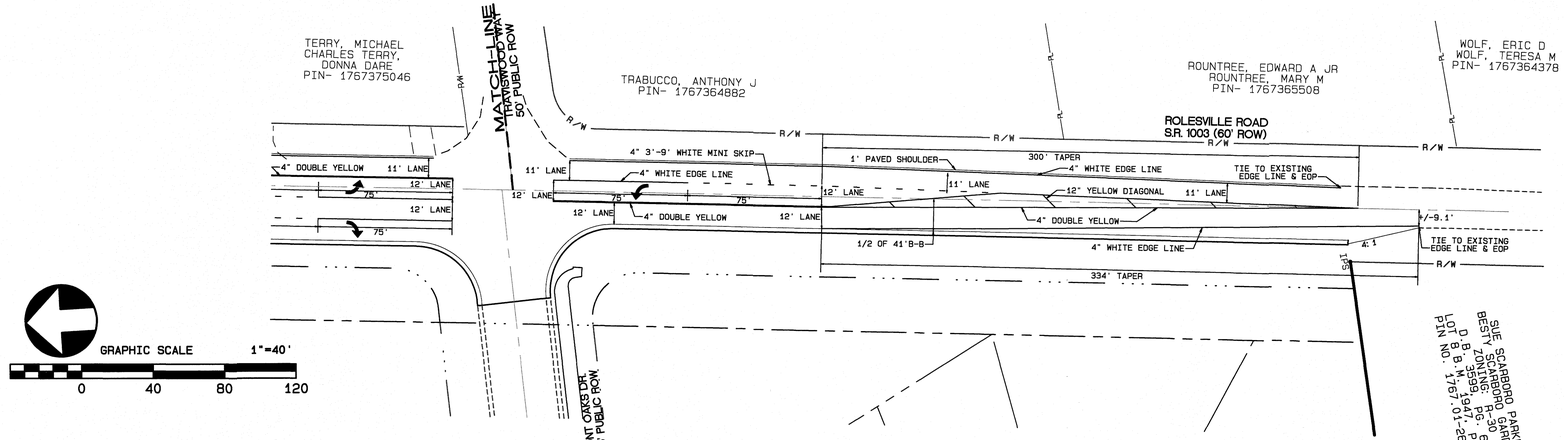
SHEET NO.

18.3

Plot Date : 6/28/2021 Time: 7:54AM FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro



ROAD IMPROVEMENTS AT SOUTHERN ENTRANCES



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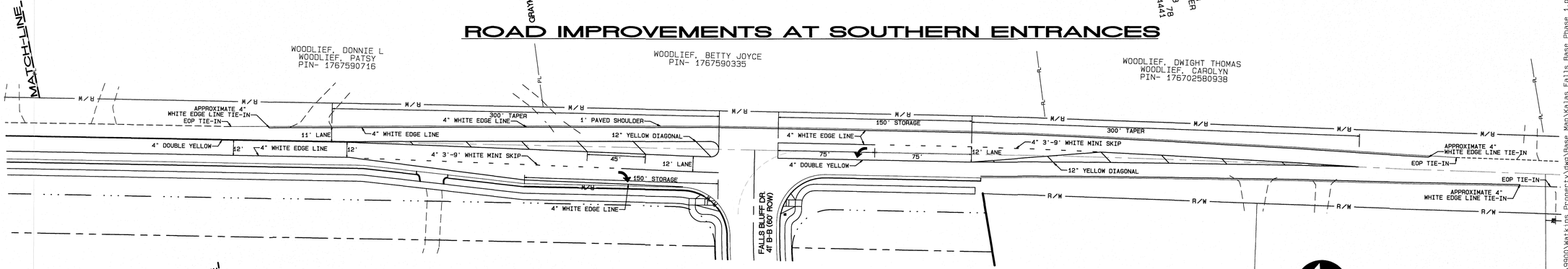

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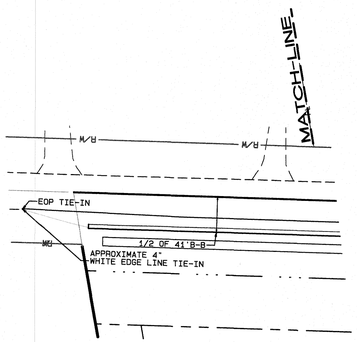
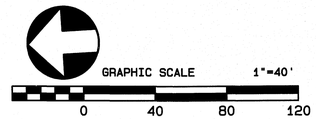




No.	DATE	REVISION	DWN/CHK
1	06/28/21	ADDRESSING, NCDOT COMMENTS	BAH/JRH

ROLESVILLE ROAD IMPROVEMENTS

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD

WAKE COUNTY, NORTH CAROLINA

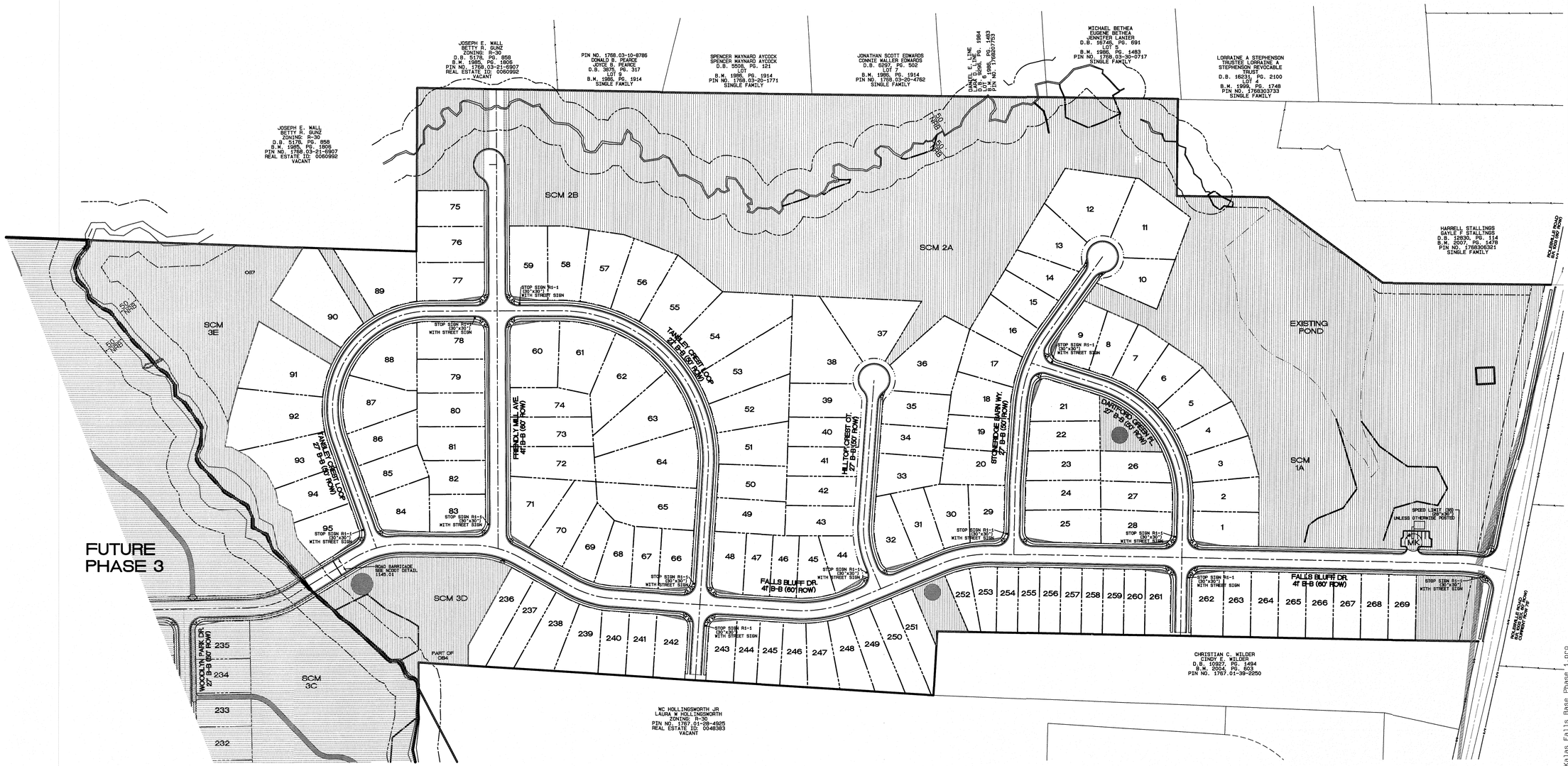
FIRM # C-3881

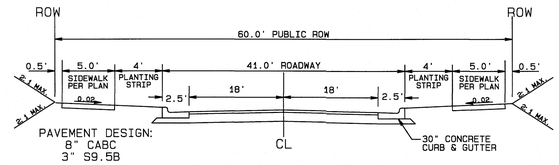
JOB NUMBER:
CHECKED BY:
DRAWN BY:
DATE:

AMERICAN Engineering
American Engineering Associates—Southeast, P.A.
4020 Westchase Blvd., Suite 450
Raleigh, NC 27607 919-469-1101

SHEET NO.
19.0

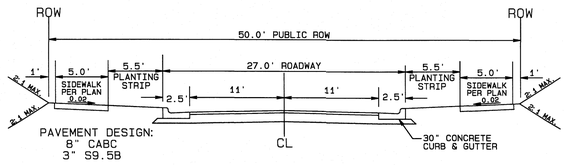
Plot Date: 6/28/2021 Time: 6:26AM FILE: Z:\Jobs\9900\Watkins Property\dwg\Base Map\Kalas Falls Base Phase 1.pro





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

NOTE:

A. SIGHT DISTANCE IS THE LENGTH OF ROADWAY AHEAD VISIBLE TO THE DRIVER. THE MINIMUM SIGHT DISTANCE AVAILABLE ON THE ROADWAY SHOULD BE SUFFICIENTLY LONG TO ENABLE A VEHICLE TRAVELING AT OR NEAR THE DESIGN SPEED TO STOP BEFORE REACHING A STATIONARY OBJECT IN ITS PATH.

B. MINIMUM STOPPING SIGHT DISTANCES SHALL BE PROVIDED IN BOTH THE HORIZONTAL AND VERTICAL PLANES FOR PLANNED ROADWAYS AS RELATED TO ASSUMED DRIVER S EYE HEIGHT AND POSITION.

C. ADEQUATE SIGHT DISTANCE SHOULD BE PROVIDED AT ALL DRIVEWAY ACCESS POINTS AND SHALL BE IN ACCORDANCE WITH THE STANDARDS PROVIDED IN THIS MANUAL.

D. SIGHT TRIANGLES EASEMENTS SHALL BE SHOWN ON ALL NCDOT MAINTAINED ROADWAYS FOR ANY DRIVEWAY ACCESS ACCORDING TO THE MANUAL "POLICY ON STREET AND DRIVEWAY ACCESS TO NORTH CAROLINA HIGHWAYS," AS ADOPTED AND AMENDED BY NCDOT.

E. THIS NOTE MUST BE PLACED ON ALL PLANS: "WITHIN THE AREA OF ABOVE DEFINED SIGHT TRIANGLE, THERE SHALL BE NO SIGHT OBSTRUCTING OR PARTLY OBSTRUCTING WALL, FENCE, SIGN, FOLIAGE, BERMS, OR PARKED VEHICLES BETWEEN THE HEIGHTS OF 24 INCHES AND EIGHT FEET ABOVE THE CURB LINE ELEVATION OR THE NEAREST TRAVELED WAY IF NO CURBING EXISTS."

F. OBJECTS THAT CAN BE PERMITTED IN THE SIGHT DISTANCE TRIANGLE ARE UTILITIES SUCH AS HYDRANTS, UTILITY POLES, UTILITY BOXES, GSI PRACTICES, AND TRAFFIC CONTROL DEVICES. THOSE OBJECTS MUST BE LOCATED TO MINIMIZE VISUAL OBSTRUCTION.

OPEN SPACE

FUTURE PHASE 3

GRAPHIC SCALE 1"=120'
0 120 240 360

No.	DATE	REVISION	DWN/CHK

PHASE 1 TRANSPORTATION 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:	9/19/2019

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

JOHN R. HARMAN SEAL 9810 ENGINEER
6.28.21

SHEET NO.
20.0

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

NCDOT PAVEMENT SCHEDULE
- 3" S9.5C
- 4" I19.0C
- 10" CABC (OR 5" B25.0C IF LESS THAN 6 FEET WIDE WIDENING)

GRAPHIC SCALE

5 0 2.5 5 10 20

(IN FEET)
1 inch = 5

CITY OF RALEIGH - PLANS AUTHORIZED FOR CONSTRUCTION

Electronic Approval: This approval is being issued electronically. This approval is valid only upon the signature of a City of Raleigh Review Officer below. The City will retain a copy of the approved plans. Any work authorized by this approval must proceed in accordance with the plans kept on file with the City. This electronic approval may not be edited once issued. Any modification to this approval once issued will invalidate this approval.

City of Raleigh Development Approval

Timothy Beasley

Raleigh Water Review Officer

North Carolina 811 www.nc811.org

*** 3 Days Before Digging ***
North Carolina 811
811 or 1-800-632-4949
Remote Ticket Entry
http://nc811.org/remoteticketentry.htm

AMERICAN Engineering
American Engineering Associates - Southeast, P.A.
4020 Westchase Boulevard, Suite 450
Raleigh, NC 27607
919-469-1101

NORTH CAROLINA
AMERICAN ENGINEERING ASSOCIATES SOUTHEAST
C-3881
CERTIFICATE OF AUTHORIZATION

6.15.21

NO.	DATE	REVISION:
1	6-14-2021	ADD NCDOT PAVEMENT SCHEDULE PER NCDOT REVIEW

STIPULATION FOR REUSE

KALAS FALLS
PHASE 1
1832 ROLESVILLE ROAD
WAKE COUNTY, NC

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

SHEET TITLE:
CROSS-SECTION
STA:
9+57.35 - 11+50

SHEET NO.:
X1

June 14, 2021

Z:\Jobs\9900\Workfiles Property\Civil_Working Dwgs\Phase 1\Rolesville Road Cross-sections.dwg

AMERICAN Engineering
American Engineering Associates - Southeast, P.A.
4020 Westchase Boulevard, Suite 460
Raleigh, NC 27607
919-469-1101

NORTH CAROLINA
AMERICAN ENGINEERING ASSOCIATES SOUTHEAST
C-3881
CERTIFICATE OF AUTHORIZATION

NO.	DATE	REVISION:

STIPULATION FOR REUSE

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KALAS FALLS PHASE 1
1832 ROLESVILLE ROAD
WAKE COUNTY, NC

GRAPHIC SCALE
5 0 2.5 5 10 20
(IN FEET)
1 inch = 5

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

SHEET TITLE:
CROSS-SECTION STA: 12+00 - 14+00

SHEET NO.:
X2

CITY OF RALEIGH - PLANS AUTHORIZED FOR CONSTRUCTION
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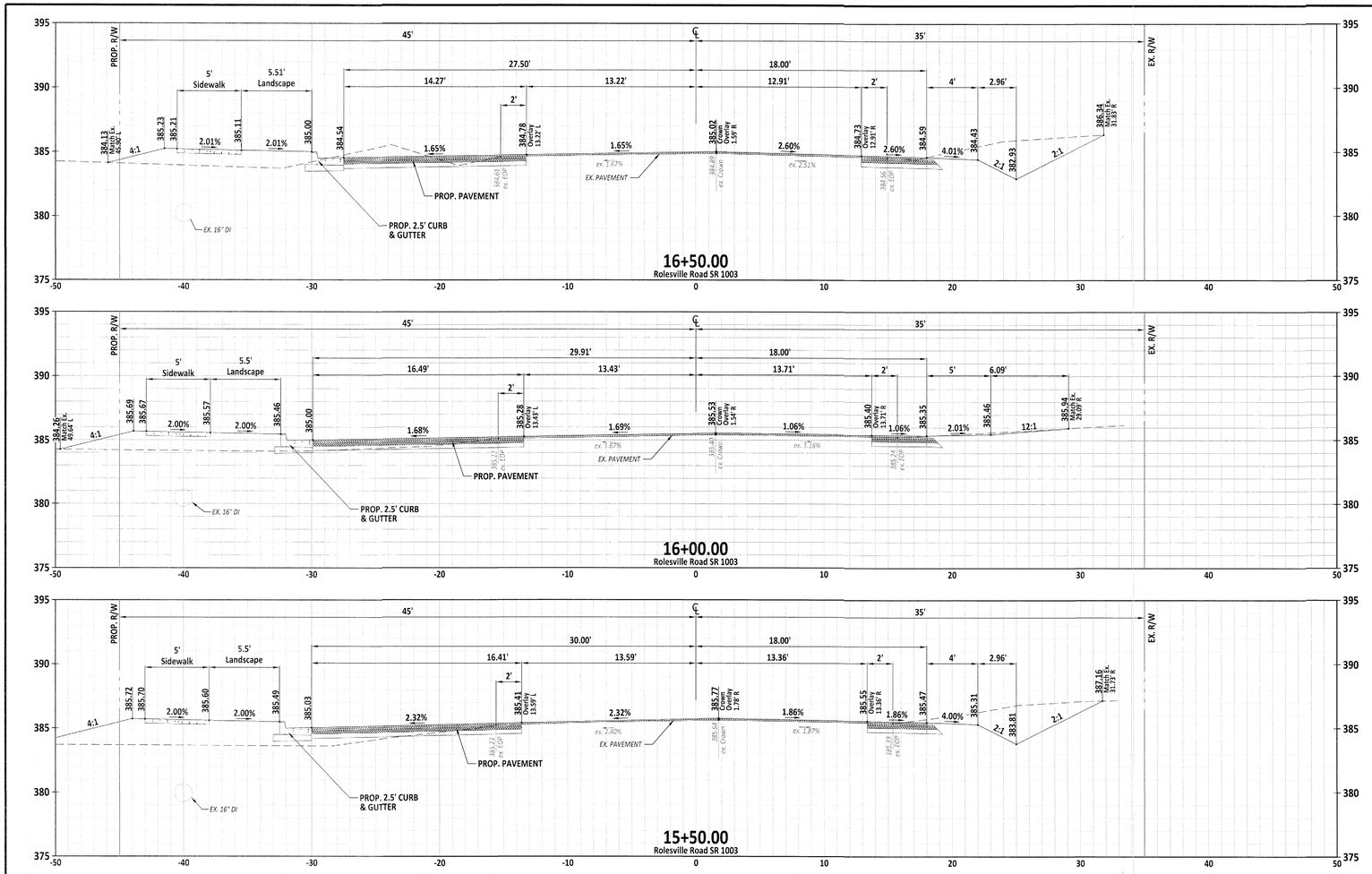
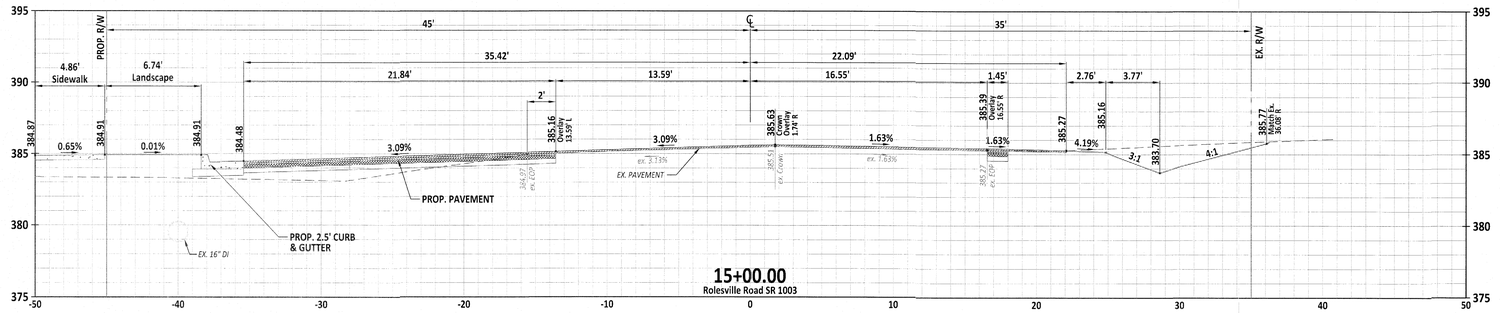
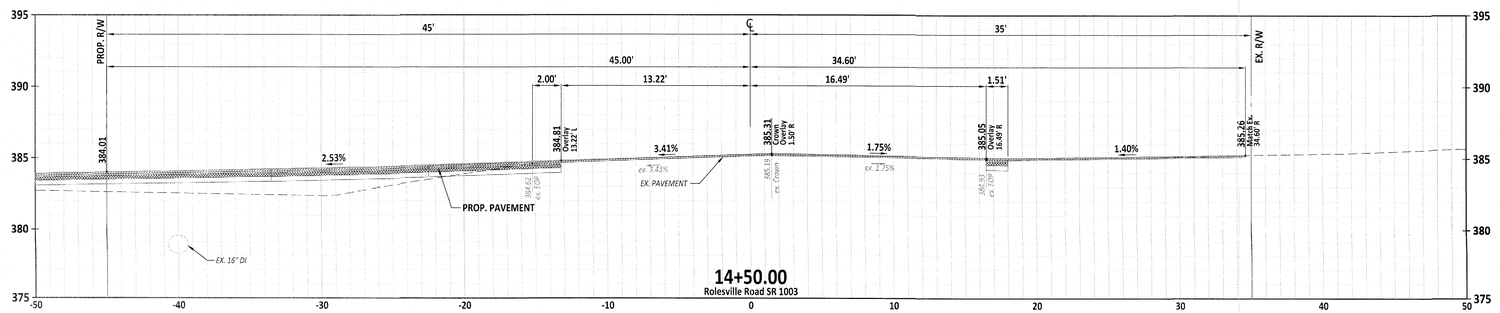
City of Raleigh Development Approval _____
Timothy Beasley
Raleigh Water Review Officer

North 811 Carolina
www.nc811.org
*** 3 Days Before Digging ***
North Carolina 811
811 or 1-800-632-4949
Remote Ticket Entry
http://nc811.org/remoteticketentry.htm

May 14, 2021
J:\Jobs\9900\Kalas Phase1\Work_Dwg\Phase 1\Rolesville Road Cross-sections.dwg







AMERICAN Engineering
American Engineering Associates - Southeast, P.A.
4020 Westchase Boulevard, Suite 450
Raleigh, NC 27607
919-469-1101

NORTH CAROLINA
AMERICAN ENGINEERING ASSOCIATES SOUTHEAST
C-3881
CERTIFICATE OF AUTHORIZATION

NO.	DATE	REVISION:

STIPULATION FOR REUSE

KALAS FALLS PHASE 1
1832 ROLESVILLE ROAD
WAKE COUNTY, NC

GRAPHIC SCALE
5 0 2.5 5 10 20
(IN FEET)
1 inch = 5

CITY OF RALEIGH - PLANS AUTHORIZED FOR CONSTRUCTION

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City of Raleigh Development Approval _____

Timothy Beasley

Raleigh Water Review Officer

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

SHEET TITLE:
CROSS-SECTION
STA:
14+50 - 16+50

SHEET NO.:
X3

May 14, 2021
Z:\Jobs\9900\Working Property\Misc_Working Dwgs\XPhase 1\Rolesville Road Cross-sections.dwg

GRAPHIC SCALE

5 0 2.5 5 10 20

(IN FEET)
1 inch = 5

CITY OF RALEIGH - PLANS AUTHORIZED FOR CONSTRUCTION

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City of Raleigh Development Approval _____

Raleigh Water Review Officer

North Carolina 811 www.nc811.org

*** 3 Days Before Digging ***
North Carolina 811
811 or 1-800-632-4949
Remote Ticket Entry
http://nc811.org/remoteticketentry.htm

AMERICAN Engineering
American Engineering Associates - Southeast, P.A.
4020 Westchase Boulevard, Suite 450
Raleigh, NC 27607
919-469-1101

NORTH CAROLINA
AMERICAN ENGINEERING ASSOCIATES SOUTHEAST
C-3881
CERTIFICATE OF AUTHORIZATION

NO.	DATE	REVISION:

STIPULATION FOR REUSE

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KALAS FALLS PHASE 1
1832 ROLESVILLE ROAD
WAKE COUNTY, NC

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

SHEET TITLE:
CROSS-SECTION STA: 17+00 - 19+00

SHEET NO.:
X4

May 14, 2021

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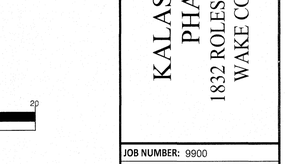

GRAPHIC SCALE

5 0 2.5 5 10 20

(IN FEET)
1 inch = 5

CITY OF RALEIGH - PLANS AUTHORIZED FOR CONSTRUCTION

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City of Raleigh Development Approval

Timothy Beasley

Raleigh Water Review Officer

North Carolina 811 www.nc811.org

*** 3 Days Before Digging ***
North Carolina 811
811 or 1-800-632-4949
Remote Ticket Entry
http://nc811.org/remoteticketentry.htm

AMERICAN Engineering
American Engineering Associates - Southeast, P.A.
4020 Westchase Boulevard, Suite 450
Raleigh, NC 27607
919-469-1101

NORTH CAROLINA
AMERICAN ENGINEERING ASSOCIATES SOUTHEAST
C-3881
CERTIFICATE OF AUTHORIZATION

NO.	DATE	REVISION:

STIPULATION FOR REUSE

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KALAS FALLS PHASE 1

1832 ROLESVILLE ROAD
WAKE COUNTY, NC

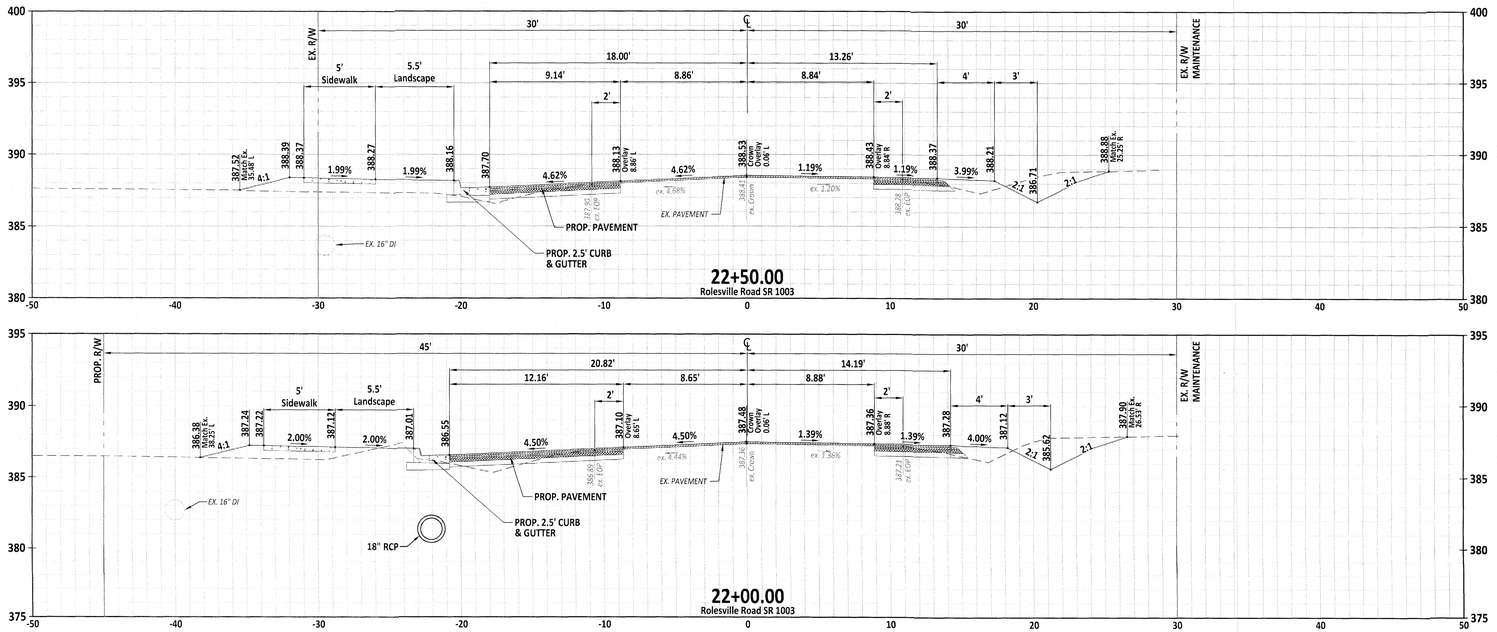
JOB NUMBER: 9900
CHECKED BY:
DRAWN BY: EDS
DATE: 9/19/2019

SHEET TITLE:
CROSS-SECTION STA: 19+50 - 21+50

SHEET NO.:
X5

May 14, 2021

J:\Jobs\9900\Kalas Property\Final_Working Dwgs\Phase 1\Rolesville Road Cross-sections.dwg



GRAPHIC SCALE

5 0 2.5 5 10 20

(IN FEET)
1 inch = 5

CITY OF RALEIGH - PLANS AUTHORIZED FOR CONSTRUCTION

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City of Raleigh Development Approval _____

Timothy Beasley

Raleigh Water Review Officer

North Carolina 811 www.nc811.org

*** 3 Days Before Digging ***
North Carolina 811
811 or 1-800-632-4949
Remote Ticket Entry
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AMERICAN Engineering
American Engineering Associates - Southeast, P.A.
4020 Westchase Boulevard, Suite 450 919-469-1101
Raleigh, NC 27607

NORTH CAROLINA AMERICAN ENGINEERING ASSOCIATES SOUTHEAST C-3881 CERTIFICATE OF AUTHORIZATION

5.14.21

NO.	DATE	REVISION:

STIPULATION FOR REUSE

KALAS FALLS PHASE 1
1832 ROLESVILLE ROAD
WAKE COUNTY, NC

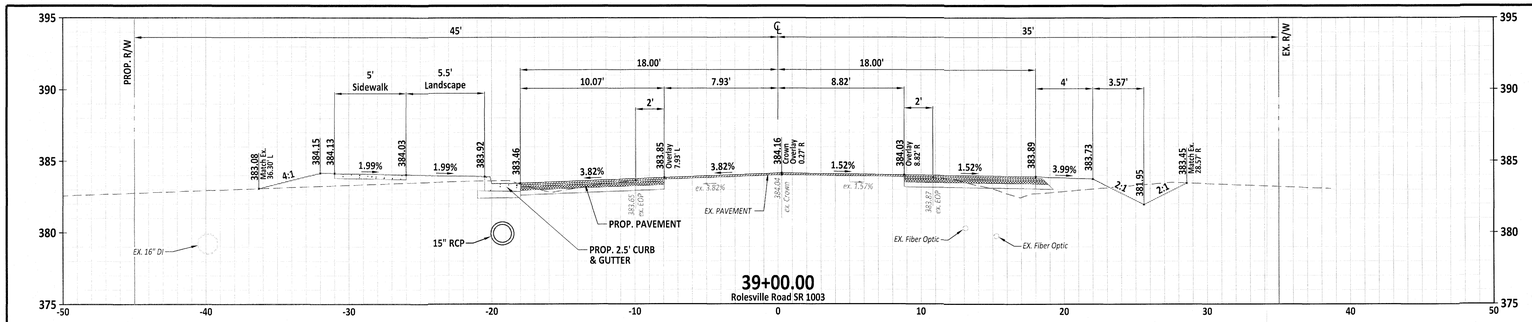
JOB NUMBER: 9900
CHECKED BY:
DRAWN BY: EDS
DATE: 9/19/2019

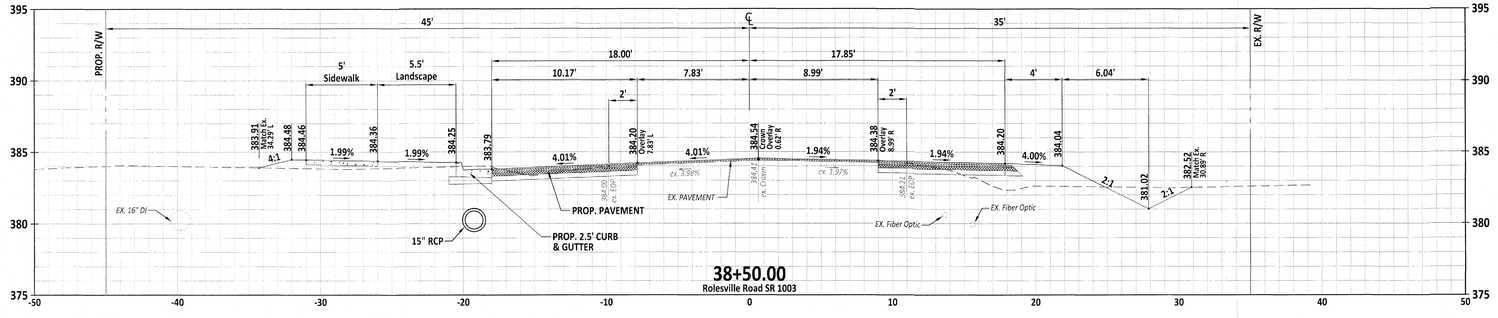
SHEET TITLE:
CROSS-SECTION
STA:
22+00 - 22+50

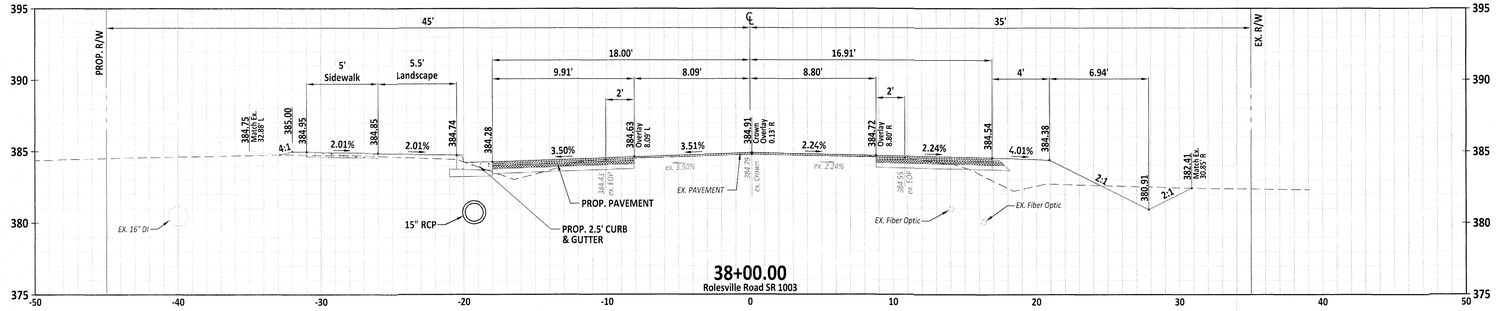
SHEET NO.:
X6

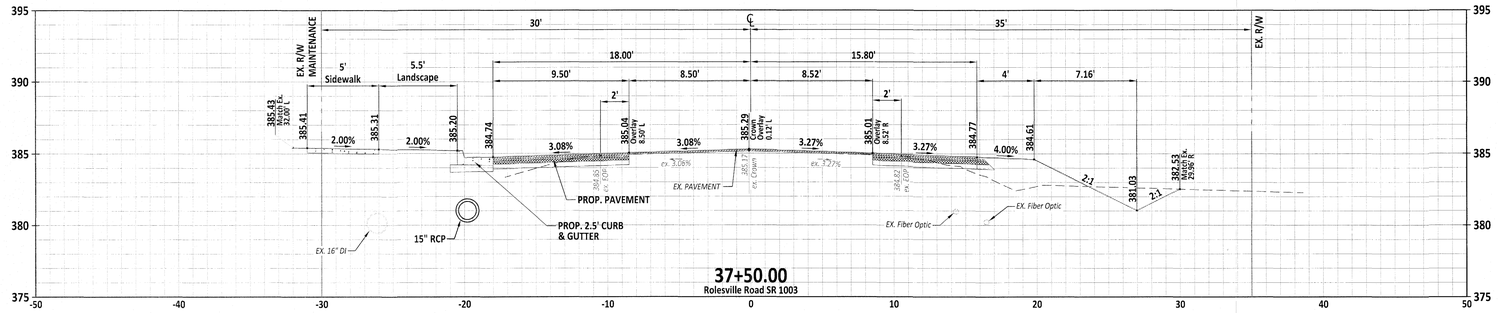
May 14, 2021

Z:\Jobs\9900\Workfiles Progress\Active_Working Dwgs\Phase 1\Rolesville Road Cross-sections.dwg









GRAPHIC SCALE

5 0 2.5 5 10 20

(IN FEET)
1 inch = 5

CITY OF RALEIGH - PLANS AUTHORIZED FOR CONSTRUCTION

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City of Raleigh Development Approval _____

Raleigh Water Review Officer

North 811 Carolina www.nc811.org

*** 3 Days Before Digging ***
North Carolina 811
811 or 1-800-632-4949
Remote Ticket Entry
http://nc811.org/remoteticketentry.htm

AMERICAN Engineering
American Engineering Associates - Southeast, P.A.
4020 Westchase Boulevard, Suite 450
Raleigh, NC 27607
919-469-1101

NORTH CAROLINA
AMERICAN ENGINEERING ASSOCIATES SOUTHEAST
C-3881
CERTIFICATE OF AUTHORIZATION

SEAL 040850 ENGINEER

5/12/21

NO.	DATE	REVISION:

STIPULATION FOR REUSE

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KALAS FALLS PHASE 1

1832 ROLESVILLE ROAD
WAKE COUNTY, NC

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

SHEET TITLE:

CROSS-SECTION STA: 37+50 - 39+00

SHEET NO.:

X7

May 14, 2021

Z:\Jobs\9900\Kalas Property\Civil_Working Dwgs\Phase 1\Rolesville Road Cross sections.dwg

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4020 Westchase Boulevard, Suite 450
Raleigh, NC 27607
919-469-1101

NORTH CAROLINA BOARD OF EXAMINERS FOR ENGINEERING AND SURVEYING
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KALAS FALLS PHASE 1
1832 ROLESVILLE ROAD
WAKE COUNTY, NC

GRAPHIC SCALE
5 0 2.5 5 10 20
(IN FEET)
1 inch = 5

CITY OF RALEIGH - PLANS AUTHORIZED FOR CONSTRUCTION

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Timothy Beasley

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Raleigh Water Review Officer

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

SHEET TITLE:
CROSS-SECTION
STA:
39+50 - 41+50

SHEET NO.:
X8

May 14, 2021
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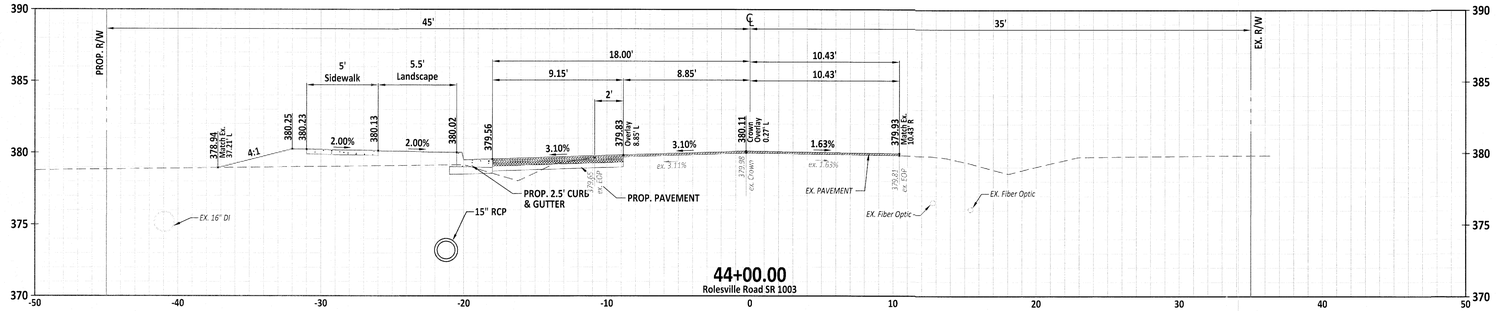

