

BEATTY WATER & SANITATION DISTRICT
WATER AND SEWER
STANDARD
SPECIFICATIONS

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Beatty, NV 89003
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CHAPTER I
GENERAL INFORMATION
TABLE OF CONTENTS

- 1.01 AUTHORITY
- 1.02 EFFECTIVE DATE OF SPECIFICATIONS
- 1.03 REVISIONS, AMENDMENTS OR ADDITIONS
- 1.04 DISTRICT CONTROL
- 1.05 DEFINITIONS
 - A. Approved Plans
 - B. Board
 - C. *Intentionally left blank
 - D. Commercial Development
 - E. Customer
 - F. District
 - G. District Engineer
 - H. District Representative
 - I. Fire Marshal
 - J. General Manager
 - K. Open Space
 - L. Paving
 - M. Project
 - N. Residential Development
 - O. Utilities
- 1.06 ABBREVIATIONS

CHAPTER I GENERAL INFORMATION

1.01 AUTHORITY

These specifications are promulgated by the General Manager of Beatty Water & Sanitation District in accordance with the authority granted by the Board of Trustees. The General Manager hereby delegates to the District Engineer the administration of these specifications including interpretation, enforcement, revisions, wavier and variance. Initial cost for District Engineer review is \$1,000 depending on the size and scope of the project and is paid by Developer and/or Customer to the District.

1.02 EFFECTIVE DATE OF SPECIFICATIONS

These specifications shall be effective from the date they have been approved by the Board of Trustees. The date shall be noted on the title sheet of the specifications. Upon approval by the Board, the Specification shall supersede all previous editions. It shall be the responsibility of the holders of the specifications to determine that the set in their possession is the current edition.

1.03 REVISIONS, AMENDMENTS OR ADDITIONS

These Standard Specifications may be revised, amended or added to from time to time, and such revisions, additions or amendments shall be binding and in full force and effect as of the date of their adoption.

1.04 DISTRICT CONTROL

The construction of any facility connected to, or to become connected to, the District's facilities shall conform to the criteria set forth in the most current edition of the Water and Sanitary Sewer Standard specifications of the District and the applicable plumbing codes enacted and enforced by District or its successor. Representatives of the District shall have access to all facilities at all times to all areas on the premises for the purpose of inspection and/or sampling. Any interpretation or clarification of the specifications shall be made by the District Engineer, whose decision shall be final. No action, direct or indirect, of or by any person in making any connection, disconnection, repair or otherwise doing work with respect to any water or sewer facility served by the District in violation of these Standard Specifications shall continue after discovery.

1.05 DEFINITIONS

1.05-A Approved Plans: Plans prepared by the Owner's Professional Engineer and approved by the District Engineer.

1.05-B Board: The Board of Trustees for Beatty Water & Sanitation District.

1.05-C District: Beatty Water & Sanitation District.

1.05-D Commercial Development: Multi-family dwelling units and all other development, except residential development.

1.05-E Customer: Any person, firm, corporation, association or agency who is authorized, or who desires, to obtain water or sewer services from the District. The term Customer also includes any person, firm corporation, association or agency constructing facilities which are to be connected to the District's facilities.

1.05-F Intentionally left blank

1.05-G District Engineer: The person designated to act as District Engineer.

1.05-H District Representative: The person designated by the District to perform as Resident Engineer to conduct plan review, site inspection and other duties with respect to any Project.

1.05-I State Fire Marshal: The person designated by the fire department for the jurisdiction in which the water system construction occurs. The Fire Marshal shall have sole authority over fire protection matters.

1.05-J General Manager: The person designated as General Manager by the Board, who administers and supervises the affairs of and operations and maintenance of facilities of the District or the person authorized by the Board or the General Manager to act on his or her behalf.

1.05-K Open Space: Any area not intended to receive future development.

1.05-L Paving: Concrete or asphalt pavement.

1.05-M Project: A facility or portion thereof which is to be connected to the District's facilities as described in the Application for Service in Section 2.02.

1.05-N Residential Development: Single family dwelling units.

1.05-O Utilities: Water distribution or transmission mains, sanitary sewer collection or trunk mains, storm sewer mains and all appurtenances thereto.

1.05-P Developer: Any Customer or Developer requires a cost estimate for a public improvement project and to provide to the District a bond 1.5 times the cost to cover the work prior to the start of a public infrastructure improvement.

1.06 ABBREVIATIONS

All mention or reference to documents or specifications shall be the latest edition or revision thereof. The following abbreviations are commonly used in these specifications:

ACI American Concrete Institute

AISC American Institute of Steel Construction, Inc.

ASA American Standards Association

ASTM American Society for Testing and Materials

AWWA American Water Works Association

ANSI American National Standard Institute, Inc.

AASHTO American Association of State Highway and Transportation Officials

NAC Nevada Administrative Code

NEC National Electric Code

OSHA Occupational Safety and Health Administration

UL Underwriters Laboratory

UPC Uniform Plumbing Code

UNI Unibell Association

CHAPTER II APPLICATION PROCEDURE/ENGINEERING STANDARDS TABLE OF CONTENTS

2.01 GRANTING OF SERVICE

2.02 APPLICATION PROCEDURES

2.03 ENGINEERING

2.04 CONSTRUCTION DOCUMENTS

A. Title Sheet

B. Overall Utility Plan

C. Plan and Profile Sheets

D. Detail Sheets

2.05 EASEMENTS

A. Easements (Residential Development)

B. Easements/Plan Approval (Commercial Development)

2.06 PLAN APPROVAL

2.07 VARIANCES

2.08 FEES

CHAPTER II APPLICATION PROCEDURE/ENGINEERING STANDARDS

2.01 GRANTING OF SERVICE

Water and sanitary sewer service shall be provided in accordance with the Rules and Regulations of the District. The request for service shall be submitted to the District and must be approved by the District Engineer.

2.02 APPLICATION PROCEDURES

The following documents shall be prepared and submitted to the District:

- Commercial Development Guidelines for Utilities and Landscaping, Application Procedure and Fees.
- Construction Documents in accordance with Section 2.04 of these specifications.

2.03 ENGINEERING

All plans and specifications submitted to the District for review, comment, and approval of a system extension or modification shall be prepared by or under the direct supervision of a Professional Engineer (P.E.) registered by the State of Nevada. All plans shall bear the P.E.'s seal. One (1) set of plans shall be submitted for review to the District Engineer. The Customer and the P.E. shall be responsible for the adequacy of the plans. Any failure or unsatisfactory performance of the system shall not be a cause for action against the District. Any plan review performed by the District is solely for the purpose of the District and the District assumes no liability or responsibility as a result of having performed any such plan review, for having failed to perform any such plan review or for having collected a fee therefore.

