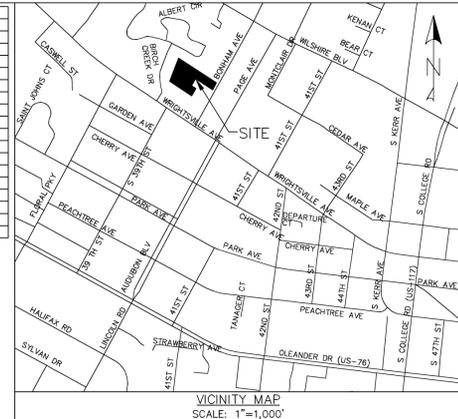
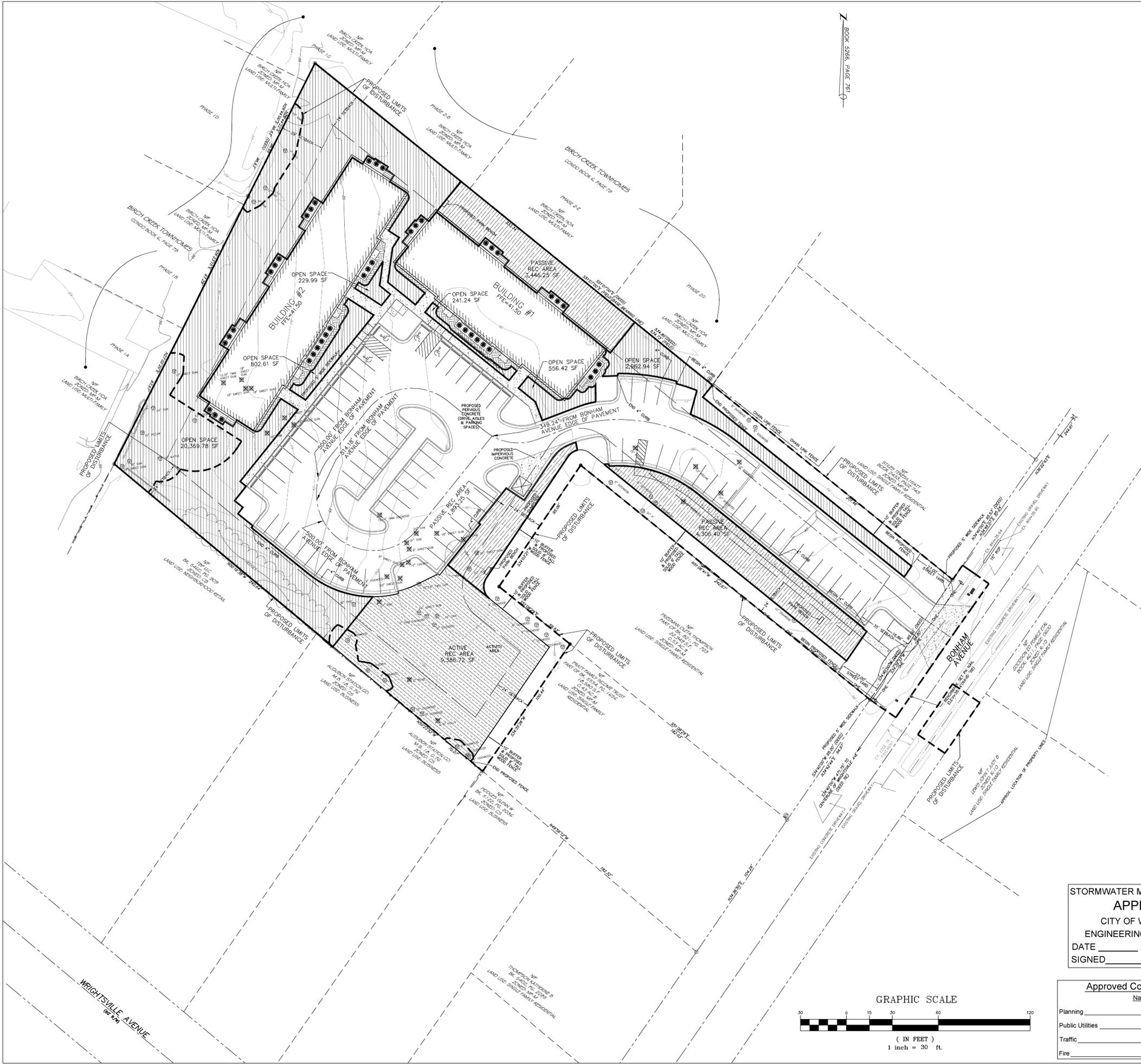


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16	WATER DETAIL SHEET
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- LEGEND**
- = EXISTING IRON PIPE
 - = SET IRON ROD
 - ⊙ = SET PK NAIL
 - ⊕ = EXISTING POWER POLE
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 - = PROPOSED SETBACK
 - = PROPOSED STREET YARD
 - ▨ = PROPOSED IMPERVIOUS CONCRETE
 - ▨ = PROPOSED FOUNDATION PLANTING
 - ▨ = PROPOSED LIMITS OF DISTURBANCE
 - ▨ = PROPOSED OPEN SPACE
 - ▨ = PROPOSED ACTIVE RECREATION (OPEN SPACE)
 - ▨ = PROPOSED PASSIVE RECREATION (OPEN SPACE)



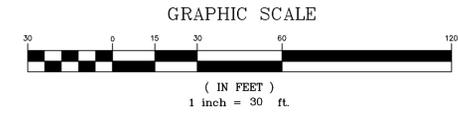
OPEN SPACE
 REQUIRED OPEN SPACE = $0.35 \times 106,955 = 37,434.25$ SF = 0.86 ACRES
 REQUIRED RECREATION AREA = $0.5 \times 37,434.25 = 18,717.13$ SF
 REQUIRED ACTIVE RECREATION AREA = $0.5 \times 18,717.13 = 9,358.57$ SF
 PROVIDED ACTIVE RECREATION AREA = 9,386.72 SF
 REQUIRED PASSIVE RECREATION AREA = $0.5 \times 18,717.13 = 9,358.57$ SF
 PROVIDED PASSIVE RECREATION AREA = 9,645.90 SF
 PROVIDED TOTAL RECREATION AREA = 19,032.62 SF
 PROVIDED OPEN SPACE = 44,195.60 SF = 1.02 ACRES (TOTAL SITE AREA MINUS STREET YARD AREAS, INTERIOR LANDSCAPING ISLANDS, FOUNDATION PLANTING AREAS, BUFFERS, IMPERVIOUS SURFACE AREAS, & WOOD DECK PATIOS)

REV. NO.	DESCRIPTION	DATE
1	REVISED PER CITY OF WILMINGTON.	3-15-13
2	REVISED PER CITY OF WILMINGTON.	4-10-13
3	REVISED PER CITY OF WILMINGTON.	4-30-13

STORMWATER MANAGEMENT PLAN
APPROVED
 CITY OF WILMINGTON
 ENGINEERING DEPARTMENT
 DATE _____ PERMIT # _____
 SIGNED _____

Approved Construction Plan

Name	Date
Planning	
Public Utilities	
Traffic	
Fire	



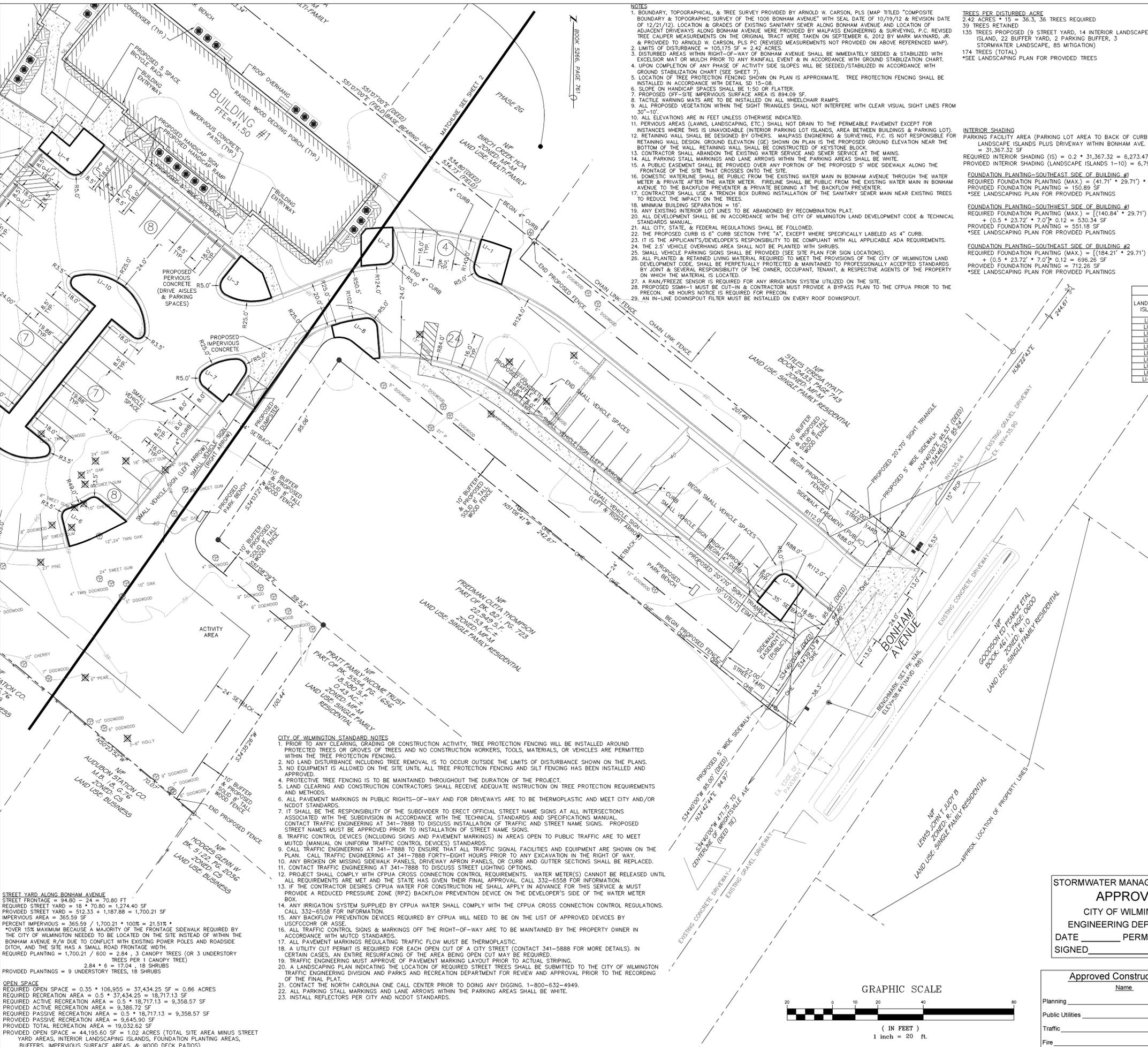
COVER SHEET
 1006 BONHAM AVENUE
BONHAM APARTMENTS
 CITY OF WILMINGTON WILMINGTON TOWNSHIP NEW HANOVER COUNTY NORTH CAROLINA

FINAL DRAWING FOR REVIEW PURPOSES ONLY

MALPASS ENGINEERING & SURVEYING, P.C.
 1134 SHIPYARD BOULEVARD
 WILMINGTON, NORTH CAROLINA 28412
 Phone 910-392-5843 License No. C-2320
 Fax 910-392-5203

Owner: 1280M LLC
 P.O. BOX 12229
 WILMINGTON, NORTH CAROLINA 28402

DATE: 2-7-13
 SCALE: 1"=30'
 DRAWN: JCB
 CHECKED: JEM
 PROJECT NO: 219
 SHEET NO: 1A
 OF: 17



- NOTES**
- BOUNDARY, TOPOGRAPHICAL, & TREE SURVEY PROVIDED BY ARNOLD W. CARSON, PLS (MAP TITLED "COMPOSITE BOUNDARY & TOPOGRAPHIC SURVEY OF THE 1006 BONHAM AVENUE" WITH SEAL DATE OF 10/19/12 & REVISION DATE OF 12/21/12). LOCATION & GRADES OF EXISTING SANITARY SEWER ALONG BONHAM AVENUE AND LOCATION OF ADJACENT DRIVEWAYS ALONG BONHAM AVENUE WERE PROVIDED BY MALPASS ENGINEERING & SURVEYING, P.C. REVISED TREE CALIPER MEASUREMENTS ON THE ORIGINAL TRACT WERE TAKEN ON SEPTEMBER 6, 2012 BY MARK MAYNARD, JR. & PROVIDED TO ARNOLD W. CARSON, PLS PC (REVISED MEASUREMENTS NOT PROVIDED ON ABOVE REVISIONED MAP).
 - LIMITS OF DISTURBANCE = 105.175 SF = 2.42 ACRES.
 - DISTURBED AREAS WITHIN RIGHT-OF-WAY OF BONHAM AVENUE SHALL BE IMMEDIATELY SEEDED & STABILIZED WITH EXCELISOR MAT OR MULCH PRIOR TO ANY RAINFALL EVENT & IN ACCORDANCE WITH GROUND STABILIZATION CHART.
 - UPON COMPLETION OF ANY PHASE OF ACTIVITY SIDE SLOPES WILL BE SEEDED/STABILIZED IN ACCORDANCE WITH GROUND STABILIZATION CHART (SEE SHEET 7).
 - LOCATION OF TREE PROTECTION FENCING SHOWN ON PLAN IS APPROXIMATE. TREE PROTECTION FENCING SHALL BE INSTALLED IN ACCORDANCE WITH DETAIL SE 15-08.
 - SLOPE ON HANDICAP SPACES SHALL BE 1:50 OR FLATTER.
 - PROPOSED OFF-SITE IMPERVIOUS SURFACE AREA IS 894.09 SF.
 - TACTILE WARNING MATS ARE TO BE INSTALLED ON ALL WHEELCHAIR RAMP.
 - ALL PROPOSED VEGETATION WITHIN THE SIGHT TRIANGLES SHALL NOT INTERFERE WITH CLEAR VISUAL SIGHT LINES FROM 30'-10'.
 - ALL ELEVATIONS ARE IN FEET UNLESS OTHERWISE INDICATED.
 - PERVIOUS AREAS (LAWNS, LANDSCAPING, ETC.) SHALL NOT DRAIN TO THE PERMEABLE PAVEMENT EXCEPT FOR INSTANCES WHERE THIS IS UNAVOIDABLE (INTERIOR PARKING LOT ISLANDS, AREA BETWEEN BUILDINGS & PARKING LOT).
 - RETAINING WALL SHALL BE DESIGNED BY OTHERS. MALPASS ENGINEERING & SURVEYING, P.C. IS NOT RESPONSIBLE FOR RETAINING WALL DESIGN. GROUND ELEVATION (GE) SHOWN ON PLAN IS THE PROPOSED GROUND ELEVATION NEAR THE BOTTOM OF THE WALL. RETAINING WALL SHALL BE CONSTRUCTED OF KEYSTONE BLOCK.
 - CONTRACTOR SHALL ABANDON THE EXISTING WATER SERVICE AND SEWER SERVICE AT THE MAINS.
 - ALL PARKING STALL MARKINGS AND LANE ARROWS WITHIN THE PARKING AREAS SHALL BE WHITE.
 - 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.
 - DOMESTIC WATERLINE SHALL BE PUBLIC FROM THE EXISTING WATER MAIN IN BONHAM AVENUE THROUGH THE WATER METER & PRIVATE AFTER THE WATER METER. FIRELINE SHALL BE PUBLIC FROM THE EXISTING WATER MAIN IN BONHAM AVENUE TO THE BACKFLOW PREVENTER & PRIVATE BEGINNING AT THE BACKFLOW PREVENTER.
 - CONTRACTOR SHALL USE A TRENCH BOX DURING INSTALLATION OF THE SANITARY SEWER MAIN NEAR EXISTING TREES TO REDUCE THE IMPACT ON THE TREES.
 - MINIMUM BUILDING SEPARATION = 16'.
 - ANY EXISTING INTERIOR LINES TO BE ABANDONED BY RECOMBINATION PLAN.
 - ALL DEVELOPMENT SHALL BE IN ACCORDANCE WITH THE CITY OF WILMINGTON LAND DEVELOPMENT CODE & TECHNICAL STANDARDS MANUAL.
 - ALL CITY, STATE, & FEDERAL REGULATIONS SHALL BE FOLLOWED.
 - THE PROPOSED CURB IS 6" CURB SECTION TYPE "A", EXCEPT WHERE SPECIFICALLY LABELED AS 4" CURB.
 - IT IS THE APPLICANT'S/DEVELOPER'S RESPONSIBILITY TO BE COMPLIANT WITH ALL APPLICABLE ADA REQUIREMENTS.
 - THE 2.5' VEHICLE OVERHANG AREA SHALL NOT BE PLANTED WITH SHRUBS.
 - SMALL VEHICLE PARKING SIGNS SHALL BE PROVIDED (SEE SITE PLAN FOR SIGN LOCATIONS).
 - ALL PLANTED & RETAINED VEGETATION REQUIRED TO MEET THE PROVISIONS OF THE CITY OF WILMINGTON LAND DEVELOPMENT CODE, SHALL BE PERPETUALLY 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.
 - A RAIN/FREEZE SENSOR IS REQUIRED FOR ANY IRRIGATION SYSTEM UTILIZED ON THE SITE.
 - PROPOSED SSM-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.
 - AN IN-LINE DOWNSPOUT FILTER MUST BE INSTALLED ON EVERY ROOF DOWNSPOUT.

