SUPERIOR WATER SERVICE

Providing Superior Water Service to Tennessee

October 30, 2017

Via Hand Delivery
Chairman, Tennessee Public Utility Commission
c/o Sharla Dillon, Dockets and Records Manager
502 Deaderick Street, 4th Floor
Nashville, TN 37243

Docket No. 17-00120

Re: Petition of Superior Water Service, LLC for a Certificate of Convenience and Necessity to Provide Water Service to a Portion of King's Chapel Subdivision in Williamson County

Ms. Dillon:

Superior Water Service, LLC files the attached Petition for a Certificate of Convenience and Necessity to provide water service to a portion of the King's Chapel Subdivision in Williamson County, Tennessee. Included in this filing under seal is Exhibit 6 containing the owner's financial statements which are confidential and should not be placed on the TPUC's website.

I have also enclosed a check in the amount of $25.00 for the required filing fee. Please contact me if you have any questions or need additional information.

Respectfully submitted,

John Powell, President

Enclosures

Cc: Milcrofton Utility District
Michael Murphy, TDEC

P.O. Box 40
Arrington, TN 37014
615-496-8681

BEFORE THE TENNESSEE PUBLIC UTILITY COMMISSION

IN RE:

PETITION OF SUPERIOR WATER SERVICE, LLC FOR A CERTIFICATE OF CONVENIENCE AND NECESSITY TO PROVIDE WATER SERVICE TO A PORTION OF KING'S CHAPEL SUBDIVISION IN WILLIAMSON COUNTY	**)**	**DOCKET NO. _____**

PETITION

The Petitioner, Superior Water Service, LLC, would respectfully show to the Authority as follows:

1. Superior Water Service is a limited liability company in good standing with the state of Tennessee as shown on Exhibit (1).
2. That Superior Water Service, LLC is an affiliate of King's Chapel Capacity, LLC ("KCC"). and was created in order to provide water service to a portion of the King's Chapel Subdivision in Williamson County. In order to provide water service, Superior Water Service, LLC intends to construct and operate a water distribution system of approved design by the Tennessee Department of Environment and Conservation ("TDEC").
3. That Superior Water Service, LLC is a public utility as defined in T.C.A. 65-4-101 and subject to the regulations of the Tennessee Public Utility Commission. Superior Water Service, LLC is privately owned and the utility is not owned or operated by any municipal form of government.
4. That as a public utility, Superior Water Service, LLC seeks a Certificate of Convenience and Necessity from this Commission.

5. That Superior Water Service, LLC desires to operate as a private utility company and provide water service to a portion of the King's Chapel Subdivision in Williamson County, Tennessee.

6. That Superior Water Service, LLC ultimately anticipates providing water service to 177 single family homes in Williamson County, Tennessee in the service area identified on Exhibit (2) attached to this Petition. A need presently exists for the creation of the water utility as existing water utilities are unable to immediately provide such water service within the area as shown on Exhibit (3). The Company's proposed facility will provide an affordable, timely solution for the provision of water service within the affected area.

7. That Superior Water Service, LLC ultimately expects to enter into an agreement with the Nolensville/College Grove Utility District ("NCGUD") to provide a source of supply for wholesale treated water at adequate pressure and volumes to service Superior Water Service, LLC as shown on Exhibit (4).

8. That immediate water services are not available by any other utility company in the proposed service area. Attached as collective Exhibit (5) to this Petition are letters from Williamson County and effected utilities reflecting that they either have no interest in providing water services in the proposed service area or are unable to do so in a timely manner.

9. That neither the City of Franklin, nor the government of Williamson County presently have any water service lines that would be affected by the Company's proposed water service.

10. That the owner of Superior Water Service, LLC is John Powell. Mr. Powell has significant financial assets as shown in Exhibit (6) attached to this Petition that are dedicated to providing water service to a portion of King's Chapel Subdivision. In addition, Mr. Powell recognizes that it may be some time before the customer base of Superior Water Service, LLC is of adequate size in order to fully support the annual cost of providing water service. Mr. Powell therefore stands ready to provide the additional financial support necessary until the water system can fully support itself.

11. That Superior Water Service, LLC also has the managerial capability to provide wastewater service. Mr. John Powell, the President of Superior Water Service, LLC is also the President of King's Chapel Capacity, a wastewater utility providing service in this same area since 2004. In addition, Superior Water Service, LLC has engaged legal, accounting and regulatory experts to assist it with these managerial duties. Superior Water Service, LLC states that it is well aware of the periodic reporting requirements of the Tennessee Public Utility Commission, and fully intends to comply with these requirements.

12. That Superior Water Service has the technical ability to provide water service. As shown on Exhibit (7) attached to this Petition, a qualified engineer has been engaged to monitor and test the water distribution system of Superior Water Service on a regular basis.

13. The Petitioner has prepared proposed Tariffs, Rules and Regulations, and a Customer Service Application, attached as collective Exhibit (8) for approval by the Authority. Superior Water Service, LLC proposes to adopt the present

rates of NCGUD shown on Exhibit (9) as its own. In addition, Superior Water Service, LLC proposes to adopt the existing Rules and Regulations of King's Chapel Capacity as its own.

14. In further support of its Petition, Superior Water Service, LLC attaches the testimony of Messrs. John Powell and William Novak.

WHEREFORE, PETITIONER PRAYS:

1. That the Tennessee Public Utility Commission grant a Certificate of Necessity and Convenience.
2. That the Tariff, Rules & Regulations, and Customer Service Application be approved for the Petitioner.
3. That this matter be set for hearing.
4. For such other relief as it may be entitled to.

Respectfully submitted, this 30th day of October 2017.

John Powell, President
Superior Water Service
P.O. Box 40
Arrington, Tennessee 37014
615-496-8681

BEFORE THE TENNESSEE PUBLIC UTILITY COMMISSION
NASHVILLE, TENNESSEE

PETITION OF SUPERIOR WATER SERVICE, LLC FOR A CERTIFICATE OF CONVENIENCE AND NECESSITY TO PROVIDE WATER SERVICE TO A PORTION OF KING'S CHAPEL SUBDIVISION IN WILLIAMSON COUNTY	**)** **)** **)** **)** **)** **)** **)**	**DOCKET NO._____**

DIRECT TESTIMONY
of
JOHN POWELL

ON BEHALF OF SUPERIOR WATER SERVICE, LLC

October 30, 2017

Q1. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS FOR THE RECORD.

A1. My name is John Powell and my business address is 9539 Mullens Road, Arrington, TN 37014.

Q2. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A2. I am the owner and president of Superior Water Service, LLC ("Superior" or "the Company"). I am also the owner of King's Chapel Capacity, LLC ("KCC") a provider of wastewater utility service, regulated by this Commission.

Q3. WHAT ARE YOUR RESPONSIBILITIES FOR SUPERIOR AND KCC?

A3. I am responsible for the day-to-day operation, permitting, and long-term planning. Among other things, this includes supervision of the system; review and approval of expenditures; reviewing and resolving customer issues; scoping and obtaining proposals for maintenance work; establishment of contracts; contact with regulatory personnel on existing and future permit requirements and issues; preparation of portions of and review of tariff documents; investigation of physical and operational conditions of the distribution systems; and evaluation of proposals for plant upgrades and replacement.

Q4. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A4. The purpose of my testimony is to present information to the Tennessee Public Utility Commission on the managerial, financial, and technical capabilities of Superior. In addition to my testimony, Mr. William Novak will present testimony on the proposed rates, tariffs and rules & regulations for Superior.

Q5. PLEASE DESCRIBE THE SUPERIOR SERVICE AREA.

A5. The proposed service territory for Superior encompasses Sections 8, 9 and 10 of the King's Chapel Subdivision in Williamson County. As shown on Exhibit (2), Superior ultimately anticipates providing water service to 177 single family homes in this area.

Q6. DOES A NEED PRESENTLY EXIST FOR WATER SERVICE IN THIS AREA?

A6. Yes. Currently this area is served by Milcrofton Utility District ("Milcrofton").[1] However, as shown on Exhibit (3), Milcrofton has informed Superior that they will not be able to provide water service in this area for at least two years. Therefore, in order to address the need for adequate and timely water service to future homeowners, Superior is asking the TPUC to approve its Petition to provide water distribution services.

[1] Originally, this service territory was a part of the Nolensville/College Grove Utility District ("NCGUD"). However, it was transferred to Milcrofton in 2008 after NCGUD was unable to adequately provide water service.

Q7. DOES SUPERIOR POSSESS THE MANAGERIAL CAPABILITIES TO OPERATE A WATER DISTRIBUTION SYSTEM?

A7. Yes. As the Commission is aware, I have managed the operations of KCC since its inception in 2004. I am very proud that KCC has the lowest wastewater rates of any privately-owned utility in Tennessee. In addition, to my knowledge, the Commission has never had a customer complaint regarding KCC's operations. Finally, Superior has engaged legal, accounting and regulatory experts to advise and assist it with the managerial responsibilities of operating a water distribution system.

Q8. DOES SUPERIOR POSSESS THE FINANCIAL CAPABILITIES TO OPERATE A WATER DISTRIBUTION SYSTEM?

A8. Yes. As shown on Exhibit (6), I have the financial assets to necessary to finance the construction costs of the water distribution system, which is expected to be approximately $1.5 million as shown on Exhibit 11. My intent is to finance the entire construction cost through an equity investment in Superior. However, I do realize that it will likely be some time before the customer base of Superior is of adequate size to fully support the annual cost of providing service. I am therefore ready to subsidize the operating costs of Superior through additional equity investments until such time that the water system can fully support itself.

Q9. DOES SUPERIOR POSSESS THE TECHNICAL CAPABILITIES TO OPERATE A WATER DISTRIBUTION SYSTEM?

A9. Yes. As shown on Exhibit (7), Superior has engaged a qualified engineer to be its water distribution operator and to monitor and test the water distribution system of Superior on a regular basis in compliance with TDEC rules. In addition, Superior ultimately expects to enter into an agreement with Nolensville/College Grove Utility District ("NCGUD") to provide a source of supply for wholesale treated water at adequate pressure and volumes to service Superior's customers as shown on Exhibit (4).

Q10. HAS SUPERIOR SUBMITTED PROPOSED TARIFFS ALONG WITH ITS APPLICATION.?

A10. Yes. These tariffs are shown on Exhibit (8), and discussed further in Mr. Novak's testimony.

Q11. DOES THIS COMPLETE YOUR TESTIMONY?

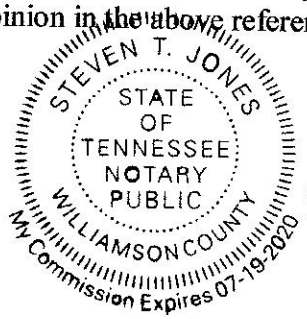
A11. Yes, it does.

BEFORE
THE TENNESSEE PUBLIC UTILITY COMMISSION

PETITION OF SUPERIOR WATER SERVICE, LLC FOR A CERTIFICATE OF CONVENIENCE AND NECESSITY TO PROVIDE WATER SERVICE TO A PORTION OF KING'S CHAPEL SUBDIVISION IN WILLIAMSON COUNTY	)

AFFIDAVIT

I, John Powell, on behalf of Superior Water Service, LLC hereby certify that the attached direct testimony represents my opinion in the above referenced case.



John Powell

Sworn to and subscribed before me this 19 day of Oct, 2017.

NOTARY PUBLIC

My commission expires: 7-19-2020

BEFORE
THE TENNESSEE PUBLIC UTILITY COMMISSION

PETITION OF SUPERIOR WATER SERVICE, LLC FOR A CERTIFICATE OF CONVENIENCE AND NECESSITY TO PROVIDE WATER SERVICE TO A PORTION OF KING'S CHAPEL SUBDIVISION IN WILLIAMSON COUNTY	)	Docket No. _____

DIRECT TESTIMONY
of
WILLIAM H. NOVAK

ON BEHALF OF SUPERIOR WATER SERVICE, LLC

October 30, 2017

Q1. PLEASE STATE YOUR NAME, BUSINESS ADDRESS AND OCCUPATION FOR THE RECORD.

A1. My name is William H. Novak. My business address is 19 Morning Arbor Place, The Woodlands, TX, 77381. I am the President of WHN Consulting, a utility consulting and expert witness services company.[1]

Q2. PLEASE PROVIDE A SUMMARY OF YOUR BACKGROUND AND PROFESSIONAL EXPERIENCE.

A2. Briefly, I have both a Bachelor's degree in Business Administration with a major in Accounting, and a Master's degree in Business Administration from Middle Tennessee State University. I am a Certified Management Accountant, and am also licensed to practice as a Certified Public Accountant.

My work experience has centered on regulated utilities for over 35 years. Before establishing WHN Consulting, I was Chief of the Energy & Water Division of the Tennessee Public Utility Commission (the Commission) where I had either presented testimony or advised the Commission on a host of regulatory issues for over 19 years. In addition, I was previously the Director of Rates & Regulatory Analysis for two years with Atlanta Gas Light Company, a natural gas distribution utility with operations in Georgia and Tennessee. I also served for two years as the Vice President of Regulatory Compliance for Sequent Energy Management, a natural gas trading and optimization entity in Texas, where I was

[1] State of Tennessee, Registered Accounting Firm ID 3682.

responsible for ensuring the firm's compliance with state and federal regulatory requirements.

In 2004, I established WHN Consulting as a utility consulting and expert witness services company. Since 2004 WHN Consulting has provided testimony or consulting services to state public utility commissions and state consumer advocates in at least ten state jurisdictions.

Q3. ON WHOSE BEHALF ARE YOU TESTIFYING IN THIS PROCEEDING?

A3. I am testifying on behalf of Superior Water Services, LLC ("Superior").

Q4. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A4. The purpose of my testimony is to describe the development of Superior's proposed rates, tariff, and rules & regulations for the Commission. In addition, my testimony will also support Superior's 10-year pro forma rate of return calculation.

Q5. HAVE YOU PREPARED A PRO FORMA RATE OF RETURN CALCULATION THAT CONSIDERS SUPERIOR'S EXPECTED INVESTMENT, REVENUES AND OPERATING COSTS?

A5. Yes. As shown on Exhibit 10, the pro forma rate of return calculation considers Superior's plant investment, revenues and operating costs for the next 10 years

and results in a positive return each year from -2.87% to 3.85%. Specific highlights of this calculation are as follows:

- The estimated plant investment in water infrastructure is expected to be approximately $1.5 million;
- Superior ultimately expects to enter into a source of supply contract with Nolensville/College Grove Utility District (NCGUD) to provide water at wholesale rates;
- Superior expects to ultimately serve 177 customers in Sections 8, 9 and 10 of King's Chapel Subdivision.

The list assumptions used by Superior in developing the ten-year pro forma rate of return calculations are also included in Exhibit 10. Included in these assumptions is a composite depreciation rate of 3.33% that I would recommend the TPUC adopt for Superior.

Q6. HAVE YOU PREPARED A PROPOSED TARIFF FOR THE COMMISSION'S CONSIDERATION?

A6. Yes. Superior's proposed tariff is included on Exhibit 8. This proposed tariff includes Superior's proposed billing rates as well as our proposed rules and regulations.

Q7. HOW WERE THE PROPOSED RATES IN YOUR TARIFF DEVELOPED?

A7. Superior has adopted the same rates currently charged by NCGUD as its proposed billing rates. As mentioned above, Superior expects to enter into an agreement with NCGUD to provide wholesale water, and adopting the same retail billing structure as NCGUD will assure that Superior's customers are billed identically to their neighbors.

Q8. HOW WERE THE PROPOSED RULES & REGULATIONS IN YOUR TARIFF DEVELOPED?

A8. The proposed rules and regulations were adapted from the same provisions already approved by the Commission for King's Chapel Capacity. These rules are largely transferable between utilities and have already been successfully implemented by King's Chapel Capacity for over 10 years. Superior feels that these same rules & regulations can be now be applied to the water utility.

Q9. DOES THIS COMPLETE YOUR TESTIMONY?

A9. Yes, it does.

BEFORE
THE TENNESSEE PUBLIC UTILITY COMMISSION

PETITION OF SUPERIOR WATER SERVICE, LLC FOR A CERTIFICATE OF CONVENIENCE AND NECESSITY TO PROVIDE WATER SERVICE TO A PORTION OF KING'S CHAPEL SUBDIVISION IN WILLIAMSON COUNTY	))))))))

AFFIDAVIT

I, William H. Novak, on behalf of Superior Water Service, LLC hereby certify that the attached direct testimony represents my opinion in the above referenced case.

William H. Novak

Sworn to and subscribed before me this 19 day of OCT, 2017.

NOTARY PUBLIC

My commission expires: 12-23-2017

CHEL LARKIN NOTARY PUBLIC STATE OF TEXAS EXPIRES 12-23-17

EXHIBIT 1

COMPANY FORMATION OF SUPERIOR WATER SERVICE, LLC

000920970

ARTICLES OF ORGANIZATION
LIMITED LIABILITY COMPANY

SS-4270

Tre Hargett
Secretary of State

Division of Business Services
Department of State
State of Tennessee
312 Rosa L. Parks AVE, 6th FL
Nashville, TN 37243-1102
(615) 741-2286

Filing Fee: $50.00 per member
(minimum fee = $300.00, maximum fee = $3,000.00)

For Office Use Only

-FILED-

Control # 000920970

The Articles of Organization presented herein are adopted in accordance with the provisions of the Tennessee Revised Limited Liability Company Act.

1. The name of the Limited Liability Company is: Superior Water Service, LLC

(Note: Pursuant to the provisions of T.C.A. §48-249-106, each Limited Liability Company name must contain the words "Limited Liability Company" or the abbreviation "LLC" or "L.L.C.")

