

REQUEST FOR BOARD ACTION

**HENDERSON COUNTY
BOARD OF COMMISSIONERS**

MEETING DATE: Tuesday, September 6, 2005

SUBJECT: Water & Sewer Line Extensions

ATTACHMENTS: Yes

1. Dalton Property Water Line Extension
2. Carriage Park Section 21 Water Line Extension
3. Willow Brook Falls Water Line Extension
4. White Oak Village Sewer Line Extension

SUMMARY OF REQUEST:

The City of Hendersonville has requested that the County comment on the proposed water line and sewer line extensions listed above. Staff has reviewed the water and sewer lines and has provided the project summary and staff comments as attached.

RECOMMENDATION / BOARD ACTION REQUESTED:

The County Manager recommends approval of these water and sewer line extensions and directs staff to convey the County's comments upon Board approval.

HENDERSON COUNTY REVIEW OF CITY WATER LINE EXTENSIONS

Project Name: Dalton Property
 Size of Water Line (Main & Distribution Pipe Size): 8" DIP CL 350 – 106 linear feet; 8" DIP CL 350 – 511 linear feet; total 615 linear feet of water line
 County Staff Reviewing Extension: Rocky Hyder, Fire Marshal, Matt Card, Subdivision Administrator, Lori Sand, Project Mgr.

Has the project been reviewed under the **County Subdivision Ordinance**? Yes No N/A
 Date reviewed: _____
 Action: _____
 Conditions: _____
 Comments: _____

Has the project been reviewed under the **County Manufactured Park Ordinance**? Yes No N/A
 Date reviewed: _____
 Action: _____
 Conditions: _____
 Comments: _____

Has the project been reviewed under the **County Zoning Ordinance (i.e. Special-Use or Conditional-Use Permit)**? Yes No N/A
 Date reviewed: _____
 Action: A
 Conditions: _____
 Comments: _____

Is the project subject to **any other County Land Use Ordinance**? Yes No N/A
 If yes, explain: _____

Does the project conform with the **2020 Henderson County Comprehensive Plan (CCP)**? Yes No N/A

Does the project have **adequate hydrant location and spacing**? Yes No N/A

Description of **hydrant type and thread**: Mueller Centurion – National Standard Thread

Does the estimated flow rate (gpm) meet **fire protection standards**? Meets standard for structure spacing of more than 30 feet. Yes No N/A

BOARD OF COMMISSIONERS APPROVAL

- Approved
- Not Approved
- Conditional Approval (See Comments)

Date of Board Review: _____
 Comments: _____

**City of Hendersonville - Project Summary
Water Line Extension
Dalton Property**

Date: August 12, 2005

This is a project to extend existing water lines to provide water service to an existing residence located at 158 Banner Farm Road. This extension will provide stubouts for future extension along Banner Farm Road.

This project is under the reviewing jurisdiction of: **Henderson County.**

This project requires approximately **615** linear feet of water line sized as following:

Description:	Approximate Length
8" DIP CL350	106 lf
6" DIP CL350	511 lf

Fire Protection will be provided by the installation of 1 fire hydrant.

The entire cost of the proposed water line extension is to be paid for by Joey & Mary Dalton.

Water pressure and flow in this area is as follows:

Static Pressure:	100 PSI	(Hydrant 11-0621)
Residual:	88 PSI	
Flow:	860 GPM	
Static:	100 PSI	(Hydrant 11-0616)

Based on the above information, the Water & Sewer department is capable of supporting the additional connections and recommends approval of the project contingent upon approval of the final plans and specifications from the Water & Sewer Department.

A motion is needed to approve and accept this project. Suggest wording is as follows:

I move to accept this water line extension project and to authorize the City manager to execute the water line extension agreement on behalf of the City.

Water & Sewer Department:	<input type="checkbox"/> Approved	<input type="checkbox"/> Disapproved	Date: _____
Hendersonville City Council:	<input type="checkbox"/> Approved	<input type="checkbox"/> Disapproved	Date: _____

The undersigned represents this utility extension line request has been evaluated in light of the adopted land use plan for the municipality or Henderson County. In the absence of such a plan for the general area to be served, this extension has been evaluated in terms of its future impact on existing land uses.

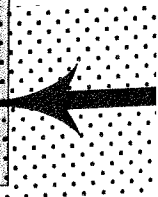
Reviewing Jurisdiction: Henderson County

Signing Official: _____

Date of Review: _____

Approved Disapproved

Narrative Comments Provided: Yes No



Laughter, Austin and Associates, P.A.
Engineering • Planning • Land Surveying
131 FOURTH AVENUE EAST
HENDERSONVILLE, NORTH CAROLINA 28792

Jon H. Laughter
Donald J. Austin
Thomas P. Welbourn
James D. Chambless, Sr.

(828) 692-9089
Fax (828) 693-8822
WATS 1-800-858-LAND

PROJECT NARRATIVE

Project : **City of Hendersonville**
WATER LINE EXTENSION
to serve
Properties on Banner Farm Road, SR 1331
located at the intersection of Leigh Anne Lane

Project Number: **LAA05-178**

Owner/Developer: **City of Hendersonville**

Address: P.O. Box 1670
Hendersonville, North Carolina 28793

Telephone: (828) 697-3063

5.20.03

Description:

This proposed Water Main Extension is being planned to serve existing residential properties along Banner Farm Road, SR 1331 located 6140± feet south of School House Road, SR 1426 northwest of Hendersonville. This water main extension is being done in-house by the City of Hendersonville's Water and Sewer Department.

This proposed water extension will require extending the existing water service on the north side of Leigh Anne Lane west for approximately 106 feet and south along the east side Banner Farm Road, SR 1331 for approximately 511 feet. This dead-end line extension will be available for future connection and extension north and south along the east side of SR 1331.

This extension shall be installed according to the proposed plans and as follows:

OFF-SITE WATER EXTENSION;

A proposed connection to the existing City of Hendersonville water system shall be made by connecting to the existing 8" water line on the north side of Leigh Anne Lane near its intersection with SR 1331.

PROJECT NARRATIVE, continued

City of Hendersonville
Water and Sewer Department
SR 1331
Water Main Extension
Page-2-
June 13, 2005
LAA Job No. 05-178

Approximately 617 lineal feet of 6 and 8-inch diameter water main with appurtenances will be extended southward along the east side of SR 1331 to a point where a 6"x6" tee with 2 gate valves and a fire hydrant will be installed and will end with a temporary 6-inch plug.

This water main extension and all other appurtenances necessary to provide adequate water distribution shall be installed.

ON-SITE WATER EXTENSION;

Not applicable to this project.

In General;

The installation of this Water Main Extension is expected to begin shortly after all approvals and permits have been issued and "authorization to start" has been given by the City's Water and Sewer Department. The utility contractor for this project will be determined at a later date and the City Water and Sewer Department will be notified.

This is a water main extension for the City of Hendersonville Water and Sewer Department. This water main extension shall be installed in accordance with all local and state regulations by a N.C. licensed utility contractor to be selected by the Owner/Developer and approved by the Water and Sewer Department.

Laughter, Austin and Associates, P.A. (Consulting Engineers) shall provide installation monitoring services during the construction and installation process and provide completion certification when the job is completed as required under the terms of the "Water Line Extension Agreement" with the City Of Hendersonville Water and Sewer Department.

ENGINEER'S REPORT
FOR
WATER SYSTEM IMPROVEMENTS

To Serve

BANNER FARM ROAD – SR 11331

Hendersonville

NORTH CAROLINA

Project Number 05-178

Prepared By:

LAUGHTER, AUSTIN & ASSOCIATES, P.A.
131 Fourth Avenue East
Hendersonville, North Carolina 28792

June 13, 2005

ENGINEER'S REPORT
BANNER FARM ROAD – SR 1331
WATER MAIN EXTENSION

1. NAME AND ADDRESS OF APPLICANT

City of Hendersonville
PO Box 1760
Hendersonville, NC 28793

2. PROJECT DESCRIPTION & INTRODUCTION

This project is located on the east side of Basnner Farm Road (SR 1331) northwest of Hendersonville and at the intersection of Leigh Anne Lane. This water main extension is being done in-house by the City of Hendersonville's Water and Sewer Department.

This proposed water extension will require extending the existing 8" water service on Leigh Anne Road westward to Banner Farm Road for approximately 106 feet to the east side of Banner Farm Road where an 8"x6"x6" Tee, an 8" Gate Valve, a 6" Gate Valve and a Plug and Anchor will be installed. From the Tee a 6" water line will be installed along the east side of Banner Farm Road for approximately 511 feet with a 1" service line installed to serve the property at 158 Banner Farm Road and installing one fire hydrant and appurtenances and a plug and anchor.

3. DESCRIPTION OF FUTURE SERVICE AREAS

This extension serves existing residences and provides stubouts for future extension along SR1331. Existing lines are adequate for serving surrounding areas.

4. PRESENT AND ANTICIPATED WATER DEMANDS

Present water demands are to serve the existing residence at 158 Banner Farm Road, SR1331. Thus the design demand is approximately 1 connection @ 400 GPD/connection. Total demand is approximately 400 GPD.

5. CHARACTER OF THE SOURCE SUPPLY

The water supply for this project is from the City of Hendersonville Water Treatment Plant.

6. AGREEMENTS TO PURCHASE WATER

Not Applicable

7. USEFUL LIFE OF FACILITIES

The useful life of the water lines for this project is expected to be 50 years minimum.

8. MAXIMUM DAILY TREATED WATER SUPPLY AND MAXIMUM DAILY DEMAND

The maximum daily treated water supply for the City of Hendersonville water plant is 12MGD. The average demand is 7.2 MGD, with a daily peak (for the year) of 9.5 MGD

9. IDENTIFICATION & DESCRIPTION OF THE SERVICE AREA

The initial service area for this project is approximately 1 domestic connections.

10. CONSIDERATION OF ALTERNATIVES TO CONSTRUCTING A NEW WATER SYSTEM.

Not applicable

11. POPULATION RECORDS AND TRENDS

According to the Office of State Planning, The population of the City of Hendersonville in 1998 was 9,538 persons. The growth rate from 1990 to 1998 was 30.9%.

12. PRESENT AND FUTURE YIELD FROM THE SOURCES OF SUPPLY

The City of Hendersonville Water Plant currently draws water from the Mills River. The present and future yield of the source of supply is expected to be adequate for the City of Hendersonville's needs.

13. PROPOSED WATER TREATMENT PROCESSES

Not Applicable

14. DESIGN BASIS

The design basis for this project is to provide adequate flow @ 30 psi minimum at the street.

15. PRIORITIZED LIST OF INFRASTRUCTURE IMPROVEMENTS

Not Applicable

HENDERSON COUNTY REVIEW OF CITY WATER LINE EXTENSIONS

Project Name: Carriage Park, Section 21
 Size of Water Line (Main & Distribution Pipe Size): 8" DIP CL 350 – 1,332 linear feet
 County Staff Reviewing Extension: Rocky Hyder, Fire Marshal, Matt Card, Subdivision Administrator, Lori Sand, Project Mgr.

Has the project been reviewed under the **County Subdivision Ordinance**? Yes No N/A

Date reviewed: February 15, 2005
 Action: Planning Board Approval Non-standard Subdivision with Conditions
 Conditions: Approval of water, sewer and erosion control, Standard Final Plat conditions, Other conditions; etc.
 Comments:

Has the project been reviewed under the **County Manufactured Park Ordinance**? Yes No N/A

Date reviewed: _____
 Action: _____
 Conditions: _____
 Comments:

Has the project been reviewed under the **County Zoning Ordinance (i.e. Special-Use or Conditional-Use Permit)**? Yes No N/A

Date reviewed: February 15, 2005
 Action: Planning Board Approved Development Parcel with Conditions
 Conditions: Same as above
 Comments: Carriage Park is a Planned Unit Development which was approved under special use permit #SP-93-13 and as amended.

Is the project subject to **any other County Land Use Ordinance**? Yes No N/A

If yes, explain:
The Henderson County Water Supply Watershed Protection Ordinance.

Does the project conform with the **2020 Henderson County Comprehensive Plan (CCP)**? Yes No N/A

Does the project have **adequate hydrant location and spacing**? Yes No N/A

Description of **hydrant type and thread**: Mueller Centurion – National Standard Thread

Does the estimated flow rate (gpm) meet **fire protection standards**? Meets minimum standard for structure spacing of 30 feet or more. Yes No N/A

BOARD OF COMMISSIONERS APPROVAL

- | | | |
|--------------------------|-------------------------------------|-----------------------------|
| <input type="checkbox"/> | Approved | Date of Board Review: _____ |
| <input type="checkbox"/> | Not Approved | Comments: _____ |
| <input type="checkbox"/> | Conditional Approval (See Comments) | |

**City of Hendersonville - Project Summary
Water Line Extension
Carriage Park, Section 21**

Date: August 12, 2005

This is a project to extend existing water lines to provide water service to an existing residential development. This section is situated just north of Carriage Park Way and east of the upper existing lake. This extension will serve a total of fourteen (14) townhomes.

This project is under the reviewing jurisdiction of: **Henderson County.**

This project requires approximately **1,332** linear feet of water line sized as following:

Description:	Approximate Length
8" DIP CL 350	1,332 lf

Fire Protection will be provided by the installation of two (2) fire hydrant(s).

The entire cost of the proposed water line extension is to be paid for by Carriage Park Associates, L.L.C.

Water pressure and flow in this area is as follows:

Static Pressure:	74 PSI	(Hydrant 12-0853)
Residual:	52 PSI	
Flow:	800 GPM	(Hydrant 12-0854) <i>verified by Rhonda Wiggins ROK</i>
Static:	70 PSI	(Carriage Parkway @ head of pond)

Based on the above information, the Water & Sewer department is capable of supporting the additional connections and recommends approval of the project contingent upon approval of the final plans and specifications from the Water & Sewer Department.

A motion is needed to approve and accept this project. Suggest wording is as follows:

I move to accept this water line extension project and to authorize the City manager to execute the water line extension agreement on behalf of the City.

Water & Sewer Department:	<input checked="" type="checkbox"/> Approved	<input type="checkbox"/> Disapproved	Date: 8-5-05
Hendersonville City Council:	<input type="checkbox"/> Approved	<input type="checkbox"/> Disapproved	Date: _____

The undersigned represents this utility extension line request has been evaluated in light of the adopted land use plan for the municipality or Henderson County. In the absence of such a plan for the general area to be served, this extension has been evaluated in terms of its future impact on existing land uses.

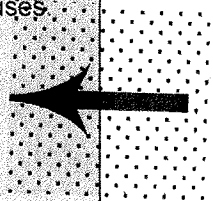
Reviewing Jurisdiction: Henderson County

Signing Official: _____

Date of Review: _____

Approved Disapproved

Narrative Comments Provided: Yes No



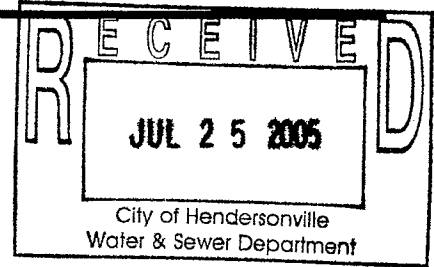
PATTERSON & PATTERSON

PAUL PATTERSON
PROFESSIONAL ENGINEER

WILLIAM PATTERSON
PROFESSIONAL LAND SURVEYOR

P.O. BOX 1189
HENDERSONVILLE, NC 28793-1189
1-828-692-6629 (TEL & FAX)

MEMORANDUM



To: City of Hendersonville Water & Sewer Department
From: Paul Patterson, P.E.
Date: July 25, 2005
Subject: Carriage Park Section 21 - Water Main Extension

An extension of the existing 8" water main located adjacent to Carriage Park Way is required to provide water service to Section 21 of Carriage Park. This section is situated just north of Carriage Park Way and east of the upper existing lake. The water extension will serve a total of fourteen (14) townhomes. The proposed site is currently owned and being developed by:

Carriage Park Associates, L.L.C.
2827 Haywood Road
Hendersonville, NC 28791
Mr. Dale Hamlin, General Manager
(828) 697-7200


At the present time, Mr. Hamlin will be responsible for signing the Waterline Extension Agreement with the City of Hendersonville.

The project will consist of 1332 linear feet of 8" CL-350 Ductile Iron water main, two (2) fire hydrants and assemblies, and other appurtenances. For more information, see the accompanying preliminary plans. (The above quantities are approximate.)

This project should be completed within one hundred twenty (120) working days after final grading has been completed, assuming favorable weather conditions. At the present time, I will be monitoring construction for this project.

We are hereby requesting that these plans be reviewed by your staff for compliance with the requirements set forth by the City of Hendersonville. Should you have any questions and/or comments concerning the plans, please feel free to call.

Sincerely,


Paul Patterson, P.E.

cc: File: 04-12-78-Eng

ENGINEERING REPORT

FOR

CARRIAGE PARK - SECTION 21 WATER MAIN EXTENSION

OFF CARRIAGE PARK WAY

HENDERSONVILLE, NORTH CAROLINA

HENDERSONVILLE TOWNSHIP
HENDERSON COUNTY

(JOB NO.: 04-12-78-ENG)

PREPARED BY:

PATTERSON & PATTERSON

ENGINEERING - SURVEYING - PLANNING

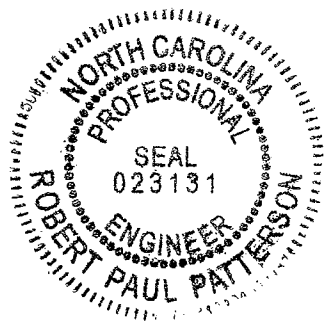
P.O. BOX 1189

HENDERSONVILLE, NC 28793-1189

TEL. & FAX: (828) 692-6629

I HEREBY CERTIFY THAT THE REPORT CONTAINED HEREIN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION.

SIGNED, SEALED AND DATED THIS 8TH DAY OF AUGUST, 2005.



BY: Robert Paul Patterson
ROBERT PAUL PATTERSON, P.E.
PATTERSON & PATTERSON
N.C.P.E. # 023131

Carriage Park Section 21 - Water Main Extension
Carriage Park Section 21
Project No.: 04-12-78-ENG (Patterson & Patterson)

PROJECT SUMMARY:

An extension of the existing 8" water main located adjacent to Carriage Park Way is required to provide water service to Section 21 of Carriage Park. This section is situated just north of Carriage Park Way and east of the upper existing lake. The water extension will serve a total of fourteen (14) townhomes. The proposed site is currently owned and being developed by:

Carriage Park Associates, L.L.C.
2827 Haywood Road
Hendersonville, NC 28791
Mr. Dale Hamlin, General Manager
(828) 697-7200

At the present time, Mr. Hamlin will be responsible for signing the Waterline Extension Agreement with the City of Hendersonville.