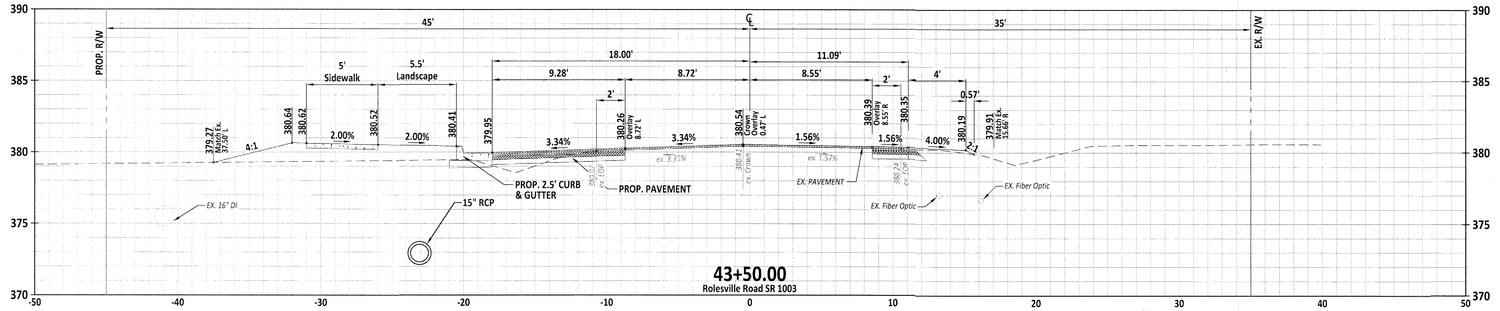

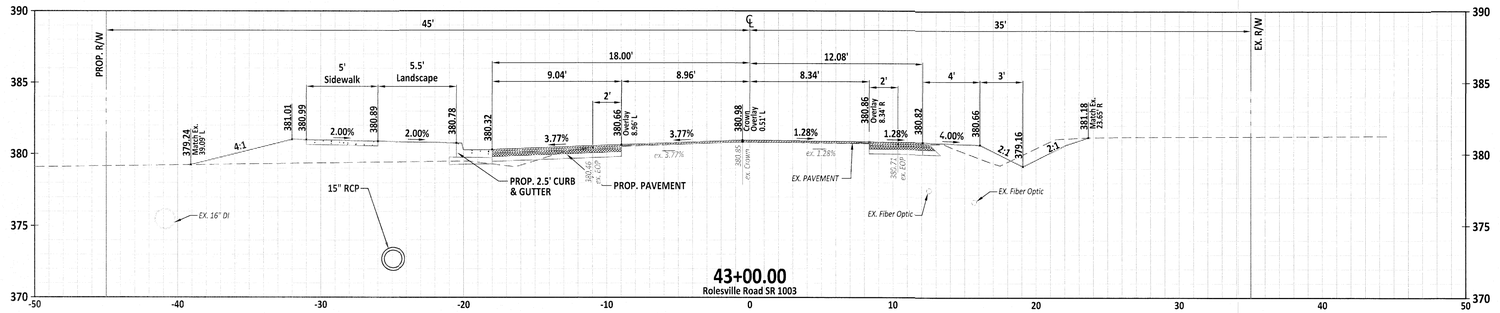

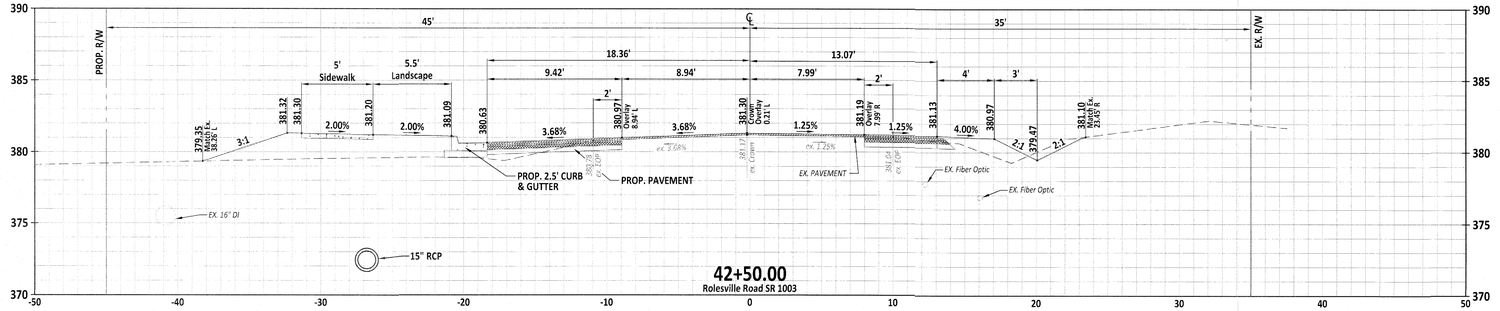

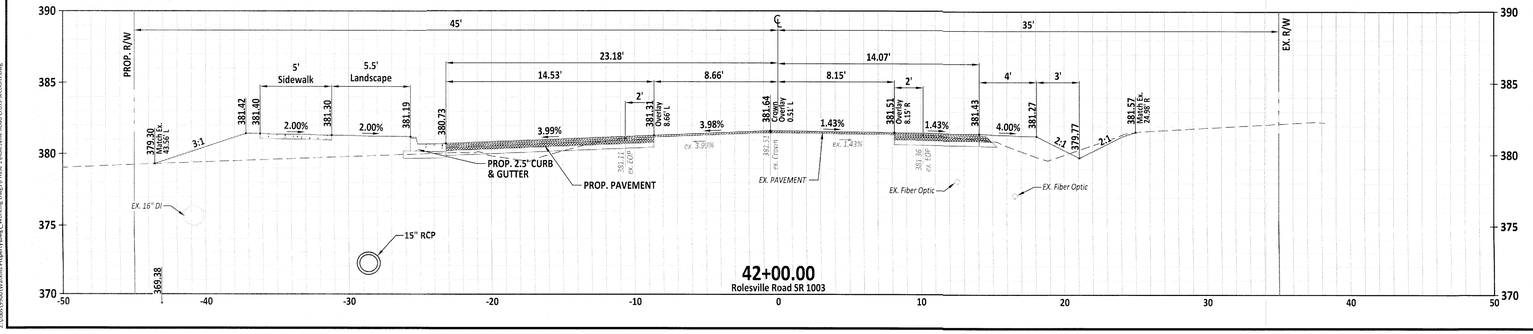

GRAPHIC SCALE

5 0 2.5 5 10 20

(IN FEET)
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City of Raleigh Development Approval Timothy Beasley

Raleigh Water Review Officer

North Carolina 811 www.nc811.org

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AMERICAN Engineering
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4020 Westchase Boulevard, Suite 450
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919-469-1101

NORTH CAROLINA
AMERICAN ENGINEERING ASSOCIATES SOUTHEAST
C-3881
CERTIFICATE OF AUTHORIZATION

5.14.21

NO.	DATE	REVISION:

STIPULATION FOR REUSE

KALAS FALLS PHASE 1
1832 ROLESVILLE ROAD
WAKE COUNTY, NC

JOB NUMBER:

CHECKED BY:

DRAWN BY:

DATE:

SHEET TITLE:

CROSS-SECTION
STA:
42+00 - 44+00

SHEET NO.:

X9

May 14, 2021

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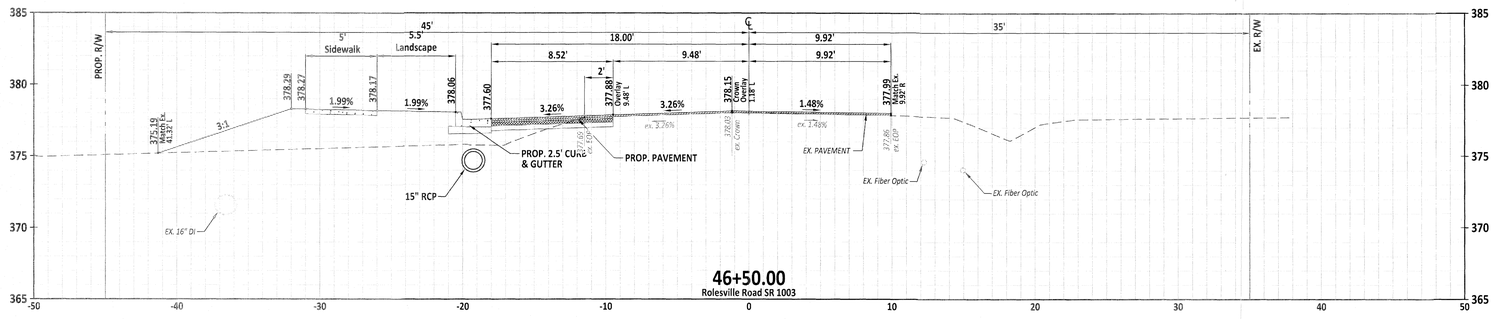

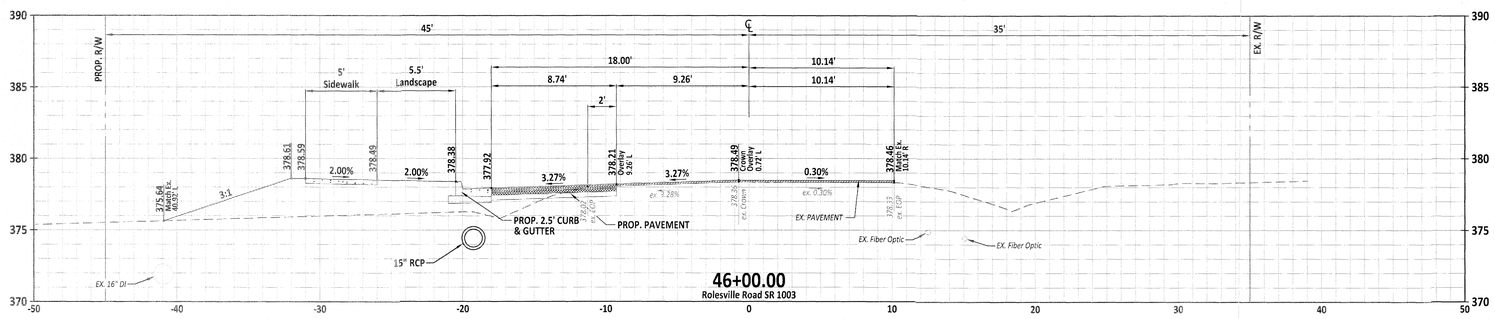

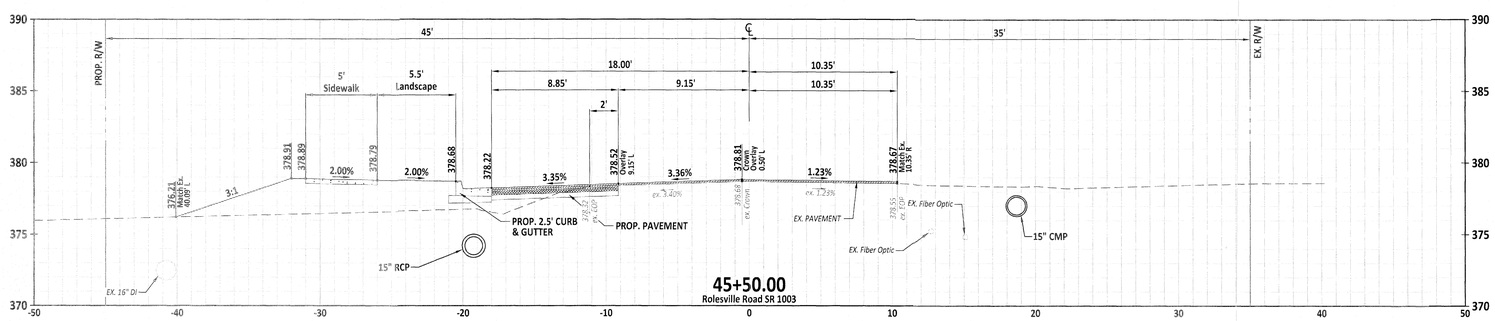

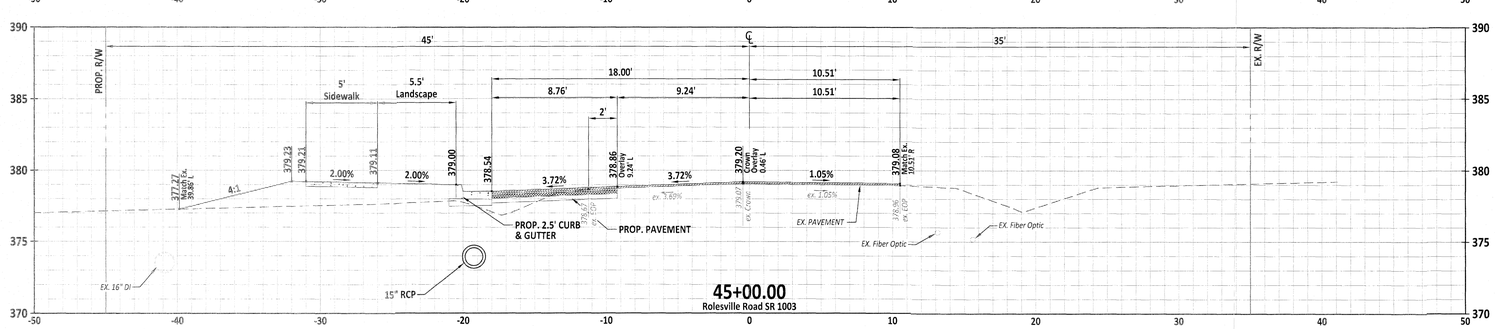

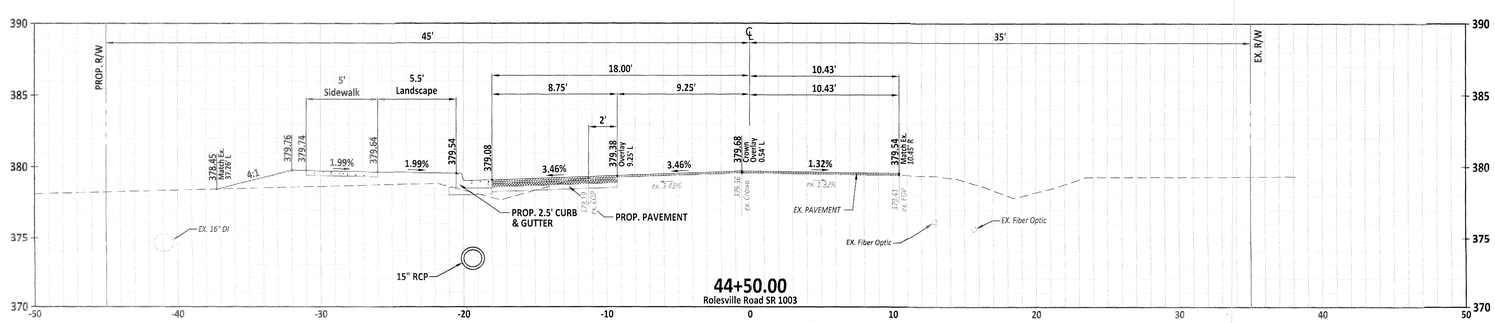

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Raleigh Water Review Officer

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919-469-1101

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AMERICAN ENGINEERING ASSOCIATES SOUTHEAST
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CERTIFICATE OF AUTHORIZATION

NO.	DATE	REVISION:

STIPULATION FOR REUSE

KALAS FALLS PHASE 1
1832 ROLESVILLE ROAD
WAKE COUNTY, NC

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

SHEET TITLE:
CROSS-SECTION STA: 44+50 - 46+50

SHEET NO.:
X10

May 14, 2021

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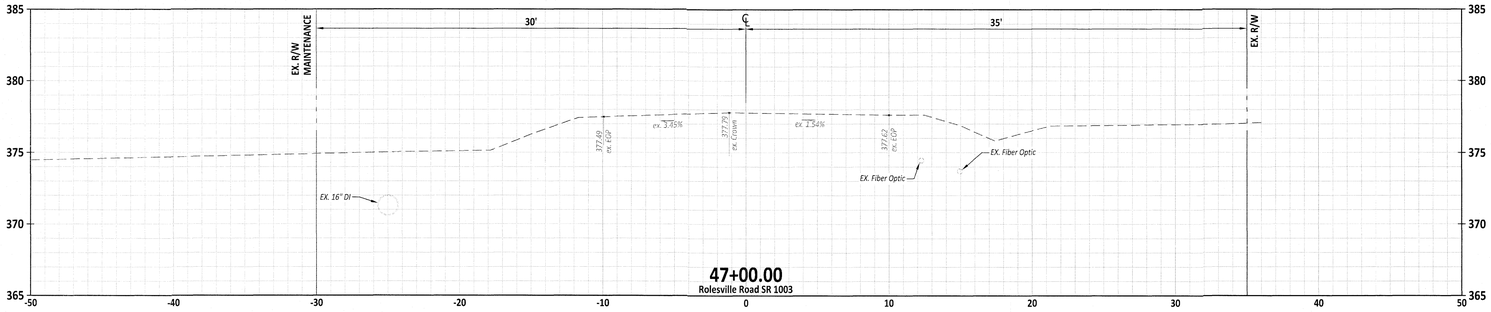

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KALAS FALLS
PHASE 1
1832 ROLESVILLE ROAD
WAKE COUNTY, NC

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

SHEET TITLE:
CROSS-SECTION
STA:
47+00

SHEET NO.:
X11

May 14, 2021
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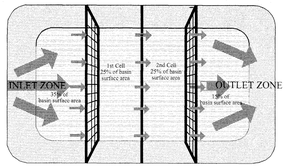
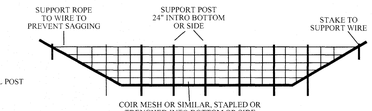
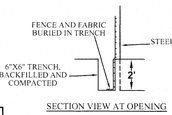


PLAN VIEW

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



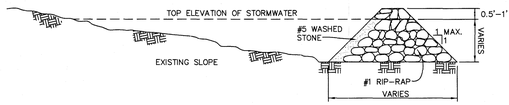


SECTION VIEW AT OPENING

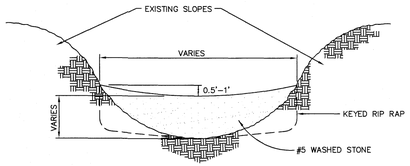
WAKE COUNTY NORTH CAROLINA

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.

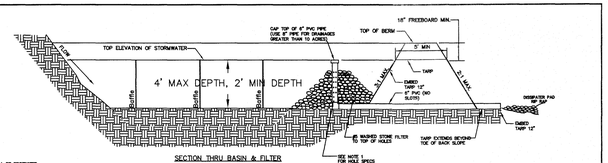
STEP SEQUENCE

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

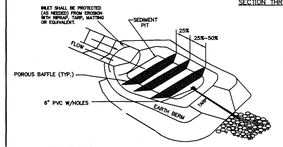
WAKE COUNTY NORTH CAROLINA

EFFECTIVE: 01/31/08

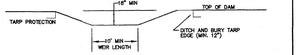
STANDARD CHECK DAM



SECTION THRU BASIN & FILTER



PERSPECTIVE VIEW



SECTION THRU WEIR

GENERAL NOTES

1. DRAIN DOWN RISER & BARREL SHALL BE 6" SCH. 40 PVC WITH CLEAN-OUT CAP AND 3/4" HOLES. SEE NOTE 1 FOR NUMBER AND PLACEMENT 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" OF TARP SHALL OVERLAP THE DOWNSTREAM TARP. THE TARP SHALL BE SOLID, 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. SUBSEQUENT RINGS WILL BE SET 6 INCHES VERTICALLY APART. HOLES WILL BE 1/4 INCH IN DIAMETER AND WILL BE SPACED EQUALLY AROUND THE RISER. THE NUMBER OF HOLES PER RING WILL EQUAL TO THE DRAINAGE AREA.

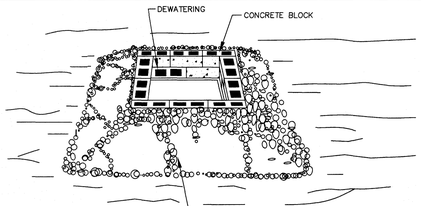
EXAMPLE:
A BASIN DRAINING 2.0 ACRES SHOULD HAVE 2 HOLES PER RING EVERY 3 INCHES ON THE RISER PIPE. THE FIRST RING (2 HOLES) WILL BE SET 6 INCHES FROM THE BOTTOM OF THE RISER.

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

WAKE COUNTY NORTH CAROLINA

EFFECTIVE: 01/31/08

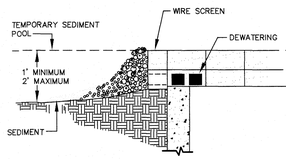
STANDARD CUSTOM BASIN



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.



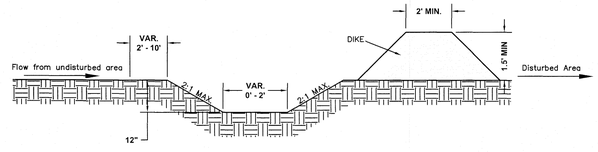
WAKE COUNTY NORTH CAROLINA

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

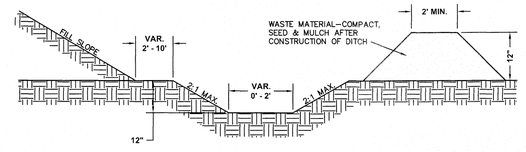
WAKE COUNTY NORTH CAROLINA

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.

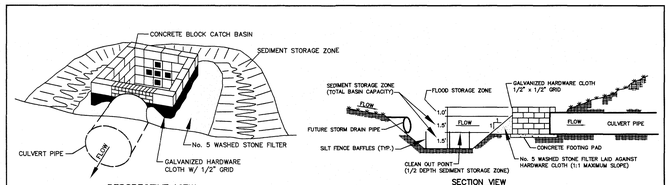


CROSS SECTIONAL VIEW

WAKE COUNTY NORTH CAROLINA

EFFECTIVE: 01/31/08

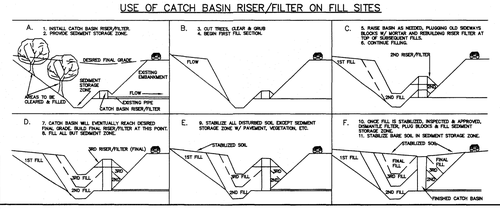
STANDARD TEMPORARY DIVERSION DITCH



PERSPECTIVE VIEW

SECTION VIEW

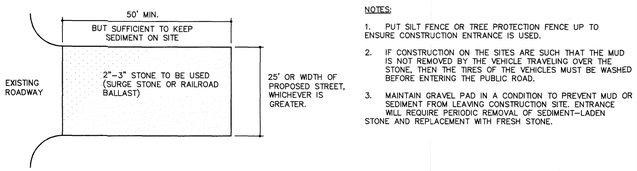
USE OF CATCH BASIN RISER/FILTER ON FILL SITES



WAKE COUNTY NORTH CAROLINA

EFFECTIVE: 01/31/08

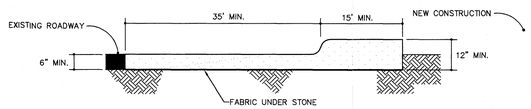
STANDARD CATCH BASIN RISER/FILTER



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

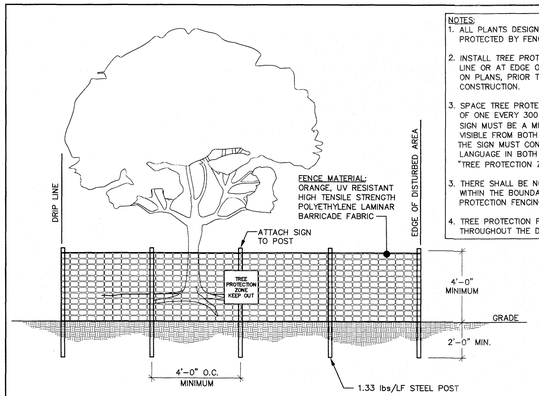
WAKE COUNTY NORTH CAROLINA

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

SITE PERMITTING APPROVAL

Water and Sewer Permits (if applicable)

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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 #** W-3784

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City of Raleigh Public Utilities Department Permit # _____

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City of Raleigh Development Approval _____ Timothy Beasley

Raleigh Water Review Officer

North Carolina 811 www.nc811.org

*** 3 Days Before Digging ***
North Carolina 811
811 or 1-800-632-4949
Remote Ticket Entry
http://nc811.org/remoteticketentry.htm

AMERICAN Engineering
American Engineering Associates - Southeast, P.A.
4020 Westchase Boulevard, Suite 450
Raleigh, NC 27607
919-469-1101

NORTH CAROLINA AMERICAN ENGINEERING ASSOCIATES SOUTHEAST C-3881 CERTIFICATE OF AUTHORIZATION

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMAN

DETAIL SELECTION ONLY

NO.	DATE	REVISION:

STIPULATION FOR REUSE

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KALAS FALLS PHASE 1

1832 ROLESVILLE ROAD
WAKE COUNTY, NC

JOB NUMBER:
CHECKED BY:
DRAWN BY:
DATE:

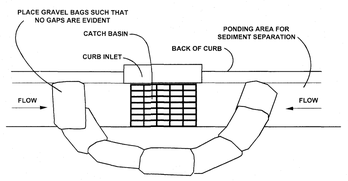
SHEET TITLE:

KALAS FALLS CIVIL DETAILS

SHEET NO.:

CD1

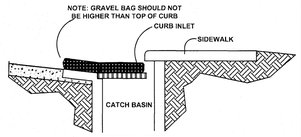
Z:\Jobs\9900\Workbook Projects\Kalas_Working Dwgs\Storm Files\Kalas 1 Lot Set Details.dwg



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.

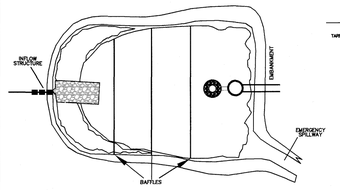


SECTION VIEW

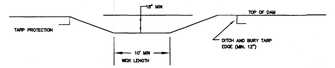
WAKE COUNTY NORTH CAROLINA

EFFECTIVE: 01/31/08

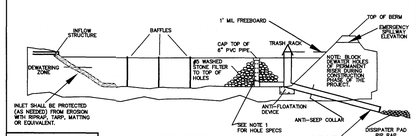
STANDARD GRAVEL BAG CURB INLET PROTECTION



PLAN VIEW



SECTION THRU WEIR



CROSS SECTION

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.

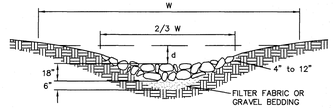
GENERAL NOTES:

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) TARP IS 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

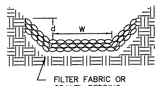
EFFECTIVE: 01/31/08

STANDARD CUSTOM BASIN ATTACHED TO PERMANENT RISER

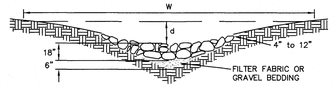


PARABOLIC-SHAPED WATERWAY WITH STONE CENTER DRAIN
(SHAPED BY BULLDOZER)

TYPICAL RIP RAP CHANNEL



TRAPEZOIDAL



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

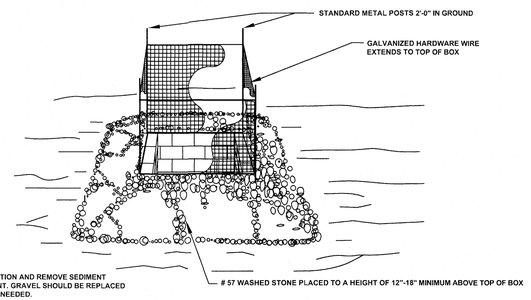
NOTES:

- 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



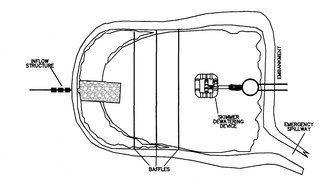
NOTE:

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

WAKE COUNTY NORTH CAROLINA

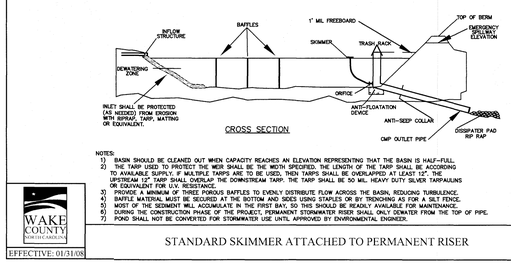
EFFECTIVE: 01/31/08

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.
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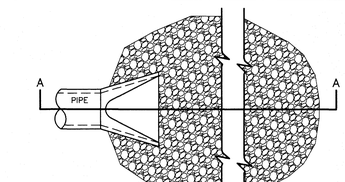
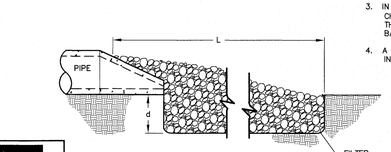
WAKE COUNTY NORTH CAROLINA

EFFECTIVE: 01/31/08

STANDARD SKIMMER ATTACHED TO PERMANENT RISER



PLAN VIEW



SECTION 'A-A'

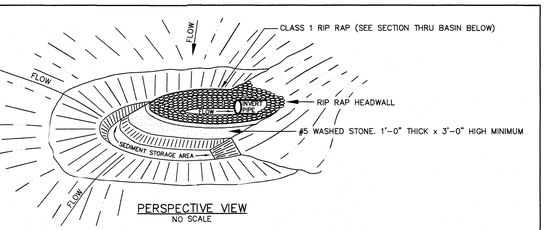
NOTES:

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.

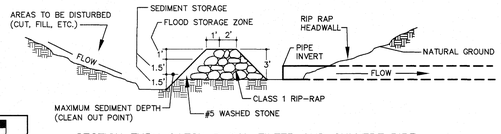
WAKE COUNTY NORTH CAROLINA

EFFECTIVE: 01/31/08

STANDARD PIPE OUTLET TO WELL-DEFINED CHANNEL



PERSPECTIVE VIEW
NO SCALE

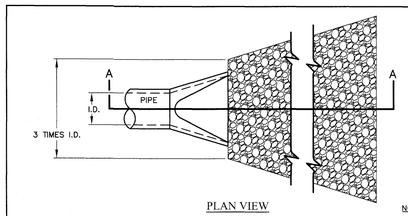


SECTION THRU CATCH BASIN, FILTER AND CULVERT PIPE
NO SCALE

WAKE COUNTY NORTH CAROLINA

EFFECTIVE: 01/31/08

STANDARD HORSESHOE INLET PROTECTION



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NOTES:

1. L = THE LENGTH OF THE RIPRAP APRON.
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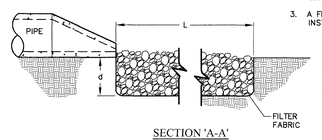
3. A FILTER BLANKET OR FILTER FABRIC SHOULD BE INSTALLED BETWEEN THE RIPRAP AND SOIL FOUNDATION.

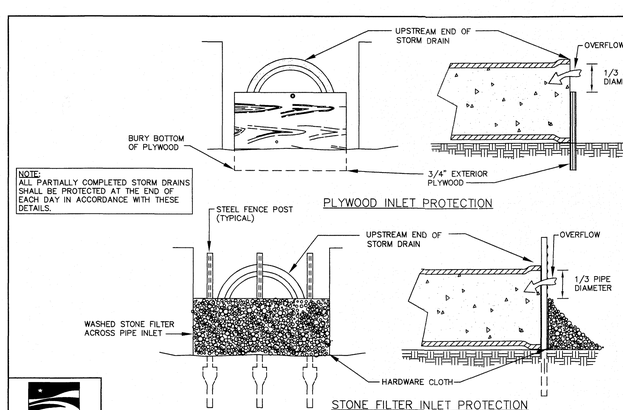


SECTION 'A-A'

WAKE COUNTY NORTH CAROLINA

EFFECTIVE: 01/31/08

STANDARD PIPE OUTLET TO FLAT AREA
NO WELL-DEFINED CHANNEL



PLYWOOD INLET PROTECTION

STONE FILTER INLET PROTECTION

WAKE COUNTY NORTH CAROLINA

EFFECTIVE: 01/31/08

STANDARD PIPE INLET PROTECTION (PLYWOOD & STONE)

SITE PERMITTING APPROVAL

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NORTH CAROLINA AMERICAN ENGINEERING ASSOCIATES SOUTHEAST C-3881 CERTIFICATE OF AUTHORIZATION

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JASON R. HARMAN

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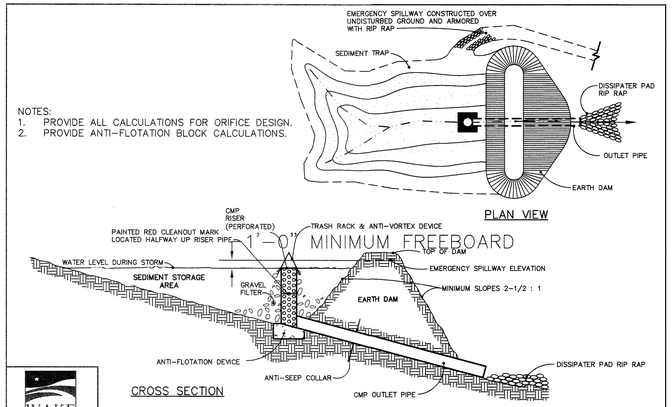
KALAS FALLS
PHASE 1
1832 ROLESVILLE ROAD
WAKE COUNTY, NC

JOB NUMBER:
CHECKED BY:
DRAWN BY:
DATE:

SHEET TITLE:
KALAS FALLS CIVIL DETAILS

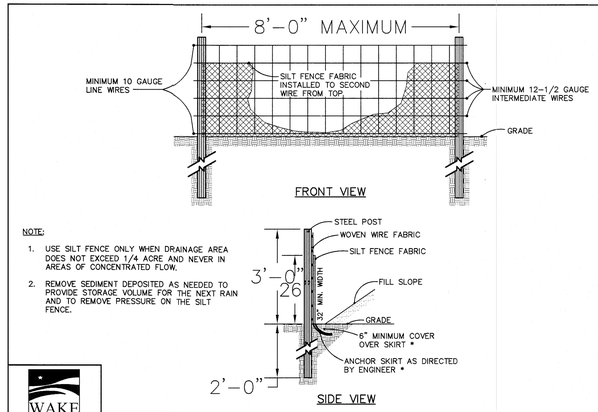
SHEET NO.:
CD2

Z:\Jobs\0900\Working Property\dwg_Working Dwgs\Storm Files\Kalas Fall Set Details.dwg



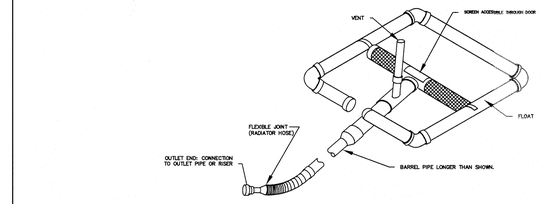
STANDARD RISER-BARREL SEDIMENT BASIN

EFFECTIVE: 01/31/08



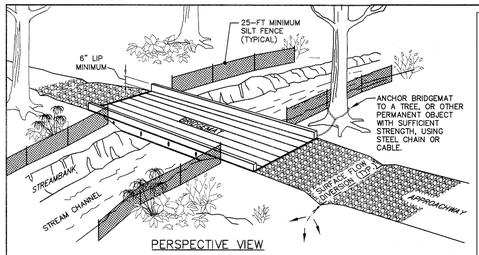
STANDARD TEMPORARY SILT FENCE

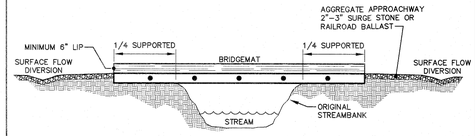
EFFECTIVE: 01/31/08



STANDARD SKIMMER DETAIL

EFFECTIVE: 01/31/08



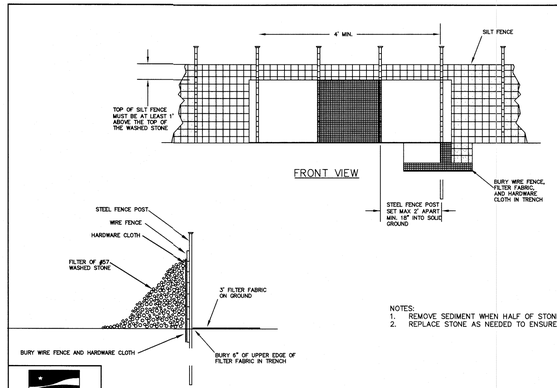


INSTALLATION NOTES:
1. REFER TO "NORTH CAROLINA DIVISION OF FOREST RESOURCES" LITERATURE, INSTALLATION MAINTENANCE GUIDELINES, & "NORTH CAROLINA FORESTRY BMP MANUAL--2006".
2. INSTALL WATER DIVERSION DEVICES (WATER BARS, TURNOUTS, BROAD-BASED DIPS, ETC.) ON BOTH SIDES OF THE MATS.
3. STABILIZE EXPOSED 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.

STANDARD SILT FENCE OUTLET

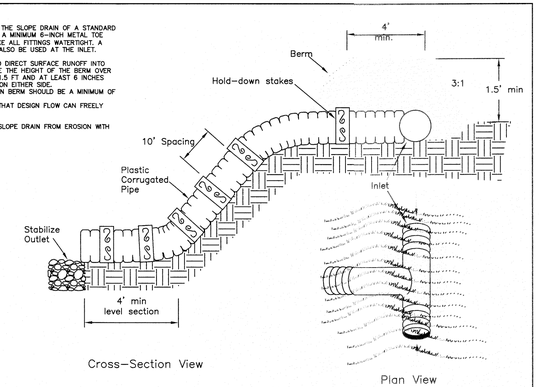
EFFECTIVE: 01/31/08

NOTES:

1. CONSTRUCT THE ENTRANCE TO THE SLOPE DRAIN OF A STANDARD FLARED-END SECTION OF PIPE WITH A MINIMUM 8-INCH METAL TOE PLATE (CROSS-SECTION VIEW). MAKE ALL FITTINGS WATERTIGHT; A STANDARD T-SECTION FITTING MAY ALSO BE USED AT THE INLET.

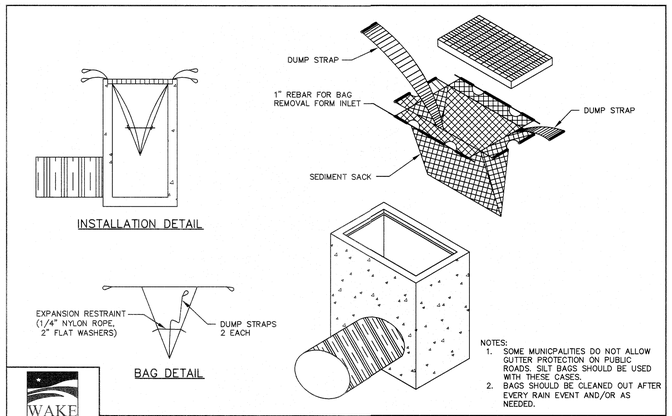
2. USE AN EARTHEN DIVERSION TO DIRECT SURFACE RUNOFF INTO THE TEMPORARY SLOPE DRAIN. MAKE THE HEIGHT OF THE BERM OVER THE DRAIN CONDUIT A MINIMUM OF 1.5 FT AND AT LEAST 6 INCHES HIGHER THAN THE ADJOINING BERM ON EITHER SIDE. THE LOWEST POINT OF THE DIVERSION BERM SHOULD BE A MINIMUM OF 1 FT ABOVE THE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



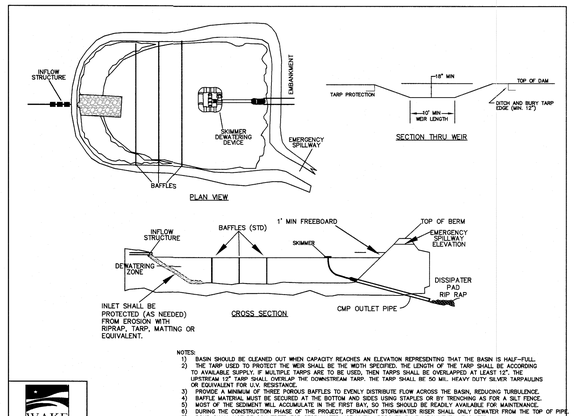
STANDARD TEMPORARY SLOPE DRAIN

EFFECTIVE: 01/31/08



STANDARD SILT BAG - INLET SEDIMENT CONTROL DEVICE

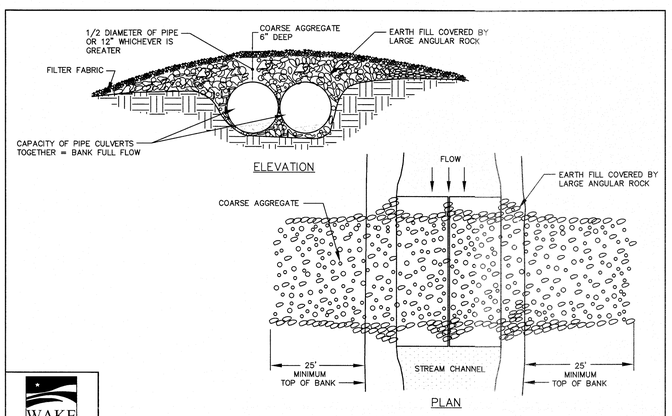
EFFECTIVE: 01/31/08



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 ML. HEAVY DUTY SILVER TARPAULINS OR EQUIVALENT FOR U.V. RESISTANCE.
3) ENSURE A MINIMUM OF THREE POROUS BAFFLES TO EVENLY DISTRIBUTE FLOW ACROSS THE BASIN, REDUCING TURBULENCE.
4) BAFFLES SHALL BE SECURELY ANCHORED AT THE BOTTOM AND SIDES USING STAPLES OR BY TROUGHING 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.