2. Name Consent: (Written Consent for Use of Indistinguishable Name)
☐ This entity name already exists in Tennessee and has received name consent from the existing entity.

3. This company has the additional designation of: None

4. The name and complete address of the Limited Liability Company's initial registered agent and office located in the state of Tennessee is:
JOHN E. POWELL
9539 MULLINS RD
ARRINGTON, TN 37014-9732
WILLIAMSON COUNTY

5. Fiscal Year Close Month: December

6. If the document is not to be effective upon filing by the Secretary of State, the delayed effective date and time is:
(none) (Not to exceed 90 days)

7. The Limited Liability Company will be:
☑ Member Managed ☐ Manager Managed ☐ Director Managed

8. Number of Members at the date of filing: 1

9. Period of Duration: Perpetual

10. The complete address of the Limited Liability Company's principal executive office is:
9539 MULLINS RD
ARRINGTON, TN 37014-9732
WILLIAMSON COUNTY

ARTICLES OF ORGANIZATION
LIMITED LIABILITY COMPANY

SS-4270

Tre Hargett
Secretary of State

Division of Business Services
Department of State
State of Tennessee
312 Rosa L. Parks AVE, 6th FL
Nashville, TN 37243-1102
(615) 741-2286

Filing Fee: $50.00 per member
(minimum fee = $300.00, maximum fee = $3,000.00)

For Office Use Only
-FILED-
Control # 000920970

The name of the Limited Liability Company is: Superior Water Service, LLC

11. The complete mailing address of the entity (if different from the principal office) is:
PO BOX 190
ARRINGTON, TN 37014-0190

12. Non-Profit LLC (required only if the Additional Designation of "Non-Profit LLC" is entered in section 3.)
☐ I certify that this entity is a Non-Profit LLC whose sole member is a nonprofit corporation, foreign or domestic, incorporated under or subject to the provisions of the Tennessee Nonprofit Corporation Act and who is exempt from franchise and excise tax as not-for-profit as defined in T.C.A. §67-4-2004. The business is disregarded as an entity for federal income tax purposes.

13. Professional LLC (required only if the Additional Designation of "Professional LLC" is entered in section 3.)
☐ I certify that this PLLC has one or more qualified persons as members and no disqualified persons as members or holders.
Licensed Profession:

14. Series LLC (optional)
☐ I certify that this entity meets the requirements of T.C.A. §48-249-309(a) & (b)

15. Obligated Member Entity (list of obligated members and signatures must be attached)
☐ This entity will be registered as an Obligated Member Entity (OME) Effective Date: (none)
☐ I understand that by statute: THE EXECUTION AND FILING OF THIS DOCUMENT WILL CAUSE THE MEMBER(S) TO BE PERSONALLY LIABLE FOR THE DEBTS, OBLIGATIONS AND LIABILITIES OF THE LIMITED LIABILITY COMPANY TO THE SAME EXTENT AS A GENERAL PARTNER OF A GENERAL PARTNERSHIP. CONSULT YOUR ATTORNEY.

16. This entity is prohibited from doing business in Tennessee:
☐ This entity, while being formed under Tennessee law, is prohibited from engaging in business in Tennessee.

17. Other Provisions:

Electronic	
Signature	Title/Signer's Capacity
E S	Aug 31, 2017 9:43AM
Printed Name	Date

OPERATING AGREEMENT
OF
SUPERIOR WATER SERVICE, LLC

RECITAL

Superior Water Service, LLC (SWSLLC) is a limited liability company (LLC) organized pursuant to the laws of the State of Tennessee. This Operating Agreement (Agreement) is between and among SWSLLC and its initial member and any joining members and is effective when adopted by the member whose signature appears below. The Agreement is intended to delineate the basic relationships between and among SWSLLC and its member(s) without intending to contemplate all matters that may arise during the life of the LLC. The Agreement may not be the entire agreement and, as contemplated in TCA 48-206-101(b), may from time to time be modified or supplemented by other written unanimous agreements of the member(s). It is anticipated that other members will be joining the LLC at which time this Agreement will be amended or supplanted.

ARTICLE ONE
FORMATION, OPERATION, TERMINATION

1.1 Formation. The Articles of Organization for SWSLLC were registered with the Secretary of State of Tennessee on August 31, 2017 establishing SWSLLC as a legal entity separate and distinct from its member(s).

1.2 Activity. The activity of SWSLLC will be to provide potable Water to residents in a community know as Kings Chapel.

1.3 Purpose of the LLC. The purpose of forming a limited liability company for SWSLLC is to protect its member(s) from the legal and financial risk associated with the leasing and renting of equipment and trucking services. Accordingly, any business activity associated with the LLC shall be conducted by and in the name of the LLC, and not by its member(s).

1.4 Termination. SWSLLC may be terminated only by unanimous consent of its member(s).

ARTICLE TWO
MEMBERS, CONTRIBUTIONS, AND INTERESTS

2.1 Initial and Subsequent Members. The initial member of SWSLLC as John E. Powell.

2.2 Member Contributions. John E. Powell's initial contribution to the LLC was $300.00. As additional members join the LLC, the existing members and the joining member contributions to the LLC will be in the nature and amount as the members elect among themselves.

2.3 Member Interests. While John E. Powell is the sole member of the LLC she will own 100% of the LLC. When other members join the LLC, the respective member interests will be determined as the members elect among themselves.

ARTICLE THREE
MEMBER RIGHTS, POWERS, AND OBLGATIONS

3.1 Member Share of Profits, Losses, Distributions, and Income Tax Attributes. While John E. Powell is the sole member of SWSLLC she will be entitled to 100% % of SWSLLC profits, losses, distributions, and income tax attributes. As additional members join SWSLLC the LLC profits, losses, distributions, and income tax attributes will be determined as the members elect among themselves.

3.2 Member Voting. Each member will be entitled to one vote for each percentage of member interest that each member owns.

3.3 Member Meetings. While the LLC has only one member, member meetings will not be required. As additional members join the LLC, the timing, nature, and extent of member meetings shall be as the members determine among themselves.

3.4 Sale of Assets. The sale of the SWSLLC assets valued at more than $1,000.00 will occur only upon the unanimous consent of its members.

3.5 Member Powers. John E. Powell, while the sole member of the LLC, will have the power to open and operate bank accounts of the LLC, to borrow funds on behalf of the LLC, and to mortgage, pledge, or otherwise encumber assets of the LLC. As additional members join the LLC, the se powers will also be granted to the joining members as the members determine among themselves.

3.6 Member Duties. No limitations are placed upon the members respecting duties to SWSLLC other than to endeavor to maximize the eventual profit of the LLC and to act lawfully and in good faith with respect to SWSLLC and each other.

ARTICLE FOUR
INCOME TAX AND ADMINISTRATIVE MATTERS

4.1 Entity Choice For Income Tax Purposes. While the LLC has only one member the LLC will be treated as a disregarded entity having the nature of a sole proprietorship for federal income tax reporting purposes, unless and until "check-the -box" and other

elections are made for tax reporting purposes characterizing SWSLLC as an "S" corporation.

4.2 Financial and Administrative Record Keeping. The bookkeeping and administrative record keeping system of SWSLLC will be satisfied by any reasonable system of recording transactions. The system will include but not limited to recording member identity and capital account activity, property acquisitions and encumbrances, and financial activity necessary to facilitate balance sheet and income statement preparation.

4.3 Member Certificates. SWSLLC member ownership interest certificates will not be issued. Member ownership shall be represented by membership interest percentages attributed to each member.

4.4 Management. As stated in the SWSLLC Articles of Organization, SWSLLC will be member managed.

4.5 Principal Office. The principal office of the LLC shall be located at 9539 Mullens Road, Arrington, Tennessee 37014.

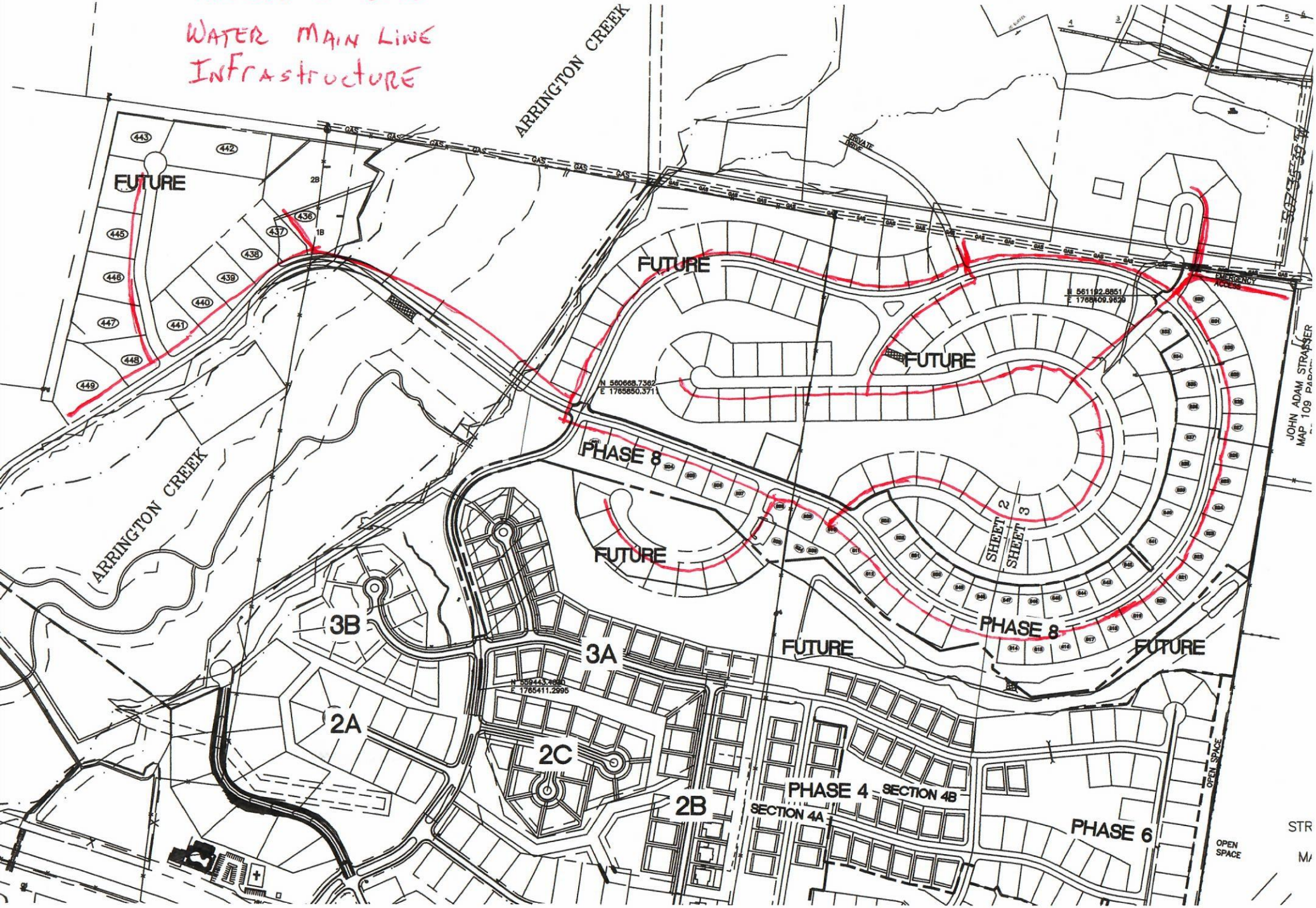
IN WITNESS WSHE REOF, the initial member of SWSLLC signs and adopts this Agreement as the operating agreement of Superior Water Service, LLC:

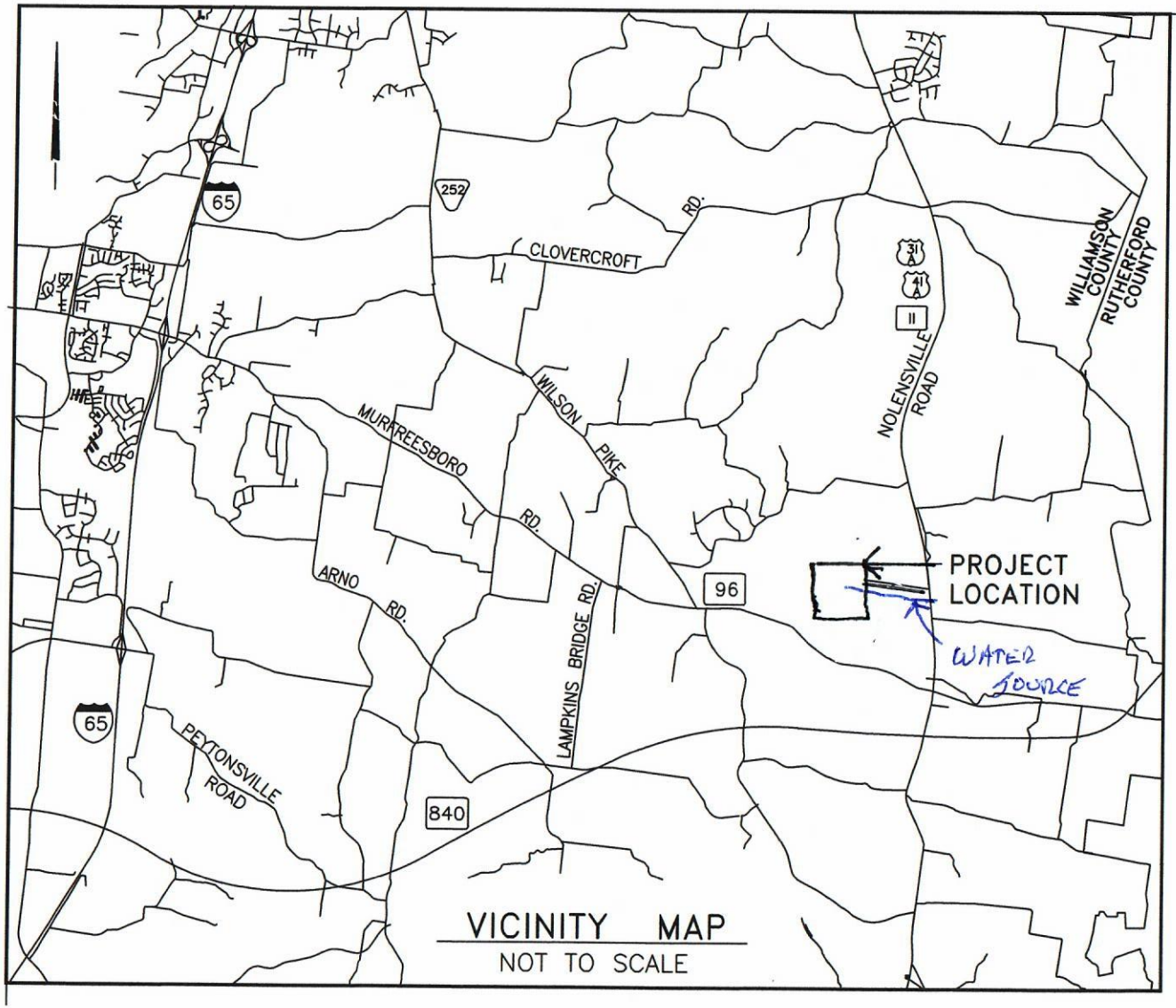
J. Powell — 8/31/17

John E. Powell, Managing Member — Date

EXHIBIT 2

SERVICE AREA & MAPS


PROPOSED ON Site
WATER MAIN LINE
INFRASTRUCTURE
ARRINGTON CREEK
FUTURE
PHASE 8
PHASE 4
SECTION 4B
SECTION 4A
PHASE 6
OPEN SPACE
3A
3B
2A
2B
2C
SHEET 2
SHEET 3
PRIVATE DRIVE
EMERGENCY ACCESS
JOHN ADAM STRASSER
MAP 109



VICINITY MAP

NOT TO SCALE

LEGEND

WATER METER

WATER VALVE

PROPOSED FIR

IRON PIN (SET

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MANHOLE · · ·

ADDRESSES · ·

PROPERTY LIN

PROPOSED 8"

PROPOSED 2"

UTILITY & DRA

MILCROFTON U

MINIMUM BUILD

Milcrofton Utility District
Kings Chapel Section 8 Development
Fire Flow Analysis - No Improvements