2.04 CONSTRUCTION DOCUMENTS

All plans and specifications submitted shall be in strict compliance with State and Federal regulations and acceptable engineering standards contained herein and shall meet any special conditions that may be reasonably required by the District Engineer. No work shall commence on any facilities until the plans and the District Engineer approves specifications in writing.

The approval is only valid for one year. If construction has not begun within one year, the plans must be resubmitted, and in case of any change of ownership, the plans must be resubmitted to the District for approval. Each and every deviation from the specifications shall be considered a variance and each request shall be submitted in writing and submitted to the District prior to the approval of the construction drawings. Addenda and modifications to the construction drawings and specifications take precedence over the original documents. In the construction drawings, calculated dimensions shall take precedence over scaled dimensions and noted material over graphic indication. All construction shall be completed in full compliance with the approved plans. Any revisions or modifications shall be made **ONLY** after written approval of the District Engineer. The Fire Marshall must also approve any revisions affecting fire protection service.

A short design report shall be submitted with the Plans and Specifications including determination of sewer impact on existing infrastructure and theory behind design.

Construction Documents shall be submitted consisting of the following sheets:

- **Title Sheet**
- **Overall Utility Plan**
- **Plan and Profile Sheets**
- **Detail Sheet(s)**
- **Site Plan and Grading Plan**

The standard size shall be 24" X 36". (8 1/2" X 11" addenda's will not be accepted.)

The following minimum standards shall apply to each sheet as follows:

2.04-A Title Sheet

The title shall contain:

1. **Name of Project.**
2. **Name and Address of Developer or Customer.**
3. **Name of Engineer.**
4. **Subdivision Name and Filing Number.**
5. **Signature lines for District Engineer, Fire Marshal, and District if required.**
6. **Professional Engineer's Seal and Signature.**

2.04-B Overall Utility Plan

The Overall Utility Plan shall contain:

1. **Location, horizontal alignment and dimensions of existing and proposed streets, easements and right-of-way.**
2. **Street names, or letters if names have not been assigned.**
3. **Lots to be served (with lot and parcel numbers).**
4. **All existing or proposed water mains, sewer mains, water services lines, and sewer service lines, valves, fire hydrants, manholes, vaults and other appurtenances.**
5. **Gas, electric and telephone lines need not be shown unless they will be impacted by the proposed construction.**
6. **Scale shall be 1"=20' to 1"=100'.**
7. **Phasing boundaries/areas shall be shown on all site plans**

2.04-C Plan and Profile Sheets

Plan and Profile Sheets shall contain:

1. **Centerline profile and horizontal alignment of streets and easements.**
2. **Lot and parcel number of lots to be served with property lines.**
3. **Existing and proposed water, sanitary sewer and storm sewer facilities. Sanitary sewer, storm sewer and water mains shall be shown in both plan and profile views.**
4. **Existing and proposed curb, gutter, sidewalk and parking lots.**
5. **Stationing of utilities (only on the Plan and Profile, NOT on the Overall Utility Plan).**
6. **Dimensions from property line, flow-line or centerline for all proposed water, sanitary sewer and storm sewer facilities. Dimensions between utilities shall be required.**
7. **Pipe diameters, lengths, depths, slopes, elevations, and inverts.**

8. All valves, fire hydrants, manholes, fittings, service lines, blowoff, and segments of restrained pipe shall be stationed. Service lines may follow a standard layout if shown on the detail sheets.

9. North arrow, scale, benchmarks, profile elevations, pipeline stationing.

10. Scale for horizontal shall be 1"=20' to 1"=50', and for vertical 1"-4' to 1"-8'.

2.04-D Detail Sheets

Detail sheet(s) shall contain all details specific to the project.

2.05 EASEMENTS

2.05-A Easements (Residential Development)

All water and sanitary sewer facilities, which are to be granted to the District, shall be located within a dedicated right-of-way or easement. Easements shall be dedicated on the plat or granted to the District on Nye County's Easement form. All necessary easements shall be executed and recorded prior to the start of construction. The start of the one-year warranty period is dependent on the requirements in Section 3.10 of these specifications. Trees shall not be placed in District easements without written permission of the District Engineer. In the event that trees are placed in District's easements without written permission of the District Engineer, they shall be removed at the expense of the Customer. The minimum width of an easement for a single utility line shall be 15 feet. If two or more utilities are to be located within the same easement, the minimum width shall be:

Two utility lines - 30'

Three utility lines - 40'

Four utility lines - 50'

2.05-B Easements/Plan Approval (Commercial Development)

The approval of utilities plans for commercial development on Beatty Water Sanitation where the District will own and maintain the water and sanitary sewer facilities is contingent on the acceptance of the appropriate easements. Easements are required to be granted to the District for the purpose of maintaining the utilities once they have been granted and accepted by the District. Easements shall be dedicated on the plat or granted to the District on the county's Grant of Easement form. If the easements are being dedicated on the plat, a copy needs to be submitted with the drawings at the time of initial submittal for review. Easements granted by separate document will require the following:

1. Meets and Bounds legal description
2. Exhibit showing the limits of the easements
3. Title policy for the property

The legal description, exhibit, title policy and executed easement forms will be submitted for approval to the District prior to the approval of the final construction documents. In the event that the easement(s) cannot be prepared prior to approval of the plans, a deposit must be made to ensure preparation of all of the required legal documents. The amount of the deposit will be based on the following criteria:

Water & Sewer Lines 500 linear feet or less \$500

Water & Sewer Lines between 500 and 1500 linear feet \$3000

Water & Sewer Lines that exceed 1,500 linear feet Determined by District Staff

There will be a 60-day grace period given with the issuance of a deposit. If the easement documents have been provided within the 60-day grace period, the deposit will be returned to the Customer. After this period if the easement documents have not been delivered to the District, the deposit will be utilized to prepare the documents. Once the documents have been prepared, it will be the responsibility of the customer to obtain the necessary approvals. The easement must be executed prior to the release of the water meter(s) for the project.

2.06 PLAN APPROVAL

The District Engineer shall not approve any construction drawings until the Fire Marshall has approved, in writing, the number, location and spacing of all fire hydrants. Upon notice of plan approval, the Customer shall submit a minimum of five (5) sets of stamped and signed construction drawings to the District Engineer for signatures. The District Engineer will retain three sets of these construction drawings and two sets will be returned to the Customer.

2.07 VARIANCES

Any request for a variance from the requirements of these Standard Specifications shall be submitted in writing to the District Engineer. Each variance request shall include a detailed description of the proposed variance together with the Customer's Professional Engineers' analysis of the impact of the variance. The decision of the District Engineer to grant or deny any variance will be final.

2.08 Fees

The District collects a fee to offset the costs of plan review, inspection and administration. Fees shall be in accordance with the Rules and Regulations of the District. Which are amended by the Board of Directors, from time to time. Fees apply to new construction projects, and modifications to existing facilities and services, including the interior plumbing of nonresidential properties. A list of fees can be found in Section A-1 of the Rules and Regulations.