STANDARD SKIMMER BASIN

EFFECTIVE: 01/31/08



STANDARD TEMPORARY STREAM CROSSING

EFFECTIVE: 01/31/08

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 #** S-4224

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 #** W-3785

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 # _____

CITY OF RALEIGH - PLANS AUTHORIZED FOR CONSTRUCTION

Electronic Approval: This approval is being issued electronically. This approval is valid only upon the signature of a City of Raleigh Review Officer below. The City will retain a copy of the approved plans. Any work authorized by this approval must proceed in accordance with the plans kept on file with the City. This electronic approval may not be edited once issued. Any modification to this approval once issued will invalidate this approval.

City of Raleigh Development Approval _____

Timothy Beverly

Raleigh Water Review Officer

AMERICAN Engineering
American Engineering Associates - Southeast, P.A.
4020 Westchase Boulevard, Suite 450
Raleigh, NC 27607
919-469-1101

NORTH CAROLINA AMERICAN ENGINEERING ASSOCIATES SOUTHEAST, P.A. C-3881 CERTIFICATE OF AUTHORIZATION

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMAN

DETAIL SELECTION ONLY

NO.	DATE	REVISION:

STIPULATION FOR REUSE

KALAS FALLS
PHASE 1
1832 ROLESVILLE ROAD
WAKE COUNTY, NC

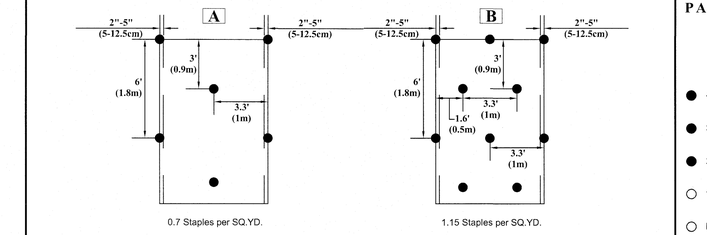
JOB NUMBER:
CHECKED BY:
DRAWN BY:
DATE:

SHEET TITLE:
KALAS FALLS CIVIL DETAILS

SHEET NO.:
CD3

Z:\Jobs\20000\Watkins Property\Proj_Working Things\Base File\Atlas Full Set Details.dwg

STAPLE PATTERN GUIDE



0.7 Staples per SQ.YD. | 1.15 Staples per SQ.YD. | 1.7 Staples per SQ.YD. | 3.4 Staples per SQ.YD. | 3.75 Staples per SQ.YD.

- 4:1 Slopes (A)
- 3:1 Slopes (B)
- 2:1 Slopes (C)
- 1:1 & Steeper Slopes (D)
- Medium/High Flow Channel (D)
- High Flow Channel And Shoreline (E)

NOTES:

* Use ECMDS© for more accurate staple pattern selection.

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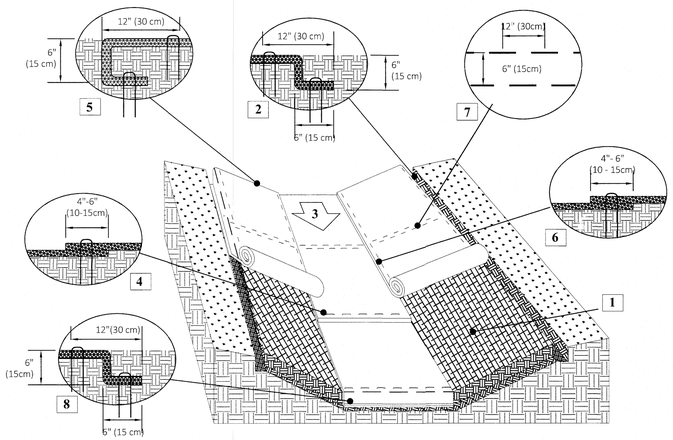
Disclaimer:
The information presented herein is general design information only. For specific applications, consult an independent professional for further design guidance.

Drawn on: 5-4-17

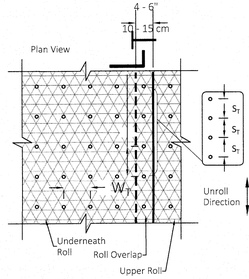
Drawing Not To Scale



Instructions

1. Prepare soil before installing rolled erosion control products (RECPs), including any necessary application of lime, fertilizer, and seed. Ground surface must be free of debris, rocks, clay clods and raked smooth sufficient to allow intimate contact of the RECP with the soil over the entirety of the installation.
2. Begin at the top of the channel by anchoring the RECPs in a 6" (15 cm) deep X 6" (15 cm) wide trench with approximately 12" (30 cm) of RECPs extended beyond the up-slope portion of the trench. Use ShoreMax mat at the channel/culvert outlet as supplemental scour protection as needed. Anchor the RECPs with a row of staples/stakes/pins approximately 12" (30 cm) apart in the bottom of the trench. Backfill and compact the trench after stapling. Apply seed to the compacted soil and fold the remaining 12" (30 cm) portion of RECPs back over the seed and compacted soil. Secure RECPs over compacted soil with a row of staples/stakes/pins spaced approximately 12" (30 cm) apart across the width of the RECPs.
3. Roll center RECPs in direction of water flow in bottom of channel. RECPs will unroll with appropriate side against the soil surface. All RECPs must be securely fastened to soil surface by placing staples/stakes/pins in appropriate locations as shown in the staple pattern guide.
4. Place consecutive RECPs end-over-end (Shingle style) with a 4"- 6" (10 - 15 cm) overlap. Use a double row of staples staggered 4" apart and 4" on center to secure RECPs.
5. Full length edge of RECPs at top of side slopes must be anchored with a row of staples/stakes/pins spaced at S_T apart in a 6" (15 cm) deep X 6"(15 cm) wide trench. Backfill and compact the trench after stapling.
6. Adjacent RECPs must be overlapped approximately 4"- 6" (10 - 15 cm) and secured with staples/stakes/pins at S_T.
7. In high flow channel applications a staple check slot is recommended at 30 to 40 foot (9 -12m) intervals. Use a double row of staples staggered 6" (15 cm) apart and 12" (30 cm) on center over entire width of the channel.
8. The terminal end of the RECPs must be anchored with a row of staples/stakes/pins spaced at S_T apart in a 6" (15 cm) deep X 6" (15 cm) wide trench. Backfill and compact the trench after stapling.
9. Fasteners should provide a minimum of twenty pounds of pullout resistance. Six-inch (10 cm) X one-inch (2.5 cm) eleven gauge staples are typically adequate. In loose soils, longer staples may be necessary, twist pins can provide the greatest pullout resistance. In hard or rocky soils, straight pins may by used where staples or twist pins are refused, provided the minimum pullout requirements are met. Bio-degradable fasteners shall not be used with VMax (TRM) or TMax (HPTRM) materials.

Staple Pattern Guide



- Pin / Staple / Twist Pin, as appropriate for field conditions

	Staple Pattern
Dimension	E
W_T	20" (50 cm)
L_T	20" (50 cm)
S_T	18" (45 cm)
Nominal Frequency	3.8 / SY

Figure 1. Minimum Anchor Pattern

Maximum Design Conditions			Anchor Pattern
Shear Stress	Velocity	Wave Heigth	
<= 6 lbs/ft2	<= 14 ft/s	6 in.	F
> 6-8 lbs/ft2	> 14-18 ft/s	12 in.	G
> 8 lbs/ft2	> 18 ft/s	18 in.	H

Figure 2. Minimum Anchor Type

Soil Type	Anchor Type
Clay-Clay Loam	10 in Wire Staple
Silt Loam - Loam	10 in Wire Staple
Sandy Loam	12 in Wire Staple
Sand / Muck <= 6 in	12in Rebar Staple
Sand / Muck 6-12 in	18 in Rebar Staple
Sand / Muck 12-18 in	24 in Earth Anchor + 12 in Rebar Staple
Sand / Muck > 18 in	36 in Earth Anchor + 18 in Rebar Staple

Figure 3. Anchor Patterns for use with Wire/Rebar Staples

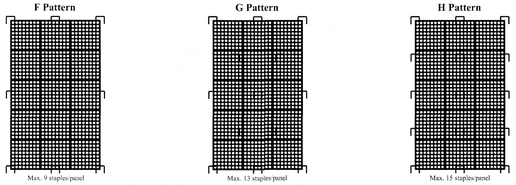
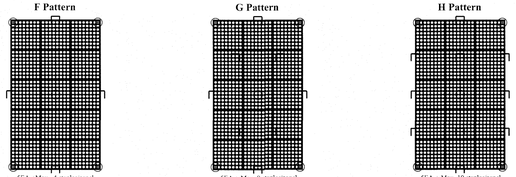


Figure 4. Anchor Patterns for use with Combination of Earth Anchors and Staples



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Poseyville, IN 47633 www.nagreen.com

Disclaimer:
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Drawn on: 5-4-17

Drawing Not To Scale

ShoreMax™

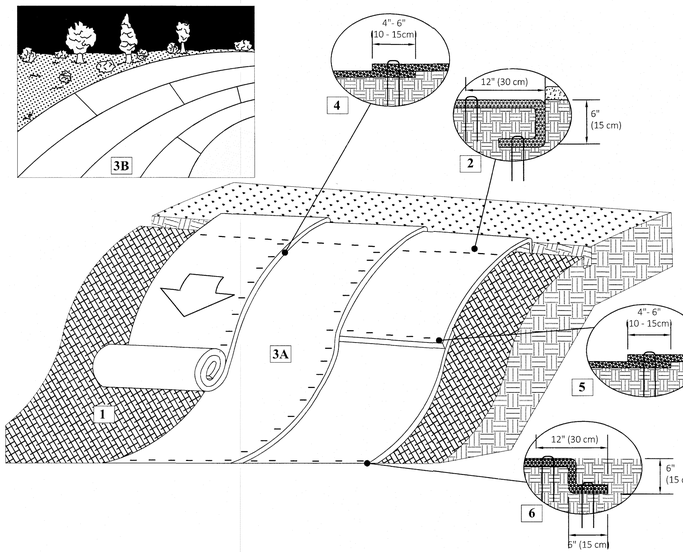
ANCHORING GUIDE

1. When installing ShoreMax mat, the anchor pattern (figure 3 or 4) should be selected based on the expected maximum design conditions (shear stress, velocity, or wave impact) (figure 1).
2. Anchor selection should be based on the soil type and pull-out strength required (figure 2). In soft, highly erodible soils percussion earth anchors may be necessary. Earth anchors can be installed in conjunction with rebar staples (figure 4).
3. When using percussion earth anchors, position anchors in each corner and the center of the panel. Place staples in the appropriate pattern through remainder of mat. Staples can be shared between two adjacent panels.

***Note:**
Number of staples used per panel can be reduced by 30-40% when sharing staples between panels.

⊓ - Wire/Rebar Staple

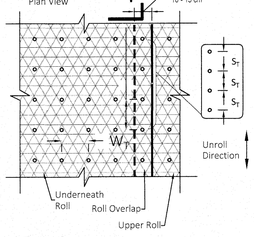
⊕ - Percussion Earth Anchor



Instructions

1. Prepare soil before installing rolled erosion control products (RECPs), including any necessary application of lime, fertilizer, and seed. Ground surface must be free of debris, rocks, clay clods and raked smooth sufficient to allow intimate contact of the RECP with the soil over the entirety of the installation.
2. Begin at the top of the slope by anchoring the RECPs in a 6" (15 cm) deep X 6" (15 cm) wide trench. Anchor the RECPs with a row of staples/stakes/pins spaced at S_T apart in the bottom of the trench. Backfill and compact the trench after stapling and fold the roll over downslope. Secure RECPs over compacted soil with a row of staples/stakes/pins spaced at S_T apart across the width of the RECPs.
3. Roll the RECPs (A) down or (B) horizontally across the slope. RECPs will unroll with appropriate side against the soil surface. All RECPs must be securely fastened to soil surface by placing staples/stakes/pins in appropriate locations as shown in the staple pattern guide. RollMax RECPs and ECBs should utilize Staple Pattern C, TRMs and VMax materials should utilize Staple Pattern D.
4. The edges of parallel RECPs must be stapled with approximately 4" - 6" (10 - 15 cm) overlap.
5. Consecutive RECPs spliced down the slope must overlapped with the upstream mat atop the downstream mat (shingle style). The overlap should be 4" - 6" (10 - 15 cm).
6. At the terminal end, secure each mat across the width with a row of staples/stakes/pins spaced at S_T. If exposed to flow, foot traffic, wind uplift or other disruption, trench the terminal end in as shown in detail.
7. Fasteners should provide a minimum of twenty pounds of pullout resistance. Six-inch (10 cm) X one-inch (2.5 cm) eleven gauge staples are typically adequate. In loose soils, longer staples may be necessary, twist pins can provide the greatest pullout resistance. In hard or rocky soils, straight pins may by used where staples or twist pins are refused, provided the minimum pullout requirements are met. Bio-degradable fasteners shall not be used with VMax (TRM) or TMax (HPTRM) materials.

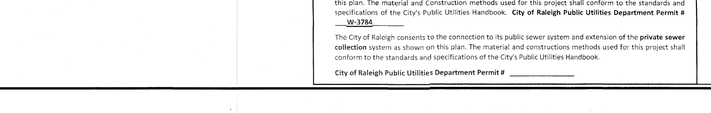
Staple Pattern Guide



- Pin / Staple / Twist Pin, as appropriate for field conditions

	Staple Pattern	
Dimension	C	D
W_T	30" (75 cm)	24" (60 cm)
L_T	30" (75 cm)	20" (50 cm)
S_T	18" (45 cm)	18" (45 cm)
Nominal Frequency	1.7 / SY	3.0 / SY
Application	ECB (Degradable)	TRM (Permanent)

*Note: Staple Pattern A and B used prior to 8/2019 have been discontinued.



WAKE COUNTY NORTH CAROLINA
EFFECTIVE: 01/31/08

STANDARD FILTER BAG FOR DEWATERING ACTIVITIES

SITE PERMITTING APPROVAL

Water and Sewer Permits (if applicable)

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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 #** W-3784

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City of Raleigh Public Utilities Department Permit # _____

CITY OF RALEIGH - PLANS AUTHORIZED FOR CONSTRUCTION

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Timothy Beasley

City of Raleigh Development Approval _____

Raleigh Water Review Officer

North Carolina 811 ncocc.811.org
*** 3 Days Before Digging ***
North Carolina 811
811 or 1-800-632-4949
Remote Ticket Entry
http://nc811.org/remoteticketentry.htm

AMERICAN Engineering
American Engineering Associates - Southeast, P.A.
4020 Westchase Boulevard, Suite 450
Raleigh, NC 27607
919-469-1101

NORTH CAROLINA AMERICAN ENGINEERING ASSOCIATES SOUTHEAST C-3881 CERTIFICATE OF AUTHORITY

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARRIS

DETAIL SELECTION ONLY

NO.	DATE	REVISION:

STIPULATION FOR REUSE

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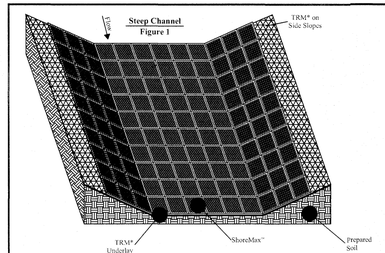
KALAS FALLS
PHASE 1
1832 ROLESVILLE ROAD
WAKE COUNTY, NC

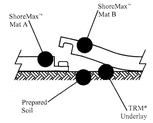
JOB NUMBER:
CHECKED BY:
DRAWN BY:
DATE:

SHEET TITLE:
KALAS FALLS CIVIL DETAILS

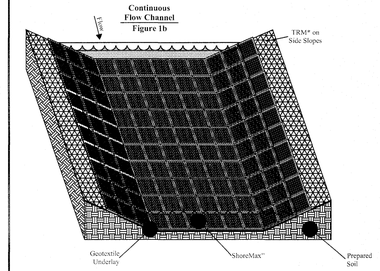
SHEET NO.:
CD4

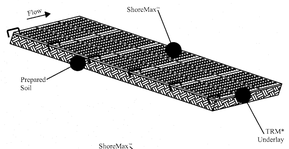
Z:\Jobs\19000\Walton Property\Revit_Working Docs\Walton Est\Kalas Fall Set Details.dwg

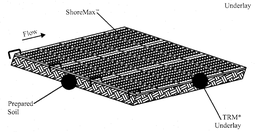




Integrated Panel Interlock System
Figure 2







Leading Edge Anchoring
Figure 3

High Scour Line
Low Flow Line

Channel/Downchute/Spillway Plan View

Drawing Not To Scale

ShoreMax™

STEEP CHANNEL/ CHUTE/SPILLWAY DETAIL

* ShoreMax mats can be installed over a variety of underlayments including: sod, turf reinforcement mats (TRMs), geotextiles, and in some cases erosion control blankets (ECBs).

1. Prepare soil before installing erosion control products, including any necessary application of lime, fertilizer, and seed (when installing TRM or ECB underlayment).
2. Install turf reinforcement mat (TRM) over prepared soils according to manufacturer's recommendations.
3. Place ShoreMax mat in the bottom of the channel over the installed TRM (figure 1). The ShoreMax mat should be installed up to the appropriate elevation on the side slope as determined by the engineer. When using multiple panels, connect the panels using the Integrated Panel Interlock System (figure 2). ShoreMax mat can be laid in either direction.
4. For channels carrying continuous water flows, an appropriate geotextile should be placed under the ShoreMax mat for submerged applications (figure 1b).
5. Place staples/anchors in the appropriate pattern. Perimeter staples can be shared between two adjacent panels. In soft or highly erodible soils, percussion earth anchors may be required. View ShoreMax Anchoring Guide, for additional details.
6. At beginning of channel and areas where significant concentrated flows are directed onto the ShoreMax mat, place 1 staple/pin per linear foot along the leading edge of the ShoreMax system, resulting in 1 staple/pin on each corner and gridline (figure 3).

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Drawn on: 5-4-17

PART III
SELF-INSPECTION, RECORDKEEPING AND REPORTING

SECTION A: SELF-INSPECTION

Self-inspections are required during normal business hours in accordance with the table below. When adverse weather or site conditions would cause the safety of the inspection personnel to be in jeopardy, the inspection may be delayed until the next business day on which it is safe to perform the inspection. In addition, when a storm event of equal to or greater than 1.0 inch occurs outside of normal business hours, the self-inspection shall be performed upon the commencement of the next business day. Any time when inspections were delayed shall be noted in the Inspection Record.

Inspect	Frequency (during normal business hours)	Inspection records must include:
(1) Rain gauge maintained in good working order	Daily	Daily rainfall amounts. If no daily rain gauge observations are made during weekend or holiday periods, and no individual-day rainfall information is available, record the cumulative rain measurement for those un-attended days (and this will determine if a site inspection is needed). Days on which no rainfall occurred shall be recorded as "zero." The permittee may use another rain-monitoring device approved by the Division.
(2) E&SC Measures	At least once per 7 calendar days and within 24 hours of a rain event ≥ 1.0 inch in 24 hours	1. Identification of the measures inspected, 2. Date and time of the inspection, 3. Name of the person performing the inspection, 4. Indication of whether the measures were operating properly, 5. Description of maintenance needs for the measure, 6. Description, evidence, and date of corrective actions taken.
(3) Stormwater discharge outfalls (SDOs)	At least once per 7 calendar days and within 24 hours of a rain event ≥ 1.0 inch in 24 hours	1. Identification of the discharge outfalls inspected, 2. Date and time of the inspection, 3. Name of the person performing the inspection, 4. Evidence of indicators of stormwater pollution such as oil sheen, floating or suspended solids or discoloration, 5. Indication of visible sediment leaving the site, 6. Description, evidence, and date of corrective actions taken.
(4) Perimeter of site	At least once per 7 calendar days and within 24 hours of a rain event ≥ 1.0 inch in 24 hours	If visible sedimentation is found outside site limits, then a record of the following shall be made: 1. Actions taken to clean up or stabilize the sediment that has left the site limits, 2. Description, evidence, and date of corrective actions taken, and 3. An explanation as to the actions taken to control future releases.
(5) Streams or wetlands onsite or offsite (where accessible)	At least once per 7 calendar days and within 24 hours of a rain event ≥ 1.0 inch in 24 hours	If the stream or wetland has increased visible sedimentation or a stream has visible increased turbidity from the construction activity, then a record of the following shall be made: 1. Description, evidence and date of corrective actions taken, and 2. Records of the required reports to the appropriate Division Regional Office per Part III, Section C, item (2)(a) of this permit.
(6) Ground stabilization measures	After each phase of grading	1. The phase of grading (installation of perimeter E&SC measures, clearing and grubbing, installation of storm drainage facilities, completion of all land-disturbing activity, construction or redevelopment, permanent ground cover); and 2. Documentation that the required ground stabilization measures have been provided within the required timeframe or an assurance that they will be provided as soon as possible.

NOTE: The rain inspection resets the required 7 calendar day inspection requirement.

PART III
SELF-INSPECTION, RECORDKEEPING AND REPORTING

SECTION B: RECORDKEEPING

1. E&SC Plan Documentation

The approved E&SC plan as well as any approved deviation shall be kept on the site. The approved E&SC plan must be kept up-to-date throughout the coverage under this permit. The following items pertaining to the E&SC plan shall be kept on site and available for inspection at all times during normal business hours.

Item to Document	Documentation Requirements
(a) Each E&SC measure has been installed and does not significantly deviate from the locations, dimensions and relative elevations shown on the approved E&SC plan.	Initial and date each E&SC measure on a copy of the approved E&SC plan or complete, date and sign an inspection report that lists each E&SC measure shown on the approved E&SC plan. This documentation is required upon the initial installation of the E&SC measures or if the E&SC measures are modified after initial installation.
(b) A phase of grading has been completed.	Initial and date a copy of the approved E&SC plan or complete, date and sign an inspection report to indicate completion of the construction phase.
(c) Ground cover is located and installed in accordance with the approved E&SC plan.	Initial and date a copy of the approved E&SC plan or complete, date and sign an inspection report to indicate compliance with approved ground cover specifications.
(d) The maintenance and repair requirements for all E&SC measures have been performed.	Complete, date and sign an inspection report.
(e) Corrective actions have been taken to E&SC measures.	Initial and date a copy of the approved E&SC plan or complete, date and sign an inspection report to indicate the completion of the corrective action.

2. Additional Documentation to be Kept on Site

In addition to the E&SC plan documents above, the following items shall be kept on the site and available for inspectors at all times during normal business hours, unless the Division provides a site-specific exemption based on unique site conditions that make this requirement not practical:

(a) This General Permit as well as the Certificate of Coverage, after it is received.

(b) Records of inspections made during the previous twelve months. The permittee shall record the required observations on the Inspection Record Form provided by the Division or a similar inspection form that includes all the required elements. Use of electronically-available records in lieu of the required paper copies will be allowed if shown to provide equal access and utility as the hard-copy records.

3. Documentation to be Retained for Three Years

All data used to complete the e-NOI and all inspection records shall be maintained for a period of three years after project completion and made available upon request. [40 CFR 122.41]

PART III
SELF-INSPECTION, RECORDKEEPING AND REPORTING

SECTION C: REPORTING

1. Occurrences that Must be Reported

Permittees shall report the following occurrences:

(a) Visible sediment deposition in a stream or wetland.

(b) Oil spills if:
- They are 25 gallons or more,
- They are less than 25 gallons but cannot be cleaned up within 24 hours,
- They cause sheen on surface waters (regardless of volume), or
- They are within 100 feet of surface waters (regardless of volume).

(c) Releases of hazardous substances in excess of reportable quantities under Section 311 of the Clean Water Act (Ref: 40 CFR 110.3 and 40 CFR 117.3) or Section 102 of CERCLA (Ref: 40 CFR 302.4) or G.S. 143-215.85.

(d) Anticipated bypasses and unanticipated bypasses.

(e) Noncompliance with the conditions of this permit that may endanger health or the environment.

2. Reporting Timeframes and Other Requirements

After a permittee becomes aware of an occurrence that must be reported, he shall contact the appropriate Division regional office within the timeframes and in accordance with the other requirements listed below. Occurrences outside normal business hours may also be reported to the Department's Environmental Emergency Center personnel at (800) 858-0368.

Occurrence	Reporting Timeframes (After Discovery) and Other Requirements
(a) Visible sediment deposition in a stream or wetland	• ***Within 24 hours***, an oral or electronic notification. • ***Within 7 calendar days***, a report that contains a description of the sediment and actions taken to address the cause of the deposition. Division staff may waive the requirement for a written report on a case-by-case basis. • If the stream is named on the NC 303(d) list as impaired for sediment-related causes, the permittee may be required to perform additional monitoring, inspections or apply more stringent practices if staff determine that additional requirements are needed to assure compliance with the federal or state impaired-waters conditions.
(b) Oil spills and release of hazardous substances per Item 1(b)-(c) above	• ***Within 24 hours***, an oral or electronic notification. The notification shall include information about the date, time, nature, volume and location of the spill or release.
(c) Anticipated bypasses [40 CFR 122.41(m)(3)]	• ***A report at least ten days before the date of the bypass, if possible.*** The report shall include an evaluation of the anticipated quality and effect of the bypass.
(d) Unanticipated bypasses [40 CFR 122.41(m)(3)]	• ***Within 24 hours,*** an oral or electronic notification. • ***Within 7 calendar days,*** a report that includes an evaluation of the quality and effect of the bypass.
(e) Noncompliance with the conditions of this permit that may endanger health or the environment[40 CFR 122.41(l)(7)]	• ***Within 24 hours,*** an oral or electronic notification. • ***Within 7 calendar days,*** a report that contains a description of the noncompliance, and its causes; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time noncompliance is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance. [40 CFR 122.41(l)(6).
	• Division staff may waive the requirement for a written report on a case-by-case basis.

PART II, SECTION G, ITEM (4)
DRAW DOWN OF SEDIMENT BASINS FOR MAINTENANCE OR CLOSE OUT

Sediment basins and traps that receive runoff from drainage areas of one acre or more shall use outlet structures that withdraw water from the surface when these devices need to be drawn down for maintenance or close out unless this is infeasible. The circumstances in which it is not feasible to withdraw water from the surface shall be rare (for example, times with extended cold weather). Non-surface withdrawals from sediment basins shall be allowed only when all of the following criteria have been met:

(a) The E&SC plan authority has been provided with documentation of the non-surface withdrawal and the specific time periods or conditions in which it will occur. The non-surface withdrawal shall not commence until the E&SC plan authority has approved these items,
(b) The non-surface withdrawal has been reported as an anticipated bypass in accordance with Part III, Section C, item (2)(c) and (d) of this permit,
(c) Dewatering discharges are treated with controls to minimize discharges of pollutants from stormwater that is removed from the sediment basin. Examples of appropriate controls include properly sited, designed and maintained dewatering tanks, weir tanks, and filtration systems,
(d) Vegetated, upland areas of the sites or a properly designed stone pad is used to the extent feasible at the outlet of the dewate ing treatment devices described in Item (c) above,
(e) Velocity dissipation devices such as check dams, sediment traps, and riprap are provided at the discharge points of all dewatering devices, and
(f) Sediment removed from the dewatering treatment devices described in Item (c) above is disposed of in a manner that does not cause deposition of sediment into waters of the United States.

NCG01 SELF-INSPECTION, RECORDKEEPING AND REPORTING | EFFECTIVE: 04/01/19

GROUND STABILIZATION AND MATERIALS HANDLING PRACTICES FOR COMPLIANCE WITH THE NCG01 CONSTRUCTION GENERAL PERMIT

Implementing the details and specifications on this plan sheet will result in the construction activity being considered compliant with the Ground Stabilization and Materials Handling sections of the NCG01 Construction General Permit (Sections E and F, respectively). The permittee shall comply with the Erosion and Sediment Control plan approved by the delegated authority having jurisdiction. All details and specifications shown on this sheet may not apply depending on site conditions and the delegated authority having jurisdiction.

SECTION E: GROUND STABILIZATION

Site Area Description	Required Ground Stabilization Timeframes: Stabilize within this many calendar days after ceasing land disturbance	Timeframe variations
(a) Perimeter dikes, swales, ditches, and perimeter slopes	7	None
(b) High Quality Water (HQW) Zones	7	None
(c) Slopes steeper than 3:1	7	If slopes are 10' or less in length and are not steeper than 2:1, 14 days are allowed
(d) Slopes 3:1 to 4:1	14	-7 days for slopes greater than 50' in length and with slopes steeper than 4:1 -7 days for perimeter dikes, swales, ditches, perimeter slopes and HQW Zones -10 days for Falls Lake Watershed
(e) Areas with slopes flatter than 4:1	14	-7 days for perimeter dikes, swales, ditches, perimeter slopes and HQW Zones -10 days for Falls Lake Watershed unless there is zero slope

Note: After the permanent cessation of construction activities, any areas with temporary ground stabilization shall be converted to permanent ground stabilization as soon as practicable but in no case longer than 90 calendar days after the last land disturbing activity. Temporary ground stabilization shall be maintained in a manner to render the surface stable against accelerated erosion until permanent ground stabilization is achieved.

GROUND STABILIZATION SPECIFICATION

Stabilize the ground sufficiently so that rain will not dislodge the soil. Use one of the techniques in the table below:

Temporary Stabilization	Permanent Stabilization
• Temporary grass seed covered with straw or other mulches and tackifiers • Hydroseeding • Rolled erosion control products with or without temporary grass seed • Appropriately applied straw or other mulch • Plastic sheeting	• Permanent grass seed covered with straw or other mulches and tackifiers • Geotextile fabrics such as permanent soil reinforcement matting • Hydroseeding • Shrubs or other permanent plantings covered with mulch • Uniform and evenly distributed ground cover sufficient to restrain erosion • Structural methods such as concrete, asphalt or retaining walls • Rolled erosion control products with grass seed

POLYACRYLAMIDES (PAMS) AND FLOCCULANTS

1. Select flocculants that are appropriate for the soils being exposed during construction, selecting from the *NC DWR List of Approved PAMS/Flocculants*.
2. Apply flocculants at or before the inlets to Erosion and Sediment Control Measures.
3. Apply flocculants at the concentrations specified in the *NC DWR List of Approved PAMS/Flocculants* and in accordance with the manufacturer's instructions.
4. Provide ponding area for containment of treated Stormwater before discharging offsite.
5. Store flocculants in leak-proof containers that are kept under storm-resistant cover or surrounded by secondary containment structures.

EQUIPMENT AND VEHICLE MAINTENANCE

1. Maintain vehicles and equipment to prevent discharge of fluids.
2. Provide drip pans under any stored equipment.
3. Identify leaks and repair as soon as feasible, or remove leaking equipment from the project.
4. Collect all spent fluids, store in separate containers and properly dispose as hazardous waste (recycle when possible).
5. Remove leaking vehicles and construction equipment from service until the problem has been corrected.
6. Bring used fuels, lubricants, coolants, hydraulic fluids and other petroleum products to a recycling or disposal center that handles these materials.

LITTER, BUILDING MATERIAL AND LAND CLEARING WASTE

1. Never bury or burn waste. Place litter and debris in approved waste containers.
2. Provide a sufficient number and size of waste containers (e.g dumpster, trash receptacle) on site to contain construction and domestic wastes.
3. Locate waste containers at least 50 feet away from storm drain inlets and surface waters unless no other alternatives are reasonably available.
4. Locate waste containers on areas that do not receive substantial amounts of runoff from upland areas and does not drain directly to a storm drain, stream or wetland.
5. Cover waste containers at the end of each workday and before storm events or provide secondary containment. Repair or replace damaged waste containers.
6. Anchor all lightweight items in waste containers during times of high winds.
7. Empty waste containers as needed to prevent overflow. Clean up immediately if containers overflow.
8. Dispose waste off-site at an approved disposal facility.
9. On business days, clean up and dispose of waste in designated waste containers.

PAINT AND OTHER LIQUID WASTE

1. Do not dump paint and other liquid waste into storm drains, streams or wetlands.
2. Locate paint washouts at least 50 feet away from storm drain inlets and surface waters unless no other alternatives are reasonably available.
3. Contain liquid wastes in a controlled area.
4. Containment must be labeled, sized and placed appropriately for the needs of site.
5. Prevent the discharge of soaps, solvents, detergents and other liquid wastes from construction sites.

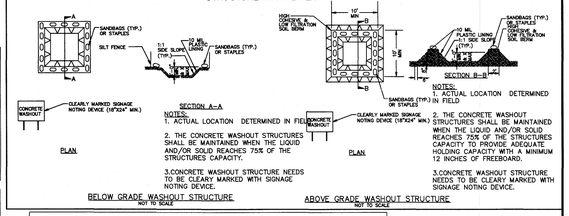
PORTABLE TOILETS

1. Install portable toilets on level ground, at least 50 feet away from storm drains, streams or wetlands unless there is no alternative reasonably available. If 50 foot offset is not attainable, provide relocation of portable toilet behind silt fence or place on a gravel pad and surround with sand bags.
2. Provide staking or anchoring of portable toilets during periods of high winds or in high foot traffic areas.
3. Monitor portable toilets for leaking and properly dispose of any leaked material. Utilize a licensed sanitary waste hauler to remove leaking portable toilets and replace with properly operating unit.

EARTHEN STOCKPILE MANAGEMENT

1. Show stockpile locations on plans. Locate earthen-material stockpile areas at least 50 feet away from storm drain inlets, sediment basins, perimeter sediment controls and surface waters unless it can be shown no other alternatives are reasonably available.
2. Protect stockpile with silt fence installed along toe of slope with a minimum offset of five feet from the toe of stockpile.
3. Provide stable stone access point when feasible.
4. Stabilize stockpile within the timeframes provided on this sheet and in accordance with the approved plan and any additional requirements. Soil stabilization is defined as vegetative, physical or chemical coverage techniques that will restrain accelerated erosion on disturbed soils for temporary or permanent control needs.

ONSITE CONCRETE WASHOUT STRUCTURE WITH LINER



BELOW GRADE WASHOUT STRUCTURE NOT TO SCALE

ABOVE GRADE WASHOUT STRUCTURE NOT TO SCALE

CONCRETE WASHOUTS

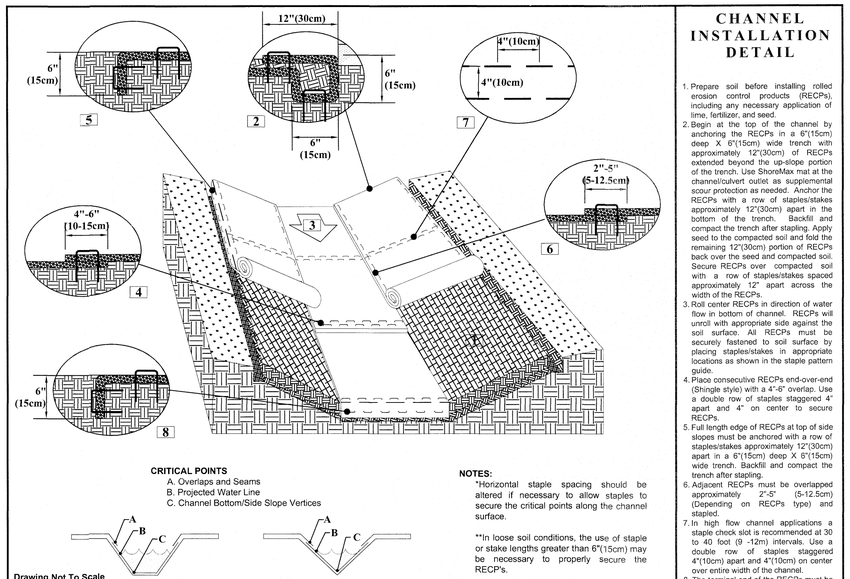
1. Do not discharge concrete or cement slurry from the site.
2. Dispose of, or recycle settled, hardened concrete residue in accordance with local and state solid waste regulations and at an approved facility.
3. Manage washout from mortar mixers in accordance with the above item and in addition place the mixer and associated materials on impervious barrier and within lot perimeter silt fence.
4. Install temporary concrete washouts per local requirements, where applicable. If an alternate method or product is to be used, contact your approval authority for review and approval. If local standard details are not available, use one of the two types of temporary concrete washouts provided on this detail.
5. Do not use concrete washouts for dewatering or storing defective curb or sidewalk sections. Stormwater accumulated within the washout may not be pumped into or discharged to the storm drain system or receiving surface waters. Liquid waste must be pumped out and removed from project.
6. Locate washouts at least 50 feet from storm drain inlets and surface waters unless it can be shown that no other alternatives are reasonably available. At a minimum, install protection of storm drain inlet(s) closest to the washout which could receive spills or overflow.
7. Locate washouts in an easily accessible area, on level ground and install a stone entrance pad in front of the washout. Additional controls may be required by the approving authority.
8. Install at least one sign directing concrete trucks to the washout within the project limits. Post signage on the washout itself to identify this location.
9. Remove leavings from the washout when at approximately 75% capacity to limit overflow events. Replace the tarp, sand bags or other temporary structural components when no longer functional. When utilizing alternative or proprietary products, follow manufacturer's instructions.
10. At the completion of the concrete work, remove remaining leavings and dispose of in an approved disposal facility. Fill pit, if applicable, and stabilize any disturbance caused by removal of washout.

HERBICIDES, PESTICIDES AND RODENTICIDES

1. Store and apply herbicides, pesticides and rodenticides in accordance with label restrictions.
2. Store herbicides, pesticides and rodenticides in their original containers with the label, which lists directions for use, ingredients and first aid steps in case of accidental poisoning.
3. Do not store herbicides, pesticides and rodenticides in areas where flooding is possible or where they may spill or leak into wells, stormwater drains, ground water or surface water. If a spill occurs, clean area immediately.
4. Do not stockpile these materials onsite.

HAZARDOUS AND TOXIC WASTE

1. Create designated hazardous waste collection areas on-site.
2. Place hazardous waste containers under cover or in secondary containment.
3. Do not store hazardous chemicals, drums or bagged materials directly on the ground.



CRITICAL POINTS
A. Overlaps and Seams
B. Projected Water Line
C. Channel Bottom/Side Slope Vertices

Drawing Not To Scale

NOTES:
"Horizontal staple spacing should be altered if necessary to allow staples to secure the critical points along the channel surface.

**In loose soil conditions, the use of staple or stake lengths greater than 6"(15cm) may be necessary to properly secure the RECP's.

CHANNEL INSTALLATION DETAIL

1. Prepare soil before installing rolled erosion control products (RECPs), including any necessary application of lime, fertilizer, and seed.
2. Begin at the top of the channel by anchoring the RECPs in a 6"(15cm) deep X 6"(15cm) wide trench with approximately 12"(30cm) of RECPs extended beyond the up-slope portion of the trench. Use ShoreMax mat at the channel/culvert outlet as supplemental scour protection as needed. Anchor the RECPs with a row of staples/stakes approximately 12"(30cm) apart in the bottom of the trench. Backfill and compact the trench after stapling. Apply seed to the compacted soil and fold the remaining 12"(30cm) portion of RECPs back over the seed and compacted soil. Secure RECPs over compacted soil with a row of staples/stakes spaced approximately 12" apart across the width of the RECPs.
3. Roll center RECPs in direction of water flow in bottom of channel. RECPs will unroll with appropriate side against the soil surface. All RECPs must be securely fastened to soil surface by placing staples/stakes in appropriate locations as shown in the staple pattern guide.
4. Place consecutive RECPs end-over-end (Shingle style) with a 4"-6" overlap. Use a double row of staples staggered 4" apart and 4" on center to secure RECPs.
5. Full length edge of RECPs at top of side slopes must be anchored with a row of staples/stakes approximately 12"(30cm) apart in a 6"(15cm) deep X 6"(15cm) wide trench. Backfill and compact the trench after stapling.
6. Adjacent RECPs must be overlapped approximately 2"-5" (5-12.5cm) (Depending on RECPs type) and stapled.
7. In high flow channel applications a staple check slot is recommended at 30 to 40 foot (9 -12m) intervals. Use a double row of staples staggered 4"(10cm) apart and 4"(10cm) on center over entire width of the channel.
8. The terminal end of the RECPs must be anchored with a row of staples/stakes approximately 12" (30cm) apart in a 6"(15cm) deep X 6"(15cm) wide trench. Backfill and compact the trench after stapling.

