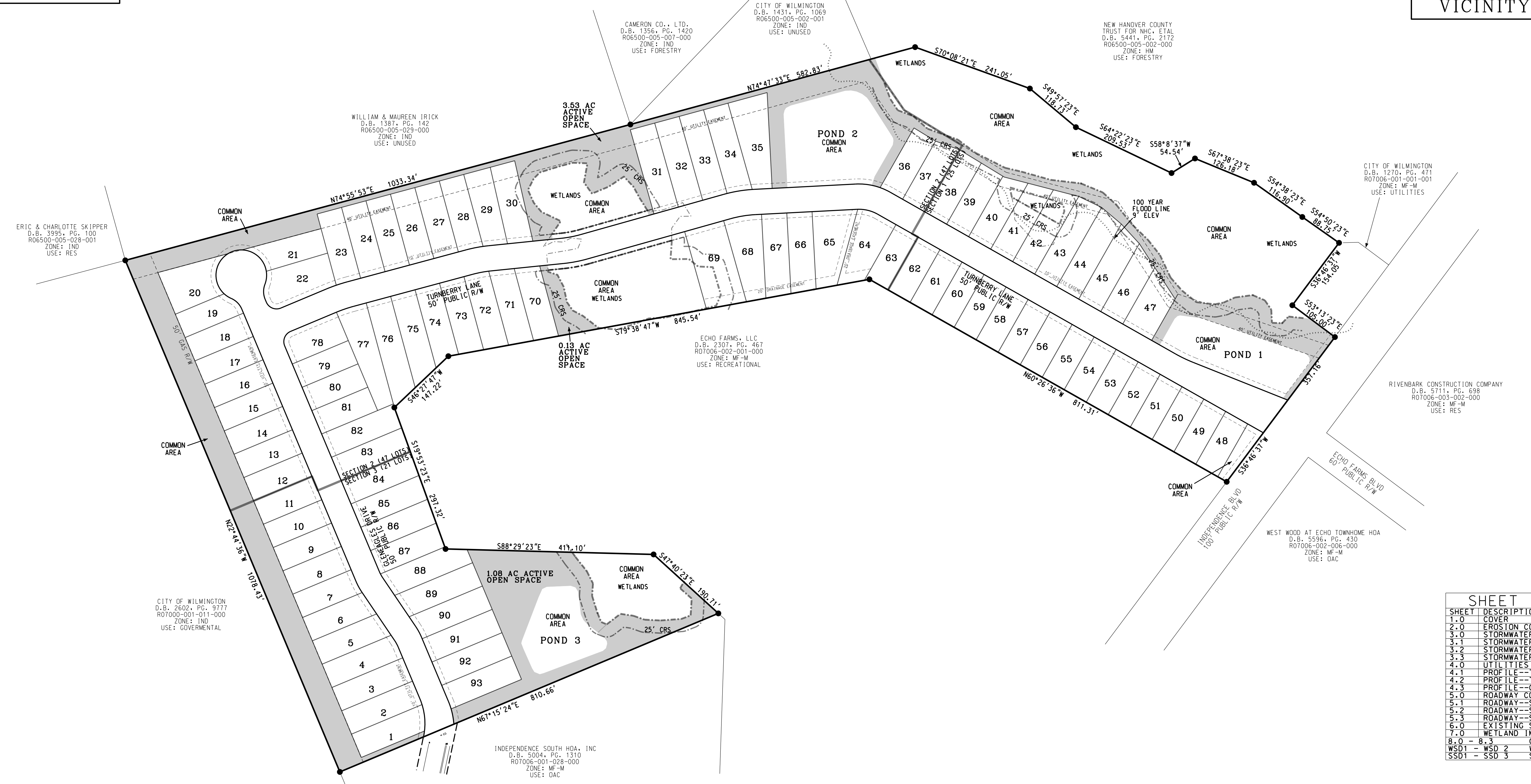
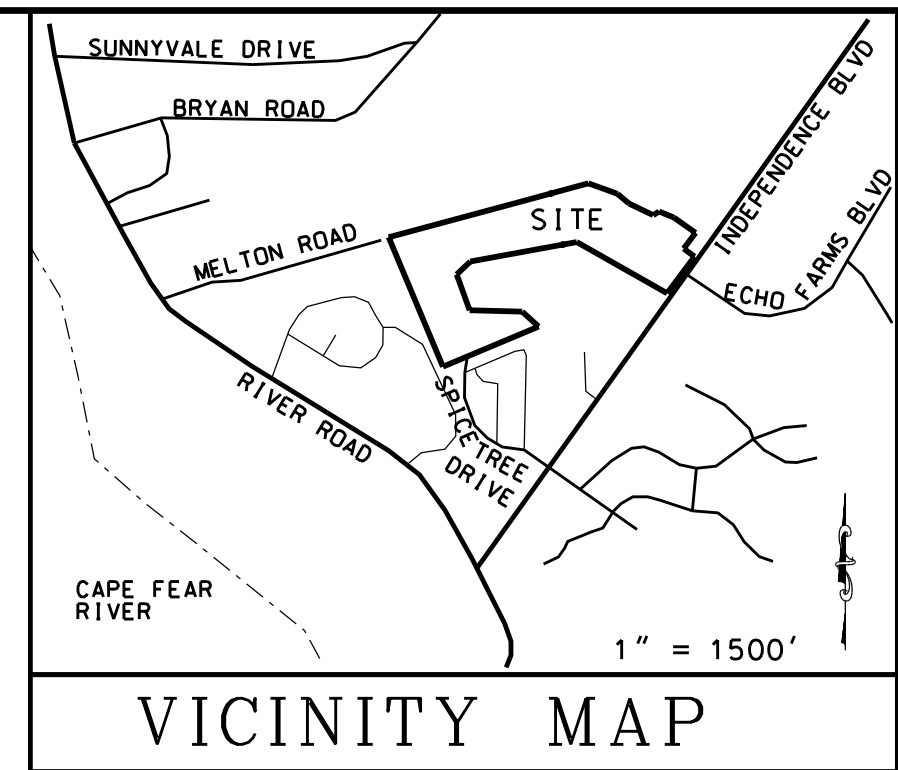
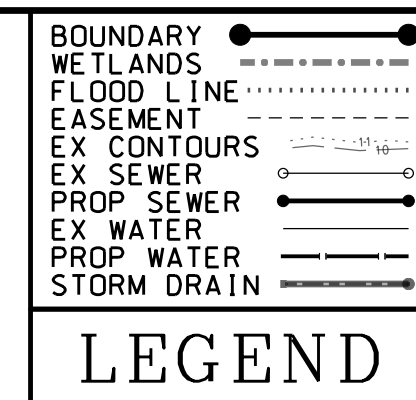


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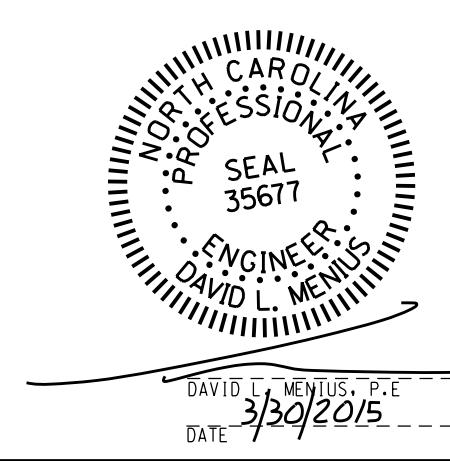
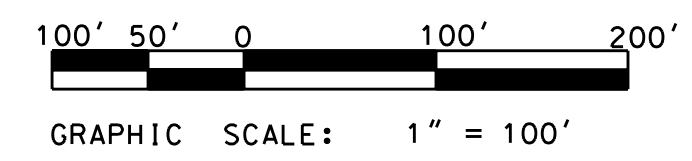
TRACT AREA--31.27 AC  
 --1,362,275 SF  
 ZONING--MF-M  
 PROPOSED UNITS--93  
 UNITS PER ACRE--3.0  
 MINIMUM LDT SIZE--5,928 SF  
 TAX PIN--R07006-001-005-000  
 DEED BOOK/PAGE--R07006-002-021-000  
 CAMA LUC--2946  
 PROPOSED BUA--521,549 SF  
 --11.97 AC  
 --38.3%  
 RECEIVING STREAM--BARNARDS CREEK  
 CLASSIFICATION--C:SW  
 SETBACKS--  
 FRONT--15  
 REAR--15  
 SIDE--5  
 CORNER--10  
 MAX HEIGHT--35



**SHEET INDEX**

SHEET	DESCRIPTION
1.0	COVER
2.0	EROSION CONTROL
3.0	STORMWATER COVER
3.1	STORMWATER--SECTION 1
3.2	STORMWATER--SECTION 2
3.3	STORMWATER--SECTION 3
4.0	UTILITIES COVER
4.1	PROFILE--TURNBERRY SECT 1
4.2	PROFILE--TURNBERRY SECT 2
4.3	PROFILE--GLENEAGLES
5.0	ROADWAY COVER
5.1	ROADWAY--SECTION 1
5.2	ROADWAY--SECTION 2
5.3	ROADWAY--SECTION 3
6.0	EXISTING SITE CONDITIONS
7.0	WETLAND IMPACTS
8.0 - 8.3	GENERAL DETAILS
WSD1	WSD 2 WATER DETAILS
SSD1	SSD 3 SEWER DETAILS

TOTAL TRACT AREA-- 31.27 AC  
 AREA IN R/W-- 1 AC  
 AREA IN LOTS-- 1.42 AC  
 TOTAL COMMON AREA-- 11.42 AC  
 REQUIRED RECREATION SPACE (0.03 ACRES X 93 LOTS)-- 2.79 AC  
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 COMMON AREA RESERVED FOR PASSIVE RECREATION (1.40 AC MIN)-- 6.58 AC



**COVER**

# ECHO WEST

CITY OF WILMINGTON    NEW HANOVER COUNTY    NORTH CAROLINA

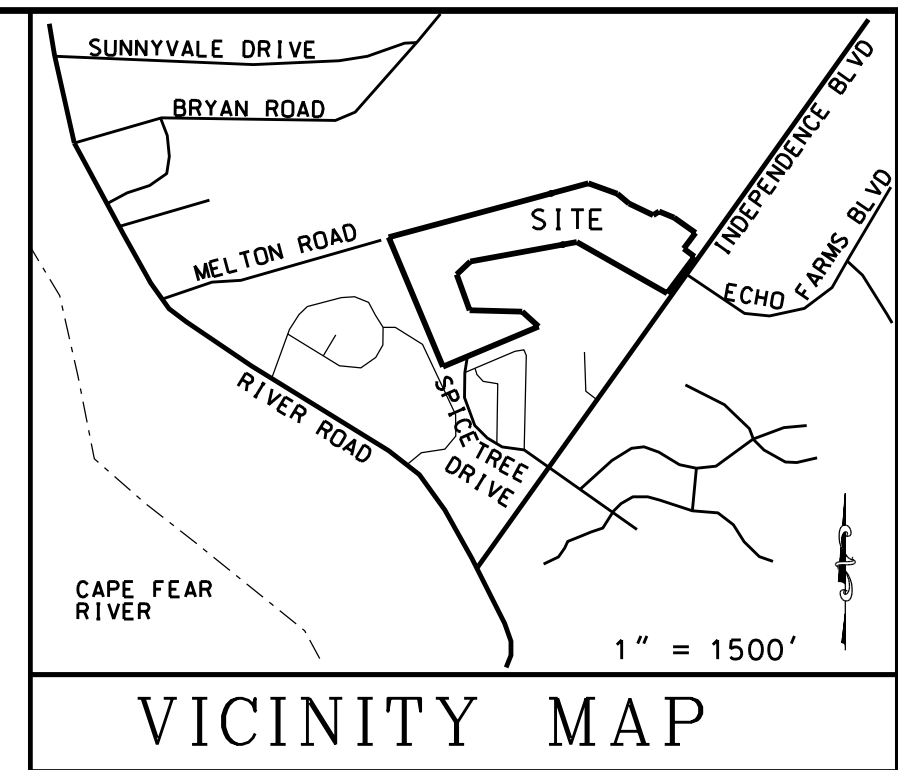
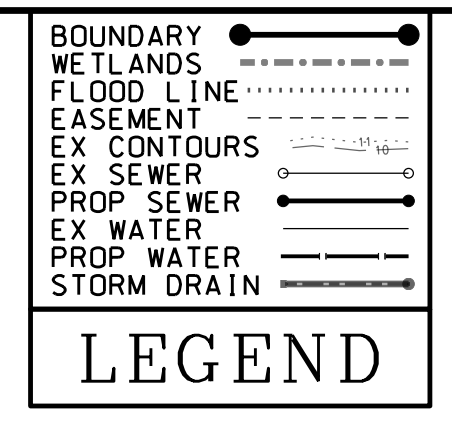
**OWNER:** HOOSIER DADDY, LLC  
**ADDRESS:** 6025 TARIN ROAD  
 WILMINGTON, NC 28409  
**PHONE:** (252) 412-9622

**DESIGNED:** DLM  
**DRAWN:** DLM  
**APPROVED:** JHF

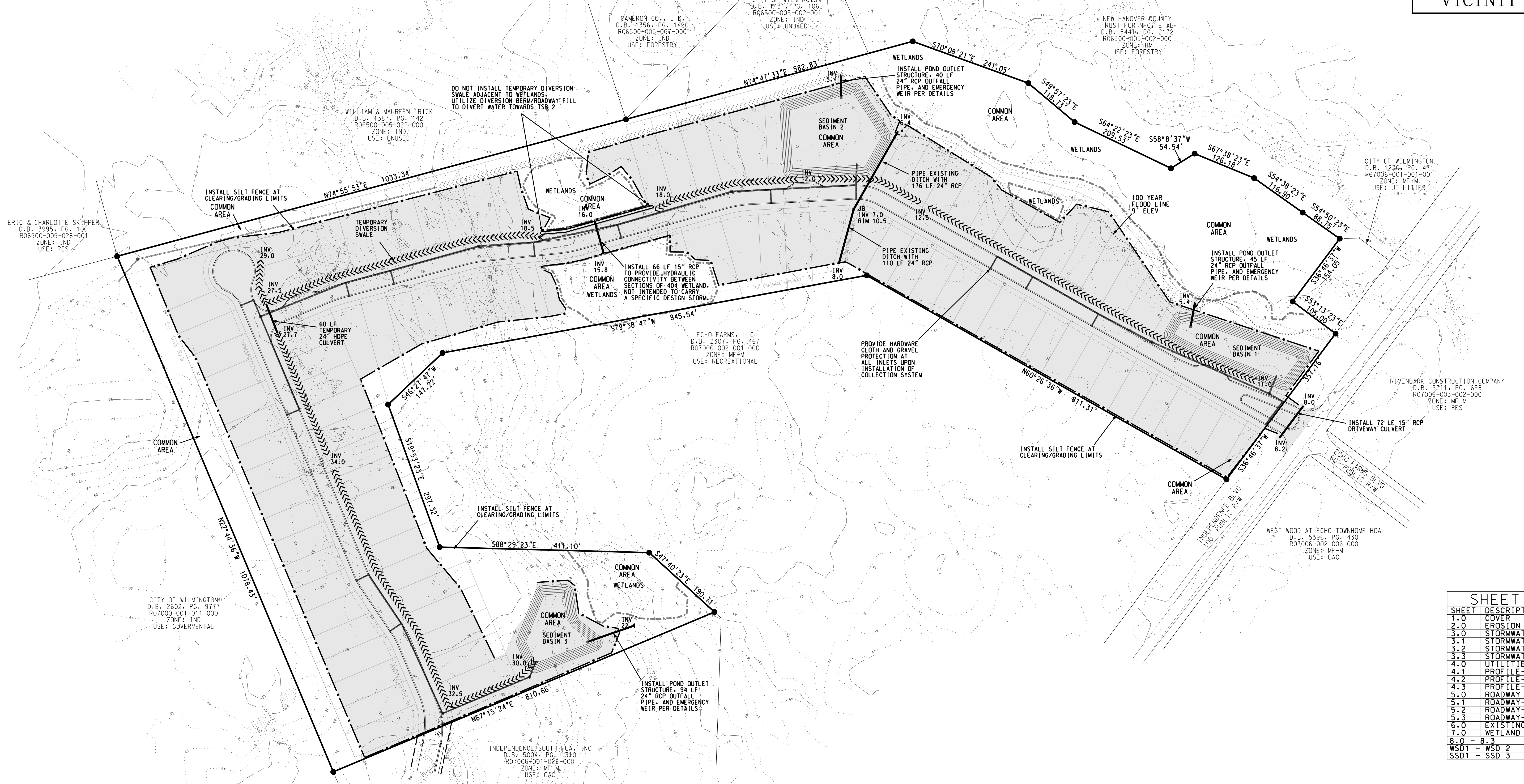
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**SCALE:** 1" = 100'  
**SHEET:** 1.0

**STROUD ENGINEERING, P.A.**  
 102-D CINEMA DRIVE  
 WILMINGTON, NORTH CAROLINA  
 (910) 815-0775  
 LICENSE NO. C-0647

TRACT AREA--31.27 AC  
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 ZONING--MF-M  
 PROPOSED UNITS--93  
 UNITS PER ACRE--5.0  
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 DEED BOOK/PAGE--R07006-002-021-000  
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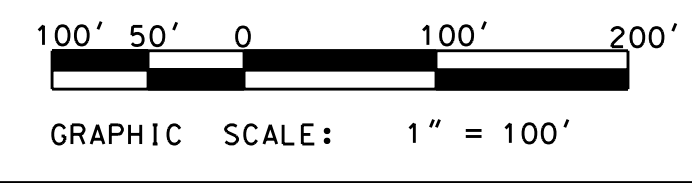
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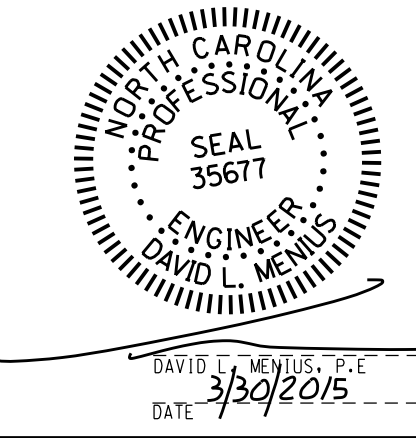
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THE SQUARE FOOTAGE OF THE PROPOSED LOTS RANGES FROM 5,928 SF TO 13,048 SF



**EROSION CONTROL**

# ECHO WEST

CITY OF WILMINGTON    NEW HANOVER COUNTY    NORTH CAROLINA

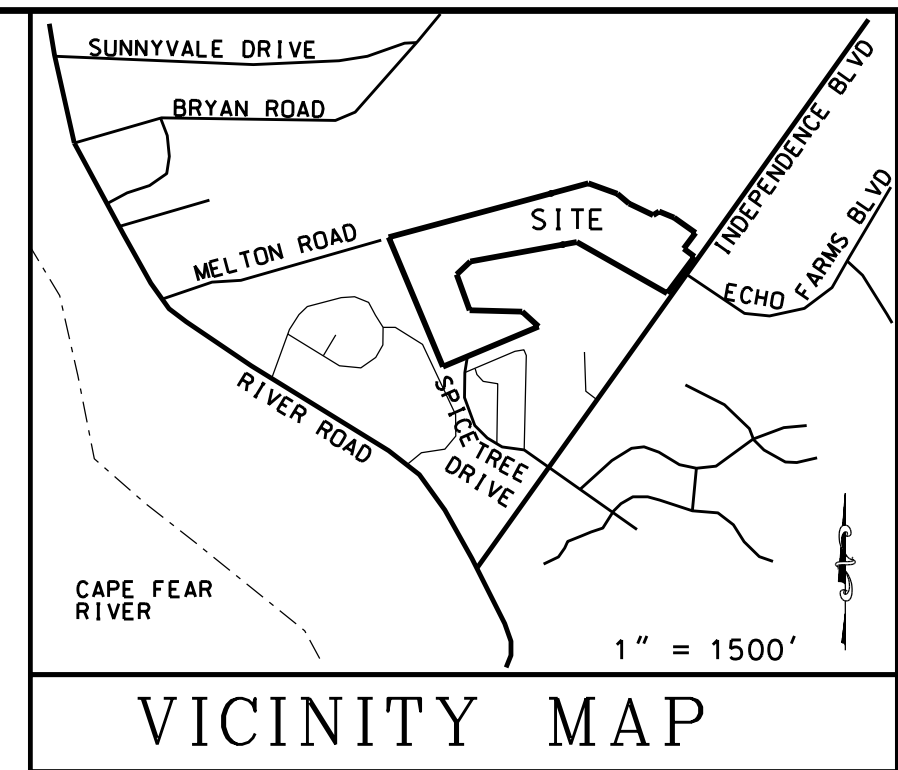
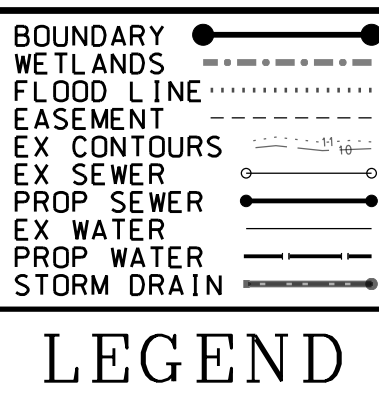
OWNER: HOOSIER DADDY, LLC  
 ADDRESS: 6025 TARIN ROAD  
 WILMINGTON, NC 28409  
 PHONE: (252) 412-9622

DESIGNED: DLM  
 DRAWN: DLM  
 APPROVED: JHF

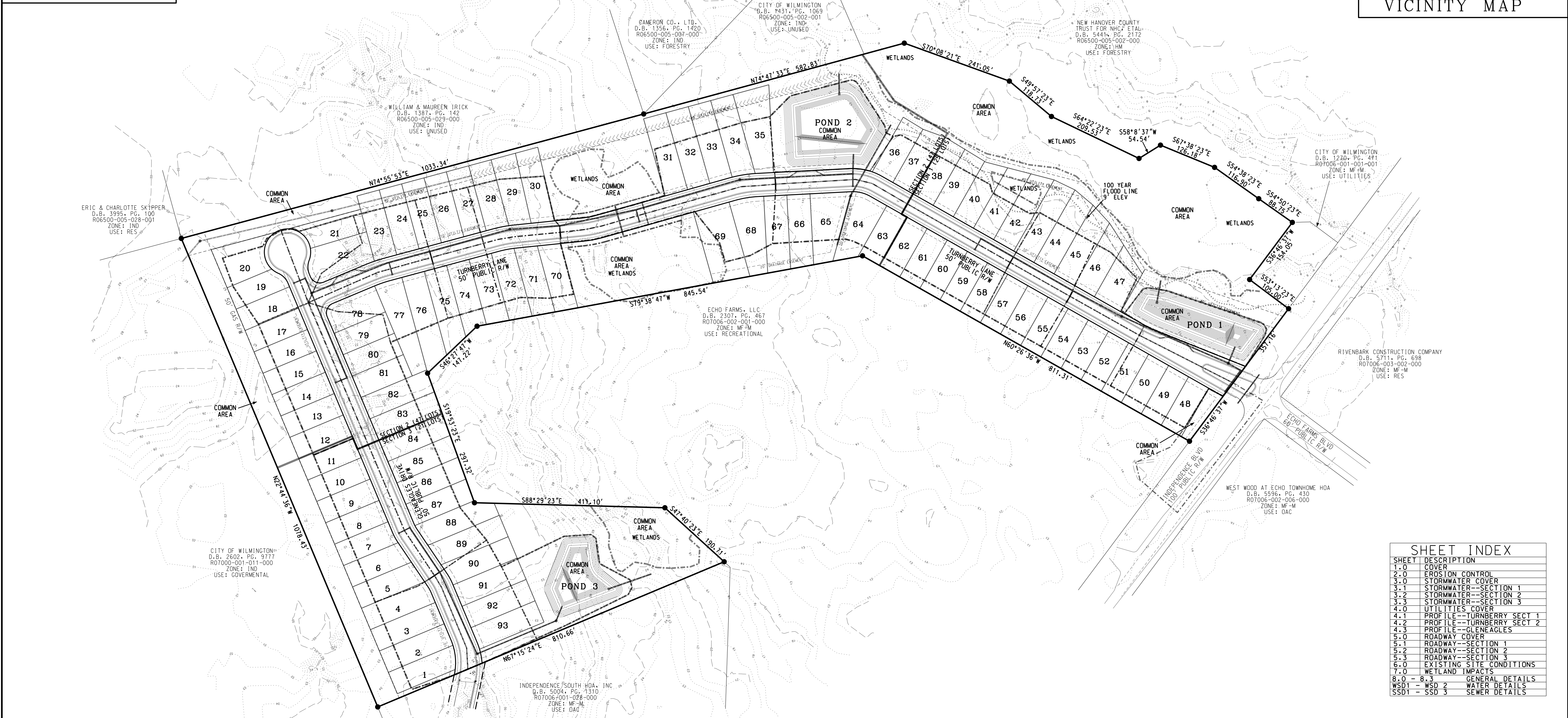
DATE: 1/13/2015  
 SCALE: 1" = 100'  
 SHEET: 2.0

**STROUD ENGINEERING, P.A.**  
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 WILMINGTON, NORTH CAROLINA  
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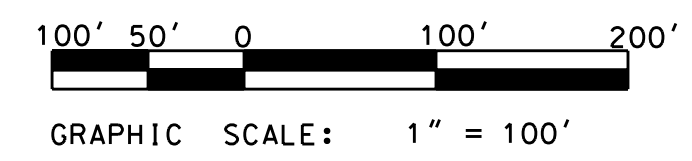
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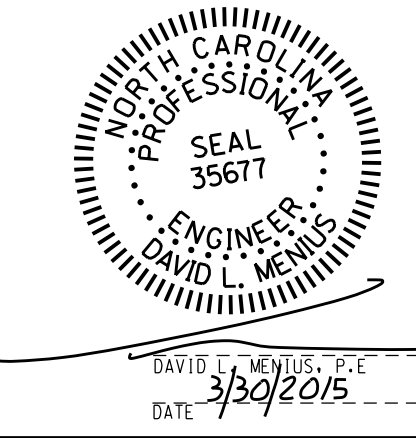
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THE SQUARE FOOTAGE OF THE PROPOSED LOTS RANGES FROM 5,928 SF TO 13,048 SF



**STORMWATER COVER**

# ECHO WEST

CITY OF WILMINGTON    NEW HANOVER COUNTY    NORTH CAROLINA

**OWNER:** HOOSIER DADDY, LLC  
**ADDRESS:** 6025 TARIN ROAD  
 WILMINGTON, NC 28409  
**PHONE:** (252) 412-9622

**DESIGNED:** DLM  
**DRAWN:** DLM  
**APPROVED:** JHF

**DATE:** 1/13/2015  
**SCALE:** 1" = 100'  
**SHEET:** 3.0

**STROUD ENGINEERING, P.A.**  
 102-D CINEMA DRIVE  
 WILMINGTON, NORTH CAROLINA  
 (910) 815-0775  
 LICENSE NO. C-0647

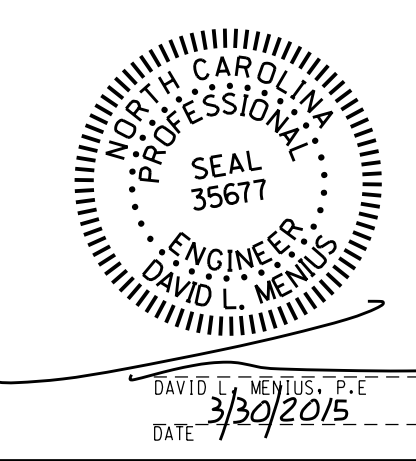
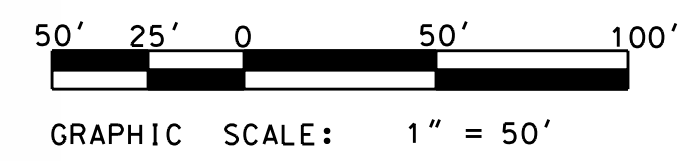


**ECHO WEST BASIN 1 STORMWATER SCHEDULE**

STRUCTURES				PIPES						
ID <sub>USER</sub>	RIM EL	CROWN EL	ID <sub>OWNER</sub>	RIM EL	CROWN EL	LENGTH	SIZE	INV <sub>OWNER</sub>	INV <sub>OWNER</sub>	SLOPE
CI 18	10.5	9.10	CI 17	10.5	9.00	24	15	7.85	7.75	0.4%
CI 17	10.5	9.00	CI 15	11.0	8.90	76	18	7.50	7.40	0.1%
CI 16	11.0	9.00	CI 15	11.0	8.90	24	15	7.75	7.65	0.4%
CI 15	11.0	8.90	CI 13	11.7	8.80	144	24	6.90	6.80	0.1%
CI 14	11.7	8.90	CI 13	11.7	8.80	24	15	7.65	7.55	0.4%
CI 13	11.7	8.80	JB 12	12.3	8.40	115	24	6.80	6.40	0.3%
JB 12	12.3	8.40	JB 11	11.0	8.20	248	24	6.40	6.20	0.1%
CI 12	10.6	9.20	CI 11	10.6	9.10	54	15	7.95	7.85	0.2%
CI 11	10.6	9.10	JB 11	11.0	8.20	28	15	7.85	6.95	3.2%
JB 11	11.0	8.20	FES 12	na	7.00	38	24	6.20	5.00	3.2%
OS 1	8.4	7.50	FES 11	na	7.40	54	24	5.50	5.40	0.2%

**ECHO WEST BYPASS STORMWATER SCHEDULE**

STRUCTURES				PIPES						
ID <sub>USER</sub>	RIM EL	CROWN EL	ID <sub>OWNER</sub>	RIM EL	CROWN EL	LENGTH	SIZE	INV <sub>OWNER</sub>	INV <sub>OWNER</sub>	SLOPE
FES 24	na	13.00	JB 21	10.5	9.00	140	24	11.00	7.00	2.9%
JB 21	10.5	9.00	FES 23	na	7.50	176	24	7.00	5.50	0.9%
FES 14	na	9.45	FES 13	na	9.25	78	15	8.20	8.00	0.3%
FES 26	na	17.25	FES 25	na	17.05	62	15	16.00	15.80	0.3%