2.09 WILL SERVE

All connection fees and water rights dedication for service must be approved by the Board prior to any construction takes place.

CHAPTER III
CONSTRUCTION INSPECTION AND ACCEPTANCE PROCEDURES
TABLE OF CONTENTS

- 3.01 GENERAL
- 3.02 CONSTRUCTION PROCEDURE
- 3.03 INSPECTION PROCEDURE
- 3.04 SURVEYING
- 3.05 TRAFFIC CONTROL
- 3.06 SERVICE INTERRUPTION
- 3.07 CONNECTIONS TO EXISTING MAINS
- 3.08 EXISTING UTILITIES AND STRUCTURES
- 3.09 SAFETY
- 3.10 ACCEPTANCE OF FACILITIES
 - A. Pre-Warranty Inspections
 - B. Record Drawings and Easements
 - C. Warranty Period
 - D. Warranty Repair Procedures
 - E. Final Acceptance
 - F. Electronic Files

CHAPTER III
CONSTRUCTION INSPECTION AND ACCEPTANCE PROCEDURES

3.01 GENERAL

All utility system construction within the District shall be performed only in accordance with these specifications and the Approved Plans.

3.02 CONSTRUCTION PROCEDURE

A Notice to Proceed will be issued by the District at the pre-construction meeting in order to monitor the progress and ensure completion of the project is on time. Following final approval of the plans and specifications, the Customer may proceed with construction. In addition to all construction requirements contained in other portions of these specifications: A preconstruction conference shall be held prior to the commencement of work with the General Manager for District the Contractor who is to perform the work and the Customer's professional engineer. The General Manager shall be notified a minimum of 48 hours prior to the commencement of work. This notice shall be given for all new projects and for projects that have been inactive for more than one week. Inspections for "ongoing" work may be scheduled with 24-hour notice. Development phasing of any project shall be shown on the initial drawing submittal and made a part of the application procedure. All construction shall be accurately surveyed and staked in accordance with the Approved Plans.

Adequate provisions for notification of a service outage must be given by the Customer prior to the actual isolation of the system by the District. Outages shall be kept to a minimum.

The District shall be notified whenever it becomes necessary to open or close a valve on the existing water system. Only District personnel are authorized to operate valves in the service area. The Customer may operate valves under the approval and direct supervision of District Representative.

3.03 INSPECTION PROCEDURE

The District shall have a right to inspect at all times all facilities connected to, or to become connected to, the District's facilities. Authorized employees and representatives of the District shall be allowed free access at all reasonable hours to any building or premises receiving water or sanitary sewer service to insure compliance with these specifications. Any inspection performed by the District is solely for the purposes of the District and the District assumes no liability or responsibility as a result of having performed any such inspection, for having failed to perform any such inspection or for having collected a fee therefore. Any such inspection shall not be deemed to be an approval of the size, slope, alignment, materials use in construction, the method used in excavating, the placing of pipe, jointing, testing, backfilling or any other aspect of the facility inspected. Personnel authorized by the District shall inspect all construction of utilities. Inspection shall not relieve the Customer from any obligation to perform the work strictly in accordance with the plans and specifications. Any work, which is not in accordance with the approved plans and these specifications, shall be removed and corrected at the Customer's sole expense.

Approval by the District Engineer shall in no manner relieve the Customer from responsibility for errors or omissions in the plans. Any errors shall be corrected by Customer at no expense to the District.

Whenever a conflict occurs in the standard specifications or between the standard specifications and construction drawings, the District Engineer shall make the final interpretation. All materials used shall be subject to the inspection and approval of the District Engineer at all times. The District Engineer has the right to perform any testing deemed necessary to ensure compliance of the material with these Standard Specifications. Failure to condemn or reject inferior materials or work shall not be construed as acceptance. The District Engineer shall have the authority to reject defective or inferior materials or defective workmanship and to suspend work until such time that the Customer has replaced the materials or corrected the defective work.

Whenever defective materials or work are rejected, the Customer shall promptly remove the defective materials and replace all defective work to the satisfaction of the District Representative. In the event the Customer fails to remove rejected materials within a reasonable length of time, the District Engineer may arrange for such removal at the expense of the Customer. Except in cases of emergency, maintenance or protection of work already done, no work shall be allowed between the hours of 6 p.m. and 7 a.m. nor on Saturday, Sunday or legal holidays unless approved by the District Engineer. When inspectors are required to work overtime, it shall be at the Customer's expense. All requests for overtime shall be made to the District Engineer at least 48 hours in advance. Payment for such overtime work shall be made by check to the District.

The District will witness all sampling and testing procedures during the project and shall be performed and paid by the Customer.

3.04 SURVEYING

Line and grade for water and sewer mains shall be established by a Land Surveyor licensed to practice in the State of Nevada or by his authorized representative. Correct alignment and elevation of the mains as shown on the approved construction drawings are the responsibility of the Customer. Approval of the staked alignment and elevations by the District Representative does not relieve the Customer in any manner from the responsibility for field errors. No pipe may be installed without line and grade stakes set by the Surveyor and approved by the District Representative. Exception: If a main is to be extended in an existing street and if the Customer's consulting engineer who prepared the plans can show that the finish grade of the street is to remain unchanged, no grade stakes need be set. The water main shall be installed with a minimum of cover from final grade based on District's Engineer recommendation. The sewer main shall be installed with a minimum cover from final grade based on District's Engineer recommendations. Hubs and stakes shall be set on an offset line to mark the location of the center line of the main. Center line hubs and stakes may be used in addition to the offset hubs and stakes; however, they may not be set instead of the offset hubs and stakes. All valves, crosses, tees, horizontal and vertical bends, fire hydrants, and manholes shall be staked for line and grade. Points of curvature and points of tangency of curves, as well as points on the curve, shall be staked for line and grade.

3.05 TRAFFIC CONTROL

All traffic control shall be in accordance with the requirements of the Nye County Highway Department, Nevada Department of Highways and the law enforcement agency whose jurisdiction applies. The Customer shall be responsible for the provision of a safe travel way on all dedicated roadways on and adjacent to the job site. The Customer shall provide for proper traffic control warning devices around all excavations, embankments and obstructions and shall provide maintenance of said devices. The Customer shall not close any street or portion of a street without receiving a traffic control plan from Nye County. It is the Customer's responsibility to notify the Nye County Sheriff and District's Fire Department 24 hours prior to closing any street. The Customer shall also notify the Sheriff, Nye County, and Fire Department immediately after opening of any street.

