MEMO

APPIAN
CONSULTING ENGINEERS, PA
CIVIL, MUNICIPAL & STRUCTURAL ENGINEERS
COMPREHENSIVE ENVIRONMENTAL SERVICES

841 S. Wesleyan Blvd.
Rocky Mount, North Carolina 27803
1-800-248-9290 – Engineering Division
(252) 972-7638 – Fax

DATE March 29, 2004

TO Anthony Brown
American Homeland Development

Mr. Steve Bristow, LSS
Wake County Environmental Services

FROM John R. Davis, Jr. LSS
Bobby Joyner, PE

RE 2 inch PVC Schedule 40 Force Main for Strathaven Subdivision.

Appian Consulting Engineers, PA designed the 2" PVC force main to convey septic tank effluent from Lot 10 to the remote septic drainfield. Appian also, managed the pipe installation by Corbett Contracting, Inc.

Installation As-built Summary

On March 23, 2004, the contractor bored under the road at the corner of lot 10 and 11 and installed a 2-inch Schedule 40 PVC pipe about 4 to 5 feet under the road. There is a 45 degree expansion coupling elbow with a concrete thrust block installed on the north side of the road near the corner of lot 10 about 15 feet from the pipe stub up. See As-built drawing. Green paint on the pavement marks the location of the pipe crossing under the road.

On March 24, 2004, the sediment basin on the south side of the road was drained and the force main pipe was routed approximately 36 inches under the bottom of the basin. See attached photos and drawing. The force main was then installed 36 inches deep in the center of the 20 wide septic easement all the way to the drainfield easement lot. The length of the force main is 520 feet. The septic easement is outside of a 50-foot protected area for the existing bored well for the H. C. Allen, Jr. Property.

If you have any questions, give us a call at 919-833-2611 or 919-218-3352.

APPIAN
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COMPREHENSIVE ENVIRONMENTAL SERVICES

225 Hillsboro Place Suite 260
Raleigh, North Carolina 27603
919-833-2611 – Engineering Division
(252) 833-2499 – Fax

DATE March 29, 2004

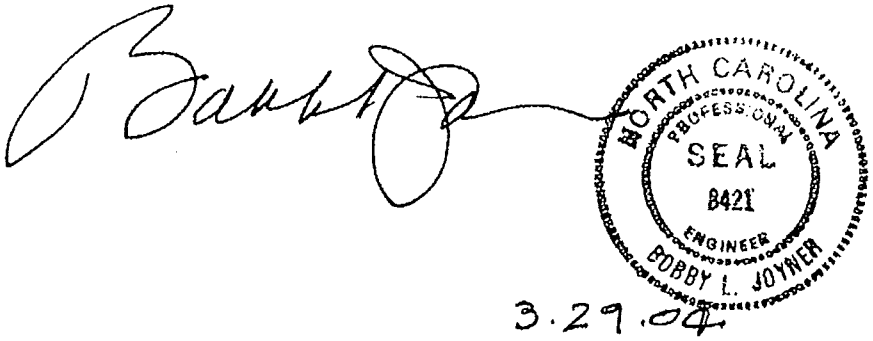
TO Anthony Brown
American Homeland Development

Mr. Steve Bristow, LSS
Wake County Environmental Services

FROM Bobby Joyner, PE

RE 2 inch PVC Schedule 40 Force Main Installation for Strathaven Subdivision, Wake County, NC.

I, Bobby L. Joyner, certify that the above referenced force main was installed in the designated septic easement in Strathaven Subdivsion, Wake County, NC according to the North Carolina State and Wake County Regulations governing on-site septic system force mains.



3.29.04

WAKE COUNTY DEPARTMENT OF ENVIRONMENTAL SERVICES WELL AND SEWAGE SITE LOCATION PERMIT
NO PERMIT(S) FOR CONSTRUCTION, LOCATION OR RELOCATION ACTIVITY SHALL BE ISSUED
UNTIL AN AUTHORIZATION FOR WASTEWATER SYSTEM CONSTRUCTION HAS BEEN ISSUED
PERMIT VOID IF NOT IN COMPLIANCE WITH ZONING REGULATIONS AND/ OR IF SITE IS ALTERED OR INTENDED USE CHANGED

