Approved Construction Plan	
	Name / Date
Planning	
Public Utilities	
Traffic	
Fire	

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

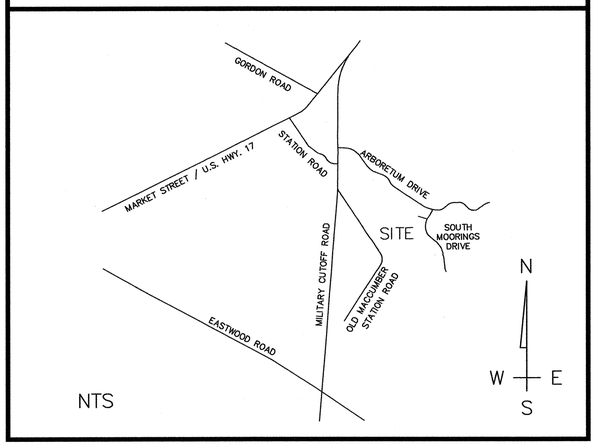
For each open utility cut of City streets, a $325 permit shall be required from the City prior to occupancy and/or project acceptance.

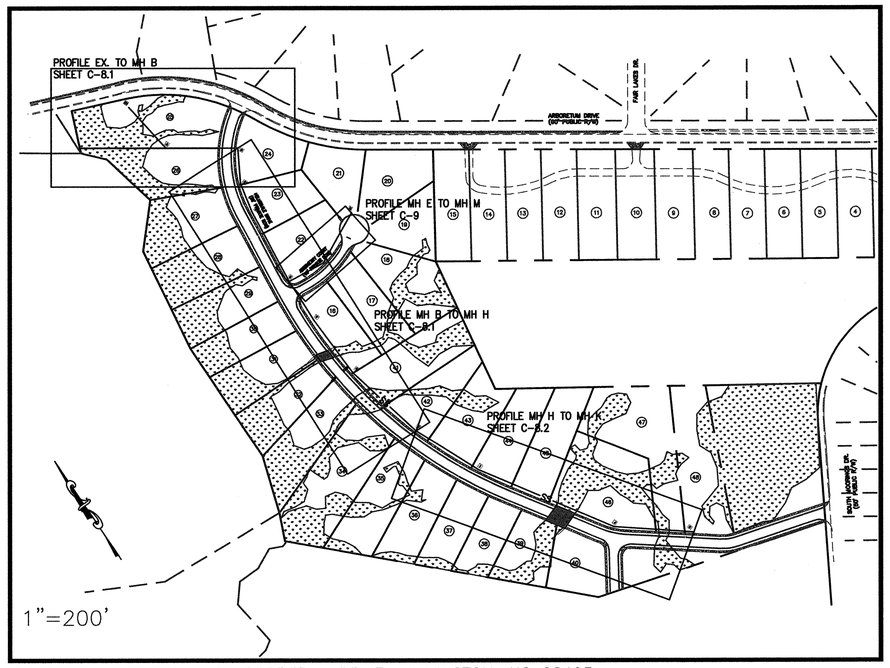
NCDENR PWSS WATER PERMIT #: 07-01574
WATER CAPACITY: _____ GPD
DWQ SEWER PERMIT #: WQ0033225
SEWER CAPACITY: _____ GPD
SEWER SHED # AND PLANT: _____
SEWER TO FLOW THROUGH NEI: YES or NO (CIRCLE ONE)

SITE DEVELOPMENT PLANS
FOR
HELMSDALE @ LANDFALL
PHASE 2
CITY OF WILMINGTON
AUGUST 14, 2007
(UPDATED APRIL 2014)

CONSTRUCTION PLANS
FOR: HELMSDALE @ LANDFALL – PHASE 2
W&R PROJECT NO.: 03050283.01

VICINITY MAP





PROPERTY ADDRESS: 558 ARBORETUM DRIVE, WILMINGTON, NC 28405

INDEX OF SHEETS

COVER SHEET	SHT C-0
GENERAL NOTES	SHT C-1
EXISTING CONDITIONS	SHT C-2
SITE INVENTORY MAP/SITE LAYOUT/TREE PRESERVATION	SHT C-3.1-3.3
UTILITY PLAN	SHT C-4.1-4.2
EROSION CONTROL PLAN	SHT C-5.1-5.2
GRADING PLAN	SHT C-6.1-6.2
DRAINAGE AREA PLAN	SHT C-7
HELMSDALE DRIVE PLAN & PROFILE	SHT C-8.1-8.2
ABERNETHY DRIVE & WINCHESTER TERRACE PLAN & PROFILE	SHT C-9
LANDSCAPE PLAN	SHT C-10
SWALE DETAILS	SHT C-11.1
DRY DETENTION AREA DETAILS	SHT C-11.2
DRY DETENTION AREA DETAILS	SHT C-11.3
STANDARD DETAILS	SHT C-12.1
CFPUA SEWER DETAILS	SHT C-12.2
CFPUA SEWER DETAILS	SHT C-12.3
CFPUA SEWER DETAILS	SHT C-12.4
CFPUA SEWER DETAILS	SHT C-12.5
CFPUA WATER DETAILS	SHT C-12.6
CFPUA WATER DETAILS	SHT C-12.7
EROSION & SEDIMENT CONTROL DETAILS	SHT C-12.8
STORM DRAINAGE DETAILS	SHT C-12.9

LEGEND

DESCRIPTION	EXISTING	PROPOSED
1' CONTOUR INTERVAL		
5' CONTOUR INTERVAL		
PROPERTY LINE		
ROADWAY CENTERLINE		
RIGHT OF WAY LIMITS		
EASEMENT LINE		
CURB & GUTTER		
SANITARY SEWER FACILITIES	SS	SS
STORM SEWER FACILITIES		
WATERLINE	W	W
FIRE HYDRANT ASSEMBLY		
FENCING STRUCTURE		
WOODSLINE		N/A
WATERWAYS		N/A
TREE PROTECTION FENCE	N/A	TP
SILT FENCE	N/A	SF

DEVELOPER/OWNER

HELMSDALE INVESTORS, LCC
100 WESTON ESTATES WAY
CARY, NC 27513
(919) 481-3000

ATTN: TIM SMITH

NORTH CAROLINA PROFESSIONAL SEAL 39113 ENGINEER JOSEPH S. BOYD
4-28-14

THIS PLAN SET WAS DESIGNED AND LAST SIGNED BY GARRY S. PAPE (PE LICENSE # 031315) ON 7/9/08. THIS REVISED SET IS ONLY PER REVISIONS BY THE GOVERNING AGENCIES AND VARIOUS SITE EDITS.

PREPARED BY:

WITHERS & RAVENEL
ENGINEERS | PLANNERS | SURVEYORS
1410 Commonwealth Drive, Unit 101, Wilmington, NC 28403
tel: 910-256-9277 fax: 910-256-2584 www.withersravenel.com

SITE DEVELOPMENT DATA

DEVELOPMENT DATA :
TOTAL LOTS PROPOSED – 33
IMPERVIOUS SURFACE (PROPOSED):
ROADWAY – 79,966 SF
SIDEWALK – 26,526 SF
LOTS – 185,658 SF

GENERAL NOTES:

1. NEW HANOVER COUNTY PARCEL NO.(S): *3158(15) – 64 – 5396*
2. TOTAL TRACT AREA: 31.94 ACRES
3. EXISTING ZONING DISTRICT: R–20
4. LAND CLASSIFICATION: RESOURCE PROTECTION & CONSERVATION
5. *SETBACKS (CITY OF WILMINGTON):*
   FRONT–30
   SIDE–15
   BACK–25
6. *THIS PHASE IS LOCATED IN ZONE "AE" ACCORDING TO THE FEDERAL EMERGENCY MANAGEMENT AGENCY'S INSURANCE RATE MAP COMMUNITY–PANEL NUMBER 3720315800J DATED APRIL 3, 2006, 100–YEAR FLOOD ELEV=10.00*

NOTE:
ALL DESIGN AND CONSTRUCTION SHALL BE IN CONFORMANCE WITH THE CITY OF WILMINGTON, THE CAPE FEAR UTILITY AUTHORITY & STATE OF NORTH CAROLINA

W:\13\13-0480\130481-Helmsdale\CAD\2013 Updated Plans\SHEETS\C-0 COVER.dwg– Tuesday, April 29, 2014 2:11:00 PM – BOYD, JOSEPH

COORDINATION NOTES:

1. THE CONTRACTOR IS REQUIRED TO OBTAIN ANY/ALL PERMITS REQUIRED FOR CONSTRUCTION OF THESE PLANS.
2. ALL WORK IS TO BE IN ACCORDANCE WITH THE CITY OF WILMINGTON, CAPE FEAR PUBLIC UTILITY AUTHORITY, NEW HANOVER COUNTY, AND THE STATE OF NORTH CAROLINA.
3. THE CONTRACTOR IS TO ESTABLISH AND CHECK ALL HORIZONTAL AND VERTICAL CONTROLS TO BE USED WITH THE PROJECT. IN ADDITION, THE CONTRACTOR IS TO COMPUTE THE LAYOUT OF THE ENTIRE SITE PLAN IN ADVANCE OF BEGINNING ANY WORK ASSOCIATED WITH THE SUBJECT PLANS. CONTRACTOR SHALL EMPLOY A PROFESSIONAL SURVEYOR TO PERFORM SITE IMPROVEMENT STAKEOUT(S).
4. ANY TIME WORK IS PERFORMED OFF-SITE OR WITHIN AN EXISTING EASEMENT, THE CONTRACTOR IS TO NOTIFY THE HOLDER OF SAID EASEMENT AS TO THE NATURE OF PROPOSED WORK, AND TO FOLLOW ANY GUIDELINES OR STANDARDS WHICH ARE ASSOCIATED WITH OR REFERENCED IN THE RECORDED EASEMENT.
5. THE CONTRACTOR SHALL SCHEDULE A PRECONSTRUCTION MEETING WITH THE CITY OF WILMINGTON INSPECTOR AND NOTIFY THE ENGINEER AT LEAST 48 HOURS PRIOR TO THE MEETING. AT A MINIMUM; THE CONTRACTOR, CITY INSPECTOR, AND ENGINEER SHALL ATTEND THIS MEETING.

GENERAL NOTES:

1. THE TOPOGRAPHY AND UTILITIES HAVE BEEN PROVIDED BY WITHERS & RAVENEL. THE BOUNDARY AND WETLAND SURVEY HAVE BEEN PROVIDED BY HOBBS SURVEYING COMPANY, INC. THE TREE SURVEY HAS BEEN PROVIDED BY HANOVER DESIGN SERVICES, PA.
2. REASONABLE CARE HAS BEEN EXERCISED IN SHOWING THE LOCATION OF EXISTING UTILITIES ON THE PLANS. THE EXACT LOCATION OF ALL EXISTING UTILITIES IS NOT KNOWN IN ALL CASES. THE CONTRACTOR SHALL EXPLORE THE AREA AHEAD OF DITCHING OPERATIONS BY OBSERVATIONS, ELECTRONIC DEVICES, HAND DIGGING AND BY PERSONAL CONTACT WITH THE UTILITY COMPANIES. IN ORDER TO LOCATE EXISTING UTILITIES IN ADVANCE OF TRENCHING OPERATIONS SO AS TO ELIMINATE OR MINIMIZE DAMAGE TO EXISTING UTILITIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS RESULTING FROM ANY DAMAGE TO THE EXISTING UTILITY LINES INCLUDING LOSS OF UTILITY REVENUES. CONTRACTOR SHALL ARRANGE FOR TEMPORARY SUPPORT OF EXISTING UTILITIES, SUCH AS POLES, CONDUITS, FIBER OPTIC CABLES, TELEPHONE CABLES, WATER LINES, ETC.
3. CONTRACTOR SHALL COMPLY WITH THE LATEST REVISIONS AND INTERPRETATIONS OF THE DEPARTMENT OF LABOR SAFETY AND HEALTH REGULATIONS FOR CONSTRUCTION PROMULGATED UNDER THE OCCUPATIONAL SAFETY AND HEALTH ACT. CONTRACTOR SHALL PLAN AND CONSTRUCT WORK SO AS TO CAUSE MINIMUM INCONVENIENCE TO THE OWNER AND THE PUBLIC.
4. CONTRACTOR SHALL PROVIDE, ERECT AND MAINTAIN AT ALL TIMES DURING THE PROGRESS OR TEMPORARY SUSPENSION OF WORK, SUITABLE BARRIERS, FENCES, SIGNS OR OTHER ADEQUATE PROTECTION, INCLUDING FLAGMEN AND WATCHMEN AS NECESSARY TO INSURE THE SAFETY OF THE PUBLIC AS WELL AS THOSE ENGAGED IN THE CONSTRUCTION WORK. CONSTRUCTION SIGNING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF "CONSTRUCTION AND MAINTENANCE OPERATIONS SUPPLEMENT TO THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" BY THE DOT.
5. ALL MATERIAL CLEARED OR DEMOLISHED BY THE CONTRACTOR IN ORDER TO CONSTRUCT THE WORK SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE PROPERLY DISPOSED OF OFF-SITE.
6. ALL WORK BY THE CONTRACTOR SHALL BE WARRANTED BY THE CONTRACTOR FOR A PERIOD OF ONE YEAR AFTER THE OWNER ACCEPTS THE WORK.
7. CONTRACTOR SHALL CALL THE NORTH CAROLINA ONE-CALL CENTER AT 1 (800) 632-4949 AND ALLOW THE CENTER TO LOCATE EXISTING UTILITIES BEFORE DIGGING.
8. CONTRACTOR SHALL REMOVE ASPHALT, AGGREGATE BASE COURSE, AND CONCRETE CURB & GUTTER WITHIN LIMITS OF DEMOLITION AS SHOWN ON PLAN.

DEMOLITION NOTES:

1. CONTRACTOR TO COORDINATE WITH THE OWNER TO PROPERLY MAINTAIN OR RELOCATE EXISTING SERVICE CONNECTIONS WHEN NECESSARY.
2. CONTRACTOR IS TO WALK THE SITE AND BECOME FAMILIAR WITH THE SCOPE OF DEMOLITION REQUIRED. ALL DEMOLITION WORK REQUIRED TO CONSTRUCT NEW SITE IMPROVEMENTS WILL BE PERFORMED BY THE CONTRACTOR AND WILL BE UNCLASSIFIED EXCAVATION.
3. DEMOLITION SHALL INCLUDE BUT IS NOT LIMITED TO THE EXCAVATION, HAULING AND OFFSITE DISPOSAL OF CONCRETE PADS, CONCRETE DITCHES, FOUNDATIONS, SLABS, STEPS, AND STRUCTURES; ABANDONED UTILITIES, BUILDINGS, PAVEMENTS AND ALL MATERIALS CLEARED AND STRIPPED TO THE EXTENT NECESSARY AS DIRECTED BY THE SOILS ENGINEER FOR THE INSTALLATION OF THE NEW IMPROVEMENTS AND WITHIN THE LIMITS OF CLEARING AND GRADING AND AS SHOWN ON THESE PLANS.
4. THE CONTRACTOR SHALL PROTECT ALL ADJACENT PROPERTY, STRUCTURES AND UTILITIES ON THE PROPERTY NOT TO BE DEMOLISHED. DAMAGE TO PROPERTIES OF OTHERS DUE TO THE CONTRACTOR'S ACTIVITIES SHALL BE REPLACED IN KIND BY THE CONTRACTOR AT NO COST TO OWNER.
5. ELECTRIC, TELEPHONE, SANITARY SEWER, WATER AND STORM SEWER UTILITIES THAT SERVICE OFF-SITE PROPERTIES SHALL BE MAINTAINED DURING THE CONSTRUCTION PROCESS BY THE CONTRACTOR.
6. EXISTING UTILITIES NOT INTENDED FOR DEMOLITION SHALL BE MAINTAINED, PROTECTED AND UNDISTURBED DURING DEMOLITION.
7. ALL EXISTING IMPROVEMENTS INDICATED OR REQUIRED TO BE DEMOLISHED SHALL INCLUDE REMOVAL FROM THE PROPERTY AND PROPER DISPOSAL.
8. CONTRACTOR SHALL COORDINATE RELOCATION OF ALL EXISTING OVER HEAD AND UNDERGROUND UTILITIES INCLUDING CABLE, GAS, TELEPHONE AND ELECTRIC AND ANY OTHER UTILITIES THROUGH THE SITE WITH THE RESPECTIVE COMPANIES.
9. PROVIDE SMOOTH SAW CUT OF EXISTING PAVEMENTS, CURBS AND GUTTERS AND SIDEWALKS TO BE DEMOLISHED.
10. ALL DEMOLITION WORK SHALL BE DONE IN STRICT ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS AS WELL AS OSHA REGULATIONS.
11. INFORMATION CONCERNING UNDERGROUND UTILITIES WAS OBTAINED FROM AVAILABLE RECORDS, BUT THE THE CONTRACTOR MUST DETERMINE THE EXACT LOCATION AND ELEVATIONS OF THE MAINS BY DIGGING TEST PITS BY HAND.

CONSTRUCTION NOTES:

1. THE CONSTRUCTION RELEASE BY THE CITY OF WILMINGTON WILL ADDRESS INFRASTRUCTURE PHASING REQUIREMENTS AND APPLICANT IS ENCOURAGED TO CONTACT THE WILMINGTON FIRE DEPARTMENT FOR GUIDANCE.

EROSION AND SEDIMENT CONTROL NOTES

EROSION CONTROL AND SEQUENCE OF CONSTRUCTION NOTES:

1. CLEAR AND REMOVE FROM SITE ALL TREES, ROOTS, ROOT MAT, ETC. FROM THE AREA WITHIN DESIGNATED CLEARING LIMITS.
2. PLANT GRASS OVER ALL GRADED AREAS WITHIN 21 CALENDAR DAYS OF CEASE OF ANY GRADING ACTIVITY.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR CLEANING AND RESTORING TO PRE-CONSTRUCTION CONDITIONS ANY AREAS OUTSIDE THE PROJECT LIMITS THAT MAY INADVERTENTLY BE DAMAGED DUE TO THE FAILURE OF THE EROSION MEASURES
4. DURING GRADING AND AFTER GRADING HAS BEEN COMPLETED, CONTRACTOR SHALL CONTINUE TO MAINTAIN PERMANENT AND TEMPORARY EROSION CONTROL MEASURES UNTIL FINAL INSPECTION AND APPROVAL BY THE NEW HANOVER COUNTY ENGINEERING DEPARTMENT.
5. WATER, FERTILIZE, MOW AND MAINTAIN SPRIGGED, SODDED AND PLANTED AREAS UNTIL FINAL APPROVAL BY NEW HANOVER COUNTY.
6. 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.
7. DRY DETENTION BASINS TO BE USED AS SEDIMENT TRAPS DURING LAND DISTURBING ACTIVITIES.

MAINTENANCE PLAN

1. ALL EROSION AND SEDIMENT CONTROL PRACTICES WILL BE CHECKED FOR STABILITY AND OPERATION FOLLOWING EVERY RUNOFF-PRODUCING RAINFALL BUT IN NO CASE LESS THAN ONCE EVERY WEEK AND WITHIN 24 HOURS OF EVERY HALF INCH RAINFALL. ANY NEEDED REPAIRS WILL BE MADE IMMEDIATELY TO MAINTAIN ALL PRACTICES AS DESIGNED.
2. 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.
3. SEDIMENT WILL BE REMOVED BEHIND THE SEDIMENT FENCE WHEN IT BECOMES 0.5 FEET DEEP AT THE FENCE. THE SEDIMENT FENCE WILL BE REPAIRED AS NECESSARY TO MAINTAIN A BARRIER. SILT FENCE STAKES WILL BE SPACED 6 FEET APART UNLESS A WIRE BACKING IS USED WITH 8 FOOT STAKE SPACING.
4. SEDIMENT WILL BE REMOVED FROM SEDIMENT TRAPS WHEN THE DESIGNED STORAGE REPLACE WHEN THE SEDIMENT POOL NO LONGER DRAINS OR WHEN THE ROCK IS DISLODGED. BAFFLES WILL BE REPAIRED OR REPLACED IF THEY COLLAPSE, TEAR, DECOMPOSE OR BECOME INEFFECTIVE. THEY WILL BE REPLACED PROMPTLY. SEDIMENT WILL BE REMOVED WHEN DEPOSITS REACH HALF THE HEIGHT OF THE 1ST BAFFLE.
5. ALL SEEDED AREAS WILL BE FERTILIZED, RESEEDED AS NECESSARY, AND MULCHED ACCORDING TO SPECIFICATIONS IN THE VEGETATIVE PLAN TO MAINTAIN A VIGOROUS, DENSE VEGETATIVE COVER. ALL SLOPES WILL BE STABILIZED WITHIN 21 CALENDAR DAYS. ALL OTHER AREAS WILL BE STABILIZED WITHIN 15 WORKING DAYS.
6. SEDIMENT WILL BE REMOVED FROM AROUND TEMPORARY ROCK CHECK DAMS ONCE A WEEK AND AFTER EVERY RAIN EVENT.

STABILIZATION NOTES

1. SLOPES LEFT EXPOSED WILL, WITHIN 21 CALENDAR DAYS OF ANY PHASE OF GRADING, BE PLANTED OR OTHERWISE PROVIDED WITH GROUND COVER, DEVICES, OR STRUCTURES TO RESTRAIN EROSION.
2. ALL OTHER DISTURBED AREAS SHALL BE PLANTED OR OTHERWISE PROVIDED PERMANENT GROUND COVER WITHIN 15 WORKING DAYS OR 90 CALENDAR DAYS FOLLOWING COMPLETION OF CONSTRUCTION OR DEVELOPMENT WHICHEVER PERIOD IS SHORTER.

GROUND STABILIZATION

SITE AREA DESCRIPTION	STABILIZATION TIME FRAME	STABILIZATION TIME FRAME EXCEPTIONS
PERIMETER DIKES, SWALES, DITCHES AND SLOPES	7 DAYS	NONE
HIGH QUALITY WATER (HQW) ZONES	7 DAYS	NONE
SLOPES STEEPER THAN 3:1	7 DAYS	IF SLOPES ARE 10' OR LESS IN LENGTH AND ARE NOT STEEPER THAN 2:1, 14 DAYS ARE ALLOWED
SLOPES FLATTER THAN 3:1	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 HQW ZONES)

Extensions of time may be approved by the permitting authority based on weather or other site-specific conditions that make compliance impracticable. (Section 11.B(2)(b))

PERMANENT SEEDING SCHEDULE – MIXTURE 5CP

Seeding Mixture

SPECIES	RATE (LB/ACRE)
CENTIPEDE GRASS	10–20

Seeding Dates
MARCH – JUNE

Soil Amendments
APPLY LIME AND FERTILIZER ACCORDING TO SOIL TESTS, OR APPLY 300 LB/ACRE 10–10–10 FERTILIZER.

Mulch
DO NOT MULCH.

Maintenance
FERTILIZE VERY SPARINGLY LB/ACRE NITROGEN IN SPRING WITH NO PHOSPHORUS. CENTIPEDE GRASS CANNOT TOLERATE HIGH PH OR EXCESS FERTILIZER.

TEMPORARY SEEDING–LATE WINTER/EARLY SPRING

Seeding Mixture

WINTER AND EARLY SPRING

SPECIES	RATE (LB/ACRE)
Rye (GRAIN)	120
ANNUAL LESPEDEZA (KOBE IN PIEDMONT AND COASTAL PLAIN, KOREAN IN MOUNTAINS)	50

OMIT ANNUAL LESPEDEZA WHEN DURATION OF TEMPORARY COVER IS NOT TO EXTEND BEYOND JUNE.

SUMMER

SPECIES	RATE (LB/ACRE)
GERMAN MILLET	40

FALL

SPECIES	RATE (LB/ACRE)
RYE (GRAIN)	120

Seeding dates
COASTAL PLAIN – DEC.1–APR. 15 – LATE WINTER AND EARLY SPRING
APRIL 15 – AUG. 15 – SUMMER
AUG. 15 – DEC. 30 – FALL

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, REFERTILIZE AND MULCH IMMEDIATELY FOLLOWING EROSION OR OTHER DAMAGE.

GENERAL GRADING NOTES

1. REASONABLE CARE HAS BEEN EXERCISED IN SHOWING THE LOCATION OF EXISTING UTILITIES ON THE PLANS. THE EXACT LOCATION OF SUCH UTILITIES IS NOT KNOWN IN ALL CASES. THE CONTRACTOR SHALL EXPLORE THE AREA AHEAD OF THE DITCHING OPERATION BY OBSERVATIONS, ELECTRONIC DEVICES, HAND DIGGING AND BY PERSONAL CONTACT WITH THE UTILITY COMPANIES IN ORDER TO LOCATE EXISTING UTILITIES IN ADVANCE OF THE TRENCHING OPERATIONS SO AS TO AVOID AND PREVENT DAMAGE TO THE EXISTING UTILITIES. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COST RESULTING FROM ANY DAMAGE TO THE EXISTING UTILITY LINES INCLUDING BUT NOT LIMITED TO REPAIRS AND LOSS SERVICE REVENUE. CONTRACTOR SHALL ARRANGE FOR TEMPORARY SUPPORT OF EXISTING UTILITIES, SUCH AS POLES, CONDUITS, FIBER OPTIC CABLES, TELEPHONE CABLES, WATER LINES, ETC...

2. CONTRACTOR SHALL COMPLY WITH THE LATEST REVISIONS AND INTERPRETATIONS OF THE DEPARTMENT OF LABOR SAFETY AND HEALTH REGULATIONS FOR CONSTRUCTION PROMULGATED UNDER THE OCCUPATIONAL SAFETY AND HEALTH ACT.

3. CONTRACTOR SHALL PLAN AND CONSTRUCT WORK SO AS TO CAUSE MINIMUM INCONVENIENCE TO THE OWNER AND THE PUBLIC. THE CONTRACTOR SHALL PROVIDE, ERECT AND MAINTAIN AT ALL TIMES DURING THE PROGRESS OR TEMPORARY SUSPENSION OF WORK, SUITABLE BARRIERS, FENCES, SIGNS OR OTHER ADEQUATE PROTECTION, INCLUDING FLAG MEN AND WATCHMEN AS NECESSARY TO INSURE THE SAFETY OF THE PUBLIC AS WELL AS THOSE ENGAGED IN THE CONSTRUCTION WORK. CONSTRUCTION SIGNING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF "CONSTRUCTION AND MAINTENANCE OPERATIONS SUPPLEMENT TO THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" BY THE NCDOT.

4. ALL MATERIAL CLEARED AND GRUBBED BY THE CONTRACTOR IN ORDER TO CONSTRUCT THE WORK, SUCH AS TREES, VEGETATION, FENCING, ETC... SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE PROPERLY DISPOSED OF OFF-SITE OR BURNED IF PROPER PERMITS ARE RECEIVED.

SITE NOTES

1. ANY DISCREPANCY IN THIS PLAN AND ACTUAL FIELD CONDITIONS SHALL BE REPORTED TO THE OWNER PRIOR TO START OF CONSTRUCTION. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION OF ALL SETBACKS, EASEMENTS AND DIMENSIONS SHOWN HEREON BEFORE BEGINNING CONSTRUCTION.
2. THE GENERAL CONTRACTOR SHALL CONTACT ALL OWNERS OF EASEMENTS, UTILITIES AND R.O.W.'S PUBLIC OR PRIVATE, PRIOR TO WORKING IN THESE AREAS.
3. CONTRACTOR SHALL MAINTAIN THE SITE IN A MANNER SO THAT WORKMEN AND PUBLIC SHALL BE PROTECTED FROM INJURY, AND ADJOINING PROPERTY PROTECTED FROM DAMAGE.
4. ACCESS TO UTILITIES, FIRE HYDRANTS, STREET LIGHTING, ETC., SHALL REMAIN UNDISTURBED, UNLESS COORDINATED WITH THE RESPECTIVE UTILITY.
5. DO NOT SCALE THIS DRAWING AS IT IS A REPRODUCTION AND SUBJECT TO DISTORTION.
6. THE GENERAL CONTRACTOR SHALL REMOVE ALL DEBRIS FROM THE SITE UPON COMPLETION OF THE PROJECT AND AT LEAST ONCE A WEEK DURING CONSTRUCTION.
7. THE GENERAL CONTRACTOR SHALL KEEP THE AREA OUTSIDE THE "CONSTRUCTION LIMITS" BROOM CLEAN AT ALL TIMES.
8. CONTRACTOR SHALL MAINTAIN AN "AS-BUILT" SET OF DRAWINGS TO RECORD THE EXACT LOCATION OF ALL PIPING PRIOR TO CONCEALMENT. DRAWINGS SHALL BE GIVEN TO THE OWNER UPON COMPLETION OF THE PROJECT WITH A COPY OF THE TRANSMITTAL LETTER TO THE ENGINEER.
9. IF DEPARTURES FROM THE SPECIFICATIONS OR DRAWINGS ARE DEEMED NECESSARY BY THE CONTRACTOR, DETAILS OF SUCH DEPARTURES AND REASONS THEREOF SHALL BE GIVEN TO THE OWNER FOR REVIEW, NO DEPARTURES FROM THE CONTRACT DOCUMENT SHALL BE MADE WITHOUT THE PERMISSION OF THE OWNER.
10. CONTRACTOR SHALL VERIFY LOCATION AND ELEVATION OF ALL UNDERGROUND UTILITIES. THE LOCATION OF ALL EXISTING UTILITIES ARE NOT NECESSARILY SHOWN ON PLANS AND WHERE SHOWN ARE ONLY APPROXIMATE. THE CONTRACTOR SHALL ON HIS INITIATIVE AND AT NO EXTRA COST HAVE LOCATED ALL UNDERGROUND LINES AND STRUCTURES AS NECESSARY. NO CLAIMS FOR DAMAGES OR EXTRA COMPENSATION SHALL ACCRUE TO THE CONTRACTOR FROM THE PRESENCE OF SUCH PIPE OTHER OBSTRUCTIONS OR FROM DELAY DUE TO REMOVAL OR REARRANGEMENT OF THE SAME. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO UNDERGROUND STRUCTURES. CONTACT NORTH CAROLINA ONE CALL" TOLL FREE 1-800-632-4949 AT LEAST 48 HOURS PRIOR TO CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING ALL NONSUBSCRIBING UTILITIES.
11. ALL PERMITS RELATIVE TO PROJECT MUST BE OBTAINED, PRIOR TO CONSTRUCTION
12. ALL CONSTRUCTION TO BE IN ACCORDANCE WITH PERMITS ISSUED AND APPLICABLE STATE, COUNTY, AND LOCAL CODES.
13. FOR BUILDING DIMENSIONS, SEE ARCHITECTURAL DRAWINGS.
14. ALL DIMENSIONS AND RADII ARE TO OUTSIDE FACE OF BUILDING OR TO FACE OF CURB UNLESS OTHERWISE NOTED.
15. THE CONTRACTOR SHALL OBTAIN AND PAY FOR ALL INSPECTIONS, CERTIFICATIONS, EQUIPMENT, ETC., THAT MAY BE REQUIRED.
16. THE ENGINEER AND/OR OWNER DISCLAIM ANY ROLE IN THE CONSTRUCTION MEANS AND METHODS ASSOCIATED WITH THE PROJECT AS SET FORTH IN THESE PLANS.
17. ALL PAVEMENT MARKINGS IN PUBLIC RIGHTS-OF-WAY AND FOR DRIVEWAYS ARE TO BE THERMOPLASTIC AND MEET CITY AND/OR NCDOT STANDARDS.
18. 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.

GRADING & STORMWATER MANAGEMENT NOTES:

1. STORMWATER MANAGEMENT WILL MEET BOTH THE STATE OR NORTH CAROLINA AND CITY OF WILMINGTON REQUIREMENTS. PROJECT HAS BEEN DESIGNED TO MEET THE "LOW-DENSITY" STANDARDS WITH MAXIMUM IMPERVIOUS SURFACES OF 25%. WHERE ROOFTOP RUNOFF DOES NOT DRAIN TO THE STREETS IT WILL BE DIRECTED BY GUTTERS AND DOWNSPOUTS TO INDIVIDUAL INFILTRATION TRENCHES ON EACH LOT. STREET RUNOFF WILL BE DIRECTED FROM CURB FLUMES THROUGH MINIMUM 100' GRASSED SWALES, AND INTO WETLANDS FOR BIO-RETENTION AND INFILTRATION.
2. TREE PRESERVATION / REMOVAL PERMIT IS REQUIRED PRIOR TO CLEARING AND LAND DISTURBANCE.
3. NO EQUIPMENT IS ALLOWED ON THE SITE UNTIL ALL TREE PROTECTION FENCING AND SILT FENCING HAS BEEN INSTALLED AND APPROVED.
4. PROTECTIVE 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.

EXISTING UTILITY NOTES:

1. IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO VERIFY THE ACTUAL LOCATION AND AVAILABILITY OF ALL EXISTING AND PROPOSED UTILITIES IN THE FIELD PRIOR TO GROUND BREAKING.
2. EXISTING UTILITIES AND STRUCTURES SHOWN, BOTH UNDERGROUND AND ABOVE GROUND ARE BASED ON A FIELD SURVEY AND THE BEST AVAILABLE RECORD DRAWINGS. THE CONTRACTOR SHALL FIELD VERIFY FIELD CONDITIONS PRIOR TO BEGINNING RELATED CONSTRUCTION. ANY DISCREPANCIES SHALL BE REPORTED TO THE OWNER'S REPRESENTATIVE IMMEDIATELY.

UTILITY CONTACTS:

1. CONTACT THE NORTH CAROLINA ONE CALL CENTER PRIOR TO DOING ANY DIGGING. 1-800-632-4949.

NOTICE REQUIRED:

ALL EXISTING UNDERGROUND UTILITIES SHALL BE PHYSICALLY LOCATED BY CONTRACT PRIOR TO THE BEGINNING OF ANY CONSTRUCTION IN THE VICINITY OF SAID UTILITIES.

CONTRACTORS SHALL NOTIFY OPERATORS WHO MAINTAIN UNDERGROUND UTILITIY LINES IN THE AREA OF PROPOSED EXCAVATION AT LEAST TWO WORKING DYAS, BUT NOT MORE THAN TEN WORKING DAYS PRIOR TO ANY EXCAVATION OR DEMOLITION.