3.05 A: PERMITS

Permits required by the District include but not limited to:

- NDOT Encroachment/Occupancy Permit
- NDEP Approval for Construction
- Storm water Pollution Prevention Permit (SWPPP)
- Temporary Discharge Permit
- Street Cut Permit

3.06 SERVICE INTERRUPTION

In the event that existing water or sanitary sewer service will be interrupted as a result of construction, the District Representative shall be responsible for the notification of all affected customers at least 24 hours in advance of the work. Service interruptions for schools, medical clinics and various commercial businesses shall be conducted at times specified by the District Representative. If outages for more than 4 hours are necessary, they must be conducted at times to cause the least inconvenience to other customers. Under all circumstances, work shall be continuous until all customers are back in service. If, in the process of installing a connection, there exists a facility that cannot be out of water, as designated by the District Representative, such as a hospital, appropriate temporary means shall be taken to provide and convey water. The District Representative shall approve any such measures, along with the fire department notification.

3.07 CONNECTIONS TO EXISTING MAINS

Where connections are made between new and existing mains, each connection shall be made as indicated on the construction drawings. If field conditions make the detailed connection impossible, then an alternative method may be used with the approval of the District Engineer. The location of existing stub-outs, as shown on the District's Standards Details, is based on the best available information but may not be exact. The Customer shall be responsible for determining the exact location of any stub-out. The Customer shall notify the District Representative a minimum of 48 hours in advance of connection to an existing line or interruption of the water supply to an existing line. The Customer is responsible for any de-watering necessary which shall be done without damage to property. Special care shall be taken to prevent contamination when de-watering, cutting into, or making connections to existing pipes. No trench water, mud, or dirt shall be permitted to enter the lines.

At the beginning of a construction project, the Customer shall install a watertight plug in the connection manhole, or first manhole upstream, in order to prevent any inflow to enter the existing sewer system. The Contractor only in the presence of the District Representative shall remove this plug. Any bypass pumping will require a plan and must be submitted to NDEP, Bureau of Pollution Control and the District for approval prior to construction. All related costs shall be borne by the Customer.

3.08 EXISTING UTILITIES AND STRUCTURES

It shall be the responsibility of the Customer to investigate and verify the existence and location of existing utilities. The Customer shall be solely responsible for the protection of all structures or utilities including pipes, cables, fences or similar items. Permission for adjustment of existing utilities or other items or structures shall be obtained from the appropriate owners or agencies.

3.09 SAFETY

The Customer shall be responsible for initiating, maintaining and supervising all safety programs in connection with the work. The Customer shall comply with all applicable laws, ordinances, rules, regulations and orders of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss, and shall provide and maintain all necessary safeguards for the protection of property and utilities. All damage, injury or loss to any property caused, directly or indirectly, in whole or in part, by the Customer, or anyone directly or indirectly employed by the Customer or anyone for whose acts the Customer may be liable, shall be remedied by the Customer.

3.10 ACCEPTANCE OF FACILITIES AND REPORTS

The District will accept water and sanitation sewer utilities as follows:

3.10-A Pre-Warranty Inspections

After installation and testing of all water and sanitary sewer mains and appurtenances and all paving has been completed, the District Representative shall inspect for approval:

- valve box alignment and accessibility,
- manhole ring alignment and vertical adjustment,
- main line, blowoff assembly and fire hydrant location and operation

All discrepancies shall be noted on a punch list which shall be submitted to the Customer for correction prior to the start of the warranty period.

Construction documentation shall be provided to the District including compaction testing reports, water main pressure testing, bacteriological sample results, and any applicable backflow preventer testing results.

3.10-B Record Drawings and Easements

The Customer shall submit to the District Engineer the following documents:

1. "As-Built" record drawings including plan and profile sheets, on Mylar.
2. Electronic construction drawing files, AutoCAD Land Desktop Civil 3D, Version 2007 or newer.
3. Easements for water and sanitary sewer lines.
4. Grant and Acceptance of Utilities Agreement.

3.10-C Warranty Period

Upon satisfactory completion of the above, the District will accept the utilities subject to a one-year warranty. During the warranty, the Customer shall be solely responsible for the maintenance or replacement of the utilities.

3.10-D Warranty Repair Procedures

During the Warranty Period, the District Representative shall be responsible for notifying the Customer of any defects and the Customer shall repair or cause to be repaired any such defects within 48 hours after receipt of the District's notification. In the event Customer fails to make such repairs within such a 48-hour period or, if such repairs cannot reasonably be accomplished within such a 48-hour period and the Customer has not begun diligent efforts to make such repairs within such a 48-hour period, the District may, at its option, proceed to repair or cause the repair of the defects at the Customer's cost and expense. In the event of emergency repairs which, in the sole opinion of the District, must be made immediately in order to maintain a reasonable level of water and sanitary sewer service, the District may make such emergency repairs without prior notice to the Customer at the Customer's cost and expense, but the District shall give the Customer notice thereof as soon as reasonably possible. If the District deems it necessary to flush water mains to maintain water quality control in a portion of the platted area in which any of the streets have not been constructed, the District shall provide to the Customer 48-hours prior notice. Thereafter, the Customer shall provide the necessary manpower and materials to assist the District personnel in directing the flow of water from the location of the flushing operation in such a manner as to mitigate, to the extent reasonably possible, any damage from the flow of water.

3.10-E Final Acceptance

At least 45 days prior to the expiration of the Warranty Period, the District and the Customer shall conduct a final inspection of the facilities. The District Representative shall prepare a list of any defects (the "Punch List"). At least 30 days prior to the expiration of the Warranty Period, the District shall submit the Punch List to the Customer, and the Customer shall repair or cause to be repaired those items on the Punch List. Upon completion by the Customer, to the reasonable satisfaction of the District, of the items contained on the Punch List, the District shall accept the facilities. The District agrees that from the date of final acceptance the District shall be responsible for all-future repairs, maintenance, operation and use of the facilities.

3.10-F Electronic Files

Electronic files need to consist of the following information:

Plat

Water lines

Sewer lines

Storm sewer lines

Site grading

Appurtenances

CHAPTER IV
WATER DISTRIBUTION SYSTEM SPECIFICATIONS
TABLE OF CONTENTS

4.01 WATER MAIN DESIGN

- A. Flow Design Criteria
- B. Hydraulic Design
- C. Location and Alignment
- D. Materials
- E. Depth
- F. Valves
- G. Fire Hydrants
- H. Fire Sprinkler Lines
- I. Pressure Regulating Stations
- J. Air and Vacuum Valves
- K. Blowoff Assemblies
- L. Rods, Clamps and Restraining Devices
- M. Thrust Blocks
- N. Wet Taps
- O. Limits of Accuracy (Allowable Error)