TREES PER DISTURBED ACRE
 2.42 ACRES * 15 = 36.3, 36 TREES REQUIRED
 39 TREES RETAINED
 135 TREES PROPOSED (9 STREET YARD, 14 INTERIOR LANDSCAPE ISLAND, 22 BUFFER YARD, 2 PARKING BUFFER, 3 STORMWATER LANDSCAPE, 85 MITIGATION)
 174 TREES (TOTAL)
 *SEE LANDSCAPING PLAN FOR PROVIDED TREES

INTERIOR SHADING
 PARKING FACILITY AREA (PARKING LOT AREA TO BACK OF CURB MINUS LANDSCAPE ISLANDS PLUS DRIVEWAY WITHIN BONHAM AVE. R/W) = 31,567.32 SF
 REQUIRED INTERIOR SHADING (IS) = 0.2 * 31,567.32 = 6,273.47 SF
 PROVIDED INTERIOR SHADING (LANDSCAPE ISLANDS 1-10) = 6,797 SF

FOUNDATION PLANTING—SOUTHWEST SIDE OF BUILDING #1
 REQUIRED FOUNDATION PLANTING (MAX.) = [(140.84' * 29.71') + (70.09' * 2.17') + (0.5 * 23.72' * 7.0')] * 0.12 = 148.71 SF
 PROVIDED FOUNDATION PLANTING = 150.89 SF
 *SEE LANDSCAPING PLAN FOR PROVIDED PLANTINGS

FOUNDATION PLANTING—SOUTHWEST SIDE OF BUILDING #1
 REQUIRED FOUNDATION PLANTING (MAX.) = [(140.84' * 29.71') + (70.09' * 2.17') + (0.5 * 23.72' * 7.0')] * 0.12 = 148.71 SF
 PROVIDED FOUNDATION PLANTING = 150.89 SF
 *SEE LANDSCAPING PLAN FOR PROVIDED PLANTINGS

FOUNDATION PLANTING—SOUTHWEST SIDE OF BUILDING #2
 REQUIRED FOUNDATION PLANTING (MAX.) = [(184.21' * 29.71') + (113.46' * 2.17') + (0.5 * 23.72' * 7.0')] * 0.12 = 696.26 SF
 PROVIDED FOUNDATION PLANTING = 712.26 SF
 *SEE LANDSCAPING PLAN FOR PROVIDED PLANTINGS

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LEGEND

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- = SET IRON ROD
- ⦿ = SET PK NAIL
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- ⊕ = EXISTING WATER METER
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- = PROPOSED STREET YARD
- = PROPOSED IMPERVIOUS CONCRETE
- = PROPOSED FOUNDATION PLANTING

INTERIOR LANDSCAPING ISLANDS

LANDSCAPE ISLAND	TOTAL AREA (SF)	IMPERVIOUS AREA (SF)	PERCENT IMPERVIOUS	INTERIOR SHADING (SF)
LI-1	217.17	0	0	354
LI-2	217.86	0	0	354
LI-3	284.49	0	0	707
LI-4	312.76	0	0	354
LI-5	285.65	0	0	354
LI-6	351.90	0	0	707
LI-7	244.73	0	0	707
LI-8	217.76	0	0	157
LI-9	220.36	0	0	354
LI-10	1,466.02	0	0	2,749

SITE DATA
 PROPERTY OWNER: 12BMM LLC
 PROJECT ADDRESS: 1006 BONHAM AVENUE
 PIN NUMBER: R05514-001-022-000, PART OF R05514-001-021-000, PART OF R05514-001-020-000
 ZONING DISTRICT: M-10
 FLOOD AREA: THIS LOT IS LOCATED IN ZONES "X" ACCORDING TO THE FEDERAL EMERGENCY MANAGEMENT AGENCY'S FLOOD INSURANCE RATE MAP, MAP NUMBER 3720313700 J, DATED: 4-3-06 (PER ARNOLD W. CARSON, PLS)
 BUILDING SETBACKS, REQUIRED: FRONT-35', REAR-29', INTERIOR SIDE-24', CORNER LOT SIDE-34' (ADDITIONAL 4' REAR & BUILDING SETBACKS, PROPOSED: FRONT-272.66', REAR-29.5', INTERIOR SIDE-25.5')
 SITE AREA: 106,955 SF = 2.46 ACRES ±
 EXISTING BUILDING AREA: 1,911.65 SF = 0.05 ACRES
 EXISTING BUILDING LOT COVERAGE: 1,911.65 / 106,955 * 100% = 1.79%
 PROPOSED BUILDING AREA (FOOTPRINT EXCLUDING PATIOS): 13,862.85 SF = 0.32 ACRES
 PROPOSED BUILDING LOT COVERAGE: 13,862.85 / 106,955 * 100% = 12.97%
 ALLOWABLE MAXIMUM BUILDING HEIGHT (BASED ON REQUIRED SETBACK USED): 45'
 PROPOSED BUILDING HEIGHT (AVG. EX. GROUND ELEV. TO HALFWAY BETWEEN HIGHEST PEAK & EAVE): 41.14' (BLDG #1) & 44.63' (BLDG #2)
 NUMBER OF EXISTING BUILDINGS: 2
 NUMBER OF PROPOSED BUILDINGS: 2 (42 UNITS TOTAL)
 BUILDING SIZE:

BUILDING	SQUARE FOOTAGE (1ST STORY)	SQUARE FOOTAGE (2ND STORY)	SQUARE FOOTAGE (3RD STORY)	NUMBER OF UNITS	NUMBER OF ONE BEDROOM UNITS	NUMBER OF TWO BEDROOM UNITS	NUMBER OF THREE BEDROOM UNITS	EXISTING / PROPOSED
HOUSE	1,510.02	N/A	N/A	N/A	N/A	N/A	N/A	EXISTING (TO BE REMOVED)
SHED	401.83	N/A	N/A	N/A	N/A	N/A	N/A	EXISTING (TO BE REMOVED)
1	5,990.73	5,990.73	6,020.85	18	6	6	6	PROPOSED
2	7,872.12	7,872.12	7,902.24	24	6	12	6	PROPOSED

TOTAL AMOUNT & PERCENT OF IMPERVIOUS SURFACE AREAS ON-SITE:

BEFORE DEVELOPMENT		AFTER DEVELOPMENT	
BUILDINGS	AREA (SF) % OF SITE	EX. (SF) PROPOSED (SF)	TOTAL (SF) % OF SITE
BUILDINGS (INCLUDES ROOF OVERHANG)	1,911.65 1.79	0	15,008.86 15,008.86 14.03
PAVEMENT	977.90 0.91	0	3,606.29 3,606.29 3.37
PERVIOUS PAVEMENT (AFTER 75% CREDIT)	2,889.55 2.70	0	6,762.39 6,762.39 6.33
SIDEWALK		0	3,547.29 3,547.29 3.32
OTHER (CONCRETE PATIOS & CONDENSERS)		0	1,164.60 1,164.60 1.09
TOTAL		0	30,089.43 30,089.43 28.14

OFF STREET PARKING CALCULATIONS:
 MIN. PARKING REQ. (RESIDENTIAL) = [1.5 x 12] (1 BDRM) + [2 x 18] (2 BDRM) + [2.25 x 12] (3 BDRM) = 81 SPACES
 MAX. PARKING REQ. (RESIDENTIAL) = 2.5 x 42 = 105 SPACES
 NUMBER OF PROPOSED PARKING SPACES = 84 (20 SPACES ARE SMALL VEHICLE SPACES)
 MAX. NUMBER OF ALLOWABLE SMALL VEHICLE SPACES = 0.25 x 81 = 20 SPACES
 MIN. NUMBER OF REQ. HANDICAPPED SPACES PER ADA STANDARDS FOR ACCESSIBLE DESIGN = 4 SPACES
 NUMBER OF PROPOSED HANDICAPPED SPACES = 4 SPACES
 NUMBER OF REQ. BICYCLE PARKING SPACES = 10 SPACES
 NUMBER OF PROPOSED BICYCLE PARKING SPACES = 10 SPACES
 THIS SITE IS NOT WITHIN A SPECIAL HIGHWAY OVERLAY DISTRICT OR ANY OTHER ZONING OVERLAY DISTRICT PER THE CITY OF WILMINGTON ZONING MAP (MAP 313-3, DATED: 11/11/13).
 CAMA LAND USE CLASSIFICATION PER THE 2006 CAMA PLAN UPDATE LAND CLASSIFICATION MAP IS URBAN.

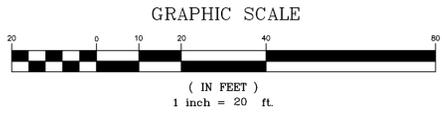
- CITY OF WILMINGTON STANDARD NOTES**
- PRIOR TO ANY CLEARING, GRADING OR CONSTRUCTION ACTIVITY, TREE PROTECTION FENCING WILL BE INSTALLED AROUND PROTECTED TREES OR GROVES OF TREES AND NO CONSTRUCTION WORKERS, TOOLS, MATERIALS, OR VEHICLES ARE PERMITTED WITHIN THE TREE PROTECTION FENCING.
 - NO LAND 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 AND APPROVED.
 - PROTECTIVE TREE FENCING IS TO BE MAINTAINED THROUGHOUT THE DURATION OF THE PROJECT.
 - LAND CLEARING AND CONSTRUCTION CONTRACTORS SHALL RECEIVE ADEQUATE INSTRUCTION ON TREE PROTECTION REQUIREMENTS AND METHODS.
 - ALL PAVEMENT MARKINGS IN PUBLIC RIGHTS-OF-WAY AND FOR DRIVEWAYS ARE TO BE THERMOPLASTIC AND 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. CALL TRAFFIC ENGINEERING AT 341-7888 FORTY-EIGHT HOURS PRIOR TO ANY EXCAVATION IN THE RIGHT OF WAY.
 - 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 REQUIREMENTS. 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 USFCOCHR 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 NORTH CAROLINA ONE CALL CENTER PRIOR TO DOING ANY DIGGING. 1-800-632-4949.
 - ALL PARKING STALL MARKINGS AND LANE ARROWS WITHIN THE PARKING AREAS SHALL BE WHITE.
 - INSTALL REFLECTORS PER CITY AND NCDOT STANDARDS.

STREET YARD ALONG BONHAM AVENUE
 STREET FRONTAGE = 94.80 - 24 = 70.80 FT
 REQUIRED STREET YARD = 18 * 70.80 = 1,274.40 SF
 PROVIDED STREET YARD = 512.33 + 1,187.88 = 1,700.21 SF
 IMPERVIOUS AREA = 365.59 SF
 PERCENT IMPERVIOUS = 365.59 / 1,700.21 * 100% = 21.51%
 *OVER 15% MAXIMUM BECAUSE A MAJORITY OF THE FRONTAGE SIDEWALK REQUIRED BY THE CITY OF WILMINGTON NEEDED TO BE LOCATED ON THE SITE INSTEAD OF WITHIN THE BONHAM AVENUE R/W DUE TO CONFLICT WITH EXISTING POWER POLES AND ROADSIDE DITCH, AND THE SITE HAS A SMALL ROAD FRONTAGE WIDTH.
 REQUIRED PASSIVE RECREATION AREA = 0.5 * 18,717.13 = 9,358.57 SF
 PROVIDED PASSIVE RECREATION AREA = 9,645.90 SF
 PROVIDED TOTAL RECREATION AREA = 19,032.62 SF
 PROVIDED OPEN SPACE = 44,195.60 SF = 1.02 ACRES (TOTAL SITE AREA MINUS STREET YARD AREAS, INTERIOR LANDSCAPING ISLANDS, FOUNDATION PLANTING AREAS, BUFFERS, IMPERVIOUS SURFACE AREAS, & WOOD DECK PATIOS)

STORMWATER MANAGEMENT PLAN
APPROVED
 CITY OF WILMINGTON
 ENGINEERING DEPARTMENT
 DATE _____ PERMIT # _____
 SIGNED _____

Approved Construction Plan

Name	Date
Planning	
Public Utilities	
Traffic	
Fire	

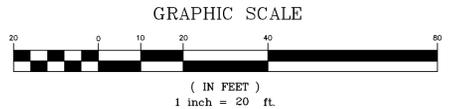
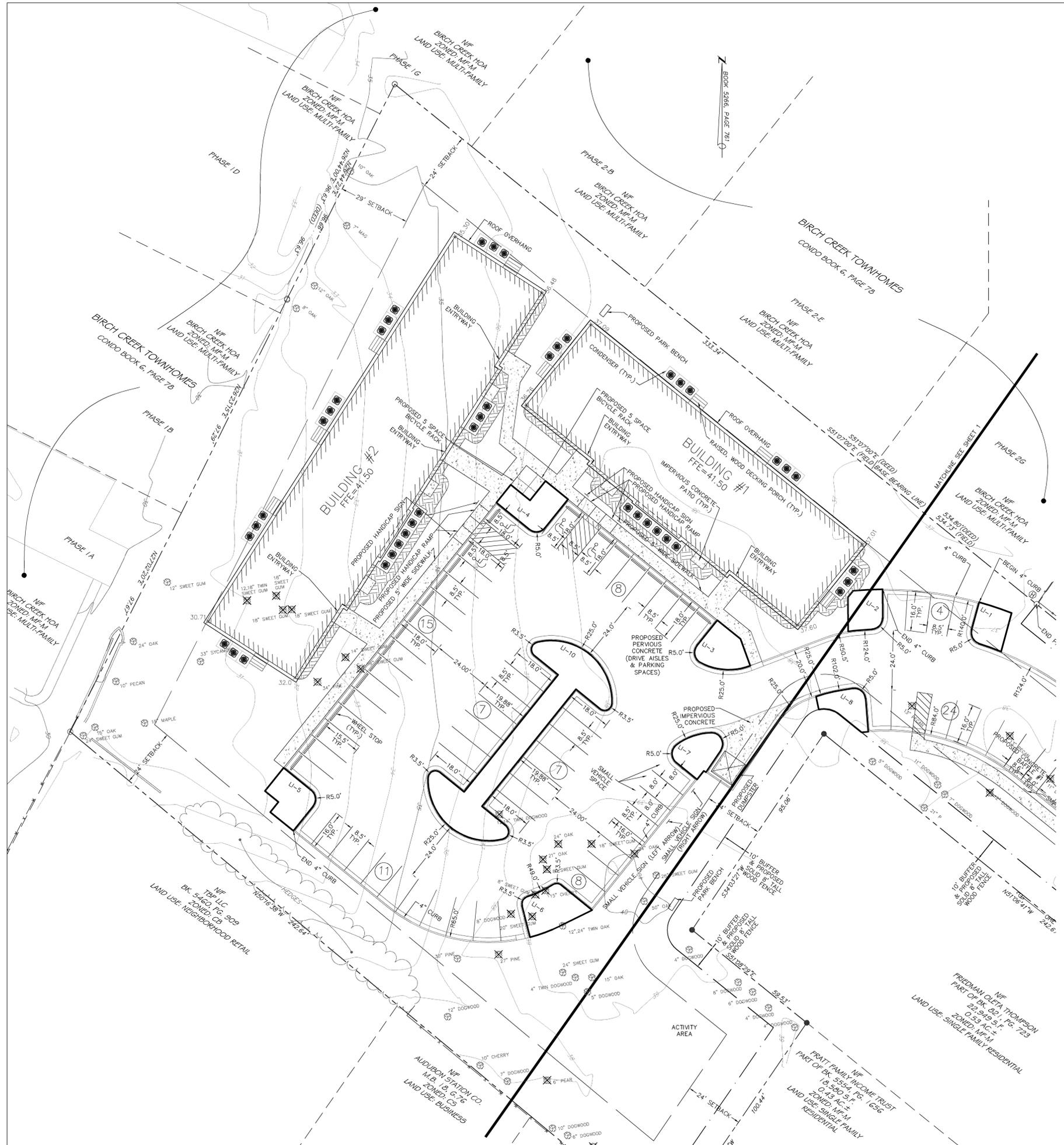
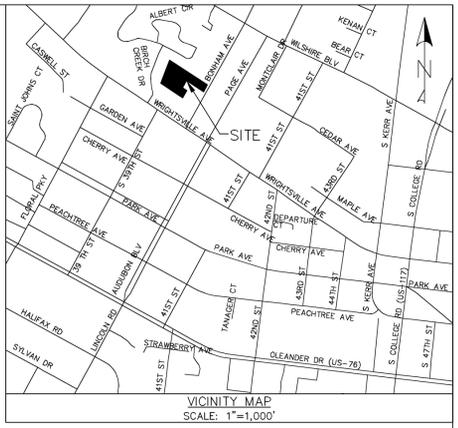


BONHAM APARTMENTS
 CITY OF WILMINGTON WILMINGTON TOWNSHIP NEW HANOVER COUNTY NORTH CAROLINA

MALPASS ENGINEERING & SURVEYING, P.C.
 1134 SHIPYARD BOULEVARD
 WILMINGTON, NORTH CAROLINA 28412
 Phone 910-392-5843
 Fax 910-392-5203 License No. C-2380

Owner: 12BMM LLC
 P.O. BOX 1229
 WILMINGTON, NORTH CAROLINA 28402

DATE: 1-7-13
SCALE: 1"=20'
DRAWN: JCB
CHECKED: JEM
PROJECT NO.: 219
SHEET NO.: 1
OF: 17



REV. NO.	DESCRIPTION	DATE
1	REVISED TO ADJUST LAYOUT.	1-11-13
2	REVISED PER CITY OF WILMINGTON.	3-15-13
3	REVISED PER CITY OF WILMINGTON.	4-19-13
4	REVISED PER CITY OF WILMINGTON.	4-30-13

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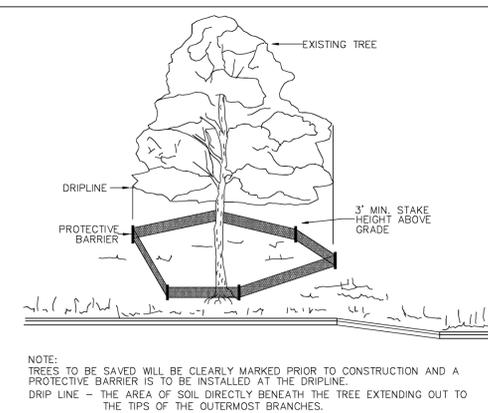
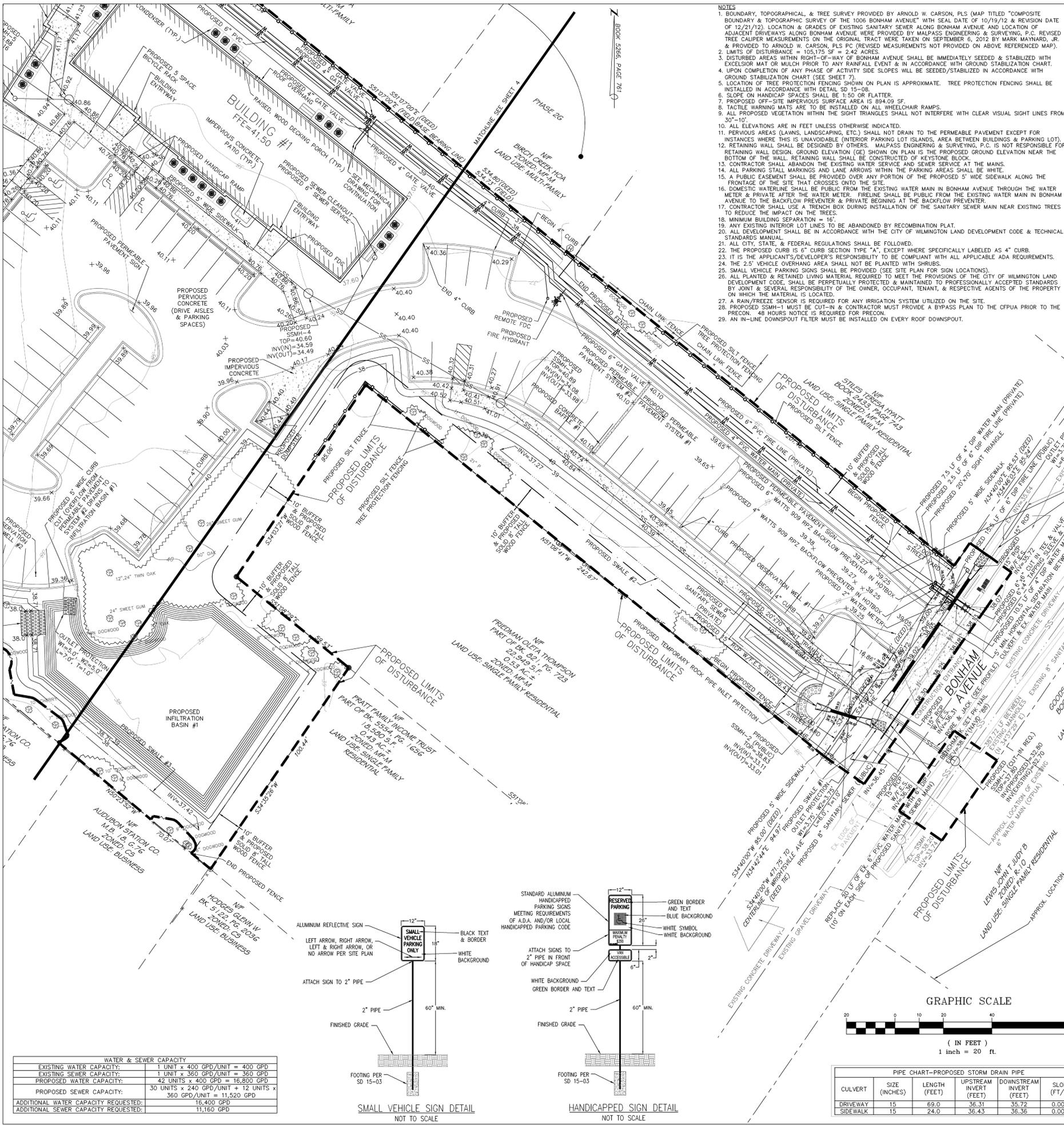
SITE PLAN
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 CITY OF WILMINGTON WILMINGTON TOWNSHIP NEW HANOVER COUNTY NORTH CAROLINA

FINAL DRAWING FOR REVIEW PURPOSES ONLY

MALPASS ENGINEERING & SURVEYING, P.C.
 1134 SHIPYARD BOULEVARD
 WILMINGTON, NORTH CAROLINA 28412
 Phone 910-392-5843 License No. C-2320
 Fax 910-392-5203