**SECTION 1 STORMWATER**

# ECHO WEST

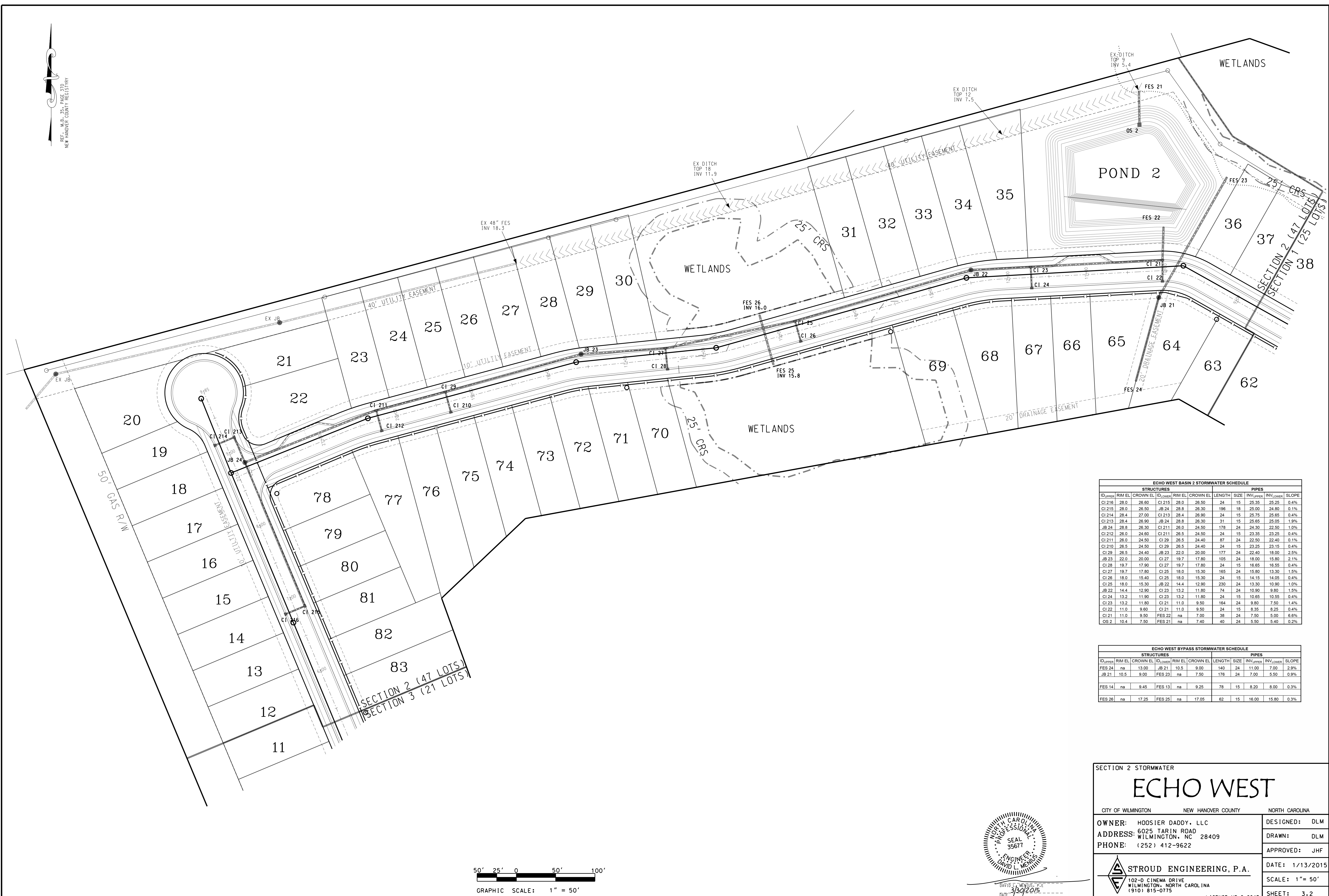
CITY OF WILMINGTON    NEW HANOVER COUNTY    NORTH CAROLINA

OWNER: HOOSIER DADDY, LLC  
ADDRESS: 6025 TARIN ROAD  
WILMINGTON, NC 28409  
PHONE: (252) 412-9622

DESIGNED: DLM  
DRAWN: DLM  
APPROVED: JHF

DATE: 1/13/2015  
SCALE: 1" = 50'  
SHEET: 3.1

**STROUD ENGINEERING, P.A.**  
102-D CINEMA DRIVE  
WILMINGTON, NORTH CAROLINA  
(910) 815-0775  
LICENSE NO. C-0647

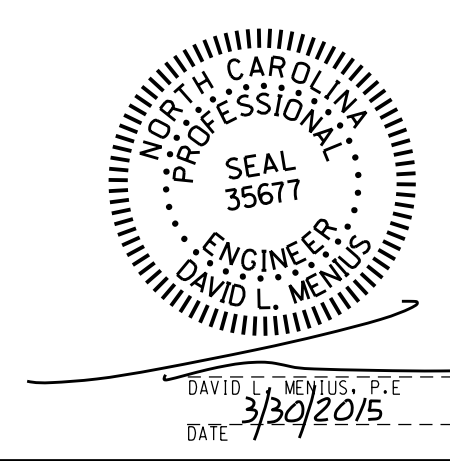
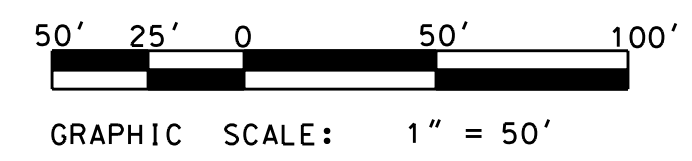


**ECHO WEST BASIN 2 STORMWATER SCHEDULE**

STRUCTURES				PIPES						
ID <sub>UPPER</sub>	RIM EL	CROWN EL	ID <sub>LOWER</sub>	RIM EL	CROWN EL	LENGTH	SIZE	INV <sub>UPPER</sub>	INV <sub>LOWER</sub>	SLOPE
CI 218	28.0	26.60	CI 215	28.0	26.50	24	15	25.35	25.25	0.4%
CI 215	28.0	26.50	JB 24	28.8	26.30	198	18	25.00	24.80	0.1%
CI 214	28.4	27.00	CI 213	28.4	26.90	24	15	25.75	25.65	0.4%
CI 213	28.4	26.90	JB 24	28.8	26.30	31	15	25.65	25.05	1.9%
JB 24	28.8	26.30	CI 211	26.0	24.50	178	24	24.30	22.50	0.9%
CI 212	28.0	24.60	CI 211	26.5	24.50	24	15	23.35	23.25	0.4%
CI 211	28.0	24.50	CI 209	26.5	24.40	87	24	22.50	22.40	0.1%
CI 210	26.5	24.50	CI 209	26.5	24.40	24	15	23.25	23.15	0.4%
CI 209	26.5	24.40	JB 23	22.0	20.00	177	24	22.40	18.00	2.5%
JB 23	22.0	20.00	CI 207	19.7	17.80	105	24	18.00	15.80	2.1%
CI 208	19.7	17.90	CI 207	19.7	17.80	24	15	16.65	16.55	0.4%
CI 207	19.7	17.80	CI 205	16.0	15.30	165	24	15.60	13.30	1.5%
CI 206	18.0	15.40	CI 205	16.0	15.30	24	15	14.15	14.05	0.4%
CI 205	18.0	15.30	JB 22	14.4	12.90	230	24	13.30	10.90	1.0%
JB 22	14.4	12.90	CI 203	13.2	11.80	74	24	10.90	9.80	1.5%
CI 204	13.2	11.90	CI 203	13.2	11.80	24	15	10.65	10.55	0.4%
CI 203	13.2	11.80	CI 201	11.0	9.50	164	24	9.80	7.50	1.4%
CI 202	11.0	9.60	CI 201	11.0	9.50	24	15	8.35	8.25	0.4%
CI 201	11.0	9.50	FES 22	na	7.00	38	24	7.50	5.00	6.8%
OS 2	10.4	7.50	FES 21	na	7.40	40	24	5.50	5.40	0.2%

**ECHO WEST BYPASS STORMWATER SCHEDULE**

STRUCTURES				PIPES						
ID <sub>UPPER</sub>	RIM EL	CROWN EL	ID <sub>LOWER</sub>	RIM EL	CROWN EL	LENGTH	SIZE	INV <sub>UPPER</sub>	INV <sub>LOWER</sub>	SLOPE
FES 24	na	13.00	JB 21	10.5	9.00	140	24	11.00	7.00	2.9%
JB 21	10.5	9.00	FES 23	na	7.50	176	24	7.00	5.90	0.9%
FES 14	na	9.45	FES 13	na	9.25	78	15	8.20	8.00	0.3%
FES 26	na	17.25	FES 25	na	17.05	62	15	16.00	15.80	0.3%



SECTION 2 STORMWATER

# ECHO WEST

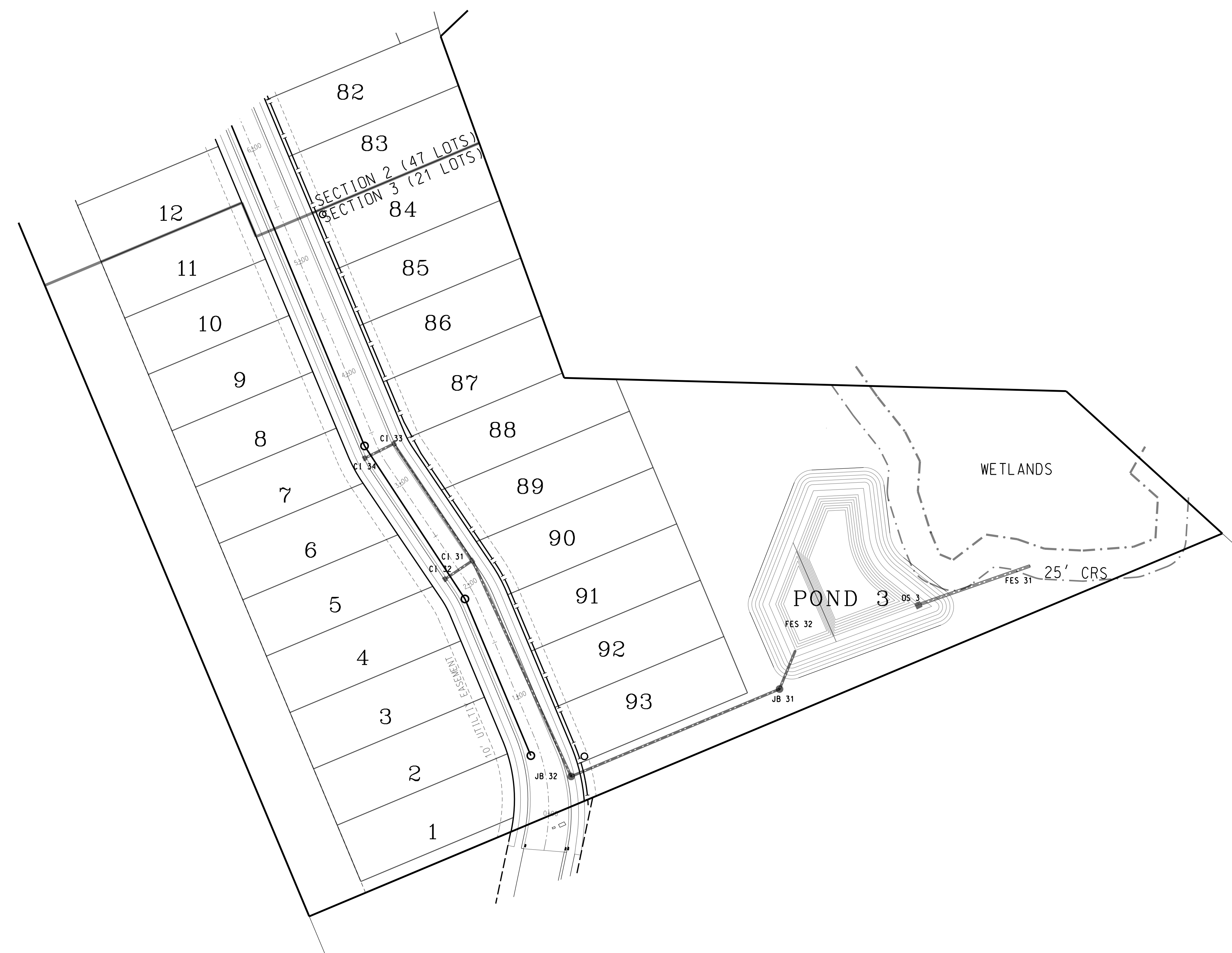
CITY OF WILMINGTON    NEW HANOVER COUNTY    NORTH CAROLINA

OWNER: HOOSIER DADDY, LLC  
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 WILMINGTON, NC 28409  
 PHONE: (252) 412-9622

DESIGNED: DLM  
 DRAWN: DLM  
 APPROVED: JHF

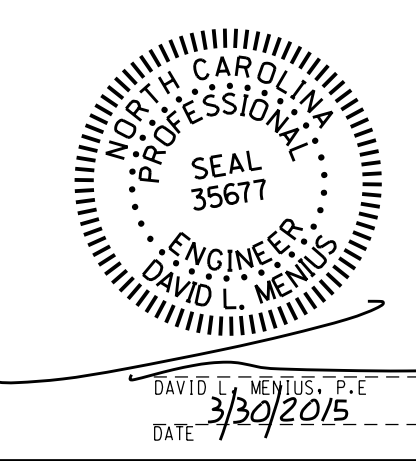
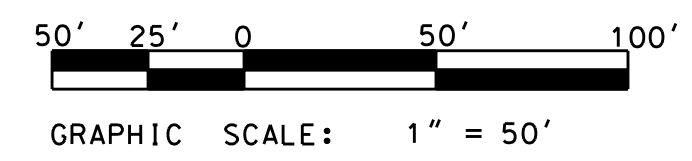
DATE: 1/13/2015  
 SCALE: 1" = 50'  
 SHEET: 3-2

**STROUD ENGINEERING, P.A.**  
 102-D CINEMA DRIVE  
 WILMINGTON, NORTH CAROLINA  
 (910) 815-0775  
 LICENSE NO. C-0647



**ECHO WEST BASIN 3 STORMWATER SCHEDULE**

STRUCTURES				PIPES						
ID#	RM EL	CROWN EL	ID#	RM EL	CROWN EL	LENGTH	SIZE	INV <sub>UP</sub>	INV <sub>DOWN</sub>	SLOPE
CI 34	31.6	30.20	CI 33	31.6	30.10	24	15	28.95	28.85	0.4%
CI 33	31.6	30.10	CI 31	32.0	30.00	111	18	28.60	28.50	0.1%
CI 32	32.0	30.10	CI 31	32.0	30.00	24	15	28.85	28.75	0.4%
CI 31	32.0	30.00	JB 32	33.0	29.80	192	24	28.00	27.80	0.1%
JB 32	33.0	29.80	JB 31	33.0	25.00	180	24	27.80	23.00	2.7%
JB 31	33.0	25.00	FES 32	na	24.00	30	24	23.00	22.00	3.3%
OS 3	25.9	24.50	FES 31	na	24.40	94	24	22.50	22.40	0.1%



SECTION 3 STORMWATER

# ECHO WEST

CITY OF WILMINGTON    NEW HANOVER COUNTY    NORTH CAROLINA

OWNER: HOOSIER DADDY, LLC  
ADDRESS: 6025 TARIN ROAD  
WILMINGTON, NC 28409  
PHONE: (252) 412-9622

DESIGNED: DLM  
DRAWN: DLM  
APPROVED: JHF

DATE: 1/13/2015  
SCALE: 1" = 50'  
SHEET: 3.3

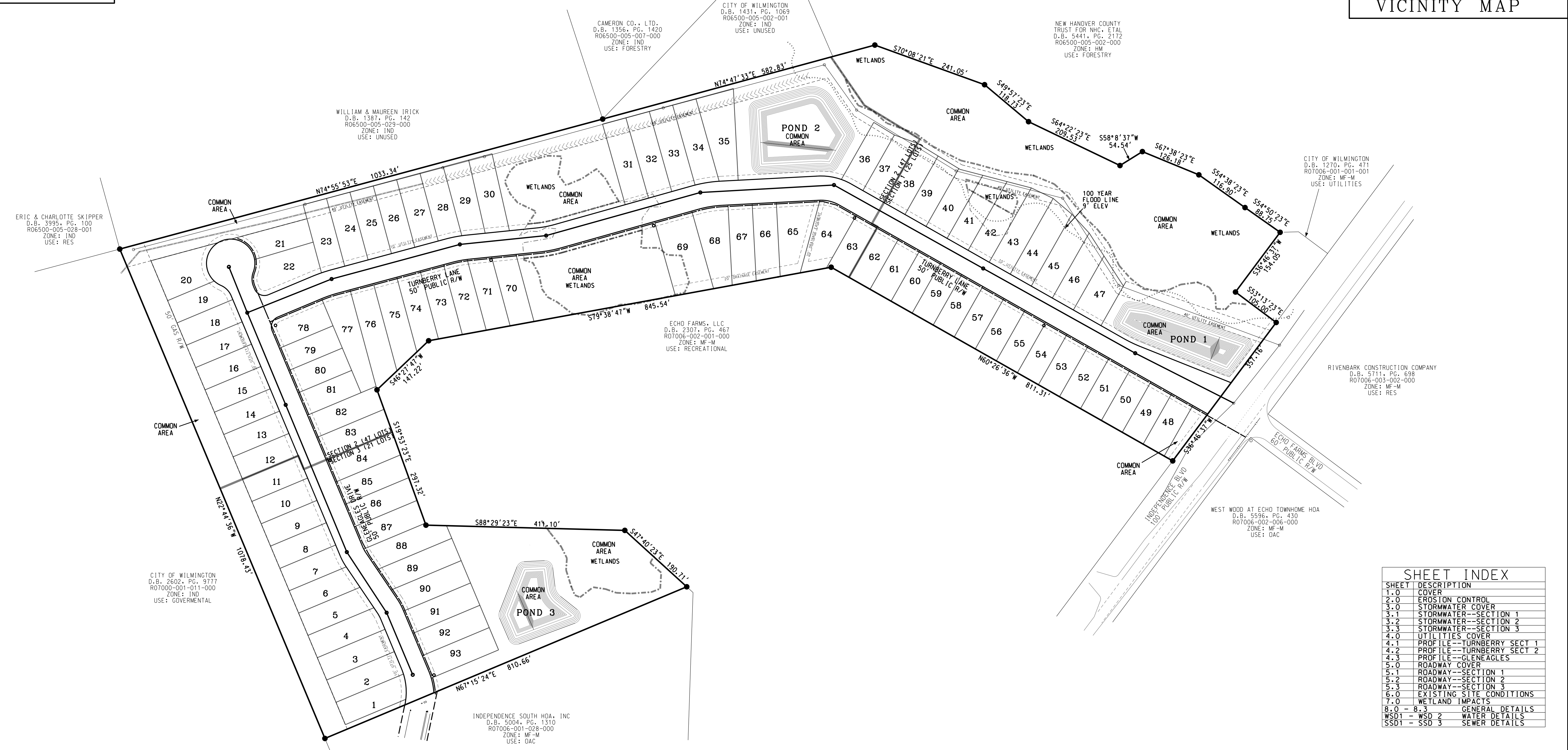
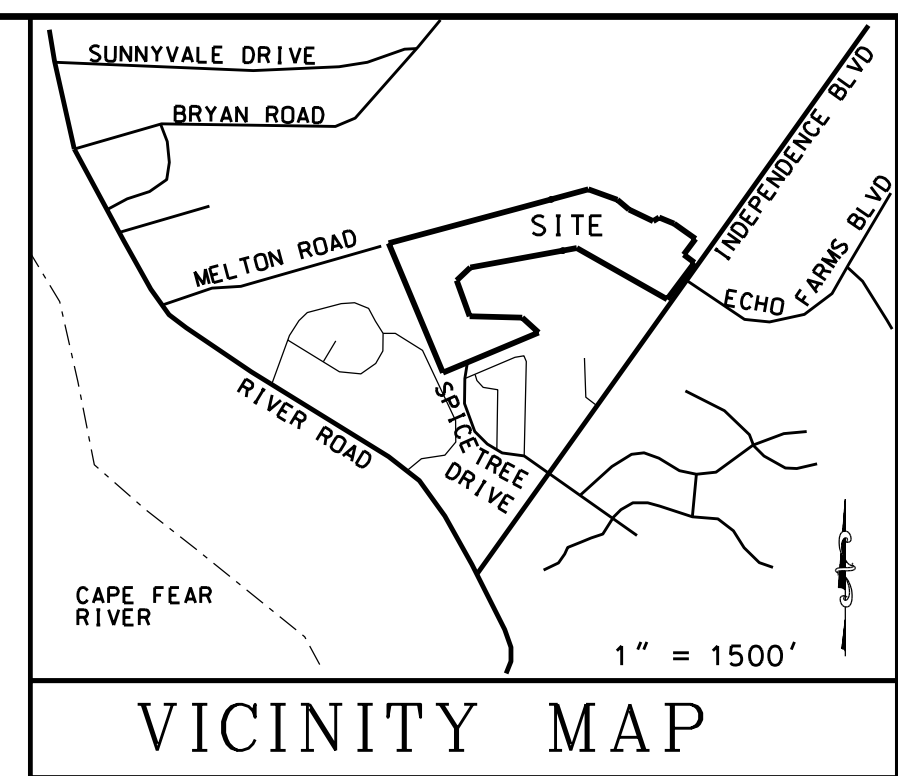
**STROUD ENGINEERING, P.A.**  
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**SITE DATA**

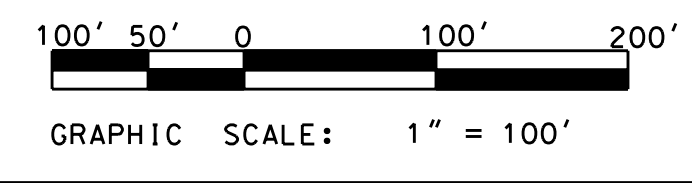
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**LEGEND**

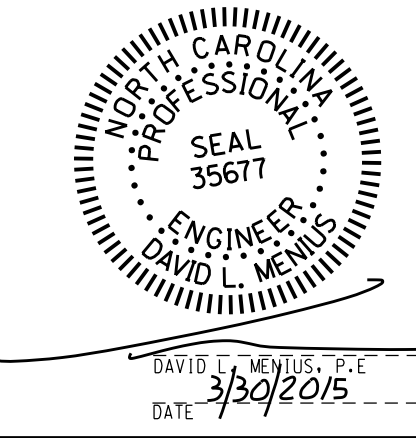
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WETLANDS	---
FLOOD LINE	---
EASEMENT	---
EX CONTOURS	---
EX SEWER	---
PROP SEWER	---
EX WATER	---
PROP WATER	---
STORM DRAIN	---



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THE SQUARE FOOTAGE OF THE PROPOSED LOTS RANGES FROM 5,928 SF TO 13,048 SF



**SHEET INDEX**

SHEET	DESCRIPTION
1.0	COVER
2.0	EROSION CONTROL
3.0	STORMWATER COVER
3.1	STORMWATER--SECTION 1
3.2	STORMWATER--SECTION 2
3.3	STORMWATER--SECTION 3
4.0	UTILITIES COVER
4.1	PROFILE--TURNBERRY SECT 1
4.2	PROFILE--TURNBERRY SECT 2
4.3	PROFILE--GLENAGLES
5.0	ROADWAY COVER
5.1	ROADWAY--SECTION 1
5.2	ROADWAY--SECTION 2
5.3	ROADWAY--SECTION 3
6.0	EXISTING SITE CONDITIONS
7.0	WETLAND IMPACTS
8.0 - 8.3	GENERAL DETAILS
WSD1 - WSD 2	WATER DETAILS
SSD1 - SSD 3	SEWER DETAILS

**UTILITIES COVER**

# ECHO WEST

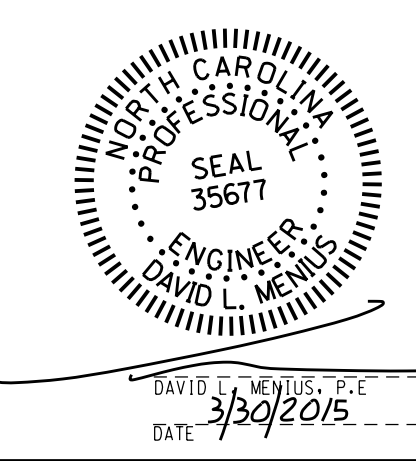
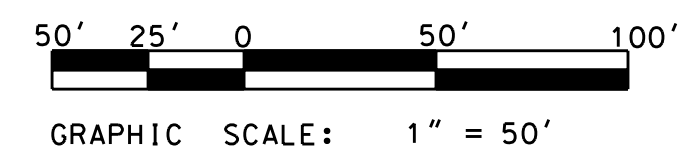
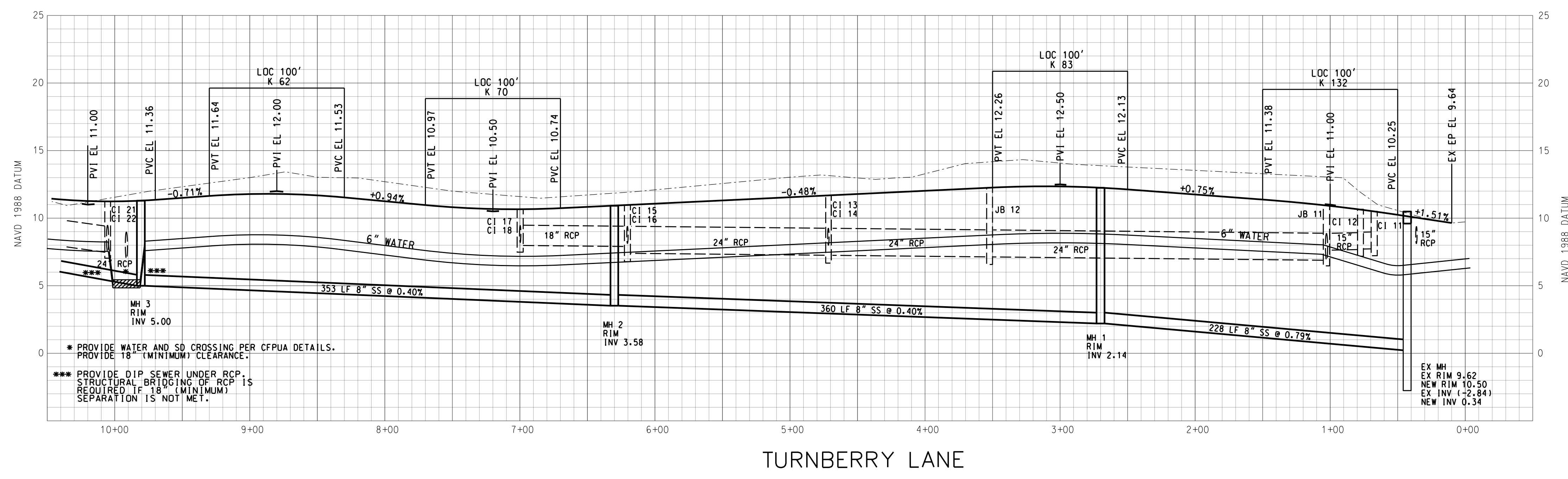
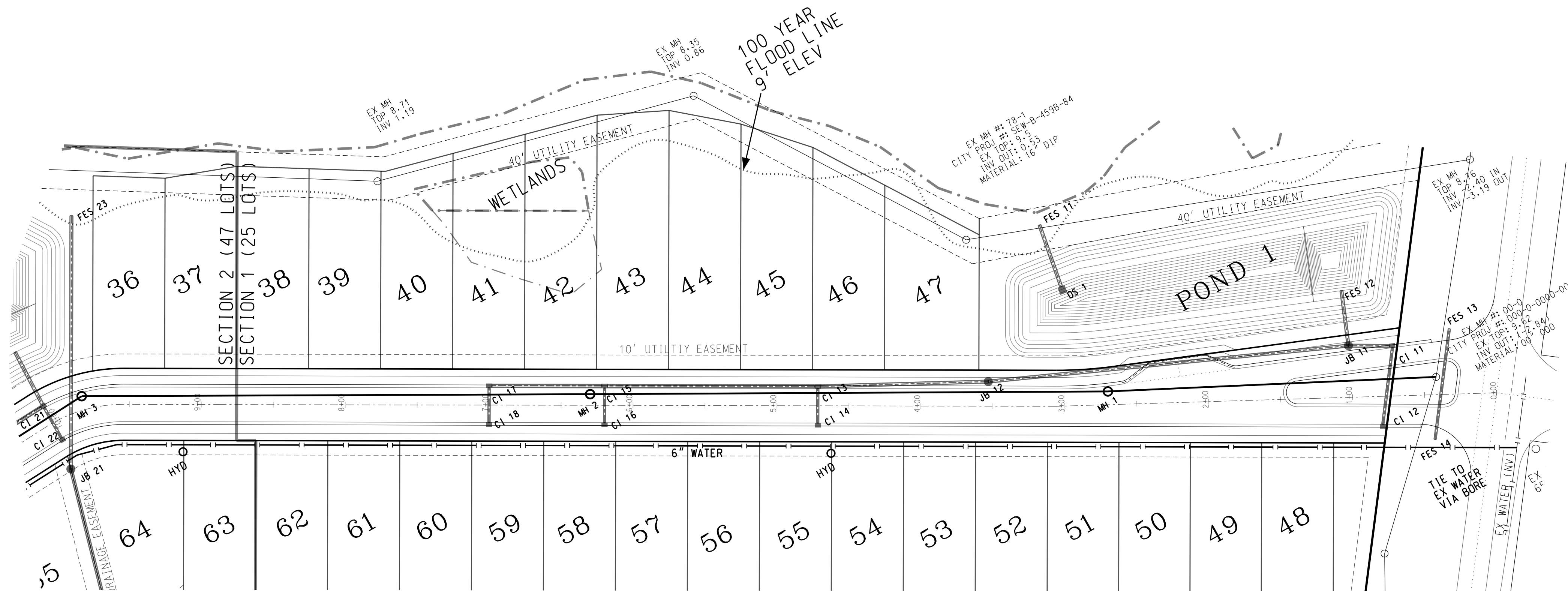
CITY OF WILMINGTON    NEW HANOVER COUNTY    NORTH CAROLINA

OWNER: HOOSIER DADDY, LLC  
 ADDRESS: 6025 TARIN ROAD  
 WILMINGTON, NC 28409  
 PHONE: (252) 412-9622

DESIGNED: DLM  
 DRAWN: DLM  
 APPROVED: JHF

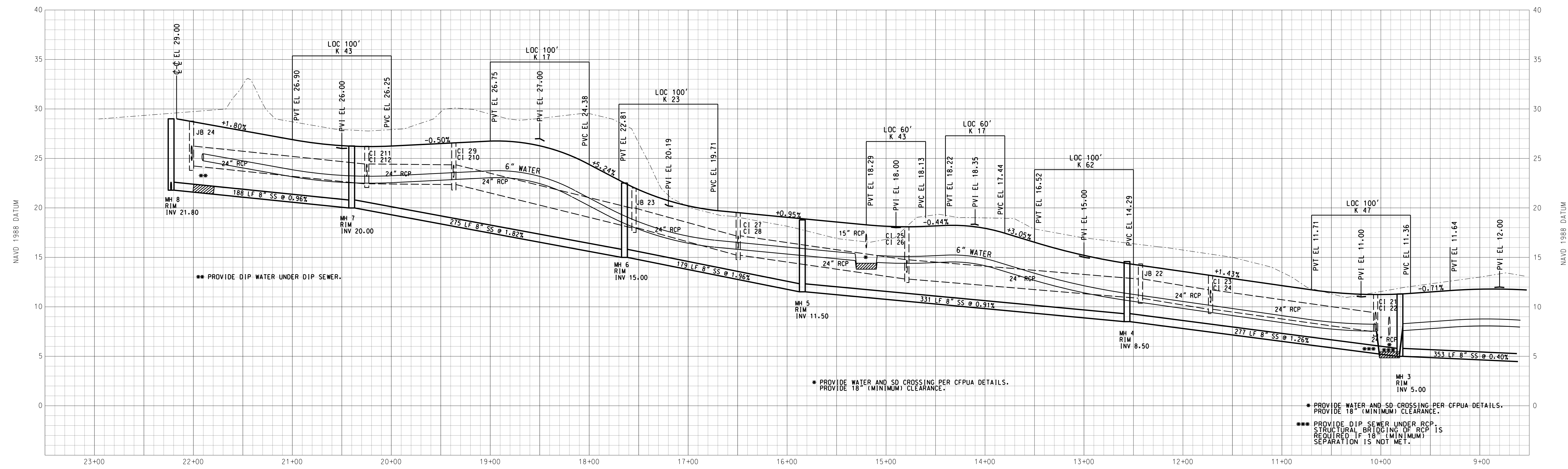
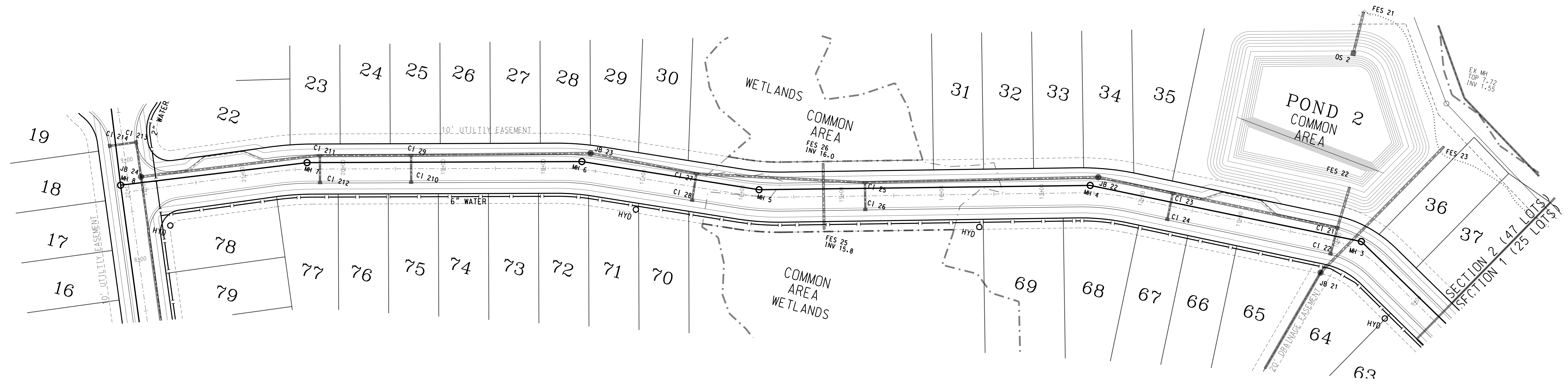
DATE: 1/13/2015  
 SCALE: 1" = 100'  
 SHEET: 4.0