4.02 WATER MAIN MATERIALS

- A. Ductile Iron Pipe
- B. Polyvinyl Chloride Pipe - PVC
- C. Use of Water Line Materials
- D. Tapping Requirements
- E. Water Main Fittings
- F. Resilient Wedge Gate Valves
- G. Tapping Valves
- H. Butterfly Valves
- I. Pressure Reducing and Regulating Valve
- J. Swing Check Valves
- K. Fire hydrants
- L. Valve Boxes
- M. Polyethylene Wrapping
- N. Combination Air Relief-Vacuum Breaker Assemblies
- O. Tapping Sleeves
- P. Rods and Clamps
- Q. Pipe Restraint
- R. Thrust Blocks
- S. Pre-Cast Concrete Vaults and Manholes
- T. Pipe Encasement

CHAPTER IV
WATER DISTRIBUTION SYSTEM SPECIFICATIONS
TABLE OF CONTENTS

4.02 WATER MAIN MATERIALS (Continued)

- U. Concrete
- V. Concrete Reinforcement
- W. Manhole Rings and Covers
- X. Bedding Material
- Y. Damp proofing for Buried Vaults
- Z. Flexible Plastic Joint Sealing Compound

4.03 WATER MAIN INSTALLATION

- A. Excavation
- B. Pipe Foundations and Bedding
- C. Trench Backfilling and Compaction
- D. Installation of Water Main
- E. Installation of Tracer Wire for PVC Pipe
- F. Installation of Polyethylene Wrapping
- G. Installation of Valves and Valve Boxes
- H. Installation of Fittings
- I. Installation of Tapping Sleeves (“Wet Tap”)
- J. Installation of Fire Hydrants
- K. Installation of Blowoff Assemblies
- L. Installation of Thrust Blocks
- M. Protection of Water Lines near Sanitary and Storm Sewer Facilities
- N. Hydrostatic Testing of Water Mains
- O. Disinfection of Water Mains

4.04 WATER SERVICE LINE DESIGN

- A. Flow Design Criteria
- B. Hydraulic Design
- C. Sizing
- D. Location and Alignment
- E. Depth
- F. Service Taps
- G. Materials
- H. Valves
- I. Pressure Reducing Valves (PRV)

CHAPTER IV
WATER DISTRIBUTION SYSTEM SPECIFICATIONS
TABLE OF CONTENTS

4.05 WATER SERVICE MATERIALS

- A. "K" Copper Pipe
- B. Ductile Iron Pipe
- C. Polyvinyl Chloride Pipe - PVC
- D. Bedding Material
- E. Water Service Fittings
- F. Valves
- G. Corporation Stops
- H. Tapping Saddles
- I. Copper Setters
- J. Meter Pits
- K. Pre-Cast Concrete Vaults and Manholes
- L. Manhole Rings and Covers
- M. Meter Pit Domes
- N. Meters
- O. Curb Boxes
- P. Bell Restraints

4.06 WATER SERVICE INSTALLATION

- A. Excavation
- B. Pipe Foundation and Bedding
- C. Trench Backfilling and Compaction
- D. Installation of Water Service Lines
- E. Installation of Polyethylene Wrapping
- F. Installation of Valves and Valve Boxes
- G. Installation of Fittings
- H. Installation of Gate Valves with Drains
- I. Installation of Service Taps
- J. Abandonment of Water Service Lines
- K. Installation of Meter Pits
- L. Installation of Water Meter and Back Flow Prevention Assemblies for Commercial Developments

CHAPTER IV
WATER DISTRIBUTION SYSTEM SPECIFICATIONS
TABLE OF CONTENTS

4.07 WATER METER DESIGN CRITERIA

- A. General
- B. Sizing
- C. Meters
- D. Meter Locations

4.08 CROSS CONNECTION CONTROL CRITERIA

- A. General
- B. Types of Cross-Connection Control Devices
- C. Application of Devices
- D. Water Conservation Devices

CHAPTER IV
WATER DISTRIBUTION SYSTEM - DESIGN SPECIFICATIONS

4.01 WATER MAIN DESIGN

4.01-A Flow Design Criteria

Water system design shall be based on the hydraulic capacity of the system using the following criteria and shall be identified by the State Fire Marshall.

1. Domestic Demand Criteria

The criteria for domestic demand are minimum criteria, and at the discretion of the District Engineer, different unit flow factors may be required. The demand for Commercial/Industrial developments shall be based on the gross acreage of the development including roadways.

2. Irrigation Demand Criteria

Most irrigation demands are reviewed by the District Engineer however, an additional component for irrigation demand shall be included in systems where irrigation taps 2" diameter or larger are proposed. The actual flow calculated by the Customer's landscape architect shall be utilized for estimation purposes only. However, if the system has yet to be designed, a Unit Flow Factor of 2500 gpad and a Peaking Factor of 3.5 shall be used.

3. Fire Flow Criteria

Fire flow requirements shall be determined in accordance with the recommendations contained in the "Guide for Determination of Required Fire Flow" as published by the Insurance Services Office (I.S.O.) Municipal Survey Service. The Customer's consulting engineer shall determine the Needed Fire Flow (NFF) based on the parameters of the proposed development. Developments which consist of a combination of building types shall calculate the needed fire flow based on the highest flow requirement within the system.

4.01-B Hydraulic Design

1. Analysis Criteria

Water distribution systems shall be analyzed for pressure, velocities, head loss and surge allowance using a pipe network analysis method such as Hardy Cross. Surge allowance shall be calculated by using the guidelines set forth in AWWA C-900-75 Appendix A or Uni-Bell Handbook for the design and construction of PVC pipe. All NAC water codes for hydraulic analysis must be met.

The distribution system shall be sized to meet the following criteria:

Minimum Pressure: 40 psi during maximum day demands

Peak Hour Demands: 30 psi

Maximum Pressure: 120 psi

Maximum Velocity: 5 ft/sec.

Maximum Head Loss: 1 ft/100 ft.

Maximum Day Demand + Needed Fire Flow: 20 psi

Minimum Pressure: 20 psi

Maximum Pressure: 100 psi

Maximum Velocity: 10 ft/sec.

Maximum Head Loss: 5 ft/100 ft

Demand points for the Needed Fire Flow shall be determined from adjacent fire hydrants as required by the State Fire Marshall and District Engineer. All fire hydrants shall meet the minimum criteria as noted above.

2. Water Line Looping

Water lines shall be looped so that no more than one fire hydrant is out of service at any time when any repair of the water line or an interruption of service occurs. No more than one fire hydrant or fire sprinkler system shall be installed on a single line that is not looped. In the event that the looping is to be constructed as part of future phases, it shall be included as part of the pipe network analysis. Upsizing, at customer's cost, of distribution lines shall be required when the hydraulic analysis indicates that upsizing is needed for current or future phases to meet the hydraulic criteria for all construction phases. Any development or system improvements related to new development shall not adversely impact the existing water users/customers.

4.01-C Location and Alignment

1. Streets

Water mains shall be located within dedicated rights of way along an alignment that generally follows the roadway 6' inside of the flowline. On streets running north and south, the water line shall be placed on the east side of the street. On streets running east and west, the water line shall be placed on the north side of the street. On roadways, which meander in each direction, the water line shall not zig-zag across the street.