NORTH AMERICAN GREEN
5401 St. Wendel - Cynthiana Rd. PH: 800-722-2040
Poseyville, IN 47633 www.nagreen.com

Disclaimer:
The information presented herein is general design information only. For specific applications, consult an independent professional for further design guidance.

Drawn on: 5-4-17

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 #** S-4824

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 #** W-3784

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 # _____

CITY OF RALEIGH - PLANS AUTHORIZED FOR CONSTRUCTION

Electronic Approval: This approval is being issued electronically. This approval is valid only upon the signature of a City of Raleigh Review Officer below. The City will retain a copy of the approved plans. Any work authorized by this approval must proceed in accordance with the plans kept on file with the City. This electronic approval may not be edited once issued. Any modification to this approval once issued will invalidate this approval.

Timothy Beasley

City of Raleigh Development Approval _____

Raleigh Water Review Officer

NCG01 GROUND STABILIZATION AND MATERIALS HANDLING | EFFECTIVE: 04/01/19

AMERICAN Engineering
American Engineering Associates - Southeast, P.A.
4020 Westchase Boulevard, Suite 450 919-469-1101
Raleigh, NC 27607

NORTH CAROLINA AMERICAN ENGINEERING ASSOCIATES SOUTHEAST C-3881 CERTIFICATE OF AUTHORIZATION

NORTH CAROLINA PROFESSIONAL SEAL 9870 ENGINEER JOHN R. HARMON

DETAIL SELECTION ONLY

NO.	DATE	REVISION:

STIPULATION FOR REUSE

THIS DRAWING WAS PREPARED FOR USE ON THE SPECIFIC SITE, NAMED HEREON, CONTEMPORANEOUSLY WITH ITS ISSUE DATE AS LISTED, HEREON, AND IT IS NOT SUITABLE FOR USE ON A DIFFERENT PROJECT SITE OR AT A LATER TIME. USE OF THIS DRAWING FOR REFERENCE OR EXAMPLE ON ANOTHER PROJECT REQUIRES THE SERVICES OF PROPERLY LICENSED ARCHITECTS AND ENGINEERS. REPRODUCTION OF THIS DRAWING FOR REUSE ON ANOTHER PROJECT IS NOT AUTHORIZED AND MAY BE CONTRARY TO THE LAW.

KALAS FALLS
PHASE 1
1832 ROLESVILLE ROAD
WAKE COUNTY, NC

JOB NUMBER:
CHECKED BY:
DRAWN BY:
DATE:

SHEET TITLE:
KALAS FALLS CIVIL DETAILS

SHEET NO.:
CD5

North Carolina 811 www.nc811.org
*** 3 Days Before Digging ***
North Carolina 811
811 or 1-800-632-4949
Remote Ticket Entry
http://nc811.org/remoteticketentry.htm

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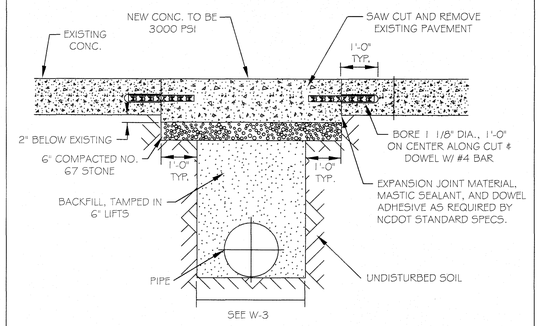
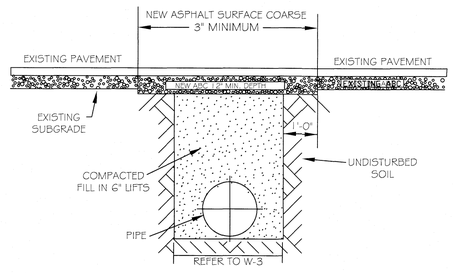


NOTES:
1. SEE CITY OF RALEIGH STANDARDS FOR TRENCHES AND PIPE BEDDING W-3 FOR ADDITIONAL DETAILS
2. PAVEMENT CUTS WITHIN NCDOT ROW SHALL CONFORM TO THE APPROVED ON SITE ENCROACHMENT PERMIT.
3. THE PAVEMENT CUT SHALL BE DEFINED BY A STRAIGHT EDGE AND CUT WITH AN APPROVED SAW CUT MACHINE.
4. THE TRENCH 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 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 .

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

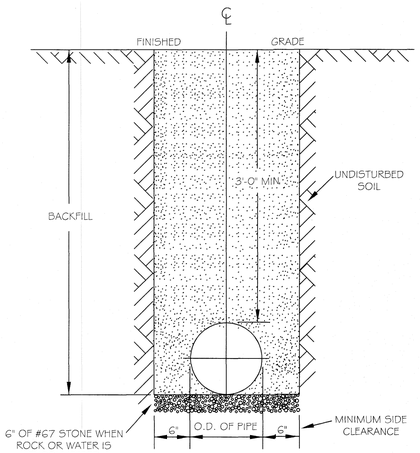
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-1	RRH	3-31-00	A.B.B.	10-29-10
	A.B.B.	2-8-05	MAB	10-31-13



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

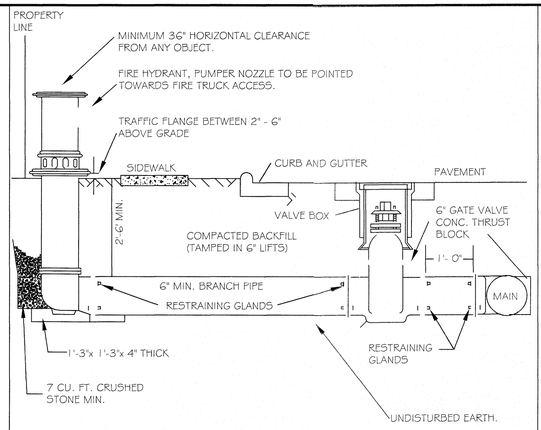
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-2	RRH	3-31-00	A.B.B.	4-16-04
	D.W.C.	11-1-99	J.P.S.	10-29-10



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

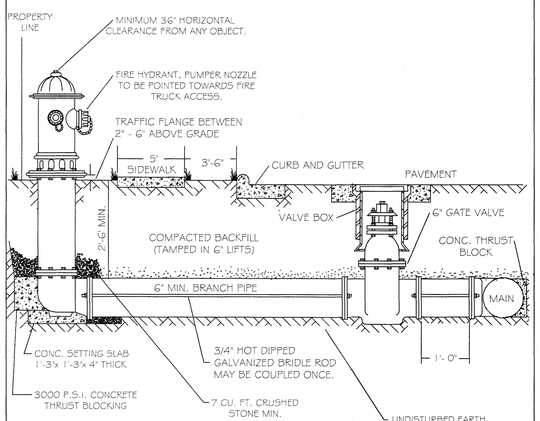


NOTES:
1. FIRE HYDRANT SHALL BE AS MANUFACTURED: MUELLER, AMERICAN DARLING, KENNEDY, M&H, WATEROUS, CLOW, EAST JORDAN IRON WORKS, OR US PIPE.
2. BRANCH PIPE SHALL BE DUCTILE IRON AWWA C150-96
3. 6" GATE VALVE SHALL BE AWWA C500-86 OPEN LEFT
4. STEEL RODS AND BOLTS SHALL BE ¾" HOT DIPPED GALVANIZED
5. 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		

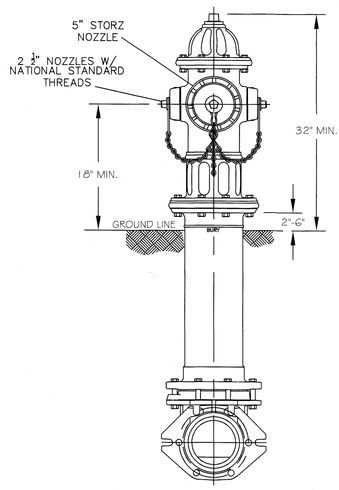


NOTES:
1. FIRE HYDRANT SHALL BE AS MANUFACTURED: MUELLER, AMERICAN DARLING, KENNEDY, M&H, WATEROUS, CLOW, EAST JORDAN IRON WORKS, OR US PIPE.
2. BRANCH PIPE SHALL BE DUCTILE IRON AWWA C150-96
3. 6" GATE VALVE SHALL BE AWWA C500-86 OPEN LEFT
4. STEEL RODS AND BOLTS SHALL BE ¾" HOT DIPPED GALVANIZED
5. 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

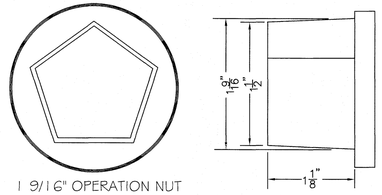
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-4a	ABB	4-6-04		

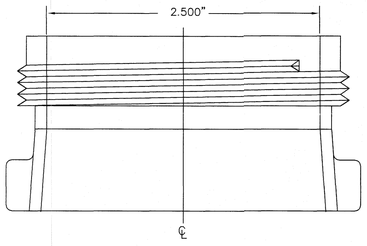


NOTES:
1. ALL PUBLIC FIRE HYDRANTS IN THE CITY OF RALEIGH AND THE MERGER TOWNS OF GARNER, ROLESVILLE, WAKE FOREST, KNIGHTDALE, WENDELL AND ZEBULON SHALL BE PAINTED CHROME YELLOW WITH HIGH REFLECTIVE ALUMINUM SILVER CAPS, BONNETS AND OPERATING NUTS.
2. ALL PRIVATE FIRE HYDRANTS SHALL BE RED.

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		
	KAT	9-15-17		

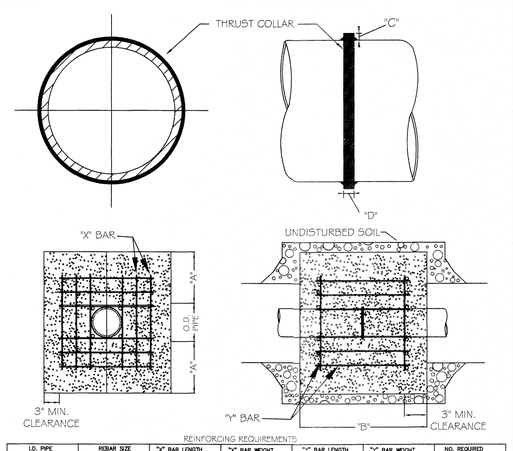




2 1/2" NATIONAL STANDARD OUTLET THREADS

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	2'-4"± 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		

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 #** S-4826

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 #** W-3786

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 # _____

CITY OF RALEIGH - PLANS AUTHORIZED FOR CONSTRUCTION

Electronic Approval: This approval is being issued electronically. This approval is valid only upon the signature of a City of Raleigh Review Officer below. The City will retain a copy of the approved plans. Any work authorized by this approval must proceed in accordance with the plans kept on file with the City. This electronic approval may not be edited once issued. Any modification to this approval once issued will invalidate this approval.

Timothy Beadle

City of Raleigh Development Approval _____

Raleigh Water Review Officer

AMERICAN Engineering
American Engineering Associates - Southeast, P.A.
4020 Westchase Boulevard, Suite 450 Raleigh, NC 27607
919-469-1101

NORTH CAROLINA AMERICAN ENGINEERING ASSOCIATES SOUTHEAST C-3881 CERTIFICATE OF AUTHORIZATION

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMAN

DETAIL SELECTION ONLY

NO.	DATE	REVISION:

STIPULATION FOR REUSE

THIS DRAWING WAS PREPARED FOR USE ON THE SPECIFIC SITE, NAMED HEREON, CONTEMPORANEOUSLY WITH ITS ISSUE DATE AS LISTED, HEREON, AND IT IS NOT SUITABLE FOR USE ON A DIFFERENT PROJECT, SITE OR AT A LATER TIME. USE OF THIS DRAWING FOR REFERENCE OR EXAMPLE ON ANOTHER PROJECT REQUIRES THE SERVICES OF PROPERLY LICENSED ARCHITECTS AND ENGINEERS. REPRODUCTION OF THIS DRAWING FOR REUSE ON ANOTHER PROJECT IS NOT AUTHORIZED AND MAY BE CONTRARY TO THE LAW.

KALAS FALLS
PHASE 1
1832 ROLESVILLE ROAD
WAKE COUNTY, NC

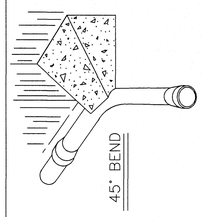
JOB NUMBER:
CHECKED BY:
DRAWN BY:
DATE:

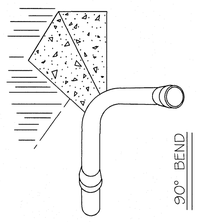
SHEET TITLE:
KALAS FALLS CIVIL DETAILS

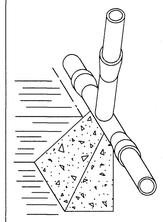
SHEET NO.:
CD6

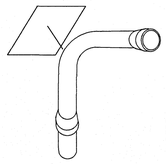
North Carolina 811 www.811.com
*** 3 Days Before Digging ***
North Carolina 811
811 or 1-800-632-4949
Remote Ticket Entry
http://nc811.org/remoteticketentry.htm

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-13.
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.

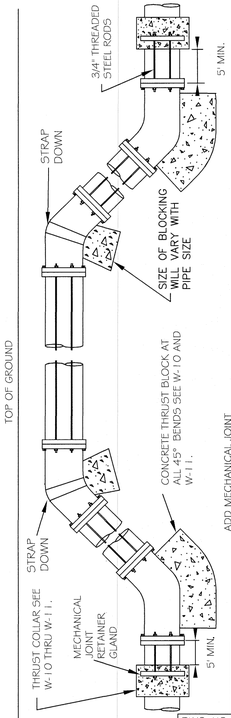
SIZE AND DEGREE OF BEND	STATIC THRUST IN POUNDS	MODERATELY DRY CLAY 4000 LBS/FT²	SOFT CLAY 2000 LBS/FT²	1600 LBS/FT² GRAVEL COARSE SAND	8000 LBS/FT² DRY CLAY ALWAYS DRY	SAND COMPACT FIRM 8000 LBS/FT²	SAND CLEAN DRY 4000 LBS/FT²	SOIL 1000 LBS/FT² QUICKSAND - VERY POOR	ROCK - POOR 10,000 LBS/FT²
6"									
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

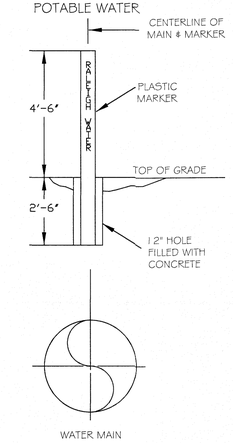
SIZE OF 45 BEND	STATIC THRUST IN POUNDS	NO. OF RODS REQUIRED
6"	4,328	2
8"	7,694	4
12"	17,312	4
16"	30,779	8
24"	69,252	8

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. SEE W-10 AND W-11 FOR REACTION BLOCK AREAS 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		

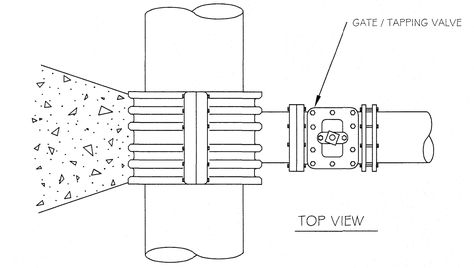
POTABLE WATER



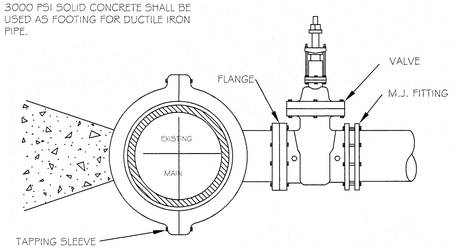
NOTES
1. POTABLE WATER MARKER TO BE BLUE IN COLOR.
2. POTABLE WATER MARKER TO BE LABELED "RALEIGH WATER".
3. TO BE SPACED ALONG CENTERLINE OF MAIN EVERY 300 FEET.
4. MARKERS TO BE ROUND AND 4" IN DIAMETER.

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



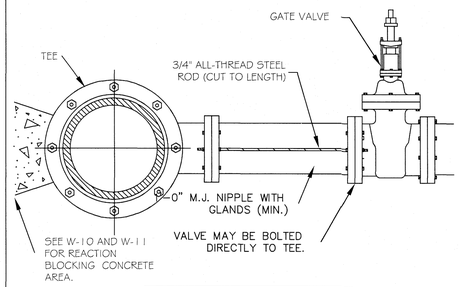
3000 PSI SOLID CONCRETE SHALL BE USED AS FOOTING FOR DUCTILE IRON PIPE.



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

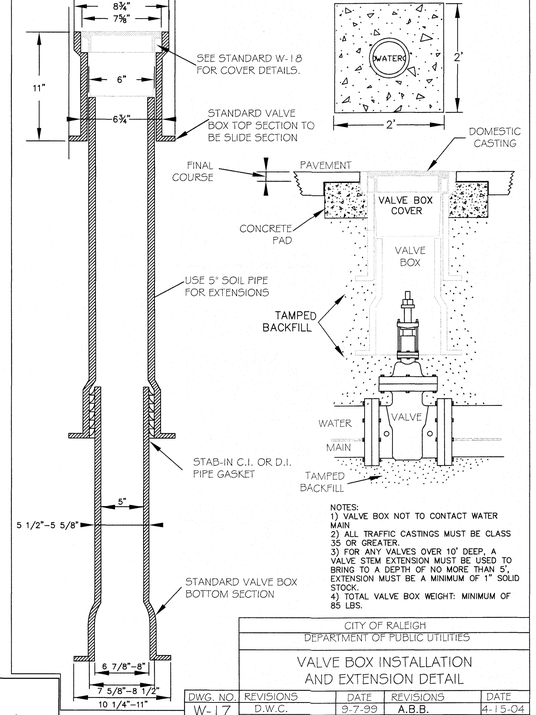
NO. OF RODS	BRANCH SIZE
4"	2
6"	2
8"	4
12"	4
16"	6
24"	6
30"	8
36"	8

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

APPROVED METHOD FOR EXTENSION OF VALVE BOX



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

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 #** S-4824

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 #** W-37165

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 # _____

CITY OF RALEIGH - PLANS AUTHORIZED FOR CONSTRUCTION

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City of Raleigh Development Approval _____

Timothy Beasley

Raleigh Water Review Officer

North Carolina 811 www.nc811.org
*** 3 Days Before Digging ***
North Carolina 811
811 or 1-800-632-4949
Remote Ticket Entry
http://nc811.org/remoteticketentry.htm

AMERICAN Engineering
American Engineering Associates - Southeast, P.A.
4020 Westchase Boulevard, Suite 450
Raleigh, NC 27607
919-469-1101

NORTH CAROLINA ENGINEERING ASSOCIATES SOUTHEAST C-3881 CERTIFICATE OF AUTHORIZATION

NORTH CAROLINA PROFESSIONAL SEAL 29810 ENGINEER JOHN R. HERMAN

DETAIL SELECTION ONLY

NO.	DATE	REVISION:

STIPULATION FOR REUSE

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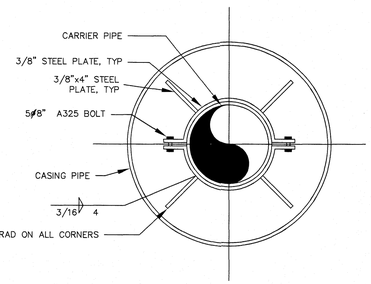
KALAS FALLS
PHASE 1
1832 ROLESVILLE ROAD
WAKE COUNTY, NC

JOB NUMBER:
CHECKED BY:
DRAWN BY:
DATE:

SHEET TITLE:
KALAS FALLS CIVIL DETAILS

SHEET NO.:
CD7

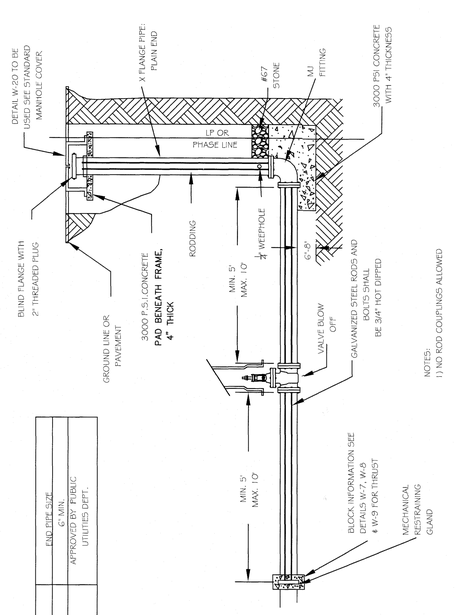
Z:\Jobs\09000\Working Projects\Active_Working Dwgs\Base File\Kalas Fall Set Details.dwg



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.

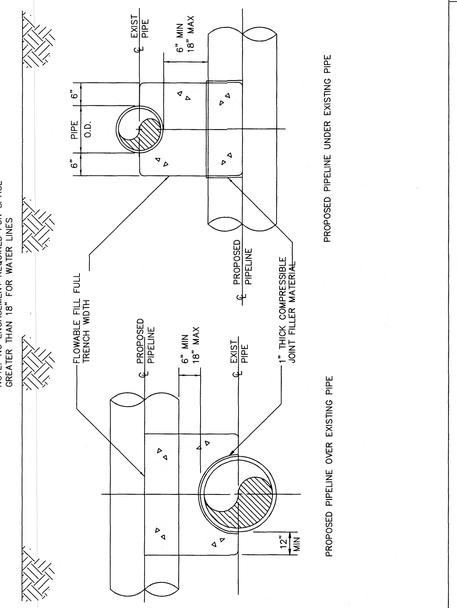
CITY OF RALEIGH				
DEPARTMENT OF PUBLIC UTILITIES				
PIPE ALIGNMENT GUIDE				
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-40	RRH	3-31-00		
	A.B.B.	4-16-04		



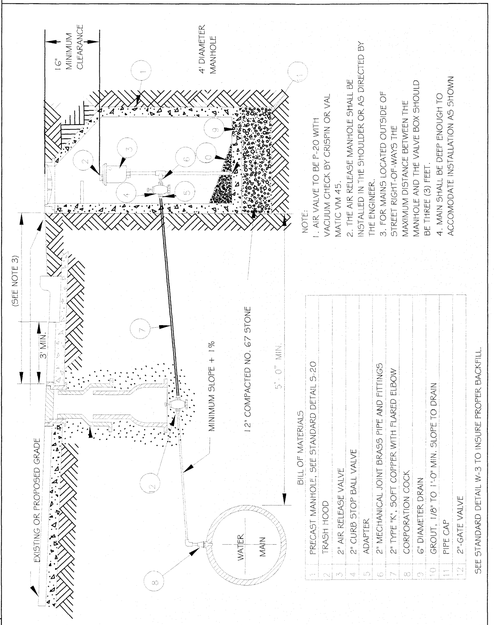
MAIN SIZE	END PIPE SIZE
16" & GREATER	6" MIN. APPROVED BY PUBLIC UTILITIES DEPT.
6" - 12"	

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	5-16-07

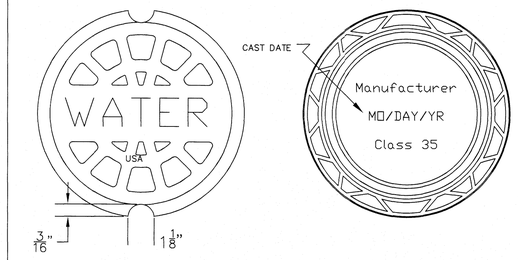
MANHOLE FRAME AND COVER
COVER 120 LBS. MINIMUM

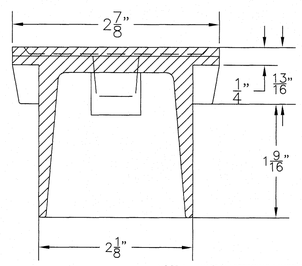


CITY OF RALEIGH				
DEPARTMENT OF PUBLIC UTILITIES				
CONCRETE CRADLE PROTECTION FOR WATER LINE CROSSINGS				
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-41	DHL	2-20-08		



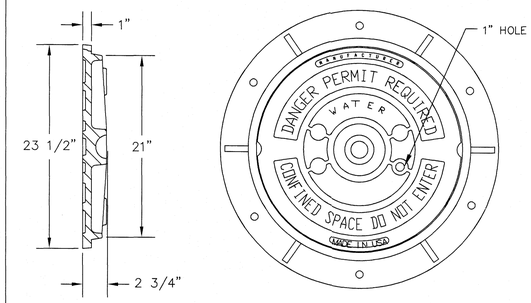
CITY OF RALEIGH				
DEPARTMENT OF PUBLIC UTILITIES				
STANDARD WATER AIR RELEASE VALVE				
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-19	ABB	10-4-04		2-31-91
	J.P.S.	11-1-10	RRH	6-7-00

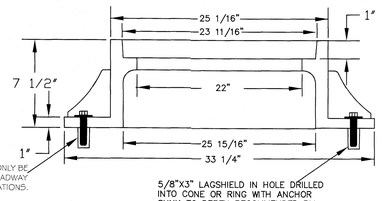




NOTE 1 - "WATER" LETTERING MUST BE 1" RAISED (RECESSED FLUSH)
NOTE 2 - VALVE COVER SHALL BE DOMESTICALLY CAST.
NOTE 3 - COVER MUST HAVE A MINIMUM WEIGHT OF 25 POUNDS.
NOTE 4 - COVER MUST BE CLASS 35 OR GREATER.
NOTE 5 - COVER MUST MEET OR EXCEED AASHTO H-20 LOAD REQUIREMENTS.

CITY OF RALEIGH				
DEPARTMENT OF PUBLIC UTILITIES				
5 1/4" VALVE BOX DROP LID WITH 4" SKIRT				
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-18				

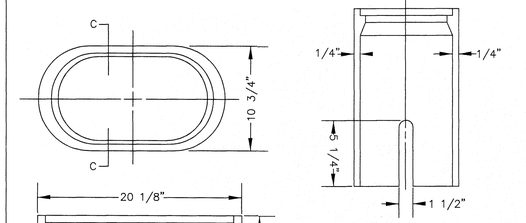


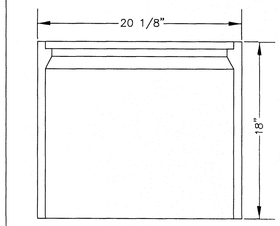


NOTES:

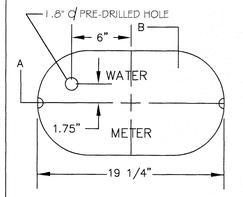
1) ALL MANHOLE FRAMES SHALL BE BE DOMESTICALLY CAST
2) FRAME SHALL BE A MINIMUM WEIGHT OF 182 LBS.
3) COVER SHALL WEIGH A MIN. OF 120 LBS.
4) MANHOLES WITHIN PAVED SURFACES SHALL BE CONSTRUCTED IN ACCORDANCE WITH S-29.

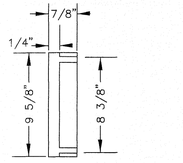
CITY OF RALEIGH				
DEPARTMENT OF PUBLIC UTILITIES				
STANDARD MANHOLE COVER				
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-20	A.B.B.	4-8-04		
	D.H.L.	6-18-08		

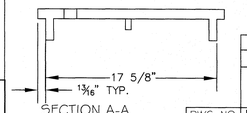




NOTES:
1. COVER WEIGHT: 13 LBS +/- 5%
2. LIDS TO BE COATED WITH BITUMINOUS COAL TAR COATING
3. HOLE SHALL BE FITTED WITH A METAL GROMMET







CITY OF RALEIGH				
DEPARTMENT OF PUBLIC UTILITIES				
WATER METER BOX DETAIL				
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
W-25	D.W.C.	11-3-99	ABB	1-20-05
	DHL	2-21-08	J.P.S.	11-4-10

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 # S-4824**

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 # W-3784**

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 # _____

CITY OF RALEIGH - PLANS AUTHORIZED FOR CONSTRUCTION

Electronic Approval: This approval is being issued electronically. This approval is valid only upon the signature of a City of Raleigh Review Officer below. The City will retain a copy of the approved plans. Any work authorized by this approval must proceed in accordance with the plans kept on file with the City. This electronic approval may not be edited once issued. Any modification to this approval once issued will invalidate this approval.

City of Raleigh Development Approval _____

Timothy Beasley

Raleigh Water Review Officer

AMERICAN Engineering
American Engineering Associates - Southeast, P.A.
4020 Westchase Boulevard, Suite 450
Raleigh, NC 27607
919-469-1101

NORTH CAROLINA
AMERICAN ENGINEERING ASSOCIATES SOUTHEAST
C-3881
CERTIFICATE OF AUTHORIZATION

NORTH CAROLINA
PROFESSIONAL SEAL 9810 ENGINEER
CHAD R. HAGAN

DETAIL SELECTION ONLY

NO.	DATE	REVISION:

STIPULATION FOR REUSE

THIS DRAWING WAS PREPARED FOR USE ON THE SPECIFIC SITE, NAMED HEREON, CONTEMPORANEOUSLY WITH ITS ISSUE DATE AS LISTED, HEREON, AND IT IS NOT SUITABLE FOR USE ON A DIFFERENT PROJECT SITE OR AT A LATER TIME. USE OF THIS DRAWING FOR REFERENCE OR EXAMPLE ON ANOTHER PROJECT REQUIRES THE SERVICES OF PROPERLY LICENSED ARCHITECTS AND ENGINEERS. REPRODUCTION OF THIS DRAWING FOR REUSE ON ANOTHER PROJECT IS NOT AUTHORIZED AND MAY BE CONTRARY TO THE LAW.

KALAS FALLS
PHASE 1
1832 ROLESVILLE ROAD
WAKE COUNTY, NC

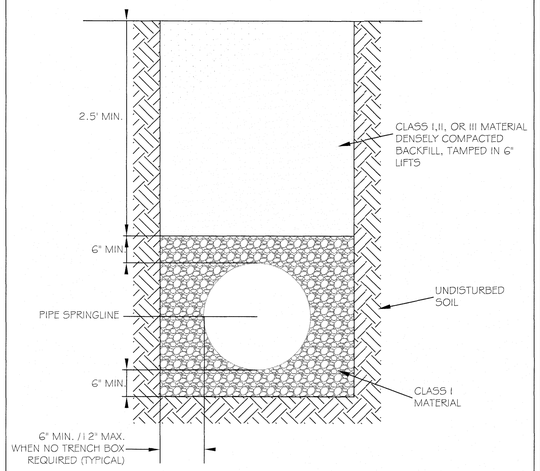
JOB NUMBER:
CHECKED BY:
DRAWN BY:
DATE:

SHEET TITLE:
KALAS FALLS
CIVIL DETAILS

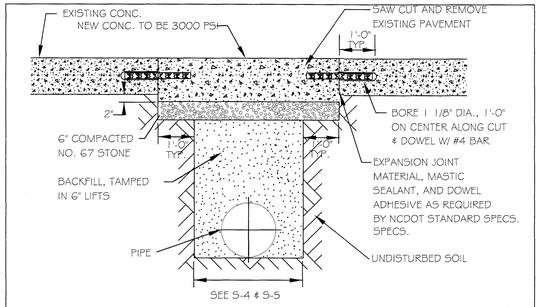
SHEET NO.:
CD8

North Carolina 811 www.nc811.org
*** 3 Days Before Digging ***
North Carolina 811
811 or 1-800-632-4949
Remote Ticket Entry
http://nc811.org/remoteticketentry.htm

J:\Jobs\JAM\Working Projects\Kalas_Working Dwg\Sheet Files\Kalas Full Set Details.dwg

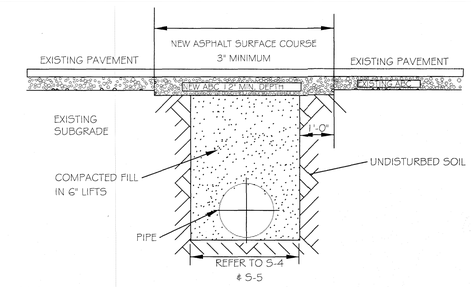


CITY OF RALEIGH				
DEPARTMENT OF PUBLIC UTILITIES				
STANDARD BEDDING DETAILS FOR CCFRPM PIPES				
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-1	J.P.S	10-8-10		



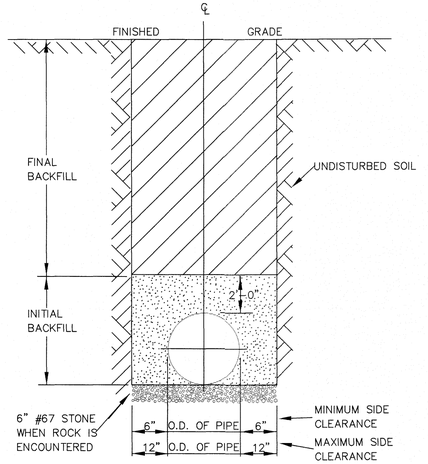
NOTES:
1. See City of Raleigh standards for trenches and pipe bedding (S-4 & S-5) for additional details.
2. Pavement cuts over 5'-0" in width shall be reinforced to N.C.D.O.T. standards.
3. Pavement cuts shall be made with an appropriate saw cut machine.
4. Pavement cuts within NCDOT ROW shall conform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

CITY OF RALEIGH				
DEPARTMENT OF PUBLIC UTILITIES				
STANDARD CONCRETE PAVEMENT PATCH DETAIL				
DWG. NO.	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



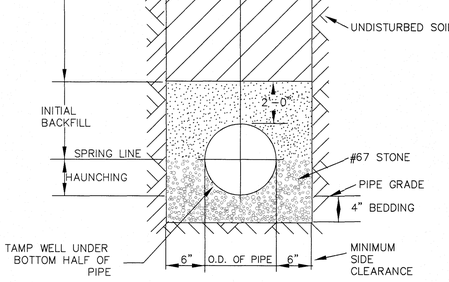
NOTES:
1. IN NCDOT MAINTAINED ROADWAYS ENCROACHMENT PAVEMENT PATCH REQUIREMENTS SHALL TAKE PRECEDENCE.
2. THE PAVEMENT CUT SHALL BE DEFINED BY A STRAIGHT EDGE AND CUT WITH AN APPROPRIATE SAWCUT MACHINE.
3. THE TRENCH SUBGRADE MATERIAL SHALL BE BACKFILLED WITH SUITABLE MATERIAL AND COMPACTED TO A DENSITY 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.

CITY OF RALEIGH				
DEPARTMENT OF PUBLIC UTILITIES				
STANDARD ASPHALT PAVEMENT PATCH DETAIL				
DWG. NO.	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.

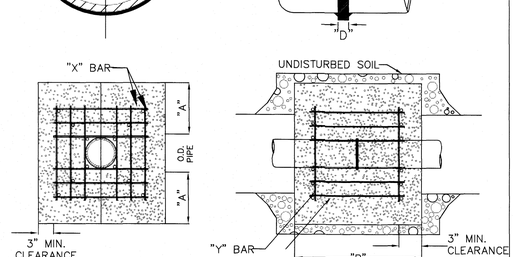
CITY OF RALEIGH				
DEPARTMENT OF PUBLIC UTILITIES				
TRENCH BOTTOM DIMENSIONS & BACKFILLING REQUIREMENTS FOR DUCTILE IRON				
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-4	D.W.C.	9-3-99		
	RRH	8-30-00		



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.

CITY OF RALEIGH				
DEPARTMENT OF PUBLIC UTILITIES				
TRENCH BOTTOM DIMENSIONS AND BACKFILLING REQUIREMENTS FOR PVC GRAVITY SEWER MAIN				
DWG. NO.	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

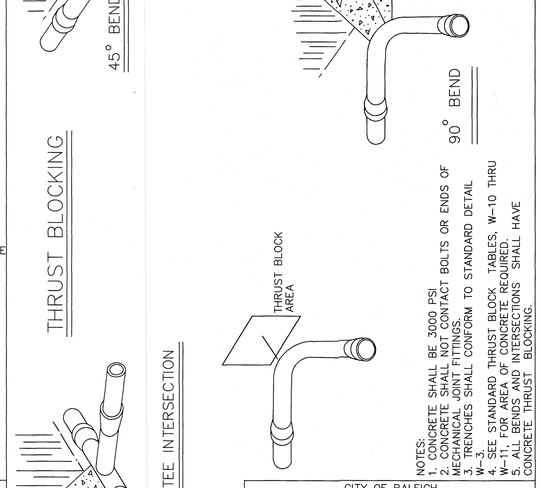
I.D. PIPE	REBAR SIZE	"X" BAR LENGTH	"X" BAR WEIGHT	"Y" BAR LENGTH	"Y" BAR WEIGHT	NO. REQUIRED
6" - 36"	#5	2'-2"+ O.D. PIPE	1.043 LBS/FT	1'-1"	1.1 LBS. EACH	X-24, Y-12
48" & greater	#6	3'-0"+ O.D. PIPE	1.502 LBS/FT	1'-3"	1.9 LBS. EACH	X-24, Y-12

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.

CITY OF RALEIGH				
DEPARTMENT OF PUBLIC UTILITIES				
RESTRAINING COLLAR DESIGN DATA FOR SEWER FORCE MAIN				
DWG. NO.	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-11, FOR AREA OF CONCRETE REQUIRED.
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
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:

ALL MATERIALS UTILIZED ON THESE DETAIL SHEETS SHALL CONFORM TO THE
1. 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
3. MANUFACTURED BY GRIFFIN PIPE PRODUCTS, OR EQUAL.

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%
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
4. 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".

CONVENTIONAL REINFORCING STEEL SHALL CONFORM TO ASTM A615 GRADE 60
6. 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.

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

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 #** S-4824

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 #** W-3784

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 # _____

CITY OF RALEIGH - PLANS AUTHORIZED FOR CONSTRUCTION

Electronic Approval: This approval is being issued electronically. This approval is valid only upon the signature of a City of Raleigh Review Officer below. The City will retain a copy of the approved plans. Any work authorized by this approval must proceed in accordance with the plans kept on file with the City. This electronic approval may not be edited once issued. Any modification to this approval once issued will invalidate this approval.

Timothy Beasley

City of Raleigh Development Approval _____

Raleigh Water Review Officer

*** 3 Days Before Digging ***
North Carolina 811
811 or 1-800-632-4949
Remote Ticket Entry:
http://nc811.org/remoteticketentry.htm

AMERICAN Engineering
American Engineering Associates - Southeast, P.A.
4020 West Chapel Hill Boulevard, Suite 450
Raleigh, NC 27607
919-469-1101

NORTH CAROLINA AMERICAN ENGINEERING ASSOCIATES SOUTHEAST C-3881 CERTIFICATE OF AUTHORIZATION

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMAN

DETAIL SELECTION ONLY

NO.	DATE	REVISION:

STIPULATION FOR REUSE

THIS DRAWING WAS PREPARED FOR USE ON THE SPECIFIC SITE, NAMED HEREON, CONTEMPORANEOUSLY WITH ITS ISSUE DATE AS LISTED, HEREON, AND IT IS NOT SUITABLE FOR USE ON A DIFFERENT PROJECT SITE OR AT A LATER TIME. USE OF THIS DRAWING FOR REFERENCE OR EXAMPLE ON ANOTHER PROJECT REQUIRES THE SERVICES OF PROPERLY LICENSED ARCHITECTS AND ENGINEERS. REPRODUCTION OF THIS DRAWING FOR REUSE ON ANOTHER PROJECT IS NOT AUTHORIZED AND MAY BE CONTRARY TO THE LAW.