The project will consist of 1332 linear feet of 8" CL-350 Ductile Iron water main, two (2) fire hydrants and assemblies, and other appurtenances. For more information, see the accompanying preliminary plans. (The above quantities are approximate.)

This project should be completed within one hundred twenty (120) working days after final grading has been completed, assuming favorable weather conditions. At the present time, I will be monitoring construction for this project. Should you have any questions and/or comments concerning the plans, please feel free to call.

WATER SUPPLY:

The proposed water main extension will tie into an existing 8" water main located on the north side of Carriage Park Way. The existing water main is owned and maintained by the City of Hendersonville Water & Sewer Department. The existing water main is pressurized by a 200,000 gallon tank located within the Carriage Park Development. The City of Hendersonville's water system is supplied by an intake pipe on Mills River at U.S. Highway 280/N.C. 191 and two (2) intake pipes in the Pisgah National Forest. For further details and information on the City of Hendersonville's water system, please contact:

CITY OF HENDERSONVILLE
Attn.: Mr. Dennis Frady, Assistant Utilities Director
Water & Sewer Department
Engineering Division
318 Fourth Avenue East
P.O. Box 1760
Hendersonville, N.C. 28793
Telephone No. (828) 697-3065
Fax No. (828) 697-1707

Once the project is complete, the City of Hendersonville will take over and maintain the proposed water main extension.

All calculations for the proposed water main extension were based on information provided by the City of Hendersonville Water & Sewer Department. The detailed information on residual pressure, flow, and static pressure on this water main may be obtained from Mr. Dennis Frady at (828) 697-3073.

SANITARY SEWER:

At the current time, public sanitary sewer exists adjacent to the proposed site. The proposed Section 21 will be served via a sewer force main collection line that will tie into a manhole in Section 1 of Carriage Park. The existing sewer system has sufficient capacity to collect all of the proposed sewer discharge from Section 21.

CONCLUSION:

The proposed water main extension will be installed by a licensed Utility Contractor and inspected by both the Engineer and a City of Hendersonville representative. The water main extension will be financed by Carriage Park Associates, L.L.C., and not the City of Hendersonville.

The proposed water main extension will be connecting to an existing eight (8) inch water main that is pressurized by an existing 200,000 gallon storage tank. There is sufficient flow and pressure to provide adequate fire protection and residential service (See attached calculation sheets), according to pressure charts provided by the City of Hendersonville Water and Sewer Department. Fire protection will be provided via existing hydrants along the existing water main. No future expansion of this line is proposed.

The proposed extension should have a negligible impact on the overall water system capacity depletion. A water availability letter will be provided by the City of Hendersonville for the proposed project. Therefore, it is my professional opinion that the proposed water main extension can serve the site with both water service and fire protection.

ADDITIONAL INFORMATION

(As per 15A NCAC 18C .0307)

1. The proposed extension will tie into an existing 8" water main owned by the City of Hendersonville Water & Sewer Department.
2. The proposed water main extension is located in the central portion of Henderson County, and will serve a new residential section within the Carriage Park Development. The surrounding properties are already served with public water from the City of Hendersonville or by private wells.
3. The applicant is:
Carriage Park Associates, L.L.C.
2827 Haywood Road
Hendersonville, NC 28791
Mr. Dale Hamlin, General Manager
(828) 697-7200
4. The proposed service area is an approximate 3.65 acre tract of land that is currently undeveloped.
5. The future service area for the proposed extension can now change with the availability of city water, with additional development of the land adjacent to this phase being proposed in the future.
6. N/A
7. N/A
8. The proposed project to serve a total of fourteen (14) residential lots. The anticipated future peak water usage for this section is approximately 5,600 G.P.D.
9. Water is to be supplied to this extension by the City of Hendersonville Water & Sewer Department.
10. N/A
11. N/A
12. The proposed water main extension is to be constructed of CL-350 Ductile Iron with an estimated design service life of fifty years.
13. The maximum daily treated water supply for the City of Hendersonville is 12 M.G.D. The current maximum daily demand is approximately 7 M.G.D.
14. N/A

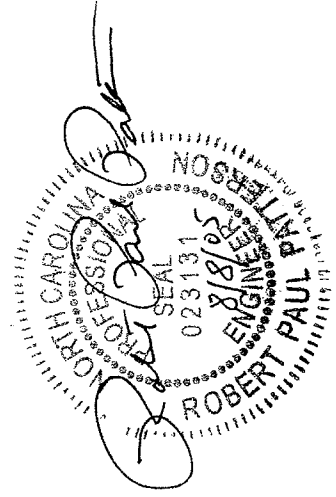
PRESSURE CALCULATIONS

Pressure Head = 2725
 Elevation = 2559.5
 Qinit = 500 gpm
 Home Use: 48.1 pgm
 Units/Houses: 14 units
 C = 100

Project Name:
 Carriage Park - Section 21

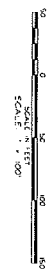
Project No.:
 04-12-78-ENG

Pt	# Houses	Q (gpm)	Length1 (ft)	Equiv. Length (ft)	Length2 (ft)	Pipe Diameter (in)	Friction Head (ft)	Comp. Fric. Head (ft)	Elev. Head (ft)	Res. Pres. (ft)	Pressure (psi)
A	14	548.06	0	0	0	8	0.00	0.00	2559.5	165.5	71.7
B	14	548.06	30	20	50	8	0.49	0.49	2558.5	166.0	71.9
C	14	548.06	201	40	211	8	2.05	2.54	2551.7	170.8	74.0
D	12	541.20	375	0	174	8	1.65	4.19	2554.1	166.7	72.2
E	9	530.90	601	0	226	8	2.07	6.26	2541.9	176.8	76.6
F	6	520.60	873	0	272	8	2.40	8.66	2559.5	156.8	68.0
G	0	500.00	1300	20	447	8	3.66	12.32	2529	183.7	79.6
H	0	500.00	1356	20	503	8	4.12	12.78	2532.3	179.9	78.0
I	0	500.00	1362	20	26	8	0.21	13.00	2532.7	179.3	77.7



- M - WATER VALVE
- - WATER METERS
- ⑥ - AIR RELEASE VALVE
- ⑨ - WATER LATERAL (PROPOSED)

SECTION 19
PHASE 2

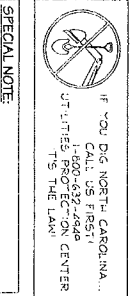
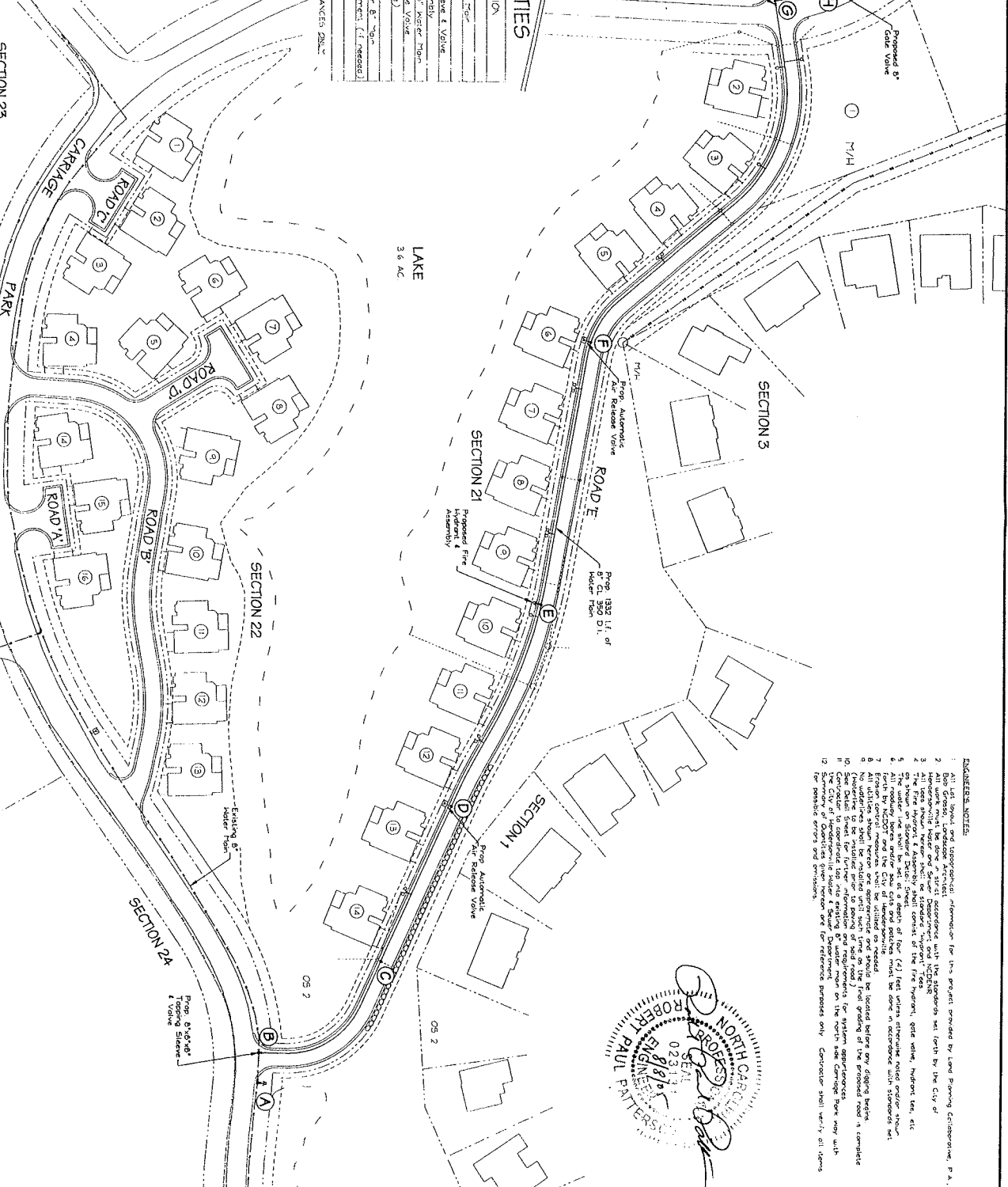


SUMMARY OF QUANTITIES

ITEM	QUANTITY	UNITS	ITEM DESCRIPTION
1	1332	L.F.	6" CLASS D.I. WATER MAIN
2	2	E.A.	6" GATE VALVE
3	1	E.A.	8" x 6" TAPPING STEWIE & VALVE
4	2	E.A.	FIRE HYDRANT & ASSEMBLY
5	1	E.A.	6" BAND (M.I.) FOR 6" WATER MAIN
6	1	E.A.	AUTOMATIC AIR RELEASE VALVE
7	4	E.A.	WATER LATERAL (SINGLE)
8	5	E.A.	WATER LATERAL (DOUBLE)
9	1	S.S.	30" RECOVERY BORE FOR 6" MAIN
10	1	S.S.	STANDARD GUY/REINFORCEMENT (IF NEEDED)
11	1	E.A.	B. PLUG
12	1	S.S.	THREE FRISBEE

NOTE: ALL PIPE LENGTHS ARE HORIZONTAL DISTANCES

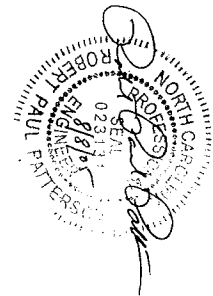
SECTION 19
PHASE 1



SPECIAL NOTE:

PLUMBING & WATER MAINS 15488 STAND & CODE - 888
 CONTRACTOR IS ADVISED TO CONSULT WITH THE NORTH-CAROLINA
 ADMINISTRATIVE CODE'S STATE ENGINEERING BOARD WATER
 SYSTEMS, TITLE 15A NCAC 80C 0600.
 See Section 1000 in the Technical Specifications.

- ENGINEER'S NOTES:
- All lot lines and topographic information for this project provided by Land Survey Corporation, P.A.
 - All work shall be done in strict accordance with the standards set forth by the City of Hendersonville.
 - All water mains shall be done in strict accordance with the standards set forth by the City of Hendersonville.
 - The Fire Hydrant & Assembly shall consist of the Fire Hydrant, gate valve, hydrant tee, etc.
 - The water main shall be set at a depth of four (4) feet unless otherwise noted on other sheets.
 - All roadway, driveway, and other work shall be done in accordance with standards set forth by the local jurisdiction.
 - Excavation shall be done in accordance with standards set forth by the local jurisdiction.
 - No underdrains shall be installed until such time as the final plan is approved by the local jurisdiction.
 - The water main shall be installed at a depth of four (4) feet unless otherwise noted on other sheets.
 - The water main shall be installed at a depth of four (4) feet unless otherwise noted on other sheets.
 - The water main shall be installed at a depth of four (4) feet unless otherwise noted on other sheets.
 - The water main shall be installed at a depth of four (4) feet unless otherwise noted on other sheets.



CARRIAGE PARK - SECTION 21 HENDERSONVILLE TOWNSHIP - CITY OF HENDERSONVILLE - HENDERSON CO., N.C.	PATTERSON & PATTERSON ENGINEERING - SURVEYING - PLANNING PAUL PATTERSON WILLIAM PATTERSON Professional Engineer and Surveyor Professional Land Surveyor	DRAWING NAME: CPICAL DATE: 7/25/05 JOB NO.: 04-12-76-FNG SCALE: NOTED
PRESSURE CALCULATIONS	<small>P.O. BOX 1009 HENDERSONVILLE, NC 28793-1009 TEL: F: (706) 492-4629</small>	WATER MAIN EXTENSION <small>© COPYRIGHT 2005 - PATTERSON & PATTERSON</small>

HENDERSON COUNTY REVIEW OF CITY WATER LINE EXTENSIONS

Project Name: Willow Brook Falls Water Line Extension
 Size of Water Line (Main & Distribution Pipe Size): Approximately 2200 LF 6" DIP; 1100 LF 2" PVC
 County Staff Reviewing Extension: Selena Coffey, Interim Planning Director; Rocky Hyder, Emergency Management Director

Has the project been reviewed under the **County Subdivision Ordinance**? **Yes** **No** **N/A**
 Date reviewed: March 15, 2005
 Action: Approved with Conditions
 Conditions: Final Plat details, approval of water plans and approval of road names
 Comments:

Has the project been reviewed under the **County Manufactured Park Ordinance**? **Yes** **No** **N/A**
 Date reviewed: _____
 Action: _____
 Conditions: _____
 Comments:

Has the project been reviewed under the **County Zoning Ordinance (i.e. Special-Use or Conditional-Use Permit)**? **Yes** **No** **N/A**
 Date reviewed: _____
 Action: _____
 Conditions: _____
 Comments:

Is the project subject to **any other County Land Use Ordinance**? **Yes** **No** **N/A**
 If yes, explain:

Does the project conform with the **2020 Henderson County Comprehensive Plan (CCP)**? **Yes** **No** **N/A**

Does the project have **adequate hydrant location and spacing**? **Yes** **No** **N/A**
 Description of **hydrant type and thread**: Mueller Centurion – National Standard Thread

Does the estimated flow rate (gpm) meet **fire protection standards**? Meets standard for structure spacing of 31 feet or more. **Yes** **No** **N/A**

BOARD OF COMMISSIONERS APPROVAL

- Approved
 - Not Approved
 - Conditional Approval (See Comments)
- Date of Board Review: _____
 Comments: _____

OFFICERS:

Fred H. Niehoff, Jr.
Mayor
Ron Stephens
Mayor Pro-Tem
Chris A. Carter
City Manager

CITY OF HENDERSONVILLE

"The City of Four Seasons"

WATER AND SEWER DEPARTMENT
Lee Smith, Utilities Director

CITY COUNCIL:

BARBARA VOLK
MARY JO PADGETT
RON STEPHENS
JON LAUGHTER

August 5, 2005

Henderson County Planning Department
Kathleen Scanlan, Administrative Assistant
101 East Allen Street
Hendersonville, NC 28792

Re: REQUEST FOR COMMENTS
Willow Brook Falls Subdivision
Water Line Extension

Dear Ms. Scanlan:

The above referenced project lies within the jurisdiction of Henderson County and is hereby submitted for your approval. Enclosed, please find the following information:

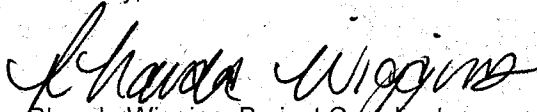
Project Summary
Engineers Report
Technical Specifications
Line Details

Please return the Project summary upon completion along with your department's projects processing review form.

If you have any questions, please contact me at 233-3206 or Lee Smith, Director @ 233-3211.

rwiggins@cityofhendersonville.org
lsmith@cityofhendersonville.org

Sincerely,


Rhonda Wiggins, Project Coordinator
Utility Line Extensions

PO BOX 1670

305 Williams Street
Hendersonville, NC 28792-4461
e-mail: lsmith@cityofhendersonville.org

Phone: (828) 697-3063
Fax: (828) 697-3089
www.cityofhendersonville.org

City of Hendersonville - Project Summary
Water Line Extension
Willow Brook Falls

Date: August 5, 2005

This is a project to extend existing water lines to provide water service to fifteen (15) single-family homes within a proposed residential subdivision. This property is located along Willow Road.

This project is under the reviewing jurisdiction of: **Henderson County.**

This project requires approximately **3,300** linear feet of water line sized as following:

Description:	Approximate Length:
6" DIP	2,200 LF
2" PVC	1,100 LF

Fire Protection will be provided by the installation of three (3) fire hydrant(s).

The entire cost of the proposed water line extension is to be paid for by Willow Brook Falls, LLC, Fletcher, NC.

Water pressure and flow in this area is as follows:

Static Pressure:	146 PSI (Hydrant at entrance of Chattoga Run & Mtn Ivy Ln)
Residual:	86 PSI
Flow:	700 GPM (Hydrant at End)
Static:	90 PSI

Based on the above information, the Water & Sewer department is capable of supporting the additional connections and recommends approval of the project contingent upon approval of the final plans and specifications from the Water & Sewer Department.

A motion is needed to approve and accept this project. Suggest wording is as follows:

I move to accept this water line extension project and to authorize the City manager to execute the water line extension agreement on behalf of the City.