Owner: 1288M LLC
 P.O. BOX 1229
 WILMINGTON, NORTH CAROLINA 28402

DATE: 1-7-13
 SCALE: 1"=20'
 DRAWN: JCB
 CHECKED: JEM
 PROJECT NO: 219
 SHEET NO: **2**
 OF: **17**

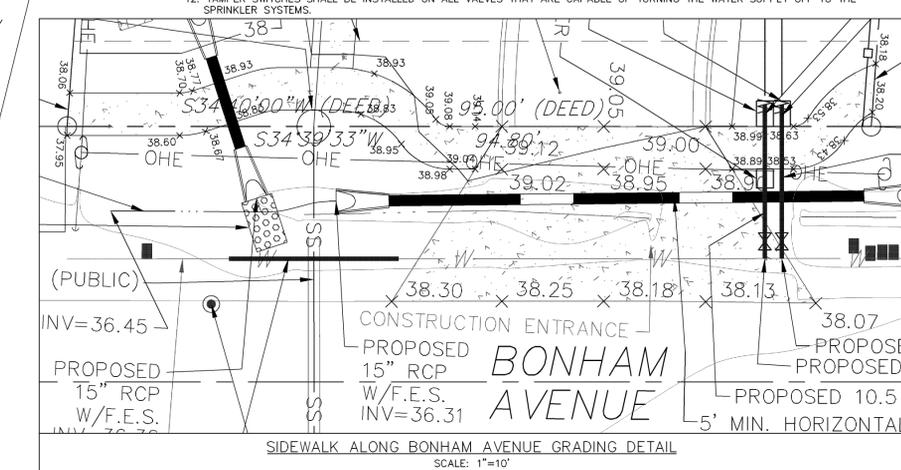
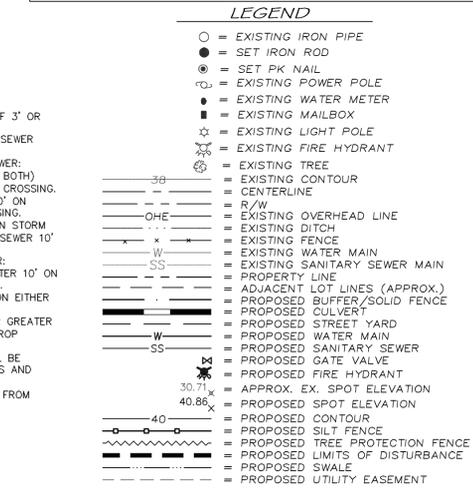
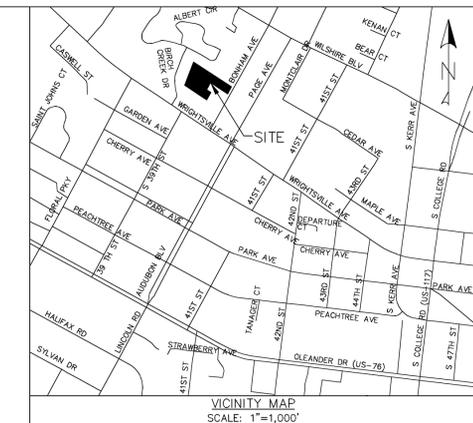


METHOD OF TREE PROTECTION DURING CONSTRUCTION
SD 15-08
NOT TO SCALE

- 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. WATER OVER SANITARY SEWER: >18" 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. A 24" VERTICAL SEPARATION SHALL BE PROVIDED BETWEEN STORM SEWER AND SANITARY SEWER OR USE D.I.P. ON SANITARY SEWER 10' ON EITHER SIDE OF CROSSING.
 6. VERTICAL SEPARATION BETWEEN WATER AND STORM SEWER: WATER OVER STORM SEWER: >18" 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.
 7. ALL SANITARY SEWER MANHOLES WITH A DROP OF 30" OR GREATER SHALL HAVE AN INSIDE DIAMETER OF 5' WITH AN INSIDE DROP STRUCTURE.
 8. 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).
 9. SANITARY SEWER MANHOLES MUST BE GREATER THAN 50' FROM WETLANDS, AS MEASURED TO THE CLOSEST OUTSIDE EDGE.

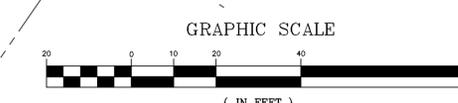
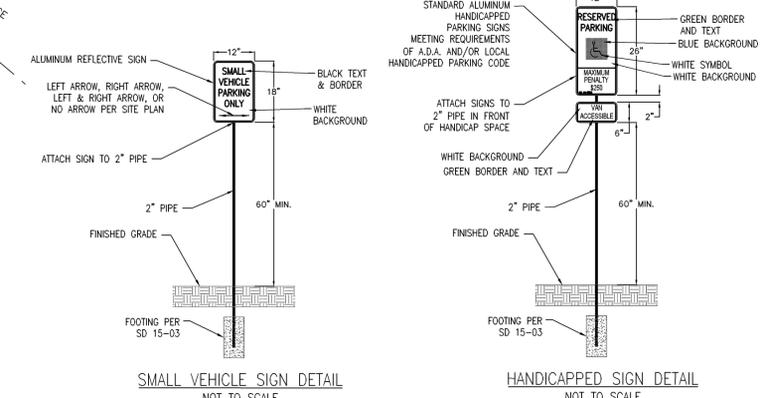
FIRE AND LIFE SAFETY NOTES

1. 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.
2. FIRE HYDRANTS CANNOT BE FURTHER THAN 8' FROM THE CURB.
3. NEW HYDRANTS MUST BE BROUGHT INTO SERVICE PRIOR TO COMBUSTIBLE MATERIALS BEING DELIVERED TO THE JOB SITE.
4. ALL WEATHER ACCESS ROADS MUST BE MAINTAINED AROUND CONSTRUCTION SITE AT ALL TIMES.
5. PRIVATE UNDERGROUND FIRE LINES REQUIRE A SEPARATE UNDERGROUND FIRE LINE PERMIT FROM THE WILMINGTON FIRE & LIFE SAFETY DIVISION AT 910-343-0696.
6. A MINIMUM OF 5' SMALL SEPARATE UNDERGROUND FIRE LINES OR PRIVATE WATER MAINS FROM OTHER UNDERGROUND UTILITIES.
7. FDC'S CAN BE NO FURTHER THAN 150' FROM A FIRE HYDRANT.
8. FDC'S CAN BE NO FURTHER THAN 40' FROM FIRE DEPARTMENT VEHICLE PLACEMENT.
9. BUILDING CONSTRUCTION TYPE ACCORDING TO THE INTERNATIONAL BUILDING CODE IS V-B.
10. HYDRANTS SHALL BE OF SUFFICIENT NUMBERS TO ACCOMMODATE BASE FLOW REQUIREMENTS OF STRUCTURE.
11. IN ADDITION TO THE STANDARD COMMENTS, ADDITIONAL FIRE PROTECTION AND ACCESSIBILITY REQUIREMENTS MAY BE REQUIRED DUE TO ANY SPECIAL CIRCUMSTANCES CONCERNING THE PROJECT.
12. TAMPER SWITCHES SHALL BE INSTALLED ON ALL VALVES THAT ARE CAPABLE OF TURNING THE WATER SUPPLY OFF TO THE SPRINKLER SYSTEMS.



WATER & SEWER CAPACITY

EXISTING WATER CAPACITY:	1 UNIT x 400 GPD/UNIT = 400 GPD
EXISTING SEWER CAPACITY:	1 UNIT x 360 GPD/UNIT = 360 GPD
PROPOSED WATER CAPACITY:	42 UNITS x 400 GPD = 16,800 GPD
PROPOSED SEWER CAPACITY:	30 UNITS x 240 GPD/UNIT + 12 UNITS x 360 GPD/UNIT = 11,520 GPD
ADDITIONAL WATER CAPACITY REQUESTED:	16,400 GPD
ADDITIONAL SEWER CAPACITY REQUESTED:	11,160 GPD



PIPE CHART-PROPOSED STORM DRAIN PIPE

CULVERT	SIZE (INCHES)	LENGTH (FEET)	UPSTREAM INVERT (FEET)	DOWNSTREAM INVERT (FEET)	SLOPE (FT/FT)
DRIVEWAY	15	69.0	36.31	35.72	0.0086
SIDEWALK	15	24.0	36.43	36.36	0.0029

STORMWATER MANAGEMENT PLAN
APPROVED
CITY OF WILMINGTON
ENGINEERING DEPARTMENT
DATE _____ PERMIT # _____
SIGNED _____

Approved Construction Plan
Name _____ Date _____
Planning _____
Public Utilities _____
Traffic _____
Fire _____

1 REVISED TO ADJUST LAYOUT 1-11-13
2 REVISED PER CITY OF WILMINGTON 2-15-13
3 REVISED PER CITY OF WILMINGTON 4-18-13
4 REVISED PER CITY OF WILMINGTON 4-30-13

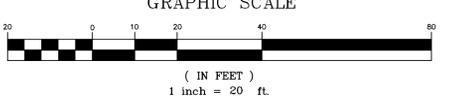
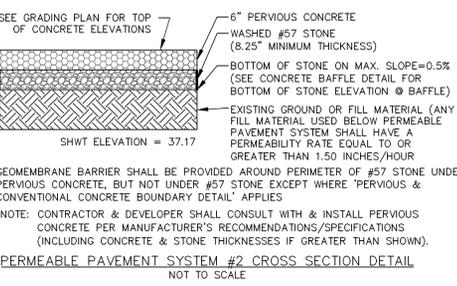
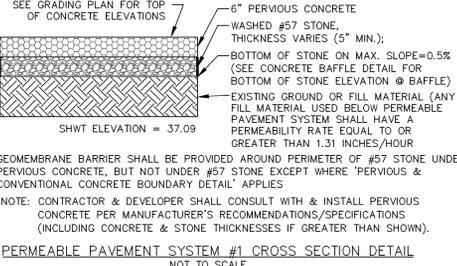
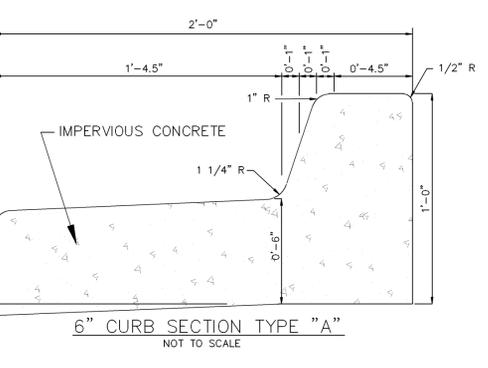
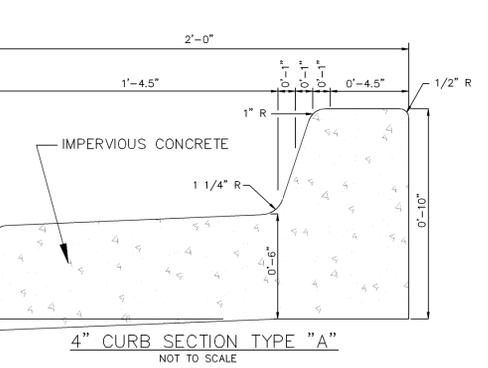
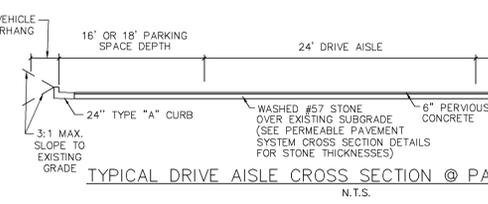
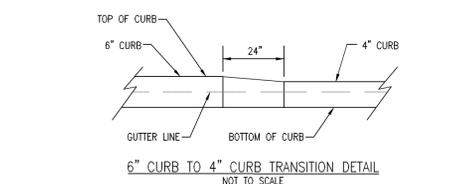
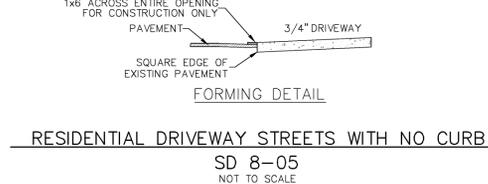
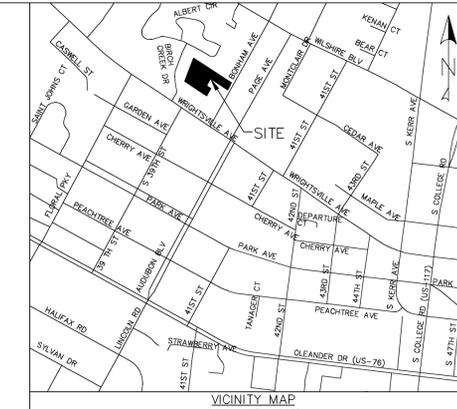
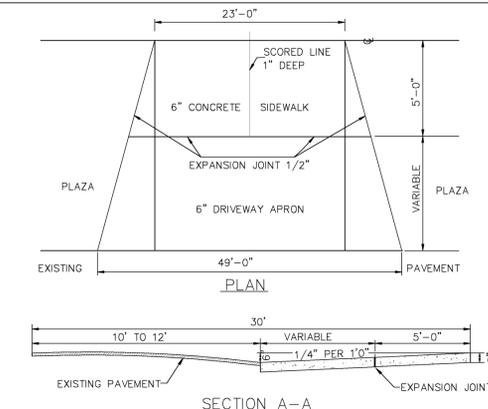
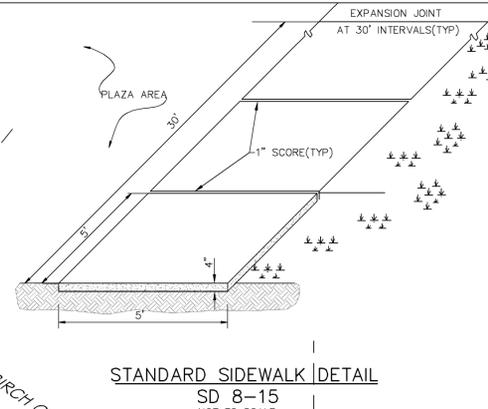
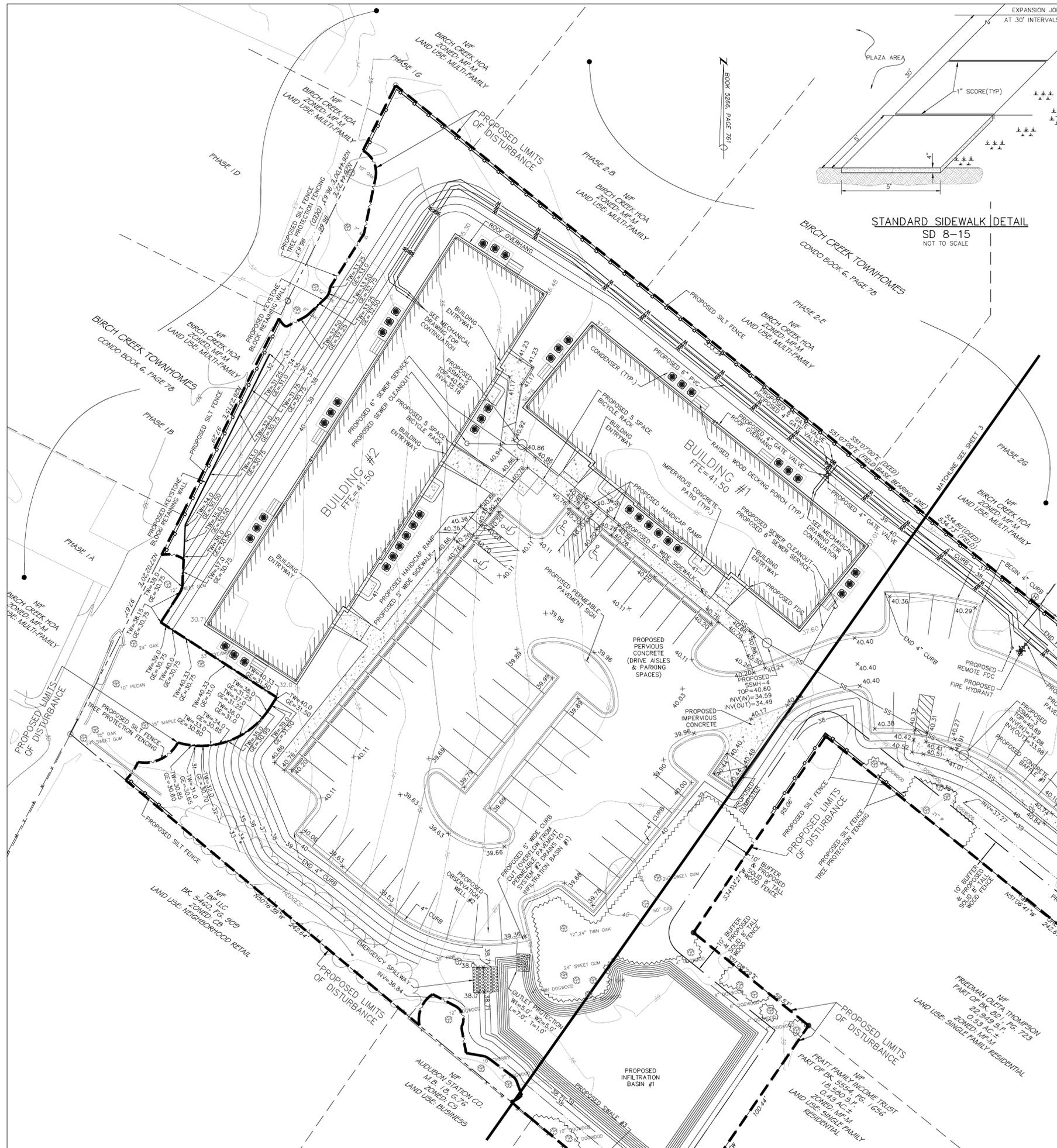
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2	REVISED PER CITY OF WILMINGTON		2-15-13
3	REVISED PER CITY OF WILMINGTON		4-18-13
4	REVISED PER CITY OF WILMINGTON		4-30-13

BONHAM APARTMENTS
CITY OF WILMINGTON WILMINGTON TOWNSHIP NEW HANOVER COUNTY NORTH CAROLINA

MALPASS ENGINEERING & SURVEYING, P.C.
1134 SHIPYARD BOULEVARD
WILMINGTON, NORTH CAROLINA 28412
Phone 910-392-5843
Fax 910-392-5203 License No. C-2380