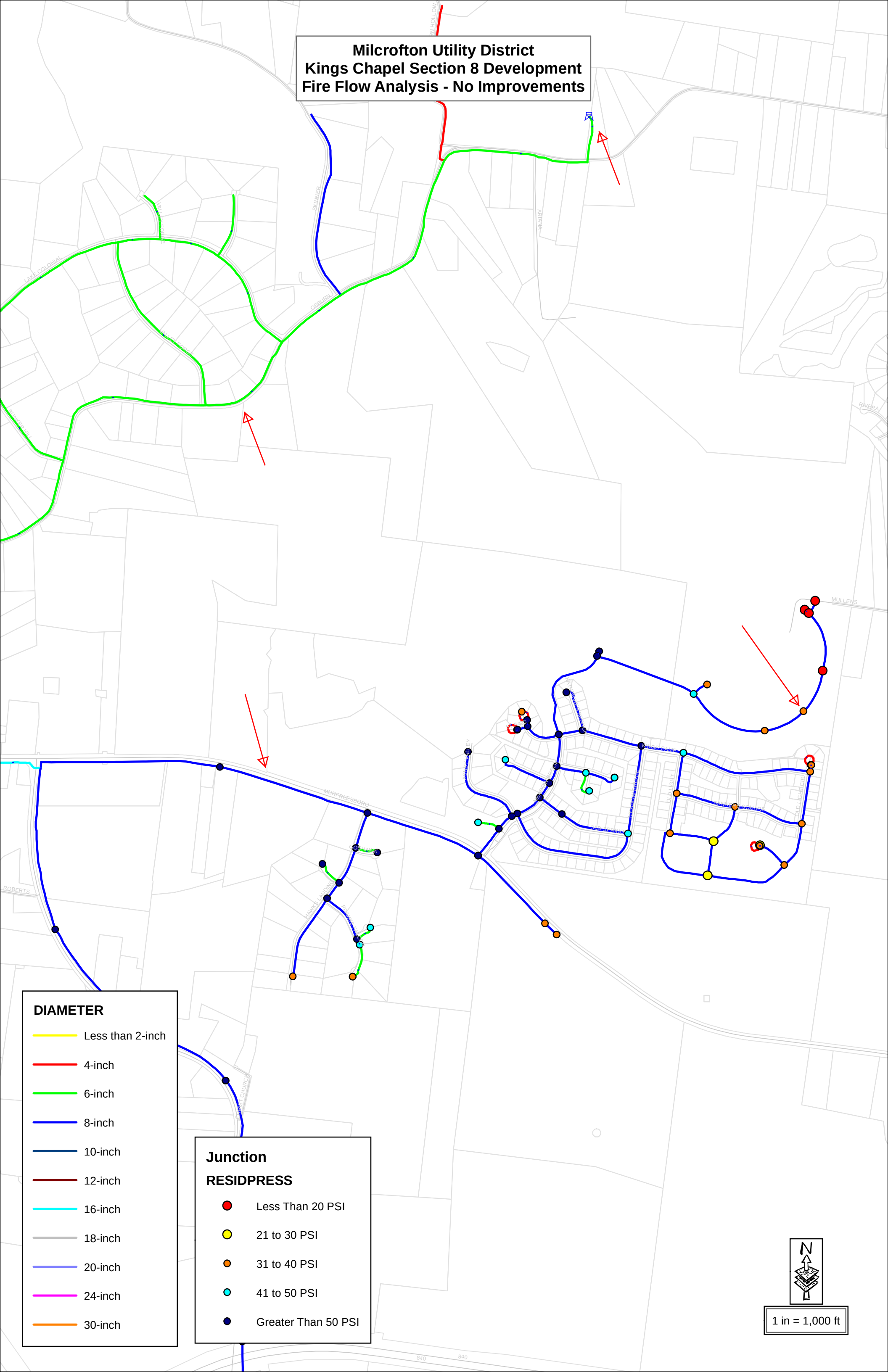


EXHIBIT 3

INABILITY OF MILCROFTON UTILITY DISTRICT TO PROVIDE WATER SERVICE

Milcrofton UTILITY DISTRICT

May 17, 2016
REVISED July 5, 2017

Mr. John Powell
Ashby Communities, LLC
4980 Meadowbrook Blvd.
Arrington, TN 37014
Sent via email: john-powell@comcast.net; dickie@sullivanengineering.com

RE: Kings Chapel, Section 8
51 Single Family Sublots

Dear Mr. Powell:

Prior to the start of the next section of this project, a two-hydrant fire flow test will be required to be performed by the District to evaluate flow and pressure characteristics of the water system within the development. The cost of this test is **$450.00** and payable in advance by the applicant to the District. Once the results of that flow test are obtained, future planning for the remaining sections of the project can be evaluated further. This hydrant test needs to be performed before the plan preparation of Section 8 as it is now required with the submittal to TDEC. The District is in the process of installing a new 300,000 gallon water tank on Osburn Road, which was added into the District's water model for the purposes of evaluation of potential pressures and flows for this project. A detailed analysis of the District's water model was conducted to evaluate different scenarios for the project based on the recent CAD layouts provided, with the following results:

1. **Scenario #1:** - No off-site improvements to existing District infrastructure, can service **30** new sublots with adequate fire flow (Up to lot line between S/L 820/821). See attached Exhibit #1.
2. **Scenario #2:** - Upsize existing 8" water line on SR96 from Cox Road to project entrance can service **9** additional new sublots with adequate fire flow (Up to lot line between S/L 825/826). See attached Exhibit #2.
3. **Scenario #3:** - SR96 upsize and upsize of existing 6" water line on Osburn Road from new water tank to SR96/Wilson Pike intersection to a 10" line can service the remaining **12** sublots of Section 8 and future Sections of the project. The upsize of Osburn Road waterline is on the District's 5-year CIP schedule with an anticipated build schedule of 2018-2019. See attached Exhibit #3.

If you wish for the District to proceed with the design of the public water line system for the above referenced project under **Scenario #1**, the following fees would need to be paid to the District:

Estimated Construction Costs

Approximately 4,453+/- LF 8" water line x $55/LF =	$ 244,915.00
Approximately 200+/- LF 18" steel casing pipe x $42/LF =	$ 8,400.00
Approximately 3,516 lbs. Fittings x $3.50/lb. =	$ 12,306.00
13 – 8" Gate Valves w/ Boxes x $2,000.00/box =	$ 26,000.00
6 – Fire Hydrant Assemblies x $3,500/each =	$ 21,000.00
30 – Water Services and Meter Box x $250/service =	$ 7,500.00
Total Estimated Construction Cost =	*$ 320,121.00*

6333 Arno Road • Franklin, Tennessee 37064
(615) 794-5947 • Fax (615) 791-9872

Milcrofton UTILITY DISTRICT

Administration & Professional Fee

Estimated Construction Costs = $ 320,121.00 x 15% =	$ 48,018.15
State Plan Review Fee =	$ 134.53
Total Fee Due =	***$ 48,152.68***

Once the $48,152.68 fee has been paid to the District, a water line plan will be prepared and submitted to the State of Tennessee (TDEC) for approval for Scenario #1.

Cost estimates for Scenarios #2 and #3 can be developed for the applicant to discuss reimbursement scenarios with the District should you request them.

Prior to the start of the public water line system construction for Scenario #1, the following fees will be required to be paid to the District:

Tap/User Fees

Capacity Fee: 30 SFUs x $2,500/SFU =	$ 75,000.00
Fire Hydrant Connection Fee: 6 Fire Hydrants x $1,500/hydrant =	$ 9,000.00*
Meter Fee: 30 Meters x $325/Meter	$ 9,750.00
Total Fee Due =	***$ 93,750.00***

*Fire Hydrant fee to be adjusted, if necessary, after final design has been completed.

Prior to, or at the time of the pre-construction meeting for each Section, a letter signed/sealed by an engineer or surveyor, stating that the water line easement (entire width) has been constructed to final grade, must be submitted to the District.

Once all the above Capacity/Meter fees have been paid and the developer executes the water agreement contract with the District, the public water line construction may commence. When the builder requests the District to set the water meter, the builder will be required to pay a $100.00 application fee as required by the District Rules and Regulations. If you have any questions please feel free to contact Mr. Mike Jones, General Manager, or myself at 615.406.3415 or matt@m2groupllc.com. This letter is valid for sixty (60) days.

Sincerely,
Milcrofton Utility District

Matt W. Bryant, P.E.

Enclosures

cc: Mike Jones, Michael Wall

EXHIBIT 4

WATER SUPPLY AGREEMENT WITH
NOLENSVILLE/COLLEGE GROVE UTILITY DISTRICT

EXHIBIT 4

WATER SUPPLY AGREEMENT WITH
NOLENSVILLE/COLLEGE GROVE UTILITY DISTRICT

A final water supply agreement between Superior Water Service and Nolensville/College Grove Utility District (N/CG) is pending approval of this CCN filing by the Tennessee Public Utility Commission in accordance with T.C.A § 7-82-301(a)(1)(B) which reads as follows:

B) So long as the district continues to furnish any of the services that it is authorized to furnish in this chapter, it shall be the sole public corporation empowered to furnish such services in the district, and no other person, firm or corporation shall furnish or attempt to furnish any of the services in the area embraced by the district, unless and until it has been established that the public convenience and necessity requires other or additional services; provided, that this chapter shall not amend or alter §§ 6-51-101 6-51-111, and 6-51-301.

As a result of the language contained in T.C.A § 7-82-301(a)(1)(B), N/CG has determined that it cannot provide Superior Water Service with a water purchase agreement until the Tennessee Public Utility Commission first awards a CCN.

EXHIBIT 5

AREA UTILITY LETTERS REGARDING INABILITY TO PROVIDE SERVICE

Rogers C. Anderson
Williamson County Mayor

WILLIAMSON COUNTY GOVERNMENT

October 17, 2017

Mr. John Powell
Ashby Communities, LLC
4980 Meadowbrook Blvd.
Arrington, TN 37014

RE: Water Request – Kings Chapel Subdivision, Section 8

Mr. John:

On October 19, 2017, Williamson County received your request that water service be provided to the above-named property. In response to your inquiry, this correspondence confirms that Williamson County Government does not currently provide public water service and has no plans in the foreseeable future to provide said service.

I hope this information is helpful. Should you need anything further, please do not hesitate to contact me.

Sincerely,

Rogers Anderson, County Mayor
Williamson County

RCA/dg

EXHIBIT 6

OWNER FINANCIAL STATEMENTS

EXHIBIT 6

OWNER FINANCIAL STATEMENTS

Owner Financial Statements are confidential and filed separately under seal.

EXHIBIT 7

WATER TESTING & MONITORING AGREEMENT

EXHIBIT 7

WATER TESTING & MONITORING AGREEMENT

Superior Water Service has engaged John T. Ham (615-804-7954) to be its water distribution operator as required by TDEC. Mr. Ham is a licensed and certified water distribution operator. Mr. Ham has notified Mr. Michael Murphy at TDEC (615-687-7000) of his intent to be the certified water distribution operator of Superior Water Service and Mr. Ham is aware of the TDEC requirements to fulfill this responsibility. Mr. Ham also works for a local water utility in Williamson County and operates a large mixed-use water system in compliance with TDEC requirements.

EXHIBIT 8

PROPOSED TARIFF

Superior Water Service

Water Service Tariff

TPUC #1
Cost of Residential Services

Superior Water Service
Schedule of Rates & Charges

Tariff Item #	Description	Monthly Rate
1	**Monthly Usage Charges:**	
	0 Gallons (Minimum Bill)	$17.61
	1 – 20,000 Gallons per 1,000 Gallons	5.50
	20,001 – 50,000 Gallons per 1,000 Gallons	7.62
	Over 50,000 Gallons per 1,000 Gallons	10.15
2	**Service Fees:**	
	Residential	$75.00
	Commercial	75.00
3	**Miscellaneous Charges:**	
	Returned Checks & Drafts	$35.00
	Reconnection Fee During Office Hours	40.00
	Reconnection Fee After Office Hours	65.00
	Meter Testing Fee (Waived if Outside of the AWWA Acceptable Range)	150.00
	Late Fee	5.00%

Note: All rates and charges are prior to any applicable taxes and fees.

Superior Water Service

Water Service Tariff

TPUC #2
Rules and Regulations

RULES AND REGULATIONS

Governing the water distribution systems of Superior Water Service.

Statement of Purpose:

The general purpose of these Rules and Regulations is:

1. To institute measures and procedures for serving the customers and service area of Superior Water Service on a uniform basis. Included are:
   a. The Definition of Terms.
   b. The Authorization of Rules.
   c. Identifying the Service.
   d. Establishing Property Easements.
   e. Establishing Discontinuance of Service Policies.
   f. Stating Non-payment Penalties.
   g. Establishing Returned Check Policy.
   h. Establishing Policy for Changes of Property Owners or Tenants.
   i. Establishing Policy for Security Deposits.

Definition of Terms:

1. Collector Line - Shall mean the line from the service line to the main line.
2. Company - Shall mean Superior Water Service.
3. Customer - Shall mean any person, firm, corporation, association, company, or government unit furnished sewage services by Superior Water Service.
4. Main Line - Shall mean the line from the collector line to the source of water supply.
5. Property - Shall mean all facilities owned and/or operated by the Superior Water Service.
6. TPUC – Shall mean Tennessee Public Utility Commission.

Authorization of Rules and Regulations

Superior Water Service is a limited liability company in good standing with the State of Tennessee and is organized as a privately owned public utility. Superior Water Service operates under the auspices of a Certificate of Convenience and Necessity issued by the Tennessee Public Utility Commission.

Effect of Rules and Regulations

All provisions of these rules and regulations shall be incorporated in each contract with each water customer of Superior Water Service.

Utility Items on Private Property

Superior Water Service shall own and maintain all control systems, main lines and service lines required to provide water service on the customer's premises. The customer must execute an agreement granting an easement to the company for maintenance of the water system. The building plumbing and Stub-out line shall be maintained by the customer.

Discontinuance of Service

Service under any application may be discontinued for the following reasons:

1. Non-payment of bill as hereinafter set forth below.
2. For misrepresentation in the application.
3. For adding to the property or fixtures without notice to the company.
4. For molesting any service pipe, tank, control system, filter, or any property of the company in any way whatsoever.
5. For violation of any rules of the company.
6. For disconnecting or reconnecting service by any party, other than a duly authorized agent of the company, without the consent of the company.

Non-payment Penalties

A non-payment penalty of five percent (5%) of the monthly charge will be due after the due date shown on the bill. If payment is received within fifteen days after the due date, a written notice will be sent to the customer. If payment is not received within 15 days of the written notice, wastewater service will be turned off from the customer's property as per the Water Subscription Agreement (Attachment #1) executed by the customer with no additional notice being sent. No service shall be reconnected if discontinued for non-payment (or any valid reason) until all charges have been paid, including reconnection fees. The reconnection fee is $40.00 during office hours and $60.00 after office hours.

Returned Checks and Drafts

A check or draft returned by the bank will incur a fee of $35.00.

Changes in ownership, Tenancy of Services

A new application and agreement must be made and approved by the Company on any change in ownership of property, or in tenancy, or in the services as described in the application. In the event of

failure of a new owner or tenant to make such application, the company shall have the right to discontinue service until such new application is made and approved.

Security Deposits

Each new customer, before connection or reconnection of the service, will be required to make a refundable deposit to secure payment of water service bills in an amount of $60.00. Deposits will be held by the company as long as required to insure payment of bill.

Damages

Superior Water Service shall in no event be responsible for maintaining any Stub-out line owned by the customer, or for the damages created by water escaping therefrom, or for defects in the customer's building lines or fixtures. The customer shall at all times comply with all regulations of the Tennessee Public Utility Commission and of Superior Water Service. All leaks in any building pipe or fixture on the premises of the customer shall be repaired by the customer. On failure to repair any such leak, the service may be discontinued until such repairs are made.

In Event of Emergency

The Company shall not be liable to the customer for interruption in service, or for damages or inconvenience as a result of any interruption, stoppage, etc., which was beyond the reasonable control of Superior Water Service. In the case of an emergency, call 615-370-4432 or other provided service number.

Service Area

Superior Water Service will only provide service within its current approved service territory as approved by the Tennessee Public Utility Commission.

Extension Plan

Superior Water Service may furnish water service to property owners whose lands are abut the main line of existing water systems. The water service charges listed in the water billing structure do not include costs for constructing the water system. Any water system components required to service such abutting properties shall be constructed at the cost of those parties desiring same, and these components shall become the property of Superior Water Service, to be credited to the account for Contributions in Aid of Construction. Water service to new areas within a service territory will be made available where it is technically feasible and the developer or property owner is willing to bear the expense of designing and building the water distribution system.

Contributions in Aid of Construction

Water system components furnished by developers and landowners to King's Chapel Capacity will be recognized as Contributions in Aid of Construction in the amount of actual construction cost.

Contracts for Services

Each customer, before installation of service, shall be required to execute a water service agreement with Superior Water Service.

Public Contact

John Powell, President
Superior Water Service
9539 Mullens Road
Arrington, TN 37014

Phone: 615-370-4432

Tennessee Regulatory Authority Regulations

Superior Water Service in its operation, shall conform to all applicable rules and regulations promulgated by the Tennessee Public Utility Commission. Phone 1-800- 342-8359.

Attachment 1

WATER SUBSCRIPTION CONTRACT

Printed Name

Address of Property

Mailing Address

Telephone Number

I hereby make application to Superior Water Service for water service at the address of property stated above. In consideration of the undertaking on the part of Superior Water Service to furnish water service, I understand, covenant and agree as follows:

1. I understand that components of a water system have been installed on the property referred to above, which is owned or occupied by me, and which is to be connected with a water distribution system owned and/or maintained by Superior Water Service. I warrant that any connection to and/or subsequent use to this system by the components on my property shall be in accordance with the Rules and Regulations and Plans of Superior Water Service.

2. I acknowledge Superior Water Service, its successors and assigns have a perpetual easement in, over, under and upon the above specified land as shown on the property plat, with the right to operate and repair all components of the water system on my property, including but not limited to the main lines and service lines I further grant Superior Water Service permission to enter upon my property for any reason connected with the provision water service.

3. For all other plumbing and structures on the property, I agree that I am responsible for all operation and repair thereof.

4. I understand and agree to pay a security deposit of $60.00, to promptly pay for service at the then current schedule of rates and fees and agree to abide by and be subject to Superior Water Service's billing and cutoff procedures. Should I not pay in accordance with Superior Water Service's Rules, I agree to pay all costs of collection, including attorney fees.

6. I accept the current Rules and Regulations and the Rates and Fees Schedule and agree to abide by any amendments to such Schedules.

7. I agree that this Agreement shall remain in effect for as long as I own, reside upon or rent the above- described property. When such circumstances no longer exist, I agree to provide notice to Superior Water Service at least thirty (30) days in advance of my vacating the property.