**STROUD ENGINEERING, P.A.**  
 102-D CINEMA DRIVE  
 WILMINGTON, NORTH CAROLINA  
 (910) 815-0775  
 LICENSE NO. C-0647

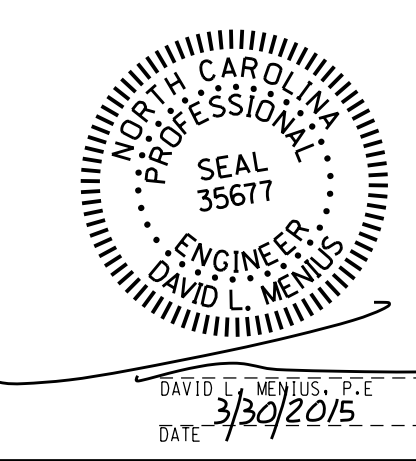
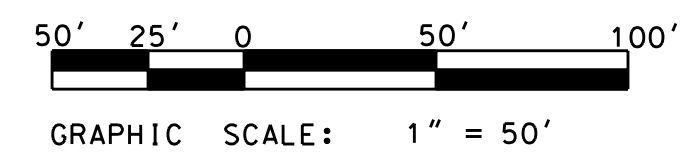


SECTION 1 PROFILE		
<h1>ECHO WEST</h1>		
CITY OF WILMINGTON	NEW HANOVER COUNTY	NORTH CAROLINA
OWNER: HOOSIER DADDY, LLC	DESIGNED: DLM	
ADDRESS: 6025 TARIN ROAD	DRAWN: DLM	
WILMINGTON, NC 28409	APPROVED: JHF	
PHONE: (252) 412-9622		
<b>STROUD ENGINEERING, P.A.</b> 102-D CINEMA DRIVE WILMINGTON, NORTH CAROLINA (910) 815-0775 LICENSE NO. C-0647		DATE: 1/13/2015 SCALE: 1" = 50' HOR 1" = 5' VERT SHEET: 4.1

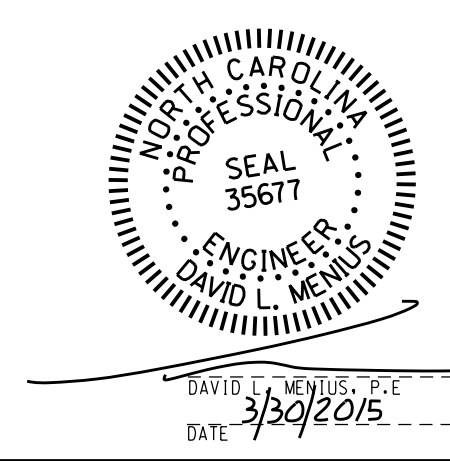
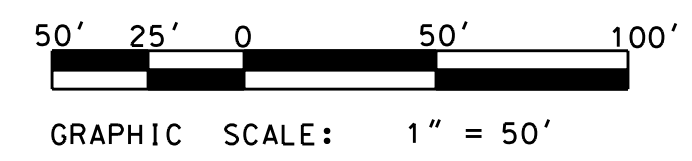
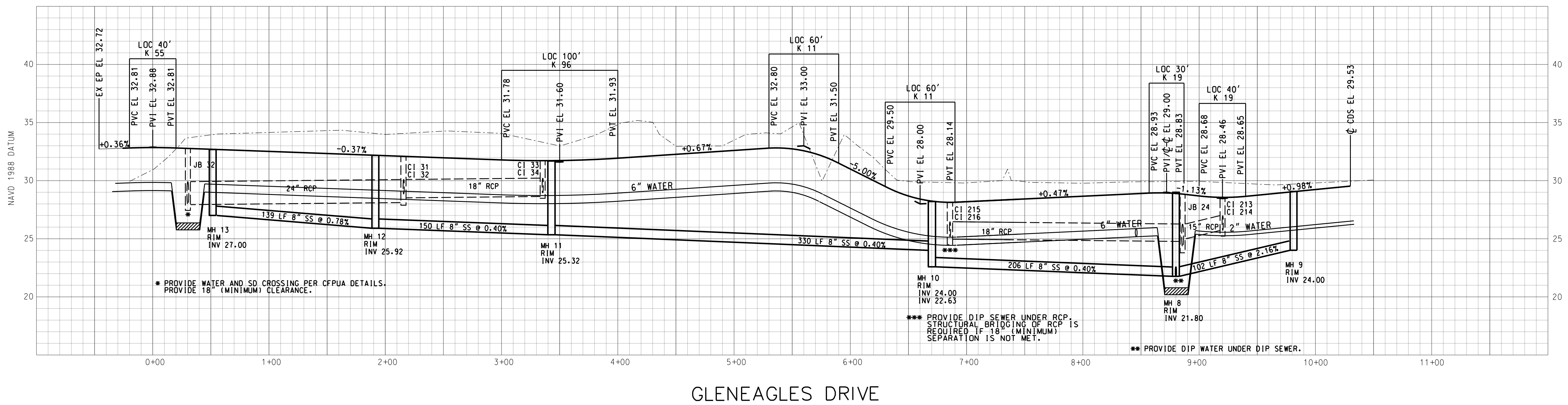
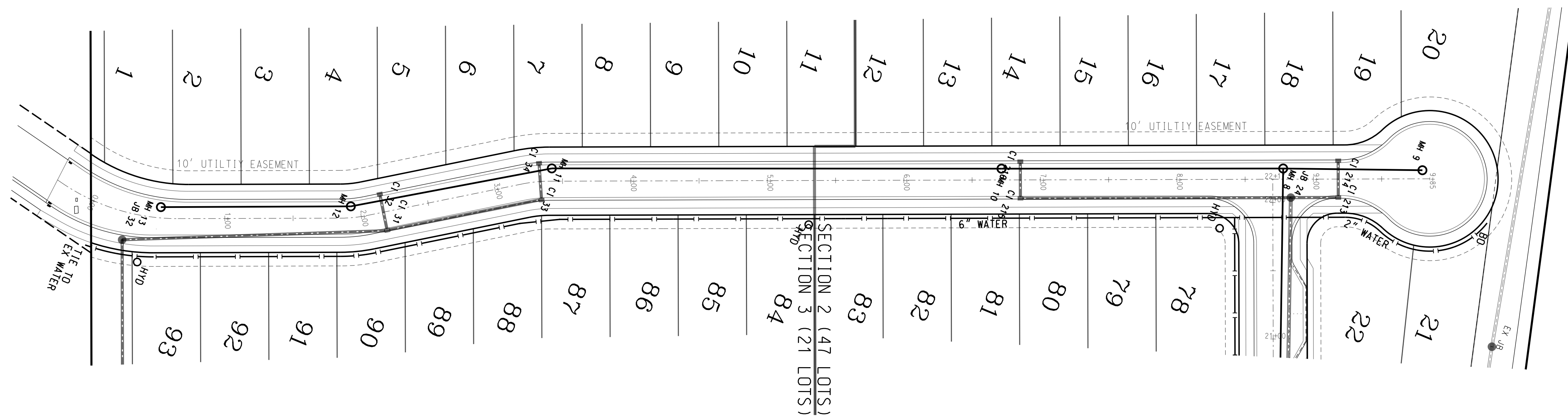




TURNBERRY LANE



SECTION 2 PROFILE		
<b>ECHO WEST</b>		
CITY OF WILMINGTON	NEW HANOVER COUNTY	NORTH CAROLINA
OWNER: HOOSIER DADDY, LLC	DESIGNED: DLM	
ADDRESS: 6025 TARIN ROAD	DRAWN: DLM	
WILMINGTON, NC 28409	APPROVED: JHF	
PHONE: (252) 412-9622		
<b>STROUD ENGINEERING, P.A.</b> 102-D CINEMA DRIVE WILMINGTON, NORTH CAROLINA (910) 815-0775 LICENSE NO. C-0647		DATE: 1/13/2015 SCALE: 1" = 50' HOR 1" = 5' VERT SHEET: 4.2



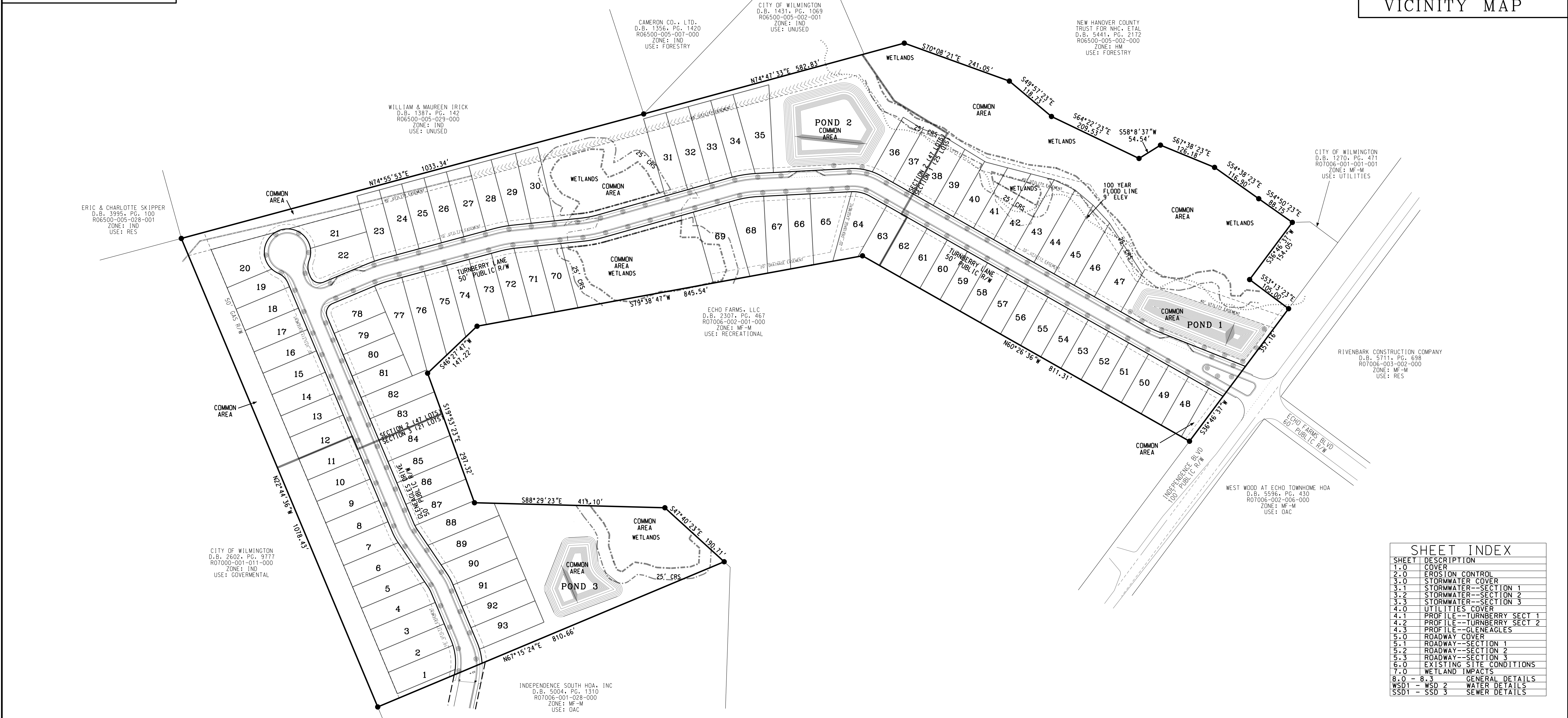
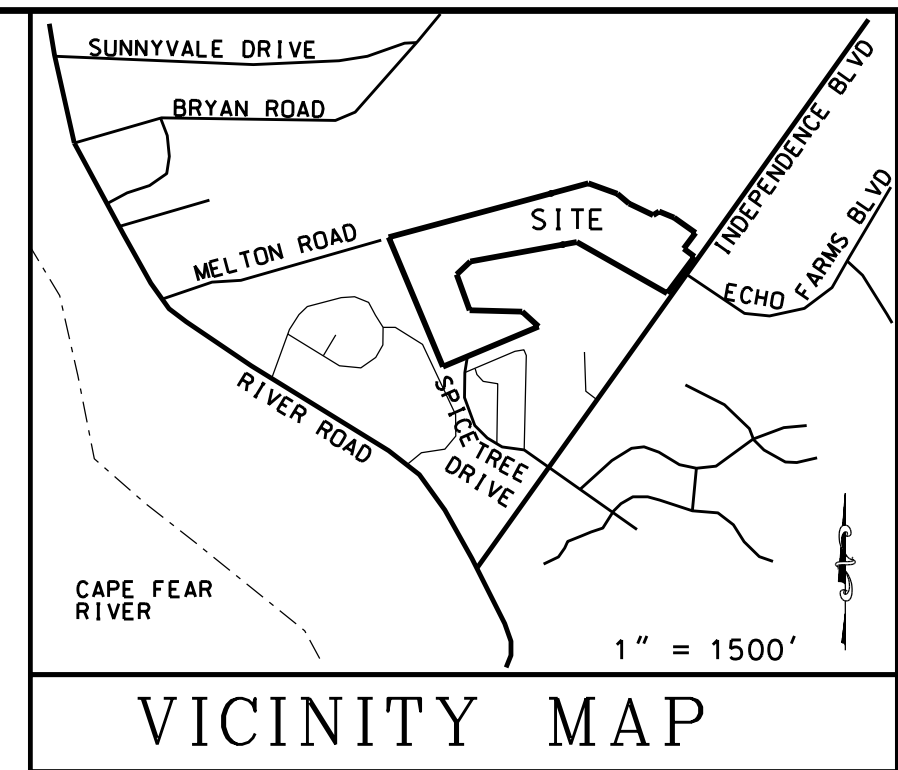
SECTION 3 PROFILE		
<h1>ECHO WEST</h1>		
CITY OF WILMINGTON	NEW HANOVER COUNTY	NORTH CAROLINA
OWNER: HOOSIER DADDY, LLC	DESIGNED: DLM	
ADDRESS: 6025 TARIN ROAD	DRAWN: DLM	
WILMINGTON, NC 28409	APPROVED: JHF	
PHONE: (252) 412-9622		
<b>STROUD ENGINEERING, P.A.</b>		DATE: 1/13/2015
102-D CINEMA DRIVE WILMINGTON, NORTH CAROLINA (910) 815-0775		SCALE: 1" = 50' HOR 1" = 5' VERT
LICENSE NO. C-0647		SHEET: 4.3

**SITE DATA**

TRACT AREA	--31.27 AC
	--1,362,275 SF
ZONING	--MF-M
PROPOSED UNITS	--93
UNITS PER ACRE	--5.0
MINIMUM LDT SIZE	--5,928 SF
TAX PIN	--R07006-001-005-000
DEED BOOK/PAGE	--R07006-002-021-000
CAMA LUC	--5822/2946
PROPOSED BUA	--521,549 SF
	--11.97 AC
% BUA	--38.3%
RECEIVING STREAM	--BARNARDS CREEK
CLASSIFICATION	--C:SW
SETBACKS	--
FRONT	--15
REAR	--15
SIDE	--5
CORNER	--10
MAX HEIGHT	--35

**LEGEND**

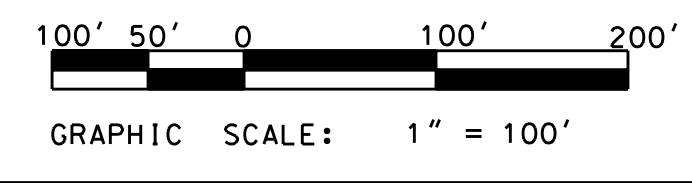
BOUNDARY	—●—●—●—
WETLANDS	—- - - - -
FLOOD LINE	—- - - - -
EASEMENT	—- - - - -
EX CONTOURS	—- - - - -
EX SEWER	—- - - - -
PROP SEWER	—- - - - -
EX WATER	—- - - - -
PROP WATER	—- - - - -
STORM DRAIN	—- - - - -



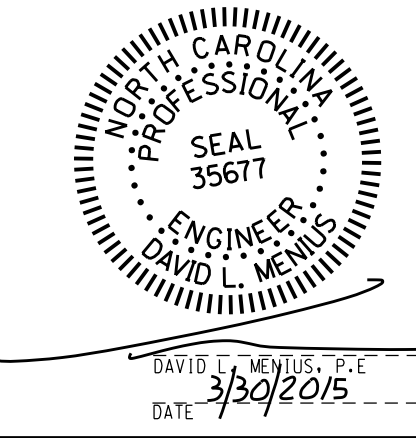
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4.3	PROFILE--GLENEAGLES
5.0	ROADWAY COVER
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TOTAL TRACT AREA-- 31.27 AC  
 AREA IN R/W-- 1 AC  
 AREA IN LOTS-- 1 AC  
 TOTAL COMMON AREA-- 11.42 AC  
 REQUIRED RECREATION SPACE (0.03 ACRES X 93 LOTS)-- 2.79 AC  
 COMMON AREA RESERVED FOR ACTIVE RECREATION (1.40 AC MIN)-- 4.84 AC  
 COMMON AREA RESERVED FOR PASSIVE RECREATION (1.40 AC MIN)-- 6.58 AC



THE SQUARE FOOTAGE OF THE PROPOSED LOTS RANGES FROM 5,928 SF TO 13,048 SF



**ROADWAY COVER**

# ECHO WEST

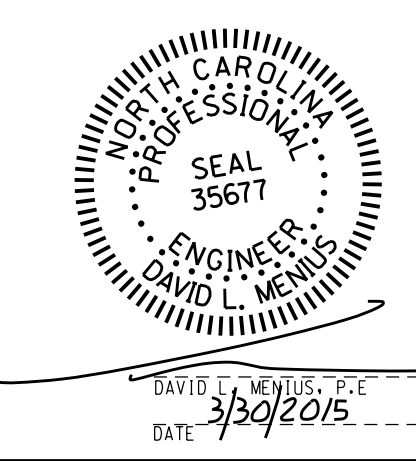
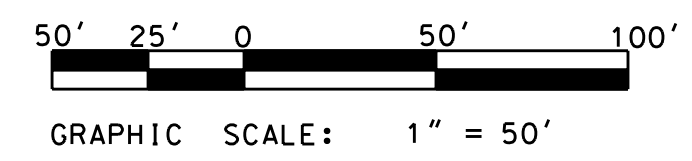
CITY OF WILMINGTON    NEW HANOVER COUNTY    NORTH CAROLINA

OWNER: HOOSIER DADDY, LLC  
 ADDRESS: 6025 TARIN ROAD  
 WILMINGTON, NC 28409  
 PHONE: (252) 412-9622

DESIGNED: DLM  
 DRAWN: DLM  
 APPROVED: JHF

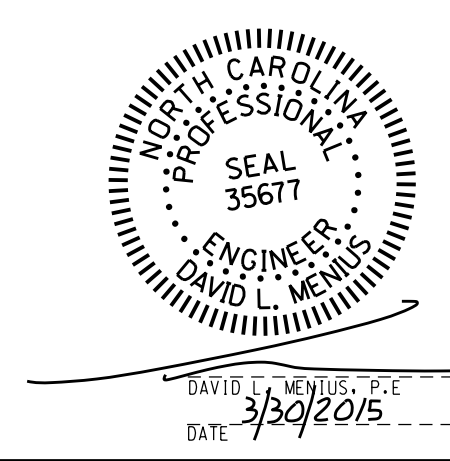
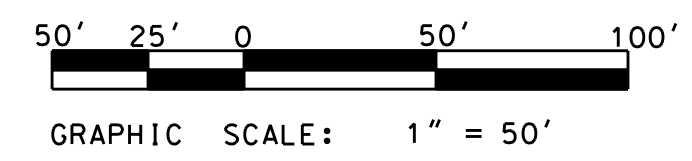
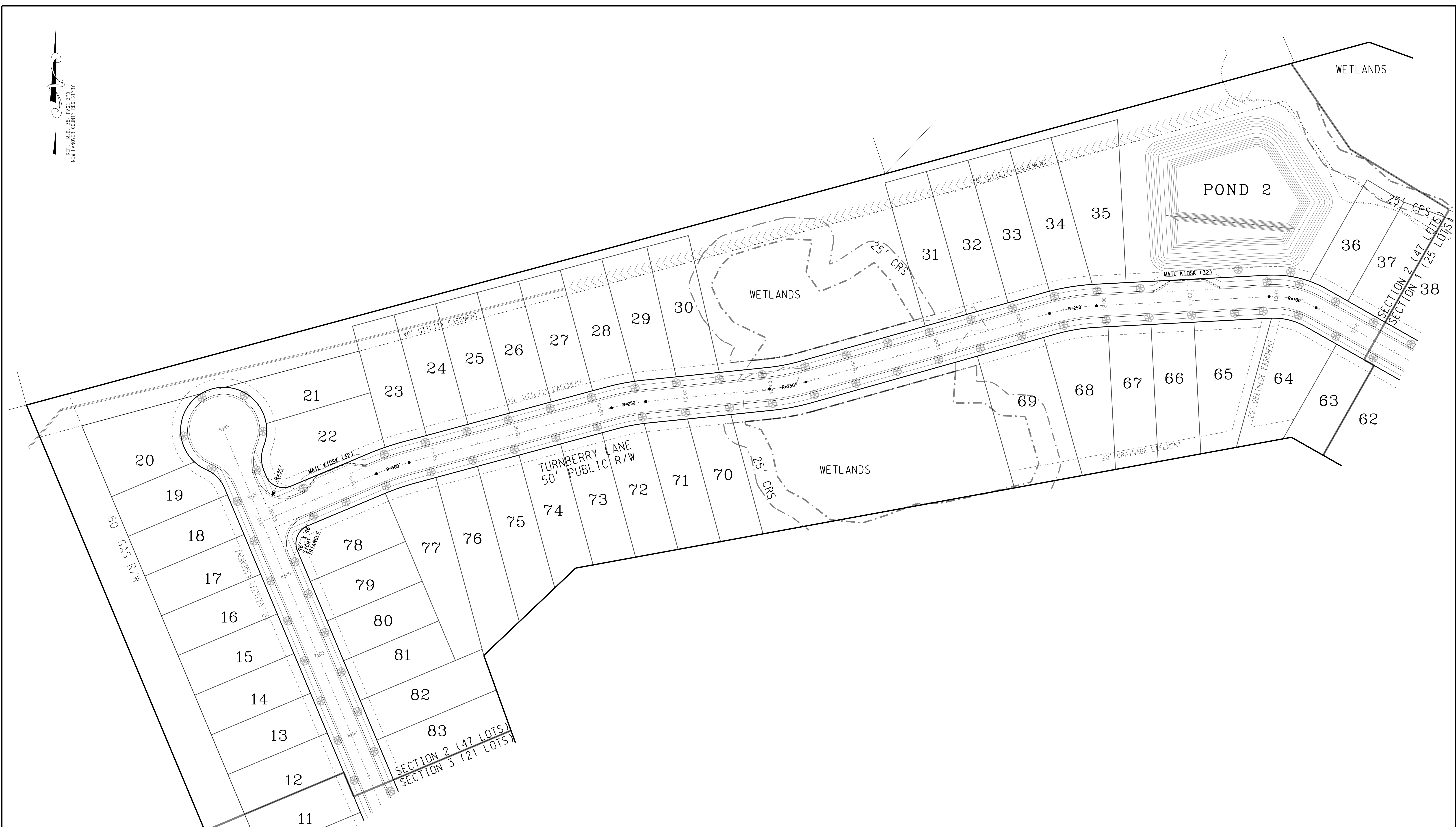
DATE: 1/13/2015  
 SCALE: 1" = 100'  
 SHEET: 5.0

**STROUD ENGINEERING, P.A.**  
 102-D CINEMA DRIVE  
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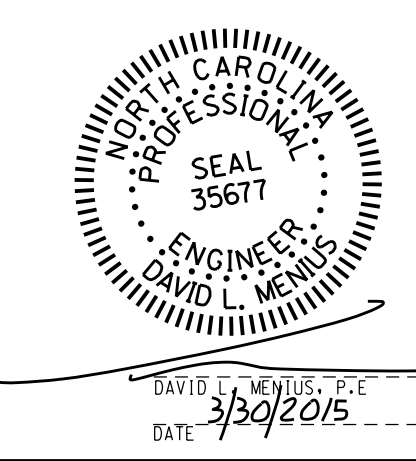
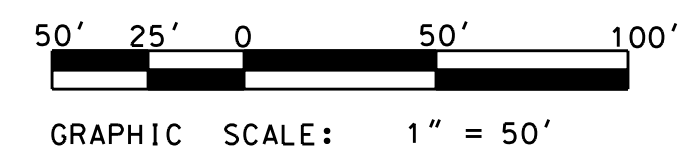
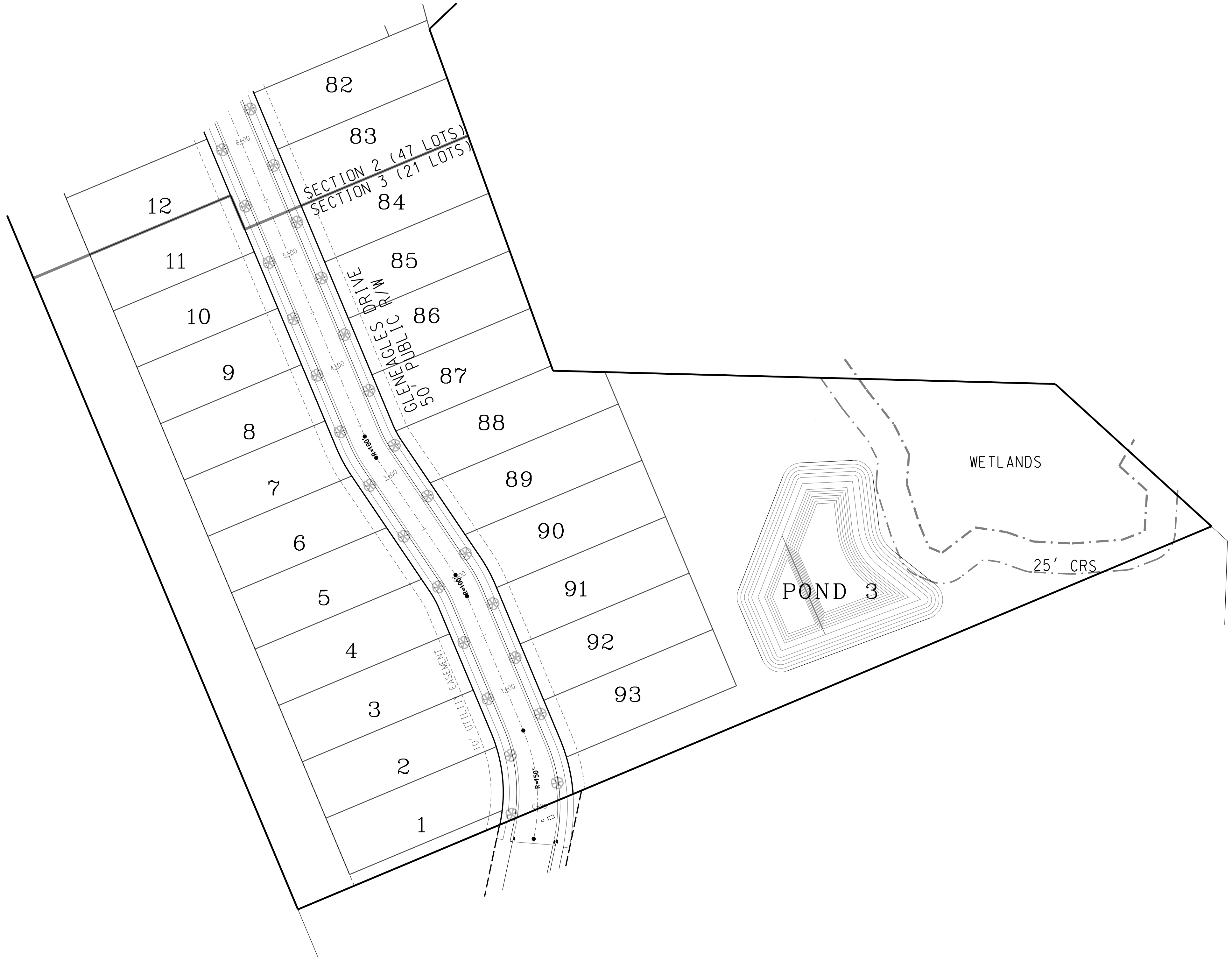


SECTION 1 ROADWAY		
<b>ECHO WEST</b>		
CITY OF WILMINGTON	NEW HANOVER COUNTY	NORTH CAROLINA
OWNER: HOOSIER DADDY, LLC	DESIGNED: DLM	
ADDRESS: 6025 TARIN ROAD WILMINGTON, NC 28409	DRAWN: DLM	
PHONE: (252) 412-9622	APPROVED: JHF	
<b>STROUD ENGINEERING, P.A.</b> 102-D CINEMA DRIVE WILMINGTON, NORTH CAROLINA (910) 815-0775 LICENSE NO. C-0647		DATE: 1/13/2015
		SCALE: 1" = 50'
		SHEET: 5.1

REF. M.B. 35, PAGE 370  
 NEW HANOVER COUNTY REGISTRY

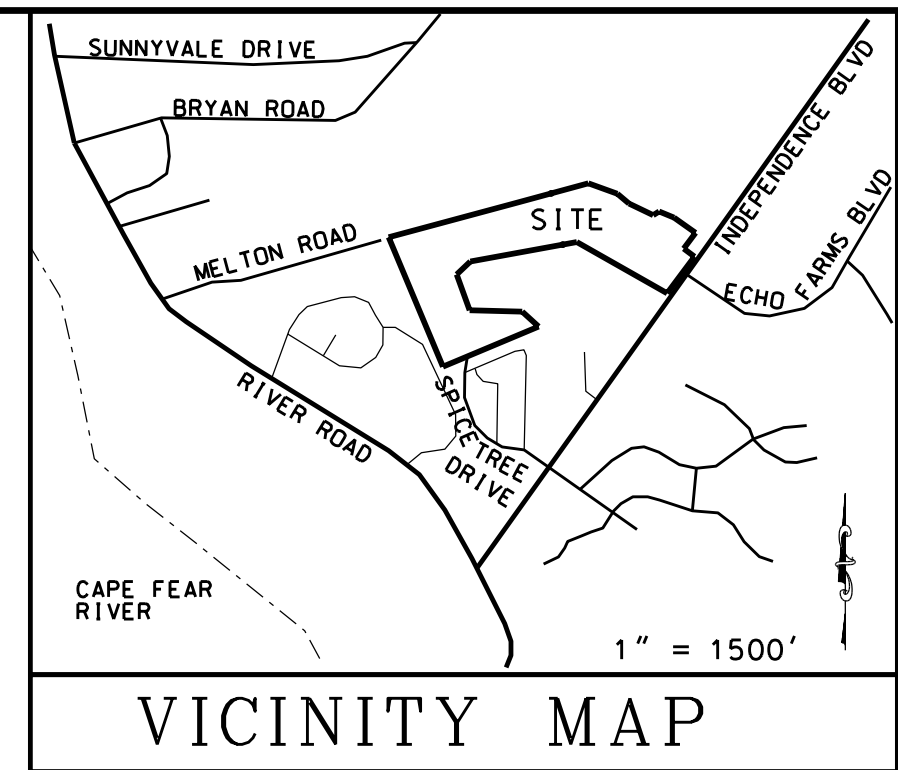
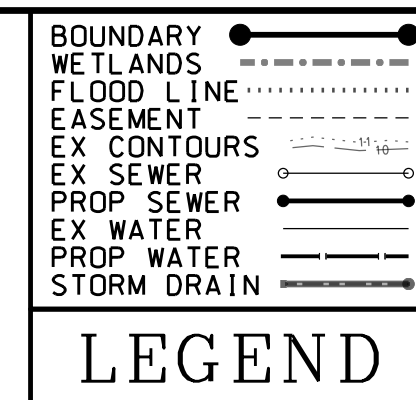


