

SITE DATA
 PROJECT OWNER: ECHO FARM APARTMENTS, LLC
 PROJECT ADDRESS: 4010 CAROLINA BEACH ROAD
 PIN NUMBER: RO6500-004-001-000 & RO6500-004-001-002
 ZONING DISTRICT: MF-1M
 FLOOD AREA: THE TRACT IS NOT WITHIN ANY SPECIAL FLOOD HAZARD BOUNDARY REFERENCE NC FIRM MAP #3720312500J, EFFECTIVE APRIL 1, 2006 (PER PRELIMINARY SITE INVENTORY BY WITHERS & RAVENEL, DATED 11/06/06)
 MAXIMUM ALLOWABLE BUILDING HEIGHT (BASED ON REQUIRED SETBACK USED): 45'
 MAXIMUM PROPOSED BUILDING HEIGHT (AVG. EX. GROUND ELEV. TO HALFWAY BETWEEN HIGHEST PEAK & EAVE): 43.74' (BLDG #6)
 BUILDING SETBACKS, REQUIRED (DUE TO BUILDING HEIGHT): FRONT-35', REAR-29', INTERIOR SIDE-24', CORNER LOT SIDE-34'
 BUILDING SETBACKS, PROPOSED (MIN.): FRONT-36.65', INTERIOR SIDE-25'
 SITE AREA: 475,805 SF = 10.92 ACRES ±
 MAXIMUM ALLOWABLE DENSITY: 17 UNITS/ACRE X 10.92 ACRES = 185.64 UNITS, 186 UNITS
 TOTAL UNITS: 184 (ONE BEDROOM)
 PROPOSED BUILDING AREA (FOOTPRINT, EXCLUDES PORCHES, PATIOS, BALCONIES, & ROOF OVERHANGS): 50,765.56 SF
 MAXIMUM ALLOWABLE LOT COVERAGE: 30%
 PROPOSED LOT COVERAGE: 50,765.56 / 475,805 x 100% = 10.67%
 NUMBER OF PROPOSED BUILDINGS: 10
 BUILDING SIZE (AREA & UNITS ARE PER BUILDING):

BUILDING	SQUARE FOOTAGE (1ST STORY)	SQUARE FOOTAGE (2ND STORY)	SQUARE FOOTAGE (3RD STORY)	NUMBER OF UNITS (1 BEDROOM)
1-2	6,034.06	6,034.06	6,034.06	20
3-5	6,034.06	6,034.06	6,034.06	24
CLUBHOUSE	2,013.08	N/A	N/A	N/A
MAINTENANCE	480.00	N/A	N/A	N/A

TOTAL AMOUNT & PERCENT OF IMPERVIOUS SURFACE AREAS ON-SITE:			
BEFORE DEVELOPMENT		AFTER DEVELOPMENT	
BUILDINGS	AREA (SQ'F) % OF SITE	BUILDINGS (INCLUDES ROOF OVERHANG)	EX. (SQ'F) PROPOSED (SQ'F) TOTAL (SQ'F) % OF SITE
1	14,100	0	0
2	954	0	59,296
3	20,504	1,135	59,296
4	1,135	0	71,700
5	2,96	0	71,700
6	0.20	0	10,836
7	4.31	0	10,836
8		0	13,628
9		0	6,041
10		0	6,041
11		0	1,336
12		0	1,336
13		0	162,837
14		0	162,837

OFF STREET PARKING CALCULATIONS (RESIDENTIAL):
 MIN. PARKING REQ. = 1.5 SPACES/UNIT x 184 UNITS = 276 SPACES
 MAX. PARKING REQ. = 2.5 SPACES/UNIT x 184 UNITS = 460 SPACES
 NUMBER OF PROPOSED PARKING SPACES = 297
 MIN. NUMBER OF HANDICAPPED SPACES PER ADA STANDARDS FOR ACCESSIBLE DESIGN = 15
 NUMBER OF PROPOSED HANDICAPPED SPACES = 15 SPACES
 NUMBER OF REQ. BICYCLE PARKING SPACES = 20
 NUMBER OF PROPOSED BICYCLE PARKING SPACES = 24
 THE TRACT IS NOT WITHIN ANY SPECIAL HIGHWAY OVERLAY DISTRICT OR ANY OTHER ZONING OVERLAY DISTRICT PER THE CITY OF WILMINGTON ZONING MAPS (MAPS 3125-2 & 3125-4, DATED: MAY 8, 2015)
 CAMA LAND USE CLASSIFICATION PER THE 2006 CAMA PLAN UPDATE LAND CLASSIFICATION MAP IS URBAN.

CITY OF WILMINGTON STANDARD NOTES

- PRIOR TO ANY CLEARING OR CONSTRUCTION ACTIVITY, TREE PROTECTION FENCING WILL BE INSTALLED AROUND PROTECTED TREES OR GROVES OF TREES & NO CONSTRUCTION WORKERS, TOOLS, MATERIALS, OR VEHICLES ARE PERMITTED WITHIN THE TREE PROTECTION FENCING.
- NO LAND DISTURBANCE INCLUDING TREE REMOVAL IS TO OCCUR OUTSIDE THE LIMITS OF DISTURBANCE SHOWN ON THE PLANS.
- NO EQUIPMENT IS ALLOWED ON THE SITE UNTIL ALL TREE PROTECTION FENCING AND SILT FENCING HAS BEEN INSTALLED & APPROVED.
- PROTECTIVE TREE TRUNKS MUST BE MAINTAINED THROUGHOUT THE DURATION OF THE PROJECT.
- LAND CLEARING AND CONSTRUCTION CONTRACTORS SHALL RECEIVE ADEQUATE INSTRUCTION ON TREE PROTECTION REQUIREMENTS & METHODS.
- ALL PAVEMENT MARKINGS IN PUBLIC RIGHTS-OF-WAY & FOR DRIVEWAYS ARE TO BE THERMOPLASTIC & MEET CITY AND/OR NCDOT STANDARDS.
- IT SHALL BE THE RESPONSIBILITY OF THE SUBDIVIDER TO ERECT OFFICIAL STREET NAME SIGNS AT ALL INTERSECTIONS ASSOCIATED WITH THE SUBDIVISION IN ACCORDANCE WITH THE TECHNICAL STANDARDS AND SPECIFICATIONS MANUAL. CONTACT TRAFFIC ENGINEERING AT 341-7888 TO DISCUSS INSTALLATION OF TRAFFIC AND STREET NAME SIGNS. PROPOSED STREET NAMES MUST BE APPROVED PRIOR TO INSTALLATION OF STREET NAME SIGNS.
- TRAFFIC CONTROL DEVICES (INCLUDING SIGNS AND PAVEMENT MARKINGS) IN AREAS OPEN TO PUBLIC TRAFFIC ARE TO MEET MUTCD (MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES) STANDARDS.
- CALL TRAFFIC ENGINEERING AT 341-7888 TO ENSURE THAT ALL TRAFFIC SIGNAL FACILITIES AND EQUIPMENT ARE SHOWN ON THE PLAN.
- ANY BROKEN OR MISSING SIDEWALK PANELS, DRIVEWAY APRON PANELS, OR CURB AND GUTTER SECTIONS SHALL BE REPLACED.
- CONTACT TRAFFIC ENGINEERING AT 341-7888 TO DISCUSS STREET LIGHTING OPTIONS.
- PROJECT SHALL COMPLY WITH CFPWA CROSS CONNECTION CONTROL REGULATIONS. WATER METER(S) CANNOT BE RELEASED UNTIL ALL REQUIREMENTS ARE MET AND THE STATE HAS GIVEN THEIR FINAL APPROVAL. CALL 332-6558 FOR INFORMATION.
- IF THE CONTRACTOR DESIRES CFPWA WATER FOR CONSTRUCTION HE SHALL APPLY IN ADVANCE FOR THIS SERVICE & MUST PROVIDE A REDUCED PRESSURE ZONE (RPZ) BACKFLOW PREVENTION DEVICE ON THE DEVELOPER'S SIDE OF THE WATER METER BOX.
- ANY IRRIGATION SYSTEM SUPPLIED BY CFPWA WATER SHALL COMPLY WITH THE CFPWA CROSS CONNECTION CONTROL REGULATIONS. CALL 332-6558 FOR INFORMATION.
- ANY BACKFLOW PREVENTION DEVICES REQUIRED BY CFPWA WILL NEED TO BE ON THE LIST OF APPROVED DEVICES BY USFCCOHR OR ASSE.
- ALL TRAFFIC CONTROL SIGNS & MARKINGS OFF THE RIGHT-OF-WAY ARE TO BE MAINTAINED BY THE PROPERTY OWNER IN ACCORDANCE WITH MUTCD STANDARDS.
- ALL PAVEMENT MARKINGS REGULATING TRAFFIC FLOW MUST BE THERMOPLASTIC.
- A UTILITY CUT PERMIT IS REQUIRED FOR EACH OPEN CUT OF A CITY STREET (CONTACT 341-5888 FOR MORE DETAILS). IN CERTAIN CASES, AN ENTIRE RESURFACING OF THE AREA BEING OPEN CUT MAY BE REQUIRED.
- TRAFFIC ENGINEERING MUST APPROVE OF PAVEMENT MARKING LAYOUT PRIOR TO ACTUAL STRIPING.
- A LANDSCAPING PLAN INDICATING THE LOCATION OF REQUIRED STREET TREES SHALL BE SUBMITTED TO THE CITY OF WILMINGTON TRAFFIC ENGINEERING DIVISION AND PARKS AND RECREATION DEPARTMENT FOR REVIEW AND APPROVAL PRIOR TO THE RECORDING OF THE FINAL PLAN.
- CONTACT THE NORTHERN DISTRICT PRIOR TO DOING ANY DITCHING (1-500-632-4949).
- ALL PARKING STALL MARKINGS AND LANE ARROWS WITHIN THE PARKING AREAS SHALL BE WHITE.
- INSTALL REFLECTORS PER CITY AND NCDOT STANDARDS.

FIRE AND LIFE SAFETY NOTES

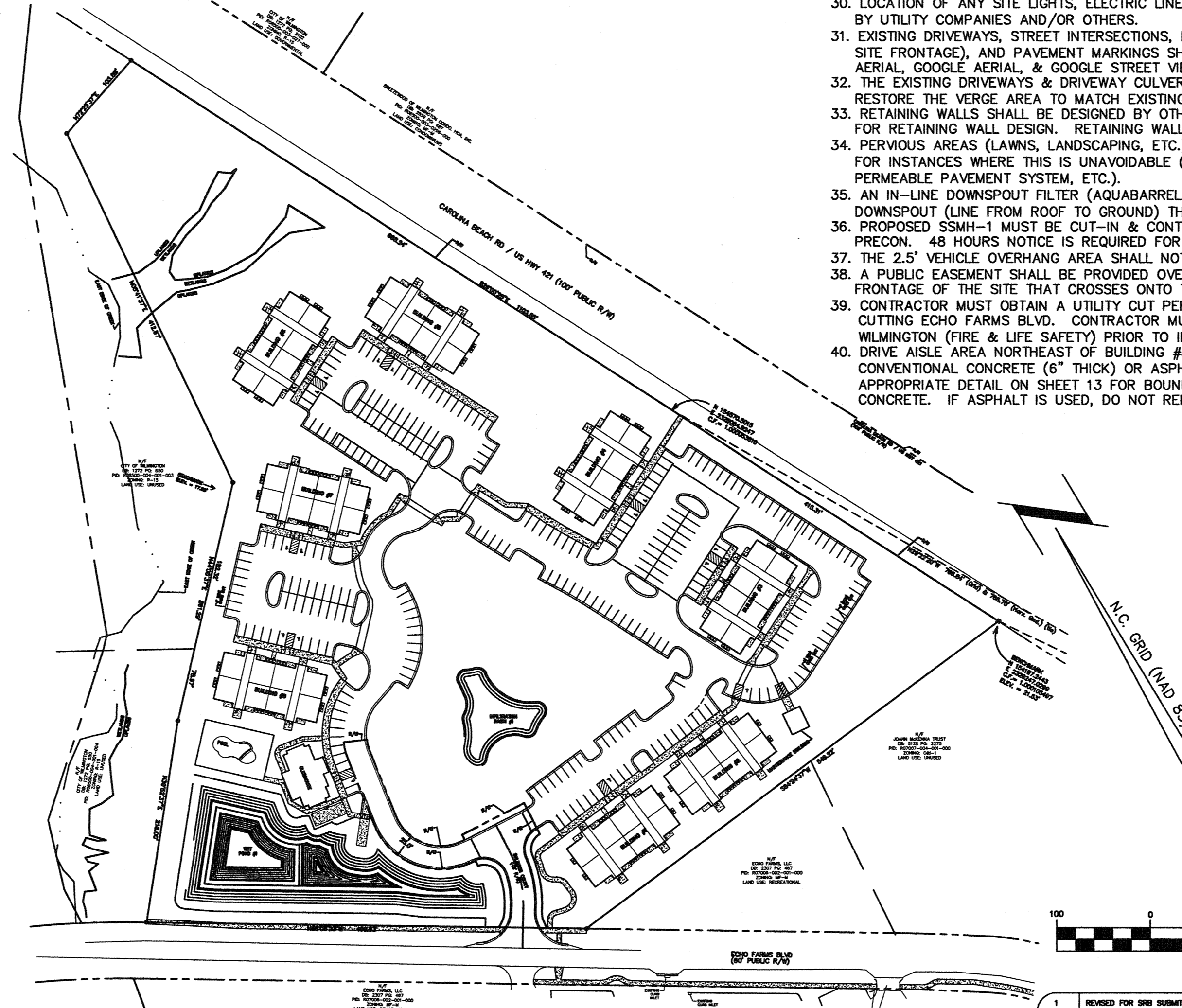
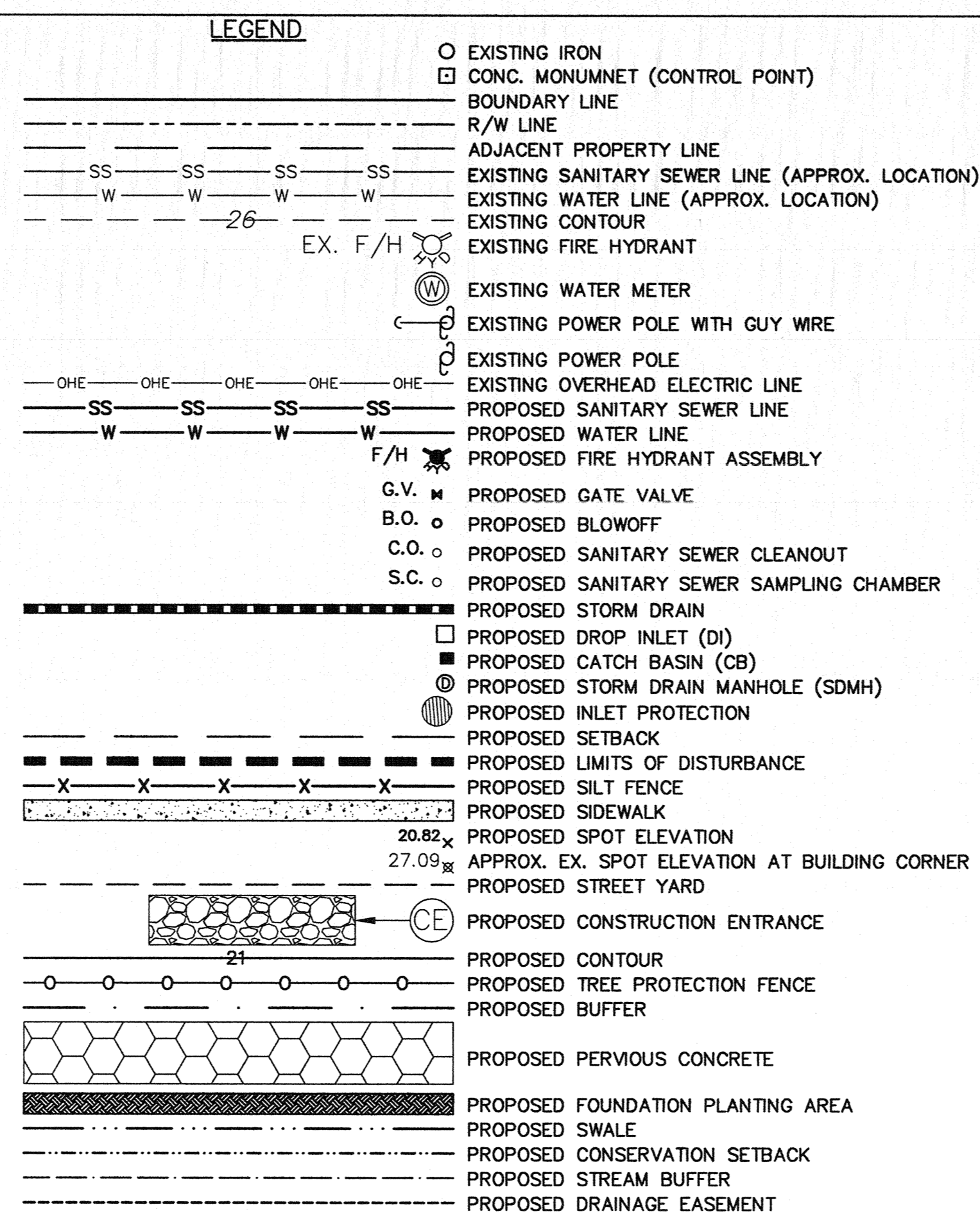
- PARKING AND LANDSCAPING CANNOT BLOCK FIRE HYDRANTS OR FDC'S. A 3-FOOT CLEAR SPACE SHALL BE MAINTAINED AROUND THE CIRCUMFERENCE OF THE HYDRANT AND FDC.
- FIRE HYDRANTS CANNOT BE FURTHER THAN 8' FROM THE CURB.
- NEW HYDRANTS MUST BE BROUGHT INTO SERVICE PRIOR TO COMBUSTIBLE MATERIALS BEING DELIVERED TO THE JOB SITE.
- ALL WEATHER ACCESS ROAD MUST BE MAINTAINED AROUND CONSTRUCTION SITE AT ALL TIMES.
- PRIVATE UNDERGROUND FIRE LINES REQUIRE A SEPARATE UNDERGROUND FIRE LINE PERMIT FROM THE WILMINGTON FIRE & LIFE SAFETY DIVISION AT 910-343-0696.
- A MINIMUM OF 5' SHALL SEPARATE UNDERGROUND FIRE LINES OR PRIVATE WATER MAINS FROM OTHER UNDERGROUND UTILITIES.
- FDC'S CAN BE NO FURTHER THAN 150' FROM A FIRE HYDRANT.
- FDC'S CAN BE NO FURTHER THAN 10' FROM FIRE DEPARTMENT VEHICLE PLACEMENT.
- BUILDING CONSTRUCTION TYPE ACCORDING TO THE INTERNATIONAL BUILDING CODE IS V-B.
- TAMPER SWITCHES SHALL BE INSTALLED ON ALL VALVES THAT ARE CAPABLE OF TURNING THE WATER SUPPLY OFF TO THE SPRINKLER SYSTEMS.

SITE INVENTORY NOTES

- SOIL TYPES: Jc (JOHNSTON), Le (LEON), Lv (LYNN HAVEN), & Kr (KUREB).
- THIS SITE IS NOT LOCATED WITHIN A CAMA AEC (PER ECS CAROLINAS, LLP).
- A 25' CONSERVATION SETBACK IS REQUIRED FROM THE WETLANDS WHICH IS CONSIDERED SWAMP FOREST (PER ECS CAROLINAS, LLP).
- THIS SITE IS NOT RECOGNIZED AS A LOCAL, STATE OR FEDERALLY HISTORIC OR ARCHAEOLOGICAL SITE (PER ECS CAROLINAS, LLP).
- NO CEMETERIES, BURIAL SITES, OR BURIAL GROUNDS LOCATED ON THE SITE (PER ECS CAROLINAS, LLP).
- WETLANDS DELINEATED BY ECS CAROLINAS, LLP (SEE EXISTING CONDITIONS MAP).
- THE PROJECT WILL NOT ADVERSELY AFFECT THREATENED OR ENDANGERED SPECIES (OPINION PER ECS CAROLINAS, LLP). ECS CAROLINAS, LLP OBSERVED SUMMER HABITAT FOR THE NORTHERN LONG-EARED BAT ON THE SITE AND RECOMMENDS ANY PROPOSED CLEARING FOR THE SITE BE CONDUCTED DURING THE WINTER MONTHS.
- EXISTING VEGETATION HAS BEEN LOCATED AND IS LABELED (SEE EXISTING CONDITIONS MAP).
- THE SITE IS NOT LOCATED WITHIN THE 100-YEAR FLOOD PLAIN (PER ECS CAROLINAS, LLP).
- SEE EXISTING CONDITIONS MAP & SITE PLAN FOR PRESENCE OR NON-PRESENCE OF EXISTING OR PROPOSED THROUGHFARES, BIKE ROUTES, PEDESTRIAN SIDEWALKS, OR TRAILS & TRANSPORT FACILITIES.
- THE TRACT IS WITHIN THE CAPE FEAR RIVER BASIN & DRAINS TO BARNARD'S CREEK (C.S.W).
- THE SITE IS CLASSIFIED AS URBAN PER THE CAMA LAND CLASSIFICATION WITH AN OFF-SITE CONSERVATION AREA LOCATED TO THE NORTHWEST OF THE SITE (PER ECS CAROLINAS, LLP).

LIST OF CONDITIONS AS APPROVED BY THE PLANNING COMMISSION ON 2/3/16

- THE USE & DEVELOPMENT OF THE SUBJECT PROPERTY SHALL COMPLY WITH ALL REGULATIONS & REQUIREMENTS IMPOSED BY THE LAND DEVELOPMENT CODE, THE CITY OF WILMINGTON TECHNICAL STANDARDS & SPECIFICATIONS MANUAL & ANY OTHER APPLICABLE FEDERAL, STATE OR LOCAL LAW, ORDINANCE OR REGULATION, AS WELL AS ANY CONDITION STATED BELOW. IN THE EVENT OF A CONFLICT, THE MORE STRINGENT REQUIREMENT OR HIGHER STANDARD SHALL APPLY.
- APPROVAL OF THIS PRELIMINARY PLAN DOES NOT CONSTITUTE TECHNICAL APPROVAL OF THE SITE PLAN. FINAL APPROVAL BY THE TECHNICAL REVIEW COMMITTEE & THE ISSUANCE OF ALL REQUIRED PERMITS MUST OCCUR PRIOR TO RELEASE OF THE PROJECT FOR CONSTRUCTION.
- IF, FOR ANY REASON, ANY CONDITION FOR APPROVAL IS FOUND TO BE ILLEGAL OR INVALID OR IF THE APPLICANT SHOULD FAIL TO ACCEPT ANY CONDITION FOLLOWING APPROVAL, THE APPROVAL OF THE SITE PLAN FOR THE DISTRICT SHALL BE NULL & VOID & OF NO EFFECT & PROCEEDINGS SHALL BE INSTITUTED TO REZONE THE PROPERTY TO ITS PREVIOUS ZONING CLASSIFICATION.
- THE USE & DEVELOPMENT OF THE SUBJECT PROPERTY SHALL BE IN ACCORDANCE WITH THE PRELIMINARY PLAN AS SUBMITTED OCTOBER 13, 2015 & APPROVED.
- THE USE OF PINE STRAW AS GROUND COVER SHALL BE PROHIBITED WITHIN 10 FEET OF ANY PROPOSED COMBUSTIBLE EXTERIOR CONSTRUCTION.
- ALL EXISTING & PROPOSED PUBLIC & NON-MUNICIPAL EASEMENTS SHALL BE ADDED TO THE PRELIMINARY PLAN AS NECESSARY.
- ALL CONSTRUCTION TRAFFIC ASSOCIATED WITH THE SITE SHALL ACCESS THE SITE FROM ECHO FARMS BOULEVARD.
- REQUIREMENTS OF THE APPROVED TRAFFIC IMPACT ANALYSIS (TIA) MUST BE COMPLETED PRIOR TO ISSUANCE OF A CERTIFICATE OF OCCUPANCY.
- THE REQUIRED SIDEWALK ALONG THE CAROLINA BEACH ROAD FRONTAGE SHALL BE WAIVED & AN EQUAL AMOUNT OF SIDEWALK, BASED ON AN APPROVED COST ESTIMATE, SHALL BE PROVIDED ALONG ECHO FARMS BOULEVARD WHICH CONNECTS THE SUBJECT SITE TO THE EXISTING SIDEWALK NETWORK.



WATER & SEWER CAPACITY

EXISTING WATER CAPACITY:	2 HOUSES x 400 GPD/HOUSE = 800 GPD
EXISTING SEWER CAPACITY:	2 HOUSES x 360 GPD/HOUSE = 720 GPD
PROPOSED WATER CAPACITY:	184 UNITS x 400 GPD/UNIT + 50 PEOPLE x 10 GPD/PERSON = 74,100 GPD
PROPOSED SEWER CAPACITY:	184 UNITS x 240 GPD/UNIT + 50 PEOPLE x 10 GPD/PERSON = 44,660 GPD

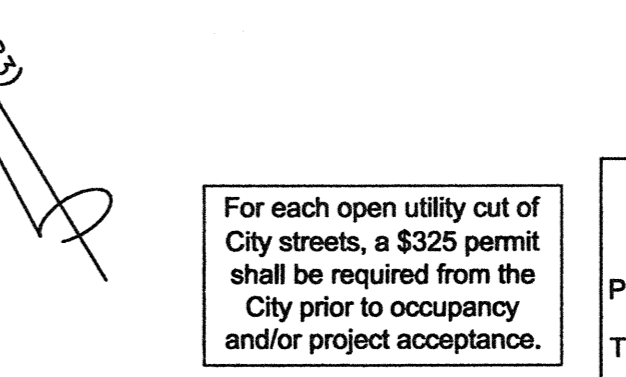
TOTAL LENGTH OF PUBLIC SANITARY SEWER MAIN = 46.32 LF
 TOTAL LENGTH OF PRIVATE SANITARY SEWER MAIN = 892.07 LF
 TOTAL LENGTH OF PUBLIC WATER MAIN (DOMESTIC & FIRE LINE) = 38 LF
 TOTAL LENGTH OF PRIVATE WATER LINE (DOMESTIC & FIRE LINE, INCLUDING LINES TO EACH BUILDING) = 4,354 LF

NOTES

- BOUNDARY & TOPOGRAPHICAL SURVEY BY BATEMAN CIVIL SURVEY COMPANY, 200 N. MAIN STREET, HOLLY SPRINGS, NC 27540, PHONE: 919-577-1080.
- ALL ELEVATIONS ARE IN FEET UNLESS OTHERWISE INDICATED.
- ALL CITY, STATE & FEDERAL REGULATIONS SHALL BE FOLLOWED.
- PRIOR TO INSTALLATION OF WATER OR SANITARY SEWER MAINS CONTRACTOR SHALL NOTIFY THE ENGINEER WITH MALPASS ENGINEERING & SURVEYING, P.C. AT 910-392-5243.
- EXISTING SANITARY SEWER MAINS OWNED BY CFPWA. PROPOSED PVC SANITARY SEWER MAINS SHALL BE AWMA C900 CLASS 150 (DR-18) UNLESS OTHERWISE INDICATED. PROPOSED DIP SANITARY SEWER MAINS SHALL CONFORM TO AWMA C151 CLASS 350 AND LINED WITH PROTECTO 401.
- EXISTING WATER MAINS ARE OWNED BY CFPWA. PROPOSED PVC WATER MAINS SHALL BE AWMA C900 CLASS 150 (DR-18) UNLESS OTHERWISE INDICATED. PROPOSED DIP WATER MAINS SHALL CONFORM TO AWMA C150 PRESSURE CLASS 360.
- DOMESTIC WATER MAIN SHALL BE PUBLIC FROM THE EXISTING WATER MAIN IN ECHO FARMS BLVD THROUGH THE WATER METER & PRIVATE AFTER THE WATER METER. FIRE LINE SHALL BE PUBLIC FROM THE EXISTING WATER MAIN IN ECHO FARMS BLVD TO THE BACKFLOW PREVENTER & PRIVATE BEGINNING AT THE BACKFLOW PREVENTER.
- PROPOSED SANITARY SEWER MAINS SHALL BE 8" & PROPOSED SEWER SERVICES SHALL BE 6". PROPOSED SEWER ON SITE & ON ADJACENT CITY PROPERTY SHALL BE PRIVATE, & PROPOSED SEWER WITHIN ECHO FARMS BLVD SHALL BE PUBLIC.
- PROPOSED WATER & FIRE LINES SIZES PER PLAN. PROPOSED WATER & FIRE LINES ON SITE SHALL BE PRIVATE & PROPOSED WATER & FIRE LINES OFF-SITE SHALL BE PUBLIC.
- LIMITS OF DISTURBANCE = 433,785 SF = 9.96 ACRES.
- DISTURBED AREAS WITHIN ADJACENT RIGHTS-OF-WAY (EXCEPT FOR SWALE #1, 2, 7, & 8) & ON ADJACENT CITY OF WILMINGTON PROPERTY SHALL BE IMMEDIATELY SEEDED & STABILIZED WITH MULCH OR EXCELISOR MAT PRIOR TO ANY RAINFALL EVENT. SEE SWALE #1, 2, 7, & 8 DETAILS FOR SEEDING & STABILIZATION OF SWALES.
- ON COMPLETION OF ANY PHASE OF ACTIVITY SIDE SLOPES WILL BE SEEDED/STABILIZED IN ACCORDANCE WITH GROUND STABILIZATION CHART ON SHEET 11.
- SLOPE ON HANDICAP SPACES SHALL BE 1:50 OR FLATTER.
- PROPOSED OFF-SITE IMPERVIOUS SURFACE AREA IS 7,606 SF.
- TACTILE WARNING MATS ARE TO BE INSTALLED ON ALL WHEELCHAIR (HANDICAP) RAMPS.
- ANYTHING WITHIN THE SIGHT TRIANGLES SHALL NOT INTERFERE WITH CLEAR VISUAL SIGHT LINES FROM 30'-10'.
- ALL PARKING STALL MARKINGS AND LANE ARROWS WITHIN THE PARKING AREAS SHALL BE WHITE.
- ALL DEVELOPMENT SHALL BE IN ACCORDANCE WITH THE CITY OF WILMINGTON LAND DEVELOPMENT CODE & TECHNICAL STANDARDS MANUAL, EXCEPT WHERE EXEMPTED OR VARIANCES ARE OBTAINED.
- THE PROPOSED CURB IS 4" MEDIAN VERTICAL CURB & GUTTER, 4" VERTICAL CURB & GUTTER, VALLEY CURB, & REVERSE VALLEY CURB (SD 3-11).
- IT IS THE APPLICANT'S/DEVELOPER'S RESPONSIBILITY TO BE COMPLIANT WITH ALL APPLICABLE ADA REQUIREMENTS.
- ALL PLANTED & RETAINED LIVING MATERIAL REQUIRED TO MEET THE PROVISIONS OF THE CITY OF WILMINGTON LAND DEVELOPMENT CODE, & PAVEMENT MARKINGS SHALL BE PROTECTED & MAINTAINED TO PROFESSIONALLY ACCEPTED STANDARDS BY JOINT & SEVERAL RESPONSIBILITY OF THE OWNER, OCCUPANT, TENANT, & RESPECTIVE AGENTS OF THE PROPERTY ON WHICH THE MATERIAL IS LOCATED.
- STORM DRAIN MANHOLES, CATCH BASINS, & DROP INLETS SHALL BE SIZED APPROPRIATELY TO ACCOMMODATE OVERSIZED PIPES AND FRAME & GRATE.
- PROPOSED DROP INLETS TO HAVE HEAVY DUTY 2'x3' FRAME & GRATE (GENERAL FOUNDRIES INC., ITEM #24364 OR EQUIVALENT).
- NO PIPE JOINTS SHALL BE INSIDE ANY INTERFERENCE MANHOLE.
- A RECORDED DRAINAGE EASEMENT SHALL BE PROVIDED FOR WET POND #1 & INFILTRATION BASIN #1 INCLUDING ACCESS TO THE NEAREST RIGHT-OF-WAY.
- BUILDING RUNOFF SHALL BE DIRECTED TO DRAIN TO APPROPRIATE LOCATION (SEE SHEETS 13 & 14). USE DOWNSPOUT PIPING AS NECESSARY. DOWNSPOUT PIPING SHALL BE DESIGNED BY OTHERS. MAXIMUM ALLOWABLE ROOF AREA PER DOWNSPOUT PIPING DISCHARGE POINT INTO PERMEABLE PAVEMENT SYSTEM IS 1,000 SF.
- DURING CONSTRUCTION WET POND #1 WILL SERVE AS A SEDIMENT BASIN. A FAIRCLOTH SKIMMER SHALL BE INSTALLED & CONNECTED TO THE OUTLET STRUCTURE (SEE SKIMMER DETAIL & CHART FOR SKIMMER & ORIFICE SIZE). THE FAIRCLOTH SKIMMER IS TEMPORARY. ONCE THE ENTIRE AREA DRAINING TO THE POND HAS BEEN STABILIZED THE SKIMMER SHALL BE REMOVED & THE ORIFICE PIPE (SEE POND DETAIL & CHART FOR SIZE) SHALL BE INSTALLED.
- A MINIMUM COVER OF 2 FEET FROM TOP OF PIPE TO BOTTOM OF STONE SHALL BE PROVIDED OVER STORM DRAIN PIPE UNDER THE PARKING/DRIVE AISLES & PRIVATE STREET UNLESS CLASS IV RCP IS USED.
- ALL PROPOSED ON-SITE UTILITY LINES SHALL BE UNDERGROUND.
- LOCATION OF ANY SITE LIGHTS, ELECTRIC LINES, TELEPHONE LINES, AND/OR NATURAL GAS LINES TO BE DETERMINED BY UTILITY COMPANIES AND/OR OTHERS.
- EXISTING DRIVEWAYS, STREET INTERSECTIONS, POWER/TRAFFIC SIGNAL POLES & OVERHEAD WIRES (EXCEPT ALONG SITE FRONTAGE), AND PAVEMENT MARKINGS SHOWN ON PLAN WERE TRACED/APPROXIMATED FROM NHC GIS 2010 AERIAL & GOOGLE AERIAL & GOOGLE STREET VIEW.
- THE EXISTING DRIVEWAYS & DRIVEWAY CULVERTS OFF CAROLINA BEACH ROAD TO THE SITE SHALL BE REMOVED. RESTORE THE VERGE AREA TO MATCH EXISTING/PROPOSED.
- RETAINING WALLS SHALL BE DESIGNED BY OTHERS. MALPASS ENGINEERING & SURVEYING, P.C. IS NOT RESPONSIBLE FOR RETAINING WALL DESIGN. RETAINING WALL SHALL BE CONSTRUCTED OF KEYSTONE BLOCK.
- PERVIOUS AREAS (LAWNS, LANDSCAPING, ETC.) SHALL NOT DRAIN TO THE PERMEABLE PAVEMENT SYSTEMS EXCEPT FOR INSTANCES WHERE THIS IS UNAVOIDABLE (INTERIOR PARKING LOT ISLAND, AREA BETWEEN BUILDING & PERMEABLE PAVEMENT SYSTEM, ETC.).
- AN IN-LINE DOWNSPOUT FILTER (AQUABARREL-SLIM LINE, OR SIMILAR) MUST BE INSTALLED ON EVERY ROOF DOWNSPOUT (LINE FROM ROOF TO GROUND) THAT DRAINS TO A PERMEABLE PAVEMENT SYSTEM.
- PROPOSED SSMH-1 MUST BE CUT-IN & CONTRACTOR MUST PROVIDE A BYPASS PLAN TO THE CFPWA PRIOR TO THE PRECON. 48 HOURS NOTICE IS REQUIRED FOR PRECON.
- THE 2.5' WIDE OVERHANG AREA SHALL NOT BE PLANTED WITH SHRUBS.
- A PUBLIC EASEMENT SHALL BE PROVIDED OVER ANY PORTION OF THE PROPOSED 5' WIDE SIDEWALK ALONG THE FRONTAGE OF THE SITE THAT CROSSES ONTO THE SITE.
- CONTRACTOR MUST OBTAIN UTILITY CUT PERMIT FROM THE CITY OF WILMINGTON (ENGINEERING) PRIOR TO OPEN CUTTING ECHO FARMS BLVD. CONTRACTOR MUST OBTAIN AN UNDERGROUND FIRE LINE PERMIT FROM THE CITY OF WILMINGTON (FIRE & LIFE SAFETY) PRIOR TO INSTALLING THE FIRE LINE.
- DRIVE AISLE AREA NORTHEAST OF BUILDING #3 BETWEEN PERMEABLE PAVEMENTS SYSTEMS SHALL BE EITHER CONVENTIONAL CONCRETE (6" THICK) OR ASPHALT (2" SF.5A ASPHALT OVER 6" COMPACTED ABC STONE). USE APPROPRIATE DETAIL ON SHEET 13 FOR BOUNDARY BETWEEN ASPHALT/CONVENTIONAL CONCRETE & PERVIOUS CONCRETE. IF ASPHALT IS USED, DO NOT REDUCE THE PERVIOUS CONCRETE AREAS TO PROVIDE CONCRETE CURB.

APPROXIMATE FINISHED FLOOR ELEVATION (CONTRACTOR TO CONSULT WITH ARCHITECT & DEVELOPER REGARDING FFE PRIOR TO CONSTRUCTING BUILDING PAD)

BUILDING	FFE (FEET)
1	23.96
2	27.30
3-4	28.67
5-6	27.75
7	21.79
8	17.43
CLUBHOUSE	16.58
MAINTENANCE	28.28



NOTE WELL
 DEVELOPER TO PROVIDE SIDEWALK ALONG ECHO FARMS BLVD, IN ADDITION TO PROPOSED FRONTAGE SIDEWALK, IN LIEU OF PROVIDING FRONTAGE SIDEWALK ALONG CAROLINA BEACH ROAD PER PLANNING COMMISSION CONDITIONAL APPROVAL.

OPEN SPACE
 TOP OF STORMWATER POND AREA = 21932 SF
 REQUIRED OPEN SPACE = 0.35 * (475,805 - 21,932) = 158,856 SF = 3.65 ACRES
 PROVIDED OPEN SPACE (INCLUDES ACTIVE & PASSIVE RECREATION AREA) = 160,022 SF = 3.67 ACRES
 REQUIRED ACTIVE OR PASSIVE RECREATION AREA = 0.5 * 158,856 = 79,428 SF = 1.82 ACRES
 PROVIDED ACTIVE RECREATION AREA = 6,113 SF = 0.14 ACRES
 PROVIDED PASSIVE RECREATION AREA = 80,468 SF = 1.85 ACRES
 PROVIDED TOTAL RECREATION AREA = 86,581 SF = 1.99 ACRES

Approved Construction Plan

Planning: [Signature] Date: 12/17/16
 Traffic: [Signature] Date: 12/21/16
 Fire: [Signature] Date: 12/13/16

CITY OF WILMINGTON
 Public Services • Engineering Division
 APPROVED STORMWATER MANAGEMENT PLAN
 Date: 12/13/16 Permit # 2016010E2
 Signed: [Signature]

COVER SHEET
 4010 CAROLINA BEACH ROAD
 ARBOR TRACE APARTMENTS
 WILMINGTON TOWNSHIP NEW HANOVER COUNTY NORTH CAROLINA

DATE: 7-22-15
 SCALE: 1"=100'
 DRAWN: JCB
 CHECKED: JEM
 PROJECT NO: 260
 SHEET NO: 1 OF 22

Developer: ECHO FARM APARTMENTS, LLC
 10 S. CAROLINA DRIVE
 WILMINGTON, NORTH CAROLINA 28403
 PHONE: 910-251-5030

Malpass Engineering & Surveying, P.C.
 1154 SHIPYARD BOULEVARD
 WILMINGTON, NORTH CAROLINA 28412
 Phone 910-392-5243
 Fax 910-392-5253
 License No. C-2820

EXISTING PROTECTED TREES CHART. Table with columns: NUMBER, TREE, REMOVAL, REASON FOR REMOVAL, MITIGATION REQUIRED, MITIGATION FACTOR. Rows 1-188.

EXISTING PROTECTED TREES CHART. Table with columns: NUMBER, TREE, REMOVAL, REASON FOR REMOVAL, MITIGATION REQUIRED, MITIGATION FACTOR. Rows 189-335.

EXISTING PROTECTED TREES CHART. Table with columns: NUMBER, TREE, REMOVAL, REASON FOR REMOVAL, MITIGATION REQUIRED, MITIGATION FACTOR. Rows 336-488.

EXISTING PROTECTED TREES CHART. Table with columns: NUMBER, TREE, REMOVAL, REASON FOR REMOVAL, MITIGATION REQUIRED, MITIGATION FACTOR. Rows 489-551.

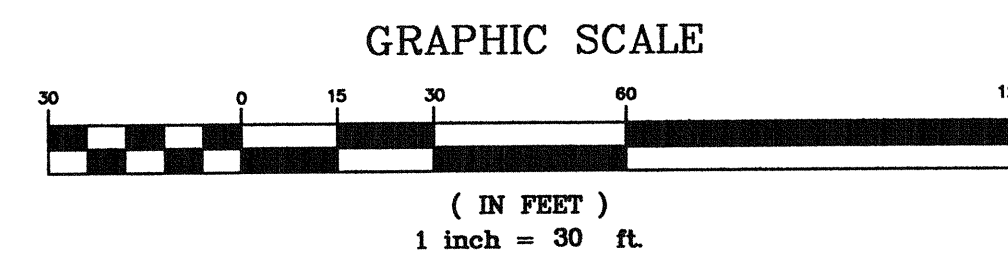
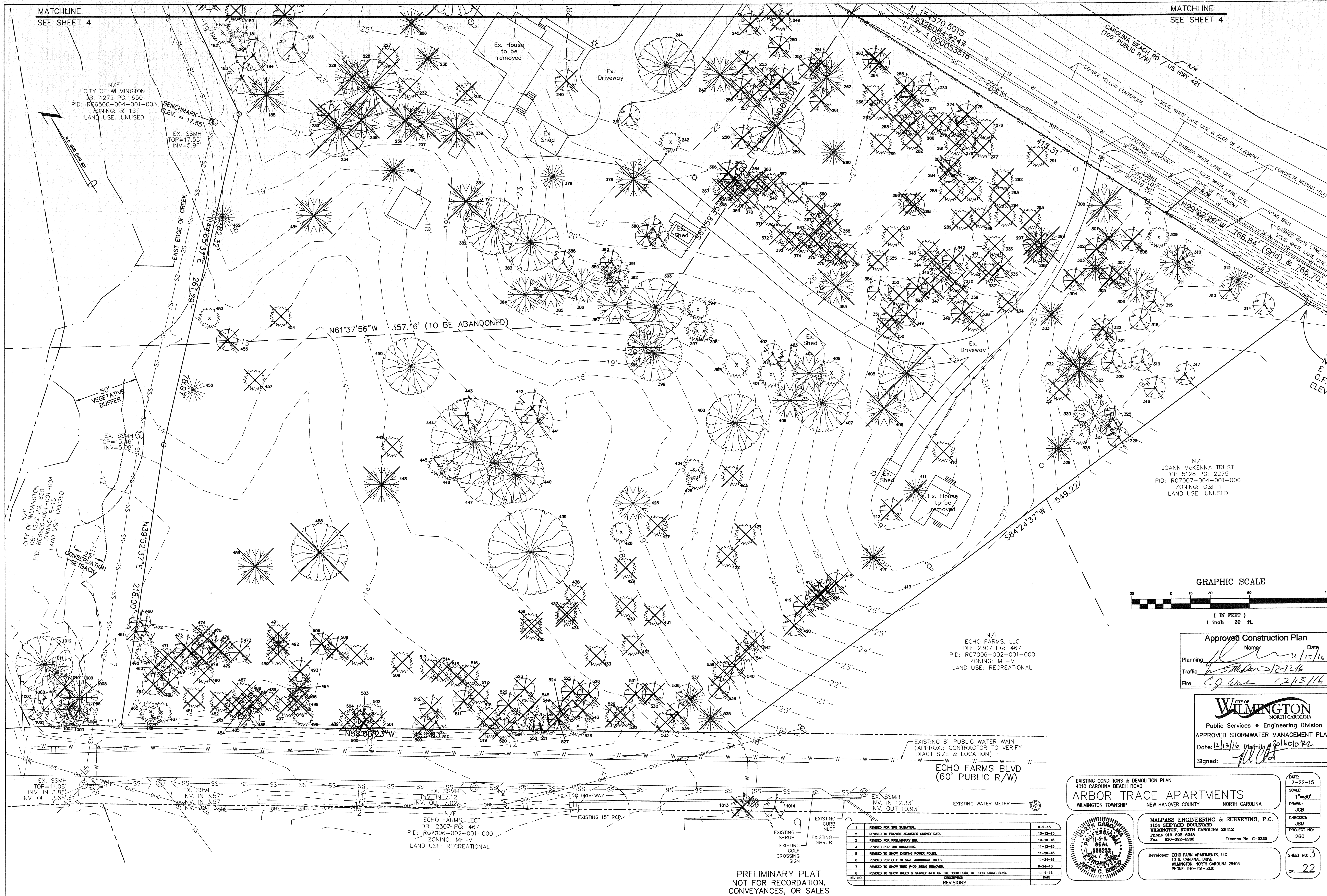
EXISTING PROTECTED TREES CHART - OFF-SITE ALONG/NEAR PROPOSED WET POND #1 OUTFALL PIPE. Table with columns: NUMBER, TREE, REMOVAL, REASON FOR REMOVAL, MITIGATION REQUIRED, MITIGATION FACTOR. Rows 1001-1011.

EXISTING PROTECTED TREES CHART - OFF-SITE WITHIN ECHO FARMS BLVD. Table with columns: NUMBER, TREE, REMOVAL, REASON FOR REMOVAL, MITIGATION REQUIRED, MITIGATION FACTOR. Rows 1013-1016.

EXISTING Tree Legend. Diagrams showing tree symbols for Existing Significant Flowering Trees, Existing Significant Hardwood & Non-Pine Conifer Trees, Existing Regulated Flowering Trees, Existing Regulated Hardwood & Non-Pine Conifer Trees, Existing Regulated Pine Trees.

Approved Construction Plan. Signature block with Name, Date, Title, and Project Name: ARBOR TRACE APARTMENTS. Includes date 12/13/16 and signature of C.J. Walker.

REVISIONS table with columns: REV NO., DESCRIPTION, DATE. Includes 5 revision entries. Also includes project information for MALPASS ENGINEERING & SURVEYING, P.C. and SHEET NO. 22.