Subscribers Signature Date

STANDARD WATER SPECIFICATIONS
KINGS CHAPEL SUBDIVISION

PART 1 – PROJECT DEVELOPMENT AND GUIDELINES

1.01 APPLICABILITY

A. The following specifications apply to the construction of all potable water facilities constructed by or for the **Kings Chapel Subdivision in Williamson County, TN.**

1.02 PROCEDURAL GUIDELINES

A. The **Developer** shall be responsible for all other required permits.

1.03 DESIGN CRITERIA

A. Water mains to be installed along existing State or County roads will be installed on private easement immediately adjacent to and parallel to the road right-of- way. Permanent easements obtained or provided by developers or others on behalf of the **Developer** shall be 20 feet in width with temporary construction easements 30 feet in width. Permanent easements obtained or provided by developers or others on behalf of the **Developer** shall be 20 feet in width with an additional temporary construction easement of 20 feet in width. All easements shall be obtained in recordable form, and recorded at the Register of Deeds Office for Williamson County, Tennessee.

B. For new subdivision construction, mains will be placed inside the 50-foot road right of way, 5 feet minimum outside the street curb or edge of pavement. Any easements required for necessary off-site improvements will be obtained by the developer at the developer's expense.

C. **All new streets and roads must be to grade prior to water main installation.**

D. Maximum depth to the top of the pipe shall be 4 feet maximum; minimum depth shall be 30 inches to the top of the pipe. Water mains deeper than 4 feet or with less than 30 inches of cover as measured from finished grade will not be accepted without prior written approval.

E. No mains shall be installed longitudinally under sidewalks or paved or concrete drainage structures.

F. Spacing between potable water mains and sewer mains, storm drains, and sewage force mains shall be in conformance with the applicable regulations promulgated by the Tennessee Department of Environment and Conservation. Minimum spacing from gas mains and buried electric lines shall be 5 feet minimum. Where water mains cross other utilities, the mains shall be bedded in crushed stone.

G. No meters, saddles, or service lines shall be installed under or in a driveway.

PART 2 – GENERAL INFORMATION

2.01 GROUNDWATER PROTECTION AND EROSION CONTROL

A. All wet weather conveyance and stream crossings will be accomplished in conformance with the regulations promulgated by the Tennessee Department of Environment and Conservation.

B. No blasting will be permitted in any streambed.

C. The **Contractor** will perform erosion control inspections before anticipated storm events (or series of storm events such as intermittent showers over one or more days) and within 24 hours after the end of a storm event of 0.5 inches or greater, and at least once every 14 calendar days. Where sites have been finally or temporarily stabilized, or runoff is unlikely due to winter conditions (e.g. site covered with snow, ice, or frozen ground) such inspections only have to be conducted once per month.

D. Inspections shall be documented and include the scope of the inspection, name(s) and title or qualifications of personnel making the inspection, the date(s) of the inspection, major observations, and actions taken.

E. Based on the results of the inspection, any inadequate control measures or control measures in disrepair shall be replaced or modified, or repaired as necessary, before the next rain event if possible, but in no case more than seven days after the need is identified. If maintenance prior to the next anticipated storm event is impractical, maintenance must be scheduled and accomplished as soon as practicable.

F. Stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than seven days after the construction activity in that portion of the site has temporarily or permanently ceased. Except where construction activity on a portion of the site is temporarily ceased, and earth disturbing activities will be resumed within 15 days, temporary stabilization measures do not have to be initiated on that portion of site.

G. Temporary or permanent soil stabilization shall be accomplished 15 days after final grading or other earth work. Permanent stabilization with perennial vegetation (using native herbaceous and woody plants where practicable) or other permanently stable, non-eroding surface shall replace any temporary measures as soon as possible.

2.02 OBSTRUCTIONS TO BE REMOVED AND REPLACED

A. The scope of the Construction Drawings does not include an exhaustive identification of all obstacles which may be encountered during installation of the proposed facilities.

B. The **Contractor** shall follow the provisions of T.C.A. 65- 31-101 et seq.,: "Underground Utility Damage Prevention Act" to the letter in order to identify underground facilities in the vicinity of the work. All work in the vicinity of any unidentified obstacles or underground facilities shall cease until the ownership, location, and nature of the obstacle is determined. The **Contractor** shall fully indemnify the **Developer** and the **Engineer** for any damages resulting from non-compliance with T.C.A. 65-31-101 et seq. and this portion of the specifications. For all work covered under this project where existing water system facilities may occur, the **Nolensville / College Grove Utility Developer** of Williamson County, TN hereby delegates it responsibilities under the "Underground Utility Damage Prevention Act" to the **Contractor**.

C. In cases where other water lines, gas lines, sanitary sewer lines, storm sewer lines, telephone lines, power lines or other underground structures are encountered, they shall not be displaced or molested unless necessary in which case they shall be replaced in as good condition as found, as quickly as possible. All such lines or underground structures damaged or molested in the construction shall be replaced at the **Contractor's** expense.

D. In cases where the pipe crosses drainage culverts the carrier pipe shall be encased in PVC pipe and the following conditions shall prevail:

1. The minimum dimension from the top of the culvert to natural grade must equal 46 inches plus the diameter of the required casing pipe.

2. At least 16 inches of natural cover will be provided between the bottom of the casing pipe and the top of the culvert.

3. The PVC casing pipe will extend no less than 18 inches beyond each side of the culvert.

E. In cases where proper cover for the pipe as described above does not exist, the pipe will be installed under the culvert with a natural cover of 18 inches between the bottom of the culvert and top of the pipe. Casing shall be provided as described above.

2.03 INSPECTION BY THE DEVELOPER

A. Before the **Contractor** backfills any of the lines, they shall first be inspected by the **Developer** and the **Developer** shall give the **Contractor** permission to proceed with the backfilling. If any joints, pipe, fittings, or other materials and workmanship are found to be defective, they shall be removed and replaced by the **Contractor** without any additional compensation.

2.04 TRAFFIC CONTROL

A. The **Contractor** shall, before beginning work on any public highway, or roadway make arrangements for maintaining traffic on the said highway or roadway or re-routing traffic as may be required. The applicable regulations of the Tennessee Department of Transportation must be followed. In addition, the **Contractor** shall make proper arrangements with the authorities of the Public Transportation Systems whenever the work will interfere with established routing and schedules. Prudent use of flagmen and acceptable signs will be exercised by the **Contractor**.

B. Should it become necessary to provide additional guying or support of power, lighting or telephone facilities, the authorities of these utilities shall be consulted so that suitable arrangements can be made for protection of same.

C. All costs for temporary or permanent work necessary for protection of utilities private or public, shall be included in the contract amounts to which the items of work pertain or may be incidental thereto. In addition, the **Contractor** shall be responsible for any damage to the existing utilities resulting from the construction operations and shall bear the cost of all repair or replacement necessary for correction.

D. The **Contractor** shall furnish proper equipment which shall be available at all times for maintaining streets and roads upon which work is being performed. All such streets and roads shall be maintained for traffic until complete and final acceptance of the work.

E. When the **Contractor** is cutting perpendicular to cross a street or highway, he is to cut half of the street at one time, lay the pipe and complete the backfilling operation so that traffic may pass over this section before opening the trench for the other half of the street or highway. At points of heavy traffic, this work shall be done at night during period of low rates of traffic. The time of making these crossings shall be approved by the **Engineer** and the agency or legal entity having responsibility for maintenance of the street.

PART 3 – MATERIALS

3.01 DUCTILE IRON PIPE

A. All pipe greater than 2 inches in diameter shall be Pressure Class 350 or better ductile iron pipe.

B. Pipe with mechanical joints or push-on joints shall conform to the applicable dimensions and weights shown in the Handbook for Ductile Iron Pipe standard and to the applicable requirements of ANSI/AWWAC111/A21.11 of the latest revision. The mechanical-joint glands shall be cast iron in accordance with ANSI/AWWAC111/A21.11 of latest revision and bolts shall conform to the requirements of the same standard.

C. The nominal laying length of the pipe shall be as shown in the tables appearing in the Handbook for Ductile Iron Pipe.

D. The outside coating for shall be an asphaltic coating approximately 1 mil (25um) thick. The coatings shall be applied to the outside of all pipe, unless otherwise specified. The finished coating shall be continuous, smooth, neither brittle when cold nor sticky when exposed to the sun, and shall be strongly adherent to the pipe.

E. Cement linings shall be in accordance with the latest revision of ANSI/AWWAC104/A21.4, Cement-Mortar Lining for Ductile-Iron and Gray-Iron Pipe and Fittings for Water.

F. Each pipe shall be subjected to a hydrostatic test of not less than 500 psi (3.45 MPa). This test may be made either before or after the outside coating and inside coating have been applied, but shall be made before the application of the cement lining. The pipe shall be under the full test pressure for at least 10s. Suitable controls and recording devices shall be provided so that the test pressure and duration may be adequately ascertained. Any pipe that leaks or does not withstand the test pressure shall be rejected. In addition to the hydrostatic test before application of a cement lining or special lining, the pipe may be retested, at the manufacturer's option, after application of such lining.

3.02 DUCTILE IRON FITTINGS

A. All fittings shall be mechanical joint ductile iron ASTM A536 Class 350 fittings conforming to ANSI/AWWA C153/A21.53-84 and meet UL-FM requirements. Cement lining and coating shall be in accordance with ANSI/AWWA C104/A21.4. NSF 61 Certified. SBR Gaskets in accordance with ANSI/AWWA C111 / A21.1. **All fittings including tees, bends, and reducers shall be mechanical joint "anchor" fittings. Slip joint fittings are not acceptable. All valves and fittings will be restrained with Mega-Lug type restraints.**

3.03 GRIPPER GASKETS (3 INCHES – 24 INCHES)

A. At overbends and for ductile iron joints in both bored and open cut casing pipes, the use of Gripper Gaskets is required. Additionally, install Gripper Gaskets at two joints beyond both sides of the casing. Installation of Gripper Gaskets shall also include casings at bridge crossings.

B. Joint restraint for ductile iron water systems including pipe, valves and fittings shall be accomplished using integral boltless restraining gaskets. Pressure rating 350 psi. These gaskets shall be designed, manufactured and tested in accordance with AWWA C111/A21.11. Certified to NSF/ANSI 61. UL Recognized Component. Boltless restraining gaskets shall be Gripper Gasket or equivalent.

3.04 2 INCH AND SMALLER PIPE

A. Pipe of diameters 2 inches and smaller shall be DR17 PVC pipe or better.

B. Pipe must meet all the requirements as set forth in Product Standard PS 22-70 (formerly Commercial Standard CS 256-63) for PVC Type I, Grade I, PVC 1120 or PVC Type I, Grade 2, PVC 1220 only, with standard dimension ratio of DR14 for C900, and bear the National Sanitation Foundation Testing Laboratories, Inc., seal of approval for potable water.

C. Provisions must be made for contraction and expansion at each joint with rubber ring, tapered end and bell as integral part with the pressure class being maintained throughout the entire bell section.

D. **Plastic fittings shall not be permitted for sizes larger than 2 inches.** Only ductile iron fittings as specified hereinbefore, and as manufactured for jointing with PVC pipe will be permitted. All fittings shall be mechanical joint. Slip joint fittings are not acceptable.

E. **All valves and fittings will be restrained with Mega-Lug type restraints.**

F. PVC pipe shall be in 20 foot lengths and shall be transported to and about the job site with trucks or pipe trailers which provide support for not less than 75% of their lengths. At least 2 men shall be used to load, unload and stockpile PVC pipe, and the pipe shall be lifted and placed in position without dropping, tossing, or otherwise being abused. PVC pipe shall not be pulled or pushed over objects that can gouge, cut, or damage the pipe. Care in handling shall be exercised during cold weather conditions.

G. All installation specifications covering the use of other type of pipe shall be used with plastic pipe. However, no plastic pipe shall be used in marshy places, below the normal ground water table, or in areas of finely divided granular soils. Alternate pipe materials will be identified by the **Engineer** and/or specified on drawings.

H. Only PVC pipe manufactured with the Reiber Type Gasket is acceptable. Pipe shall be provided from a manufacturer having no less than a five-year history of providing pipe in Tennessee and with no less than 250,000 linear feet previously installed in Tennessee.

3.05 HIGH DENSITY POLYETHYLENE PIPE AND FITTINGS FOR DIRECTIONALLY BORED CROSSINGS

A. All polyethylene pipe and fittings shall be material cell classification 345434C, material designation, PE 3408, DR9.

B. All pipe and fittings shall be joined by the butt heat fusion process, and the **Contractor's** personnel performing the heat fusion shall be qualified by appropriate training and experience in the procedure.

C. The **Contractor** shall take every precaution in handling the PE pipe and fittings to insure scratching, gouging, or other damage does not occur. Pipe having a nominal diameter of two inches or less shall normally be installed by unrolling from a reel trailer to prevent damage. If the pipe or fittings are scratched or gouged due to improper handling, the affected areas shall be replaced at the **Contractor's** expense.

D. All joining shall be made by qualified personnel and shall be the butt heat fusion process in accordance with the pipe manufacturer's written procedures. An approved butt fusion machine shall be used for the heat fusion process.

E. The **Engineer** shall have the right to inspect the joining process to insure it is being performed in accordance with the written procedure and shall have the right to inspect the completed fusion joint for proper appearance. If the **Engineer** determines the fusion joint was not made in accordance with proper procedure or if the joint does not exhibit the proper appearance, the joint shall be cut out and replaced at the **Contractor's** expense.

F. Pipe, tubing, and fittings shall meet the requirements of ASTM D 2513 as mandated by CFR 49 Part 192 et al and shall be so marked. Fittings shall meet the requirements of ASTM D 3261 and shall be marked as such in accordance with ASTM D 2513. Socket Fusion Fittings shall meet the requirements of ASTM D 2683 and shall be marked as such in accordance with ASTM D 2513.

3.06 GATE VALVES, BOXES, CONCRETE COLLARS, AND MARKERS

A. **Pipe 8 inches in diameter and smaller shall be fitted with gate valves. All valves will be restrained with Mega-Lug type restraints.** Valves boxes will not be paved over or covered with fill material.

B. All gate valves shall be of the resilient seat type valve manufactured to meet or exceed the requirements of ANSI/AWWA C509-Latest Revision, and suitable for water working pressures of no less than 200 psi unless otherwise specified. Valves shall be of standard manufacture and of the highest quality both as to materials and workmanship.

C. The wedge shall be fully encapsulated in the elastomer, including the guides. The brass stem nut must be rigidly enclosed in the wedge to maintain alignment. The wedge elastomer shall be bonded to the wedge. The stem shall be stainless steel (AISI-420).

D. Valve body and bonnet shall be electrostatically applied, fusion bonded, epoxy coated both inside and out by the valve manufacturer. The coating shall meet the requirements of AWWA C-550.

E. The bonnet bolts shall not be exposed to the environment or, alternatively, be in 316 stainless steel. O-ring style seals shall be used as gaskets on the bonnet and on the stuffing box.

F. All gate valves shall be furnished with mechanical joint end-connections, unless otherwise shown on the plans or specified herein. Slip joint connections are not acceptable. The end-connections furnished shall be suitable for connecting to standard mechanical joint ductile iron pipe or single gasket slip-on joint PVC pipe.

G. All gate valves shall have the name or monogram of the manufacturer, the year the valve casting was made, the size of the valve, and the working water pressure cast on the body of the valve.

H. All gate valves shall be provided with a 2-inch square operating nut and shall open by turning to the left (counter clockwise).

I. Gate valves shall be installed in a vertical position with cast iron valve box and shall be installed on a firm bed at the proper elevations to conform to elevation of the pipe.

J. Hand wheel valves are not acceptable except when used in a building, pit, or vault.

3.07 BUTTERFLY VALVES, BOXES, CONCRETE COLLARS, AND MARKERS

A. Butterfly valves shall be manufactured by Crispin / K-FLO, Dezurik, Pratt, or approved equal. The Manufacturer shall have had a successful experience in manufacturing tight closing Buna-N or other acceptable synthetic rubber-seated butterfly valves for this type service in the size indicated. The Manufacturer shall have at least 10 years' experience in the manufacture of valves. All butterfly valves of the same type shall be the product of one Manufacturer. All materials used shall be new, of high grade, and with properties best suited to the working environment.

B. All butterfly valves shall be of the tight-closing, rubber seated type, conforming to the design standards of ANSI/AWWA C504 latest revision, except where noted herein. Valves shall be bubble-tight at the rated pressure in either direction and shall be suitable for throttling service and/or operation after long periods of inactivity. Maximum operating non-shock shut-off pressure and maximum operating non-shock line pressure is 250 psi. Each valve shall be performance and leak tested as specified in AWWA C504 revised as follows: In addition to the testing requirements of AWWA C504, each butterfly valve shall be thoroughly cleaned and opened at least three (3) times prior to testing.

C. All valves shall have the name or symbol of the maker, the nominal size, date of manufacture, and the working pressure for which they are designed, cast, stamped or permanently marked on the body.

D. Butterfly valves shall be Class 250B, unless otherwise indicated and of the flanged short body design. The valve bodies shall be constructed of ductile iron in accordance with ASTM A-536.

E. Discs shall be constructed of 316 stainless steel or epoxy coated ductile iron ASTM A-536. All ductile iron discs shall have a 316 stainless steel disc edge. Discs for valve sizes 24 inches and larger shall be of the offset design to provide a full 360-degree seating surface and shall be constructed from epoxy coated ductile iron ASTM A-536.

F. Valves 3 inches to 20 inches shall have a one piece through shaft constructed of 17-4 stainless steel corresponding to the requirements of AWWA C504, latest revision. The shafts shall be fastened to the disc by means of a threaded disc pin providing a positive leak proof connection of the shaft to the disc. Valves 24 inches and larger shall have stub shafts of 17-4 stainless steel corresponding to the design requirements of AWWA C504, latest revision. The shafts shall be fastened to the disc by straight pins that provide a .005 interference fit.