PERMIT#: D037402 STATUS: A | APP. DATE: 06/28/2006 | BLDG. PERMIT#: 0064343
PIN: 1822.01 16 3188 000 | TAX MAP: 0173 0000 | RECORDED: Y ORIG. PERMIT#:
TOWNSHIP: 14 NEW LIGHT | JURISDICTION: WC | ZONING: R40W
APPLICANT: MARCUS, SEAN
125 CAMDEN DR
YOUNGSVILLE, NC 27596
(919) 570 - 0465
USE: HD USE: 101 ONE-FAMILY HOUSE
EXIST USE:
DISPOSAL: BEDROOMS: 4 BASEMENT: Y #EMPLOYEES: 0 FOUND DRAIN: Y
SITE: ADDRESS: 8712 BALBIRNIE CT
SUBDIVISION: STRATHAVEN LOT: 10 ACRES: 4.48
DIRECTION: US1 N TO PURNELL RD WEST ON PURNELL RD TO POWEL
L NORTH ON POWELL RD TO BALBIRNIE CT LOT ON RT

IMPROVEMENT PERMIT

TANK SIZE: 1200 gal. PUMP Tank: 1200 gal. SQ FT: 1200 INNOVATIVE MAX DEPTH LINE: 24 in.
WASTEWATER: INDIVIDUAL SEWAGE: DOMESTIC TYPE SYSTEM: III G PUMP: Y P/M: N
DAILY FLOW: 480 gal/day DESIGN FEE REQ?: PAID?: WATER: COMMUNITY

COMMENTS:

IP ISSUED? Y DATE: 07/26/2006 BY: (SCR) PHONE#: 856-6194

AUTHORIZATION FOR WASTEWATER/WATER SYSTEM CONSTRUCTION
VOID SIXTY (60) MONTHS FROM DATE OF ISSUANCE
AUTHORIZATION CONDITIONS:

Contractors shall install system on contours, see attached site plan for wastewater system design and well location. No underground utilities, water lines or sprinkler systems may be located in the original system or repair areas. A septic tank filter with a riser for access is required. The wastewater system shall not be covered or placed into use until inspected by the Wake County Department of Environmental Services and an Operation Permit issued. An Accepted Status System may be used in place of conventional system, if it can be placed in the permitted/authorized trench footprint (except reduction in line length and/or number as allowed for in approval) and the installation is in accordance with the accepted system approval, without unauthorized product alteration. If permit required use of an Accepted Status System, substitution with another accepted status system may be made, as long as no changes are necessary in the location of each nitrification line (including any increase in line length), trench depth or effluent distribution method. If changes are necessary, prior approval by this office is required before system installation. **OTHER CONDITIONS:**

PERMIT ISSUED FOR OFF-SITE SEPTIC SYSTEM. ATTACHED OFF-SITE EASEMENT SEWAGE DISPOSAL MAINTENANCE SCEDULE MUST RECORDED IN THE REGISTERED DEEDS OFFICE PRIOR TO ISSUANCE OF OPERATION PERMIT. INITIAL SYSTEM PUMPS TO D-BOX TO FEED 3 135' LINES, FLAGGED OUT IN FIELD. SEPTIC INSTALLER MUST USE PUMP LARGE ENOUGH TO ACCOMADATE DESIRED HEAD PRESSURE. THIS IS AN ACCEPTED STATUS SYSTEM, 25% REDUCTION ALREADY TAKEN. REPAIR WILL REQUIRE PRESSURE MANIFOLD WHEN NEEDED. KEEP TANKS 15' OFF BASEMENT FOUNDATION AND KEEP PROPER SETBACKS TO FOUNDATION DRAINS.

TANK SIZE: 1200 gal. PUMP TANK: 1200 gal. SQ FT: 1200 INNOVATIVE MAX DEPTH LINE: 24 in.
MAINT: N OPER: N L/O: Y TRENCH#: 3 LENGTH: 135 ft. WIDTH: 36 in. DESIGNER: ___
SUBFIELDS: __ DESIGN HEAD PRESSURE: _ DESIGN FLOW: ____ gal/min DOSE VOLUME: ____ gal.