N/F
JOANN MCKENNA TRUST
DB: 5128 PG: 2275
PID: R07007-004-001-000
ZONING: O&I-1
LAND USE: UNUSED

N/F
ECHO FARMS, LLC
DB: 2307 PG: 467
PID: R07006-002-001-000
ZONING: MF-M
LAND USE: RECREATIONAL

Approved Construction Plan

Name: _____ Date: 12/15/16

Planning: _____

Traffic: _____

Fire: _____

CITY OF WILMINGTON
NORTH CAROLINA
Public Services • Engineering Division
APPROVED STORMWATER MANAGEMENT PLAN
Date: 12/15/16
Signed: _____

REV. NO.	DESCRIPTION	DATE
1	REVISED FOR SHE SUBMITTAL	8-2-15
2	REVISED TO PROVIDE ADJUSTED SURVEY DATA	10-12-15
3	REVISED FOR PRELIMINARY INFO.	10-18-15
4	REVISED FOR THE COMMENTS	11-12-15
5	REVISED TO SHOW EXISTING POWER POLES	11-20-15
6	REVISED PER CITY TO SAVE ADDITIONAL TREES	11-24-15
7	REVISED TO SHOW TREES (AND BEING REMOVED)	8-24-16
8	REVISED TO SHOW TREES & SURVEY INFO ON THE SOUTH SIDE OF ECHO FARMS BLVD.	11-15-16
	REVISIONS	DATE

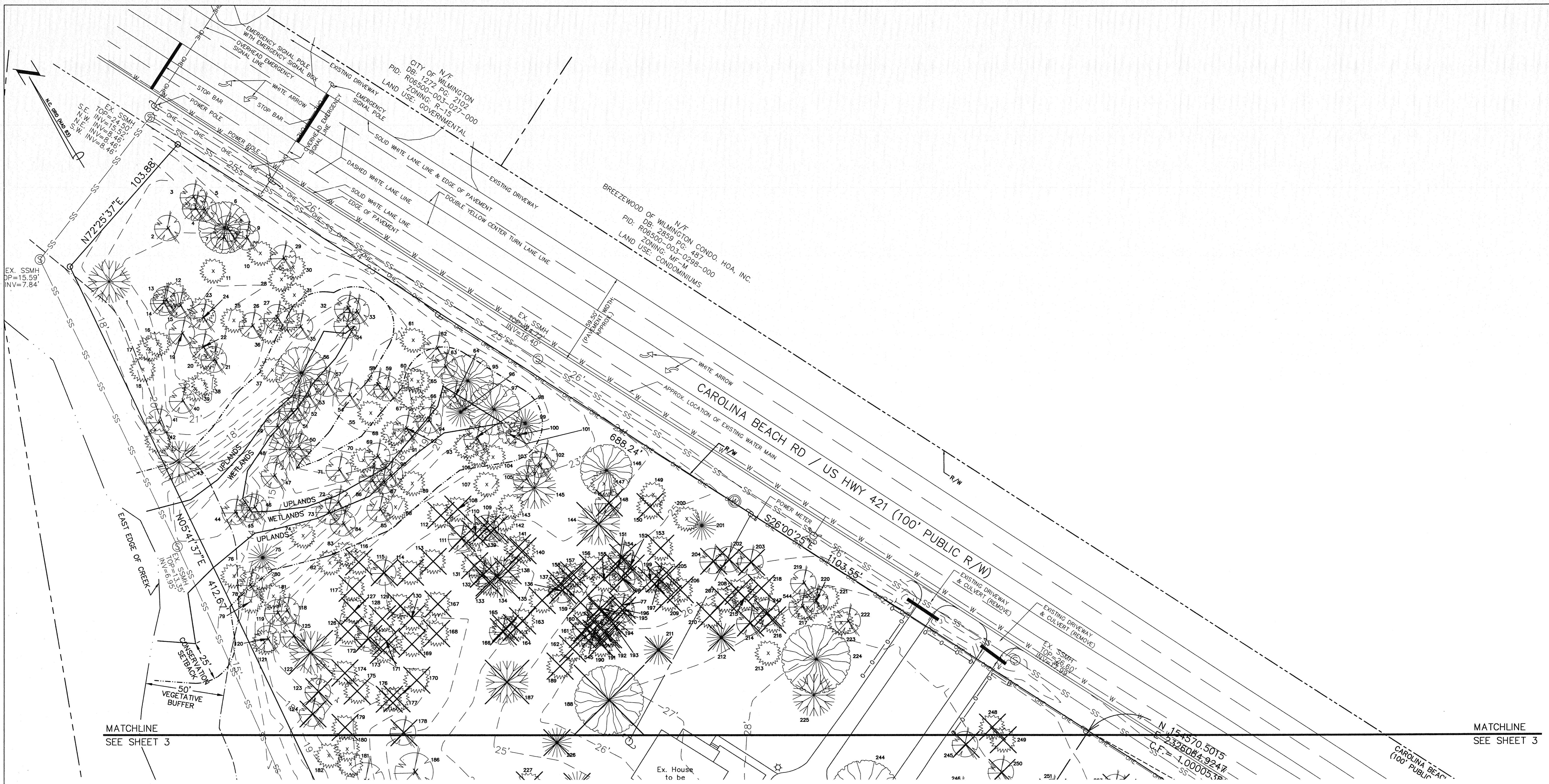
PRELIMINARY PLAT
NOT FOR RECORDATION,
CONVEYANCES, OR SALES

EXISTING CONDITIONS & DEMOLITION PLAN
4010 CAROLINA BEACH ROAD
ARBOR TRACE APARTMENTS
WILMINGTON TOWNSHIP NEW HANOVER COUNTY NORTH CAROLINA

MALPASS ENGINEERING & SURVEYING, P.C.
1134 SHIPYARD BOULEVARD
WILMINGTON, NORTH CAROLINA 28412
Phone 910-392-6843
Fax 910-392-6893
License No. C-2820

Developer: ECHO FARM APARTMENTS, LLC
10 S. CARDINAL DRIVE
WILMINGTON, NORTH CAROLINA 28403
PHONE: 910-251-5030

DATE: 7-22-15
SCALE: 1"=30'
DRAWN: JCB
CHECKED: JEM
PROJECT NO: 260
SHEET NO. 3
OF: 22



MATCHLINE
SEE SHEET 3

MATCHLINE
SEE SHEET 3

Approved Construction Plan

Name: _____ Date: 12/13/16

Planning: _____

Traffic: _____ 12/12/16

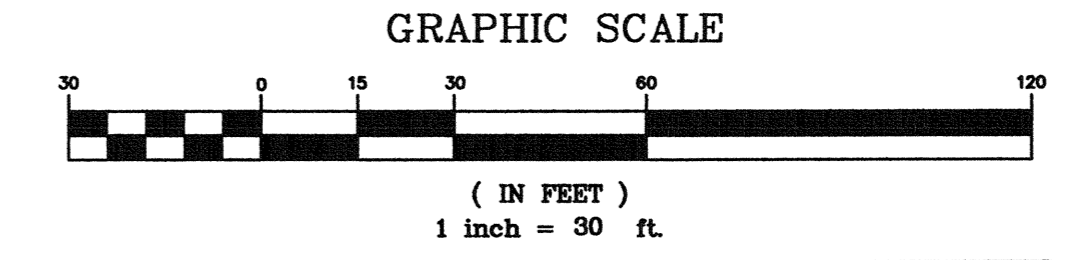
Fire: _____ 12/13/16

WILMINGTON
NORTH CAROLINA
Public Services • Engineering Division

APPROVED STORMWATER MANAGEMENT PLAN

Date: 12/13/16 Permit: 201601022

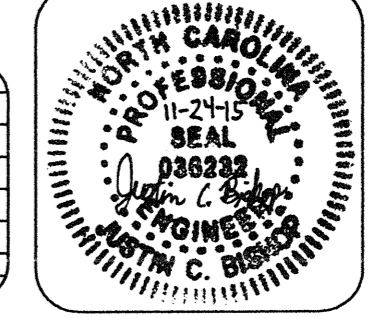
Signed: _____



REV. NO.	DESCRIPTION	DATE
1	REVISED FOR 3RD SUBMITTAL	8-2-15
2	REVISED TO PROVIDE ADJUSTED SURVEY DATA	10-12-15
3	REVISED FOR PRELIMINARY INFO.	10-16-15
4	REVISED PER THE COMMENTS	11-12-15
5	REVISED TO SHOW EXISTING POWER POLES	11-20-15
6	REVISED PER CITY TO SAVE ADDITIONAL TREES	11-24-15

PRELIMINARY PLAT
NOT FOR RECORDATION,
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EXISTING CONDITIONS & DEMOLITION PLAN
4010 CAROLINA BEACH ROAD
ARBOR TRACE APARTMENTS
WILMINGTON TOWNSHIP NEW HANOVER COUNTY NORTH CAROLINA



MALPASS ENGINEERING & SURVEYING, P.C.
1134 SHIPYARD BOULEVARD
WILMINGTON, NORTH CAROLINA 28412
Phone: 910-392-5242 Fax: 910-392-5203 License No. C-2820

Developer: ECHO FARM APARTMENTS, LLC
10 S. CAROLINA, DRIVE
WILMINGTON, NORTH CAROLINA 28403
PHONE: 910-291-5030

DATE: 7-22-15
SCALE: 1"=30'
DRAWN: JCB
CHECKED: JEM
PROJECT NO: 260
SHEET NO: 4
OF: 22

MATCHLINE
SEE SHEET 6

MATCHLINE
SEE SHEET 6

N/F
CITY OF WILMINGTON
DB: 1272 PG: 650
PID: R06500-004-001-003
ZONING: R-15
LAND USE: UNUSED

BENCHMARK
ELEV. = 17.55'

EAST EDGE OF CREEK

N 43° 05' 37" E 261.58'

N 39° 52' 37" E 218.00'

N 39° 52' 37" E 218.00'

N 39° 52' 37" E 218.00'

N 39° 52' 37" E 218.00'

N 39° 52' 37" E 218.00'

N 39° 52' 37" E 218.00'

N 39° 52' 37" E 218.00'

N 39° 52' 37" E 218.00'

N 39° 52' 37" E 218.00'

N 39° 52' 37" E 218.00'

N 39° 52' 37" E 218.00'

N 39° 52' 37" E 218.00'

50' VEGETATIVE BUFFER

WETLANDS UPLANDS

CONSERVATION SETBACK

CONSERVATION SETBACK

CONSERVATION SETBACK

CONSERVATION SETBACK

CONSERVATION SETBACK

CONSERVATION SETBACK

CONSERVATION SETBACK

CONSERVATION SETBACK

CONSERVATION SETBACK

CONSERVATION SETBACK

CONSERVATION SETBACK

BUILDING #8

POOL

WET POND #1

WET POND #1

WET POND #1

WET POND #1

WET POND #1

WET POND #1

WET POND #1

WET POND #1

INFILTRATION BASIN #1

BUILDING #2

MAINTENANCE BUILDING

BUILDING #2

BUILDING #2

BUILDING #2

BUILDING #2

BUILDING #2

BUILDING #2

BUILDING #2

BUILDING #2

BUILDING #2

BUILDING #2

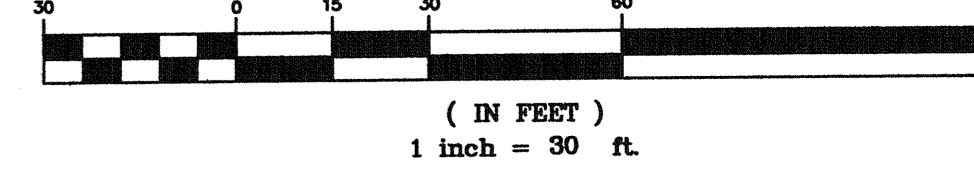
BUILDING #2

BUILDING #2

BUILDING #2

N/F
JOANN MCKENNA TRUST
DB: 5128 PG: 2275
PID: R07007-004-001-000
ZONING: O&E-1
LAND USE: UNUSED

GRAPHIC SCALE



(IN FEET)
1 inch = 30 ft.

Approved Construction Plan
Name: _____ Date: 12/15/16
Planning: _____
Traffic: _____
Fire: _____

WILMINGTON
NORTH CAROLINA
Public Services • Engineering Division
APPROVED STORMWATER MANAGEMENT PLAN
Date: 12/15/16
Signed: _____

N/F
ECHO FARMS, LLC
DB: 2307 PG: 467
PID: R07006-002-001-000
ZONING: MF-M
LAND USE: RECREATIONAL

ECHO FARMS BLVD
(60' PUBLIC R/W)

N/F
ECHO FARMS, LLC
DB: 2307 PG: 467
PID: R07006-002-001-000
ZONING: MF-M
LAND USE: RECREATIONAL

PRELIMINARY PLAT
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CONVEYANCES, OR SALES

REV. NO.	DESCRIPTION	DATE
1	REVISED FOR SUBMITTAL	8-2-15
2	REVISED TO SHOW PRIVATE STREET	10-12-15
3	REVISED FOR PRELIMINARY SET	10-12-15
4	REVISED FOR TRC COMMENTS	11-17-15
5	REVISED TO SHOW EXISTING OFF-SITE TREES ALONG/NEAR WET POND #1 OUTFALL PIPE	11-20-15
6	REVISED PER CITY TO ADD ADDITIONAL TREES	11-20-15
7	REVISED TO PROVIDE SIGHT TRIANGLE ALONG CAROLINA BEACH RD.	12-14-15
8	REVISED PER CITY	2-9-16
9	REVISED TO SHOW TREE BOUNDARY NEAR/ALONG PRIVATE DRIVEWAY OF BUILDING #2	8-24-16
10	REVISED TO ADJUST MAIL BOX & WET POND	8-9-16
11	REVISED TO SHOW TREES & SURVEY BOUND ON THE SOUTH SIDE OF ECHO FARMS BLVD.	11-14-16
	REVISIONS	

SITE INVENTORY
4010 CAROLINA BEACH ROAD
ARBOR TRACE APARTMENTS
WILMINGTON TOWNSHIP NEW HANOVER COUNTY NORTH CAROLINA

MALPASS ENGINEERING & SURVEYING, P.C.
1134 SHIPYARD BOULEVARD
WILMINGTON, NORTH CAROLINA 28412
Phone 910-382-8843
Fax 910-382-5033 License No. C-2320

Developer: ECHO FARM APARTMENTS, LLC
10 S. CAROLINA DRIVE
WILMINGTON, NORTH CAROLINA 28403
PHONE: 910-251-5030

DATE: 7-22-15
SCALE: 1"=30'
DRAWN: JCB
CHECKED: JSM
PROJECT NO: 260
SHEET NO: 5
OF: 22



MATCHLINE
SEE SHEET 5

MATCHLINE
SEE SHEET 5

Approved Construction Plan

Name: _____ Date: 12/13/16

Planning: _____

Traffic: _____

Fire: _____

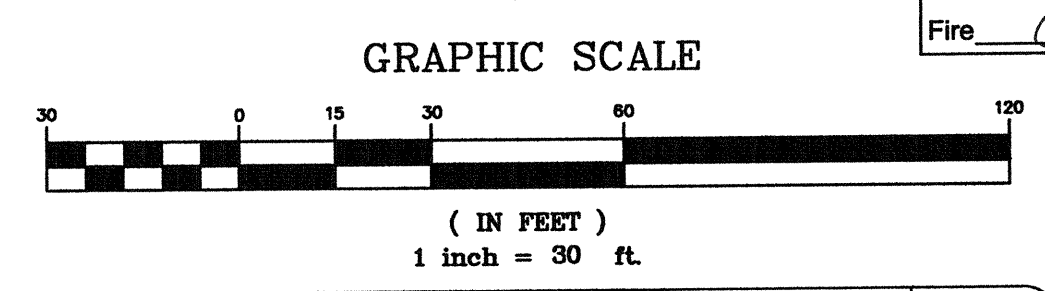
CITY OF WILMINGTON
NORTH CAROLINA

Public Services • Engineering Division

APPROVED STORMWATER MANAGEMENT PLAN

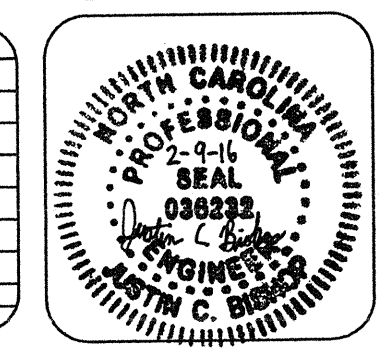
Date: 12/13/16 Permit: 201601022

Signed: _____



REV. NO.	DESCRIPTION	DATE
1	REVISED FOR SHE SUBMITTAL	8-2-15
2	REVISED TO PROVIDE ADJUSTED SURVEY DATA	10-12-15
3	REVISED FOR PRELIMINARY SET	10-15-15
4	REVISED PER THE COMMENTS	11-17-15
5	REVISED TO SHOW EXISTING POWER POLES	11-20-15
6	REVISED PER CITY TO SAVE ADDITIONAL TREES	12-14-15
7	REVISED TO PROVIDE SIDEWALK ALONG CAROLINA BEACH RD.	2-8-16
8	REVISED PER CITY	

SITE INVENTORY
4010 CAROLINA BEACH ROAD
ARBOR TRACE APARTMENTS
WILMINGTON TOWNSHIP NEW HANOVER COUNTY NORTH CAROLINA



MALPASS ENGINEERING & SURVEYING, P.C.
1124 SITTIPARD BOULEVARD
WILMINGTON, NORTH CAROLINA 28412
Phone: 910-382-8843 Fax: 910-382-8803 License No. C-2820

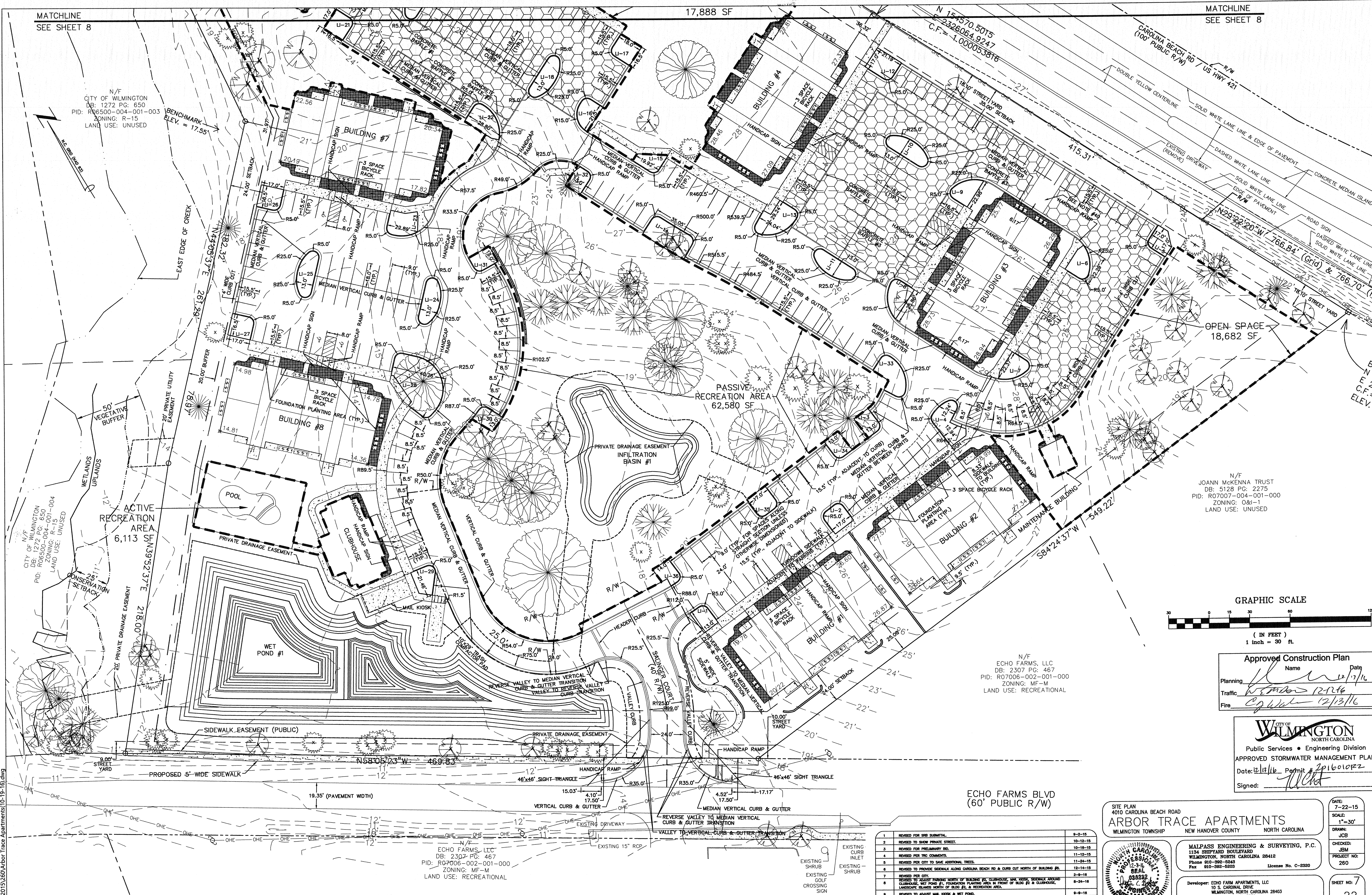
Developer: ECHO FARM APARTMENTS, LLC
10 S. CAROLINA DRIVE
WILMINGTON, NORTH CAROLINA 28403
PHONE: 910-251-5030

DATE: 7-22-15
SCALE: 1"=30'
DRAWN: JCB
CHECKED: JEM
PROJECT NO: 260
SHEET NO: 6
OF: 22

PRELIMINARY PLAT
NOT FOR RECORDATION,
CONVEYANCES, OR SALES

MATCHLINE
SEE SHEET 8

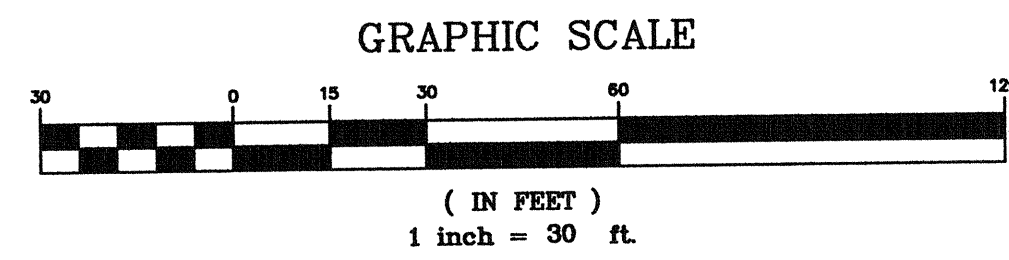
MATCHLINE
SEE SHEET 8



N/F
CITY OF WILMINGTON
DB: 1272 PG: 650
PID: R06500-004-001-003
ZONING: R-15
LAND USE: UNUSED

N/F
JOANN MCKENNA TRUST
DB: 5128 PG: 2275
PID: R07007-004-001-000
ZONING: O&J-1
LAND USE: UNUSED

N/F
ECHO FARMS, LLC
DB: 2307 PG: 467
PID: R07006-002-001-000
ZONING: MF-M
LAND USE: RECREATIONAL



Approved Construction Plan	
Name	Date
Planning	12/17/16
Traffic	12/16
Fire	12/13/16

CITY OF WILMINGTON
NORTH CAROLINA
Public Services • Engineering Division
APPROVED STORMWATER MANAGEMENT PLAN
Date: 12/17/16 Permit: 201601022
Signed: [Signature]

SITE PLAN
4010 CAROLINA BEACH ROAD
ARBOR TRACE APARTMENTS
WILMINGTON TOWNSHIP NEW HANOVER COUNTY NORTH CAROLINA

MALPASS ENGINEERING & SURVEYING, P.C.
1134 SHIPYARD BOULEVARD
WILMINGTON, NORTH CAROLINA 28412
Phone 910-392-6243
Fax 910-392-6203 License No. C-2280

Developer: ECHO FARM APARTMENTS, LLC
10 S. CARDINAL DRIVE
WILMINGTON, NORTH CAROLINA 28403
PHONE: 910-251-5030

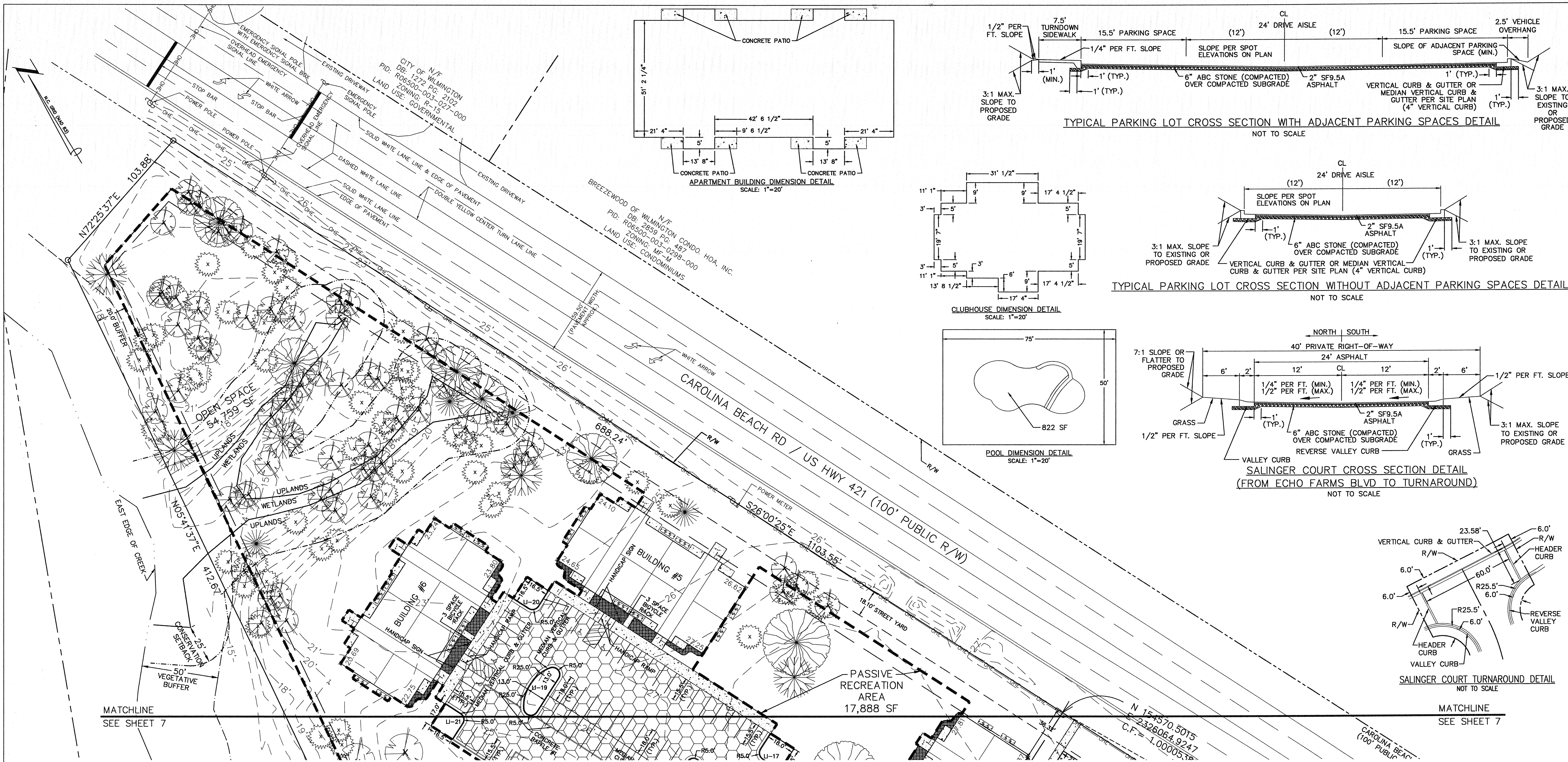
DATE: 7-22-15
SCALE: 1"=30'
DRAWN: JCB
CHECKED: JEM
PROJECT NO: 260
SHEET NO: 7
OF: 22

REV NO.	DESCRIPTION	DATE
1	REVISED FOR SUBMITTAL	6-2-15
2	REVISED TO SHOW PRIVATE STREET	10-19-15
3	REVISED FOR PRELIMINARY R.O.	10-19-15
4	REVISED PER THE COMMENTS	11-24-15
5	REVISED PER CITY TO SAVE ADDITIONAL TREES	11-24-15
6	REVISED TO PROMOTE SIDEWALK ALONG CAROLINA BEACH RD & CURB OUT NORTH OF BUILDING #6	12-14-15
7	REVISED PER CITY	2-2-16
8	REVISED TO ADJUST PARKING NORTH OF BUILDING #2 "LAPAROUSE" WAS "WALK" "SEPARATE" AROUND "CLIMATE" WET POND #1, FOUNDATION PLANTING AREA IN FRONT OF BUILD #2 & CLEARWALK "LANDSCAPE ISLANDS" NORTH OF BUILD #2 & RECREATION AREA	6-24-16
9	REVISED TO ADJUST MAIL KIOSK & WET POND	6-24-16
10	REVISED TO ADD SIDEWALK WITH ECHO FARMS BLVD SIDE	11-4-16
11	REVISED PER CITY TO ADD ECHO FARMS BOULEVARD SIDEWALK NOTE	12-8-16

ECHO FARMS BOULEVARD SIDEWALK NOTE:
DUE TO VARYING SITE CONDITIONS, THE DESIGN AND FINAL CONFIGURATION OF THE PROPOSED SIDEWALK ALONG ECHO FARMS BOULEVARD ARE SUBJECT TO FIELD EVALUATION AND VERIFICATION. THE CITY OF WILMINGTON ENGINEERING DIVISION, MALPASS ENGINEERING & SURVEYING, P.C. (ENGINEERING CONSULTANT), CONTRACTOR AND PROPERTY OWNER SHALL JOINTLY DETERMINE ANY FIELD CHANGES NECESSARY FOR THE SIDEWALK LAYOUT TO FUNCTION PROPERLY.

PRELIMINARY PLAT
NOT FOR RECORDATION,
CONVEYANCES, OR SALES

C:\Users\CD\2015\260\Arbor Trace Apartments\10-19-16.dwg



LANDSCAPE ISLAND	TOTAL AREA (SF)	IMPERVIOUS AREA (SF)	PERCENT IMPERVIOUS
LI-1	224.80	0	0
LI-2	288.90	0	0
LI-3	223.15	0	0
LI-4	456.81	0	0
LI-5	248.52	0	0
LI-6	281.12	0	0
LI-7	282.65	0	0
LI-8	339.15	0	0
LI-9	287.15	0	0
LI-10	378.84	0	0
LI-11	378.84	0	0
LI-12	355.84	0	0
LI-13	491.09	0	0
LI-14	609.04	0	0
LI-15	229.99	0	0
LI-16	283.78	0	0
LI-17	292.65	0	0
LI-18	378.84	0	0
LI-19	378.84	0	0
LI-20	267.90	0	0
LI-21	276.15	0	0
LI-22	397.14	0	0
LI-23	367.99	0	0
LI-24	378.84	0	0
LI-25	378.84	0	0
LI-26	276.15	0	0
LI-27	276.15	0	0
LI-28	1171.14	147.53	12.60
LI-29	278.99	0	0
LI-30	224.31	0	0
LI-31	223.15	0	0
LI-32	217.52	0	0
LI-33	436.55	0	0
LI-34	223.15	0	0
LI-35	288.80	0	0
LI-36	216.87	0	0

TREES PER DISTURBED ACRE
0.63 ACRES * 15 = 144.45, 144 TREES REQUIRED
*SEE LANDSCAPING PLAN FOR PROVIDED TREES

STREET YARD-CAROLINA BEACH ROAD (PRIMARY FRONTAGE)
STREET FRONTAGE = 1,103.55 FT
REQUIRED STREET YARD = 18 * 1,103.55 = 19,863.90 SF
PROVIDED STREET YARD = 19,937.57 SF
IMPERVIOUS AREA = 90.51 SF
PERCENT IMPERVIOUS = 90.51 / 19,937.57 * 100% = 0.46%
REQUIRED PLANTING = 19,937.57 / 600 = 33.23, 33 CANOPY TREES (OR 3 UNDERSTORY TREES PER 1 CANOPY TREE)
33.23 * 6 = 199.38, 199 SHRUBS
*SEE LANDSCAPING PLAN FOR PROVIDED TREES & SHRUBS

STREET YARD-ECHO FARMS BLVD (SECONDARY FRONTAGE)
STREET FRONTAGE = 469.83 = 37.53 * 12.54 = 432.30 FT
REQUIRED STREET YARD = 18 * 432.30 / 2 = 3,890.70 SF
PROVIDED STREET YARD = 3,461.82 + 578.81 = 4,040.63 SF
IMPERVIOUS AREA = 233.20 SF
PERCENT IMPERVIOUS = 233.20 / 4,040.63 * 100% = 5.78%
REQUIRED PLANTING = 4,040.63 / 600 = 6.74, 7 CANOPY TREES (OR 3 UNDERSTORY TREES PER 1 CANOPY TREE)
6.74 * 6 = 40.44, 40 SHRUBS
*SEE LANDSCAPING PLAN FOR PROVIDED TREES & SHRUBS

INTERIOR SHADING
PARKING FACILITY AREA [PARKING LOT AREA TO BACK OF CURB (OR BACK OF SIDEWALK ADJACENT TO PARKING SPACES)]
MINUS LANDSCAPE ISLANDS PLUS PRIVATE STREET (INCLUDING PORTION WITHIN ECHO FARMS BLVD R/W)
= 125,139 SF
REQUIRED INTERIOR SHADING (IS) = 0.2 * 125,139 = 25,028 SF
*SEE LANDSCAPING PLAN FOR PROVIDED INTERIOR SHADING & TREES

FOUNDATION PLANTING-FRONT OR REAR OF BUILDINGS #1-8 (PER FRONT OR REAR OF BUILDING ADJACENT TO PARKING/DRIVE AISLE)
REQUIRED FOUNDATION PLANTING = ((10.73' * 12.54') + (0.5 * 10.62' * 31.88')) * 0.12 = 455.61 SF
PROVIDED FOUNDATION PLANTING (BUILDINGS #1-8) = 508.48 SF
*SEE LANDSCAPING PLAN FOR PROVIDED PLANTINGS

FOUNDATION PLANTING-SIDE OF BUILDINGS #1, 2, 3, 4, 7, & 8 (PER SIDE OF BUILDING ADJACENT TO PARKING/DRIVE AISLE)
REQUIRED FOUNDATION PLANTING = ((31.44' * 51.19') + (0.5 * 12.63' * 50.53')) * 0.12 = 231.43 SF
PROVIDED FOUNDATION PLANTING (BUILDINGS #1 & 2) = 262.12 SF
PROVIDED FOUNDATION PLANTING (BUILDINGS #3 & 4) = 236.31 SF
PROVIDED FOUNDATION PLANTING (BUILDING #7) = 267.45 SF
PROVIDED FOUNDATION PLANTING (BUILDING #8) = 280.41 SF
*SEE LANDSCAPING PLAN FOR PROVIDED PLANTINGS

FOUNDATION PLANTING-FRONT OF CLUBHOUSE
REQUIRED FOUNDATION PLANTING = ((8.98' * 14.09') + (11.31' * 31.05') + (8.98' * 20.39') + (13.61' * 4.61' * 0.5) + 87.47 SF) * 0.12 = 93.61 SF
PROVIDED FOUNDATION PLANTING = 163.32 SF
*SEE LANDSCAPING PLAN FOR PROVIDED PLANTINGS

FOUNDATION PLANTING-FRONT OF MAINTENANCE BUILDING
REQUIRED FOUNDATION PLANTING = ((10.00' * 20.00') + (0.5 * 6.67' * 20.00')) * 0.12 = 32 SF
PROVIDED FOUNDATION PLANTING = 33.42 SF
*SEE LANDSCAPING PLAN FOR PROVIDED PLANTINGS

PRELIMINARY PLAT
NOT FOR RECORDATION,
CONVEYANCES, OR SALES

GRAPHIC SCALE
(IN FEET)
1 inch = 30 ft

1	REVISED FOR SITE SUBMITTAL	9-2-15
2	REVISED TO PROVIDE ADJUSTED SURVEY DATA	10-12-15
3	REVISED FOR PRELIMINARY BID	10-15-15
4	REVISED FOR THE COMPACT	11-12-15
5	REVISED PER CITY TO SPEC ADDITIONAL TREES	11-24-15
6	REVISED TO PROVIDE SIDEWALK ALONG CAROLINA BEACH RD, STREET YARD CALC. & TREE CALC.	12-14-15
7	REVISED PER CITY	2-9-16
8	REVISED TO CORRECT IMPERVIOUS AREA IN STREET YARD ALONG CAROLINA BEACH ROAD	2-15-16
9	REVISED TO ADJUST CLUBHOUSE TURNAROUND DETAIL, INTERIOR LANDSCAPE SHADING, INTERIOR SHADING CALCULATIONS, & FOUNDATION PLANTING CALCULATIONS FOR REAR OF #1 CLUBHOUSE	8-24-16
REV. NO.	DESCRIPTION	DATE

Approved Construction Plan
Name: [Signature] Date: 12/17/16
Planning: [Signature] Date: 12/17/16
Traffic: [Signature] Date: 12/17/16
Fire: [Signature] Date: 12/17/16

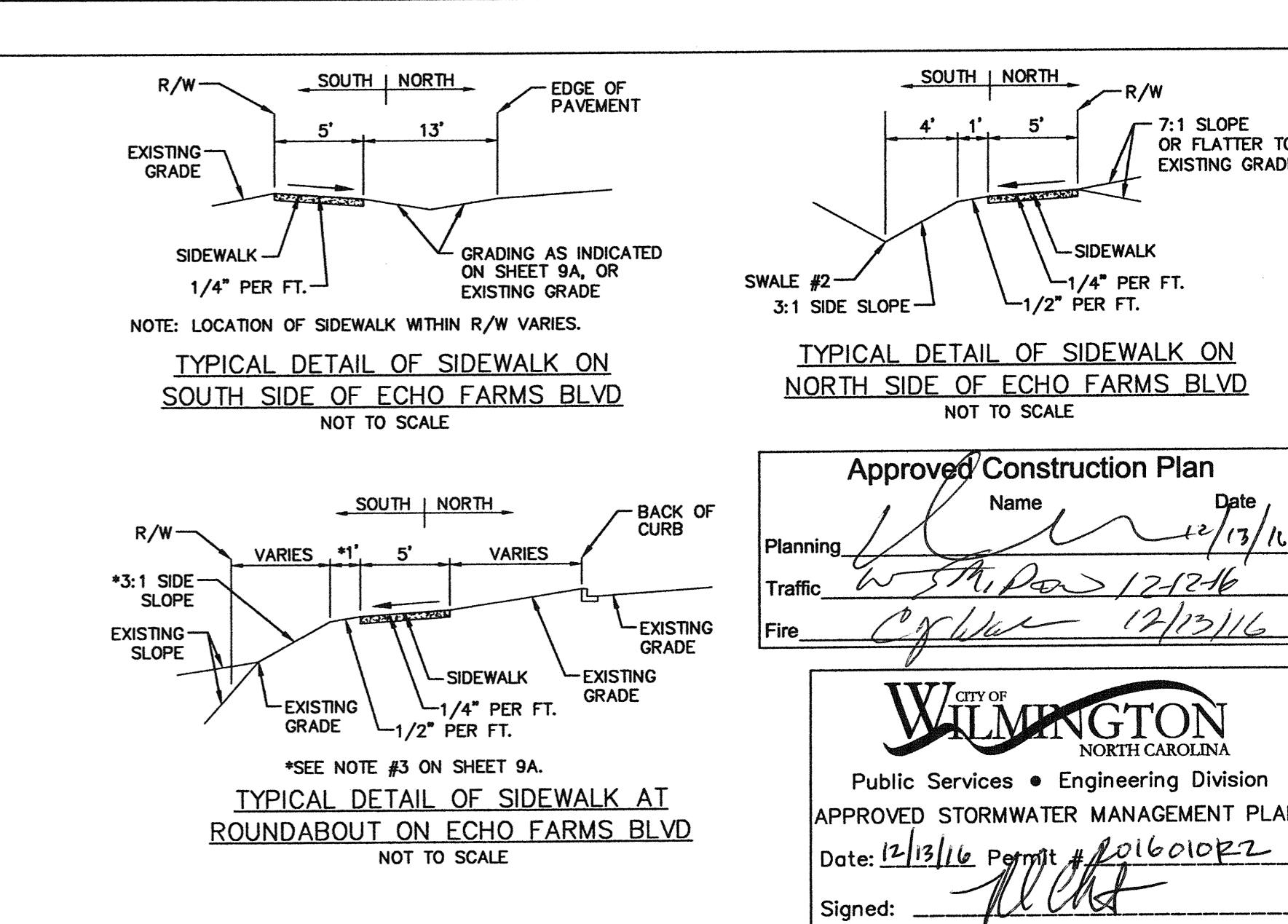
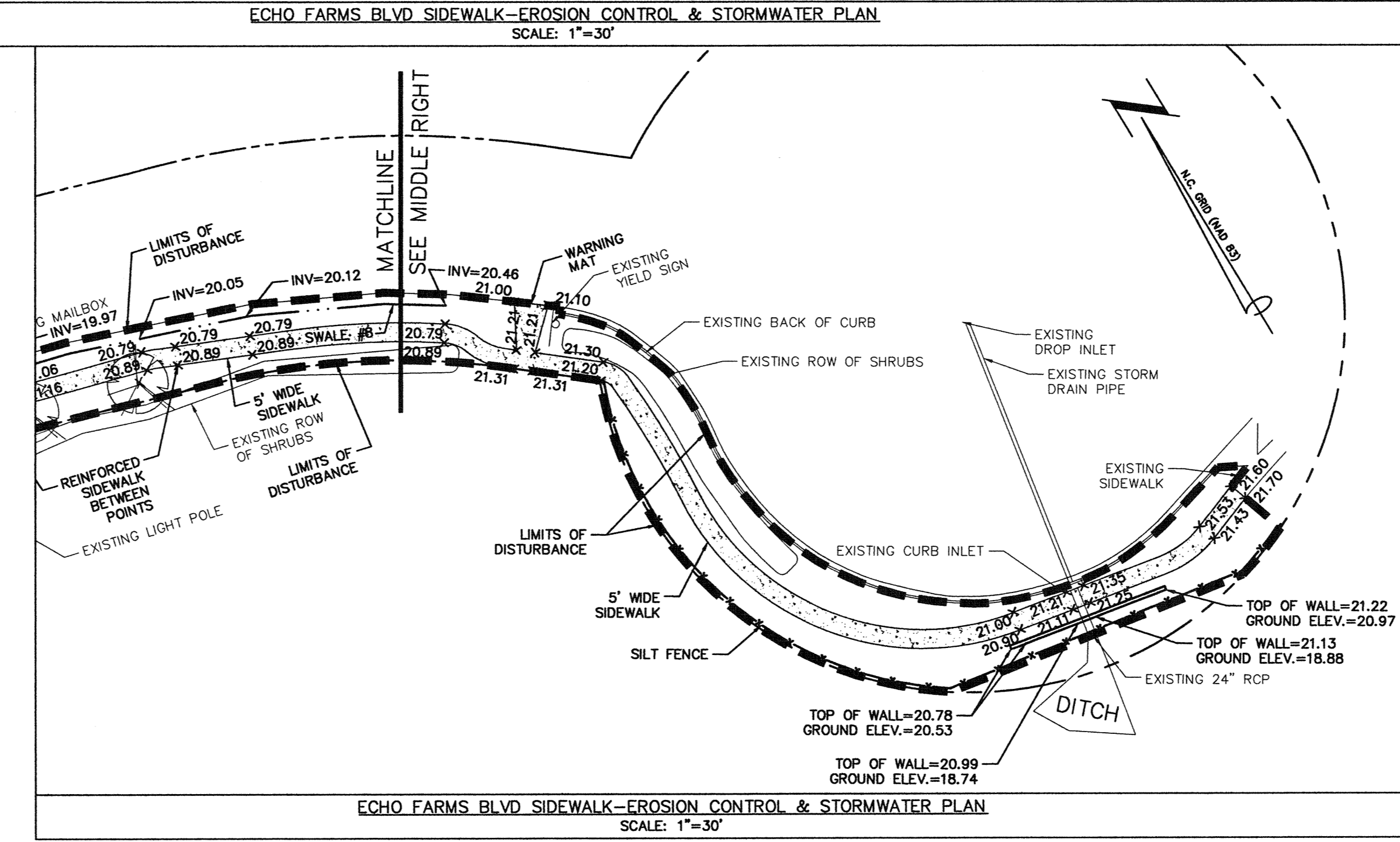
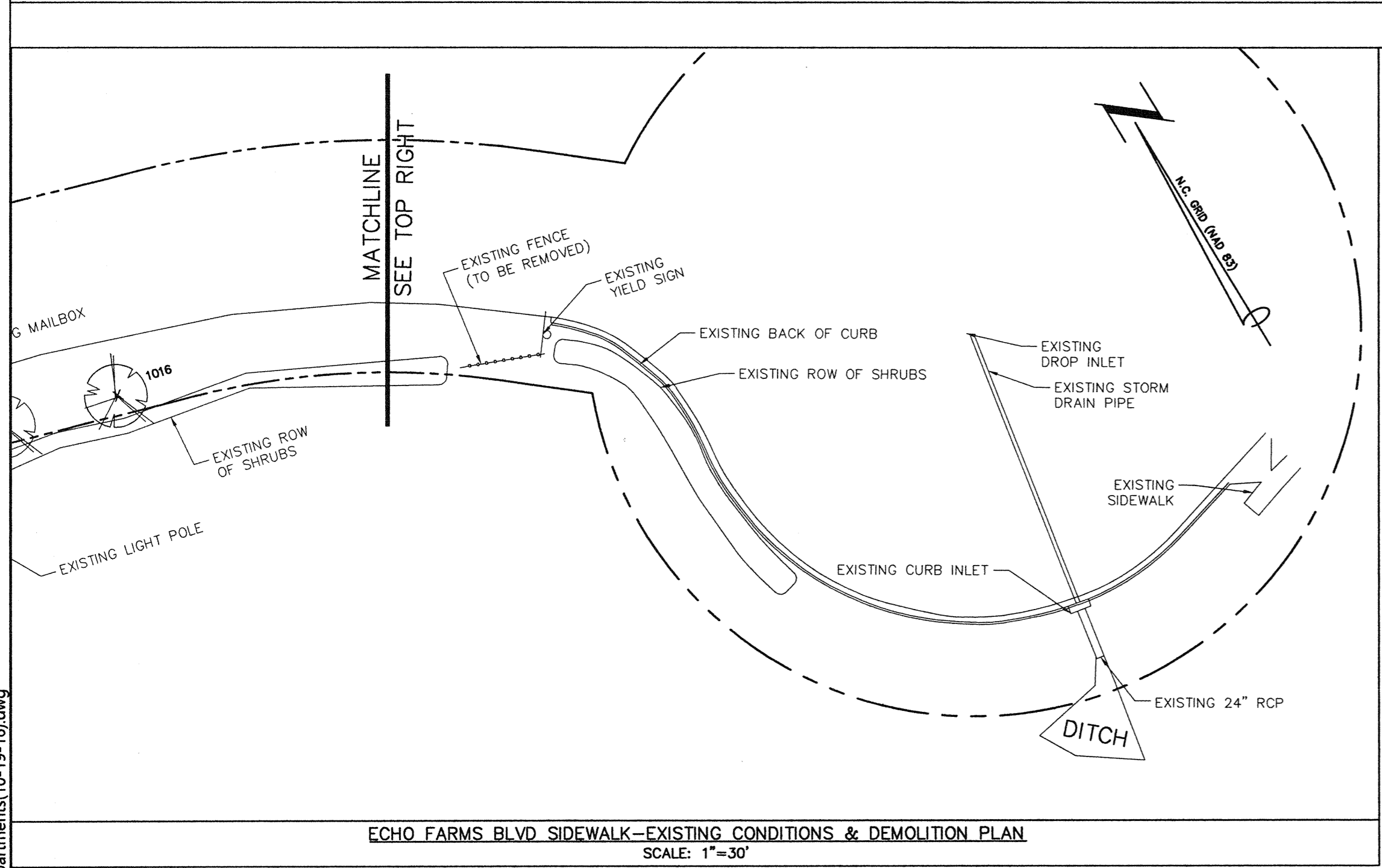
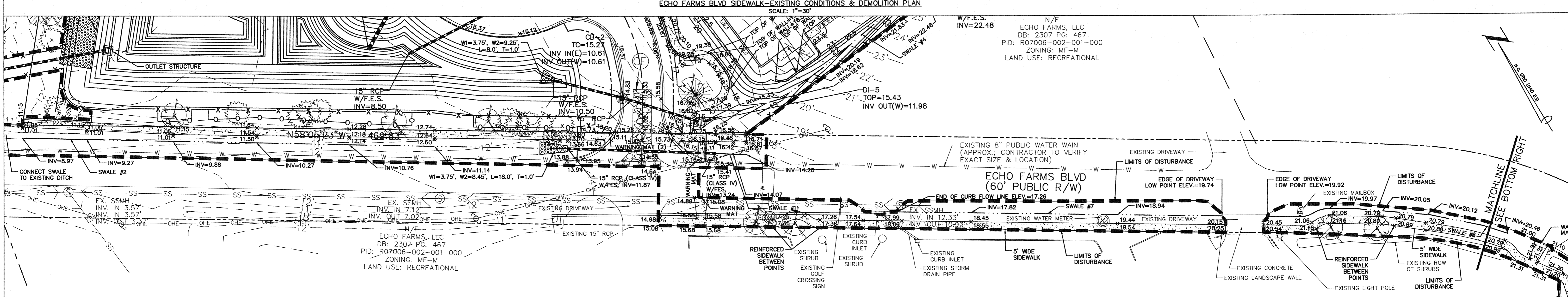
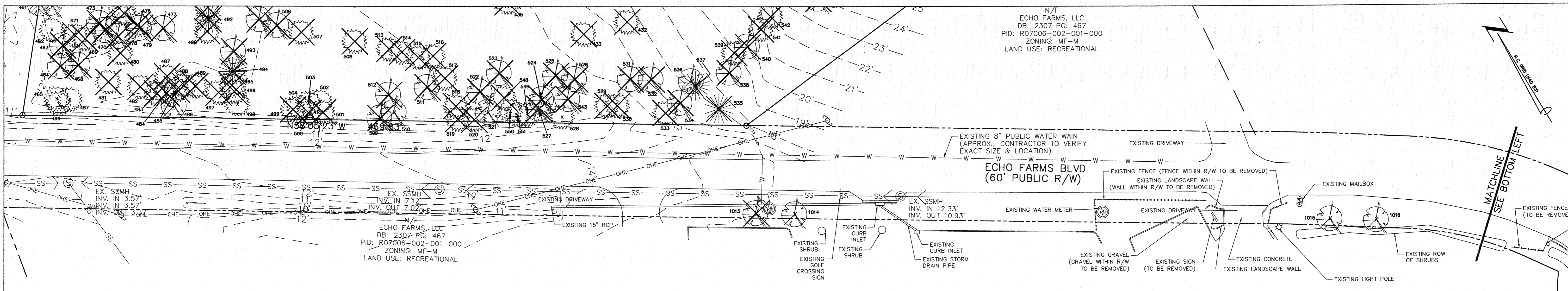
WILMINGTON NORTH CAROLINA
Public Services • Engineering Division
APPROVED STORMWATER MANAGEMENT PLAN
Date: 12/16/16 Permit # 201601022
Signed: [Signature]

SITE PLAN
4010 CAROLINA BEACH ROAD
ARBOR TRACE APARTMENTS
WILMINGTON TOWNSHIP NEW HANOVER COUNTY NORTH CAROLINA

MALPASS ENGINEERING & SURVEYING, P.C.
1134 SHILOHARD BOULEVARD
WILMINGTON, NORTH CAROLINA 28412
Phone 910-388-8243 Fax 910-388-5008 License No. C-2320

Developer: ECHO FARM APARTMENTS, LLC
10 S. CARDINAL DRIVE
WILMINGTON, NORTH CAROLINA 28403
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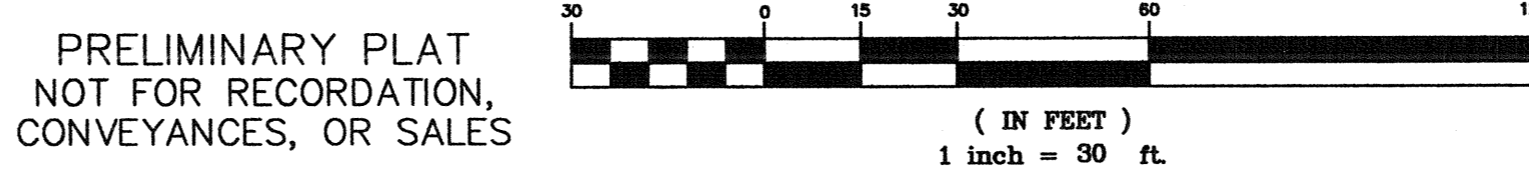
DATE: 7-22-15
SCALE: 1"=30'
DRAWN: JCB
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PROJECT NO: 260
SHEET NO: 8
OF: 22



NOTES FOR SIDEWALK WITHIN ECHO FARMS BLVD.

1. CONTRACTOR AND/OR DEVELOPER TO COORDINATE THE REMOVAL OF THE EXISTING FENCE, SIGN, LANDSCAPE WALL, GRAVEL, & DEAD TREE WITH THE ADJACENT PROPERTY OWNER.
2. FIELD ADJUSTMENTS TO THE PROPOSED SIDEWALK GRADES ARE TO BE COORDINATED WITH & APPROVED BY THE ENGINEER & CITY INSPECTOR.
3. IF THE 3:1 SIDE SLOPE DOES NOT TIE BACK INTO THE EXISTING GRADE PRIOR TO THE END OF THE EXISTING 24" RCP AT THE ROUNDABOUT, THEN A MODULAR/KEYSTONE BLOCK RETAINING WALL WITH A FENCE SHALL BE INSTALLED AS SHOWN ON THE PLAN.
4. RETAINING WALL DESIGN BY OTHERS. MALPASS ENGINEERING & SURVEYING, P.C. IS NOT RESPONSIBLE FOR RETAINING WALL DESIGN.