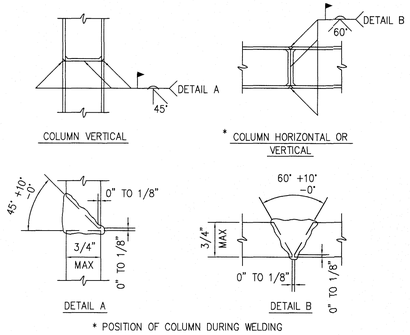
KALAS FALLS
PHASE 1
1832 ROLESVILLE ROAD
WAKE COUNTY, NC

JOB NUMBER:
CHECKED BY:
DRAWN BY:
DATE:

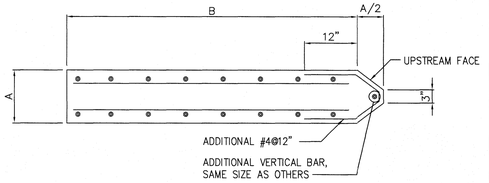
SHEET TITLE:
KALAS FALLS CIVIL DETAILS

SHEET NO.:
CD9

J:\Jobs\2009\Kalas Property\Civil_Working Dwg\Base File\Kalas Full Set Details.dwg



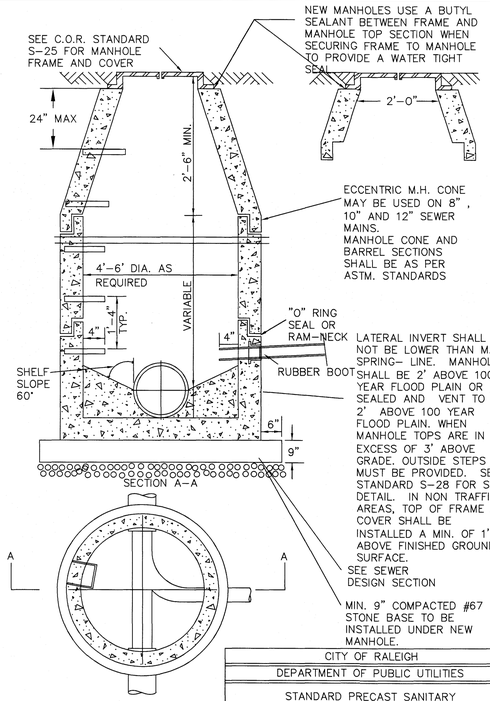
STEEL PILE SPLICE



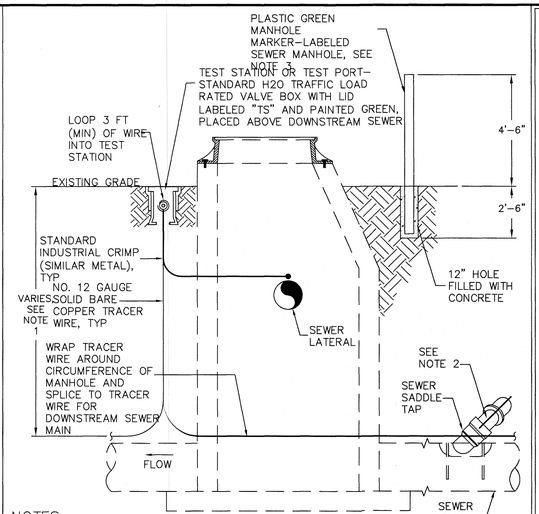
PLAN – CONCRETE SUPPORT NOSING

(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		

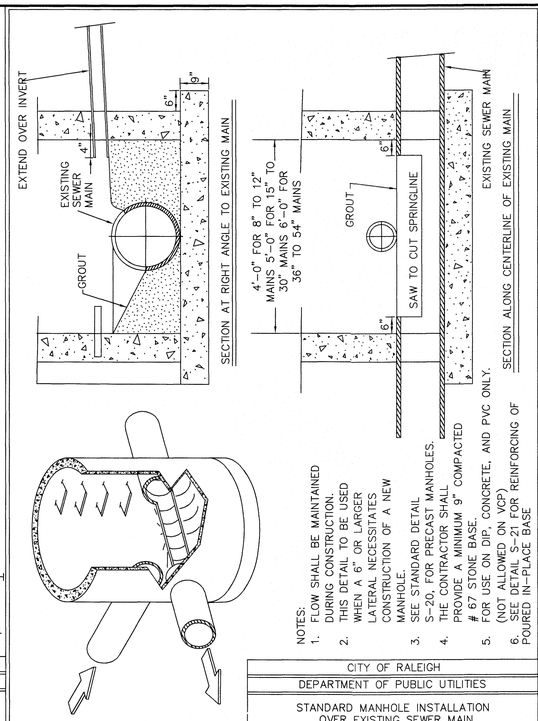


CITY OF RALEIGH				
DEPARTMENT OF PUBLIC UTILITIES				
STANDARD PRECAST SANITARY SEWER MANHOLE				
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-20	Y.C.A.	12-31-92	ABB	2-21-05
	RRH	3-30-00	D.H.L.	6-16-08



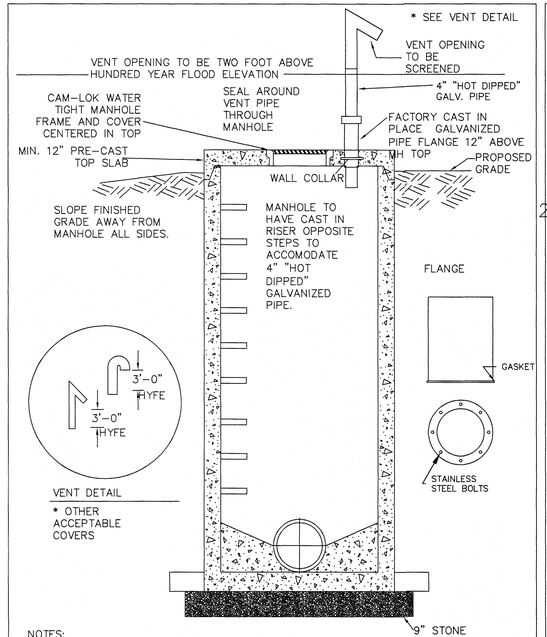
NOTES:
1. THE TRACER WIRE SHALL BE CONTINUOUS TO THE GREATEST EXTENT POSSIBLE. FOR GRAVITY MAIN AND OR LATERAL INSTALLATIONS LESS THAN 8 FT, THE TRACING WIRE SHALL BE ATTACHED TO THE PIPE. TRACER WIRE SHALL BE LAID FLAT AND SECURELY AFFIXED TO THE PIPE AT 10 FOOT INTERVALS. FOR GRAVITY MAIN AND OR LATERAL 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		



NOTES:
1. FLOW SHALL BE MAINTAINED DURING CONSTRUCTION.
2. 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

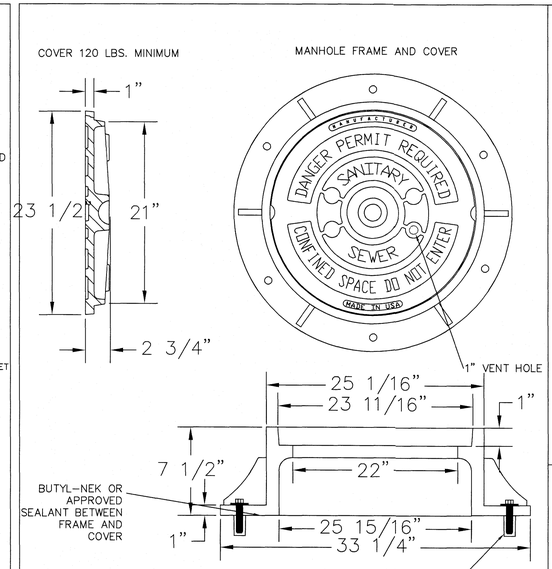
CITY OF RALEIGH				
DEPARTMENT OF PUBLIC UTILITIES				
STANDARD MANHOLE INSTALLATION OVER EXISTING SEWER MAIN				
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-22	Y.C.A.	12-31-91	A.B.B.	1-19-05
	RRH	3-30-00	D.H.L.	6/16/08



NOTES:

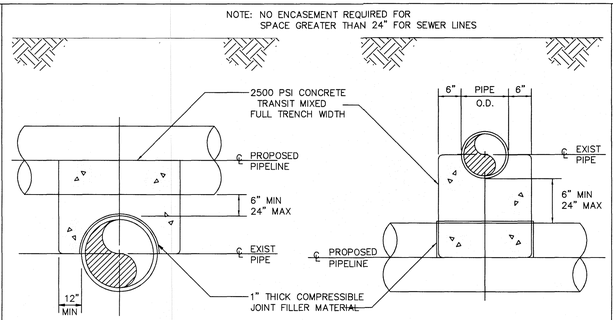
1. VENT MUST BE FACTORY WELDED FABRICATED AND "HOT DIPPED" GALVANIZED.
2. HYFE- Hundred Year Flood elevation

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.

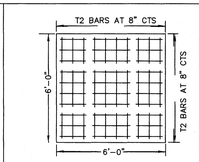
CITY OF RALEIGH				
DEPARTMENT OF PUBLIC UTILITIES				
STANDARD MANHOLE COVER				
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-25	3-1-87	3-1-87	A.B.B.	2-9-05
	RRH	3-30-00	D.H.L.	6-18-08



PROPOSED PIPELINE OVER EXISTING PIPE

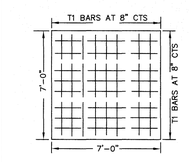
PROPOSED PIPELINE UNDER EXISTING PIPE

CITY OF RALEIGH				
DEPARTMENT OF PUBLIC UTILITIES				
CONCRETE CRADLE PROTECTION FOR SEWER LINE CROSSINGS				
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-49	DHL	2-20-08		



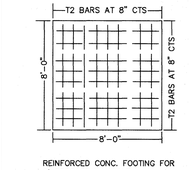
REINFORCED CONC. FOOTING FOR 4" PRECAST MANHOLE

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

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

T1 OR T2 BAR

STRAIGHT BAR

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		

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 #** S-4824

The City of Raleigh consents to the connection and extension of the City's **Put**)(**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 #** W-3784

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 # _____

CITY OF RALEIGH - PLANS AUTHORIZED FOR CONSTRUCTION

Electronic Approval: This approval is being issued electronically. This approval is valid only upon the signature of a City of Raleigh Review Officer below. The City will retain a copy of the approved plans. Any work authorized by this approval must proceed in accordance with the plans kept on file with the City. This electronic approval may not be edited once issued. Any modification to this approval once issued will invalidate this approval.

Timothy Beasley

City of Raleigh Development Approval _____

Raleigh Water Review Officer

North Carolina 811 www.nc811.org

*** 3 Days Before Digging ***
North Carolina 811
811 or 1-800-632-4949
Remote Ticket Entry
http://nc811.org/remoteticketentry.htm

AMERICAN Engineering
American Engineering Associates - Southeast, P.A.
4020 Westchase Boulevard, Suite 450
Raleigh, NC 27607
919-469-1101

NORTH CAROLINA AMERICAN ENGINEERING ASSOCIATES SOUTHEAST C-3881 CERTIFICATE OF AUTHORIZATION

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JON R. HARMON

DETAIL SELECTION ONLY

NO.	DATE	REVISION:

STIPULATION FOR REUSE

THIS DRAWING WAS PREPARED FOR USE ON THE SPECIFIC SITE, NAMED HEREON, CONTEMPORANEOUSLY WITH ITS ISSUE DATE AS LISTED, HEREON, AND IT IS NOT SUITABLE FOR USE ON A DIFFERENT PROJECT SITE OR AT A LATER TIME. USE OF THIS DRAWING FOR REFERENCE OR EXAMPLE ON ANOTHER PROJECT REQUIRES THE SERVICES OF PROPERLY LICENSED ARCHITECTS AND ENGINEERS. REPRODUCTION OF THIS DRAWING FOR REUSE ON ANOTHER PROJECT IS NOT AUTHORIZED AND MAY BE CONTRARY TO THE LAW.

KALAS FALLS
PHASE 1
1832 ROLESVILLE ROAD
WAKE COUNTY, NC

JOB NUMBER:

CHECKED BY:

DRAWN BY:

DATE:

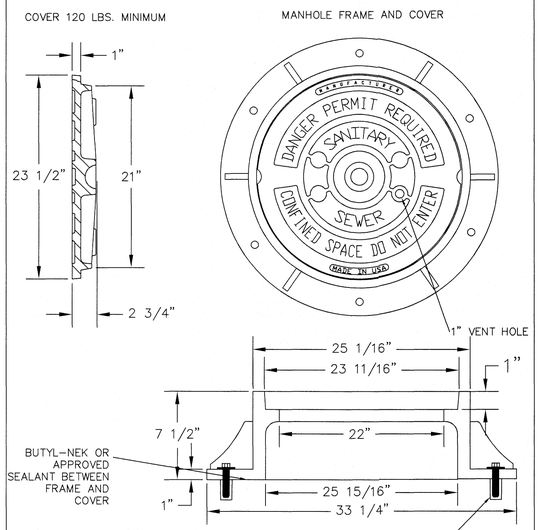
SHEET TITLE:

KALAS FALLS CIVIL DETAILS

SHEET NO.:

CD10

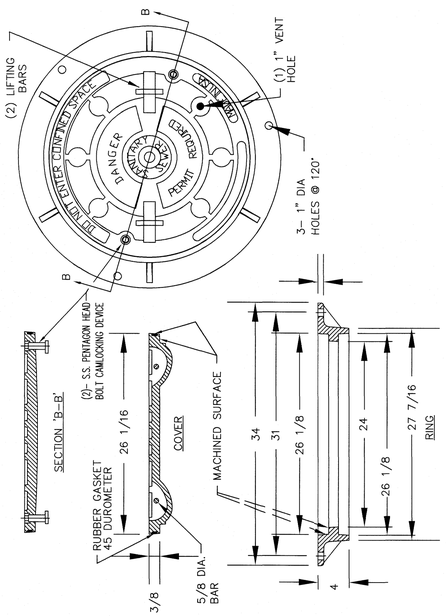
Z:\Jobs\0900\Working Project\Kalas_Working Dwgs\Base File\Kalas Full Set Details.dwg



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

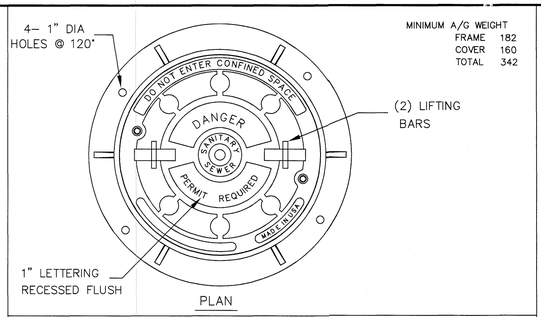
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-25	3-1-87	3-1-87	A.B.B.	2-9-05
	RRH	3-30-00	D.H.L.	6-18-08



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

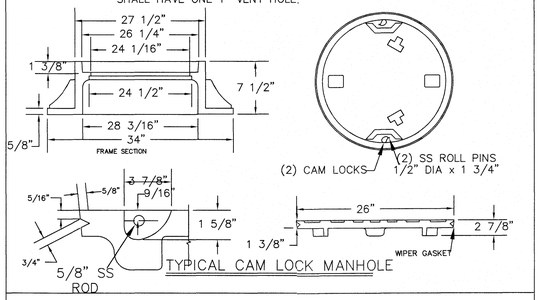


TYPICAL LIFTING DEVICE

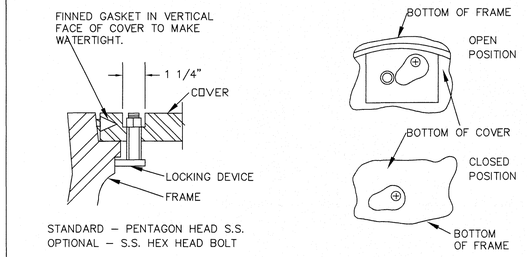
CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
MANHOLE FRAME AND WATERTIGHT COVER

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

NOTE: WHEN WATERTIGHT NOT SPECIFIED, TOP SHALL SHALL HAVE ONE 1" VENT HOLE.



TYPICAL CAM LOCK MANHOLE

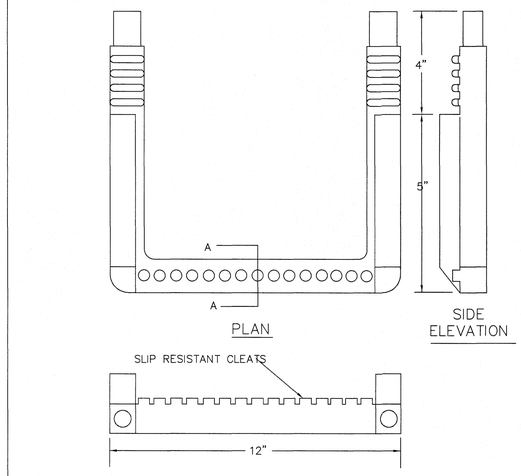


TYPICAL LOCKING DEVICE

RING MUST BE ANCHORED IN ACCORDANCE WITH S-25

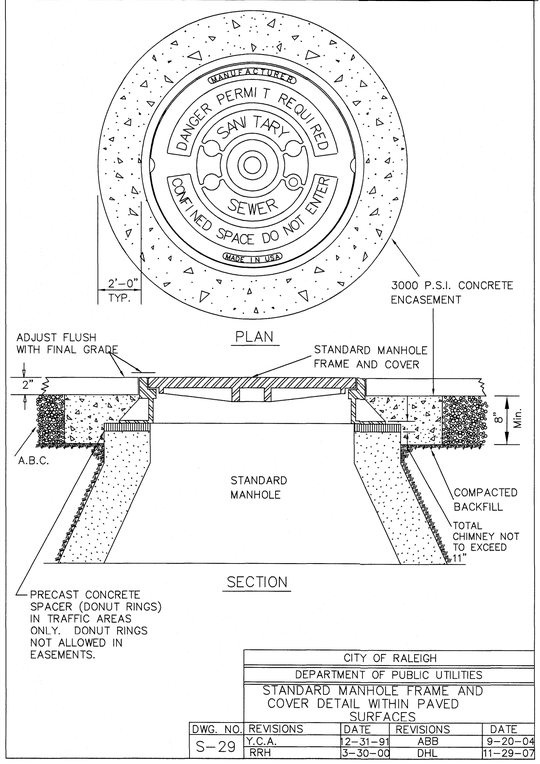
CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
WATER-TIGHT MANHOLE FRAME WITH CAM LOCK COVER

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



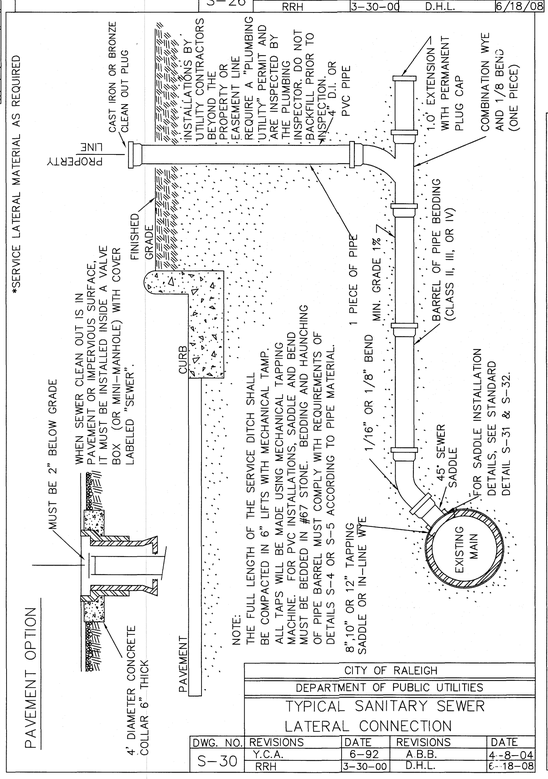
CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
STANDARD SLIP RESISTANT MANHOLE STEP DETAIL

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



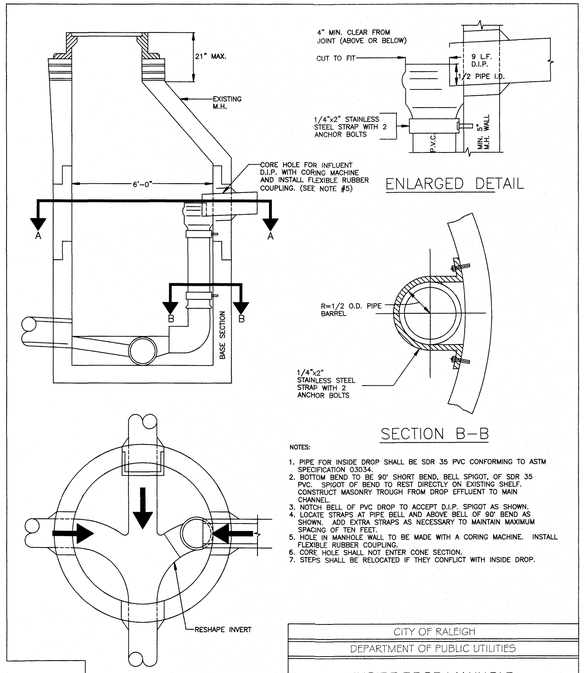
CITY OF RALEIGH
DEPARTMENT OF PUBLIC UTILITIES
STANDARD MANHOLE FRAME AND COVER DETAIL WITHIN PAVED SURFACES

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



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		

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 #** S-4826

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 #** W-3784

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 # _____

CITY OF RALEIGH - PLANS AUTHORIZED FOR CONSTRUCTION

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Timothy Beasley

City of Raleigh Development Approval _____

Raleigh Water Review Officer

North Carolina 811 Excavators

*** 3 Days Before Digging ***
North Carolina 811
811 or 1-800-632-4949
Remote Ticket Entry
http://nc811.org/remoteticketentry.htm

AMERICAN Engineering
American Engineering Associates - Southeast, P.A.
4000 Westchase Boulevard, Suite 450
Raleigh, NC 27607
919-469-1101

NORTH CAROLINA AMERICAN ENGINEERING ASSOCIATES SOUTHEAST C-3881 CERTIFICATE OF AUTHORIZATION

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMAN

DETAIL SELECTION ONLY

NO.	DATE	REVISION:

STIPULATION FOR REUSE

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KALAS FALLS
PHASE 1
1832 ROLESVILLE ROAD
WAKE COUNTY, NC

JOB NUMBER:
CHECKED BY:
DRAWN BY:
DATE:

SHEET TITLE:
KALAS FALLS CIVIL DETAILS

SHEET NO.:
CD11

I:\Jobs\2009\Wireless Properties\Kalas_Waterford Dwg\Base Drawings\Civil\Kalas Civil Details.dwg

GENERAL NOTES:

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

PLACE 2 #6 "H" 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 CONCRETE AND DOUBLE PIPE CULVERTS
15" THRU 48" PIPE - 90° SKEW

838.01 SHEET 1 OF 8

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

SEE STD. # 838.45 FOR GENERAL NOTES.

BILL OF MATERIAL FOR ENDWALL

REINF. STEEL	PIPE			
BAR SIZE	LENGTH	NO.	REINF	NO.
B1	#4	5'-6"	4	15
B2	#4	4'-6"	4	12
G1	#7	8'-0"	2	35
G2	#7	15'-10"	2	65
H2	#4	4'-0"	4	11
N1	#5	3'-11"	10	41
N2	#4	3'-5"	6	14
		12'-8"	6	51
T1	#4	5'-6"	6	22
T4	#4	2'-6"	36	60
T5	#4	6'-3"	6	25
V1	#4	2'-9"	6	11
V3	#4	3'-11"	6	16
V4	#4	3'-10"	4	10
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

SHEET 1 OF 2
838.27

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

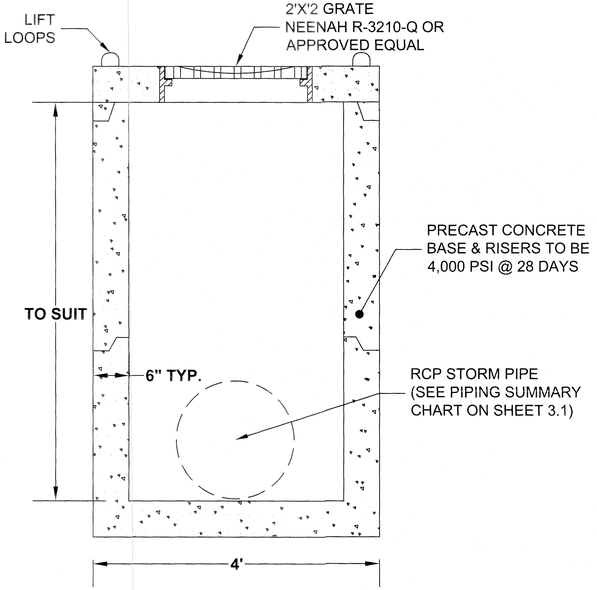
GENERAL NOTES:

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 NO WEEP HOLE IN THE 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.



3' X 3' DROP INLET

SCALE: 1" = 1'

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 2
839.60

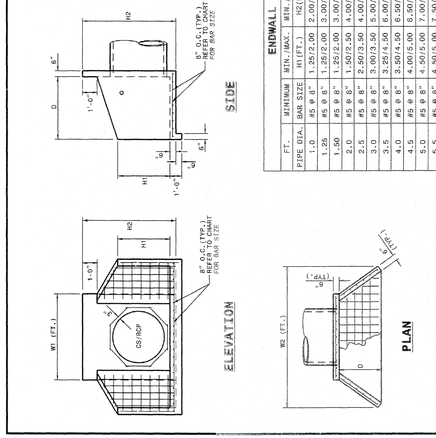
NOTES:

- THIS PRECAST ENDWALL MAY BE USED FOR THE FOLLOWING PIPE CULVERTS: 838.11 CLASS III RCP, 838.14 CLASS IV RCP, 838.30, 838.31, 838.57, 838.63 AND 838.66.
- INSTALL PRECAST ENDWALLS WITH WINGS AND FAX.
- ALL MATERIALS AND SPECIFICATIONS SHALL CONFORM TO 4815 USE 4000 PSI CONCRETE.
- PROVIDE ALL REINFORCING STEEL WHICH MEETS ASTM A615 GRADE 60 AND FABRICATED AND PLACED IN ACCORDANCE WITH TO ASTM A185 WITH 2" MIN. CLEARANCE.
- PIPE TO BE GROUTED INTO HEADWALL AT JOB SITE BY CONTRACTOR.
- ALL ELEMENTS PRECAST TO MEET ASTM C913.
- REINFORCING STEEL SHALL BE EXTENDED FROM 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 WHEN THE WALL THICKNESS IS 8" OR GREATER TO ENGINEER THIS BAR SIZE AS NEEDED.

ENDWALL DIMENSIONS

PIPE DIA.	MINIMUM BAR SIZE	T MIN./MAX. H1(FT.)	T MIN./MAX. H2(FT.)	T MIN./MAX. W3 (FT.)	MIN./MAX. W1	MIN./MAX. W2
1.0	#5 @ 8"	1.25/2.00	3.00/3.75	1.25/2.00	3.50/3.75	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	4.00/8.00	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	3.25/3.00	6.50/6.75	13.00/13.25
4.5	#5 @ 8"	4.00/5.00	6.50/6.50	3.25/4.00	7.00/9.25	13.50/15.75
5.0	#5 @ 8"	4.50/5.00	7.00/7.50	3.25/4.00	7.25/9.25	14.00/15.75
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



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 #** S-4824

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 #** W-3784

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 #** _____

CITY OF RALEIGH - PLANS AUTHORIZED FOR CONSTRUCTION

Electronic Approval: This approval is being issued electronically. This approval is valid only upon the signature of a City of Raleigh Review Officer below. The City will retain a copy of the approved plans. Any work authorized by this approval must proceed in accordance with the plans kept on file with the City. This electronic approval may not be edited once issued. Any modification to this approval once issued will invalidate this approval.

Timothy Beasley

City of Raleigh Development Approval _____

Raleigh Water Review Officer

North Carolina 811 Know what's below. Call before you dig.

*** 3 Days Before Digging ***
North Carolina 811
811 or 1-800-632-4949
Remote Ticket Entry
http://nc811.org/remoteticketentry.htm

AMERICAN Engineering
American Engineering Associates - Southeast, P.A.
4020 Westchase Boulevard, Suite 450
Raleigh, NC 27607
919-469-1101

NORTH CAROLINA
AMERICAN ENGINEERING ASSOCIATES SOUTHEAST, P.A.
C-3881
CERTIFICATE OF AUTHORIZATION

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HERMAN

DETAIL SELECTION ONLY

NO.	DATE	REVISION:

STIPULATION FOR REUSE

KALAS FALLS
PHASE 1
1832 ROLESVILLE ROAD
WAKE COUNTY, NC

JOB NUMBER:

CHECKED BY:

DRAWN BY:

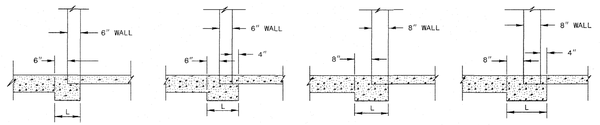
DATE:

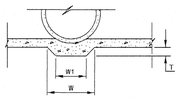
SHEET TITLE:

KALAS FALLS CIVIL DETAILS

SHEET NO.:

CD12





TABLES OF QUANTITIES FOR PIPE SET IN PAD

PIPE	"W"	"W1"	"T"	C.Y. QUANTITIES WHEN L IS		
D	DIM	DIM	DIM	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 5/8"	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

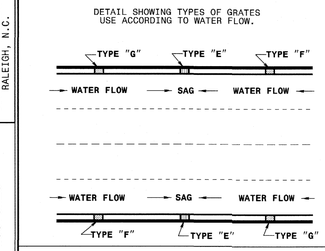
GENERAL NOTES:
USE THIS STANDARD WITH ALL DRAINAGE STRUCTURES USING REINFORCED CONCRETE PIPE SET IN BASE SLAB.

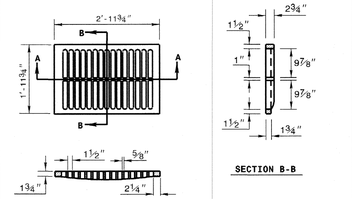
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-18

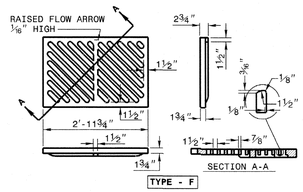
ROADWAY STANDARD DRAWING FOR
CONCRETE BASE PAD FOR DRAINAGE STRUCTURES

SHEET 1 OF 1
840.00

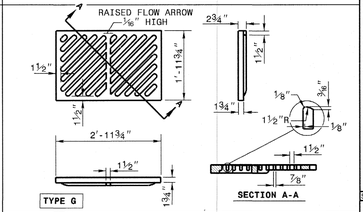




TYPE - E



TYPE - F



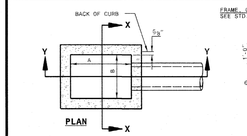
TYPE G

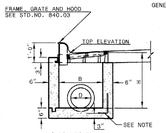
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-18

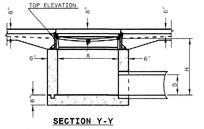
ROADWAY STANDARD DRAWING FOR
FRAME, GRATES, AND HOOD
FOR USE ON STANDARD CATCH BASIN

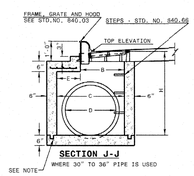
SHEET 2 OF 2
840.03

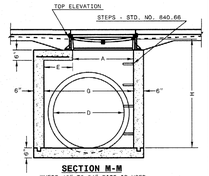


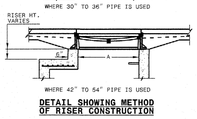


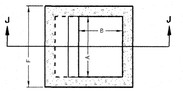
GENERAL NOTES:
USE CLASS "B" CONCRETE THROUGHOUT.
PROVIDE ALL CATCH BASINS OVER 3'-6" IN DEPTH WITH STEPS 12" ON CENTER. USE STEPS WHICH COMPLY WITH STD. DRAWING 840.66.
OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2" KEYWAY, OR #4 BAR DOWELS AT 12" CENTERS AS DIRECTED BY THE ENGINEER.
USE FORMS FOR THE 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 3'-0" IN HEIGHT OR LESS USE 6" WALLS AND BOTTOM SLAB. OVER 3'-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.

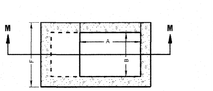










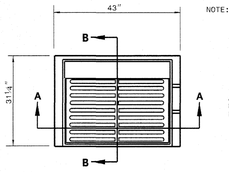


STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

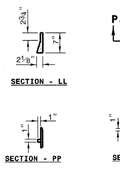
1-18

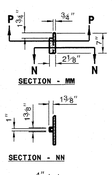
ROADWAY STANDARD DRAWING FOR
CONCRETE CATCH BASIN
12" THRU 54" PIPE

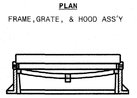
SHEET 1 OF 2
840.02

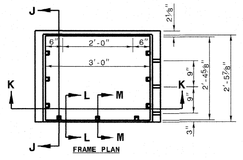


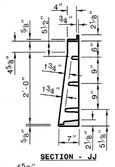
NOTE: USE TYPE "E", "F" AND "G" GRATE UNLESS OTHERWISE NOTED.

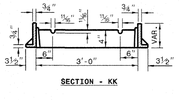


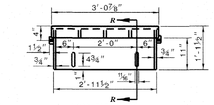


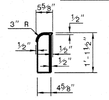






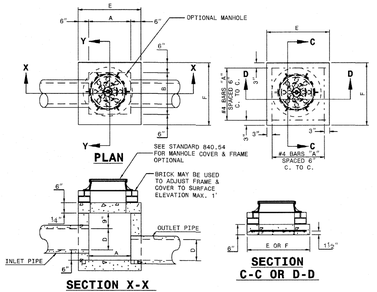




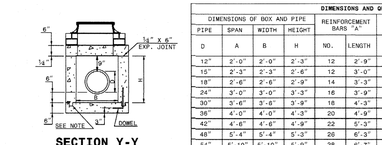


ROADWAY STANDARD DRAWING FOR
FRAME, GRATES, AND HOOD
FOR USE ON STANDARD CATCH BASIN

SHEET 1 OF 2
840.03



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

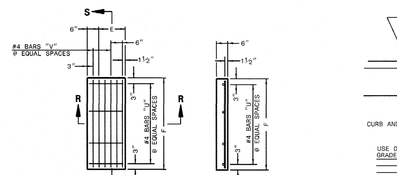
DIMENSIONS OF BOX AND PIPE				REINFORCEMENT BARS "A"		TOP SLAB DIMENSIONS		CUBIC YARDS IN BOX			TOTAL QUANTITIES BOX AND SLABS	DEDUCTIONS FOR ONE PIPE CU.YDS.	
PIPE D	SPAN A	WIDTH B	HEIGHT H	NO.	LENGTH	E	F	TOP SLAB	BOTTOM SLAB	WALL FT. OF HT.	LBS. REINF	C.S.	R.C.
12"	2'-0"	2'-0"	2'-3"	12	2'-9"	3'-0"	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

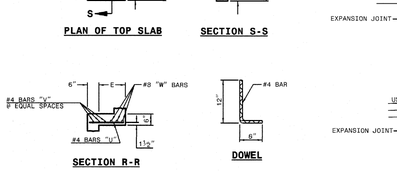
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

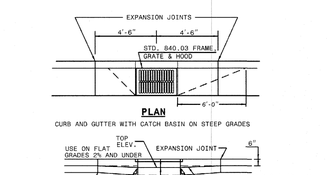
1-18

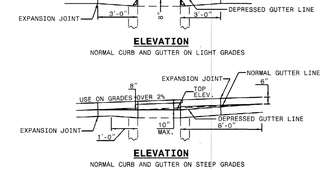
ROADWAY STANDARD DRAWING FOR
CONCRETE JUNCTION BOX
(WITH OPTIONAL MANHOLE)
12" THRU 66" PIPE

SHEET 1 OF 1
840.31









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

DIMENSIONS OF BOX AND PIPE						COVER DIMENSION		BARS-U		BARS-V		BARS-W		TOTAL LBS.	CU.YDS. CONC. IN BOX		DEDUCTIONS ONE PIPE	
PIPE D	SPAN A	WIDTH WIDTH B	SPAN C	G	MIN. HEIGHT H	E	F	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH		TOP SLAB	BOTTOM SLAB	CU. YDS. CONC. IN WALLS	C.Y.
12"	3'-0"	2'-2"	--	--	2'-9"	--	--	--	--	--	--	--	--	--	0.235	0.770	0.015	0.096
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'-8"	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	2.053	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

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

1-18

ROADWAY STANDARD DRAWING FOR
CONCRETE CATCH BASIN
12" THRU 54" PIPE

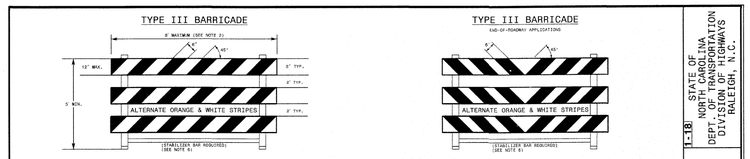
SHEET 2 OF 2
840.02

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

1-18

ROADWAY STANDARD DRAWING FOR
BARRICADES
TYPE-III

SHEET 1 OF 1
1145.01



GENERAL NOTES

1- HORIZONTAL RAILS FOR MAY BE CONSTRUCTED OF APPROVED COMPOSITE, HOLLOW/CORRUGATED EXTRUDED RIGID POLYOLEFIN, HIGH DENSITY POLYETHYLENE, OR OTHER NCDOT APPROVED MATERIAL.

2- BARRICADE SHALL BE LIMITED TO A MAXIMUM LENGTH OF 8 FT UNLESS NCHRP 350 CRASH TESTED FOR CATEGORY II DEVICES AND NCDOT APPROVED.

3- ONLY NCDOT APPROVED COMPOSITE AND ROLL-UP SIGNS MAY BE MOUNTED ON THE BARRICADE RAILS. MOUNT SIGNS TO BARRICADE RAILS TO ENSURE SIGN WILL NOT BECOME DETACHED UNDER NORMAL WIND AND TRAFFIC CONDITIONS.

4- SIGNS SHALL BE MOUNTED A MINIMUM OF 1 FOOT FROM THE GROUND TO THE BOTTOM OF THE SIGN UNLESS SIGNS R11-3 OR R11-4 ARE REQUIRED BY THE PLANS OR DIRECTED BY THE ENGINEER.

5- BARRICADE MUST BE NCHRP 350 FOR CATEGORY II DEVICES AND NCDOT APPROVED WITH STABILIZER BAR OR ADEQUATE LATERAL BRACING.

6- ASSEMBLY OF THE GENERIC BARRICADES MUST BE SELF CERTIFIED BY THE ASSEMBLER.

7- BARRICADES USED TO CLOSE A ROADWAY SHALL EXTEND ACROSS THE ENTIRE ROADWAY. WHERE LOCAL TRAFFIC MUST BE MAINTAINED, THEY MAY BE PLACED IN A STAGGERED PATTERN.

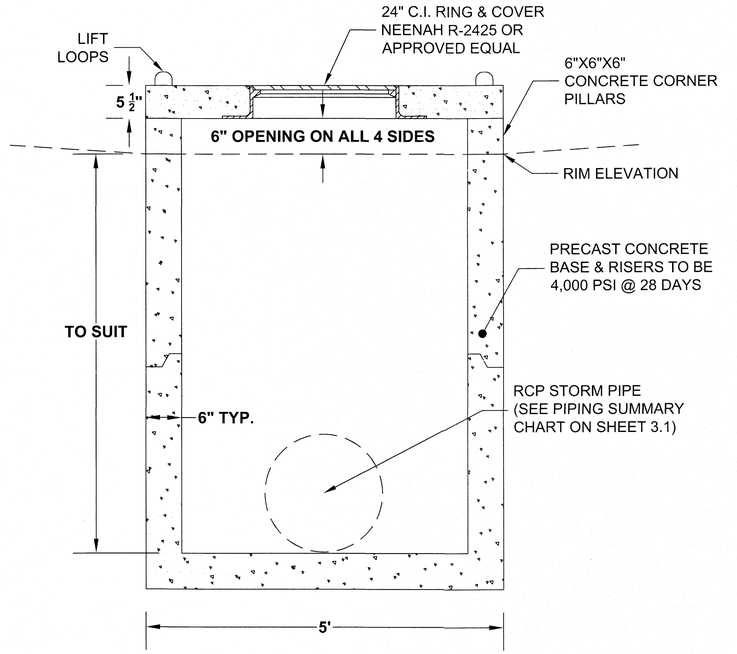
8- STRIPES ON WORK ZONE BARRICADE RAILS SHALL BE ALTERNATE ORANGE AND WHITE RETROREFLECTIVE STRIPES, SLOPED DOWNWARD TOWARDS THE SIDE WHICH TRAFFIC IS TO PASS OR TURN IN DETOURING. WHERE NO TURNS ARE INTENDED, THE STRIPES SHOULD SLOPE DOWNWARD TOWARD THE CENTER OF THE BARRICADE OR BARRICADES.