SECTION 2 ROADWAY		
<b>ECHO WEST</b>		
CITY OF WILMINGTON	NEW HANOVER COUNTY	NORTH CAROLINA
OWNER: HOOSIER DADDY, LLC	DESIGNED: DLM	
ADDRESS: 6025 TARIN ROAD	DRAWN: DLM	
WILMINGTON, NC 28409	APPROVED: JHF	
PHONE: (252) 412-9622	DATE: 1/13/2015	
<b>STROUD ENGINEERING, P.A.</b>		SCALE: 1" = 50'
102-D CINEMA DRIVE WILMINGTON, NORTH CAROLINA (910) 815-0775		SHEET: 5.2
LICENSE NO. C-0647		



SECTION 3 ROADWAY		
<b>ECHO WEST</b>		
CITY OF WILMINGTON	NEW HANOVER COUNTY	NORTH CAROLINA
OWNER: HOOSIER DADDY, LLC	DESIGNED: DLM	
ADDRESS: 6025 TARIN ROAD WILMINGTON, NC 28409	DRAWN: DLM	
PHONE: (252) 412-9622	APPROVED: JHF	
<b>STROUD ENGINEERING, P.A.</b> 102-D CINEMA DRIVE WILMINGTON, NORTH CAROLINA (910) 815-0775 LICENSE NO. C-0647		DATE: 1/13/2015 SCALE: 1" = 50' SHEET: 5.3

TRACT AREA--31.27 AC  
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 UNITS PER ACRE--3.0  
 MINIMUM LDT SIZE--5,928 SF  
 TAX PIN--R07006-001-005-000  
 DEED BOOK/PAGE--R07006-002-021-000  
 CAMA LUC--URBAN  
 PROPOSED BUA--521,549 SF  
 ---11.97 AC  
 % BUA--38.3%  
 RECEIVING STREAM--BARNARDS CREEK  
 CLASSIFICATION--C:SW  
 SETBACKS--  
 FRONT--15  
 REAR--15  
 SIDE--5  
 CORNER--10  
 MAX HEIGHT--35



**SITE DATA**



**REGULATED TREES**  
 1,020 REGULATED PINES  
 @ 14\"/>

**SIGNIFICANT TREES**  
 5 SIGNIFICANT PINES  
 @ 24\"/>

**1 SIGNIFICANT PINE**  
 @ 26\"/>

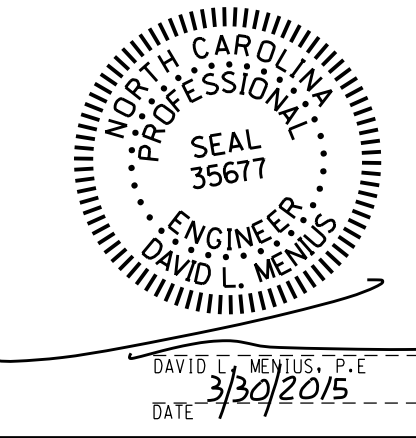
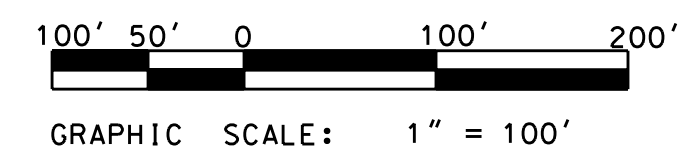
**TREE INDEX**

SYMBOL	DESCRIPTION
OK	OAK
PN	PINE
MG	MAGNOLIA
HT	HOLLY
HK	HICKORY
DW	DOGWOOD
CH	CHERRY
T	TWIN
C	CLUSTER

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**EXISTING SITE CONDITIONS**

# ECHO WEST

CITY OF WILMINGTON    NEW HANOVER COUNTY    NORTH CAROLINA

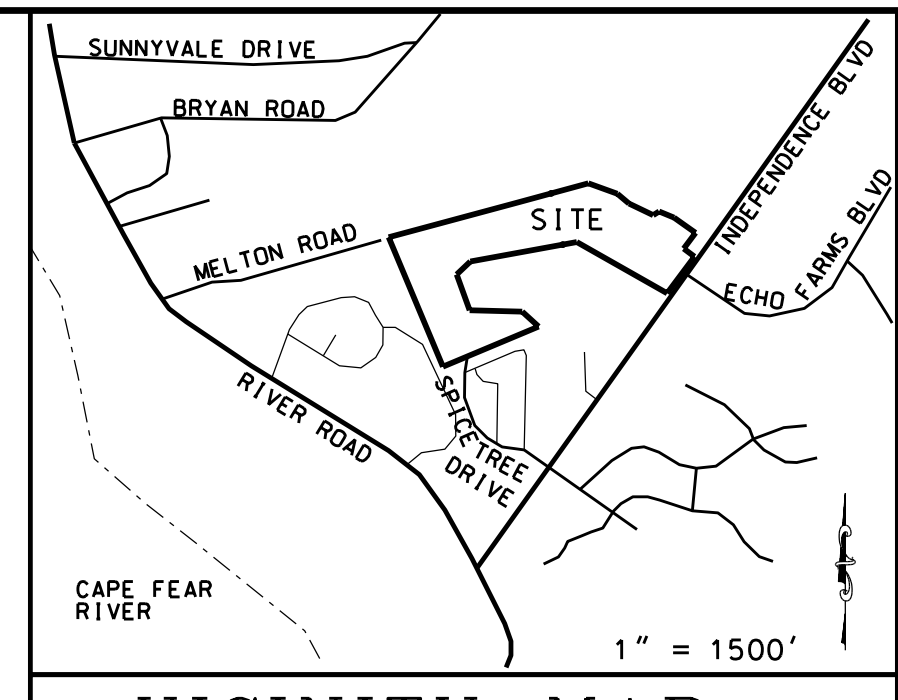
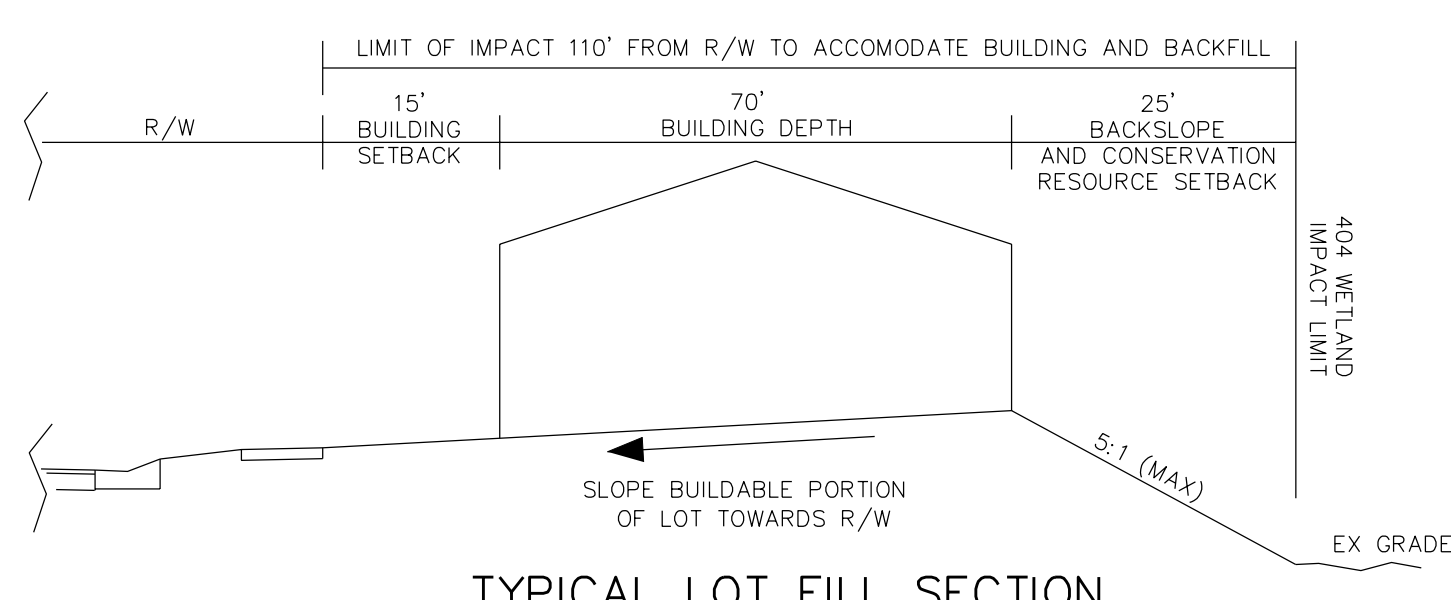
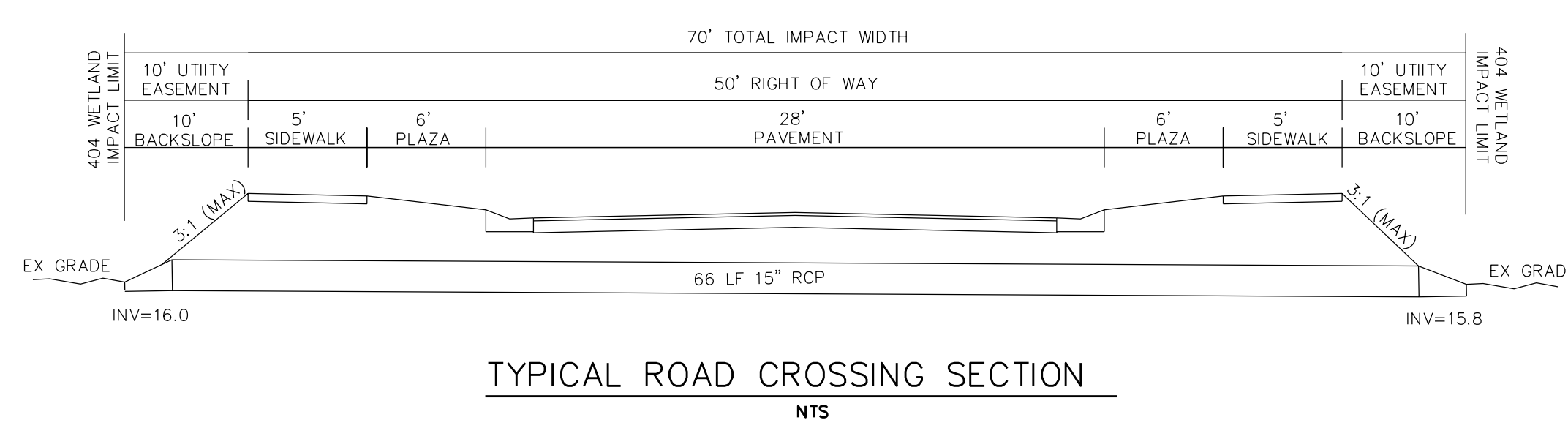
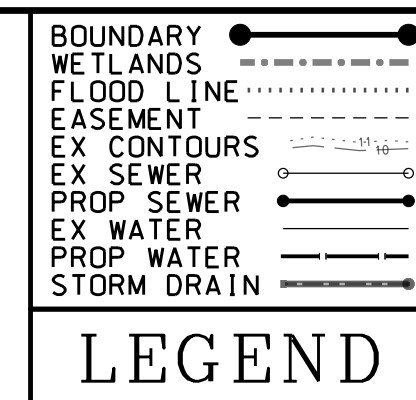
**OWNER:** HOOSIER DADDY, LLC  
**ADDRESS:** 6025 TARIN ROAD  
 WILMINGTON, NC 28409  
**PHONE:** (252) 412-9622

**DESIGNED:** DLM  
**DRAWN:** DLM  
**APPROVED:** JHF

**DATE:** 1/13/2015  
**SCALE:** 1" = 100'  
**SHEET:** 6.0

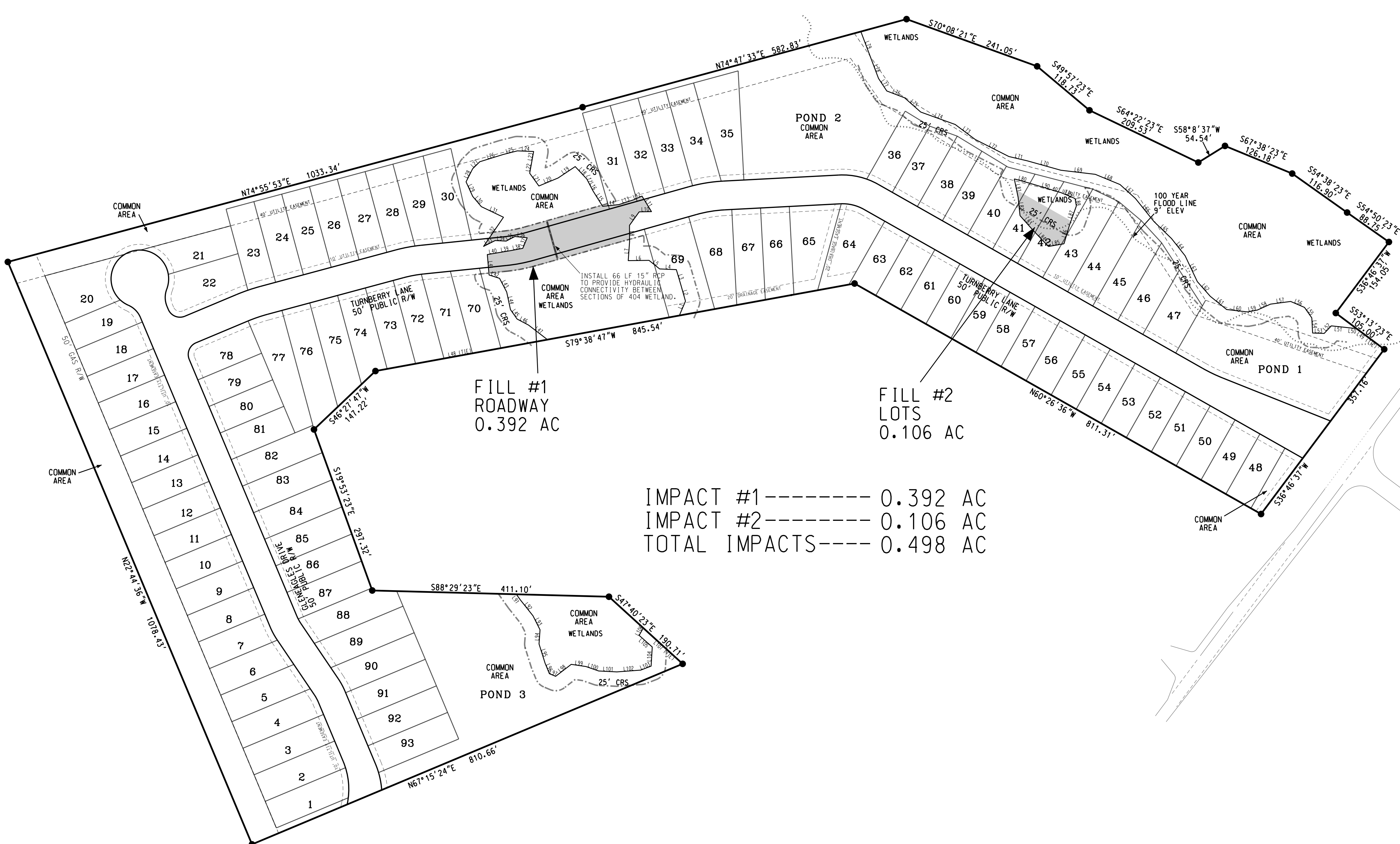
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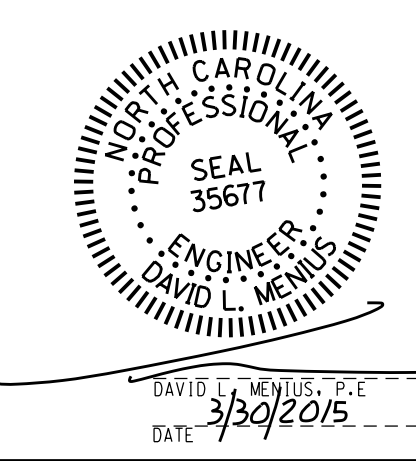
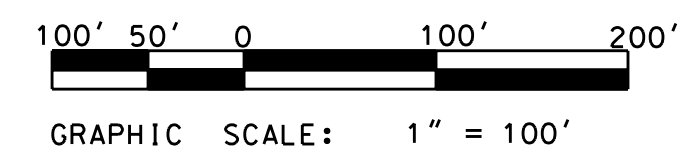
**SITE DATA**

Name	Wetland Line Table	Length	Direction
L1	23.30	N 23°04'07" E	
L2	28.28	N 15°48'27" W	
L3	28.69	N 16°30'08" W	
L4	29.02	N 87°35'39" W	
L5	23.68	N 51°06'11" W	
L6	36.10	S 89°16'38" W	
L7	32.86	N 4°05'05" E	
L8	28.50	N 0°16'03" W	
L9	28.82	N 35°38'41" E	
L10	21.38	N 88°59'26" W	
L11	31.59	N 31°25'03" W	
L12	16.09	S 66°19'16" W	
L13	26.60	S 71°55'11" W	
L14	28.46	S 83°56'13" W	
L15	31.60	S 32°00'58" W	
L16	21.42	N 28°40'12" W	
L17	2.07	N 15°36'48" W	
L18	29.33	N 43°09'35" W	
L19	35.77	S 56°19'14" W	
L20	35.03	S 67°24'37" W	
L21	27.32	N 35°47'22" W	
L22	18.60	N 10°16'44" W	
L23	19.76	N 10°16'44" W	
L24	28.27	N 87°52'28" W	
L25	45.44	S 75°42'21" W	
L26	42.49	S 72°46'02" W	
L27	17.36	S 45°28'05" W	
L28	25.43	S 26°47'43" W	
L29	21.69	S 24°28'40" W	
L30	23.43	S 40°06'13" W	
L31	32.57	S 64°26'27" W	
L32	61.28	S 34°19'50" W	
L33	22.55	N 63°16'35" W	
L34	19.10	S 87°11'56" W	
L35	17.05	N 62°23'21" W	
L36	21.55	S 84°18'01" W	
L37	19.87	S 22°43'32" W	
L38	20.89	S 79°17'04" W	
L39	20.78	S 80°24'30" W	
L40	20.88	S 80°24'30" W	
L41	45.59	S 45°58'54" W	
L42	19.13	S 72°07'37" W	
L43	26.69	S 27°34'29" W	
L44	31.27	S 12°06'11" W	
L45	20.02	S 35°06'56" W	
L46	22.49	S 62°07'42" W	
L47	39.12	S 52°27'01" W	
L48	302.03	S 79°19'37" W	
L49	59.90	N 53°13'23" W	
L50	14.21	N 83°48'55" W	
L51	29.90	N 83°48'55" W	
L52	18.10	S 43°29'11" W	
L53	20.05	N 88°02'01" W	
L54	26.29	N 3°04'44" W	
L55	22.27	N 34°53'11" W	
L56	26.09	N 66°45'25" W	
L57	35.33	S 82°26'24" W	
L58	24.95	S 65°46'01" W	
L59	17.34	S 78°59'52" W	
L60	36.63	N 83°25'20" W	
L61	36.54	N 51°03'01" W	
L62	33.97	N 41°22'41" W	
L63	49.60	N 25°16'37" W	
L64	38.15	N 38°18'18" W	
L65	42.50	N 45°54'31" W	
L66	51.18	N 38°46'46" W	
L67	36.14	N 47°48'42" W	
L68	46.51	N 67°35'05" W	
L69	60.17	N 83°13'22" W	
L70	60.56	N 74°21'08" W	
L71	32.75	N 76°50'04" W	
L72	65.73	N 63°07'32" W	
L73	43.23	N 53°09'10" W	
L74	63.67	N 70°09'40" W	
L75	37.33	N 48°31'06" W	
L76	33.10	N 69°00'59" W	
L77	26.13	N 33°23'34" W	
L78	34.41	N 20°38'39" W	
L79	52.50	N 20°38'39" W	
L80	27.64	N 74°19'44" W	
L81	32.59	S 11°44'06" W	
L82	32.06	S 5°53'33" W	
L83	33.43	S 41°43'10" W	
L84	39.38	S 43°26'54" W	
L85	27.47	N 80°13'31" W	
L86	34.80	N 16°28'48" W	
L87	34.28	N 19°44'24" W	
L88	13.09	N 9°44'40" W	
L89	26.72	N 67°11'56" W	
L90	56.71	N 73°16'54" W	
L91	11.00	S 35°22'32" W	
L92	36.34	S 38°27'56" W	
L93	27.12	S 26°40'10" W	
L94	24.63	S 4°03'01" W	
L95	35.04	S 17°27'08" W	
L96	19.65	S 22°16'15" W	
L97	11.76	S 67°04'10" W	
L98	34.15	N 52°32'23" W	
L99	25.84	S 81°33'56" W	
L100	23.41	S 70°44'31" W	
L101	31.60	S 87°07'38" W	
L102	41.50	N 85°44'10" W	
L103	19.36	N 69°00'35" W	
L104	33.25	N 3°26'47" W	
L105	30.43	N 48°24'55" W	
L106	14.66	N 29°33'04" W	
L107	92.33	S 47°40'23" W	



IMPACT #1----- 0.392 AC  
 IMPACT #2----- 0.106 AC  
 TOTAL IMPACTS---- 0.498 AC

TOTAL TRACT AREA-- 31.27 AC  
 AREA IN R/W-- 1 AC  
 AREA IN LOTS-- 1 AC  
 TOTAL COMMON AREA-- 11.42 AC  
 REQUIRED RECREATION SPACE (0.03 ACRES X 93 LOTS)-- 2.79 AC  
 COMMON AREA RESERVED FOR ACTIVE RECREATION (1.40 AC MIN)-- 4.84 AC  
 COMMON AREA RESERVED FOR PASSIVE RECREATION (1.40 AC MIN)-- 6.58 AC



**SHEET INDEX**

SHEET	DESCRIPTION
1.0	COVER
2.0	EROSION CONTROL
3.0	STORMWATER COVER
3.1	STORMWATER--SECTION 1
3.2	STORMWATER--SECTION 2
3.3	STORMWATER--SECTION 3
4.0	UTILITIES COVER
4.1	PROFILE--TURNBERRY SECT 1
4.2	PROFILE--TURNBERRY SECT 2
4.3	PROFILE--GLENEAGLES
5.0	ROADWAY COVER
5.1	ROADWAY--SECTION 1
5.2	ROADWAY--SECTION 2
5.3	ROADWAY--SECTION 3
6.0	EXISTING SITE CONDITIONS
7.0	WETLAND IMPACTS
8.0 - 8.3	GENERAL DETAILS
WSD1 - WSD 2	WATER DETAILS
SSD1 - SSD 3	SEWER DETAILS

**WETLAND IMPACTS**

# ECHO WEST

CITY OF WILMINGTON NEW HANOVER COUNTY NORTH CAROLINA

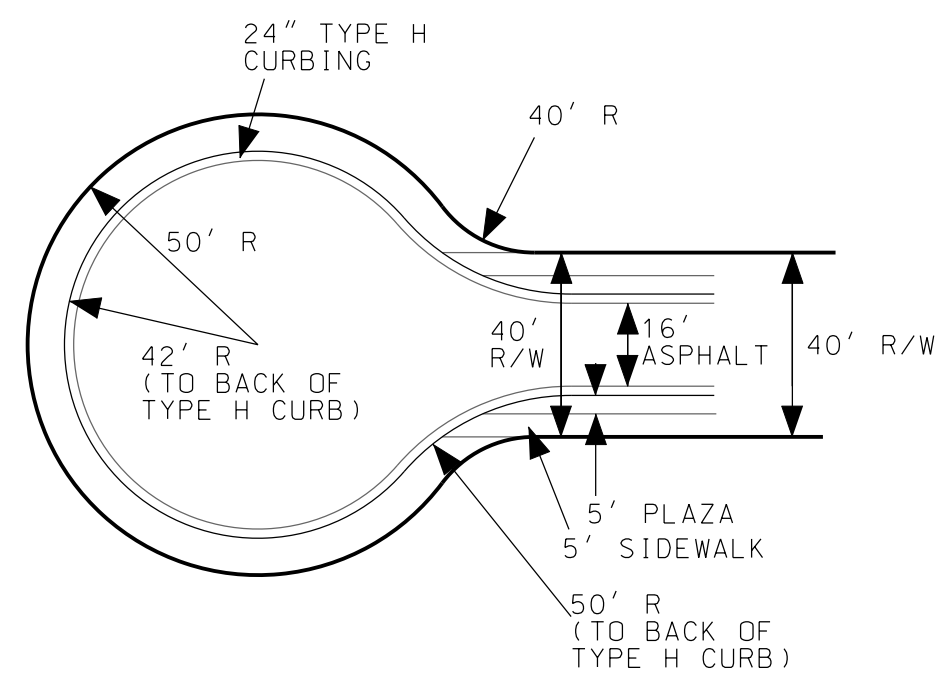
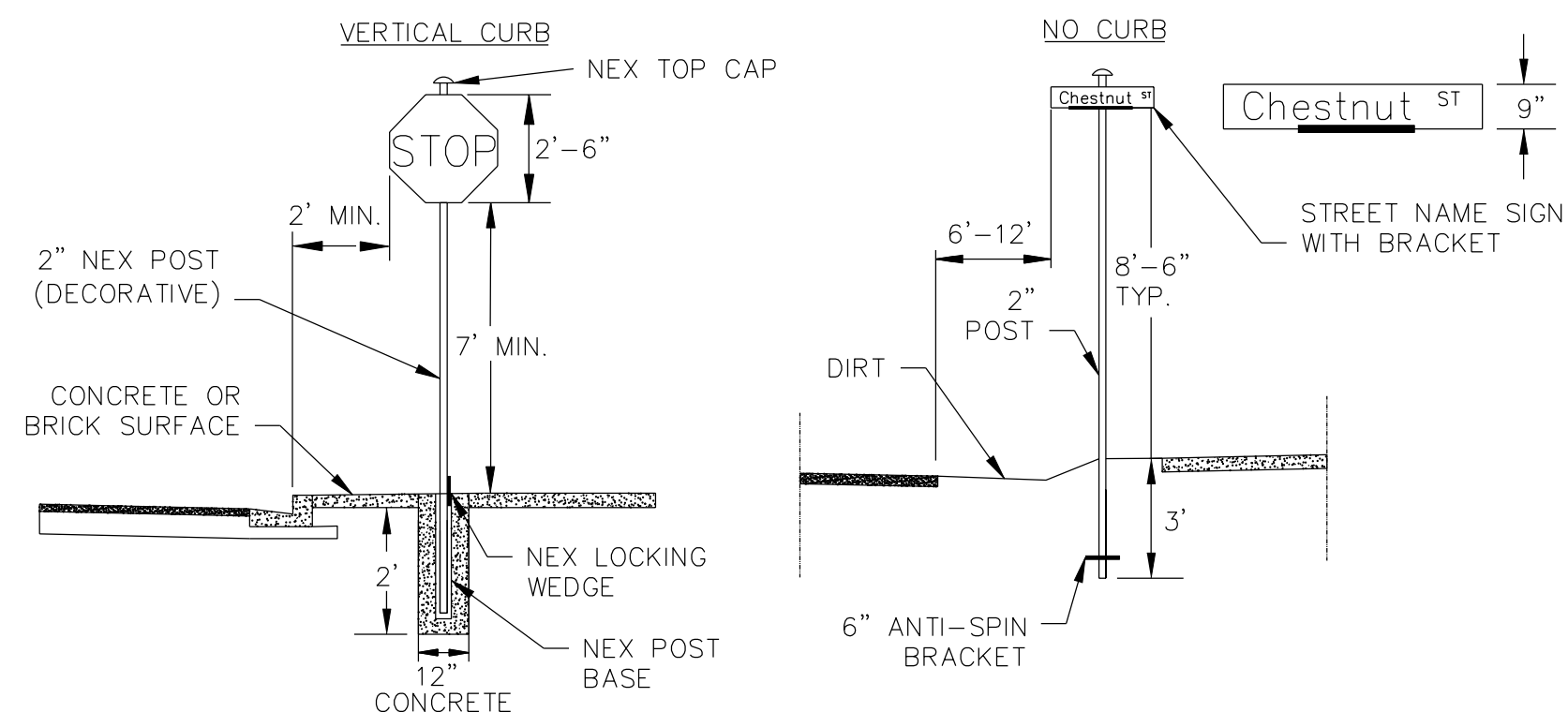
OWNER: HOOSIER DADDY, LLC  
 ADDRESS: 6025 TARIN ROAD WILMINGTON, NC 28409  
 PHONE: (252) 412-9622

DESIGNED: DLM  
 DRAWN: DLM  
 APPROVED: JHF

DATE: 1/13/2015  
 SCALE: 1" = 100'  
 SHEET: 7.0

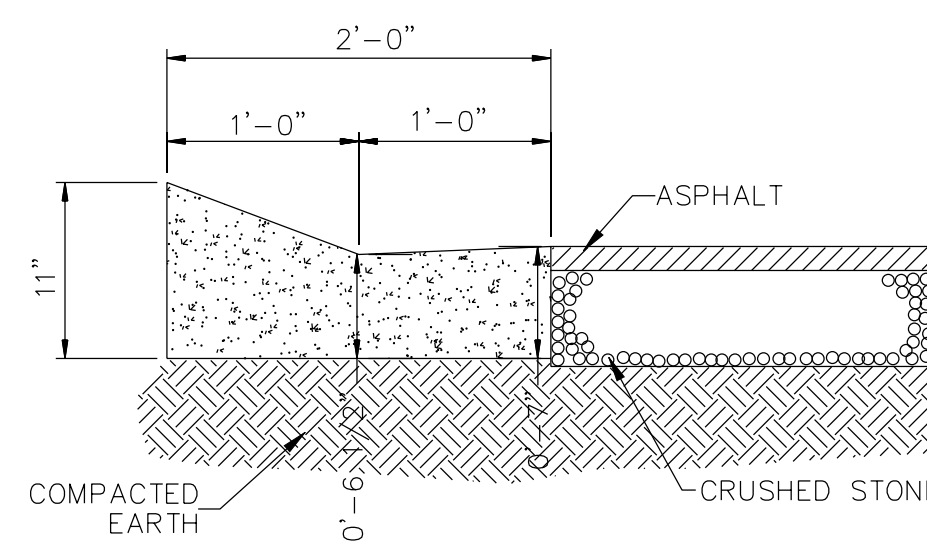
**STROUD ENGINEERING, P.A.**  
 102-D CINEMA DRIVE WILMINGTON, NORTH CAROLINA (910) 815-0775  
 LICENSE NO. C-0647