CONTACT "CAROLINA ONE CALL" AT
1-800-632-4949

EMERGENCY DIAL 911 **POLICE - FIRE - RESCUE**

UTILITY NOTES:

1. EXISTING WATER AND SANITARY SEWER SERVICES ARE CURRENTLY AVAILABLE TO THE SITE FROM PUBLIC SYSTEMS. WATER SERVICE AND SANITARY SEWER SERVICE WILL BE PROVIDED BY CAPE FEAR PUBLIC UTILITY AUTHORITY.
2. ALL UTILITY SERVICES, SUCH AS ELECTRIC POWER, CATV, GAS, AND TELEPHONE SHALL BE INSTALLED UNDERGROUND.
3. PROJECT SHALL COMPLY WITH CAPE FEAR PUBLIC UTILITY AUTHORITY CROSS CONNECTION CONTROL REQUIREMENTS. WATER METER(S) CANNOT BE RELEASED UNTIL ALL REQUIREMENTS ARE MET AND N.C.D.E.N.R. HAS ISSUED THEIR "FINAL APPROVAL". CALL 332-6560 FOR INFORMATION.
4. ALL COMMERCIAL WATER SERVICES AND ANY IRRIGATION SYSTEMS SUPPLIED BY C.F.P.U.A. WATER SHALL HAVE A BACKFLOW PREVENTION DEVICE ACCEPTABLE TO THE CITY AND APPROVED BY USCFCCCHR OR ASSE. CALL 332-6560 FOR INFORMATION.
5. WATER AND SEWER SERVICES CAN NOT BE ACTIVATED ON NEW MAINS UNTIL THE ENGINEER'S CERTIFICATION AND AS-BUILTS ARE RECEIVED AND "FINAL APPROVAL" ISSUED BY THE PUBLIC WATER SUPPLY SECTION OF NCDENR, AND "FINAL ENGINEERING CERTIFICATION" ISSUED BY DIVISION OF WATER QUALITY SECTION OF N.C.D.E.N.R.
6. IF CONTRACTOR DESIRES WATER FOR CONSTRUCTION, HE SHALL APPLY IN ADVANCE FOR THIS SERVICE AND MUST PROVIDE A REDUCED PRESSURE ZONE (RPZ) BACKFLOW PREVENTION DEVICE ON THE DEVELOPER'S SIDE OF THE WATER METER BOX.
7. WHEN PVC WATER MAINS AND SERVICES ARE PROPOSED, THE PIPES ARE TO BE MARKED WITH NO. 10 INSULATED COPPER WIRE INSTALLED AND STRAPPED TO THE PIPES WITH DUCT TAPE. THE INSULATED WIRE IS TO BE STRIPPED TO BARE WIRE AND SECURED TO ALL VALVES AND FITTINGS. THIS WIRE IS TO BE ACCESSIBLE IN ALL VALVE AND METER BOXES TO AID IN FUTURE LOCATION OF FACILITIES.
8. THE CONTRACTOR IS RESPONSIBLE FOR THE LOCATION AND PROTECTION OR EXISTING UTILITIES DURING CONSTRUCTION. DAMAGED ITEMS HALL BE REPAIRED TO AT LEAST THE QUALITY OR WORKMANSHIP FOUND IN THE ORIGINAL ITEM.
9. SOLID WASTE DISPOSAL TO BE SERVED BY CITY, AND PROVIDED BY INDIVIDUAL WASTE BINS FOR EACH LOT.

FIRE & LINE SAFETY NOTES:

1. LANDSCAPING CANNOT BLOCK OR IMPEDE THE FDC OR FIRE HYDRANTS. A 3-FOOT (3') CLEAR SPACE SHALL BE MAINTAINED AROUND THE CIRCUMFERENCE OF THE HYDRANT AND FDC.
2. HYDRANTS MUST BE LOCATED WITHIN 8' OF THE CURB.
3. NEW HYDRANTS MUST BE AVAILABLE FOR USE PRIOR TO CONSTRUCTION OF THE BUILDING(S).
4. CONTRACTOR SHALL MAINTAIN AN ALL WEATHER ACCESS FOR EMERGENCY VEHICLES AT ALL TIMES DURING CONSTRUCTION.
5. TEMPORARY STREET SIGNS SHALL BE INSTALLED AT EACH STREET INTERSECTION WHEN CONSTRUCTION OF NEW ROADWAYS ALLOWS PASSAGE BY VEHICLES.

TRAFFIC NOTES:

1. ALL SIGNS AND PAVEMENT MARKINGS IN AREAS OPEN TO PUBLIC TRAFFIC ARE TO MEET MUTCD STANDARDS.
2. ANY BROKEN OR MISSING SIDEWALK PANELS AND/OR CURBING SHALL BE REPLACED.
3. A LANDSCAPING PLAN, INDICATING THE LOCATION OR REQUIRED STREET TREES SHALL BE SUBMITTED TO THE TRAFFIC ENGINEERING DIVISION AND PARKS AND RECREATION DEPARTMENT FOR REVIEW AND APPROVAL PRIOR TO THE RECORDING OF THE FINAL PLAT. PLAN SHALL ADHERE TO SD 15-17.

NORTH CAROLINA PROFESSIONAL SEAL 39113 ENGINEER JOSEPH S. BOYD
12-20-13

THIS PLAN SET WAS DESIGNED AND LAST SIGNED BY GARRY S. PAPE (PE LICENSE # 031315) ON 7/9/08. THIS REVISED SET IS ONLY PER REVISIONS BY THE GOVERNING AGENCIES AND VARIOUS SITE EDITS.

Approved Construction Plan

	Name	Date
Planning		
Traffic		
Fire		

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

For each open utility cut of City streets, a $325 permit shall be required from the City prior to occupancy and/or project acceptance.

SITE ADDRESS: 558 ARBORETUM DRIVE

No.	Revision	Date	By

Designer	W&R	Scale	
Drawn By	W&R	Date	12/19/13
Checked By	JSB	Job No.	03050283.01

HELMSDALE @ LANDFALL - PHASE II
CITY OF WILMINGTON NEW HANOVER NORTH CAROLINA

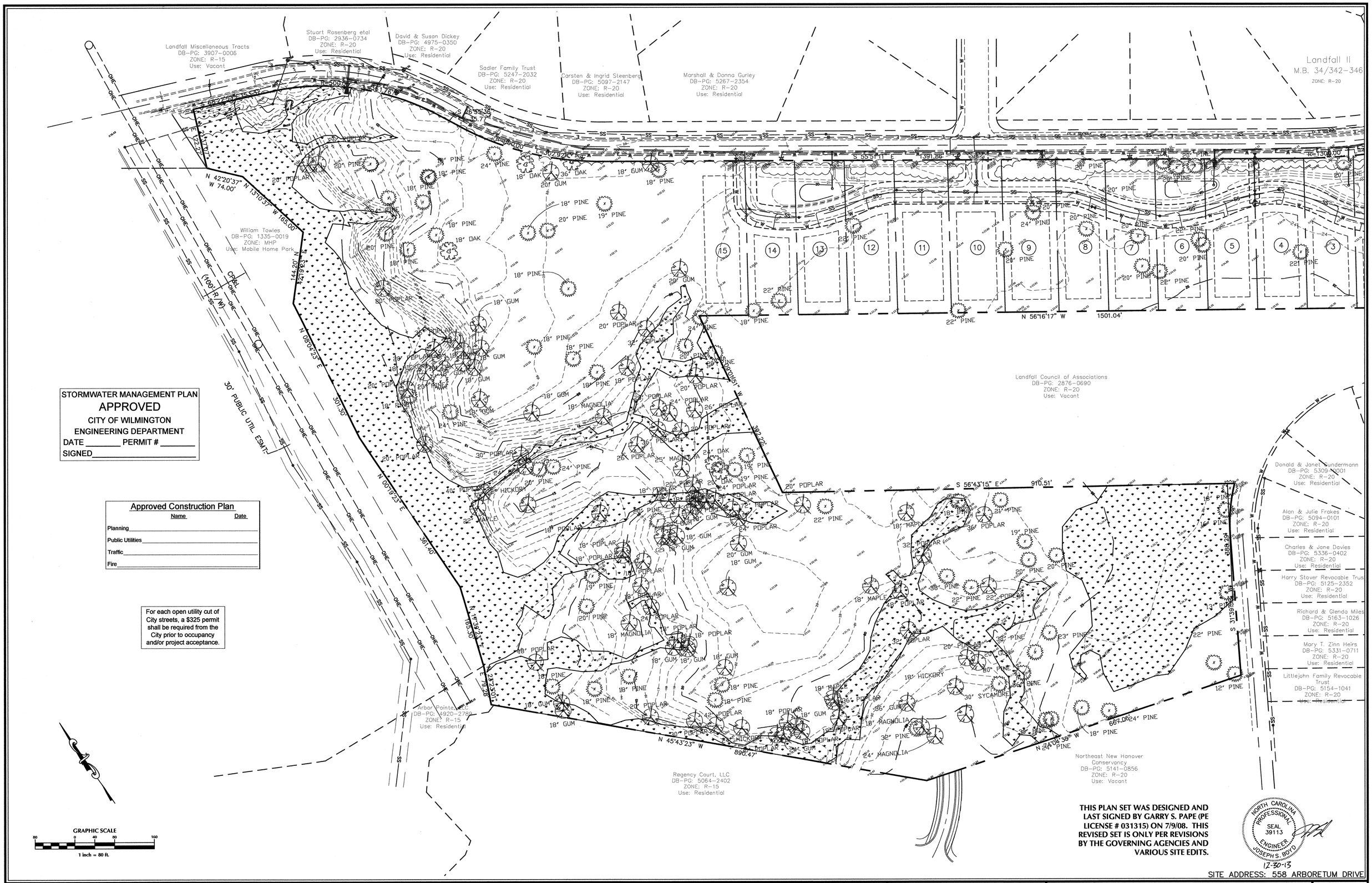
GENERAL NOTES

PREPARED FOR:
HELMSDALE INVESTORS, LLC
100 WESTON ESTATES WAY
CARY, NC 27513
919-481-3000

WITHERS & RAVENEL
ENGINEERS | PLANNERS | SURVEYORS
1410 Commonwealth Drive, Suite 101, Wilmington, North Carolina 28403 tel: 910-256-9277 fax: 910-256-2584 www.withersravenel.com

Sheet No. C-1

W:\03\05-28\05283.01-Helmsdale @ Landfall - Phase 2\CAD\2013 Updated Plans\SHEETS\C-1 GENERAL NOTES.dwg- December 23, 2013 - BOYD, JOSEPH



No.	Revision	Date	By
1	~~C.O.W. PLANNING COMMENTS~~	~~07/24/07~~	~~JSB~~

Designer	W&R	Scale	1"=80'
Drawn By	W&R	Date	12/19/13
Checked By	JSB	Job No.	03050283.01

HELMSDALE @ LANDFALL - PHASE II

CITY OF WILMINGTON NEW HANOVER NORTH CAROLINA

EXISTING CONDITIONS

PREPARED FOR:
HELMSDALE INVESTORS, LLC
100 WESTON ESTATES WAY
CARY, NC 27513
919-481-3000

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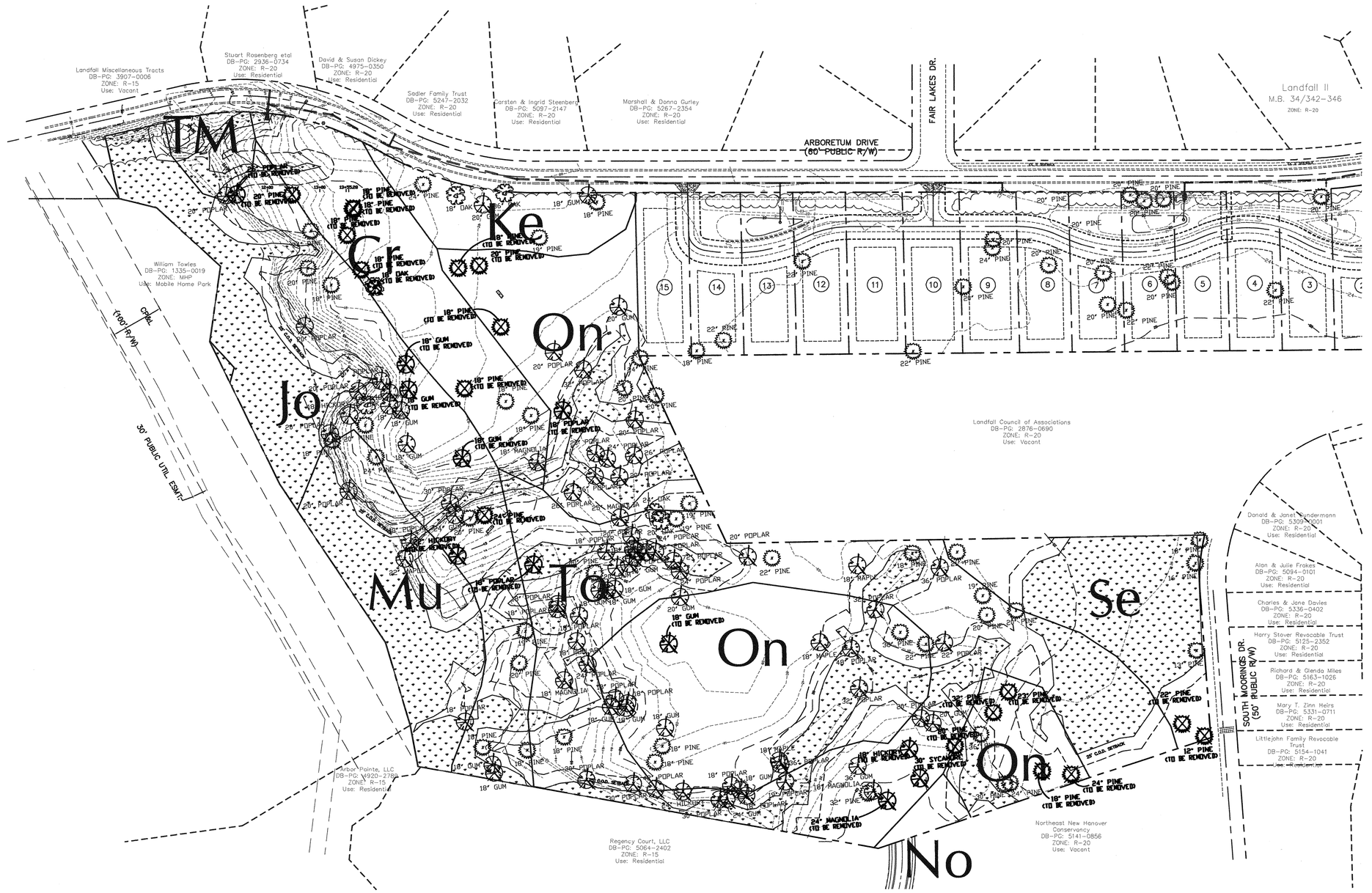
Sheet No.
C-2

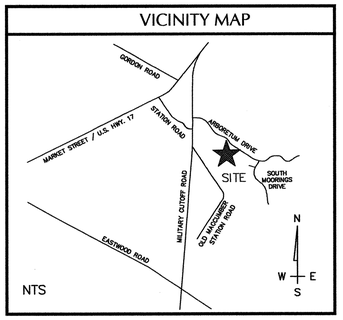
w:\cd\cd-2005\050283.01 - Helmsdale @ Landfall - Phase 2\CAD\2013 Updated Plans\SHEETS\C-2 EXISTING CONDITIONS.dwg - December 23, 2013 - BOYD, JOSEPH

SITE INVENTORY NOTES:

1. Soils Types: (Ke) Kenansville , (Jo) Johnston, (Se) Seagate, (Cr) Craven, (On) Onslow, (To) Torhunta, (Mu) Murville, (No) Norfolk, (TM) Tidal Marsh.
2. This property is not impacted by any AEC.
3. There are Conservation Overlay boundaries affecting this property.
4. This site is not impacted by any recognized historic or archeological significance.
5. No cemeteries were evidenced on the site.
6. Existing vegetation has been located and is labeled.
7. There is evidence of jurisdictional wetlands on the site. The boundaries have been certified by the Corps of Engineers.
   All wetlands areas or areas contained within wetlands areas may not be filled, disturbed, or altered in any way unless properly permitted by the north carolina department of environment and natural resources and/or the u.s. army corp of engineers.
   No wetlands fill permits will be required. Wetland crossings will be bridged and left undisturbed.
8. There is no evidence of endangered species or habitat issues on the site.
9. A large area of this proposed development is located in within a Special Flood Hazard boundary, Zone AE (El 10).
10. Research resulted in no findings of proposed thoroughfares, bike routes, pedestrian sidewalks or trails, or transit facilities affecting this project.
11. The NCDWQ Drainage Basin Classification is classified as SA waters. These waters drain to the tributary of Howe Creek.



VICINITY MAP



WETLANDS / UPLANDS
9.13±AC. / 22.83±AC.

100YR FLOOD BOUNDRY
5.51± AC. IN BOUNDRY
26.45± AC. OUT OF BOUNDRY

Approved Construction Plan

	Name	Date
Planning		
Public Utilities		
Traffic		
Fire		

STORMWATER MANAGEMENT PLAN
APPROVED
CITY OF WILMINGTON
ENGINEERING DEPARTMENT
DATE _____ PERMIT # _____
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NORTH CAROLINA PROFESSIONAL SEAL 39113 ENGINEER JOSEPH S. BOYD
12-30-13

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GRAPHIC SCALE
100 0 50 100 200
1 inch = 100 ft.

SITE ADDRESS: 558 ARBORETUM DRIVE

No.	Revision	Date	By

Designer	W&R	Scale	1"=100'
Drawn By	W&R	Date	12/19/13
Checked By	JSB	Job No.	03050283.01

HELMSDALE @ LANDFALL - PHASE II

CITY OF WILMINGTON NEW HANOVER NORTH CAROLINA

SITE INVENTORY MAP

PREPARED FOR:
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Sheet No.
C-3.1

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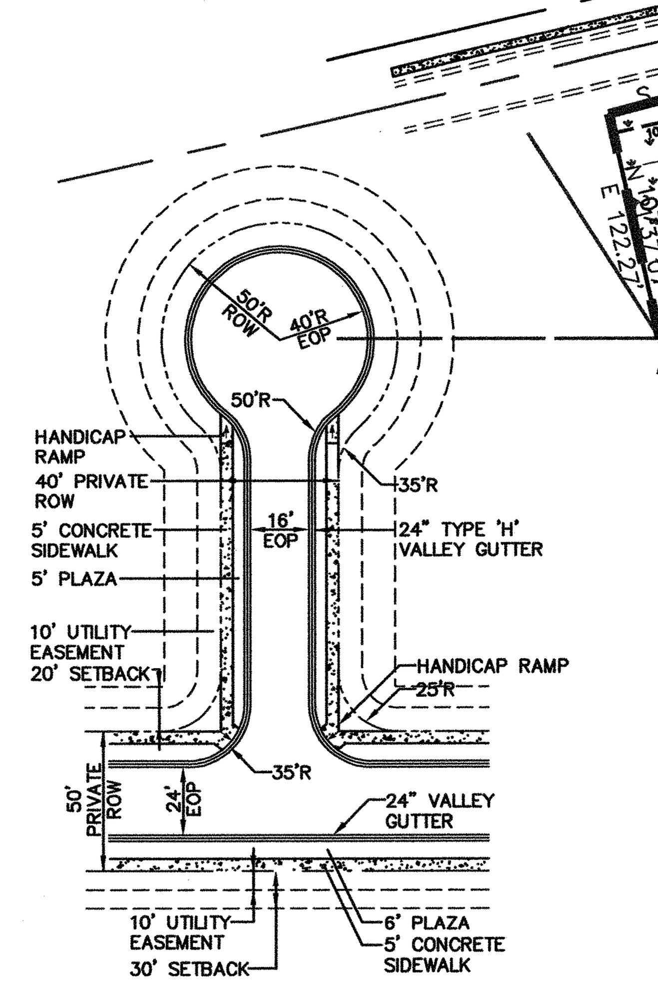
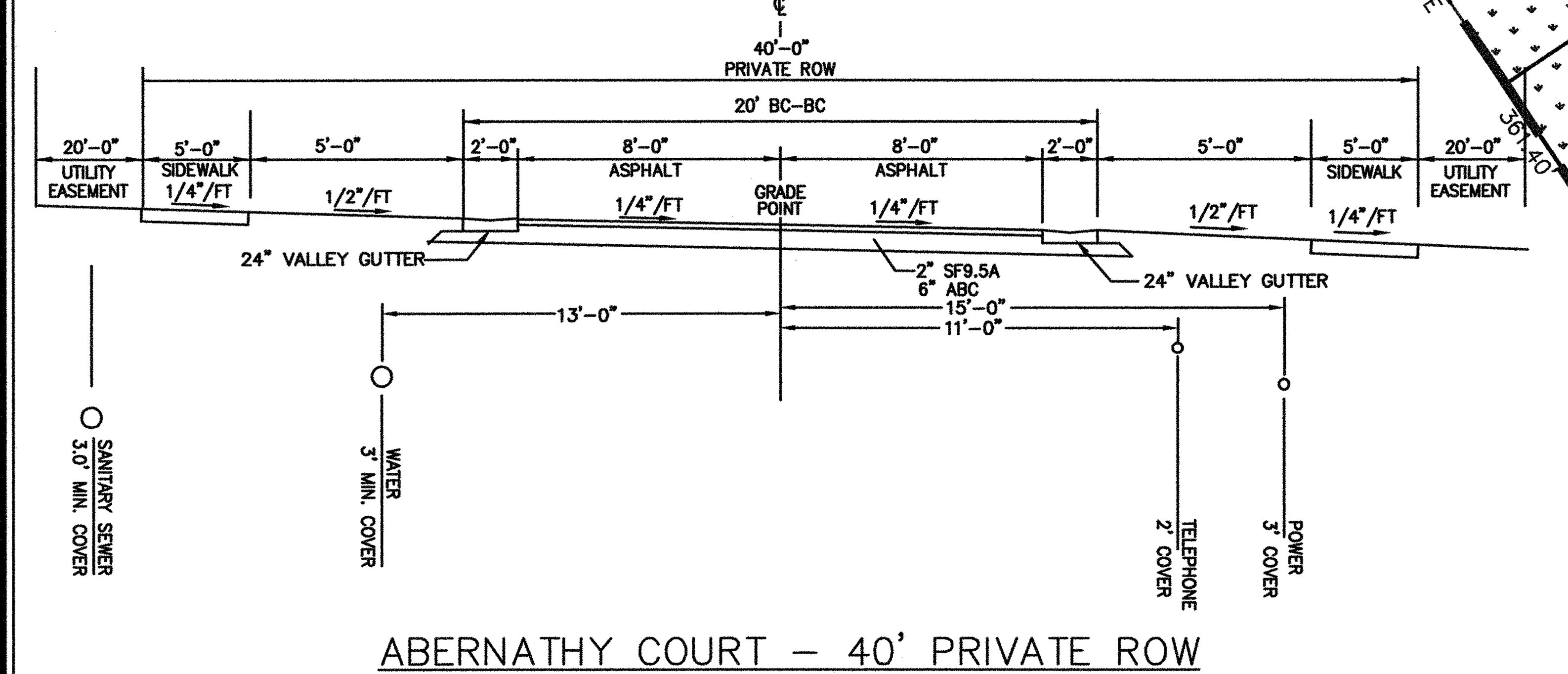


LOCAL STREET/CUL-DE-SAC

NOT TO SCALE

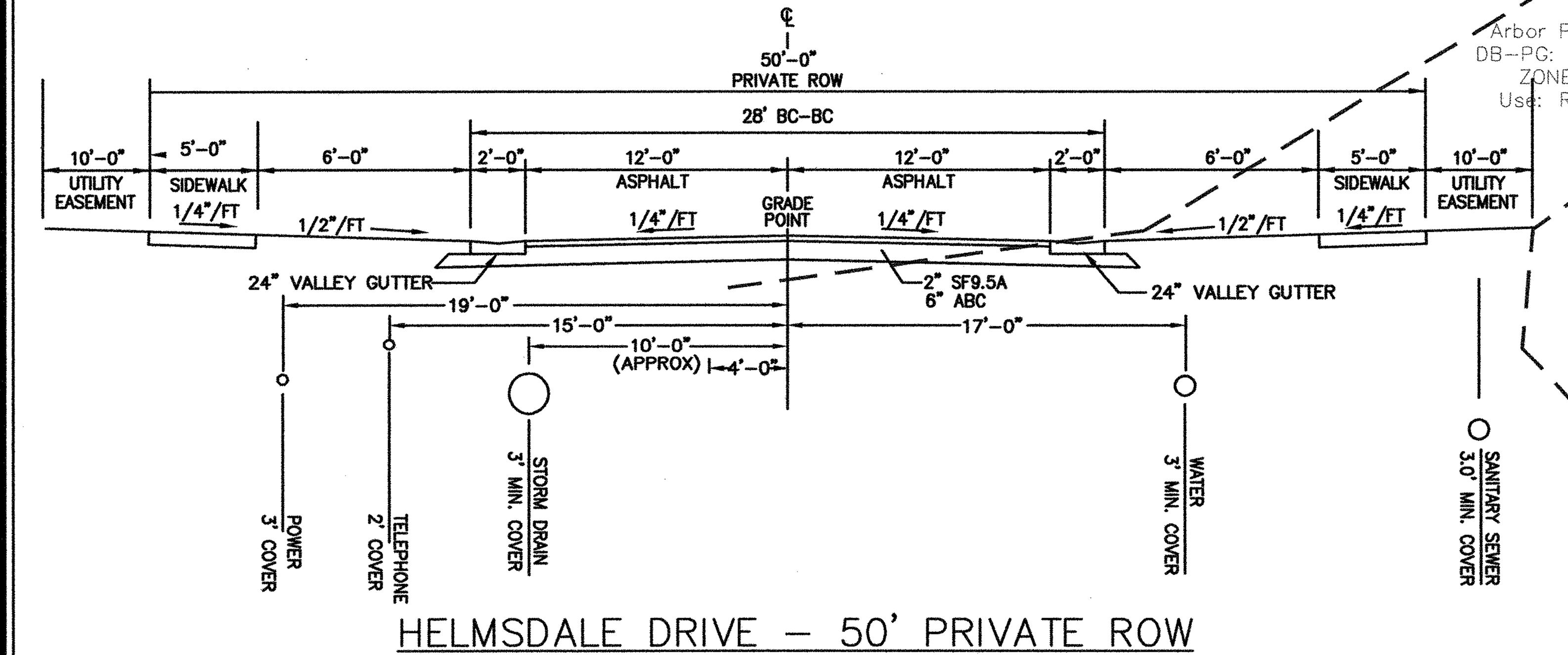
GENERAL NOTES:

1. NEW HANOVER COUNTY PARCEL NO.: 3158(15) - 64 - 5396
2. TOTAL TRACT AREA: 31.94 AC.±
3. ZONING DISTRICT: R-20
4. LAND CLASSIFICATION: RESOURCE PROTECTION & CONSERVATION
5. SETBACKS (CITY OF WILMINGTON):
   FRONT-30
   SIDE-15
   BACK-25
6. THIS PHASE IS LOCATED IN ZONE "AE" ACCORDING TO THE FEDERAL EMERGENCY MANAGEMENT AGENCY'S INSURANCE RATE MAP COMMUNITY-PANEL NUMBER 3720315800J DATED APRIL 3, 2006, 100-YEAR FLOOD ELEV=10.00



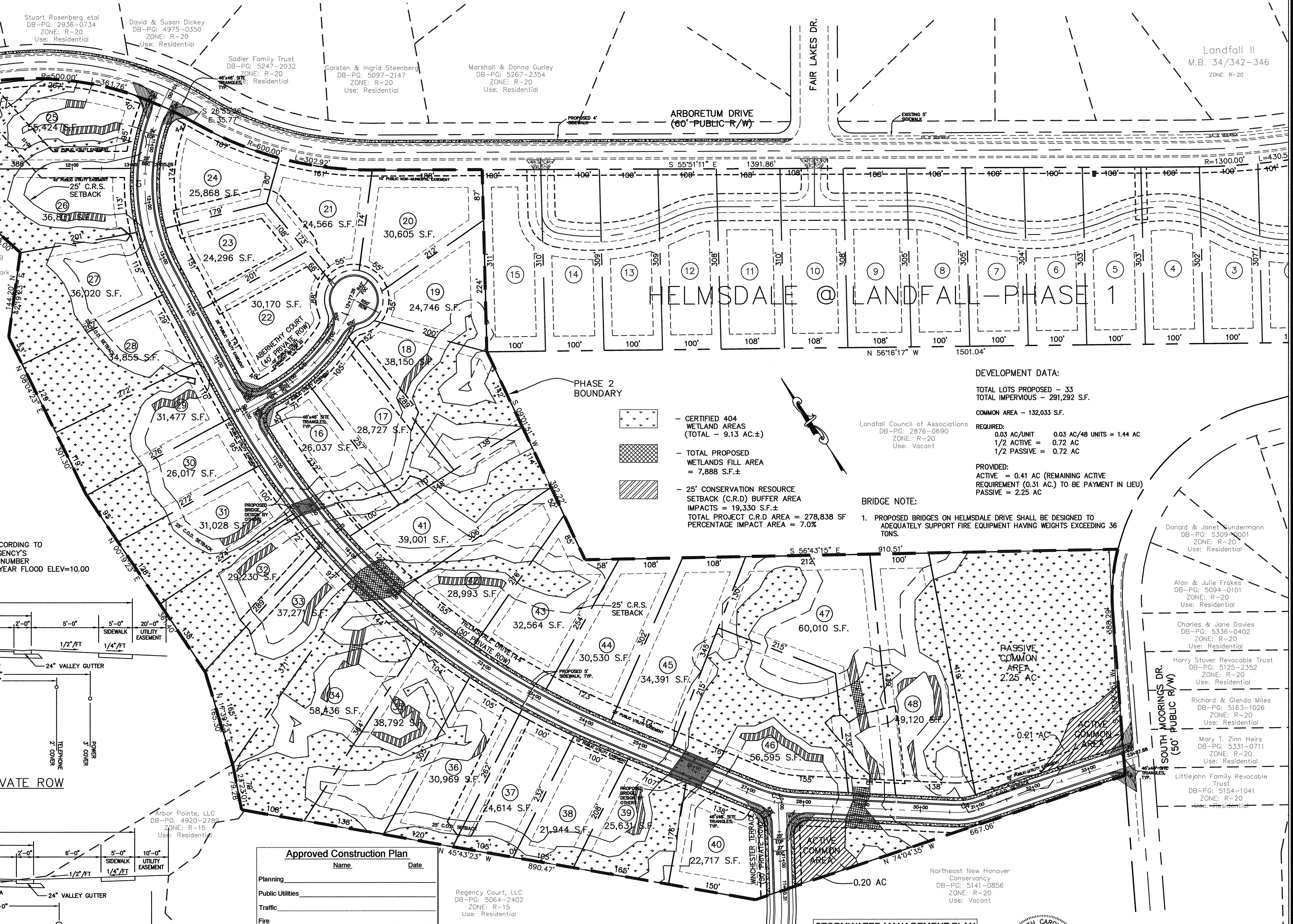
ABERNATHY COURT – 40' PRIVATE ROW

NOT TO SCALE



HELMSDALE DRIVE – 50' PRIVATE ROW

NOT TO SCALE



- CERTIFIED 404 WETLAND AREAS (TOTAL – 9.13 AC.±)
- TOTAL PROPOSED WETLANDS FILL AREA = 7,888 S.F.±
- 25' CONSERVATION RESOURCE SETBACK (C.R.D) BUFFER AREA IMPACTS = 19,330 S.F.±
  TOTAL PROJECT C.R.D AREA = 278,838 SF
  PERCENTAGE IMPACT AREA = 7.0%

DEVELOPMENT DATA:

TOTAL LOTS PROPOSED – 33
TOTAL IMPERVIOUS – 291,292 S.F.

COMMON AREA – 132,033 S.F.

REQUIRED:
0.03 AC/UNIT 0.03 AC/48 UNITS = 1.44 AC
1/2 ACTIVE = 0.72 AC
1/2 PASSIVE = 0.72 AC

PROVIDED:
ACTIVE = 0.41 AC (REMAINING ACTIVE REQUIREMENT (0.31 AC.) TO BE PAYMENT IN LIEU)
PASSIVE = 2.25 AC

BRIDGE NOTE:

1. PROPOSED BRIDGES ON HELMSDALE DRIVE SHALL BE DESIGNED TO ADEQUATELY SUPPORT FIRE EQUIPMENT HAVING WEIGHTS EXCEEDING 36 TONS.

Approved Construction Plan

	Name	Date
Planning		
Public Utilities		
Traffic		
Fire		

For each open utility cut of City streets, a $325 permit shall be required from the City prior to occupancy and/or project acceptance.

CURVE TABLE

CURVE	RADIUS	LENGTH	CHORD	BEARING
C1	325.00'	328.13'	314.37'	S34°50'46"W
C2	1275.00'	869.69'	852.93'	S13°37'08"E
C3	225.00'	77.56'	77.18'	S43°02'08"E
C4	125.00'	46.18'	45.91'	S63°29'38"E
C5	300.00'	135.30'	134.16'	N81°53'01"E

NOTE:
ALL DESIGN AND CONSTUCTION SHALL BE IN CONFORMANCE WITH THE CITY OF WILMINGTON LAND DEVELOPMENT CODE

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

NORTH CAROLINA PROFESSIONAL SEAL 39113 ENGINEER JOSEPH S. BOYD 4-29-14

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SITE ADDRESS: 558 ARBORETUM DRIVE

No.	Revision	Date	By
1	CITY OF WILMINGTON COMMENTS	7/25/07	JBS
2	UPDATED C.R.D SETBACKS	4/25/14	JSB

Designer	W&R	Scale	1"=80'
Drawn By	W&R	Date	12/19/13
Checked By	JSB	Job No.	03050283.01

HELMSDALE @ LANDFALL - PHASE II

CITY OF WILMINGTON NEW HANOVER NORTH CAROLINA

SITE LAYOUT

PREPARED FOR:
HELMSDALE INVESTORS, LLC
100 WESTON ESTATES WAY
CARY, NC 27513
919-481-3000

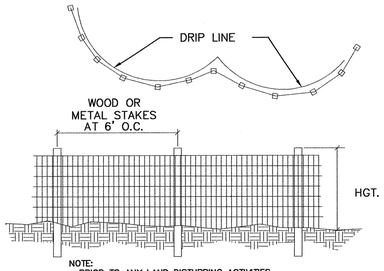
WITHERS & RAVENEL
ENGINEERS | PLANNERS | SURVEYORS
1410 Commonwealth Drive, Suite 101, Wilmington, North Carolina 28403 tel: 910-256-9277 fax: 910-256-2584 www.withersravenel.com

Sheet No. C-3.2

W:\13\13-0480\130481-Helmsdale\CAD\2013 Updated Plans\SHEETS\C-3.2 SITE LAYOUT.dwg- April 25, 2014 - BOYD, JOSEPH

TREE PROTECTION NOTES:

1. No land disturbance including tree removal is to occur outside the limits of disturbance shown on the plans. [18-457(b)]
2. Protective fencing is to be properly maintained throughout the duration of the project.[18-458]
3. Land clearing and construction contractors shall receive adequate instruction on tree protection requirments and methods.[18-457(d)]
4. Any trees and/or areas designated to be protected must be properly barricaded with fencing and protected throughout construction to insure that no clearing and grading or staging of materials will occur in those areas.[18-458]
5. No equipment is allowed on the site until all tree protection fencing and silt fencing has been installed and approved. [18-458]
6. Regulated and significant trees is the street yard [18-456(c)] and any trees in any required buffers [18-456(d)] area required to be retained.