2. Easements

When water mains cannot be located within dedicated right-of-ways, they shall be located within a dedicated easement at least 15' wide. Within residential developments, the easement shall be located within an open space tract. Under exceptional circumstances, the District Engineer may allow the easement to be located between two residential lots; however, the easement shall be at least 20' wide. In some instances, additional width may be required in accordance with Section 2.05 of these specifications. The water main shall be placed 2' on either side of the centerline of the easement with a minimum depth of cover based on District Engineer recommendations. Horizontal deflections in water mains located in easements between lots are not permitted. Valves may be located in dedicated "open space" or "common" areas. Grading within the District easement is permissible; however, the side slope may not exceed a 6:1. The grade along the length of the easement may not exceed 5% unless otherwise approved by the District Engineer. Vehicle access must be maintained at all times. Curvilinear water mains are not permitted within easements.

When a water main crosses an existing or future open space drainage way, the line shall cross perpendicular to the drainage way or as close to perpendicular as feasible. If the slope of the drainage way downstream from the crossing exceeds a grade of 0.5 percent within 200' of the crossing, a cutoff wall, a minimum of 5' deep, located 10' to 15' downstream from the crossing shall be required. Any public water or sewer utility installed within a public utility on private property must be approved by NDEP Bureau of Safe Drinking Water and Bureau of Water Pollution Control.

3. Alignment with other Utilities

In the event that a water main must cross a sanitary sewer or storm sewer main, the following criteria shall apply:

A. Horizontal

Water mains shall be located a minimum of 10' horizontally from existing or proposed sanitary and storm sewer lines (measured outside of pipe to outside of pipe).

B. Vertical

Where water mains cross storm or sanitary sewers, they shall be installed to provide a vertical clearance of at least 18" between the outside-of-pipe to outside-of-pipe. Reference Section 4.03-M for crossing requirements when 18" of clearance is not possible.

C. Depth

Minimum depth of water mains allowed by NDEP, Bureau of Safe Drinking Water, is 36 inches.

4. Curvilinear Alignment

Curvilinear alignments shall be permitted only in accordance with the criteria as set by the District Engineer. Curves shall be designed using "standard length" pipe. The field cutting of pipe to achieve a smaller radius shall not be permitted. Curvilinear alignments shall follow the same location criteria set forth in Chapter 4, Section 4.01-C.1.

4.01-D Materials

All materials for the water distribution system shall be in accordance with Chapter 4, Section 4.02 of these specifications.

1. Sizing of Mains

Water mains shall be standard diameters of: 4", 6", 8", 10", & 12".

- a. Ductile iron pipe may be used in all pressure zones as approved by the District Engineer.
- b. PVC pipe may be used in all pressure zones with a combined operating pressure and surge pressure of less than 150 psig.
- c. DR 14 Class 305 PVC pipe may be used in all pressure zones.
- d. Water lines in side lots or tracts shall be a minimum of C-900, Class 200 PVC or Class 50 DIP.
- e. Water line depressions shall be a minimum of C-900, Class 200 PVC
- f. Fire hydrant leads shall be Class 50 DIP.
- g. Fire suppression lines shall be Class 50 DIP.

4.01-E Depth

All water mains shall be designed so that a minimum of cover based on District Engineer recommendations shall exist over the top of pipe after final grade has been established. Where the water line is constructed in an easement between lots, the minimum depth shall be based on District Engineer or General Manager from final grade to top of pipe. The maximum depth of a water main shall not exceed 10' to top of pipe after final grade has been established unless approved by District Engineer

4.01-F Valves

1. Placement Criteria

Valves shall be placed in the distribution system in accordance with the criteria below. These criteria shall be the minimum requirement and additional valves may be required where the District Engineer determines they are necessary.

Valves shall be placed in the distribution system such that:

- a. No more than 20 dwelling units will be out of service as a result of a single main break.
- b. No adjacent fire hydrants or fire suppression systems will be out of service as a result of a single main break.
- c. No more than three valves shall be necessary to isolate a single main break.
- d. The maximum spacing between valves on a single line shall not exceed 800' for mains 6" through 12".
- e. Any connection to the transmission system shall have a means of isolation directly adjacent to the transmission line. If a connection results in an adjacent service and fire hydrant being out of service as a result of a transmission main break, an additional valve will be required on the transmission main.

- f. Any future extensions of distribution lines may be accomplished without interruption of service.
- g. When a water line is placed through a side lot easement or tract for the purpose of looping or connecting to an infrastructure water line, isolation valves shall be placed at the points of connection. No water services shall be permitted on this portion of the water line.
- h. Valves may not be moved from the location shown on the approved plans. Prior acceptance required by District or District Engineer.

Construction Drawings without District approval.

3. Location and Alignment

Valve locations shall be determined in accordance with the following:

- a. At intersections, valves shall be located 2.5-feet from the center of the tee or cross to the center of the valve.
- b. In the middle of blocks, valves shall be located along the projection of a property line, and adjacent to a fire hydrant.
- c. Valves shall be located within paved areas at a minimum of 1' from the lip of the curb and gutter or the edge of pan on the street side.
- d. Valves shall have an 18" square concrete collar poured around the box.
- e. When a water line is placed through a side lot easement or tract for the purpose of looping or connecting to an infrastructure water line, isolation valves shall be placed at the connection in the street and on the connection to the infrastructure line. No water services shall be permitted on this portion of the water line.

4. Resilient Wedge Gate Valves

Resilient wedge gate valves shall be installed on all water mains. Resilient wedge gate valves shall comply with all provisions of Chapter 4, Section 4.02-E and 4.02-F.

5. Butterfly Valves

Butterfly valves shall be required on any water mains larger than 12 inches in diameter and approved by District Engineer.

6. Operators

All buried valves shall have a standard AWWA 2" square operating nut. Valves located in vaults or meter pits shall have a hand-wheel operator. All valve operators shall open the valves by means of clockwise rotation (OPEN RIGHT) of the nut or hand-wheel. Blow off assemblies shall have a 2" brass nut attached with a brass cotter pin.

4.01-G Fire Hydrants

The Fire Marshall shall approve the number, location and spacing of fire hydrants. The Fire Marshall will determine the required fire flows and locate the appropriate number of fire hydrants on the water main construction plans. Fire hydrants shall be located on the same side of the street as the water main. At intersections, fire hydrants will be located on the northeast corner. If hydrants are to be installed at locations other than street intersections, they shall be located along the projection of a property line.