Owner: 1280M LLC
P.O. BOX 1229
WILMINGTON, NORTH CAROLINA 28402

DATE: 1-7-13
SCALE: 1"=20'
DRAWN: JCB
CHECKED: JEM
PROJECT NO: 219
SHEET NO: 3
OF: 17



STORMWATER MANAGEMENT PLAN APPROVED
 CITY OF WILMINGTON
 ENGINEERING DEPARTMENT
 DATE _____ PERMIT # _____
 SIGNED _____

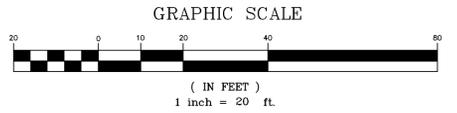
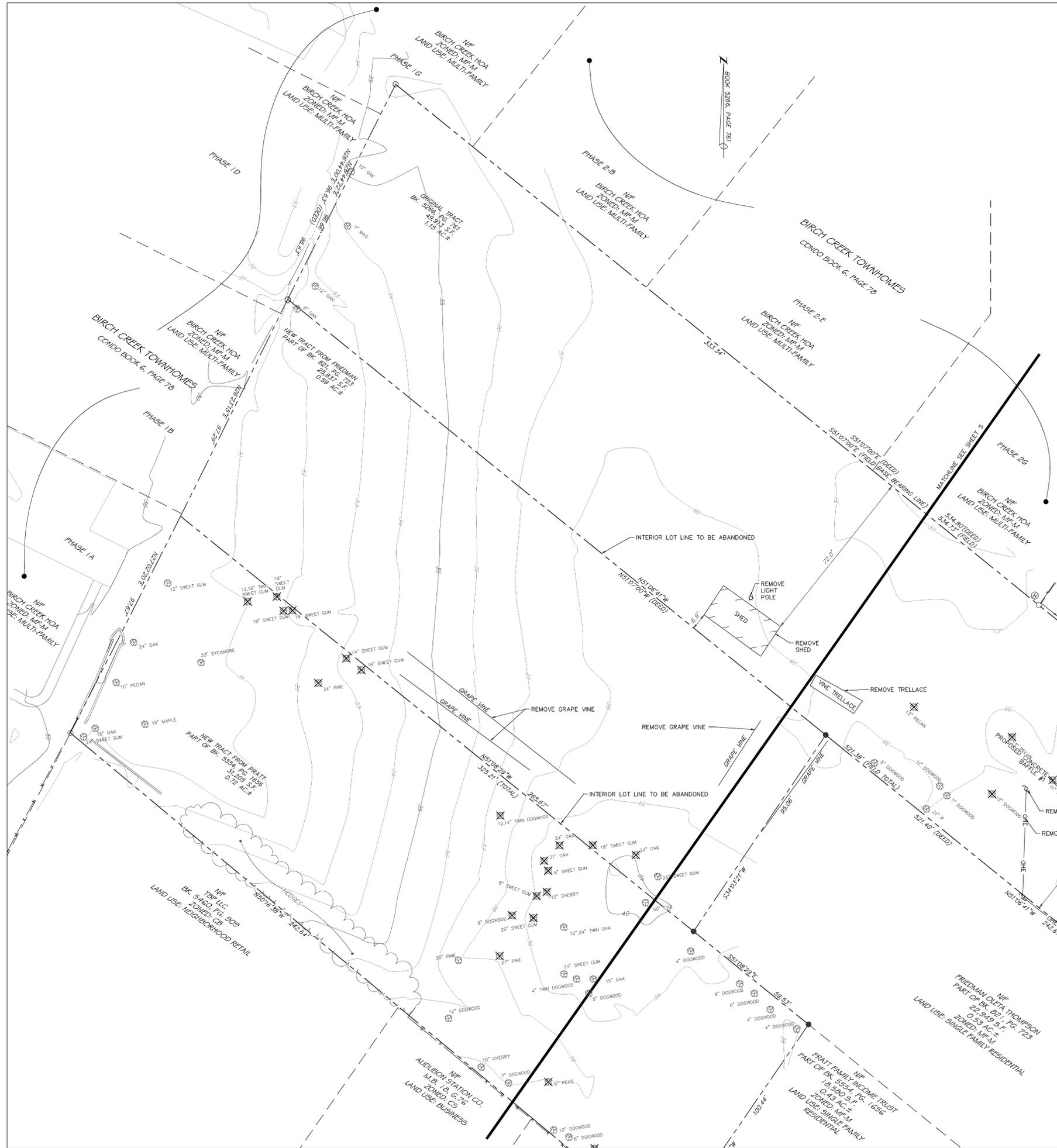
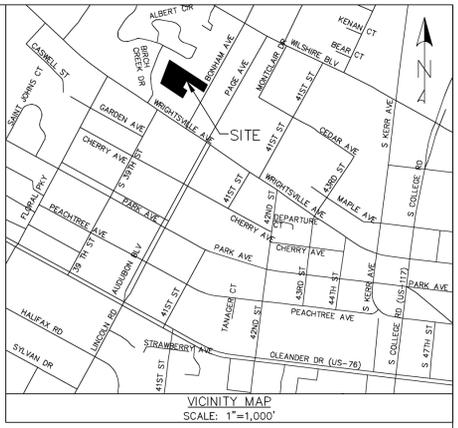
Approved Construction Plan		
Name	Date	
Planning		
Public Utilities		
Traffic		
Fire		

REV NO.	DESCRIPTION	DATE
1	REVISED TO ADJUST LAYOUT.	1-11-13
2	REVISED PER CITY OF WILMINGTON.	3-15-13
3	REVISED PER CITY OF WILMINGTON.	4-19-13
4	REVISED PER CITY OF WILMINGTON.	4-30-13

BONHAM APARTMENTS
 CITY OF WILMINGTON WILMINGTON TOWNSHIP NEW HANOVER COUNTY NORTH CAROLINA

MALPASS ENGINEERING & SURVEYING, P.C.
 1134 SHIPYARD BOULEVARD
 WILMINGTON, NORTH CAROLINA 28412
 Phone 910-392-5843
 Fax 910-392-5293 License No. C-2320

DRAINAGE & UTILITY PLAN
 1006 BONHAM AVENUE
 DATE: 1-7-13
 SCALE: 1"=20'
 DRAWN: JCB
 CHECKED: JEM
 WILMEST NO: PROJECT NO: 219
 SHEET NO: 4
 OF: 17



REV. NO.	DESCRIPTION	DATE
1	REVISED TO ADD TREES TO BE REMOVED.	1-11-13
2	REVISED PER CITY OF WILMINGTON.	3-15-13

STORMWATER MANAGEMENT PLAN
APPROVED
 CITY OF WILMINGTON
 ENGINEERING DEPARTMENT
 DATE _____ PERMIT # _____
 SIGNED _____

Approved Construction Plan	
Name	Date
Planning _____	_____
Public Utilities _____	_____
Traffic _____	_____
Fire _____	_____

EXISTING CONDITIONS & DEMOLITION PLAN
 1006 BONHAM AVENUE
BONHAM APARTMENTS
 CITY OF WILMINGTON WILMINGTON TOWNSHIP NEW HANOVER COUNTY NORTH CAROLINA

FINAL DRAWING FOR REVIEW PURPOSES ONLY

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 1134 SHIPYARD BOULEVARD
 WILMINGTON, NORTH CAROLINA 28412
 Phone 910-392-5843 License No. C-2320
 Fax 910-392-5203

Owner: 128UM LLC
 P.O. BOX 1229
 WILMINGTON, NORTH CAROLINA 28402

DATE: 1-7-13
 SCALE: 1"=20'
 DRAWN: JCB
 CHECKED: JEM
 PROJECT NO: 219
 SHEET NO: 6
 OF: 17

Permanent Seeding
 Specifications #11 – Specifications
 (Specifications are as per the "Erosion and Sediment Control Planning and Design Manual" of the state of North Carolina.)
 Table 6.11p – Seeding No. 10CP for: Well-to Poorly Drained soils with Good Moisture Retention; Low Maintenance
 Seeding mixture
 Species Rate (lb/acre)
 Tall fescue 50
 Pensacola Bahiagrass 30
 Sericea lespedeza 10
 Koba lespedeza 10

Seeding Notes
 1. From Sept. 1 – Mar. 1, use unscarified sericea seed
 2. On poorly drained sites omit sericea and increase Koba to 30 lb/acre.
 3. Where a neat appearance is desired, omit sericea and increase Koba to 40 lb/acre.

Nurse plants
 Between Apr. 15 & Aug. 15, add 10 lb/acre German millet or 15 lb/acre Sudangrass. Prior to May 1 or after Aug. 15, add 25 lb/acre rye (grain).

Seeding dates
 Best Possible
 Early spring: Feb. 15 – Mar. 20 Feb. 15 – Apr. 30
 Fall: Sept. 1 – Sept. 30 Sept. 1 – Oct. 31

Soil amendments – Apply lime and fertilizer according to soil tests, or apply 3,000–5,000 lb/acre ground agricultural limestone (use the lower rate on sandy soils) and 1,000 lb/acre 10–10–10 fertilizer.
 Mulch – Apply 4,000 lb/acre grain straw or equivalent cover of another suitable mulch. Anchor straw by tacking with asphalt, netting, or riving or by crimping with a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.
 Maintenance – If growth is less than fully adequate, re-fertilize in the second year, according to soil tests or topdress with 500 lb/acre 10–10–10 fertilizer. Mow as needed when sericea is omitted from the mixture. Reseed, fertilize, and mulch damaged areas immediately.

Table 6.11q – Seeding No. 2CP for: Well-to Poorly Drained soils with Good Moisture Retention; High Maintenance
 Seeding mixture
 Species Rate (lb/acre)
 Tall fescue (blend of two or three improved varieties) 200
 Rye (grain) 25

Seeding dates
 Best: Sept. 15 – Oct. 15
 Possible: Sept. 1 – Oct. 31 or Feb. 15 – Apr. 30

Soil amendments – Apply lime and fertilizer according to soil tests, or apply 3,000–5,000 lb/acre ground agricultural limestone (use the lower rate on sandy soils) and 1,000 lb/acre 10–10–10 fertilizer.
 Mulch – Apply 4,000 lb/acre grain straw or equivalent cover of another suitable mulch. Anchor straw by tacking with asphalt, netting, or riving or by crimping with a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.
 Maintenance – Fertilize according to soil tests or apply 40 lb/acre nitrogen in Jan. or Feb., 40 lb in Sept., and 40 lb in Nov. from a 12–4–8, 16–4–8, or similar turf fertilizer. Avoid fertilizer applications during warm weather, as this increases stand losses to disease. Reseed, fertilize, and mulch damaged areas immediately. Mow to a height of 2.5–3.5 inches as needed.

Table 6.11r – Seeding No. 3CP for: Dry Sands to Sandy Loams; High Maintenance, Fine Turf
 Seeding mixture
 Species Rate (bu/1,000 ft²)
 Tifway II Minimum: 3
 Hybrid Bermudagrass Rapid cover: 10

Seeding Notes
 1. Sprig or sod (Practice 6.12, Sodding). Moisture is essential during initial establishment. Sod must be kept well watered 2–3 weeks, but can be planted earlier or later than sprigs.
 2. Common Bermuda can be seeded or sprigged but does not produce a high-quality turf. It is also cold tolerant than the hybrids, more weed prone, and a pest in flower beds and specimen plantings.

Planting dates
 Apr. – July

Soil amendments – Apply lime and fertilizer according to soil tests, or apply 3,000 lb/acre ground agricultural limestone and 500 lb/acre 10–10–10 fertilizer, or 50 lb/acre nitrogen from turf-type slow-release fertilizer. Add 25–50 lb/acre nitrogen at 2- to 3-week intervals through midsummer.
 Sprigging – Plant sprigs in furrows with a tractor-drawn transplanter, or broadcast by hand. Furrows should be 4–6 inches deep and 2 ft apart. Place sprigs about 2 ft apart in the row with one end of or above ground level (Figure 6.11d).
 Broadcast at rates shown above, and press sprigs into the top 1/2–2 inches of soil with a disk set straight so that sprigs are not brought back toward the surface.
 Mulch – Do not mulch.
 Maintenance – Water as needed and mow to 3/4- to 1-inch height. Topdress with 40 lb/acre nitrogen in Apr., 50 lb in May, 50 lb in June, 30 lb in July, and 25–50 lb in Aug.

Table 6.11s – Seeding No. 4CP for: Well-Drained Sandy Loams to Dry Sands, Coastal Plain and Eastern Edge of Piedmont; Low-to Medium-Care Lawns
 Seeding mixture
 Species Rate
 Centipedegrass 10–20 lb/acre (seed) or 33 bu/acre (sprigs)

Seeding dates
 Mar. – June
 (Sprigging can be done through July where water is available for irrigation.)

Soil amendments – Apply lime and fertilizer according to soil tests, or apply 300 lb/acre 10–10–10.
 Sprigging – Plant sprigs in furrows with a tractor-drawn transplanter, or broadcast by hand. Furrows should be 4–6 inches deep and 2 ft apart. Place sprigs about 2 ft apart in the row with one end at or above ground level (Figure 6.11d).
 Broadcast at rates shown above, and press sprigs into the top 1/2–2 inches of soil with a disk set straight so that sprigs are not brought back toward the surface.
 Mulch – Do not mulch.
 Maintenance – Fertilize very sparingly – 20 lb/acre nitrogen in spring with no phosphorus. Centipedegrass cannot tolerate high pH or excess fertilizer.

Table 6.11t – Seeding No. 5CP for: Well-Drained Sandy Loams to Dry Sands; Low Maintenance
 Seeding mixture
 Species Rate (lb/acre)
 Pensacola Bahiagrass 50
 Sericea lespedeza 30
 Common Bermudagrass 10
 German millet 10

Seeding Notes
 1. Where a neat appearance is desired, omit sericea.
 2. Use common Bermuda only on isolated sites where it cannot become a pest. Bermudagrass may be replaced with 5 lb/acre centipedegrass.

Seeding dates
 Apr. 1 – July 15

Soil amendments – Apply lime and fertilizer according to soil tests, or apply 3,000 lb/acre ground agricultural limestone and 500 lb/acre 10–10–10 fertilizer.
 Mulch – Apply 4,000 lb/acre grain straw or equivalent cover of another suitable mulch. Anchor by tacking with asphalt, netting, or riving or by crimping with a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.
 Maintenance – Refertilize the following Apr. with 50 lb/acre nitrogen. Repeat as growth requires. May be mowed only once a year. Where a neat appearance is desired, omit sericea and mow as often as needed.

Table 6.11v – Seeding No. 70CP for: Grass-lined Channels; Coastal Plain, Lower Piedmont, and Dry Soils in the Central Piedmont
 Seeding mixture
 Species Rate (lb/acre)
 Common Bermudagrass 40–80 (1–2 lb/1,000 ft²)

Seeding dates
 Coastal Plain: Apr. – July
 Piedmont: Apr. 15 – June 30

Soil amendments – Apply lime and fertilizer according to soil tests, or apply 3,000 lb/acre ground agricultural limestone and 500 lb/acre 10–10–10 fertilizer.
 Mulch – Use jute, excelsior matting, or other effective channel lining material to cover the bottom of channels and ditches. The lining should extend above the highest calculated depth of flow. On channel side slopes above this height, and on grades requiring temporary linings, apply 4,000 lb/acre grain straw and anchor straw by stapling netting over the top. Mulch and anchoring materials must not be allowed to wash down slopes where they can clog drainage devices.
 Maintenance – A minimum of 3 weeks is required for establishment. Inspect and repair mulch frequently. Refertilize the following Apr. with 50 lb/acre nitrogen.

Refer to Appendix B.02 for botanical names.

Temporary Seeding
 Specifications #10 – Specifications
 (Specifications are as per the "Erosion and Sediment Control Planning and Design Manual" of the state of North Carolina.)
 Table 6.10a – Temporary Seeding Recommendations for Late Winter and Early Spring
 Seeding Mixture
 Species Rate (lb/acre)
 Rye (grain) 120
 Annual lespedeza (Koba in Piedmont and Coastal Plain, Korean in Mountains) 50

Omit annual lespedeza when duration of temporary cover is not to extend beyond June.

Seeding dates
 Mountains – Above 2500 ft: Feb. 15–May 15
 Below 2500 ft: Feb. 1–May 1
 Piedmont – Jan. 1–May 1
 Coastal Plain – Dec. 1–Apr. 15

Soil amendments – Follow recommendations of soil tests or apply 2,000 lb/acre ground agricultural limestone and 750 lb/acre 10–10–10 fertilizer.
 Mulch – Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.
 Maintenance – Refertilize if growth is not fully adequate. Reseed, fertilize and mulch immediately following erosion or other damage.

Table 6.10b Temporary Seeding Recommendations for Summer
 Seeding mixture
 Species Rate (lb/acre)
 German millet 40

In the Piedmont and Mountains, a small-stemmed Sudangrass may be substituted at a rate of 50 lb/acre.

Seeding dates
 Mountains – May 15–Aug. 15
 Piedmont – May 1–Aug. 15
 Coastal Plain – Apr. 15–Aug. 15

Soil amendments – Follow recommendations of soil tests or apply 2,000 lb/acre ground agricultural limestone and 750 lb/acre 10–10–10 fertilizer.
 Mulch – Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.
 Maintenance – Refertilize if growth is not fully adequate. Reseed, fertilize and mulch immediately following erosion or other damage.

Table 6.10c Temporary Seeding Recommendations for Fall
 Seeding mixture
 Species Rate (lb/acre)
 Rye (grain) 120

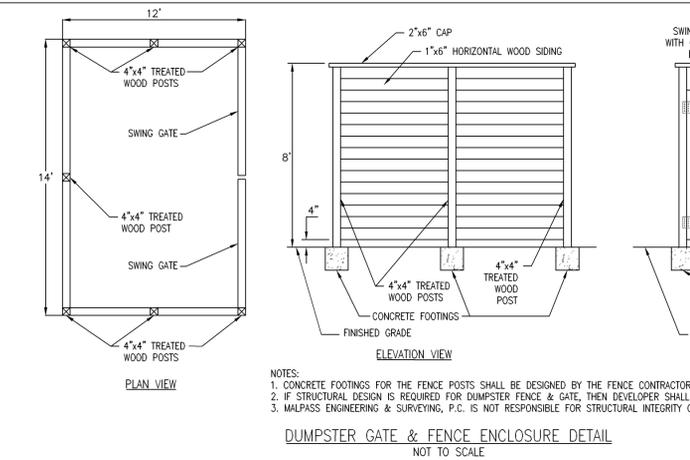
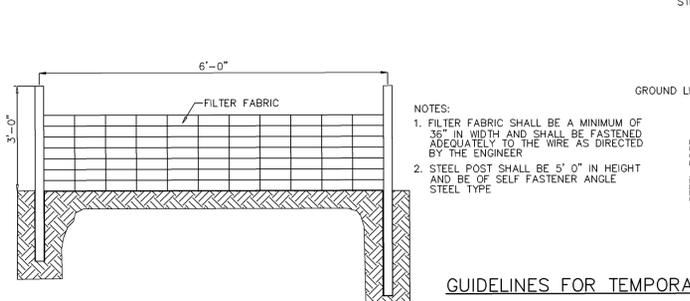
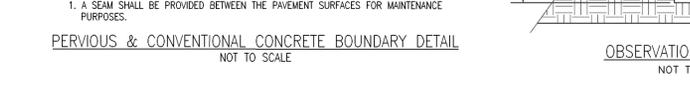
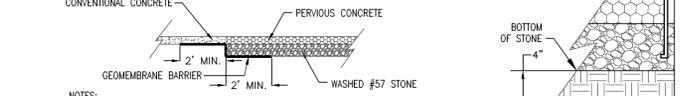
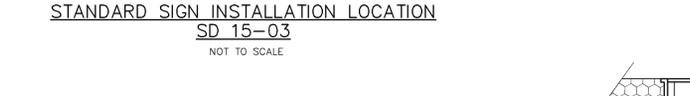
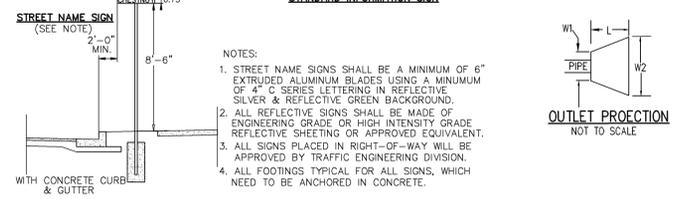
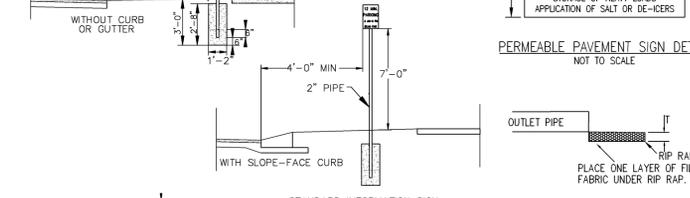
Seeding dates
 Mountains – Aug. 15–Dec. 30
 Coastal Plain and Piedmont – Aug. 15–Dec. 30

Soil amendments – Follow soil tests or apply 2,000 lb/acre ground agricultural limestone and 1,000 lb/acre 10–10–10 fertilizer.
 Mulch – Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.
 Maintenance – Repair and refertilize damaged areas immediately. Topdress with 50 lb/acre of nitrogen in March. If it is necessary to extend temporary cover beyond June 15, overseed with 50 lb/acre Koba (Piedmont and Coastal Plain) or Korean (Mountains) lespedeza in late February or early March.