ECHO FARMS BOULEVARD SIDEWALK NOTE:
 DUE TO VARYING SITE CONDITIONS, THE DESIGN AND FINAL CONFIGURATION OF THE PROPOSED SIDEWALK ALONG ECHO FARMS BOULEVARD ARE SUBJECT TO FIELD EVALUATION AND VERIFICATION. THE CITY OF WILMINGTON ENGINEERING DIVISION, MALPASS ENGINEERING & SURVEYING, P.C. (ENGINEERING CONSULTANT), CONTRACTOR AND PROPERTY OWNER SHALL JOINTLY DETERMINE ANY FIELD CHANGES NECESSARY FOR THE SIDEWALK LAYOUT TO FUNCTION PROPERLY.



NO.	DESCRIPTION	DATE
1	ISSUED FOR CITY TO ADD ECHO FARMS BOULEVARD SIDEWALK NOTE & ADJUST SIDEWALK GRADES AT ROUNDABOUT	12-8-18

APPROVED CONSTRUCTION PLAN

Name: _____ Date: 12/13/18

Planning: _____

Traffic: _____

Fire: _____

CITY OF WILMINGTON
 NORTH CAROLINA

Public Services • Engineering Division

APPROVED STORMWATER MANAGEMENT PLAN

Date: 12/13/18 Permit # 161601022

Signed: _____

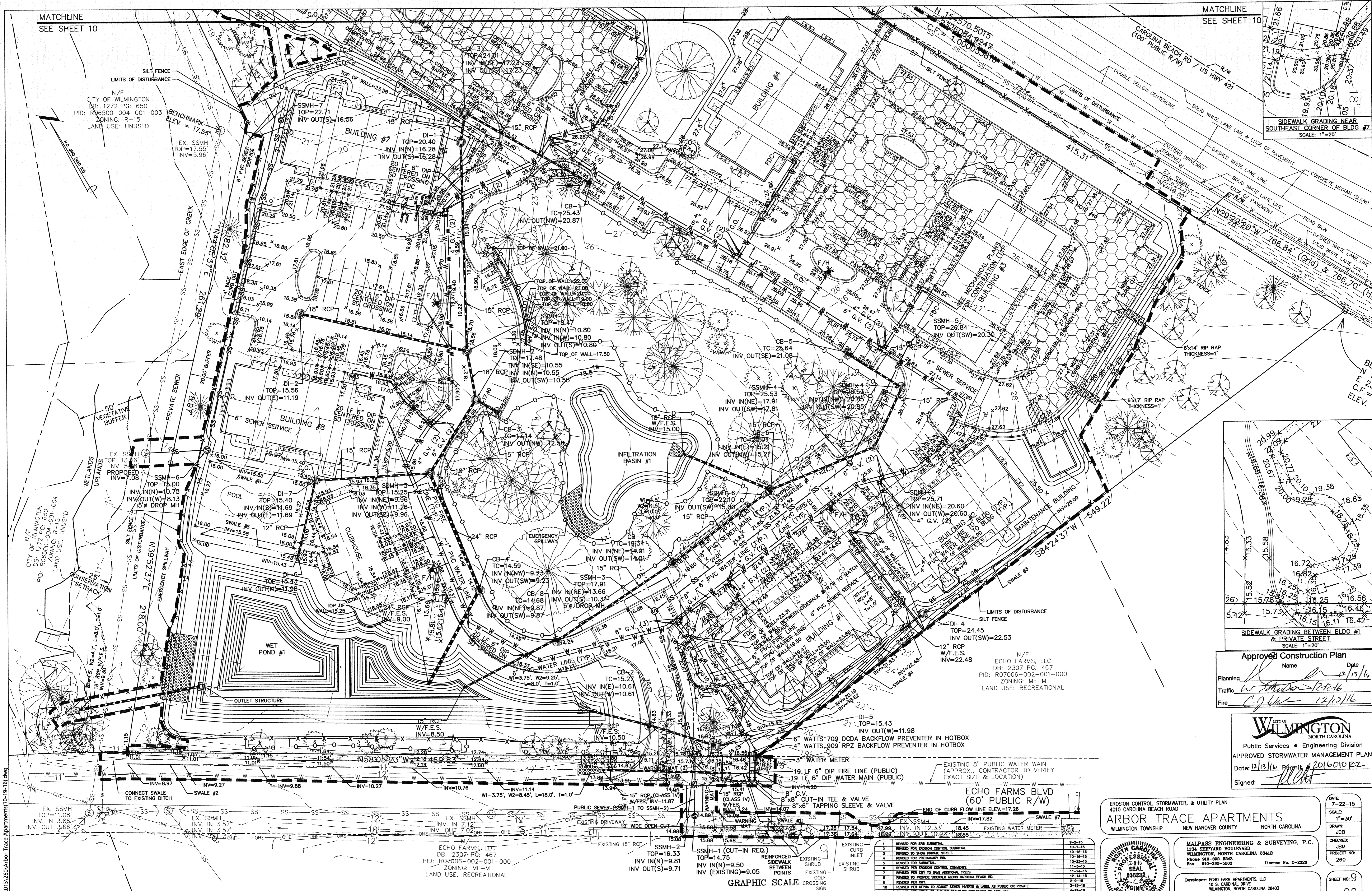
ARBOR TRACE APARTMENTS
 WILMINGTON TOWNSHIP NEW HANOVER COUNTY NORTH CAROLINA

DATE: 11-4-18
 SCALE: 1"=30'
 DRAWN: JCB
 CHECKED: JEM
 PROJECT NO: 260

Developer: ECHO FARM APARTMENTS, LLC
 10 S. CAROLINA DRIVE
 WILMINGTON, NORTH CAROLINA 28403
 PHONE: 910-291-5030

SHEET NO: 9A
 OF: 22

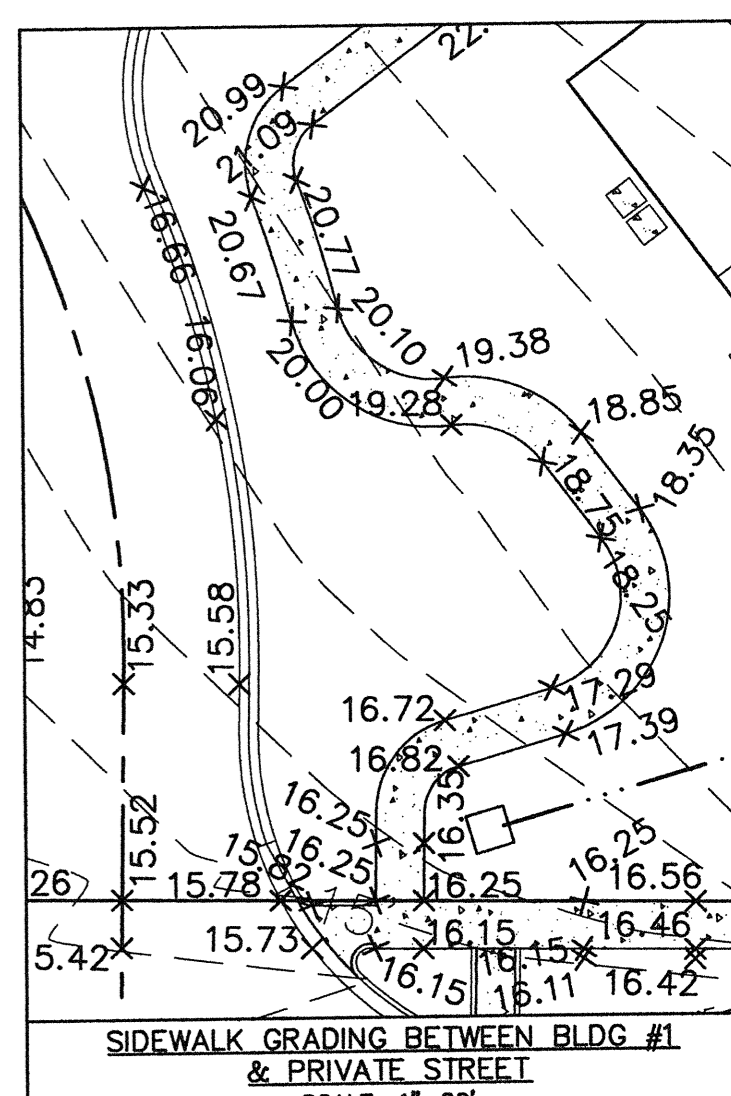
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MATCHLINE
SEE SHEET 10

MATCHLINE
SEE SHEET 10

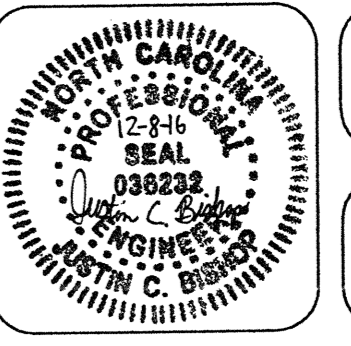
SIDEWALK GRADING NEAR
SOUTHWEST CORNER OF BLDG #7
SCALE: 1"=20'



Approved Construction Plan
Name: _____ Date: 12/13/16
Planning: _____
Traffic: _____
Fire: _____

City of WILMINGTON
Public Services • Engineering Division
APPROVED STORMWATER MANAGEMENT PLAN
Date: 12/13/16 Permit: 201601022
Signed: _____

EROSION CONTROL, STORMWATER, & UTILITY PLAN
ARBOR TRACE APARTMENTS
WILMINGTON TOWNSHIP NEW HANOVER COUNTY NORTH CAROLINA



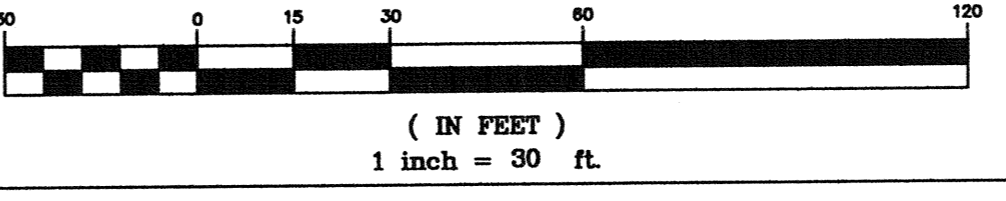
MALPASS ENGINEERING & SURVEYING, P.C.
1134 SHIPYARD BOULEVARD
WILMINGTON, NORTH CAROLINA 28412
Phone 910-382-5248
Fax 910-382-5200 License No. C-2320

Developer: ECHO FARM APARTMENTS, LLC
10 S. CAROLINA DRIVE
WILMINGTON, NORTH CAROLINA 28403
PHONE: 910-291-9030

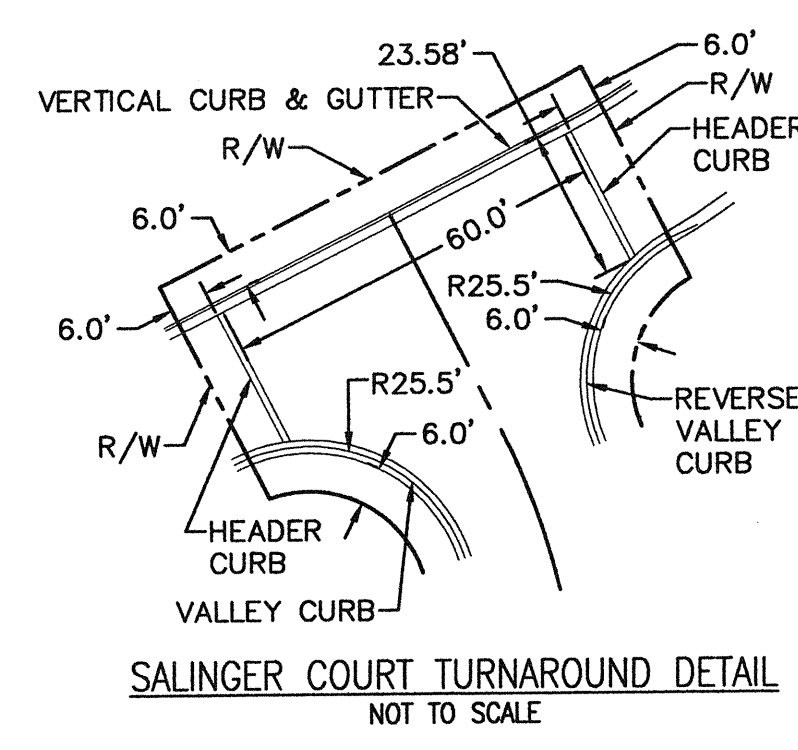
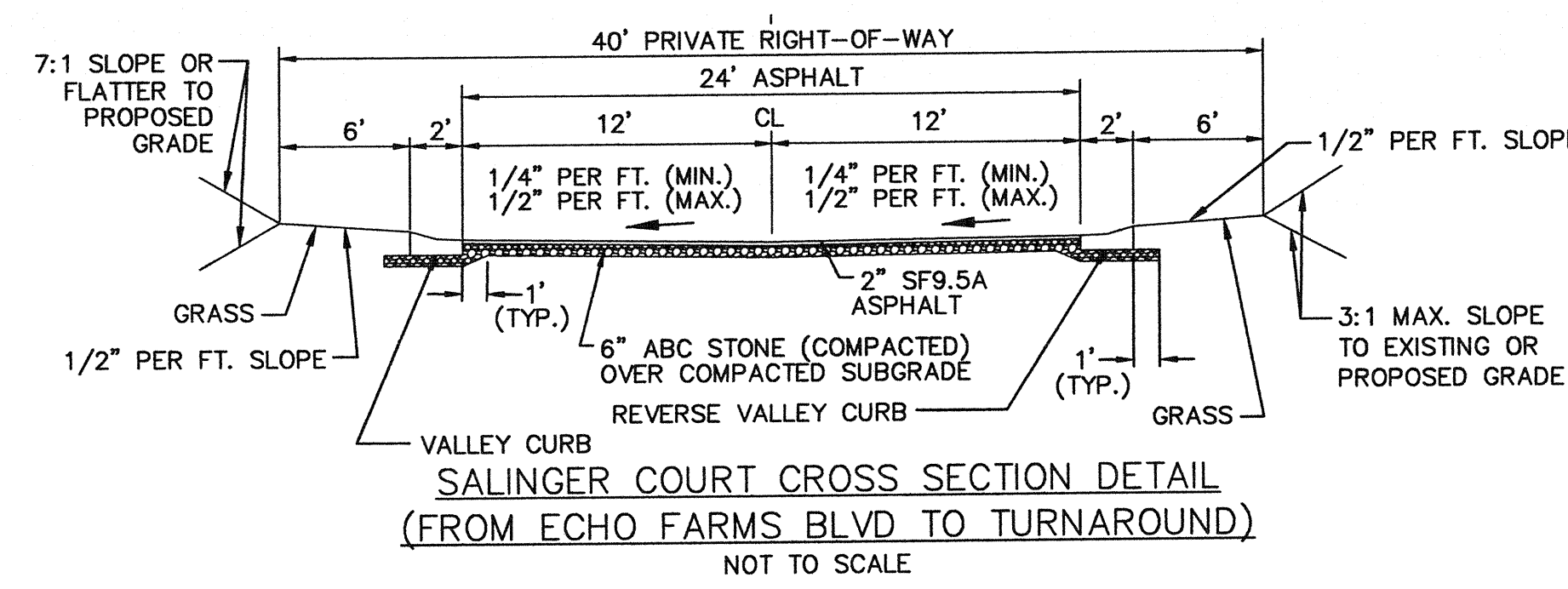
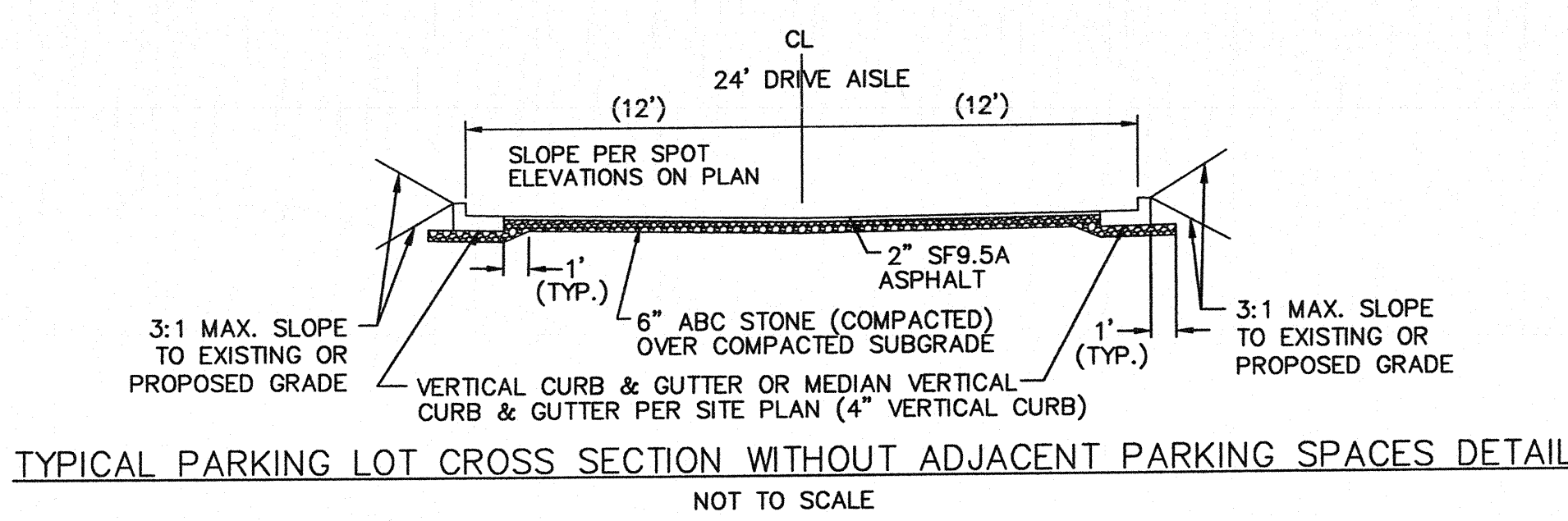
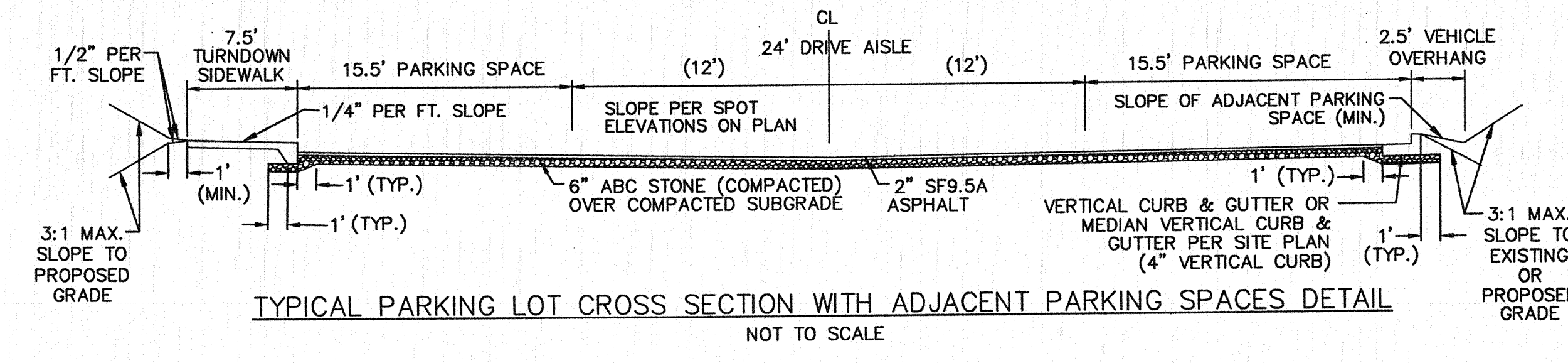
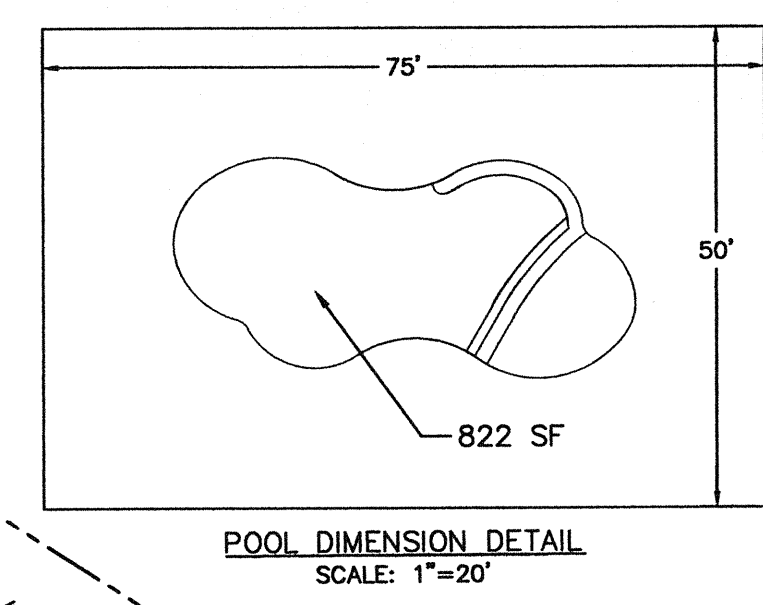
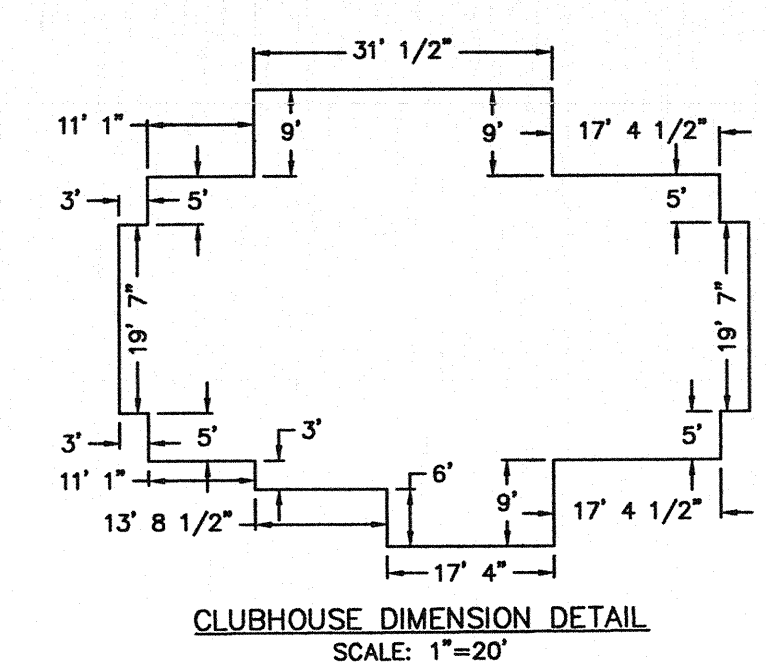
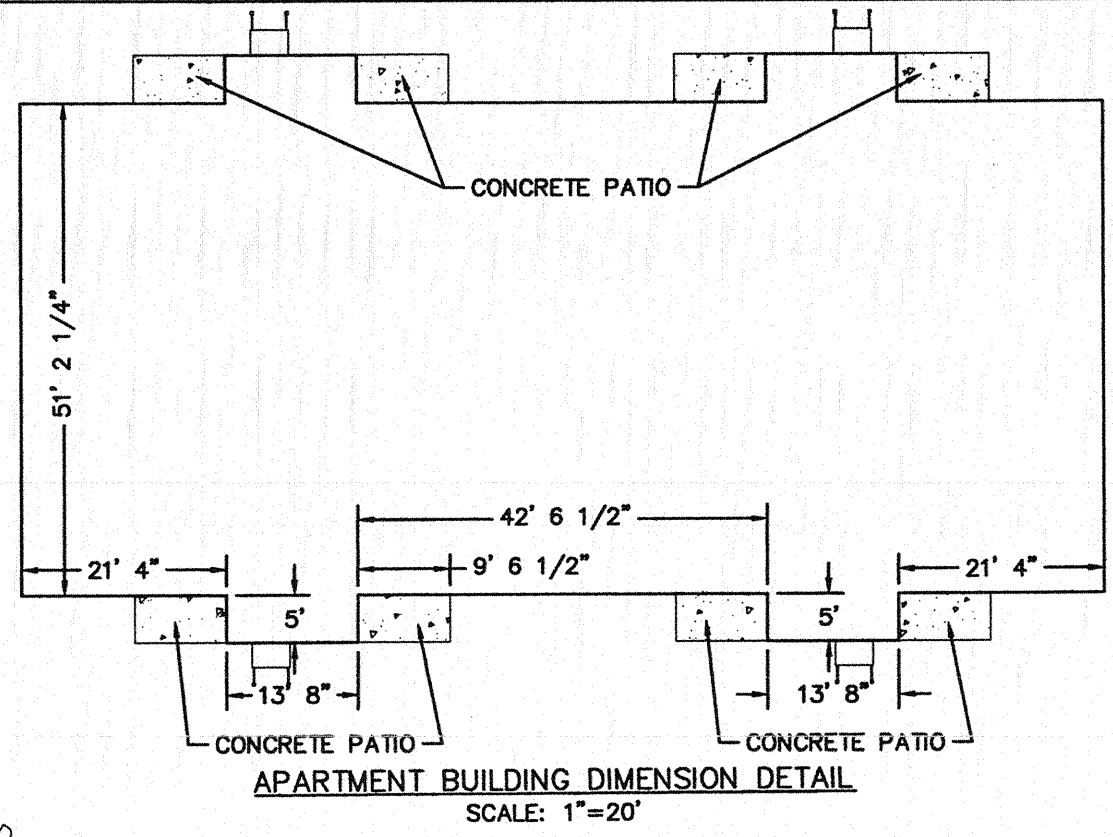
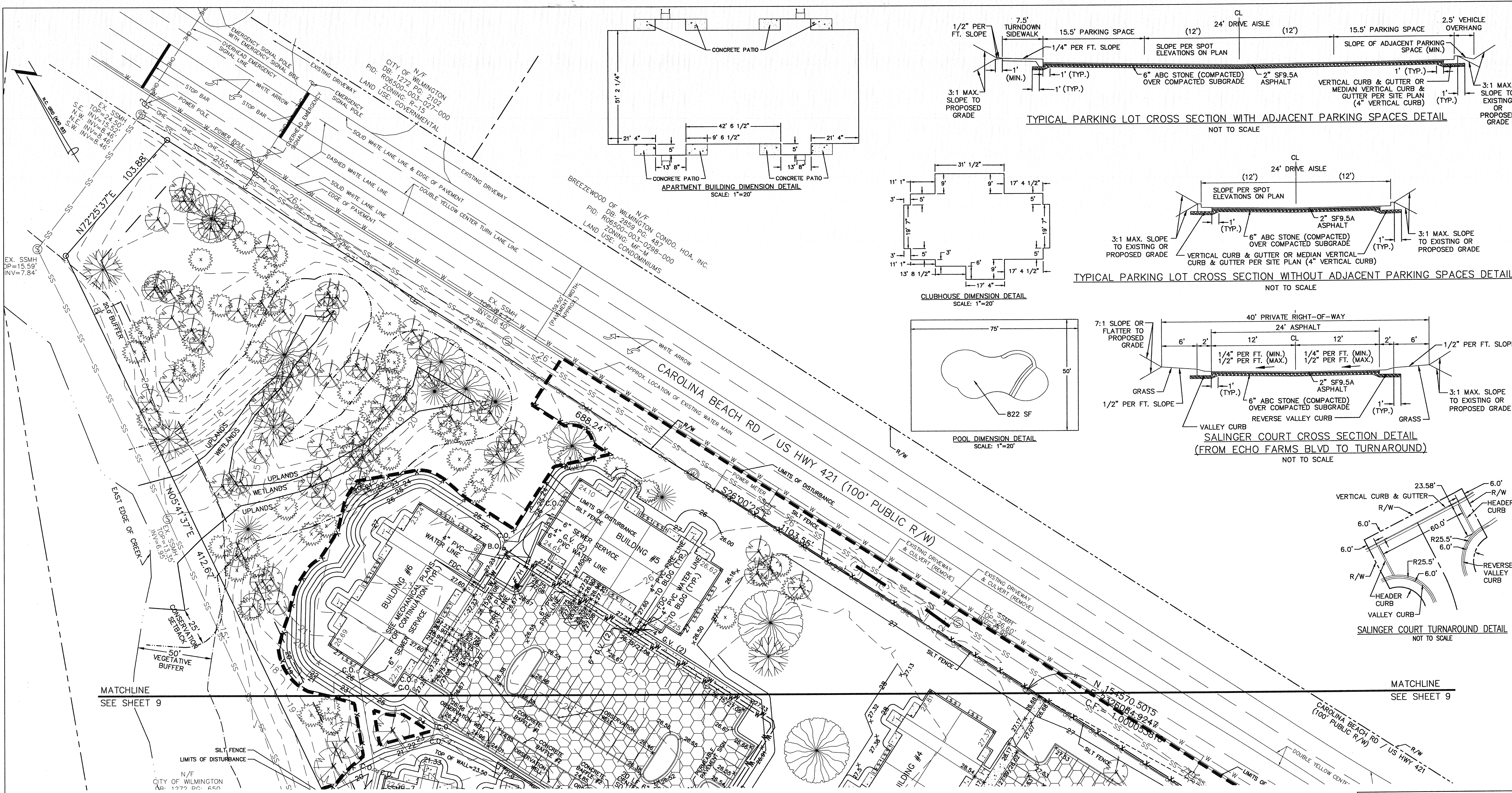
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CHECKED: SEM
PROJECT NO: 260
SHEET NO: 9
OF: 22

ECHO FARMS BOULEVARD SIDEWALK NOTE:
DUE TO VARYING SITE CONDITIONS, THE DESIGN AND FINAL CONFIGURATION OF THE PROPOSED SIDEWALK ALONG ECHO FARMS BOULEVARD ARE SUBJECT TO FIELD EVALUATION AND VERIFICATION. THE CITY OF WILMINGTON ENGINEERING DIVISION, MALPASS ENGINEERING & SURVEYING, P.C. (ENGINEERING CONSULTANT), CONTRACTOR AND PROPERTY OWNER SHALL JOINTLY DETERMINE ANY FIELD CHANGES NECESSARY FOR THE SIDEWALK LAYOUT TO FUNCTION PROPERLY.

PRELIMINARY PLAT
NOT FOR RECORDATION,
CONVEYANCES, OR SALES

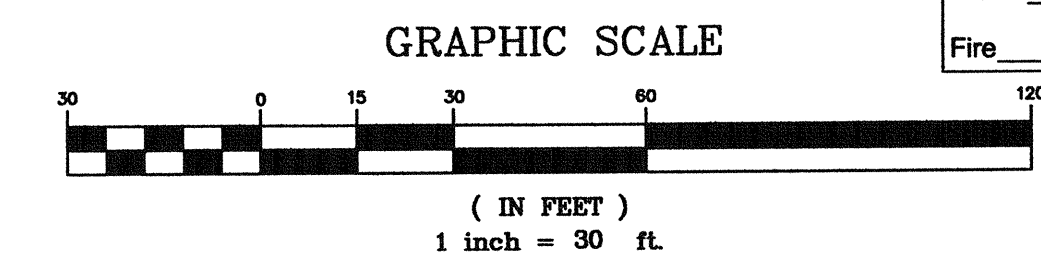


REV NO.	DESCRIPTION	DATE
1	REVISED FOR S&B SUBMITTAL	8-3-15
2	REVISED FOR EROSION CONTROL SUBMITTAL	10-1-15
3	REVISED TO SHOW PRIVATE STREET	10-1-15
4	REVISED FOR PRELIMINARY BLD.	10-15-15
5	REVISED FOR COMMENTS	10-29-15
6	REVISED PER EROSION CONTROL COMMENTS	11-3-15
7	REVISED PER CITY TO SHOW ADDITIONAL TREES	12-14-15
8	REVISED TO PROVIDE DETAILS ALONG CAROLINA BEACH RD.	2-4-16
9	REVISED PER CITY	2-15-16
10	REVISED PER CITY TO CHANGE SEWER INVERTS & LABEL AS PUBLIC OR PRIVATE	4-29-16
11	REVISED TO ADJUST LENGTH OF RAIN GUTTER PREVENTER ON FIRE LINE	8-18-16
12	REVISED TO ADJUST LENGTH OF RAIN GUTTER PREVENTER ON FIRE LINE	8-18-16
13	REVISED TO ADJUST LENGTH OF RAIN GUTTER PREVENTER ON FIRE LINE	8-18-16
14	REVISED TO INCREASE LENGTH OF MAN HOLES & ADD SIGNING WITHIN ECHO FARMS BLVD R/W	11-4-16
15	REVISED PER CITY TO ADD ECHO FARMS BOULEVARD SIDEWALK NOTE	12-8-16



- UTILITY SEPARATION NOTES**
1. WATER MAINS SHALL HAVE A MINIMUM COVER OF 3'.
 2. SANITARY SEWER MAINS SHALL HAVE A MINIMUM COVER OF 3' OR D.I.P. SHALL BE USED.
 3. HORIZONTAL SEPARATION BETWEEN WATER AND SANITARY SEWER SHALL BE 10' BETWEEN EDGE OF PIPES.
 4. VERTICAL SEPARATION BETWEEN WATER AND SANITARY SEWER: WATER OVER SANITARY SEWER: >18" BETWEEN PIPES OR USE D.I.P. (ON BOTH) 10' ON EITHER SIDE OF CROSSING. SANITARY SEWER OVER WATER: USE D.I.P. (ON BOTH) 10' ON EITHER SIDE OF CROSSING.
 5. HORIZONTAL SEPARATION BETWEEN STORM SEWER & SANITARY SEWER SHALL BE 5' BETWEEN EDGE OF PIPES.
 6. A 24" VERTICAL SEPARATION BETWEEN PIPES SHALL BE PROVIDED BETWEEN STORM SEWER AND SANITARY SEWER. WHERE SEPARATION IS LESS THAN 24" & SANITARY IS OVER STORM USE D.I.P. ON SANITARY SEWER 10' ON EITHER SIDE OF CROSSING. WHERE SEPARATION IS LESS THAN 12" & STORM IS OVER SANITARY BRIDGING IS REQUIRED (SEE SANITARY SEWER DETAIL). WHERE SEPARATION IS 12"-24" & STORM IS OVER SANITARY BRIDGING OR D.I.P. ON SANITARY SEWER 10' ON EITHER SIDE OF CROSSING.
 7. HORIZONTAL SEPARATION BETWEEN WATER AND STORM SEWER SHALL BE 5' BETWEEN EDGE OF PIPES.
 8. VERTICAL SEPARATION BETWEEN WATER AND STORM SEWER: WATER OVER STORM SEWER: >18" BETWEEN PIPES OR USE D.I.P. ON WATER 10' ON EITHER SIDE OF CROSSING. STORM SEWER OVER WATER: USE D.I.P. ON WATER 10' ON EITHER SIDE OF CROSSING.

9. ALL SANITARY SEWER MANHOLES WITH A DROP OF 30" OR GREATER SHALL HAVE AN INSIDE DIAMETER OF 5' WITH AN INSIDE DROP STRUCTURE.
10. GRAVITY SANITARY SEWER WITHIN 50' OF WETLANDS SHALL BE D.I.P. AND MEET WATER MAIN MATERIALS, TESTING METHODS AND ACCEPTABILITY STANDARDS [15A NCAC 18C].
11. SANITARY SEWER MANHOLES MUST BE GREATER THAN 50' FROM WETLANDS, AS MEASURED TO THE CLOSEST OUTSIDE EDGE.



REV NO.	DESCRIPTION	DATE
1	REVISED FOR 3RD SUBMITTAL	9-2-15
2	REVISED FOR EROSION CONTROL SUBMITTAL	10-1-15
3	REVISED TO PROVIDE ADJUSTED SURVEY DATA	10-15-15
4	REVISED FOR PRELIMINARY BID	10-23-15
5	REVISED FOR SUBMITTAL	11-3-15
6	REVISED PER EROSION CONTROL COMMENTS	11-24-15
7	REVISED PER CITY TO SAVE ADDITIONAL TREES	12-16-15
8	REVISED TO PROVIDE SPECIALLY ALONG CAROLINA BEACH RD.	2-8-16
9	REVISED PER CITY	2-24-16
10	REVISED TO ADJUST CLUBHOUSE DIMENSION DETAIL	2-24-16

PRELIMINARY PLAT
NOT FOR RECORDATION,
CONVEYANCES, OR SALES

Approved Construction Plan

Name: [Signature] Date: 12/15/16

Planning: [Signature] Date: 12/16/16

Traffic: [Signature] Date: 12/16/16

Fire: [Signature] Date: 12/16/16

Signed: [Signature]

WILMINGTON
NORTH CAROLINA

Public Services • Engineering Division

APPROVED STORMWATER MANAGEMENT PLAN

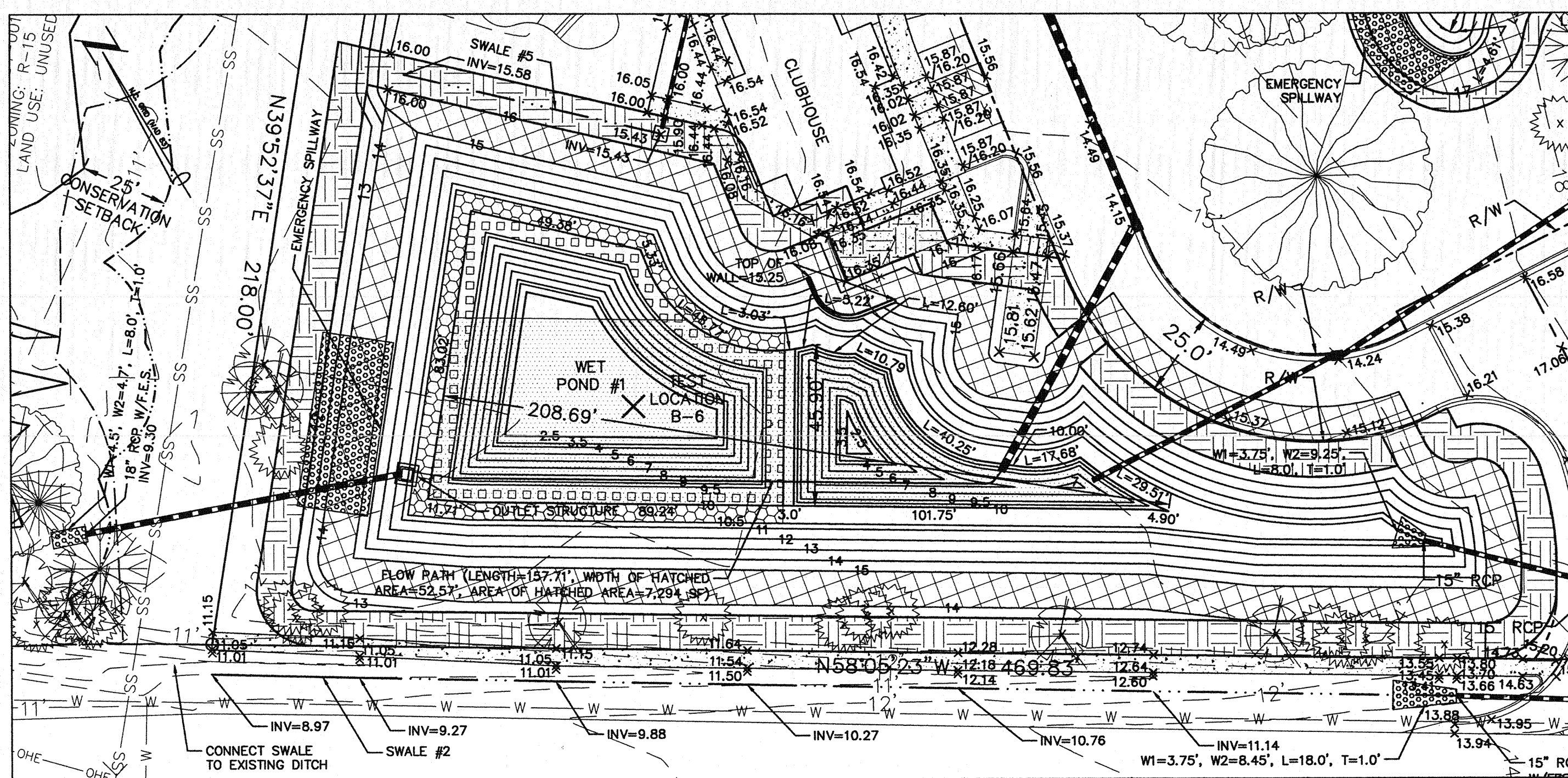
Date: 12/16/16 Permit #: 201601022

EROSION CONTROL, STORMWATER, & UTILITY PLAN
4010 CAROLINA BEACH ROAD
ARBOR TRACE APARTMENTS
WILMINGTON TOWNSHIP NEW HANOVER COUNTY NORTH CAROLINA

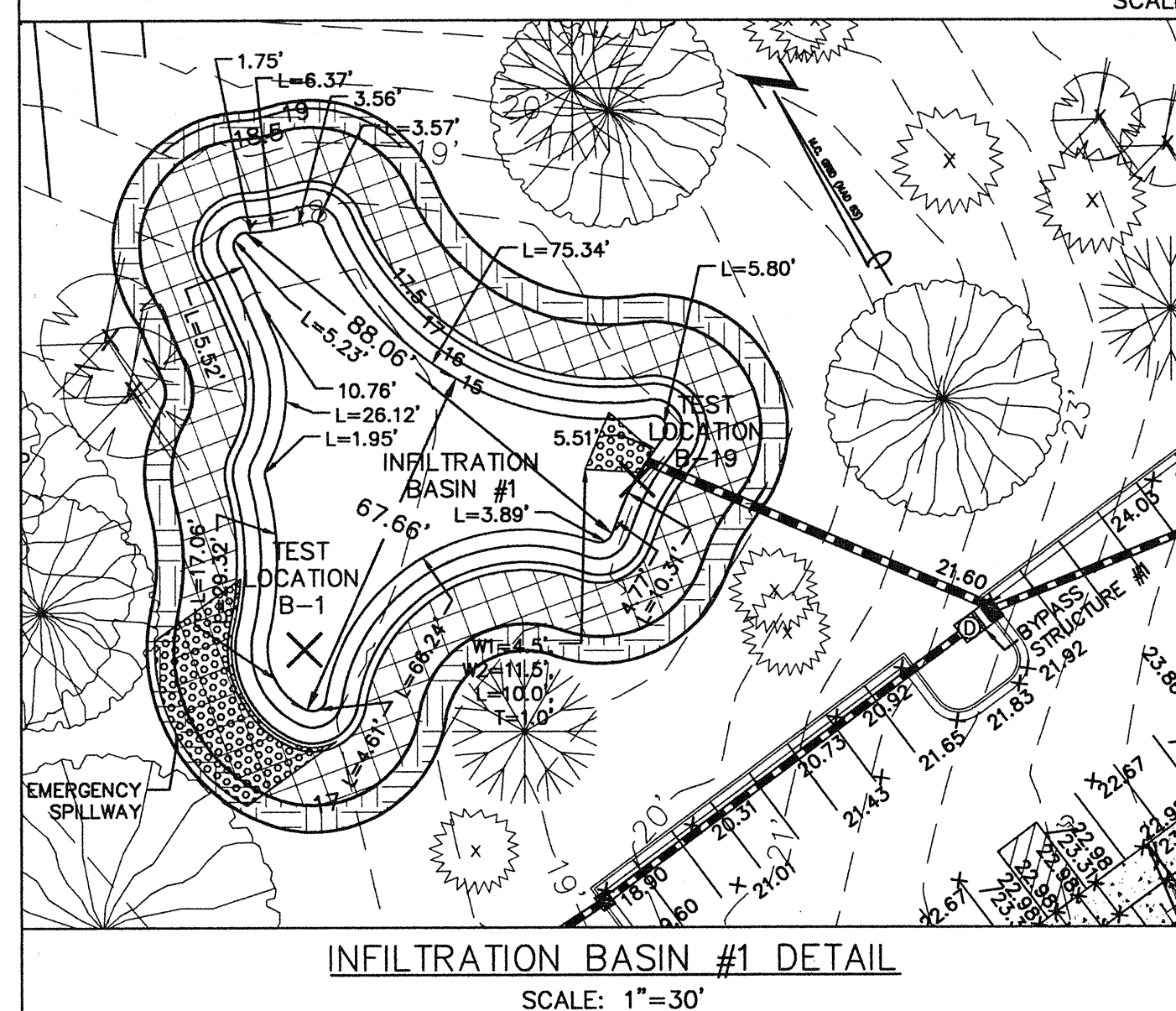
MALPASS ENGINEERING & SURVEYING, P.C.
1134 SHEPARD BOULEVARD
WILMINGTON, NORTH CAROLINA 28412
Phone 910-392-8843 Fax 910-392-8800 License No. C-2320

Developer: ECHO FARM APARTMENTS, LLC
10 S. CARDINAL DRIVE
WILMINGTON, NORTH CAROLINA 28403
PHONE: 910-251-5030

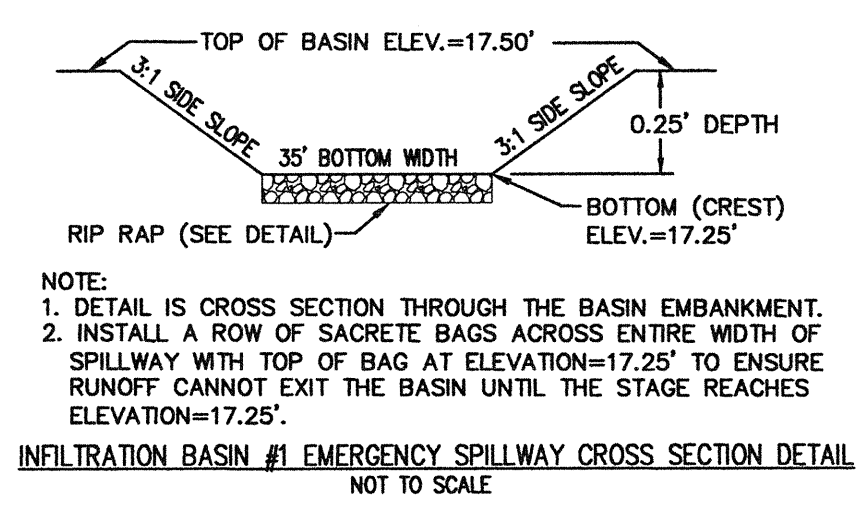
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SHEET NO: 10
OF: 22



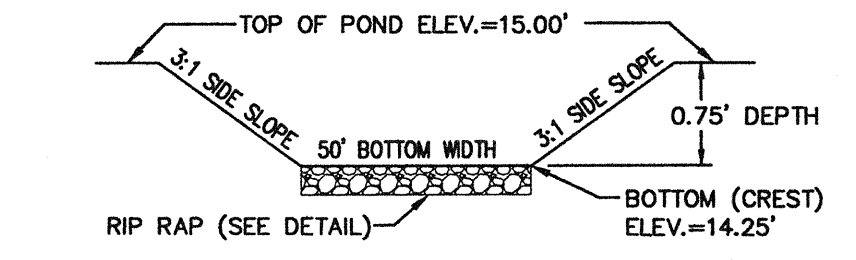
WET POND #1 DETAIL
SCALE: 1"=30'



INFILTRATION BASIN #1 DETAIL
SCALE: 1"=30'