NOTE:
PRIOR TO ANY LAND DISTURBING ACTIVITIES, TREE PROTECTION FENCES SHALL BE INSTALLED ALONG THE DRIP LINES OF ALL EXISTING TREES LABELLED AS TO BE RETAINED; NO STORAGE OF MATERIALS, FILL, ETC. AND NO PEDESTRIAN OR VEHICULAR TRAFFIC SHALL BE ALLOWED INSIDE OF THE FENCES DURING CONSTRUCTION.

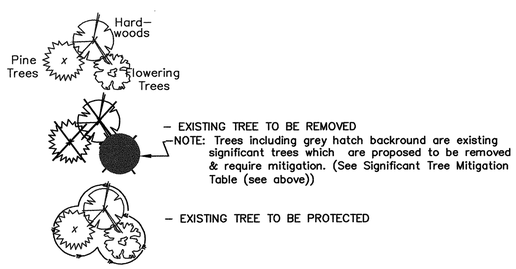
TREE PROTECTION FENCE DETAIL

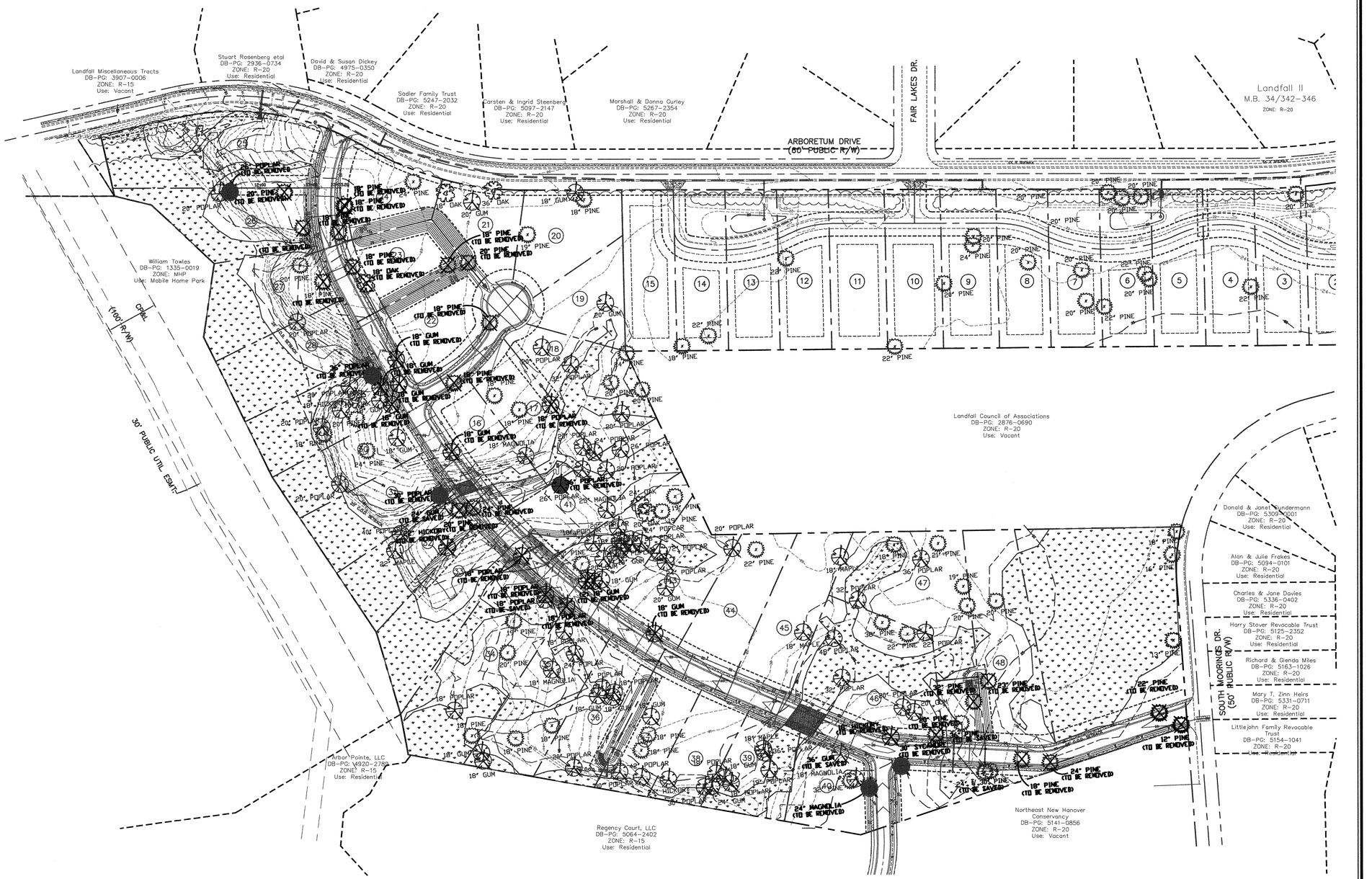
SIGNIFICANT TREE MITIGATION

TREES TO BE MITIGATED	MITIGATION VALUE (X2)	REQUIRED	PROVIDED
1 – 26" POPLAR	@ (200%)	25" (17–3" CAL.)	EX. TREE CREDIT
1 – 36" POPLAR	@ (200%)	72" (24–3" CAL.)	EX. TREE CREDIT
1 – 30" POPLAR	@ (200%)	60" (20–3" CAL.)	EX. TREE CREDIT
1 – 26" POPLAR	@ (200%)	25" (17–3" CAL.)	EX. TREE CREDIT
1 – 24" MAGNOLIA	@ (200%)	48" (16–3" CAL.)	EX. TREE CREDIT
1 – 30" SYCAMORE	@ (150%)	60" (20–3" CAL.)	EX. TREE CREDIT

ALL SIGNIFICANT TREES FOUND WITHIN THE CLEARING LIMITS WILL BE MITIGATED PER CITY OF WILMINGTON ZONING ORDINANCE BY PRESERVATION OF OPEN SPACE AND/OR TREE CREDITS.

TREE PRESERVATION/REMOVAL KEY





Approved Construction Plan	
	Name / Date
Planning	
Public Utilities	
Traffic	
Fire	

For each open utility cut of City streets, a $325 permit shall be required from the City prior to occupancy and/or project acceptance.

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

NORTH CAROLINA PROFESSIONAL SEAL 39113 ENGINEER JOSEPH S. BOYD
12-30-13

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GRAPHIC SCALE
100 0 50 100 200
1 inch = 100 ft.

SITE ADDRESS: 558 ARBORETUM DRIVE

No.	Revision	Date	By

Designer	W&R	Scale	1"=100'
Drawn By	RCM	Date	9/27/07
Checked By	JSB	Job No.	03050283.01

HELMSDALE @ LANDFALL - PHASE II
CITY OF WILMINGTON NEW HANOVER NORTH CAROLINA

TREE PRESERVATION PLAN

PREPARED FOR:
HELMSDALE INVESTORS, LLC
100 WESTON ESTATES WAY
CARY, NC 27513
919-481-3000

WITHERS & RAVENEL
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Sheet No.
C-3.3

W:\03_05-280\03283.01-Helmsdale @ Landfall - Phase 2\CAD\2013 Updated Plans\SHEETS\C-3.3 TREE PRESERVATION.dwg- December 23, 2013 - BOYD, JOSEPH

GENERAL UTILITY NOTES:

1. PROJECT SHALL COMPLY WITH CAPE FEAR PUBLIC UTILITY AUTHORITY (CFPUA) CROSS CONNECTION REQUIREMENTS. WATER METER(S) CANNOT BE SET AND ACTIVATED ON NEW MAINS UNTIL ALL REQUIREMENTS ARE MET AND NCDENR HAS ISSUED THEIR "FINAL APPROVAL". CALL 799-6064 FOR INFORMATION.
2. IF THE CONTRACTOR DESIRES CFPUA WATER FOR CONSTRUCTION HE SHALL APPLY IN ADVANCE FOR THIS SERVICE AND MUST PROVIDE A REDUCED PRESSURE ZONE (RPZ) BACKFLOW PREVENTION DEVICE ON THE DEVELOPER'S SIDE OF THE WATER METER BOX.
3. CFPUA REGULATIONS DO NOT ALLOW SEPARATE WATER CONNECTIONS TO THE PUBLIC MAINS FOR IRRIGATION SYSTEMS. TO USE CFPUA WATER FOR IRRIGATION IT WILL NEED TO GO THROUGH THE DOMESTIC WATER METER AND SUBJECT TO THE NORMAL BILLING RATES. CALL 799-6064 FOR INFORMATION.
4. WHEN PVC WATER MAINS AND/OR POLYETHYLENE SERVICES ARE PROPOSED, THE PIPES ARE TO BE MARKED WITH NO. 10 INSULATED COPPER WIRE INSTALLED THE ENTIRE LENGTH AND STRAPPED TO THE PIPES WITH DUCT TAPE. THE INSULATED WIRE IS TO BE STRIPPED TO BARE WIRE AND SECURED TO ALL VALVES AND FITTINGS. THIS WIRE IS TO BE ACCESSIBLE AT ALL VALVES, FIRE HYDRANTS, AND WATER METER BOXES TO AID IN FUTURE LOCATIONS OF FACILITIES.
5. STREET TREES ARE NOT TO BE PLANTED OVER WATER MAINS OR WITHIN UTILITY EASEMENTS.
6. STATE WATER AND SEWER PERMITS AS WELL AS A WATER EXTENSION AGREEMENT SHALL BE OBTAINED PRIOR TO RELEASE OF THE PROJECT FOR CONSTRUCTION.

Approved Construction Plan

	Name	Date
Planning		
Public Utilities		
Traffic		
Fire		

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STORMWATER MANAGEMENT PLAN
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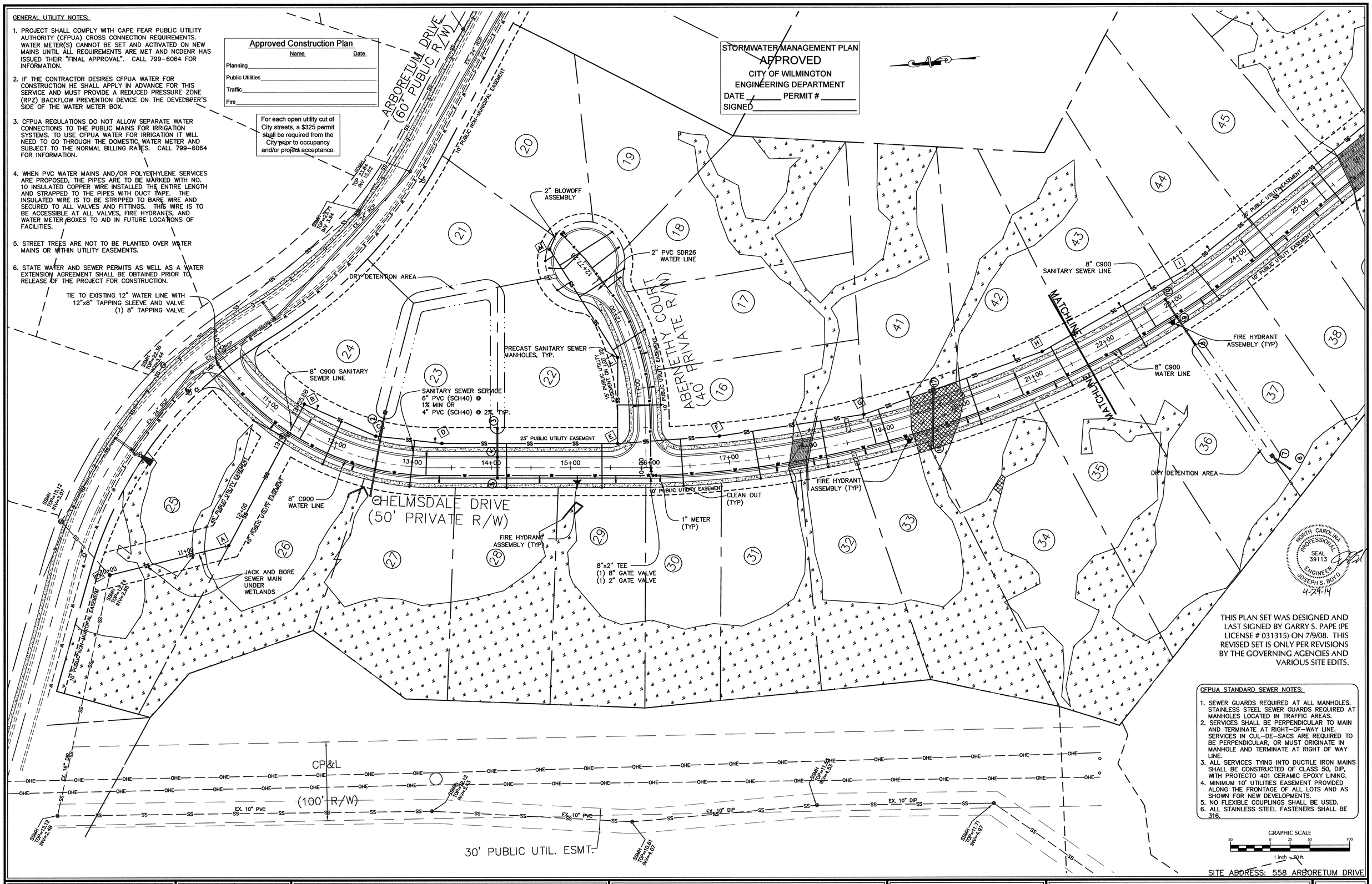

NORTH CAROLINA PROFESSIONAL SEAL 39113 ENGINEER JOSEPH S. BOYD
4-29-14

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CFPUA STANDARD SEWER NOTES:

1. SEWER GUARDS REQUIRED AT ALL MANHOLES. STAINLESS STEEL SEWER GUARDS REQUIRED AT MANHOLES LOCATED IN TRAFFIC AREAS.
2. 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.
3. ALL SERVICES TYING INTO DUCTILE IRON MAINS SHALL BE CONSTRUCTED OF CLASS 50, DIP, WITH PROTECTO 401 CERAMIC EPOXY LINING.
4. MINIMUM 10' UTILITIES EASEMENT PROVIDED ALONG THE FRONTAGE OF ALL LOTS AND AS SHOWN FOR NEW DEVELOPMENTS.
5. NO FLEXIBLE COUPLINGS SHALL BE USED.
6. ALL STAINLESS STEEL FASTENERS SHALL BE 316.

SITE ADDRESS: 558 ARBORETUM DRIVE

No.	Revision	Date	By
1	CITY OF WILMINGTON WATER COMMENTS	07/03/07	W&R
2	CITY OF WILMINGTON WATER COMMENTS	07/09/07	W&R
3	CFPUA COMMENTS	12/20/13	JSB
4	CFPUA COMMENTS	04/01/14	JSB

Designer	W&R	Scale	1"=50'
Drawn By	W&R	Date	12/19/13
Checked By	JSB	Job No.	03050283.01

HELMSDALE @ LANDFALL - PHASE II

CITY OF WILMINGTON NEW HANOVER NORTH CAROLINA

UTILITY PLAN

PREPARED FOR:
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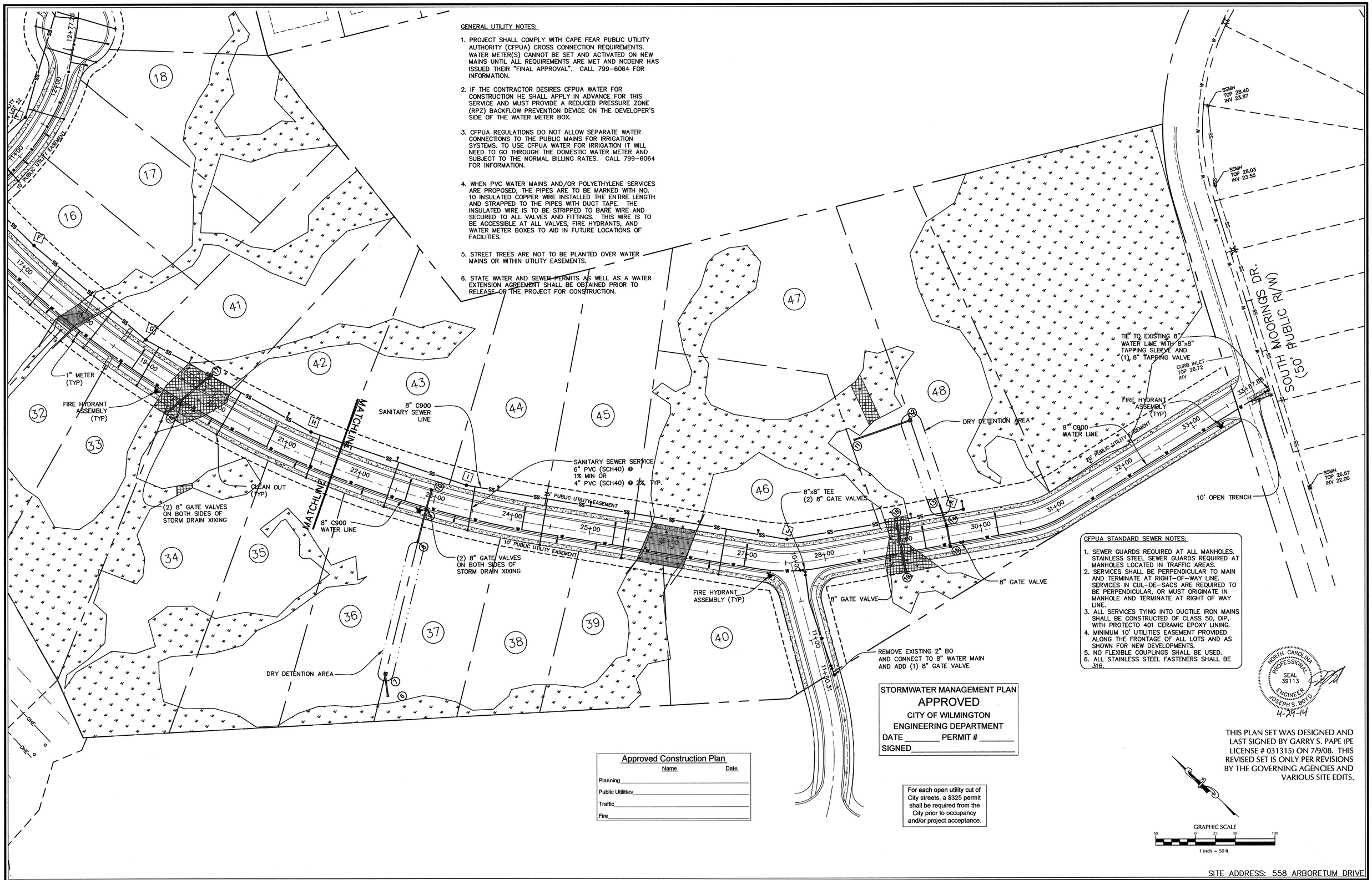
Sheet No. C-4.1

W:\13\13-0480\130481-Helmsdale\CAD\2013 Updated Plans\SHEETS\C-4 UTILITY PLAN.dwg- April 25, 2014 - BOYD, JOSEPH

GENERAL UTILITY NOTES:

1. PROJECT SHALL COMPLY WITH CAPE FEAR PUBLIC UTILITY AUTHORITY (CFPUA) CROSS CONNECTION REQUIREMENTS. WATER METER(S) CANNOT BE SET AND ACTIVATED ON NEW MAINS UNTIL ALL REQUIREMENTS ARE MET AND NCDENR HAS ISSUED THEIR "FINAL APPROVAL". CALL 799-6064 FOR INFORMATION.
2. IF THE CONTRACTOR DESIRES CFPUA WATER FOR CONSTRUCTION HE SHALL APPLY IN ADVANCE FOR THIS SERVICE AND MUST PROVIDE A REDUCED PRESSURE ZONE (RPZ) BACKFLOW PREVENTION DEVICE ON THE DEVELOPER'S SIDE OF THE WATER METER BOX.
3. CFPUA REGULATIONS DO NOT ALLOW SEPARATE WATER CONNECTIONS TO THE PUBLIC MAINS FOR IRRIGATION SYSTEMS. TO USE CFPUA WATER FOR IRRIGATION IT WILL NEED TO GO THROUGH THE DOMESTIC WATER METER AND SUBJECT TO THE NORMAL BILLING RATES. CALL 799-6064 FOR INFORMATION.
4. WHEN PVC WATER MAINS AND/OR POLYETHYLENE SERVICES ARE PROPOSED, THE PIPES ARE TO BE MARKED WITH NO. 10 INSULATED COPPER WIRE INSTALLED THE ENTIRE LENGTH AND STRAPPED TO THE PIPES WITH DUCT TAPE. THE INSULATED WIRE IS TO BE STRIPPED TO BARE WIRE AND SECURED TO ALL VALVES AND FITTINGS. THIS WIRE IS TO BE ACCESSIBLE AT ALL VALVES, FIRE HYDRANTS, AND WATER METER BOXES TO AID IN FUTURE LOCATIONS OF FACILITIES.
5. STREET TREES ARE NOT TO BE PLANTED OVER WATER MAINS OR WITHIN UTILITY EASEMENTS.
6. STATE WATER AND SEWER PERMITS AS WELL AS A WATER EXTENSION AGREEMENT SHALL BE OBTAINED PRIOR TO RELEASE OF THE PROJECT FOR CONSTRUCTION.



CFPUA STANDARD SEWER NOTES:

1. SEWER GUARDS REQUIRED AT ALL MANHOLES. STAINLESS STEEL SEWER GUARDS REQUIRED AT MANHOLES LOCATED IN TRAFFIC AREAS.
2. 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.
3. ALL SERVICES TYING INTO DUCTILE IRON MAINS SHALL BE CONSTRUCTED OF CLASS 50, DIP, WITH PROTECTO 401 CERAMIC EPOXY LINING.
4. MINIMUM 10' UTILITIES EASEMENT PROVIDED ALONG THE FRONTAGE OF ALL LOTS AND AS SHOWN FOR NEW DEVELOPMENTS.
5. NO FLEXIBLE COUPLINGS SHALL BE USED.
6. ALL STAINLESS STEEL FASTENERS SHALL BE 316.

NORTH CAROLINA PROFESSIONAL SEAL 39113 ENGINEER JOSEPH S. BOYD
4-24-14

THIS PLAN SET WAS DESIGNED AND LAST SIGNED BY GARRY S. PAPE (PE LICENSE # 031315) ON 7/9/08. THIS REVISED SET IS ONLY PER REVISIONS BY THE GOVERNING AGENCIES AND VARIOUS SITE EDITS.

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

Approved Construction Plan

	Name	Date
Planning		
Public Utilities		
Traffic		
Fire		

For each open utility cut of City streets, a $325 permit shall be required from the City prior to occupancy and/or project acceptance.

GRAPHIC SCALE
50 0 25 50 100
1 inch = 50 ft.

SITE ADDRESS: 558 ARBORETUM DRIVE

No.	Revision	Date	By
1	CITY OF WILMINGTON WATER COMMENTS	07/03/07	W&R
2	CITY OF WILMINGTON WATER COMMENTS	07/09/07	W&R
3	CFPUA COMMENTS	12/20/13	JSB
4	CFPUA COMMENTS	04/01/14	JSB

Designer	W&R	Scale	1"=50'
Drawn By	W&R	Date	12/19/13
Checked By	JSB	Job No.	03050283.01

HELMSDALE @ LANDFALL - PHASE II

CITY OF WILMINGTON NEW HANOVER NORTH CAROLINA

UTILITY PLAN

PREPARED FOR:
HELMSDALE INVESTORS, LLC
100 WESTON ESTATES WAY
CARY, NC 27513
919-481-3000

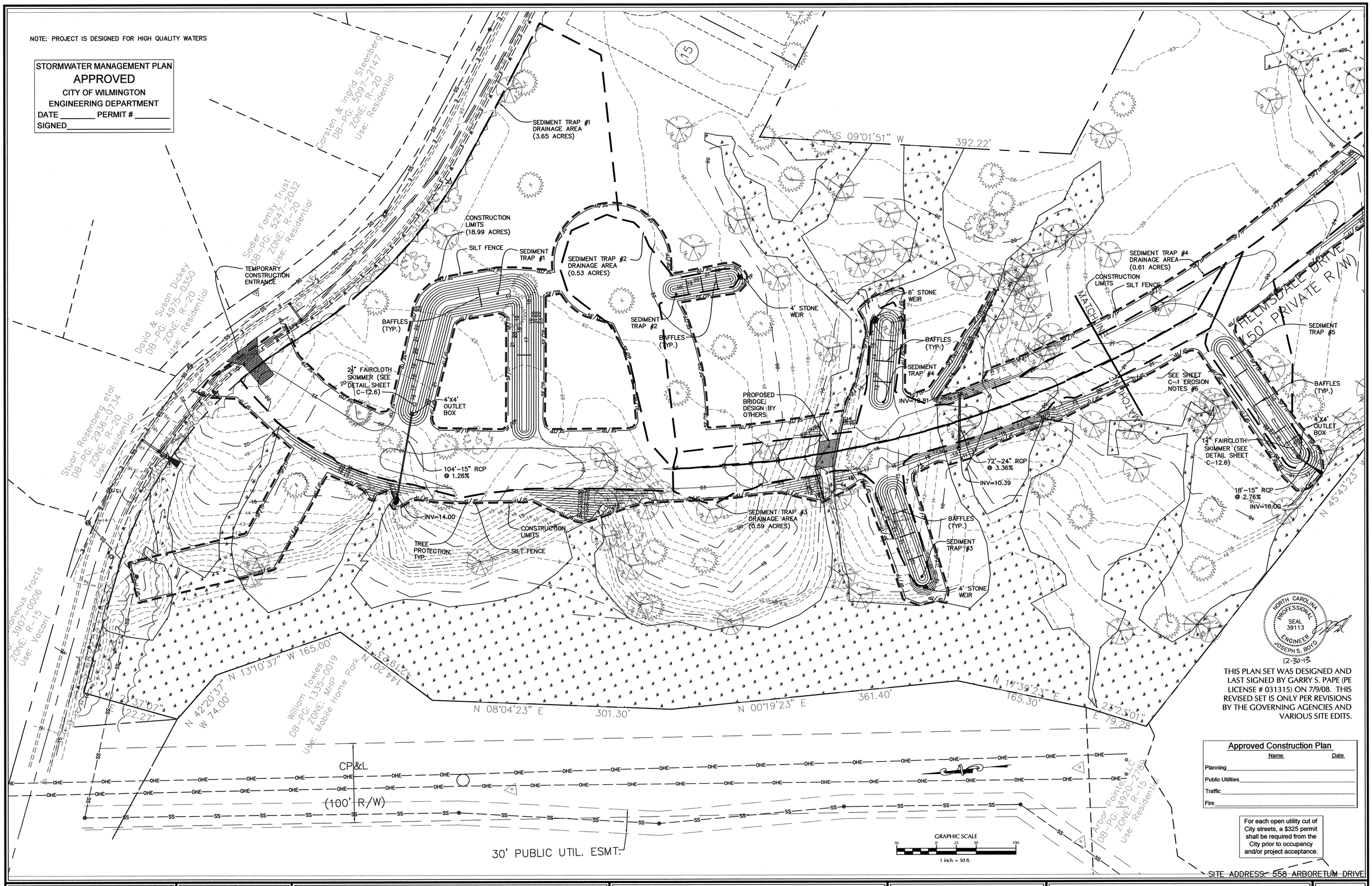
WITHERS & RAVENEL
ENGINEERS | PLANNERS | SURVEYORS
1410 Commonwealth Drive, Suite 101, Wilmington, North Carolina 28403 tel: 910-256-9277 fax: 910-256-2584 www.withersravenel.com

Sheet No. C-4.2

W:\13\13-0480\130481-Helmsdale\CAD\2013 Updated Plans\SHEETS\C-4 UTILITY PLAN.dwg- April 25, 2014 - BOYD, JOSEPH

NOTE: PROJECT IS DESIGNED FOR HIGH QUALITY WATERS

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



NORTH CAROLINA PROFESSIONAL SEAL 39113 ENGINEER JOSEPH S. BOYD 12-30-13

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Approved Construction Plan

	Name	Date
Planning		
Public Utilities		
Traffic		
Fire		

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SITE ADDRESS: 558 ARBORETUM DRIVE

No.	Revision	Date	By

Designer	W&R	Scale	1"=50'
Drawn By	W&R	Date	12/19/13
Checked By	JSB	Job No.	03050283.01

HELMSDALE @ LANDFALL - PHASE II

CITY OF WILMINGTON NEW HANOVER NORTH CAROLINA

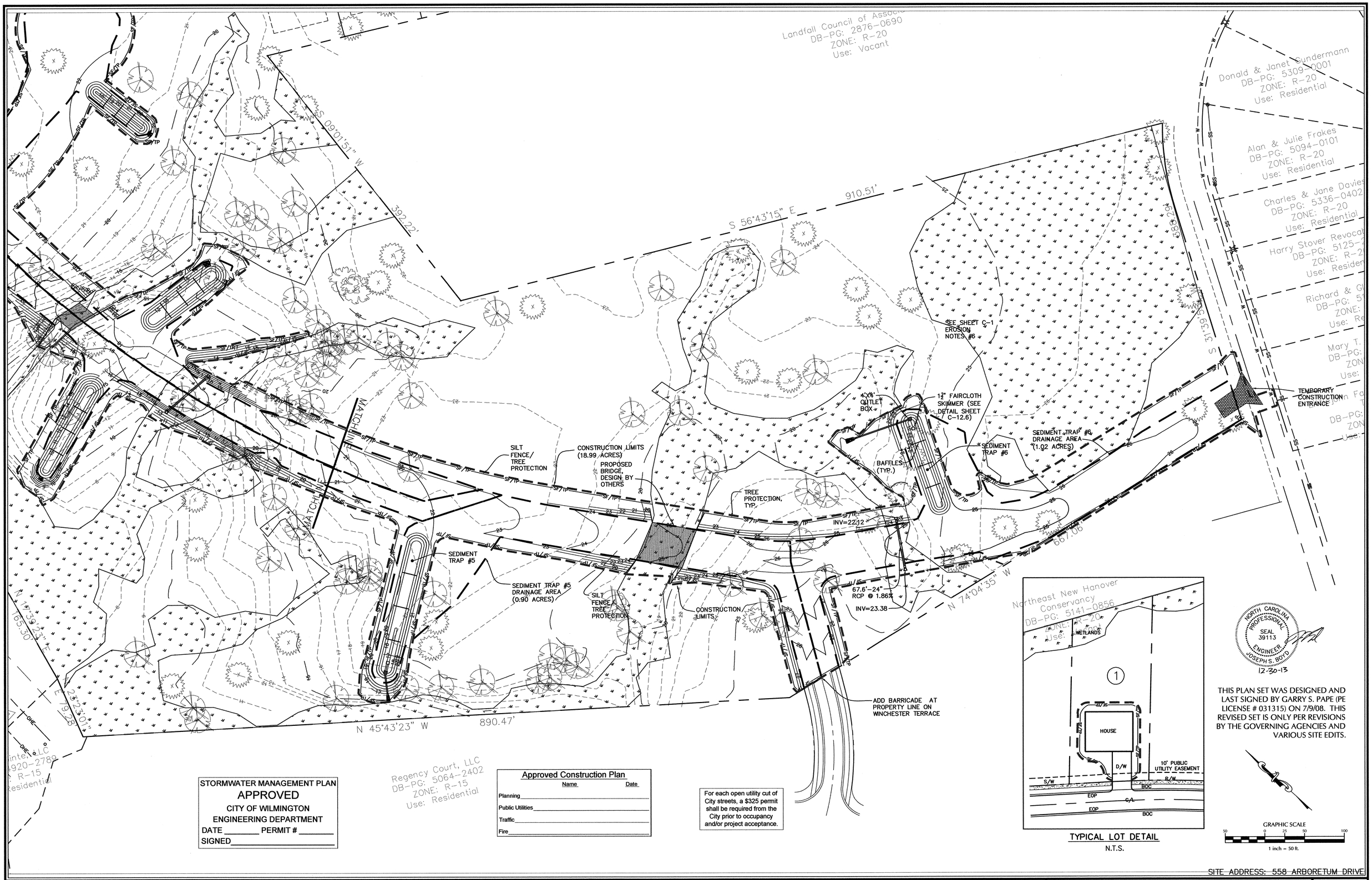
EROSION CONTROL PLAN

PREPARED FOR:
HELMSDALE INVESTORS, LLC
100 WESTON ESTATES WAY
CARY, NC 27513
919-481-3000

WITHERS & RAVENEL
ENGINEERS | PLANNERS | SURVEYORS
1410 Commonwealth Drive, Suite 101, Wilmington, North Carolina 28403 tel: 910-256-9277 fax: 910-256-2584 www.withersravenel.com

Sheet No. C-5.1

W:\05\05-280\03283.01-Helmsdale @ Landfall - Phase 2\CAD\2013 Updated Plans\SHEETS\C-5 EROSION CNTRL PLAN.dwg- December 23, 2013 - BOYD, JOSEPH



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

Approved Construction Plan		
	Name	Date
Planning		
Public Utilities		
Traffic		
Fire		

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TYPICAL LOT DETAIL
N.T.S.