G. The resilient seat shall be Buna-N for valves 3 inches to 20 inches and shall be simultaneously bonded and vulcanized to body of the valve. All interior surfaces in contact with water, excluding stainless steel and disc, shall be completely rubber lined. Seats for valves 3 inches to 20 inches shall be designed so that they will require no internal adjustment or maintenance to seat against a pressure differential of 250 psi on either side of the valve. The resilient seat shall be Buna-N for valves 24 inches and larger and shall be fully adjustable and replaceable in the field.

H. All bearings shall be of the self-lubricating, corrosion-resistant, sleeve type. Bearings shall be designed for horizontal and/or vertical shaft loading. The valve assembly shall be furnished with a factory set two-way thrust bearing designed to center the valve disc in the valve seat at all times.

I. Shaft packing shall be of the V-type, self-adjusting type and suitable for pressure and vacuum service or PTFE, interlocking braid, self-compensating type. Stuffing boxes for pull down packing shall have a depth sufficient to accept at least four (4) rings of self-compensating type packing specifically selected for the operating pressure to be encountered.

J. The interior of valves 3 inches to 20 inches shall be completely rubber lined. The valve disc shall either be entirely 316 stainless steel or be epoxy coated from an AWWA NSF-61 coating system. The use of liquid epoxy on body interior surfaces shall not be allowed. Valves 24 inches and larger: the interior of the valve body and the exterior of the valve disc shall be cleaned and sandblasted and lining shall be

applied as per the Manufacturer's instructions. The lining material shall be in compliance with ANSI/NSF Standard 61, for contact with potable water. The lining material shall be "Pota-Pox" as manufactured by Tnemec, or equal. The interior lining shall be applied in a minimum of two coats at 4 – 5 mils per coat; the total dry thickness shall be 8 – 10 mils.

K. The exterior surfaces shall be cleaned and sandblasted and coating shall be applied in accordance with the Manufacturer's instructions. Surface cleanliness shall be inspected and any contaminants on the surface shall be removed prior to the coating operations. The coating material shall be "Pota-Pox" as manufactured by Tnemec, or equal. The coating material shall be applied in a minimum of two coats, at 4 – 5 mils per coat; the total dry thickness shall be 8 – 10 mils.

L. Valve installation shall be in strict accordance with the Manufacturer's printed recommendations, and the Contract Documents. Valve shaft shall be truly vertical or horizontal as indicated.

M. Four (4) copies of Final Operations and Maintenance Manuals are to be provided. The manuals shall include but not be limited to the following: installations and adjustment instructions; maintenance procedures and operation parameters; wiring diagrams; control diagrams; control sequence and instructions; lubrication schedule, including type, grade, temperature range, and frequency; diagrams and illustrations; test procedures, performance data; and parts list.

N. Upon completion of installation of the butterfly valves an acceptance test shall be conducted to verify the satisfactory to the **Engineer** before final acceptance will be made by the **Developer**.

O. The manufacturer warrants the workmanship and material to be free from defect for a period of one (1) year from the date of shipment from the factory. The manufacturer shall replace any parts deemed defective during the said time period, provided that the product has been properly applied and used for the purpose intended. The manufacturer must be notified of the alleged defect and provided with the proper data as to this application. The manufacturer at its discretion will repair or replace the product, F.O.B. factory. The manufacturer shall not be liable to the buyer or others for any consequential or incidental damage. The unit shall not be disassembled in any way by the buyer, unless written permission and instruction is provided by the manufacturer – otherwise the warranty is void. The buyer agrees that the manufacturer shall not be liable for any loss, cost, expense, or damages from the product, its uses, installation or replacement instructions, labeling, technical data, description of the product, its uses or warnings or lack of any of the foregoing. No other warranties, written or oral, expressed or implied, shall apply.

3.08 CHECK VALVES

A. Check valves shall have a cast iron or ductile iron body. Body seats shall be bronze or stainless steel. Valve body shall be enlarged to allow disc to swing in the waterway. When valve is full open, body design shall permit a "full flow" thru the valve equal to the nominal pipe diameter. They shall comply with AWWA Standard C-508's latest revision.

B. All cast iron parts shall conform to ASTM A126 Class B, or ASTM A48 Class 40C. All ductile iron shall conform to ASTM-A-536 GR 65-45-12. Castings shall be clean and sound without defects that will impair their service. No plugging or welding of such defects will be allowed.

C. Discs shall have a Buna-N rubber seat ring for sizes thru 3"-36" for water or sewage service.

D. Check valves shall be supplied with a side mounted lever arm and counter weight or spring to aid in the valve closure to prevent flow reversal.

E. Hinge pins shall be 304 Stainless Steel rotating in bronze bearings.

F. Bolts shall be electro-zinc plated steel with hex heads and hex nuts in accordance with ASTM A-307 and A-563 respectively.

G. Check valves shall be constructed to permit top entry for complete removal of internal components without removing the valve from the line. Gaskets shall be conventional in all sizes 3"-36". Valves shall be suitable for installation in either a horizontal or a vertical position.

H. The inside and outside of all valves shall be coated with two coats 8 mils total DFT of an NSF approved epoxy coating accordance with AWWA standards.

I. Marking shall be in accordance with AWWA C-508 and shall be in accordance with AWWA C-508 and shall include size, working pressure, and cast arrow to indicate direction of flow, and name of manufacturer.

J. Check valves shall be model SWL swing check valves as manufactured by Crispin Valves or equal.

3.09 AIR VALVES

A. Air Valves and boxes shall be installed on water lines at high points in the lines as shown on the plans or as directed.

B. The Air Valve assembly shall be made up of a standard yoke, curb stop, service tubing, locking corporation stop, and air release valve installed in a standard

residential meter box. The meter box protecting the assembly stop shall not be installed in a borrow ditch or other unsuitable location.

C. Air Valves for clean water service shall be the size and the type as per the project drawings.

D. Air Valves for clean water service shall be in full compliance with these specifications and AWWA standard C512-92 or latest revision.

E. Valve bodies shall be constructed of Cast Iron ASTM A126 Class B, Cast Iron ASTM A48 Class 40C, or Ductile Iron, ASTM A536 grade 65-45-12. The float shall be constructed of series 300 stainless steel, ASTM A240. The internal linkage or trim shall be made of Stainless Steel or corrosion resistant materials. Valves with plastic/nylon bodies, plastic/composite floats, and/or plastic linkage shall not be acceptable.

F. Unless otherwise shown or noted on the project drawings, valves shall be rated for a working pressure from 20 to 150 psig. Valves operating from 5 to 20 psig shall be designated as low pressure valves, and valves operating from 150 to 300 psig shall be designated as high pressure valves. Regardless of the working pressure all threaded inlet valve bodies shall be rated to withstand 300 psig. The **Contractor** shall verify the system pressures at the air valve location before air valves are ordered.

G. All threaded inlets and outlets shall be NPT standard for cast iron pipe threads. All flanged ends shall meet ANSI B16.1 Class 125/150# standards unless shown on the project drawings as Class 250/300#.

H. The valve exterior shall be coated with a rust inhibitive primer. The interior on valves 3 inches and larger shall have a minimum of two coats or 8 mils total thickness of Tnemec Pota-pox two-part epoxy paint or equal. All valves on dual body valves 3 inches or larger shall have the interior coating. The epoxy paint shall be white, beige, green or blue. As an option the interior and exterior of valves 3” and larger may be coated with a fusion bonded epoxy.

I. Exterior bolting on air valves 2 inches and smaller shall be carbon steel. The exterior bolting on air valves 3 inches and larger shall be type 18-8 or type 304 stainless steel.

J. Air valves shall be manufactured by one of the following manufacturers: Crispin / Multiplex, Apco / DeZurik, Cla-Val, Flo-Matic, GA Industries / Empire, Henry Pratt Company, Val-Matic, or approved equal.

K. Air Valves for clean water service shall be one of the following types:

1. AIR/VACUUM VALVE: This valve automatically exhausts large quantities of air during filling of the pipeline. It also allows air to re-enter the pipeline during

drainage or when negative pressure occurs. This valve shall close and be drip tight while the pipeline is pressurized.

Air/Vacuum Valves for clean water service shall have the same size inlet and outlet. Unless shown otherwise on the project drawings, valves 2 inches and smaller shall have N.P.T. inlets and outlets, and valves 3 inches and larger shall flanged inlets. Unless shown otherwise on the project drawings, valves 3 inches and larger shall have a hooded outlet to keep debris out of the valve.

Air/Vacuum Valves 3 inches and larger shall be equipped with a flanged Surge Check Valve. The Surge Check Valve shall be installed on the inlet of the Air/Vacuum Valve. The Surge Check valve shall have a Cast Iron ASTM A126 Class B, Cast Iron ASTM A48 Class 40C, or Ductile Iron, ASTM A536 grade 65-45-12 valve body. The valve Disc shall be type 316 Stainless Steel ASTM A351 Type CF8M with a type 316 stainless steel spring.

Air/Vacuum Valves 3 inches to 12 inches shall have a 1" tapped and plugged hole in the side of the body for the future addition of an Air Release Valve. Air/Vacuum Valves 14 inches and larger shall have a 2 inch tapped and plugged hole.

2. AIR RELEASE VALVES: This valve automatically exhausts small amounts of air that accumulate at the valve while the pipeline is pressurized.

   Air Release Valves for water service shall have N.P.T. outlets. Unless shown otherwise on the project drawings, valves 2 inches and smaller shall have N.P.T. inlets, and valves 3 inches and larger shall have flanged inlets.

   Air Release Valves 1 inch and larger shall be of the compound lever type.

3. COMBINATION VALVES: This valve shall have the same functions of an air/vacuum valve and air release valve combined.

   Combination Valves 2 inches and smaller shall be the single body type with the air/vacuum and air release functions in one housing. Combination valves 3 inches and larger shall be dual body type with an air release valve piped into the side of the air/vacuum valve. A gate valve shall be installed between the air/vacuum and air release valve to isolate the air release valve. Valves 3 inches and larger shall be equipped with a flanged Surge Check Valve. The Surge Check Valve shall be installed on the inlet of the Air/Vacuum Valve. The Surge Check valve shall have a Cast Iron ASTM A126 Class B, Cast Iron ASTM A48 Class 40C, or Ductile Iron, ASTM A536 grade 65-45-12 valve body. The valve Disc shall be type 316 Stainless Steel ASTM A351 Type CF8M with a type 316 stainless steel spring

   Unless shown otherwise on the project drawings, valves 2 inches and smaller shall have N.P.T. inlets and outlets, and valves 3 inches and larger shall have

flanged inlets. Unless shown otherwise on the project drawings, valves 3 inches and larger shall have a hooded outlet to keep debris out of the valve.

4. DEEP WELL AIR/VACUUM VALVE: This valve is installed between the pump discharge and a check valve. The Deep Well valve shall have an adjustable throttling outlet device. This valve automatically exhausts large quantities of air during pump start-up. It also allows air to re-enter the pump column during pump shutdown. This valve shall close and be drip tight while the pipeline is pressurized.

   The Throttling Top shall be adjusted in the field to allow all the air to escape before the check valve opens. Also, it shall be adjusted to keep the float ball from slamming into the resilient seat.

   Deep Well Valves shall have the same size inlet and outlet. Unless shown otherwise on the project drawings, valves 2 inches and smaller shall have N.P.T. inlets and outlets, and valves 3 inches and larger shall flanged inlets.

3.10 VALVE BOXES, CONCRETE COLLARS, AND MARKERS

A. Valve boxes shall be cast iron, two-piece, screw type with drop cover marked "Water". Concrete traffic boxes are required where they are located within the street or parking area. They shall be set vertically and properly adjusted so that the cover will be in the same plane as the finished surface of the ground or street.

B. Valve boxes shall be as manufactured by Mueller, Chapman, M & H, or approved equal.

C. A concrete collar as shown on the plans is to be poured around each valve box to prevent it from being disturbed or moved from its proper alignment. The minimum thickness of the concrete collars shall be 4 inches. Precast square collars are acceptable. The collar shall have a firm base and not be poured on fill or disturbed dirt.

D. For installations in rural areas, a valve marker as shown on the plans is to be installed in the vicinity of the valve box to insure easy location of the valve. Valve markers shall be as manufactured by Carsonite International. Provide blue color-coded marker with APWA/ULCC approved decal for use with potable water systems. The marker shall be located so as to prevent it from being moved or damaged by road maintenance equipment. It shall also have the distance to the valve painted on the back of the marker.

3.11 TAPPING SLEEVES

A. Tapping sleeves shall be of the Mechanical Joint (MJ) type. Tapping sleeves on 8 inches and below PVC water lines shall be either epoxy coated or stainless steel.

3.12 CONCRETE THRUST BLOCKS, ANCHORS, CRADLES, AND / OR ENCASEMENT

A. Poured in place concrete thrust blocks and Mechanical Joint Restraints shall be provided at all bends, tees and valves, dead-ends, tapping tees and all other points of unbalanced pressure where the pipe line could pull apart. Thrust blocks shall be as shown on the detail sheet and shall bear against the undisturbed trench face. Concrete shall be Class B concrete poured only in temperatures well above freezing. Cover fittings with plastic sheeting to prevent concrete from covering all nuts and bolts on fitting assemblies.

B. Concrete for anchors, cradles, or encasement shall be mixed sufficiently wet to permit it to flow under the pipe to form a continuous bed. No "sack crete" may be used for any anchors, cradles and/or encasement.

3.13 FIRE HYDRANTS

A. All fire hydrants shall conform to the requirements for the current standard specifications of the American Water Works Association for fire hydrants or ordinary water works practice (C502-54) except as such specifications are modified or amended herein, and shall be as manufactured by M & H Valve and Fittings Co., Mueller, or American Darling.

B. Three-way fire hydrants shall be furnished with two hose connections each two and one-half inches in diameter and one, four and one-half inch diameter pumper connection unless otherwise called for on the plans. Provide pent operating nut.

C. The height of each hydrant shall result in the correct vertical distance from the bottom hydrant to the finished ground line. Fire hydrants shall be raised or lowered to finished grade as necessary to meet this requirement.

D. Hydrants shall be designed for mechanical joint connections unless otherwise shown on the plans. Unless otherwise directed by the **Engineer**, the nozzles and caps shall be cased to National standard hose and streamer nozzle threads (see B-26-1925, with latest revision).

E. Hydrants shall be designed to open by turning the opening nut to the left, or counter-clockwise. An arrow and the word "OPEN" shall be cast in relief on the top of the hydrant to designate the direction of opening.

F. Fire Hydrants shall be painted or coated in the manner designated in the AWWA Specifications and named above (C503), the color or paint above the finished ground line to be as selected by the **Engineer**. After installation, the hydrants shall be repainted above ground if, in the opinion of the **Engineer**, the shop coating has been damaged or its appearance marred by handling.

G. Fire hydrants shall be installed in a vertical position at the location shown on the plans or directed by the **Engineer**. **ALL FIRE HYDRANT LOCATIONS INSIDE THE CITIES OF NOLENSVILLE AND BRENTWOOD ARE SUBJECT TO THE APPROVAL OF THEIR RESPECTIVE FIRE MARSHALLS.**

3.14 BLOW-OFF ASSEMBLIES

A. Blow-offs shall be installed at the location as shown on the plans, or as directed by the **Engineer**. The **Developer** prefers the use of the below ground blow-off assembly detailed on the Typical Details sheet of the Drawings. Use fire hydrants in residential subdivisions where practical.

3.15 SERVICE ASSEMBLIES

A. Water Meters

1. All new water meters shall meet the requirements of the latest "American Water Works Association Standard Specifications for Cold-Water Meters – Displacement Type."

2. Meters shall be housed in an all cast bronze case with hinged cover and shall be of the "Frost-proof" type. The meter register shall read in gallons and shall be hermetically sealed to prevent condensation and keep out water and foreign materials. The meters may be either of the piston operated type or of the disc operated type. The meter shall be equipped with a stainless steel strainer and shall be of the magnetic drive type. The MINIMUM meter size required is 5/8" by 3/4" where no fire suppression sprinkler system is to be installed or 1" where fire suppression sprinkler systems shall be installed. Meters and shall have maximum capacities as shown in the following table:

Meter Size	Maximum Capacity
5/8 inch x 3/4 inch	20 gpm
1-1/2 inch	100 gpm
2 inch	160 gpm

The meters shall be the magnetic-drive remote read meter as manufactured by the Neptune Meter Manufacturing Company, with lead free bronze body, or an approved equal, with remote read transmitting head.

3. Commercial meters larger than 2" in diameter shall be remote read meter as manufactured by the Neptune Meter Manufacturing Company compound meters, and shall be supplied by the **Contractor**. The customer shall be responsible for installing and maintaining a reduced pressure backflow preventer on all commercial services.

4. The customer shall be responsible installing and maintaining a double check valve on all fire lines.

B. Meter Boxes

1. Meter boxes shall fall in to one of the following categories:
   a. Non-Traffic Rated: All meter boxes for ¾" meters and 1" meters, which can be located within grass, shall be plastic meter boxes as manufactured by Mid-States Plastics, Inc., Model MSBCF-1324-18XL for both. Lids shall be Model MSCBC-1324-R ductile iron lids with AMR reader opening.
   b. Traffic Rated: All meter boxes for ¾" meters and 1" meters, which must be located within a driveway, pavement, or other traffic bound surface, shall be a traffic rated two-piece concrete meter box. Lids shall be John Bouchard & Sons Co. 8110X Cover with Hole.

2. All meter boxes for 2" meters shall be concrete meter vaults with outside dimensions of approximately 37" wide by 67" long by 34" deep. Access doors shall be Halliday Products, Inc. aluminum plates with stainless steel hardware and a recessed lift handle.