Water & Sewer Department:	<input type="checkbox"/> Approved	<input type="checkbox"/> Disapproved	Date: _____
Hendersonville City Council:	<input type="checkbox"/> Approved	<input type="checkbox"/> Disapproved	Date: _____

The undersigned represents this utility extension line request has been evaluated in light of the adopted land use plan for the municipality or Henderson County. In the absence of such a plan for the general area to be served, this extension has been evaluated in terms of its future impact on existing land uses.	
Reviewing Jurisdiction: Henderson County	
Signing Official:	_____
Date of Review:	_____
<input type="checkbox"/> Approved <input type="checkbox"/> Disapproved	
Narrative Comments Provided: <input type="checkbox"/> Yes <input type="checkbox"/> No	



ENGINEERING REPORT
Water Line Extension to Serve Willow Brook Falls
Henderson County, North Carolina
April 15, 2005

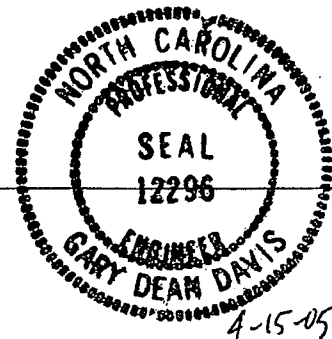
The proposed project is located on Willow Road across from Chattooga Run which is in the Champion Hills Club property in southwest Henderson County. The proposed project is an extension of the existing public water distribution system owned and maintained by the HENDERSONVILLE WATER & SEWER DEPARTMENT. The project will include the extension of approximately 2200 lf of 6" ductile iron and approximately 1100 lf of 2" PVC waterline pipe and related appurtenances to serve 15 single-family homes located on the south side of Willow Road. Three (3) fire hydrants and other related appurtenances will be installed. The proposed extension will be completed in one (1) phase.

The proposed extension will tie to the existing valve on the existing publicly owned 6" water main located along within the Champion Hills Club subdivision along the south side of Chattooga Run at the current end of the line. The total estimated water use for the subdivision is approximately 6000 gpd, with an anticipated peak water usage of approximately 25 gpm. The proposed project is currently owned and is being developed by:

Willow Brook Falls, LLC
Mr. John Thompson
452 Butler Bridge Road, Unit A-1
Fletcher, North Carolina 28732
828.684.750

The installation of the water line is anticipated to be completed in approximately 60 working days, after final grading is completed. Construction observation will be by Davis Civil Solutions, P.A.

Gary Dean Davis, P.E.



Seal

**HENDERSON COUNTY
REVIEW OF CITY SEWER LINE EXTENSIONS**

Project Name White Oak Village
 Size of Sewer Line: 8" SDR 35 PVC - 5,381 lf.; 8" DIP CL350 - 351 lf.; 2" SDR 13.5 PVC - 1,044 lf. Sewer line and a pump station
 County Staff Reviewing Extension: Kathleen Scanlan, Admin. Asst., Matt Card, Subdivision Administrator

	Yes	No	N/A
Has the project been reviewed under the <i>County Subdivision Ordinance</i> ?	<u>X</u>		

Date reviewed: Original Review for Phase 1, Master Plan Approval was on December 21, 2004; Phases 2,3, and 4 was approved on April 28, 2005.
 Action: Conditionally approved.
 Conditions: Approval of sewer and water plans, submittal of Soil & Erosion Control Plans and Final Plat Details
 Comments: _____

	Yes	No	N/A
Has the project been reviewed under the <i>County Manufactured Park Ordinance</i> ?			<u>X</u>

Date reviewed: _____
 Action: _____
 Conditions: _____
 Comments: This development was an approved Manufactured Home Park but at present is approved as a subdivision.

	Yes	No	N/A
Has the project been reviewed under the <i>County Zoning Ordinance</i> (i.e. Special-Use or Conditional-Use Permit)?		<u>X</u>	

Date reviewed: _____
 Action: _____
 Conditions: _____
 Comments: _____

	Yes	No	N/A
Is the project subject to any other <i>County Land Use Ordinance</i> ?		<u>X</u>	

If yes, explain: _____

	Yes	No	N/A
Does the project conform to the 2020 Henderson County Comprehensive Plan (CCP)?		<u>X</u>	

The project is located in the Urban Services Area (USA).

Board of Commissioners Approval

Approved _____
 Not Approved _____
 Conditional Approval _____
 (See comments)

Date of Board Review: _____
 Comments: _____

City of Hendersonville - Project Summary
Sewer Line Extension
White Oak Village

Date: August 5, 2005

This is a project to extend existing sewer lines to provide sewer service to a proposed residential development. This project is situated just west of Zeb Corn Road. This extension will serve a total of eighty-seven (87) lots, with a proposed lift station having a capacity for a total of one hundred twenty (120) lots.

This project is under the reviewing jurisdiction of: **Henderson County.**

This project requires approximately **6,776** linear feet of sewer line sized as following:

Description:	Approximate Length
8" SDR 35 PVC	5,381 lf
8" DIP CL350	351 lf
2" SDR 13.5 PVC	1,044 lf

Pump station required: yes No

The amount of wastewater generated by this project will be approximately **28,800** gallons per day.

The entire cost of the proposed sewer line extension is to be paid for by VGC Properties, LLC

Based on the above information, the Water & Sewer department is capable of supporting the additional connections and recommends approval of the project contingent upon approval of the final plans and specifications from the Water & Sewer Department.

A motion is needed to approve and accept this project. Suggest wording is as follows:

I move to accept this sewer line extension project and to authorize the City manager to execute the sewer line extension agreement on behalf of the City.

Water & Sewer Department:	<input type="checkbox"/> Approved	<input type="checkbox"/> Disapproved	Date: _____
Hendersonville City Council:	<input type="checkbox"/> Approved	<input type="checkbox"/> Disapproved	Date: _____

The undersigned represents this utility extension line request has been evaluated in light of the adopted land use plan for the municipality or Henderson County. In the absence of such a plan for the general area to be served, this extension has been evaluated in terms of its future impact on existing land uses.	
Reviewing Jurisdiction: Henderson County	
Signing Official: _____	
Date of Review: _____	
<input type="checkbox"/> Approved <input type="checkbox"/> Disapproved	
Narrative Comments Provided: <input type="checkbox"/> Yes <input type="checkbox"/> No	

OFFICERS:

Fred H. Niehoff, Jr.
Mayor
Ron Stephens
Mayor Pro-Tem
Chris A. Carter
City Manager

CITY OF HENDERSONVILLE

"The City of Four Seasons"

WATER AND SEWER DEPARTMENT
Lee Smith, Utilities Director

CITY COUNCIL:

BARBARA VOLK
MARY JO PADGETT
RON STEPHENS
JON LAUGHTER

August 5, 2005

Henderson County Planning Department
Kathleen Scanlan, Administrative Assistant
101 East Allen Street
Hendersonville, NC 28792

Re: REQUEST FOR COMMENTS
White Oak Village
Sewer Line Extension

Dear Ms. Scanlan:

The above referenced project lies within the jurisdiction of Henderson County and is hereby submitted for your approval. Enclosed, please find the following information:

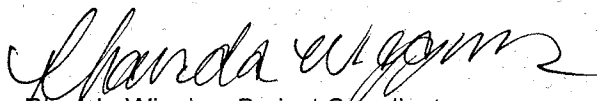
Project Summary
Project Narrative
Line Details

Please return the Project summary upon completion along with your department's projects processing review form.

If you have any questions, please contact me at 233-3206 or Lee Smith, Director @ 233-3211.

rwiggins@cityofhendersonville.org
ismith@cityofhendersonville.org

Sincerely,



Rhonda Wiggins, Project Coordinator
Utility Line Extensions

PATTERSON & PATTERSON

PAUL PATTERSON

WILLIAM PATTERSON

PROFESSIONAL ENGINEER/LAND SURVEYOR

PROFESSIONAL LAND SURVEYOR

P.O. BOX 1189

HENDERSONVILLE, NC 28793-1189

1-828-692-6629 (TEL & FAX)

MEMORANDUM

To: City of Hendersonville Water & Sewer Department
From: Paul Patterson, P.E.
Date: July 22, 2005
Subject: White Oak Village - Sewer Extension

An extension of the existing sewer force main located adjacent to Zeb Corn Road is required to provide sewer service to White Oak Village. This project is situated just west of said Zeb Corn Road. The sewer extension will serve a total of eighty-seven (87) lots, with the proposed sewer lift station having a capacity for a total of one hundred twenty (120) lots. The proposed site is currently owned and being developed by:

VGC Properties, LLC
c/o Mr. Lex Veazey, Atty.
210 N. Main Street
Hendersonville, NC 28792
Tel. Contact: Mr. Howard George
(828) 775-7477

At the present time, Mr. Veazey or Mr. George will be responsible for signing the Sewerline Extension Agreement with the City of Hendersonville.

The project will consist of thirty three (33) standard precast manholes, 5381 linear feet of 8" SDR35 PVC Sewer Pipe, 351 linear feet of 8" CL350 D.I. Sewer Pipe, eighty-seven (87) sewer laterals, a Sewer Lift Station Complete with appurtenances, and 1044 linear feet of 2" SDR13.5 PVC Force Main. The proposed sewer force main will tap into an existing force main on the west side of Zeb Corn Road. For additional information, see the attached preliminary plans. (The above quantities are approximate.)

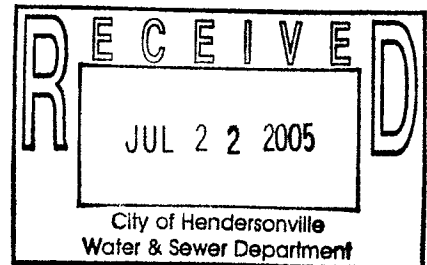
This project should be completed within one hundred twenty (120) working days after final grading has been completed, assuming favorable weather conditions. At the present time, I will be monitoring construction for this project. Should you have any questions and/or comments concerning the plans, please feel free to call.

Sincerely,



Paul Patterson, P.E.

cc: File: 05-06-27-Eng



CONSTRUCTION PLANS FOR: WHITE OAK VILLAGE

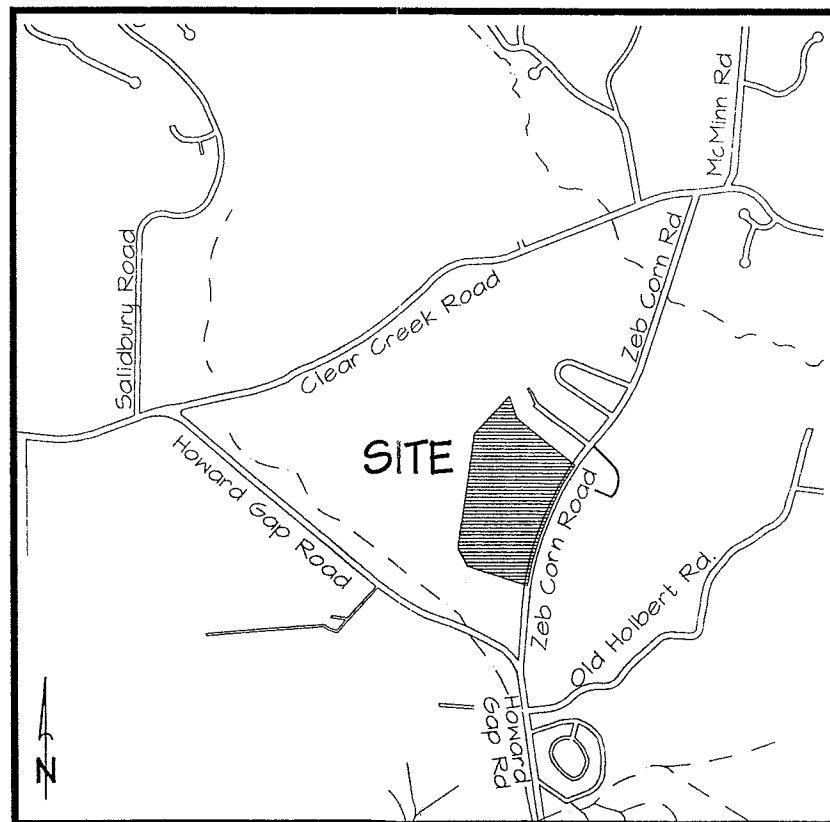
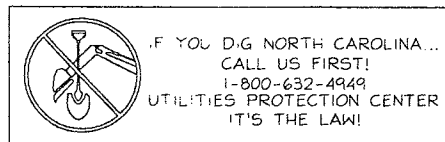
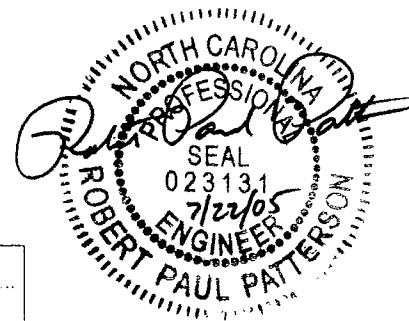
SEWER LINE EXTENSION CITY OF HENDERSONVILLE

HENDERSON COUNTY, NORTH CAROLINA

JULY 22, 2005

DEVELOPER:

VGC PROPERTIES, LLC
 ATTN.: MR. LEX VEAZEY, ATTY.
 210 N. MAIN STREET
 HENDERSONVILLE, NC 28792
 TEL. CONTACT: MR. HOWARD GEORGE
 TEL.: (828) 775-7477



VICINITY MAP
(NOT TO SCALE)

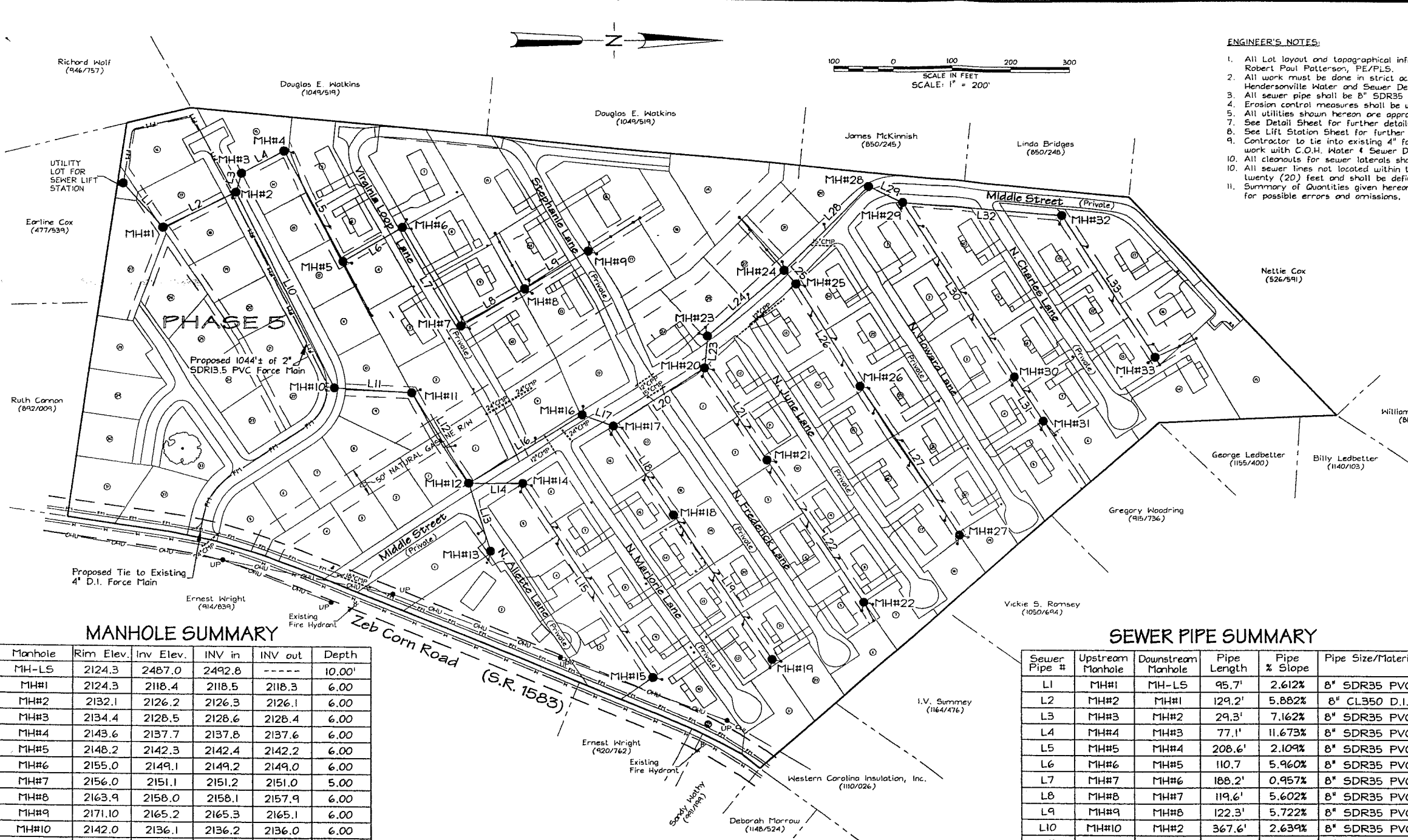
TABLE OF CONTENTS:

SHEET 1	COVER SHEET
SHEET 2	OVERALL SITE PLAN
SHEET 3	PLAN/PROFILE
SHEET 4	PLAN/PROFILE
SHEET 5	PLAN/PROFILE
SHEET 6	PLAN/PROFILE
SHEET 7	SEWER LIFT STATION
SHEET 8	STANDARD DETAILS

ORTHO TAX PARCEL NUMBERS:
00-9670-45-5564-55

ENGINEERING BY:
PATTERSON & PATTERSON
 ENGINEERING - SURVEYING - PLANNING
PAUL PATTERSON **WILLIAM PATTERSON**
 Professional Engineer/Land Surveyor Professional Land Surveyor
 P.O. BOX 1189
 HENDERSONVILLE, NC 28793-1189
 TEL. & FAX: (828) 692-6620

SPECIAL NOTE:
 CONTRACTOR TO FIELD VERIFY LOCATION OF ALL UTILITIES, AND BEFORE ANY DIGGING BEGINS, CONTRACTOR MUST HAVE ALL UNDERGROUND UTILITIES LOCATED.