INFILTRATION BASIN #1 EMERGENCY SPILLWAY CROSS SECTION DETAIL
NOT TO SCALE

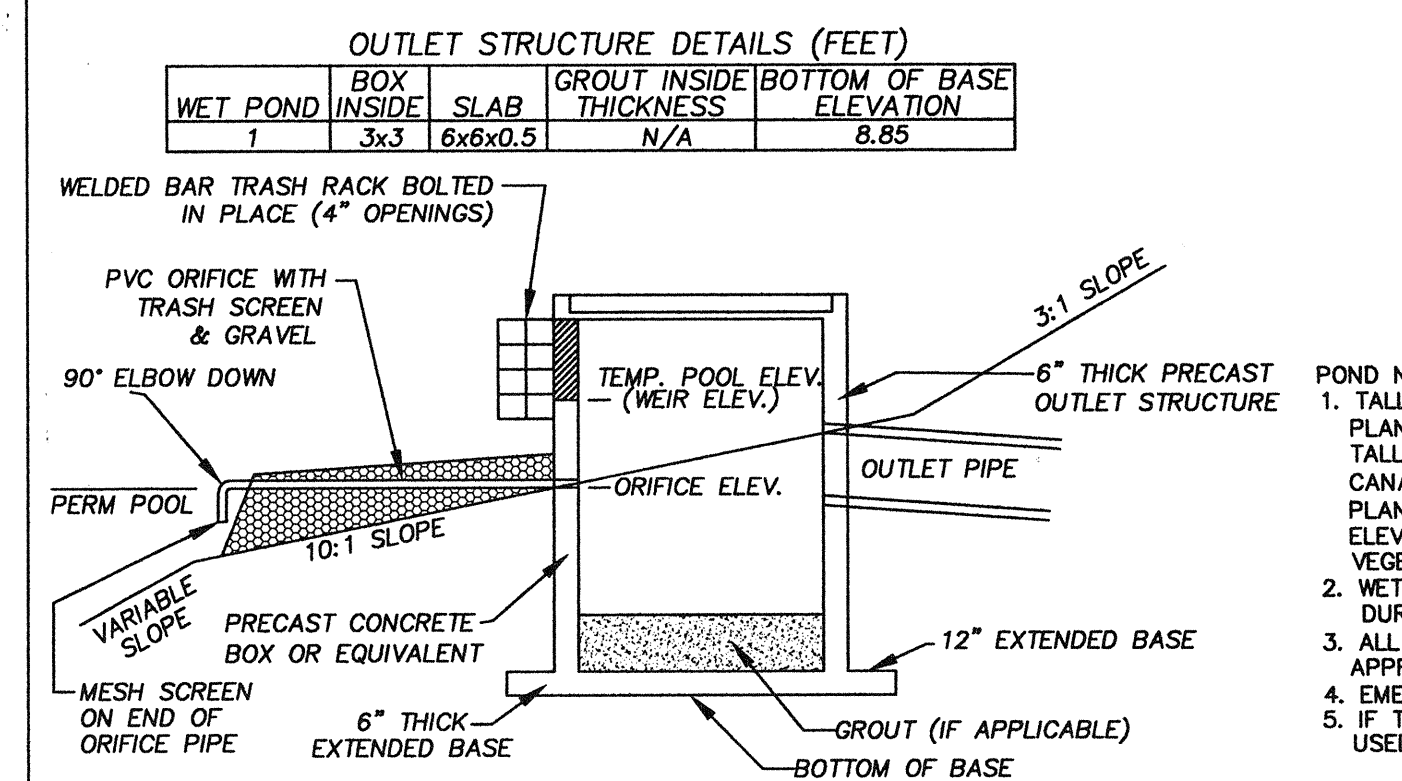


WET POND #1 EMERGENCY SPILLWAY CROSS SECTION DETAIL
NOT TO SCALE

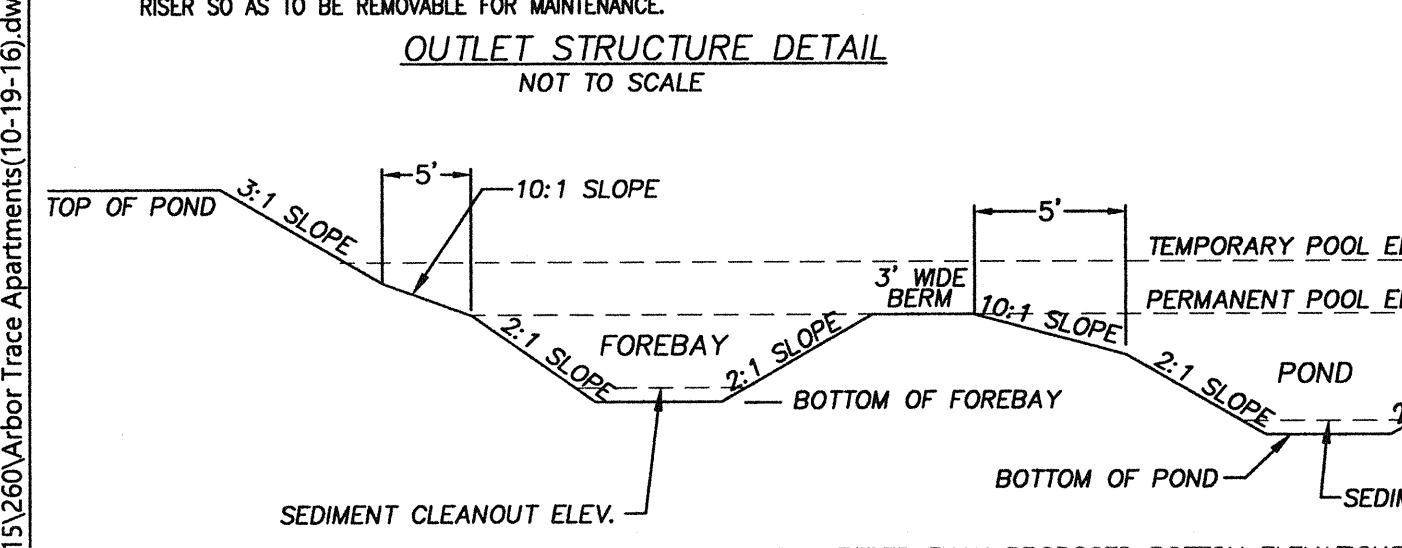
ELEV. (FT.)	AREA (SQ. FT.)	INCREMENTAL VOLUME (CU. FT.)	CUMULATIVE VOLUME (CU. FT.)
15.00	2,925	0	0
15.50	3,364	1,572	1,572
16.00	3,817	1,795	3,367
16.50	4,283	2,025	5,392
17.00	4,764	2,262	7,654
17.50	5,260	2,506	10,160

TEST LOCATION ID	EXISTING GROUND ELEVATION (FEET)**	SHWT (INCHES BELOW GROUND SURFACE)**	SHWT ELEVATION (FEET)***
B-1	16.60	48	12.60
B-2	20.96	38	17.80
B-3	27.98	60	22.98
B-4	26.17	36	23.17
B-5	24.67	66	19.17
B-6	12.47	10	11.64
B-7	14.50	30	12.00
B-8	14.79	36	11.79
B-9	18.18	60	13.18
B-10	27.03	48	23.03
B-11	25.73	16	24.40
B-12	25.47	18	23.97
B-13	26.32	36	23.32
B-14	25.48	48	21.48
B-15	25.71	42	22.21
B-16	25.48	42	21.98
B-17	24.73	42	21.23
B-18	25.57	44	21.91
B-19	17.76	66	12.26
B-20	27.02	52	22.69
B-21	27.05	50	22.89
B-22	26.29	38	23.13
B-23	26.50	42	22.80

* INFORMATION PROVIDED BY BATEMAN CIVIL SURVEY COMPANY, P.C.
** INFORMATION PROVIDED BY ECS CAROLINAS, L.P.
*** CALCULATED BASED ON INFORMATION PROVIDED BY OTHERS



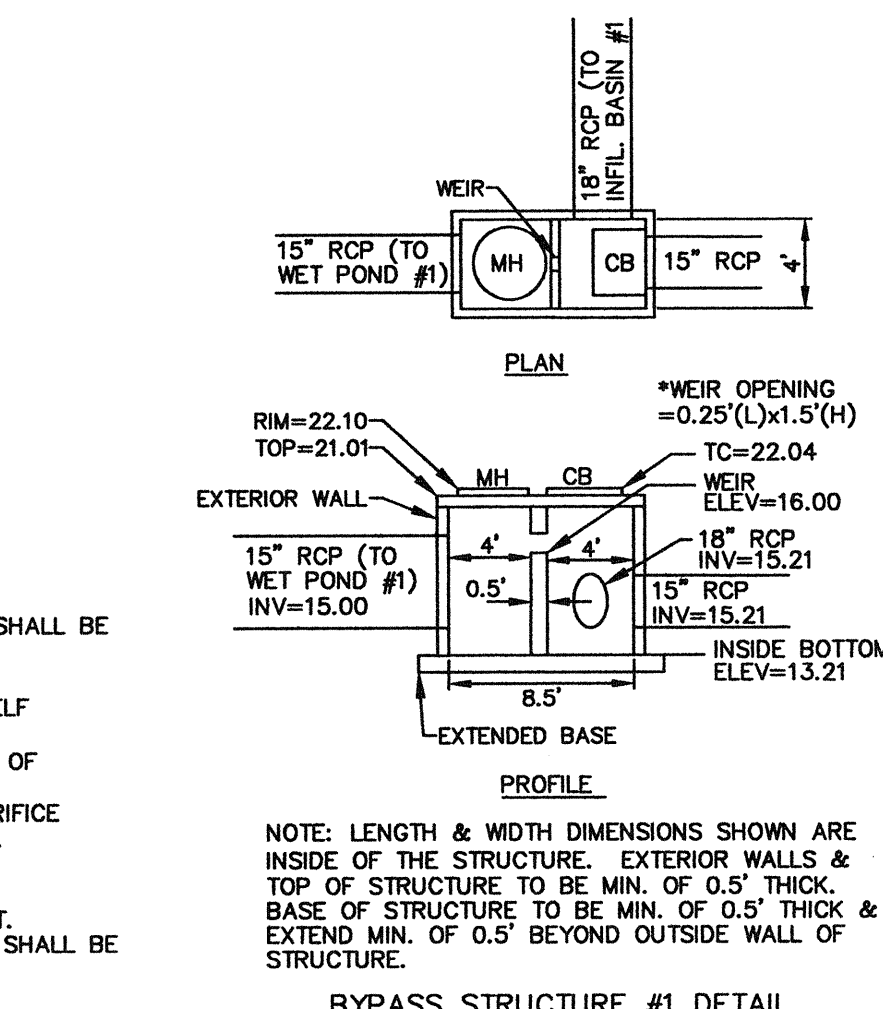
NOTE: ALL OUTLETS SHALL BE PROTECTED BY TRASH SCREENS/RACKS. THE TOP OF THE RISER SHALL HAVE A TRASH RACK MADE OF NUMBER 5 REBARS WELDED TO ANGLE FRAME. FRAME SHALL BE ATTACHED TO RISER SO AS TO BE REMOVABLE FOR MAINTENANCE.



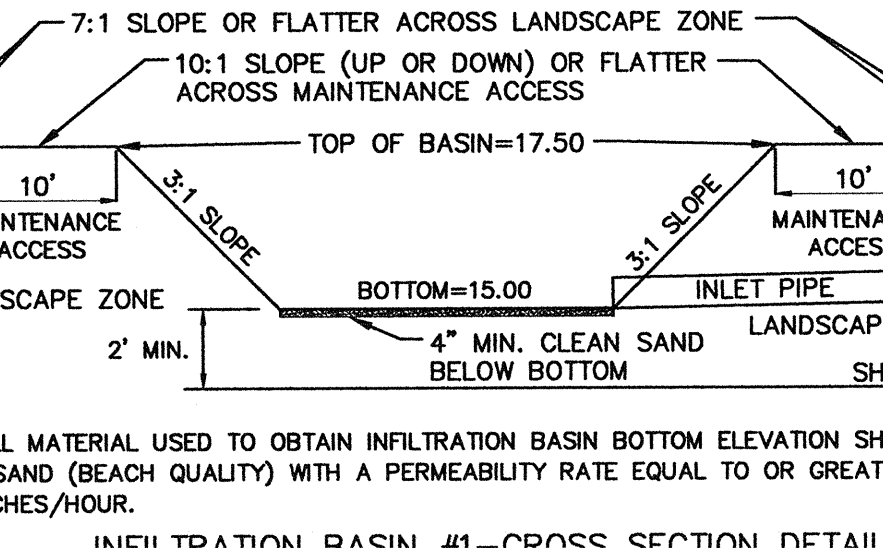
WET POND #1-FOREBAY & POND SECTION DETAIL
NOT TO SCALE

ELEV. (FT.)	AREA (SQ. FT.)	INCREMENTAL VOLUME (CU. FT.)	CUMULATIVE VOLUME (CU. FT.)
15.00	2,925	0	0
15.50	3,364	1,572	1,572
16.00	3,817	1,795	3,367
16.50	4,283	2,025	5,392
17.00	4,764	2,262	7,654
17.50	5,260	2,506	10,160

POND NOTES:
1. TALL FESCUE, BERMUDA GRASS, PENSACOLA BAHIAGRASS, OR REED CANARY GRASS SHALL BE PLANTED ON SLOPES OF WET POND #1 ABOVE ELEVATION=10.50'.
2. TALL FESCUE, BERMUDA GRASS, PENSACOLA BAHIAGRASS, REED CANARY GRASS, OR ANY SHALLOW LAND PLANT VARIETIES FROM THE VEGETATIVE SHELF PLANT SCHEDULE SHALL BE PLANTED AROUND THE FOREBAY IN WET POND #1 FROM ELEVATION=10.00' TO 10.50'. SEE VEGETATIVE SHELF PLANT SCHEDULE FOR PLANTING OF VEGETATIVE SHELF (HATCHED AREA).
3. ALL WATER THAT DRAINS OFF IMPERVIOUS SURFACES SHALL BE DIRECTED INTO THE APPROPRIATE STORMWATER SYSTEM (SEE DRAINAGE AREA MAPS).
4. EMERGENCY SPILLWAY & ENERGY DISSIPATOR TO HAVE FILTER FABRIC UNDERLAYMENT.
5. IF THE POND NEEDS TO BE DRAINED FOR MAINTENANCE OR AN EMERGENCY A PUMP SHALL BE USED TO DRAIN IT.

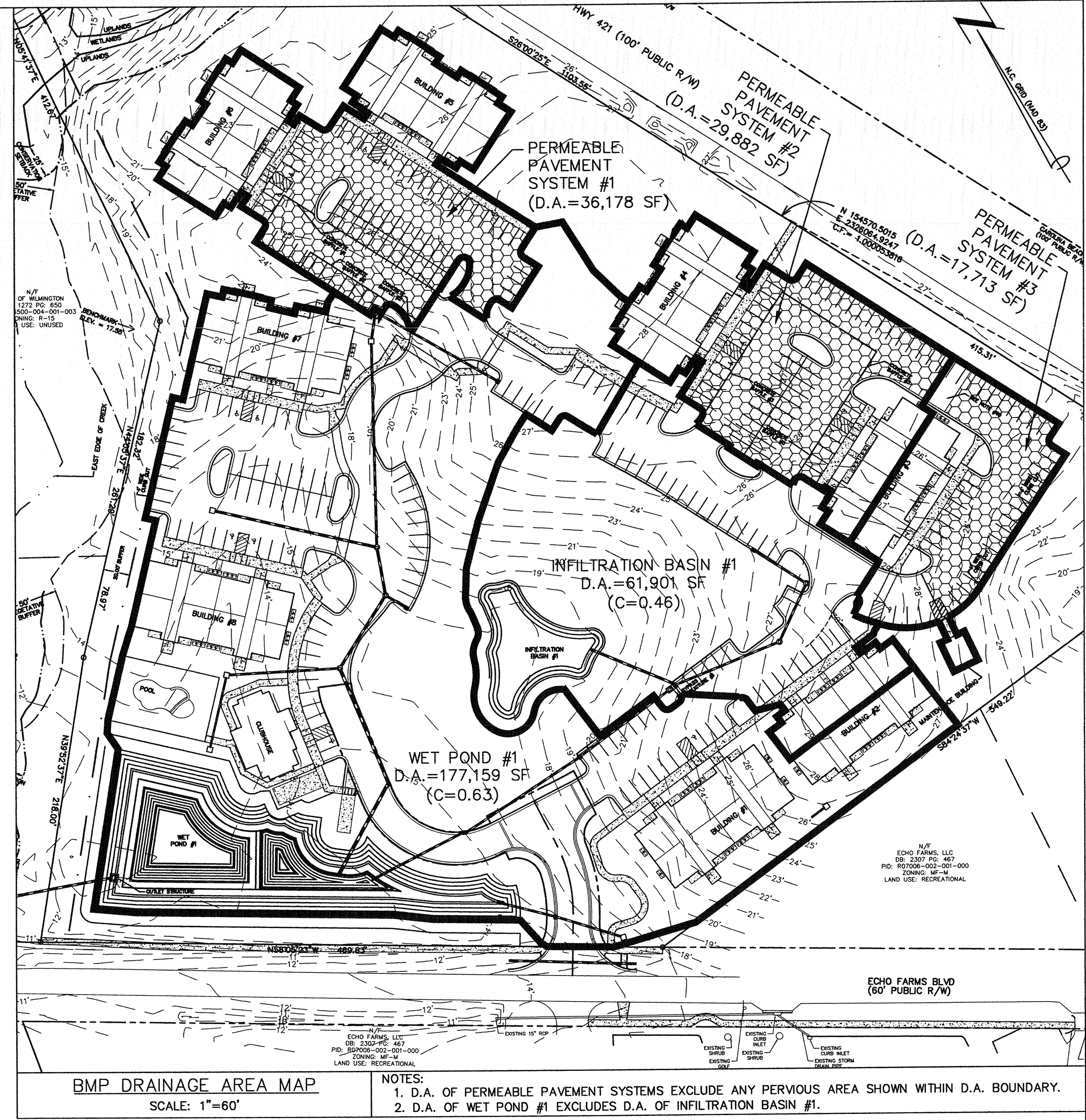
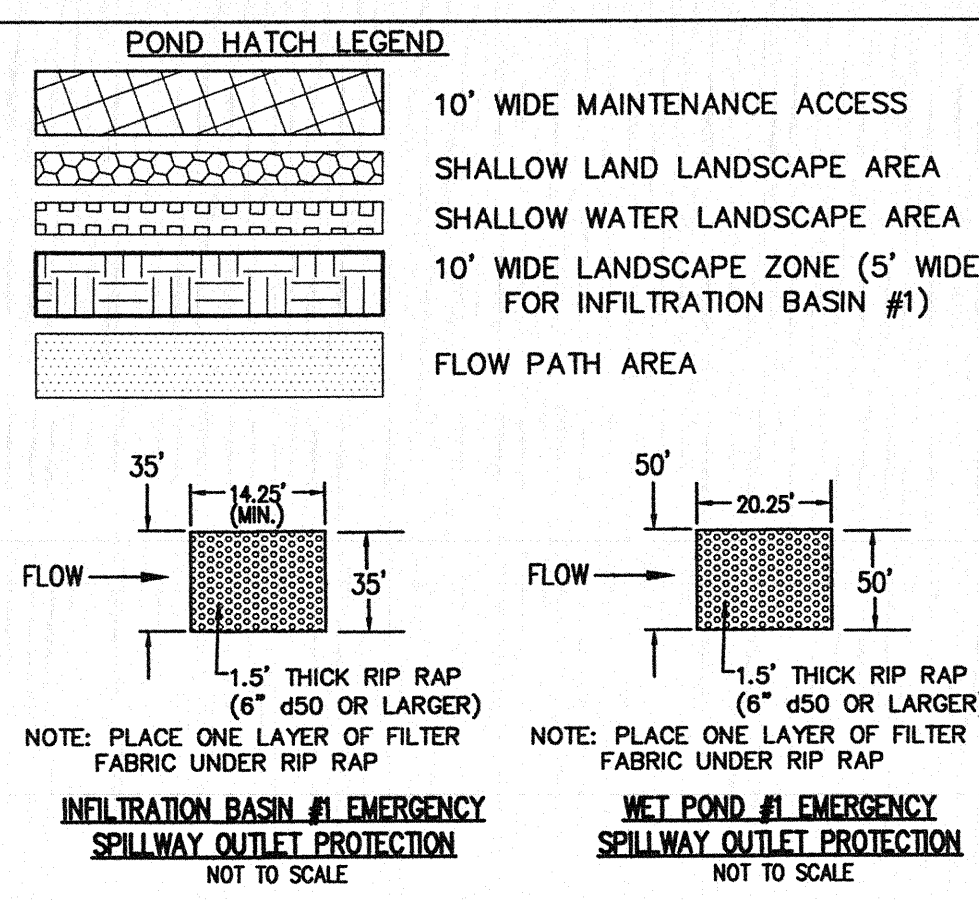


BYPASS STRUCTURE #1 DETAIL
NOT TO SCALE



INFILTRATION BASIN #1-CROSS SECTION DETAIL
NOT TO SCALE

WET POND	PERIMETER	TEMP. VEGETATED SHELF	FOREBAY	POND	SEDIMENT CLEANOUT EL.	OUTLET STRUCTURE ELEVATIONS	EMERGENCY SPILLWAY	IMPERVIOUS AREAS (SQ. FEET)	TOTAL															
1	15.00	10.00	11.20	10.50	2.50	2.50	3.50	13.75	0.5	1.75	11.20	N/A	1.5"	18"	RCP	9.85	90'	14.25	30,819	65,872	8,092	1,517	1,336	111,276



BMP DRAINAGE AREA MAP
SCALE: 1"=60'

NOTES:
1. D.A. OF PERMEABLE PAVEMENT SYSTEMS EXCLUDE ANY PEROUS AREA SHOWN WITHIN D.A. BOUNDARY.
2. D.A. OF WET POND #1 EXCLUDES D.A. OF INFILTRATION BASIN #1.

LOCATION	PLANT VARIETIES BOTANICAL NAME (COMMON NAME)	VEGETATIVE SHELF PLANT SCHEDULE	SPACING	SIZE	HATCHED SHELF AREA (SF)	PLANTINGS REQUIRED (MIN. 50 PER 200 SF)	PLANTINGS PROVIDED (MIN. 50 PER 200 SF)
**SHALLOW WATER (VEGETATIVE SHELF BELOW PERMANENT POOL ELEVATION: ELEV.=9.50' TO ELEV.=10.00')	Acorus subcordatum (Sweetflag), Allium subcordatum (Water plantain), Hydrocotyle quadrivalvis (Waterpocket), Iris virginica (Blue flag iris), Juncea effusus var. pycnos (Soft rush), Ludwigia spp. (Primrose willow), Petalandra virginica (Arrow arum), Pontederia cordata (Pickersweed), Sagittaria latifolia (Duck Potato), Sagittaria lanifolia (Bulltongue), Saururus cernuus (Lizard's tail), Schoenoplectus tomentosum (Soft stem bulrush), Schoenoplectus americanus (Three-square bulrush), Scirpus operinus (Woolgrass), Zizaniopsis milloacea (Stout cutgrass)	2' O.C. STAGGERED	5-6" PLUG	1,554.90	389	389	
**SHALLOW LAND (VEGETATIVE SHELF ABOVE PERMANENT POOL ELEVATION: ELEV.=10.00' TO ELEV.=10.50')	Azalea incarnata (Swamp Milkweed), Carex tenera (Quill sedge), Chelone glabra (White Turtlehead), Eupatoriadelphus dubius (Dwarf Joe Pye Weed), Eupatoriadelphus fistulosus (Joe Pye Weed), Eupatoriadelphus maculatus (Spotted trumpetweed), Hibiscus coccineus (Scarlet rose mallow), Hibiscus laevis (Holberton rosemallow), Kosteletzkyia virginica (Seashore Mallow), Lobelia cardinalis (Cardinal flower), Lobelia elongata (Longleaf tobelia), Lobelia siphilitica (Great blue Lobelia), Rhyssospora colorata (Starush whitetop), Saccharum baldwinii (Narrow plume grass)	2' O.C. STAGGERED	5-6" PLUG	1,490.12	373	373	

*AT LEAST 3 DIFFERENT SHALLOW WATER PLANT VARIETIES MUST BE PLANTED.
**AT LEAST 3 DIFFERENT SHALLOW LAND PLANT VARIETIES MUST BE PLANTED.

Approved Construction Plan
Name: [Signature] Date: 12/13/16
Planning: [Signature] Date: 12/13/16
Traffic: [Signature] Date: 12/13/16
Fire: [Signature] Date: 12/13/16

WILMINGTON NORTH CAROLINA
Public Services • Engineering Division
APPROVED STORMWATER MANAGEMENT PLAN
Date: 12/13/16 Permit: 201601022
Signed: [Signature]

EROSION CONTROL & STORMWATER DETAIL SHEET
4010 CAROLINA BEACH ROAD
ARBOR TRACE APARTMENTS
WILMINGTON TOWNSHIP NEW HANOVER COUNTY NORTH CAROLINA

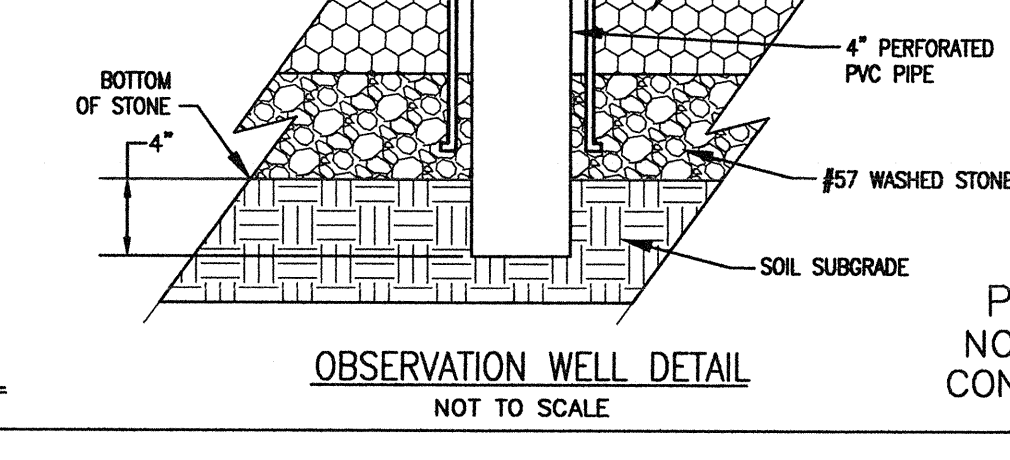
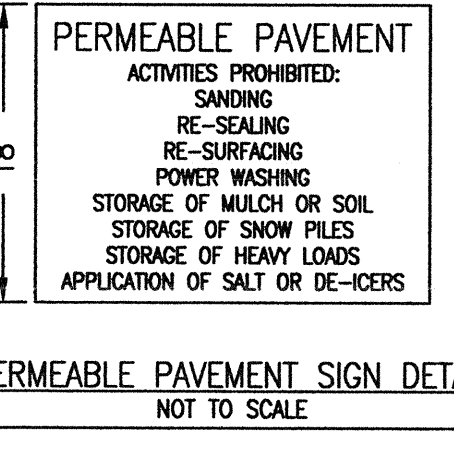
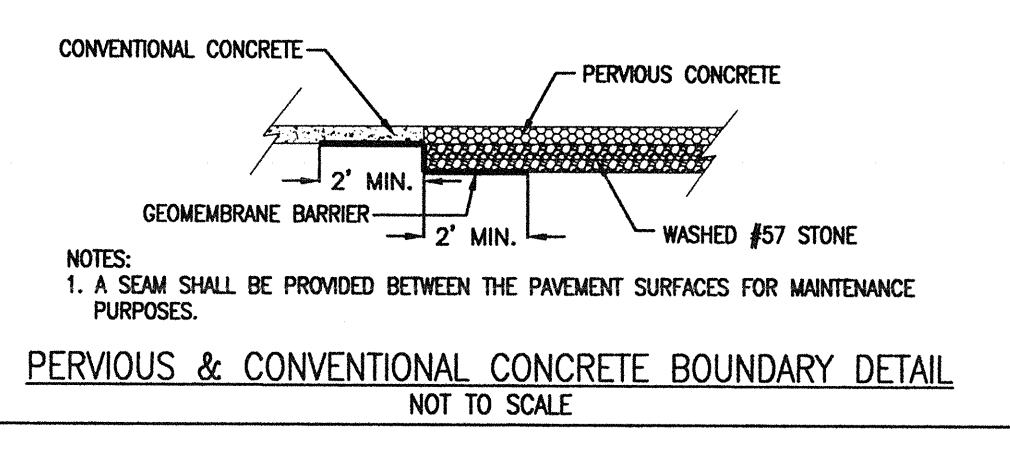
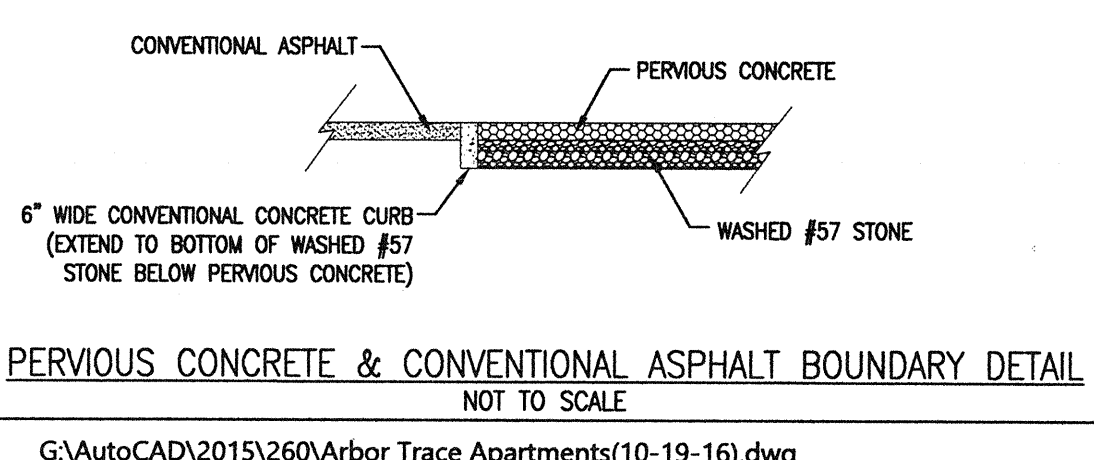
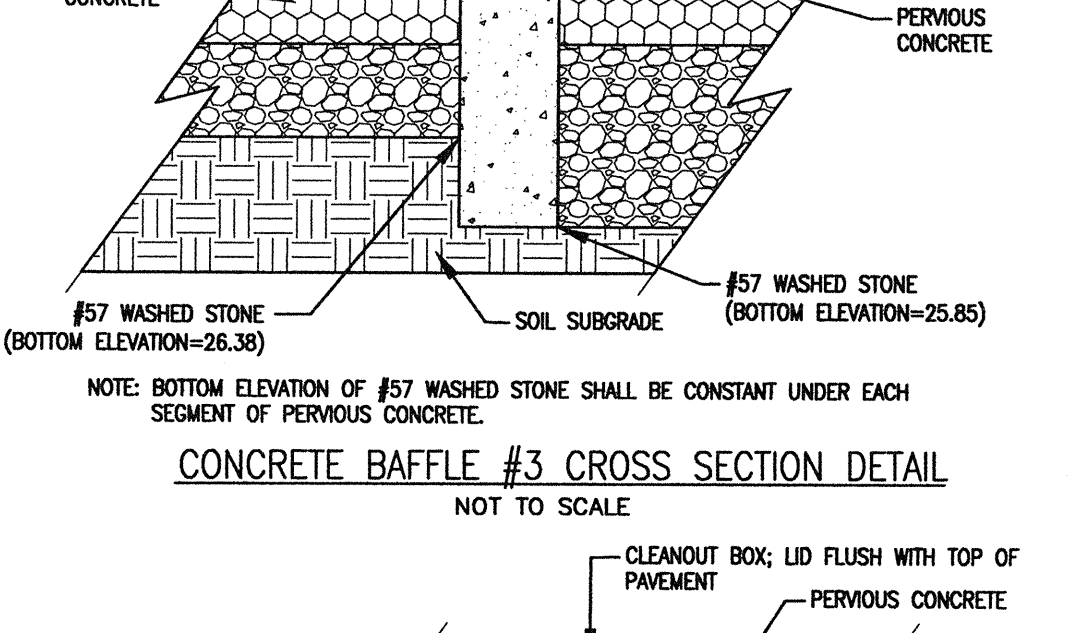
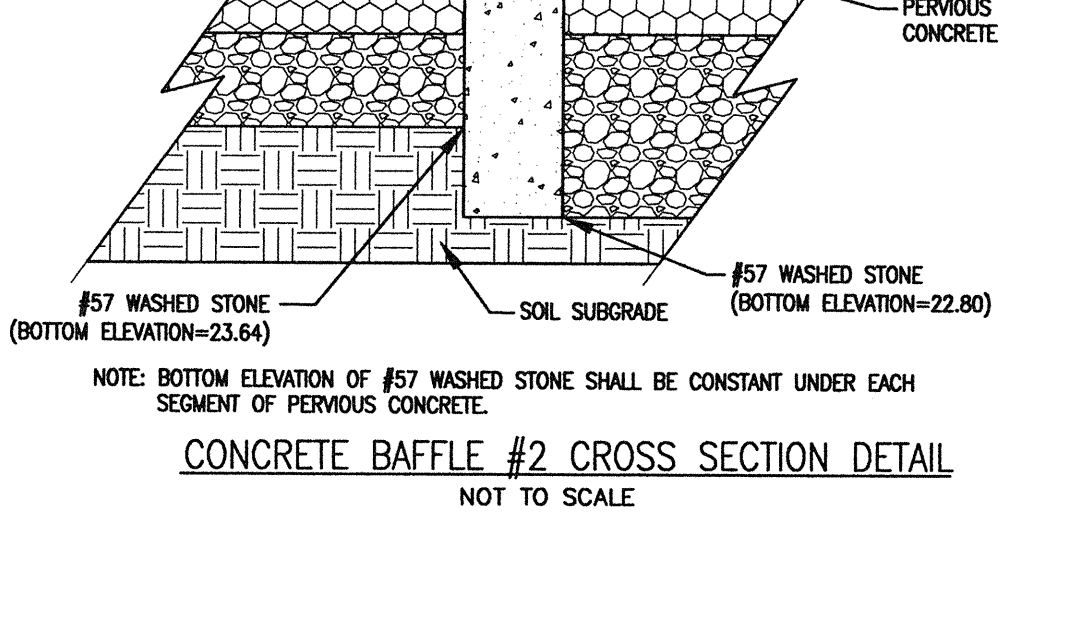
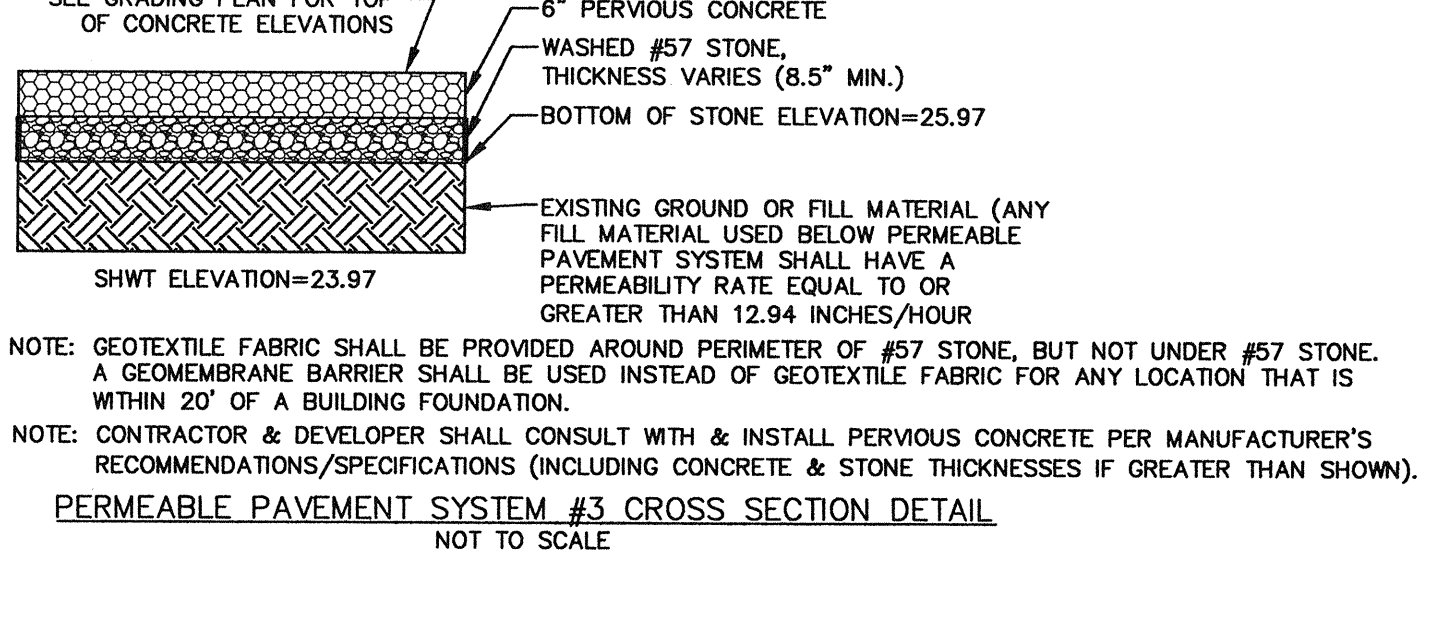
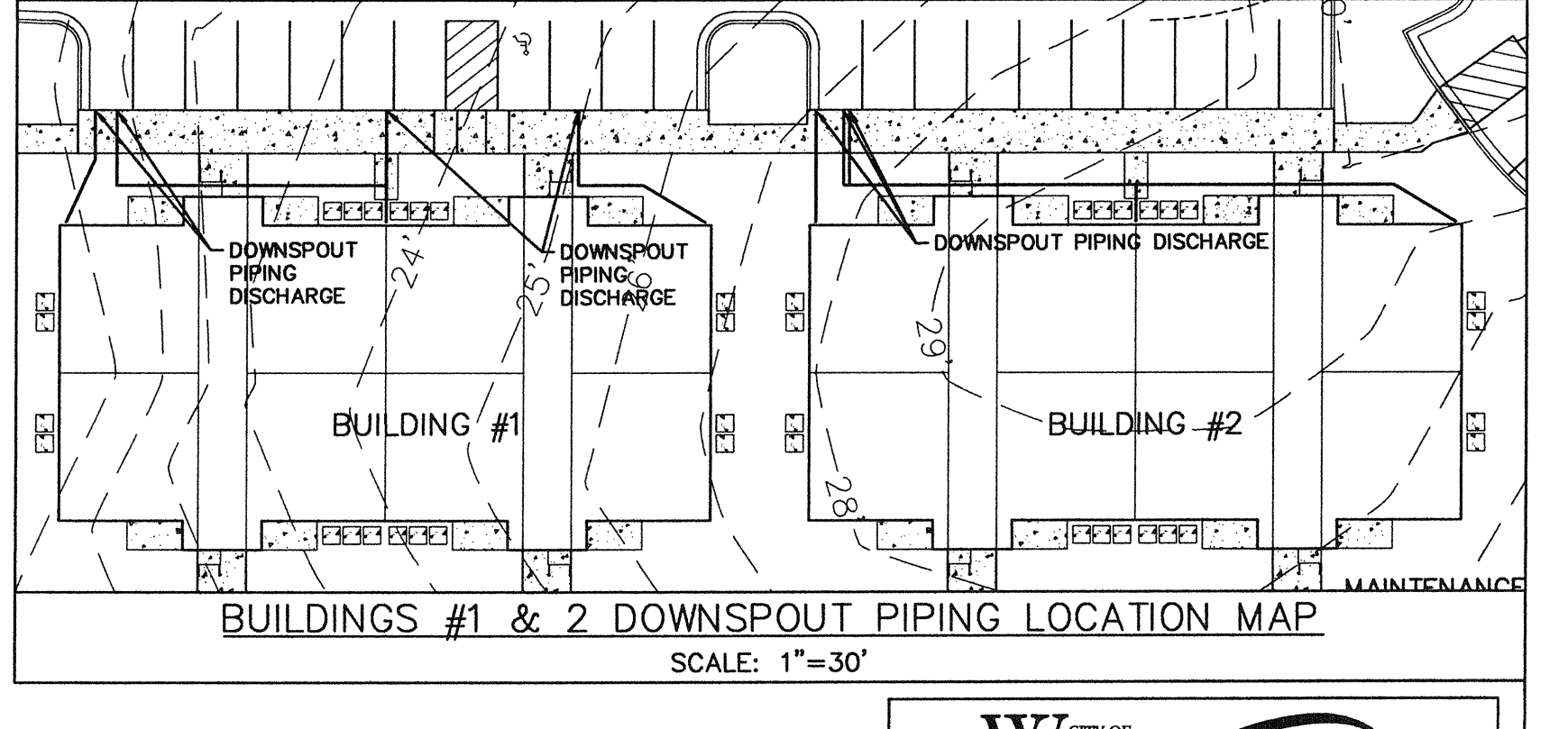
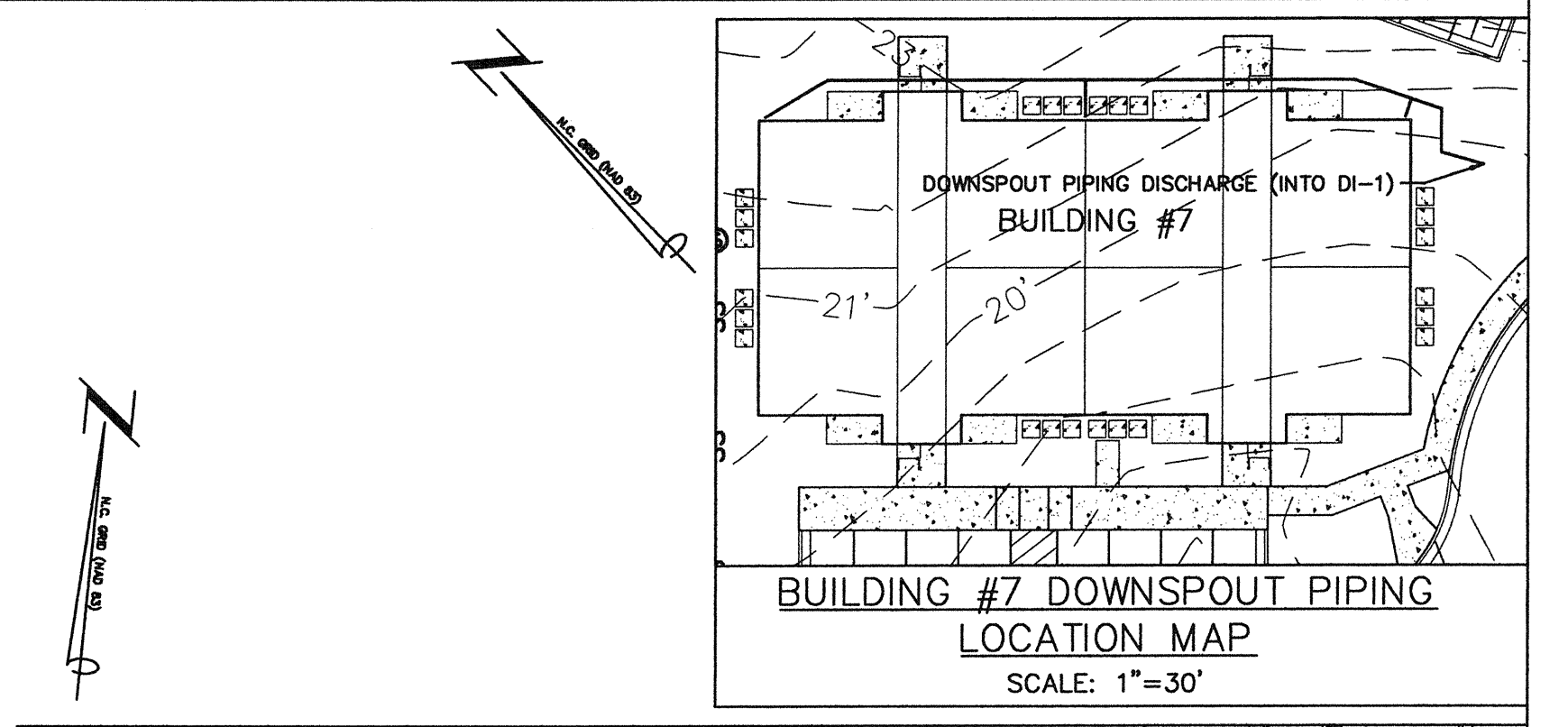
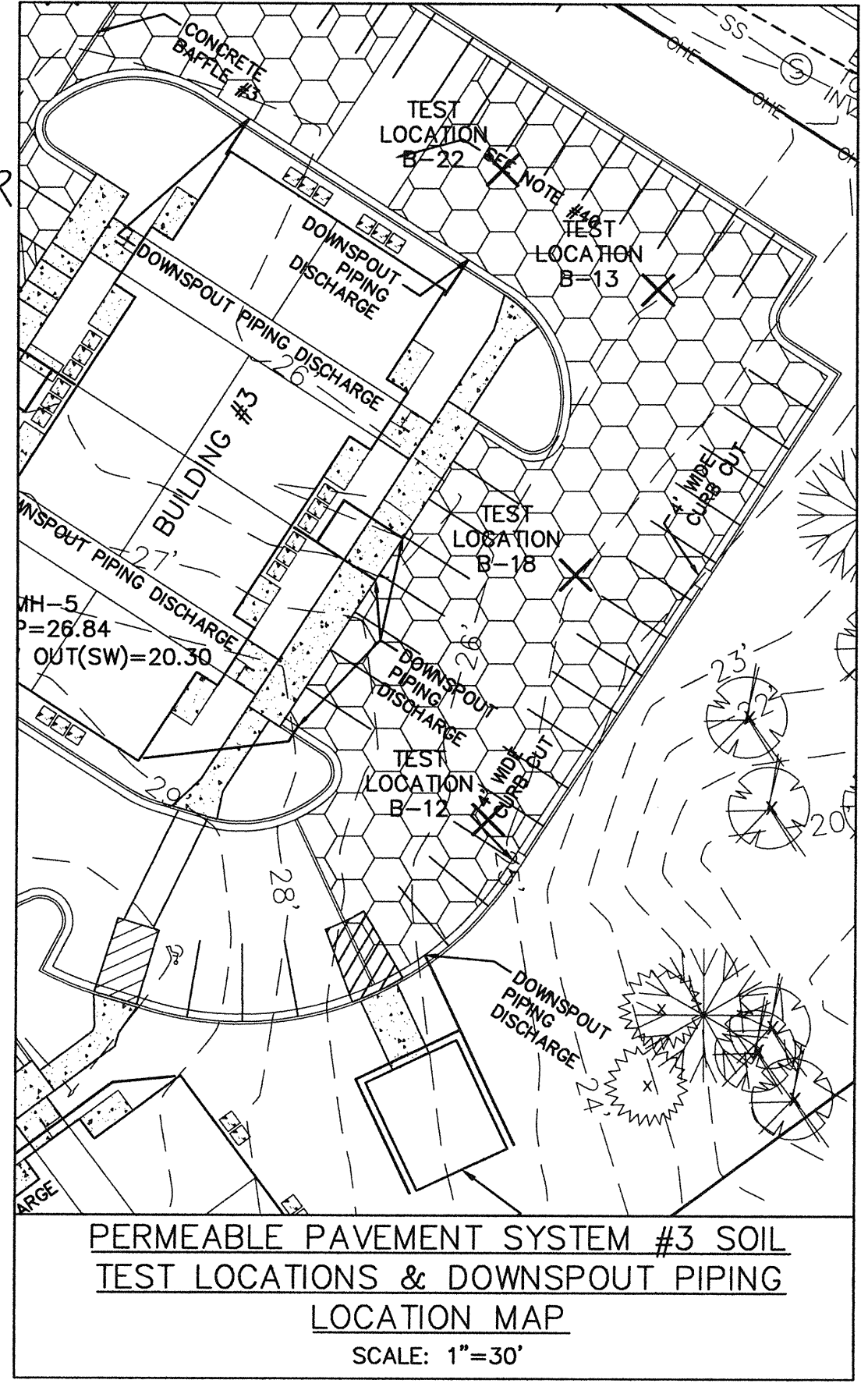
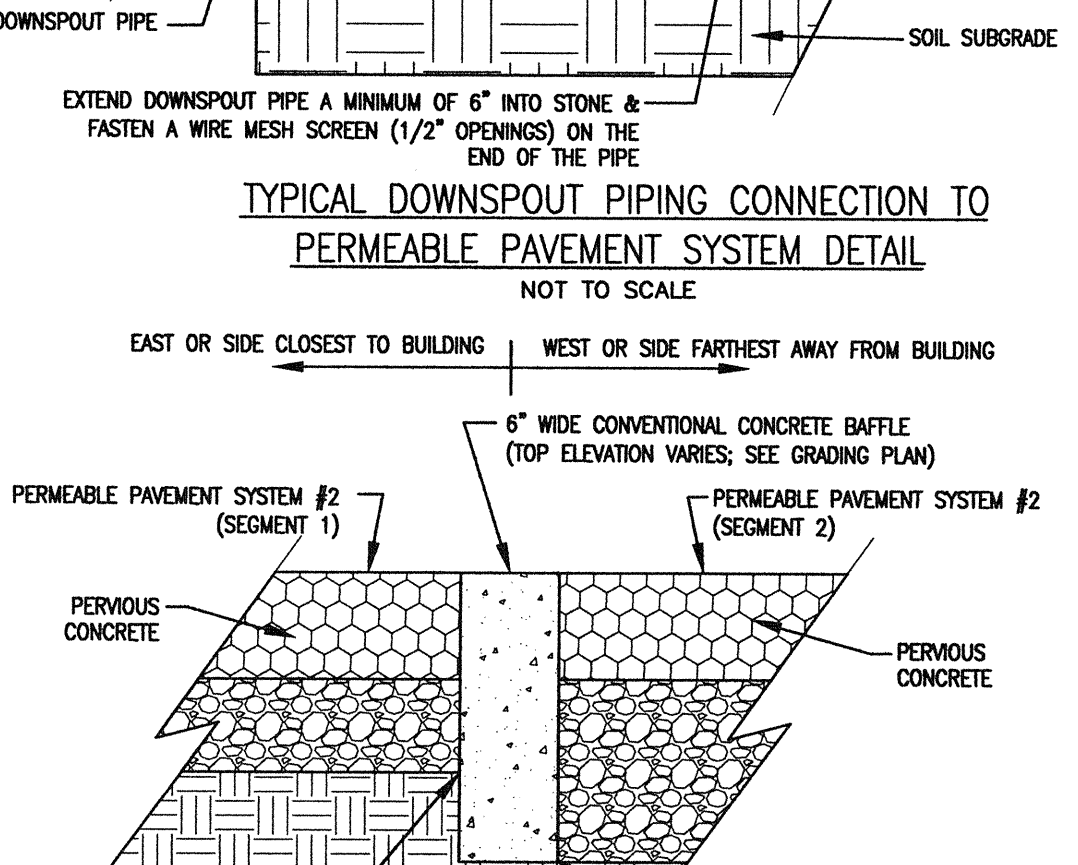
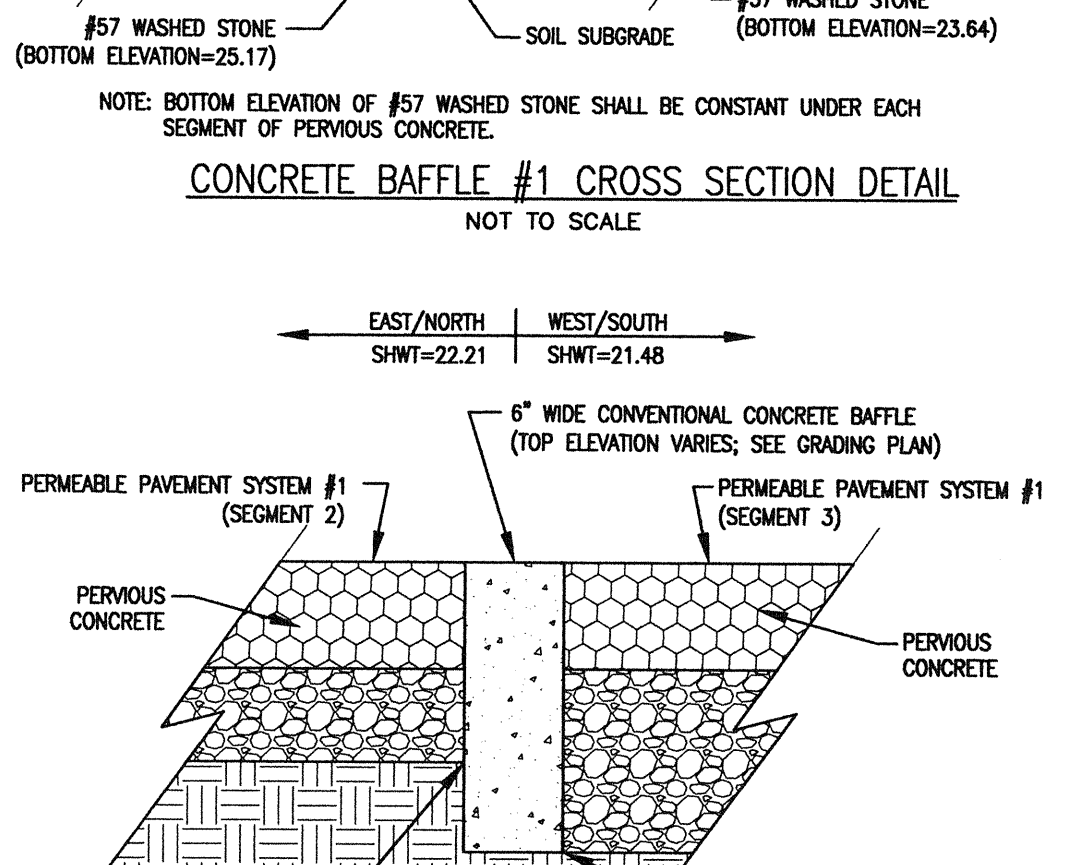
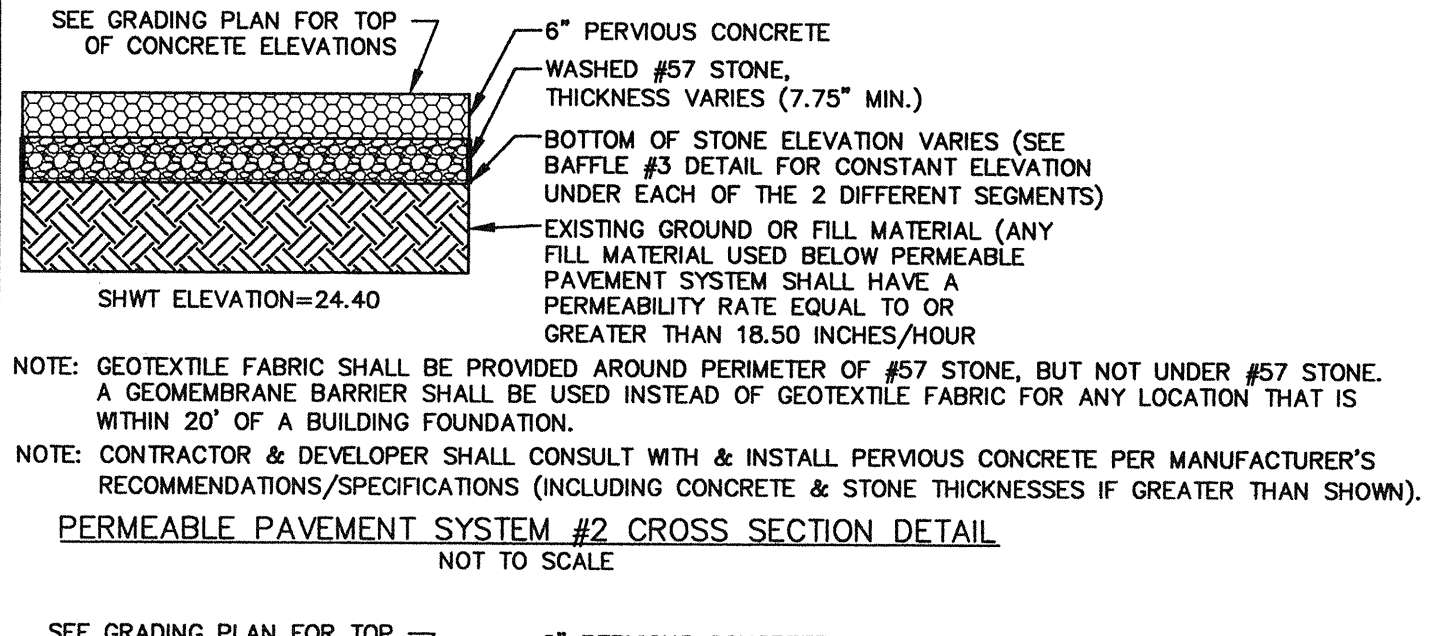
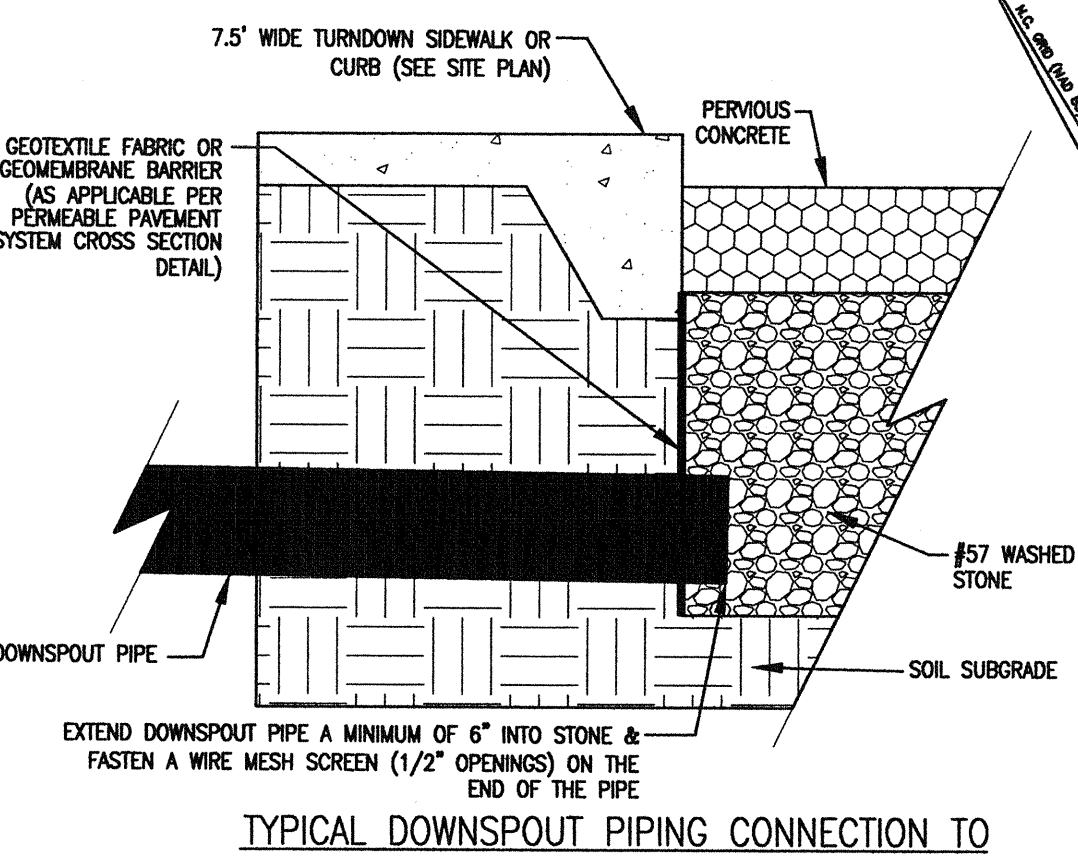
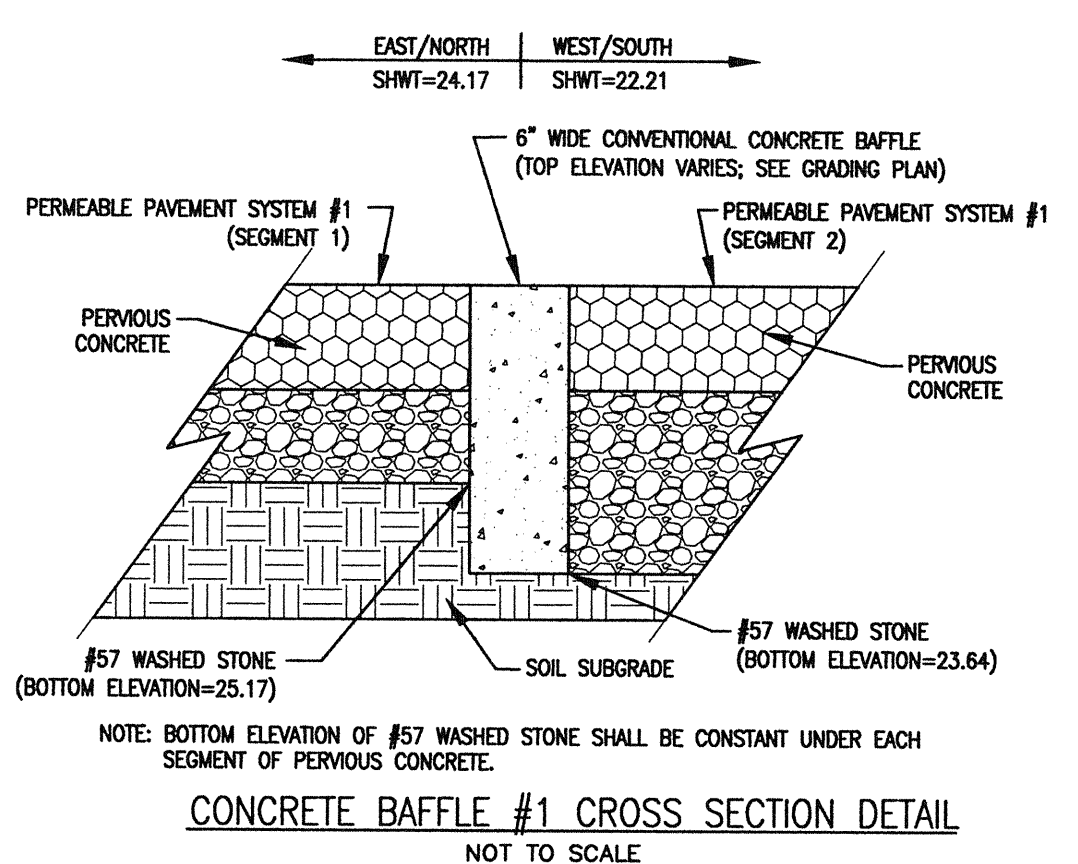
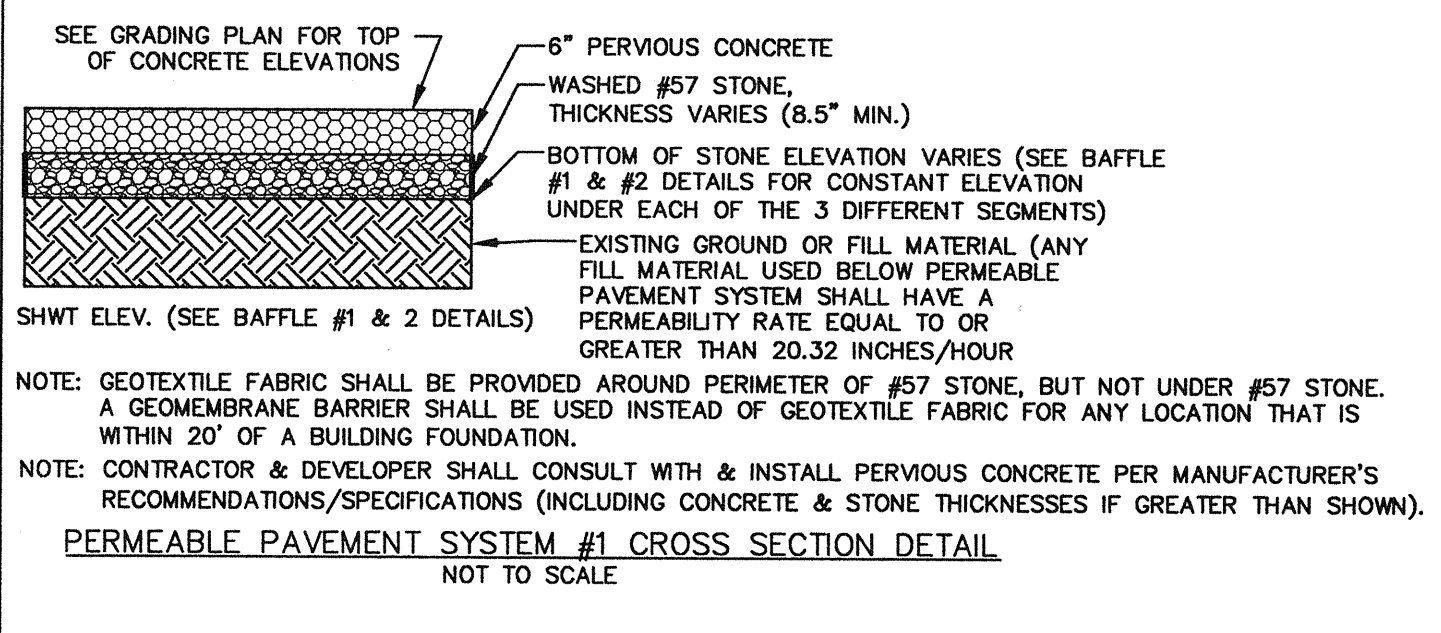
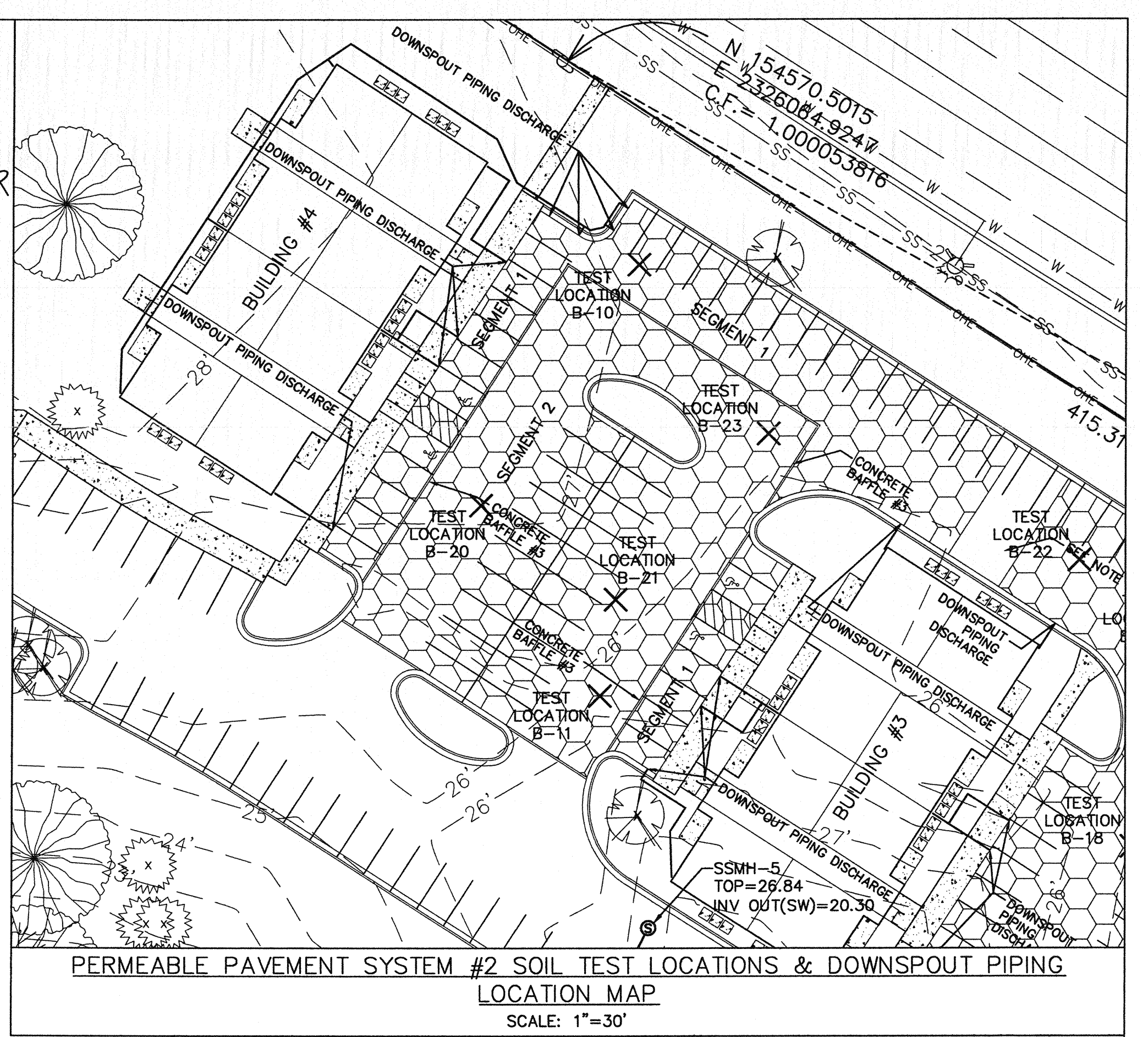
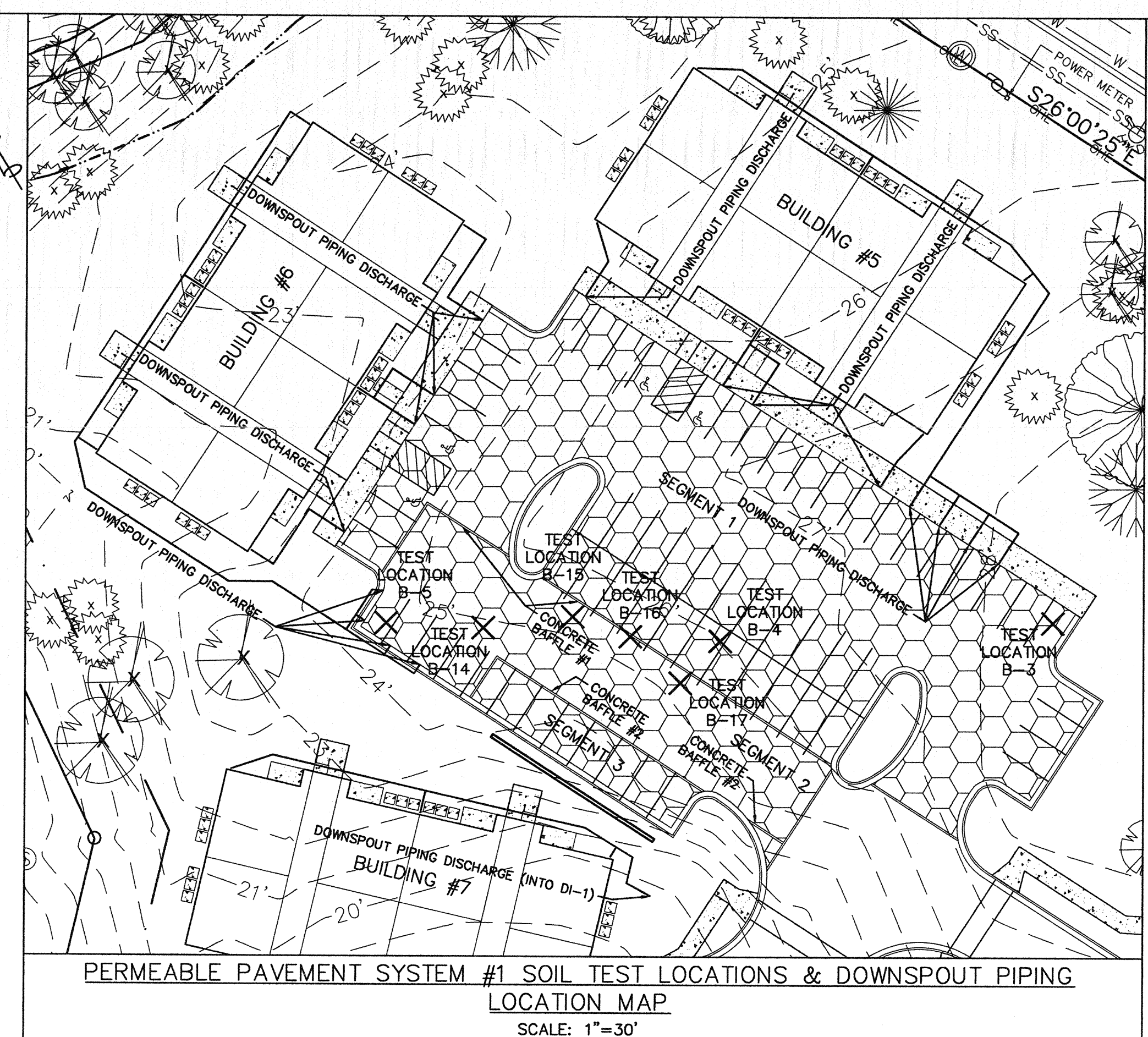
MALPASS ENGINEERING & SURVEYING, P.C.
1134 SHIPYARD BOULEVARD
WILMINGTON, NORTH CAROLINA 28412
Phone 910-382-6545 Fax 910-382-6203 License No. C-2880