9- USE RED AND WHITE STRIPES FOR PERMANENT BARRICADES.

10- ALL BARRICADES MUST BE LISTED ON THE DEPARTMENT'S APPROVED PRODUCTS LIST.

11- PLACE MANUFACTURER'S NAME AND FEDERAL HIGHWAY ADMINISTRATION'S NCHRP 350 APPROVAL LETTER NUMBER ON BARRICADE FRAME.

12- PLACE SANDBAGS OR OTHER APPROVED BALLASTING METHODS ON THE FEET OF THE FRAME. DO NOT PLACE SANDBAGS ON TOP OF A STRIPED RAIL OR STABILIZER BAR. DO NOT BALLAST BARRICADES BY HEAVY OBJECTS SUCH AS ROCKS, CHUNKS OF CONCRETE OR OTHER ITEMS THAT WOULD CAUSE DAMAGE IF THE BARRICADE IS STRUCK BY A VEHICLE.



4' X 4' YARD INLET
SCALE: 1" = 1'

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 #** S-4824

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City of Raleigh Public Utilities Department Permit # _____

CITY OF RALEIGH - PLANS AUTHORIZED FOR CONSTRUCTION

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City of Raleigh Development Approval _____

Timothy Beasley

Raleigh Water Review Officer

North Carolina 811 www.nc811.org
*** 3 Days Before Digging ***
North Carolina 811
811 or 1-800-632-4949
Remote Ticket Entry
http://nc811.org/remotetickentry.htm

AMERICAN Engineering
American Engineering Associates - Southeast, P.A.
4020 Westchase Boulevard, Suite 450
Raleigh, NC 27607
919-469-1101

NORTH CAROLINA AMERICAN ENGINEERING ASSOCIATES SOUTHEAST C-3881 CERTIFICATE OF AUTHORIZATION

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R KARAN

DETAIL SELECTION ONLY

NO.	DATE	REVISION:

STIPULATION FOR REUSE

THIS DRAWING WAS PREPARED FOR USE ON THE SPECIFIC SITE, NAMED HEREON, CONTEMPORANEOUSLY WITH ITS ISSUE DATE AS LISTED, HEREON, AND IT IS NOT SUITABLE FOR USE ON A DIFFERENT PROJECT SITE OR AT A LATER TIME. USE OF THIS DRAWING FOR REFERENCE OR EXAMPLE ON ANOTHER PROJECT REQUIRES THE SERVICES OF PROPERLY LICENSED ARCHITECTS AND ENGINEERS. REPRODUCTION OF THIS DRAWING FOR REUSE ON ANOTHER PROJECT IS NOT AUTHORIZED AND MAY BE CONTRARY TO THE LAW.

KALAS FALLS
PHASE 1
1832 ROLESVILLE ROAD
WAKE COUNTY, NC

JOB NUMBER: 9900
CHECKED BY:
DRAWN BY:
DATE: 02-23-2021

SHEET TITLE:
KALAS FALLS
CIVIL DETAILS

SHEET NO.:
CD13

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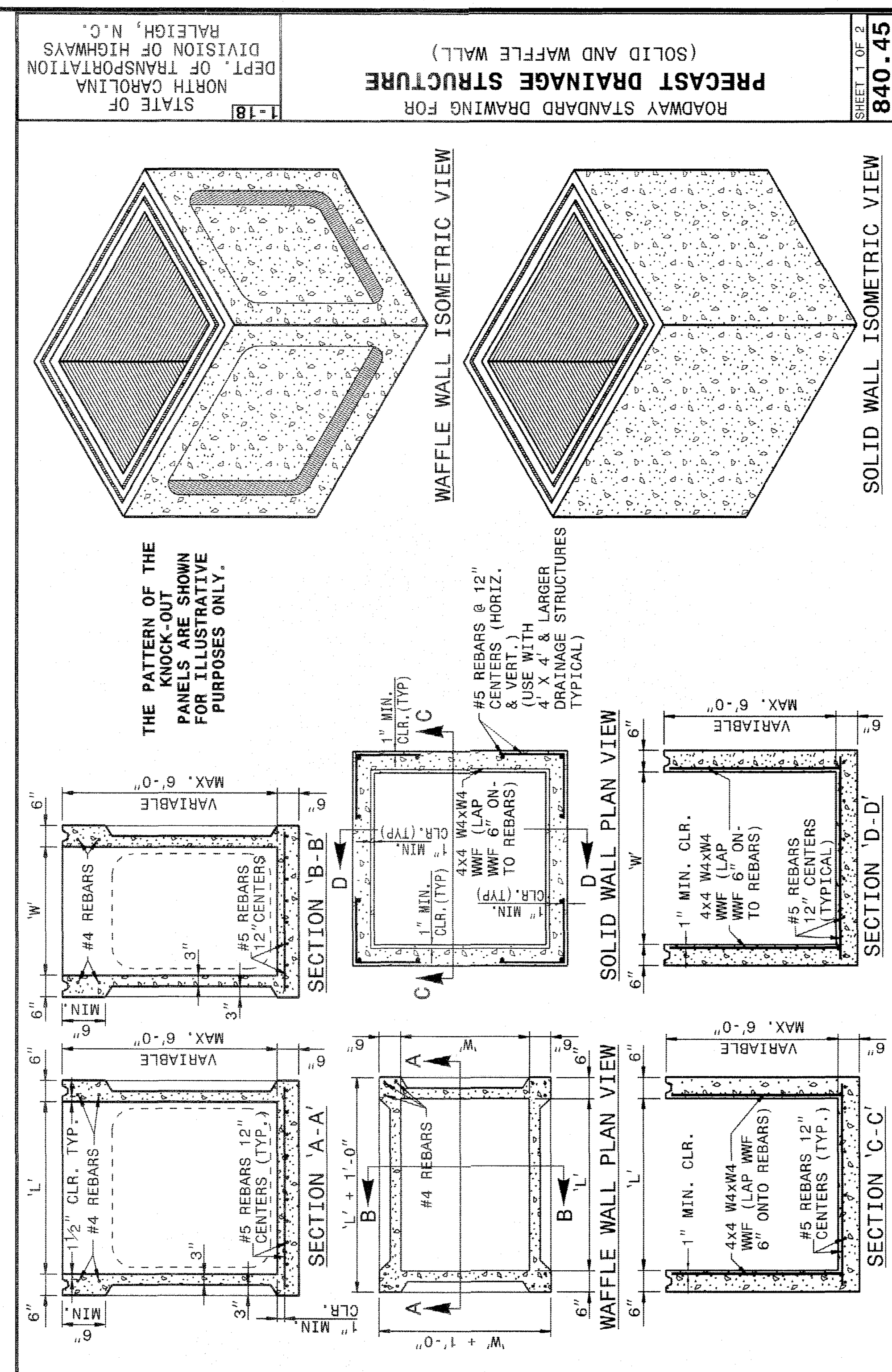
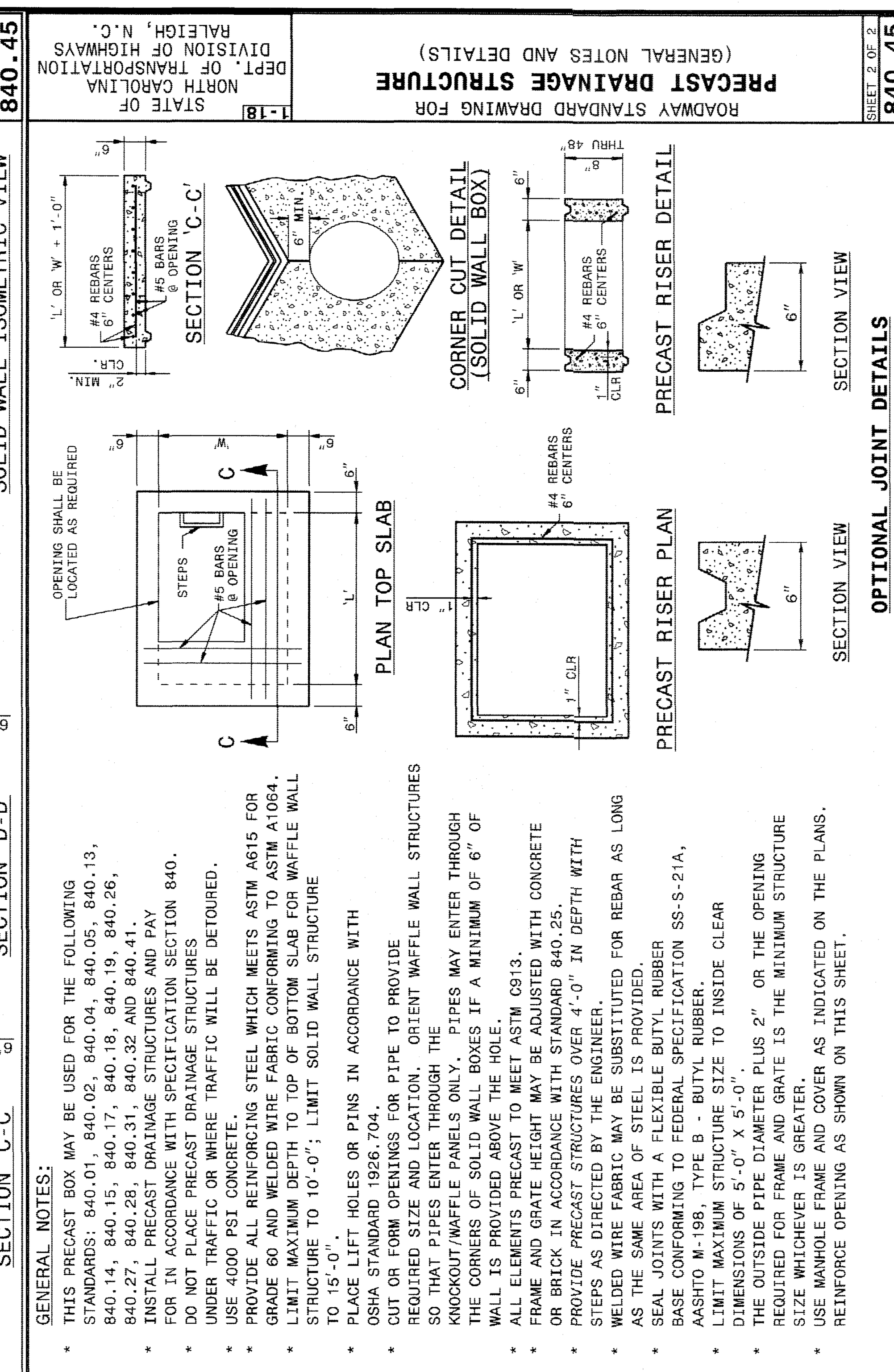
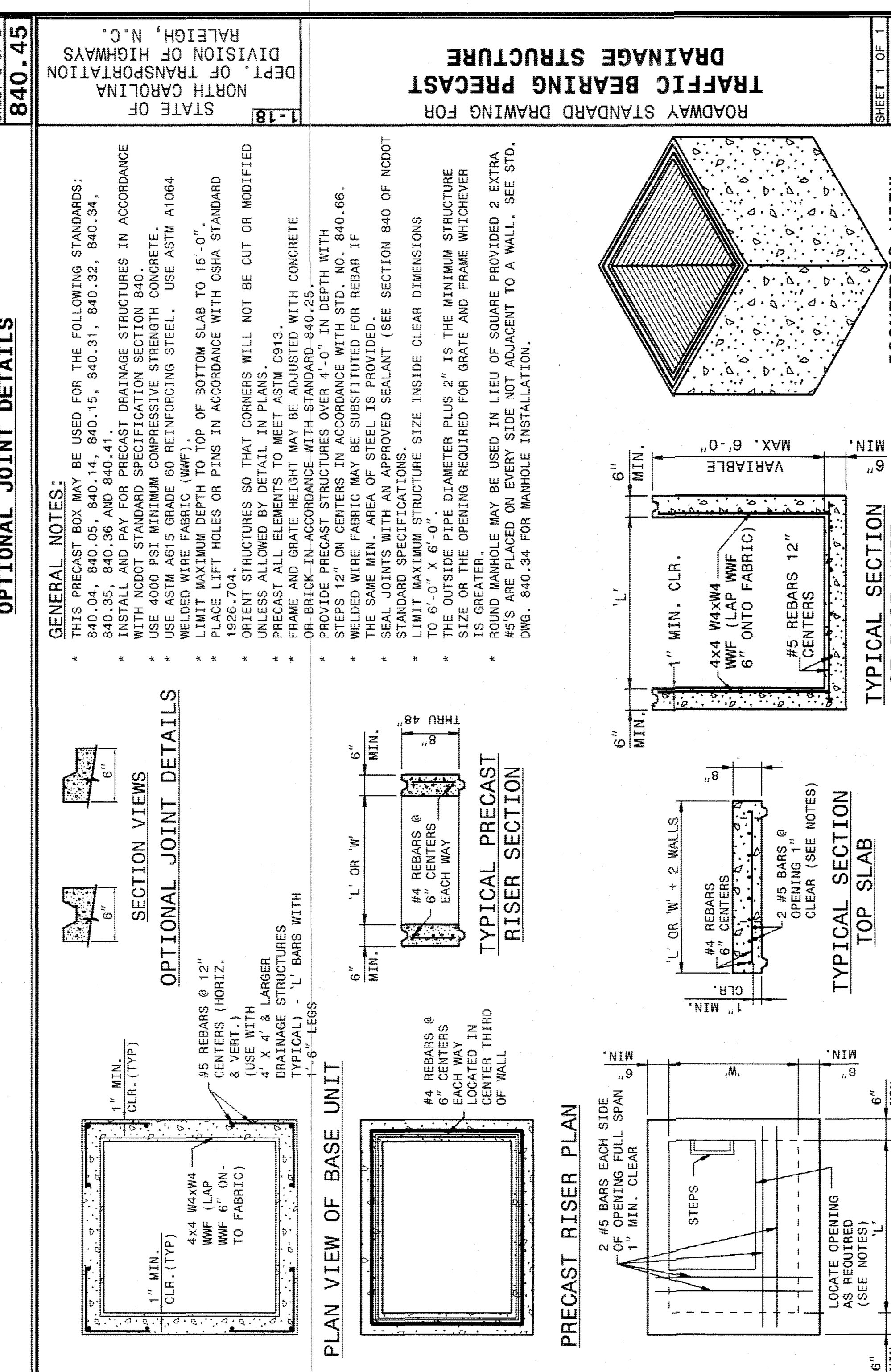
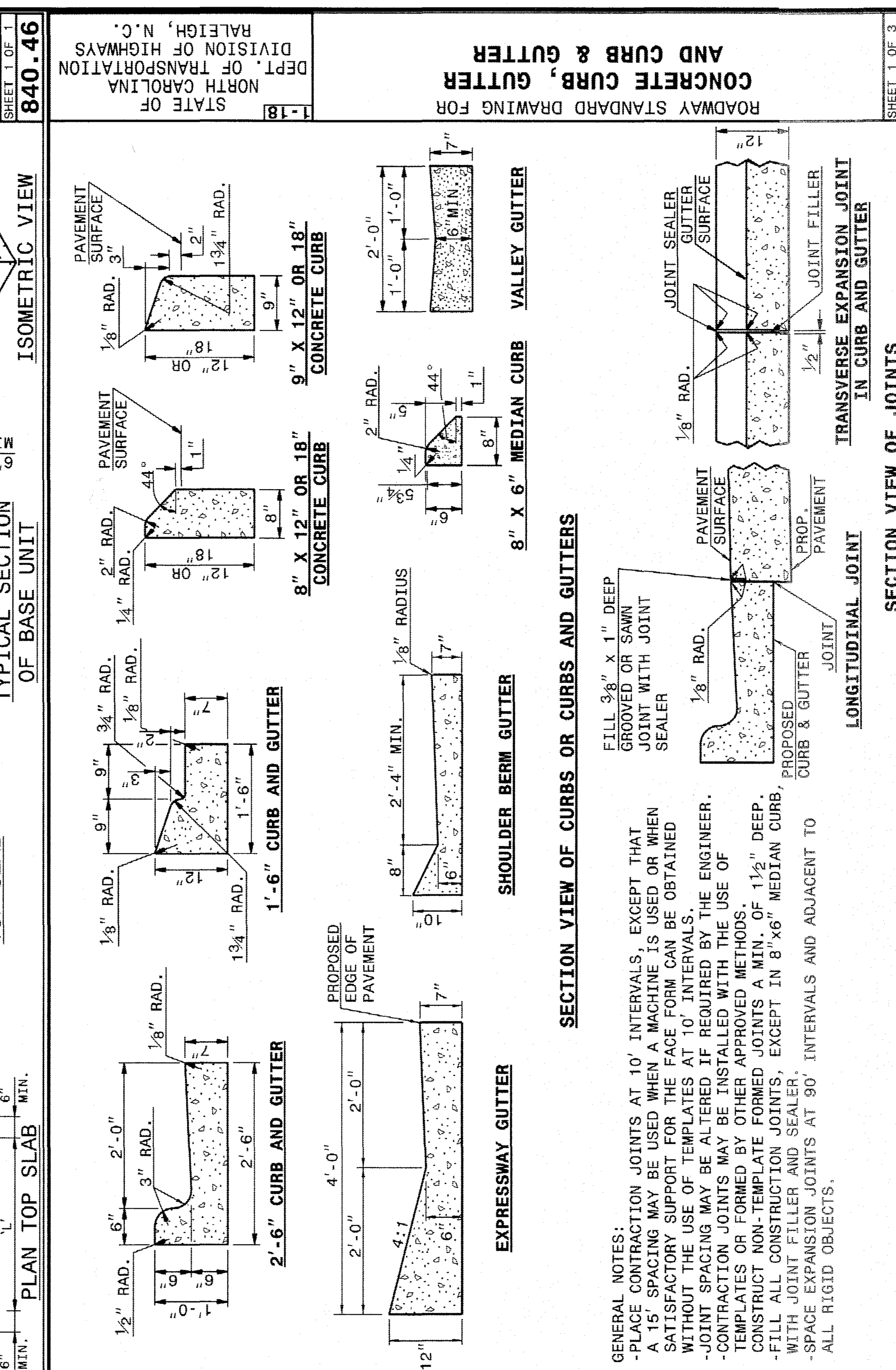
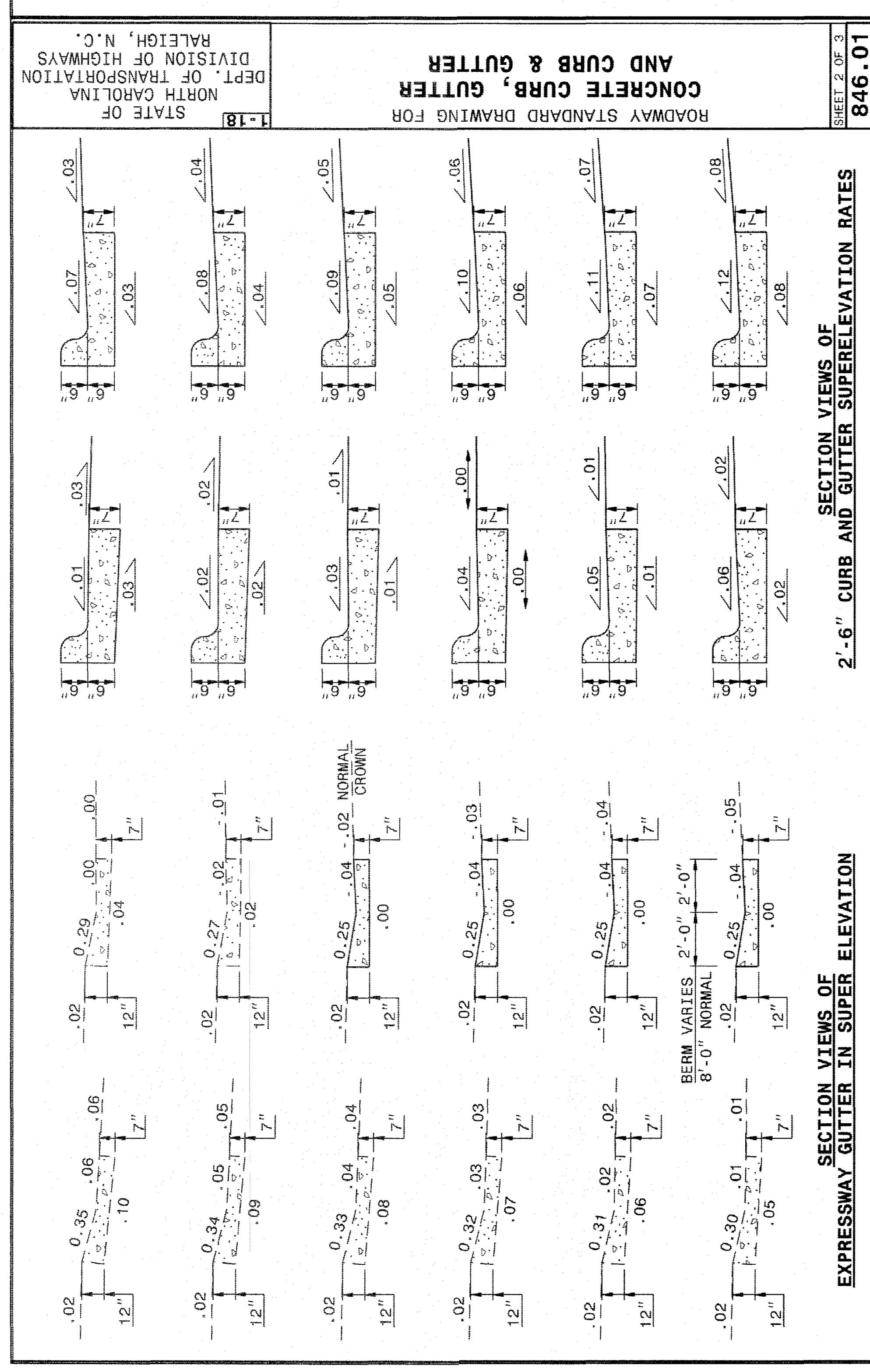
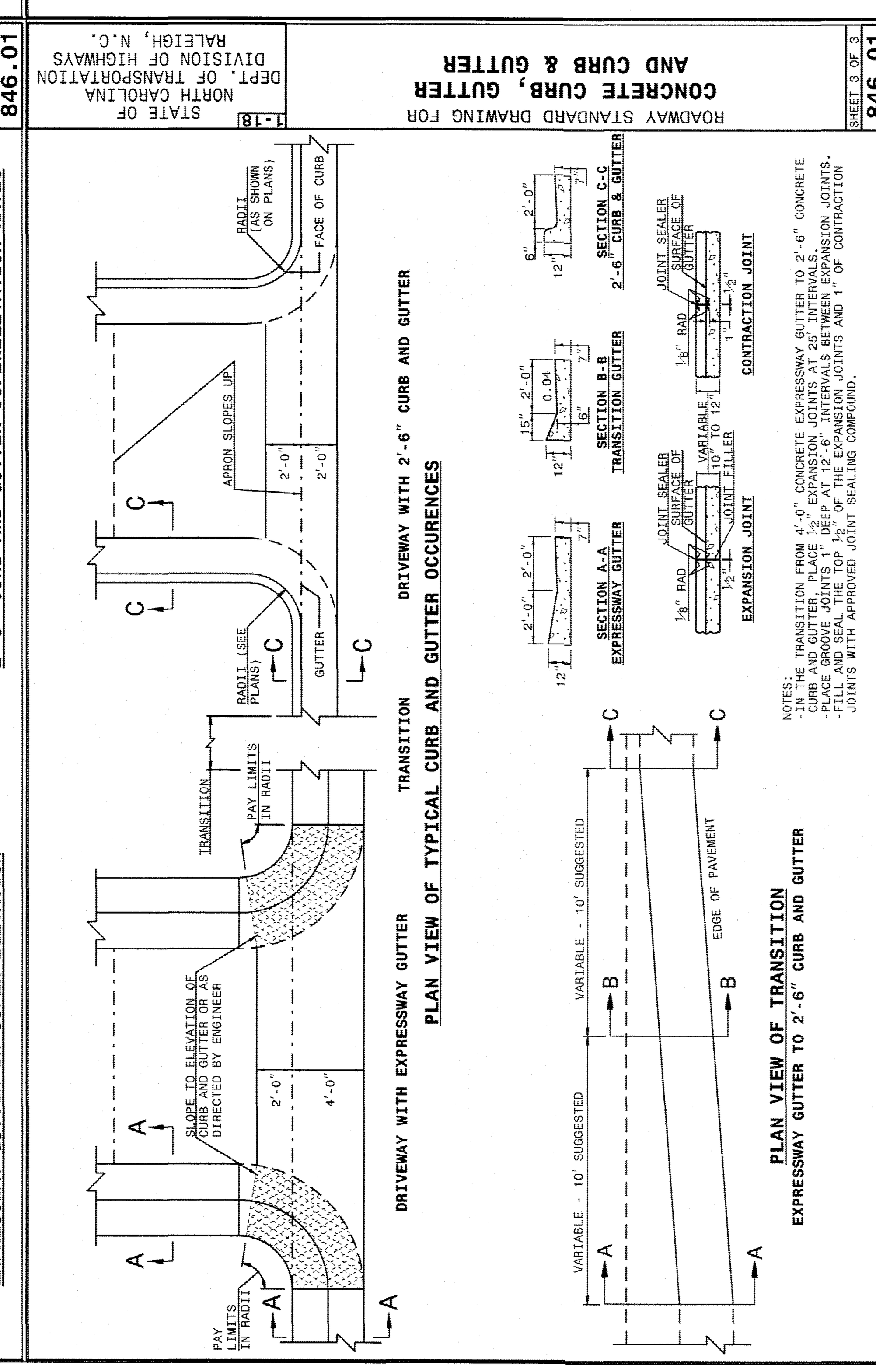


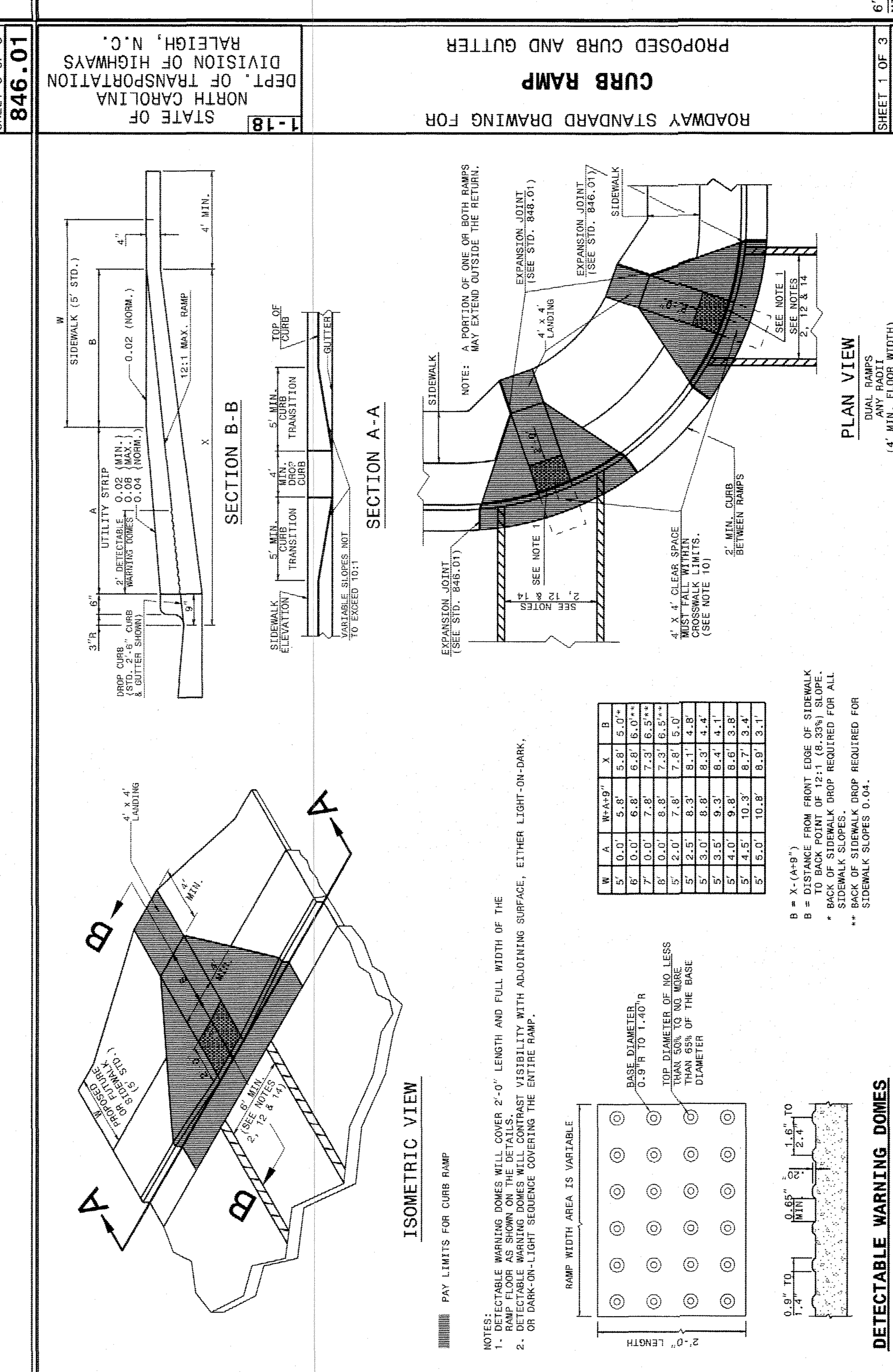






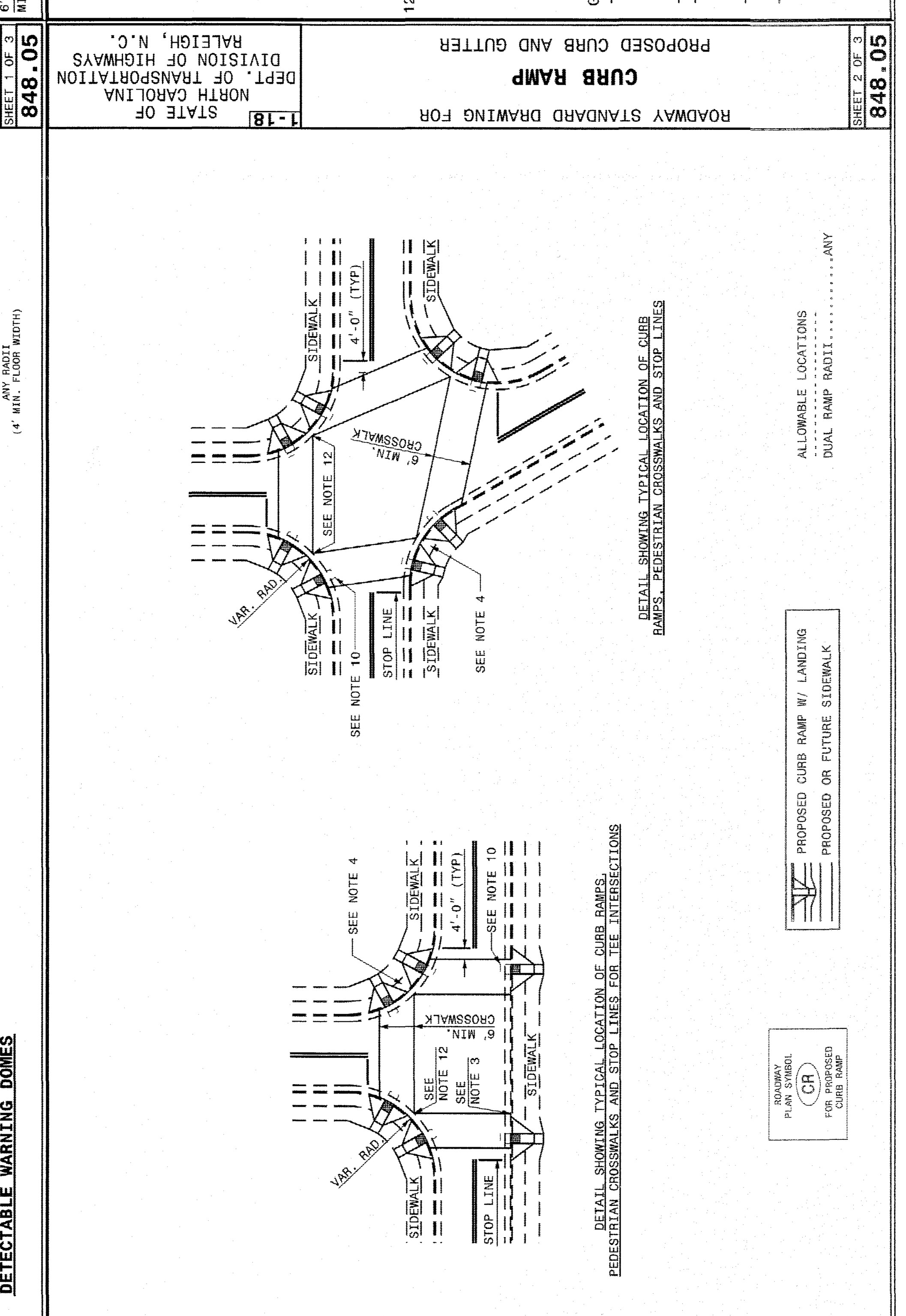






W	A	W+A+9"	X	B
5'	0.0'	5.8'	5.8'	5.0'
6'	0.0'	6.8'	6.8'	6.0'*
7'	0.0'	7.8'	7.3'	6.5'**
8'	0.0'	8.8'	7.3'	6.5'**
5'	2.0'	7.8'	7.8'	5.0'
5'	2.5'	8.3'	8.1'	4.8'
5'	3.0'	8.8'	8.3'	4.4'
5'	3.5'	9.3'	8.4'	4.1'
5'	4.0'	9.8'	8.6'	3.8'
5'	4.5'	10.3'	8.7'	3.4'
5'	5.0'	10.8'	8.9'	3.1'

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.



SITE PERMITTING APPROVAL

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City of Raleigh Public Utilities Department Permit # ____________

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City of Raleigh Development Approval ____________ Timothy Beasley

Raleigh Water Review Officer

North Carolina 811 www.nc811.org
*** 3 Days Before Digging ***
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AMERICAN Engineering
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4020 Westchase Boulevard, Suite 450
Raleigh, NC 27607
919-469-1101

NORTH CAROLINA AMERICAN ENGINEERING ASSOCIATES SOUTHEAST C-3881 CERTIFICATE OF AUTHORIZATION

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMAN

DETAIL SELECTION ONLY

NO.	DATE	REVISION:

STIPULATION FOR REUSE

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KALAS FALLS
PHASE 1
1832 ROLESVILLE ROAD
WAKE COUNTY, NC

JOB NUMBER:
CHECKED BY:
DRAWN BY:
DATE:

SHEET TITLE:
KALAS FALLS CIVIL DETAILS

SHEET NO.:
CD14

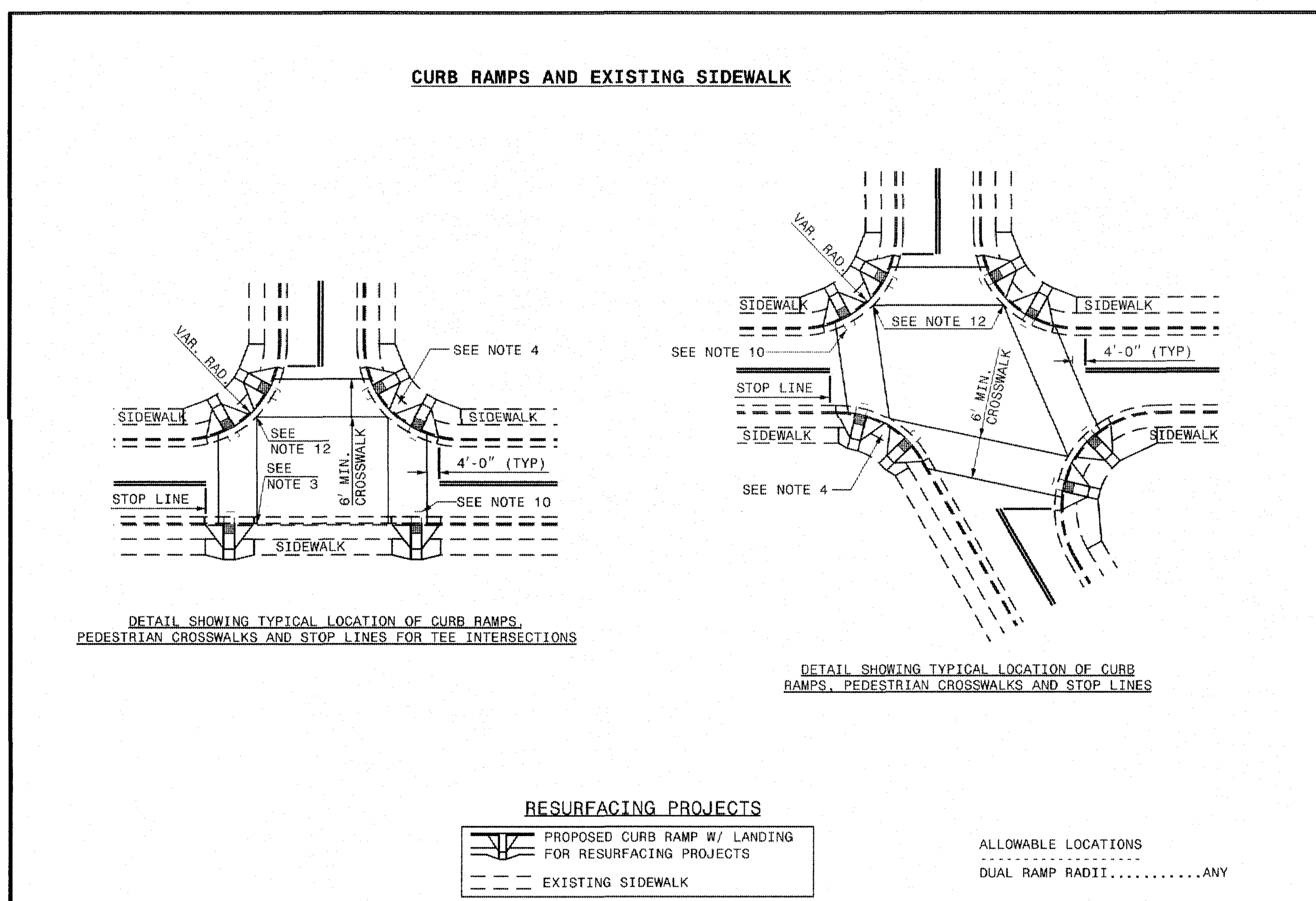
Z:\Jobs\9900\Watkins Property\dwg_Working Dwgs\Base File\Kalas Full Set Details.dwg

1-18 STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ROADWAY STANDARD DRAWING FOR **CURB RAMP** EXISTING CURB AND GUTTER

SHEET 4 OF 5 **848.06**

CURB RAMPS AND EXISTING SIDEWALK



1-18 STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ROADWAY STANDARD DRAWING FOR **CURB RAMPS** NOTES

SHEET 3 OF 3 **848.05**

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.