CA ISSUED? Y DATE: 07/26/2006 BY: (SCR) PHONE#: 856-6194

WAKE COUNTY DEPARTMENT OF ENVIRONMENTAL SERVICES WELL AND SEWAGE SITE LOCATION PERMIT
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UNTIL AN AUTHORIZATION FOR WASTEWATER SYSTEM CONSTRUCTION HAS BEEN ISSUED
PERMIT VOID IF NOT IN COMPLIANCE WITH ZONING REGULATIONS AND/ OR IF SITE IS ALTERED OR INTENDED USE CHANGED

PERMIT#: D037402 STATUS: A | APP. DATE: 06/28/2006 | BLDG. PERMIT#: 0064343
PIN: 1822.01 16 3188 000 | TAX MAP: 0173 0000 | RECORDED: Y ORIG. PERMIT#:
TOWNSHIP: 14 NEW LIGHT | JURISDICTION: WC | ZONING: R40W
APPLICANT: MARCUS, SEAN
125 CAMDEN DR
YOUNGSVILLE, NC 27596
(919) 570 - 0466
USE: HD USE: 101 ONE-FAMILY HOUSE
EXIST USE:
DISPOSAL: BEDROOMS: 4 BASEMENT: Y #EMPLOYEES: 0
SITE: ADDRESS: 8712 BALBIRNIE CT
SUBDIVISION: STRATHAVEN LOT: 10 ACRES: 4.48
DIRECTION: US1 N TO PURNELL RD WEST ON PURNELL RD TO POWEL
L NORTH ON POWELL RD TO BALBIRNIE CT LOT ON RT

Well System: WATER: **COMMUNITY** - TYPE:

WELL LOG INFORMATION: DEPTH: ____ CASING DEPTH: ___ YIELD: _____ STATIC LEVEL: _____
WELL CONTRACTOR: _____ REG.# _____ PUMP CONTRACTOR: _____ REG.# _____
Construction Compliance
GROUT APPROVED ☐ DATE _____ EHS _____
WELLHEAD APPROVED ☐ DATE _____ EHS _____
SYSTEM FINALIZED ☐ DATE _____ EHS _____
COMMENTS:

Operation Permit

DESIGN FLOW: _____ gal./min. ACTUAL FLOW: _____ INNOVATIVE LETTER:

INSTALLED BY: _____ INSTALLATION APPROVED BY: _____
PROPRIETARY SYSTEM: FILTER NO: _____
COMMENTS:

OPERATIONS PERMIT ISSUED? ___ OP DATE: _____ BY: _____

This permit is based in part on information provided by the homeowner or his/her representative in the application submitted for this permit. The Environmental Health Specialist is not responsible for false or misleading information contained in the application. The Environmental Health Specialist is also not responsible for concealed conditions on the property or for statements in this report that may have resulted from false or misleading statements provided to him in the application. Neither Wake County nor the Environmental Health Specialist warrants that the septic tank system will continue to function satisfactorily in the future or that the water supply will remain potable.

As Built Information:

Date: _____ Benchmark: _____ Rod reading: _____ Distance to Structure: _____
ST: _____ gals ID#: _____ D.O.M.: _____ Elev.: _____ Distance to Well: _____
PT: _____ gals ID#: _____ D.O.M.: _____ Elev.: _____
D-box/FD/PM elev.: _____ Supply Line: _____ ft. Pump/Control Panel: _____

Line 1: _____ _____ _____ _____ Date: _____ Line 6: _____ _____ _____ _____ Date: _____
Line 2: _____ _____ _____ _____ Date: _____ Line 7: _____ _____ _____ _____ Date: _____
Line 3: _____ _____ _____ _____ Date: _____ Line 8: _____ _____ _____ _____ Date: _____
Line 4: _____ _____ _____ _____ Date: _____ Line 9: _____ _____ _____ _____ Date: _____
Line 5: _____ _____ _____ _____ Date: _____ Line 10: _____ _____ _____ _____ Date: _____
Distance to P/L: _____ Notes: _____

TAP CHART

Bench Mark		is = 100.00	set at						
Pump tank elev.			100.00	Pump elev.	95.00		Manifold elev.		101.00
line	color	rod read	Elevation	length	hole size	flow/tap	gal/day	trench area	LINE LTAR
1			100.00	110	1/2in SCH 40	7.11	127.30	330	0.386
2			100.00	130	1/2in SCH 40	7.11	127.30	390	0.326
3			100.00	115	1/2in SCH 40	7.11	127.30	345	0.369
4			100.00	80	1/2in SCH 80	5.48	98.11	240	0.409
5			100.00		NA		0.00	0	#DIV/0!
6			100.00		NA		0.00	0	#DIV/0!
7			100.00		NA		0.00	0	#DIV/0!
8			100.00		NA		0.00	0	#DIV/0!
9			100.00		NA		0.00	0	#DIV/0!
10			100.00		NA		0.00	0	#DIV/0!
11			100.00		NA		0.00	0	#DIV/0!
		total	feet =	435	gal/min =	26.81		LTAR =	0.30
% of Dose Vol.		70.00		Des. Flow	480			(ltar W/ INOV)	0.40
Dose Volume		197.93		Pump Run=	17.90			(ltar + 5%)	0.42
Dose Pump Time		7.38		Tank Gal/IN	21				
Drawdown in Inches		9.43		Elevation Head	6.00				