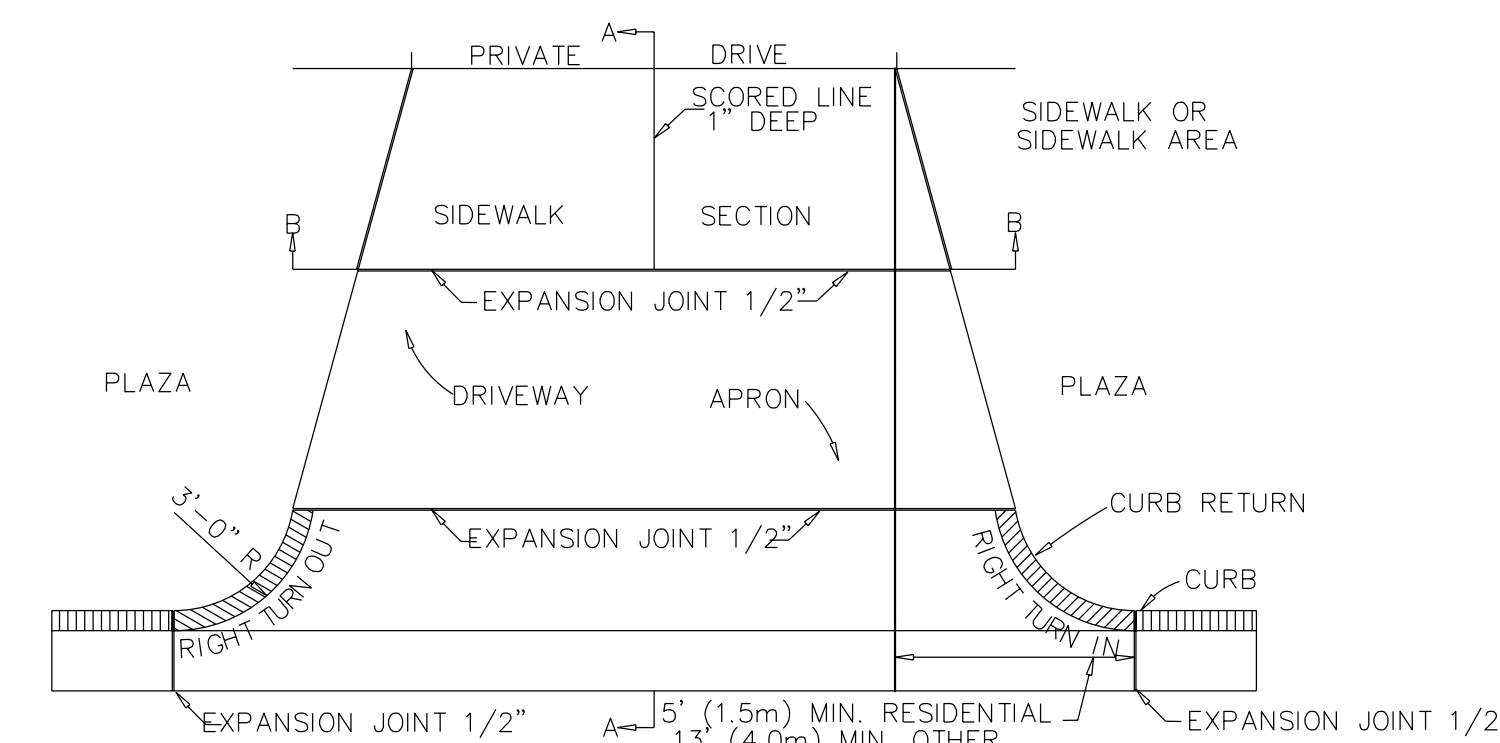


### MACLEOD COURT CUL DE SAC DETAIL

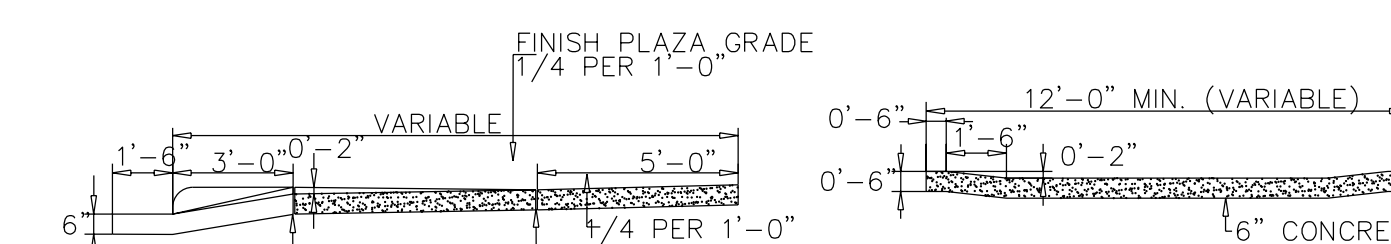
NTS



TYPE "H" CURB AND GUTTER  
SD 7-04  
NOT TO SCALE

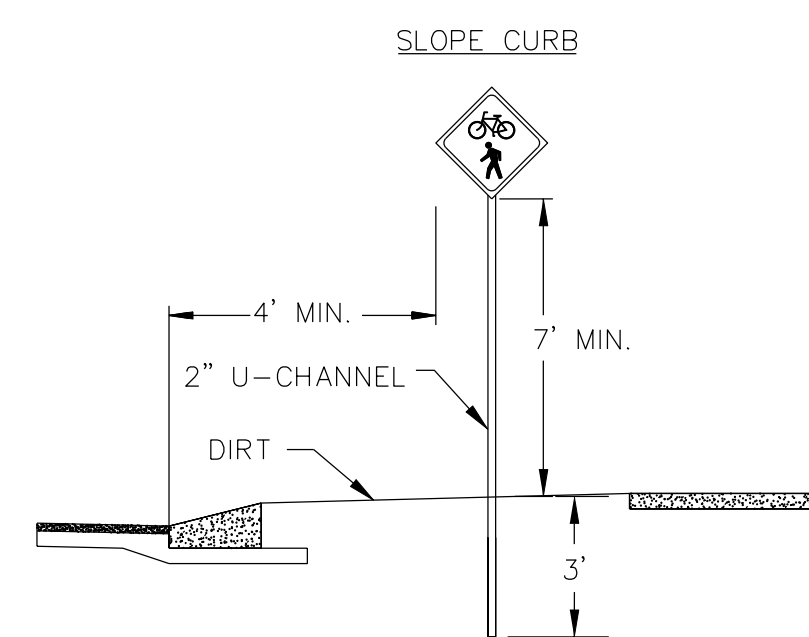


PAVEMENT PLAN

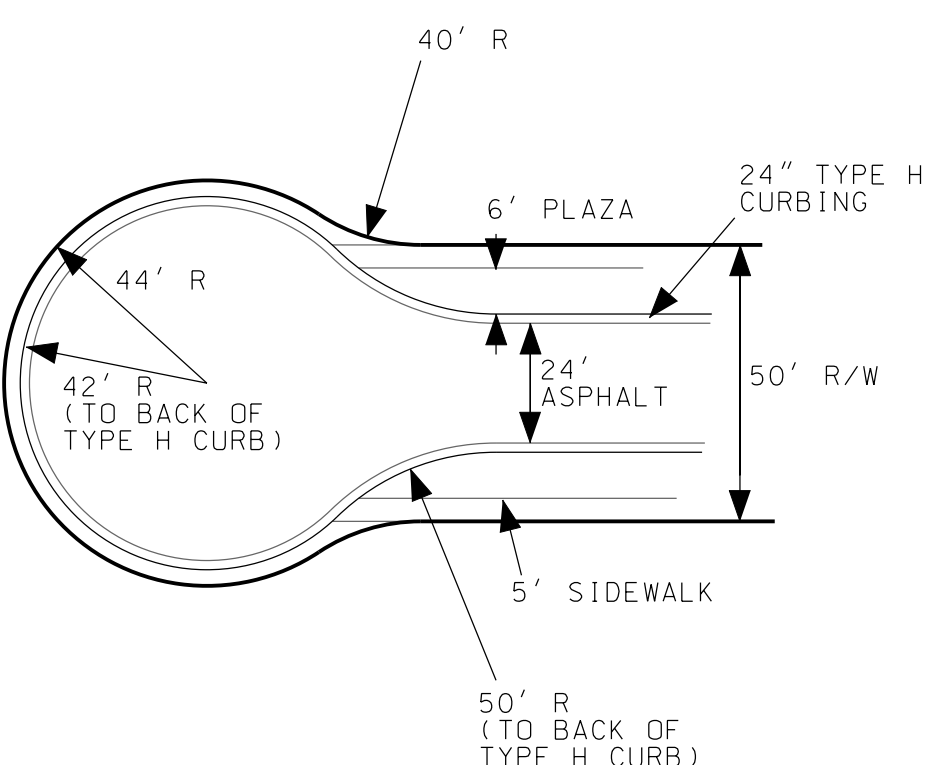


STANDARD DRIVEWAY DETAIL

SD 8-02  
NOT TO SCALE

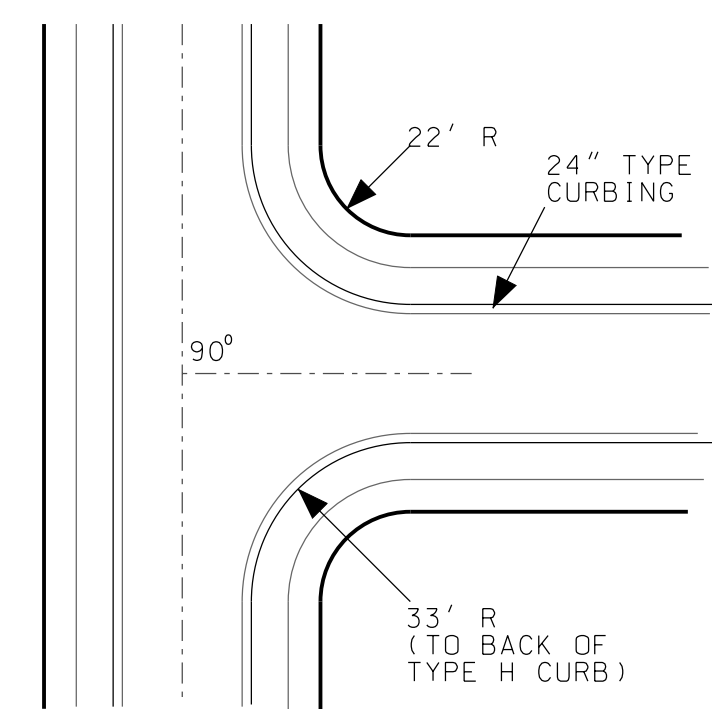


\*DETAILS SHOW VARIOUS TYPES AND LOCATION, BUT NOT ALL COMBINATIONS.



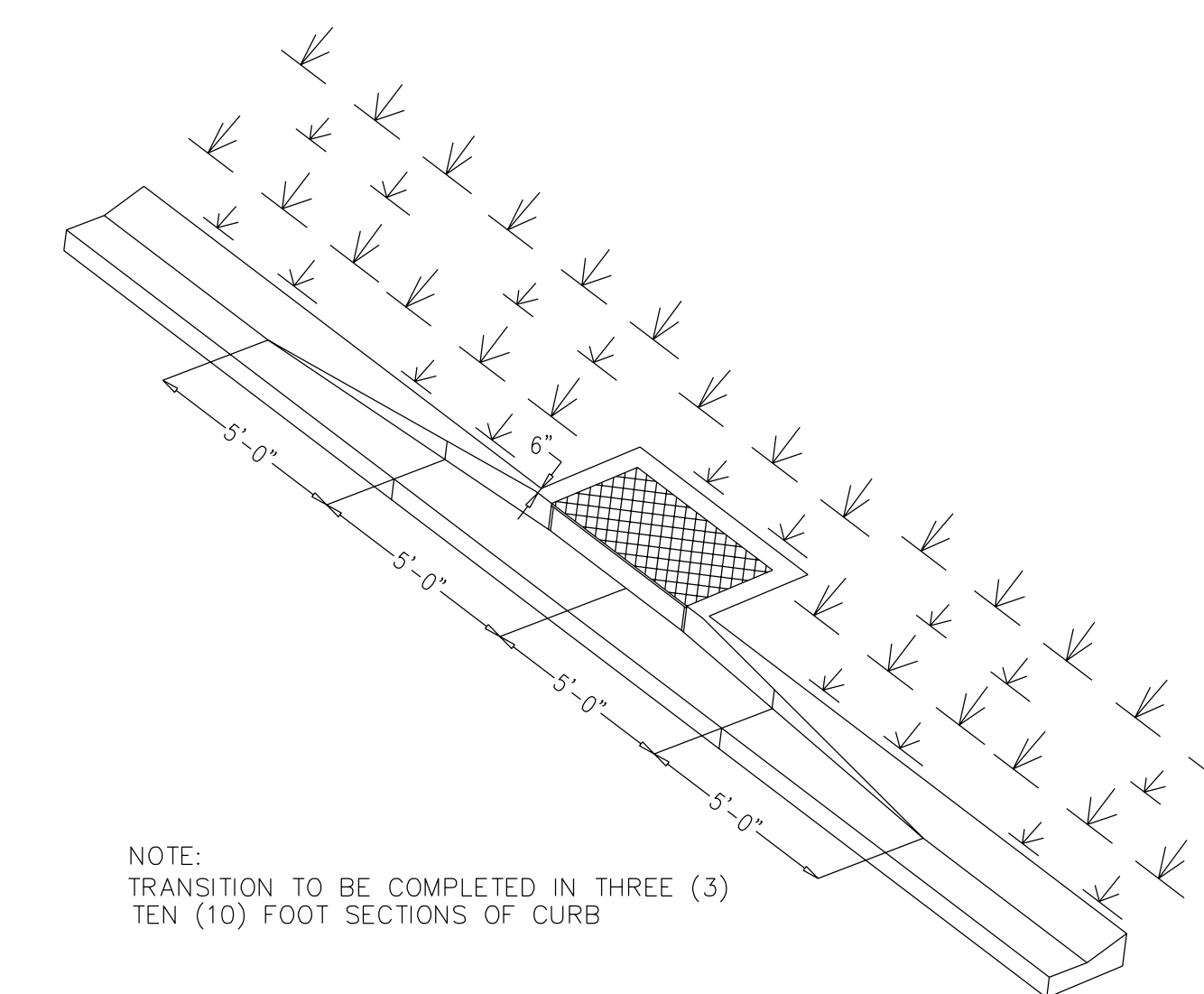
### GLENEAGLES DRIVE CUL DE SAC DETAIL

NTS



### INTERSECTION DETAIL

NTS



NOTE:  
TRANSITION TO BE COMPLETED IN THREE (3)  
TEN (10) FOOT SECTIONS OF CURB

TYPE "H" CURBING AROUND FACE BASIN TRANSITION SECTION

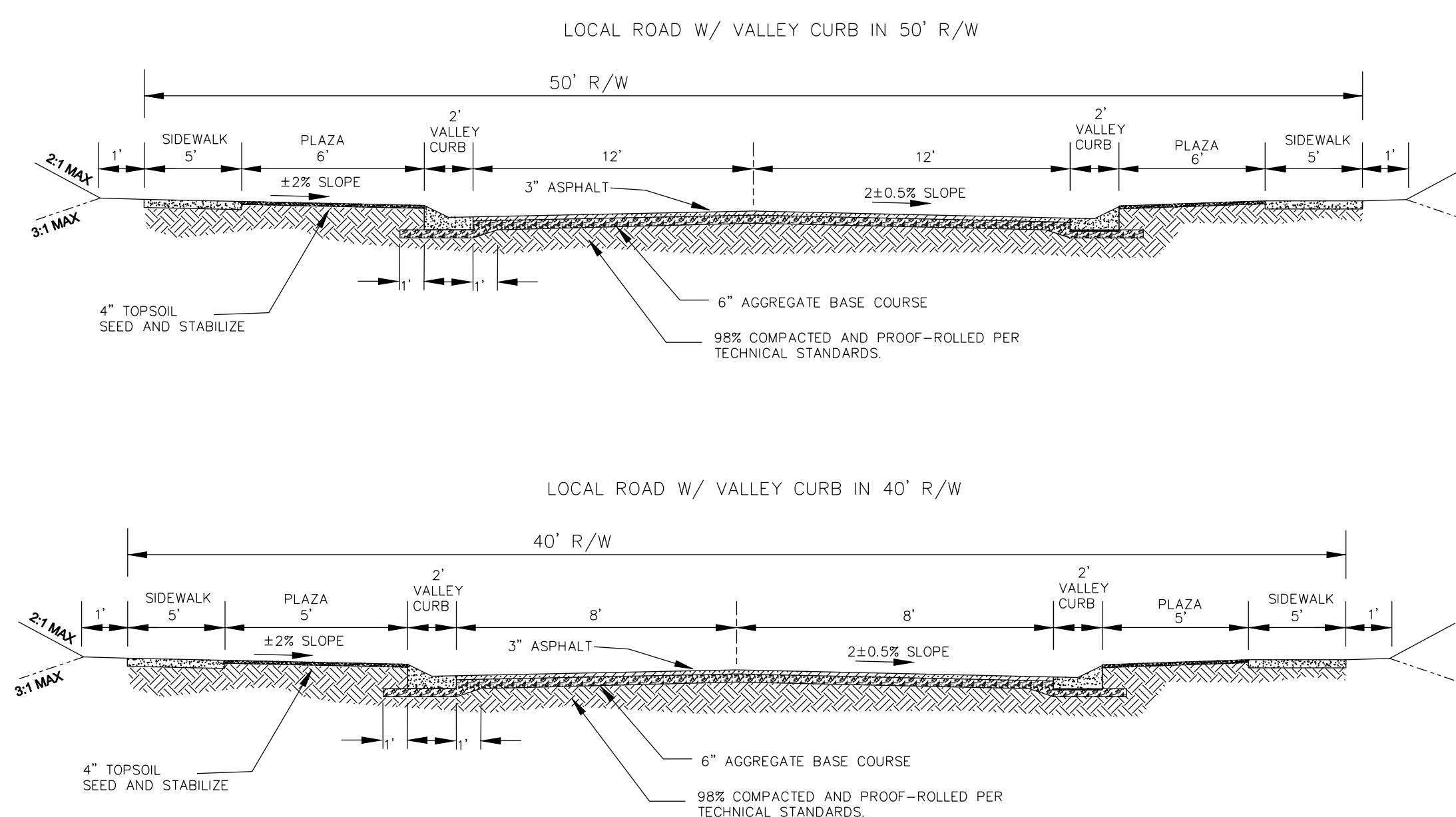
SDS 7-05  
NOT TO SCALE

#### SIGNS

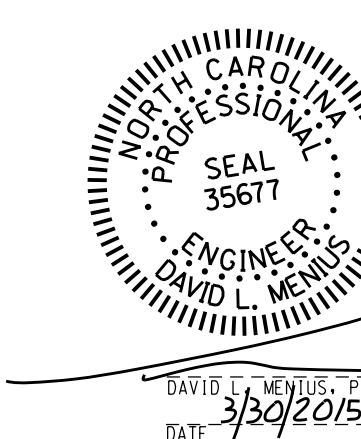
- All signs shall meet the requirements of MUTCD and City Traffic Engineering in effect at the time of construction.
- All Traffic Control Signs including multi-use paths shall be fabricated with 0.080 inch aluminum blanks using high intensity prismatic reflective sheeting Type IV or better. STOP signs shall be a minimum of 30"x30".
- SPECIAL DESIGNATION signs by location and type shall adhere to City of Wilmington signage plan (ie. downtown, historic, cross-city trail, parks, riverfront, scenic by-way, parking, etc. ) and all associated policies.
- POST MOUNTED STREET NAME SIGNS shall be fabricated with 9" extruded aluminum street name sign blanks using a standard cut-out. Minimum sign length is 18" long and increasing in 6" increments to 54" maximum as dictated by the number of letters in the name. The color scheme shall be white letters on a green background without a border. Generally, in the downtown and historic areas or as designated in the City of Wilmington signage plan the background shall be blue and contain a topper.
- Decorative sign posts shall consist of the NEX sign support system, 2" octagonal tube, 14 gauge, powder coated glossy black and include cap, post, base and wedge.
- All other sign posts shall be u-channel posts made of galvanized steel with 8" posts 2lbs/ft or 12" posts 3lbs/ft. Galvanized NEX post may be substituted with approval from the City Signs and Markings Engineer.
- OVERHEAD STREET NAME SIGNS shall be fabricated with 0.080 inch aluminum flat sign blanks 18" in height using a standard cut-out. Sign length will be dictated by the number of letters in the name. For mast-arm type traffic signal supports and other overhead support systems refer to the design plans for maximum sign length.
- All sign lettering, colors and fonts shall adhere to the MUTCD in effect at the time of construction. Florescent Yellow-Green shall be used on signs, in place of Yellow, when listed as an optional color in the MUTCD. Generally, the font will be FHWA series fonts (Highway Gothic.) Other font types require prior City Signs and Markings Engineer approval.

#### LOCATION

- Sign locations depend on the edge of road condition. Generally, signs shall be a minimum 2' from face of a vertical curb, 4' from front of slope face curb, and 6' from edge of pavement without curb. Signs shall not be located more than 12' from any of these locations.
- Sign posts installed in dirt shall be buried a minimum of 36". Octagonal posts shall utilize an anti-spin device, 6" in length minimum. Sign posts installed in concrete or brick shall utilize a base cast in concrete 24" x 12" diameter.
- Street name signs shall be installed 8'-6" from the ground to the bottom of the sign. Street name signs co-located with STOP signs shall be installed above the STOP sign. A 6" space shall be maintained between the STOP sign and a Street name sign that is parallel to the STOP sign face. All other signs should be mounted per MUTCD guidelines for Urban Areas.

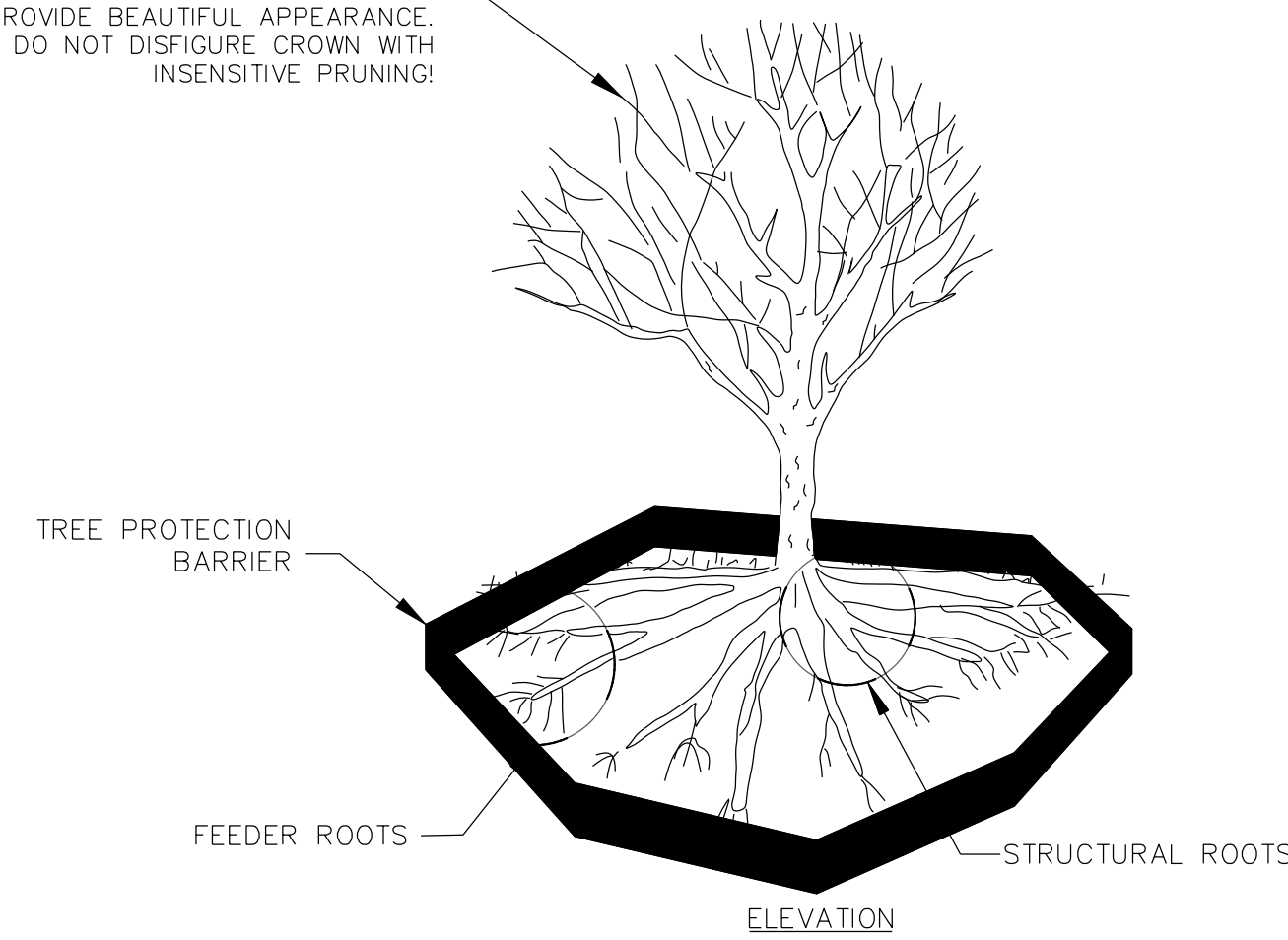


- NOTES:
- LANE WIDTH (W) AS GIVEN IN THE TECHNICAL STANDARDS
  - ALL CONCRETE TO BE 3000 PSI
  - HEADER CURB PERMITTED IN R-15 OR LOWER DENSITY ZONES OR TO MATCH EXISTING LOCAL CONDITIONS
  - COMBINE ROAD PROFILES, CURB TYPE, PARKING LANE, SIDEWALK, AND MULTI-USE PATHS AS APPROPRIATE
  - SEE CURB AND SIDEWALK DETAILS FOR APPLICABLE DIMENSIONS
  - MULTI-USE PATH MAY BE REDUCED TO 8' WHERE LIMITED BY EXISTING CONDITIONS
  - LARGER SECTIONS MAY BE REQUIRED FOR ROADS WITH HIGH TRAFFIC COUNTS
  - ADJACENT GROUND SLOPE EXCEEDING 3:1 DOWN FROM SIDEWALK REQUIRES GUARD RAIL



<b>ECHO WEST</b>		
CITY OF WILMINGTON	NEW HANOVER COUNTY	NORTH CAROLINA
OWNER: HOOSIER DADDY, LLC	DESIGNED: DLM	
ADDRESS: 6025 TARIN ROAD WILMINGTON, NC 28409	DRAWN: DLM	
PHONE: (252) 412-9622	APPROVED: JHF	
<b>STROUD ENGINEERING, P.A.</b>		DATE: 1/13/2015
102-D CINEMA DRIVE WILMINGTON, NORTH CAROLINA (910) 815-0775		SCALE: AS NOTED
LICENSE NO. C-0647		SHEET: 8.0

CROWN OF TREE IS NEEDED FOR LEAF GROWTH TO PRODUCE OXYGEN, FILTER THE AIR, REDUCE WIND, SOFTEN NOISE, AND PROVIDE BEAUTIFUL APPEARANCE. DO NOT DISFIGURE CROWN WITH INSENSITIVE PRUNING!



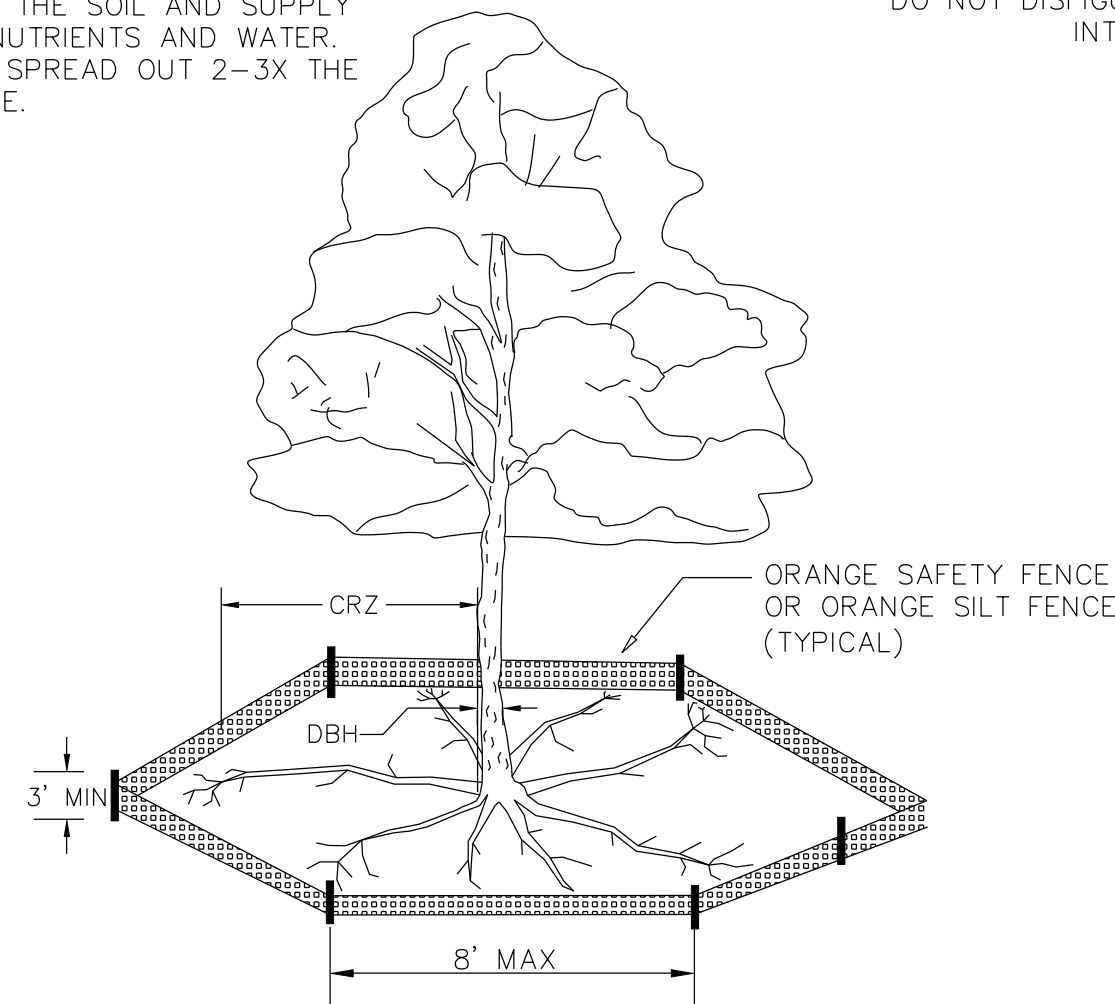
**TREE PROTECTION DURING CONSTRUCTION**

1. CLEARLY MARK THE TREES TO BE SAVED PRIOR TO CONSTRUCTION AND ERECT A PROTECTIVE BARRIER AT THE CRZ. TREE PROTECTION BARRIER SHALL BE MAINTAINED UNTIL CONSTRUCTION IS COMPLETE.
2. CRITICAL ROOT ZONE (CRZ) DISTANCE SHALL BE DETERMINED BY DIAMETER OF THE TREE AT BREAST HEIGHT.
3. DO NOT COMPACT SOIL BENEATH TREES. NO VEHICLE SHALL BE ALLOWED TO PARK UNDER TREES. NO HEAVY MATERIALS SHALL BE STORED BENEATH TREES. DAMPING THE BARK WITH LAWNMOWERS, CONSTRUCTION EQUIPMENT, OR ANYTHING ELSE IS PROHIBITED. CUTTING OF LARGE STRUCTURAL ROOTS LOCATED NEAR THE BASE OF THE TRUNK IS PROHIBITED.
4. CUT AND FILL WITHIN DIAMETER OF TREE CROWN.
5. WHERE SIDEWALKS AND PATHWAYS PASS WITHIN CRZ, EXTRA CARE SHALL BE TAKEN TO AVOID DAMAGE TO THE ROOTS. ALTERNATE CONSTRUCTION METHODS, SUCH AS A REINFORCED SIDEWALK, SHALL BE IMPLEMENTED AS NECESSARY.

NOTE:

THE CRITICAL ROOT ZONE (CRZ) OF A TREE IS WHERE THE MAJORITY OF A TREE'S ROOTS LAY. 85% OF MOST TREE ROOTS ARE FOUND IN THE TOP 24" OF THE SOIL AND SUPPLY THE MAJORITY OF NUTRIENTS AND WATER. GENERALLY, ROOTS SPREAD OUT 2-3X THE HEIGHT OF THE TREE.

NOTE: CROWN OF THE TREE IS NEEDED FOR LEAF GROWTH TO PRODUCE OXYGEN, FILTER THE AIR, REDUCE WIND AND SOFTEN NOISE. DO NOT DISFIGURE CROWN WITH INTENSIVE PRUNING.