1-18 STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ROADWAY STANDARD DRAWING FOR **CURB RAMP** EXISTING CURB AND GUTTER

SHEET 5 OF 5 **848.06**

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.
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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.
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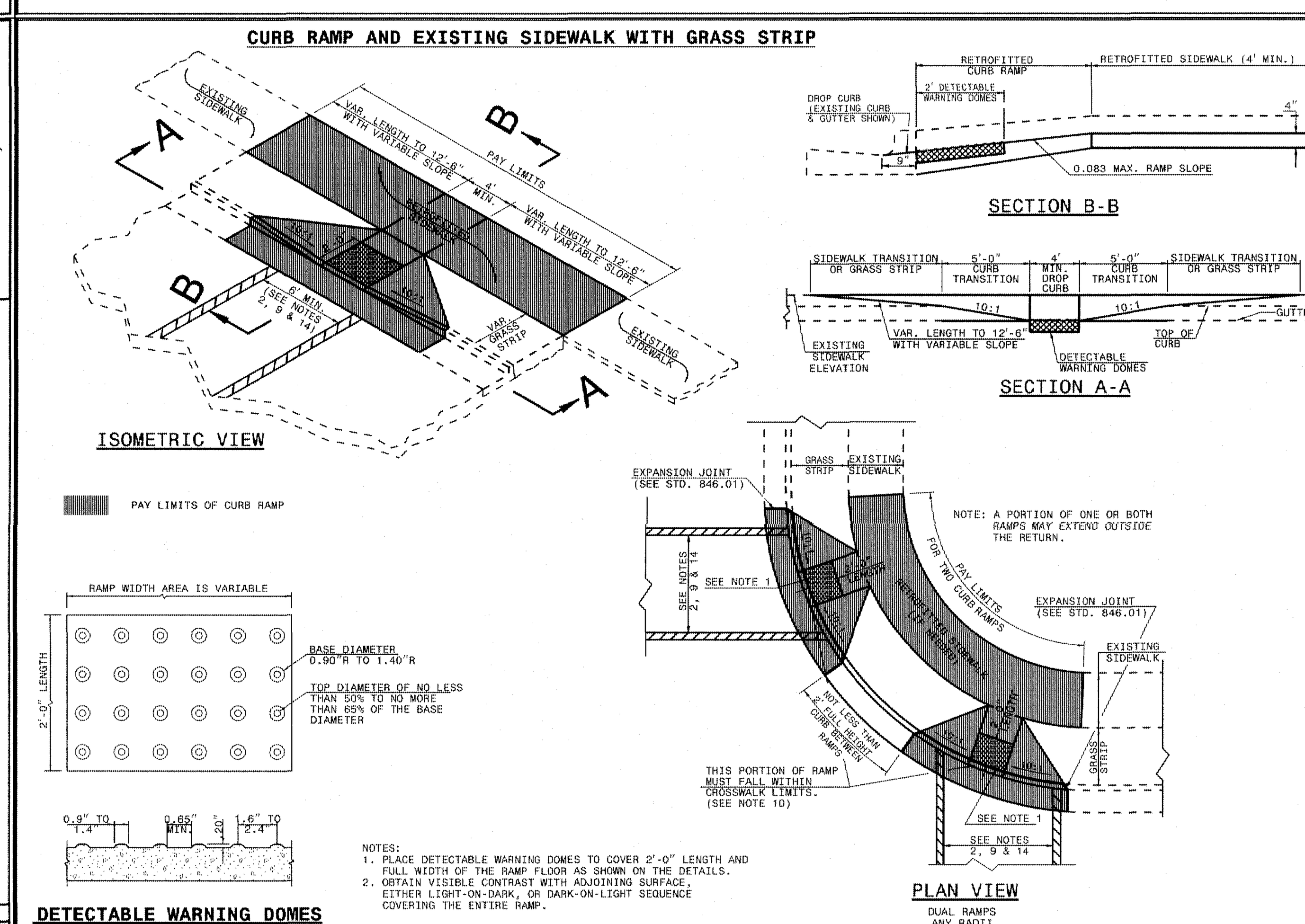
17. PLACE ALL PEDESTRIAN PUSH BUTTON ACTUATORS AND CROSSING SIGNALS AS SHOWN IN THE PLANS OR AS SHOWN IN THE MUTCD.
18. CURB RAMPS THROUGH MEDIAN ISLANDS, SINGLE RAMPS AT DUAL CROSSWALKS OR LIMITED R/W SITUATIONS, WILL BE HANDLED BY SPECIAL DETAILS. CONTACT THE CONTRACT STANDARDS AND DEVELOPMENT UNIT FOR THE DETAILS OR FOR A SPECIAL DESIGN.

1-18 STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ROADWAY STANDARD DRAWING FOR **CURB RAMP** EXISTING CURB AND GUTTER

SHEET 1 OF 5 **848.06**

CURB RAMP AND EXISTING SIDEWALK WITH GRASS STRIP

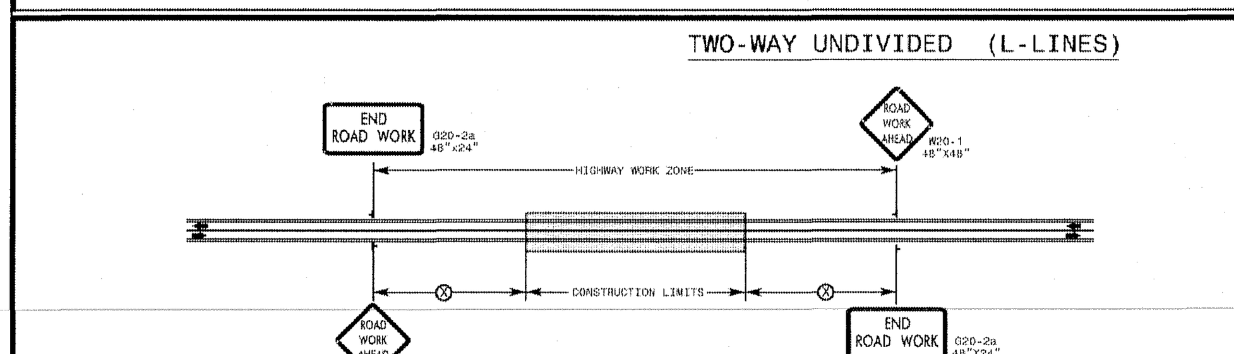


1-18 STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

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

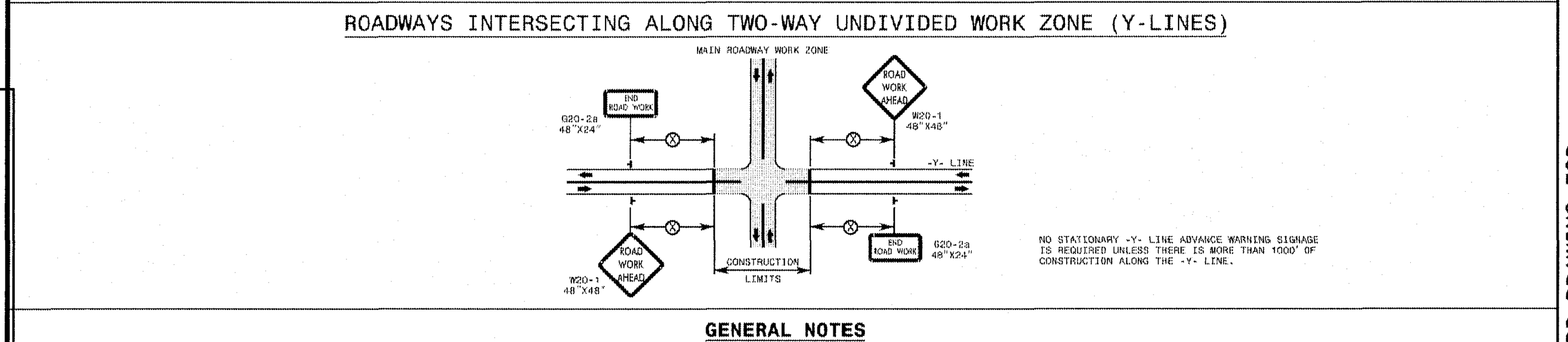
SHEET 3 OF 3 **1101.01**

TWO-WAY UNDIVIDED (L-LINES)



POSTED SPEED LIMIT (MPH)	RECOMMENDED MINIMUM SIGN SPACING ⊗
≤ 50	500'
55	1000'

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



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.

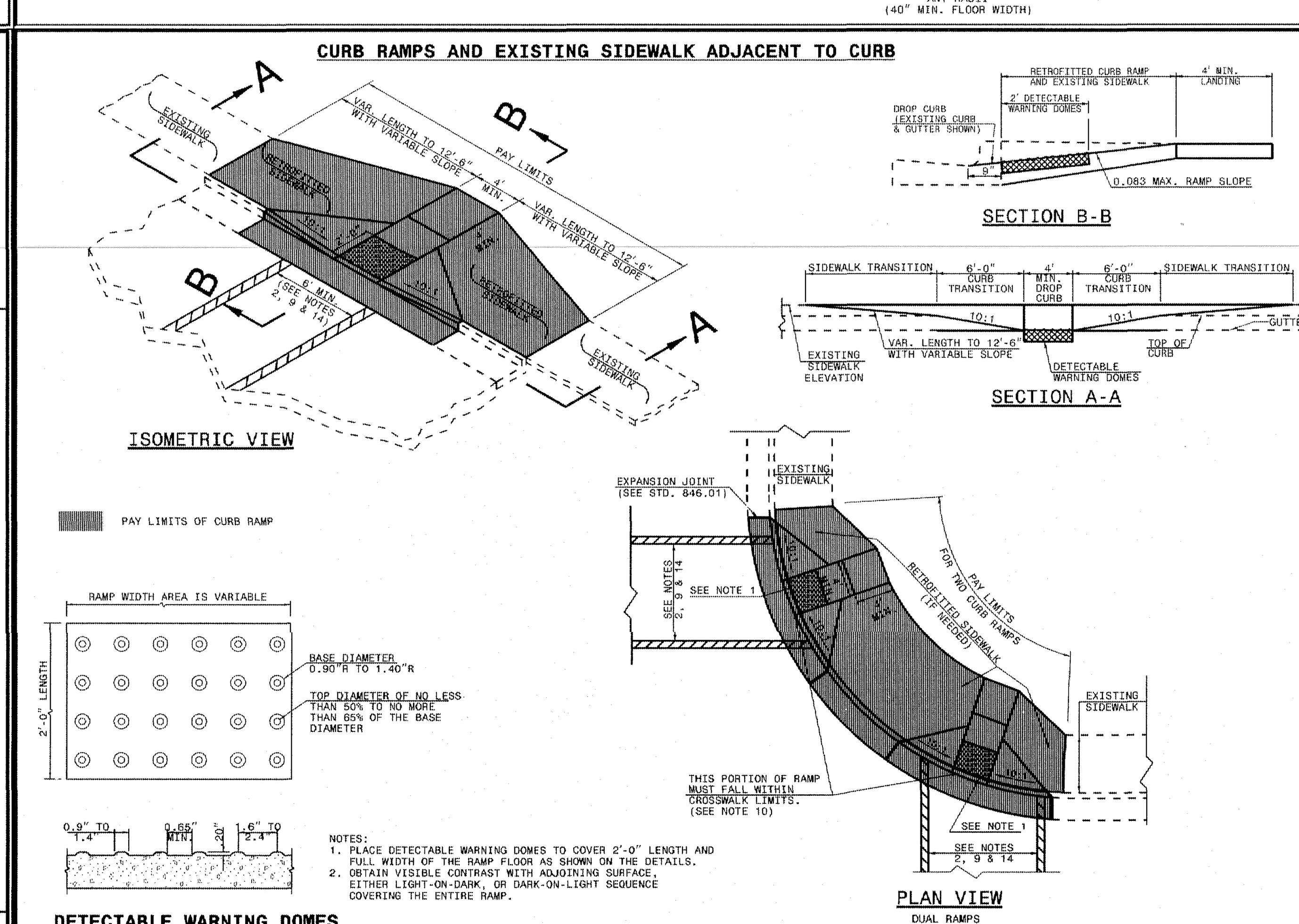
LEGEND
STATIONARY SIGN
DIRECTION OF TRAFFIC FLOW

1-18 STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ROADWAY STANDARD DRAWING FOR **CURB RAMP** EXISTING CURB AND GUTTER

SHEET 2 OF 5 **848.06**

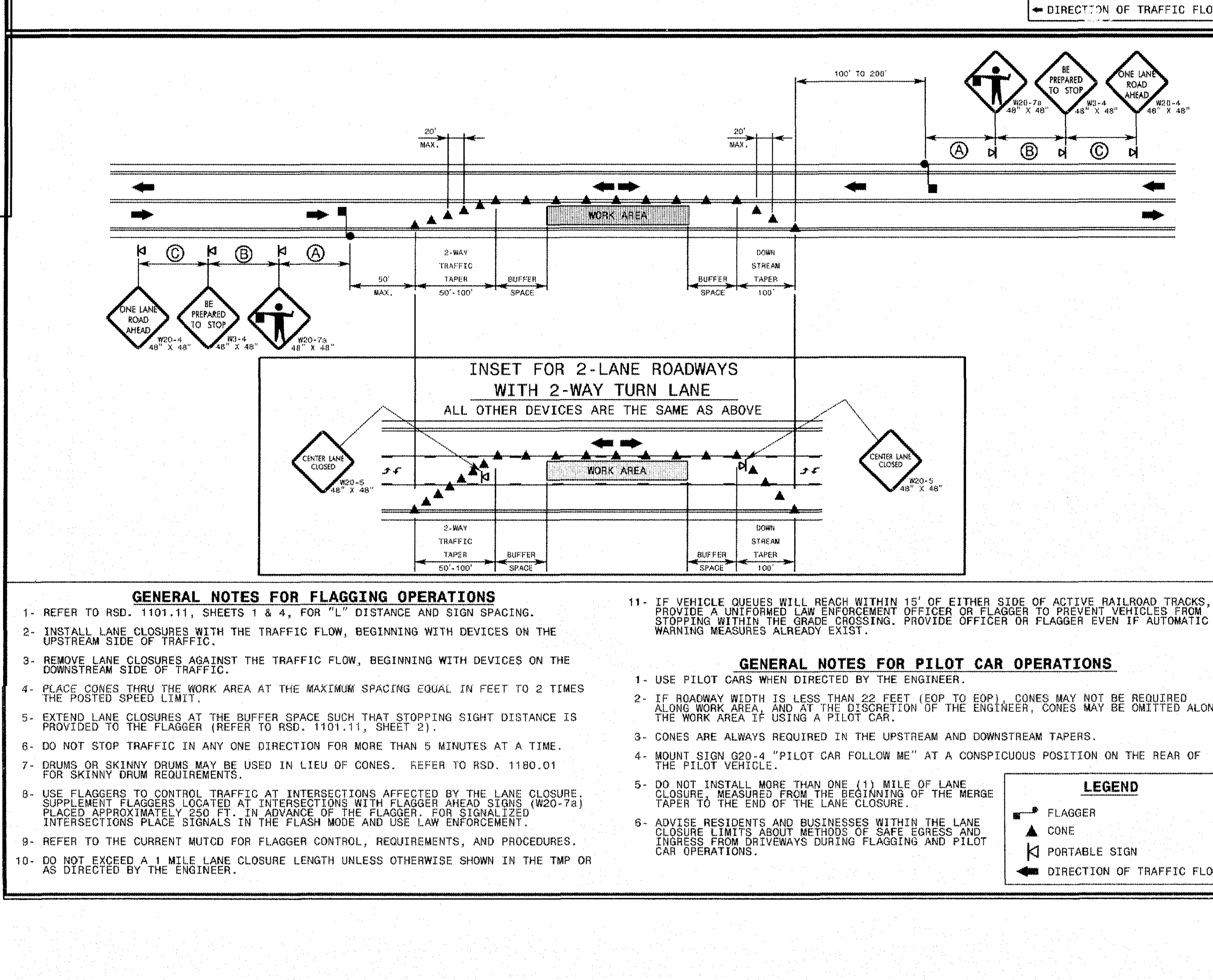
CURB RAMPS AND EXISTING SIDEWALK ADJACENT TO CURB



1-18 STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ROADWAY STANDARD DRAWING FOR **TEMPORARY LANE CLOSURES** 2-LANE, 2-WAY ROADWAY-1 LANE CLOSED

SHEET 1 OF 14 **1101.02**



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 THRU 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 FLAGGER AHEAD SIGNS (W20-7a) PLACED APPROXIMATELY 250 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 (EOP TO EOP), 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- MOUNT SIGN G20-4 "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, MEASURED FROM 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.

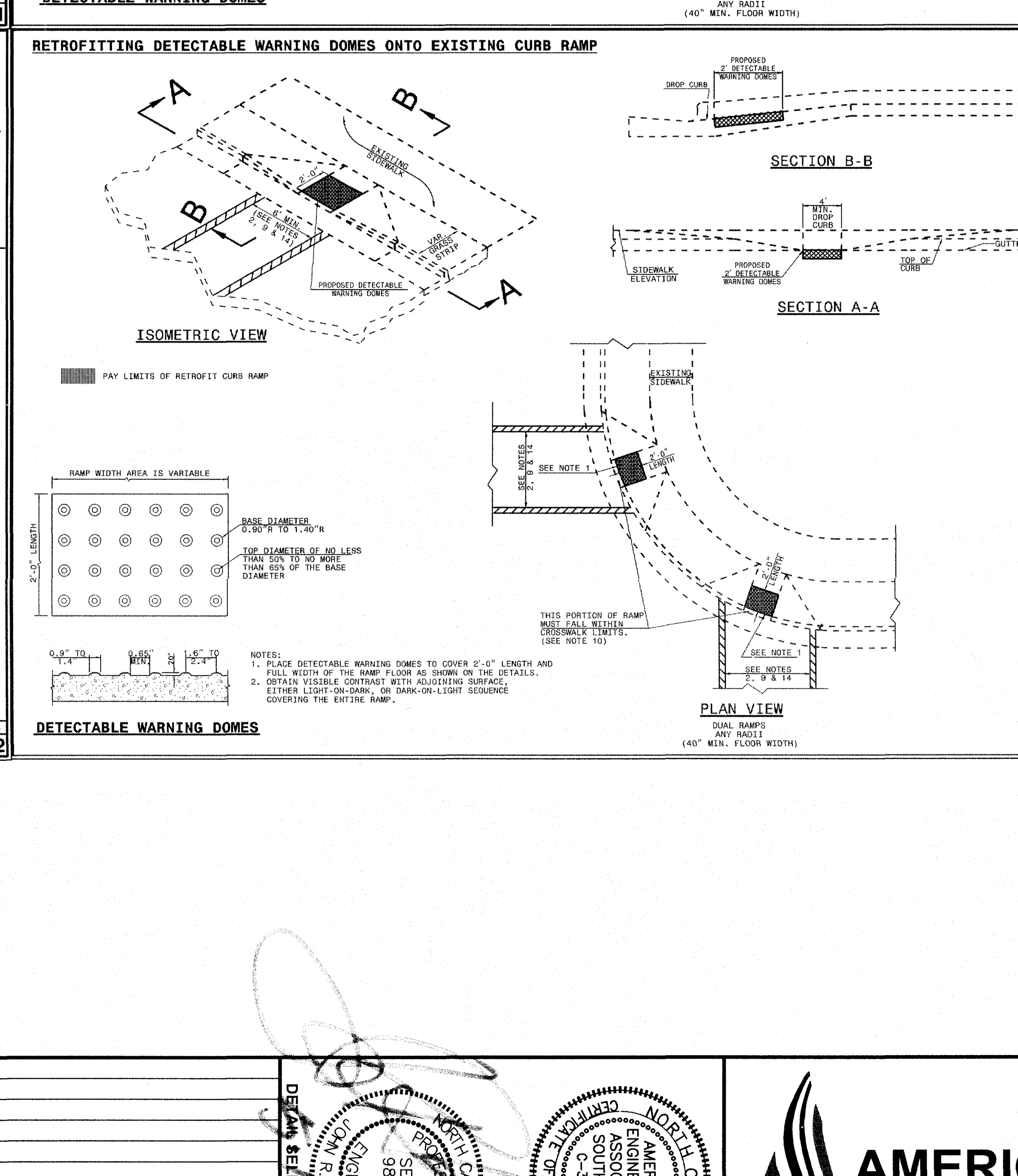
LEGEND
FLAGGER
CONE
PORTABLE SIGN
DIRECTION OF TRAFFIC FLOW

1-18 STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ROADWAY STANDARD DRAWING FOR **CURB RAMP** EXISTING CURB AND GUTTER

SHEET 3 OF 5 **848.06**

RETROFITTING DETECTABLE WARNING DOMES ONTO EXISTING CURB RAMP



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 #** S-4824

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 #** W-3784

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 # ________

CITY OF RALEIGH - PLANS AUTHORIZED FOR CONSTRUCTION

Electronic Approval: This approval is being issued electronically. This approval is valid only upon the signature of a City of Raleigh Review Officer below. The City will retain a copy of the approved plans. Any work authorized by this approval must proceed in accordance with the plans kept on file with the City. This electronic approval may not be edited once issued. Any modification to this approval once issued will invalidate this approval.

City of Raleigh Development Approval Timothy Beasley

Raleigh Water Review Officer

North Carolina 811 www.nc811.org
*** 3 Days Before Digging ***
North Carolina 811
811 or 1-800-632-4949
Remote Ticket Entry
http://nc811.org/remoteticketentry.htm

AMERICAN Engineering
American Engineering Associates - Southeast, P.A.
4020 Westchase Boulevard, Suite 450
Raleigh, NC 27607
919-469-1101

NORTH CAROLINA AMERICAN ENGINEERING ASSOCIATES SOUTHEAST C-3881 CERTIFICATE OF AUTHORIZATION

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMAN

DETAIL SELECTION ONLY

NO.	DATE	REVISION:

STIPULATION FOR REUSE

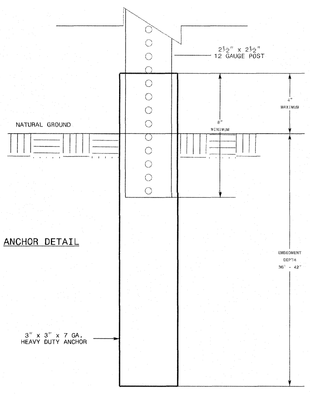
THIS DRAWING WAS PREPARED FOR USE ON THE SPECIFIC SITE, NAMED HEREON, CONTEMPORANEOUSLY WITH ITS ISSUE DATE AS LISTED, HEREON. AND IT IS NOT SUITABLE FOR USE ON A DIFFERENT PROJECT SITE OR AT A LATER TIME. USE OF THIS DRAWING FOR REFERENCE OR EXAMPLE ON ANOTHER PROJECT REQUIRES THE SERVICES OF PROPERLY LICENSED ARCHITECTS AND ENGINEERS. REPRODUCTION OF THIS DRAWING FOR REUSE ON ANOTHER PROJECT IS NOT AUTHORIZED AND MAY BE CONTRARY TO THE LAW.

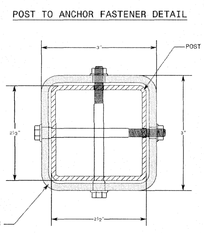
KALAS FALLS
PHASE 1
1832 ROLESVILLE ROAD
WAKE COUNTY, NC

JOB NUMBER:
CHECKED BY:
DRAWN BY:
DATE:

SHEET TITLE:
KALAS FALLS CIVIL DETAILS

SHEET NO.:
CD15





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.

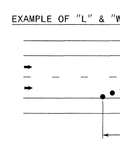
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

I-18

ROADWAY STANDARD DRAWING FOR
STATIONARY WORK ZONE SIGNS
PERFORATED SQUARE STEEL TUBING

SHEET 3 OF 3
1110.01

EXAMPLE OF "L" & "W" DESIGNATIONS



TAPER LENGTH CRITERIA FOR CHANNELIZING DEVICES IN WORK ZONES

TYPES OF TAPERS	TAPER LENGTH
UPSTREAM TAPER	
MERGING TAPER	MINIMUM
SHIFTING TAPER	½ L MINIMUM
SHOULDER TAPER	½ 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 (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	90
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	20	45	65	85	105	125	145	165	185	205	225	245
40	30	55	80	110	130	160	190	215	240	270	295	320
45	40	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

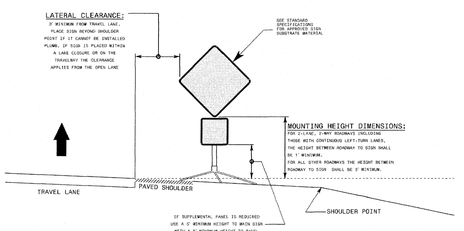
2- "L" DISTANCE IS FOR APPLICATION WITH CHANNELIZING DEVICE AND PAVEMENT MARKING TAPERS AND TRANSITIONS. CHANNELIZING DEVICES INCLUDE DRUMS, CONES, TUBULAR MARKERS, BARRICADES, RAISED ASPHALT ISLANDS, AND VERTICAL PANELS.

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

I-18

ROADWAY STANDARD DRAWING FOR
TRAFFIC CONTROL DESIGN TABLES
"L" DISTANCE AND CHANNELIZING DEVICE TAPER CRITERIA

SHEET 1 OF 4
1101.11



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.

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

I-18

ROADWAY STANDARD DRAWING FOR
PORTABLE WORK ZONE SIGNS
MOUNTING HEIGHT & LATERAL CLEARANCE

SHEET 1 OF 1
1110.02

DESIGN SPEED (MPH)	MINIMUM SIGHT DISTANCE: STOPPING SIGHT DISTANCE (FEET)	PASSING SIGHT DISTANCE (FEET)	MINIMUM LONGITUDINAL BUFFER SPACE (FEET)
30	200	1090	65
35	250	1290	120
40	305	1470	155
45	360	1625	195
50	425	1835	240
55	495	1985	290
60	570	2135	345
65	645	2305	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.

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

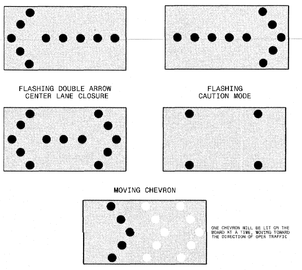
I-18

ROADWAY STANDARD DRAWING FOR
TRAFFIC CONTROL DESIGN TABLES
BUFFER SPACE & SIGHT DISTANCE

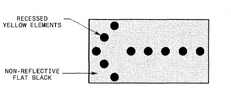
SHEET 2 OF 4
1101.11

FLASHING ARROW BOARD MODES

FLASHING ARROW BOARD TYPE			
PANEL TYPE	MINIMUM SIZE (W x H, INCHES)	MINIMUM VISIBILITY DISTANCE (MILES)	MINIMUM NUMBER OF ELEMENTS
C	96 X 48	1	15



TYPICAL FLASHING ARROW BOARD



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.

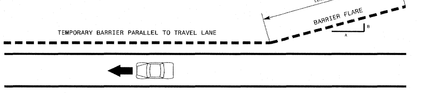
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

I-18

ROADWAY STANDARD DRAWING FOR
FLASHING ARROW BOARDS

SHEET 1 OF 1
1115.01

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.

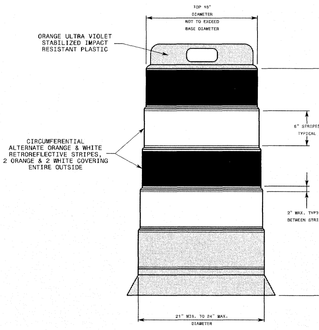
2- A BARRIER IS CONSIDERED FLARED WHEN IT IS NOT PARALLEL TO THE EDGE OF THE TRAVELWAY.

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

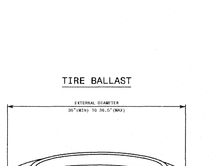
I-18

ROADWAY STANDARD DRAWING FOR
TRAFFIC CONTROL DESIGN TABLES
TEMPORARY BARRIER FLARE RATES

SHEET 3 OF 4
1101.11



TIRE BALLAST



ALL RUBBER ROLLERS MUST BE BLACK TO COLOR AND FREE OF ANY COLORED PAINT

BALLAST SHALL SHIELD HOSE FROM CONTACT WITH THE PAVING SURFACE AND BALLAST OUTER EDGE OF THE DRUM BY A MINIMUM OF 2"

DRUMS THAT USE TIRE BALLASTS ARE MANUFACTURED SPECIFICALLY FOR THAT PURPOSE. DO NOT USE TIRE BALLASTS WITH OTHER DRUM DESIGNS.

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.

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

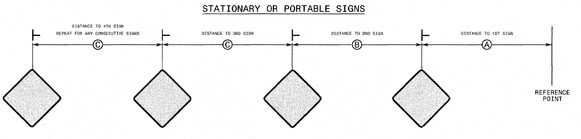
I-18

ROADWAY STANDARD DRAWING FOR
DRUMS

SHEET 1 OF 1
1130.01

ADVANCE WARNING SIGN SPACING CHART			
POSTED SPEED LIMIT (MPH)	RECOMMENDED DISTANCE BETWEEN SIGNS (FEET) (A)	(B)	(C)
≤ 35	205	250	280
40-50	350	350	350
55	500	500	500
CONTROLLED ACCESS ROADS (≥ 55)	1000	1000	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.

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

I-18

ROADWAY STANDARD DRAWING FOR
TRAFFIC CONTROL DESIGN TABLES
SPACING OF TEMPORARY SIGNS IN SERIES

SHEET 4 OF 4
1101.11

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 # S-14252**

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 # W-27284**

The City of Raleigh consents to the connection to its public sewer system and extension of the private 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 # _____

CITY OF RALEIGH - PLANS AUTHORIZED FOR CONSTRUCTION

Inspection of work shall not relieve the owner or his agent of responsibility for the proper construction of this development in accordance with City of Raleigh Standards and Specifications. Any work authorized by this approval must proposed in accordance with the plans kept on file with the City. Any modifications to the approved plans must be clouded and issued. Any modifications not issued will invalidate this approval.

City of Raleigh Development Approval

Raleigh Water Review Officer

Timothy Beadles

Date: 2013.04.30 08:58:37 -04'00'

Know what's below. Call before you dig.
North Carolina 811
1-800-632-4949 or 811
North Carolina 811 Ticket Entry
http://ncocc1.ncgovernor.ca/ticketentry.htm

JOB NUMBER:	
CHECKED BY:	
DRAWN BY:	
DATE:	

SHEET TITLE:
KALAS FALLS
CIVIL DETAILS

SHEET NO:
CD16

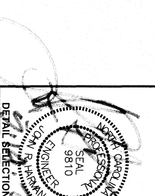
KALAS FALLS
PHASE 1
1832 ROLESVILLE ROAD
WAKE COUNTY, NC

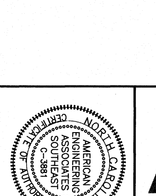
STIPULATION FOR REUSE

THESE PLANS ARE PREPARED FOR USE ON THE SPECIFIC SITE NAMED HEREON. SUITABILITY FOR USE ON A DIFFERENT SITE OR EXTENSIONS OF THIS SITE OR USE AT A DIFFERENT DATE ARE CONDITIONAL, AND IT IS THE RESPONSIBILITY OF THE PERSON OR ENTITY USING THE PLANS FOR ANY SUCH USE TO VERIFY OR ADAPT THE PLANS TO THE CONDITIONS PRESENT. THE SERVICES OF PROPERLY LICENSED ARCHITECTS AND ENGINEERS, REPRODUCTION OF THESE PLANS FOR REFERENCE OR USE OF THIS DRAWING FOR REFERENCE OR ANOTHER PROJECT IS NOT AUTHORIZED AND MAY BE CONTRARY TO THE LAW.

NO.	DATE	REVISION:

DETAIL REFLECTION ONLY





AMERICAN Engineering
American Engineering Associates - Southeast, P.A.
4020 Westchase Boulevard, Suite 450
Raleigh, NC 27607
919-469-1101

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

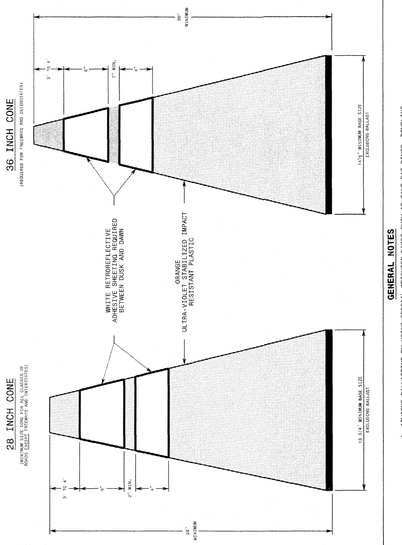
1-18

ROADWAY STANDARD DRAWING FOR

CONES

1135.01

SHEET 1 OF 1



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). SEVERITY PERCENT OF THE WEIGHT OF THE CONE SHALL BE IN THE BASE. DO NOT USE BALLAST THAT WILL DAMAGE PAVEMENT 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

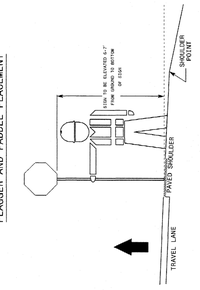
ROADWAY STANDARD DRAWING FOR

FLAGGERS

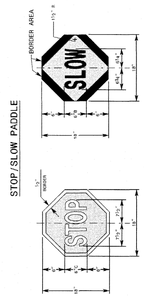
1150.01

SHEET 1 OF 1

FLAGGER AND PADDLE PLACEMENT



STOP/SLOW PADDLE



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 6.5' ABOVE GROUND LEVEL.

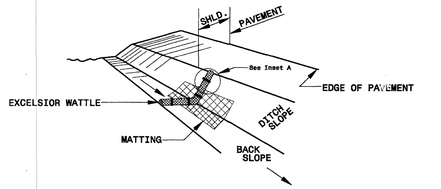
3- PROVIDE STOPPING SIGHT DISTANCE TO EACH FLAGGER STATION. REFER TO RSD, 1101.11, SHEET 2.

4- ILLUMINATE FLAGGER STATIONS DURING NIGHT OPERATIONS.

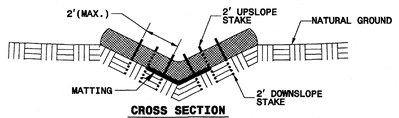
5- FOLLOW FLAGGER QUALIFICATIONS AND METHODS OF HAND SIGNALING PROCEDURES IN ACCORDANCE WITH THE LATEST EDITION OF THE MUTCD AND NCDOT APPROVED TRAINING RESOURCE.

6- ALL FLAGGERS MUST BE CERTIFIED BY AN NCDOT APPROVED TRAINING RESOURCE.

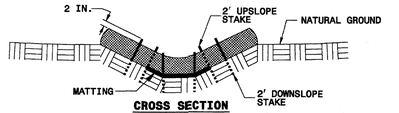
WATTLE DETAIL



ISOMETRIC VIEW



CROSS SECTION VEE DITCH



CROSS SECTION TRAPEZOIDAL DITCH

NOTES:

USE MINIMUM 12 IN. DIAMETER EXCELSIOR WATTLE.

USE 2 FT. WOODEN STAKES WITH A 2 IN. BY 2 IN. NOMINAL CROSS SECTION.

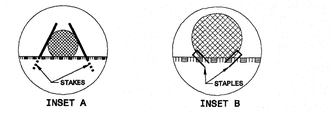
ONLY INSTALL WATTLE(S) TO A HEIGHT IN DITCH SO FLOW WILL NOT WASH AROUND WATTLE AND SCOUR DITCH SLOPES AND AS DIRECTED.

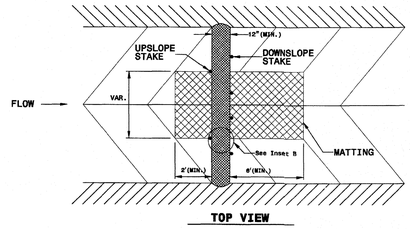
INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE WATTLE TO BOTTOM OF DITCH.

PROVIDE STAPLES MADE OF 0.125 IN. DIAMETER STEEL WIRE FORMED INTO A U SHAPE NOT LESS THAN 12" IN LENGTH.

INSTALL STAPLES APPROXIMATELY EVERY 1 LINEAR FOOT ON BOTH SIDES OF WATTLE AND AT EACH END TO SECURE IT TO THE SOIL.

INSTALL MATTING IN ACCORDANCE WITH SECTION 1631 OF THE STANDARD SPECIFICATIONS.





TOP VIEW

PROJECT REFERENCE NO.	SHEET NO.
F-2XXX	EC-20
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

1205.01

SHEET 1 OF 2

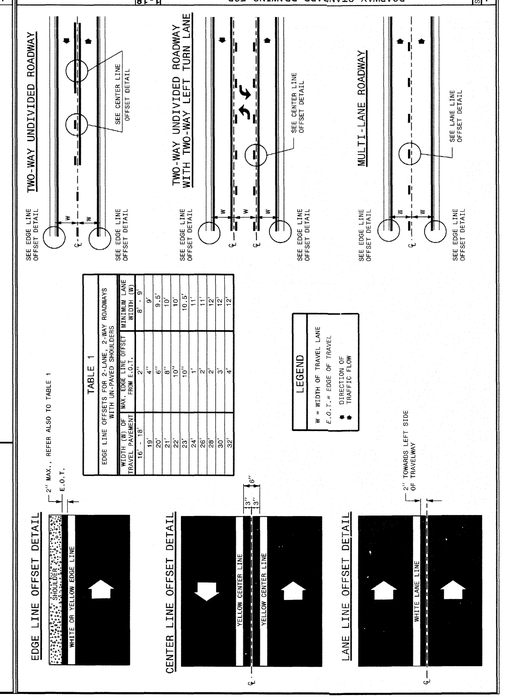


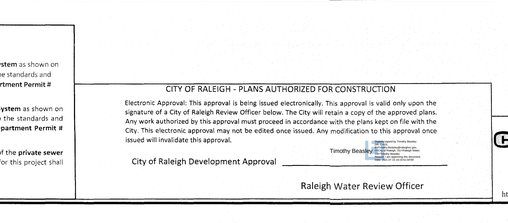
TABLE 1

EDGE LINE OFFSETS FOR 2-LANE, 2-WAY ROADWAYS WITH UNPAVED SHOULDERS

WIDTH OF EP OF TRAVEL PAVEMENT	EDGE LINE OFFSET FROM E.O.T.	CENTERLINE MARK WIDTH (B)
16' - 18'	2"	8"
20'	4"	8"
22'	6"	8"
24'	8"	8"
26'	10"	10"
28'	12"	10"
30'	2"	12"
32'	4"	12"

LEGEND

W = WIDTH OF TRAVEL LANE
E.O.T. = EDGE OF TRAVEL
DIRECTION OF TRAFFIC FLOW



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

1-18

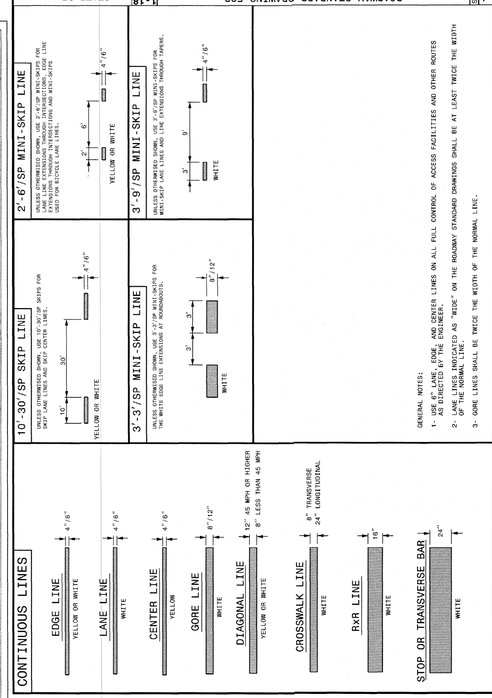
ROADWAY STANDARD DRAWING FOR

PAVEMENT MARKINGS

LINE TYPES AND OFFSETS

1205.01

SHEET 1 OF 2



GENERAL NOTES:

1- USE 4" 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

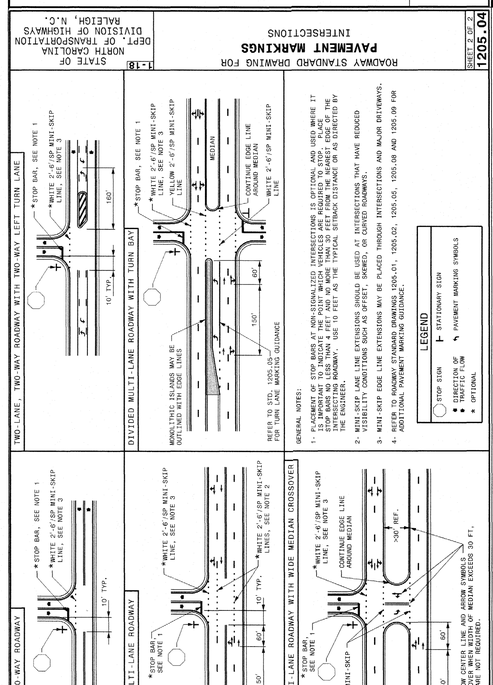
ROADWAY STANDARD DRAWING FOR

PAVEMENT MARKINGS

INTERSECTIONS

1205.04

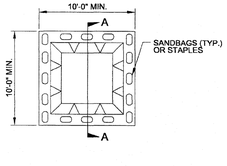
SHEET 2 OF 2



LEGEND

STOP SIGN
STATIONARY SIGN
DIRECTION OF TRAFFIC FLOW
PAVEMENT MARKING SYMBOLS
OPTIONAL

ONSITE CONCRETE WASHOUT STRUCTURE WITH LINER



CONCRETE WASHOUT — CLEARLY MARKED SIGNAGE NOTING DEVICE (18"X24" MIN.)