TAP CHART

Bench Mark		is = 100.00	set at						
Pump tank elev.			100.00	Pump elev.	95.00		Manifold elev.		101.00
line	color	rod read	Elevation	length	hole size	flow/tap	gal/day	trench area	LINE LTAR
1			100.00		NA		#DIV/0!	0	#DIV/0!
2			100.00		NA		#DIV/0!	0	#DIV/0!
3			100.00		NA		#DIV/0!	0	#DIV/0!
4			100.00		NA		#DIV/0!	0	#DIV/0!
5			100.00		NA		#DIV/0!	0	#DIV/0!
6			100.00		NA		#DIV/0!	0	#DIV/0!
7			100.00		NA		#DIV/0!	0	#DIV/0!
8			100.00		NA		#DIV/0!	0	#DIV/0!
		total	feet =	0	gal/min =	0		LTAR =	
% of Dose Vol.				Des. Flow	480			(ltar W/ INOV)	0.00
Dose Volume		0.00		Pump Run=	#DIV/0!			(ltar + 5%)	0.00
Dose Pump Time		#DIV/0!		Tank Gal/IN	21				
Drawdown in Inches		0.00		Elevation Head	6.00				

Head Loss in 2 inch SCH 40 Supply Pipe for Lot 10 Repair System Flow at 36 GPM.

Total Dynamic Head

Friction Head Calculation

$$H_f = \frac{K(Q/C)^{1.852}}{D^{4.87}}$$

	Pipe ID Sch 40	Sch 80
2"	2.049	1.913
2.5"	2.445	2.289
3"	3.042	2.864
3.5"	3.520	3.326

where:

H_f = Friction loss in feet per foot of pipe
K = 10.45 (Constant)
C = Roughness Coefficient (150 for plastic pipe)
Q = Flow in gpm = 36.00 gpm
D = Diameter of Pipe in inches = 2.049 inches

H_f = 0.02 feet per foot
Length of Supply Line = 700 900 feet
Friction Head = Length of Supply Line Plus 200 feet for loss in fittings 20.35 feet

Friction Head (Repair System) = 20.35 feet
Elevation Head (Repair System) = 34 feet (402' - 368' = 34')
Pressure Head (Repair System) = See Note feet 395'

Total Dynamic Head (Repair System) = 54.35 feet

Note: Pressure head for manifold is 2 feet plus 395' = 397' < 402'

Head Loss in Supply Pipe for Lot 10 Primary System Flow at 22 GPM.

Total Dynamic Head

Friction Head Calculation

$$H_f = \frac{K(Q/C)^{1.852}}{D^{4.87}}$$

	Pipe ID Sch 40	Sch 80
2"	2.049	1.913
2.5"	2.445	2.289
3"	3.042	2.864
3.5"	3.520	3.326

where:

H_f = Friction loss in feet per foot of pipe
K = 10.45 (Constant)
C = Roughness Coefficient (150 for plastic pipe)
Q = Flow in gpm = 22.00 gpm
D = Diameter of Pipe in inches = 2.049 inches

H_f = 0.01 feet per foot
Length of Supply Line = 700 900 feet
Friction Head = Length of Supply Line Plus 200 feet for loss in fittings 8.17 feet

Friction Head (Primary System) = 8.17 feet
Elevation Head (Primary System) = 34 feet (402' - 368' = 34')
Pressure Head (Primary System) = See Note feet 398