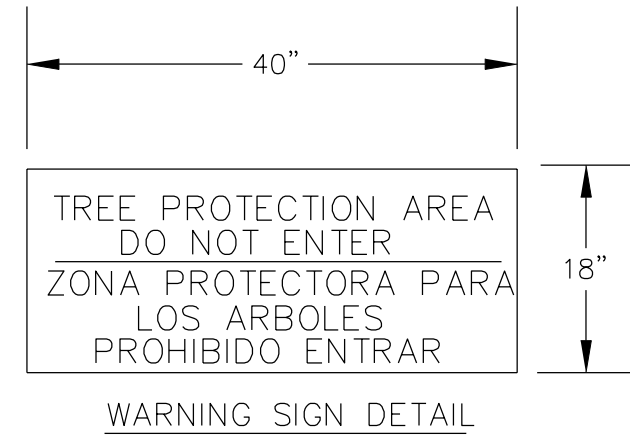
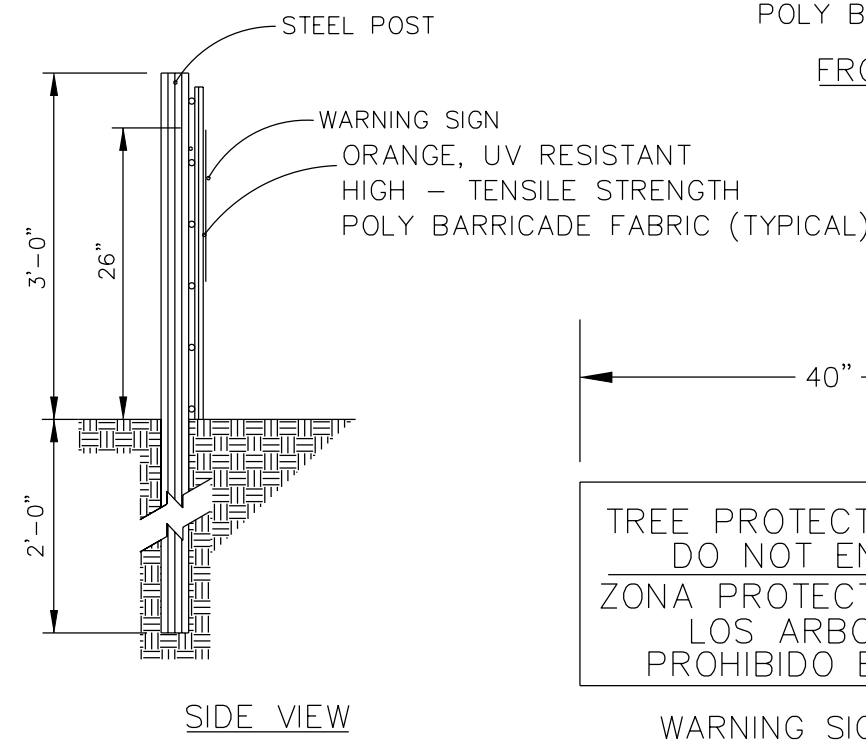
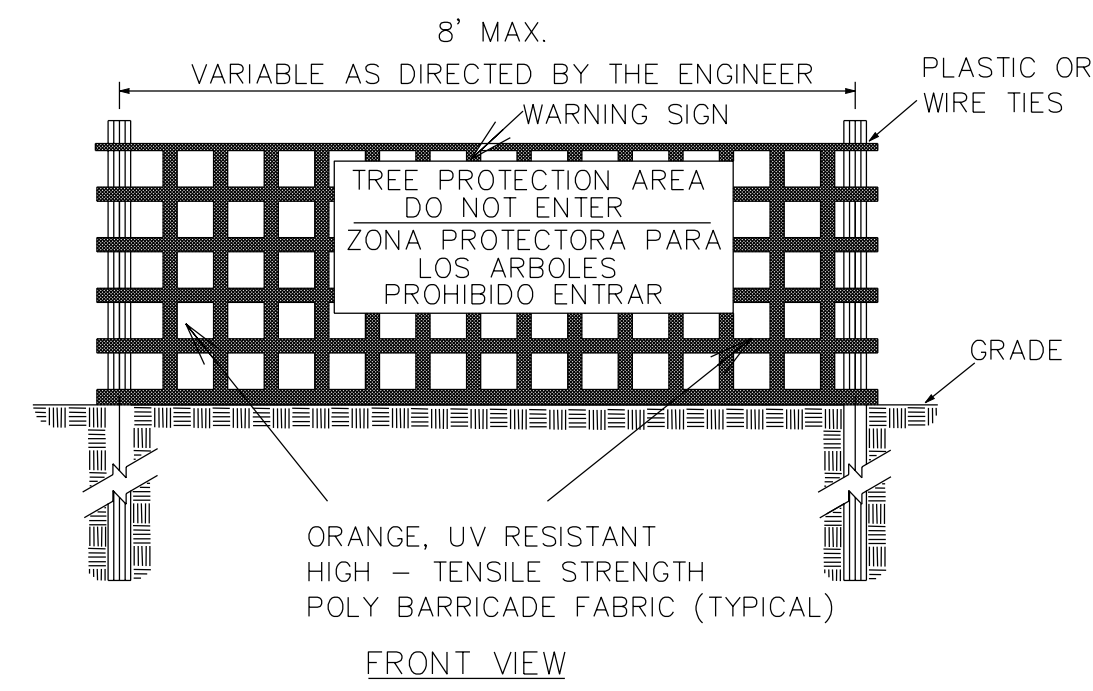


**NOTES:**

1. PROTECT CRITICAL ROOT ZONE (CRZ) OF TREES PRIOR TO CONSTRUCTION. CLEARLY MARK THE TREES AND ERECT A PROTECTIVE BARRIER AT THE CRZ. BARRIER SHALL BE MAINTAINED UNTIL CONSTRUCTION IS COMPLETE.
2. CRZ RADIUS IS 1 FT PER INCH OF TREE DIAMETER AT BREAST HEIGHT (DBH).
3. IF CONSTRUCTION OCCURS WITHIN THE CRZ, AT LEAST 12" OF MULCH AND/OR LOGGING MATS SHALL BE PLACED WHERE MACHINERY MANEUVERS TO REDUCE SOIL COMPACTION IN THIS ZONE.
4. WHERE SIDEWALKS AND PATHWAYS PASS WITHIN CRZ, EXTRA CARE SHALL BE TAKEN TO AVOID DAMAGE TO THE ROOTS. ALTERNATE CONSTRUCTION METHODS, SUCH AS A REINFORCED SIDEWALK, SHALL BE IMPLEMENTED AS NECESSARY.
5. FOR ALL TREES, CUTTING OF LARGE STRUCTURAL ROOTS LOCATED NEAR THE BASE

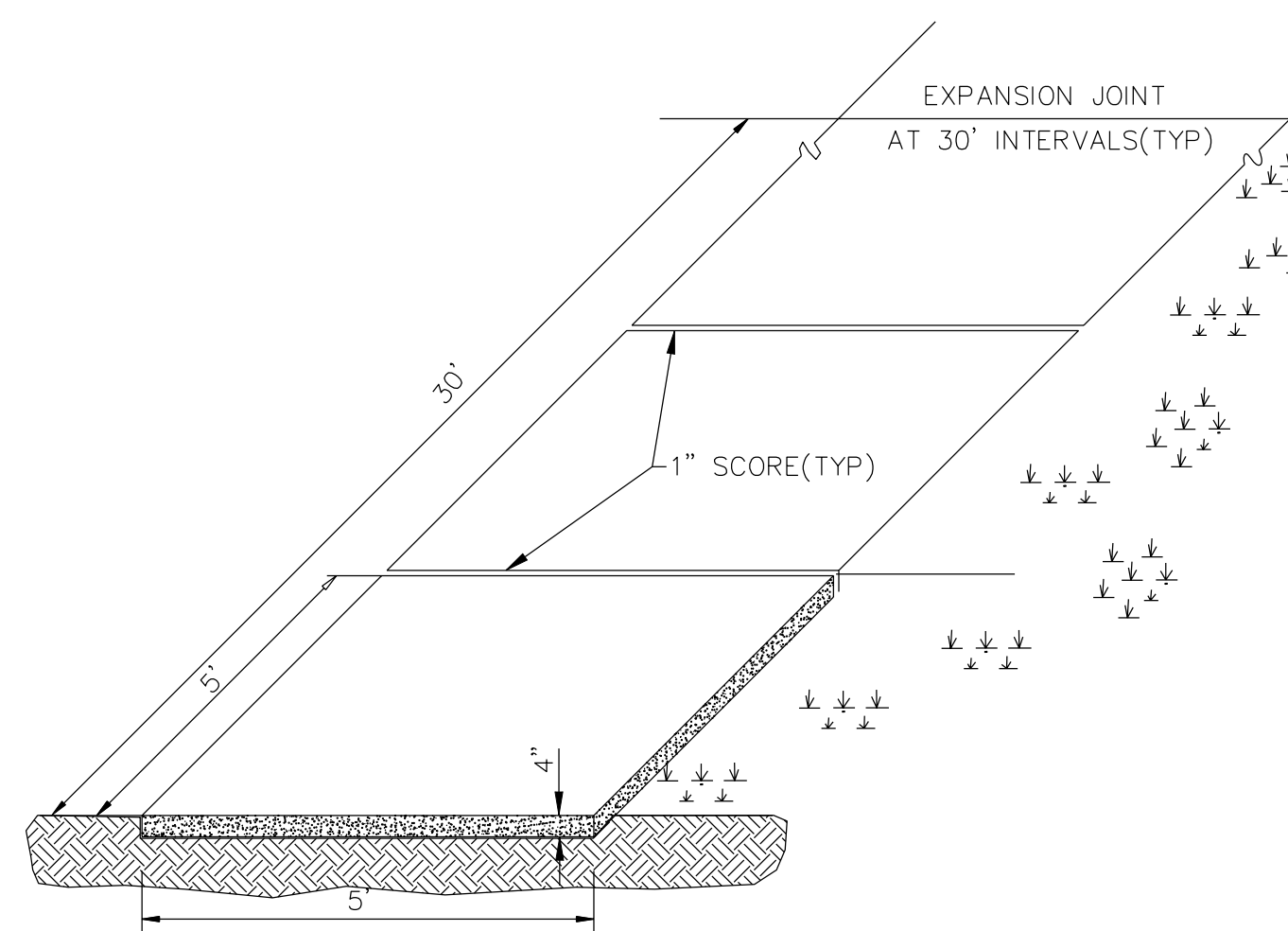
OF THE TRUNK IS PROHIBITED. DO NOT COMPACT SOIL BENEATH TREES. NO VEHICLE SHALL BE ALLOWED TO PARK UNDER TREES. NO MATERIALS OR EQUIPMENT SHALL BE STORED BENEATH TREES. DAMPING THE BARK WITH LAWNMOWERS, CONSTRUCTION EQUIPMENT, OR ANYTHING ELSE IS PROHIBITED. CONTRACTOR SHALL REPAIR DAMAGE TO TREES.

6. FAILING TO INSTALL OR MAINTAIN PROTECTION MEASURES SHALL RESULT IN A STOP WORK ORDER AND FINE OF \$500/DAY. DISTURBANCE OTHER THAN THAT ALLOWED ON THE APPROVED PLAN WILL REQUIRE OWNER TO POST A LETTER OF CREDIT FOR 3 YRS FOR TREE MITIGATION.



**NOTES:**

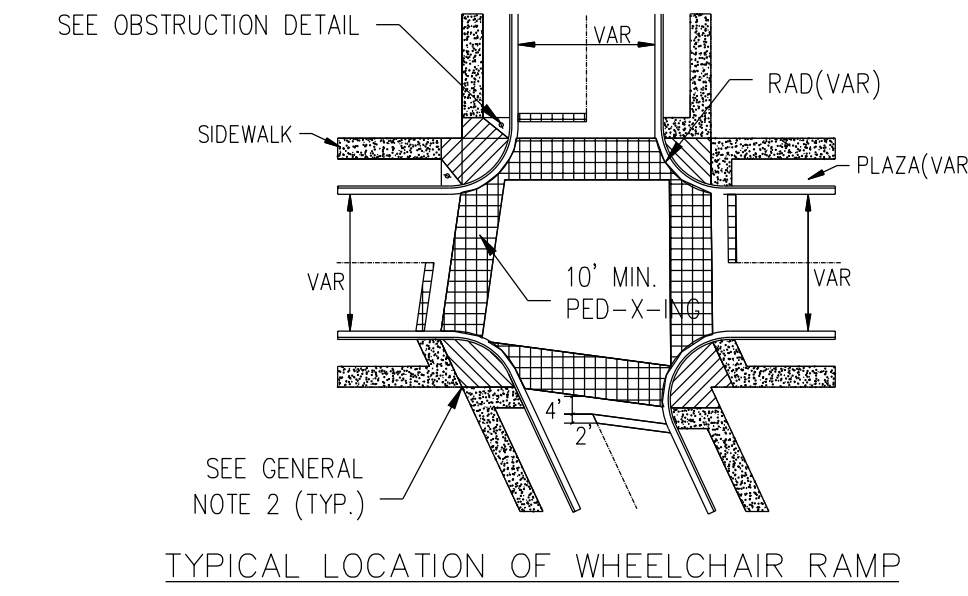
1. THE TREE PROTECTION FENCING SHALL NOT BE VIOLATED FOR THE ENTIRE DURATION OF THE PROJECT WITHOUT APPROVAL FROM URBAN FORESTRY STAFF.
2. WARNING SIGNS TO BE MADE OF DURABLE, WEATHERPROOF MATERIAL. LETTERS TO BE 3" HIGH, MINIMUM. CLEARLY LEGIBLE AND SPACED AS DETAILED.
3. SIGNS SHALL BE PLACED AT 50' MAXIMUM INTERVALS. PLACE A SIGN AT EACH END OF LINEAR TREE PROTECTION AND 50' ON CENTER THEREAFTER. FOR TREE PROTECTION AREAS LESS THAN 100' IN PERIMETER, PROVIDE NO LESS THAN TWO SIGNS PER PROTECTION AREA.
4. ATTACH SIGNS SECURELY TO FENCE POSTS AND FABRIC. MAINTAIN TREE PROTECTION FENCE AND SIGNS THROUGHOUT DURATION OF PROJECT.
5. TREE PROTECTION FENCING AND SIGNAGE SHALL BE REMOVED AFTER CONSTRUCTION.
6. ADDITIONAL SIGNS MAY BE REQUIRED BY CITY OF WILMINGTON, BASED ON ACTUAL FIELD CONDITIONS.



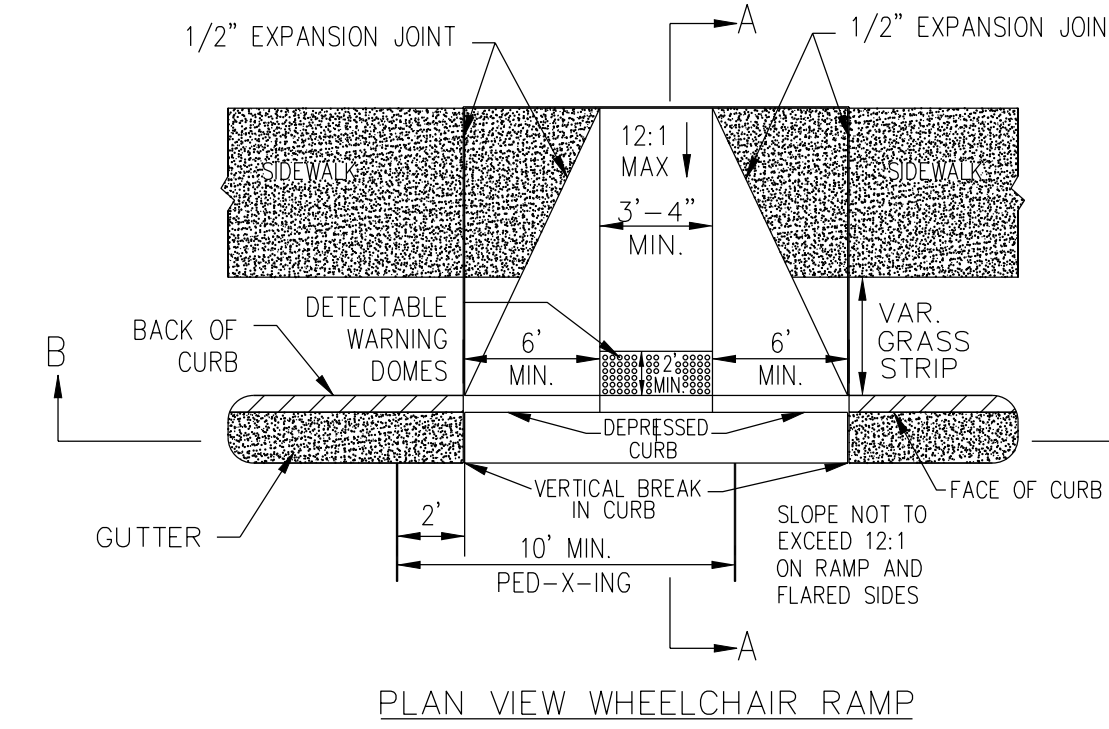
**NOTES:**

1. JOINT MATERIAL TO COMPLY WITH CURRENT NCDOT STANDARDS.
2. SANITARY SEWER CLEAN-OUTS, WATER METERS, MANHOLES, AND VALVE LIDS TO BE LOCATED OUTSIDE SIDEWALK WHERE FEASIBLE.
3. MINIMUM SIDEWALK WIDTH TO BE 6' MINIMUM IF PLACED AT BACK OF CURB.
4. CONCRETE FOR ALL SIDEWALKS (EXCEPT ANY PORTION CONTAIN WITHIN A DRIVEWAY APRON) SHALL BE CLASS "A" - 3,000 PSI.
5. MINIMUM REPLACEMENT FOR REPAIRS IS A 5' X 5' PANEL.
6. 4" STONE BASE MAY BE REQUIRED FOR POOR SOIL CONDITIONS.
7. MINIMUM DEPTH FOR TUNNELING BELOW SIDEWALK IS 12"
8. MAX ADJACENT GROUND SLOPE WITHOUT RAILING IS 2:1
9. MIN GRADE FOR PROPER DRAINAGE IS 1% IN AT LEAST 1 DIRECTION. MAX CROSS SLOPE IS 2%. MAX LONGITUDINAL SLOPE IS 8.3%, 10% IF LIMITED BY EXISTING CONDITIONS, OR NO GREATER THAN THE SLOPE OF THE EXISTING ADJACENT ROAD.

SIDEWALK  
SD 5-10



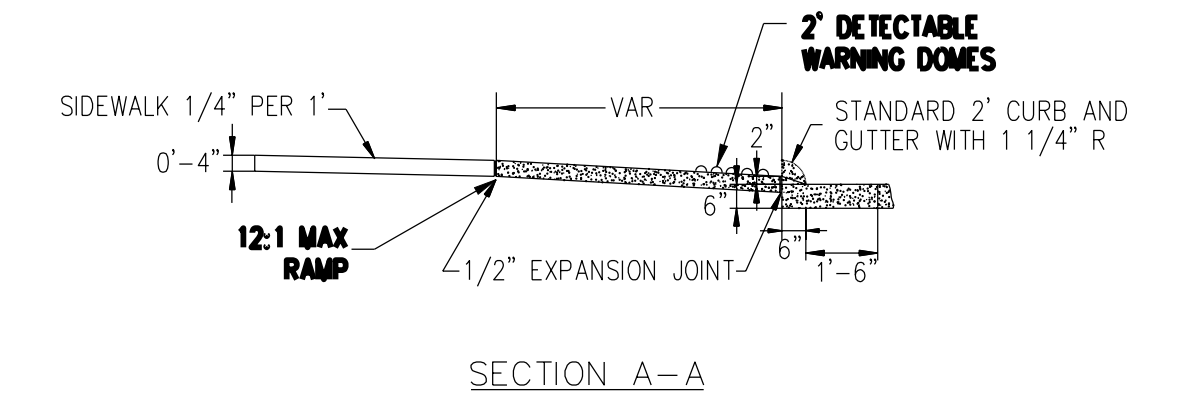
TYPICAL LOCATION OF WHEELCHAIR RAMP



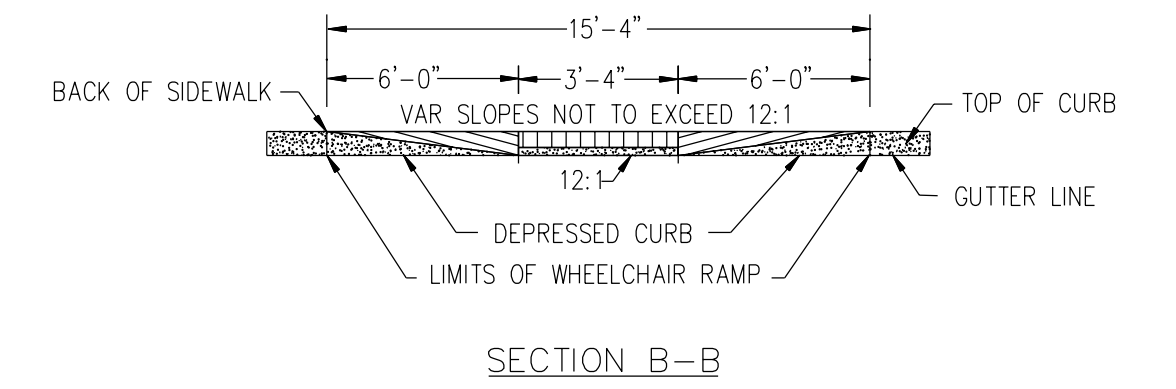
PLAN VIEW WHEELCHAIR RAMP

**GUIDELINES FOR WHEELCHAIR RAMPS & DEPRESSED CURBS**

SD 8-10



SECTION A-A



SECTION B-B

**GENERAL NOTES**

1. LOCATION OF WHEELCHAIR RAMPS:
  1. IN ACCORDANCE WITH THE RATIFIED HOUSE BILL 1296, ALL STREET CURBS IN NORTH CAROLINA BEING CONSTRUCTED OR RECONSTRUCTED FOR MAINTENANCE PROCEDURES, TRAFFIC OPERATIONS, REPAIRS, CORRECTION OF UTILITIES OR ALTERED FOR ANY REASON AFTER SEPTEMBER 1, 1973 SHALL PROVIDE WHEELCHAIR RAMPS FOR THE PHYSICALLY HANDICAPPED AT ALL INTERSECTIONS WHERE BOTH CURB AND GUTTERS AND SIDEWALKS ARE PROVIDED AND AT OTHER MAJOR POINTS OF PEDESTRIAN FLOW.
  2. WHEELCHAIR RAMPS SHOULD BE LOCATED AS INDICATED IN DETAIL DRAWINGS, HOWEVER EXISTING LIGHT POLES, FIRE HYDRANTS, DROP INLETS, ETC. MAY AFFECT PLACEMENT.
- II. CONSTRUCTION NOTES:
  1. NO SLOPE SHALL EXCEED 1"=1" (12:1) ON THE RAMP OR SIDEWALK.
  2. IN NO CASE SHALL THE WIDTH OF WHEELCHAIR RAMPS BE LESS THAN 40" (3'-4"). WIDTHS MAY EXCEED 40" IF NECESSARY.
  3. USE CLASS "A" CONCRETE WITH THE SURFACE HAVING A ROUGH, NON-SKID TYPE FINISH.
  4. 1/2" EXPANSION JOINT WILL BE REQUIRED WHERE THE CONCRETE WHEELCHAIR RAMP JOINS ANY RIGID PAVEMENT OR STRUCTURE.
  5. CONSTRUCTION METHODS SHALL CONFORM WITH THOSE OF THE GOVERNING BODY WHICH HAS JURISDICTION OF THE PARTICULAR STREET.
- III. ADDITIONAL NOTES:
  1. THE INSIDE PEDESTRIAN CROSSWALK LINES SHALL BE ESTABLISHED BY BISECTING THE INTERSECTION RADII WHERE MARKED (SEE NOTE 6).
  2. THE WHEELCHAIR RAMP SHALL BE LOCATED SO THAT THE BEGINNING OF THE WHEEL CHAIR RAMP WILL BE TWO FEET FROM THE INSIDE PEDESTRIAN CROSSWALK LINE.
  3. THE WIDTH OF THE PEDESTRIAN CROSSWALK SHALL BE 10 FEET UNLESS A GREATER WIDTH IS REQUIRED TO ACCOMMODATE THE PEDESTRIAN TRAFFIC.
  4. STOP BARS SHALL BE USED WHERE IT IS IMPORTANT TO INDICATE THE POINT BEHIND WHICH VEHICLES ARE REQUIRED TO STOP IN COMPLIANCE WITH A TRAFFIC SIGNAL, STOP SIGN, OR OTHER LEGAL REQUIREMENTS.
  5. PARKING SHALL BE ELIMINATED A MINIMUM OF 20 FEET BACK OF PEDESTRIAN CROSSWALK.
  6. ALL PAVEMENT MARKINGS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES, PUBLISHED BY THE FEDERAL HIGHWAY ADMINISTRATION. THIS IS AVAILABLE FROM THE SUPERINTENDENT OF DOCUMENTS, U.S. GOVERNMENT PRINTING OFFICE, WASHINGTON, D.C. 20402.

**GUIDELINES FOR WHEELCHAIR RAMPS**

SD 8-09

**DETAILS**

**ECHO WEST**

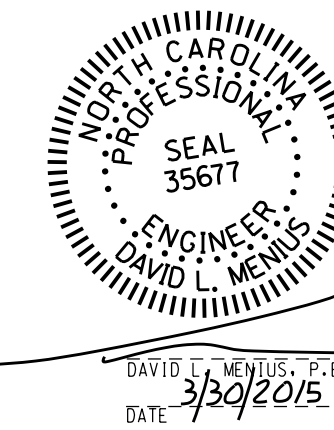
CITY OF WILMINGTON NEW HANOVER COUNTY NORTH CAROLINA

OWNER: HOOSIER DADDY, LLC  
ADDRESS: 6025 TARIN ROAD WILMINGTON, NC 28409  
PHONE: (252) 412-9622

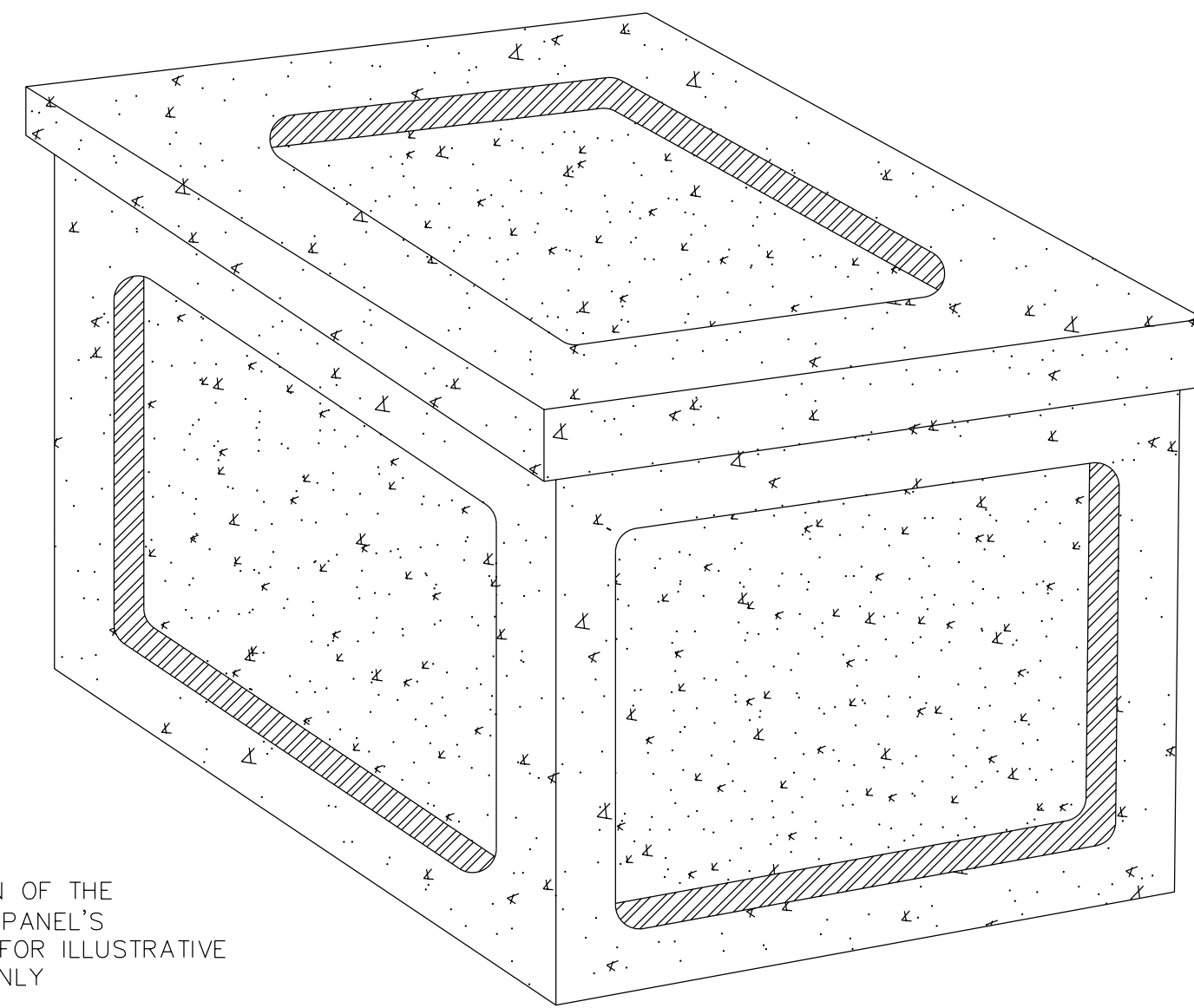
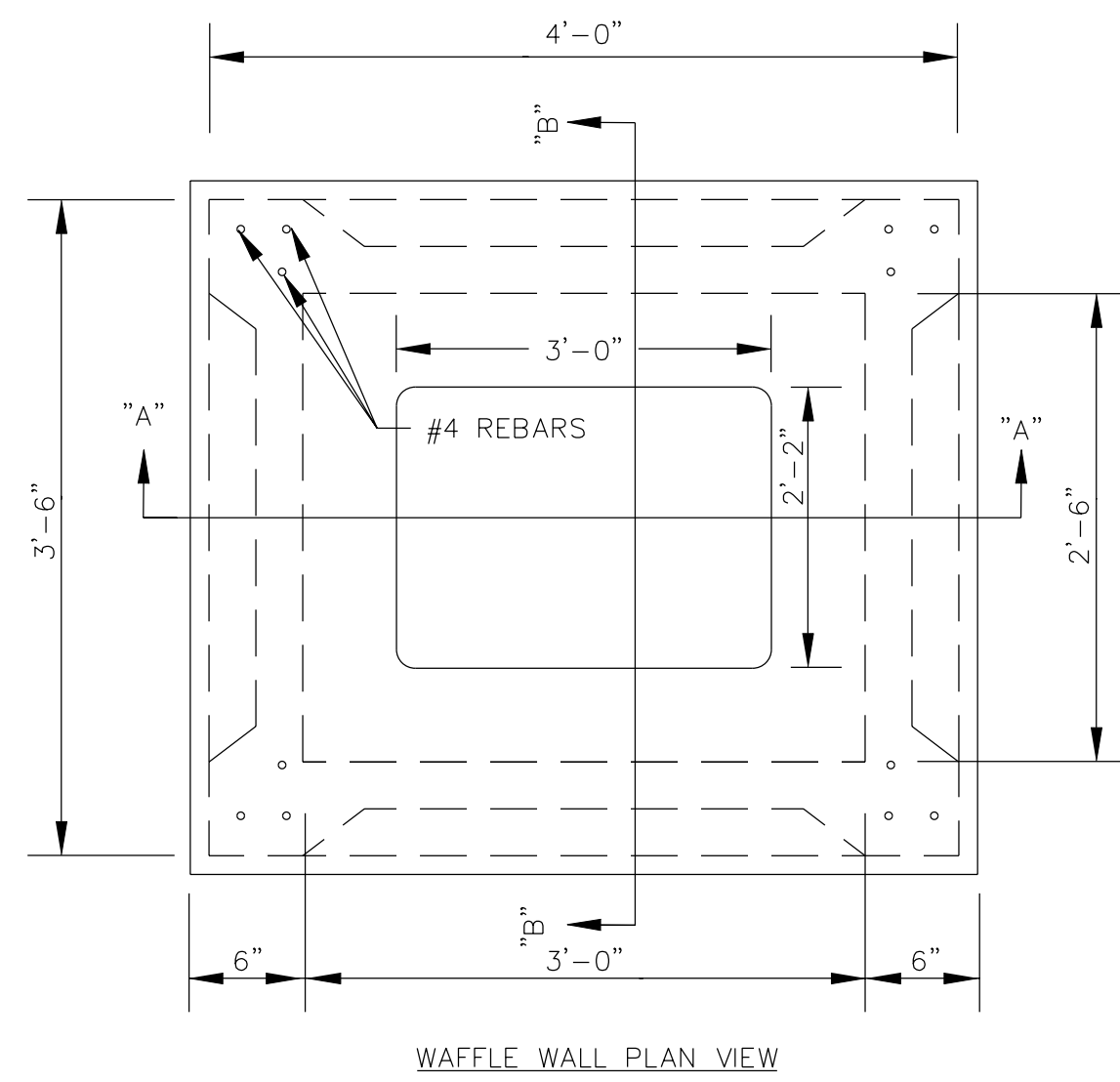
DESIGNED: DLM  
DRAWN: DLM  
APPROVED: JHF