ENGINEER'S NOTES:

- All Lot layout and topographical information for this project provided by Patterson & Patterson, Robert Paul Patterson, PE/PLS.
- All work must be done in strict accordance with the standards set forth by the City of Hendersonville Water and Sewer Department and NCDENR.
- All sewer pipe shall be 8" SDR35 PVC or 8" CL350 D.I. Sewer Pipe as shown hereon these plans.
- Erosion control measures shall be utilized as needed.
- All utilities shown hereon are approximate and should be located before any digging begins.
- See Detail Sheet for further details and requirements for system appurtenances.
- See Lift Station Sheet for further details and requirements on sewer lift station.
- Contractor to tie into existing 4" force main located on Zeb Corn Road. (Coordinate all work with C.O.H. Water & Sewer Dept.)
- All cleanouts for sewer laterals shall be set inside easements/right-of-ways at closest available location.
- All sewer lines not located within the proposed road right-of-way shall have an easement with a width of twenty (20) feet and shall be defined as shown hereon.
- Summary of Quantities given hereon are for reference purposes only. Contractor shall verify all items for possible errors and omissions.

SPECIAL NOTE:

RELATIONSHIP OF WATER MAINS, SEWER MAINS & STORM PIPES
 Contractor is required to comply with the North Carolina Administrative Code, Rules Governing Public Water Systems, Title 15A NCAC 18C.0906.
 See Special Provisions in the Technical Specifications.



ENGINEER'S LEGEND

- ⊕ - WATER VALVE
- ⊙ - WATER METER
- ⊕ - FIRE HYDRANT
- - SANITARY SEWER MANHOLE (PROPOSED)
- ⊙ - SANITARY SEWER MANHOLE (EXISTING)
- - - - - SANITARY SEWER LATERAL
- ⊕ - AUTOMATIC AIR RELEASE VALVE

MANHOLE SUMMARY

Manhole	Rim Elev.	Inv Elev.	INV in	INV out	Depth
MH-LS	2124.3	2487.0	2492.8	-----	10.00'
MH#1	2124.3	2118.4	2118.5	2118.3	6.00
MH#2	2132.1	2126.2	2126.3	2126.1	6.00
MH#3	2134.4	2128.5	2128.6	2128.4	6.00
MH#4	2143.6	2137.7	2137.8	2137.6	6.00
MH#5	2148.2	2142.3	2142.4	2142.2	6.00
MH#6	2155.0	2149.1	2149.2	2149.0	6.00
MH#7	2156.0	2151.1	2151.2	2151.0	5.00
MH#8	2163.9	2158.0	2158.1	2157.9	6.00
MH#9	2171.10	2165.2	2165.3	2165.1	6.00
MH#10	2142.0	2136.1	2136.2	2136.0	6.00
MH#11	2144.8	2138.9	2139.0	2138.8	6.00
MH#12	2156.5	2149.1	2149.2	2149.0	7.50
MH#13	2169.9	2164.0	2164.1	2163.9	6.00
MH#14	2160.0	2154.1	2154.2	2154.0	6.00
MH#15	2188.8	2182.1	2182.2	2182.0	6.00
MH#16	2156.8	2150.9	2151.0	2150.8	6.00
MH#17	2157.5	2151.6	2151.7	2151.5	6.00
MH#18	2175.3	2169.4	2169.5	2169.3	6.00
MH#19	2190.4	2184.5	2184.6	2184.4	6.00
MH#20	2168.3	2162.4	2162.5	2162.3	6.00
MH#21	2170.3	2164.4	2164.5	2164.3	6.00
MH#22	2190.5	2184.6	2184.7	2184.5	6.00
MH#23	2171.6	2165.7	2165.8	2165.6	6.00
MH#24	2182.8	2502.8	2502.9	2175.8	7.00
MH#25	2182.1	2176.4	2176.5	2176.3	5.80
MH#26	2185.8	2179.9	2180.0	2179.8	6.00
MH#27	2194.0	2188.1	2188.2	2188.0	6.00
MH#28	2194.5	2188.6	2188.7	2188.5	6.00
MH#29	2195.7	2189.8	2189.9	2189.7	6.00
MH#30	2204.3	2196.5	2196.6	2196.4	7.90
MH#31	2203.1	2197.2	2197.3	2197.1	6.00
MH#32	2197.8	2191.9	2192.0	2191.8	6.00
MH#33	2201.4	2195.5	2195.6	2195.4	6.00

SEWER PIPE SUMMARY

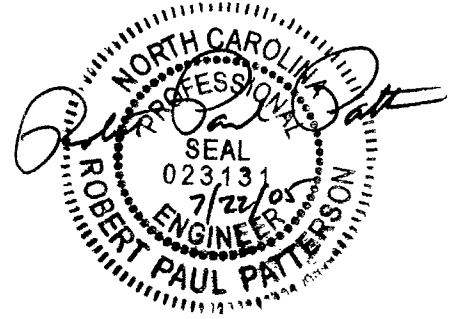
Sewer Pipe #	Upstream Manhole	Downstream Manhole	Pipe Length	Pipe % Slope	Pipe Size/Material
L1	MH#1	MH-LS	95.7'	2.612%	8" SDR35 PVC
L2	MH#2	MH#1	129.2'	5.882%	8" CL350 D.I.
L3	MH#3	MH#2	29.3'	7.162%	8" SDR35 PVC
L4	MH#4	MH#3	77.1'	11.673%	8" SDR35 PVC
L5	MH#5	MH#4	208.6'	2.109%	8" SDR35 PVC
L6	MH#6	MH#5	110.7'	5.960%	8" SDR35 PVC
L7	MH#7	MH#6	188.2'	0.957%	8" SDR35 PVC
L8	MH#8	MH#7	119.6'	5.602%	8" SDR35 PVC
L9	MH#9	MH#8	122.3'	5.722%	8" SDR35 PVC
L10	MH#10	MH#2	367.6'	2.639%	8" SDR35 PVC
L11	MH#11	MH#10	125.8'	2.066%	8" SDR35 PVC
L12	MH#12	MH#11	176.1'	5.678%	8" SDR35 PVC
L13	MH#13	MH#12	117.8'	12.475%	8" SDR35 PVC
L14	MH#14	MH#12	86.6'	5.545%	8" SDR35 PVC
L15	MH#15	MH#14	394.5'	7.047%	8" SDR35 PVC
L16	MH#16	MH#12	211.1'	0.724%	8" CL350 D.I.
L17	MH#17	MH#16	51.9'	0.963%	8" SDR35 PVC
L18	MH#18	MH#17	178.3'	9.869%	8" SDR35 PVC
L19	MH#19	MH#18	293.6'	5.076%	8" SDR35 PVC
L20	MH#20	MH#17	177.1'	5.987%	8" SDR35 PVC
L21	MH#21	MH#20	185.2'	0.972%	8" SDR35 PVC
L22	MH#22	MH#21	288.8'	6.925%	8" SDR35 PVC
L23	MH#23	MH#20	50.4'	6.151%	8" SDR35 PVC
L24	MH#24	MH#23	165.1'	6.058%	8" SDR35 PVC
L25	MH#25	MH#24	26.2'	1.147%	8" SDR35 PVC
L26	MH#26	MH#25	200.3'	1.647%	8" SDR35 PVC
L27	MH#27	MH#26	301.4'	2.655%	8" SDR35 PVC
L28	MH#28	MH#24	196.9'	6.350%	8" SDR35 PVC
L29	MH#29	MH#28	58.8'	1.702%	8" SDR35 PVC
L30	MH#30	MH#29	348.8'	1.863%	8" SDR35 PVC
L31	MH#31	MH#30	86.1'	0.581%	8" SDR35 PVC
L32	MH#32	MH#29	268.8'	0.707%	8" SDR35 PVC
L33	MH#33	MH#32	283.4'	1.200%	8" SDR35 PVC

SUMMARY OF QUANTITIES

ITEM	QUANTITY	UNITS	ITEM DESCRIPTION
1	5381	L.F.	8" SDR35 PVC Sewer Pipe
2	351	L.F.	8" CL350 D.I. Sewer Pipe
3	30	EA.	4' Dia. Precast Manhole (Depth 0'-6')
4	3	EA.	4' Dia. Precast Manhole (Depth 7'-8')
5	903	TNS.	Pipe Bedding - Washed #57 Stone
6	28	EA.	Sewer Laterals (New)
7	3	EA.	Extra Long Laterals (New)
8	56	EA.	Crush & Fill Septic Tanks
9	56	EA.	Laterals to be tied to Ex. Units
10	1	L.S.	Sewer Lift Station Complete w/flow meter
11	1044	L.F.	2" SDR13.5 PVC Sewer Force Main
12	1	L.S.	Tie into existing 4" D.I. Force Main
13	1	L.S.	Misc. Fittings
14	11	EA.	Open Cut Ex. Roads/Patch Road

NOTE: ALL PIPE LENGTHS ARE HORIZONTAL DISTANCES ONLY.

NOTE: PIPE LENGTH DEFINED AS DISTANCE FROM INSIDE MANHOLE TO INSIDE MANHOLE (I.E., INVERT OUT TO INVERT IN).



SEWER LINE EXTENSION

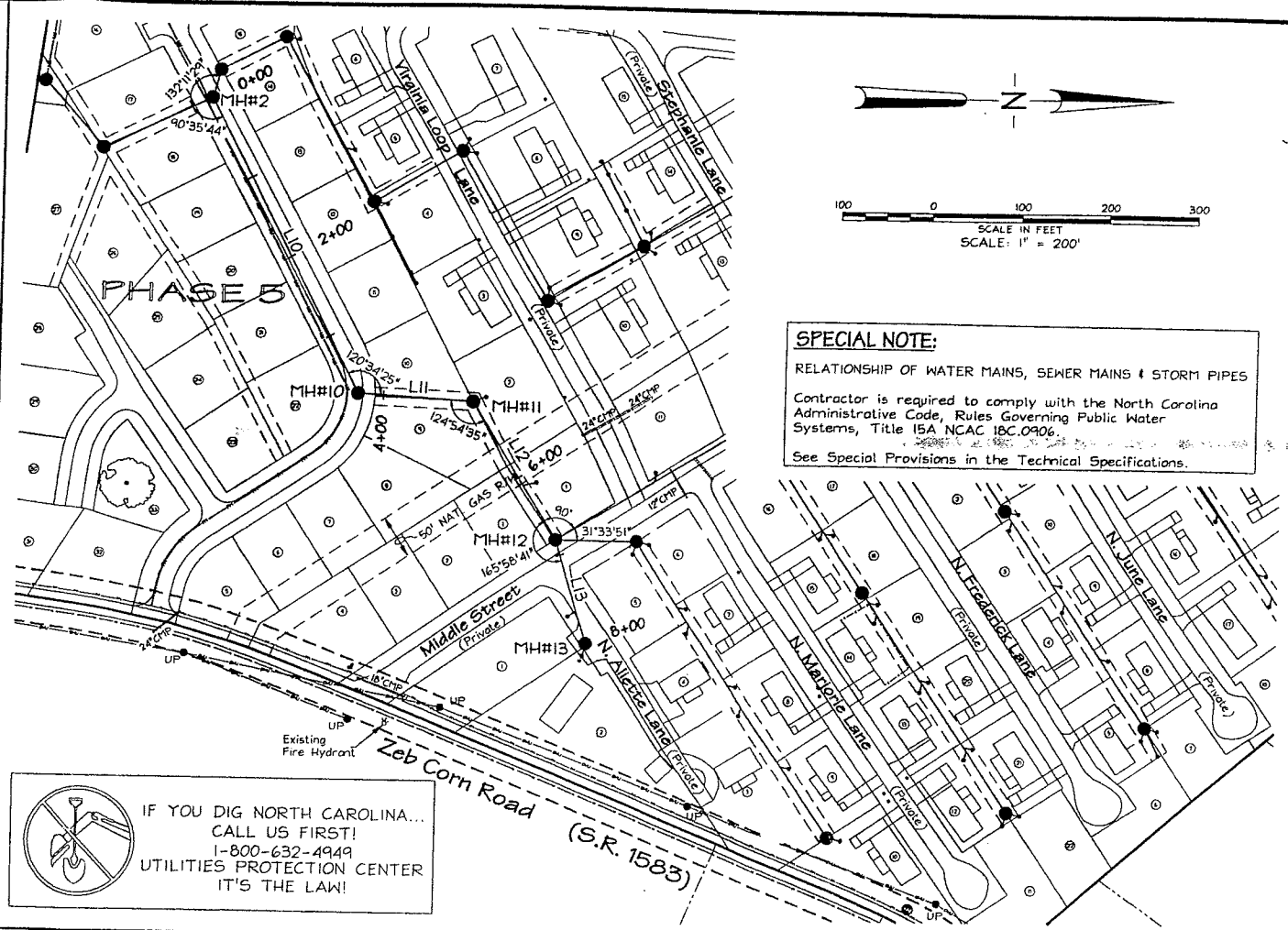
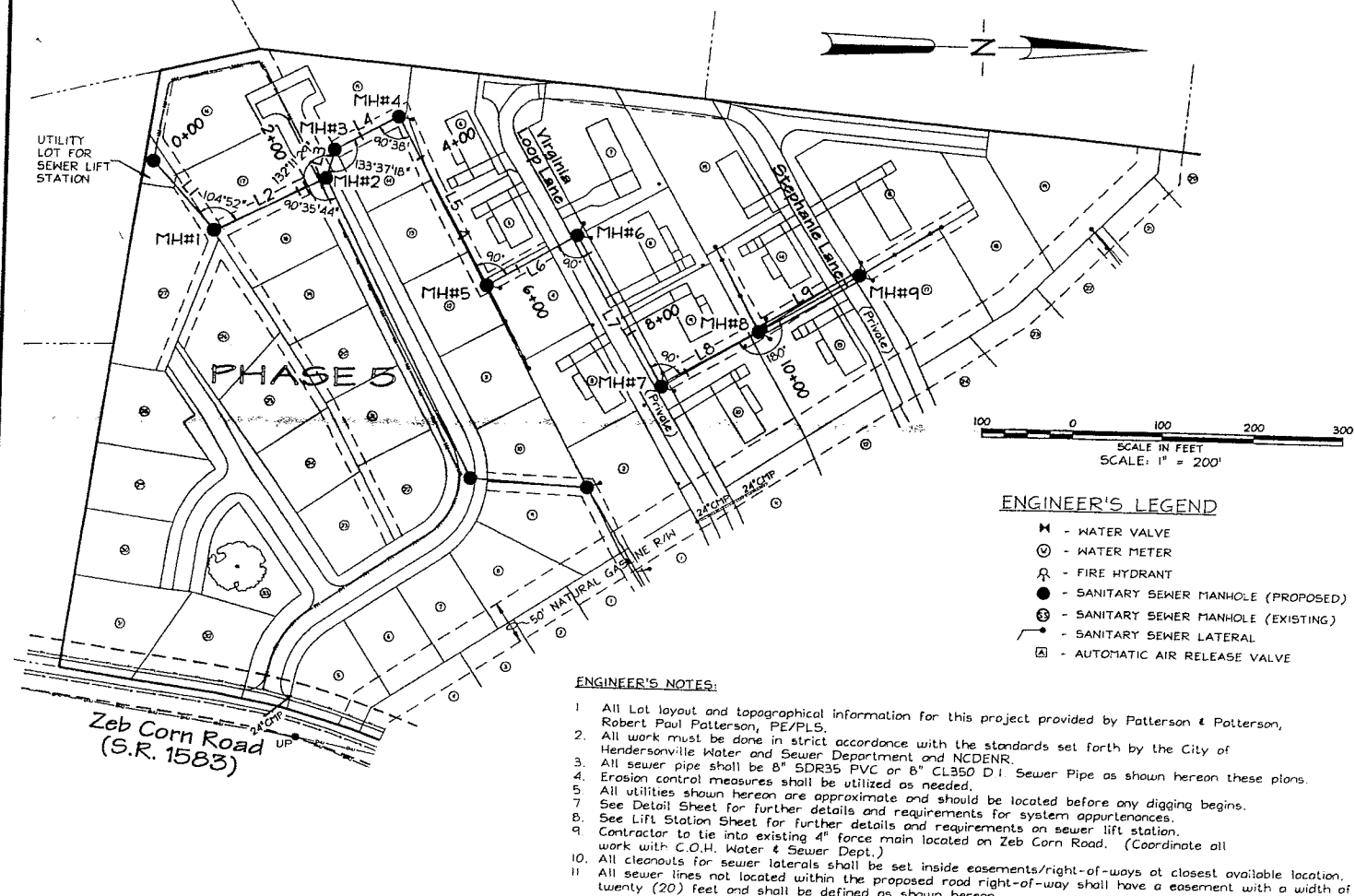
PATTERSON & PATTERSON
 ENGINEERING - SURVEYING - PLANNING
PAUL PATTERSON WILLIAM PATTERSON
 Professional Engineer/Land Surveyor Professional Land Surveyor

WHITE OAK VILLAGE OVERALL SITE PLAN

REVISIONS

SHEET **2** OF 8

DRAWING NAME: PHOAKSSP DATE: 7/22/05
 JOB NO.: 05-06-27-ENG SCALE: NOTED
 © COPYRIGHT 2005 - PATTERSON & PATTERSON

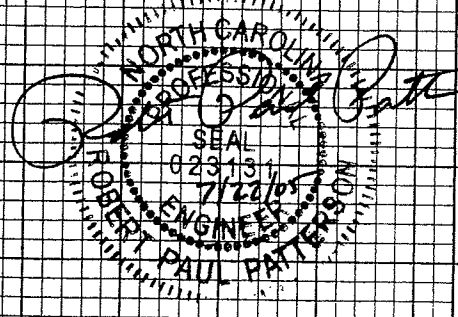
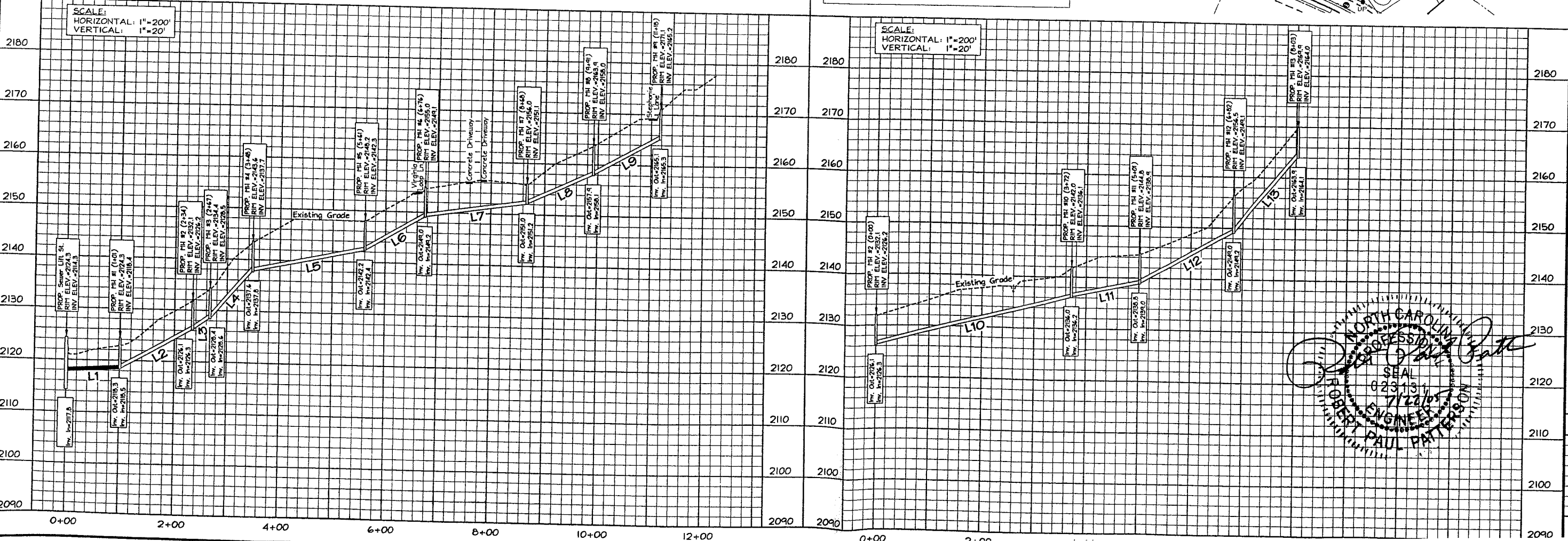


SPECIAL NOTE:
 RELATIONSHIP OF WATER MAINS, SEWER MAINS & STORM PIPES
 Contractor is required to comply with the North Carolina Administrative Code, Rules Governing Public Water Systems, Title 15A NCAC 18C.0906.
 See Special Provisions in the Technical Specifications.