Developer: ECHO FARM APARTMENTS, LLC
10 S. CARDINAL DRIVE
WILMINGTON, NORTH CAROLINA 28403
PHONE: 910-251-9030

DATE: 10-1-15
SCALE: Varies
DRAWN: JCB
CHECKED: JEM
PROJECT NO: 260
SHEET NO: 12
OF: 22

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- CONSTRUCTION SEQUENCE FOR INSTALLATION OF PERMEABLE PAVEMENT (INCIDENT STORMWATER BMP MANUAL CHAPTER 10)**
- ENSURE ACCEPTABLE CONDITIONS FOR CONSTRUCTION
 - PERVIOUS SURFACES MUST BE GRADED TO DRAIN AWAY FROM THE PERMEABLE PAVEMENT, EXCEPT WHERE THIS IS UNAVOIDABLE. SUCH AS PARKING LOT ISLANDS, AND AREA BETWEEN BUILDINGS & PARKING LOT.
 - IMPERVIOUS AREAS THAT WILL DRAIN TO THE PERMEABLE PAVEMENT ARE COMPLETED.
 - AREAS ADJACENT TO THE PERMEABLE PAVEMENT ARE STABILIZED (VEGETATION, MULCH, STRAW, FIBER BLANKETS, ETC.) IN ORDER TO PREVENT EROSION & POSSIBLE CONTAMINATION WITH SEDIMENTS.
 - CONSTRUCTION ACCESS TO OTHER PORTIONS OF THE SITE IS ESTABLISHED SO THAT NO CONSTRUCTION TRAFFIC PASSES THROUGH THE PERMEABLE PAVEMENT SITE DURING INSTALLATION. INSTALL BARRIERS/FENCES AS NEEDED.
 - WEATHER FORECAST CALLS FOR A WINDOW OF DRY WEATHER TO PREVENT EXCESS COMPACTION OR SMearing OF THE SOIL SUBGRADE WHILE IT IS EXPOSED.
 - ALL PERMEABLE AREAS ARE CLEARLY MARKED ON THE SITE.
 - EXCAVATE PERMEABLE PAVEMENT AREA & PREPARE SUBGRADE SURFACE
 - EXCAVATE IN DRY SUBGRADE CONDITIONS & AVOID EXCAVATING IMMEDIATELY AFTER STORMS WITHOUT A SUFFICIENT DRYING PERIOD.
 - DO NOT ALLOW EQUIPMENT TO CROSS THE PAVEMENT AREA AFTER EXCAVATION HAS BEGUN.
 - OPERATE EXCAVATION EQUIPMENT FROM OUTSIDE THE EXCAVATION AREA OR FROM UNEXCAVATED PORTIONS OF THE AREA USING AN EXCAVATION STAGING PLAN.
 - USE EQUIPMENT WITH TRACKS RATHER THAN TIRES TO MINIMIZE SOIL COMPACTION WHEN EQUIPMENT ON THE SUBGRADE SURFACE IS UNAVOIDABLE.
 - DIG THE FINAL 9 TO 12 INCHES BY USING THE TEETH OF THE EXCAVATOR BUCKET TO LOOSEN SOIL & DO NOT SMear THE SUBGRADE SOIL SURFACE. FINAL GRADING OR SMOOTHING OF SUBGRADE SHOULD BE DONE BY HAND IF POSSIBLE.
 - THE FINAL SUBGRADE SLOPE SHALL NOT EXCEED 0.5% THE FINAL SUBGRADE SHALL BE SURVEYED BEFORE PROCEEDING WITH INSTALLATION.
 - MINIMIZE THE TIME BETWEEN EXCAVATION AND PLACEMENT OF THE AGGREGATE.
 - AFTER THE SUBGRADE IS VERIFIED, SCOUR THE SOIL SUBGRADE SURFACE TO MAINTAIN THE SOILS PRE-DISTURBANCE INFILTRATION RATE.
 - TO SCOURIFY THE PAVEMENT, USE THE EXCAVATOR BUCKET'S TEETH TO RAKE THE SURFACE OF THE SUBGRADE.
 - TEST THE SUBGRADE SOIL INFILTRATION RATE (INFILTRATION SYSTEMS ONLY)
 - IMMEDIATELY AFTER EXCAVATION & BEFORE THE AGGREGATE IS PLACED, CONDUCT A DIRECT MEASUREMENT OF THE SOIL'S INFILTRATION RATE. INFILTRATION TESTING SHALL BE PERFORMED BY AN APPROPRIATELY-QUALIFIED PROFESSIONAL.
 - RESULTS OF THE INFILTRATION TESTING SHALL BE PROVIDED TO THE ENGINEER.
 - IF THE SOIL TEST SHOWS INFILTRATION RATE(S) THAT ARE LOWER THAN THE RATE(S) USED IN THE DESIGN, THEN ADDITIONAL SCOURIFICATION, RIPPING OR TRENCHING OF THE SOIL WILL BE NEEDED.
 - CONTRACTOR SHALL CONTACT & RECEIVE APPROVAL FROM ENGINEER OF RECORD TO CONTINUE INSTALLATION OF PERMEABLE PAVEMENT.
 - PLACE GEOTEXTILES AND GEOMEMBRANE (IF APPLICABLE)
 - FOLLOW MANUFACTURER'S RECOMMENDATIONS FOR THE APPROPRIATE OVERLAP BETWEEN ROLLS OF MATERIAL. SECURE THE MATERIAL TO ENSURE IT DOES NOT MOVE OR WRINKLE WHEN PLACING AGGREGATE.
 - PLACE OBSERVATION WELLS
 - PLACE OBSERVATION WELL(S) ACCORDING TO THE PLAN AND VERIFY THAT THE ELEVATIONS ARE CORRECT.
 - PLACE & COMPACT AGGREGATE BASE
 - INSPECT ALL AGGREGATES TO ENSURE THEY ARE CLEAN, FREE OF FINES, AND CONFORM TO THE PLANS.
 - IF AGGREGATE DELIVERED TO THE SITE CANNOT BE IMMEDIATELY PLACED INTO THE EXCAVATION, THEY SHOULD BE STOCKPILED ON AN IMPERVIOUS SURFACE, GEOTEXTILE, OR ON AN IMPERVIOUS MATERIAL TO KEEP THE AGGREGATE FREE OF SEDIMENT.
 - IF AGGREGATE BECOMES CONTAMINATED WITH SEDIMENT, THEN IT SHALL BE REPLACED WITH CLEAN AGGREGATE.
 - BEFORE PLACING THE AGGREGATE BASE, REMOVE ANY ACCUMULATION OF SEDIMENTS ON THE FINISHED SOIL SUBGRADE.
 - IF THE EXPOSED SUBGRADE HAS BEEN SUBJECT TO RAINFALL BEFORE PLACEMENT OF THE AGGREGATE, THEN THE SUBGRADE SURFACE MUST BE SCOURIFIED TO BREAK UP THE RESULTING SURFACE CRUST.
 - SLOPES & ELEVATIONS SHALL BE CHECKED ON THE SOIL SUBGRADE AND THE FINISHED ELEVATION OF BASE (AFTER COMPACTION) OR BEDDING MATERIALS TO ASSURE THEY CONFORM TO THE PLANS AND SPECIFICATIONS.
 - THE AGGREGATE SHALL BE SPREAD (NOT DUMPED) BY A FRONT-END LOADER OR FROM DUMP TRUCKS DEPOSITING FROM NEAR THE EDGE OF THE EXCAVATED AREA OR DIRECTLY ON DEPOSITED AGGREGATE PILES. MOISTEN AND SPREAD THE WASHED STONE WITHOUT DRIVING ON THE SOIL SUBGRADE. BE CAREFUL NOT TO DAMAGE THE OBSERVATION WELLS DURING COMPACTION.
 - FOLLOW COMPACTION RECOMMENDATIONS BY THE PERMEABLE PAVEMENT MANUFACTURER OR THAT FROM INDUSTRY GUIDELINES.
 - BE SURE THAT CORNERS, AREAS AROUND UTILITY STRUCTURES AND OBSERVATION WELLS, & TRANSITION AREAS TO OTHER PAVEMENTS ARE ADEQUATELY COMPACTED.
 - DO NOT CRUSH AGGREGATES DURING COMPACTION.
 - INSTALL CURB RESTRAINTS AND PAVEMENT BARRIERS
 - EDGE RESTRAINTS AND BARRIERS BETWEEN PERMEABLE IMPERVIOUS PAVEMENT SHALL BE INSTALLED PER THE PLAN.
 - BEFORE MOVING ON TO CONSTRUCTION STEP 8, BE CERTAIN THE DESIGN AND INSTALLATION ARE CONSISTENT.
 - INSTALL PERVIOUS COURSE
 - PERVIOUS CONCRETE SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE LATEST VERSION OF ACI 522.1 SPECIFICATION FOR PERVIOUS CONCRETE.
 - INSTALLATION OF THE PERVIOUS CONCRETE MAY BE ACCOMPLISHED USING EITHER THE ONE-STEP OR TWO-STEP METHOD.
 - PROTECT THE PAVEMENT THROUGH PROJECT COMPLETION
 - IF IT IS NOT POSSIBLE TO INSTALL THE PERMEABLE PAVEMENT AT THE END OF THE SITE CONSTRUCTION TIMELINE, THEN PROTECT THE PAVEMENT UNTIL PROJECT COMPLETION. THIS SHALL BE DONE BY:
 - ROUTING CONSTRUCTION ACCESS THROUGH OTHER PORTIONS OF THE SITE SO THAT NO CONSTRUCTION TRAFFIC PASSES THROUGH THE PERMEABLE PAVEMENT SITE (INSTALL BARRIERS/FENCES AS NEEDED).
 - IF THIS IS NOT POSSIBLE, PROTECT THE PAVEMENT PER THE CONSTRUCTION DOCUMENTS, PROTECTION TECHNIQUES THAT MAY BE USED INCLUDE MATS, PLASTIC SHEETING, BARRIERS TO LIMIT ACCESS, OR MOVING THE STABILIZED CONSTRUCTION ENTRANCE.
 - SCHEDULE STREET SWEEPING DURING AND AFTER CONSTRUCTION TO PREVENT SEDIMENT FROM ACCUMULATING ON THE PAVEMENT.



PRELIMINARY PLAT
NOT FOR RECORDATION,
CONVEYANCES, OR SALES

1	REVISED FOR PRELIMINARY I.D.	10-18-15
2	REVISED FOR SUBMITTAL	10-23-15
3	REVISED TO ADJUST DETAILS	11-18-15
4	REVISED TO ADD DETAILS	11-24-15
5	REVISED TO ADD DETAIL	12-14-15
6	REVISED PER CITY	2-9-16
7	REVISED TO ADJUST PAVING NORTH OF BUILDING #2	8-24-16
REV. NO.	DESCRIPTION	DATE

Approved Construction Plan

Name: _____ Date: 12/15/16

Planning: _____

Traffic: _____

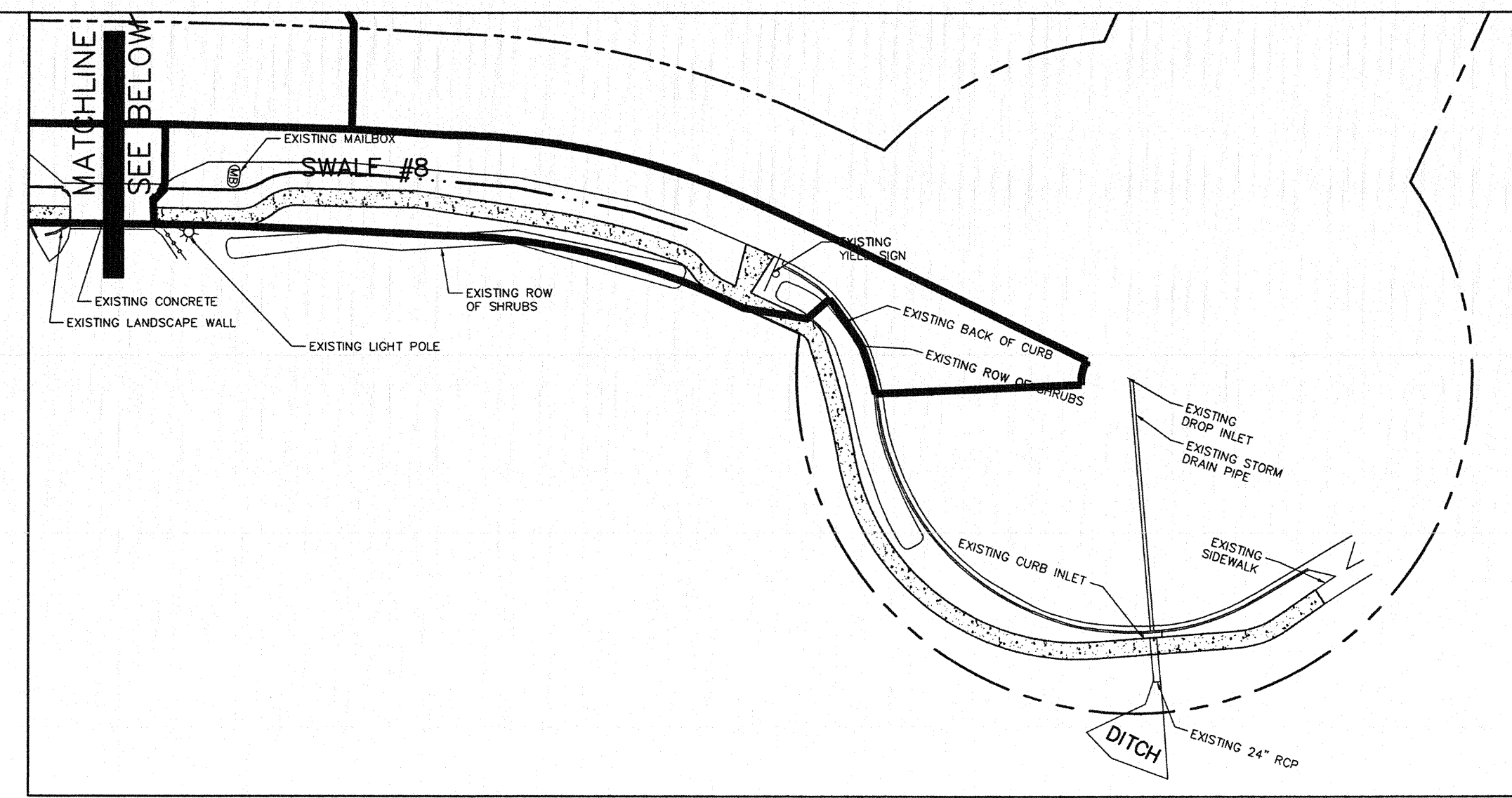
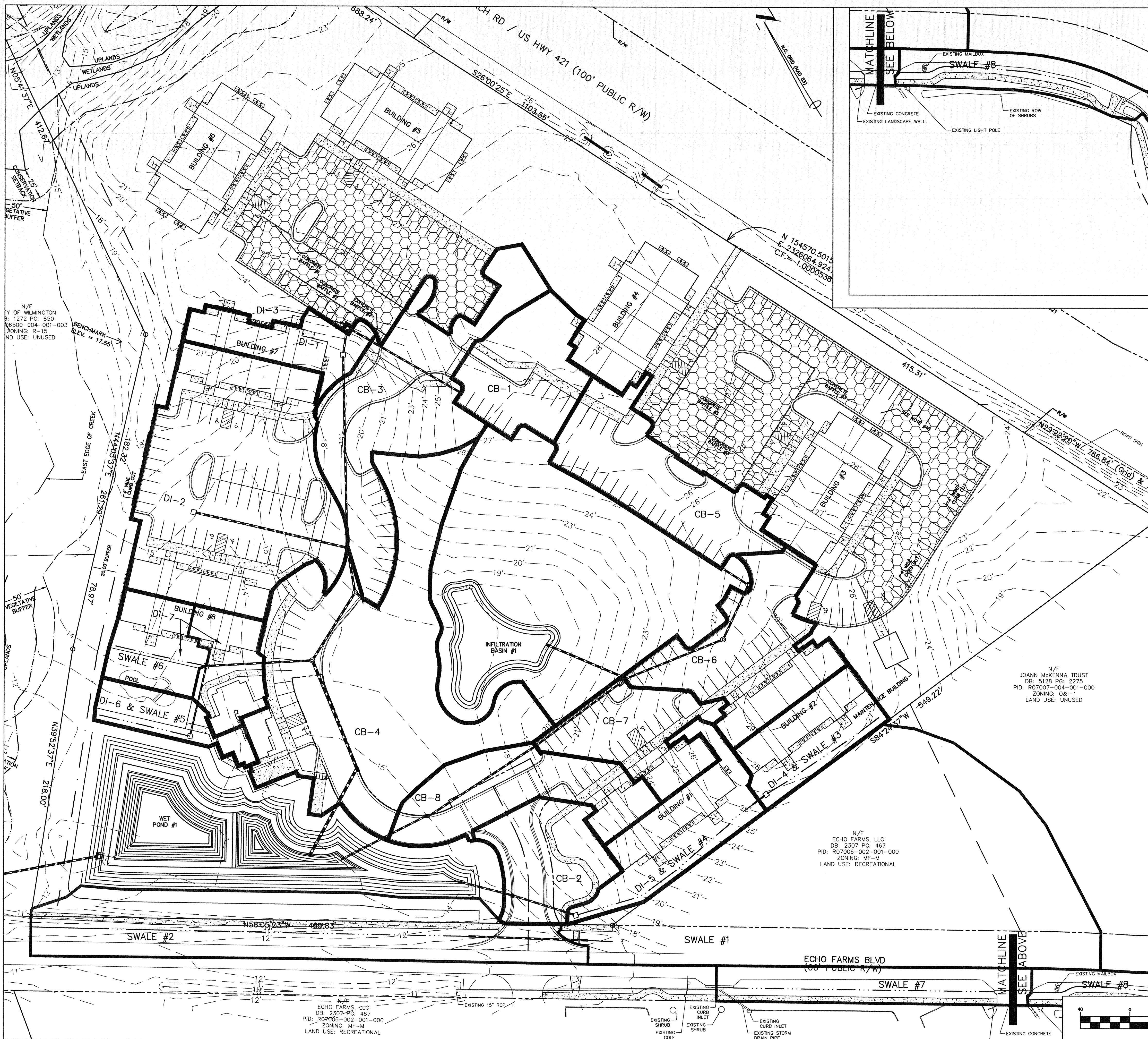
Fire: _____

STORMWATER DETAIL SHEET
4010 CAROLINA BEACH ROAD
ARBOR TRACE APARTMENTS
WILMINGTON TOWNSHIP NEW HANOVER COUNTY NORTH CAROLINA

DATE: 10-1-15
SCALE: VARIES
DRAWING: ICB
CHECKED: JEM
PROJECT NO: 260
SHEET NO: 13
OF: 22

MALPASS ENGINEERING & SURVEYING, P.C.
1134 SHIPYARD BOULEVARD
WILMINGTON, NORTH CAROLINA 28412
Phone: 910-392-6945
Fax: 910-392-6203
License No. C-2300

Developer: ECHO FARM APARTMENTS, LLC
10 S. CAROLINA DRIVE
WILMINGTON, NORTH CAROLINA 28403
PHONE: 910-251-5000



INLET & SWALE DRAINAGE AREA CHART

INLET	DRAINAGE AREA (ACRES)
CB-1	0.20
CB-2	0.18
CB-3	0.42
CB-4	0.78
CB-5	0.28
CB-6	0.23
CB-7	0.19
CB-8	0.24
DI-1	0.13
DI-2	0.66
DI-3	0.01
DI-4 & SWALE #3	0.16
DI-5 & SWALE #4	0.36
DI-6 & SWALE #5	0.09
DI-7	0.23
SWALE #1	1.21
**SWALE #2	1.71
SWALE #6	0.19
***SWALE #7	0.35
SWALE #8	0.18

*DI-5 D.A. INCLUDES DI-4 D.A.
 **SWALE #2 D.A. INCLUDES SWALE #1 D.A.
 ***SWALE #7 D.A. INCLUDES SWALE #8 D.A.

Pipe Table-System #1

From	To	Size	Length	Slope	D.S. Invert	U.S. Invert
CB-8	Pond	15	78	1.78%	8.50	9.87
CB-7	CB-8	15	103	4.05%	9.87	14.01
SDMH-6	CB-7	15	81	1.19%	14.01	15.00

Pipe Table-System #2

From	To	Size	Length	Slope	D.S. Invert	U.S. Invert
CB-4	Pond	24	78	0.29%	9.00	9.23
SDMH-3	CB-4	24	92	0.78%	9.23	9.96
SDMH-2	SDMH-3	18	62	0.91%	9.96	10.55
SDMH-1	SDMH-2	18	34	0.68%	10.55	10.80
DI-2	SDMH-1	18	125	0.31%	10.80	11.19
DI-7	SDMH-3	15	83	0.50%	11.26	11.69
DI-6	DI-7	12	56	0.50%	11.69	11.98
CB-3	SDMH-2	15	16	11.95%	10.55	12.58
DI-1	SDMH-1	15	154	3.51%	10.80	16.28
DI-3	DI-1	15	20	4.25%	16.28	17.23
CB-1	DI-3	15	104	3.46%	17.23	20.87

Pipe Table-System #3

From	To	Size	Length	Slope	D.S. Invert	U.S. Invert
CB-6	Pond	18	69	0.31%	15.00	15.21
SDMH-5	CB-6	15	81	6.43%	15.21	20.60
SDMH-4	SDMH-5	15	46	0.51%	20.60	20.85
CB-5	SDMH-4	15	44	0.50%	20.85	21.08

Pipe Table-System #4

From	To	Size	Length	Slope	D.S. Invert	U.S. Invert
CB-2	Pond	15	46	0.23%	10.50	10.61
DI-5	CB-2	15	50	2.62%	10.61	11.98

Pipe Table-System #5

From	To	Size	Length	Slope	D.S. Invert	U.S. Invert
DI-4	Swale	12	13	0.36%	22.48	22.53

Pipe Table-Driveway Culvert

From	To	Size (in)	Length (ft)	Slope (%)	D.S. Invert (ft)	U.S. Invert (ft)
Upstream	Downstream	15 (Class IV)	96	1.43	11.87	13.24

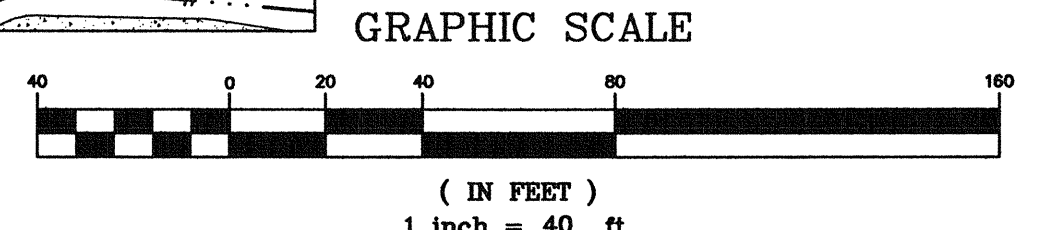
Pipe Table-Wet Pond #1 Outfall

From	To	Size (in)	Length (ft)	Slope (%)	D.S. Invert (ft)	U.S. Invert (ft)
Pond	Downstream	18	92	0.60	9.30	9.85

Pipe Table-Culvert Downstream of Swale #7

From	To	Size (in)	Length (ft)	Slope (%)	D.S. Invert (ft)	U.S. Invert (ft)
Swale #7	Downstream	15	21	2.20	22.70	23.16

DRAINAGE AREA MAP-INLETS & SWALES
 SCALE: 1"=40'



REV. NO.	DESCRIPTION	DATE
1	REVISED TO ADD SWALE #7 DRAINAGE AREA & PIPE CHART.	12-14-15
2	REVISED PER CITY.	2-9-16
3	REVISED TO ADJUST PARKING NORTH OF BUILDING #2 & INLET DRAINAGE AREAS AT CLUBHOUSE.	8-28-16
4	REVISED TO ADJUST HALL ROOM AND WET POND.	8-28-16
5	REVISED TO ADD SWALE #8 ON SOUTH SIDE OF ECHO FARMS BLVD N/W & ADD SWALE #7 & 8 TO DRAINAGE AREA CHART.	11-4-16