C. PEXa Pipe for Water Services (¾", 1", or 2")

1. Service connection piping shall be as manufactured by "Municipex" PEX "A" SDR 9 or equal service connection piping meeting AWWAC904-Latest Revision, ASTM F876, and NSF-14.

2. Special care shall be taken to protect the service piping. Provide approximately 18 inches slack in the service tubing with each service installation.

3. The minimum cover on plastic service lines shall be 24 inches. **Furnish and install plastic inserts at all service tubing connections.**

4. Prior to backfilling, the **Contractor** shall install 12 Gauge copper-clad wire with all PVC and PEXa pipe including service tubing for locating the pipe.

5. Service tubing crossing streets and roads shall be placed in a 2 inch PVC casing pipe.

D. Water Service Connections

1. Note: All products must be certified "Lead Free."

2. Water service connections shall be made in the following manner:
   a. Corporation Stops
      i. Ford # F1000-3-Q CC
      ii. Mueller H15008 CCXCTS

b. Coppersetters
    i. Ford 5/8" x 3/4" VH72-7W-41-33-Q Compx or equal with 7-inch rise, compression X all-purpose nut, and dual check valve
c. Copper Meter Yokes (1-1/2" or 2" flanged meter)
    i. Mueller B-2423-2N with 2" by 12" rise

3.16 DETECTION WIRE AND DETECTION TAPE

A. Prior to backfilling, the **Contractor** shall install 12 Gauge copper-clad wire with all PVC and PEXa pipe including service tubing for locating the pipe. The detection wire shall be continuous and shall be connected to all valve boxes, fire hydrants, and flush hydrants. The **Contractor** shall include the cost of the Detection Wire in the unit price per linear foot for the various pipe sizes. Wire shall be taped to the top of the pipe and shall loop up into valve boxes.

B. After the pipe has been installed and backfilling has been completed to a depth of 12 inches above the pipe, the **Contractor** shall install 2-inch-wide Linegard Tape or an approved equal material for locating the pipe after backfilling has been brought to the original ground level. The **Contractor** shall include the cost of the Detection Tape in the unit price per linear foot for the various pipe sizes.

PART 4 – EXCAVATION AND BACKFILL

4.01 GENERAL

A. Ductile Iron Pipe shall be laid in accordance with manufacturer's recommendations and AWWA C600.

B. For new construction, all streets and roads must be to grade prior to water main installation.

C. Water lines shall be laid on trench bottoms first backfilled with 6 inches of crushed stone bedding to provide continuous support for the entire length of the line. All valve and hydrant stems are to be installed plumb.

D. The pipe and fittings shall be inspected for defects immediately before being lowered into the ditch. When pipe laying operations are suspended, a watertight plug shall be inserted in the open ends of the pipe. All cuts shall be in accordance with the manufacturer's specification.

E. Pipe shall be laid with the bell ends facing in the direction of laying and shall be jointed in accordance with the manufacturer's recommendations.

4.02 TRENCH EXCAVATION

A. The minimum trench width shall be the pipe diameter plus 18 inches.

B. The depth of the trench shall provide a minimum of 30 inches of cover over the top of the pipe except where the pipe is located in a borrow ditch, or under a highway or roadway, no less than 48 inches of cover shall be provided.

C. Otherwise, the depth of the trench shall provide a maximum of 48 inches of cover over the top of the pipe.

D. Where rock is encountered, the trench shall be excavated to a depth of 6 inches below the bottom of the pipe to provide space for 6 inches of crushed stone bedding.

E. Installation of pipe in a borrow ditch will be accepted only where alternate locations are unavailable. The following will prevail in this situation:

1. The cover depth of the pipe will be increased to no less than 42 inches.

2. Gate valves and blow-offs will not be located in a borrow ditch.

F. All depths of cover are measured to the top of the pipe to the nearest finished grade at pipe location.

G. Lateral Cover: Where the pipe trench runs adjacent and parallel to a ditch a minimum lateral dimension cover of 30 inches will also be maintained as measured from the side of the pipe to the ditch wall.

4.03 ROCK EXCAVATION AND BLASTING

A. All blasting shall be conducted in accordance with the municipal ordinances and state laws. All damage done by blasting is the responsibility of the **Contractor**, and shall be promptly and satisfactorily repaired by same.

4.04 REMOVAL OF WATER

A. The **Contractor** shall provide adequate facilities for promptly removing water from all pipe line trenches and excavations. No mains shall be installed in trenches with standing water.

4.05 DISPOSAL OF EXCAVATED MATERIAL

A. All excavated material not needed for backfilling purposes shall be disposed of in a satisfactory and responsible manner.

4.06 CRUSHED STONE FOR PIPE BEDDING

A. The pipe shall be bedded with crushed stone. Dirt, sand, and fine gravel are not acceptable bedding materials.

B. Crushed stone bedding will be placed in the trench for a depth no less than 6" below the pipe and 12 inches above the pipe.

C. Crushed stone shall be size 1/4 inch to 3/4 inch as set out in the Standard Specifications of the Tennessee Department of Transportation. The **Contractor's** unit price bid for pipe installation shall include a 6-inch bed of crushed stone and cover to a depth of 12 inches above the top of the pipe with the same material.

4.07 BACKFILLING PIPELINE TRENCHES

A. Backfilling shall be conducted at all times in a manner to prevent damage to the pipe and the exterior protection of the pipe. Placing of backfill about exterior protected pipe shall be done in the presence of the **Developer** after the **Developer's** final inspection and acceptance of the pipe in place.

B. For backfilling of a trench in dirt where rock excavation is not required, crushed stone bedding will be placed in the trench for a depth no less than 6" below the pipe and 12" above the pipe.

C. In filling the remainder of the trench, the backfill material may be shoved into the trench with the blade of a grader or high lift. Compaction will generally be accomplished by "weathering in." Where tamping is required, the backfilling shall all be done in layers not exceeding six (6) inches and firmly tamped into place by tampers or rammers.

D. Before final acceptance, the **Contractor** will be required to level off all trenches where backfill material has been piled up, or to bring the trench up to the level of the surrounding street, roadway, or terrain. The **Contractor** will be required to remove from the streets, roadways, and private property all excess earth or other materials and obtain release from the agency responsible for the road or street or from property owners when on private easements.

E. Where mains cross lawns the topsoil shall be replaced and the lawn seeded and covered with straw. Where sod is present prior to construction the lawn shall be repaired with new sod as necessary.

F. Seeding and strawing will be required across the entire disturbed length of the project with the exception of paved and graveled areas.

PART 5 – PAVEMENT REPAIR AND SIDEWALK REPLACEMENT

5.01 GENERAL

A. The **Contractor** shall replace all street, alleys, driveways, and roadways, which may be removed, disturbed, or damaged in connection with his operation under this contract. He shall reconstruct same to the satisfaction of the Tennessee Department of Transportation, Williamson County Highway Department, or other legal entity having jurisdiction. Crushed stone or creek gravel shall be used as backfill material at these locations.

B. The **Contractor** will be paid for street replacement only where the line is constructed within the paved surface. Care shall be exercised to minimize damage to graveled shoulders and paved surfaces.

C. Gravel, crushed limestone, bituminous materials, or other materials, used in the resurfacing of streets, shall meet the current requirements of the Tennessee Department or Transportation Specifications.

D. The **Contractor** shall be held responsible for any and all damage occurring to street paving, driveways, yards, mailbox areas, etc., due to his operation outside of the actual limits of his work and shall replace any such damage to as good or better condition than that which existed prior to the **Contractor's** operations, at no additional cost to the **Developer**.

E. The above responsibilities will also apply to areas located between the street/road rights-of-way and private property.

5.02 TRAFFIC BOUND BASE COURSE

A. On all trenches, where replacing streets is required, it shall be handled in the following manner:

1. The **Contractor** shall use crushed stone as a traffic- bound base course, at the proper elevation to allow for settlement, but not in such a way as to prevent traffic from using it. Crushed stone shall be Tennessee Department of Transportation Size Number 33C.
2. The **Contractor** may be required by the **Engineer** to maintain the traffic bound base course by adding crushed stone as specified hereinbefore in a safe and passable condition for a period of sixty (60) days, or until such time as in the opinion of the **Engineer** sufficient settlement has taken place; and trenches are ready for final resurfacing. Crushed stone will be paid for at the unit bid price specified in the contract.

5.03 SUBGRADE FOR FINAL RESURFACING

A. The traffic bound course hereinbefore described shall comprise the base course for all types of resurfacing.

B. When, in the opinion of the **Engineer**, the trench has reached a condition of settlement satisfactory for final resurfacing, the **Contractor** shall first strip the base course, or backfill with crushed stone, size as hereinbefore specified, to obtain the proper subgrade elevation. The subgrade shall then be rolled with an approved type roller, or tamped until thoroughly compact. Any depressions shall be filled with crushed stone, as specified hereinbefore, and the process of rolling or tamping continued until the subgrade has a smooth and uniform surface.

5.04 PORTLAND CEMENT CONCRETE PAVEMENT

A. Where Portland Cement concrete pavement is to be replaced, or is required under bituminous replacement, it shall conform to the existing pavement and/or the **Engineer's** instructions (not less than 6-inch thickness), and be accomplished with Class "A" concrete.

5.05 ASPHALTIC CONCRETE PAVEMENT

A. Where asphaltic concrete pavement is to be replaced, the sub-grade shall be prepared as hereinbefore specified, and this subgrade shall comprise the base course upon which the concrete subslab and/or the bituminous pavement shall be laid.

B. Where no Portland Cement concrete sub-slab is required, the subgrade or base shall be thoroughly cleaned and broomed, and a prime coat of medium tar shall be uniformly applied by a pressure distributor or other approved pressure spray method.

C. When the prime coat has become tacky but not dry and hard, a bituminous surfacing consisting of asphaltic concrete shall be placed, spread, finished and compacted in accordance with the current standard specifications of the Tennessee Department of Highways Section 104. Compacted thickness of asphaltic concrete pavement replacement shall be 1-1/2 inches.

5.06 BITUMINOUS SURFACING (SURFACE TREATMENT)

A. Where bituminous surfacing is to be as shown on the plans, or as directed by the **Engineer**, the traffic bound base shall comprise the subgrade upon which the bituminous surfacing shall be constructed.

B. After the sub-grade or base has been prepared, thoroughly cleaned and broomed, a prime coat of medium tar shall be applied at the rate of .30 to .35 gallons per square yard.

C. When the prime coat has become tacky but not hard, bituminous material (asphalt of the grade directed by the **Engineer**) shall be applied in two (2) applications at the rate of 0.35 to 0.45 gallons per square yard for each application. The **Contractor** shall apply approximately 50 pounds per square yard of crushed stone chips between the two (2) applications of bituminous material and 35-40 pounds of chips after the final application of bituminous material.

D. Materials and workmanship shall conform to the current standard specifications of the Tennessee Department of Transportation, County, or City having jurisdiction.

5.07 UNTREATED SURFACE

A. Where the existing surface is untreated gravel or stone, the **Contractor** shall reuse native materials possible using crushed stone as required, replace the surfacing that is disturbed or removed with crushed stone as hereinbefore specified.

B. The traffic bound course hereinbefore specified shall comprise this type of surfacing; except prior to the final acceptance, the **Contractor** shall fill all depressions with crushed stone as hereinbefore specified, and thoroughly roll and grade to the existing surface.

5.08 BORED HIGHWAY, RAILROAD, AND STREAM CROSSINGS

A. Where required, the **Contractor** shall bore highway, railroad, and stream crossings. A smooth wall steel carrier pipe having a minimum wall thickness of 0.25 inches shall be installed. Where open cut crossings are shown, the **Contractor** may bore with the prior approval of the **Engineer**.

B. The **Developer** and / or **Engineer** shall not be responsible for any accident resulting from the boring or open-cut operation or traffic accident caused by the work being performed in or under the right-of-way. The **Contractor** shall be solely responsible for the safety of the workmen and passers-by during the course of the work and until such time the completed work has been accepted by the governing utilities. The **Contractor** shall include in his bid the cost of necessary flagmen and watchmen to insure safe completion of the crossings.

PART 6 – DIRECTIONAL BORING

6.01 GENERAL

A. All directional drilling operations shall be done by a qualified directional drilling **Contractor** with at least (3) years' experience involving work of a similar nature to the work required of this project.

B. Notify the **Engineer** and the **Developer** a minimum of three (3) days in advance of the start of work.

C. All work shall be performed in the presence of the **Developer** or the **Engineer**.

D. The directional drilling equipment shall consist of a directional drilling rig of sufficient capacity to perform the bore and pull back the pipe, a drilling fluid mixing, delivery and recovery system of sufficient capacity to successfully complete the installation, a drilling fluid recycling system to remove solids from the drilling fluid so that the fluid can be reused (if required), a magnetic guidance system or walk-over system to accurately guide boring operations, a vacuum truck of sufficient capacity to handle the drilling fluid volume, and trained and competent personnel to operate the system. All equipment shall be in good, safe condition with sufficient supplies, materials and spare parts on hand to maintain the system in good working order for the duration of this project.

6.02 DRILLING RIG

A. The directional drilling machine shall consist of a hydraulically powered system to rotate and push hollow drilling pipe into the ground at a variable angle while delivering a pressurized fluid mixture to a guidable drill (bore) head. The machine shall be anchored to the ground to withstand the pulling, pushing and rotating pressure required to complete the installation. The hydraulic power system shall be self-contained with sufficient pressure and volume to power drilling operations. Hydraulic system shall be free of leaks. Rig shall have a system to monitor and record maximum pull-back pressure during pull-back operations. There shall be a system to detect electrical current from the drill string and an audible alarm which automatically sounds when an electrical current is detected.

6.03 DRILL HEAD

A. The drill head shall be steerable by changing its rotation, and shall provide necessary cutting surfaces and drilling fluid jets.

6.04 MUD MOTORS (IF REQUIRED)

A. Mud motors shall be of adequate power to turn the required drilling tools.

6.05 DRILL PIPE

A. Shall be constructed of high quality 4130 seamless tubing, grade D or better, with threaded box and pins. Tool joints should be hardened to 32-36 RC.

6.06 MGS PROBE

A. An electronic walkover tracking system or a Magnetic Guidance System (MGS) probe or proven gyroscopic probe and interface shall be used to provide a continuous and accurate determination of the location of the drill head during the drilling

operation. The guidance shall be capable of tracking at all depths up to fifty feet and in any soil condition, including hard rock. It shall enable the driller to guide the drill head by providing immediate information on the tool face, azimuth (horizontal direction), and inclination (vertical direction).

B. The guidance system shall be accurate and calibrated to manufacturer's specifications of the vertical depth of the borehole at sensing position at depths up to fifty feet and accurate to 2-feet horizontally.

C. The **Contractor** shall supply all components and materials to install, operate, and maintain the guidance system.

D. The guidance system shall be of a proven type, and shall be set up and operated by personnel trained and experienced with the system. The operator shall be aware of any geo-magnetic anomalies and shall consider such influences in the operation of the guidance system.

6.07 MIXING SYSTEM

A. A self-contained, closed, drilling fluid mixing system shall be of sufficient size to mix and deliver drilling fluid composed of bentonite clay, potable water, and appropriate additives. Mixing system shall be able to molecularly shear individual bentonite particles from the dry powder to avoid clumping and ensure thorough mixing. The drilling fluid reservoir tank shall be minimum of 1,000 gallons. Mixing system shall continually agitate the drilling fluid during drilling operations.

6.08 DRILLING FLUIDS

A. Drilling fluid shall be composed of clean water and bentonite clay. Water shall be from an authorized source with a pH of 8.5 - 10. Water of a lower pH or with excessive calcium shall be treated with the appropriate amount of sodium carbonate or equal. No additional material may be used in drilling fluid without prior approval from the **Engineer**. The bentonite mixture used shall have the minimum viscosities as measured by a March funnel:

Rocky Clay	60 seconds
Hard Clay	40 seconds
Soft Clay	45 seconds
Sandy Clay	90 seconds
Stable Sand	80 seconds
Loose Sand	110 seconds
Wet Sand	110 seconds

B. These viscosities may be varied to best fit the soil conditions encountered, or as determined by the operator.

6.09 DELIVERY SYSTEM

A. The mud pumping system shall have a minimum capacity of 35-500 GPM and the capability of delivering the drilling fluid at a constant minimum pressure of 1200 psi. The delivery system shall have filters in-line to prevent solids from being pumped into drill pipe. Used drilling fluid and drilling fluid spilled during operations shall be contained and conveyed to the drilling fluid recycling system or shall be removed by vacuum trucks or other methods acceptable to the **Engineer**. A berm, minimum of 12-inches high, shall be maintained around drill rigs drilling fluid mixing system, entry and exit pits and drilling fluid recycling system to prevent spills into the surrounding environment. Pumps and or vacuum truck(s) of sufficient size shall be in place to convey drilling fluid from containment areas to storage and recycling facilities for disposal.

6.10 PIPE ROLLERS

A. Pipe rollers shall be used for pipe assembly during final product pull back.

6.11 RESTRICTIONS

A. Other devices or utility placement systems for providing horizontal thrust other than those previously defined in the preceding sections shall not be used unless approved by the **Engineer** prior to commencement of the work. Consideration for approval will be made on an individual basis for each specified location. The proposed device or system shall maintain line and grade within the tolerances prescribed by the particular conditions of the project.

6.12 PERSONNEL

A. All personnel shall be fully trained in their respective duties as part of the directional drilling crew and in safety. Each person must have at least two years directional drilling experience.

B. A competent and experienced supervisor representing the **Contractor** and Drilling Subcontractor shall be present at all times during the actual drilling operations. A responsible representative who is thoroughly familiar with the equipment and type of work to be performed must be in direct charge and control of the operation at all times. In all cases, the supervisor must be continually present at the job site during the actual Directional Bore operation. The **Contractor** and Subcontractor shall have a sufficient number of competent workers on the job at all times to insure the Directional Bore is made in a timely and satisfactory manner.