- ENGINEER'S LEGEND**
- ⊕ - WATER VALVE
 - ⊙ - WATER METER
 - ⊕ - FIRE HYDRANT
 - - SANITARY SEWER MANHOLE (PROPOSED)
 - ⊙ - SANITARY SEWER MANHOLE (EXISTING)
 - - SANITARY SEWER LATERAL
 - ⊕ - AUTOMATIC AIR RELEASE VALVE

- ENGINEER'S NOTES:**
- All Lot layout and topographical information for this project provided by Patterson & Patterson, Robert Paul Patterson, PE/PLS.
 - All work must be done in strict accordance with the standards set forth by the City of Hendersonville Water and Sewer Department and NCDENR.
 - All sewer pipe shall be 8" SDR35 PVC or 8" CL350 D.I. Sewer Pipe as shown hereon these plans.
 - Erosion control measures shall be utilized as needed.
 - All utilities shown hereon are approximate and should be located before any digging begins.
 - See Detail Sheet for further details and requirements for system appearances.
 - See Lift Station Sheet for further details and requirements on sewer lift station.
 - Contractor to tie into existing 4" force main located on Zeb Corn Road. (Coordinate all work with C.O.H. Water & Sewer Dept.)
 - All cleanouts for sewer laterals shall be set inside easements/right-of-ways at closest available location.
 - All sewer lines not located within the proposed road right-of-way shall have an easement with a width of twenty (20) feet and shall be defined as shown hereon.

IF YOU DIG NORTH CAROLINA...
 CALL US FIRST!
 1-800-632-4949
 UTILITIES PROTECTION CENTER
 IT'S THE LAW!



PATTERSON & PATTERSON
 ENGINEERING - SURVEYING - PLANNING
 PAUL PATTERSON Professional Engineer/Land Surveyor
 WILLIAM PATTERSON Professional Land Surveyor
 P.O. BOX 1188
 HENDERSONVILLE, NC 28734-1188
 TEL. & FAX: (828) 697-6629

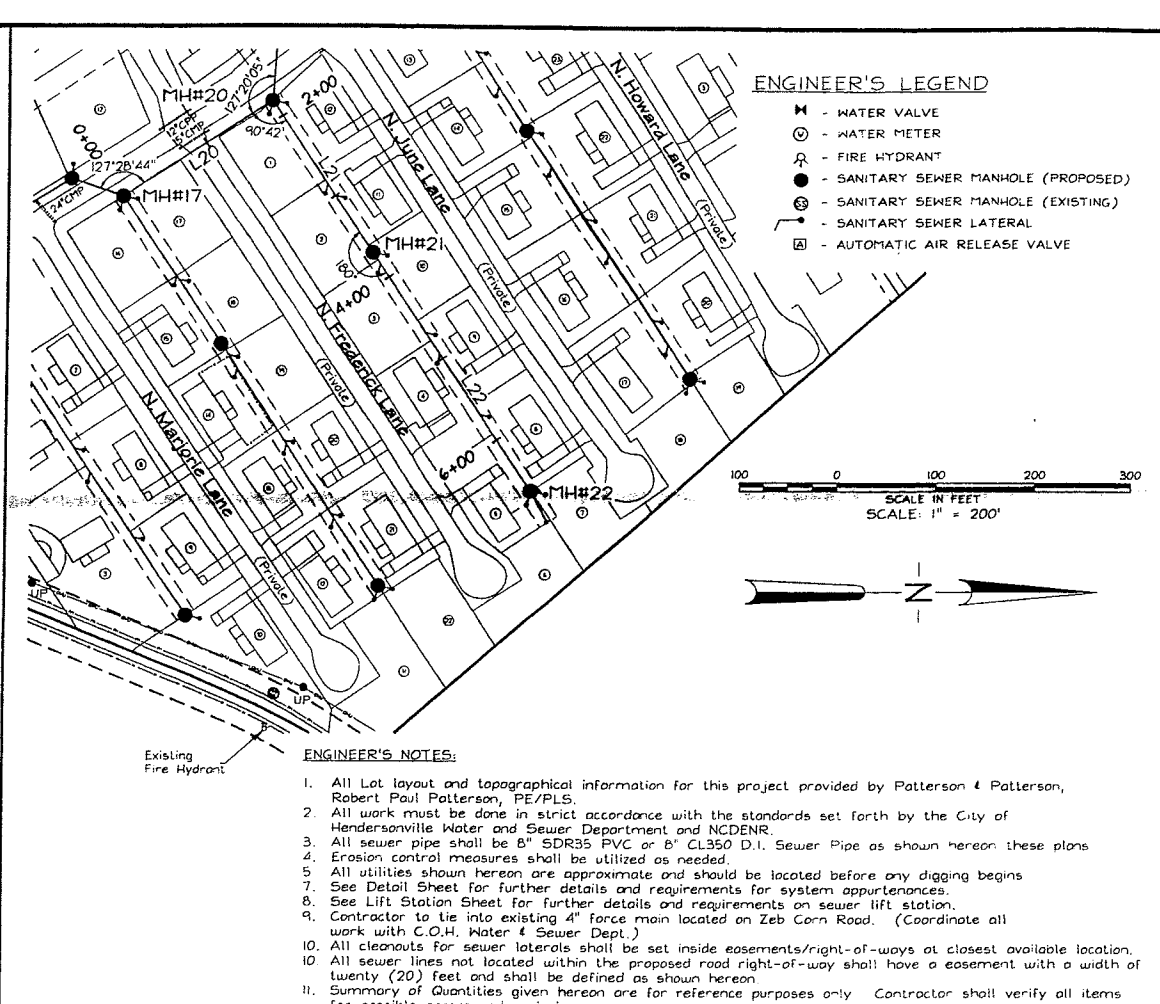
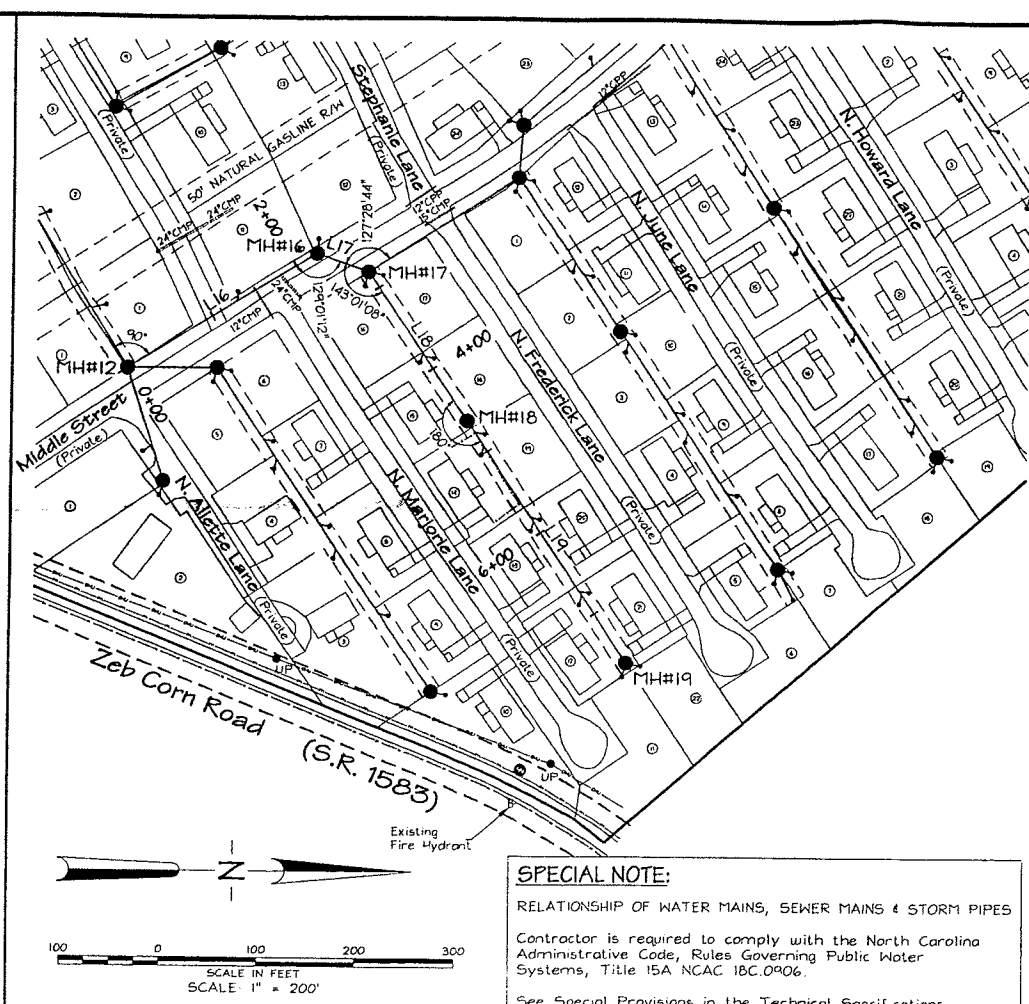
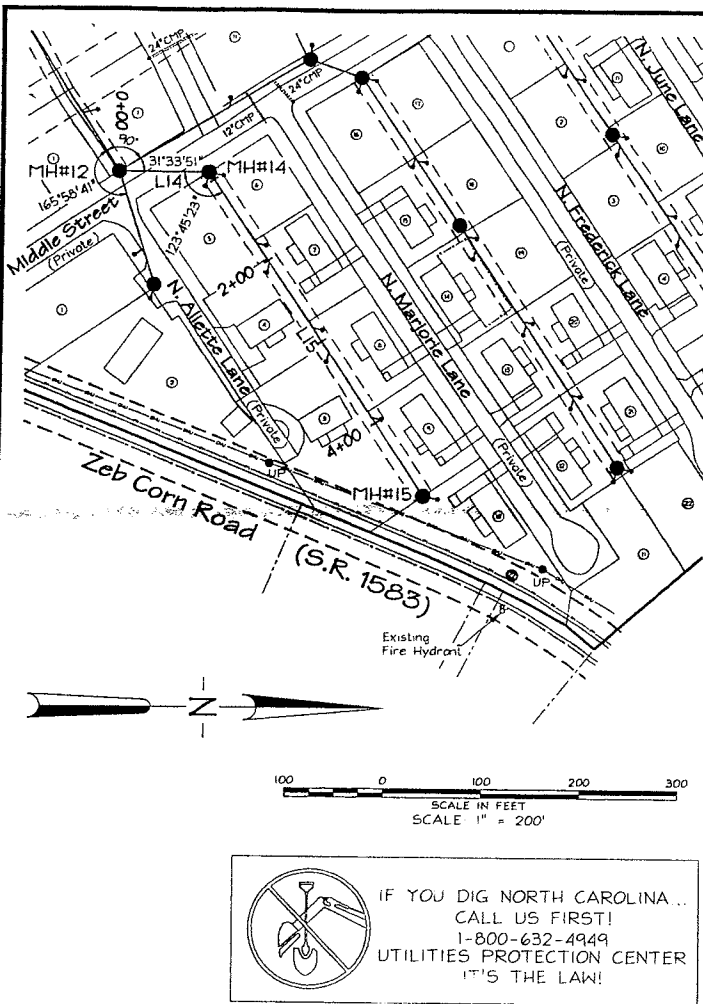
WHITE OAK VILLAGE
 HENDERSONVILLE & CLEAR CREEK TOWNSHIP - CITY OF HENDERSONVILLE - HENDERSON CO., N.C.

PLAN/PROFILE

REVISIONS

SHEET 7

DRAWING NAME: W/OAKSFI
 DATE: 1/22/05
 SCALE: NOTED
 DRAWING NO.: 05-06-27-ENG
 SEWER LINE EXTENSION
 © COPYRIGHT 2005 - PATTERSON & PATTERSON



- ENGINEER'S LEGEND**
- ⊗ - WATER VALVE
 - ⊙ - WATER METER
 - ⊕ - FIRE HYDRANT
 - ⊙ - SANITARY SEWER MANHOLE (PROPOSED)
 - ⊙ - SANITARY SEWER MANHOLE (EXISTING)
 - - - SANITARY SEWER LATERAL
 - ⊠ - AUTOMATIC AIR RELEASE VALVE

- ENGINEER'S NOTES:**
1. All Lot layout and topographical information for this project provided by Patterson & Patterson, Robert Paul Patterson, PE/PLS.
 2. All work must be done in strict accordance with the standards set forth by the City of Hendersonville Water and Sewer Department and NCDENR.
 3. All sewer pipe shall be 8" SDR35 PVC or 8" CL350 D.I. Sewer Pipe as shown hereon these plans.
 4. Erosion control measures shall be utilized as needed.
 5. All utilities shown hereon are approximate and should be located before any digging begins.
 6. See Detail Sheet for further details and requirements for system appurtenances.
 7. See Lift Station Sheet for further details and requirements on sewer lift station.
 8. Contractor to tie into existing 4" force main located on Zeb Corn Road. (Coordinate all work with C.O.H. Water & Sewer Dept.)
 9. All cleanouts for sewer laterals shall be set inside easements/right-of-ways at closest available location.
 10. All sewer lines not located within the proposed road right-of-way shall have an easement with a width of twenty (20) feet and shall be defined as shown hereon.
 11. Summary of Quantities given hereon are for reference purposes only. Contractor shall verify all items for possible errors and omissions.

SPECIAL NOTE:
 RELATIONSHIP OF WATER MAINS, SEWER MAINS & STORM PIPES
 Contractor is required to comply with the North Carolina Administrative Code, Rules Governing Public Water Systems, Title 15A NCAC 18C.0906.
 See Special Provisions in the Technical Specifications.

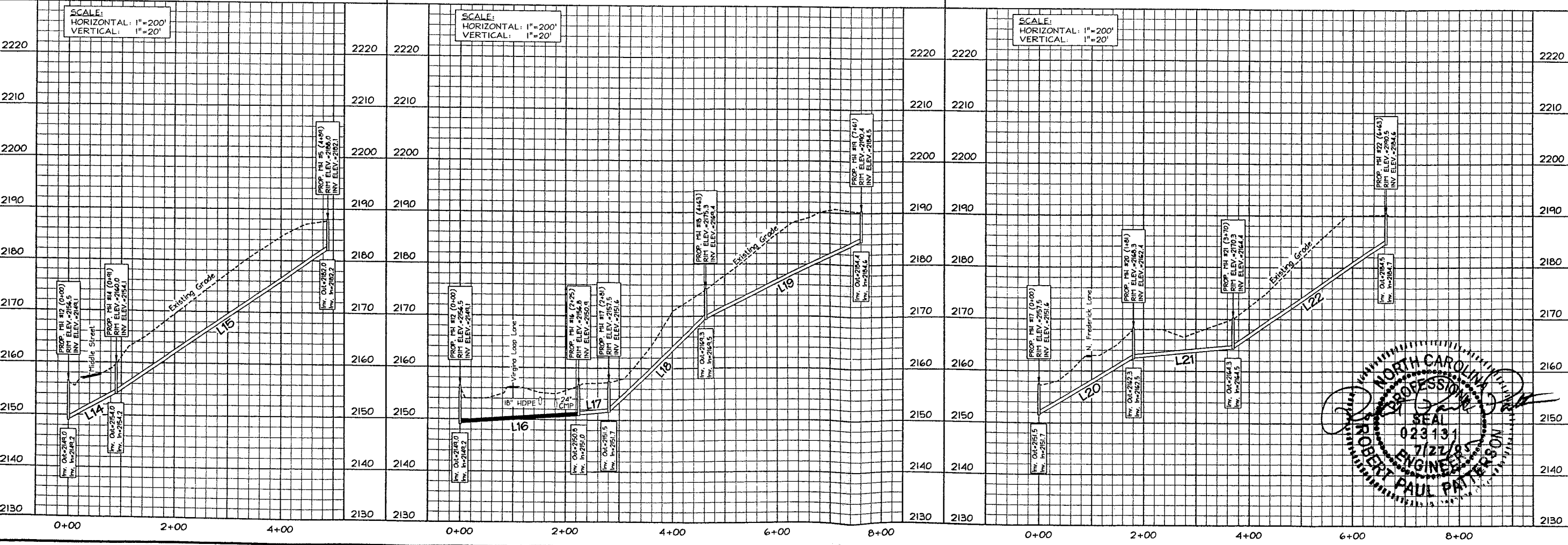
IF YOU DIG NORTH CAROLINA... CALL US FIRST!
 1-800-632-4949
 UTILITIES PROTECTION CENTER
 IT'S THE LAW!