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SITE ADDRESS: 558 ARBORETUM DRIVE

No.	Revision	Date	By

Designer	W&R	Scale	1"=50'
Drawn By	W&R	Date	12/19/13
Checked By	JSB	Job No.	03050283.01

HELMSDALE @ LANDFALL - PHASE II
CITY OF WILMINGTON NEW HANOVER NORTH CAROLINA

EROSION CONTROL PLAN

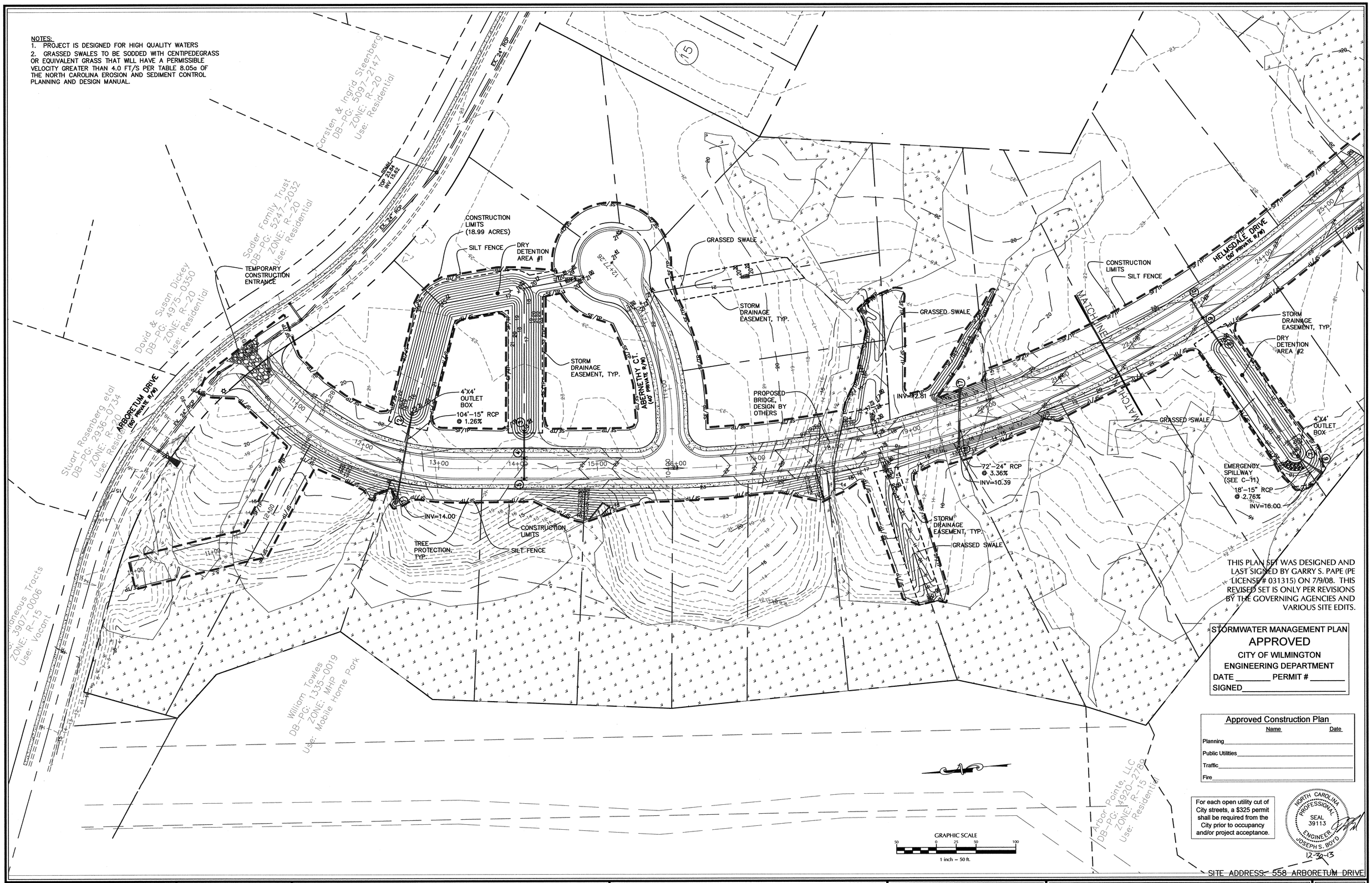
PREPARED FOR:
HELMSDALE INVESTORS, LLC
100 WESTON ESTATES WAY
CARY, NC 27513
919-481-3000

WITHERS & RAVENEL
ENGINEERS | PLANNERS | SURVEYORS
1410 Commonwealth Drive, Suite 101, Wilmington, North Carolina 28403 tel: 910-256-9277 fax: 910-256-2584 www.withersravenel.com

Sheet No.
C-5.2

W:\03_05-28th\03283.01-Helmsdale @ Landfall - Phase 2\CAD\2013 Updated Plans\SHEETS\C-5 EROSION CNTRL PLAN.dwg- December 23, 2013 - BOYD, JOSEPH

NOTES:
1. PROJECT IS DESIGNED FOR HIGH QUALITY WATERS
2. GRASSED SWALES TO BE SODDED WITH CENTIPEDEGRASS OR EQUIVALENT GRASS THAT WILL HAVE A PERMISSIBLE VELOCITY GREATER THAN 4.0 FT/S PER TABLE 8.05a OF THE NORTH CAROLINA EROSION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.



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

Approved Construction Plan

	Name	Date
Planning		
Public Utilities		
Traffic		
Fire		

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 39113 JOSEPH S. BOYD
12-30-13

SITE ADDRESS: 558 ARBORETUM DRIVE

No.	Revision	Date	By

Designer	W&R	Scale	1"=50'
Drawn By	W&R	Date	12/19/13
Checked By	JSB	Job No.	03050283.01

HELMSDALE @ LANDFALL - PHASE II
CITY OF WILMINGTON NEW HANOVER NORTH CAROLINA

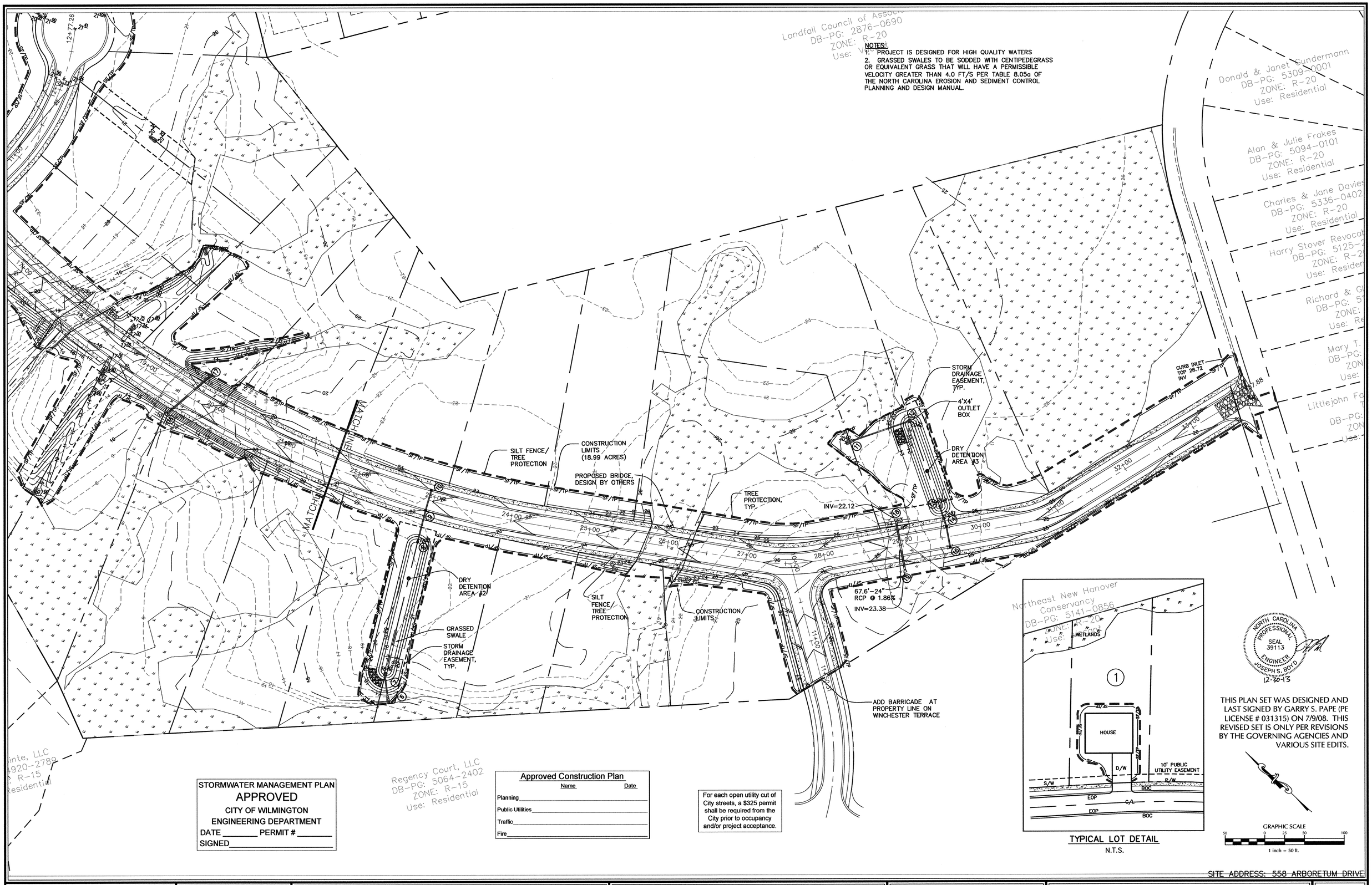
GRADING PLAN

PREPARED FOR:
HELMSDALE INVESTORS, LLC
100 WESTON ESTATES WAY
CARY, NC 27513
919-481-3000

WITHERS & RAVENEL
ENGINEERS | PLANNERS | SURVEYORS
1410 Commonwealth Drive, Suite 101. Wilmington, North Carolina 28403 tel: 910-256-9277 fax: 910-256-2584 www.withersravenel.com

Sheet No.
C-6.1

W:\03\05-283\03283.01-Helmsdale @ Landfall - Phase 2\CAD\2013 Update Plans\SHEETS\C-6 GRADING PLAN.dwg- December 23, 2013 - BOYD, JOSEPH



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

Approved Construction Plan

	Name	Date
Planning		
Public Utilities		
Traffic		
Fire		

For each open utility cut of City streets, a $325 permit shall be required from the City prior to occupancy and/or project acceptance.

TYPICAL LOT DETAIL
N.T.S.

NORTH CAROLINA PROFESSIONAL SEAL 39113 ENGINEER JOSEPH S. BOYD 12-30-13

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GRAPHIC SCALE
50 0 25 50 100
1 inch = 50 ft.

SITE ADDRESS: 558 ARBORETUM DRIVE

No.	Revision	Date	By

Designer	W&R	Scale	1"=50'
Drawn By	W&R	Date	12/19/13
Checked By	JSB	Job No.	03050283.01

HELMSDALE @ LANDFALL - PHASE II
CITY OF WILMINGTON NEW HANOVER NORTH CAROLINA

GRADING PLAN

PREPARED FOR:
HELMSDALE INVESTORS, LLC
100 WESTON ESTATES WAY
CARY, NC 27513
919-481-3000

WITHERS & RAVENEL
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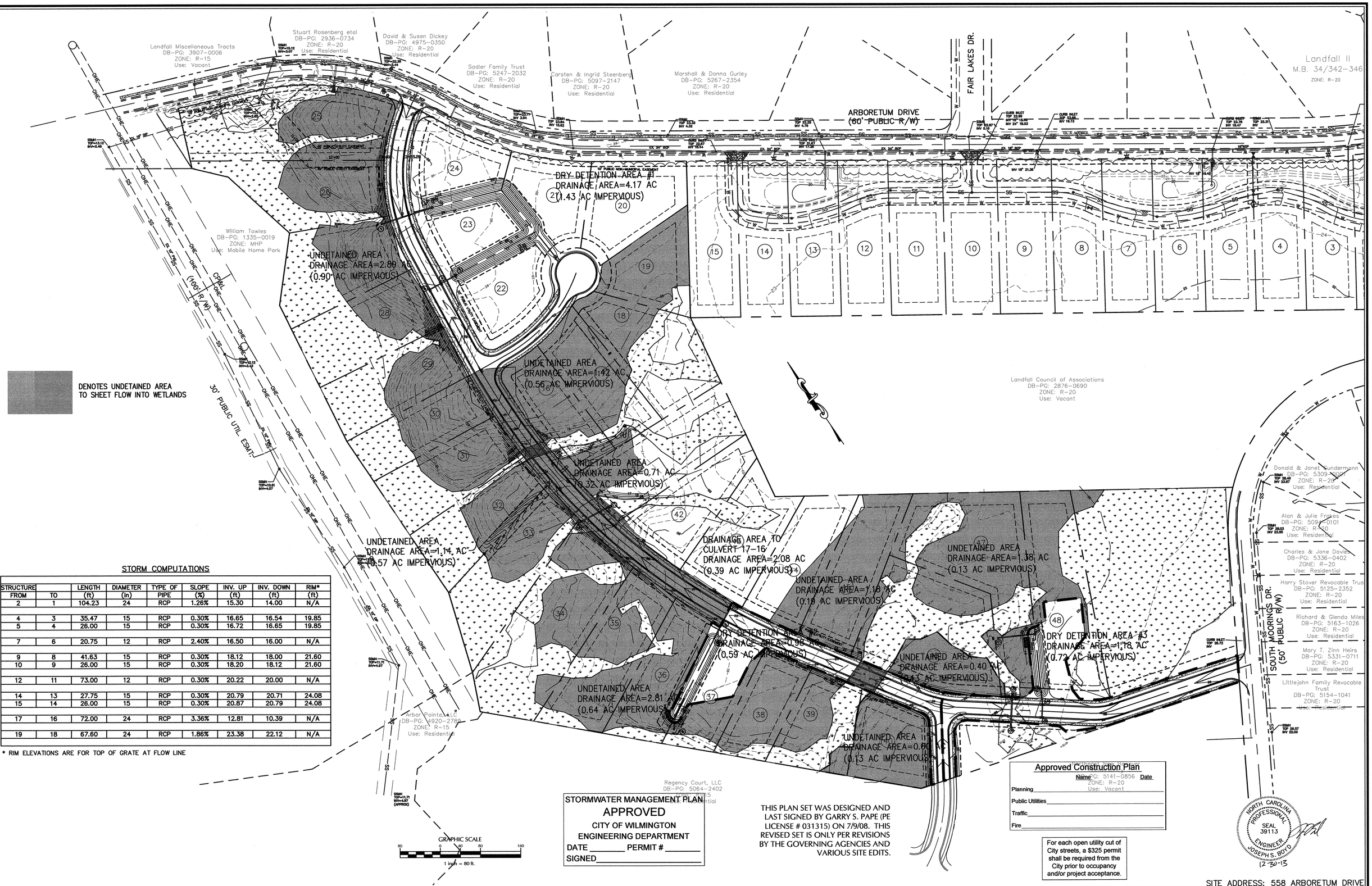
1410 Commonwealth Drive, Suite 101, Wilmington, North Carolina 28403 tel: 910-256-9277 fax: 910-256-2584 www.withersravenel.com

Sheet No.
C-6.2

W:\05-280\03283.01-Helmsdale @ Landfall - Phase 2\CAD\2013 Updated Plans\SHEETS\C-6 GRADING PLAN.dwg- December 23, 2013 - BOYD, JOSEPH



STORM COMPUTATIONS

STRUCTURE FROM	TO	LENGTH (ft)	DIAMETER (in)	TYPE OF PIPE	SLOPE (%)	INV. UP (ft)	INV. DOWN (ft)	RIM* (ft)
2	1	104.23	24	RCP	1.26%	15.30	14.00	N/A
4	3	35.47	15	RCP	0.30%	16.65	16.54	19.85
5	4	26.00	15	RCP	0.30%	16.72	16.65	19.85
7	6	20.75	12	RCP	2.40%	16.50	16.00	N/A
9	8	41.63	15	RCP	0.30%	18.12	18.00	21.60
10	9	26.00	15	RCP	0.30%	18.20	18.12	21.60
12	11	73.00	12	RCP	0.30%	20.22	20.00	N/A
14	13	27.75	15	RCP	0.30%	20.79	20.71	24.08
15	14	26.00	15	RCP	0.30%	20.87	20.79	24.08
17	16	72.00	24	RCP	3.36%	12.81	10.39	N/A
19	18	67.60	24	RCP	1.86%	23.38	22.12	N/A

* RIM ELEVATIONS ARE FOR TOP OF GRATE AT FLOW LINE

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

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Approved Construction Plan
Name PG: 5141-0856 Date
ZONE: R-20
Use: Vacant
Planning_____
Public Utilities_____
Traffic_____
Fire_____

For each open utility cut of City streets, a $325 permit shall be required from the City prior to occupancy and/or project acceptance.

NORTH CAROLINA PROFESSIONAL SEAL 39113 ENGINEER JOSEPH S. BOYD
12-20-13

SITE ADDRESS: 558 ARBORETUM DRIVE

No.	Revision	Date	By

Designer	W&R	Scale	1"=80'
Drawn By	W&R	Date	12/19/13
Checked By	JSB	Job No.	03050283.01

HELMSDALE @ LANDFALL - PHASE II

CITY OF WILMINGTON NEW HANOVER NORTH CAROLINA

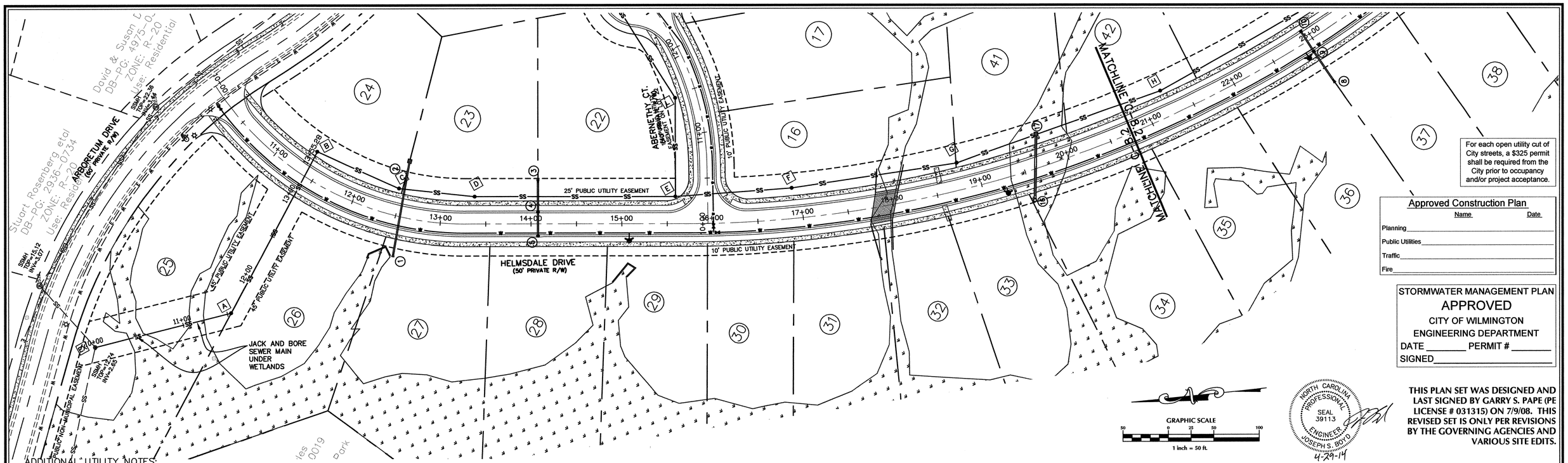
DRAINAGE AREA PLAN

PREPARED FOR:
HELMSDALE INVESTORS, LLC
100 WESTON ESTATES WAY
CARY, NC 27513
919-481-3000

WITHERS & RAVENEL
ENGINEERS | PLANNERS | SURVEYORS
1410 Commonwealth Drive, Suite 101, Wilmington, North Carolina 28403 tel: 910-256-9277 fax: 910-256-2584 www.withersravenel.com

Sheet No. C-7

W:\03-05-283\03283.01-Helmsdale @ Landfall - Phase II\CAD\2013 Updated Plans\SHEETS\C-7 DRAINAGE AREA PLAN (CITY).dwg- December 23, 2013 - BOYD, JOSEPH



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Approved Construction Plan

	Name	Date
Planning		
Public Utilities		
Traffic		
Fire		

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

NORTH CAROLINA PROFESSIONAL SEAL 39113 ENGINEER JOSEPH S. BOYD
4-29-14

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ADDITIONAL UTILITY NOTES:

1. WATER MAINS SHALL BE INSTALLED WITH MINIMUM 36" COVER PER THE CFPUA & NCDENR.
2. CONTRACTOR SHALL MAINTAIN A 24" VERTICAL SEPARATION BETWEEN WATER AND SEWER.
3. CONTRACTOR SHALL INSTALL ADDITIONAL HORIZONTAL AND VERTICAL BENDS AS NECESSARY TO MAINTAIN THE GENERAL GRADE FOR PROPOSED WATER MAINS.
4. ALL VALVE BOX RIMS SHALL BE INSTALLED AND ADJUSTED TO THE FINISHED PAVEMENT GRADE.
5. IF WATER MAIN AND/OR STORM DRAIN IS WITHIN 24" VERTICAL SEPARATION OF THE SEWER MAIN THE SEWER MAIN MATERIAL NEEDS TO BE DUCTILE IRON PIPE (DIP).
6. SEWER MAIN THROUGH ANY WETLANDS TO BE DUCTILE IRON PIPE (DIP).
7. PROPOSED SEWER MANHOLE A TO BE CONSTRUCTED WITH A WATERTIGHT LID AND WATERPROOF COATING. MANHOLE TO BE VACUUM TESTED IN ACCORDANCE WITH ASTM C1244.
8. EACH LOT REQUIRES 1 WATER AND 1 SEWER SERVICE. SEE DETAILS

CFPUA STANDARD SEWER NOTES:

1. SEWER GUARDS REQUIRED AT ALL MANHOLES. STAINLESS STEEL SEWER GUARDS REQUIRED AT MANHOLES LOCATED IN TRAFFIC AREAS.
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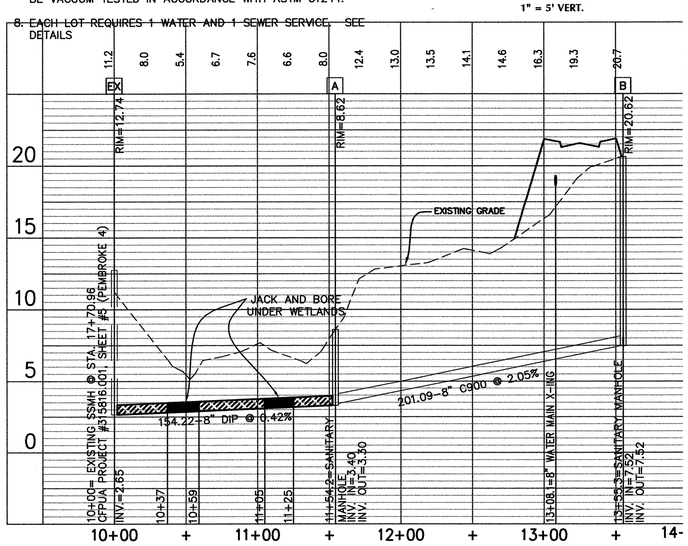
SCALE:
1" = 50' HORIZ.
1" = 5' VERT.



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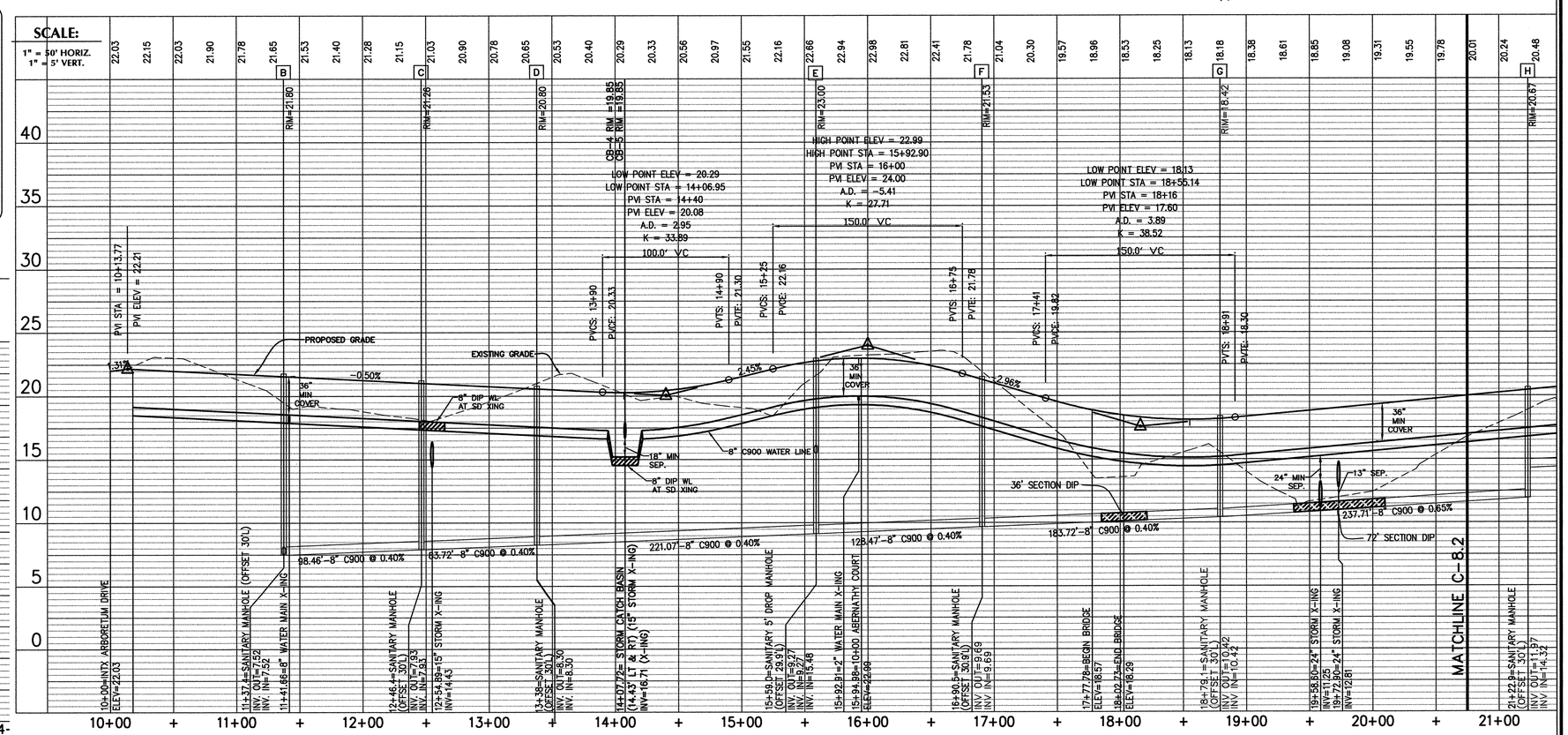


SITE ADDRESS: 558 ARBORETUM DRIVE

No.	Revision	Date	By
1	CITY OF WILMINGTON WATER COMMENTS	07/09/07	W&R
2	NEW HANOVER COUNTY SEWER COMMENTS	08/21/07	W&R
3	CFPUA COMMENTS	12/20/13	JSB
4	CFPUA COMMENTS	04/01/14	JSB

Designer	W&R	Scale	1"=50'
Drawn By	W&R	Date	12/19/13
Checked By	JSB	Job No.	03050283.01

HELMSDALE @ LANDFALL - PHASE II
CITY OF WILMINGTON NEW HANOVER NORTH CAROLINA

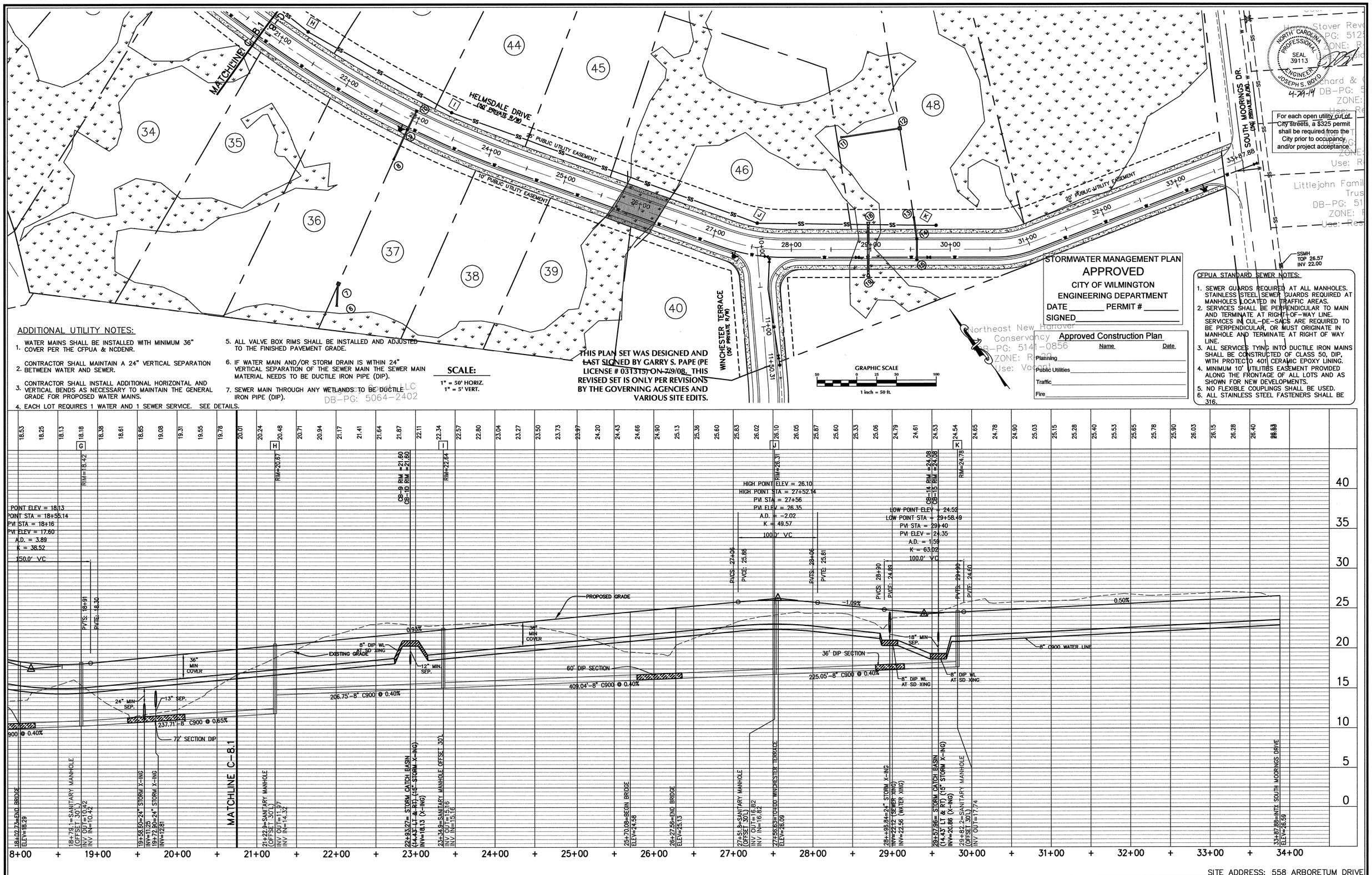
HELMSDALE DRIVE
PLAN & PROFILE (SHEET 1 OF 2)

PREPARED FOR:
HELMSDALE INVESTORS, LLC
100 WESTON ESTATES WAY
CARY, NC 27513
919-481-3000

WITHERS & RAVENEL
ENGINEERS | PLANNERS | SURVEYORS
1410 Commonwealth Drive, Suite 101, Wilmington, North Carolina 28403 tel: 910-256-9277 fax: 910-256-2584 www.withersravenel.com

Sheet No.
C-8.1

W:\13-04&05\130481-Helmesdale\CAD\2013 Updated Plans\SHEETS\C-8 HELMSDALE DRIVE PAP.dwg- April 25, 2014 - BOYD, JOSEPH



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SCALE:
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1" = 5' VERT.

THIS PLAN SET WAS DESIGNED AND ~~LAST SIGNED BY GARRY S. PAPE (PE LICENSE # 031315) ON 7/9/08.~~ THIS REVISED SET IS ONLY PER REVISIONS BY THE GOVERNING AGENCIES AND VARIOUS SITE EDITS.