**STROUD ENGINEERING, P.A.**  
102-D CINEMA DRIVE WILMINGTON, NORTH CAROLINA (910) 815-0775

DATE: 1/13/2015  
SCALE: AS NOTED  
SHEET: 8.1



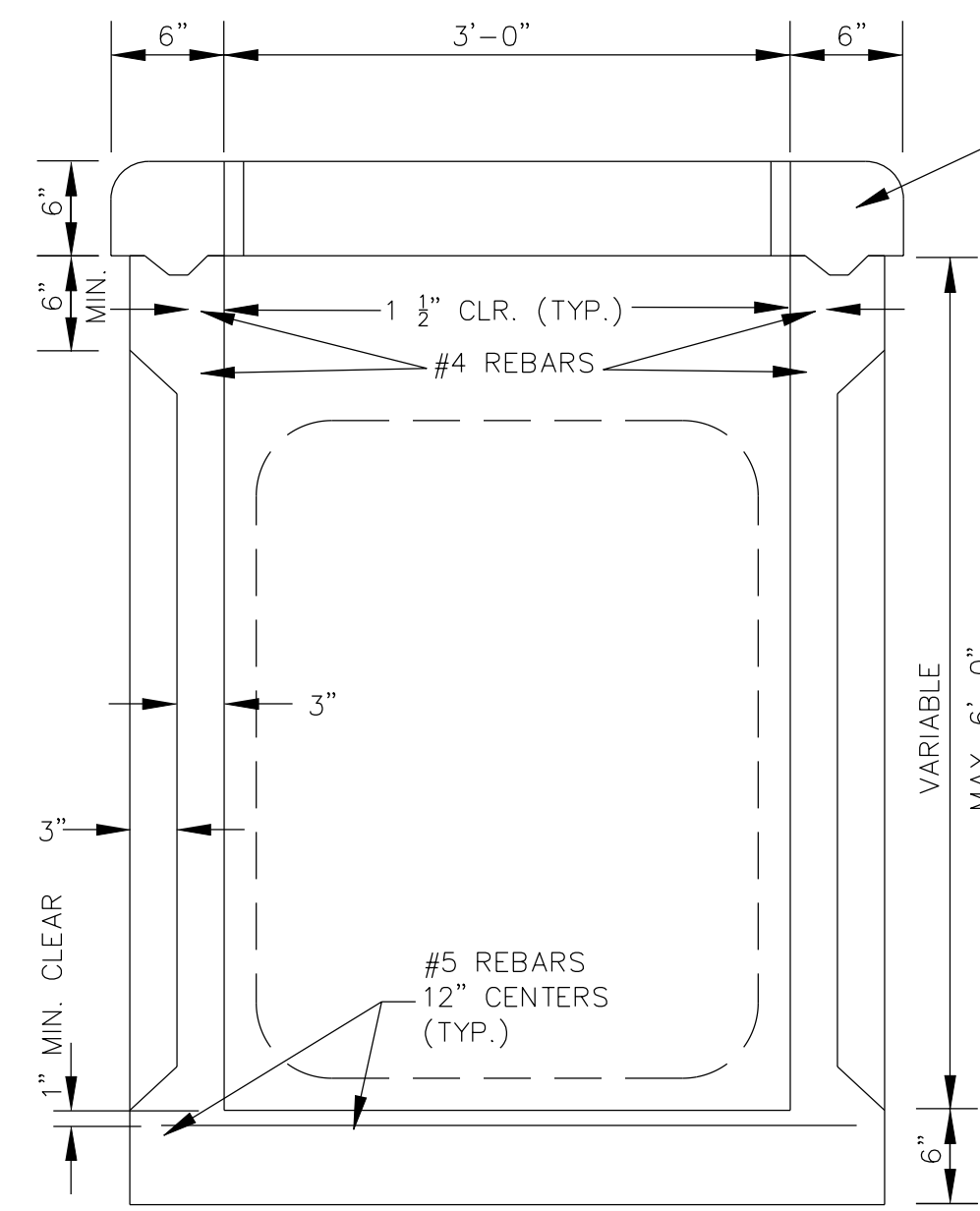
LICENSE NO. C-0647



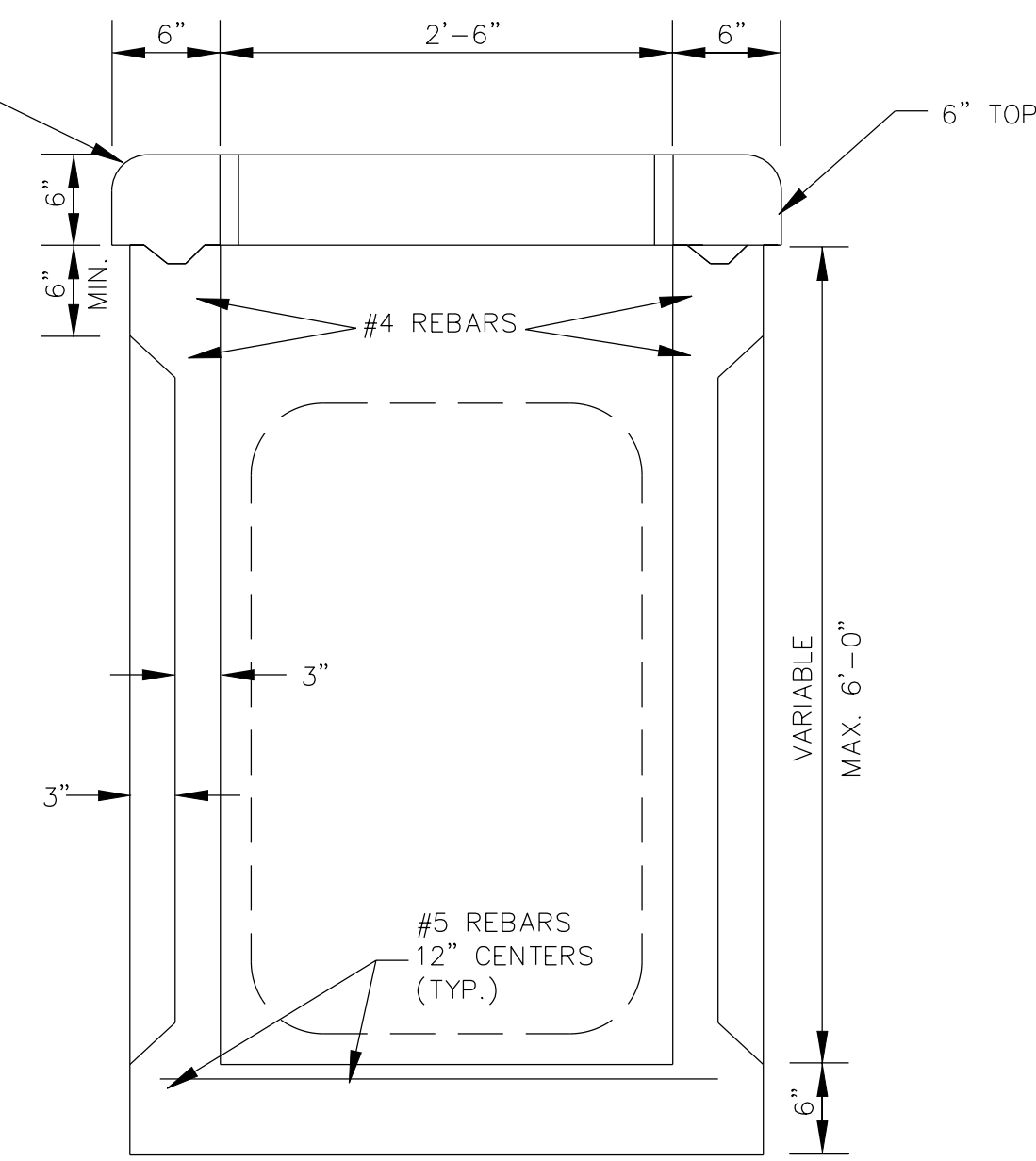
NOTE:  
THE PATTERN OF THE  
KNOCK-OUT PANEL'S  
ARE SHOWN FOR ILLUSTRATIVE  
PURPOSES ONLY

NOTE: SEE SD-230 FOR GENERAL NOTES.

WAFLE WALL ISOMETRIC VIEW



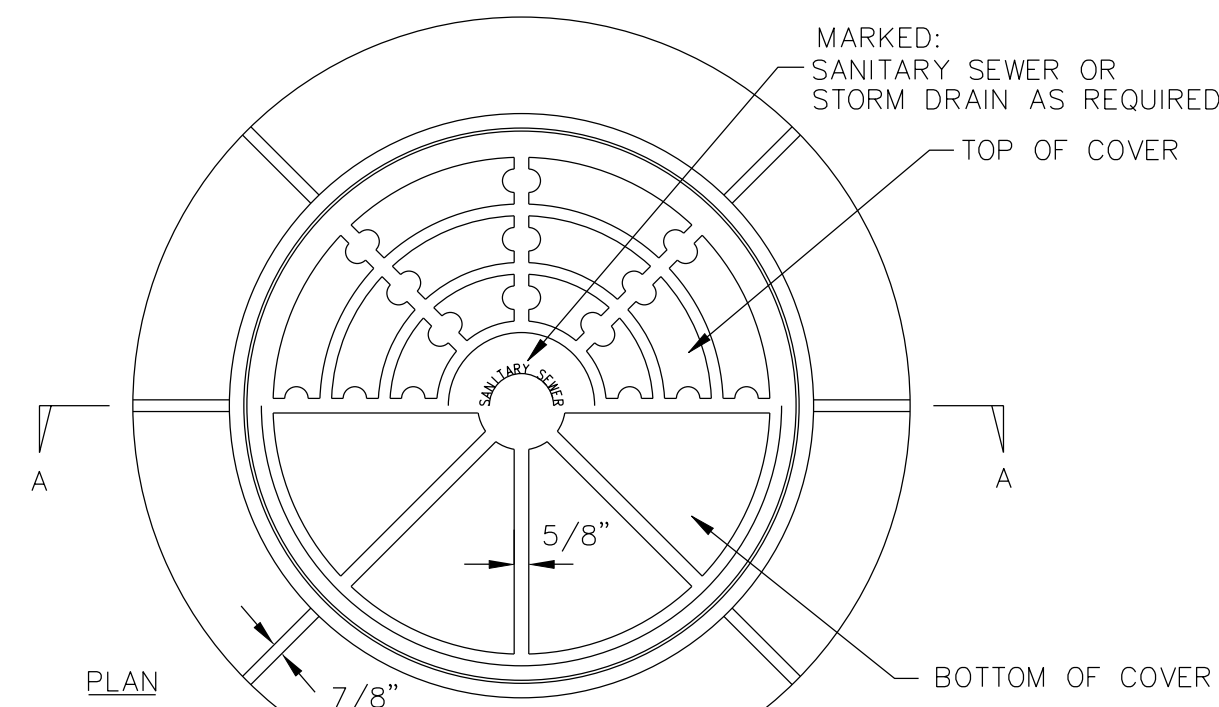
SECTION "A-A"



SECTION "B-B"

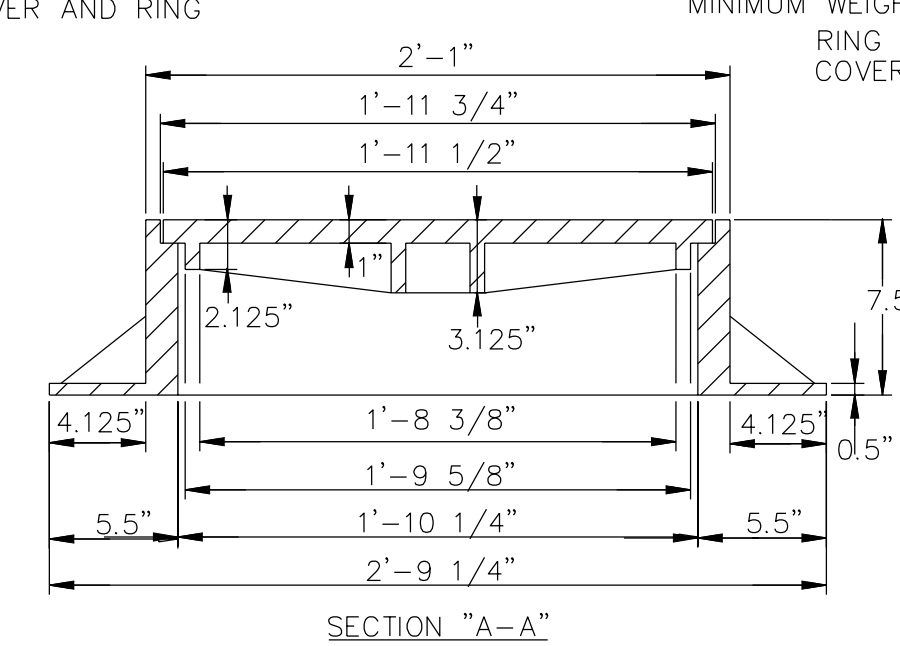
GENERAL NOTES:

- \* USE 4000 PSI CONCRETE. PROVIDE FOR H-20 TRAFFIC LOADING.
- \* PROVIDE ALL REINFORCING STEEL WHICH MEETS ASTM A615 FOR GRADE 60 AND WELDED WIRE FABRIC CONFORMING TO ASTM A185.
- \* LIMIT MAXIMUM DEPTH TO TOP OF BOTTOM SLAB FOR WAFLE WALL STRUCTURE TO 6'-0".
- \* PLACE LIFT HOLES OR PINS IN ACCORDANCE WITH OSHA STANDARD 1926.704
- \* SAW CUT, CORE DRILL OR FORM OPENINGS, FOR PIPE TO PROVIDE REQUIRED SIZE AND LOCATION. ORIENT WAFLE WALL STRUCTURES SO THAT PIPES ENTER THROUGH THE KNOCKOUT/WAFLE PANELS ONLY. SEAL OPENINGS WITH HYDRAULIC CEMENT.
- \* ALL ELEMENTS PRECAST TO MEET ASTM C913.
- \* SET ON 6" WASHED STONE
- \* FRAME AND GRATE HEIGHT MAY BE ADJUSTED WITH BRICK.
- \* PROVIDE PRECAST STRUCTURES OVER 4'-0" IN DEPTH WITH STEPS/LADDER INSTALLED IN ACCORDANCE WITH ASHA STANDARD 1910.27 AND AS FIELD CONDITIONS DICTATE.
- \* WELDED WIRE FABRIC MAY BE SUBSTITUTED FOR REBAR AS LONG AS THE SAME AREA OF STEEL IS PROVIDED.
- \* SEAL JOINTS WITH A FLEXIBLE BUTYL RUBBER BASE CONFORMING TO FEDERAL SPECIFICATION SS-5-21A, AASHTO M-19B, TYPE B - BUTYL RUBBER.
- \* LIMIT MAXIMUM STRUCTURE SIZE TO INSIDE CLEAR DIMENSIONS OF 2'-6" x 3'-0".
- \* USE FRAME AND GRATE AS PER SD-19.
- \* GROUT INVERT TO PROVIDE SMOOTH FLOW

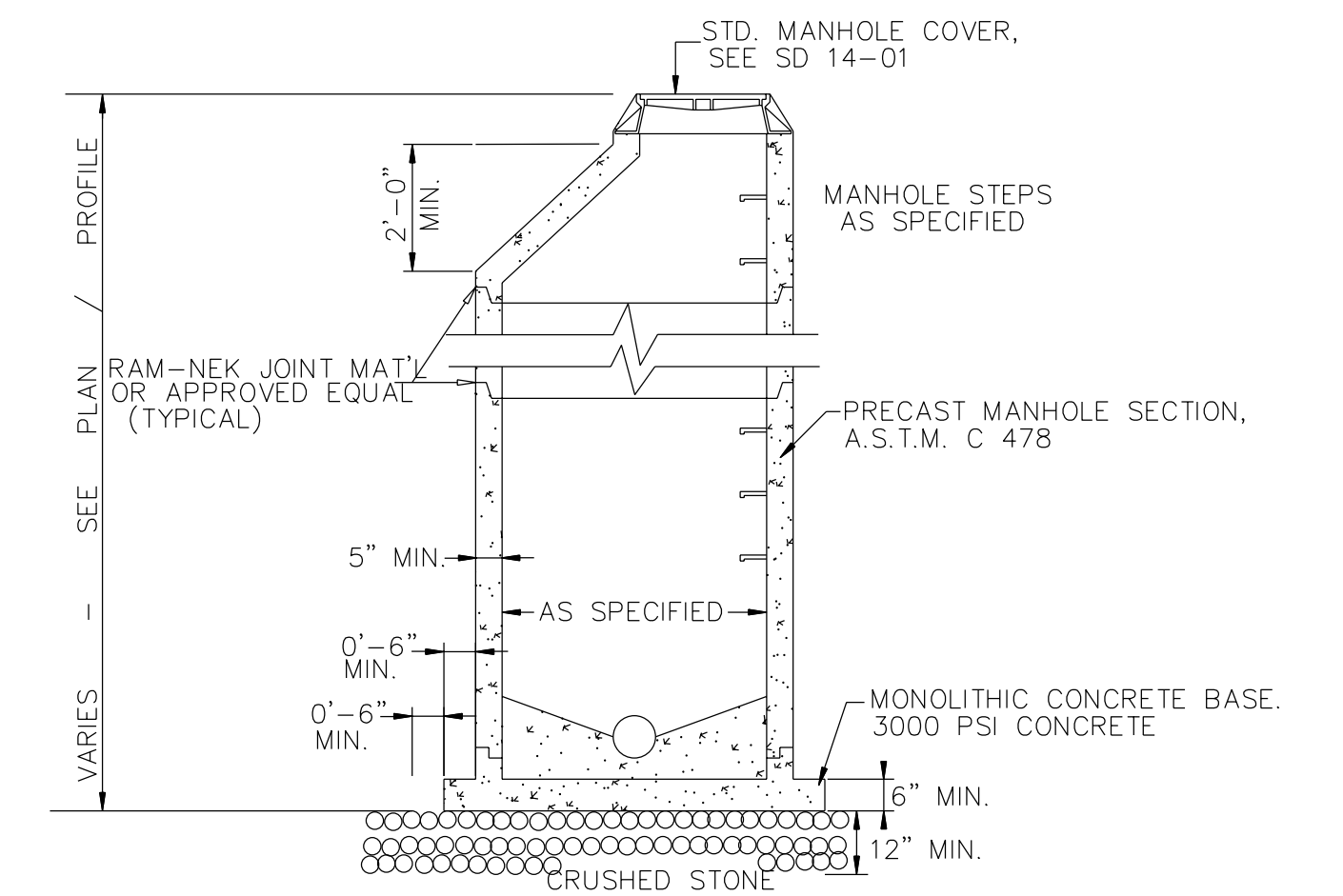


NOTE:  
RING & COVER CONTACT SURFACES SHALL  
BE MACHINED TO INSURE EVEN BEARING  
OF COVER AND RING

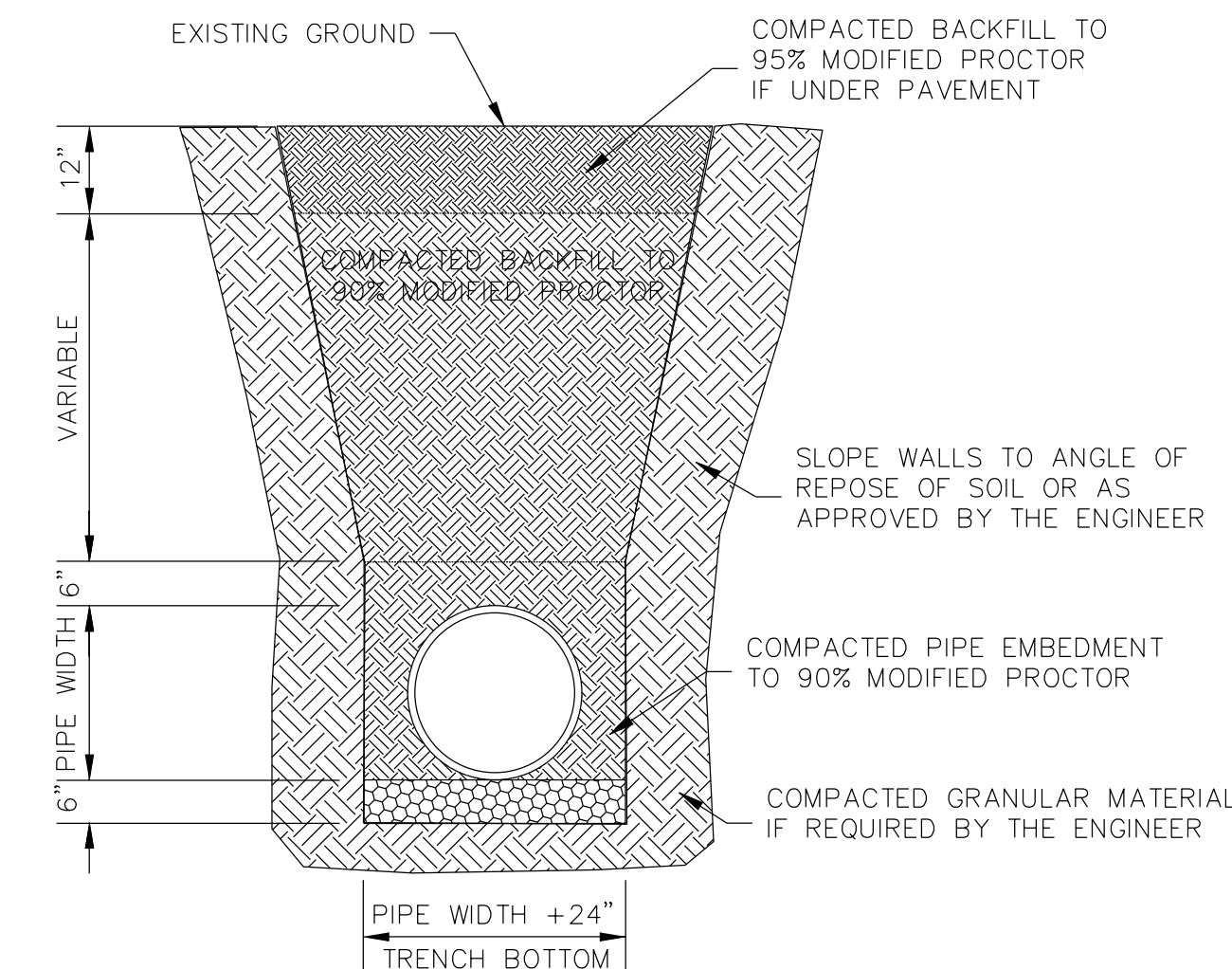
MINIMUM WEIGHTS:  
RING 261 LBS.  
COVER 120 LBS.



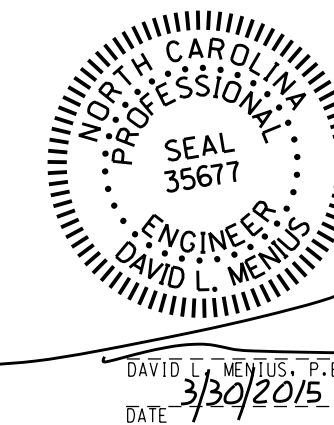
SECTION "A-A"



NOTE:  
EXTENDED BASE MAY NOT BE REQUIRED WHERE MANHOLES  
ARE GREATER THAN 4 FEET INSIDE DIAMETER



STANDARD PIPE TRENCH DETAIL  
SD 1-07  
NOT TO SCALE



CITY OF WILMINGTON			NEW HANOVER COUNTY		NORTH CAROLINA	
<b>ECHO WEST</b>						
OWNER: HOOSIER DADDY, LLC						DESIGNED: DLM
ADDRESS: 6025 TARIN ROAD						DRAWN: DLM
WILMINGTON, NC 28409						APPROVED: JHF
PHONE: (252) 412-9622						DATE: 1/13/2015
<b>STROUD ENGINEERING, P.A.</b> 102-D CINEMA DRIVE WILMINGTON, NORTH CAROLINA (910) 815-0775						SCALE: AS NOTED
						SHEET: 8.2
						LICENSE NO. C-0647

NPDES STABILIZATION TIMEFRAMES		
SITE AREA DESCRIPTION	STABILIZATION	TIMEFRAME EXCEPTIONS
PERIMETER DIKES, SWALES, AND DITCHES	7 DAYS	NONE
HIGH QUALITY WATER (HOW) ZONES	7 DAYS	NONE
SLOPES STEEPER THAN 3:1	7 DAYS	IF SLOPES ARE 10' OR LESS IN LENGTH AND FLATTER THAN 2:1 THEN 14 DAYS ARE ALLOWED.
SLOPES 3:1 OR FLATTER	14 DAYS	7 DAYS FOR SLOPES GREATER THAN 50' IN LENGTH.
OTHER AREAS WITH SLOPES FLATTER THAN 4:1	14 DAYS	NONE

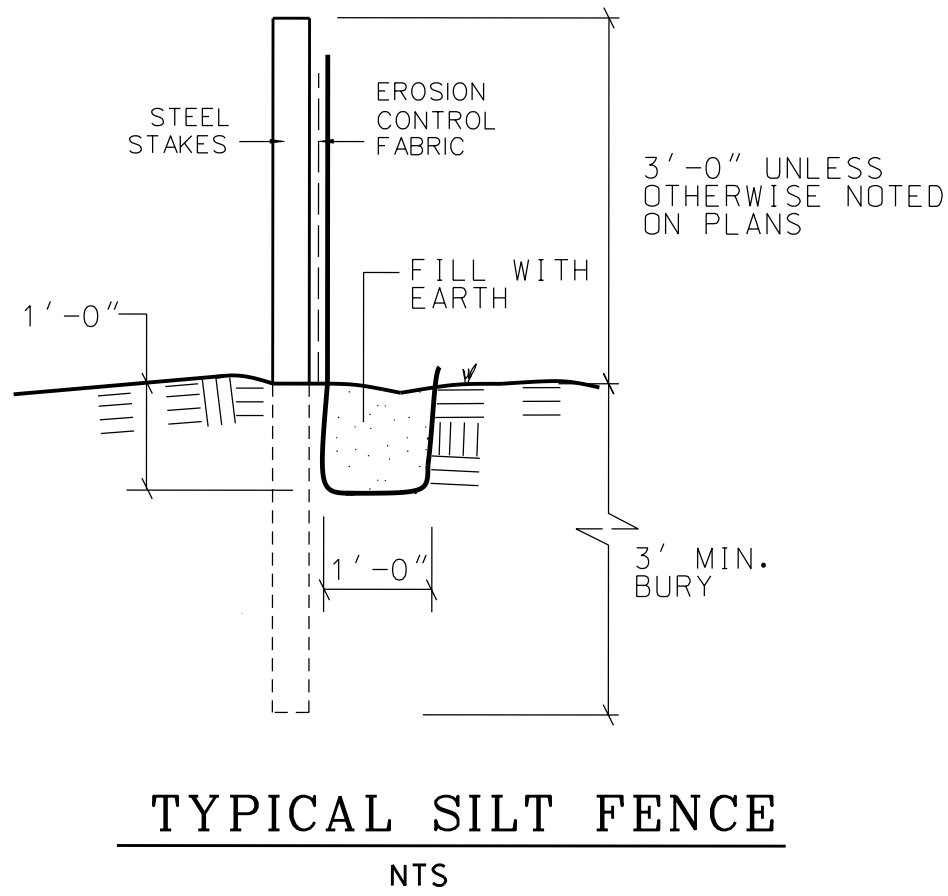
**EROSION & SEDIMENT CONTROL MAINTENANCE PLAN**

- ALL EROSION AND SEDIMENTATION CONTROL MEASURES WILL BE CHECKED FOR STABILITY AND OPERATION FOLLOWING EVERY RUNOFF-PRODUCING RAINFALL, BUT IN NO CASE LESS THAN ONCE EVERY WEEK AND WITHIN 24 HOURS OF EVERY HALF INCH RAINFALL.
- ALL POINTS OF EGRESS WILL HAVE CONSTRUCTION ENTRANCES THAT WILL BE PERIODICALLY TOP-DRESSED WITH AN ADDITIONAL 2" OF #4 STONE TO MAINTAIN PROPER DEPTH. THEY WILL BE MAINTAINED IN A CONDITION TO PREVENT MUD OR SEDIMENT FROM LEAVING THE SITE. IMMEDIATELY REMOVE OBJECTIONABLE MATERIAL SPILLED, WASHED, OR TRACKED ONTO THE CONSTRUCTION ENTRANCE OR ROADWAYS.
- SEDIMENT WILL BE REMOVED FROM HARDWARE CLOTH AND GRAVEL INLET PROTECTION, BLOCK AND GRAVEL INLET PROTECTION, ROCK DOUGHNUT INLET PROTECTION, ROCK PIPE INLET PROTECTION, AND GUTTERBOODY INLET PROTECTION WHEN THE DESIGNED STORAGE CAPACITY HAS BEEN HALF FILLED WITH SEDIMENT. ROCK WILL BE CLEANED OR REPLACED WHEN THE SEDIMENT POOL NO LONGER DRAINS AS DESIGNED. DEBRIS WILL BE REMOVED FROM THE ROCK AND HARDWARE CLOTH TO ALLOW PROPER DRAINAGE. SILT SACKS WILL BE EMPTIED ONCE A WEEK AND AFTER EVERY RAIN EVENT. SEDIMENT WILL BE REMOVED FROM AROUND BEAVER DAMS, DANDY SACKS/SOCKS, AND GUTTERBOODIES ONCE A WEEK AND AFTER EVERY RAIN EVENT. NOTE THAT THE GUTTERBOODY IS REUSABLE SHOULD BE STORED OUT OF DIRECT SUNLIGHT BETWEEN JOBS.
- DIVERSION DITCHES WILL BE CLEANED OUT IMMEDIATELY TO REMOVE SEDIMENT OR OBSTRUCTIONS FROM THE FLOW AREA. THE DIVERSION RIDGES WILL ALSO BE REPAIRED. SWALES MUST BE RE-STABILIZED WITHIN 21 CALENDAR DAYS OF CEASE OF ANY PHASE OF PHASE OF ACTIVITY ASSOCIATED WITH A SWALE.
- SEDIMENT WILL BE REMOVED FROM BEHIND THE SEDIMENT FENCE WHEN IT BECOMES HALF FILLED. THE SEDIMENT FENCE WILL BE REPAIRED AS NECESSARY TO MAINTAIN A BARRIER. STAKES MUST BE STEEL. STAKE SPACING WILL BE 6 FEET (MAX) WITH THE USE OF EXTRA STRENGTH FABRIC WITHOUT WIRE BACKING. STAKE SPACING WILL BE 8 FEET (MAX) WHEN STANDARD STRENGTH FABRIC AND WIRE BACKING ARE USED. IF ROCK FILTERS ARE USED AT LOW POINTS IN THE SEDIMENT FENCE, THE ROCK WILL BE REPAIRED OR REPLACED IF IT BECOMES HALF FULL OF SEDIMENT. NO LONGER DRAINS AS DESIGNED, OR IS DAMAGED.
- SEDIMENT WILL BE REMOVED FROM SEDIMENT TRAPS WHEN THE DESIGNED STORAGE CAPACITY HAS BEEN HALF FILLED WITH SEDIMENT. THE ROCK WILL BE CLEANED OR REPLACED WHEN THE SEDIMENT POOL NO LONGER DRAINS OR WHEN THE ROCK IS DISLODGED. BAFFLES WILL BE REPAIRED OR REPLACED IF THEY COLLAPSE, TEAR, DECOMPOSE, OR BECOME INEFFECTIVE. THEY WILL BE REPLACED PROMPTLY. SEDIMENT WILL BE REMOVED WHEN DEPOSITS REACH HALF THE HEIGHT OF THE FIRST BAFFLE. IF APPLICABLE, FLOATING SKIMMERS WILL BE INSPECTED WEEKLY AND WILL BE KEPT CLEAN.
- SEDIMENT WILL BE REMOVED FROM THE SEDIMENT BASIN WHEN THE DESIGNED STORAGE CAPACITY HAS BEEN HALF FILLED WITH SEDIMENT. ROCK WILL BE CLEANED OR REPLACED WHEN THE SEDIMENT POOL NO LONGER DRAINS OR WHEN THE ROCK IS DISLODGED. BAFFLES WILL BE REPAIRED OR REPLACED IF THEY COLLAPSE, TEAR, DECOMPOSE, OR BECOME INEFFECTIVE. THEY WILL BE REPLACED PROMPTLY. SEDIMENT WILL BE REMOVED WHEN DEPOSITS REACH HALF THE HEIGHT OF THE FIRST BAFFLE. FLOATING SKIMMERS WILL BE INSPECTED WEEKLY AND WILL BE KEPT CLEAN.
- ALL SEEDED AREAS WILL BE FERTILIZED, RESEED AS NECESSARY, AND MULCHED ACCORDING TO SPECIFICATIONS IN THE VEGETATIVE PLAN TO MAINTAIN A VIGOROUS, DENSE VEGETATIVE COVER. ALL SLOPES WILL BE STABILIZED WITHIN 21 CALENDAR DAYS. ALL OTHER AREAS WILL BE STABILIZED WITHIN 15 WORKING DAYS.
- FLOCCULANTS WILL BE USED TO ADDRESS TURBIDITY ISSUES. THE PUMPS, TANKS, HOSES AND INJECTION SYSTEMS WILL BE CHECKED FOR PROBLEMS OR TURBID DISCHARGES DAILY.