PRELIMINARY PLAT
 NOT FOR RECORDATION,
 CONVEYANCES, OR SALES

Approved Construction Plan

Name: *[Signature]* Date: 12/13/16

Planning: *[Signature]* 12/13/16

Traffic: *[Signature]* 12/13/16

Fire: *[Signature]* 12/13/16

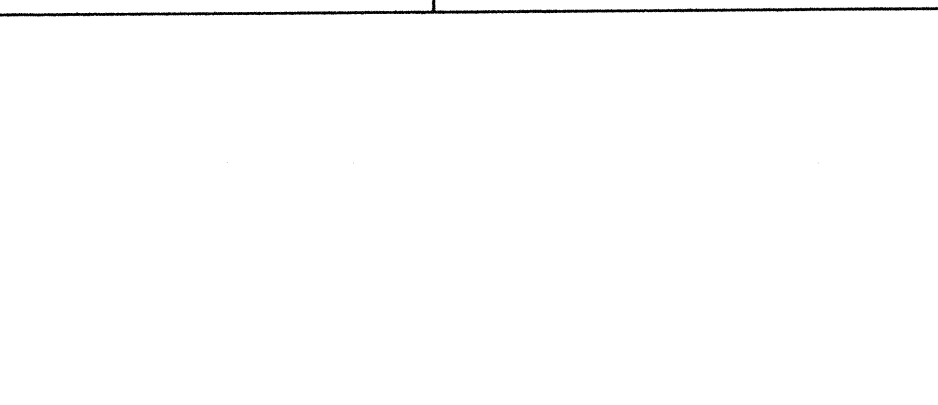
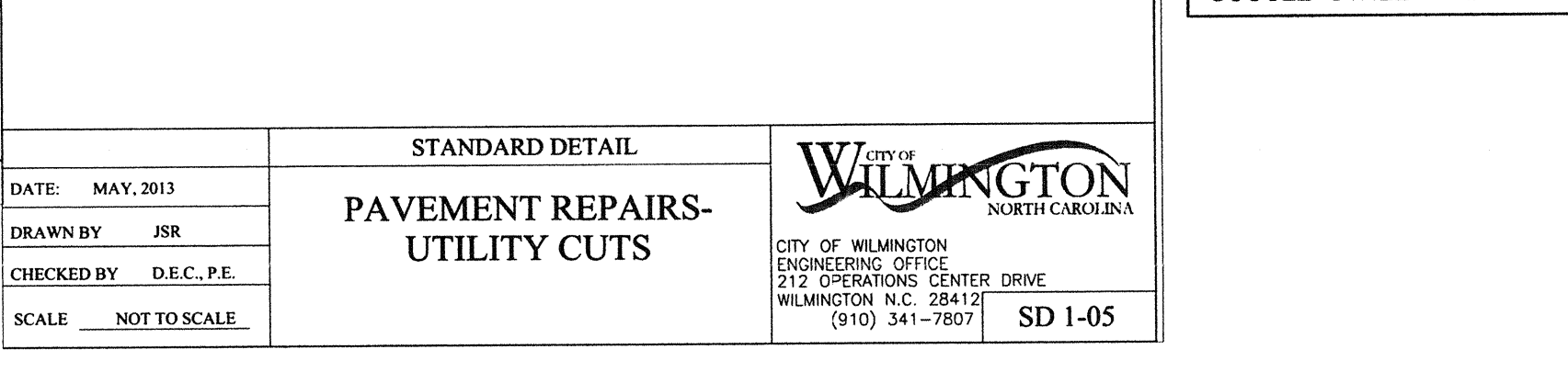
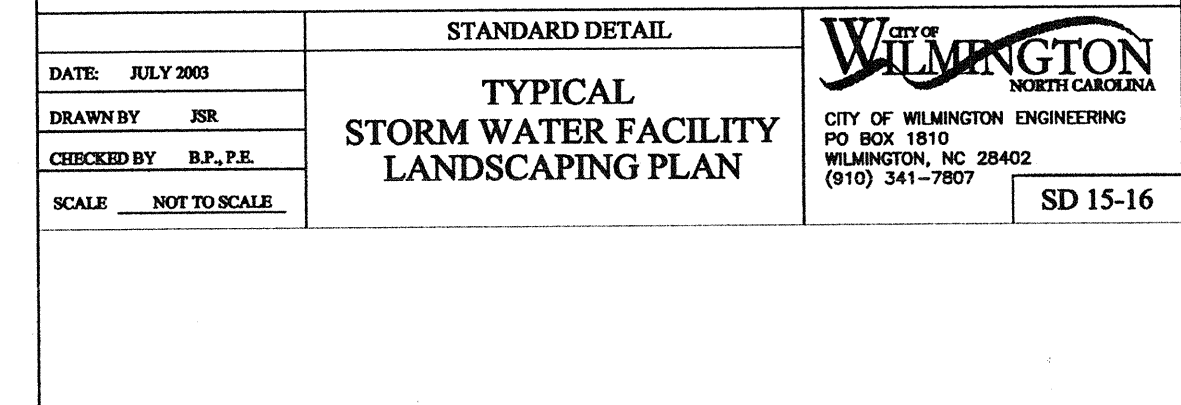
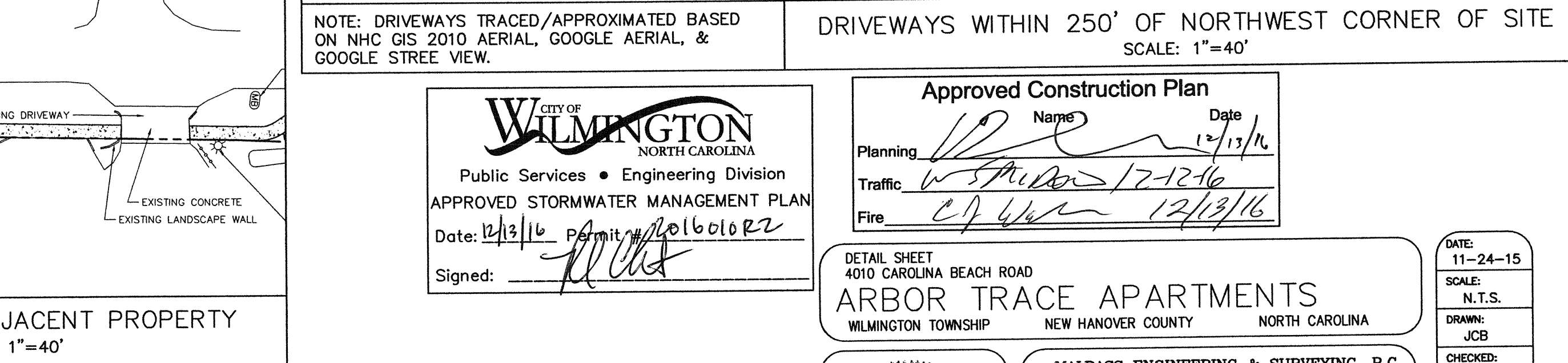
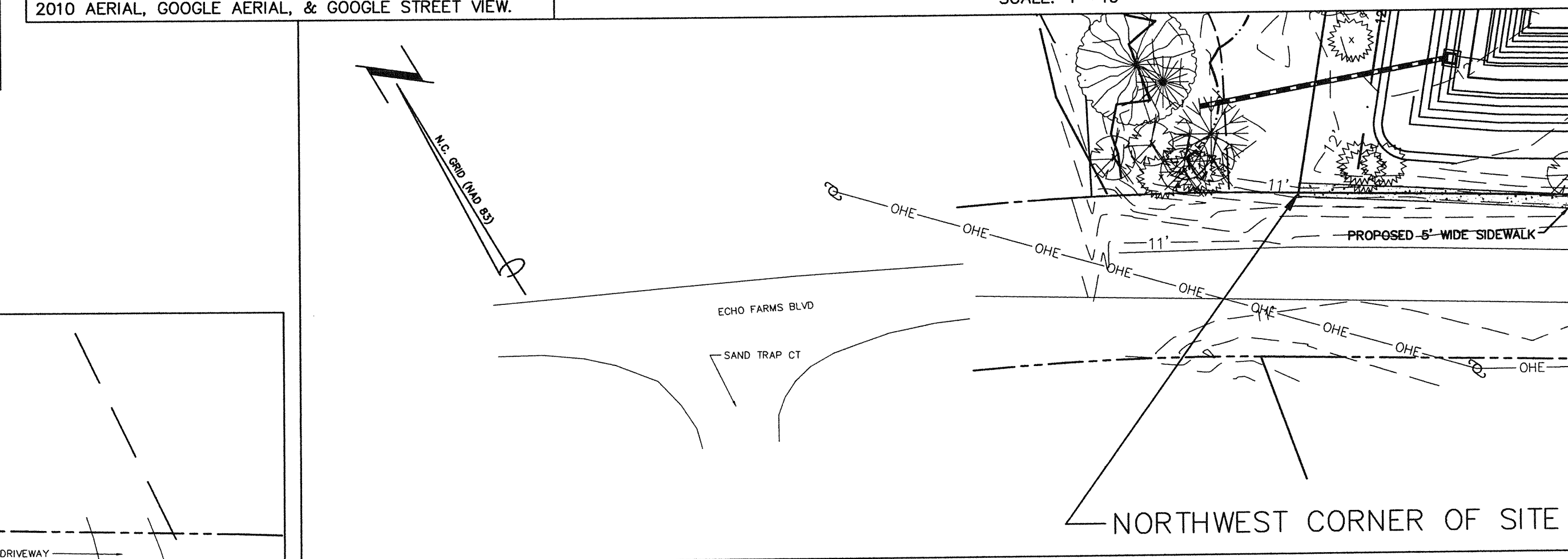
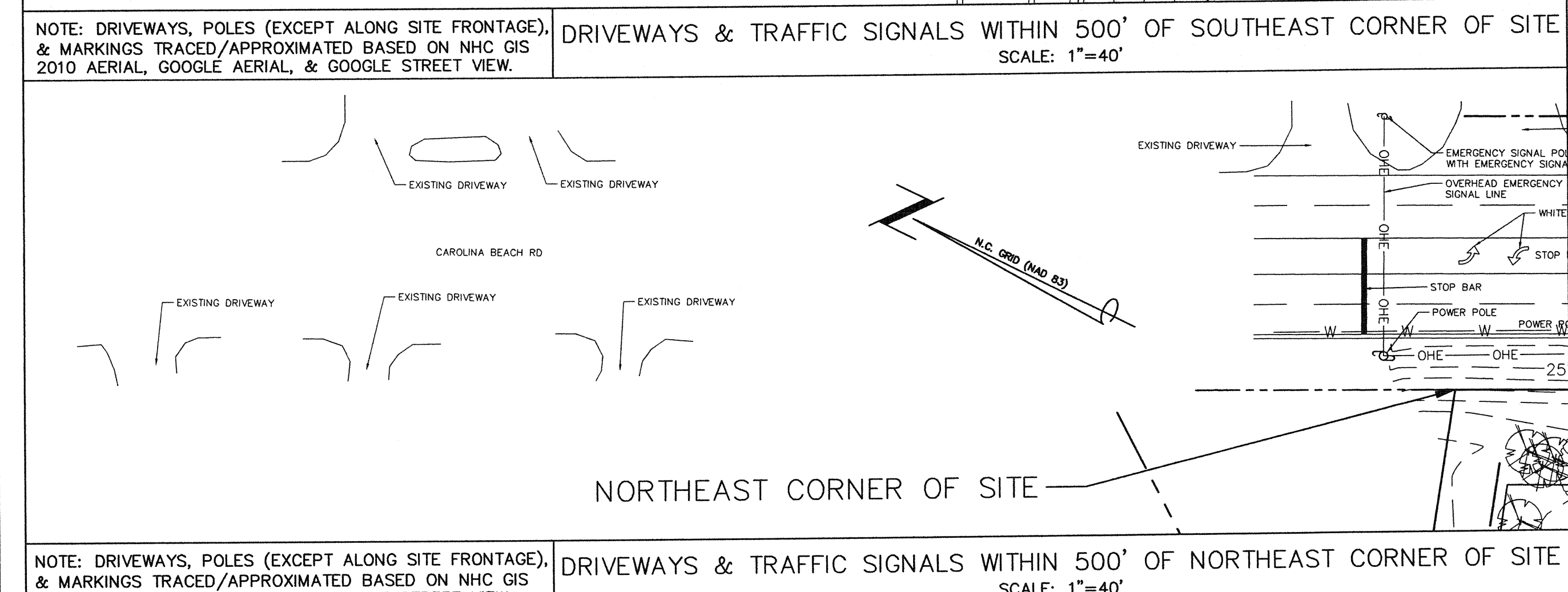
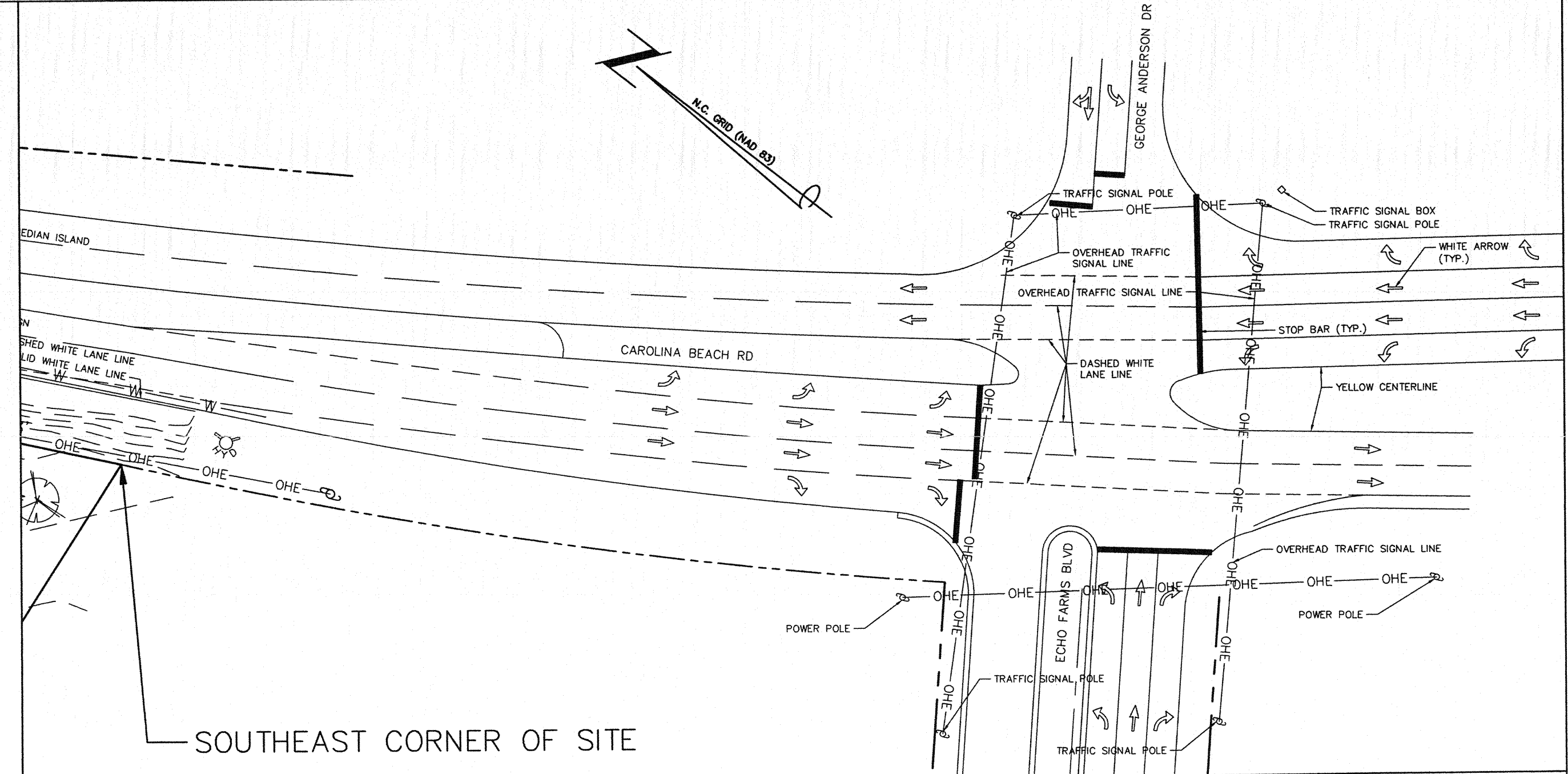
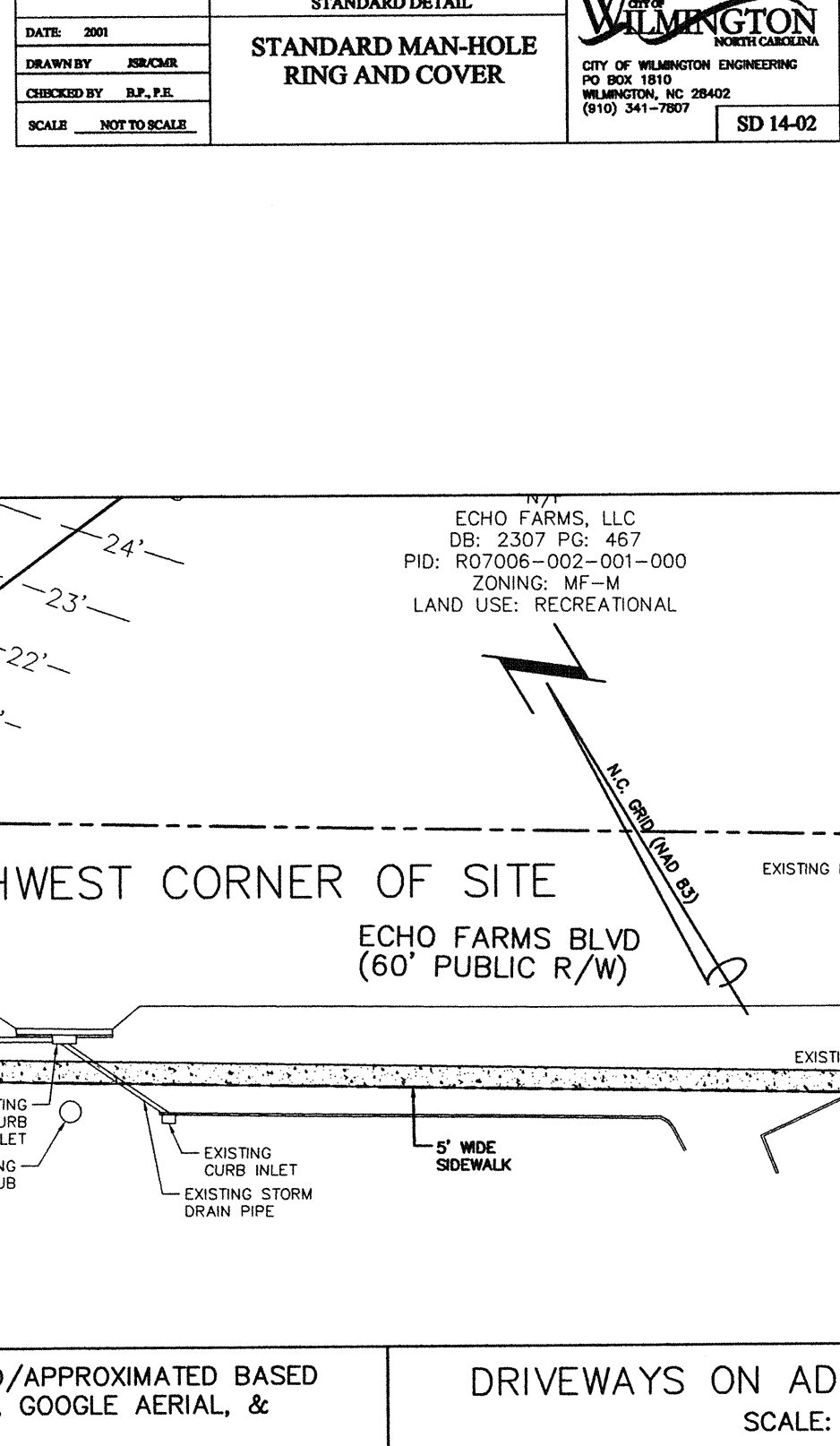
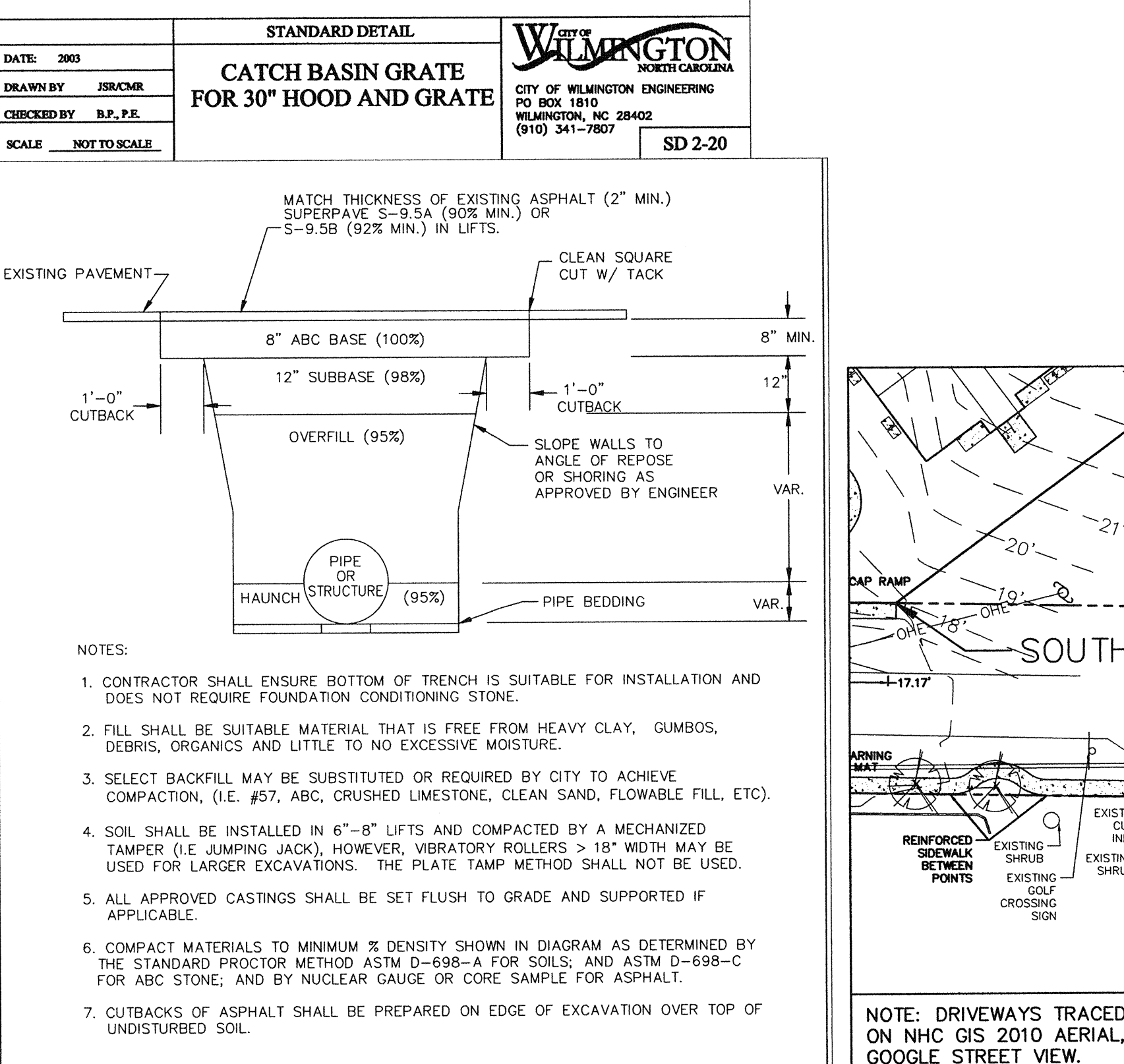
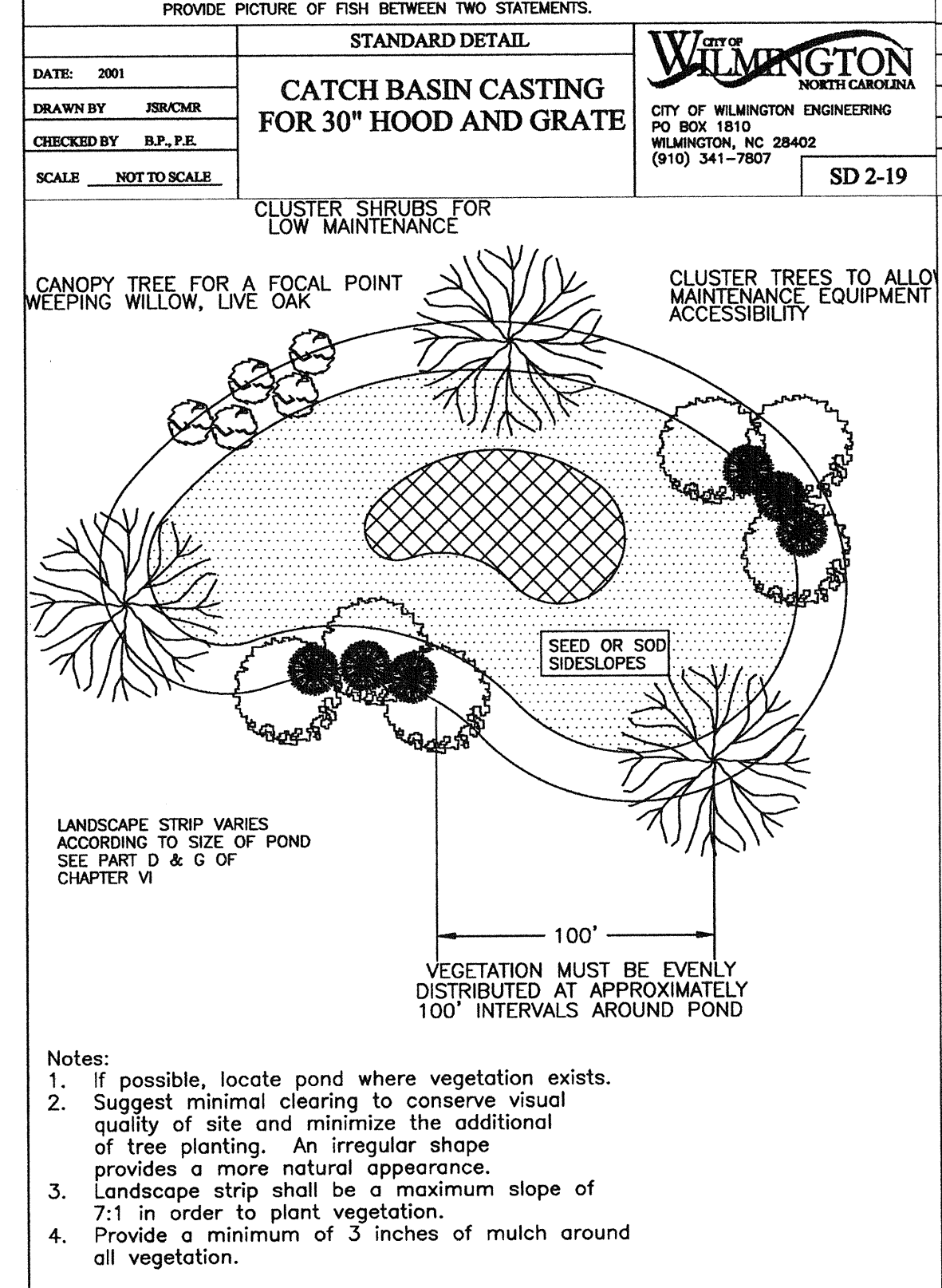
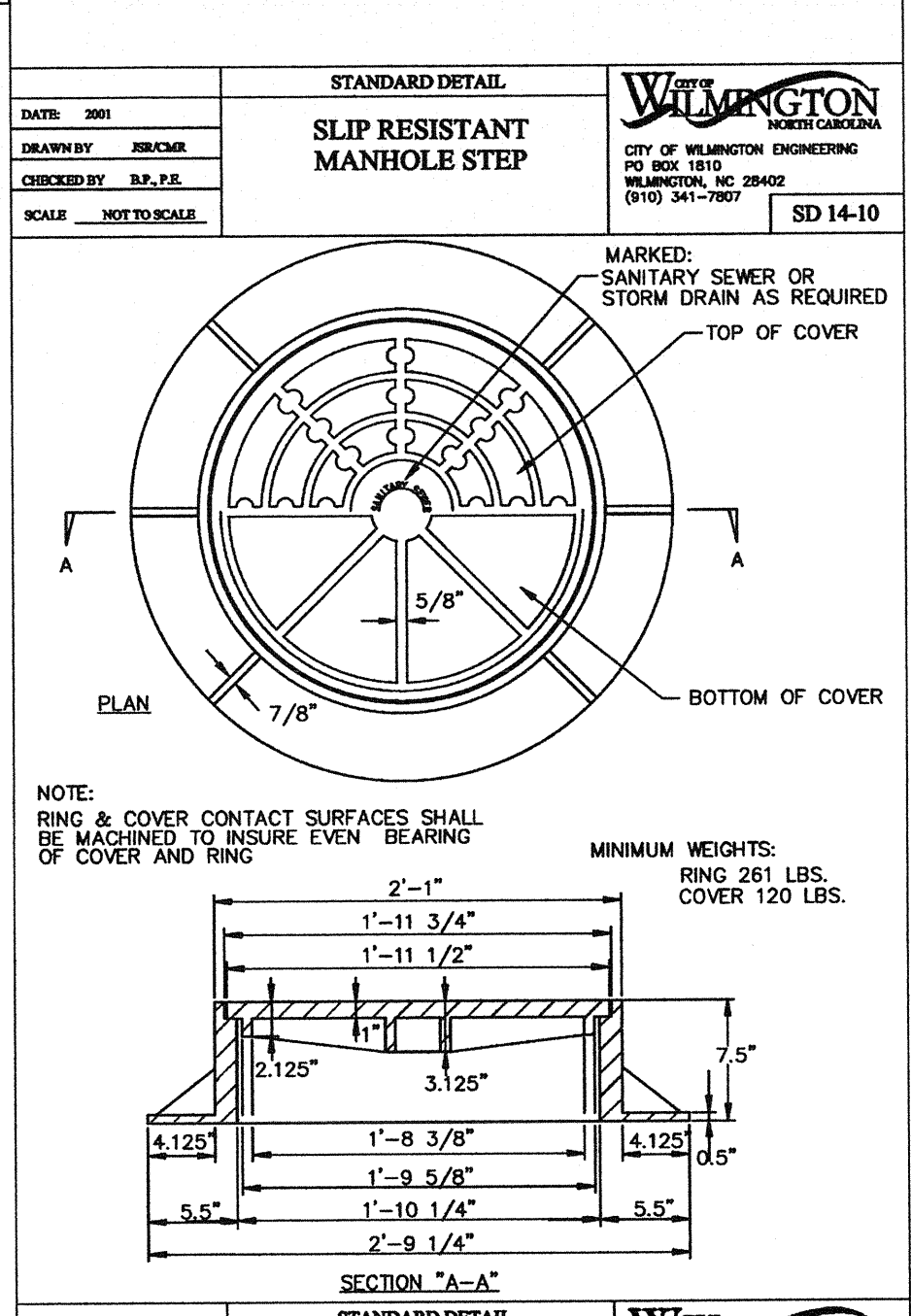
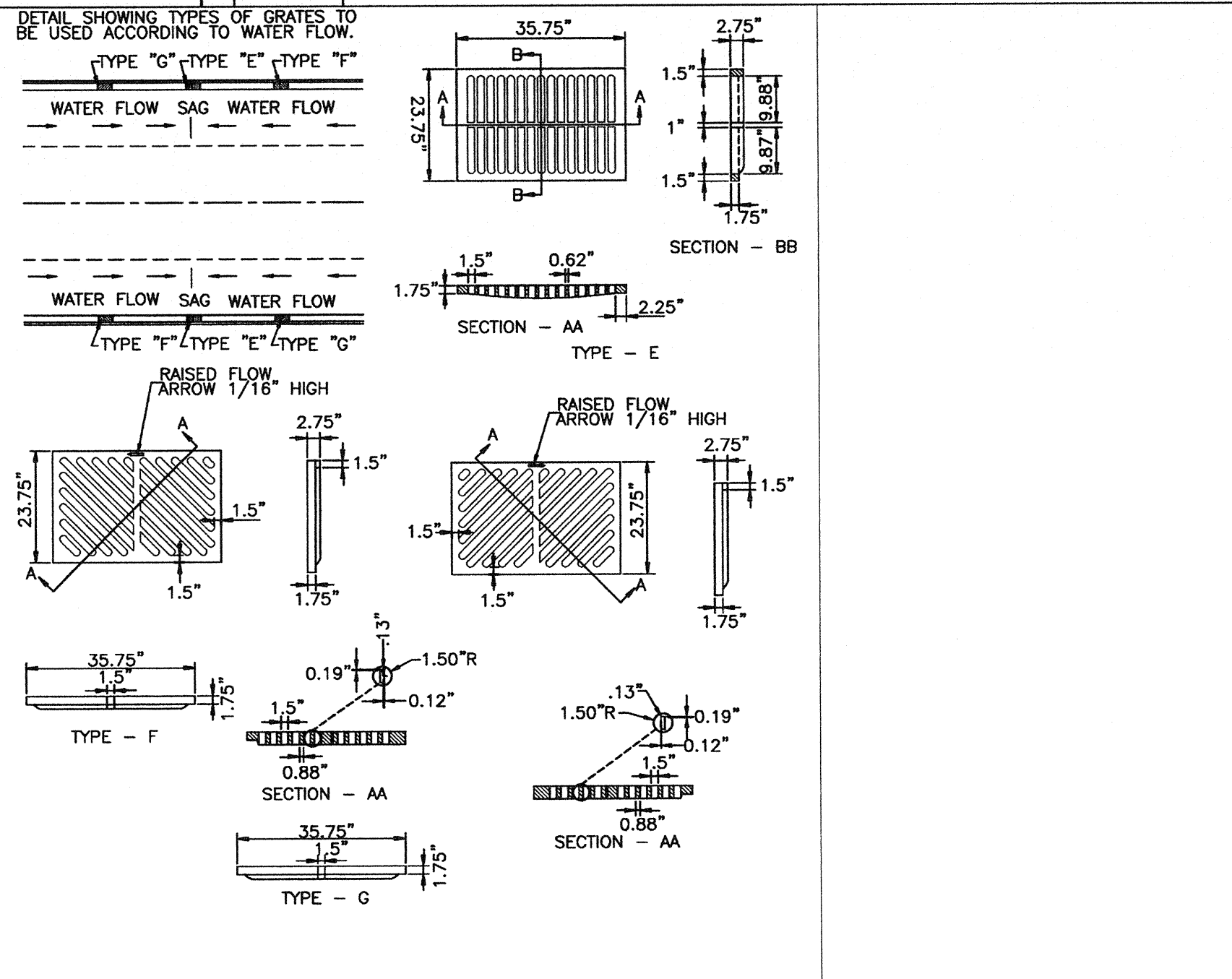
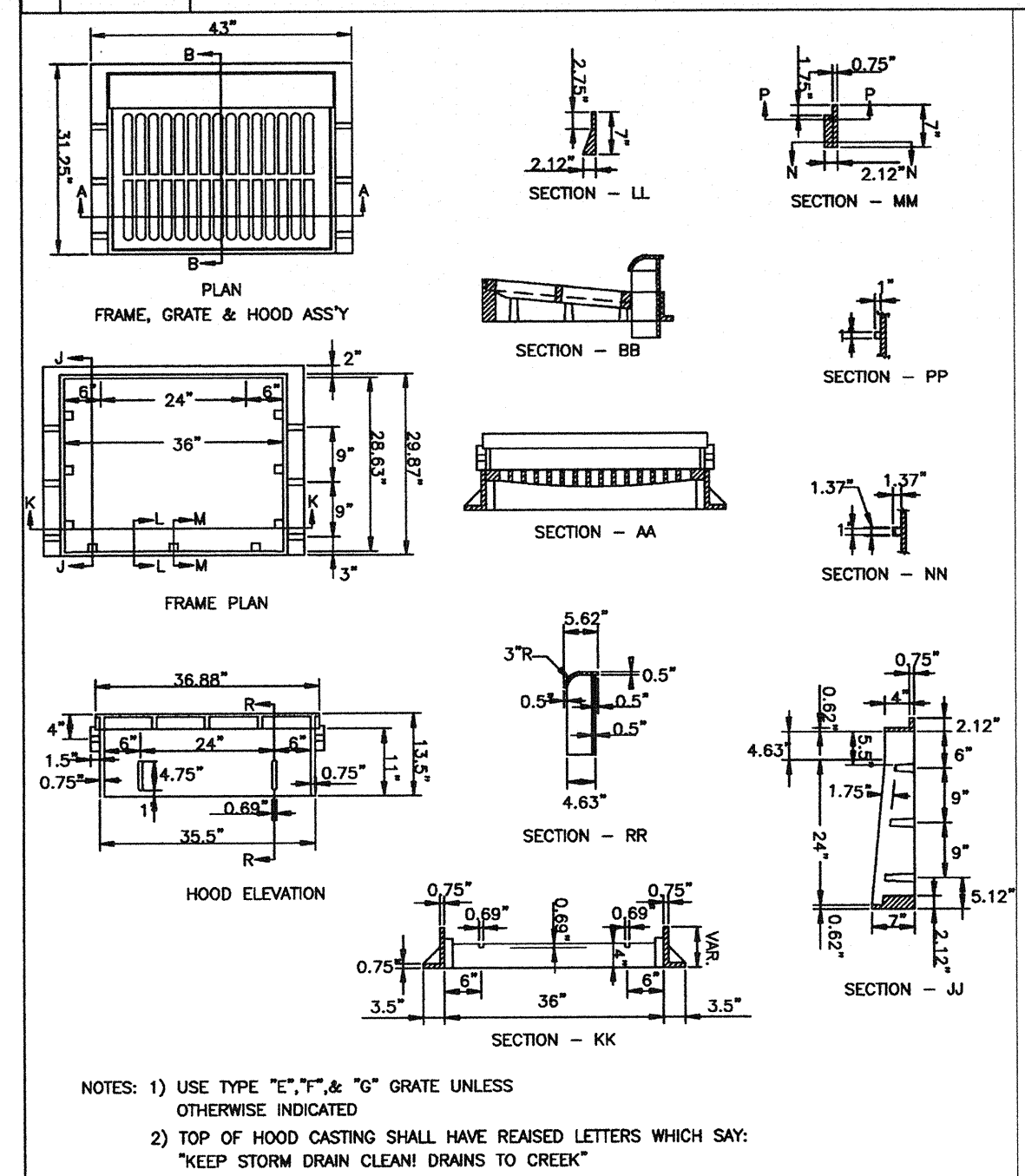
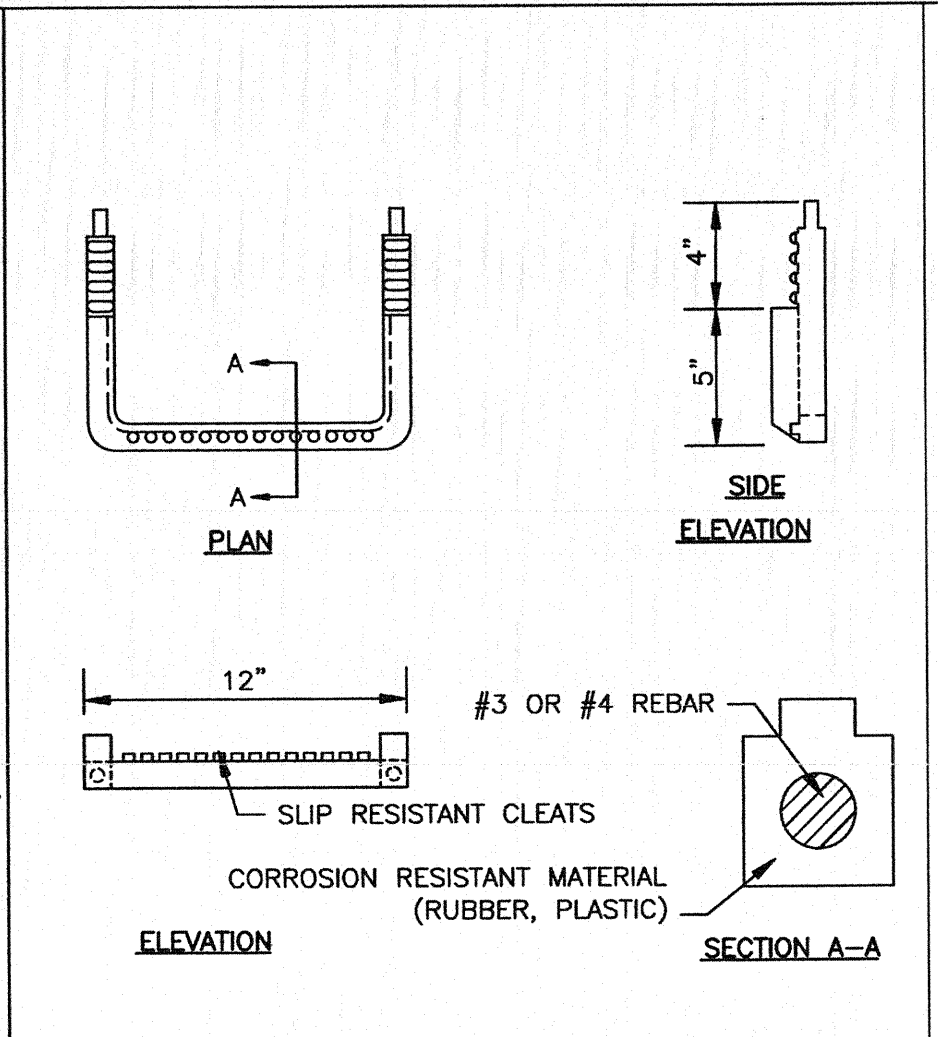
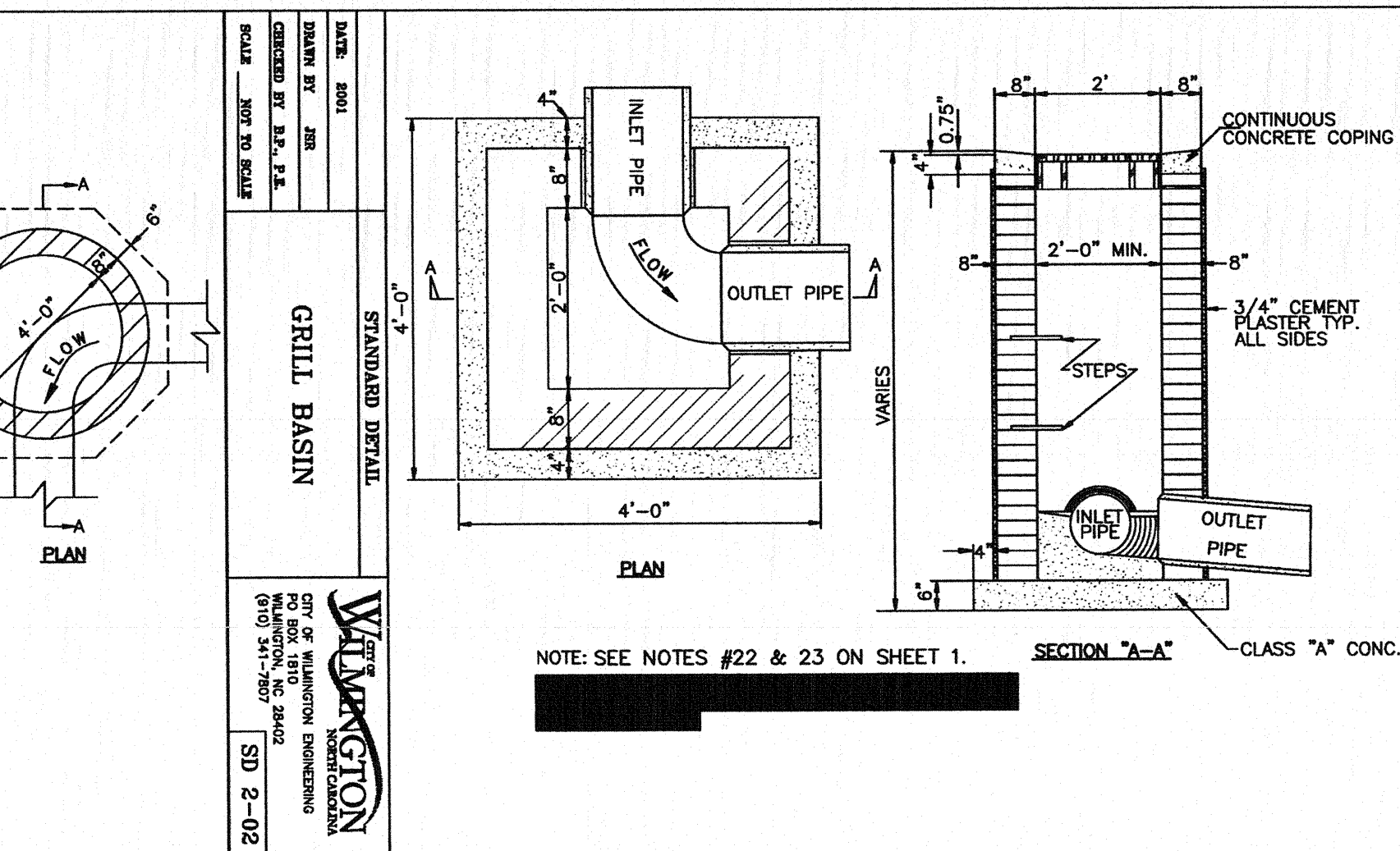
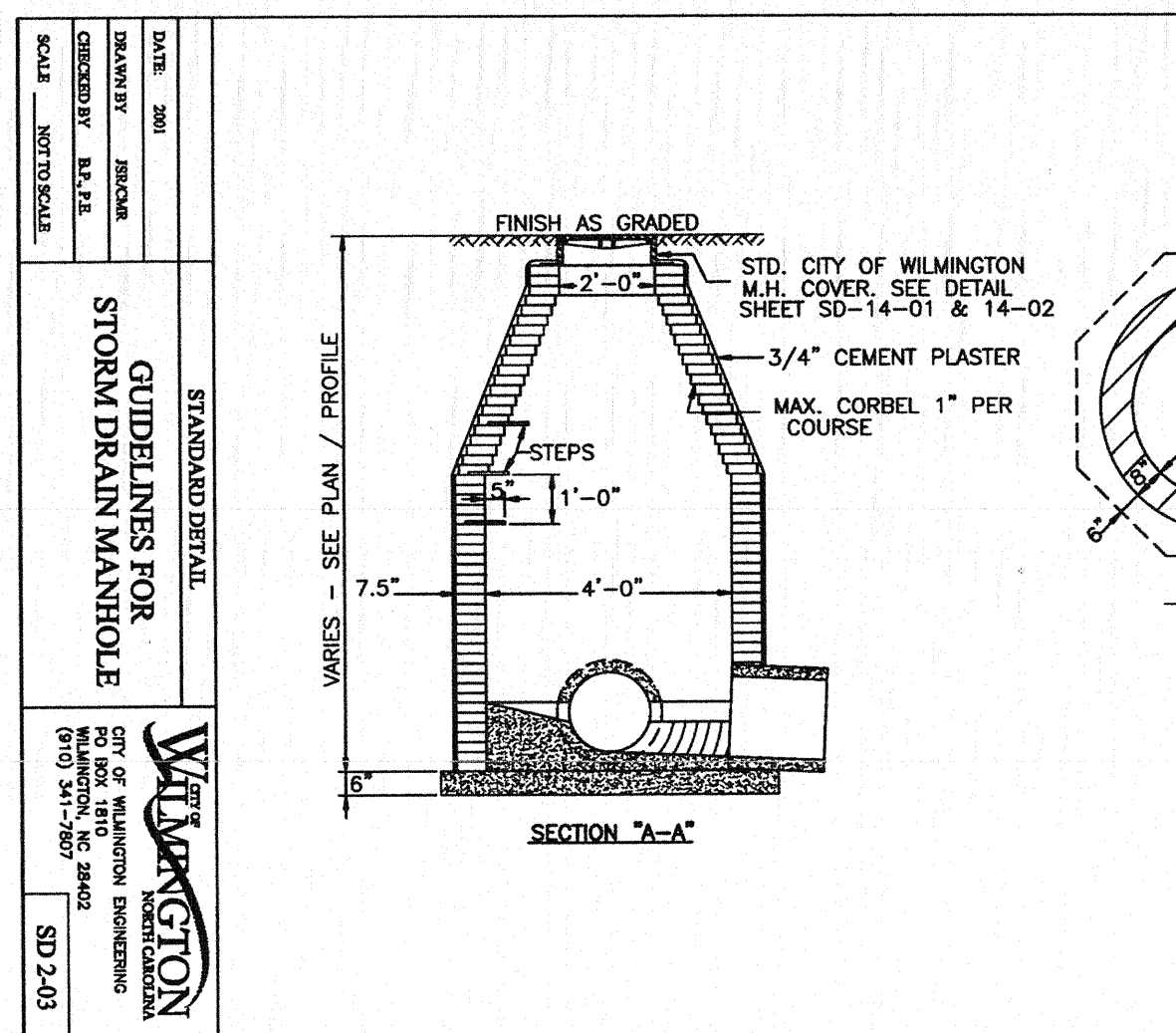
WILMINGTON
 NORTH CAROLINA
 Public Services • Engineering Division
 APPROVED STORMWATER MANAGEMENT PLAN
 Date: 12/13/16 Permit: 2016010R2
 Signed: *[Signature]*

ARBOR TRACE APARTMENTS
 WILMINGTON TOWNSHIP NEW HANOVER COUNTY NORTH CAROLINA

MALPASS ENGINEERING & SURVEYING, P.C.
 1134 SHEPPARD BOULEVARD
 WILMINGTON, NORTH CAROLINA 28418
 Phone 910-398-5245 Fax 910-398-6203 License No. C-2520

Developer: ECHO FARM APARTMENTS, LLC
 10 S. CAROLINA DRIVE
 WILMINGTON, NORTH CAROLINA 28403
 PHONE: 910-251-0000

DATE: 11-24-15
 SCALE: 1"=40'
 DRAWN: JCB
 CHECKED: JEM
 PROJECT NO: 260
 SHEET NO: 14
 OF: 22



APPROVED CONSTRUCTION PLAN

Planning: [Signature] Date: 12/13/16

Traffic: [Signature] Date: 12/13/16

Fire: [Signature] Date: 12/13/16

Signed: [Signature]

DETAIL SHEET

4010 CAROLINA BEACH ROAD

ARBOR TRACE APARTMENTS

WILMINGTON TOWNSHIP NEW HANOVER COUNTY NORTH CAROLINA

MALPASS ENGINEERING & SURVEYING, P.C.

1154 SHIPYARD BOULEVARD

WILMINGTON, NORTH CAROLINA 28412

Phone: 910-992-5045 Fax: 910-992-5203 License No. C-2350

Developer: ECHO FARM APARTMENTS, LLC

10 S. CAROLINA DRIVE

WILMINGTON, NORTH CAROLINA 28403

PHONE: 910-251-5030

DATE: 11-24-15

SCALE: N.T.S.