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

Approved Construction Plan

	Name	Date
Planning		
Public Utilities		
Traffic		
Fire		

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4	CFPUA COMMENTS	04/01/14	JSB

Designer	W&R	Scale	1"=50'
Drawn By	W&R	Date	12/19/13
Checked By	JSB	Job No.	03050283.01

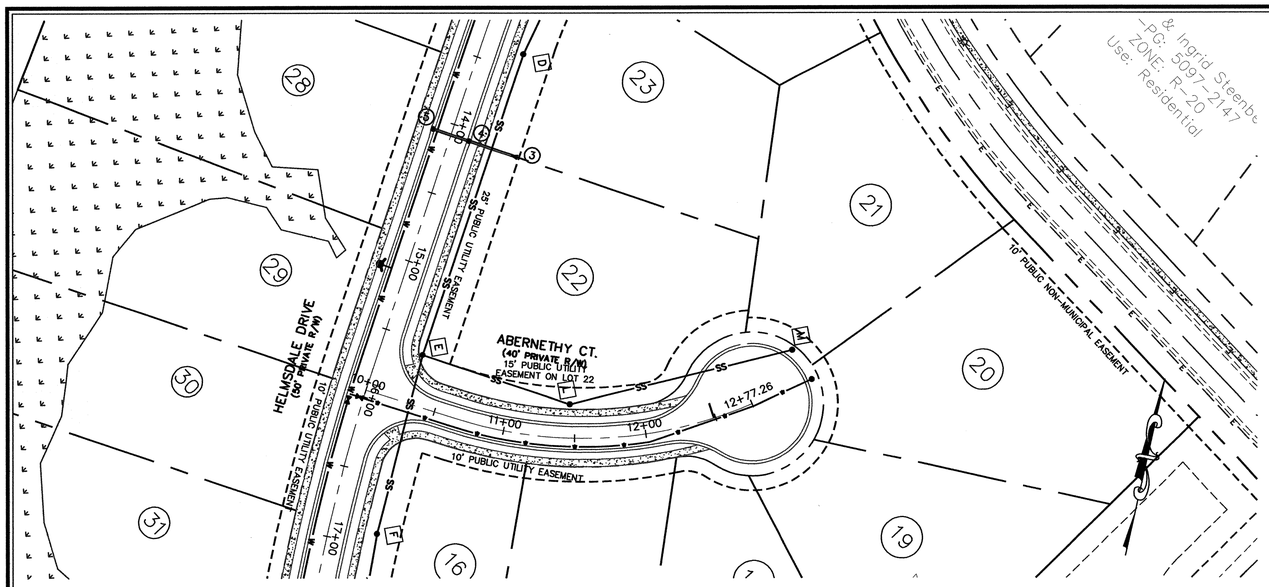
HELMSDALE @ LANDFALL - PHASE II
CITY OF WILMINGTON NEW HANOVER NORTH CAROLINA

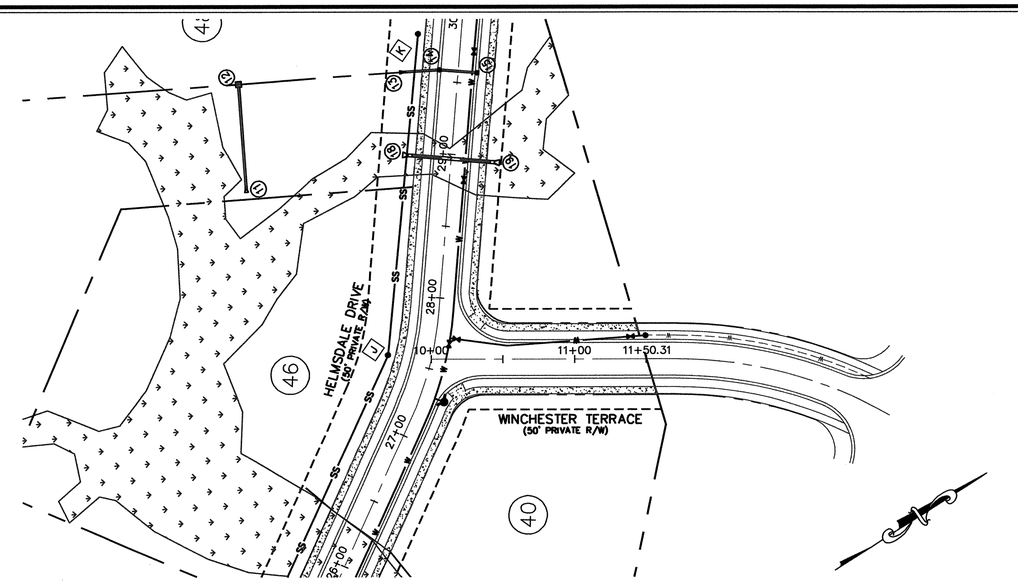
HELMSDALE DRIVE
PLAN & PROFILE (SHEET 2 OF 2)

PREPARED FOR:
HELMSDALE INVESTORS, LLC
100 WESTON ESTATES WAY
CARY, NC 27513
919-481-3000

WITHERS & RAVENEL
ENGINEERS | PLANNERS | SURVEYORS
1410 Commonwealth Drive, Suite 101, Wilmington, North Carolina 28403 tel: 910-256-9277 fax: 910-256-2584 www.withersravenel.com

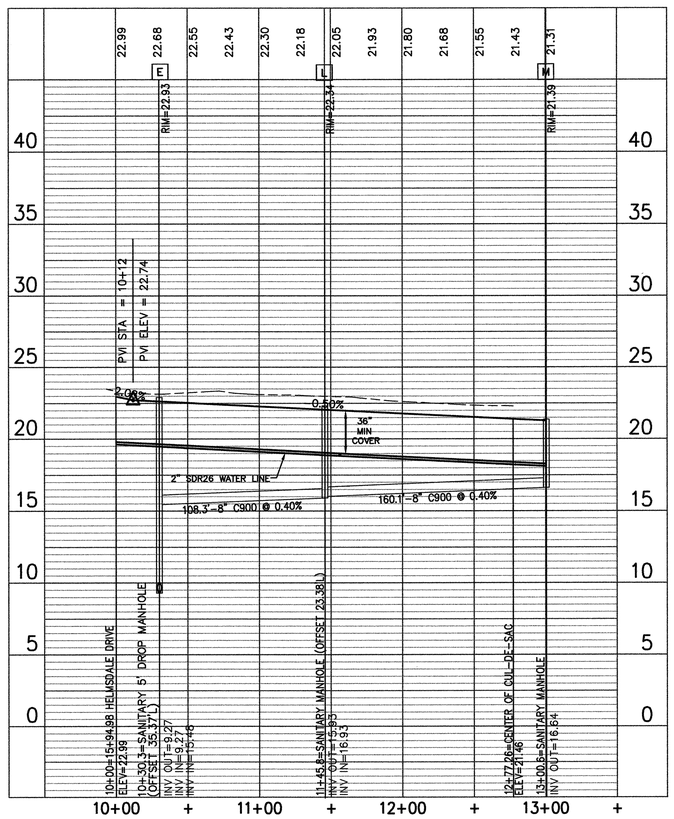
Sheet No.
C-8.2





SCALE:

1" = 50' HORIZ.
1" = 5' VERT.



ADDITIONAL UTILITY NOTES:

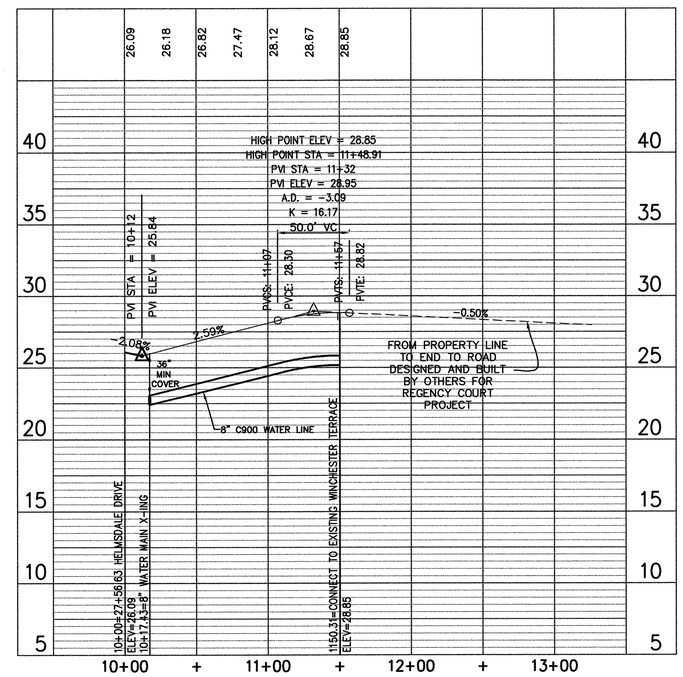
1. WATER MAINS SHALL BE INSTALLED WITH MINIMUM 36" COVER PER THE CFPUA & NCDENR.
2. CONTRACTOR SHALL MAINTAIN A 24" VERTICAL SEPARATION BETWEEN WATER AND SEWER.
3. CONTRACTOR SHALL INSTALL ADDITIONAL HORIZONTAL AND VERTICAL BENDS AS NECESSARY TO MAINTAIN THE GENERAL GRADE FOR PROPOSED WATER MAINS.
4. ALL VALVE BOX RIMS SHALL BE INSTALLED AND ADJUSTED TO THE FINISHED PAVEMENT GRADE.
5. IF WATER MAIN AND/OR STORM DRAIN IS WITHIN 24" VERTICAL SEPARATION OF THE SEWER MAIN THE SEWER MAIN MATERIAL NEEDS TO BE DUCTILE IRON PIPE (DIP).
6. SEWER MAIN THROUGH ANY WETLANDS TO BE DUCTILE IRON PIPE (DIP).
7. EACH LOT REQUIRES 1 WATER AND SEWER SERVICE. SEE DETAILS.

CFPUA STANDARD SEWER NOTES:

1. SEWER GUARDS REQUIRED AT ALL MANHOLES. STAINLESS STEEL SEWER GUARDS REQUIRED AT MANHOLES LOCATED IN TRAFFIC AREAS.
2. 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.
3. ALL SERVICES TYING INTO DUCTILE IRON MAINS SHALL BE CONSTRUCTED OF CLASS 50, DIP, WITH PROTECTO 401 CERAMIC EPOXY LINING.
4. MINIMUM 10' UTILITIES EASEMENT PROVIDED ALONG THE FRONTAGE OF ALL LOTS AND AS SHOWN FOR NEW DEVELOPMENTS.
5. NO FLEXIBLE COUPLINGS SHALL BE USED.
6. ALL STAINLESS STEEL FASTENERS SHALL BE 316.

SCALE:

1" = 50' HORIZ.
1" = 5' VERT.



NORTH CAROLINA PROFESSIONAL SEAL 39113 ENGINEER JOSEPH S. BOYD
4-29-14

THIS PLAN SET WAS DESIGNED AND LAST SIGNED BY GARRY S. PAPE (PE LICENSE # 031315) ON 7/9/08. THIS REVISED SET IS ONLY PER REVISIONS BY THE GOVERNING AGENCIES AND VARIOUS SITE EDITS.

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

Approved Construction Plan

	Name	Date
Planning		
Public Utilities		
Traffic		
Fire		

For each open utility cut of City streets, a $325 permit shall be required from the City prior to occupancy and/or project acceptance.

SITE ADDRESS: 558 ARBORETUM DRIVE

No.	Revision	Date	By
1	CITY OF WILMINGTON WATER COMMENTS	07/09/07	W&R
2	NEW HANOVER COUNTY SEWER COMMENTS	08/21/07	W&R
3	CFPUA COMMENTS	12/20/13	JSB
4	CFPUA COMMENTS	04/01/14	JSB

Designer	W&R	Scale	1"=50'
Drawn By	W&R	Date	12/19/13
Checked By	JSB	Job No.	03050283.01

HELMSDALE @ LANDFALL - PHASE II

CITY OF WILMINGTON NEW HANOVER NORTH CAROLINA

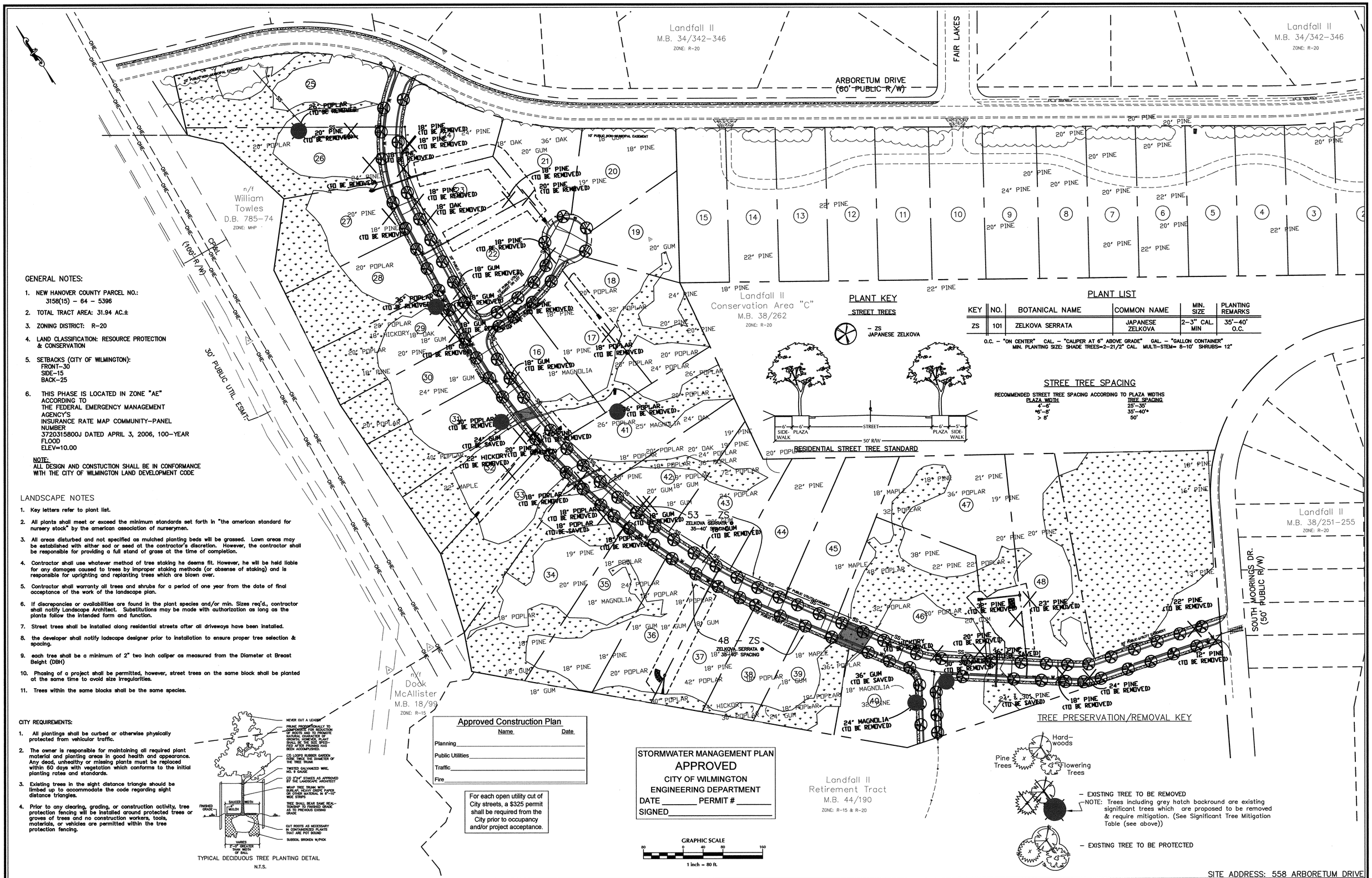
ABERNATHY COURT & WINCHESTER TERRACE
PLAN & PROFILE

PREPARED FOR:
HELMSDALE INVESTORS, LLC
100 WESTON ESTATES WAY
CARY, NC 27513
919-481-3000

WITHERS & RAVENEL
ENGINEERS | PLANNERS | SURVEYORS
1410 Commonwealth Drive, Suite 101, Wilmington, North Carolina 28403 tel: 910-256-9277 fax: 910-256-2584 www.withersravenel.com

Sheet No.
C-9

W:\13-0283\13048-Helmsdale\CAD\2013 Updated Plans\SHEETS\C-9 ABERNATHY & WINCHESTER P&P.dwg- April 25, 2014 - BOYD, JOSEPH



GENERAL NOTES:

1. NEW HANOVER COUNTY PARCEL NO.: 3158(15) - 64 - 5396
2. TOTAL TRACT AREA: 31.94 AC.±
3. ZONING DISTRICT: R-20
4. LAND CLASSIFICATION: RESOURCE PROTECTION & CONSERVATION
5. SETBACKS (CITY OF WILMINGTON): FRONT-30 SIDE-15 BACK-25
6. THIS PHASE IS LOCATED IN ZONE "AE" ACCORDING TO THE FEDERAL EMERGENCY MANAGEMENT AGENCY'S INSURANCE RATE MAP COMMUNITY-PANEL NUMBER 3720315800J DATED APRIL 3, 2006, 100-YEAR FLOOD ELEV=10.00

NOTE:
ALL DESIGN AND CONSTUCTION SHALL BE IN CONFORMANCE WITH THE CITY OF WILMINGTON LAND DEVELOPMENT CODE

LANDSCAPE NOTES

1. Key letters refer to plant list.
2. All plants shall meet or exceed the minimum standards set forth in "the american standard for nursery stock" by the american association of nurserymen.
3. All areas disturbed and not specified as mulched planting beds will be grassed. Lawn areas may be established with either sod or seed at the contractor's discretion. However, the contractor shall be responsible for providing a full stand of grass at the time of completion.
4. Contractor shall use whatever method of tree staking he deems fit. However, he will be held liable for any damages caused to trees by improper staking methods (or absense of staking) and is responsible for uprighting and replanting trees which are blown over.
5. Contractor shall warranty all trees and shrubs for a period of one year from the date of final acceptance of the work of the landscape plan.
6. If discrepancies or availabilities are found in the plant species and/or min. Sizes req'd., contractor shall notify Landscape Architect. Substitutions may be made with authorization as long as the plants follow the intended form and function.
7. Street trees shall be installed along residential streets after all driveways have been installed.
8. the developer shall notify ladscape designer prior to installation to ensure proper tree selection & spacing.
9. each tree shall be a minimum of 2" two inch caliper as measured from the Diameter at Breast Beight (DBH)
10. Phasing of a project shall be permitted, however, street trees on the same block shall be planted at the same time to avoid size irregularities.
11. Trees within the same blocks shall be the same species.

CITY REQUIREMENTS:

1. All plantings shall be curbed or otherwise physically protected from vehicular traffic.
2. The owner is responsible for maintaining all required plant material and planting areas in good health and appearance. Any dead, unhealthy or missing plants must be replaced within 60 days with vegetation which conforms to the initial planting rates and standards.
3. Existing trees in the sight distance triangle should be limbed up to accommodate the code regarding sight distance triangles.
4. 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.

TYPICAL DECIDUOUS TREE PLANTING DETAIL

N.T.S.

PLANT KEY

STREET TREES

– ZS
JAPANESE ZELKOVA

PLANT LIST

KEY	NO.	BOTANICAL NAME	COMMON NAME	MIN. SIZE	PLANTING REMARKS
ZS	101	ZELKOVA SERRATA	JAPANESE ZELKOVA	2-3" CAL. MIN	35'-40' O.C.

O.C. – "ON CENTER" CAL. – "CALIPER AT 6" ABOVE GRADE" GAL. – "GALLON CONTAINER"
MIN. PLANTING SIZE: SHADE TREES=2-21/2" CAL. MULTI-STEM= 8-10' SHRUBS= 12"

STREE TREE SPACING

RECOMMENDED STREET TREE SPACING ACCORDING TO PLAZA WIDTHS

PLAZA WIDTH	TREE SPACING
4'-6'	25'-35'
*6'-8'	35'-40'*
> 8'	50'

RESIDENTIAL STREET TREE STANDARD

TREE PRESERVATION/REMOVAL KEY

Hard-woods
Pine Trees
Flowering Trees

– EXISTING TREE TO BE REMOVED
NOTE: Trees including grey hatch backround are existing significant trees which are proposed to be removed & require mitigation. (See Significant Tree Mitigation Table (see above))

– EXISTING TREE TO BE PROTECTED

Approved Construction Plan

	Name	Date
Planning		
Public Utilities		
Traffic		
Fire		

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

SITE ADDRESS: 558 ARBORETUM DRIVE

No.	Revision	Date	By
1	UPDATED WATER & SEWER LINE LOCATION	4/01/14	JSB

Designer	W&R	Scale	1"=50'
Drawn By	W&R	Date	12/19/13
Checked By	JSB	Job No.	03050283.01

HELMSDALE @ LANDFALL - PHASE II

CITY OF WILMINGTON NEW HANOVER NORTH CAROLINA

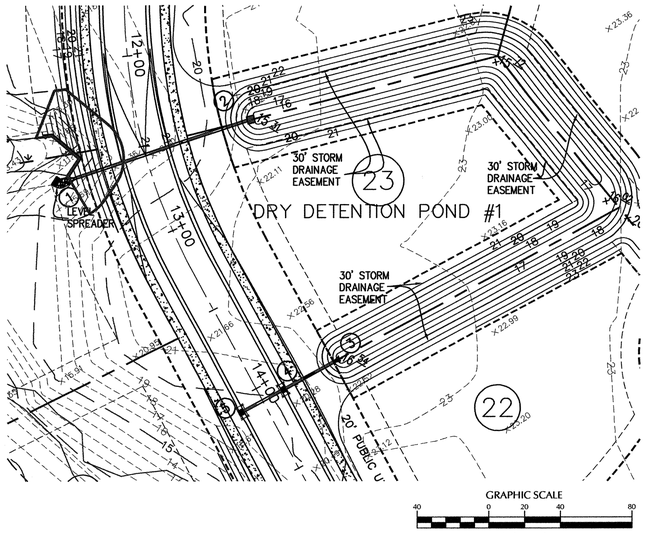
LANDSCAPE PLAN

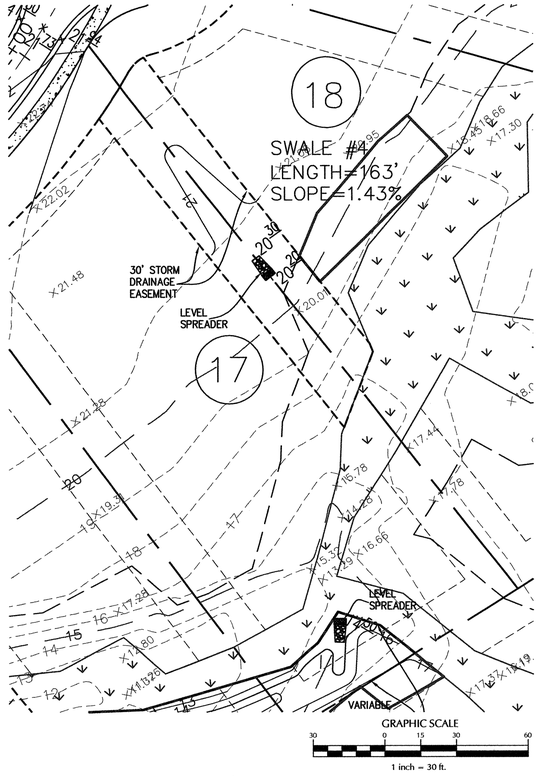
PREPARED FOR:
HELMSDALE INVESTORS, LLC
100 WESTON ESTATES WAY
CARY, NC 27513
919-481-3000

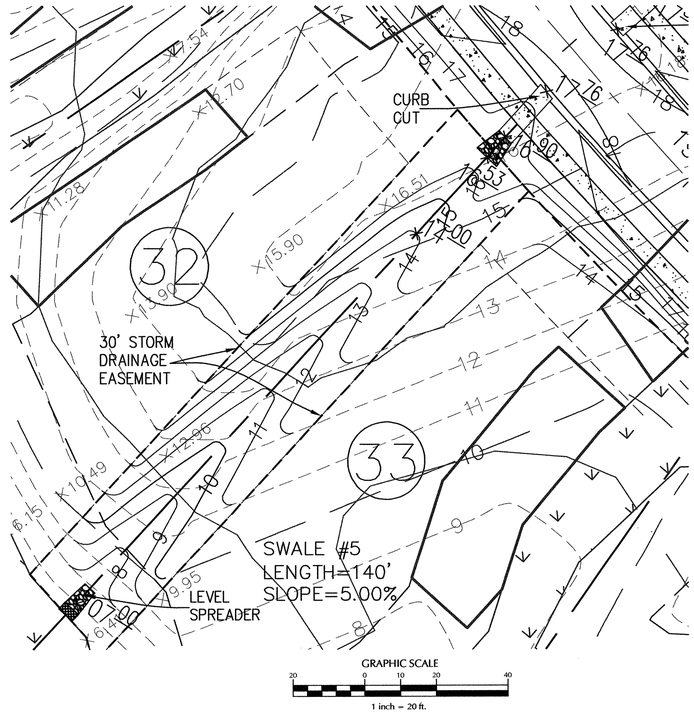
WITHERS & RAVENEL
ENGINEERS | PLANNERS | SURVEYORS
1410 Commonwealth Drive, Suite 101. Wilmington, North Carolina 28403 tel: 910-256-9277 fax: 910-256-2584 www.withersravenel.com

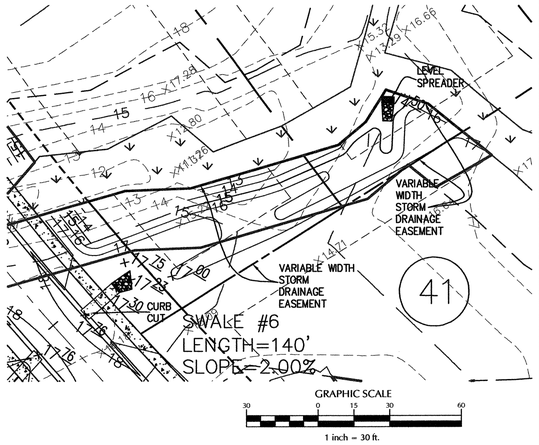
Sheet No.
C-10

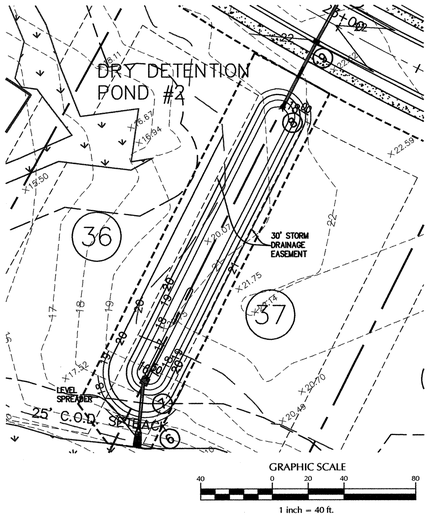
W:\13\13-0485\130481-Helmsdale\CAD\2013 Updated Plans\SHEETS\C-10 LANDSCAPE PLAN.dwg- April 25, 2014 - BOYD, JOSEPH

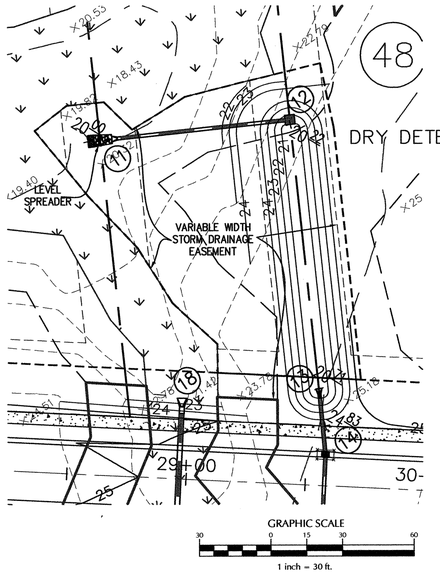


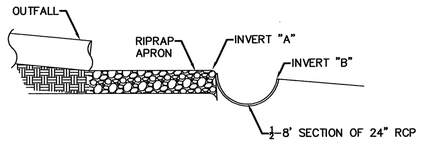










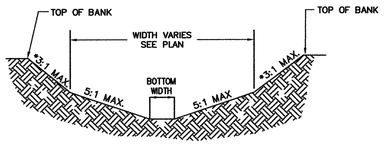


OUTLET	INVERT A	INVERT B	RIPRAP (NCDOT CLASS B, 18" THICK)		
			LENGTH (ft)	UPSTREAM WIDTH (ft)	DOWNSTREAM WIDTH (ft)
OUTLET FROM POND#1	14.00	13.90	12.00	6.00	8.00
OUTLET FROM SWALE#4	13.50	13.40	6.00	3.00	4.00
OUTLET FROM SWALE#5	7.00	6.90	6.00	3.00	4.00
OUTLET FROM SWALE#6	14.50	14.40	6.00	3.00	4.00
OUTLET FROM POND#2	16.00	15.90	6.00	3.00	4.00
OUTLET FROM POND#3	20.00	19.90	6.00	3.00	4.00

LEVEL SPREADER
NTS

SWALE CALCULATIONS

SWALE	DRAINAGE AREA	STARTING ELEVATION	OUTLET ELEVATION	LENGTH (ft)	SLOPE	CROSS SLOPE	SWALE LINER
1	3.65	16.54	15.31	410	0.30%	5:1 BOTTOM 1' 3:1 ABOVE 1' DEPTH	GRASS
4	1.20	16.04	13.70	163	1.43%	5:1 BOTTOM 1' 3:1 ABOVE 1' DEPTH	GRASS
5	0.53	14.00	7.0	140	5.00%	5:1 BOTTOM 1' 3:1 ABOVE 1' DEPTH	GRASS
6	0.99	17.30	14.50	140	2.00%	5:1 BOTTOM 1' 3:1 ABOVE 1' DEPTH	GRASS
2	0.98	18.00	16.50	168	0.89%	5:1 BOTTOM 1' 3:1 ABOVE 1' DEPTH	GRASS
3	1.18	20.71	20.22	109	0.45%	5:1 BOTTOM 1' 3:1 ABOVE 1' DEPTH	GRASS



SWALE CROSS SECTION DETAIL
N.T.S.

NORTH CAROLINA PROFESSIONAL SEAL 39113 ENGINEER JOSEPH S. BOYD
12-30-13

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SITE ADDRESS: 558 ARBORETUM DRIVE

No.	Revision	Date	By

Designer	W&R	Scale	VARIES
Drawn By	W&R	Date	12/19/13
Checked By	JSB	Job No.	03050283.01

HELMSDALE @ LANDFALL - PHASE II
CITY OF WILMINGTON NEW HANOVER NORTH CAROLINA

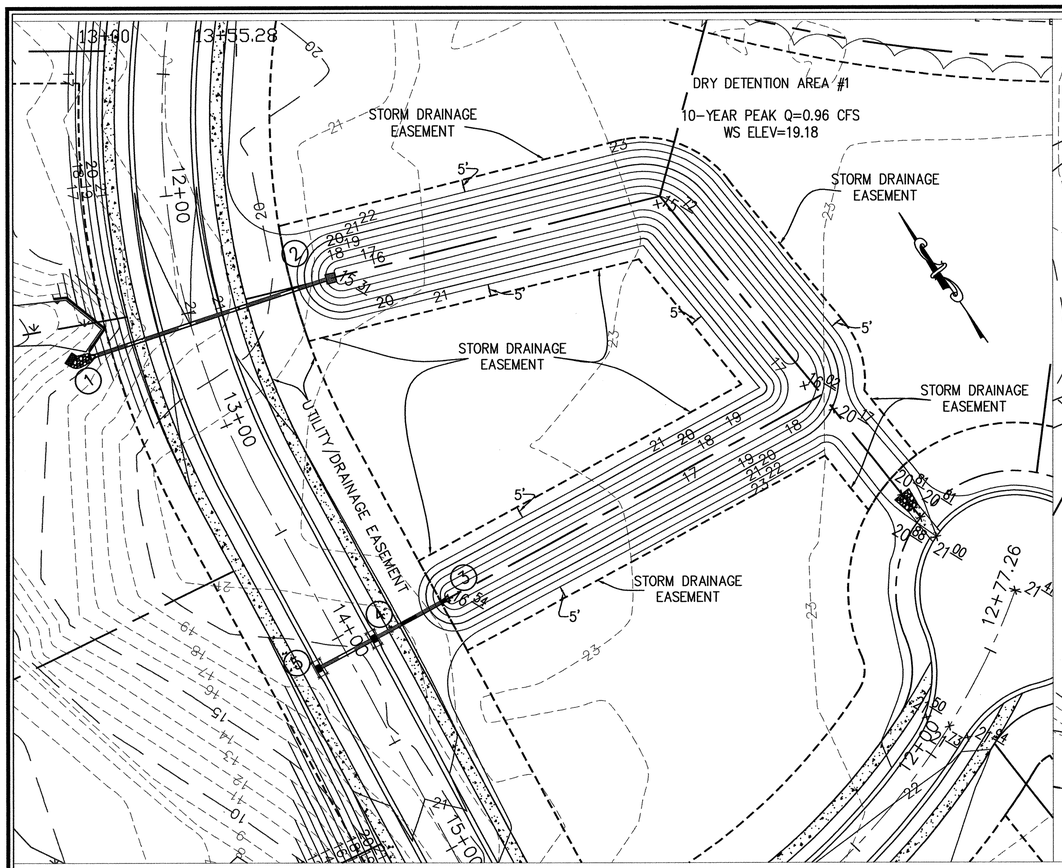
SWALE DETAILS

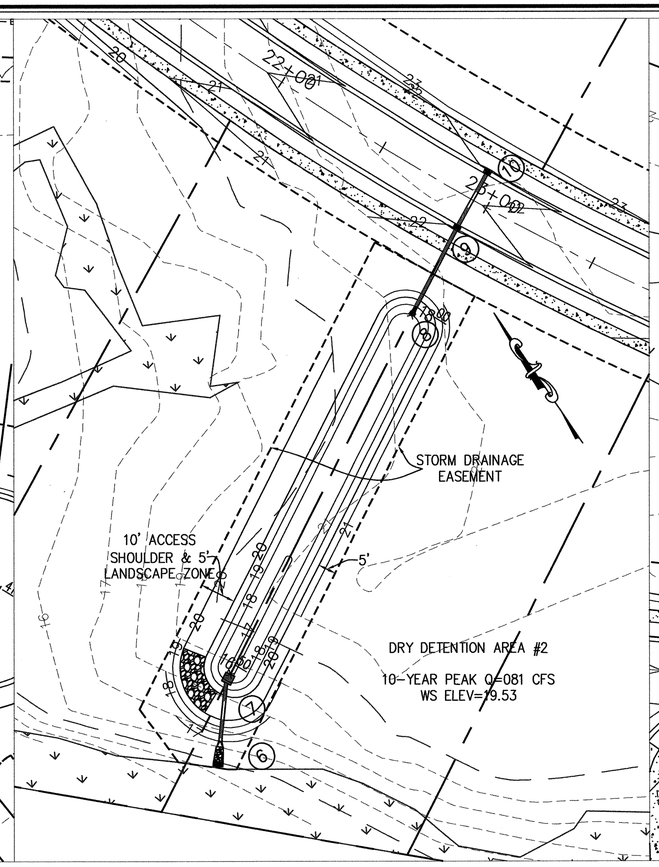
PREPARED FOR:
HELMSDALE INVESTORS, LLC
100 WESTON ESTATES WAY
CARY, NC 27513
919-481-3000

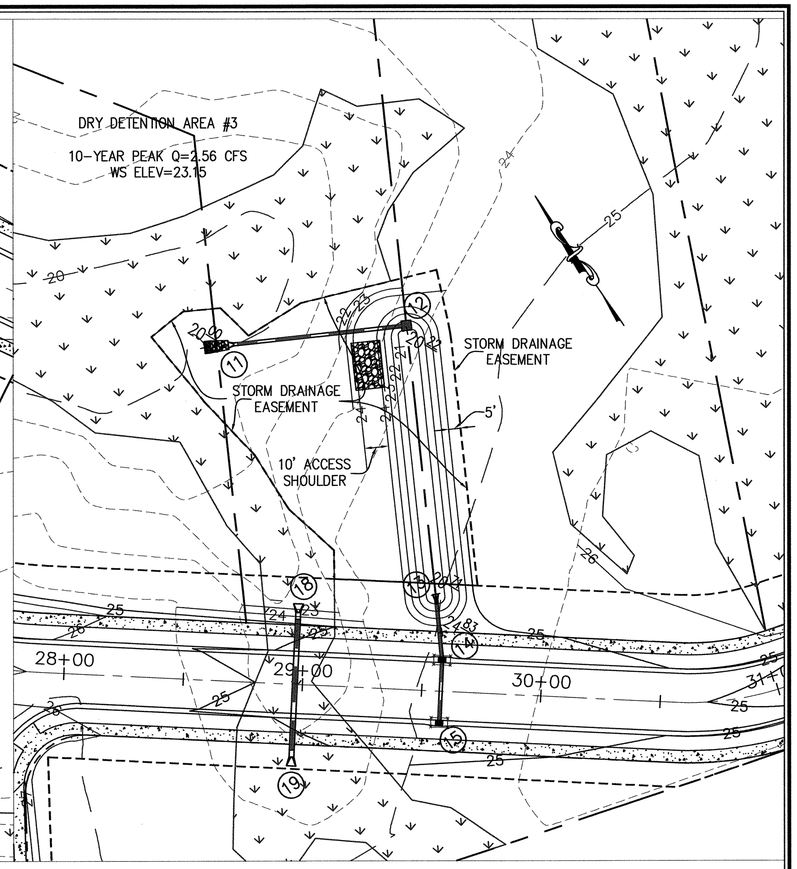
WITHERS & RAVENEL
ENGINEERS | PLANNERS | SURVEYORS
1410 Commonwealth Drive, Suite 101. Wilmington, North Carolina 28403 tel: 910-256-9277 fax: 910-256-2584 www.withersravenel.com

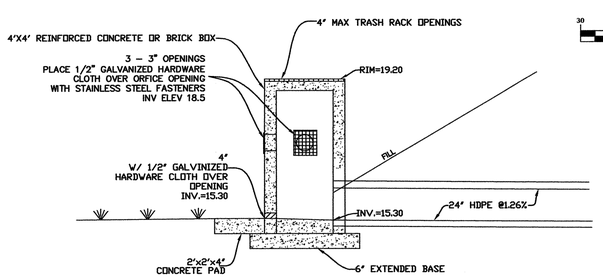
Sheet No.
C-11.1

W:\03\03-283\03283.01-Helmsdale @ Landfall - Phase 2\CAD\2013 Updated Plans\SHEETS\C-11.1 SWALE DETAILS.dwg- December 23, 2013 - BOYD, JOSEPH









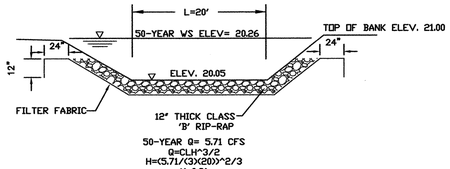
OUTLET STRUCTURE DETAIL-POND #1

N.T.S.