Table 6.10d Temporary Seeding Recommendations for Spring
 Seeding mixture
 Species Rate (lb/acre)
 Rye (grain) 120

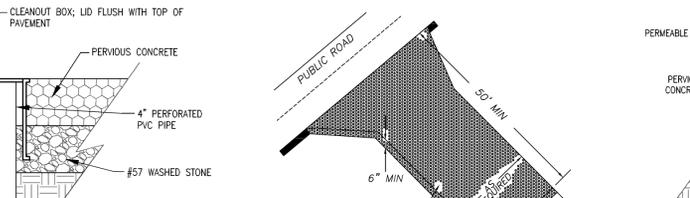
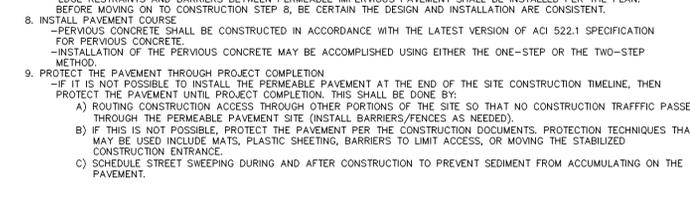
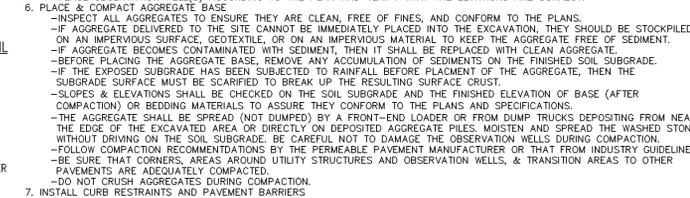
Seeding dates
 Mountains – Aug. 15–Dec. 30
 Coastal Plain and Piedmont – Aug. 15–Dec. 30

Soil amendments – Follow soil tests or apply 2,000 lb/acre ground agricultural limestone and 1,000 lb/acre 10–10–10 fertilizer.
 Mulch – Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.
 Maintenance – Repair and refertilize damaged areas immediately. Topdress with 50 lb/acre of nitrogen in March. If it is necessary to extend temporary cover beyond June 15, overseed with 50 lb/acre Koba (Piedmont and Coastal Plain) or Korean (Mountains) lespedeza in late February or early March.



CONSTRUCTION SEQUENCE FOR INSTALLATION OF PERMEABLE PAVEMENT (NCDNR STORMWATER BMP MANUAL CHAPTER 18)
 1. ENSURE ACCEPTABLE CONDITIONS FOR CONSTRUCTION
 -PREVIOUS 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 ADJACENT 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 PAVEMENT AREAS ARE CLEARLY MARKED ON THE SITE.
 2. EXCAVATE PERMEABLE PAVEMENT AREA & PREPARE SUBGRADE SURFACE
 -EXCAVATE 15 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, SCARIFY THE SOIL SUBGRADE SURFACE TO MAINTAIN THE SOILS PRE-DISTURBANCE INFILTRATION RATE.
 -DO NOT SCARIFY THE PAVEMENT, USE THE EXCAVATOR BUCKET'S TEETH TO RAKE THE SURFACE OF THE SUBGRADE.
 3. 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 SCARIFICATION, RIPPING, OR TRENCHING OF THE SOIL WILL BE NEEDED.
 -CONTRACTOR SHALL CONTACT & RECEIVE APPROVAL FROM ENGINEER OF RECORD TO CONTINUE INSTALLATION OF PERMEABLE PAVEMENT.

4. 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.
 5. PLACE OBSERVATION WELL(S)
 -PLACE OBSERVATION WELL(S) ACCORDING TO THE PLAN AND VERIFY THAT THE ELEVATIONS ARE CORRECT.
 6. PLACE & COMPACT AGGREGATE BASE
 -INSPECT ALL AGGREGATE 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 SCARIFIED 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.
 7. 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.
 8. INSTALL PAVEMENT 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 THE TWO-STEP METHOD.
 9. PROTECT THE PAVEMENT THROUGH PROJECT COMPLETION
 -IF IT IS NOT POSSIBLE TO INSTALL THE PERVIOUS PAVEMENT AT THE END OF THE SITE CONSTRUCTION TIMELINE, THEN PROTECT THE PAVEMENT UNTIL PROJECT COMPLETION. THIS SHALL BE DONE BY:
 A) 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).
 B) 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.
 C) SCHEDULE STREET SWEEPING DURING AND AFTER CONSTRUCTION TO PREVENT SEDIMENT FROM ACCUMULATING ON THE PAVED SURFACE.



SITE AREA DESCRIPTION	GROUND STABILIZATION	
	STABILIZATION TIME FRAME	STABILIZATION TIME FRAME EXCEPTIONS
PERVIOUS DIKES, SWALES, DITCHES AND SLOPES	7 DAYS	NONE
HIGH QUALITY WATER (HOW) ZONES	7 DAYS	NONE
SLOPES STEEPER THAN 3:1	7 DAYS	IF SLOPES ARE 10 FEET OR LESS IN LENGTH AND ARE NOT STEEPER THAN 2:1, 14 DAYS ARE ALLOWED
SLOPES 3:1 OR FLATTER	14 DAYS	7 DAYS FOR SLOPES GREATER THAN 50 FEET IN LENGTH
ALL OTHER AREAS WITH SLOPES FLATTER THAN 4:1	14 DAYS	NONE (EXCEPT FOR PERIMETERS AND HOW ZONES)

REV. NO.	REVISIONS	DATE
1	REVISED TO ADD DETAILS.	4-18-13
2	REVISED PER CITY OF WILMINGTON.	4-30-13

STORMWATER MANAGEMENT PLAN APPROVED
 CITY OF WILMINGTON
 ENGINEERING DEPARTMENT
 DATE _____ PERMIT # _____
 SIGNED _____

Approved Construction Plan
 Name _____ Date _____

Planning _____
 Public Utilities _____
 Traffic _____
 Fire _____

DETAIL SHEET
 1006 BONHAM AVENUE
BONHAM APARTMENTS
 CITY OF WILMINGTON WILMINGTON TOWNSHIP NEW HANOVER COUNTY NORTH CAROLINA

MALPASS ENGINEERING & SURVEYING, P.C.
 1134 SHYPHARD BOULEVARD
 WILMINGTON, NORTH CAROLINA 28412
 Phone 910-392-5843
 Fax 910-392-5203 License No. C-2380

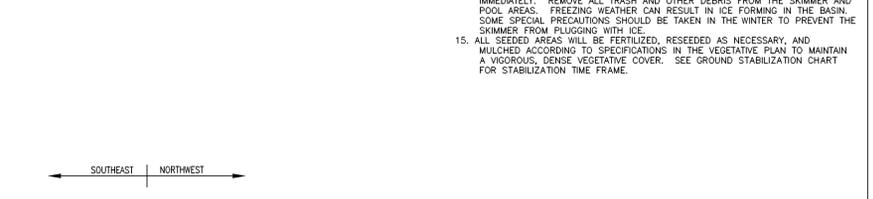
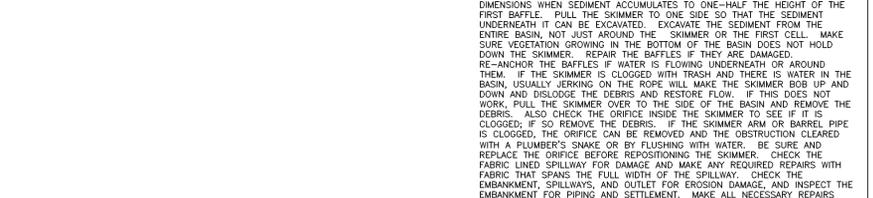
Owner: 1288M LLC
 P.O. BOX 1229
 WILMINGTON, NORTH CAROLINA 28402

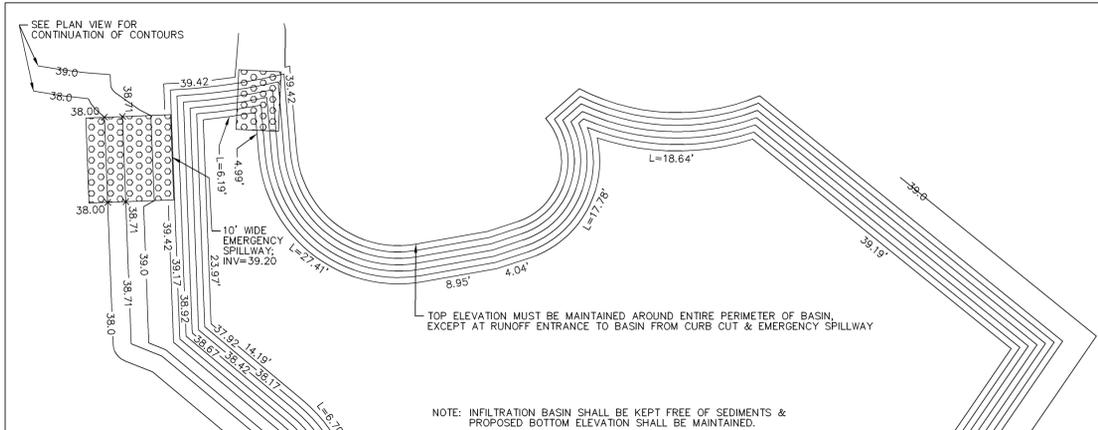
DATE: 3-15-13
 SCALE: N.T.S.
 DRAWN: JCB
 CHECKED: JSM
 WILET NO: PROJECT NO: 219
 SHEET NO: 7
 OF: 17

MAINTENANCE PLAN
 ALL EROSION CONTROL MEASURES WILL BE CHECKED EVERY 7 DAYS OR AFTER EACH RAIN PRODUCING 1/2 INCHES OR MORE WHICH EVER COMES FIRST.
 2. SEDIMENT WILL BE REMOVED FROM BEHIND SILT FENCES WHEN SEDIMENT IS 0.15 FEET DEEP AND REPAIR FABRIC IF TORN, LEAKING OR FAILING.
 3. ALL POINTS OF EGRESS WILL HAVE CONSTRUCTION ENTRANCES THAT WILL BE PERIODICALLY TOP-DRESSED WITH AN ADDITIONAL 2 INCHES OF #4 STONE TO MAINTAIN PROPER DEPTH. THEY WILL BE MAINTAINED IN A CONDITION TO PREVENT MUD OR SEDIMENT FROM LEAVING THE SITE. IMMEDIATELY REMOVE OBJECTIONABLE MATERIAL, SPILLED, WASHED, OR TRACKED ONTO THE CONSTRUCTION ENTRANCE OR ROADWAYS.
 4. CHECK SEDIMENT BASINS AFTER PERIODS OF SIGNIFICANT RUNOFF REMOVE SEDIMENT AND RESTORE THE BASIN TO ITS ORIGINAL DIMENSIONS WHEN SEDIMENT ACCUMULATES TO ONE-HALF THE DESIGN DEPTH. CHECK THE EMBANKMENT SPILLWAYS, AND OUTLET FOR EROSION DAMAGE, AND INSPECT THE EMBANKMENT FOR PIPING AND SETTLEMENT. MAKE ALL NECESSARY REPAIRS IMMEDIATELY. REMOVE ALL TRASH AND OTHER DEBRIS FROM THE RISER AND POOL AREA. GRAVEL WILL BE CLEANED OR REPLACED WHEN THE STANDING POOL NO LONGER DRAINS PROPERLY OR IF THE ROCK IS DISLOADED.
 5. INSPECT TEMPORARY SEDIMENT TRAPS AFTER EACH SIGNIFICANT RAINFALL REMOVE SEDIMENT AND RESTORE THE TRAP TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO ONE-HALF THE DESIGN DEPTH OF THE TRAP. PLACE THE SEDIMENT IN REMOVED THE DESIGNATED DISPOSAL AREA AND REPLACE THE CONTAMINATED PART OF THE GRAVEL FACING. CHECK THE STRUCTURE FOR DAMAGE FROM EROSION OR PIPING. PERIODICALLY CHECK THE DEPTH OF THE SPILLWAY TO ENSURE IT IS A MINIMUM OF 1.5 FT BELOW THE LOW POINT OF THE EMBANKMENT. IMMEDIATELY FILL ANY SETTLEMENT OF THE EMBANKMENT TO SLIGHTLY ABOVE GRADE. ANY RIPRAP DISPLACED FROM THE SPILLWAY MUST BE REPLACED IMMEDIATELY. AFTER ALL SEDIMENT-PROOFING AREAS HAVE BEEN PERMANENTLY STABILIZED, REMOVE THE STRUCTURE AND ALL UNDESIRABLE SEDIMENT. SMOOTH THE AREA TO BLEND WITH THE ADJOINING AREAS AND STABILIZE PROPERLY.
 6. INSPECT RIPRAP OUTLET STRUCTURES AFTER HEAVY RAINS TO SEE IF ANY EROSION AROUND OR BELOW THE RIPRAP HAS TAKEN PLACE OR HAS TAKEN PLACE OR HAS TAKEN PLACE. IMMEDIATELY MAKE ALL NEEDED REPAIRS TO PREVENT FURTHER DAMAGE.
 7. RIP RAP SHOULD BE INSPECTED PERIODICALLY FOR SCOUR OR DISLOADED STONES. CONTROL OF WEED AND BRUSH GROWTH MAY BE NEEDED IN SOME AREAS.
 8. ROCK DAM: CHECK SEDIMENT AFTER EACH RAINFALL. REMOVE SEDIMENT AND RESTORE ORIGINAL VOLUME WHEN SEDIMENT ACCUMULATES TO ABOUT ONE-HALF THE DESIGN VOLUME.
 9. CHECK THE STRUCTURE FOR EROSION, PIPING, AND ROCK DISPLACEMENT AFTER EACH SIGNIFICANT RAINFALL AND REPAIR IMMEDIATELY.
 10. INSPECT ALL MULCHES PERIODICALLY AND AFTER RAINSTORMS TO CHECK FOR RILL EROSION, DISLOCATION, OR FAILURE. WHERE EROSION IS OBSERVED, APPLY ADDITIONAL MULCH. IF WASHOUT OCCURS, REMOVE MULCH, RESEED, AND REINSTALL MULCH. CONTINUE INSPECTIONS UNTIL VEGETATION IS FIRMLY ESTABLISHED.
 11. INSPECT CHECK DAMS AND CHANNELS FOR DAMAGE AFTER EACH RUNOFF EVENT. ANTICIPATE SUBMERGENCE AND DEPOSITION ABOVE THE CHECK DAM AND REMOVE EXCESS HIGH FLOW ABOVE THE EDGES OF THE DAM. CORRECT ALL DAMAGE IMMEDIATELY. IF SIGNIFICANT EROSION OCCURS BETWEEN DAMS, INSTALL A PROTECTIVE RIPRAP LINER IN THAT PORTION OF THE CHANNEL. REMOVE SEDIMENT ACCUMULATED BEHIND THE DAMS AS NEEDED TO PREVENT DAMAGE TO CHANNEL VEGETATION, ALLOW THE CHANNEL TO DRAIN THROUGH THE STONE CHECK DAM, AND PREVENT LARGE FLOWS FROM CARRYING SEDIMENT OVER THE DAM. ADD STONES TO DAMS AS NEEDED TO MAINTAIN DESIGN HEIGHT AND CROSS SECTION.
 12. INSPECT GATES AT LEAST ONCE A WEEK AND AFTER EACH RAINFALL. MAKE ANY REQUIRED REPAIRS IMMEDIATELY. BE SURE TO MAINTAIN ACCESS TO THE BARRIERS. REMOVE THE FABRIC OF A BATTLE COLLAPSE, TEAR, DECOMPOSE, OR BECOME INEFFECTIVE. REPLACE IT PROMPTLY. REMOVE SEDIMENT WHEN IT REACHES HALF FULL TO PROVIDE ADEQUATE STORAGE VOLUME FOR THE NEXT RAIN AND TO REDUCE PRESSURE ON THE BARRIERS. TAKE CARE TO AVOID DAMAGING THE BARRIERS. WHEN THE SEDIMENT DEPTH SHOULD NEVER EXCEED HALF THE DESIGNED STORAGE DEPTH. AFTER THE CONTRIBUTING DRAINAGE AREA HAS BEEN PROPERLY STABILIZED, REMOVE ALL SEDIMENT, MATERIALS AND UNSTABLE SEDIMENT DEPOSITS, BRING THE AREA TO GRADE, AND STABILIZE IT.
 13. INSPECT INLETS AT LEAST WEEKLY AND AFTER EACH SIGNIFICANT (1/2 INCH OR GREATER) RAINFALL EVENT. SEDIMENT WILL BE REMOVED FROM HARDWARE CLOTH AND GRAVEL INLET PROTECTION, BLOCK AND GRAVEL INLET PROTECTION, ROCK DOUGHNUT INLET PROTECTION AND ROCK PIPE INLET PROTECTION WHEN THE DESIGNED STORAGE CAPACITY HAS BEEN HALF FILLED WITH SEDIMENT. ROCK WILL BE CLEANED OR REPLACED WHEN THE SEDIMENT POOL, NO LONGER DRAINS AS DESIGNED. DEBRIS WILL BE REMOVED FROM THE ROCK AND HARDWARE CLOTH TO ALLOW PROPER DRAINAGE. TAKE CARE NOT TO DAMAGE OR UNDERMINE THE WIRE MESH DURING SEDIMENT REMOVAL. SILT SACKS WILL BE EMPLOYED ONCE A WEEK AND AFTER EVERY RAIN EVENT. SEDIMENT WILL BE REMOVED FROM AROUND BEAVER DAMS, DANDY SACKS AND SOCKS ONCE A WEEK AND AFTER EVERY RAIN EVENT.
 14. INSPECT SKIMMER SEDIMENT BASINS AT LEAST WEEKLY AND AFTER EACH SIGNIFICANT (ONE-HALF INCH OR GREATER) RAINFALL EVENT AND REPAIR IMMEDIATELY. REMOVE SEDIMENT AND RESTORE THE BASIN TO ITS ORIGINAL DIMENSIONS WHEN SEDIMENT ACCUMULATES TO ONE-HALF THE HEIGHT OF THE ENTIRE BASIN. NOT JUST AROUND THE SKIMMER OR THE FIRST CELL. MAKE SURE VEGETATION GROWING IN THE BOTTOM OF THE BASIN DOES NOT HOLD DOWN THE SKIMMER. REPAIR THE BARRIERS IF THEY ARE DAMAGED. RE-ANCHOR THE BARRIERS IF WATER IS FLOWING UNDERNEATH OR AROUND THEM. IF THE SKIMMER IS CLOGGED WITH TRASH AND THERE IS WATER IN THE BASIN, USUALLY JERKING ON THE ROPE WILL MAKE THE SKIMMER BOB UP AND DOWN AND DISLodge THE DEBRIS AND RESTORE FLOW. IF THIS DOES NOT WORK, PULL THE SKIMMER OVER TO THE SIDE OF THE BASIN AND REMOVE THE DEBRIS. ALSO CHECK THE ORIFICE INSIDE THE SKIMMER TO SEE IF IT IS CLOGGED; IF SO REMOVE THE DEBRIS. IF THE SKIMMER ARM OR BARREL PIPE IS CLOGGED, THE ORIFICE CAN BE REMOVED AND THE OBSTRUCTION CLEARED WITH A FLUMBER'S SWAGE OR BY FLUSHING WITH WATER. BE SURE TO REPLACE THE ORIFICE BEFORE REPOSITIONING THE SKIMMER. CHECK THE FABRIC LINED SPILLWAY FOR DAMAGE AND MAKE ANY REQUIRED REPAIRS WITH FABRIC THAT SPANS THE FULL WIDTH OF THE SPILLWAY. CHECK THE EMBANKMENT, SPILLWAYS, AND OUTLET FOR EROSION DAMAGE, AND INSPECT THE EMBANKMENT FOR PIPING AND SETTLEMENT. MAKE ALL NECESSARY REPAIRS IMMEDIATELY. REMOVE ALL TRASH AND OTHER DEBRIS FROM THE SKIMMER AND POOL AREAS. FREEZING WEATHER CAN RESULT IN ICE FORMING IN THE BASIN. SOME SPECIAL PRECAUTIONS SHOULD BE TAKEN IN THE WINTER TO PREVENT THE SKIMMER FROM PLUGGING WITH ICE.
 15. ALL SEEDED AREAS WILL BE FERTILIZED, RESEED AS NECESSARY, AND MULCHED ACCORDING TO SPECIFICATIONS IN THE VEGETATION PLAN TO MAINTAIN A VIGOROUS, DENSE VEGETATIVE COVER. SEE GROUND STABILIZATION CHART FOR STABILIZATION TIME FRAME.