PATTERSON & PATTERSON
 ENGINEERING - SURVEYING - PLANNING
PAUL PATTERSON WILLIAM PATTERSON
 Professional Engineer/Land Surveyor
 P.O. Box 1189
 HENDERSONVILLE, NC 28703-1189
 TEL. & FAX: (828) 692-6624

SEWER LINE EXTENSION

DATE: 7/22/05
 SCALE: NOTED
 JOB NO: 05-06-27-ENG

© COPYRIGHT 2005 - PATTERSON & PATTERSON



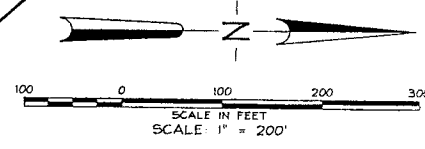
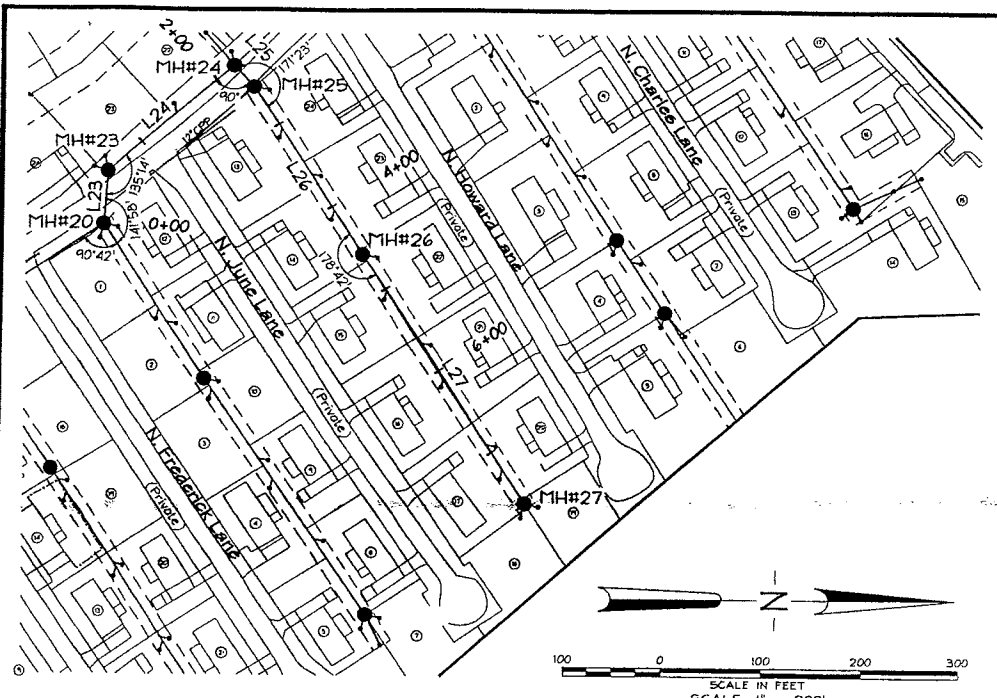
SEAL
 023131
 7/22/05
 ROBERT PAUL PATTERSON
 ENGINEER

WHITE OAK VILLAGE
 HENDERSONVILLE & CLEAR CREEK TOWNSHIP - CITY OF HENDERSONVILLE - HENDERSON CO., N.C.

PLAN/PROFILE

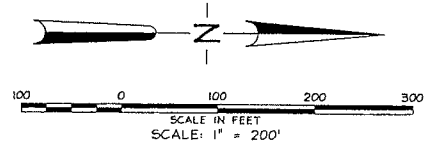
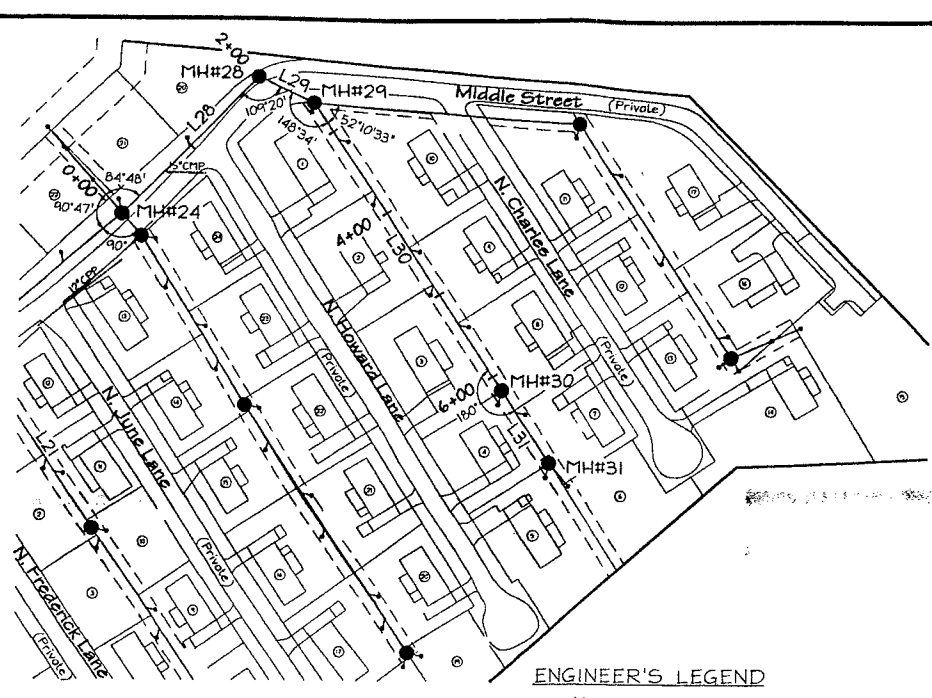
REVISIONS

SHEET **4** OF 8



ENGINEER'S NOTES

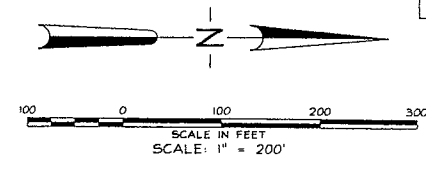
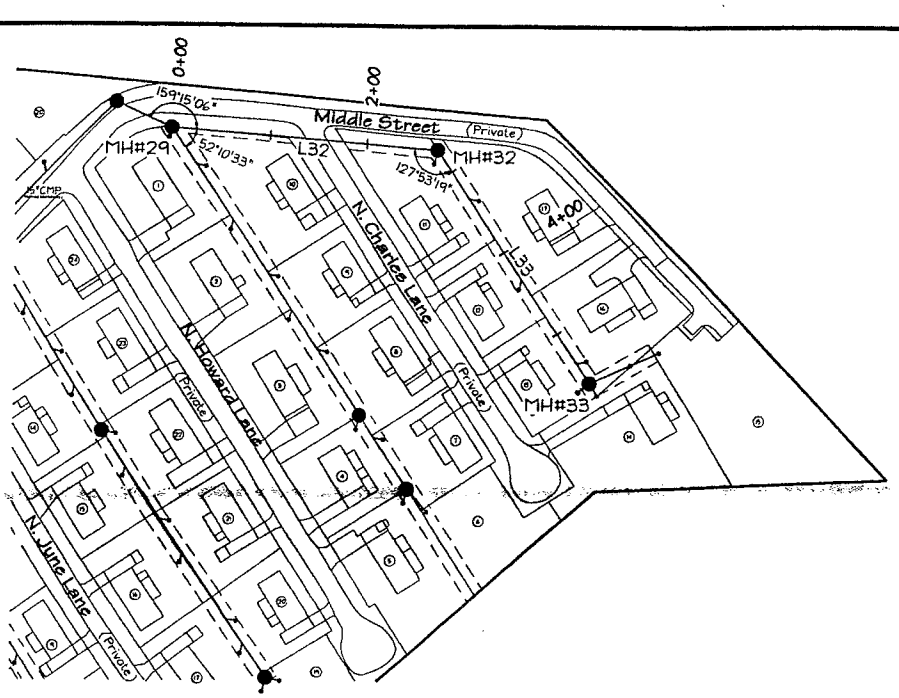
- All lot layout and topographical information for this project provided by Patterson & Patterson, Robert Paul Patterson, PE/PLS.
- All work must be done in strict accordance with the standards set forth by the City of Hendersonville Water and Sewer Department and NCDENR.
- All sewer pipe shall be 8" SDR35 PVC or 8" CL350 D.I. Sewer Pipe as shown hereon these plans.
- Erosion control measures shall be utilized as needed.
- All utilities shown hereon are approximate and should be located before any digging begins.
- See Detail Sheet for further details and requirements for system appurtenances.
- Contractor to tie into existing 4" force main located on Zeb Corn Road. (Coordinate all work with C.O.H. Water & Sewer Dept.)
- All cleanouts for sewer laterals shall be set inside easements/right-of-way at closest available location.
- All sewer lines not located within the proposed road right-of-way shall have an easement with a width of twenty (20) feet and shall be defined as shown hereon.
- Summary of Quantities given hereon are for reference purposes only. Contractor shall verify all items for possible errors and omissions.



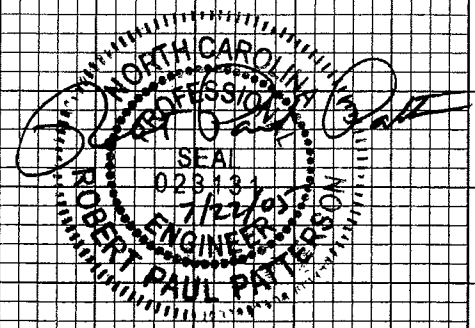
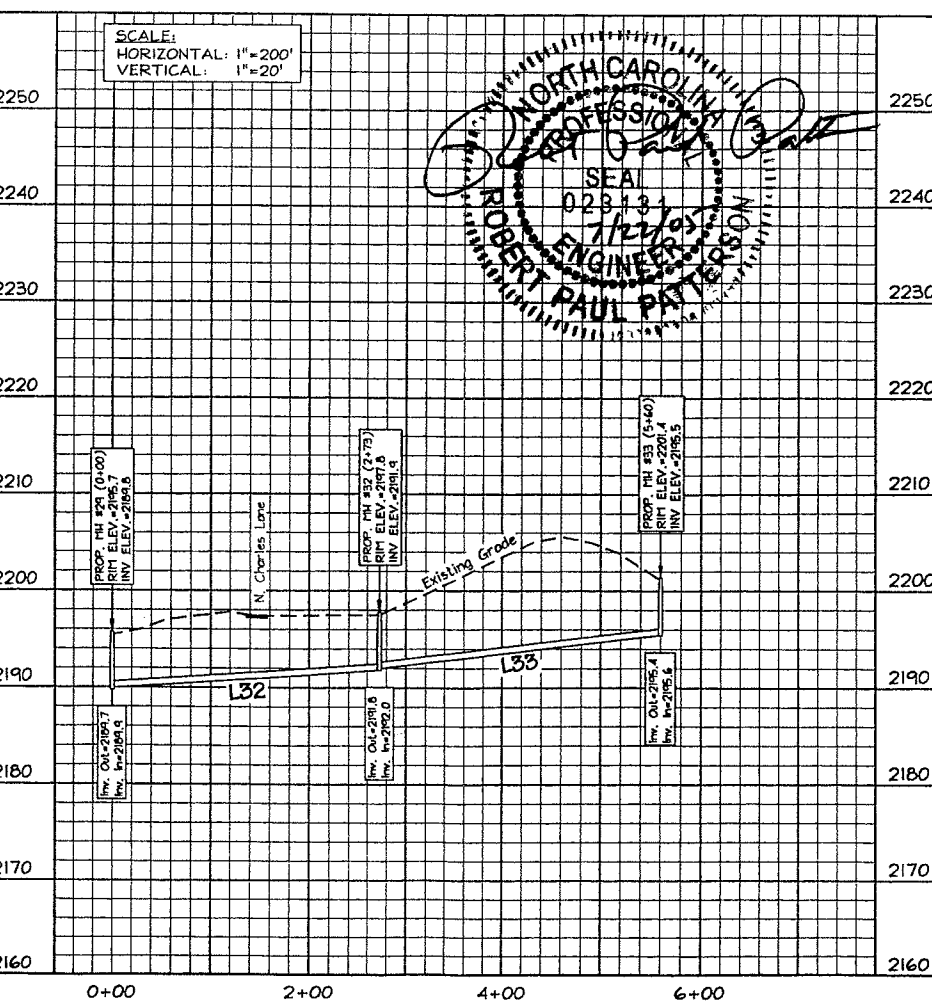
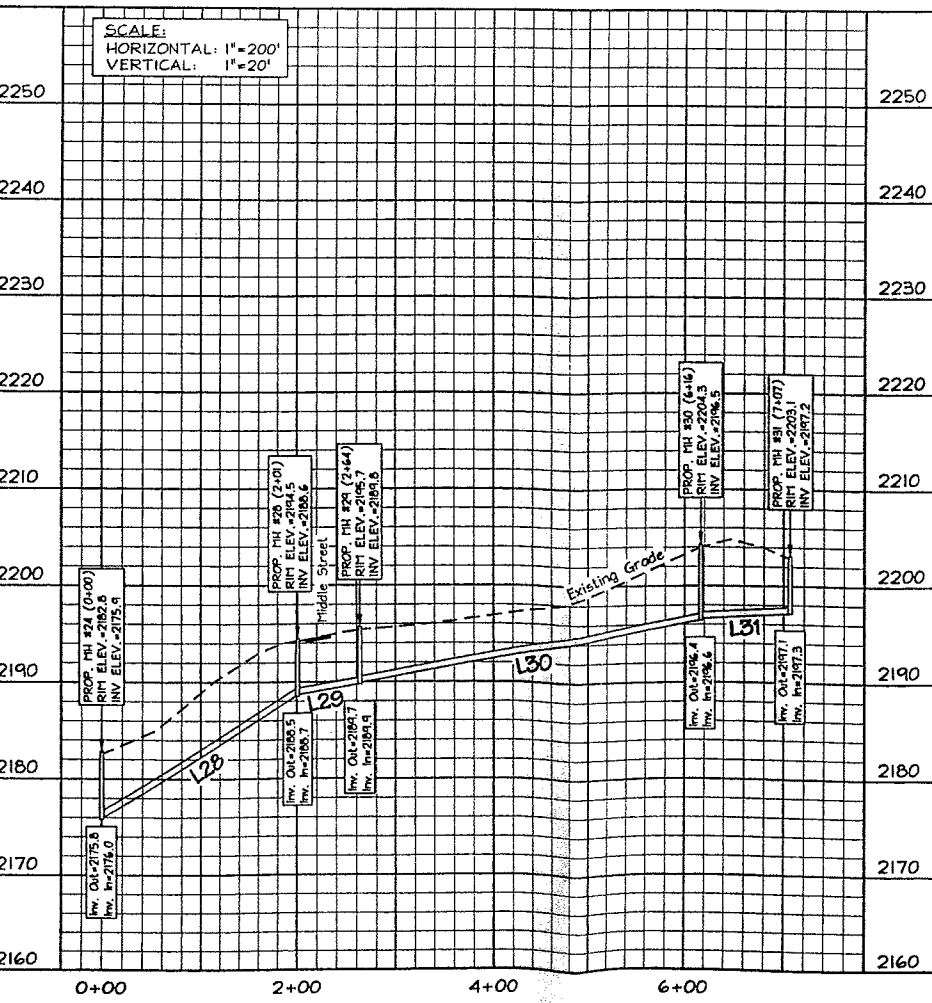
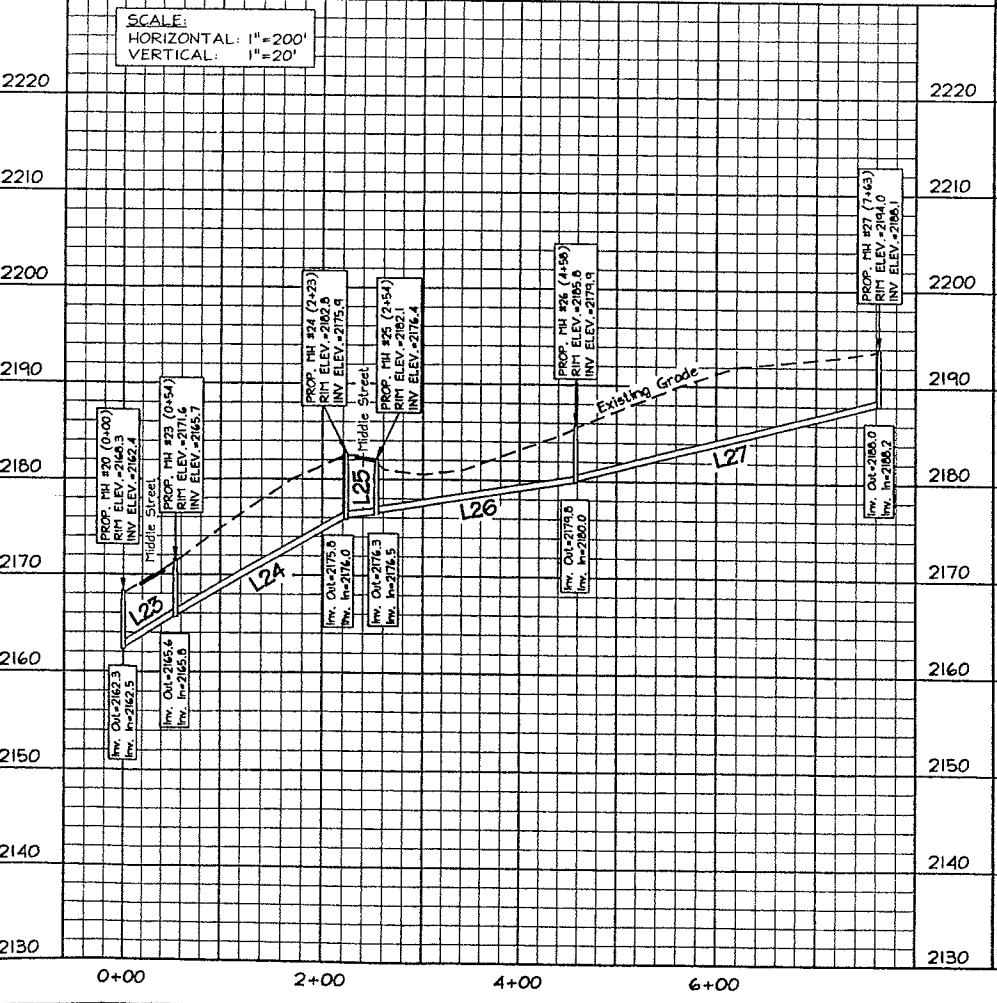
ENGINEER'S LEGEND

- ⊕ - WATER VALVE
- ⊙ - WATER METER
- ⊕ - FIRE HYDRANT
- - SANITARY SEWER MANHOLE (PROPOSED)
- ⊙ - SANITARY SEWER MANHOLE (EXISTING)
- - - SANITARY SEWER LATERAL
- ⊠ - AUTOMATIC AIR RELEASE VALVE

IF YOU DIG NORTH CAROLINA...
CALL US FIRST!
1-800-632-4949
UTILITIES PROTECTION CENTER
IT'S THE LAW!