The actual number and spacing of hydrants will depend on access road/parking lot configurations and the degree of hazard which the new development presents, i.e., sprinkled buildings require fewer hydrants, but flammable liquid storage areas require more hydrants. Hydrants shall be no more than 500' apart in single-family residential areas, 400' apart in multi-family developments, and 300' apart in commercial or industrial areas. Fire hydrants shall be at least 5' from the edge of any driveway. In the event that fire hydrants are located within parking lots or alleys without curbs, vertical steel bollard (minimum 4" diameter) barriers shall be placed around the fire hydrants. Fire hydrants located behind curbs and sidewalks shall be placed 36" behind the back of curb or sidewalk to the center of the hydrant. The maximum allowable distance between tracer wire valve boxes shall not exceed 500'. Fire hydrant branch lines shall be set at right angles to street mains. The branch line from the main to the fire hydrant may not exceed 50 feet unless otherwise approved by the District Engineer. Lines that exceed 50 feet in length may need to be upsized to the next normal pipe size and reduced adjacent to the isolation valve of the fire hydrant assembly. The hydrant shall be set at the end of the branch line and shall face the branch line. No horizontal or vertical bends shall be used in installing fire hydrant branch lines without approval from the District Engineer. Under no circumstances shall any size or manner of tap be made on a fire hydrant branch line. Each hydrant shall be connected to the main with a minimum of a 6" branch of approved piping controlled by an independent gate valve and restrained to the tee on the main. The branch line and hydrant shoe shall be rodded to the main line tee and fire hydrant shall be thrust blocked. The entire hydrant shall be wrapped in plastic, including any extension installed on the hydrant to raise it to final grade. Any fire hydrant within the District's service area shall be owned and maintained by the District, whether in public right-of-way or on private property, except where master meters are installed between the treatment plant and any one or a group of fire hydrants. All hydrants connected to the mains of the District are provided for the primary purpose of furnishing water for fire suppressing and shall be opened and used only by persons authorized to do so by the District. Any other use of fire hydrants shall be allowed by permit issued by the General Manager and shall require the use of a hydrant meter and regulating valve for the monitoring of water use. Authorized personnel shall make the connection and disconnection only. Rates to be charged for water extracted from each hydrant shall be in accordance with the current fee schedule. Use of hydrant water shall cease for the duration of any fire within the District, or for any other reason upon notice by the District. The Customer is responsible to pay for any damage to the hydrant, hydrant meter, or other District property.

4.01-H Fire Sprinkler Lines

Fire sprinkler lines shall be installed using approved piping at right angles to distribution mains and shall run in as straight a line as possible from the main to the property line and from the property line to the proposed structure. Horizontal and vertical bends must be approved by the District Engineer and shall only be permitted where interference prohibits a straight-line installation. All fire sprinkler lines shall be 100% restrained from the main to the proposed structure by means of restrained joint pipe, restraining rods, or other devices approved by the District Engineer. Tie-rod retaining clamps shall be placed at the bells of every second pipe or at a maximum distance of 40' to support the restrain rodding if used. Post indicator valves are permissible; however, the District does not require them. A post indicator valve may be installed on the fire sprinkler line provided it is designed to operate in an open right position (clockwise) only.

4.01-I Pressure Regulating Stations

Pressure regulating valve (PRV) stations are used to control pressures between distribution zones. When main extension plans are submitted for review, the need for a pressure regulating valve station shall be determined based on existing pressure zones and the impact on the proposed development. Pressure reducing and regulating valves shall be of a type capable of maintaining pre-adjusted downstream pressures with varying rates of flow and upstream pressure without causing water hammer. Four inch and larger pressure reducing valves shall have double pilots. Pressure reducing and regulating valves shall be installed in concrete vaults in accordance with Standard Details.

4.01-J Air and Vacuum Valves

Combination air and vacuum release valves shall be installed at each high point on all water mains where District Engineer deems necessary. Air and vacuum release valves shall be installed in processed concrete manholes or vaults fitted with air vents.

4.01-K Blowoff Assemblies

All water mains, which are not looped, shall have a blowoff assembly installed at the end of the main. Water mains located in cul-de-sacs that are designed as deadend lines shall have a 2" assembly installed on the end plug in accordance with the standard detail drawing. Water mains which are part of phased construction and are, in effect, dead end lines until future looping shall have a 2" assembly installed on the main or on the end plug in accordance with the Standard Details. See Chapter 4, Section 4.03-K.

In instances where the water mains are stubbed out for future phasing, the in-line valve shall be restrained from the tee to the valve, and sufficient pipe placed past the in-line valve to prevent the valve from blowing off when the main is extended in the future.

4.01-L Rods, Clamps and Restraining Devices

All bends, plug, reducers, fire hydrants, and fire suppression systems shall be rodded and clamped in accordance with the Standard Details. Rods and clamps shall be used on ductile iron and PVC pipe systems. Where mechanical joint pipe is used, rods may be bolted through the joint bolt holes in accordance with the Standard Details. All clamps shall be covered with an epoxy coating. In all cases where reducers with a reduction ratio equal to or greater than 2 to 1 are used, special rodding and clamping procedures shall be required.

4.01-M Thrust Blocks

Concrete thrust blocks shall be installed at all tees, plugs, bends, and fire hydrants in accordance with the Standard Details. Where thrust blocks are used to block plugs or valves, the valves or plugs shall be protected from concrete by 8 mil polyethylene. Size of thrust block, type of concrete, and dimensions shall be in accordance with the Standard Details.

4.01-N Wet Taps

When a connection is required on an existing distribution or transmission main, the District Engineer may require a wet tap. This determination is based on the effect any connection may have on the interruption of service to customers, the effect on the transmission system, or the time restrictions involved with working in an existing street.

The minimum size wet tap is 2" diameter and, generally, the maximum size wet tap is 4" diameter. The maximum size of the wet tap shall be limited to 75% of the nominal diameter of the distribution or transmission main. Wet taps shall not be permitted within 48" of a bell or coupling. Wet taps shall only use a flanged resilient wedge gate valve for tapping and all tapping sleeves shall be of the double-strap type.

4.01-O Limits of Accuracy (Allowable Error)

A limit of accuracy refers to the horizontal and vertical deviation permissible during the laying of water mains. The allowable error shall be a maximum of plus or minus 0.3' in a vertical direction, but no deviation will be allowed which results in less than 3' of cover. The allowable horizontal error shall be a maximum of plus or minus 0.3'. Any line that does not meet the criteria shall be removed and reinstalled. On curvilinear mains, the maximum horizontal deflection shall not exceed plus, or minus 0.3'.

4.02 WATER MAIN MATERIALS

All pipe materials used in the construction of the water system shall conform to the requirements specified herein. Any material proposed as an equal must be approved by the District in writing prior to construction. All materials furnished shall be new and undamaged. All installations shall be constructed in accordance with these specifications. All necessary pipes, joints and appurtenances shall be furnished and installed whether shown on approved construction drawings or not. All installations shall be completed as fully operable. All piping materials must meet NSF or ANSI standards. No JM Eagle brand PVC pipe will be allowed.