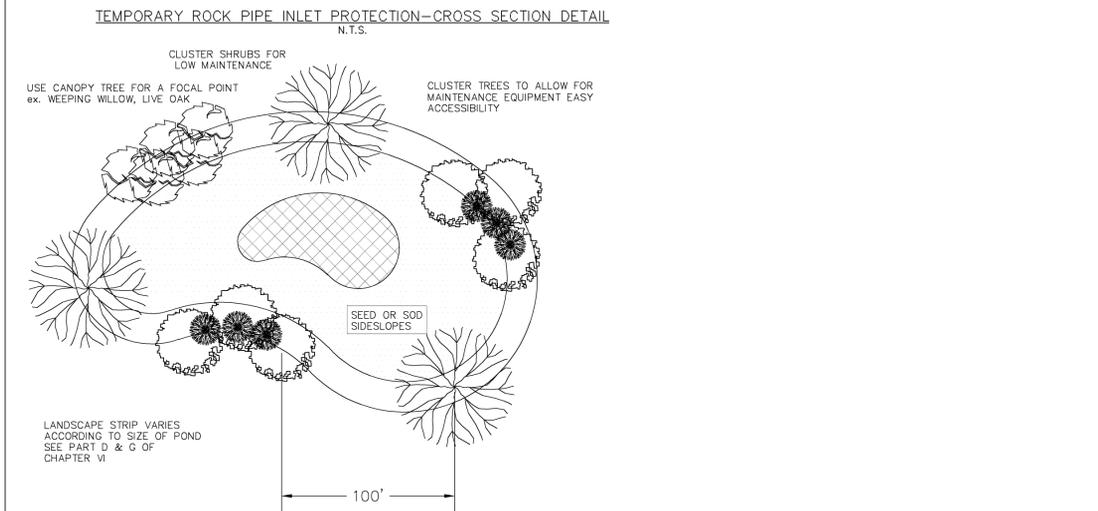
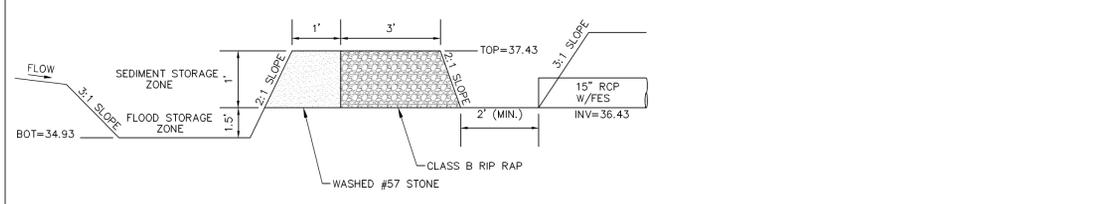
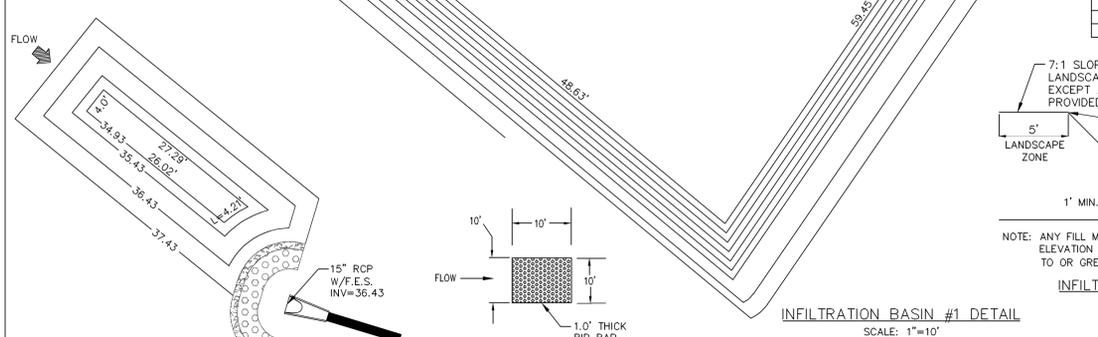
CONSTRUCTION SEQUENCE FOR INSTALLATION OF PERMEABLE PAVEMENT (NCDNR STORMWATER BMP MANUAL CHAPTER 18)
 1. ENSURE ACCEPTABLE CONDITIONS FOR CONSTRUCTION
 -PREVIOUS SURFACES MUST BE GRADED TO DRAIN AWAY FROM THE PERMEABLE PAVEMENT, EXCEPT WHERE THIS IS UNAVOIDABLE, SUCH AS PARKING LOT ISLANDS, AND AREA BETWEEN BUILDINGS & PARKING LOT.
 -IMPERVIOUS AREAS ADJACENT 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 PAVEMENT AREAS ARE CLEARLY MARKED ON THE SITE.
 2. EXCAVATE PERMEABLE PAVEMENT AREA & PREPARE SUBGRADE SURFACE
 -EXCAVATE 15 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, SCARIFY THE SOIL SUBGRADE SURFACE TO MAINTAIN THE SOILS PRE-DISTURBANCE INFILTRATION RATE.
 -DO NOT SCARIFY THE PAVEMENT, USE THE EXCAVATOR BUCKET'S TEETH TO RAKE THE SURFACE OF THE SUBGRADE.
 3. 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 SCARIFICATION, RIPPING, OR TRENCHING OF THE SOIL WILL BE NEEDED.
 -CONTRACTOR SHALL CONTACT & RECEIVE APPROVAL FROM ENGINEER OF RECORD TO CONTINUE INSTALLATION OF PERMEABLE PAVEMENT.

4. 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.
 5. PLACE OBSERVATION WELL(S)
 -PLACE OBSERVATION WELL(S) ACCORDING TO THE PLAN AND VERIFY THAT THE ELEVATIONS ARE CORRECT.
 6. PLACE & COMPACT AGGREGATE BASE
 -INSPECT ALL AGGREGATE 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 SCARIFIED 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.
 7. 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.
 8. INSTALL PAVEMENT 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 THE TWO-STEP METHOD.
 9. PROTECT THE PAVEMENT THROUGH PROJECT COMPLETION
 -IF IT IS NOT POSSIBLE TO INSTALL THE PERVIOUS PAVEMENT AT THE END OF THE SITE CONSTRUCTION TIMELINE, THEN PROTECT THE PAVEMENT UNTIL PROJECT COMPLETION. THIS SHALL BE DONE BY:
 A) 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).
 B) 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.
 C) SCHEDULE STREET SWEEPING DURING AND AFTER CONSTRUCTION TO PREVENT SEDIMENT FROM ACCUMULATING ON THE PAVED SURFACE.





ELEV. (FT)	AREA (SQ. FT.)
34.93	108.17
35.43	208.34
36.43	470.82
37.43	793.39



Notes:

- If possible, locate pond where vegetation exists.
- Suggest minimal clearing to conserve visual quality of site and minimize the additional of tree planting. An irregular shape provides a more natural appearance.
- Landscape strip shall be a maximum slope of 7:1 in order to plant vegetation.
- Provide a minimum of 3 inches of mulch around all vegetation.

LANDSCAPE STRIP VARIES ACCORDING TO SIZE OF POND SEE PART D & G OF CHAPTER VI

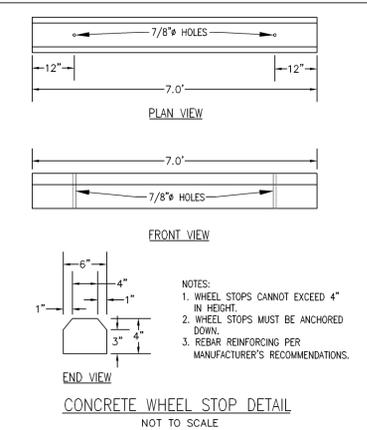
VEGETATION MUST BE EVENLY DISTRIBUTED AT APPROXIMATELY 100' INTERVALS AROUND POND

CLUSTER SHRUBS FOR LOW MAINTENANCE.
USE CANOPY TREE FOR A FOCAL POINT
 ex: WEeping WILLOW, LIVE OAK

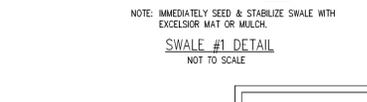
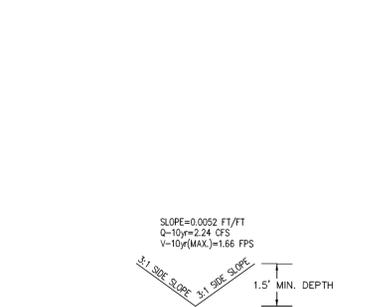
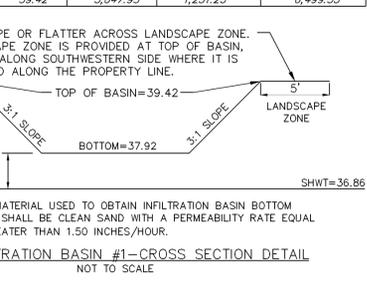
CLUSTER TREES TO ALLOW FOR MAINTENANCE EQUIPMENT EASY ACCESSIBILITY.

SEED OR SOD SIDESLOPES

DATE: DECEMBER, 2010
DRAWN: JWS
CHECKED: DEC
SCALE: NOT TO SCALE



ELEV. (FT)	AREA (SQ. FT.)	INCREMENTAL VOLUME (CU. FT.)	CUMULATIVE VOLUME (CU. FT.)
37.92	3,647.04	0	0
38.17	3,867.74	939.35	939.35
38.42	4,093.96	995.21	1,934.56
38.67	4,325.08	1,052.39	2,986.94
38.92	4,561.08	1,110.77	4,097.71
39.17	4,802.02	1,170.39	5,268.10
39.42	5,047.95	1,231.25	6,499.35



CONCRETE WHEEL STOP DETAIL
 NOT TO SCALE

INFILTRATION BASIN #1
 NOT TO SCALE

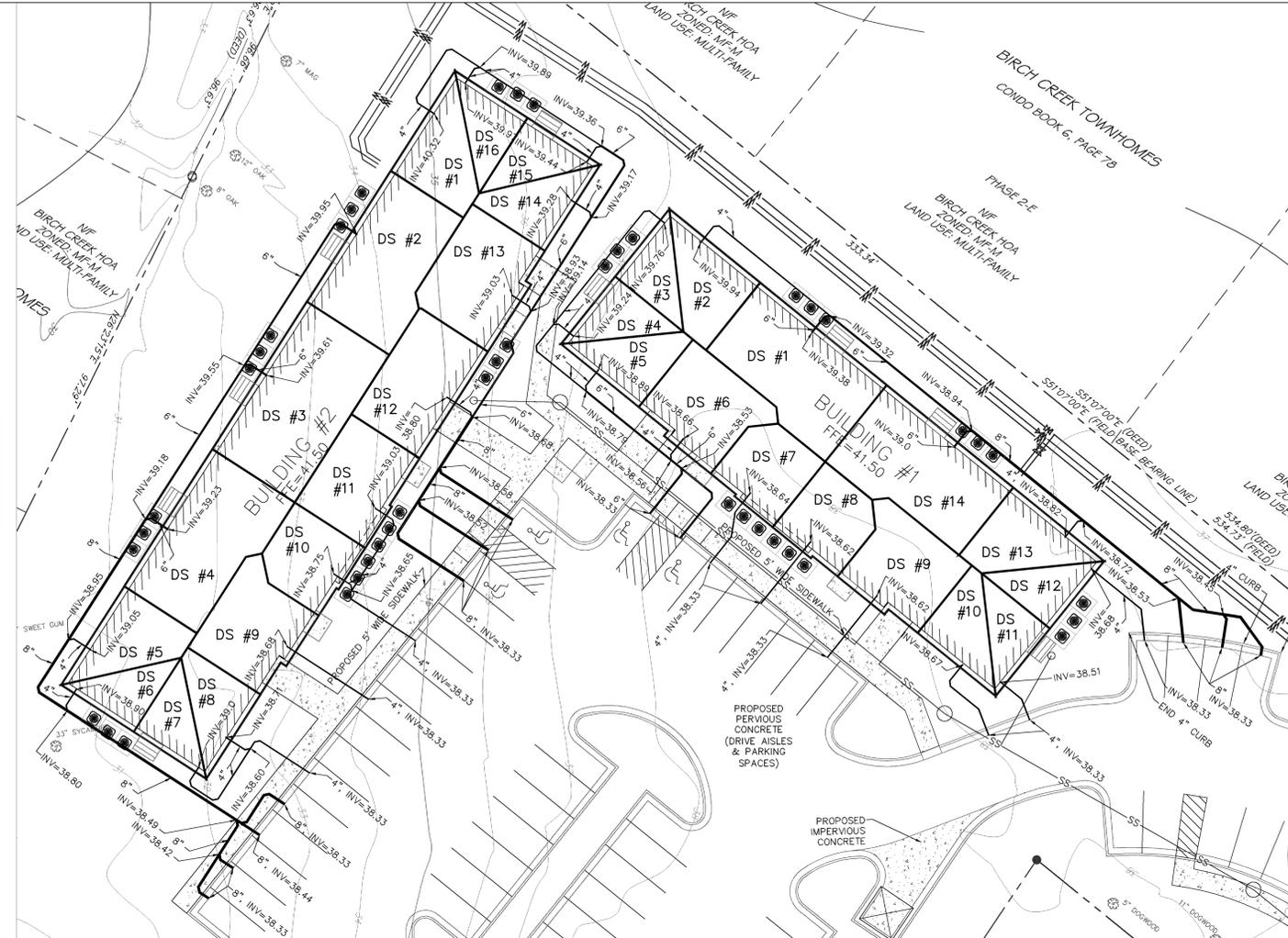
INFILTRATION BASIN #1
 NOT TO SCALE

SWALE #1 DETAIL
 NOT TO SCALE

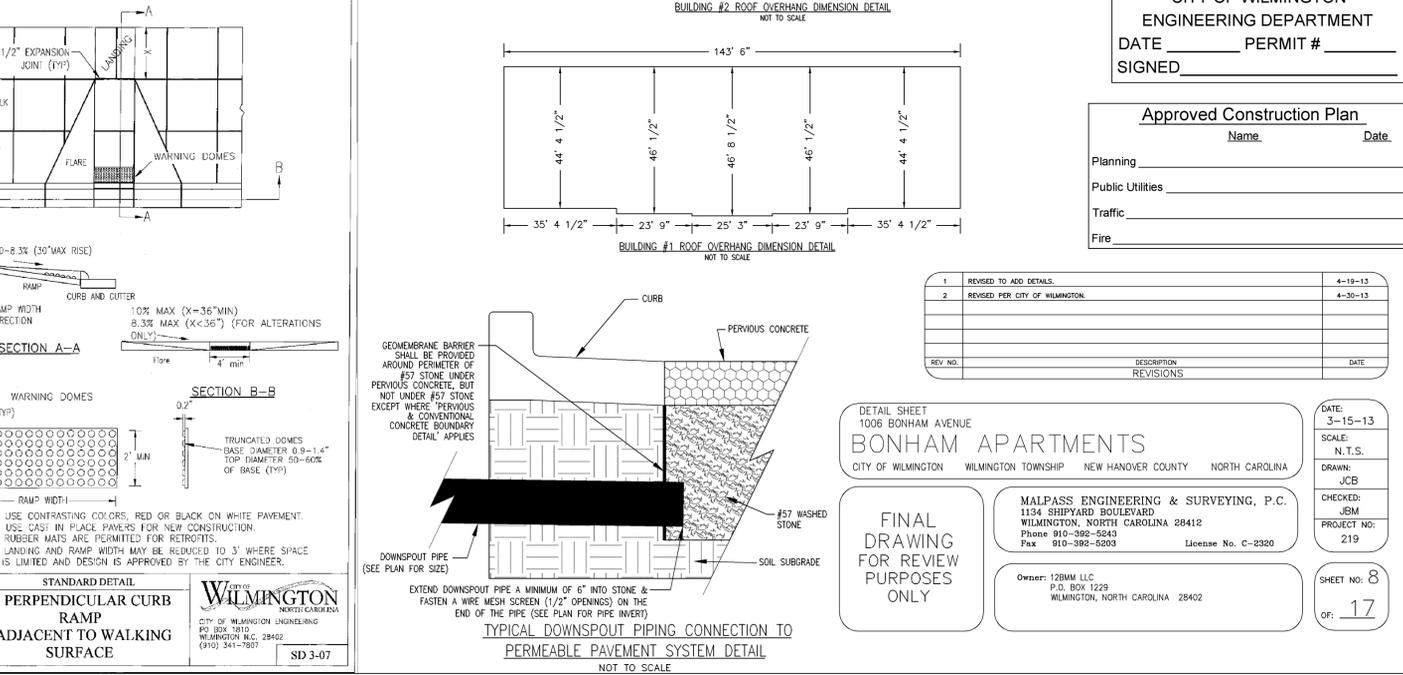
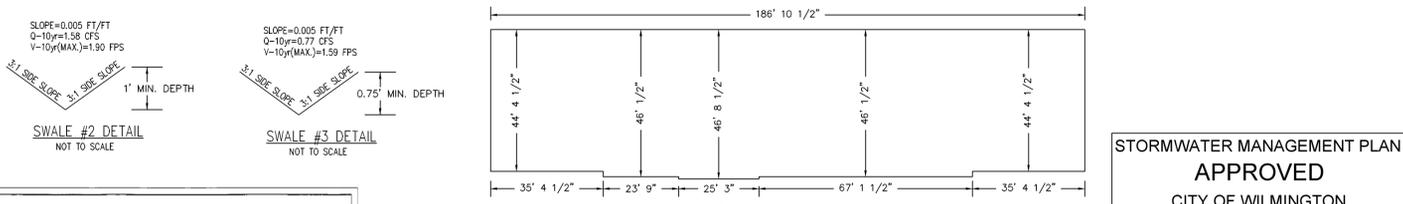
SWALE #2 DETAIL
 NOT TO SCALE

SWALE #3 DETAIL
 NOT TO SCALE

PERPENDICULAR CURB RAMP ADJACENT TO WALKING SURFACE
 SD 3-07



DOWNSPOUT PIPING LAYOUT & DRAINAGE AREAS
 SCALE: 1"=20'



STORMWATER MANAGEMENT PLAN APPROVED
 CITY OF WILMINGTON ENGINEERING DEPARTMENT
 DATE: _____ PERMIT # _____
 SIGNED: _____