SPECIAL NOTE:
RELATIONSHIP OF WATER MAINS, SEWER MAINS & STORM PIPES
Contractor is required to comply with the North Carolina Administrative Code, Rules Governing Public Water Systems, Title 15A NCAC 18C.0406.
See Special Provisions in the Technical Specifications.



DRAWING NAME: 1610KSPS
DATE: 7/22/05
JOB NO.: 05-06-27-ENG
SCALE: NOTED

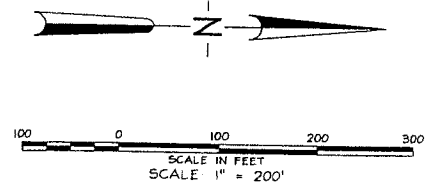
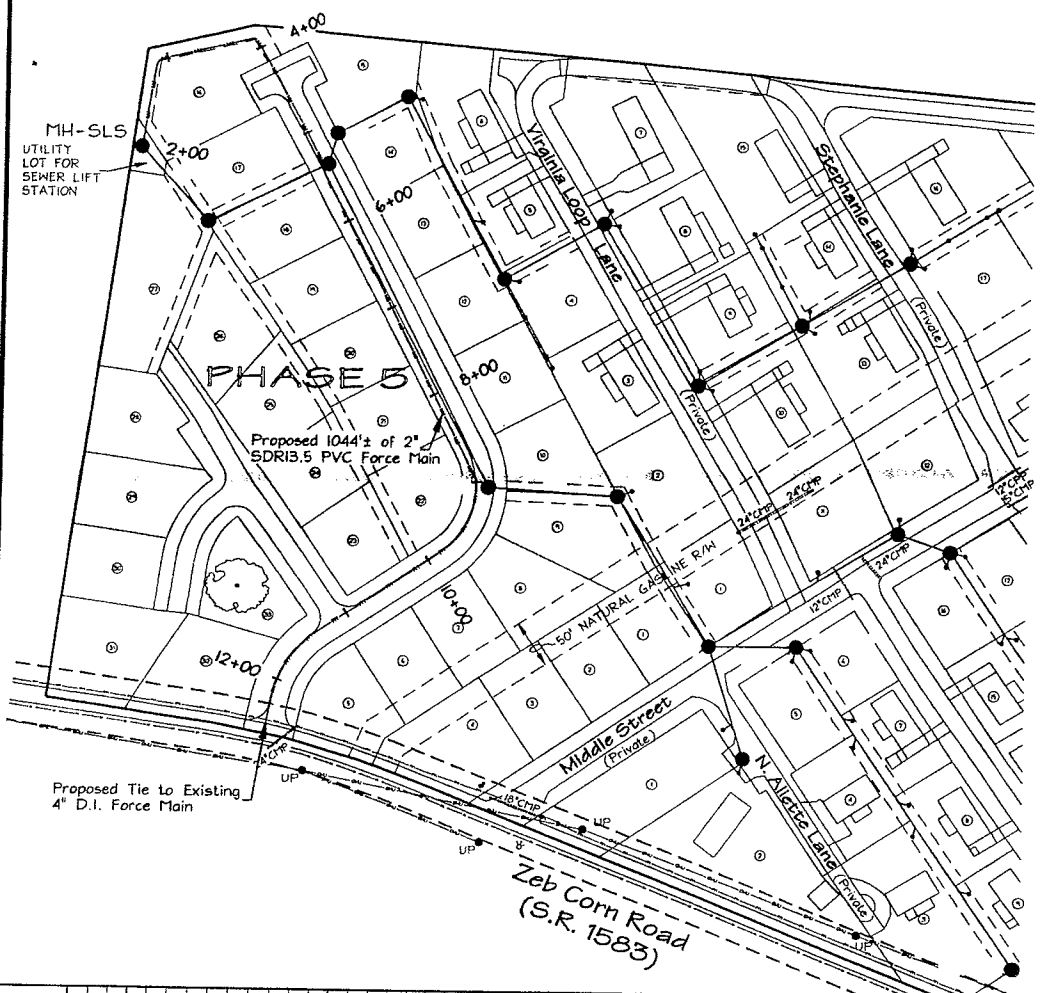
PATTERSON & PATTERSON
ENGINEERING - SURVEYING - PLANNING
PAUL PATTERSON WILLIAM PATTERSON
Professional Engineer/Land Surveyor
P.O. BOX 1188
HENDERSONVILLE, NC 28739-1188
TEL.: (704) 692-6629 FAX: (704) 692-6629

WHITE OAK VILLAGE
HENDERSONVILLE & CLEAR CREEK TOWNSHIP - CITY OF HENDERSONVILLE - HENDERSON CO., N.C.

REVISIONS

SHEET **5** OF 8

© COPYRIGHT 2005 - PATTERSON & PATTERSON



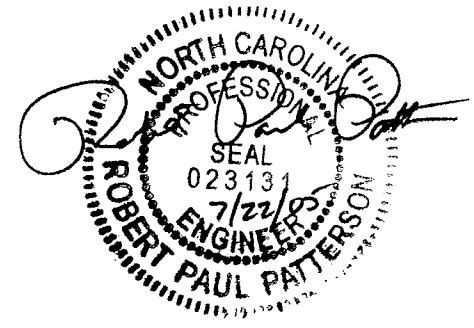
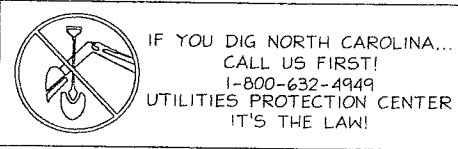
- ENGINEER'S NOTES:**
- All Lot layout and topographical information for this project provided by Patterson & Patterson, Robert Paul Patterson, PE/PLS.
 - All work must be done in strict accordance with the standards set forth by the City of Hendersonville Water and Sewer Department and NCDENR.
 - All sewer pipe shall be 8" SDR35 PVC or 8" CL350 D.I. Sewer Pipe as shown hereon these plans.
 - Erosion control measures shall be utilized as needed.
 - All utilities shown hereon are approximate and should be located before any digging begins.
 - See Detail Sheet for further details and requirements for system appurtenances.
 - See Lift Station Sheet for further details and requirements on sewer lift station.
 - Contractor to tie into existing 4" Force main located on Zeb Corn Road. (Coordinate all work with C.O.H. Water & Sewer Dept.)
 - All cleanouts for sewer laterals shall be set inside easements/right-of-ways at closest available location.
 - All sewer lines not located within the proposed road right-of-way shall have an easement with a width of twenty (20) feet and shall be defined as shown hereon.

SPECIAL NOTE:
RELATIONSHIP OF WATER MAINS, SEWER MAINS & STORM PIPES

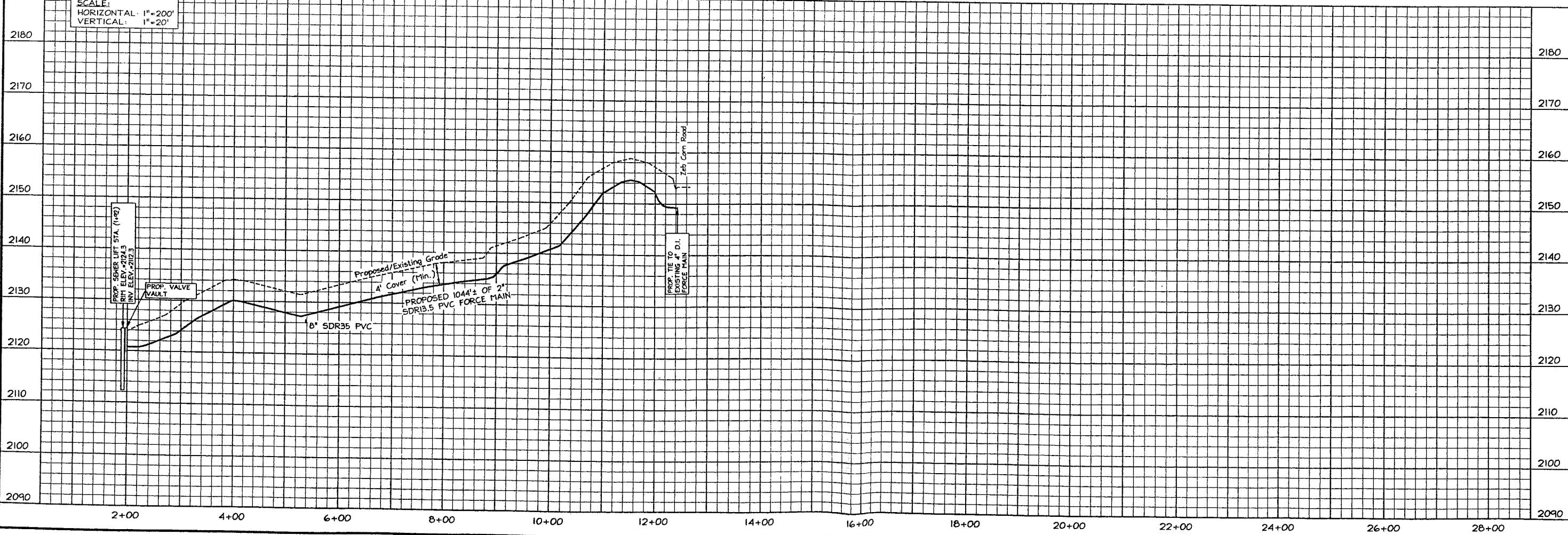
Contractor is required to comply with the North Carolina Administrative Code, Rules Governing Public Water Systems, Title 15A NCAC 18C.0906.

See Special Provisions in the Technical Specifications.

- ENGINEER'S LEGEND**
- ⊠ - WATER VALVE
 - ⊙ - WATER METER
 - ⊕ - FIRE HYDRANT
 - - SANITARY SEWER MANHOLE (PROPOSED)
 - ⊙ - SANITARY SEWER MANHOLE (EXISTING)
 - - - SANITARY SEWER LATERAL
 - ⊠ - AUTOMATIC AIR RELEASE VALVE



SCALE:
HORIZONTAL: 1"=200'
VERTICAL: 1"=20'



WHITE OAK VILLAGE
HENDERSONVILLE & CLEAR CREEK TOWNSHIP - CITY OF HENDERSONVILLE - HENDERSON CO., N.C.

PLAN/PROFILE

REVISIONS

SHEET

PATTERSON & PATTERSON
ENGINEERING - SURVEYING - PLANNING

PAUL PATTERSON
Professional Engineer/Land Surveyor

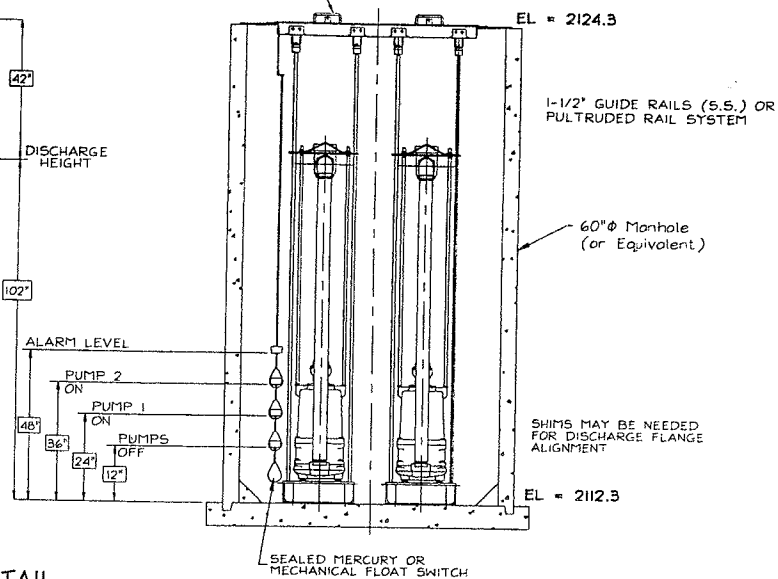
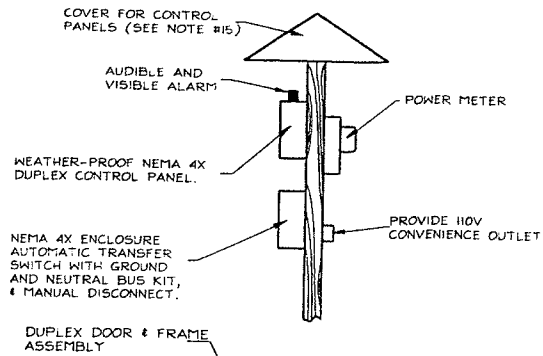
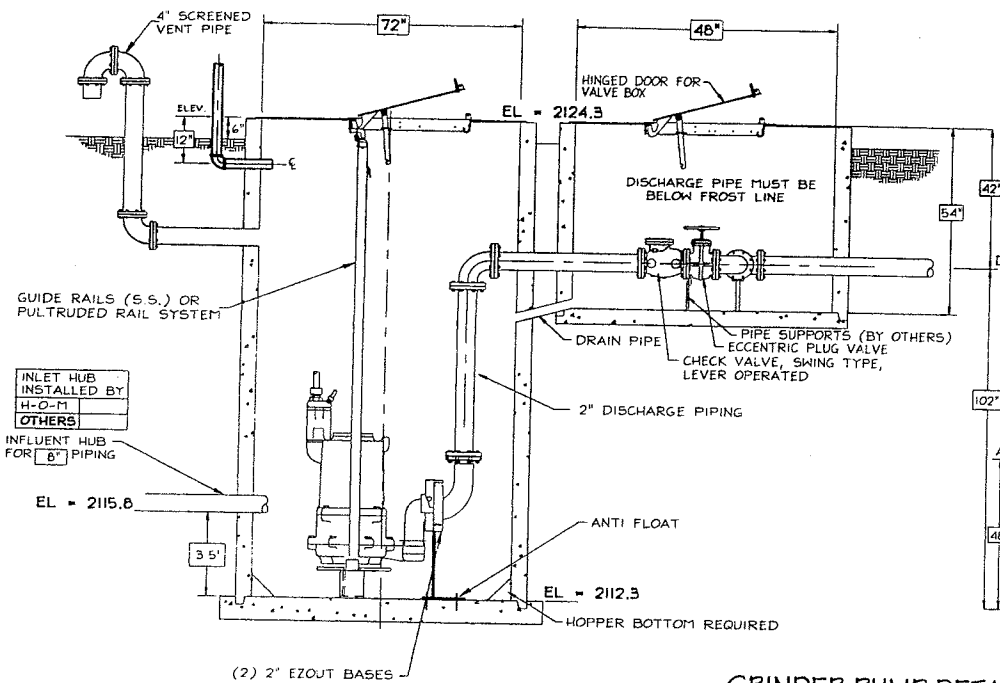
WILLIAM PATTERSON
Professional Land Surveyor

P.O. BOX 1189
HENDERSONVILLE, NC 28753-1189
TEL.: (704) 692-6629
FAX: (704) 692-6629

DRAWING NAME: 4104KSP4 DATE: 7/22/05
JOB NO.: 05-06-27-ENG SCALE: NOTED

**SEWER LINE
EXTENSION**

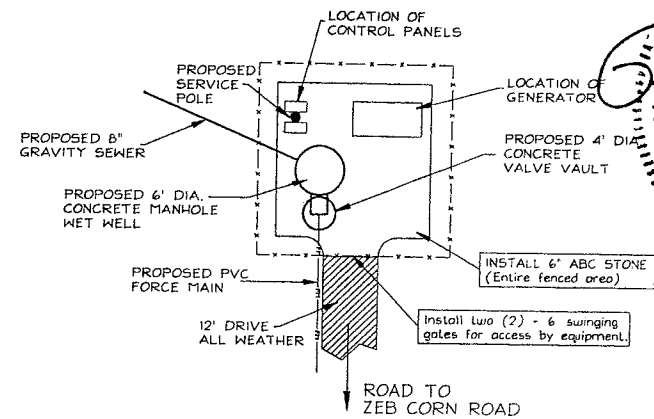
SEWER LIFT STATION (LS#1)



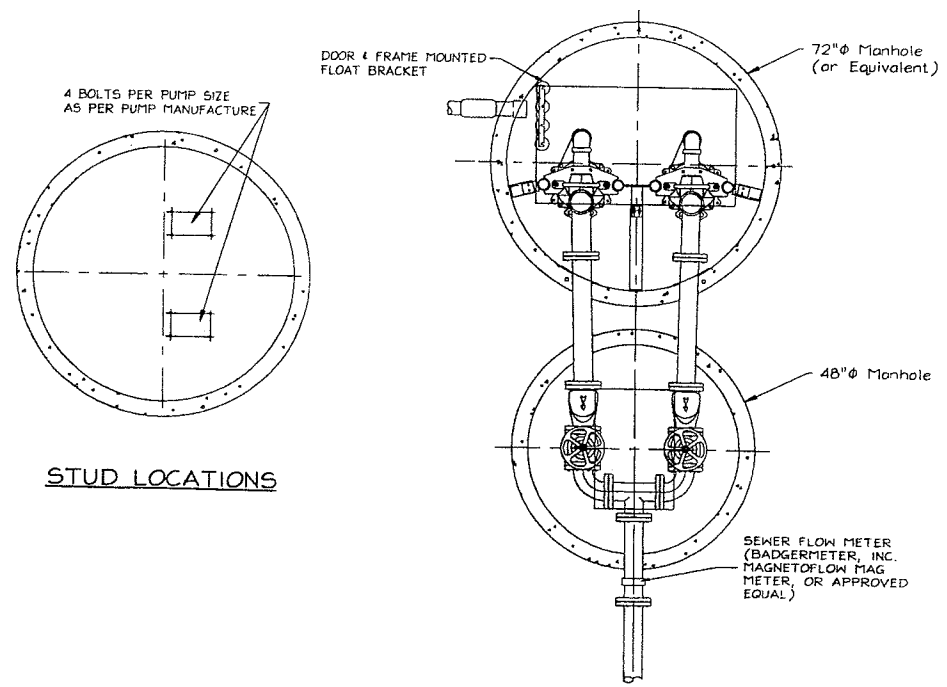
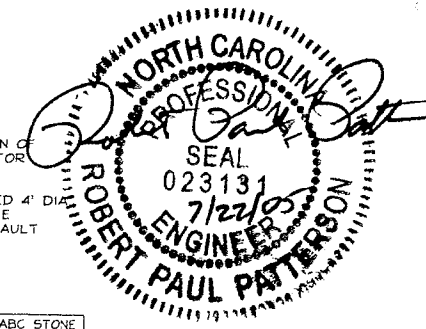
GRINDER PUMP DETAIL
(N.T.S.)