GRAPHIC SCALE

30 0 15 30 60

1 inch = 30 ft.



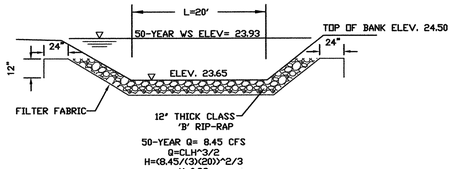
EMERGENCY SPILLWAY

N.T.S.

GRAPHIC SCALE

30 0 15 30 60

1 inch = 30 ft.



EMERGENCY SPILLWAY

N.T.S.

GRAPHIC SCALE

30 0 15 30 60

1 inch = 30 ft.

NORTH CAROLINA PROFESSIONAL SEAL 39113 ENGINEER JOSEPH S. BOYD

12-30-13

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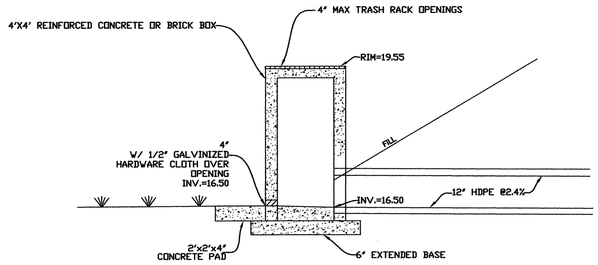
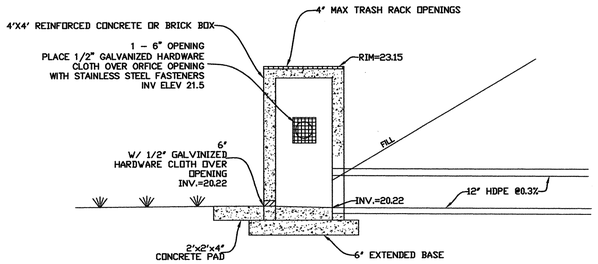
NOTE:

1. 5' AREA OFF TOP OF BANK TO BE USED FOR LANDSCAPING.



OUTLET STRUCTURE DETAIL-POND #2

N.T.S.



OUTLET STRUCTURE DETAIL-POND #3

N.T.S.

Approved Construction Plan		
	Name	Date
Planning		
Public Utilities		
Traffic		
Fire		

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

SITE ADDRESS: 558 ARBORETUM DRIVE

No.	Revision	Date	By

Designer	W&R	Scale	N/A
Drawn By	W&R	Date	12/19/13
Checked By	JSB	Job No.	03050283.01

HELMSDALE @ LANDFALL - PHASE II

CITY OF WILMINGTON NEW HANOVER NORTH CAROLINA

DRY DETENTION AREA DETAILS

PREPARED FOR:
HELMSDALE INVESTORS, LLC
100 WESTON ESTATES WAY
CARY, NC 27513
919-481-3000

WITHERS & RAVENEL
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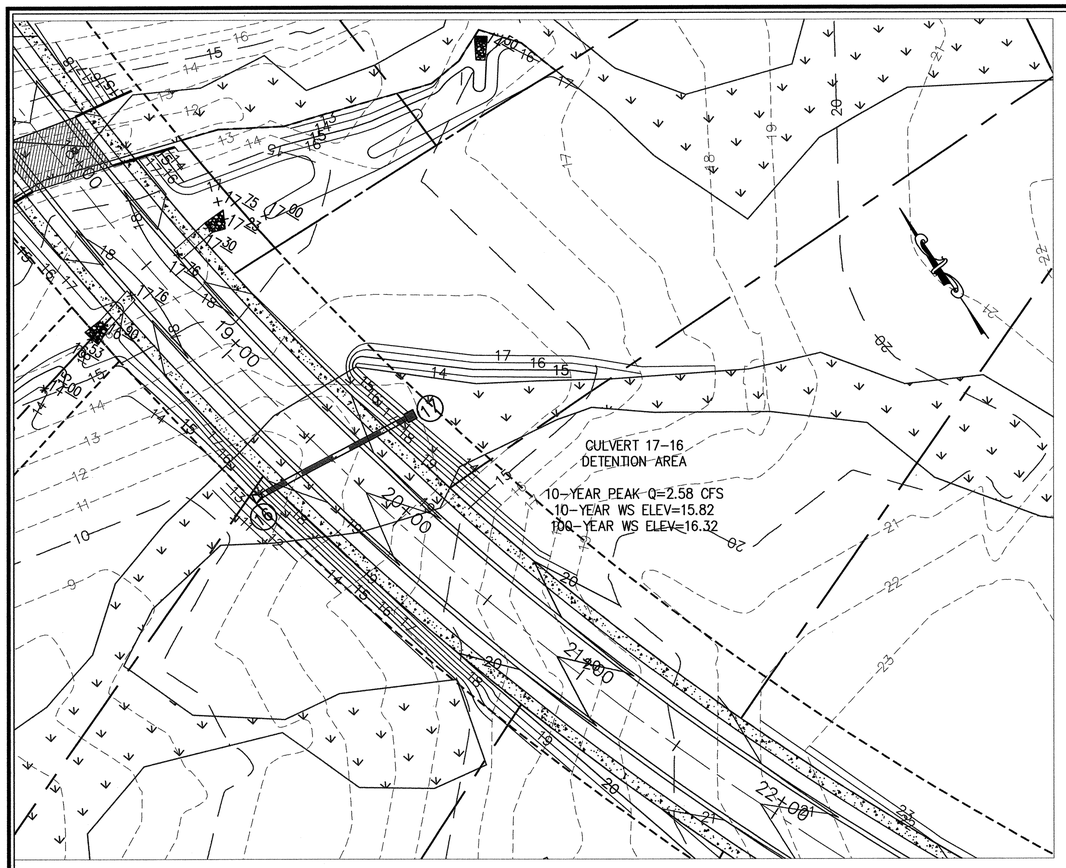
1410 Commonwealth Drive, Suite 101, Wilmington, North Carolina 28403 tel: 910-256-9277 fax: 910-256-2584 www.withersravenel.com

Sheet No.
C-11.2

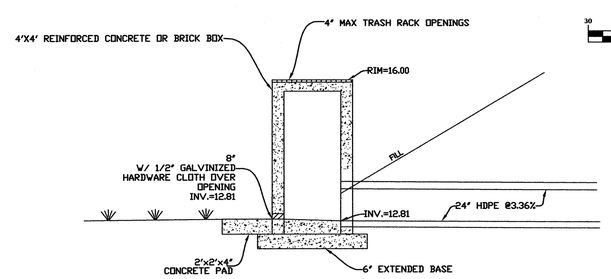
W:\03\05-280\03283.01-Helmsdale @ Landfall - Phase 2\CAD\2013 Updated Plans\SHEETS\C-11.2-11.3 DRY DETENTION DETAILS.dwg- December 23, 2013 - BOYD, JOSEPH



GRAPHIC SCALE

30 0 15 30 60

1 inch = 30 ft.



OUTLET STRUCTURE DETAIL–CULVERT 17–16

N.T.S.

Approved Construction Plan		
	Name	Date
Planning		
Public Utilities		
Traffic		
Fire		

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STORMWATER MANAGEMENT PLAN
APPROVED
CITY OF WILMINGTON
ENGINEERING DEPARTMENT
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SIGNED _____

NORTH CAROLINA PROFESSIONAL SEAL 39113 ENGINEER JOSEPH S. BOYD
12-30-13

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SITE ADDRESS: 558 ARBORETUM DRIVE

No.	Revision	Date	By

Designer	W&R	Scale	N/A
Drawn By	W&R	Date	12/19/13
Checked By	JSB	Job No.	03050283.01

HELMSDALE @ LANDFALL - PHASE II

CITY OF WILMINGTON NEW HANOVER NORTH CAROLINA

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Sheet No. C-11.3

W:\CIVIL\03-2005\03283.01 - Helmsdale @ Landfall - Phase 2\CAD\2013 Updated Plans\SHEETS\C-11.2-11.3 DRY DETENTION DETAILS.dwg- December 23, 2013 - BOYD, JOSEPH

GENERAL NOTES

I. LOCATION OF WHEELCHAIR RAMPS:

1. IN ACCORDANCE WITH THE RATIFIED HOUSE BILL 1296, ALL STREET CURBS IN NORTH CAROLINA BEING CONSTRUCTED OR RECONSTRUCTED FOR MAINTENANCE PROCEDURES, TRAFFIC OPERATIONS, REPAIRS, CORRECTION OF UTILITIES OR ALTERED FOR ANY REASON AFTER SEPTEMBER 1, 1973 SHALL PROVIDE WHEELCHAIR RAMPS FOR THE PHYSICALLY HANDICAPPED AT ALL INTERSECTIONS WHERE BOTH CURB AND GUTTERS AND SIDEWALKS ARE PROVIDED AND AT OTHER MAJOR POINTS OF PEDESTRIAN FLOW.
2. WHEELCHAIR RAMPS SHOULD BE LOCATED AS INDICATED IN DETAIL DRAWINGS, HOWEVER EXISTING LIGHT POLES, FIRE HYDRANTS, DROP INLETS, ETC. MAY AFFECT PLACEMENT.

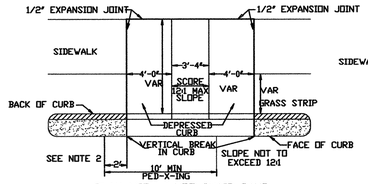
II. CONSTRUCTION NOTES:

1. NO SLOPE SHALL EXCEED 1'=1' (12:1) ON THE RAMP OR SIDEWALK.
2. IN NO CASE SHALL THE WIDTH OF WHEELCHAIR RAMPS BE LESS THAN 40" (3'-4"). WIDTHS MAY EXCEED 40" IF NECESSARY.
3. USE CLASS "A" CONCRETE WITH THE SURFACE HAVING A ROUGH, NON-SKID TYPE FINISH.
4. 1/2" EXPANSION JOINT WILL BE REQUIRED WHERE THE CONCRETE WHEELCHAIR RAMP JOINS ANY RIGID PAVEMENT OR STRUCTURE.
5. CONSTRUCTION METHODS SHALL CONFORM WITH THOSE OF THE GOVERNING BODY WHICH HAS JURISDICTION OF THE PARTICULAR STREET.

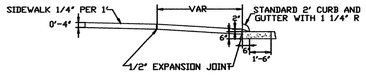
III. ADDITIONAL NOTES:

1. THE INSIDE PEDESTRIAN CROSSWALK LINES SHALL BE ESTABLISHED BY BISECTING THE INTERSECTION RADII WHERE MARKED (SEE NOTE 6).
2. THE WHEELCHAIR RAMP SHALL BE LOCATED SO THAT THE BEGINNING OF THE WHEEL CHAIR RAMP WILL BE TWO FEET FROM THE INSIDE PEDESTRIAN CROSSWALK LINE.
3. THE WIDTH OF THE PEDESTRIAN CROSSWALK SHALL BE 10 FEET UNLESS A GREATER WIDTH IS REQUIRED TO ACCOMMODATE THE PEDESTRIAN TRAFFIC.
4. STOP BARS SHALL BE USED WHERE IT IS IMPORTANT TO INDICATE THE POINT BEHIND WHICH VEHICLES ARE REQUIRED TO STOP IN COMPLIANCE WITH A TRAFFIC SIGNAL, STOP SIGN, OR OTHER LEGAL REQUIREMENTS.
5. PARKING SHALL BE ELIMINATED A MINIMUM OF 20 FEET BACK OF PEDESTRIAN CROSSWALK.
6. ALL PAVEMENT MARKINGS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES, PUBLISHED BY THE FEDERAL HIGHWAY ADMINISTRATION. THIS IS AVAILABLE FROM THE SUPERINTENDENT OF DOCUMENTS, U.S GOVERNMENT PRINTING OFFICE, WASHINGTON, D.C. 20402.

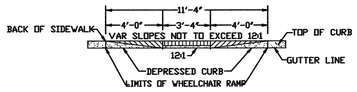
GUIDELINES FOR WHEELCHAIR RAMPS
SD 8-09



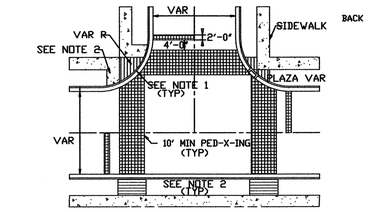
PLAN VIEW WHEELCHAIR RAMP



SECTION A-A

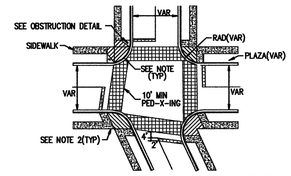


SECTION B-B

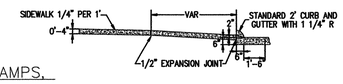


TYPICAL LOCATION OF WHEELCHAIR RAMPS, PEDESTRIAN CROSS WALKS & STOP BARS FOR TEE INTERSECTION

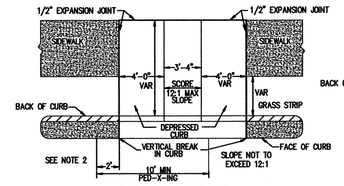
GUIDELINES FOR WHEELCHAIR RAMPS & DEPRESSED CURBS
SD 8-11
N.T.S.



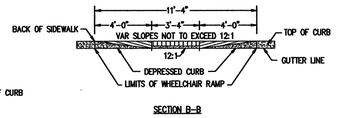
TYPICAL LOCATION OF WHEELCHAIR RAMPS, PEDESTRIAN CROSSWALKS & STOP BARS



SECTION A-A

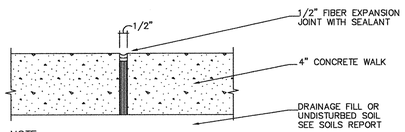


PLAN VIEW WHEELCHAIR RAMP



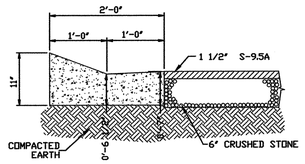
SECTION B-B

GUIDELINES FOR WHEELCHAIR RAMPS & DEPRESSED CURBS
SD 8-10
N.T.S.

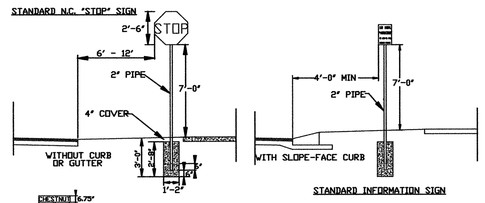


NOTE:
PROVIDE CONSTRUCTION JOINTS AT 25' O.C. MAX. IN EITHER DIRECTION WITH SQUARE FOOTAGE LESS THAN 400 S.F. AND AT CURVES, TANGENTS, AND CORNERS (UNLESS NOTED OTHERWISE).

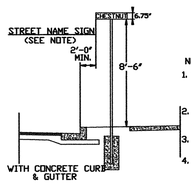
CONCRETE EXPANSION JOINT
N.T.S.



TYPE "H" CURB AND GUTTER
SD 7-04
N.T.S.

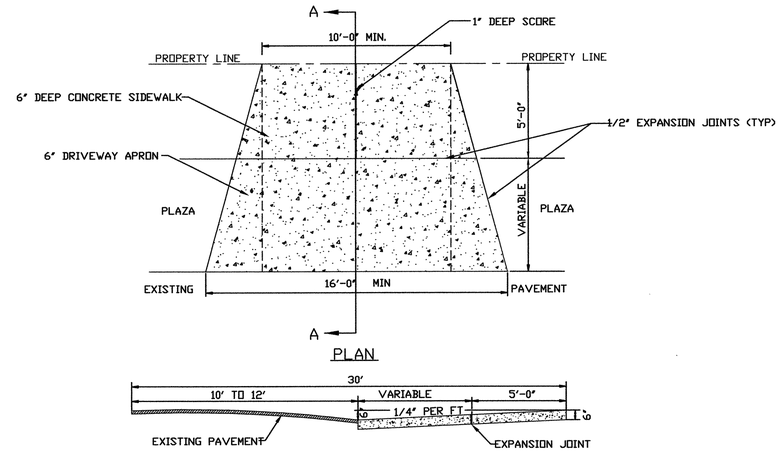


STANDARD INFORMATION SIGN



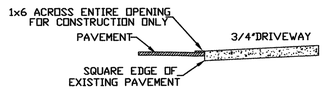
NOTES:
1. STREET NAME SIGNS SHALL BE A MINIMUM OF 6' EXTRUDED ALUMINUM BLADES USING A MINUMUM OF 4" C SERIES LETTERING IN REFLECTIVE SILVER & REFLECTIVE GREEN BACKGROUND.
2. ALL REFLECTIVE SIGNS SHALL BE MADE OF ENGINEERING GRADE OR HIGH INTENSITY GRADE REFLECTIVE SHEETING OR APPROVED EQUIVALENT.
3. ALL SIGNS PLACED IN RIGHT-OF-WAY WILL BE APPROVED BY TRAFFIC ENGINEERING DIVISION.
4. ALL FOOTINGS TYPICAL FOR ALL SIGNS, WHICH NEED TO BE ANCHORED IN CONCRETE.

STANDARD SIGN INSTALLATION LOCATION
SD 15-03
N.T.S.



PLAN

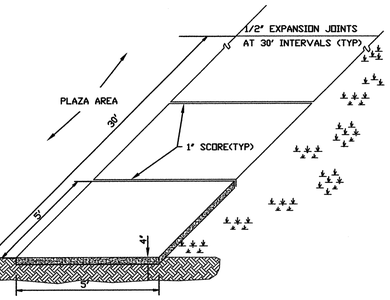
SECTION A-A



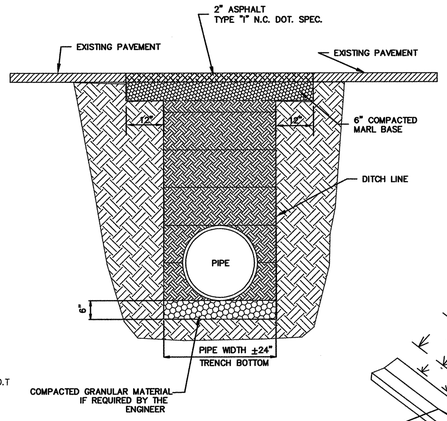
NOTES:
1. ALL DRIVEWAYS MUST BE 3000 PSI CONCRETE TO THE PROPERTY LINE.
2. PLACE DRIVEWAYS ON CORNER LOTS ON THE STOP CONTROLLED STREET.

FORMING DETAIL

RESIDENTIAL DRIVEWAY STREETS WITH NO CURB
SD 8-05
N.T.S.



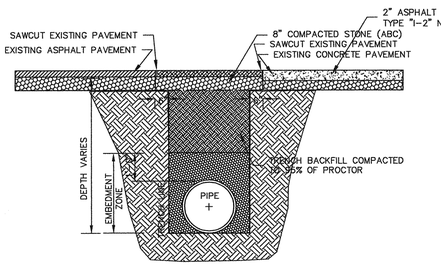
STANDARD SIDEWALK DETAIL
SD 8-15
N.T.S.



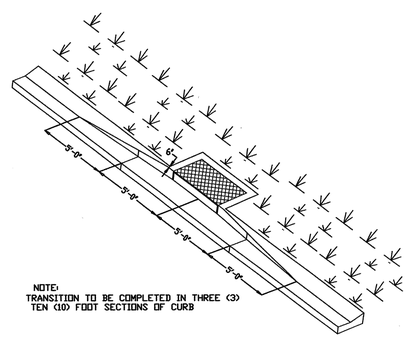
NOTE:
BACKFILL TO BE INSTALLED IN 12" LIFTS (MAXIMUM) AND COMPACTED TO A MIMIMUM DENSITY OF 95% AS DETERMINED BY THE MODIFIED A.A.S.H.T.O. STANDARD METHOD T-99.

CUT-BACK TO BE PERFORMED AFTER TRENCH BACKFILLING AND COMPACTION.

PAVEMENT REPLACEMENT
SD 1-15
N.T.S.

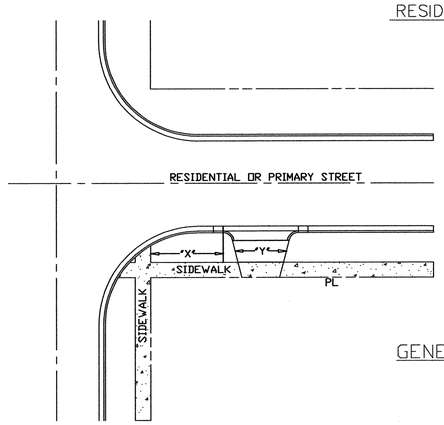


PAVEMENT REPAIR DETAIL
SD 1-16
N.T.S.



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

TYPE 'H' CURBING AROUND FACE BASIN TRANSITION SECTION
SDS 7-05
N.T.S.



NOTES:
1. "X"=26' ON RESIDENTIAL STREETS; 26' ON PRIMARY STREETS MIN
2. "Y"=VARIABLE (SEE SD8-02, SD8-04 OR SD8-05)
3. "Y" MAY NOT EXCEED 50% OF FRONTAGE NOR MAY ANY COMBINATION OF DRIVEWAYS EXCEED 50% OF FRONTAGE
4. ALL DRIVEWAYS MUST BE CONCRETE TO THE PL (ONLY CLASS "A" CONCRETE MAY BE USED)

GENERAL DRIVEWAY NOTES
SD 8-07
N.T.S.

NORTH CAROLINA PROFESSIONAL SEAL 39113 ENGINEER JOSEPH S. BOYD
12-30-13

THIS PLAN SET WAS DESIGNED AND LAST SIGNED BY GARRY S. PAPE (PE LICENSE # 031315) ON 7/9/08. THIS REVISED SET IS ONLY PER REVISIONS BY THE GOVERNING AGENCIES AND VARIOUS SITE EDITS.

SITE ADDRESS: 558 ARBORETUM DRIVE

No.	Revision	Date	By
1	CITY OF WILMINGTON COMMENTS	7/25/07	JBS

Designer	W&R	Scale	NTS
Drawn By	W&R	Date	12/19/13
Checked By	JSB	Job No.	03050283.01

HELMSDALE @ LANDFALL - PHASE II
CITY OF WILMINGTON NEW HANOVER NORTH CAROLINA

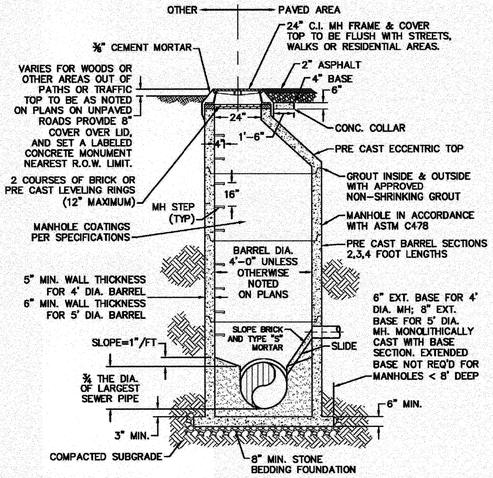
STANDARD DETAILS

PREPARED FOR:
HELMSDALE INVESTORS, LLC
100 WESTON ESTATES WAY
CARY, NC 27513
919-481-3000

WITHERS & RAVENEL
ENGINEERS | PLANNERS | SURVEYORS
1410 Commonwealth Drive, Suite 101. Wilmington, North Carolina 28403 tel: 910-256-9277 fax: 910-256-2584 www.withersravenel.com

Sheet No. C-12.1

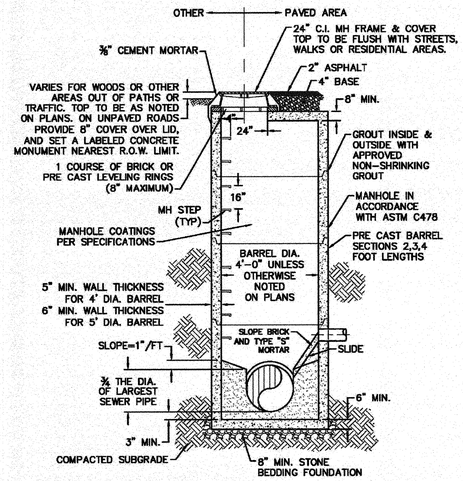
W:\03\03-283\03283.01-Helmsdale @ Landfall - Phase 2\CAD\2013 Updates Plans\SHEETS\C-12 DETAILS.dwg- December 23, 2013 - BOYD, JOSEPH



PRECAST CONCRETE OFFSET MANHOLE TYPICAL

(LESS THAN 30" DROP)

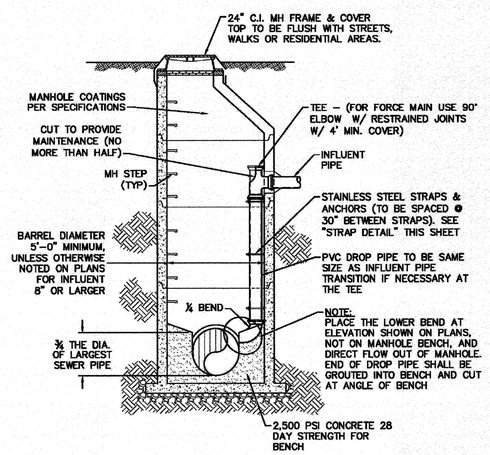
NOT TO SCALE



PRECAST CONCRETE FLAT TOP MANHOLE TYPICAL

(LESS THAN 30" DROP)

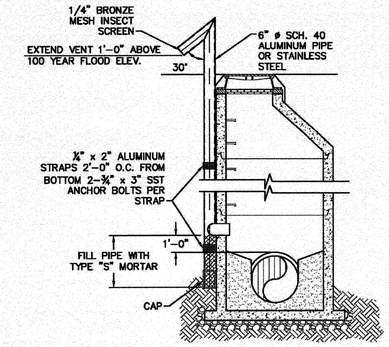
NOT TO SCALE



DROP MANHOLE

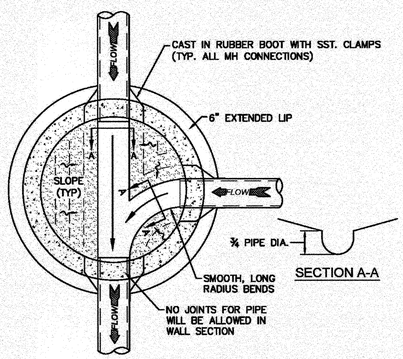
(MORE THAN 30" DROP)

NOT TO SCALE



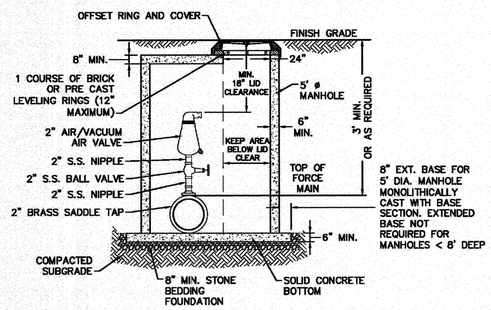
STANDARD VENT MANHOLE

NOT TO SCALE



MANHOLE FLOOR PLAN

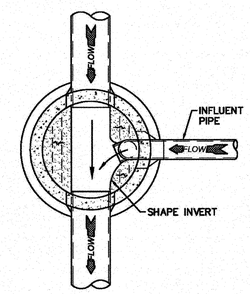
NOT TO SCALE



NOTES:
1. CONTRACTOR TO INSTALL VALVE AND MANHOLE AT SUFFICIENT DEPTH TO ALLOW FOR ACCESS.
2. FORCE MAIN TO BE OFFSET IN MANHOLE TO KEEP AREA BELOW LID CLEAR.
3. REFER TO SPECIFICATIONS FOR ADDITIONAL DETAILS.
4. USE CAST IN RUBBER BOOT WITH SST. CLAMPS FOR ALL MH CONNECTIONS, INCLUDING FORCE MAIN.

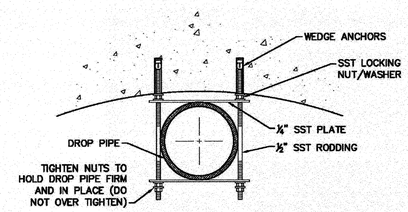
AIR/ VACUUM AND AIR RELEASE COMBINATION VALVE

NOT TO SCALE



DROP MANHOLE FLOOR PLAN

NOT TO SCALE



NOTE: ALL PARTS TO BE SST.

STRAP DETAIL

NOT TO SCALE

CAPE FEAR PUBLIC UTILITY AUTHORITY STANDARD SEWER NOTES:

1. SEWER GUARDS REQUIRED AT ALL MANHOLES. STAINLESS STEEL SEWER GUARDS REQUIRED AT MANHOLES LOCATED IN TRAFFIC AREAS.
2. 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.
3. ALL SERVICES TYING INTO DUCTILE IRON MAINS SHALL BE CONSTRUCTED OF CLASS 50, DIP, WITH PROTECTO 401 CERAMIC EPOXY LINING.
4. MINIMUM 10' UTILITIES EASEMENT PROVIDED ALONG THE FRONTAGE OF ALL LOTS AND AS SHOWN FOR NEW DEVELOPMENTS.
5. NO FLEXIBLE COUPLINGS SHALL BE USED.
6. ALL STAINLESS STEEL FASTENERS SHALL BE 316.

STANDARD SEWER NOTES

(REQUIRED ON ALL SEWER PLAN AND PROFILE SHEETS)

GENERAL NOTES:
1. NO EXCAVATED MATERIAL SHALL BE PLACED IN ANY STREAM, DITCH OR DRAINAGE-WAY.
2. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL UNDERGROUND UTILITIES BEFORE ANY CONSTRUCTION BEGINS.
3. THE CONTRACTOR IS RESPONSIBLE FOR TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES WHILE CONSTRUCTION IS IN PROGRESS.
4. THE CONTRACTOR IS RESPONSIBLE FOR STABILIZATION OF ALL DISTURBED AREAS.
5. THE CONTRACTOR IS RESPONSIBLE FOR LAY DOWN AND STOCKPILE AREAS (TO ARRANGE AND ENSURE COMPLIANCE WITH ALL LOCAL AND STATE REGULATIONS).

THE DETAILS SHOWN HEREON SUPERCEDE CFPUA WRITTEN TECHNICAL SPECIFICATIONS VERSIONS 1.00 - 1.04

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

Approved Construction Plan

	Name	Date
Planning		
Public Utilities		
Traffic		
Fire		

For each open utility cut of City streets, a $325 permit shall be required from the City prior to occupancy and/or project acceptance.

REV:	DESCRIPTION:	DATE:
1	AIR / VACUUM AND AIR RELEASE COMBINATION VALVE REVISED	10/26/12
2	STANDARD SEWER NOTE #6 REVISED	12/10/12

NORTH CAROLINA PROFESSIONAL SEAL 39113 ENGINEER JOSEPH S. BOYD 2-18-14

CFPUA SANITARY SEWER

STANDARD DETAILS

CAPE FEAR PUBLIC UTILITY AUTHORITY
235 GOVERNMENT CENTER DRIVE
WILMINGTON, NC 28403
OFFICE: (910)332-6560
Stewardship. Sustainability. Service.