C. Personnel who are unqualified, incompetent or otherwise not suitable for the performance of this project shall be removed from the job site and replaced with a suitable person.

6.13 CONSTRUCTION SEQUENCING

A. The **Contractor** shall provide all material, equipment, and facilities required for directional drilling. Proper alignment and elevation of the bore hole shall be consistently maintained throughout the directional drilling operation. The method used to complete the directional drill shall conform to the requirements of all applicable permits. Copies of all permits will be supplied to the **Contractor** by the **Developer**.

B. The entire drill path shall be accurately surveyed with entry and exit stakes placed in the appropriate locations within the areas indicated on drawings. If **Contractor** is using a magnetic guidance system, drill path will be surveyed for any surface geo-magnetic variations or anomalies.

C. The **Contractor** shall place slit fence between all drilling operations and any drainage, well-fields, wetland, waterway or other area designated for such protection necessary by documents, state, federal and local regulations. Additional environmental protection necessary to contain any hydraulic or drilling fluid spills shall be put in place, including berms, liners, turbidity curtains and other measures. **Contractor** shall adhere to all applicable environmental regulations. Fuel may not be stored in bulk containers within 200 feet of any water body or wetland.

D. Upon approval of the pilot hole location, the hole opening or enlarging phase of the installation shall begin. The bore hole diameter shall be increased to accommodate the pullback operation of the required size of PVC pipe. The type of hole opener or back reamer to be utilized in this phase shall be determined by the types of subsurface soil conditions that have been encountered during the pilot hole drilling operation. The reamer type shall be at the **Contractor's** discretion with the final hole opening being a maximum of 1.5 times larger than the outside diameter of the pipe to be installed in the bore hole.

E. The open bore hole may be stabilized by means of bentonite drilling slurry pumped through the inside diameter of the drill rod and through openings in the reamer. The drilling slurry must be in a homogenous / flowable state serving as an agent to carry the loose cuttings to the surface through the annulus of the borehole. The volume of bentonite mud required for each pullback shall be calculated based on soil conditions, largest diameter of the pipe couplings, capacity of the bentonite mud pump, and the speed of pullback as recommended by the bentonite drilling fluid manufacture. The bentonite slurry is to be contained at the exit or entry side of the directional bore in pits or holding tanks. The slurry may be recycled at this time for reuse in the hole opening operation, or shall be hauled by the **Contractor** to an approved dumpsite for proper disposal.

F. The pipe shall be joined together according to manufacturer's specifications. The gaskets and the ends of pipe must be inspected and cleaned with a wet cloth prior to

each joint assembly so they are free of any dirt or sand. The ends of pipe must be free of any chips, scratches, or scrapes before pipe is assembled. A pulling eye will be attached to the pipe pulling head on the lead stick of pipe which in turn will be attached to a swivel on the end of the drill pipe. Tracer wire (#8) solid coated copper wire shall be attached to the pulling eye and the crown of PVC pipe with a minimum of two full wraps of duct tape around the pipe. This will allow for a straight, smooth pull of the product pipe as it enters and passes through the borehole toward the drill rig and original entrance hole of the directional bore. The product pipe will be elevated to the approximate angle of entry and supported by means of a sideboom with roller arm, or similar equipment, to allow for the "free stress" situation as the pipe is pulled into the exit hole toward the drill rig. The product pullback phase of the directional operation shall be carried out in a continuous manner until the pipe reaches the original entry side of the bore.

G. Following drilling operations, **Contractor** will de-mobilize equipment and restore the work site to the original conditions or better. All excavations will be backfilled and compacted according to the specifications.

H. Surface restoration shall be completed in accordance with the requirements of the contract, to a condition as good as or better than existed prior construction.

I. The **Contractor** shall maintain a daily project log of drilling operations and a guidance system log with a copy given to the **Engineer** at completion of project.

J. The **Contractor** shall furnish "as-built" plan and profile drawing based on the log data showing the actual location horizontally and vertically of the installation, and all utility facilities found during the installation.

PART 7 – TESTING AND DISINFECTION

7.01 TESTING OF LINES

A. After pipe has been laid and backfilled (as specified hereinbefore) all pipe or any valved section thereof shall be subjected to a hydrostatic pressure of the rated pressure of the pipe. The duration of each pressure/leakage test shall be at least three hours. Under no circumstance will any pipe be subjected to pressures in excess of the rated pressure of the pipe. The **Developer** will not accept or approve payment for any pipe which has been subjected to pressures in excess of the pipe's rated pressure.

B. The **Contractor** shall furnish the necessary pump, recorder, gauges, meter, connections, and other equipment to properly test each section of line. A pressure recorder and charts shall be installed at every test section to record the pressure during the tests. The **Contractor** will provide pressure recorder – the **Engineer** will not provide pressure recorder. A meter shall be installed on the testing pump which measures the amount of water required to re-pressurize the main to its rated pressure after three hours.

C. No section of water line will be accepted by the **Engineer** for final payment until a satisfactory pressure/leakage test has been recorded. The charts become the property of the **Developer**.

D. Leakage shall be determined by the metered water pumped into the installed section of water main to return the line pressure to the specified test pressure. Leakage testing shall be conducted after service taps are completed.

E. Maximum allowable leakage per 1,000 feet of pipe shall be:

3 Hour Test

Pipe Diameter	@ 200 psi
2”	0.10 gallon
4”	0.20 gallon
6”	0.30 gallon
8”	0.40 gallon
10”	0.50 gallon
12”	0.60 gallon
16”	1.06 gallon
18”	1.35 gallon
20”	1.67 gallon

F. The normal length of pipe to be subjected to an individual pressure test is approximately 6,000 L.F. Pressure tests extending along more or less pipe length can be granted at discretion of the **Developer**.

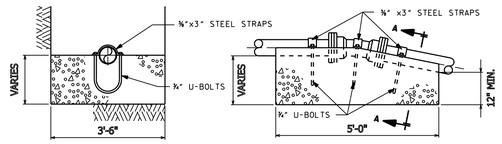
G. Approved gauges filled with oil will be the only type gauge allowed for pressure testing.

H. The test shall be performed for three hours at approximately 200 psi. Where elevations vary significantly along the length of pipe under test, the **Developer** may direct that the test pressure at the test pump location be reduced to insure a 200 psi maximum pressure at the lowest pipe elevation under test.

7.02 DISINFECTION OF LINES

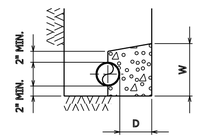
A. The new water lines shall not be placed in service -- either temporarily or permanently -- until they have been thoroughly disinfected in accordance with the following requirements and to the satisfaction of the **Developer**.

B. After testing, a solution of hypochlorite using HTH or equal shall be introduced into the section of the lines being disinfected sufficient to insure a chlorine dosage of at least 50 ppm in the lines. While the solution is being applied, the water shall be allowed to escape at the ends of the lines until test indicates that a dosage of at least 50 ppm has been obtained throughout the pipe. The chlorinated water shall be allowed to remain in the pipe for 24 hours. A residual of at least 25 ppm shall be present in the pipe at the end of the 24-hour period. After the chlorinated water has remained in the lines for 24 hours, the line shall be flushed clean and refilled with water having a chlorine residual of 2 ppm. A bacteriological sample will be taken by the Certified Water System Operator or by the **Contractor** under the guidance of the Certified Operator. If a negative sample is obtained, the line shall be thoroughly flushed and then may be connected to the system. If a positive sample is obtained, the disinfection procedure must be repeated until a negative sample is obtained. The cost of the bacteriological test shall be borne by the Developer.

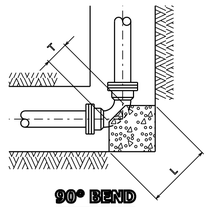


SECTION A-A

VERTICAL BEND ANCHOR



TYPICAL SECTION



90° BEND

NOTE: ALL FITTINGS 3" THRU 16" TO BE MECHANICAL JOINT SSB CLASS 350 DUCTILE IRON FITTINGS

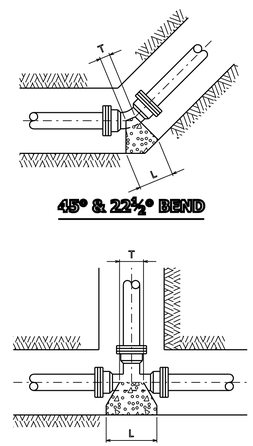
90^ BEND								
SIZE	6"	8"	10"	12"	16"	18"	20"	24"
D	8"	10"	12"	12"	12"	16"	20"	20"
L	24"	27"	30"	34"	48"	51"	54"	70"
W	12"	16"	20"	24"	28"	34"	40"	44"
T	16"	18"	20"	22"	36"	40"	44"	50"

45^ & 22½^ BEND								
SIZE	6"	8"	10"	12"	16"	18"	20"	24"
D	6"	6"	6"	6"	6"	8"	8"	16"
L	18"	20"	22"	24"	34"	40"	45"	52"
W	12"	14"	16"	18"	22"	25"	28"	32"
T	16"	16"	18"	18"	28"	33"	37"	46"

11¼^BEND								
SIZE	6"	8"	10"	12"	16"	18"	20"	24"
D	6"	6"	6"	6"	6"	8"	16"	16"
L	14"	16"	18"	20"	30"	36"	41"	48"
W	12"	14"	16"	18"	22"	25"	28"	32"
T	14"	14"	16"	16"	26"	31"	35"	44"

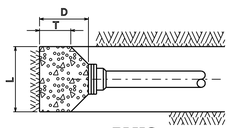
TEE								
SIZE	6"	8"	10"	12"	16"	18"	20"	24"
D	8"	10"	12"	12"	12"	16"	38"	38"
L	18"	18"	22"	27"	28"	30"	46"	48"
W	12"	16"	20"	24"	28"	34"	48"	48"
T	12"	12"	16"	18"	20"	22"	24"	24"

PLUG								
SIZE	6"	8"	10"	12"	16"	18"	20"	24"
D	18"	24"	30"	30"	30"	30"	30"	30"
L	18"	24"	30"	30"	48"	48"	48"	48"
W	18"	18"	24"	24"	30"	30"	48"	48"
T	12"	12"	12"	12"	12"	18"	24"	24"



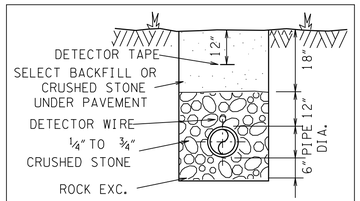
45° & 22½° BEND

TEE



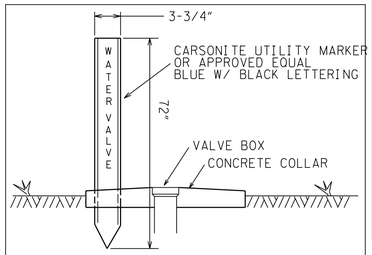
PLUG

CONCRETE BLOCKING FOR FITTINGS



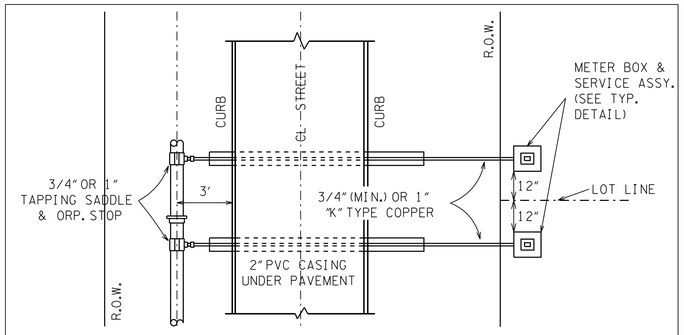
PIPE BEDDING IN ROCK

N.T.S.



TYPICAL VALVE MARKER

N.T.S.



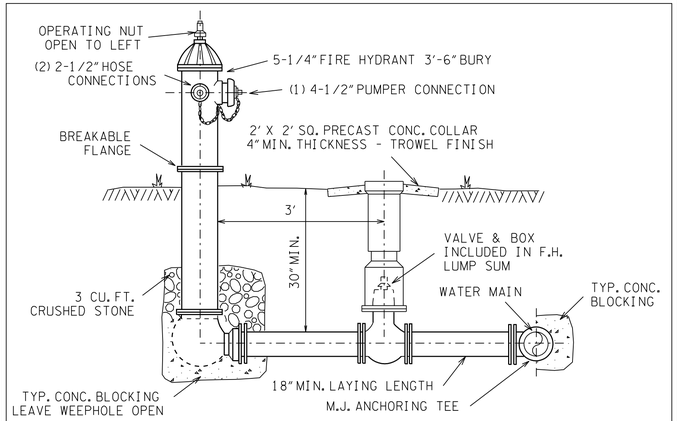
TYPICAL SERVICE INSTALLATION

N.T.S.

WHEN FIRE SUPPRESSION SPRINKLERS ARE TO BE INSTALLED IN RESIDENCE, USE INDIVIDUAL 1" METER AND COPPER SERVICE FOR EACH RESIDENCE.

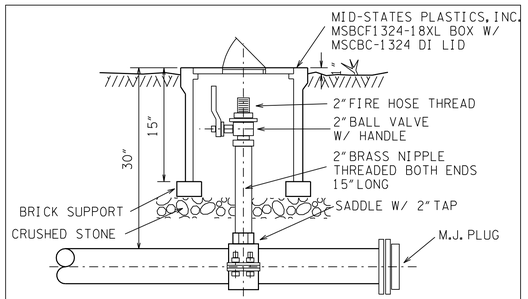
NOTE TO CONTRACTOR: CASING PIPE IS REQUIRED UNDER ALL CROSSINGS.

DIA. WM	DIA. CASING REQUIRED	BORED
8" PVC	15" PVC SDR 35	16" STEEL
6" PVC	12" PVC SDR 21	12" STEEL
3/4" OR 1" COPPER	2" PVC SDR 2	12" PVC



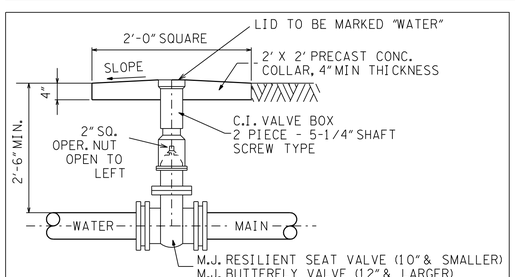
TYPICAL FIRE HYDRANT SETTING

N.T.S.



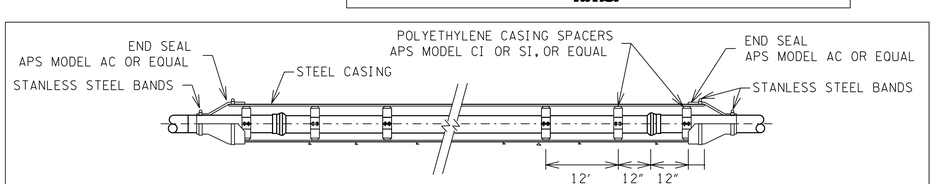
2" BLOW OFF ASSEMBLY DETAIL

N.T.S.



TYPICAL VALVE SETTING DETAIL

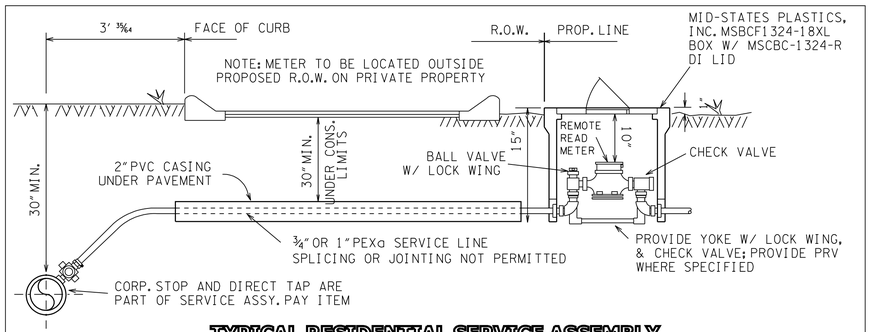
N.T.S.



CASING DETAIL

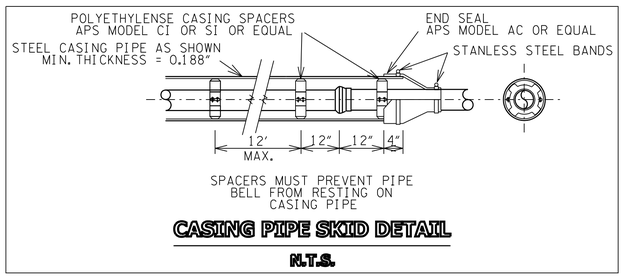
N.T.S.

SPACERS MUST PREVENT PIPE BELL FROM RESTING ON CASING PIPE



TYPICAL RESIDENTIAL SERVICE ASSEMBLY

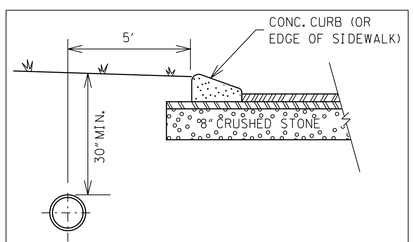
N.T.S.



SPACERS MUST PREVENT PIPE BELL FROM RESTING ON CASING PIPE

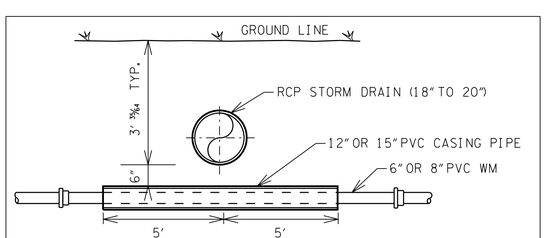
CASING PIPE SKID DETAIL

N.T.S.