Approved Construction Plan
 Name: _____ Date: _____

Planning _____
 Public Utilities _____
 Traffic _____
 Fire _____

REV. NO.	DESCRIPTION	DATE
1	REVISED TO ADD DETAILS.	4-19-13
2	REVISED PER CITY OF WILMINGTON.	4-30-13

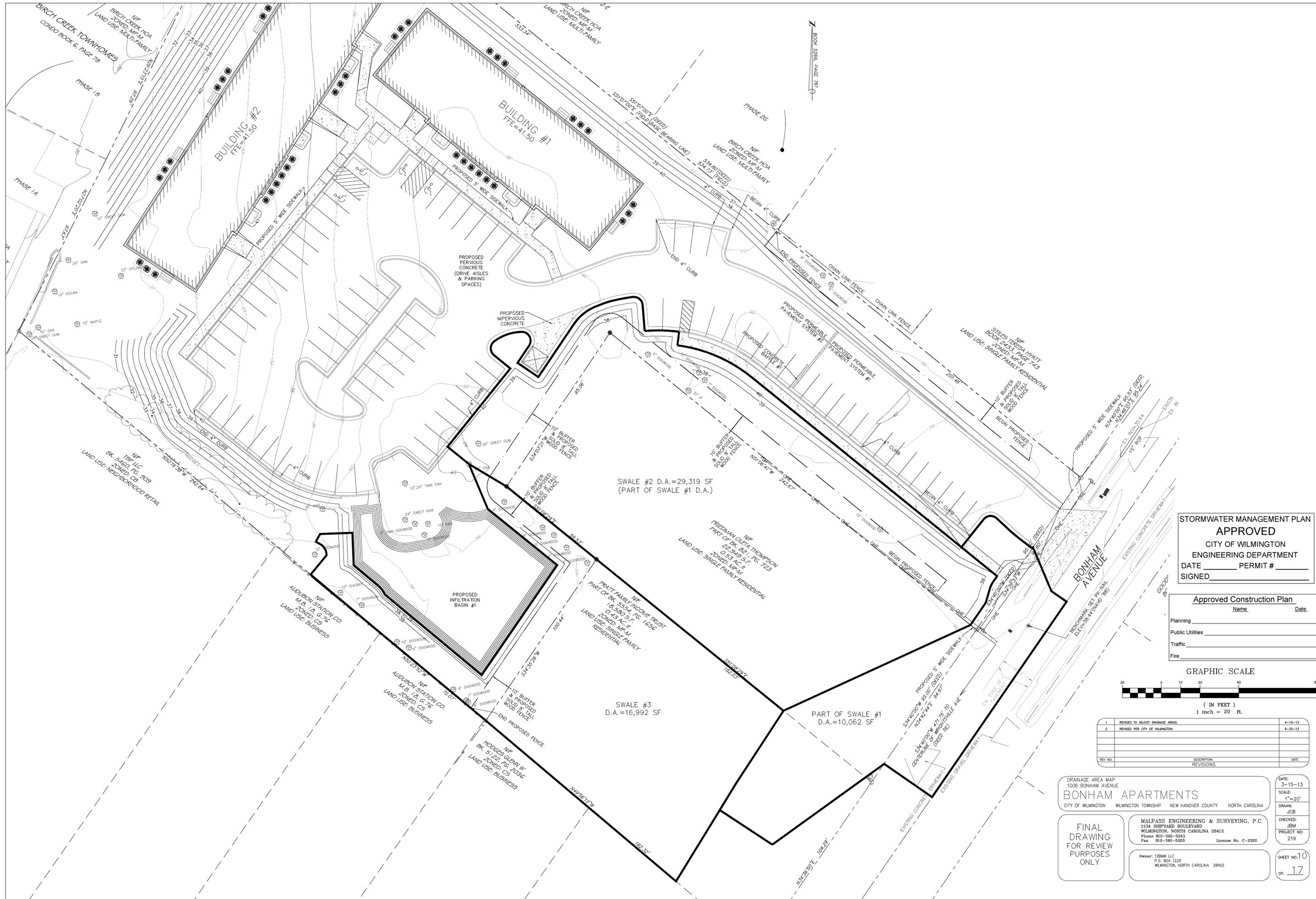
DETAIL SHEET
 1006 BONHAM AVENUE
BONHAM APARTMENTS
 CITY OF WILMINGTON WILMINGTON TOWNSHIP NEW HANOVER COUNTY NORTH CAROLINA

FINAL DRAWING FOR REVIEW PURPOSES ONLY

MALPASS ENGINEERING & SURVEYING, P.C.
 1134 SHPPYARD BOULEVARD
 WILMINGTON, NORTH CAROLINA 28412
 Phone 910-392-5843
 Fax 910-392-5203 License No. C-2380

Owner: 128UM LLC
 P.O. BOX 1229
 WILMINGTON, NORTH CAROLINA 28402

DATE: 3-15-13
SCALE: N.T.S.
DRAWN: JCB
CHECKED: JEM
PROJECT NO: 219
SHEET NO: 8
OF: 17

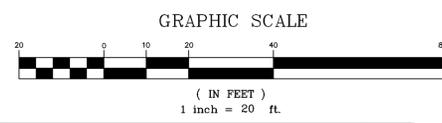


Z BOOK 5986, PAGE 781

STORMWATER MANAGEMENT PLAN
APPROVED
 CITY OF WILMINGTON
 ENGINEERING DEPARTMENT
 DATE _____ PERMIT # _____
 SIGNED _____

Approved Construction Plan

Name	Date
Planning	_____
Public Utilities	_____
Traffic	_____
Fire	_____



REV. NO.	DESCRIPTION	DATE
1	REVISED TO ADJUST DRAINAGE AREAS.	4-19-13
2	REVISED PER CITY OF WILMINGTON.	4-30-13

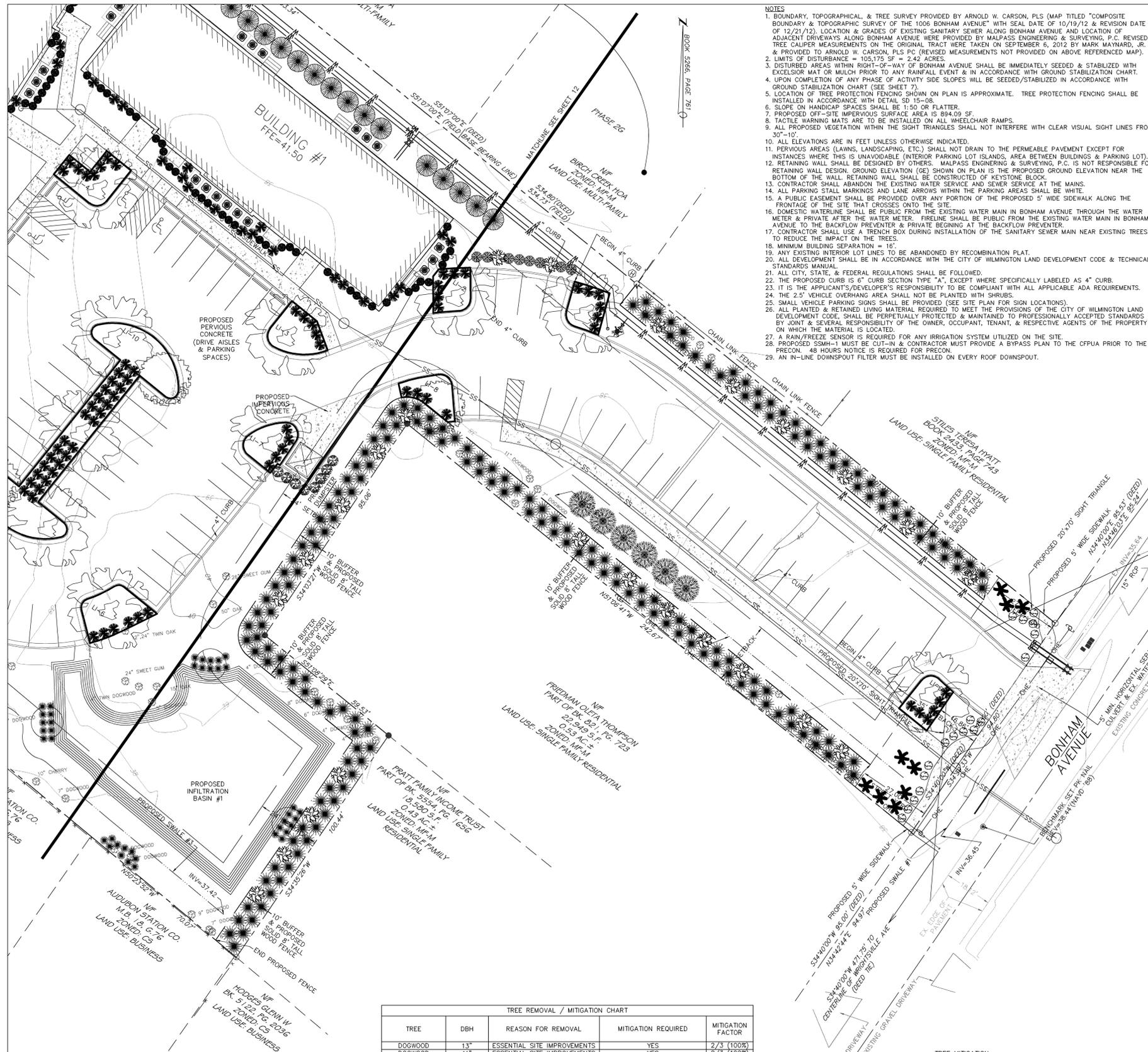
DRAINAGE AREA MAP
 1006 BONHAM AVENUE
BONHAM APARTMENTS
 CITY OF WILMINGTON WILMINGTON TOWNSHIP NEW HANOVER COUNTY NORTH CAROLINA

FINAL DRAWING FOR REVIEW PURPOSES ONLY

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 WILMINGTON, NORTH CAROLINA 28402

DATE: 3-15-13
 SCALE: 1"=20'
 DRAWN: JCB
 CHECKED: JEM
 PROJECT NO: 219
 SHEET NO: 10
 OF: 17



- NOTES**
- BOUNDARY, TOPOGRAPHICAL, & TREE SURVEY PROVIDED BY ARNOLD W. CARSON, PLS (MAP TITLED "COMPOSITE BOUNDARY & TOPOGRAPHIC SURVEY OF THE 1006 BONHAM AVENUE" WITH SEAL DATE OF 10/19/12 & REVISION DATE OF 12/21/12). LOCATION & GRADES OF EXISTING SANITARY SEWER ALONG BONHAM AVENUE AND LOCATION OF ADJACENT DRIVEWAYS ALONG BONHAM AVENUE WERE PROVIDED BY MALPASS ENGINEERING & SURVEYING, P.C. REVISED TREE CALIPER MEASUREMENTS ON THE ORIGINAL TRACT WERE TAKEN ON SEPTEMBER 6, 2012 BY MARK MAYNARD, JR. & PROVIDED TO ARNOLD W. CARSON, PLS (REVISED MEASUREMENTS NOT PROVIDED ON ABOVE REFERENCED MAP).
 - LIMITS OF DISTURBANCE = 105,175 SF = 2.42 ACRES.
 - DISTURBED AREAS WITHIN RIGHT-OF-WAY OF BONHAM AVENUE SHALL BE IMMEDIATELY SEEDED & STABILIZED WITH EXCELISOR MAT OR MULCH PRIOR TO ANY RAINFALL EVENT & IN ACCORDANCE WITH GROUND STABILIZATION CHART.
 - UPON COMPLETION OF ANY PHASE OF ACTIVITY SIDE SLOPES WILL BE SEEDED/STABILIZED IN ACCORDANCE WITH GROUND STABILIZATION CHART (SEE SHEET 7).
 - LOCATION OF TREE PROTECTION FENCING SHOWN ON PLAN IS APPROXIMATE. TREE PROTECTION FENCING SHALL BE INSTALLED IN ACCORDANCE WITH DETAIL SD 15-08.
 - SLOPE ON HANDICAP SPACES SHALL BE 1:50 OR FLATTER.
 - PROPOSED OFF-SITE IMPERVIOUS SURFACE AREA IS 894.09 SF.
 - TACTILE WARNING MATS ARE TO BE INSTALLED ON ALL WHEELCHAIR RAMPS.
 - ALL PROPOSED VEGETATION WITHIN THE SIGHT TRIANGLES SHALL NOT INTERFERE WITH CLEAR VISUAL SIGHT LINES FROM 30'-10'.
 - ALL ELEVATIONS ARE IN FEET UNLESS OTHERWISE INDICATED.
 - PERVIOUS AREAS (LAWNS, LANDSCAPING, ETC.) SHALL NOT DRAIN TO THE PERMEABLE PAVEMENT EXCEPT FOR INSTANCES WHERE THIS IS UNAVOIDABLE (INTERIOR PARKING LOT ISLANDS, AREA BETWEEN BUILDINGS & PARKING LOT).
 - RETAINING WALL SHALL BE DESIGNED BY OTHERS. MALPASS ENGINEERING & SURVEYING, P.C. IS NOT RESPONSIBLE FOR RETAINING WALL DESIGN. GROUND ELEVATION (GE) SHOWN ON PLAN IS THE PROPOSED GROUND ELEVATION NEAR THE BOTTOM OF THE WALL. RETAINING WALL SHALL BE CONSTRUCTED OF KEYSTONE BLOCK.
 - CONTRACTOR SHALL ABANDON THE EXISTING WATER SERVICE AND SEWER SERVICE AT THE MAINS.
 - ALL PARKING STALL MARKINGS AND LANE ARROWS WITHIN THE PARKING AREAS SHALL BE WHITE.
 - 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.
 - DOMESTIC WATERLINE SHALL BE PUBLIC FROM THE EXISTING WATER MAIN IN BONHAM AVENUE THROUGH THE WATER METER & PRIVATE AFTER THE WATER METER. METERS SHALL BE PUBLIC FROM THE EXISTING WATER MAIN IN BONHAM AVENUE TO THE BACKFLOW PREVENTER & PRIVATE BEGINNING AT THE BACKFLOW PREVENTER.
 - CONTRACTOR SHALL USE A TRENCH BOX DURING INSTALLATION OF THE SANITARY SEWER MAIN NEAR EXISTING TREES TO REDUCE THE IMPACT ON THE TREES.
 - MINIMUM BUILDING SEPARATION = 16'.
 - ANY EXISTING INTERIOR LOT LINES TO BE ABANDONED BY RECOMBINATION PLAT.
 - ALL DEVELOPMENT SHALL BE IN ACCORDANCE WITH THE CITY OF WILMINGTON LAND DEVELOPMENT CODE & TECHNICAL STANDARDS MANUAL.
 - ALL CITY, STATE, & FEDERAL REGULATIONS SHALL BE FOLLOWED.
 - THE PROPOSED CURB IS 6" CURB SECTION TYPE "A", EXCEPT WHERE SPECIFICALLY LABELED AS 4" CURB.
 - IT IS THE APPLICANT'S/DEVELOPER'S RESPONSIBILITY TO BE COMPLIANT WITH ALL APPLICABLE ADA REQUIREMENTS.
 - THE 2.5' VEHICLE OVERHANG AREA SHALL NOT BE PLANTED WITH SHRUBS.
 - SMALL VEHICLE PARKING SIGNS SHALL BE PROVIDED (SEE SITE PLAN FOR SIGN LOCATIONS).
 - ALL PLANTED & RETAINED LIVING MATERIAL REQUIRED TO MEET THE PROVISIONS OF THE CITY OF WILMINGTON LAND DEVELOPMENT CODE, SHALL BE PERPETUALLY 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.
 - A RAIN/FREEZE SENSOR IS REQUIRED FOR ANY IRRIGATION SYSTEM UTILIZED ON THE SITE.
 - PROPOSED SSMH-1 MUST BE CUT-IN & CONTRACTOR MUST PROVIDE A BYPASS PLAN TO THE CPUPA PRIOR TO THE PRECORD. 48 HOURS NOTICE IS REQUIRED FOR PRECORD.
 - AN IN-LINE DOWNSPOUT FILTER MUST BE INSTALLED ON EVERY ROOF DOWNSPOUT.

TREES PER DISTURBED ACRE
 2.42 ACRES * 15 = 36.3, 36 TREES REQUIRED
 39 TREES RETAINED
 135 TREES PROPOSED (9 STREET YARD, 14 INTERIOR LANDSCAPE ISLAND, 22 BUFFER YARD, 2 PARKING BUFFER, 3 STORMWATER LANDSCAPE, 85 MITIGATION)
 174 TREES (TOTAL)
 *SEE LANDSCAPING PLAN FOR PROVIDED TREES

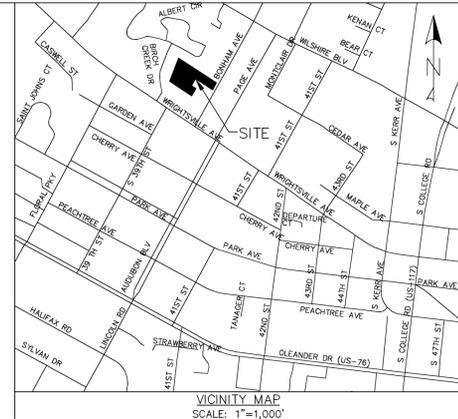
INTERIOR SHADING
 PARKING FACILITY AREA (PARKING LOT AREA TO BACK OF CURB MINUS LANDSCAPE ISLANDS PLUS DRIVEWAY WITHIN BONHAM AVE. R/W)
 = 31,367.32 SF
 REQUIRED INTERIOR SHADING (IS) = 0.2 * 31,367.32 = 6,273.47 SF
 PROVIDED INTERIOR SHADING (LANDSCAPE ISLANDS 1-10) = 6,797 SF
 *SEE LANDSCAPING PLAN FOR PROVIDED TREES

FOUNDATION PLANTING—SOUTHEAST SIDE OF BUILDING #1
 REQUIRED FOUNDATION PLANTING (MAX.) = (41.71' * 29.71') * 0.12 = 148.71 SF
 PROVIDED FOUNDATION PLANTING = 150.89 SF
 *SEE LANDSCAPING PLAN FOR PROVIDED PLANTINGS

FOUNDATION PLANTING—SOUTHWEST SIDE OF BUILDING #1
 REQUIRED FOUNDATION PLANTING (MAX.) = [(140.84' * 29.71') + (70.09' * 2.17') + (0.5' * 23.72' * 7.01')] * 0.12 = 530.34 SF
 PROVIDED FOUNDATION PLANTING = 551.18 SF
 *SEE LANDSCAPING PLAN FOR PROVIDED PLANTINGS

FOUNDATION PLANTING—SOUTHEAST SIDE OF BUILDING #2
 REQUIRED FOUNDATION PLANTING (MAX.) = [(114.21' * 29.71') + (113.46' * 2.17') + (0.5' * 23.72' * 7.01')] * 0.12 = 696.26 SF
 PROVIDED FOUNDATION PLANTING = 712.26 SF
 *SEE LANDSCAPING PLAN FOR PROVIDED PLANTINGS

INTERIOR LANDSCAPING ISLANDS				
LANDSCAPE ISLAND	TOTAL AREA (SF)	IMPERVIOUS AREA (SF)	PERCENT IMPERVIOUS	INTERIOR SHADING (SF)
LI-1	217.17	0	0	354
LI-2	217.86	0	0	354
LI-3	284.49	0	0	707
LI-4	312.76	0	0	354
LI-5	286.65	0	0	354
LI-6	351.90	0	0	707
LI-7	244.73	0	0	707
LI-8	217.76	0	0	157
LI-9	220.36	0	0	354
LI-10	1,466.02	0	0	2,749



- LEGEND**
- = EXISTING IRON PIPE
 - = SET IRON ROD
 - ⊙ = SET PK NAIL
 - ⊕ = EXISTING POWER POLE
 - ⊖ = EXISTING WATER METER
 - ⊞ = EXISTING MAILBOX
 - ☆ = EXISTING LIGHT POLE
 - ⊞ = EXISTING FIRE HYDRANT
 - ⊞ = EXISTING TREE
 - ⊞ = EXISTING CONTOUR
 - ⊞ = CENTERLINE
 - R/W = EXISTING OVERHEAD LINE
 - ⊞ = EXISTING DITCH
 - ⊞ = EXISTING FENCE
 - ⊞ = PROPERTY LINE
 - ⊞ = ADJACENT LOT LINES (APPROX.)
 - ⊞ = PROPOSED BUFFER/SOLID FENCE
 - ⊞ = PROPOSED SETBACK
 - ⊞ = PROPOSED STREET YARD
 - ⊞ = PROPOSED WATER MAIN
 - ⊞ = PROPOSED SANITARY SEWER
 - ⊞ = PROPOSED GATE VALVE
 - ⊞ = PROPOSED FIRE HYDRANT
 - ⊞ = PROPOSED SWALE

PLANT SCHEDULE

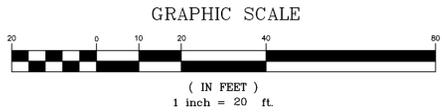
TREES	QTY	BOTANICAL NAME / COMMON NAME	CALIPER	HEIGHT @ PLANTING
11	QUERCUS PHELLOS / WILLOW OAK	2" (MIN.)		
3	CERCIS CANADENSIS / RED BUD	2" (MIN.)	8'-10'	
9	MAGNOLIA STELLATA / STAR MAGNOLIA	2" (MIN.)	8'-10'	
24	PRUNUS SERRULATA / JAPANESE FLOWERING CHERRY	2" (MIN.)	8'-10'	
3	BETULA NIGRA / RIVER BIRCH	2" (MIN.)		
79	ILEX VOMITORIA / YAUPON HOLLY	2" (MIN.)		
6	PINUS PALUSTRIS / LONG LEAF PINE	PLUGS		
8	PITTIOSPORUM TOBIRA / DWARF PITTIOSPORUM		12" (MIN.)	
18	ILEX CRENATA / HELLERI		12" (MIN.)	
119	ILEX VOMITORIA NANA / DWARF YAUPON HOLLY		12" (MIN.)	
71	HEMEROCALLIS SPP. / DAYLILY		12" (MIN.)	
184	LIGUSTRUM JAPONICUM / WAX LEAF LIGUSTRUM		36" (MIN.)	
8	ILEX CORNUTA / DWARF BUFORD HOLLY		36" (MIN.)	
40	PENNISSETUM ALOOPECUROIDES CASSIAN / DWARF FOUNTAIN GRASS		12" (MIN.)	