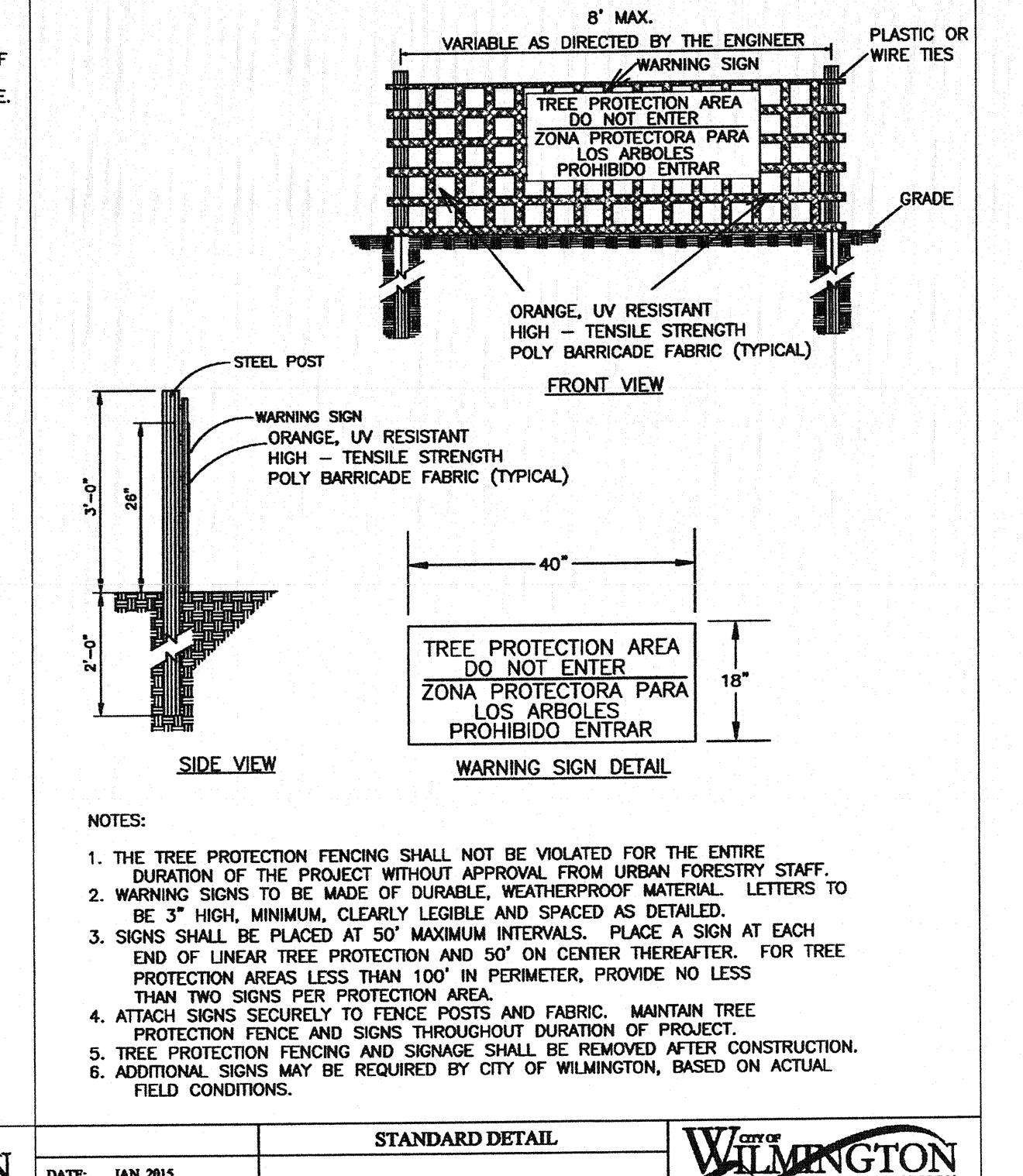
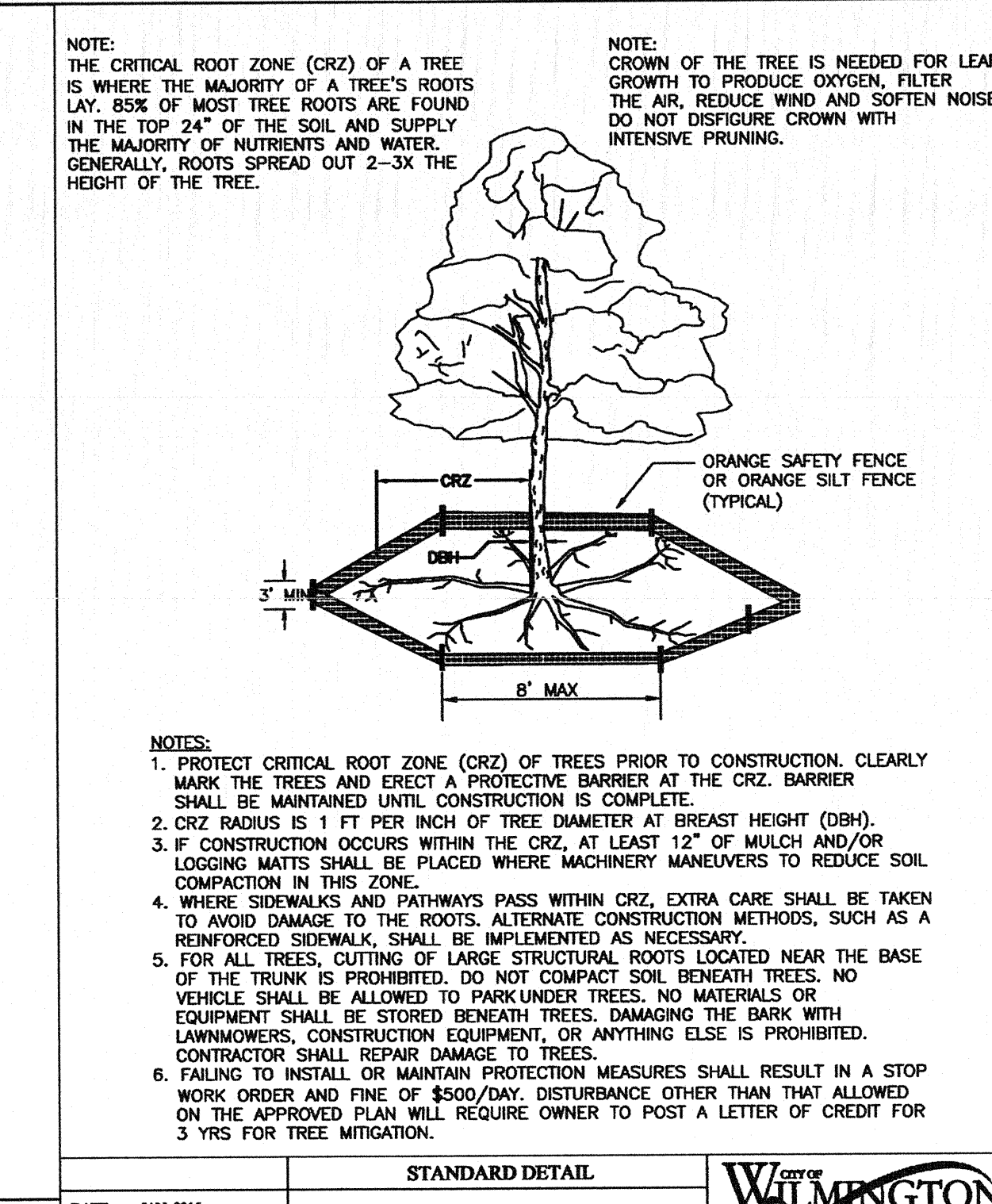
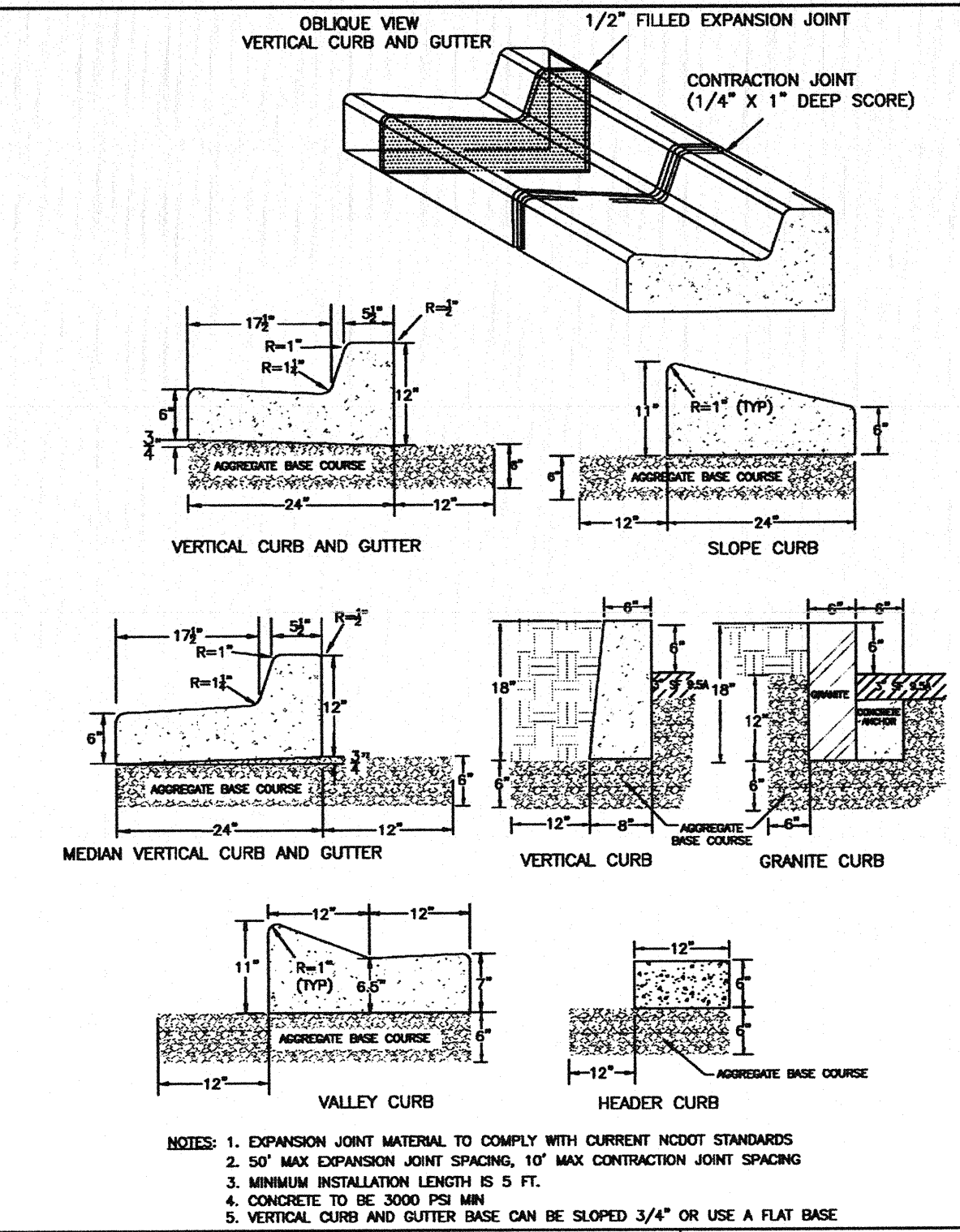
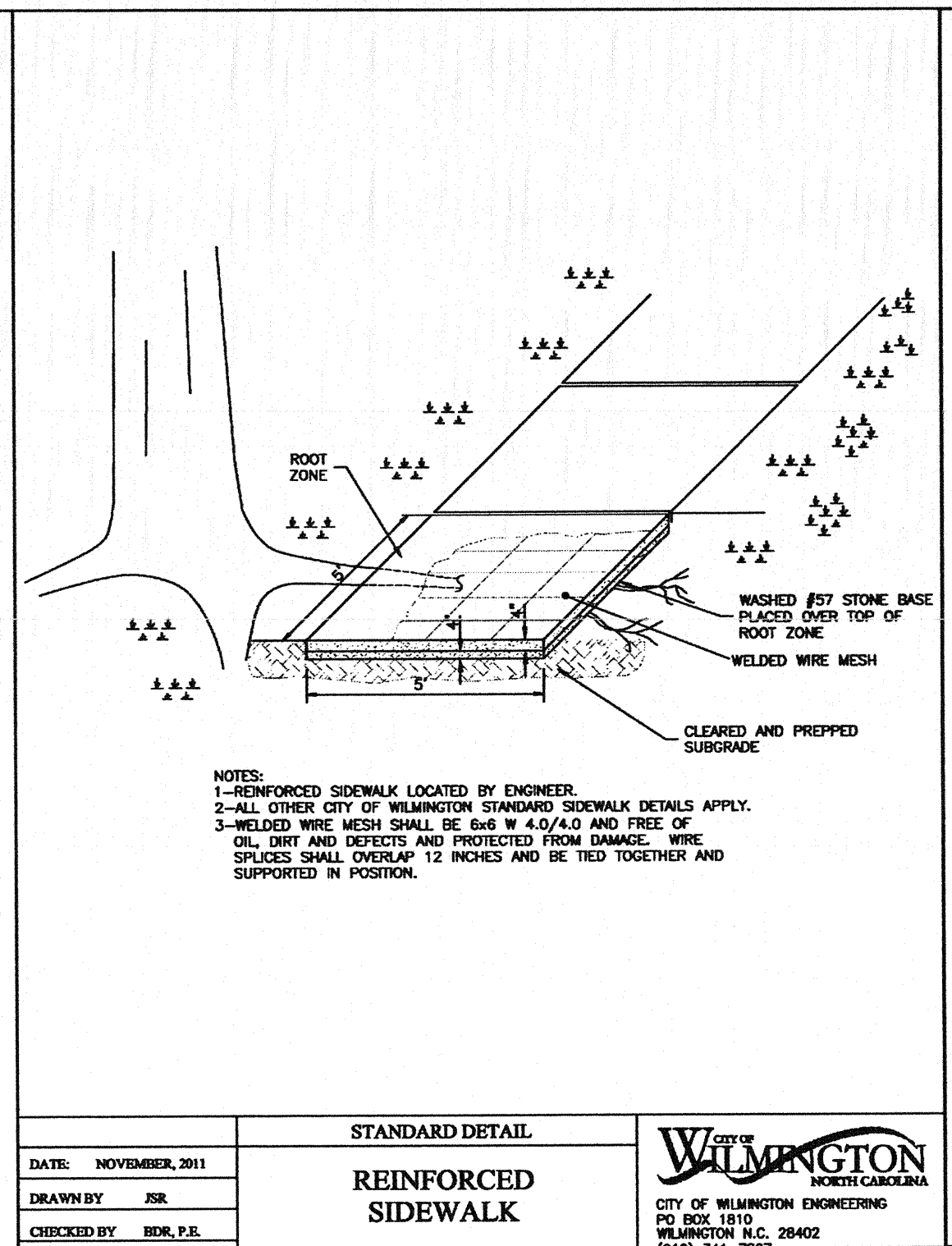
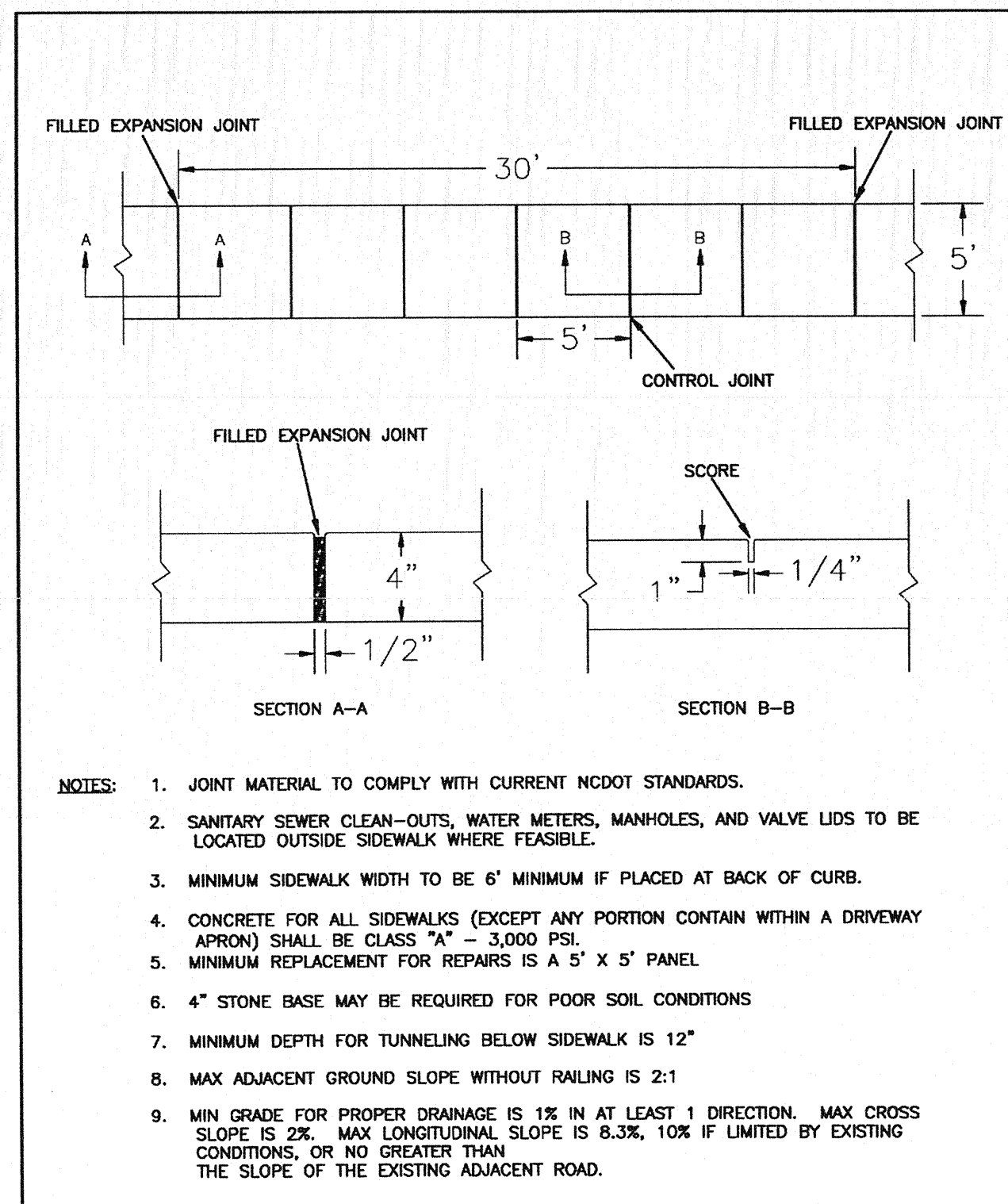
DRAWN: JCB

CHECKED: JEM

PROJECT NO: 250

SHEET NO: 15

OF: 22



STANDARD DETAIL

SIDEWALK

DATE: OCTOBER, 2010
DRAWN BY: FVSR
CHECKED BY: DEC, P.E.
SCALE: NOT TO SCALE

CITY OF WILMINGTON
NORTH CAROLINA
CITY OF WILMINGTON ENGINEERING
PO BOX 1810
WILMINGTON, NC 28402
(910) 341-7807

SD 3-10

STANDARD DETAIL

REINFORCED SIDEWALK

DATE: NOVEMBER, 2011
DRAWN BY: JSR
CHECKED BY: BOB, P.E.
SCALE: NOT TO SCALE

CITY OF WILMINGTON
NORTH CAROLINA
CITY OF WILMINGTON ENGINEERING
PO BOX 1810
WILMINGTON, NC 28402
(910) 341-7807

SD 3-100

STANDARD DETAIL

CURBING

DATE: AUGUST, 2011
DRAWN BY: FVSR
CHECKED BY: DEC, P.E.
SCALE: NOT TO SCALE

CITY OF WILMINGTON
NORTH CAROLINA
CITY OF WILMINGTON ENGINEERING
PO BOX 1810
WILMINGTON, NC 28402
(910) 341-7807

SD 3-11

STANDARD DETAIL

TREE PROTECTION DURING CONSTRUCTION

DATE: JAN, 2015
DRAWN BY: JSR
CHECKED BY: BOB, P.E.
SCALE: NOT TO SCALE

CITY OF WILMINGTON
NORTH CAROLINA
CITY OF WILMINGTON ENGINEERING
PO BOX 1810
WILMINGTON, NC 28402
(910) 341-7807

SD 15-09

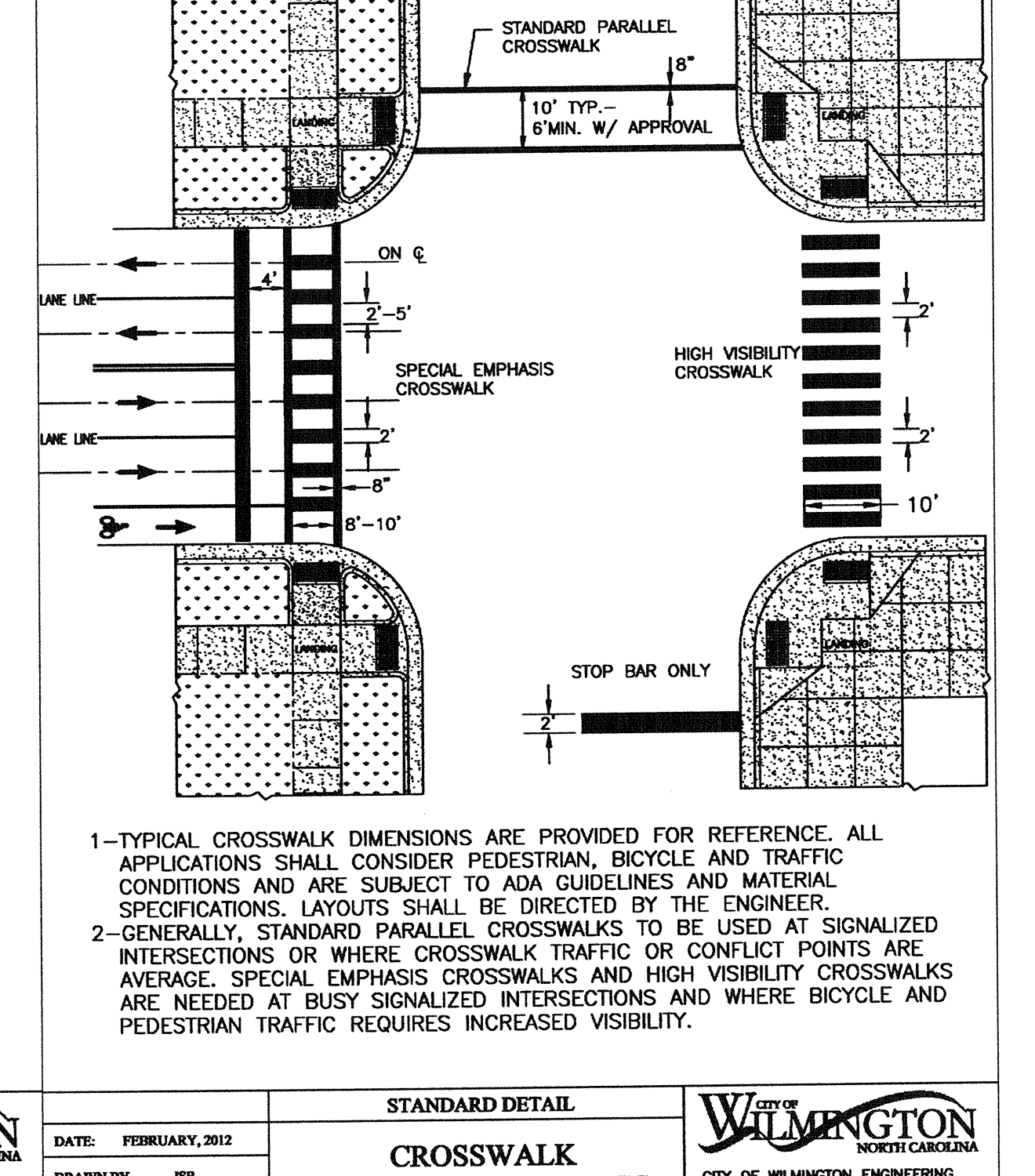
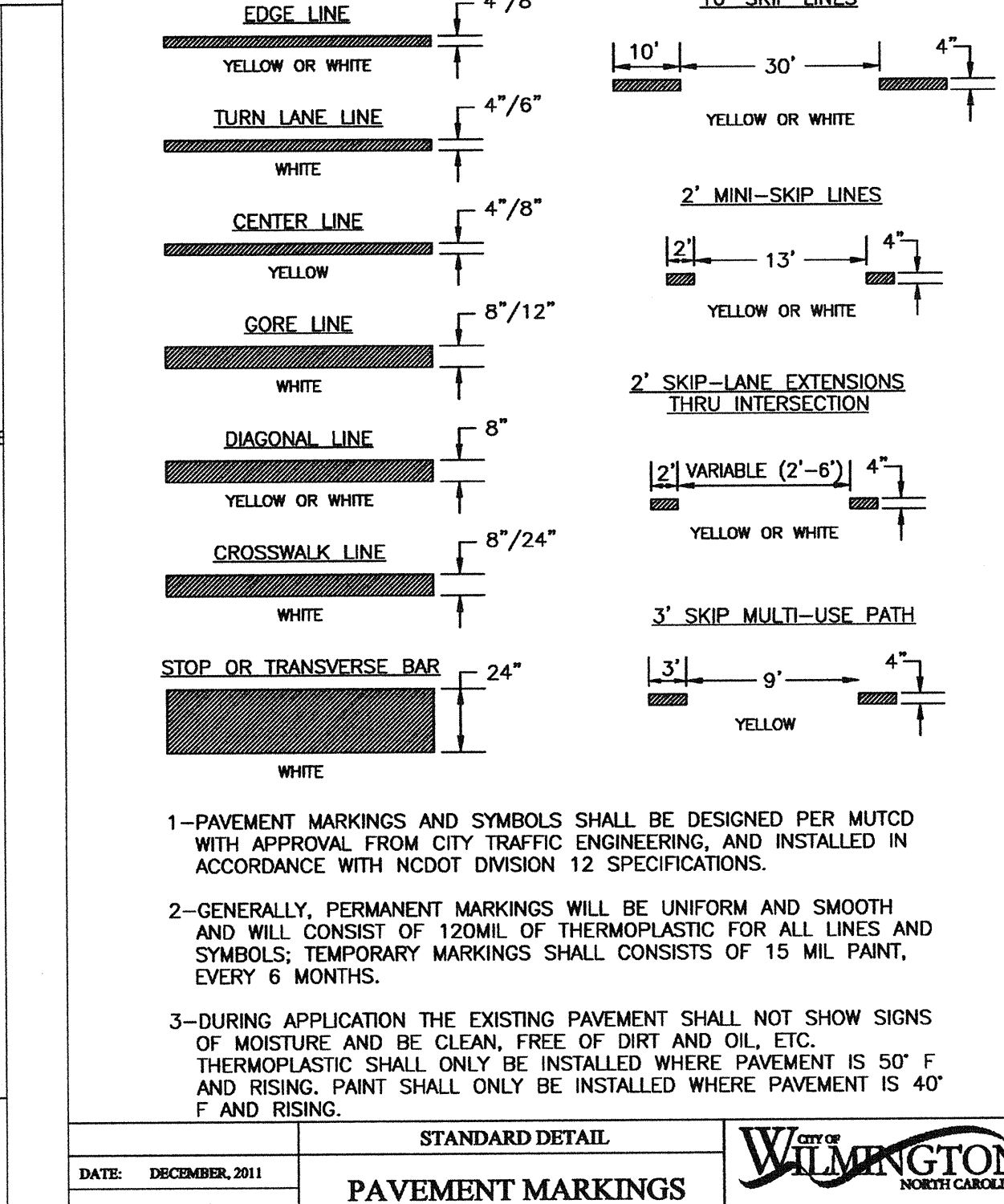
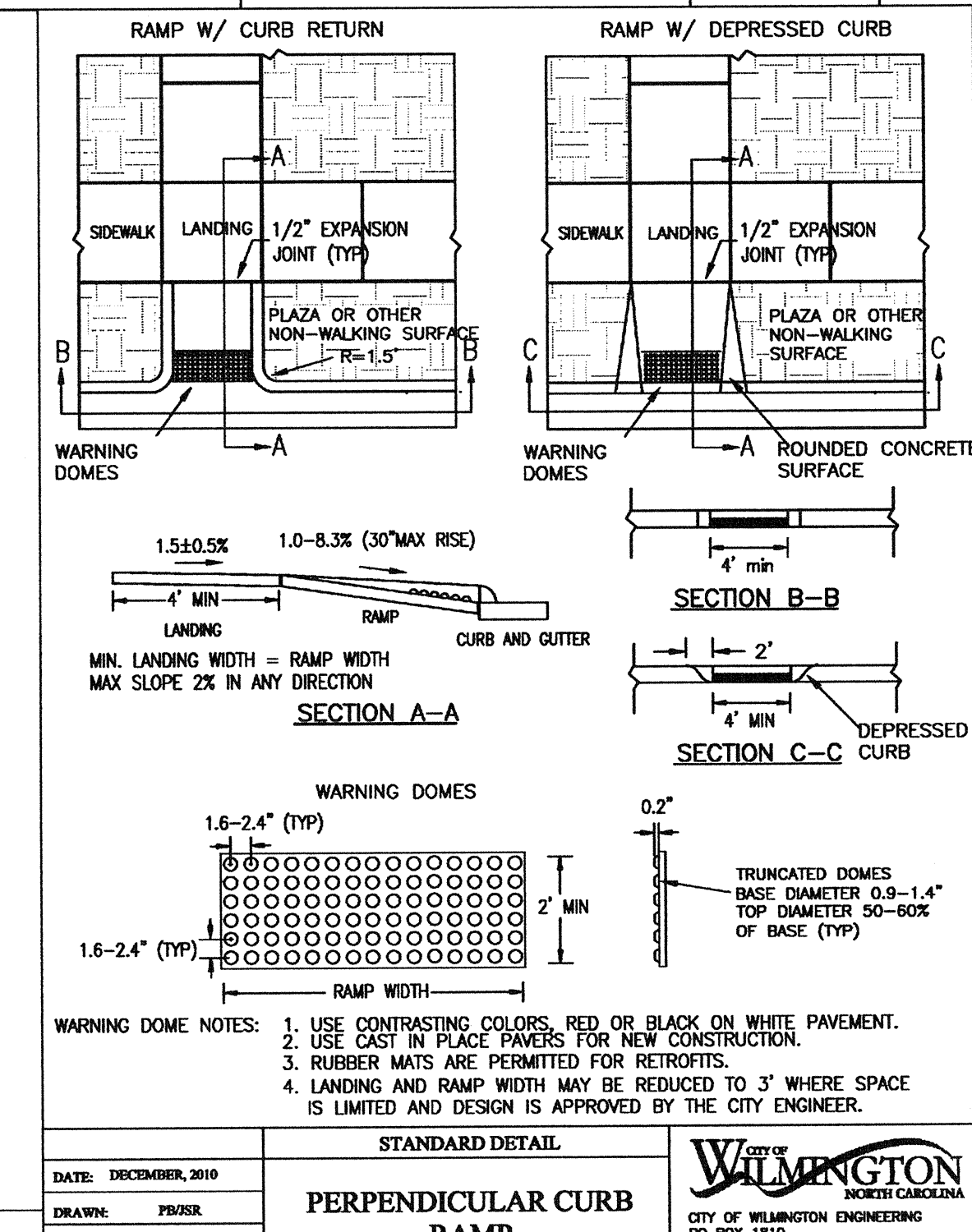
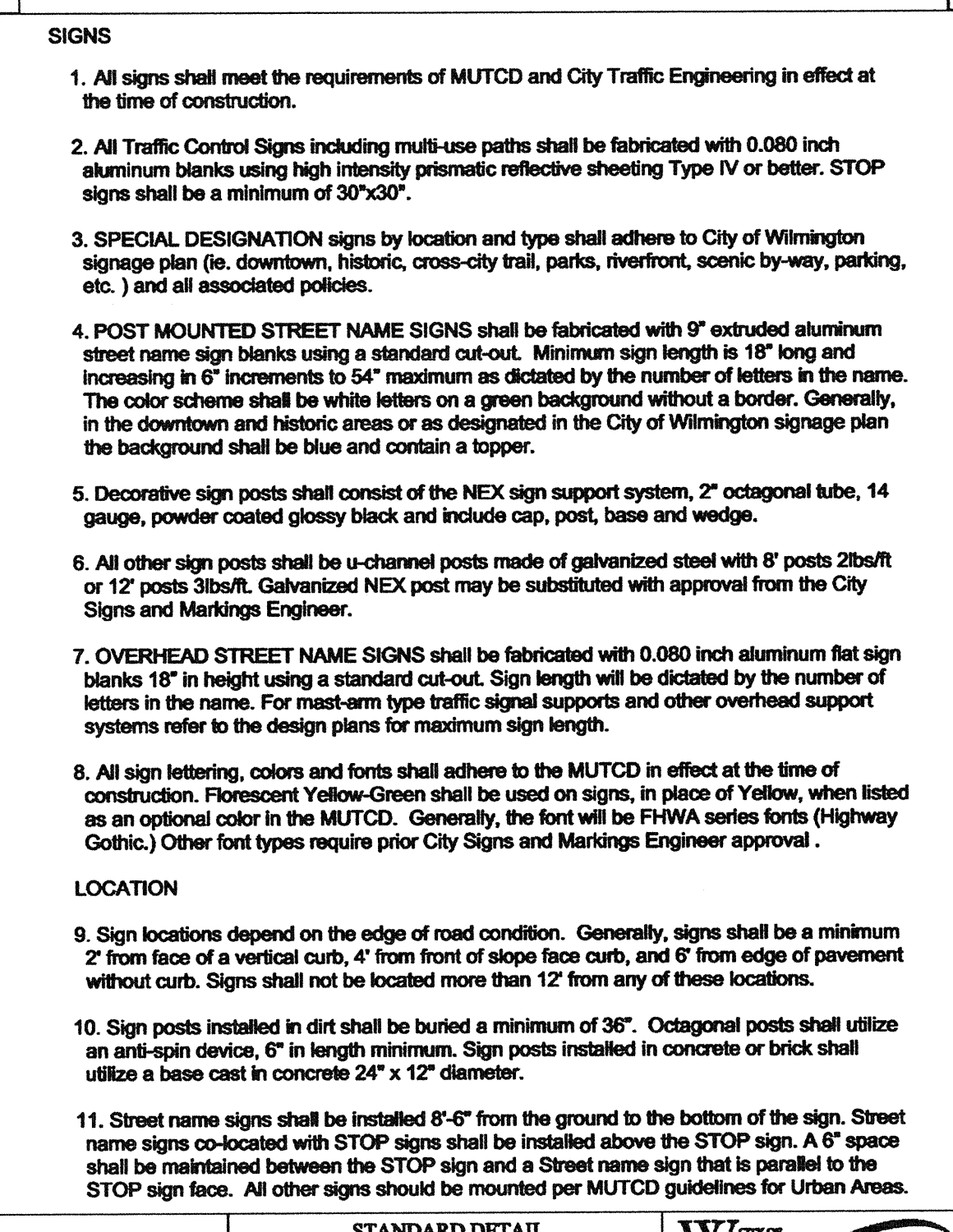
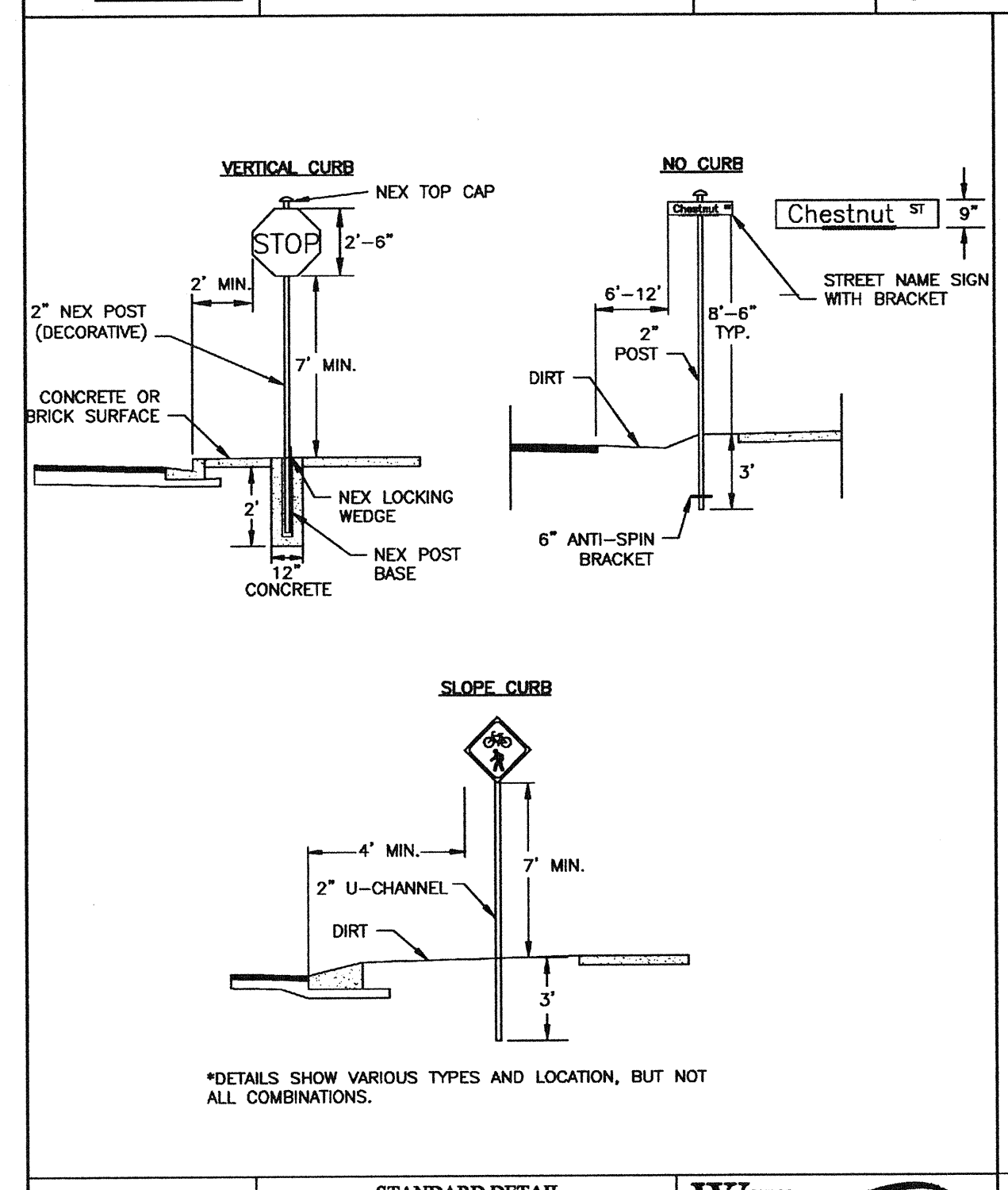
STANDARD DETAIL

TREE PROTECTION DURING CONSTRUCTION

DATE: JAN, 2015
DRAWN BY: JSR
CHECKED BY: BOB, P.E.
SCALE: NOT TO SCALE

CITY OF WILMINGTON
NORTH CAROLINA
CITY OF WILMINGTON ENGINEERING
PO BOX 1810
WILMINGTON, NC 28402
(910) 341-7807

SD 15-09



STANDARD DETAIL

STREET SIGNS AND LOCATION

DATE: NOVEMBER, 2011
DRAWN BY: JSR
CHECKED BY: BOB, P.E.
SCALE: NOT TO SCALE

CITY OF WILMINGTON
NORTH CAROLINA
CITY OF WILMINGTON ENGINEERING
PO BOX 1810
WILMINGTON, NC 28402
(910) 341-7807

SD 15-03

STANDARD DETAIL

STREET SIGNS AND LOCATION

DATE: NOVEMBER, 2011
DRAWN BY: JSR
CHECKED BY: BOB, P.E.
SCALE: NOT TO SCALE

CITY OF WILMINGTON
NORTH CAROLINA
CITY OF WILMINGTON ENGINEERING
PO BOX 1810
WILMINGTON, NC 28402
(910) 341-7807

SD 15-03

STANDARD DETAIL

PERPENDICULAR CURB RAMP ADJACENT TO PLAZA

DATE: DECEMBER, 2010
DRAWN BY: FVSR
CHECKED BY: DEC
SCALE: NOT TO SCALE

CITY OF WILMINGTON
NORTH CAROLINA
CITY OF WILMINGTON ENGINEERING
PO BOX 1810
WILMINGTON, NC 28402
(910) 341-7807

SD3-08

STANDARD DETAIL

PAVEMENT MARKINGS LINE TYPES

DATE: DECEMBER, 2011
DRAWN BY: FVSR
CHECKED BY: BOB, P.E.
SCALE: NOT TO SCALE

CITY OF WILMINGTON
NORTH CAROLINA
CITY OF WILMINGTON ENGINEERING
PO BOX 1810
WILMINGTON, NC 28402
(910) 341-7807

SD 11-01

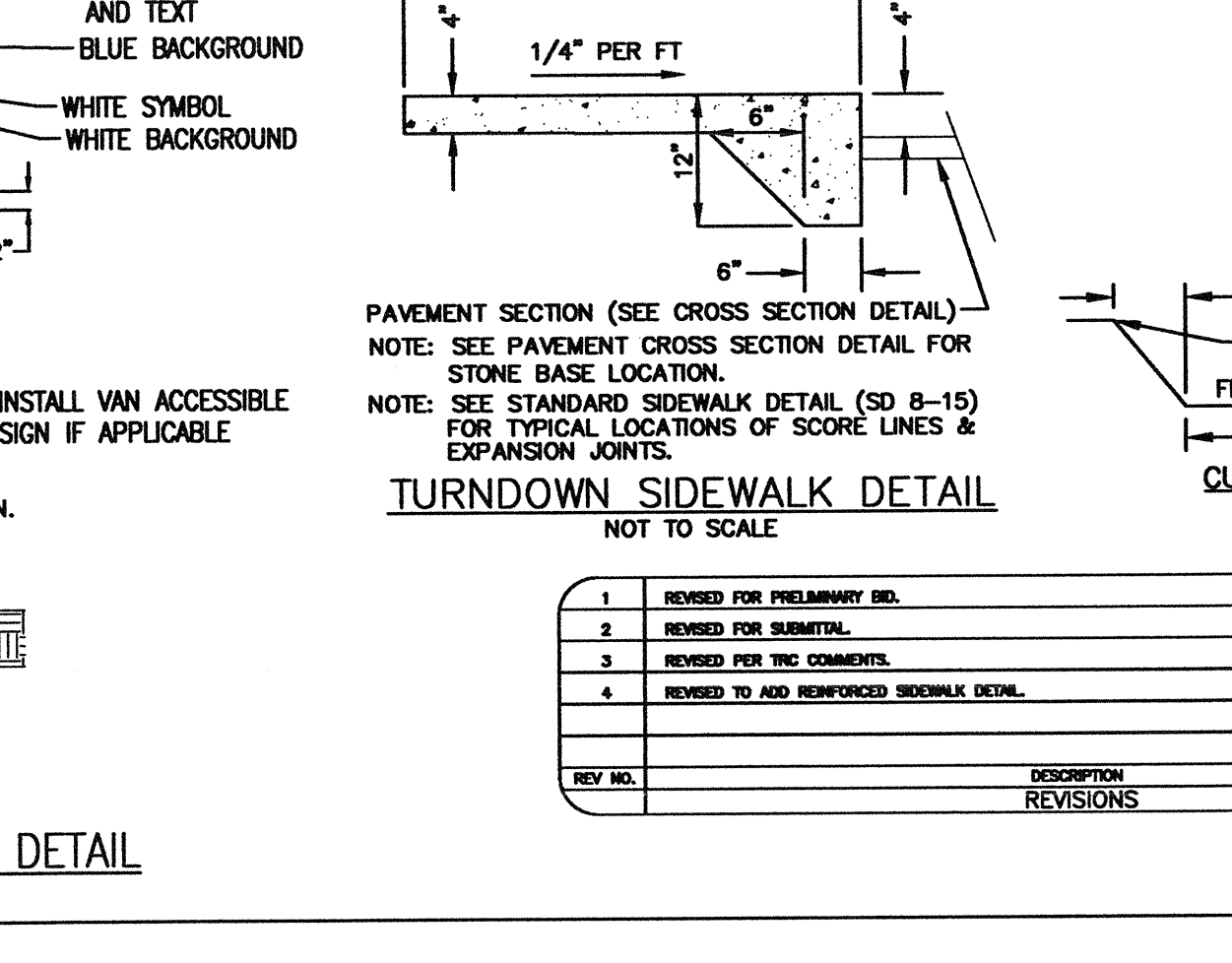
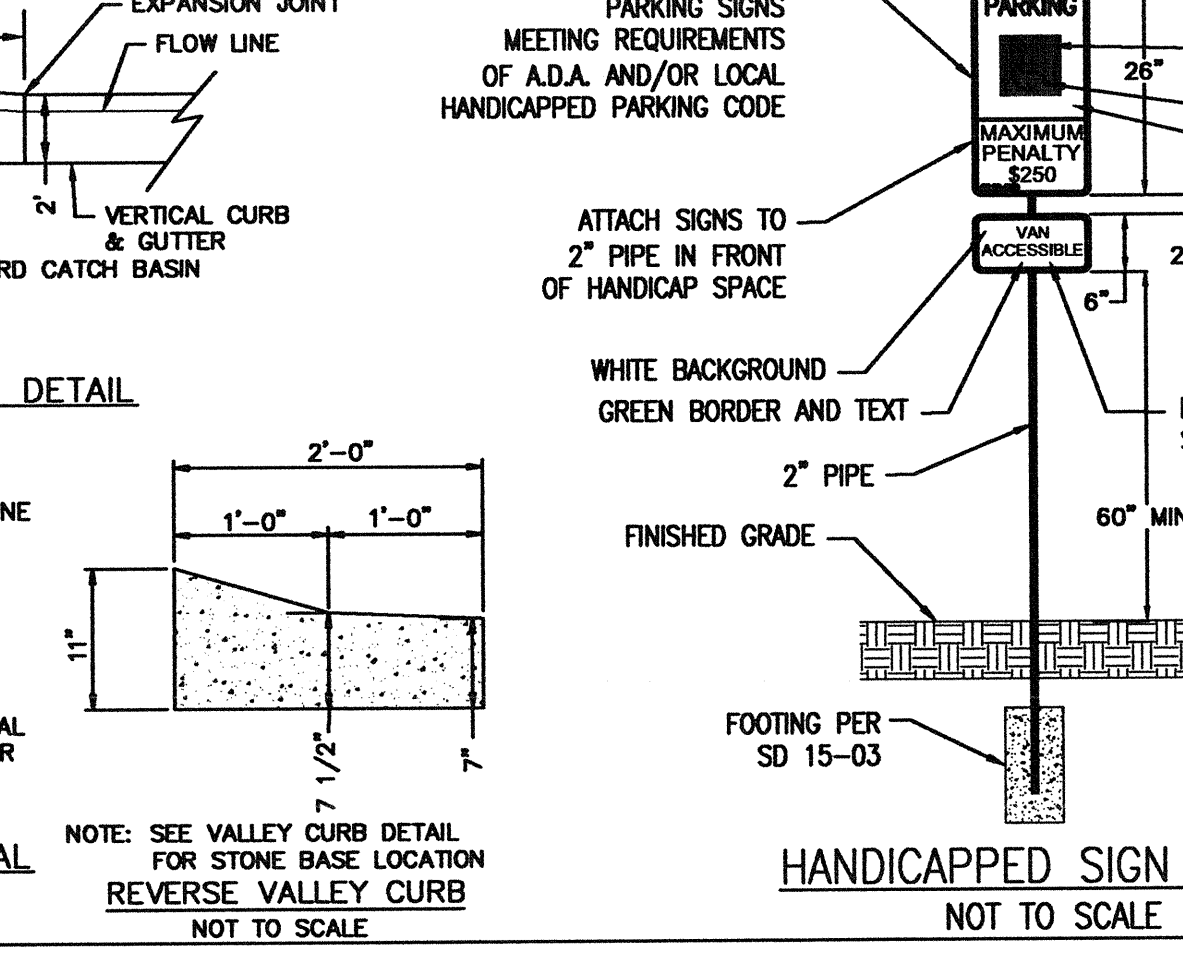
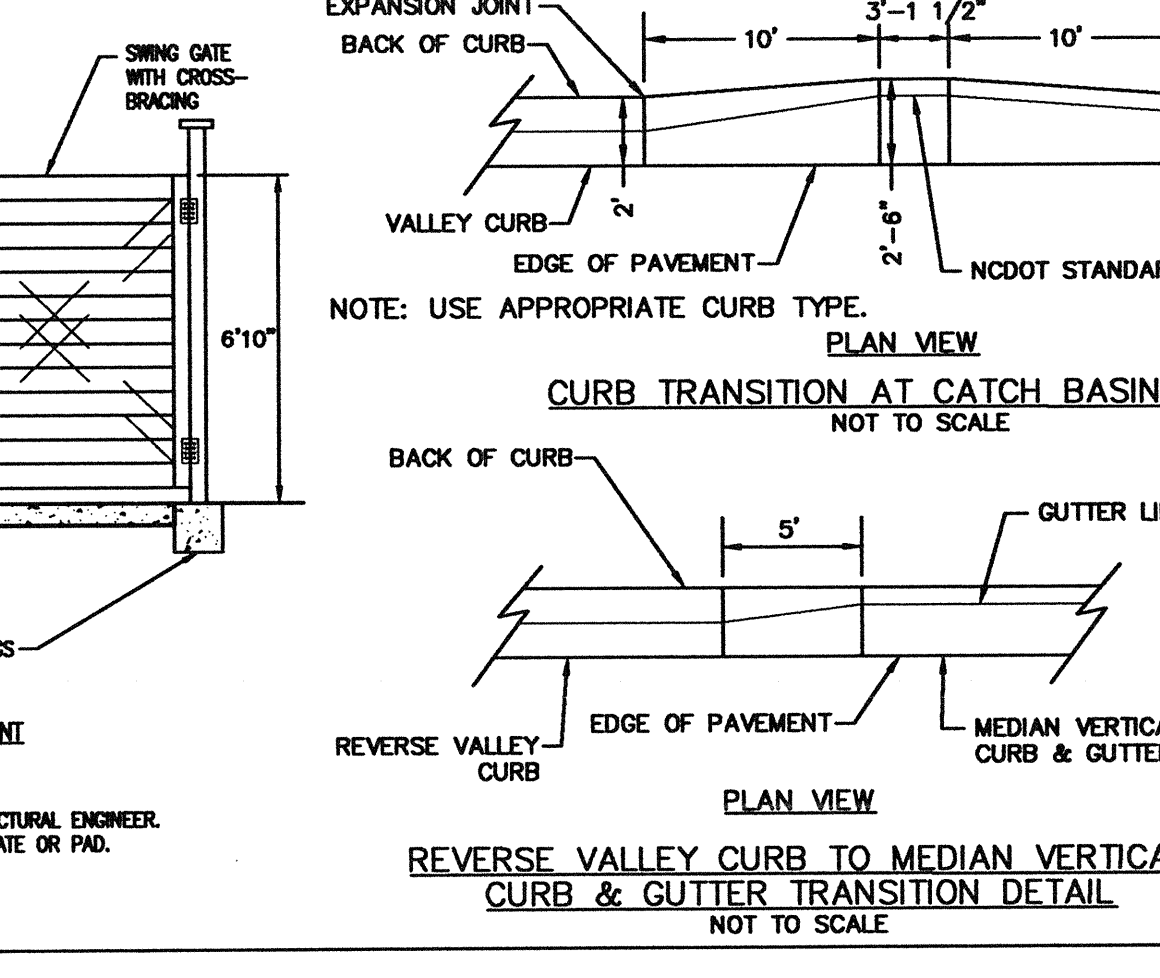
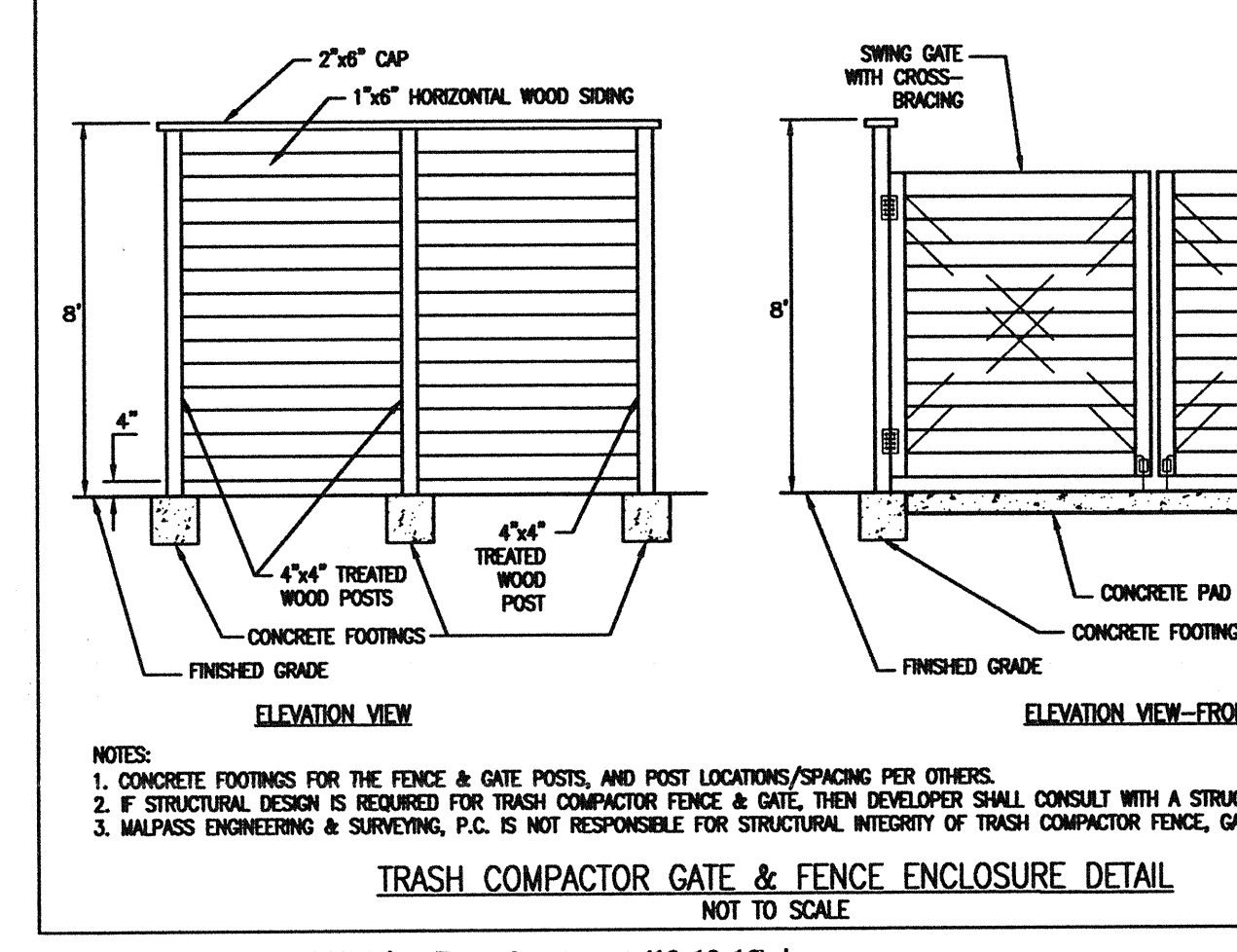
STANDARD DETAIL