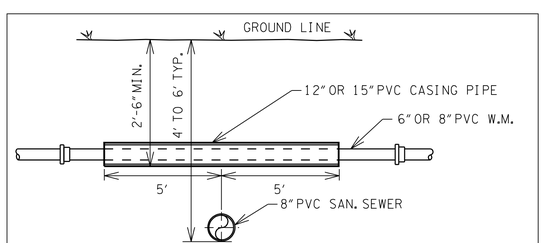
LOCATION OF WATER MAIN IN RELATION TO THE STREET

N.T.S.



TYP. STORM DRAIN CROSSING

N.T.S.



TYP. SANITARY SEWER CROSSING

N.T.S.

Joel B. Spaulding & Company, Inc.
Consulting Engineers
Bruce Spaulding, PE | J.B. Spaulding, PE, LEED AP

Joel B. Spaulding & Company, Inc.
Consulting Engineers
5822 West End Avenue, Suite 106
Nashville, Tennessee 37205
Phone: (615) 255-7788
Email: info@joelbspaulding.com
www.joelbspaulding.com

Kings Chapel Subdivision
Williamson County, Tennessee
Typical Water System Details

STATE PROJECT NUMBER

7/11/17

PLAN STATUS	
DATE	DESCRIPTION
DESIGN	DRAWN / CHECKED

SCALE: As Shown

JOB No.

DATE : July 2017

FILE No.

SHEET 1 OF 1

EXHIBIT 9

CURRENT TARIFFS OF
NOLENSVILLE/COLLEGE GROVE UTILITY DISTRICT

SCHEDULE OF RATES AND CHARGES

1. **Monthly Service Rates Revised March 16, 2017**

Residential & Commercial	0 gallons	$17.61 (min. bill)
	1 – 20,000 gallons	$ 5.50 per 1000 gals.
	20,001 – 50,000 gallons	$ 7.62 per 1000 gals.
	Over 50,000 gallons	$10.15 per 1000 gals.

(Taxes not included)
The District adopts the above rate structure designed to encourage the conservation of water used for irrigation purposes and to assist in financing capital improvements necessary to meet irrigation demands of its customers.

2. **Service Fee**

Residential - $75.00
Commercial - $75.00

3. **Tap Fees (includes service fee)**

Residential:	¾ inch	$1500.00
	1 inch	$2000.00
Commercial:	¾ inch	$2000.00
	1 inch plus*	$2500.00/inch

*Per inch meter size plus labor and materials

4. **Transportation and Storage Fee**

Residential (Developer): ¾ inch $1500/per lot*
* To be paid upon execution of water service contract

Commercial:

Transportation and Storage Fees for commercial customers shall be based upon equivalent single-family units (SFUs). The peak daily demand of a single-family unit is 350 gallons per day (gpd). The equivalent number of SFUs for a commercial customer shall be determined by estimating the customer's flow demand in gallons per day by using the DISTRICT's Water Usage Guide for Computing Fees and dividing that flow by 350 gallons per day and multiplying that number by the Residential Transportation and Storage Fee. For uses not covered by the Water Use Guide for Computing Fees, The DISTRICT shall estimate the peak daily demand of the commercial customer on other nationally recognized publications or such otter data as may be available.

Minimum Commercial Transportation and Storage Fee $2000.00
Irrigation: 3/4 and 1 inch - $2000/$2500

Larger than 1 inch - $2500/inch

5. Administrative Fees

14% of the DISTRICT's estimate of all "on-site" and "off-site" improvements needed to serve the project (includes 6% engineering fee)

6. Fire Hydrant Installation Cost

$4500.00 plus all labor and material costs for installation
(when installed by N/CG Utility District)
Adopted March 10, 2015

7. Application Review and Engineering Report Fee

2-10 lots	$250
11-20 lots	$350
21-30 lots	$450
31-40 lots	$550
41-50 lots	$650
51-75 lots	$750
76-100 lots	$850
101+ lots	$1000

For the purposes of calculating the application review fee, each separate condominium unit, apartment, business office, or other single occupant in a multi-unit facility shall be considered a lot.

8. Automatic Sprinkler Systems for Fire Protection

Effective September 13, 2016
All Fire Line Taps are $2,500.00 per inch

9. Additional Fees

Returned Checks	$35.00*
Automatic Draft Returns	$35.00 + Bank & APS fees
Reconnection fee	$40.00 during office hours $65.00 after office hours
Credit Cards	$3.25*

10. **Sprinkler Taps** (Adopted Sept. 8, 1998)

Effective Feb. 13, 2001 no sprinkler taps will be set without approval of the board.

11. **Moving Taps**

To move an existing ¾ residential tap - $1500.00 - Taps will be moved at the sole discretion of the District – additional cost may be incurred under extenuating circumstances.

12. **Meter Testing Fee**

For customers requesting that their meter be tested:
Residential Meters – (5/8" – 1") $150.00
Commercial meters 2" and above - $200.00 plus the cost of the test.
Note: The fee will be waived if the meter tests above the AWWA acceptable range for residential or commercial water meters.

13. **Renter's Nonrefundable Fee**

When a subscriber for service who is not the owner of the property applies for water service, the District shall require that the tenant or non-property owner to enter into a subscription contract for services and to pay a nonrefundable fee.

Nonrefundable Fee . $75.00

Adopted March 16, 2017

Effective March 16, 2017

EXHIBIT 10

Ten Year Pro Forma Rate of Return Projection

Superior Water Service **Exhibit 10**
Pro Forma Rate Calculation for Sections 8, 9 and 10 of King's Chapel Subdivision **Schedule 3**
10 Year income Projection

Item	Unit Rate	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Projected Customers:											
Section 8		18	18	17							
Section 9					8						
Section 10						20	20	20	20	20	16
Cumulative Customer Count		**18**	**36**	**53**	**61**	**81**	**101**	**121**	**141**	**161**	**177**
Plant Investment:											
Meter Installation & Capacity Fee	$1,500.00	$27,000.00	$54,000.00	$79,500.00	$91,500.00	$121,500.00	$151,500.00	$181,500.00	$211,500.00	$241,500.00	$265,500.00
Meter	325.00	5,850.00	11,700.00	17,225.00	19,825.00	26,325.00	32,825.00	39,325.00	45,825.00	52,325.00	57,525.00
Fire Hydrants	254.71	4,584.78	9,169.56	13,499.63	15,537.31	20,631.51	25,725.71	30,819.91	35,914.11	41,008.31	45,083.67
Engineering Fees	693.39	12,481.02	24,962.04	36,749.67	42,296.79	56,164.59	70,032.39	83,900.19	97,767.99	111,635.79	122,730.03
Construction Labor	1,563.56	28,144.08	56,288.16	82,868.68	95,377.16	126,648.36	157,919.56	189,190.76	220,461.96	251,733.16	276,750.12
Water Pipe & Valves	3,833.00	68,994.00	137,988.00	203,149.00	233,813.00	310,473.00	387,133.00	463,793.00	540,453.00	617,113.00	678,441.00
Conduit & Casings for Road Crossings	94.34	1,698.12	3,396.24	5,000.02	5,754.74	7,641.54	9,528.34	11,415.14	13,301.94	15,188.74	16,698.18
Cumulative Plant Investment		**$148,752.00**	**$297,504.00**	**$437,992.00**	**$504,104.00**	**$669,384.00**	**$834,664.00**	**$999,944.00**	**$1,165,224.00**	**$1,330,504.00**	**$1,462,728.00**
Accumulated Depreciation		4,953.44	14,860.32	29,445.46	46,232.12	68,522.61	96,316.92	129,615.06	168,417.01	212,722.80	261,431.64
Cumulative Net Plant Investment		**$143,798.56**	**$282,643.68**	**$408,546.54**	**$457,871.88**	**$600,861.39**	**$738,347.08**	**$870,328.94**	**$996,806.99**	**$1,117,781.20**	**$1,201,296.36**
Revenues:											
Total Annual Usage (Gallons)	12,000	216,000	432,000	636,000	732,000	972,000	1,212,000	1,452,000	1,692,000	1,932,000	2,124,000
Usage Charges:											
0 Gallons (Minimum Bill)	$17.61	$3,803.76	$7,607.52	$11,199.96	$12,890.52	$17,116.92	$21,343.32	$25,569.72	$29,796.12	$34,022.52	$37,403.64
1 - 20,000 Gallons	5.50	1,188.00	2,376.00	3,498.00	4,026.00	5,346.00	6,666.00	7,986.00	9,306.00	10,626.00	11,682.00
20,001 - 50,000 Gallons	7.62	0	0	0	0	0	0	0	0	0	0
Over 50,000 Gallons	10.15	0	0	0	0	0	0	0	0	0	0
Total Usage Charges		**$4,991.76**	**$9,983.52**	**$14,697.96**	**$16,916.52**	**$22,462.92**	**$28,009.32**	**$33,555.72**	**$39,102.12**	**$44,648.52**	**$49,085.64**
Service Charges											
Residential	$75.00	$16,200.00	$32,400.00	$47,700.00	$54,900.00	$72,900.00	$90,900.00	$108,900.00	$126,900.00	$144,900.00	$159,300.00
Commercial	75.00	0.00	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00
Total Service Charges		**$16,200.00**	**$32,401.00**	**$47,702.00**	**$54,903.00**	**$72,904.00**	**$90,905.00**	**$108,906.00**	**$126,907.00**	**$144,908.00**	**$159,309.00**
Total Revenues		**$21,191.76**	**$42,384.52**	**$62,399.96**	**$71,819.52**	**$95,366.92**	**$118,914.32**	**$142,461.72**	**$166,009.12**	**$189,556.52**	**$208,394.64**
Expenses:											
Telephone/Telemetry	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Electric	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Purchased Water Expense	4.00	864.00	1,728.00	2,544.00	2,928.00	3,888.00	4,848.00	5,808.00	6,768.00	7,728.00	8,496.00
Water System Operator	1,000.00	12,000.00	12,000.00	12,000.00	12,000.00	12,000.00	12,000.00	12,000.00	12,000.00	12,000.00	12,000.00
Billing:											
Labor	20.00	1,440.00	2,880.00	4,240.00	4,880.00	6,480.00	8,080.00	9,680.00	11,280.00	12,880.00	14,160.00
Phone	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00
Billing Software	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00
Billing Postage & Card Stock	0.50	108.00	216.00	318.00	366.00	486.00	606.00	726.00	846.00	966.00	1,062.00
Permit Fee	350.00	350.00	350.00	350.00	350.00	350.00	350.00	350.00	350.00	350.00	350.00
Accounting	5.00	1,080.00	2,160.00	3,180.00	3,660.00	4,860.00	6,060.00	7,260.00	8,460.00	9,660.00	10,620.00
Regulatory	5.00	1,080.00	2,160.00	3,180.00	3,660.00	4,860.00	6,060.00	7,260.00	8,460.00	9,660.00	10,620.00
Legal	5.00	1,080.00	2,160.00	3,180.00	3,660.00	4,860.00	6,060.00	7,260.00	8,460.00	9,660.00	10,620.00
Insurance	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00
Depreciation	3.33%	4,953.44	9,906.88	14,585.13	16,786.66	22,290.49	27,794.31	33,298.14	38,801.96	44,305.78	48,708.84
Property Taxes	1.00%	1,437.99	2,826.44	4,085.47	4,578.72	6,008.61	7,383.47	8,703.29	9,968.07	11,177.81	12,012.96
Total Expenses		**$27,993.43**	**$39,987.32**	**$51,262.60**	**$56,469.38**	**$69,683.10**	**$82,841.78**	**$95,945.42**	**$108,994.03**	**$121,987.60**	**$132,249.81**
Net Operating Income		**-$6,801.67**	**$2,397.20**	**$11,137.36**	**$15,350.14**	**$25,683.82**	**$36,072.54**	**$46,516.30**	**$57,015.09**	**$67,568.92**	**$76,144.83**
Income Taxes:											
Tennessee Excise Taxes	6.50%	-$442.11	$155.82	$723.93	$997.76	$1,669.45	$2,344.71	$3,023.56	$3,705.98	$4,391.98	$4,949.41
Federal Income Taxes	35.00%	-2,225.85	784.48	3,644.70	5,023.33	8,405.03	11,804.74	15,222.46	18,658.19	22,111.93	24,918.40
Total Income Taxes		**-$2,667.95**	**$940.30**	**$4,368.63**	**$6,021.09**	**$10,074.48**	**$14,149.45**	**$18,246.02**	**$22,364.17**	**$26,503.91**	**$29,867.81**
Net Income		**-$4,133.71**	**$1,456.90**	**$6,768.73**	**$9,329.05**	**$15,609.34**	**$21,923.08**	**$28,270.28**	**$34,650.92**	**$41,065.01**	**$46,277.02**
Earned Rate of Return		**-2.87%**	**0.52%**	**1.66%**	**2.04%**	**2.60%**	**2.97%**	**3.25%**	**3.48%**	**3.67%**	**3.85%**

Revenues

Estimated Water Usage = 144,000 Gallons per Year or 12,000 Gallons per month for each customer.
Monthly Rates are adopted from NCGUD current rates:

0 Gallons (Minimum Bill)	$17.61
1 - 20,000 Gallons (Per 1,000 Gallons)	5.50
20,001 - 50,000 Gallons (Per 1,000 Gallons)	7.62
Over 50,000 Gallons	10.15

Telephone/Telemetry

No anticipated costs.

Electric

The water system is pressure fed from the wholesale source of supply.
No incremental electric costs are anticipated.

Purchased Water Expense

Superior Water is purchasing wholesale water from NCGUD at $4.00 per 1,000 gallons.

Water System Operator

Wholesale water is purchased from Nolensville/College Grove Utility District
that is already monitored and sampled for water quality. Still, there will
be a need to be some minimal redundancy testing for Superior water.
Superior Water has reached an agreement with a qualified engineer to be its system
operator to conduct these tests at $100 per month at $1,000 per month or $12,000 per year.

Billing

Billing includes the time to read and record meters, write letters to late paying customers,
communication with address changes, owner changes, adding customers, calls to customers, etc.
Associated with billing is going to the Post Office box each day, logging in the billing program to
credit accounts, prepare deposits, and making deposits at the bank. The estimated average time to complete
is 20 minutes per customer per month @ $20.00 per hour. In addition to these amounts, billing also incudes
the following: Office phone @ $100 per month, billing program @ $100 per month, postage and card
stock @ $0.50 per bill.

Permit Fee

TDEC Annual Permit Fee of $350.00.

Accounting, Regulatory & Legal

Regulatory costs are estimated to be $5.00 per customer per month.
Accounting costs are estimated to be $5.00 per customer per month.
Legal costs are estimated to be $5.00 per customer per month.

Insurance

Insurance costs are estimated to be $100 per month or $1,200 per year.

Depreciation

Book depreciation is 3.33% of the Gross Plant Investment.

Property Taxes

Property taxes are estimated to be approximately 1% of Net Plant based on previous experience.

Income Taxes

State Excise Taxes are 6.50%.
Federal Income Taxes are 35.00%.

Investment

Plant Investment is estimated to total $1,462,728 and will increase as each new Section is built as follows:

Section 8	53	Years 1 - 3
Section 9	8	Year 4
Section 10	116	Years 5 -10
Total Lots	**177**	

Estimated Cost Per Lot:

Meter Installation and Capacity Fee	$1,500.00
Meter Installation and Capacity Fee	325.00
Fire Hydrants	254.71
Engineering Fee	693.39
Construction Labor	1,563.56
Water Pipe and Valves	3,833.00
Conduit & Casings for Road Crossings	94.34
Total Plant Investment per Lot	**$8,264.00**

Total Plant Investment Cost	**$1,462,728.00**

EXHIBIT 11

CONSTRUCTION COST DETAIL OF
SUPERIOR WATER SERVICES, LLC

GAM ENGINEERING, INC.
Civil Engineering • Land Surveying
"Solutions for a Greener Environment"

102 Hazel Path, Ste. 6, Office F • Hendersonville, TN 37075
Office 615.348.8282 Fax 615.447.5314
Visit us at www.gam-engineering.com

October 16, 2017

Mr. John Powell
Premier Properties
P.O. Box 190
Arrington, TN. 37014

RE: Kings Chapel Subdivision
GAM Project No. 17-160

Dear Mr. Powell,

The following are the estimated construction costs for the water line construction to serve Section 8 and the remaining sections in the above referenced Subdivision. All water line lengths and number of lots were provided to us for this estimation purpose. The number of fire hydrants was assuming a fire hydrant to be installed every 500 feet on the water line except on the 4200 feet of water line along Mullins Road. Water valves and casing pipe and fittings are estimated quantities based on number of proposed intersections and past engineering water line design assumptions.

Water Line – 21,800 L.F. 8" DIP x $48/L.F =	$1,046,400
Fire Hydrants – 37 F.H. x $5,000/FH =	$ 185,000
8" Gate Valves & Boxes – 30 Gate Valves x $2,000/GV =	$ 60,000
Road Casing Pipes – 300 LF Casing x $30/LF =	$ 9,000
Fittings – 7,000 lbs Fittings x $5/lb =	$ 35,000
Water Services – 177 lots x $350/lot =	$ 61,950
Estimated Construction Cost =	$1,397,350 or $7,900/lot

15% Contingency = $139,735 (for rock removal, design fees and water service provider fees)
Total Estimated Construction Costs = $1,537,085 or 8,685/lot

All the above fees are estimated costs and are submit to revisions once approved construction plans have been prepared.

Sincerely,
G.A.M. Engineering, Inc.

Gregg M. Clingerman, P.E.