**CONSTRUCTION SEQUENCE**

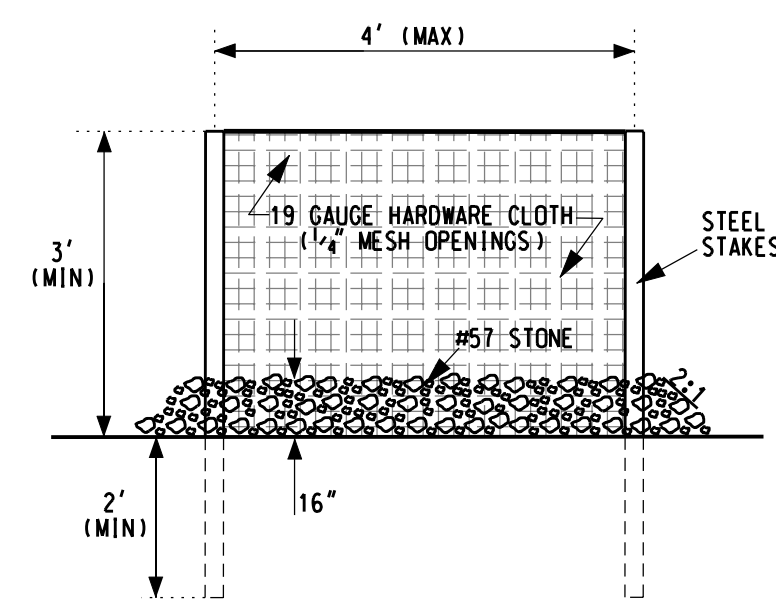
- INSTALL INLET PROTECTION, SILT FENCE, AND STONE CONSTRUCTION ENTRANCES.
- CLEAR & GRADE
- INSTALL UNDERGROUND UTILITIES
- INSTALL PAVEMENT
- PROVIDE 100% VEGETATIVE COVER OF ALL DISTURBED SOILS.
- CLEAN SEDIMENT FROM PIPES AFTER STABILIZATION.

NOTE: WETLANDS IN DISTURBED PORTIONS OF SITE SHALL BE PERMITTED BY USAGE AND NCDENR AS REQUIRED.

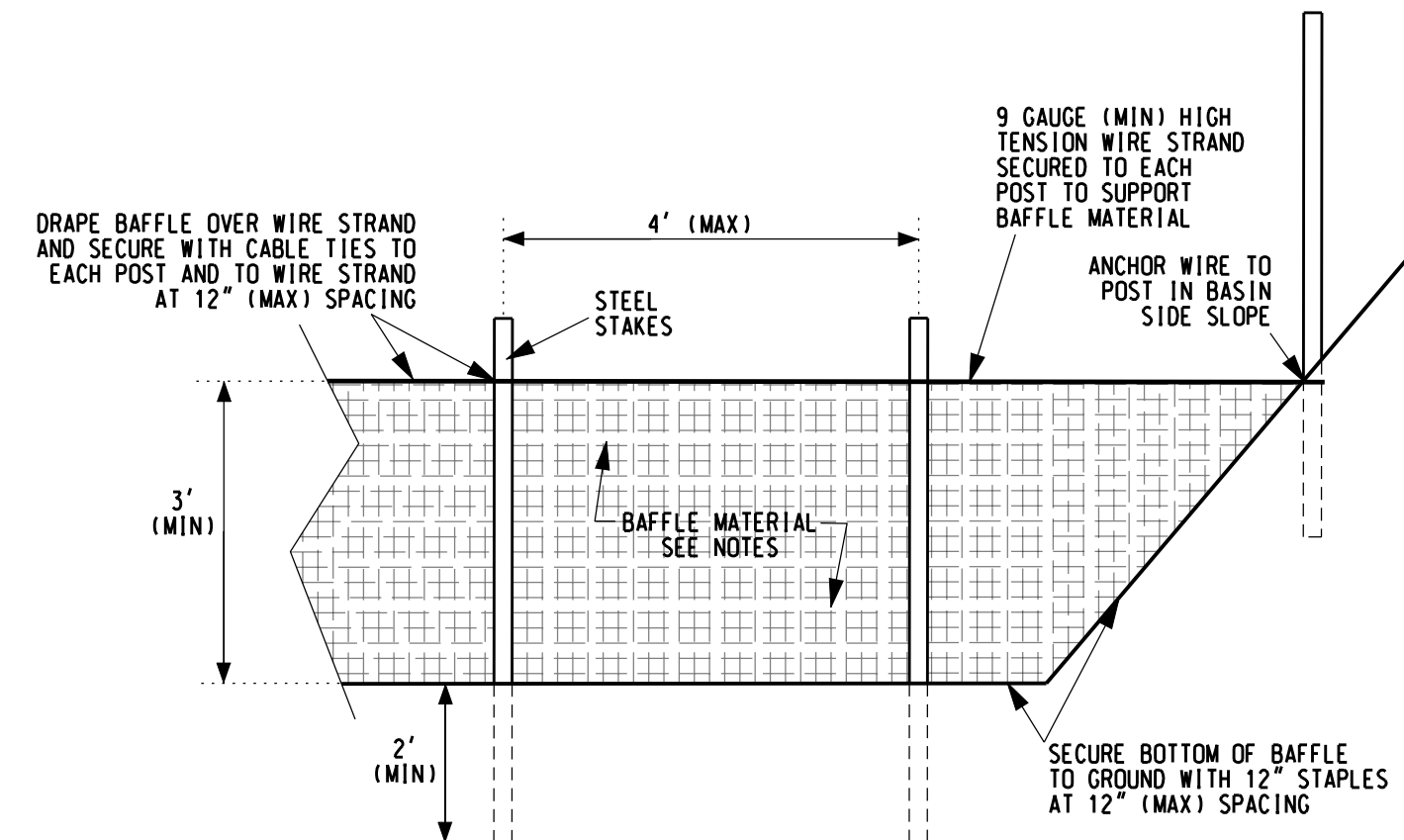


**TYPICAL SILT FENCE**  
NTS

NOTE: POSTS TO BE SPACED 6 FT O.C. OR 8 FT O.C. W/ 14 GAUGE 6 X 6 WIRE MESH REINFORCEMENT. WOODEN POSTS ARE NOT ACCEPTABLE



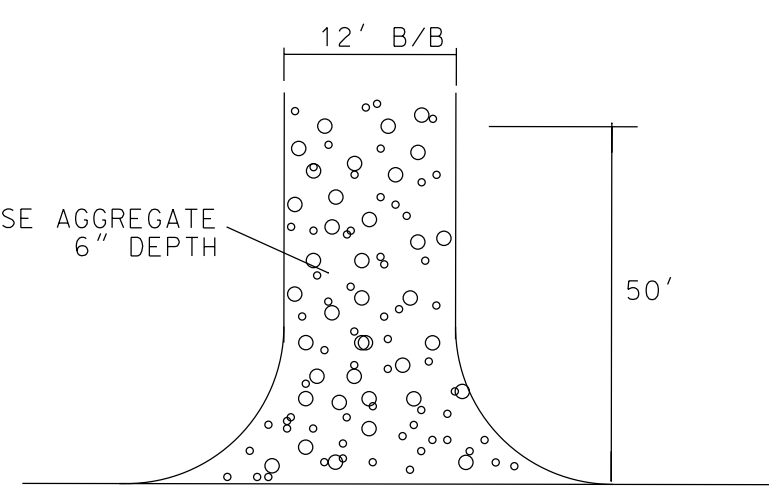
**TYPICAL INLET PROTECTION**  
NTS



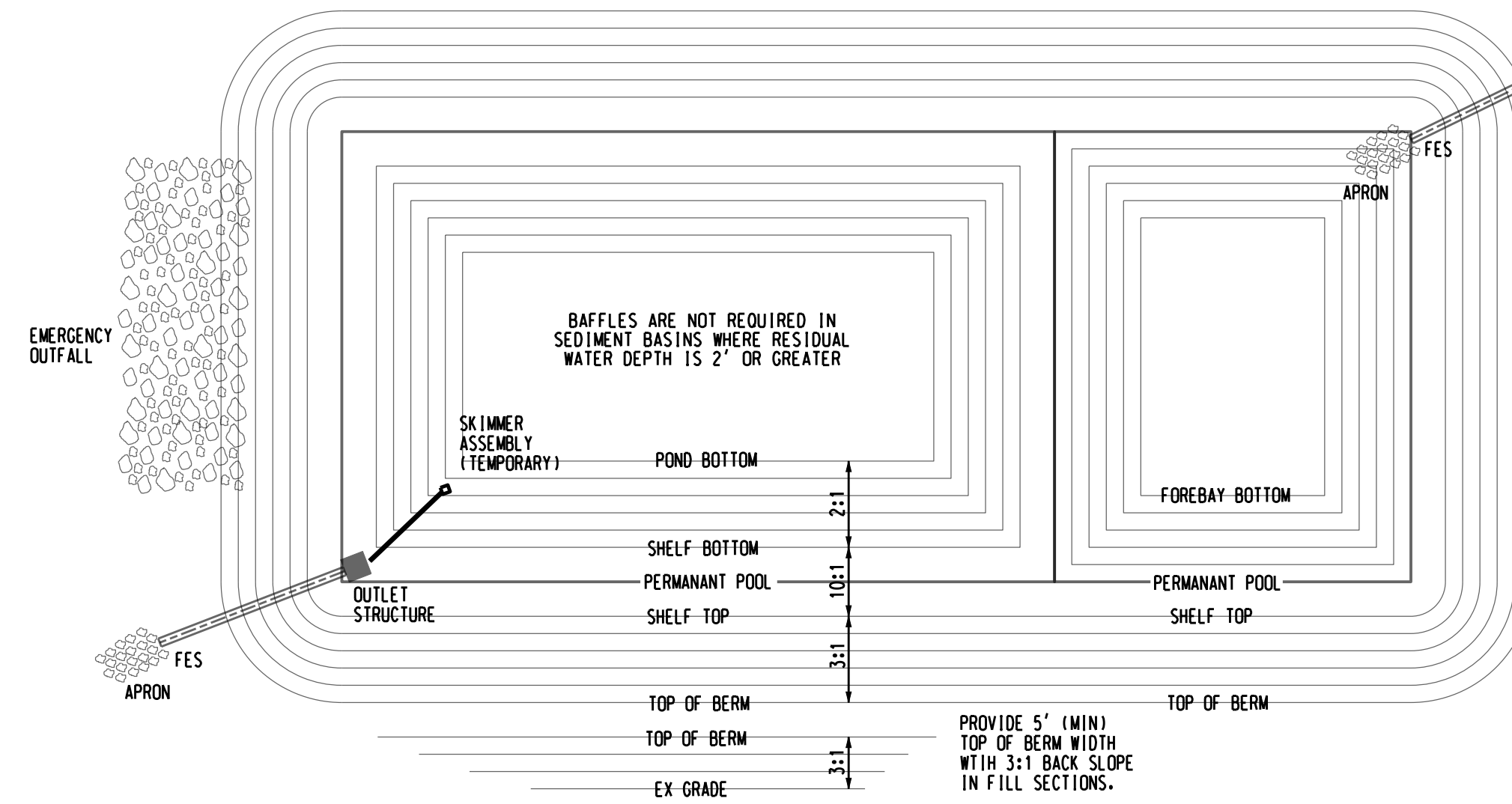
**BAFFLE DETAIL**  
NTS

COIR BAFFLE MATERIAL PROPERTY REQUIREMENTS	
THICKNESS	0.30 IN (MIN)
TENSILE STRENGTH (WET)	900 X 680 LB/FT (MIN)
ELONGATION (WET)	63% X 24" (MAX)
FLOW VELOCITY	10-12 FT/SEC
WEIGHT	20 OZ/SY (MIN)
MINIMUM WIDTH OPEN AREA	6.5 FT
	50% (MAX)

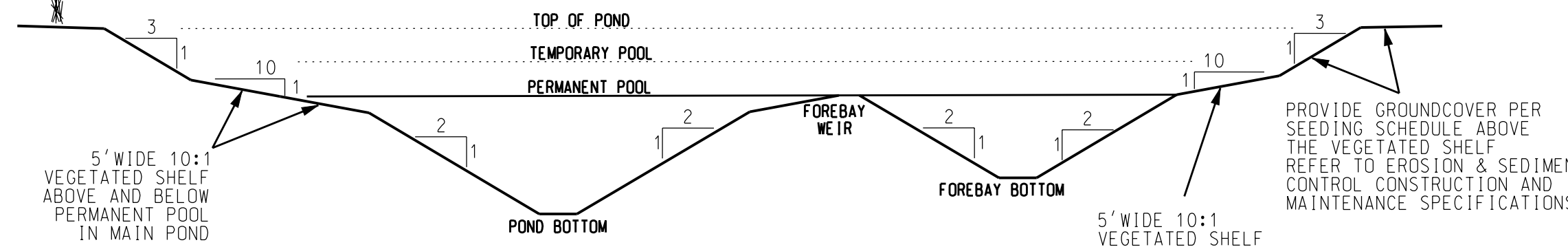
NOTE: BAFFLES ARE NOT REQUIRED IN SEDIMENT BASINS WHERE RESIDUAL WATER DEPTH IS 2' OR GREATER.



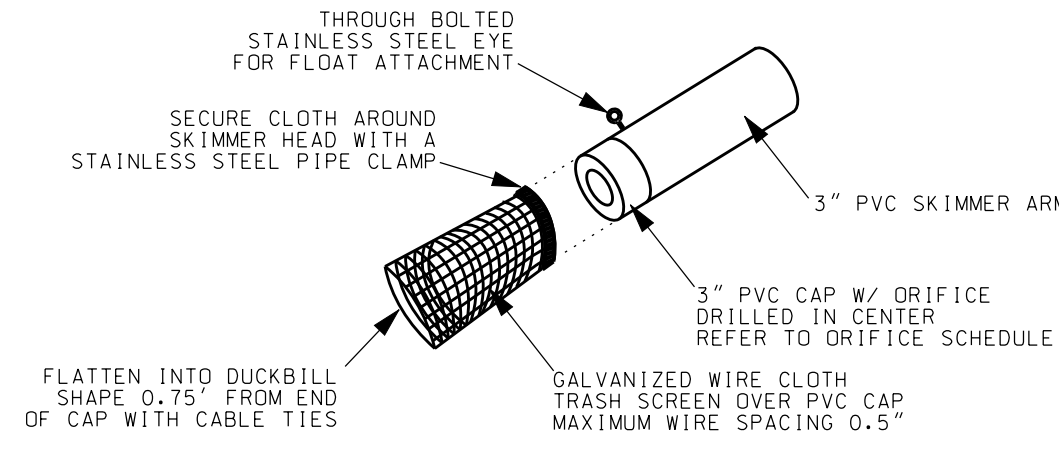
**CONSTRUCTION ENTRANCE DETAIL**  
NTS



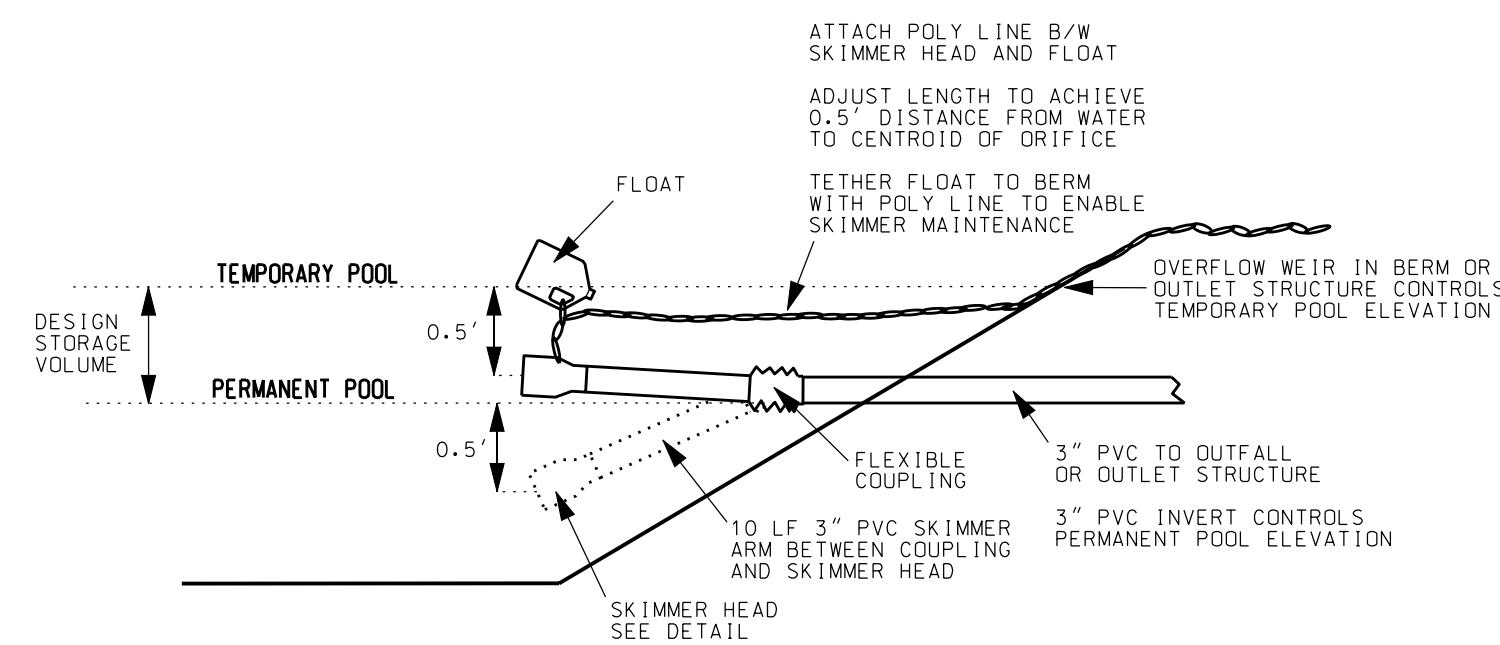
**TYPICAL POND PLAN**  
NTS



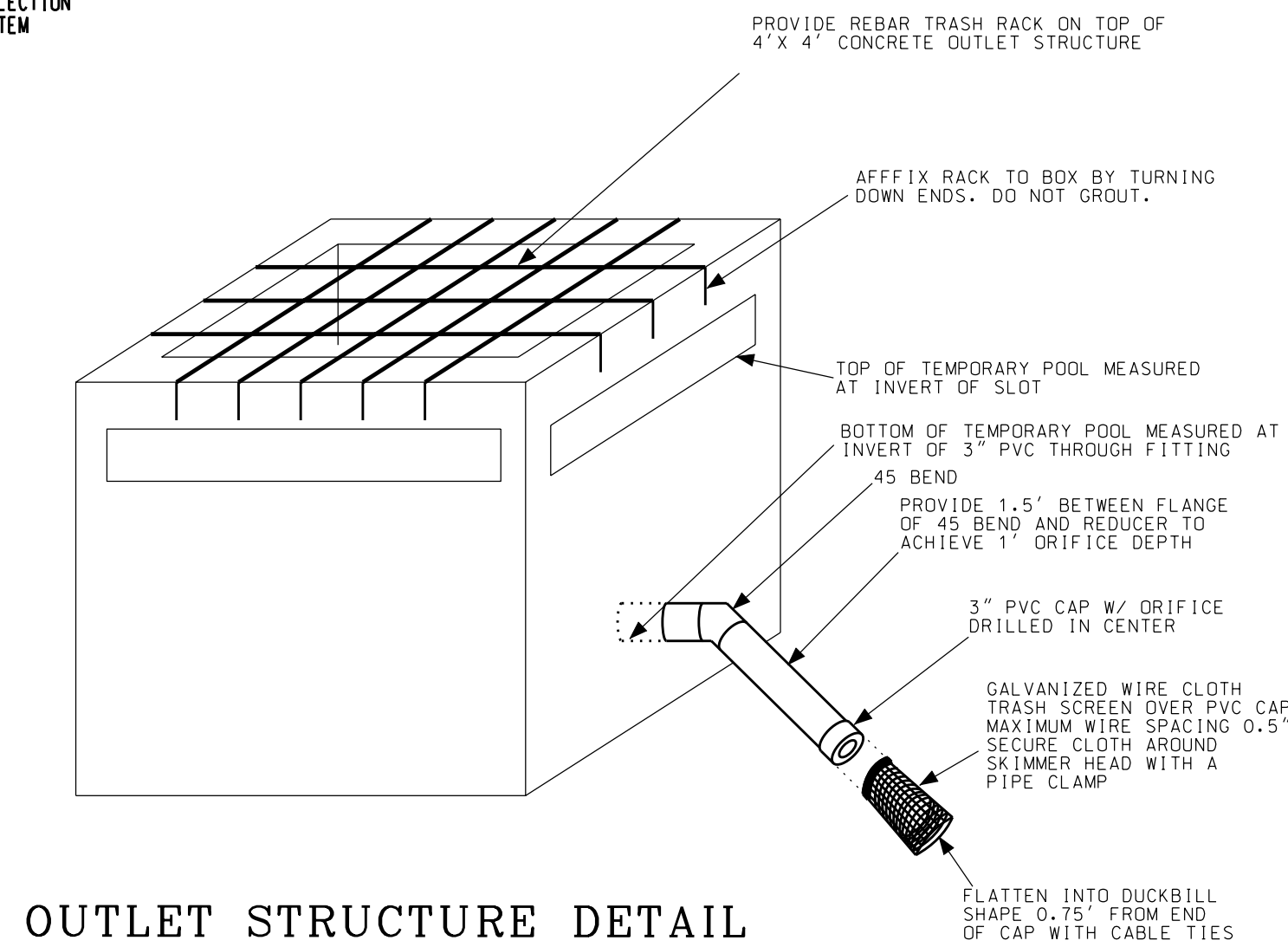
**TYPICAL POND PROFILE**  
N.T.S.



**SKIMMER HEAD DETAIL**  
NTS

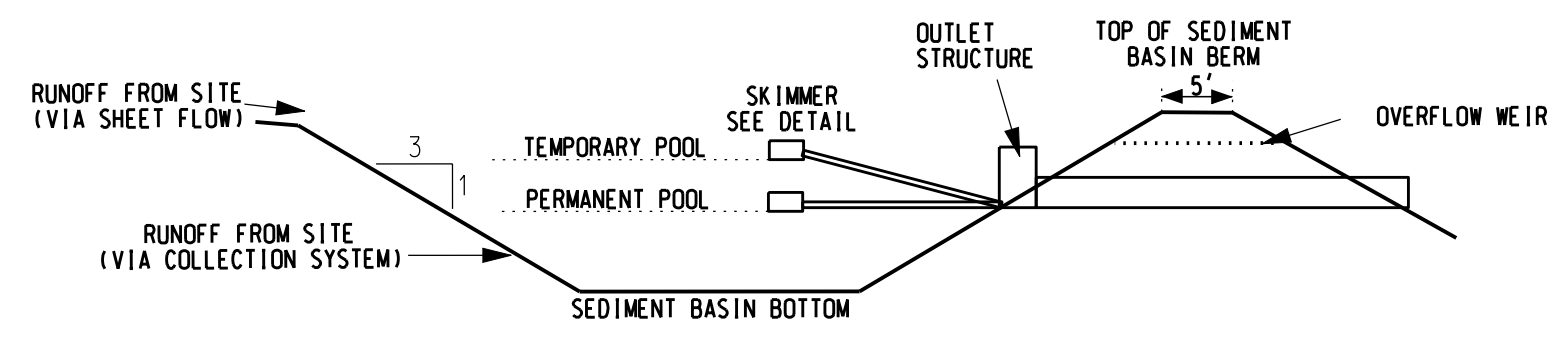


**SKIMMER ASSEMBLY DETAIL**  
NTS



**OUTLET STRUCTURE DETAIL**  
N.T.S.

DESCRIPTION	STORMWATER POND/SEDIMENT BASIN TABLE OF DIMENSIONS		
	POND 1	POND 2	POND 3
TOP OF BANK	10.00	11.00	27.00
EMERGENCY WEIR EL	9.50	10.50	26.50
EMERGENCY WEIR LENGTH	20.00	40.00	16.00
25 YR TEMP POOL	9.21	10.25	26.38
DENR TEMP POOL	6.69	6.95	23.61
TOP OF SHELF	6.00	6.00	23.00
PERMANENT POOL	5.50	5.50	22.50
BOTTOM OF SHELF	5.00	5.00	22.00
BOTTOM FOREBAY	(-3.00)	1.00	19.00
BOTTOM POND	(-4.00)	0.00	16.00
TOP OF BOX	9.21	10.25	26.38
# OF SLOTS	1	3	1
SLOT HEIGHT	0.33'	0.33'	0.33'
SLOT LENGTH	2.85'	1.48'	2.93'
SLOT INVERT	6.69	6.95	23.61
ORIFICE DIAMETER	2.00"	2.50"	2.00"
ORIFICE INVERT	5.50	5.50	22.50
OUTFALL PIPE	24"	24"	24"
INVERT OUT	5.50	5.50	22.50
TSB PERMANENT POOL	5.50	5.50	22.50
TSB TEMPORARY POOL	6.69	6.95	23.61
TSB SKIMMER ORIFICE	2.00"	2.50"	2.00"



**TYPICAL SEDIMENT BASIN DETAIL**  
NTS

NOTE: RETROFIT POND PER STORMWATER DETAILS ONCE SITE IS STABILIZED.

**COASTAL PLAIN SITE STABILIZATION SCHEDULE**

- Fertilize and lime per recommendations of soil tests or apply 2,000 lb/acre ground agricultural limestone and 750 lb/acre 10-10-10 fertilizer.
- Incorporate lime/fertilizer 4-6 inches.
- Roughen steep slopes by tracked machinery.
- Select species based on season. Refer to tables.
- Broadcast seeds evenly and cover by raking or dragging a chain. Firm soil by rolling.
- Apply straw mulch at a rate 1-2 tons per acre. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool.
- Re-seed, re-fertilize and mulch immediately following erosion or other damage.

PERMANENT SEEDING TABLE 1			
Seeding Dates	Recommended Planting	Rate (lb/oc)	
Feb. 15 - Apr. 1	Tall Fescue Mixture	see table 2	
Sep. 1 - Nov. 1	Hybrid Bermudagrass	see table 2	
Apr. 1 - Jul. 15	Common Bermudagrass	see table 2	
Mar. 1 - Jul. 1	Centipede grass	see table 2	

PERMANENT SEEDING TABLE 2a-LOW MAINTENANCE MIXTURES			
Site Description	Recommended Planting	Rate (lb/oc)	
Well to poorly drained soils	Tall Fescue Mixture	80	
	Pensacola Bahiagrass	50	
	Kobe Lespedeza	40	
Dry to well drained soils	Pensacola Bahiagrass	50	
	Common Bermudagrass	30	
	Kobe Lespedeza	10	
	German Millet	10	
Swales	Common Bermudagrass	40-80	

PERMANENT SEEDING TABLE 2b-HIGH MAINTENANCE MIXTURES			
Site Description	Recommended Planting	Rate (lb/oc)	
Well to poorly drained soils	Tall Fescue Mixture	200	
	Rye Grain	25	
Dry to well drained soils	Hybrid Bermudagrass	50	
Well drained sandy loam to sand, lawns.	Centipede grass	10-20	

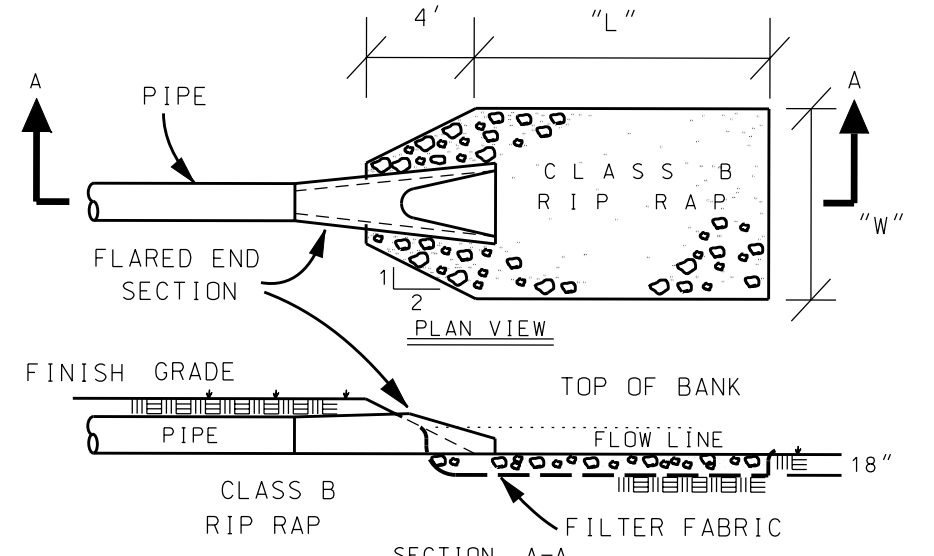
Notes:  
For seeding outside of recommended dates and/or for temporary stabilization, refer to temporary seeding table.

For highly erosive areas or as directed by an engineer, sod shall be provided.

TEMPORARY SEEDING TABLE			
Seeding Dates	Recommended Planting	Rate (lb/oc)	
Dec. 1 - Apr. 15	Kobe Lespedeza with Rye Grain	50	
Apr. 15 - Aug. 15	German Millet	40	
Aug. 15 - Dec. 1	Rye Grain	120	

**SOD INSTALLATION**

- Fertilize and lime per recommendations of soil tests or apply 100 lb/1,000 sf ground agricultural limestone and 25 lb/1,000 sf fertilizer. In the fall, use 10-10-10. In the spring, use 5-10-10.
- Incorporate lime/fertilizer 4-6 inches.
- Rake or harrow to achieve a smooth final grade.
- Roll to achieve a smooth, firm surface on which to lay the sod.
- Lightly rake and irrigate top layer of soil just prior to installation.
- Lay sod in a staggered, brick-like pattern with the longest dimension perpendicular to the slope. Avoid gaps. Use a knife to fit irregular shapes.
- Roll sod lightly after installation to ensure good sod to soil contact.
- Irrigate initially to wet soil to a depth of 4". Keep soil moist for 2-3 weeks thereafter or until sod has taken root.



**RIP RAP APRON DETAIL**  
NTS

RIP RAP APRON SCHEDULE		
PIPE LENGTH	WIDTH	
15'	7.5'	3.8'
18'	9.0'	4.5'
24'	12.0'	6.0'
30'	15.0'	7.5'
36'	18.0'	9.0'

**ECHO WEST**

CITY OF WILMINGTON    NEW HANOVER COUNTY    NORTH CAROLINA

OWNER: HOOSIER DADDY, LLC    DESIGNED: DLM  
 ADDRESS: 6025 TARIN ROAD    DRAWN: DLM  
 WILMINGTON, NC 28409  
 PHONE: (252) 412-9622    APPROVED: JHF

DATE: 1/13/2015  
 SCALE: AS NOTED  
 SHEET: 8.3

STROUD ENGINEERING, P.A.  
 102-D CINEMA DRIVE  
 WILMINGTON, NORTH CAROLINA  
 (910) 815-0775  
 LICENSE NO. C-0647