CROSSWALK PAVEMENT MARKINGS

DATE: FEBRUARY, 2012
DRAWN BY: JSR
CHECKED BY: BOB, P.E.
SCALE: NOT TO SCALE

CITY OF WILMINGTON
NORTH CAROLINA
CITY OF WILMINGTON ENGINEERING
PO BOX 1810
WILMINGTON, NC 28402
(910) 341-7807

SD 11-11



Approved Construction Plan

Name: _____ Date: 12/13/16

Planning: _____

Traffic: _____

Fire: _____

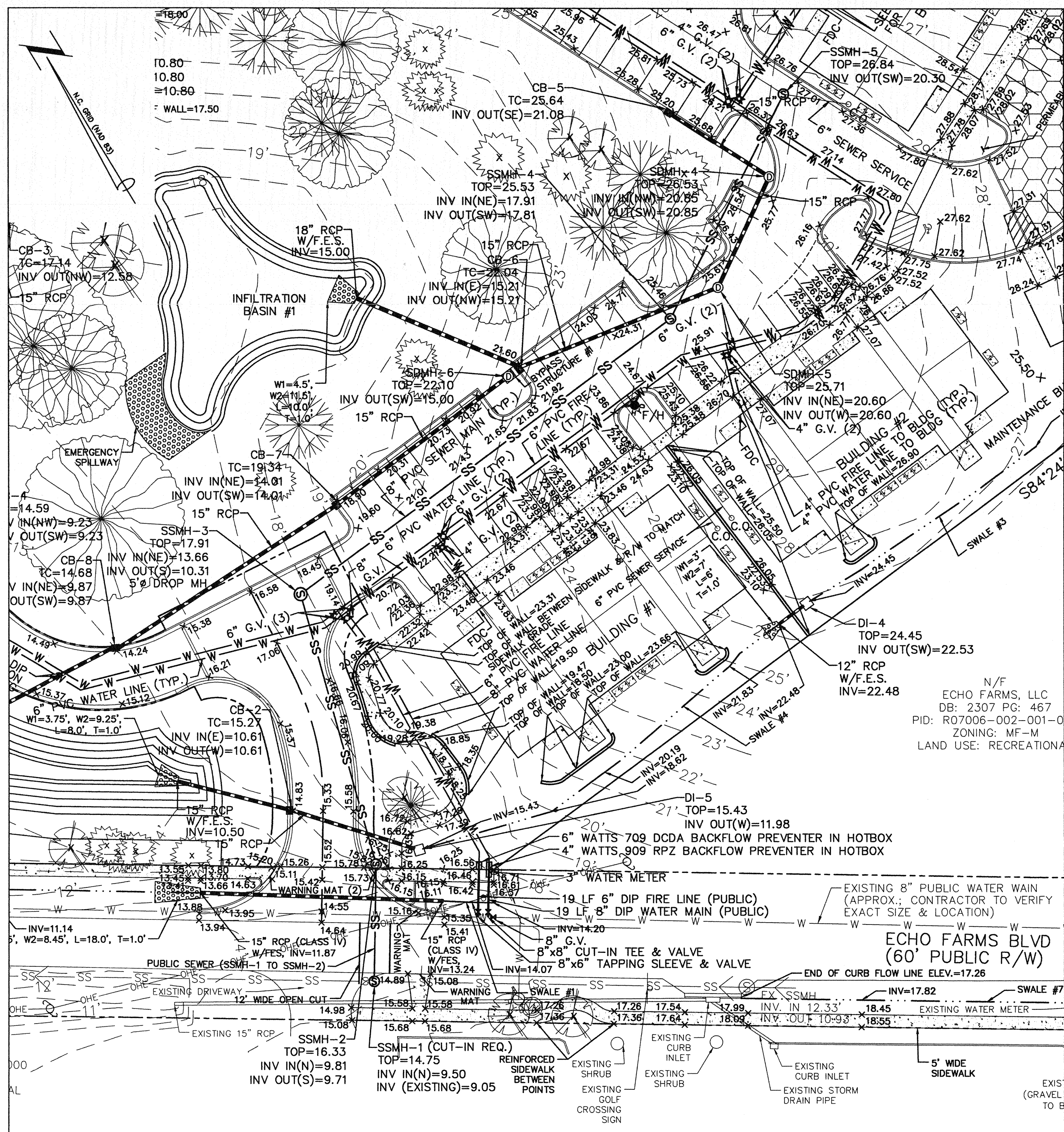
CITY OF WILMINGTON
NORTH CAROLINA
Public Services • Engineering Division
APPROVED STORMWATER MANAGEMENT PLAN
Date: 12/13/16 Permit # 20161010PZ
Signed: _____

ARBOR TRACE APARTMENTS
4010 CAROLINA BEACH ROAD
WILMINGTON TOWNSHIP NEW HANOVER COUNTY NORTH CAROLINA

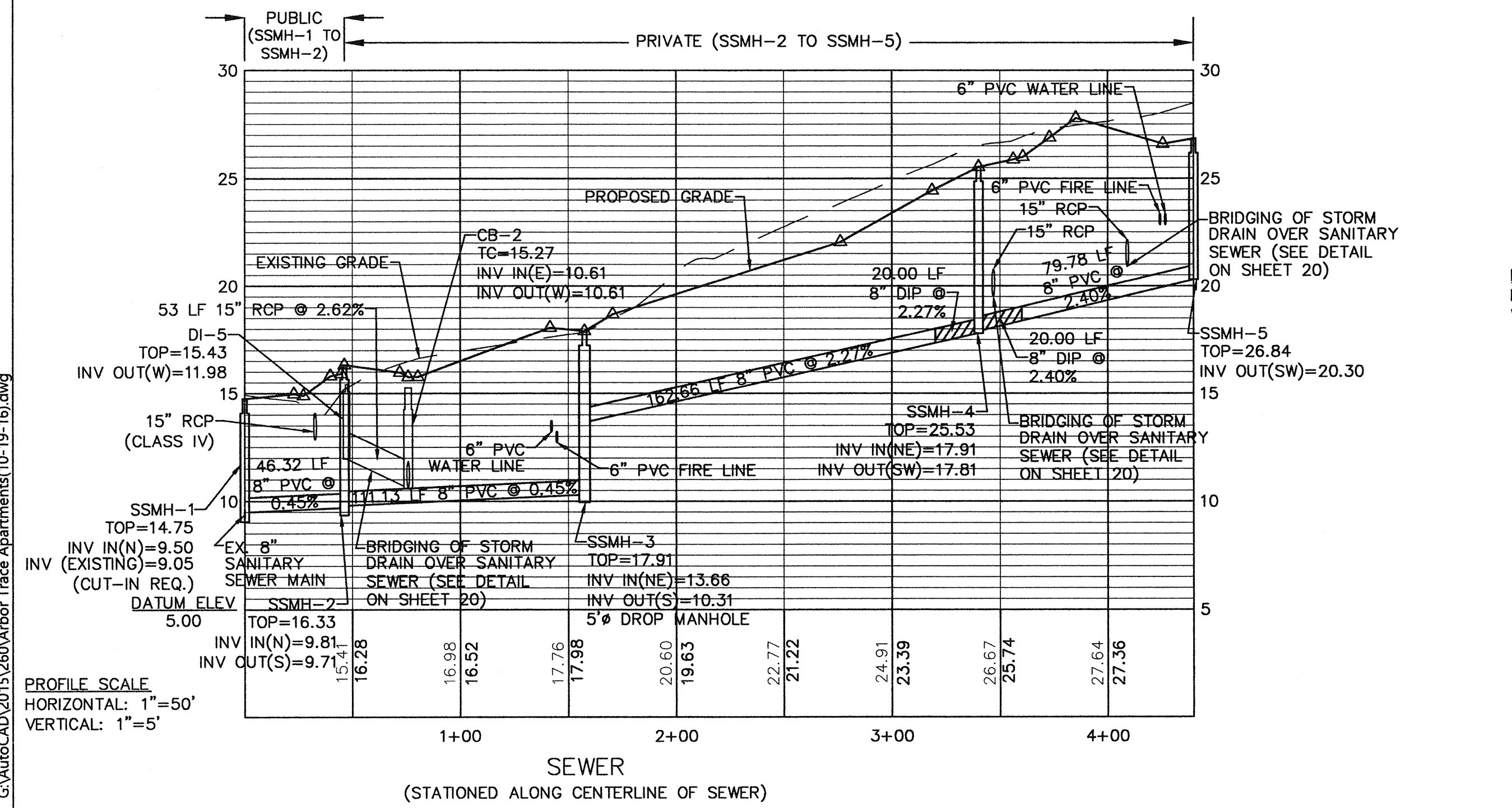
MALPASS ENGINEERING & SURVEYING, P.C.
1154 SHIPPARD BOULEVARD
WILMINGTON, NORTH CAROLINA 28412
Phone: 910-382-6845 Fax: 910-382-6803 License No. C-2300

Developer: ECHO FARM APARTMENTS, LLC
10 S. CAROLINA DRIVE
WILMINGTON, NORTH CAROLINA 28403
PHONE: 910-251-5030

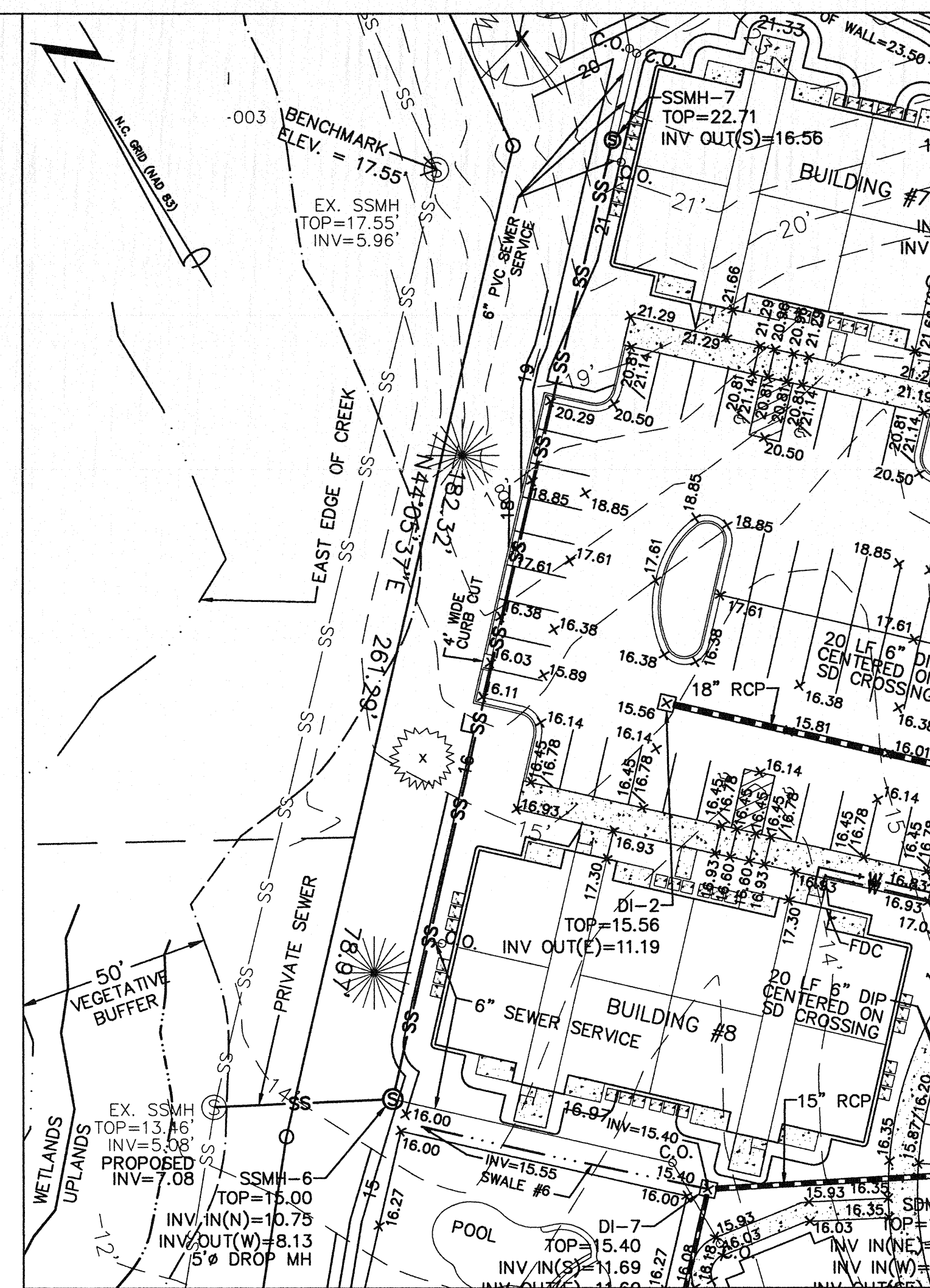
DATE: 10-1-15
SCALE: N.T.S.
DRAWN: JCB
CHECKED: JEM
PROJECT NO: 260
SHEET NO: 16
OF: 22



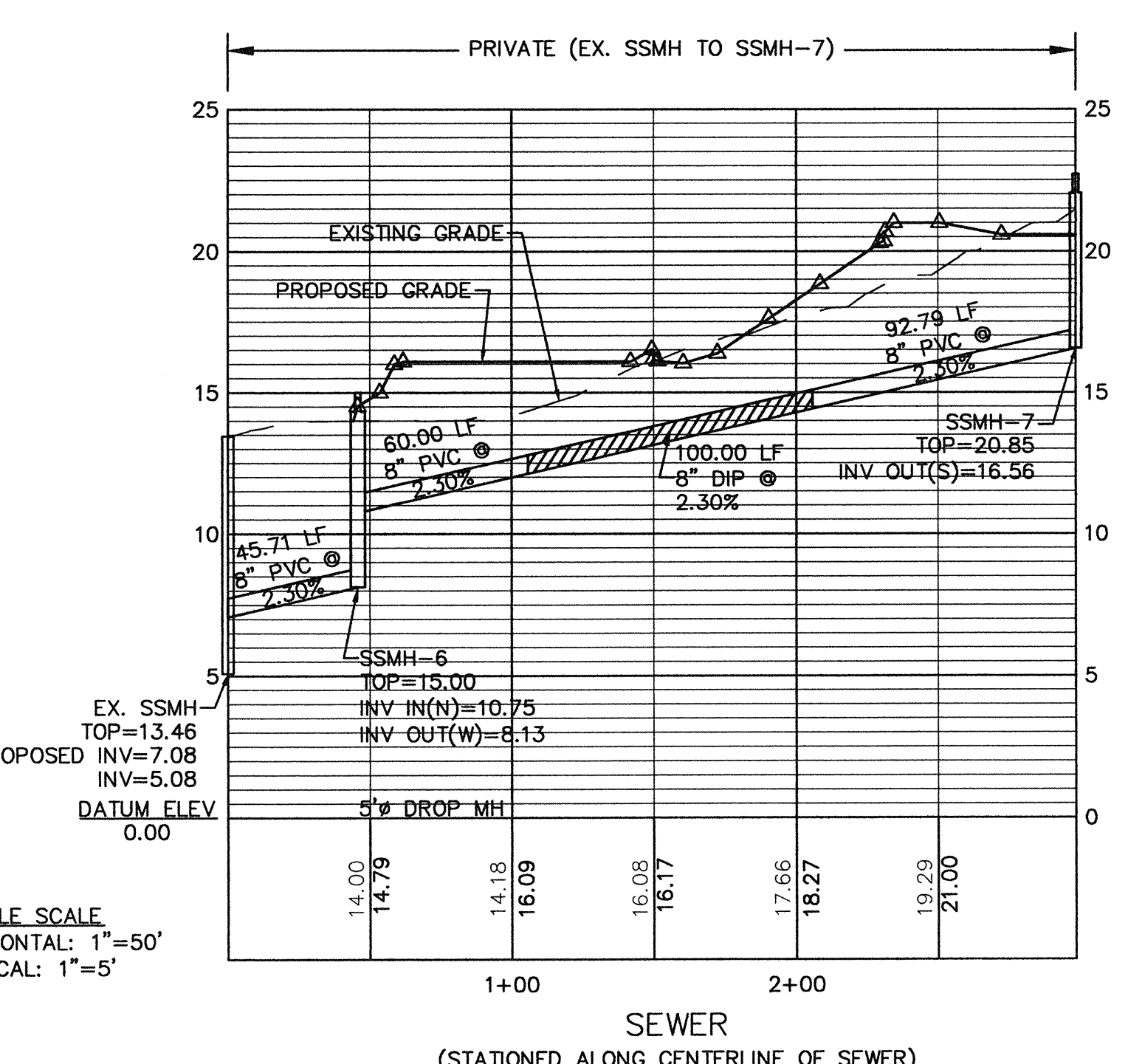
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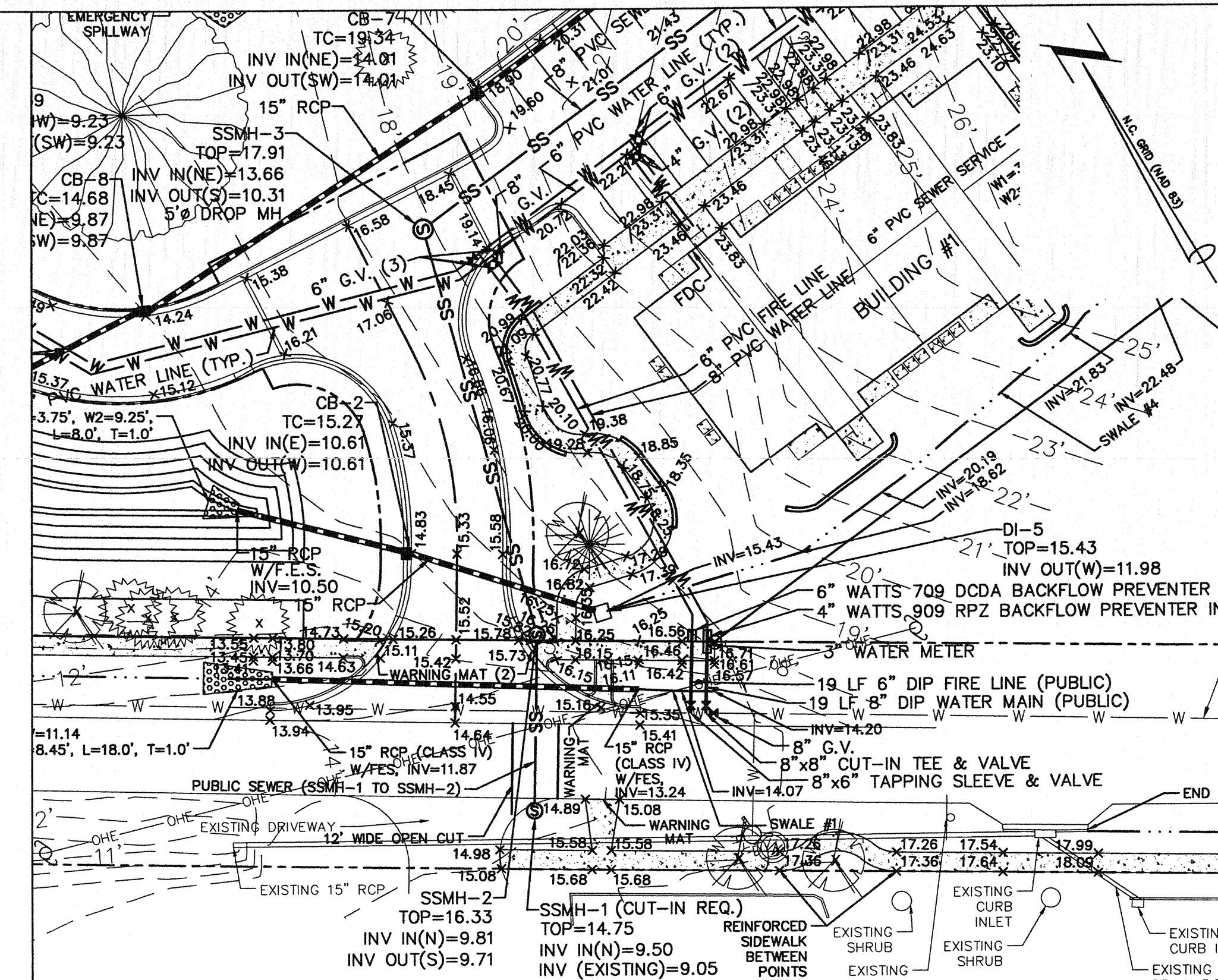
PROFILE SCALE HORIZONTAL: 1"=50' VERTICAL: 1"=5'



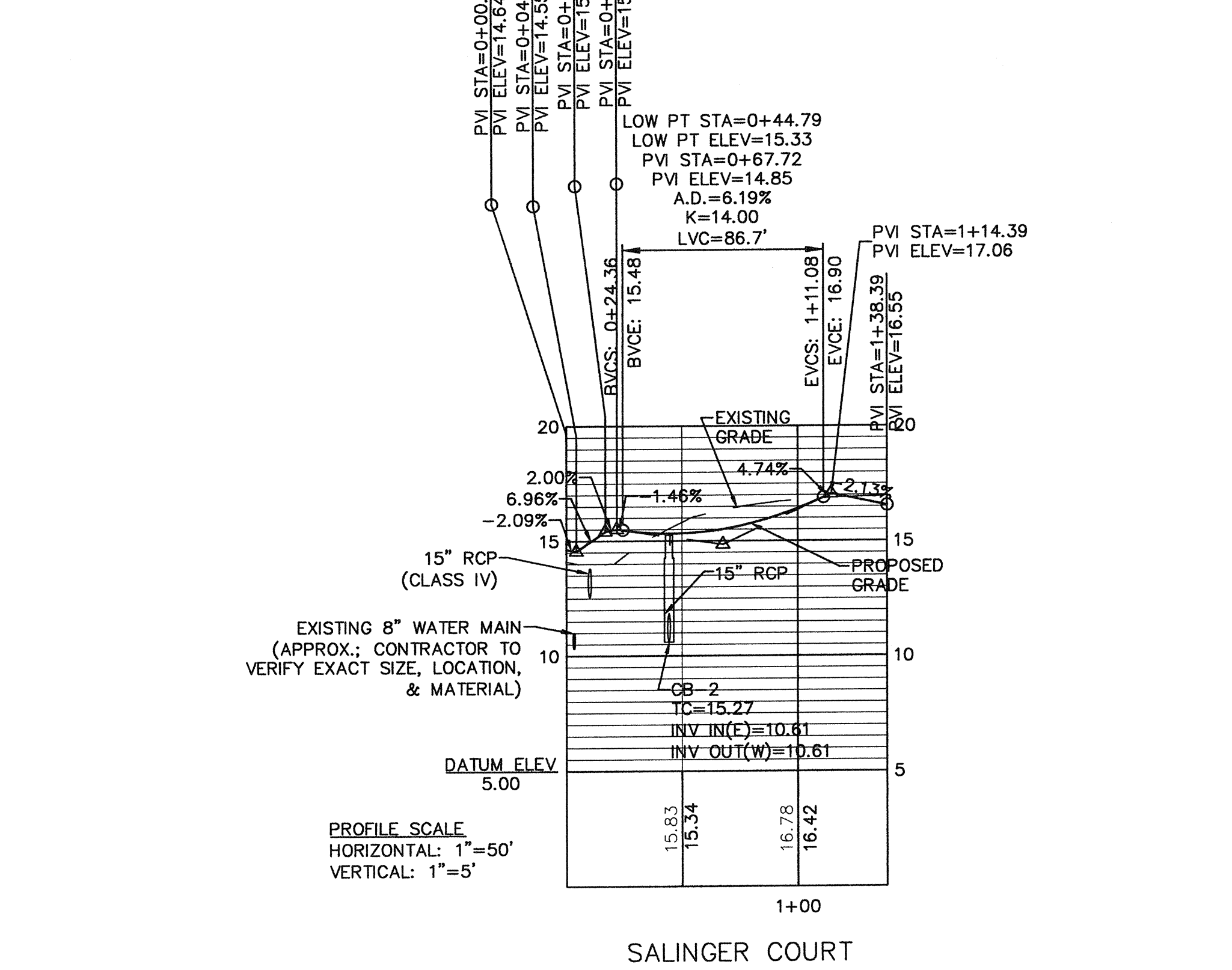
PLAN VIEW SCALE: 1"=30'



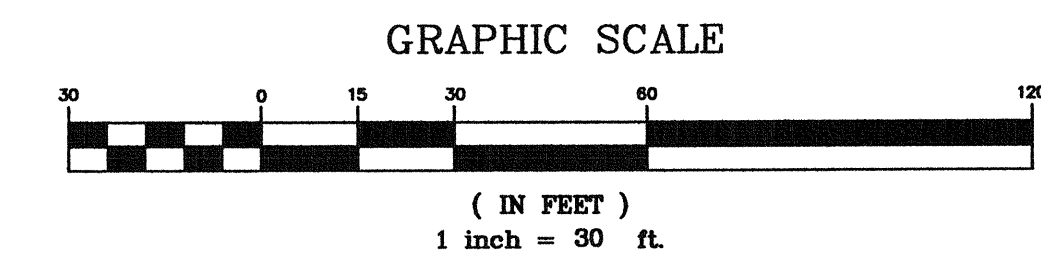
PROFILE SCALE HORIZONTAL: 1"=50' VERTICAL: 1"=5'



PLAN VIEW SCALE: 1"=30'



PROFILE SCALE HORIZONTAL: 1"=50' VERTICAL: 1"=5'



Approved Construction Plan

Planning: *[Signature]* Date: 12/19/16
 Traffic: *[Signature]* Date: 12/12/16
 Fire: *[Signature]* Date: 12/13/16

City of WILMINGTON, NORTH CAROLINA
 Public Services • Engineering Division
 APPROVED STORMWATER MANAGEMENT PLAN
 Date: 12/13/16 Permit # 2016-01027
 Signed: *[Signature]*

PLAN PROFILE
 4010 CAROLINA BEACH ROAD
ARBOR TRACE APARTMENTS
 WILMINGTON TOWNSHIP NEW HANOVER COUNTY NORTH CAROLINA

MALPASS ENGINEERING & SURVEYING, P.C.
 1134 SHEPARD BOULEVARD
 WILMINGTON, NORTH CAROLINA 28412
 Phone: 910-382-6243 Fax: 910-382-5005 License No. C-2320

Developer: ECHO FARM APARTMENTS, LLC
 10 S. CARDINAL DRIVE
 WILMINGTON, NORTH CAROLINA 28403
 Phone: 910-251-5030

DATE: 12-14-15
 SCALE: VARIES
 DRAWN: JCB
 CHECKED: JSM
 PROJECT NO: 260
 SHEET NO: 17
 OF: 22

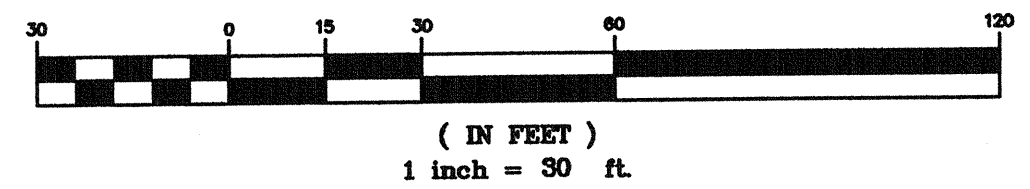
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N/F
CITY OF WILMINGTON
DB: 1272 PG: 650
PID: R06500-004-001-003
ZONING: R-15
LAND USE: UNUSED

N/F
JOANN MCKENNA TRUST
DB: 5128 PG: 2275
PID: R07007-004-001-000
ZONING: O&I-1
LAND USE: UNUSED

N/F
ECHO FARMS, LLC
DB: 2307 PG: 467
PID: R07006-002-001-000
ZONING: MF-M
LAND USE: RECREATIONAL

GRAPHIC SCALE



TREE MITIGATION PLANTINGS

SYMBOL	QTY	BOTANICAL NAME / COMMON NAME	CALIPER
☼	9	DIOSPYROS VIRGINIANA / COMMON PERSIMMON	2" (MIN.)
●	166	ILEX VOMITORIA / YAUPON HOLLY	2" (MIN.)
✱	99	PINUS PALUSTRIS / LONGLEAF PINE	PLUGS

Approved Construction Plan

Name: [Signature] Date: 12/13/16

Planning: [Signature] Date: 12/13/16

Traffic: [Signature] Date: 12/13/16

Fire: [Signature] Date: 12/13/16

WILMINGTON
NORTH CAROLINA
Public Services • Engineering Division
APPROVED STORMWATER MANAGEMENT PLAN
Date: 12/13/16 Per: [Signature]
Signed: [Signature]

ARBOR TRACE APARTMENTS

4010 CAROLINA BEACH ROAD
WILMINGTON TOWNSHIP
NEW HANOVER COUNTY
NORTH CAROLINA

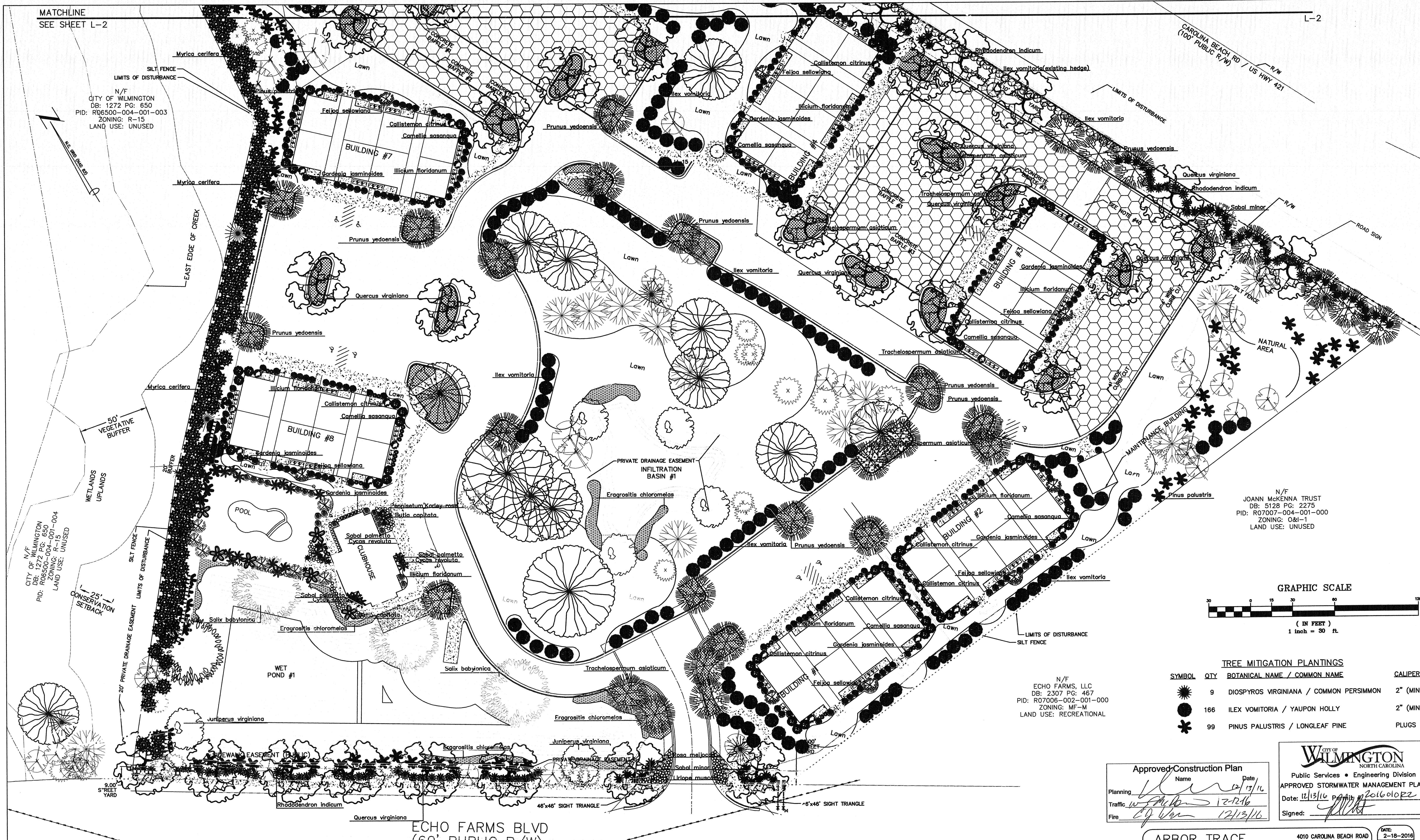
DATE: 2-18-2016
SCALE: 1"=30'
DRAWN BY: DDC
REVISION DATE: 2-23-2016
3-23-2016
5-10-2016
9-23-2016

LAND-DESIGN SOUTH
LANDSCAPE ARCHITECT-Asst
106 S. COLINA DRIVE
WIRETOWNE BEACH, N.C. 28400
910 500 8700

LANDSCAPE PLAN

Developer: ARBOR TRACE APARTMENTS, LLC
10 S. CAROLINA DRIVE
WILMINGTON, NORTH CAROLINA 28403
PHONE: 910-251-5030

SHEET NO:
L-1



ECHO FARMS BLVD
(60' PUBLIC R/W)

N/F
ECHO FARMS, LLC
DB: 2307 PG: 467
PID: R07006-002-001-000
ZONING: MF-M
LAND USE: RECREATIONAL

WETLANDS UPLANDS
50' VEGETATIVE BUFFER
15' CONSERVATION SETBACK

WET POND #1
POOL

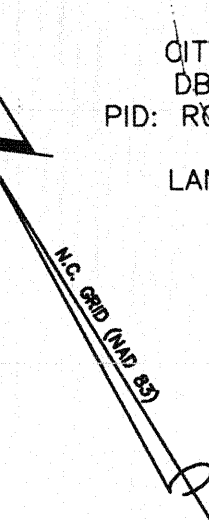
PRIVATE DRAINAGE EASEMENT
INFILTRATION BASIN #1

MAINTENANCE BUILDING

8,000' STREET YARD

46'x46' SIGHT TRIANGLE

46'x46' SIGHT TRIANGLE



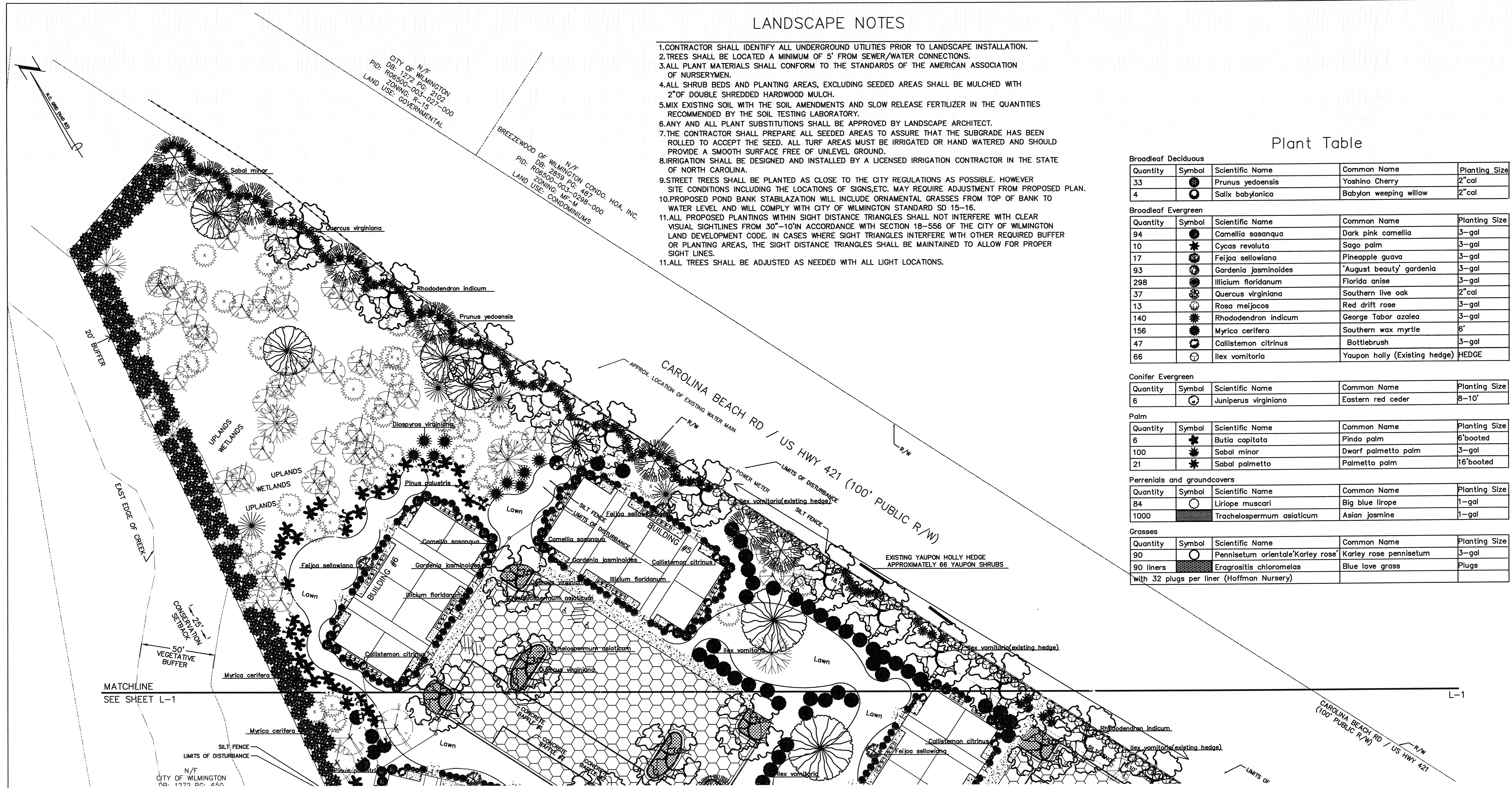
LANDSCAPE NOTES

1. CONTRACTOR SHALL IDENTIFY ALL UNDERGROUND UTILITIES PRIOR TO LANDSCAPE INSTALLATION.
2. TREES SHALL BE LOCATED A MINIMUM OF 5' FROM SEWER/WATER CONNECTIONS.
3. ALL PLANT MATERIALS SHALL CONFORM TO THE STANDARDS OF THE AMERICAN ASSOCIATION OF NURSERYMEN.
4. ALL SHRUB BEDS AND PLANTING AREAS, EXCLUDING SEEDED AREAS SHALL BE MULCHED WITH 2" OF DOUBLE SHREDDED HARDWOOD MULCH.
5. MIX EXISTING SOIL WITH THE SOIL AMENDMENTS AND SLOW RELEASE FERTILIZER IN THE QUANTITIES RECOMMENDED BY THE SOIL TESTING LABORATORY.
6. ANY AND ALL PLANT SUBSTITUTIONS SHALL BE APPROVED BY LANDSCAPE ARCHITECT.
7. THE CONTRACTOR SHALL PREPARE ALL SEEDED AREAS TO ASSURE THAT THE SUBGRADE HAS BEEN ROLLED TO ACCEPT THE SEED. ALL TURF AREAS MUST BE IRRIGATED OR HAND WATERED AND SHOULD PROVIDE A SMOOTH SURFACE FREE OF UNLEVEL GROUND.
8. IRRIGATION SHALL BE DESIGNED AND INSTALLED BY A LICENSED IRRIGATION CONTRACTOR IN THE STATE OF NORTH CAROLINA.
9. STREET TREES SHALL BE PLANTED AS CLOSE TO THE CITY REGULATIONS AS POSSIBLE. HOWEVER SITE CONDITIONS INCLUDING THE LOCATIONS OF SIGNS, ETC. MAY REQUIRE ADJUSTMENT FROM PROPOSED PLAN.
10. PROPOSED POND BANK STABILIZATION WILL INCLUDE ORNAMENTAL GRASSES FROM TOP OF BANK TO WATER LEVEL AND WILL COMPLY WITH CITY OF WILMINGTON STANDARD SD 15-16.
11. ALL PROPOSED PLANTINGS WITHIN SIGHT DISTANCE TRIANGLES SHALL NOT INTERFERE WITH CLEAR VISUAL SIGHTLINES FROM 30'-10' IN ACCORDANCE WITH SECTION 18-556 OF THE CITY OF WILMINGTON LAND DEVELOPMENT CODE. IN CASES WHERE SIGHT TRIANGLES INTERFERE WITH OTHER REQUIRED BUFFER OR PLANTING AREAS, THE SIGHT DISTANCE TRIANGLES SHALL BE MAINTAINED TO ALLOW FOR PROPER SIGHT LINES.
11. ALL TREES SHALL BE ADJUSTED AS NEEDED WITH ALL LIGHT LOCATIONS.

Plant Table

Broadleaf Deciduous				
Quantity	Symbol	Scientific Name	Common Name	Planting Size
33	●	Prunus yedoensis	Yoshino Cherry	2' cal
4	●	Salix babylonica	Babylon weeping willow	2' cal
Broadleaf Evergreen				
Quantity	Symbol	Scientific Name	Common Name	Planting Size
94	●	Camellia sasanqua	Dark pink camellia	3-gal
10	●	Cycas revoluta	Sago palm	3-gal
17	●	Feijoa sellowiana	Pineapple guava	3-gal
93	●	Gardenia jasminoides	'August beauty' gardenia	3-gal
298	●	Illicium floridanum	Florida anise	3-gal
37	●	Quercus virginiana	Southern live oak	2' cal
13	●	Rosa meijocosa	Red drift rose	3-gal
140	●	Rhododendron indicum	George Tabor azalea	3-gal
156	●	Myrica cerifera	Southern wax myrtle	6'
47	●	Callistemon citrinus	Bottlebrush	3-gal
66	●	Ilex vomitoria	Yaupon holly (Existing hedge)	HEDGE
Conifer Evergreen				
Quantity	Symbol	Scientific Name	Common Name	Planting Size
6	●	Juniperus virginiana	Eastern red cedar	8-10'
Palm				
Quantity	Symbol	Scientific Name	Common Name	Planting Size
6	●	Butia capitata	Pindo palm	6'booted
100	●	Sabal minor	Dwarf palmetto palm	3-gal
21	●	Sabal palmetto	Palmetto palm	16'booted
Perennials and groundcovers				
Quantity	Symbol	Scientific Name	Common Name	Planting Size
84	●	Liriope muscari	Big blue liriope	1-gal
1000	●	Trachelospermum asiaticum	Asian jasmine	1-gal
Grasses				
Quantity	Symbol	Scientific Name	Common Name	Planting Size
90	●	Pennisetum orientale	Karley rose	Karley rose pennisetum 3-gal
90 liners	●	Eragrostis chloromelas	Blue love grass	Plugs

with 32 plugs per liner (Hoffman Nursery)



LANDSCAPE CALCULATIONS:

TREES PER DISTURBED ACRE
 9.63 ACRES X 15 = 144.45, 144 TREES REQUIRED

STREET YARD - CAROLINA BEACH ROAD (PRIMARY FRONTAGE)
 STREET FRONTAGE = 1,103.55 FT
 REQUIRED STREET YARD = 18 X 1,103.55 = 19,863.90 SF
 PROVIDED STREET YARD = 19,937.57 SF
 IMPERVIOUS AREA = 90.51 SF
 PERCENT IMPERVIOUS = 90.51/19,937.57 X 100% = 0.46%
 REQUIRED PLANTING = 90.51/600 = 33.23, 33 CANOPY TREES (OR 3 UNDERSTORY TREES PER 1 CANOPY TREE)
 33.23 X 6 = 199.38, 199 SHRUBS
 PROVIDED PLANTING = 30 TREES & 3 EXISTING TREES TO REMAIN = 33 TREES 306 SHRUBS

STREET YARD - ECHO FARMS BLVD (SECONDARY FRONTAGE)
 STREET FRONTAGE = 489.83 = 37.53 = 432.30 FT
 REQUIRED STREET YARD = 18 X 432.30 FT = 3890.70 SF
 PROVIDED STREET YARD = 3,461.82 + 578.81 = 4,040.63 SF
 IMPERVIOUS AREA = 233.20
 PERCENT IMPERVIOUS = 233.20/4,040.63 X 100% = 5.78%
 REQUIRED PLANTING = 4,040.63/600 = 6.74, 7 CANOPY TREES (OR 3 UNDERSTORY TREES PER 1 CANOPY TREE)
 6.74 X 6 = 40.44, 40 SHRUBS
 PROVIDED PLANTING = 8 TREES & 8 EXISTING TREES TO REMAIN = 16 TREES 53 SHRUBS

INTERIOR SHADING

PARKING FACILITY AREA (PARKING LOT AREA TO BACK OF CURB (OR BACK OF SIDEWALK ADJACENT TO PARKING SPACES) MINUS LANDSCAPE ISLANDS PLUS PRIVATE STREET (INCLUDING PORTION WITHIN ECHO FARMS BLVD ROW)) = 124,085 SF
 REQUIRED INTERIOR SHADING (IS) = 0.2 X 124,085 = 24,817 SF
 PROVIDED INTERIOR SHADING (IS) = 17 LIVE OAKS @ 707 = 12,019
 15 YOSHINO CHERRY @ 707 = 10,605
 4 EXISTING HARDWOODS @ 707 = 2,828
 TOTAL (IS) = 25,452 SF

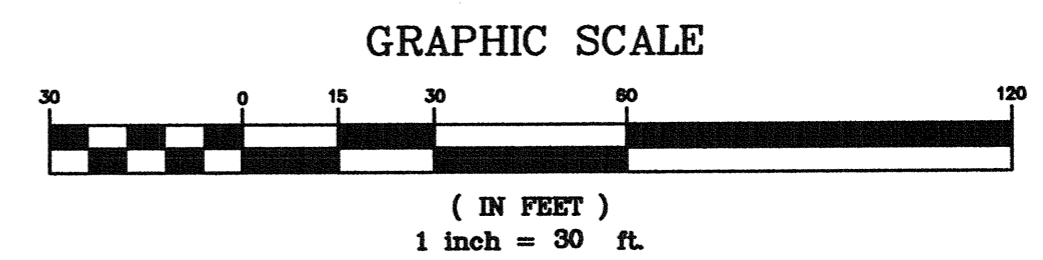
LANDSCAPE CALCULATIONS:

FOUNDATION PLANTING - FRONT OR REAR OF BUILDINGS #1-8 (PER FRONT OR REAR OF BUILDING ADJACENT TO PARKING / DRIVE AISLE) (OR BACK OF SIDEWALK ADJACENT TO PARKING SPACES)
 REQUIRED FOUNDATION PLANTING = (130.73' X 112.54') + (0.5' X 10.62' X 31.86') + (0.5' X 10.62' X 31.86') X 0.12 = 455.61 SF
 PROVIDED FOUNDATION PLANTING (BUILDINGS #1 & 3-8) = 508.48 SF
 PROVIDED FOUNDATION PLANTING (BUILDING #2) = 560.10 SF

FOUNDATION PLANTING - SIDE OF BUILDINGS #1, 2, 3, 4, 7, 8 (PER SIDE OF BUILDING ADJACENT TO PARKING / DRIVE AISLE)
 REQUIRED FOUNDATION PLANTING = [(31.44' X 51.19') + (0.5' X 12.63' X 50.53')] X 0.12 = 231.43 SF
 PROVIDED FOUNDATION PLANTINGS (BUILDINGS #1 & 2) = 262.12 SF
 PROVIDED FOUNDATION PLANTINGS (BUILDINGS #3 & 4) = 236.31 SF
 PROVIDED FOUNDATION PLANTINGS (BUILDING #7) = 267.45 SF
 PROVIDED FOUNDATION PLANTINGS (BUILDING #8) = 280.41 SF

FOUNDATION PLANTING - FRONT OF CLUBHOUSE
 REQUIRED FOUNDATION PLANTING = [(6.98' X 14.09') + (11.31' X 31.43') + (8.98' X 19.98') + (13.81' X 4.61' X 0.5) + 87.47 SF] X 0.12 = 93.69 SF
 PROVIDED FOUNDATION PLANTING = 169.84 SF

FOUNDATION PLANTING - FRONT OF MAINTENANCE BUILDING
 REQUIRED FOUNDATION PLANTING = [(10.00' X 20.00') + (0.5' X 6.67' X 20.00')] X 0.12 = 32 SF
 PROVIDED FOUNDATION PLANTING = 33.42 SF



Approved Construction Plan

Name: [Signature] Date: 12/1/16

Planning: [Signature] 12/1/16

Traffic: [Signature] 12/1/16

Fire: [Signature] 12/1/16

City of Wilmington Public Services • Engineering Division
 APPROVED STORMWATER MANAGEMENT PLAN
 Date: 12/1/16 Permit #: 201601022
 Signed: [Signature]

ARBOR TRACE APARTMENTS
 4010 CAROLINA BEACH ROAD
 WILMINGTON TOWNSHIP
 NEW HANOVER COUNTY
 NORTH CAROLINA

DATE: 2-18-2016
 SCALE: 1"=30'
 DRAWN BY: DDC

REVISION DATE:
 2-23-2016
 8-23-2016
 8-15-2016
 8-23-2016

LAND-DESIGN SOUTH
 LANDSCAPE ARCHITECT-AREA
 100 S. CORAL DRIVE
 WRIGHTSVILLE BEACH, N.C. 28440
 910 600 8789

LANDSCAPE PLAN

Developer: ARBOR TRACE APARTMENTS, LLC
 10 S. CAROLINA DRIVE
 WILMINGTON, NORTH CAROLINA 28403
 PHONE: 910-251-5030

SHEET NO:
 L-2