DATE: 1/9/12
SCALE: N/A
DRAWN BY: CFPUA
CHECKED BY: CFPUA
PROJECT NO.:

SHEET NO: SSD-1

SITE ADDRESS: 558 ARBORETUM DRIVE

No.	Revision	Date	By

Designer	W&R	Scale	
Drawn By	W&R	Date	12/19/13
Checked By	JSB	Job No.	03050283.01

HELMSDALE @ LANDFALL - PHASE II
CITY OF WILMINGTON NEW HANOVER NORTH CAROLINA

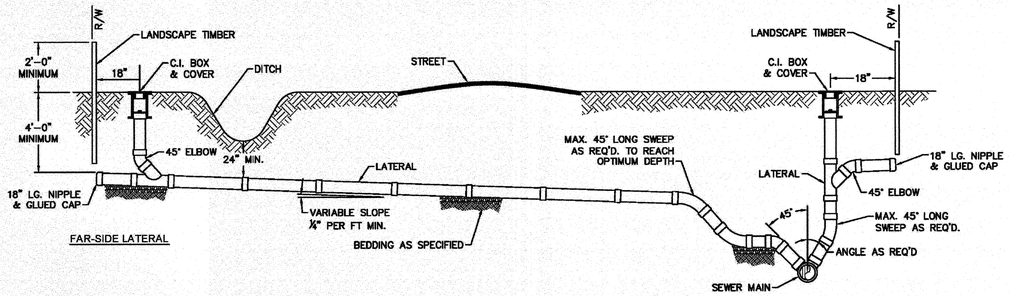
CAPE FEAR PUBLIC UTILITY AUTHORITY SEWER DETAILS

PREPARED FOR:
HELMSDALE INVESTORS, LLC
100 WESTON ESTATES WAY
CARY, NC 27513
919-481-3000

WITHERS & RAVENEL
ENGINEERS | PLANNERS | SURVEYORS
1410 Commonwealth Drive, Suite 101. Wilmington, North Carolina 28403 tel: 910-256-9277 fax: 910-256-2584 www.withersravenel.com

Sheet No. C-12.2

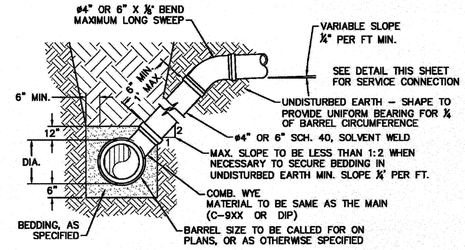
W:\13\13-0480\13048I-Helmsdale\CAD\2013 Updated Plans\SHEETS\C-12.2-12.5 CFPUA Details.dwg- February 17, 2014 - BOYD, JOSEPH



NOTE: FOR PRIVATE 8" SERVICES, MANHOLES ARE REQUIRED FOR TIE-IN TO MAIN

STANDARD SERVICE CONNECTION TO SANITARY SEWER

NOT TO SCALE

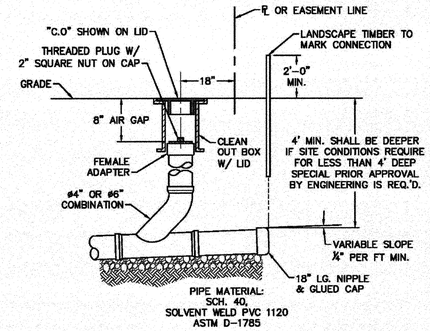


NOTE: FOR PRIVATE 8" SERVICES, MANHOLES ARE REQUIRED FOR TIE-IN TO MAIN

STANDARD SERVICE LATERAL

(MAIN DEPTH LESS THAN 8FT)

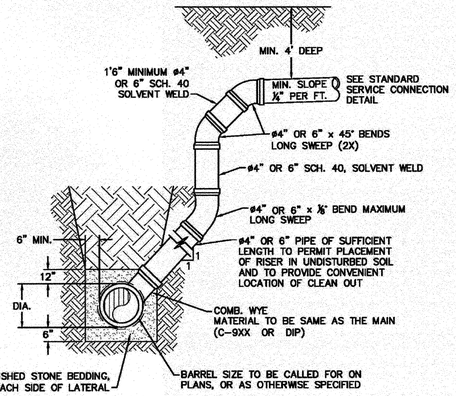
NOT TO SCALE



NOTE: FOR PRIVATE 8" SERVICES, MANHOLES ARE REQUIRED FOR TIE-IN TO MAIN

SERVICE CONNECTION & CLEAN-OUT

NOT TO SCALE

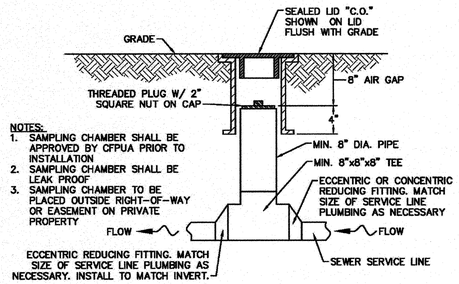


NOTES:
1. SPECIAL CARE SHALL BE TAKEN DURING BACKFILL OPERATIONS. THE RISER SHALL BE PLUMB AND TRUE AT ALL TIMES, AND REST ON FIRM, STABLE FOUNDATION.
2. FOR PRIVATE 8" SERVICES, MANHOLES ARE REQUIRED FOR TIE-IN TO MAIN.

DEEP SERVICE LATERAL

(MAIN DEPTH GREATER THAN 8FT)

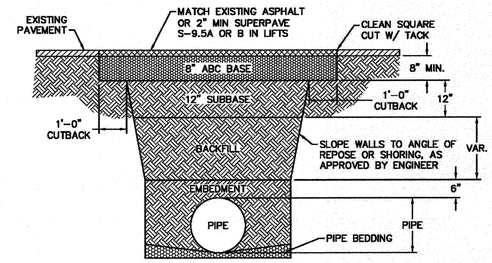
NOT TO SCALE



NOTES:
1. SAMPLING CHAMBER SHALL BE APPROVED BY CFPUA PRIOR TO INSTALLATION
2. SAMPLING CHAMBER SHALL BE LEAK PROOF
3. SAMPLING CHAMBER TO BE PLACED OUTSIDE RIGHT-OF-WAY OR EASEMENT ON PRIVATE PROPERTY

SAMPLING CHAMBER

NOT TO SCALE

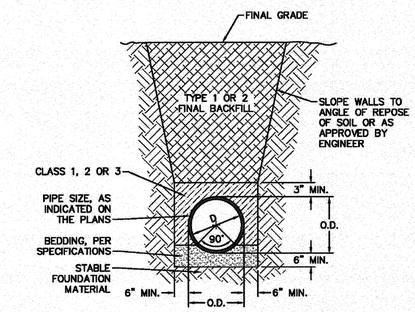


NOTES:
1. BACKFILL SHALL BE SUITABLE MATERIAL THAT IS FREE FROM HEAVY CLAY, GUMBOS, DEBRIS, ORGANICS AND LITTLE TO NO EXCESSIVE MOISTURE.
2. SELECT BACKFILL MAY BE SUBSTITUTED OR REQUIRED BY CITY TO ACHIEVE COMPACTION, (I.E. #57, ABC, CRUSHED LIMESTONE, CLEAN SAND, FLOWABLE FILL, ETC).
3. 8-INCH OF ABC BASE MATERIAL SHALL BE USED ON CITY STREETS.
4. BACKFILL AND BASE MATERIALS SHALL BE COMPACTED 12" MINIMUM LIFTS
5. SOIL SHALL BE COMPACTED BY A MECHANIZED TAMPER (I.E JUMPING JACK). HOWEVER, VIBRATORY ROLLERS > 18" WIDTH MAY BE USED FOR LARGER EXCAVATIONS. THE PLATE TAMP METHOD SHALL NOT BE USED.
6. ALL APPROVED CASTINGS SHALL BE SET FLUSH TO GRADE AND SUPPORTED IF APPLICABLE.
7. ABC BASE AND SUBBASE COMPACTED TO 98% AND BACKFILL AND EMBEDMENT COMPACTED TO 90% AS DETERMINED BY THE MODIFIED PROCTOR AASHTO METHOD T-99.
8. 1-FOOT CUTBACKS OF ASPHALT SHALL BE PREPARED ON UNDISTURBED SOIL. MINIMUM ASPHALT DENSITY IS 90%.

(FOR PRIVATE ROADS AND PAVED AREAS; CONTRACTOR TO MEET MIN. REQUIREMENTS AS DEFINED BY RIGHT-OF-WAY OWNER FOR PUBLIC ROAD REPAIRS)

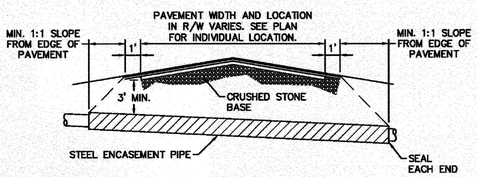
PAVEMENT REPAIR WHERE PIPE INSTALLED

NOT TO SCALE



CL 50 DUCTILE IRON DR 18 PVC PIPE TRENCH DETAIL

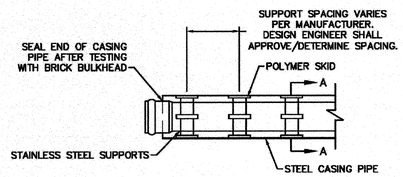
NOT TO SCALE



NOTES:
1. CASING WILL BE INSTALLED AT LINE AND GRADE SHOWN ON INDIVIDUAL PROFILE FOR EACH CROSSING. BORING/JACKING TO LINE AND GRADE IS REQUIRED.
2. TRACER WIRE SHALL BE CONTINUED THROUGH CASING.

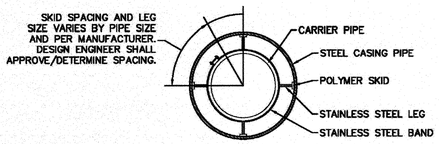
TYPICAL BORING/ JACKING DETAIL

NOT TO SCALE



PLAN

NOTE: PIPE SUPPORT TO BE PLACED TO PROVIDE PROPER SUPPORT, ALIGNMENT, AND GRADE AS SPECIFIED. CONTINUOUS SUPPORTS MAY BE USED AS ALTERNATIVE. OIL, GREASE, OR PETROLEUM PRODUCT MAY NOT BE USED AS LUBRICANT.



SECTION A-A

PIPE CASING SUPPORT DETAIL

NOT TO SCALE

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THE DETAILS SHOWN HEREON SUPERCEDE CFPUA WRITTEN TECHNICAL SPECIFICATIONS VERSIONS 1.00 - 1.04

Approved Construction Plan

	Name	Date
Planning		
Public Utilities		
Traffic		
Fire		

For each open utility cut of City streets, a $325 permit shall be required from the City prior to occupancy and/or project acceptance.

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

REV:	DESCRIPTION:	DATE:
1	SAMPLING CHAMBER REVISED	10/26/12

NORTH CAROLINA PROFESSIONAL SEAL 39113 ENGINEER JOSEPH S. BOYD 2-18-14

CFPUA SANITARY SEWER

STANDARD DETAILS

CAPE FEAR PUBLIC UTILITY AUTHORITY
235 GOVERNMENT CENTER DRIVE
WILMINGTON, NC 28403
OFFICE: (910)332-6560
Stewardship. Sustainability. Service.

DATE: 1/9/12
SCALE: N/A
DRAWN BY: CFPUA
CHECKED BY: CFPUA
PROJECT NO. :

SHEET NO: SSD-2

SITE ADDRESS: 558 ARBORETUM DRIVE

No.	Revision	Date	By

Designer	W&R	Scale	
Drawn By	W&R	Date	12/19/13
Checked By	JSB	Job No.	03050283.01

HELMSDALE @ LANDFALL - PHASE II
CITY OF WILMINGTON NEW HANOVER NORTH CAROLINA

CAPE FEAR PUBLIC UTILITY AUTHORITY SEWER DETAILS

PREPARED FOR:
HELMSDALE INVESTORS, LLC
100 WESTON ESTATES WAY
CARY, NC 27513
919-481-3000

WITHERS & RAVENEL
ENGINEERS | PLANNERS | SURVEYORS
1410 Commonwealth Drive, Suite 101. Wilmington, North Carolina 28403 tel: 910-256-9277 fax: 910-256-2584 www.withersravenel.com

Sheet No. C-12.3

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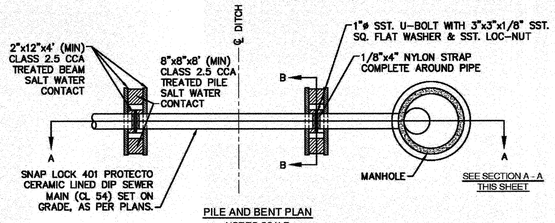
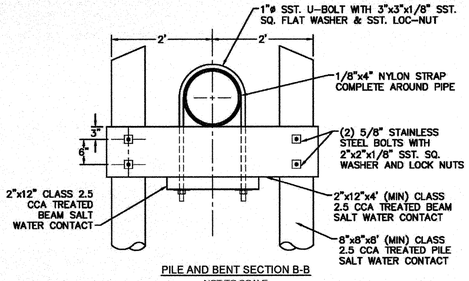
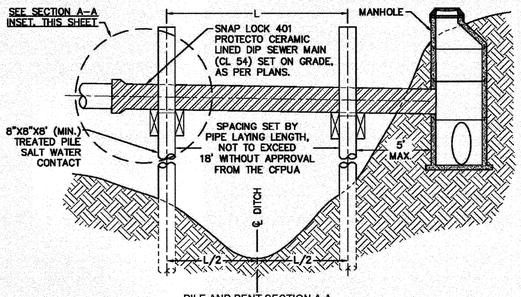


PILE AND BENT PLAN
NOT TO SCALE

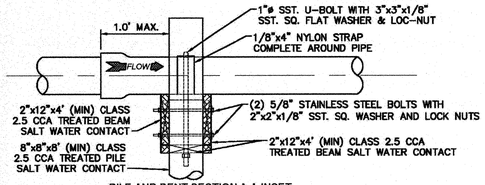
NOTES:
1. PILES AND PILE DRIVING SHALL CONFORM TO NCDOT STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES, JANUARY 2002, SECTIONS 445, 450, 1082-2 & 1084-2.
2. CENTERLINE OF BOLTS TO BE A MINIMUM OF 3" FROM OUTSIDE EDGE OF TIMBER. BOLTS TO BE A MINIMUM OF 3" CENTERLINE TO CENTERLINE.
3. ALL STAINLESS STEEL SHALL BE 316. STAINLESS STRAP TO BE COLD FORMED.
4. PILE SHALL NOT OBSTRUCT FLOW OR CAUSE EROSION OF DITCH/STREAM BANK.
5. MIN. CLASS 54 DIP-ENGINEER MUST DESIGN LOADING.
6. DESIGN SHALL BE APPROVED BY CFPUA.



PILE AND BENT SECTION B-B
NOT TO SCALE

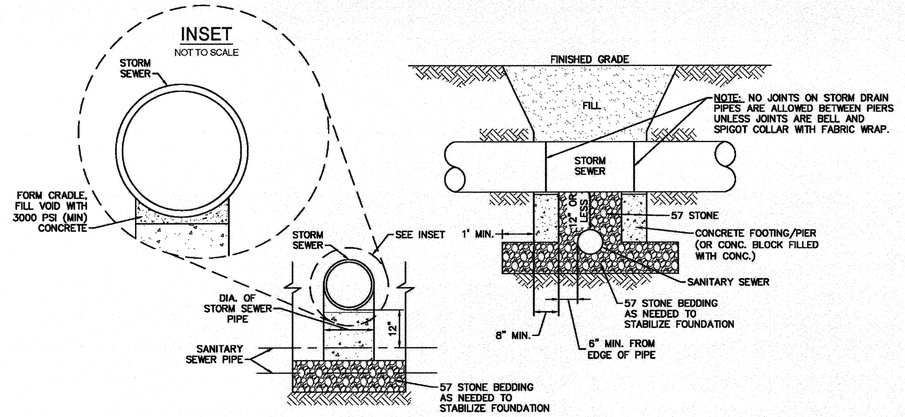


PILE AND BENT SECTION A-A
NOT TO SCALE

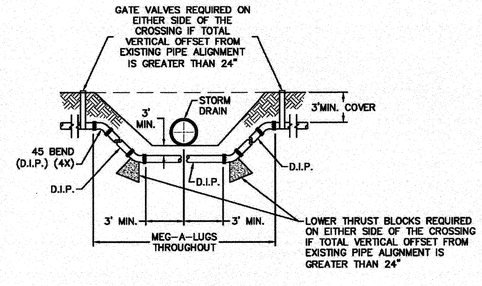


PILE AND BENT SECTION A-A INSET
NOT TO SCALE

PILE AND BENT DETAIL
NOT TO SCALE



STRUCTURAL BRIDGING DETAIL FOR STORMWATER OVER GRAVITY SEWER INSTALLATIONS WITH LESS THAN 12" SEPARATION
NOT TO SCALE



NOTE: USE D.I.P. (CL50 OR BETTER)

FORCE MAIN DITCH AND STORM DRAIN CROSSING
NOT TO SCALE

Approved Construction Plan

	Name	Date
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Public Utilities		
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STORMWATER MANAGEMENT PLAN
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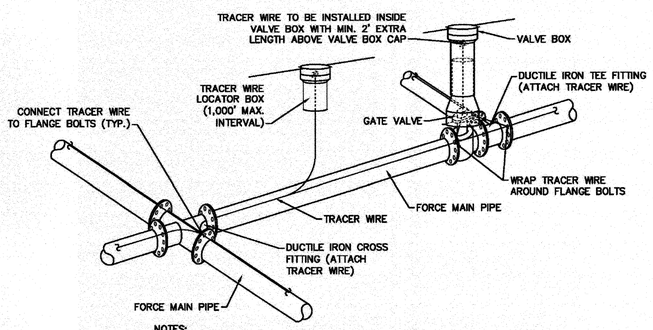

NOTES:
1. TRACER WIRE SHALL BE #10 COPPER SOLID CORE COPPER WIRE WITH GAS AND OIL RESISTANT INSULATION
2. WIRE SHALL BE STRAPPED TO ALL PVC FORCE MAIN PIPING WITH DUCT TAPE AT 12-FT. INTERVALS.
3. SECURE WIRE TO ALL TEE AND CROSS FITTINGS.
4. ALL WIRE SPLICES SHALL HAVE WATER PROOF WIRE CONNECTIONS.

TRACER WIRE DETAIL
NOT TO SCALE

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REV:	DESCRIPTION:	DATE:

CFPUA SANITARY SEWER

STANDARD DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 39113 ENGINEER JOSEPH S. BOYD
2-18-14

CAPE FEAR PUBLIC UTILITY AUTHORITY
235 GOVERNMENT CENTER DRIVE
WILMINGTON, NC 28403
OFFICE: (910)332-6560
Stewardship. Sustainability. Service.

DATE: 1/5/12
SCALE: N/A
DRAWN BY: CFPUA
CHECKED BY: CFPUA
PROJECT NO.:
SHEET NO: SSD-3

SITE ADDRESS: 558 ARBORETUM DRIVE

No.	Revision	Date	By

Designer	W&R	Scale	
Drawn By	W&R	Date	12/19/13
Checked By	JSB	Job No.	03050283.01

HELMSDALE @ LANDFALL - PHASE II
CITY OF WILMINGTON NEW HANOVER NORTH CAROLINA

CAPE FEAR PUBLIC UTILITY AUTHORITY SEWER DETAILS

PREPARED FOR:
HELMSDALE INVESTORS, LLC
100 WESTON ESTATES WAY
CARY, NC 27513
919-481-3000

WITHERS & RAVENEL
ENGINEERS | PLANNERS | SURVEYORS
1410 Commonwealth Drive, Suite 101, Wilmington, North Carolina 28403 tel: 910-256-9277 fax: 910-256-2584 www.withersravenel.com

Sheet No. C-12.4

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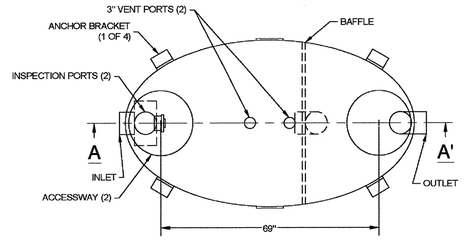
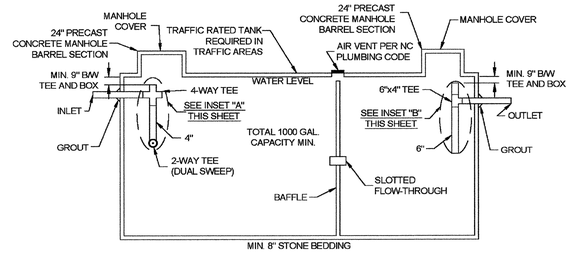
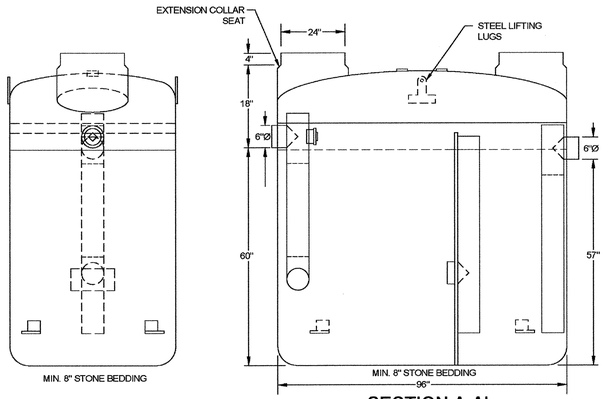




CONCRETE GREASE INTERCEPTOR

NOT TO SCALE

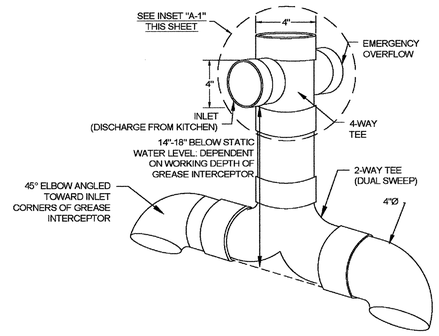


SECTION A-A'

NOTES:
1. FOR GRAVITY APPLICATIONS ONLY
2. MIN. THICKNESS: 1/4" WALL AND 3/8" TOP AND BOTTOM BOWLS
3. STANDARD PIPE STUBS ARE SOCKET SDR 35 PVC
4. EXTENSION COLLARS SHALL BE CAULKED WITH SIKAFLEX OR EQUIVALENT FOR WATERTIGHT SEAL
5. FOLLOW MANUFACTURE'S SPECS FOR TRAFFIC OR PEDESTRIAN LOADING

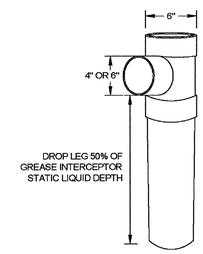
FIBERGLASS GREASE INTERCEPTOR

NOT TO SCALE



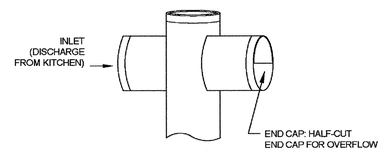
GREASE INTERCEPTOR INSET "A" 4" SANITARY TEE

NOT TO SCALE



GREASE INTERCEPTOR INSET "B" 6" X 6" X 4" OUTLET SANITARY TEE

NOT TO SCALE



GREASE INTERCEPTOR INSET "A-1" EMERGENCY OVERFLOW CLOSE-UP

NOT TO SCALE

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Public Utilities		
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NORTH CAROLINA PROFESSIONAL SEAL 39113 ENGINEER JOSEPH S. BOYD 2-18-14

CFPUA SANITARY SEWER

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PROJECT NO.:

SHEET NO: SSD-4

SITE ADDRESS: 558 ARBORETUM DRIVE

No.	Revision	Date	By

Designer	W&R	Scale	
Drawn By	W&R	Date	12/19/13
Checked By	JSB	Job No.	03050283.01

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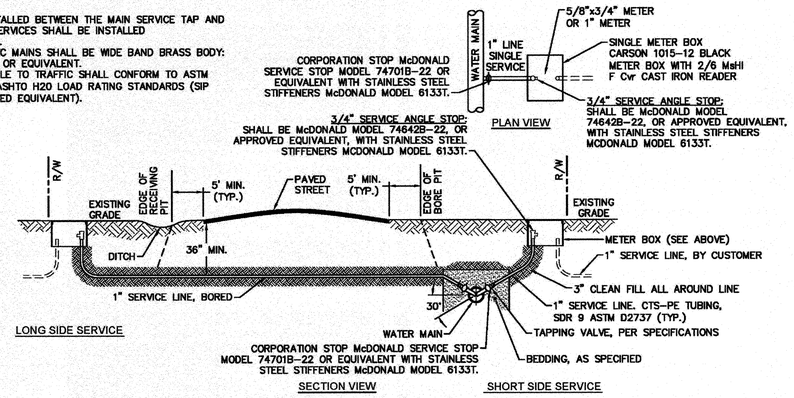
Sheet No. C-12.5

W:\13\13-0480\13048I-Hermosa\CAD\2013 Updated Plans\SHEETS\C-12.2-12.5 CFPUA Details.dwg- February 17, 2014 - BOYD, JOSEPH

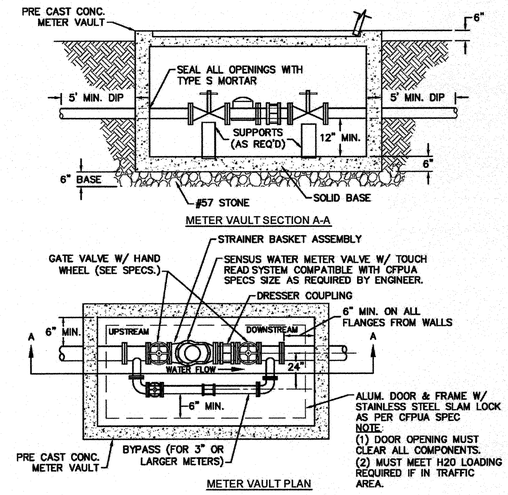
NOTES:
1. NO JOINT SHALL BE INSTALLED BETWEEN THE MAIN SERVICE TAP AND THE METER STOP. ALL SERVICES SHALL BE INSTALLED PERPENDICULAR TO MAIN.
2. SERVICE SADDLES ON PVC MAINS SHALL BE WIDE BAND BRASS BODY: SADDLE McDONALD 3801 OR EQUIVALENT.
3. METER BOXES SUSCEPTIBLE TO TRAFFIC SHALL CONFORM TO ASTM A48, CLASS 30B AND AASHTO H20 LOAD RATING STANDARDS (SIP MODEL 4240 OR APPROVED EQUIVALENT).



NOTE:
TYPICAL WATER SERVICE CONNECTION FOR RESIDENTIAL SINGLE FAMILY HOME ON CFPUA WATER SYSTEM

SINGLE SERVICE CONNECTION

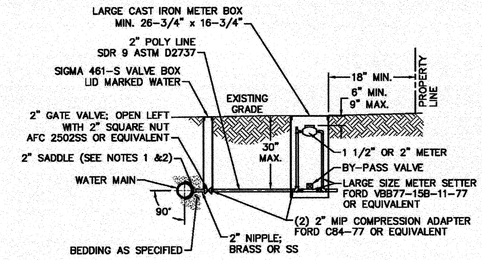
NOT TO SCALE



FOR WATER METERS LARGER THAN 2"

WATER METER VAULT

NOT TO SCALE

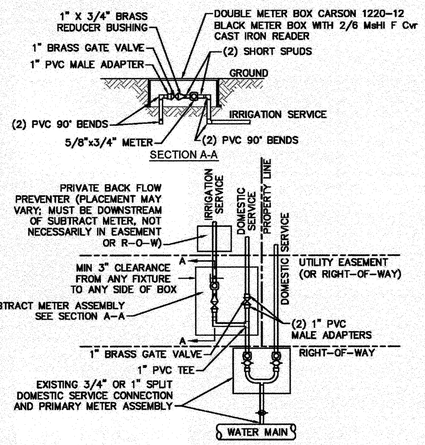


NOTES:
1. ALL SERVICES SHALL BE INSTALLED PERPENDICULAR TO MAIN.
2. SERVICE SADDLES ON PVC MAINS SHALL BE WIDE BAND BRASS BODY: McDONALD 3800, FORD S90 (DOUBLE STRAP) OR EQUIVALENT.
3. METER BOXES SUSCEPTIBLE TO TRAFFIC SHALL CONFORM TO ASTM A48, CLASS 30B AND AASHTO H20 LOAD RATING STANDARDS (OLDCASTLE PRECAST MODEL B1730 OR APPROVED EQUIVALENT).
4. METER BOXES SUSCEPTIBLE TO INCIDENTAL, NON-DELIBERATE TRAFFIC SHALL CONFORM TO ANSI/SCTE 77 TIER 15 LOAD RATING STANDARDS (SYNERTECH MODEL DUO 17x30 OR APPROVED EQUIVALENT).
5. NON-TRAFFIC METER BOXES SHALL BE SIGMA MB2203 OR APPROVED EQUIVALENT.
6. 3" CLEAN FILL REQUIRED ALL AROUND 2" POLY SERVICE LINE.

FOR 1-1/2" OR 2" WATER SERVICES

LARGE METER

NOT TO SCALE



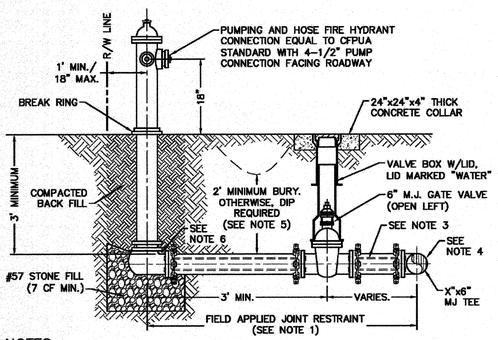
NOTES:
1. BEYOND THE PRIMARY DOMESTIC METER ASSEMBLY, CFPUA IS ONLY RESPONSIBLE FOR METER AND WASHERS OF SUBTRACT METER ASSEMBLY.
2. ALL PIPE AND FITTINGS UP TO FINAL SERVICE LINE TO BE 1" EXCLUDING METERS.

PLAN VIEW

(MULTIPLE DOMESTIC SERVICES PER TAP)

DOUBLE SERVICE CONNECTION USING SUBTRACT METER

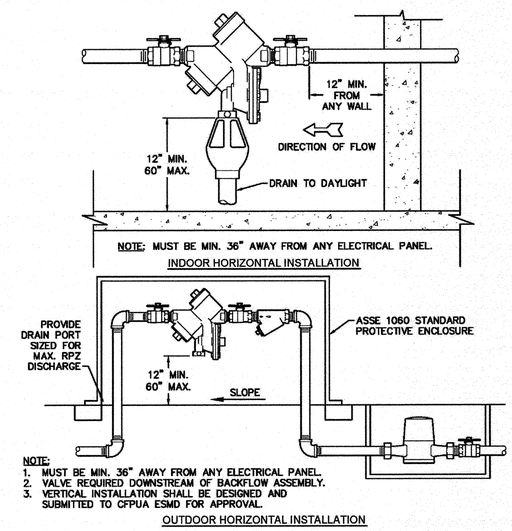
NOT TO SCALE



NOTES:
1. JOINT RESTRAINT SYSTEMS SHALL BE WEDGE ACTION STYLE FOR DI OR C-900 PVC PIPE AS MANUFACTURED BY EBAA IRON, SIGMA, STAR PIPE PRODUCTS OR APPROVED EQUAL.
2. WHEN HYDRANT LEGS REQUIRE FULL LENGTH PIPE SECTIONS, OVER BELL RESTRAINT SYSTEM SHALL HAVE 316 STAINLESS STEEL HARNESS AND FASTENERS.
3. CONTINUOUS 316 STAINLESS STEEL RODS (TEE TO VALVE AND VALVE TO HYDRANT) MAY BE USED WITH COR-BLUE MJ T-BOLT AND GASKET KITS, AS AN ALTERNATIVE.
4. HYDRANT TEE SHALL BE RESTRAINED ON EACH SIDE OF MAIN PLUS ANY VALVE, FITTING, OR JOINT IN MAIN WITHIN 10-FEET OF HYDRANT TEE.
5. HYDRANT AND VALVE SHALL BE PLACED OUTSIDE DITCH LIMITS.
6. WEEP HOLES OPEN AND UNBLOCKED TO DRAIN.

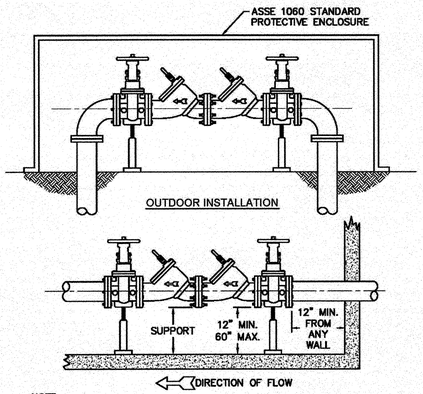
FIRE HYDRANT ASSEMBLY

NOT TO SCALE



REDUCED PRESSURE PRINCIPLE ASSEMBLY

NOT TO SCALE



DOUBLE CHECK VALVE ASSEMBLY

NOT TO SCALE

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3. THE CONTRACTOR IS RESPONSIBLE FOR TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES WHILE CONSTRUCTION IS IN PROGRESS.
4. THE CONTRACTOR IS RESPONSIBLE FOR STABILIZATION OF ALL DISTURBED AREAS.
5. THE CONTRACTOR IS RESPONSIBLE FOR LAY DOWN AND STOCKPILE AREAS (TO ARRANGE AND ENSURE COMPLIANCE WITH ALL LOCAL AND STATE REGULATIONS).

THE DETAILS SHOWN HEREON SUPERCEDE CFPUA WRITTEN TECHNICAL SPECIFICATIONS VERSIONS 1.00 - 1.04

For each open utility cut of City streets, a $325 permit shall be required from the City prior to occupancy and/or project acceptance.

Approved Construction Plan

	Name	Date
Planning		
Public Utilities		
Traffic		
Fire		

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

REV:	DESCRIPTION:	DATE:
1	Single Service Connection, Double Service Connection, and Large Meter Revised	10/26/12
2	Single Service Connection and Fire Hydrant Details Revised	7/23/13
3	Fire Hydrant Detail Revised	01/03/14

NORTH CAROLINA PROFESSIONAL SEAL 39113 ENGINEER JOSEPH S. BOYD
2-18-14

CFPUA WATER DISTRIBUTION SYSTEM

STANDARD DETAILS

CAPE FEAR PUBLIC UTILITY AUTHORITY
235 GOVERNMENT CENTER DRIVE
WILMINGTON, NC 28403
OFFICE: (910)332-6560
Stewardship. Sustainability. Service.