STREET YARD ALONG BONHAM AVENUE
 STREET FRONTAGE = 94.80 = 24' * 70.80 FT
 REQUIRED STREET YARD = 18' * 70.80 = 1,274.40 SF
 PROVIDED STREET YARD = 512.33 + 1,187.88 = 1,700.21 SF
 IMPERVIOUS AREA = 365.59 SF
 PERCENT IMPERVIOUS = 365.59 / 1,700.21 * 100% = 21.51% *
 *OVER 15% MAXIMUM BECAUSE A MAJORITY OF THE FRONTAGE SIDEWALK REQUIRED BY THE CITY OF WILMINGTON NEEDED TO BE LOCATED ON THE SITE INSTEAD OF WITHIN THE BONHAM AVENUE R/W DUE TO CONFLICT WITH EXISTING POWER POLES AND ROADSIDE DITCH, AND THE SITE HAS A SMALL ROAD FRONTAGE WIDTH.
 REQUIRED PLANTING = 1,700.21 / 600 = 2.84, 3 CANOPY TREES (OR 3 UNDERSTORY TREES PER 1 CANOPY TREE)
 2.84 * 6 = 17.04, 18 SHRUBS
 PROVIDED PLANTINGS = 9 UNDERSTORY TREES, 18 SHRUBS

TREE REMOVAL / MITIGATION CHART

TREE	DBH	REASON FOR REMOVAL	MITIGATION REQUIRED	MITIGATION FACTOR
DOGWOOD	13"	ESSENTIAL SITE IMPROVEMENTS	YES	2/3 (100%)
DOGWOOD	11"	ESSENTIAL SITE IMPROVEMENTS	YES	2/3 (100%)
DOGWOOD	12"	ESSENTIAL SITE IMPROVEMENTS	YES	2/3 (100%)
PECAN	13"	ESSENTIAL SITE IMPROVEMENTS	EXEMPT	-
PECAN	13"	ESSENTIAL SITE IMPROVEMENTS	EXEMPT	-
OAK	24"	ESSENTIAL SITE IMPROVEMENTS	YES	2/3 (100%)
SWEET GUM	18"	ESSENTIAL SITE IMPROVEMENTS	EXEMPT	-
HOLLY	3'-6"	ESSENTIAL SITE IMPROVEMENTS	EXEMPT	-
PEAR	6"	ESSENTIAL SITE IMPROVEMENTS	EXEMPT	-
PINE	27"	ESSENTIAL SITE IMPROVEMENTS	EXEMPT	-
DOGWOOD	8"	ESSENTIAL SITE IMPROVEMENTS	YES	2/3 (100%)
SWEET GUM	20"	ESSENTIAL SITE IMPROVEMENTS	EXEMPT	-
SWEET GUM	8"	ESSENTIAL SITE IMPROVEMENTS	EXEMPT	-
CHERRY	15"	ESSENTIAL SITE IMPROVEMENTS	NO; >50% DISEASED/DAMAGED	-
SWEET GUM	8"	ESSENTIAL SITE IMPROVEMENTS	EXEMPT	-
OAK	21"	ESSENTIAL SITE IMPROVEMENTS	EXEMPT	-
OAK	24"	ESSENTIAL SITE IMPROVEMENTS	YES	2/3 (100%)
TWIN DOGWOOD	12", 14"	ESSENTIAL SITE IMPROVEMENTS	YES	2/3 (100%)
SWEET GUM	18"	ESSENTIAL SITE IMPROVEMENTS	EXEMPT	-
SWEET GUM	14"	ESSENTIAL SITE IMPROVEMENTS	EXEMPT	-
PINE	34"	ESSENTIAL SITE IMPROVEMENTS	YES	1/3 (50%)
SWEET GUM	18"	ESSENTIAL SITE IMPROVEMENTS	EXEMPT	-
SWEET GUM	18"	ESSENTIAL SITE IMPROVEMENTS	EXEMPT	-
SWEET GUM	18"	ESSENTIAL SITE IMPROVEMENTS	EXEMPT	-
TWIN SWEET GUM	12", 18"	ESSENTIAL SITE IMPROVEMENTS	EXEMPT	-

TREE MITIGATION
 TOTAL PINE TREE DBH = 34"
 REQUIRED # OF PINE PLUGS = (1 / 3) * 0.5 * 34 = 5.67, 6 PLUGS
 PROVIDED # OF PINE PLUGS = 6 PLUGS (LONG LEAF PINE)
 TOTAL OTHER TREE DBH (100% MITIGATION) = 118"
 REQUIRED # OF REPLACEMENT TREES = (2 / 3) * 1.0 * 118 = 78.67, 79 TREES
 PROVIDED # OF REPLACEMENT TREES = 79 TREES (YAUPON HOLLY)



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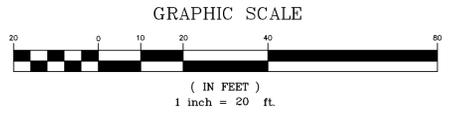
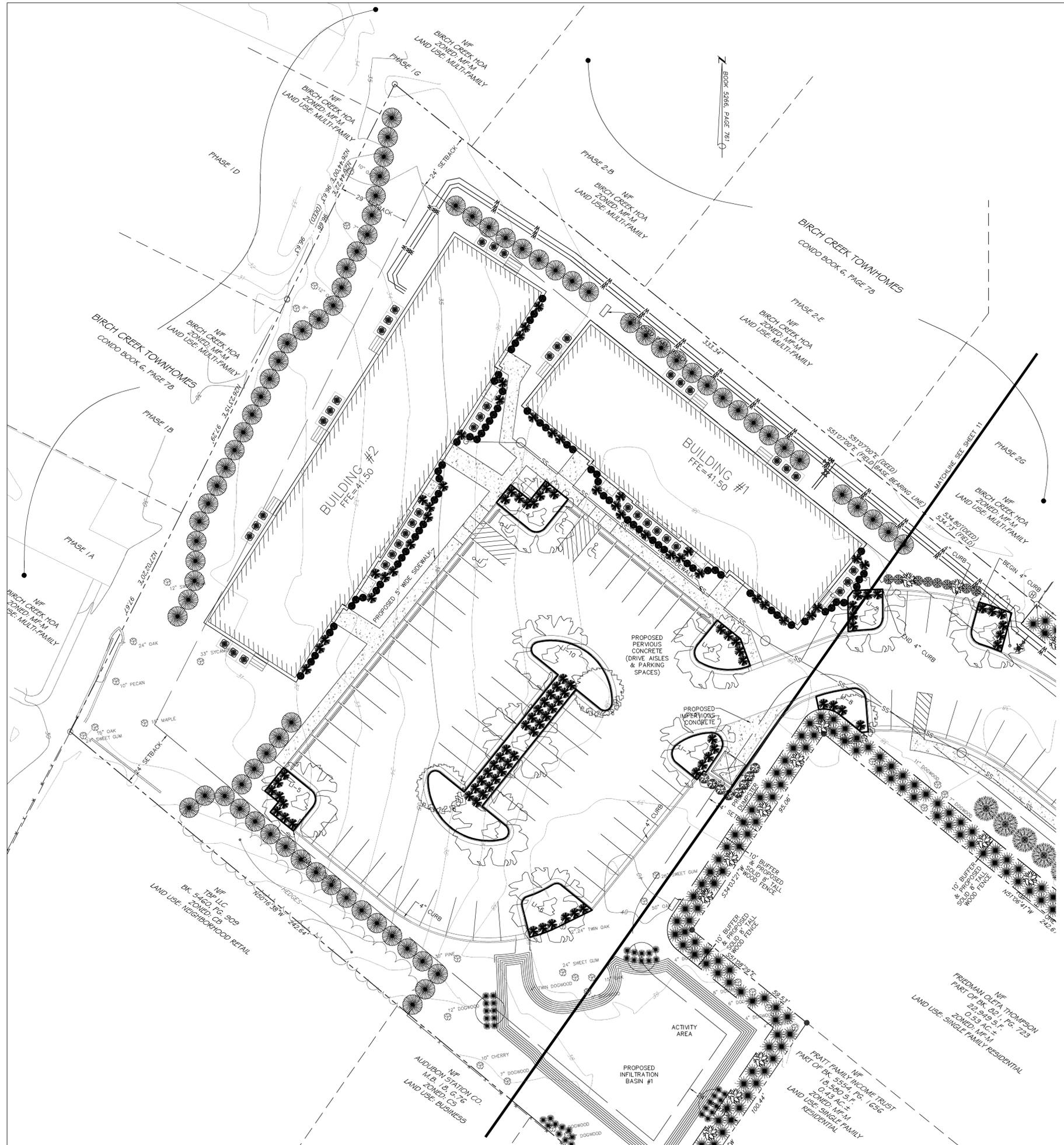
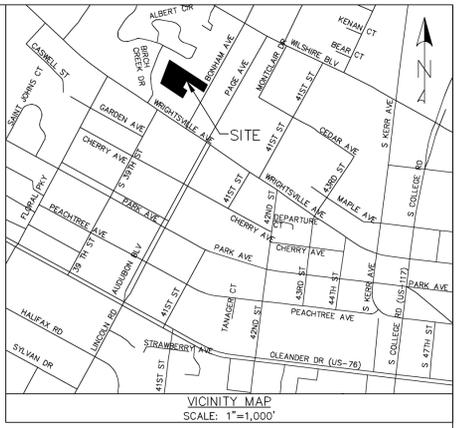
REV. NO.	DESCRIPTION	DATE
1	REVISED PER CITY OF WILMINGTON	4-10-13
2	REVISED PER CITY OF WILMINGTON	4-30-13

LANDSCAPE PLAN
 1006 BONHAM AVENUE
BONHAM APARTMENTS
 CITY OF WILMINGTON WILMINGTON TOWNSHIP NEW HANOVER COUNTY NORTH CAROLINA

MALPASS ENGINEERING & SURVEYING, P.C.
 1134 SHIPYARD BOULEVARD
 WILMINGTON, NORTH CAROLINA 28412
 Phone 910-392-5843
 Fax 910-392-5203 License No. C-2380

Owner: 1280M LLC
 P.O. BOX 1229
 WILMINGTON, NORTH CAROLINA 28402

DATE: 3-15-13
 SCALE: 1"=20'
 DRAWN: JCB
 CHECKED: JEM
 PROJECT NO: 219
 SHEET NO: 11
 OF: 17



REV NO.	DESCRIPTION	DATE
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STORMWATER MANAGEMENT PLAN
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Approved Construction Plan	
Name	Date
Planning _____	_____
Public Utilities _____	_____
Traffic _____	_____
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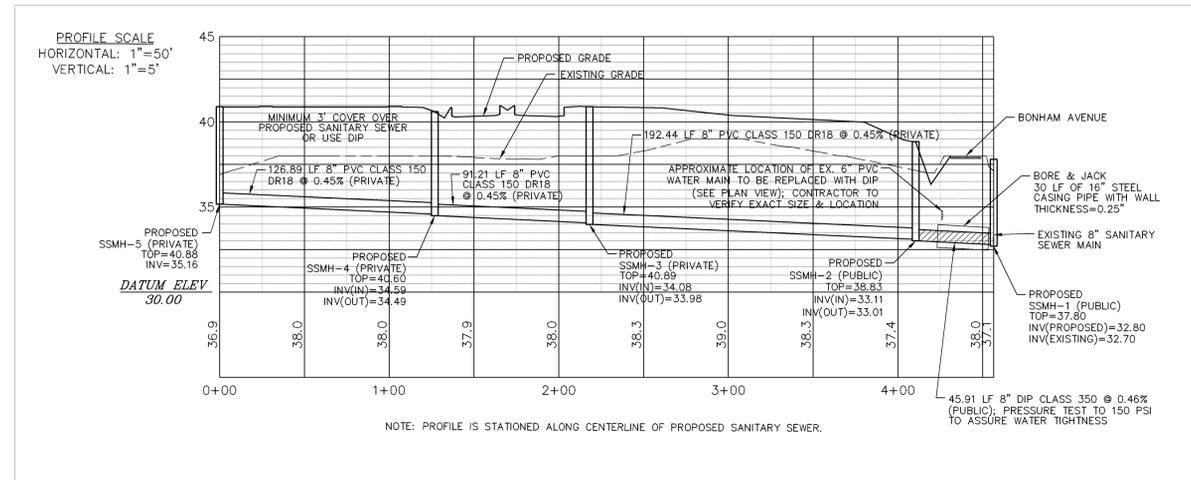
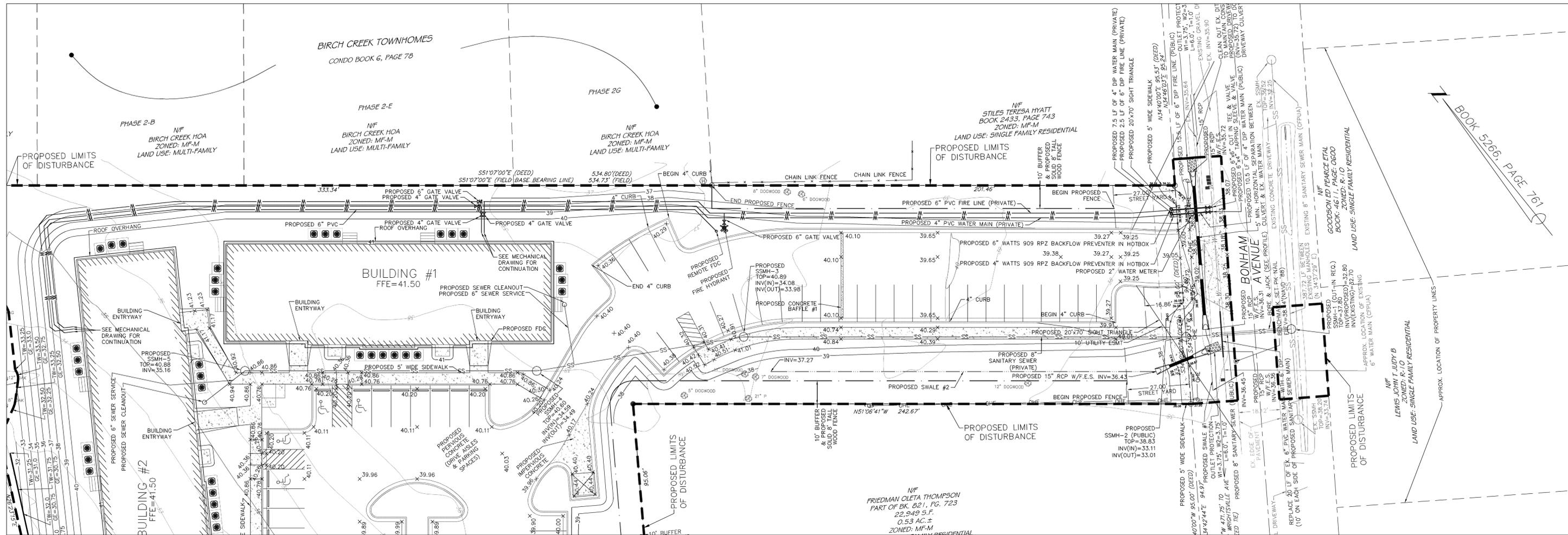
LANDSCAPE PLAN
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BONHAM APARTMENTS
 CITY OF WILMINGTON WILMINGTON TOWNSHIP NEW HANOVER COUNTY NORTH CAROLINA

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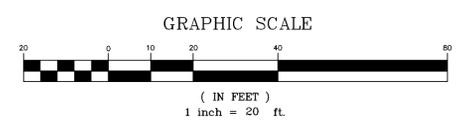
Owner: 128UM LLC
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DATE: 3-15-13
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 SHEET NO: 12
 OF: 17



LEGEND

- = EXISTING IRON PIPE
- = SET IRON ROD
- ⊙ = SET PK NAIL
- ⊕ = EXISTING POWER POLE
- ⊖ = EXISTING WATER METER
- ⊞ = EXISTING LIGHT BOX
- ⊛ = EXISTING LIGHT POLE
- ⊚ = EXISTING FIRE HYDRANT
- ⊗ = EXISTING TREE
- ⊘ = EXISTING CONTOUR
- = CENTERLINE
- = R/W
- = EXISTING OVERHEAD LINE
- = EXISTING DITCH
- = EXISTING FENCE
- = EXISTING WATER MAIN
- = EXISTING SANITARY SEWER MAIN
- = PROPERTY LINE
- = ADJACENT LOT LINES (APPROX.)
- = PROPOSED BUFFER/SOLID FENCE
- = PROPOSED CULVERT
- = PROPOSED STREET YARD
- = PROPOSED WATER MAIN
- = PROPOSED SANITARY SEWER
- = PROPOSED GATE VALVE
- = PROPOSED FIRE HYDRANT
- = PROPOSED SPOT ELEVATION
- = PROPOSED CONTOUR
- = PROPOSED LIMITS OF DISTURBANCE
- = PROPOSED SWALE



1	REVISED PER CITY OF WILMINGTON.	4-19-13
2	REVISED PER CITY OF WILMINGTON.	4-30-13
REV. NO.	DESCRIPTION	DATE
	REVISIONS	

STORMWATER MANAGEMENT PLAN
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CITY OF WILMINGTON
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Approved Construction Plan

Name	Date
Planning _____	
Public Utilities _____	
Traffic _____	
Fire _____	

- CAPE FEAR PUBLIC UTILITY AUTHORITY STANDARD SEWER NOTES:**
- SEWER GUARDS REQUIRED AT ALL MANHOLES. STAINLESS STEEL SEWER GUARDS REQUIRED AT MANHOLES LOCATED IN TRAFFIC AREAS.
 - SERVICES SHALL BE PERPENDICULAR TO MAIN AND TERMINATE AT RIGHT-OF-WAY LINE. SERVICES IN CUL-DE-SACS ARE REQUIRED TO BE PERPENDICULAR, OR MUST ORIGINATE IN MANHOLE AND TERMINATE AT RIGHT-OF-WAY LINE.
 - ALL SERVICES TYING INTO DUCTILE IRON MAINS SHALL BE CONSTRUCTED OF CLASS 50, DIP, WITH PROTECTO 401 CERAMIC EPOXY LINING.
 - MINIMUM 10' UTILITIES EASEMENT PROVIDED ALONG THE FRONTAGE OF ALL LOTS AND AS SHOWN FOR NEW DEVELOPMENTS.
 - NO FLEXIBLE COUPLINGS SHALL BE USED.
 - ALL STAINLESS STEEL FASTENERS SHALL BE 316.

STANDARD SEWER NOTES
(REQUIRED ON ALL SEWER PLAN AND PROFILE SHEETS)

PLAN PROFILE
1006 BONHAM AVENUE
BONHAM APARTMENTS
CITY OF WILMINGTON WILMINGTON TOWNSHIP NEW HANOVER COUNTY NORTH CAROLINA

MALPASS ENGINEERING & SURVEYING, P.C.
1134 SHIPYARD BOULEVARD
WILMINGTON, NORTH CAROLINA 28412
Phone 910-392-5843
Fax 910-392-5203 License No. C-2320

DATE: 3-15-13
SCALE: 1"=20'
DRAWN: JCB
CHECKED: JEM
PROJECT NO: 219
SHEET NO: 3
OF: 17