Total Dynamic Head (Primary System) = 42.17 feet

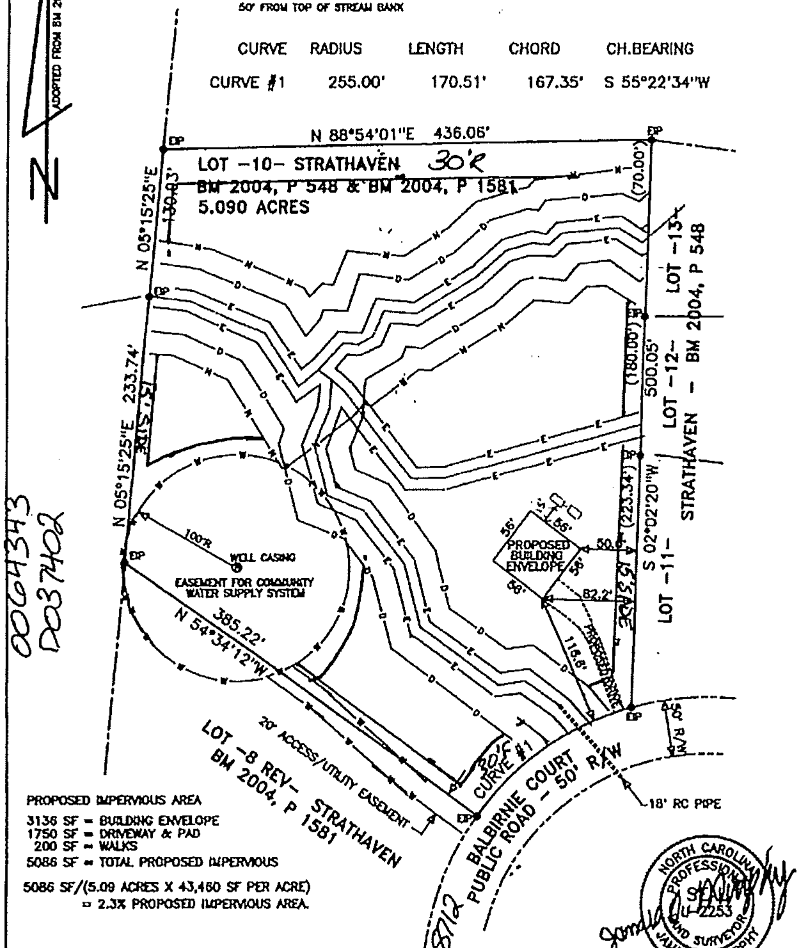
Note: Pressure head for manifold is 2 feet plus 398' = 400' < 402'

Most of head loss is in the elevation.

EIP – EXISTING IRON PIN
R/W – RIGHT OF WAY
—E— – DENOTES 20' DRAINAGE EASEMENT CENTERED ON DRAIN
—D— – DENOTES 60' DRAINAGEWAY BUFFER CENTERED ON DRAIN
—N— – DENOTES NEUSE RIVER RIPRIAN BUFFER MEASURED AT 50' FROM TOP OF STREAM BANK

– SITE PLAN –
NOT A GS 47-30 SURVEY
NOT A CURRENT SURVEY

CURVE	RADIUS	LENGTH	CHORD	CH.BEARING
CURVE #1	255.00'	170.51'	167.35'	S 55°22'34"W



PROPOSED IMPERVIOUS AREA
3136 SF = BUILDING ENVELOPE
1750 SF = DRIVEWAY & PAD
200 SF = WALKS
5086 SF = TOTAL PROPOSED IMPERVIOUS

5086 SF/(5.09 ACRES X 43,460 SF PER ACRE)
= 2.3% PROPOSED IMPERVIOUS AREA

SITE PLAN PREPARED FOR
– SEAN MARCUS –

SITE PLAN – LOT 10 STRATHAVEN
RECORDED IN BM 2004, P 548
8712 BALBIRNIE COURT
NEW LIGHT TOWNSHIP
WAKE COUNTY, N.C.
PIN #1822163788, ZONING IS "R-40W"

SITE PLAN PREPARED BY:
JAMES O. MURPHY, PLS L-2253
P. O. BOX 220
YOUNGSVILLE, N.C. 27596
TELEPHONE: 919-556-2058
PREPARED: 07-13-06

THIS SITE PLAN DOES NOT REPRESENT A CURRENT BOUNDARY SURVEY. BOUNDARY INFORMATION IS PLOTTED FROM A PREVIOUS SURVEY RECORDED IN BM 2004, P 548. PROPOSED BUILDING ENVELOPE AND DRIVE LOCATED 07-05-06.

SCALE: 1" = 100'
100 0 100 200 300
GRAPHIC SCALE – FEET

(FB 55, P 47)
NOT A GS 47-30 SURVEY