ENGINEER'S NOTES

1. Pump floats to be located clear of all lifting chains, electrical, influent line(s), steps, and other obstructions.
2. Contractor shall grade as necessary to assure finish grade and positive drainage around pump station.
3. Contractor to coordinate power installation with local Power Company.
4. Pump to be enclosed by a 6' high security chain link fence.
5. Access to pump shall be provided via a paved road (12' wide minimum), with the same typical section as Road 'F'.
6. Contractor to furnish back-up power (via a generator) as per NCDENR requirements.
7. All pump sites shall have an overhead light for emergency night service calls, etc.
8. The electrical service meter, pole and box shall be provided and sized to meet the proposed pump requirements. An automatic transfer switch (GE 200 amp or equal) shall be provided for emergency power.
9. Contractor to provide 110V convenience outlet.
10. All panels shall be approved by the City of Hendersonville Water & Sewer Department. Control Panel box shall be a NEMA 4X box and mounted off of the proposed basin on a 4' high power pole.
11. Power to be provided to the control panel via a 1-1/4" NPT conduit.
12. Contractor to provide and install stainless steel lift chain for the proposed sewer lift station.
13. Contractor shall provide and install a stainless steel float rail.
14. All piping within the pump chamber and valve vault until the Check Valve, shall be ductile iron.
15. The control and accessory panels shall be covered by a 4' wide shingled roof structure for the entire length of panels. All work to be approved by the City of Hendersonville Water and Sewer Department.



SEWER LIFT STATION SITE PLAN
N.T.S.



VALVE CONFIGURATION FOR 2" PIPING
(N.T.S.)

PUMP SUMMARY

PUMP MODEL: HYDRAMATIC HPGHH500M2-2 SEWAGE GRINDER PUMP
PUMP CAPACITY: 50 GPM @ TDH = 120'
PUMP MOTOR: 5 HP, 3450 RPM, 1/60/230

DESIGN DATA

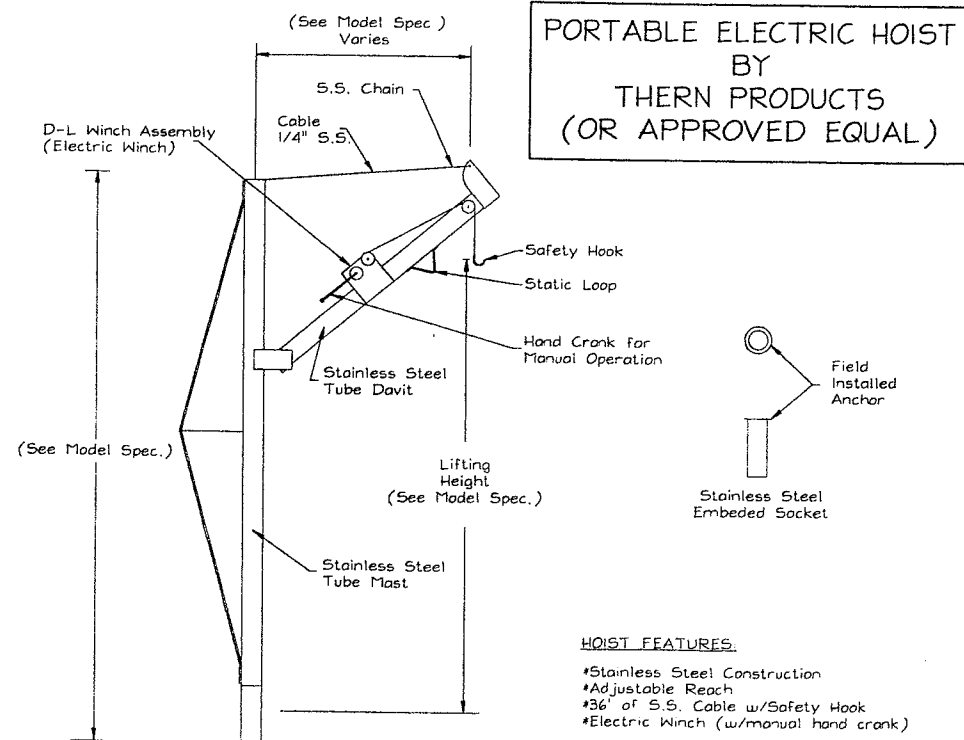
AVG. DAILY FLOW: 28,800 gpd (Q=20.0 gpm)	
PEAK FLOW (2.5Q): 50.0 gpm	DESIGN FLOW: 50 gpm
WET WELL CAPACITY: 211.5 Gallons/Ft.	NORMAL DETENTION TIME: 10.57 Minutes

**Contractor to coordinate with pump provider to verify pump and impeller size.

BACKUP POWER SUMMARY

REQUIRED GENERATOR:
KOHLER or ONAN 20kW (Natural Gas) Industrial Generator or approved equal. Any change must be approved by the Engineer and COH.

**Contractor to coordinate all electrical work with a licensed electrician. Furthermore, contractor to verify generator and electrical requirements prior to installation.



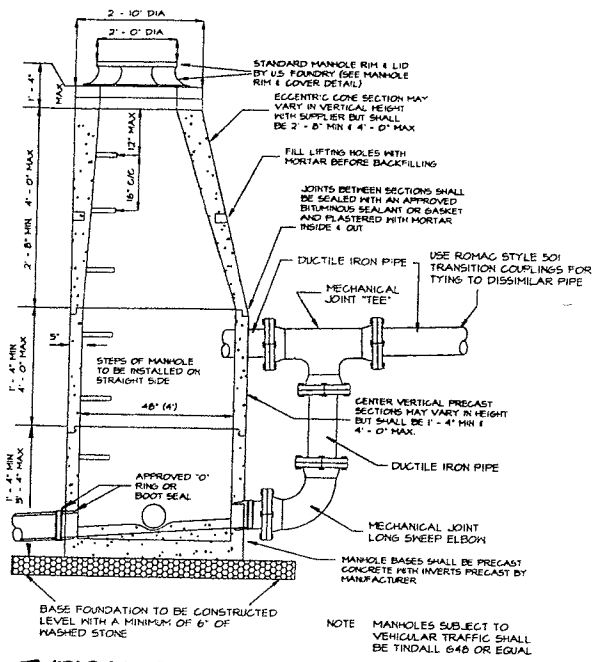
PORTABLE HOIST DETAIL
(N.T.S.)

PORTABLE ELECTRIC HOIST BY THERN PRODUCTS (OR APPROVED EQUAL)

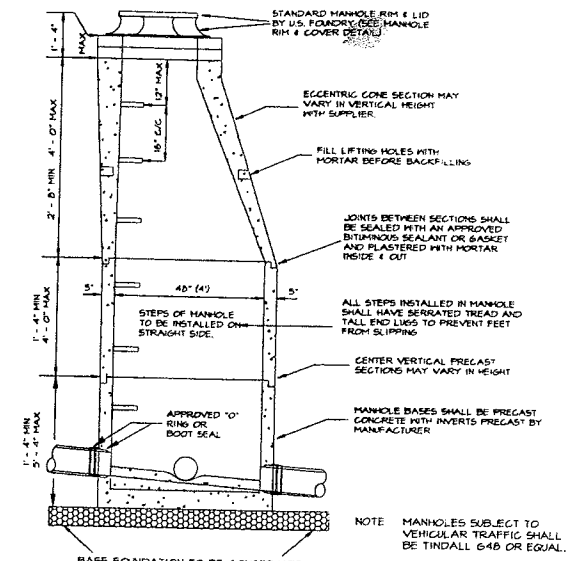
- HOIST FEATURES:**
- *Stainless Steel Construction
 - *Adjustable Reach
 - *3/8" of S.S. Cable w/Safety Hook
 - *Electric Winch (w/manual hand crank)

CONTRACTOR TO PROVIDE THERN MODEL SERIES 5124 (E2) CAPABLE OF LIFTING A MAXIMUM LOAD OF 1600 LBS.

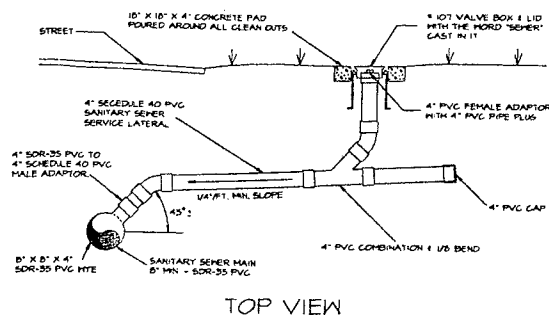
DRAWING NAME: HHD04KSL5 DATE: 7/22/05
 JOB NO.: 05-06-27-ENG SCALE: NOTED
PATTERSON & PATTERSON
 ENGINEERING - SURVEYING - PLANNING
 PAUL PATTERSON Professional Engineer/Land Surveyor
 WILLIAM PATTERSON Professional Land Surveyor
 P.O. BOX 1188 HENDERSONVILLE, NC 28738-1188
 TEL.: (828) 692-6629 FAX: (828) 692-6629
 SEWER LINE EXTENSION
 WHITE OAK VILLAGE
 HENDERSONVILLE & CLEAR CREEK TOWNSHIP - CITY OF HENDERSONVILLE - HENDERSON CO., N.C.
 SEWER LIFT STATION
 REVISIONS
 SHEET 7



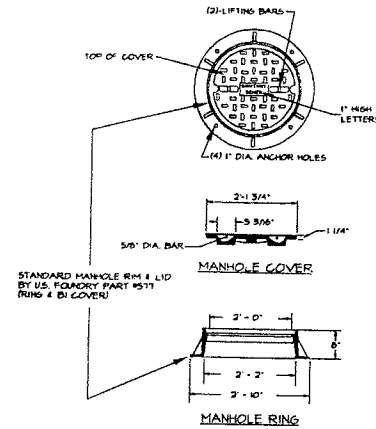
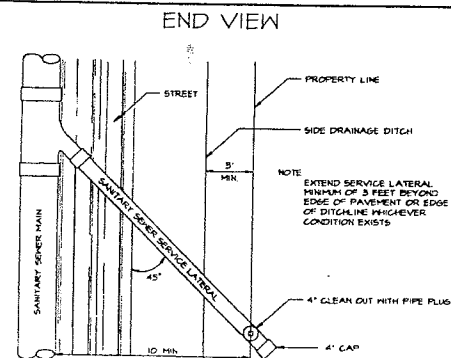
**TYPICAL PRECAST
"DROP INLET"
CONCRETE MANHOLE DETAIL**
N.T.S.



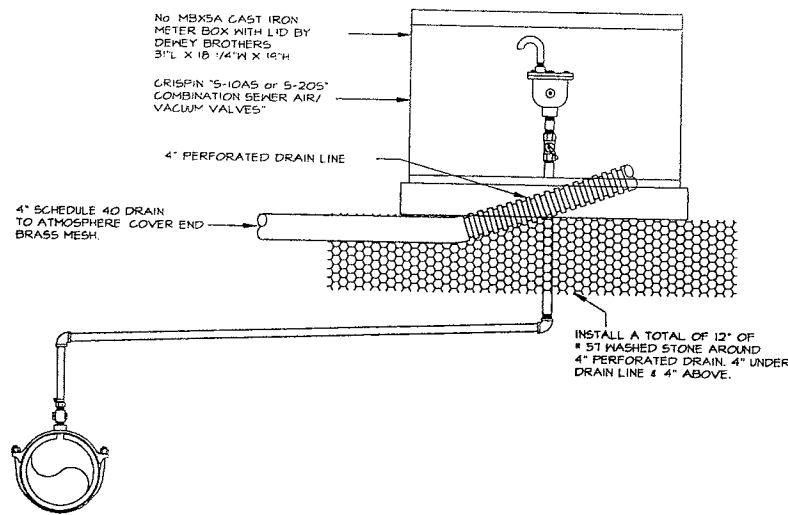
**TYPICAL PRECAST
CONCRETE MANHOLE DETAIL**
N.T.S.



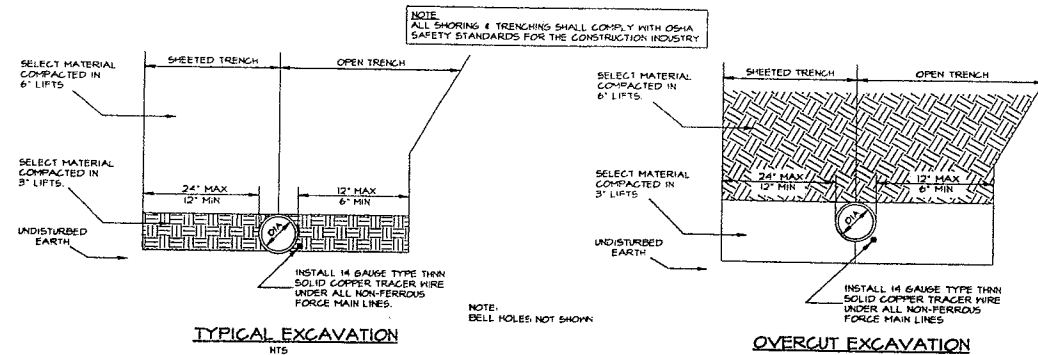
**TYPICAL 4" SEWER SERVICE LATERAL
AND CLEAN OUT DETAILS.**
N.T.S.



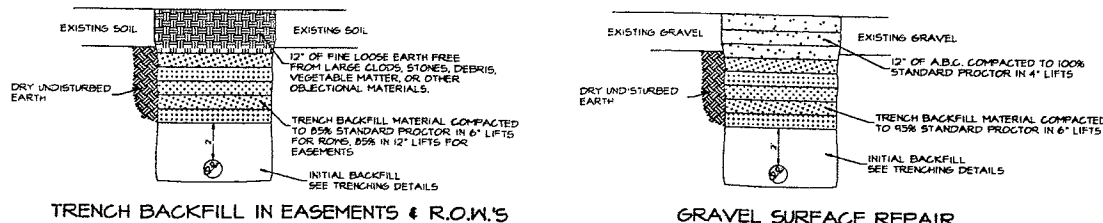
**MANHOLE RING & COVER
FOR SANITARY SEWERS**
N.T.S.



TYPICAL SEWER AIR/VACUUM VALVE DETAIL
N.T.S.



TYPICAL TRENCHING DETAILS
N.T.S.



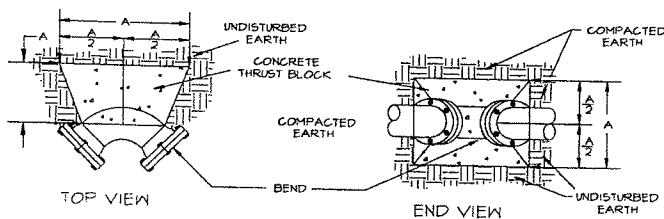
TRENCH BACKFILL IN EASEMENTS & R.O.W.'S

GRAVEL SURFACE REPAIR

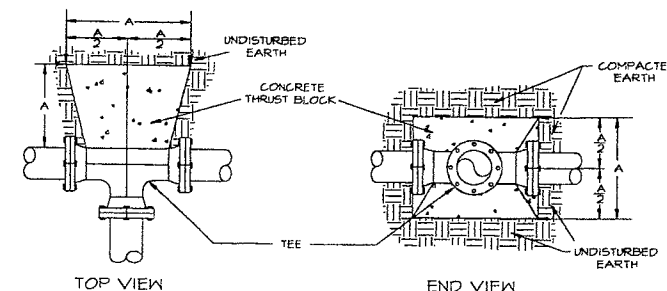
TRENCH BACKFILL
(N.T.S.)

SIZE	11 1/4" BEND	22 1/2" BEND	45" BEND	90" BEND	TEE	PLUG
6"	12	12	12	16	16	14
8"	12	12	16	16	16	14
10"	12	14	20	22	22	18
12"	12	18	24	32	32	22
14"	14	20	28	32	32	28
16"	16	22	32	42	42	36
18"	18	26	36	48	48	40
20"	20	28	40	52	52	44
24"	24	34	46	64	64	54

VALUES FOR "A"



TYPICAL THRUST BLOCK FOR FORCE MAIN BENDS
N.T.S.



TYPICAL THRUST BLOCK FOR FORCE MAIN TEES
N.T.S.

NOTE: FOR PROTECTION OF THE JOINTS, INSTALL A LAYER OF 4 MIL POLYETHYLENE BETWEEN THE CONCRETE AND THE FITTING.

DRAWING NAME: MANHOLESDT DATE: 7/22/05
JOB NO.: 05-06-27-ENG SCALE: NOTED

CITY OF HENDERSONVILLE
WATER & SEWER DEPARTMENT
STANDARD DETAILS

PATTERSON & PATTERSON
ENGINEERING - SURVEYING - PLANNING
PAUL PATTERSON WILLIAM PATTERSON
Professional Engineer/Land Surveyor Professional Land Surveyor

P.O. BOX 1189 HENDERSONVILLE, NC 28703-1189
TEL. & FAX: (828) 642-6624

**WHITE OAK VILLAGE
(SEWER MAIN EXTENSION)**
HENDERSONVILLE & CLEAR CREEKTOWNSHIP - CITY OF HENDERSONVILLE - HENDERSON CO., N.C.

STANDARD DETAILS

REVISIONS

SHEET

8

© COPYRIGHT 2005 - PATTERSON & PATTERSON