DATE: 1/9/12
SCALE: N/A
DRAWN BY: CFPUA
CHECKED BY: CFPUA
PROJECT NO. :

SHEET NO: WSD-1

SITE ADDRESS: 558 ARBORETUM DRIVE

No.	Revision	Date	By
1	UPDATED PER CFPUA REVISED DETAILS	1-7-14	JSB

Designer	W&R	Scale	
Drawn By	W&R	Date	12/19/13
Checked By	JSB	Job No.	03050283.01

HELMSDALE @ LANDFALL - PHASE II
CITY OF WILMINGTON NEW HANOVER NORTH CAROLINA

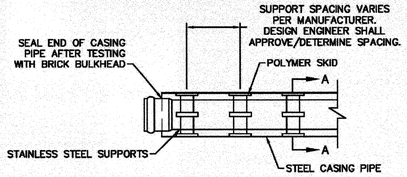
CAPE FEAR PUBLIC UTILITY AUTHORITY WATER DETAILS

PREPARED FOR:
HELMSDALE INVESTORS, LLC
100 WESTON ESTATES WAY
CARY, NC 27513
919-481-3000

WITHERS & RAVENEL
ENGINEERS I PLANNERS I SURVEYORS
1410 Commonwealth Drive, Suite 101, Wilmington, North Carolina 28403 tel: 910-256-9277 fax: 910-256-2584 www.withersravenel.com

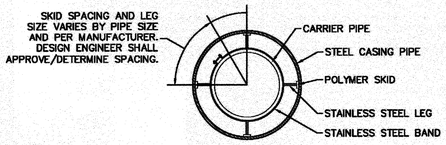
Sheet No. C-12.6

W:\13\13-0490\130490-Helmsdale\CAD\2013 Updated Plans\SHEETS\C-12.2-12.5 CFPUA Details.dwg- February 17, 2014 - BOYD, JOSEPH



PLAN

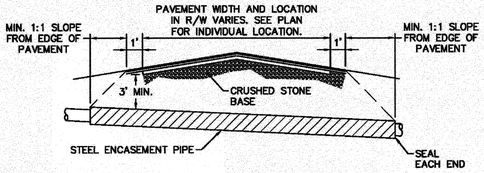
NOTE: PIPE SUPPORT TO BE PLACED TO PROVIDE PROPER SUPPORT, ALIGNMENT, AND GRADE AS SPECIFIED. CONTINUOUS SUPPORTS MAY BE USED AS ALTERNATIVE. OIL, GREASE, OR PETROLEUM PRODUCT MAY NOT BE USED AS LUBRICANT.



SECTION A-A

PIPE CASING SUPPORT DETAIL

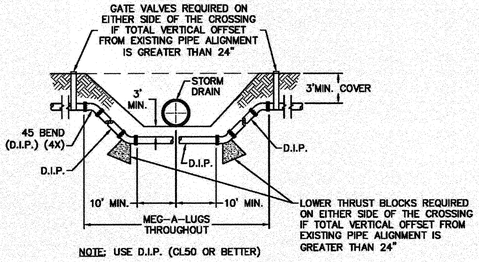
NOT TO SCALE



NOTES:
1. CASING WILL BE INSTALLED AT LINE AND GRADE SHOWN ON INDIVIDUAL PROFILE FOR EACH CROSSING. BORING/JACKING TO LINE AND GRADE IS REQUIRED.
2. TRACER WIRE SHALL BE CONTINUED THROUGH CASING.

TYPICAL BORING/ JACKING DETAIL

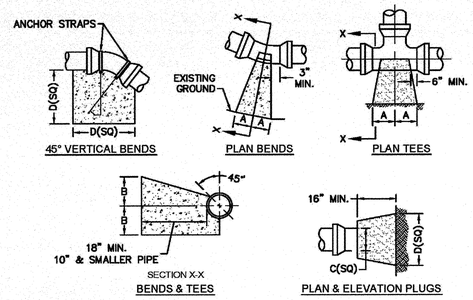
NOT TO SCALE



NOTE: USE D.I.P. (CL50 OR BETTER)

WATER MAIN DITCH AND STORM DRAIN CROSSING

NOT TO SCALE

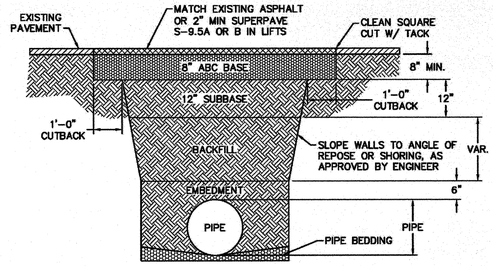


SIZE	90 BENDS		45 BENDS		22 1/2 BENDS		TEES/PLUGS		45 VERT. BENDS
	A	B	A	B	A	B	A	B	
3"	8"	6"	5"	6"	3"	7"	6"	8"	27"
4"	8"	9"	5"	9"	3"	11"	6"	9"	28"
6"	14"	11"	9"	9"	8"	8"	12"	9"	36"
8"	16"	16"	12"	12"	10"	13"	14"	13"	42"
10"	18"	22"	15"	14"	14"	16"	18"	15"	50"
12"	20"	28"	18"	17"	16"	16"	22"	18"	62"
14"	26"	29"	21"	19"	18"	18"	26"	20"	72"
16"	33"	29"	25"	21"	20"	21"	32"	21"	83"
18"	40"	30"	28"	24"	22"	23"	36"	24"	88"

NOTES:
1. BASED ON 160 PSI TEST PRESSURE AND 2000 PSF SOIL BEARING CAPACITY.
2. ALL BEARING SURFACES TO BE CARRIED TO UNDISTURBED GROUND.
3. USE MEG-A-LUG (PREFERRED) IN LIEU OF BLOCKING AND RODDING.

THRUST BLOCK DETAIL

NOT TO SCALE

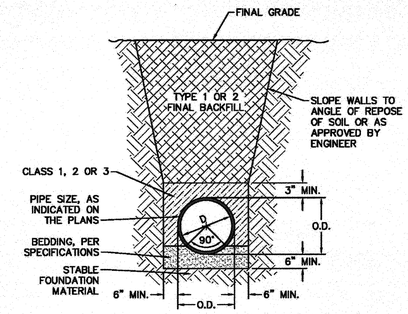


NOTES:
1. BACKFILL SHALL BE SUITABLE MATERIAL THAT IS FREE FROM HEAVY CLAY, GUMBOS, DEBRIS, ORGANICS AND LITTLE TO NO EXCESSIVE MOISTURE.
2. SELECT BACKFILL MAY BE SUBSTITUTED OR REQUIRED BY CITY TO ACHIEVE COMPACTION, (I.E. #57, ABC, CRUSHED LIMESTONE, CLEAN SAND, FLOWABLE FILL, ETC).
3. 8-INCH OF ABC BASE MATERIAL SHALL BE USED ON CITY STREETS.
4. BACKFILL AND BASE MATERIALS SHALL BE COMPACTED 12" MINIMUM LIFTS
5. SOIL SHALL BE COMPACTED BY A MECHANIZED TAMPER (I.E JUMPING JACK), HOWEVER, VIBRATORY ROLLERS > 18" WIDTH MAY BE USED FOR LARGER EXCAVATIONS. THE PLATE TAMP METHOD SHALL NOT BE USED.
6. ALL APPROVED CASTINGS SHALL BE SET FLUSH TO GRADE AND SUPPORTED IF APPLICABLE.
7. ABC BASE AND SUBBASE COMPACTED TO 98% AND BACKFILL AND EMBEDMENT COMPACTED TO 90% AS DETERMINED BY THE MODIFIED PROCTOR AASHTO METHOD T-99.
8. 1-FOOT CUTBACKS OF ASPHALT SHALL BE PREPARED ON UNDISTURBED SOIL. MINIMUM ASPHALT DENSITY IS 90%

(FOR PRIVATE ROADS AND PAVED AREAS; CONTRACTOR TO MEET MIN. REQUIREMENTS AS DEFINED BY RIGHT-OF-WAY OWNER FOR PUBLIC ROAD REPAIRS)

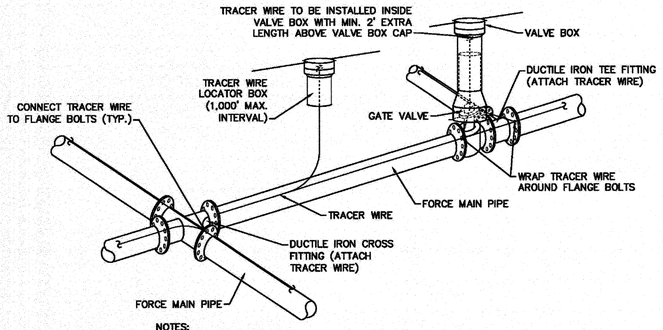
PAVEMENT REPAIR WHERE PIPE INSTALLED

NOT TO SCALE



CL 50 DUCTILE IRON DR 18 PVC PIPE TRENCH DETAIL

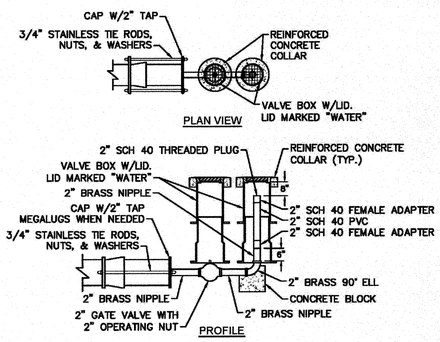
NOT TO SCALE



NOTES:
1. TRACER WIRE SHALL BE #10 COPPER SOLID CORE COPPER WIRE WITH GAS AND OIL RESISTANT INSULATION
2. WIRE SHALL BE STRAPPED TO ALL PVC FORCE MAIN PIPING WITH DUCT TAPE AT 12-FT. INTERVALS.
3. SECURE WIRE TO ALL TEE AND CROSS FITTINGS.
4. ALL WIRE SPLICES SHALL HAVE WATER PROOF WIRE CONNECTIONS.

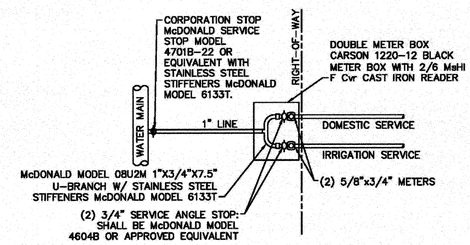
TRACER WIRE DETAIL

NOT TO SCALE



2" BLOW-OFF

NOT TO SCALE



PLAN VIEW

ONE DOMESTIC SERVICE PER TAP

DOUBLE SERVICE CONNECTION

NOT TO SCALE

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

GENERAL NOTES:
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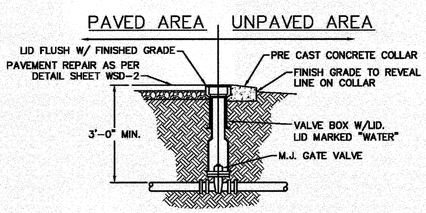
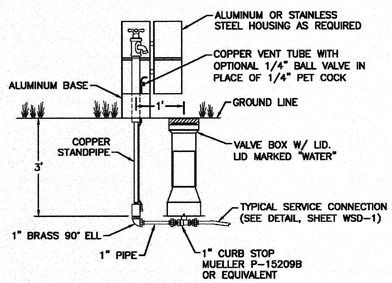


VALVE DETAIL

NOT TO SCALE



SAMPLING STATION

NOT TO SCALE

Approved Construction Plan

	Name	Date
Planning		
Public Utilities		
Traffic		
Fire		

For each open utility cut of City streets, a $325 permit shall be required from the City prior to occupancy and/or project acceptance.

REV:	DESCRIPTION:	DATE:
1	Revised Water Main Ditch and Storm Crossing Detail	11/12/13

NORTH CAROLINA PROFESSIONAL SEAL 39116 ENGINEER JOSEPH S. BOYD 2-18-14

CFPUA WATER DISTRIBUTION SYSTEM

STANDARD DETAILS

CAPE FEAR PUBLIC UTILITY AUTHORITY
235 GOVERNMENT CENTER DRIVE
WILMINGTON, NC 28403
OFFICE: (910)332-6560
Stewardship. Sustainability. Service.

DATE: 1/9/12
SCALE: N/A
DRAWN BY: CFPUA
CHECKED BY: CFPUA
PROJECT NO. :

SHEET NO: WSD-2

SITE ADDRESS: 558 ARBORETUM DRIVE

No.	Revision	Date	By
1	UPDATED PER CFPUA REVISED DETAILS	1-7-14	JSB

Designer	W&R	Scale	
Drawn By	W&R	Date	12/19/13
Checked By	JSB	Job No.	03050283.01

HELMSDALE @ LANDFALL - PHASE II
CITY OF WILMINGTON NEW HANOVER NORTH CAROLINA

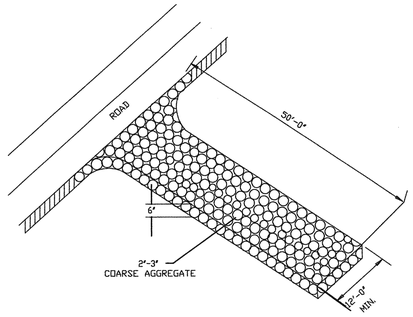
CAPE FEAR PUBLIC UTILITY AUTHORITY
WATER DETAILS

PREPARED FOR:
HELMSDALE INVESTORS, LLC
100 WESTON ESTATES WAY
CARY, NC 27513
919-481-3000

WITHERS & RAVENEL
ENGINEERS I PLANNERS I SURVEYORS
1410 Commonwealth Drive, Suite 101, Wilmington, North Carolina 28403 tel: 910-256-9277 fax: 910-256-2584 www.withersravenel.com

Sheet No. C-12.7

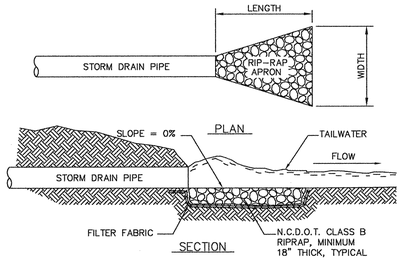
W:\13\13-0480\130481-Helmsdale\CAD\2013 Updates Plans\SHEETS\C-12.2-12.5 CFPUA Details.dwg- February 17, 2014 - BOYD, JOSEPH



CONSTRUCTION ENTRANCE/EXIT

SD 13-03

N.T.S.

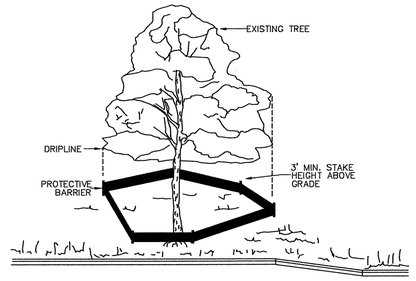


RIP-RAP SCHEDULE

(#)	PIPE DIA. (IN.)	LENGTH (FT.)	UPSTREAM WIDTH (FT.)	DOWNSTREAM WIDTH (FT.)
@FES-1	24	12.00	6.00	8.00
@FES-3	15	7.50	3.75	5.00
@FES-6	15	7.50	3.75	5.00
@FES-8	15	7.50	3.75	5.00
@FES-11	15	7.50	3.75	5.00
@FES-13	15	7.50	3.75	5.00
@FES-16	24	12.00	6.00	8.00
@FES-18	24	12.00	6.00	8.00

RIP-RAP APRON

N.T.S.

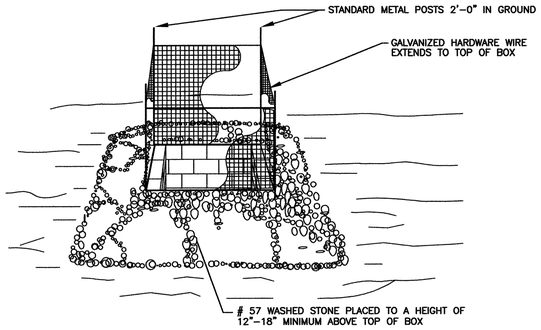


NOTE:
TREES TO BE SAVED WILL BE CLEARLY MARKED PRIOR TO CONSTRUCTION AND A PROTECTIVE BARRIER IS TO BE INSTALLED AT THE DRIPLINE.
DRIP LINE – THE AREA OF SOIL DIRECTLY BENEATH THE TREE EXTENDING OUT TO THE TIPS OF THE OUTERMOST BRANCHES.

METHOD OF TREE PROTECTION DURING CONSTRUCTION

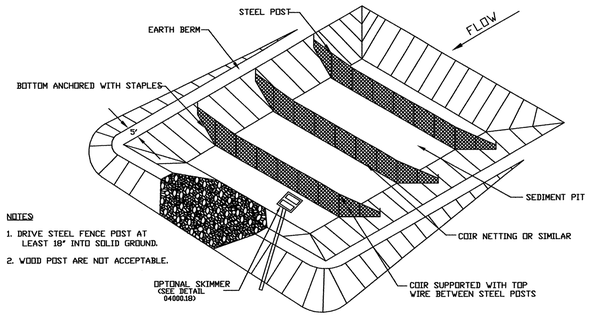
SD 15-08

N.T.S.



STANDARD CATCH BASIN/YARD INLET PROTECTION

N.T.S.



NOTES:

1. DRIVE STEEL FENCE POST AT LEAST 18" INTO SOLID GROUND.
2. WOOD POST ARE NOT ACCEPTABLE.

PERSPECTIVE VIEW

STANDARD SKIMMER FILTER BASIN

MAINTENANCE

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 FIRST BAFFLE. PULL THE SKIMMER TO ONE SIDE SO THAT THE SEDIMENT UNDERNEATH IT CAN BE EXCAVATED. EXCAVATE THE SEDIMENT FROM 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.

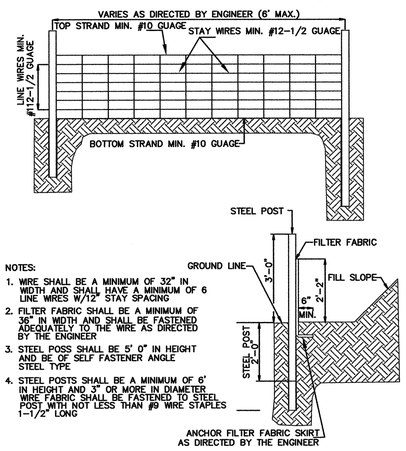
REPAIR THE BAFFLES IF THEY ARE DAMAGED. RE-ANCHOR THE BAFFLES IF WATER IS FLOWING UNDERNEATH OR ROUND THEM.

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 PLUMBER'S SNAKE OR BY FLUSHING WITH WATER. BE SURE AND 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.



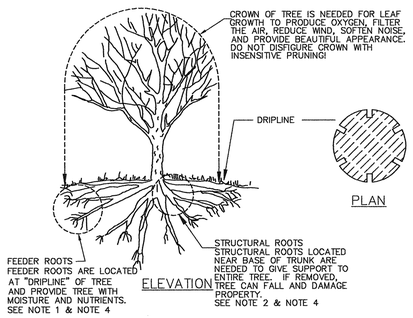
NOTES:

1. WIRE SHALL BE A MINIMUM OF 32" IN WIDTH AND SHALL HAVE A MINIMUM OF 6 LINE WIRES W/12" STAY SPACING
2. FILTER FABRIC SHALL BE A MINIMUM OF 36" IN WIDTH AND SHALL BE FASTENED ADEQUATELY TO THE WIRE AS DIRECTED BY THE ENGINEER
3. STEEL POSS SHALL BE 5' 0" IN HEIGHT AND BE OF SELF FASTENER ANGLE STEEL TYPE
4. STEEL POSTS SHALL BE A MINIMUM OF 6' IN HEIGHT AND 3" OR MORE IN DIAMETER WIRE FABRIC SHALL BE FASTENED TO STEEL POST WITH NOT LESS THAN #9 WIRE STAPLES 1-1/2" LONG

GUIDELINES FOR TEMPORARY SILT FENCE DETAIL

SD 13-01

N.T.S.



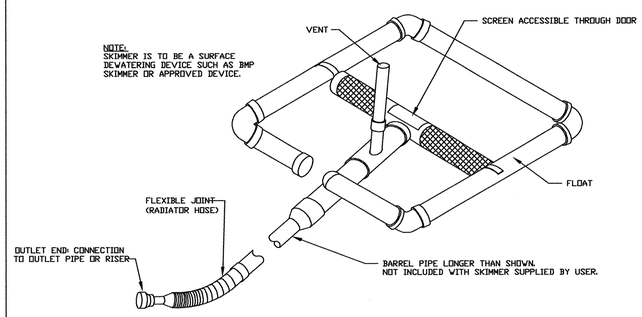
TREE PROTECTION DURING CONSTRUCTION

1. DO NOT COMPACT SOIL BENEATH TREES. NO VEHICLE SHALL BE ALLOWED TO PARK UNDER TREES. NO HEAVY MATERIALS SHALL BE STORED BENEATH TREES. RESULTS OF COMPACTION CAUSE WATER AND AIR NOT TO REACH THE ROOTS AND THE TREE WILL DIE. THESE "FEEDING ROOTS" OCCUR WELL AWAY FROM THE BASE OF THE TREE TO THE EDGE OF THE OVERHEAD BRANCH CANOPY. DAMAGING THE BARK WITH LAWNMOWERS, CONSTRUCTION EQUIPMENT, OR ANYTHING ELSE IS PROHIBITED. APROTECTIVE BARRIER SHOULD PREVENT DAMAGE FROM OCCURING DURING CONSTRUCTION.
2. NO CUTTING OF LARGE STRUCTURAL ROOTS LOCATED NEAR THE BASE OF THE TRUNK. THESE ARE ESSENTIAL IN SUPPORTING THE TREE AND HOLDING IT UPRIGHT IN HIGH WINDS. REMOVAL OF THESE ROOTS ALONG ONE SIDE IS OFTEN DONE BECAUSE OF A WALK, PAVING OR BUILDING WHICH IS BEING CONSTRUCTED.
3. AVOID CUT AND FILL WITHIN DIAMETER OF TREE CROWN DURING EXCAVATION.

METHOD OF TREE PROTECTION DURING CONSTRUCTION

SD 15-09

N.T.S.



STANDARD SKIMMER DETAIL

NORTH CAROLINA PROFESSIONAL SEAL 39113 ENGINEER JOSEPH S. BOYD 12-20-13

THIS PLAN SET WAS DESIGNED AND LAST SIGNED BY GARRY S. PAPE (PE LICENSE # 031315) ON 7/9/08. THIS REVISED SET IS ONLY PER REVISIONS BY THE GOVERNING AGENCIES AND VARIOUS SITE EDITS.

SITE ADDRESS: 558 ARBORETUM DRIVE

No.	Revision	Date	By

Designer	W&R	Scale	NTS
Drawn By	W&R	Date	12/19/13
Checked By	JSB	Job No.	03050283.01

HELMSDALE @ LANDFALL - PHASE II

CITY OF WILMINGTON NEW HANOVER NORTH CAROLINA

EROSION & SEDIMENT CONTROL DETAILS

PREPARED FOR:
HELMSDALE INVESTORS, LLC
100 WESTON ESTATES WAY
CARY, NC 27513
919-481-3000

WITHERS & RAVENEL
ENGINEERS | PLANNERS | SURVEYORS
1410 Commonwealth Drive, Suite 101. Wilmington, North Carolina 28403 tel: 910-256-9277 fax: 910-256-2584 www.withersravenel.com

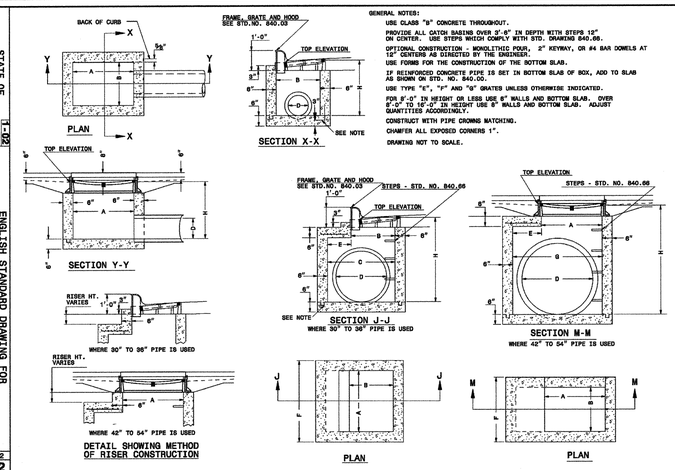
Sheet No. C-12.8

W:\03-280\03283.01-Helmsdale @ Landfall - Phase 2\CAD\2013 Updated Plans\SHEETS\C-12 DETAILS.dwg- December 23, 2013 - BOYD, JOSEPH

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

1-02

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



GENERAL NOTES:

USE CLASS "B" CONCRETE THROUGHOUT.

PROVIDE ALL CATCH BASINS OVER 3'-6" IN DEPTH WITH STEPS 12" ON CENTER. USE STEPS WHICH COMPLY WITH STD. DRAWING 840.66.

OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2" KEYWAY, OR #4 BAR DOWELS AT 12" CENTERS AS DIRECTED BY THE ENGINEER.

USE FORMS FOR THE CONSTRUCTION OF THE BOTTOM SLAB.

IF REINFORCED CONCRETE PIPE IS SET IN BOTTOM SLAB OF BOX, ADD TO SLAB AS SHOWN ON STD. NO. 840.00.

USE TYPE "E", "F" AND "G" GRATES UNLESS OTHERWISE INDICATED.

FOR 9'-0" IN HEIGHT OR LESS USE 6" WALLS AND BOTTOM SLAB. OVER 9'-0" TO 18'-0" IN HEIGHT USE 8" WALLS AND BOTTOM SLAB. ADJUST QUANTITIES ACCORDINGLY.

CONSTRUCT WITH PIPE CROWNS MATCHING.

CHAMFER ALL EXPOSED CORNERS 1".

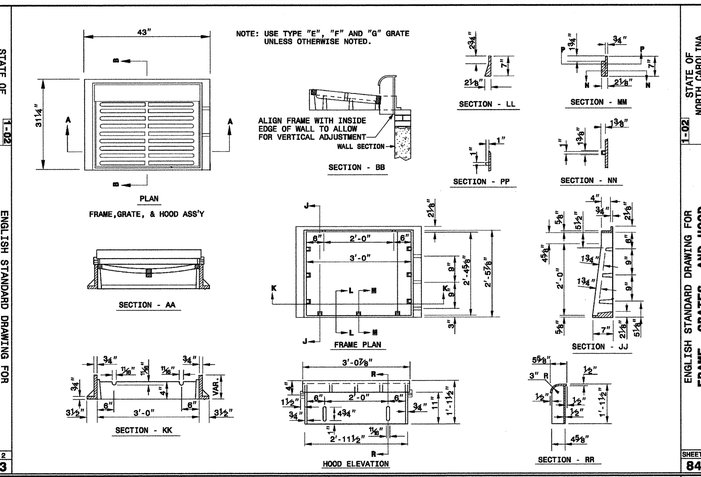
DRAWING NOT TO SCALE.

SHEET 1 OF 2
840.02

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

1-02

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



SHEET 1 OF 2
840.03

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

1-02

ENGLISH STANDARD DRAWING FOR
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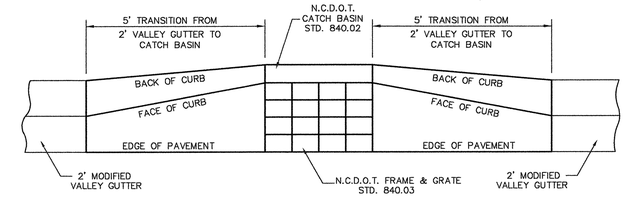

TRANSITION FROM 2' MODIFIED VALLEY GUTTER
TO N.C.D.O.T. CATCH BASIN
N.T.S.

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DIVISION OF HIGHWAYS
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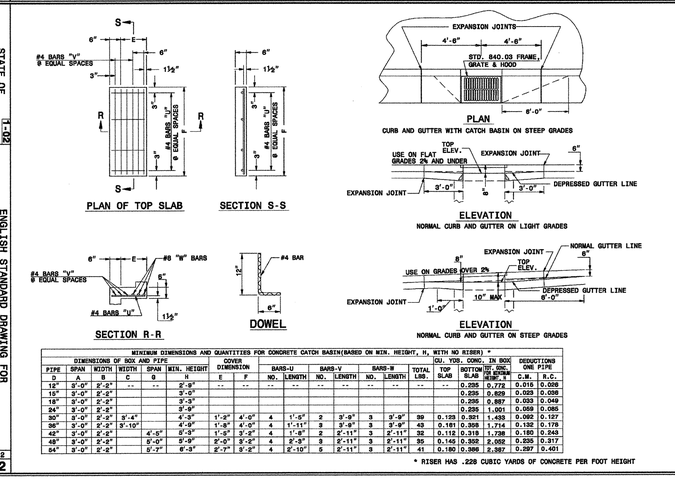
1-02

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



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

DIMENSIONS OF BOX AND PIPE							COVER DIMENSION		BARS-U		BARS-V		BARS-W		(CU. YDS. CONC. IN BOX)		DEDUCTIONS ONE PIPE	
PIPE	SPAN	WIDTH	WIDTH	SPAN	MIN. HEIGHT				NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	TOTAL	TOP SLAB	BOTTOM SLAB	TOTAL CONC. REINF.*	C.M.	N.C.
D	A	B	C	D	H	E	F													
12"	3'-0"	2'-2"	--	--	2'-9"	--	--	--	--	--	--	--	--	--	--	--	0.295	0.772	0.015	0.088
15"	3'-0"	2'-2"			3'-0"												0.295	0.829	0.023	0.086
18"	3'-0"	2'-2"			3'-3"												0.295	0.887	0.033	0.049
24"	3'-0"	2'-2"			3'-9"												0.295	1.001	0.059	0.085
30"	3'-0"	2'-2"	3'-4"		4'-3"	1'-3"	4'-0"	4	1'-5"	2	3'-9"	3	3'-9"	99	0.123	0.891	1.493	0.092	0.127
36"	3'-0"	2'-2"	3'-10"		4'-9"	1'-8"	4'-0"	4	1'-11"	2	3'-9"	3	3'-9"	43	0.181	0.958	1.714	0.132	0.178
42"	3'-0"	2'-2"		4'-0"	5'-3"	1'-8"	3'-2"	4	1'-8"	2	2'-11"	3	2'-11"	52	0.112	0.919	1.738	0.180	0.248
48"	3'-0"	2'-2"		5'-0"	5'-9"	2'-0"	3'-2"	4	2'-3"	3	2'-11"	3	2'-11"	35	0.140	0.952	2.002	0.235	0.317
54"	3'-0"	2'-2"		5'-7"	6'-3"	2'-7"	3'-2"	4	2'-10"	3	2'-11"	3	2'-11"	41	0.180	0.986	2.387	0.297	0.401

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

SHEET 2 OF 2
840.02

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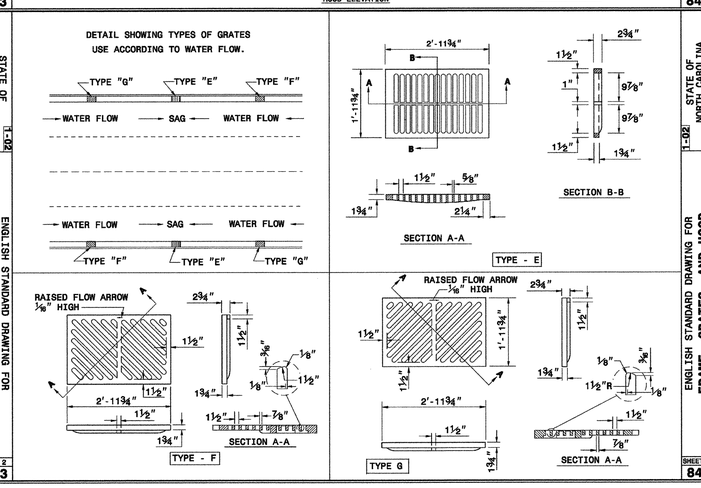
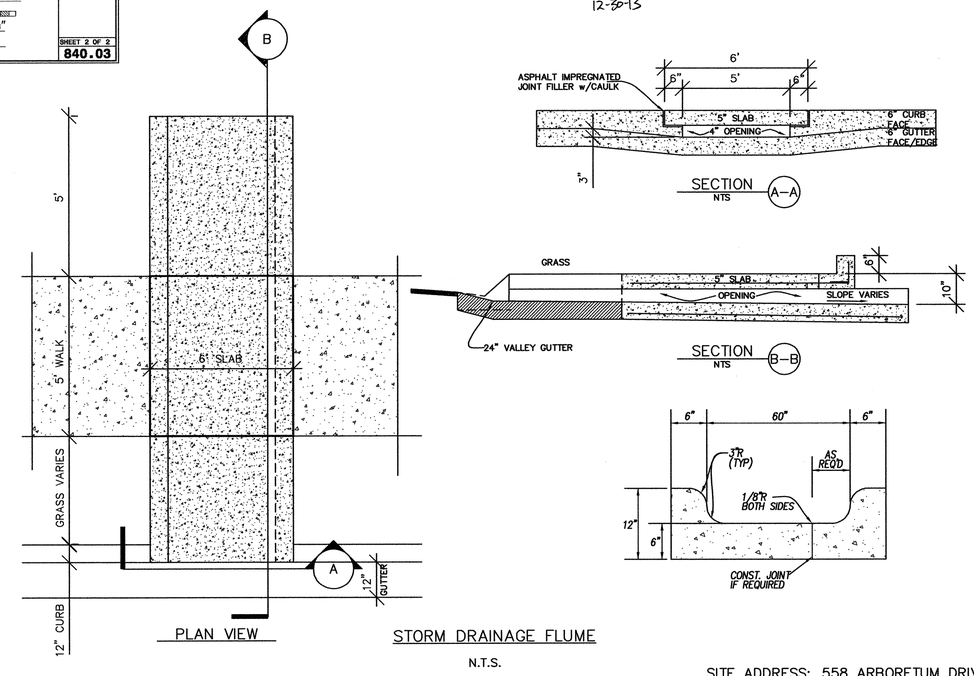
1-02

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



SHEET 2 OF 2
840.03



STORM DRAINAGE FLUME
N.T.S.

NORTH CAROLINA PROFESSIONAL SEAL 39113 ENGINEER JOSEPH S. BOYD
12-30-13

THIS PLAN SET WAS DESIGNED AND LAST SIGNED BY GARRY S. PAPE (PE LICENSE # 031315) ON 7/9/08. THIS REVISED SET IS ONLY PER REVISIONS BY THE GOVERNING AGENCIES AND VARIOUS SITE EDITS.

SITE ADDRESS: 558 ARBORETUM DRIVE

No.	Revision	Date	By

Designer	W&R	Scale	NTS
Drawn By	W&R	Date	12/19/13
Checked By	JSB	Job No.	03050283.01

HELMSDALE @ LANDFALL - PHASE II
CITY OF WILMINGTON NEW HANOVER NORTH CAROLINA

STORM DRAINAGE DETAILS

PREPARED FOR:
HELMSDALE INVESTORS, LLC
100 WESTON ESTATES WAY
CARY, NC 27513
919-481-3000

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Sheet No.
C-12.9

W:\03\05-280\03283.01-Helmsdale @ Landfall - Phase 2\CAD\2013 Updated Plans\SHEETS\C-12 DETAILS.dwg- December 23, 2013 - 10:17, JOSEPH