SECTION A-A

NOTES:
1. ACTUAL LOCATION DETERMINED IN FIELD

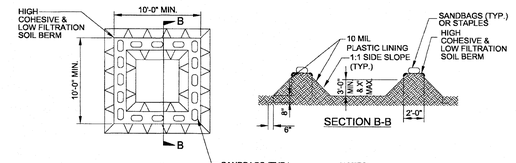
2. THE CONCRETE WASHOUT STRUCTURES SHALL BE MAINTAINED WHEN THE LIQUID AND/OR SOLID REACHES 75% OF THE STRUCTURES CAPACITY.

3.CONCRETE WASHOUT STRUCTURE NEEDS TO BE CLEARY MARKED WITH SIGNAGE NOTING DEVICE.

PLAN

BELOW GRADE WASHOUT STRUCTURE

NOT TO SCALE



CONCRETE WASHOUT — CLEARLY MARKED SIGNAGE NOTING DEVICE (18"X24" MIN.)

NOTES:
1. ACTUAL LOCATION DETERMINED IN FIELD

2. THE CONCRETE WASHOUT STRUCTURES SHALL BE MAINTAINED WHEN THE LIQUID AND/OR SOLID REACHES 75% OF THE STRUCTURES CAPACITY TO PROVIDE ADEQUATE HOLDING CAPACITY WITH A MINIMUM 12 INCHES OF FREEBOARD.

3.CONCRETE WASHOUT STRUCTURE NEEDS TO BE CLEARY MARKED WITH SIGNAGE NOTING DEVICE.

PLAN

ABOVE GRADE WASHOUT STRUCTURE

NOT TO SCALE

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 #** S-4824

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 #** W-3784

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 # _____

CITY OF RALEIGH - PLANS AUTHORIZED FOR CONSTRUCTION

Electronic Approval: This approval is being issued electronically. This approval is valid only upon the signature of a City of Raleigh Review Officer below. The City will retain a copy of the approved plans. Any work authorized by this approval must proceed in accordance with the plans kept on file with the City. This electronic approval may not be edited once issued. Any modification to this approval once issued will invalidate this approval.

Timothy Beasley

City of Raleigh Development Approval _____

Raleigh Water Review Officer

AMERICAN Engineering
American Engineering Associates - Southeast, P.A.
4020 Westchase Boulevard, Suite 450
Raleigh, NC 27607
919-469-1101

NORTH CAROLINA ENGINEERING ASSOCIATES SOUTHEAST C-3881 CERTIFICATE OF AUTHORIZATION

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. ZIMAN

DETAIL SELECTION ONLY

NO.	DATE	REVISION:

STIPULATION FOR REUSE

THIS DRAWING WAS PREPARED FOR USE ON THE SPECIFIC SITE, NAMED HEREON, CONTEMPORANEOUSLY WITH ITS ISSUE DATE AS LISTED, HEREON, AND IT IS NOT SUITABLE FOR USE ON A DIFFERENT PROJECT SITE OR AT A LATER TIME. USE OF THIS DRAWING FOR REFERENCE OR EXAMPLE ON ANOTHER PROJECT REQUIRES THE SERVICES OF PROPERLY LICENSED ARCHITECTS AND ENGINEERS. REPRODUCTION OF THIS DRAWING FOR REUSE ON ANOTHER PROJECT IS NOT AUTHORIZED AND MAY BE CONTRARY TO THE LAW.

KALAS FALLS PHASE 1

1832 ROLESVILLE ROAD
WAKE COUNTY, NC

JOB NUMBER:

CHECKED BY:

DRAWN BY:

DATE:

SHEET TITLE:

KALAS FALLS CIVIL DETAILS

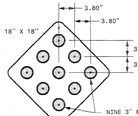
SHEET NO.:

CD17

Z:\Jobs\2XXX\Workfiles-Property\Civil_Working Drwgs\Base File\Kalas Full Set Details.dwg

TYPE I OBJECT MARKERS

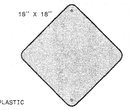
ALTERNATES 1 & 2



OM1-1
REFLECTORS ON YELLOW BACKGROUND

OM1-2
REFLECTORS ON BLACK BACKGROUND

ALTERNATE 3

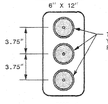


OM1-3
GRADE C YELLOW RETROREFLECTIVE SHEETING

NOTES:
1- MATERIAL- .125" ALUMINUM PANEL.

TYPE 2 OBJECT MARKERS

ALTERNATE 1



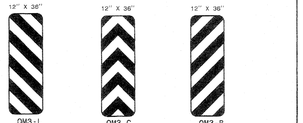
OM2-1
REFLECTORS ON GRADE C WHITE RETROREFLECTIVE SHEETING

ALTERNATE 2

OM2-2
GRADE C YELLOW RETROREFLECTIVE SHEETING

NOTES:
1- MATERIAL- .125" ALUMINUM PANEL.

TYPE 3 OBJECT MARKERS

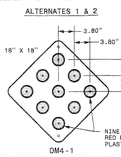


OM3-L OM3-C OM3-R

NOTES:
1- GRADE C YELLOW RETROFLECTIVE SHEETING WITH ALTERNATING BLACK AND YELLOW STRIPES.
2- STRIPES SLOPE DOWNWARD AT 45 DEGREES TOWARD THE SIDE OF THE OBSTRUCTION WHICH TRAFFIC IS TO PASS.
3- MATERIAL-.125" ALUMINUM PANEL.

TYPE 4 OBJECT MARKERS(END OF ROAD)

ALTERNATES 1 & 2



OM4-1
REFLECTORS ON RED BACKGROUND

OM4-2
REFLECTORS ON BLACK BACKGROUND

ALTERNATE 3

OM4-3
GRADE C RED RETROREFLECTIVE SHEETING

NOTES:
1- MATERIAL- .125" ALUMINUM PANEL.

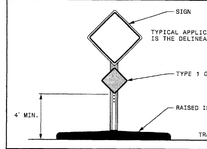
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1-18

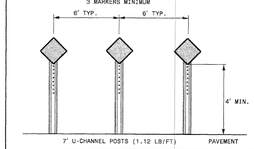
ROADWAY STANDARD DRAWING FOR
OBJECT MARKERS
TYPES

SHEET 1 OF 1
1264.01

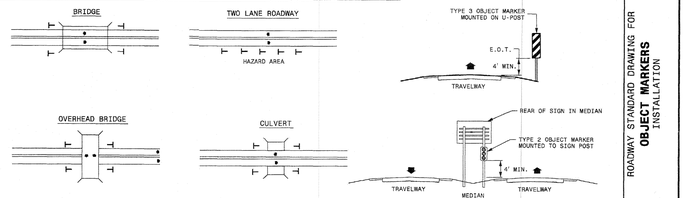
TYPE 1 OR TYPE 3 MARKERS FOR OBSTRUCTIONS WITHIN THE ROADWAY



TYPE 4 MARKERS FOR END OF ROADWAY



TYPE 2 OR TYPE 3 MARKERS FOR OBSTRUCTIONS ADJACENT TO THE ROADWAY



TYPICAL APPLICATIONS OF TYPE 2 OR TYPE 3 OBJECT MARKERS INCLUDES DELINEATION OF BRIDGE PIERS, ABUTMENTS, HANDRAILS, CULVERT HEADWALLS, NARROW SHOULDERS, DROP-OFFS, OR OTHER UNDESIRABLE CONDITIONS WHEN GUARDRAIL OR OTHER ROADSIDE PROTECTION IS NOT IN PLACE.

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

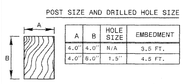
1-18

ROADWAY STANDARD DRAWING FOR
OBJECT MARKERS
INSTALLATION

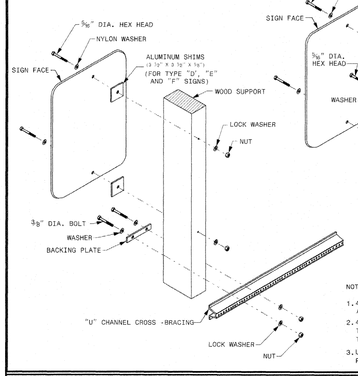
SHEET 1 OF 1
1264.02

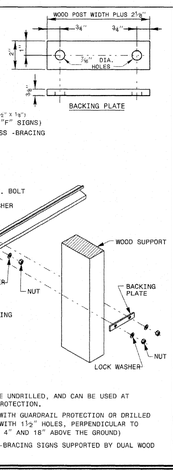
ATTACHMENT METHODS

POST SIZE AND DRILLED HOLE SIZE



A	B	HOLE SIZE	EMBEDMENT
4.0"	4.0"	N/A	3.5 FT.
4.0"	8.0"	1.5"	4.5 FT.





NOTES:
1. 4" X 4" WOOD POSTS ARE ACCEPTABLE UNDRILLED, AND CAN BE USED AT ANY LOCATION WITHOUT GUARDRAIL PROTECTION.
2. 4" X 6" WOOD POSTS MUST BE USED WITH GUARDRAIL PROTECTION OR DRILLED TO MAKE THEM BREAKAWAY.(DRILLED WITH 1½" HOLES, PERPENDICULAR TO THE DIRECTION OF TRAVEL, LOCATED 4" AND 18" ABOVE THE GROUND)
3. USE "U" CHANNEL POSTS FOR CROSS -BRACING SIGNS SUPPORTED BY DUAL WOOD POSTS.

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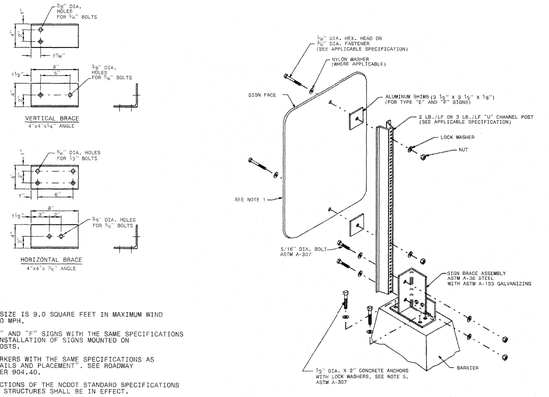
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR
MOUNTING OF TYPE 'D', 'E', AND 'F' SIGNS ON WOOD POSTS

SHEET 2 OF 2
903.20



NOTES:

1. MAXIMUM SIGN SIZE IS 9.0 SQUARE FEET IN MAXIMUM WIND VELOCITY OF 80 MPH.
2. ERECT TYPE "E" AND "F" SIGNS WITH THE SAME SPECIFICATIONS AS "TYPICAL INSTALLATION OF SIGNS MOUNTED ON "U" CHANNEL POSTS.
3. ERECT MILE MARKERS WITH THE SAME SPECIFICATIONS AS 'MILEPOST DETAILS AND PLACEMENT', SEE ROADWAY STANDARD NUMBER 904.40.
4. APPLICABLE SECTIONS OF THE NCDOT STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES SHALL BE IN EFFECT.
5. ATTACH THE BRACE TO THE BARRIER BY MEANS OF ½" DIAMETER, 2" LONG CONCRETE ANCHORS WITH LOCK WASHERS. USE CONCRETE ANCHORS THAT ARE STAINLESS STEEL OR GALVANIZED IN ACCORDANCE WITH ASTM A-153. INSTALL IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

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

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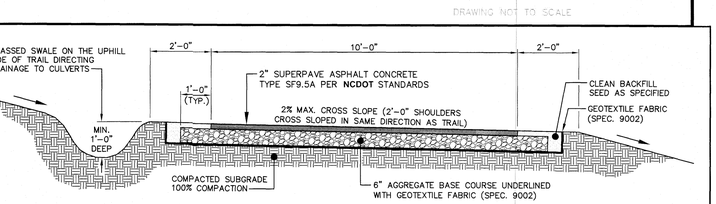
ROADWAY STANDARD DRAWING FOR
BARRIER SIGN SUPPORT ASSEMBLY

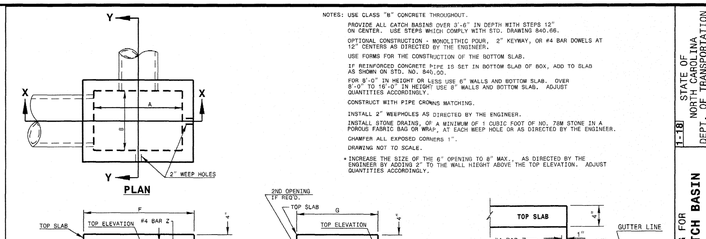
SHEET 1 OF 1
903.30



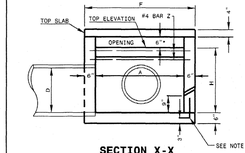
DRAWING NOT TO SCALE

NOTES:
1. CONTRACTOR IS RESPONSIBLE FOR RE-ESTABLISHING ALL SLOPES DISTURBED BY CONSTRUCTION.
2. NO ABOVE GROUND UTILITIES OR UTILITY SURFACE COVERS/PLATES/MANHOLES SHALL BE LOCATED WITHIN TRAIL AND SHALL BE MINIMUM 2 FEET FROM THE EDGE OF TRAIL. RAISED MANHOLES SHALL BE MINIMUM 4 FEET FROM TRAIL EDGE.
3. ALL TRAILS SHALL BE LOCATED MINIMUM 5 FEET FROM THE BACK OF CURB.
4. SIDE SLOPES SHALL NOT EXCEED 3:1. CUT & FILL SLOPES SHALL TIE INTO EXISTING SLOPES TO CREATE AN EVEN TRANSITION.
5. CROSS SLOPE TYPICALLY TO LOW SIDE BUT CROSS SLOPE TO INSIDE OF DOWNHILL CURVES, WITH GRADUAL TRANSITIONS BETWEEN ANY CROSS SLOPE DIRECTION CHANGES.

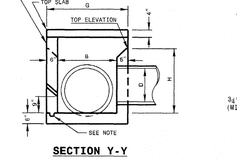
STANDARD 10-FT/STREET-SIDE TRAIL ASPHALT GREENWAY TRAIL



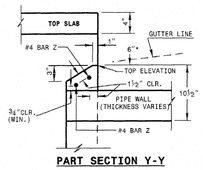
PLAN



SECTION X-X



SECTION Y-Y



PART SECTION Y-Y
SHOWING DETAILS AT OPENING

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 9'-0" IN HEIGHT OR LESS USE 6" WALLS AND BOTTOM SLAB. OVER 9'-0" TO 16'-0" IN HEIGHT USE 8" WALLS AND BOTTOM SLAB. ADJUST QUANTITIES ACCORDINGLY.

CONSTRUCT WITH PIPE GRADE 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.

DIM'S OF BOX & PIPE				MIN. DIMENSIONS AND QUANTITIES FOR CONCRETE CATCH BASIN (BASED ON MIN. HEIGHT, H)										
				REINFORCING						TOP & BOT. SLAB DIMENSIONS		TOTAL QUANTITIES BOX & SLABS		DEDUCTION ONE PIPE		
PIPE	SPAN	WIDTH	HEIGHT	BARS - X		BARS - Y		BARS - Z								
D	A	B	H	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	F	G	CU. YDS. CONC. IN BOX	WALL/FT. (Z)	LB. REINF.	C.S.	R.C.
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
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	1.106
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
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
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	1.918
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
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	59	2.914
48"	5'-0"	5'-0"	4'-10"	5	5'-9"	13	5'-9"	2	5'-9"	6'-0"	6'-0"	0.444	0.666	0.407	68	3.298

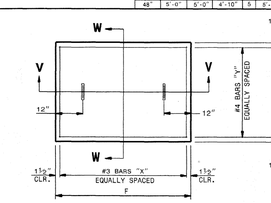
DEDUCTION ONE PIPE		SQ. FT. INTERIOR FORMED SURFACE	
C.S.	R.C.	Y.D.	A.* THROAT OMITTED
0.015	0.032	0.046	
0.023	0.036	0.046	
0.035	0.049	0.053	
0.035	0.049	0.053	
0.052	0.080	0.053	
0.078	0.127	0.053	
0.132	0.178	0.059	
0.180	0.243	0.066	
0.226	0.317	0.066	

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

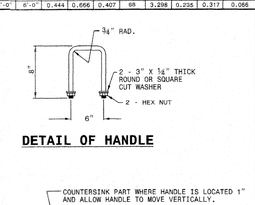
1-18

ROADWAY STANDARD DRAWING FOR
CONCRETE OPEN THROAT CATCH BASIN
12" THRU 48" PIPE

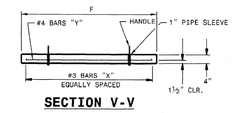
SHEET 1 OF 2
840.04



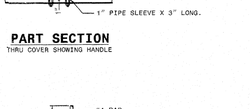
PLAN
PRECAST OR CAST IN PLACE TOP SLAB



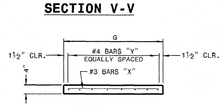
DETAIL OF HANDLE



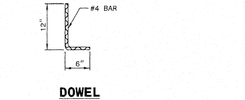
SECTION V-V



PART SECTION
THRU COVER SHOWING HANDLE



SECTION W-W



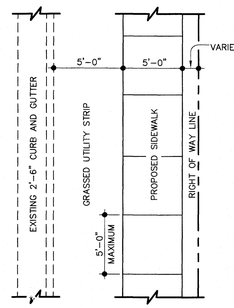
DOWEL

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

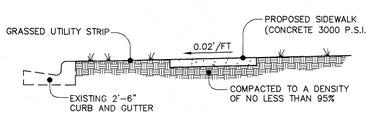
1-18

ROADWAY STANDARD DRAWING FOR
CONCRETE OPEN THROAT CATCH BASIN
12" THRU 48" PIPE

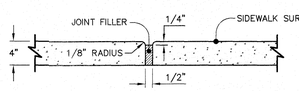
SHEET 2 OF 2
840.04



PLAN VIEW



TYPICAL SECTION



TRANSVERSE EXPANSION JOINT

NOTES:

1. TRANSVERSE EXPANSION JOINTS TO BE A MAXIMUM OF 50 FEET.
2. ALL CONCRETE TO BE FINISHED WITH CURING COMPOUND.
3. A 6 INCH DEPTH IS REQUIRED AT LOCATIONS OF DRIVEWAY CROSSINGS, AT STREET INTERSECTIONS (ALONG THE LENGTH OF RADIUS CURB RETURNS), AND IN THE HANDICAP RAMPS.

STANDARD CONCRETE SIDEWALK

DETAIL No.
03000.07
SHEET 1 OF 2

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 #** S-4824

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 #** W-3784

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 # _____

CITY OF RALEIGH - PLANS AUTHORIZED FOR CONSTRUCTION

Electronic Approval: This approval is being issued electronically. This approval is valid only upon the signature of a City of Raleigh Review Officer below. The City will retain a copy of the approved plans. Any work authorized by this approval must proceed in accordance with the plans kept on file with the City. This electronic approval may not be edited once issued. Any modification to this approval once issued will invalidate this approval.

Timothy Beadles

City of Raleigh Development Approval _____

Raleigh Water Review Officer

North Carolina 811 www.nc811.org
*** 3 Days Before Digging ***
North Carolina 811
811 or 1-800-632-4949
Remote Ticket Entry
http://nc811.org/remoteticketentry.htm

AMERICAN Engineering
American Engineering Associates - Southeast, P.A.
4020 Westchase Boulevard, Suite 450
Raleigh, NC 27607
919-469-1101

NORTH CAROLINA ENGINEERING ASSOCIATES SOUTHEAST C-3881 CERTIFICATE OF AUTHORIZATION

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 9810 ENGINEER TIMOTHY R. BEADLES 7.31.21

DETAIL SELECTION ONLY

NO.	DATE	REVISION:

STIPULATION FOR REUSE

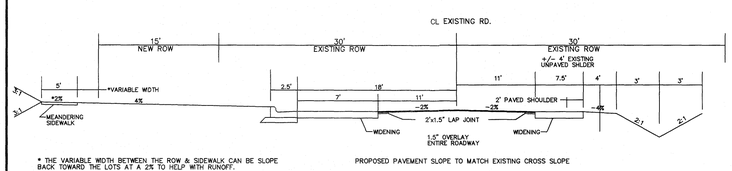
KALAS FALLS PHASE 1
1832 ROLESVILLE ROAD
WAKE COUNTY, NC

JOB NUMBER:
CHECKED BY:
DRAWN BY:
DATE:

SHEET TITLE:
KALAS FALLS CIVIL DETAILS

SHEET NO.:
CD18

Z:\Jobs\2020\Kalas Property\Civil_Working Dwgs\Base File\Kalas Full Set Details.dwg



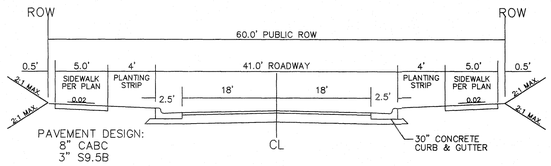
* THE VARIABLE WIDTH BETWEEN THE ROW & SIDEWALK CAN BE SLOPE BACK TOWARD THE LOTS AT A 2% TO HELP WITH RUNOFF.

PROPOSED PAVEMENT SLOPE TO MATCH EXISTING CROSS SLOPE

ROLESVILLE RD.
CROSS-SECTION (TYPICAL)

NOTE: PAVEMENT DESIGN TO BE DESIGNATED BY NCDOT ENCROACHMENT AGREEMENT
OVERLAY OR LAP JOINT TO BE DETERMINED BY NCDOT ENCROACHMENT AGREEMENT

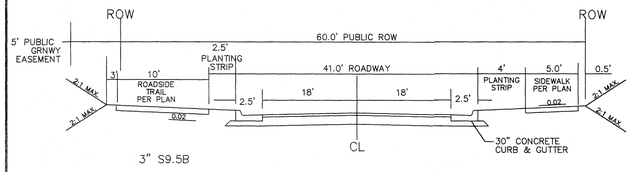
PAVEMENT DESIGN 6' OR LESS:	PAVEMENT DESIGN GREATER THAN 6':
3" S9.5C	3" S9.5C
4" I-19C	4" I-19C
5" B25.0C	10" ABC



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.

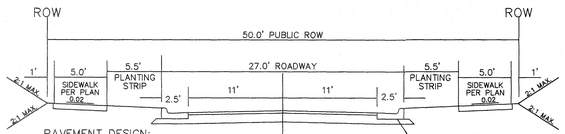
41' B-B ON A 60' R/W
TYPICAL SECTION



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.

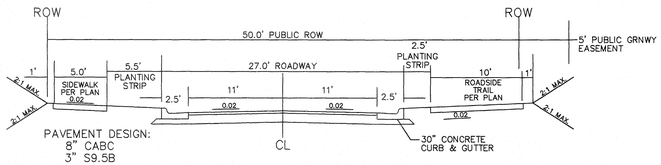
41' B-B ON A 60' R/W
TYPICAL SECTION



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.

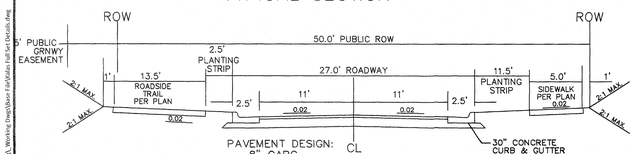
27' B-B ON A 50' R/W
TYPICAL SECTION



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.

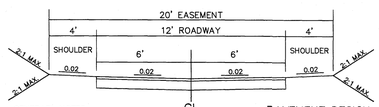
27' B-B ON A 50' R/W
TYPICAL SECTION



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.

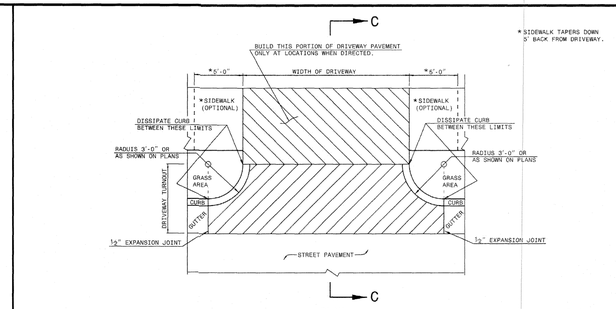
27' B-B ON A 50' R/W
TYPICAL SECTION



GENERAEL NOTES:
1. DRAINAGE VALLY OF 1/4" PER FOOT UNLESS OTHERWISE DIRECTED.
2. PAVEMENT DESIGN AS NOTED.
3. SEE DRIVEWAY DETAIL FOR ROAD INTERSECTIONS.

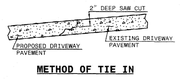
PAVEMENT DESIGN:
8" CABC
2" S9.5B

12' E-E IN A 20' EASEMENT
TYPICAL SECTION



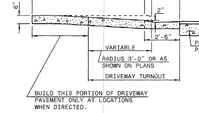
PLAN

DETAIL OF DRIVEWAY



METHOD OF TIE IN

WHEN EXISTING DRIVEWAY PAVEMENT IS CONCRETE, SAW CUT 2" DEEP JOINT AT THE POINT OF TIE-IN. SAW JOINT PERPENDICULAR TO EDGE OF EXISTING DRIVEWAY PAVEMENT.



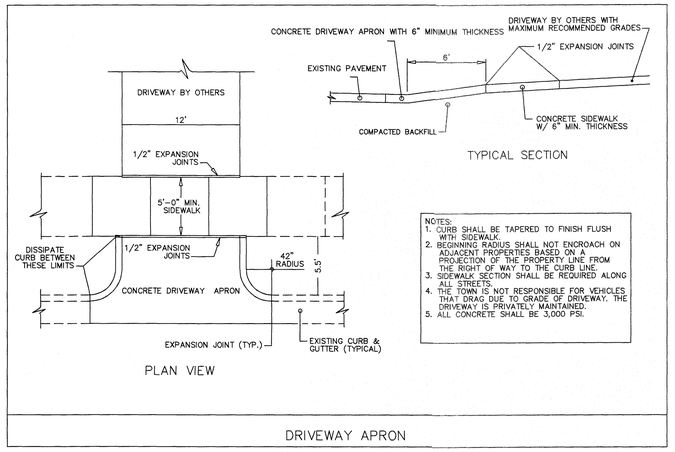
SECTION C-C

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

I-18

ROADWAY STANDARD DRAWING FOR
DRIVEWAY TURNOUT
RADIUS TYPE

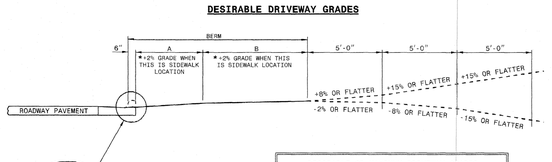
SHEET 1 OF 2
848.02

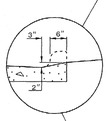


NOTES:
1. CURB SHALL BE TAPERED TO FINISH FLUSH WITH SIDEWALK.
2. BEGINNING RADIUS SHALL NOT ENCROACH ON ADJACENT PROPERTIES BASED ON A PROJECTION OF THE PROPERTY LINE FROM THE RIGHT OF WAY TO THE CURB LINE.
3. SIDEWALK SECTION SHALL BE REQUIRED ALONG ALL STREETS.
4. THE TOWN IS NOT RESPONSIBLE FOR VEHICLES THAT DRAG DUE TO GRADE OF DRIVEWAY; THE DRIVEWAY IS PRIVATELY MAINTAINED.
5. ALL CONCRETE SHALL BE 3,000 PSI.

DRIVEWAY APRON

DESIRABLE DRIVEWAY GRADES



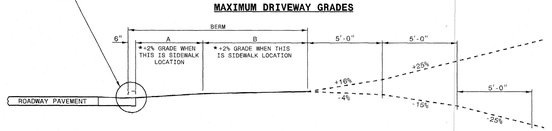


*SIDEWALK LOCATION (DO NOT PLACE SIDEWALK ON BERMS LESS THAN 6' WIDE.)

DESIRABLE OR MAXIMUM DRIVEWAY GRADES

BERM WIDTH	A		B	
	DIST.	GRADE	DIST.	GRADE
8' OR LESS	5'-0"	+2%*	2'-6"	+5%
8' OR LESS	2'-0"	+6%	5'-6"	+2%*
10'	4'-0"	+4%	5'-6"	+2%*
12' & OVER	4'-6"	+4%	7'-0"	+2%*

MAXIMUM DRIVEWAY GRADES



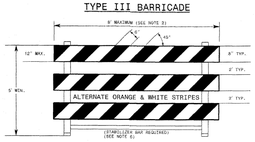
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

I-18

ROADWAY STANDARD DRAWING FOR
DRIVEWAY TURNOUT
DRIVEWAY GRADES

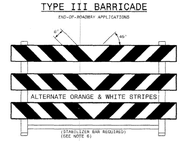
SHEET 2 OF 2
848.02

TYPE III BARRICADE



TYPE III BARRICADE

END-OF-ROADWAY APPLICATIONS



GENERAL NOTES

1- HORIZONTAL RAILS FOR MAY BE CONSTRUCTED OF APPROVED COMPOSITE, HOLLOW/CORRUGATED EXTRUDED RIGID POLYOLEFIN, HIGH DENSITY POLYETHYLENE, OR OTHER NCDOT APPROVED MATERIAL.

2- BARRICADE SHALL BE LIMITED TO A MAXIMUM LENGTH OF 8 FT UNLESS NCHRP 350 CRASH TESTED FOR CATEGORY II DEVICES AND NCDOT APPROVED.

3- ONLY NCDOT APPROVED COMPOSITE AND ROLL-UP SIGNS MAY BE MOUNTED ON THE BARRICADE RAILS. MOUNT SIGNS TO BARRICADE RAILS TO ENSURE SIGN WILL NOT BECOME DETACHED UNDER NORMAL WIND AND TRAFFIC CONDITIONS.

4- SIGNS SHALL BE MOUNTED A MINIMUM OF 1 FOOT FROM THE GROUND TO THE BOTTOM OF THE SIGN UNLESS SIGNS R11-3 OR R11-4 ARE REQUIRED BY THE PLANS OR DIRECTED BY THE ENGINEER.

5- BARRICADE MUST BE NCHRP 350 FOR CATEGORY II DEVICES AND NCDOT APPROVED WITH STABILIZER BAR OR ADEQUATE LATERAL BRACING.

6- ASSEMBLY OF THE GENERIC BARRICADES MUST BE SELF CERTIFIED BY THE ASSEMBLER.

7- BARRICADES USED TO CLOSE A ROADWAY SHALL EXTEND ACROSS THE ENTIRE ROADWAY. WHERE LOCAL TRAFFIC MUST BE MAINTAINED, THEY MAY BE PLACED IN A STAGGERED PATTERN.

8- STRIPES ON WORK ZONE BARRICADE RAILS SHALL BE ALTERNATE ORANGE AND WHITE RETROREFLECTIVE STRIPES, SLOPED DOWNWARD TOWARDS THE SIDE WHICH TRAFFIC IS TO PASS OR TURN IN DETOURING. WHERE NO TURNS ARE INTENDED, THE STRIPES SHOULD SLOPE DOWNWARD TOWARD THE CENTER OF THE BARRICADE OR BARRICADES.

9- USE RED AND WHITE STRIPES FOR PERMANENT BARRICADES.

10- ALL BARRICADES MUST BE LISTED ON THE DEPARTMENT'S APPROVED PRODUCTS LIST.

11- PLACE MANUFACTURER'S NAME AND FEDERAL HIGHWAY ADMINISTRATION'S NCHRP 350 APPROVAL LETTER NUMBER ON BARRICADE FRAME.

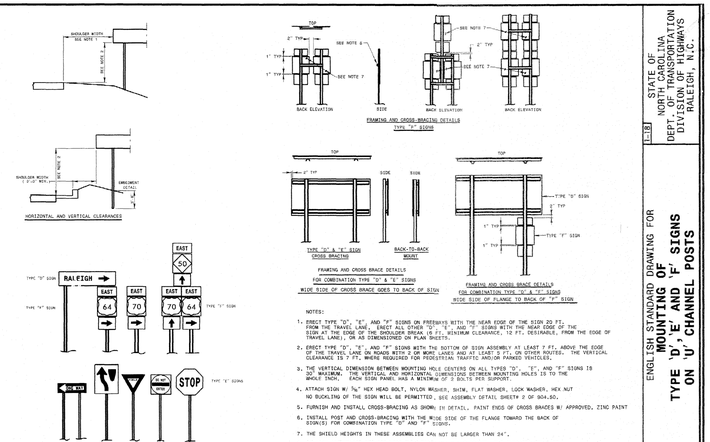
12- PLACE SANDBAGS OR OTHER APPROVED BALLASTING METHODS ON THE FEET OF THE FRAME. DO NOT PLACE SANDBAGS ON TOP OF A STRIPED RAIL OR STABILIZER BAR. DO NOT BALLAST BARRICADES BY HEAVY OBJECTS SUCH AS ROCKS, CHUNKS OF CONCRETE OR OTHER ITEMS THAT WOULD CAUSE DAMAGE IF THE BARRICADE IS STRUCK BY A VEHICLE.

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

I-18

ROADWAY STANDARD DRAWING FOR
BARRICADES
TYPE-III

SHEET 1 OF 1
1145.01



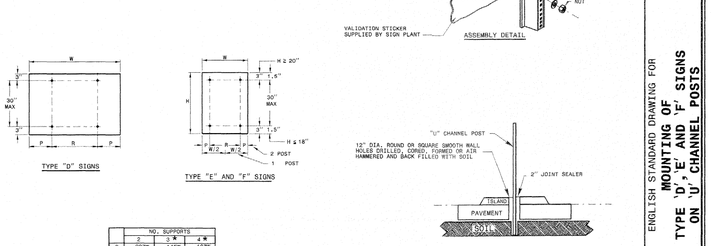
NOTES:
1. DIRECT TYPE "D", "E", AND "F" SIGNS ON FREEWAYS WITH THE NEAR EDGE OF THE SIGN 20 FT. FROM THE TRAVEL LANE. DIRECT ALL OTHER SIGNS WITH THE NEAR EDGE OF THE SIGN 2 FT. FROM THE TRAVEL LANE, OR AS DIMENSIONED (2 FT. MINIMUM CLEARANCE TO FT. DESIRABLE, FROM THE EDGE OF TRAVEL LANE), OR AS DIMENSIONED ON PLAN SHEETS.
2. DIRECT TYPE "D", "E", AND "F" SIGNS WITH THE BOTTOM OF SIGN ASSEMBLY AT LEAST 7 FT. ABOVE THE EDGE OF THE TRAVEL LANE ON ROADS WITH 2 OR MORE LANES AND AT LEAST 5 FT. ON OTHER ROUTES. THE VERTICAL CLEARANCE IS 7 FT., WHERE REQUIRED FOR PEDESTRIAN TRAFFIC AND/OR PARKED VEHICLES.
3. THE VERTICAL DIMENSION BETWEEN MOUNTING HOLE CENTERS ON ALL TYPES "D", "E", AND "F" SIGNS IS 20" MAXIMUM. THE VERTICAL AND HORIZONTAL DIMENSIONS BETWEEN MOUNTING HOLES IS TO THE WHOLE INCH. EACH SIGN PANEL HAS A MINIMUM OF 3 BOLTS PER SUPPORT.
4. ATTACH SIGN W/ ⅜" HEX HEAD BOLT, NYLON WASHER, SHIM, FLAT WASHER, LOCK WASHER, HEX NUT NO BUCKLING OF THE SIGN WILL BE PERMITTED. SEE ASSEMBLY DETAIL SHEETS 2 OF 904.50.
5. FURNISH AND INSTALL CROSS-BRACING AS SHOWN IN DETAIL. PAINT ENDS OF CROSS BRACES W/ APPROVED, ZINC PAINT
6. INSTALL POST AND CROSS-BRACING WITH THE WIDE SIDE OF THE FLANGE TOWARD THE BACK OF SIGN(S) FOR COMBINATION TYPE "D" AND "F" SIGNS.
7. THE SHIELD HEIGHTS IN THESE ASSEMBLIES CAN NOT BE LARGER THAN 24".
8. IF SIGN ASSEMBLIES REQUIRE MORE THAN TWO U-CHANNEL SUPPORTS, THE SUPPORTS SHALL BE EVENLY SPACED ALONG THE SIGN PANEL WIDTH. THE POSTS SHALL NOT BE MORE THAN 7 FT. APART. THE SIGN ASSEMBLY MUST BE PLACED BEHIND BARRIER PROTECTION.

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

I-18

ENGLISH STANDARD DRAWING FOR
MOUNTING OF TYPE 'D','E' AND 'F' SIGNS ON 'U' CHANNEL POSTS

SHEET 1 OF 2
904.50



NO. SUPPORTS	2	3 *	4 *
P	.207#	.145#	.107#
R	.556#	.350#	.282#

UNITS ON ATTACHED SHEET
*MINIMUM 4 FT. BETWEEN CHANNEL POSTS

HOLE PUNCHING DETAIL

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

I-18

ENGLISH STANDARD DRAWING FOR
MOUNTING OF TYPE 'D','E' AND 'F' SIGNS ON 'U' CHANNEL POSTS

SHEET 2 OF 2
904.50

SITE PERMITTING APPROVAL

Water and Sewer Permits (if applicable)

The City of Raleigh consents to the connection and extension of the City's **Publi. 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 #** S-4824

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 #** W-3784

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 # _____

CITY OF RALEIGH - PLANS AUTHORIZED FOR CONSTRUCTION

Electronic Approval: This approval is being issued electronically. This approval is valid only upon the signature of a City of Raleigh Review Officer below. The City will retain a copy of the approved plans. Any work authorized by this approval must proceed in accordance with the plans kept on file with the City. This electronic approval may not be edited once issued. Any modification to this approval once issued will invalidate this approval.

City of Raleigh Development Approval _____

Timothy Beasley

Raleigh Water Review Officer

North Carolina 811 www.nc811.org
*** 3 Days Before Digging ***
North Carolina 811
811 or 1-800-632-4949
Remote Ticket Entry
http://nc811.org/remoteticketentry.htm

AMERICAN Engineering
American Engineering Associates - Southeast, P.A.
4020 Westchase Boulevard, Suite 450
Raleigh, NC 27607
919-469-1101

NORTH CAROLINA BOARD OF EXAMINERS FOR ENGINEERS AND SURVEYORS
AMERICAN ENGINEERING ASSOCIATES SOUTHEAST, P.A.
C-3881
CERTIFICATE OF AUTHORIZATION

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER ADAM R. HARMAN

DETAIL SELECTION ONLY

NO.	DATE	REVISION:

STIPULATION FOR REUSE

THIS DRAWING WAS PREPARED FOR USE ON THE SPECIFIC SITE, NAMED HEREON, CONTEMPORANEOUSLY WITH ITS ISSUE DATE AS LISTED, HEREON, AND IT IS NOT SUITABLE FOR USE ON A DIFFERENT PROJECT SITE OR AT A LATER TIME. USE OF THIS DRAWING FOR REFERENCE OR EXAMPLE ON ANOTHER PROJECT REQUIRES THE SERVICES OF PROPERLY LICENSED ARCHITECTS AND ENGINEERS. REPRODUCTION OF THIS DRAWING FOR REUSE ON ANOTHER PROJECT IS NOT AUTHORIZED AND MAY BE CONTRARY TO THE LAW.

KALAS FALLS
PHASE 1
1832 ROLESVILLE ROAD
WAKE COUNTY, NC

JOB NUMBER:
CHECKED BY:
DRAWN BY:
DATE:

SHEET TITLE:
KALAS FALLS CIVIL DETAILS

SHEET NO.:
CD19

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