4.02-A Ductile Iron Pipe

1. Manufacture

Ductile iron pipe shall be manufactured in strict accordance with AWWA Standard Specification C151.

2. Size of Pipe

This specification shall cover all sizes of ductile iron pipe 12" in diameter and smaller.

3. Joint Type

All ductile iron pipe joints shall be "push on joint single gasket" or "mechanical joint single gasket". The rubber gasket shall conform to the requirements of AWWA C-111.

4. Thickness Class

Pipe furnished shall be Class 50 for all sizes 6" diameter and larger. The preceding classes are minimums and higher classes may be required.

5. Laying Length

Pipe furnished shall have a normal laying length of 18' or 20'.

6. Grade of Iron

Iron used in the manufacture of pipe shall have 60/42/10 iron strength.

7. Cement Mortar Lining

All pipe furnished shall have standard thickness cement mortar lining in accordance with AWWA C-104.

4.02-B Polyvinyl Chloride Pipe - PVC

1. Manufacture

All polyvinyl chloride pipes shall be manufactured in strict accordance with AWWA Standard C900-75.

2. Size of Pipe

This specification shall cover all sizes of PVC pipe 12" and smaller.

3. Joint Type

Joints shall use a standard elastomeric joint.

4. Thickness Class

Pipe furnished under this specification shall have a DR ratio of 18, Class 150 or DR ratio of 14, Class 200.

5. Laying Lengths

Pipe shall have a normal laying length of 20'.

4.02-C Use of Water Line Materials

Water mains shall be: 4", 6", 8", 10", and 12". The hydraulic analysis criteria shall control the size of all water mains. Four-inch mains may be required in cul-de-sacs serving eight or fewer residences. Six-inch mains may be used in accordance within the limits of the hydraulic analysis criteria. Fire hydrants shall not be connected to a 4" main. Only one fire hydrant may be connected to a 6" main. Six and 8" mains that exceed 600' in length shall be looped.

1. Ductile iron or DR14 Class 200 PVC pipe may be used in all pressure zones.

2. DR 18 Class 150 PVC pipe may be used in all pressure zones with a static pressure less than 100 psig.

3. Water line depressions shall be a minimum of C-900, Class 200 PVC.

4.02-D Tapping Requirements

4.02-E Water Main Fittings

1. Fittings shall be ductile iron mechanical joint, Class 250 or 350. Class 250 fittings shall conform to AWWA C-110 and C-111. Class 350 fittings shall conform to AWWA C-111 and C-153. All fittings shall have cement-mortar lining in accordance with AWWA C-104 and shall have a factory-applied seal coat of bituminous material NSF or ANSI approved. All rods, bolts and nuts shall be fabricated from a low alloy, high strength steel known in the industry as "Cor-Ten", "US Alloy" or approved equal.

2. All bends shall be restrained by means of a Meg-a-lug or approved equal restraint device.

3. Solid sleeve fittings shall be restrained with Meg-a-lugs or approved equal restraint device.

4.02-F Resilient Wedge Gate Valves

All gate valves shall be resilient seated, epoxy coated, cast iron body, with a nonrising stem. Gate valves shall conform to AWWA C-509, with a minimum working pressure of 200 PSI. Valve stems shall be sealed with two "O" rings, each of which shall be designed as to allow replacement under full line pressure when the valve is in the full open position. Valves shall have a 2" square operating nut and shall open by turning the nut clockwise. All buried gate valves shall have

mechanical joint ends in conformance with AWWA C-111. Tee-head bolts and hexagon nuts shall be fabricated from a high strength, low alloy steel known in the industry as "Cor-Ten", "US Alloy", or approved equal. Gate valves shall have flanged ends sized and drilled in accordance with ANSI-B16.1 Class 125. Flanges shall be machined to a flat face with a finish of 250 micro-inches, AARH maximum or machined to a flat surface with a serrated finish in accordance with AWWA C-207. All gate valves shall have the year of manufacture cast as part of the valve body. Any valve that is more than two (2) calendar years old shall not be installed unless approved in writing by the District Engineer.

The following resilient wedge gate valves have been approved for installation within the District:

- Mueller
- Clow
- U.S. Pipe Metro Seal

4.02-G Tapping Valves

Tapping valves shall be resilient wedge gate valves with centering ring on flanged face of valve, for proper alignment.

4.02-I Pressure Reducing and Regulating Valve

All pressure reducing valves shall be Clayton 90-01 series or an approved equal. The pressure reducing valve shall be hydraulically operated with a free floating guided piston having a seat diameter equal to the size of the valve. The valve shall be fully bronze mounted and all packing shall have rubber seals to provide tight closure and prevent metal to metal friction. An indicator rod shall be furnished as an integral part of the valve to show the position of the piston within the valve body. The valve shall be designed to provide an access opening in the valve body for removing the piston and other internal parts without removing the main valve body from the line. Material for valve body shall be cast-iron. Flanges and covers shall conform to ASTM Standard Designation A48. Bronze castings or parts for internal trim shall conform to ASTM Standard B61. All valves shall be furnished with flanged ends and drilled in accordance with ANSI B-16.1 Class 125 specifications. Flanges shall be machined to a flat face or machined to a flat surface with a serrated finish in accordance with AWWA Standard C-207. The pilot valve for controlling operation of the main valve shall be a single seated, diaphragm operated and spring loaded type. The pilot valve shall be attached to the main valve with piping and isolation valves arranged for easy access in making adjustments and for its removal from the main valve while the main valve is under pressure. The pilot control system shall be cast bronzed ASTM B-62 with 303 stainless steel trim. The needle valve shall be all bronze and included with the main valve to control the speed of piston travel. The operating pressure shall be 150 psi. The body of the pressure reducing valve shall be given and withstand a hydrostatic test of 50 percent more than the operating pressure specified. A second test to check seating of the cylinder shall be made at the operating pressure. All pressure reducing and regulating valves shall be installed in concrete vaults. All pressure reducing and regulating valves shall be certified by the manufacturer that the assembly has been inspected and all of the specified tests have been performed. A copy of the certification shall be sent to the District Engineer upon request.

4.07 WATER METER DESIGN CRITERIA

4.07-A General

All water service lines shall have a meter purchased from the District and set at a location in accordance with these specifications.

4.07-B Sizing

Meters shall be sized by the Customer's architect or engineer in accordance with the hydraulic analysis of the service line. Meter size shall be reviewed and approved by the District Engineer. All nonresidential users shall submit a detailed fixture unit count, including the calculations for any irrigation demands including sprinkler systems and hose bibs. All residential and commercial installations will be served by one meter and one sewer only. The water service line between the main and the meter shall be the same size as the meter.

4.08 CROSS CONNECTION CONTROL CRITERIA

4.08-A General

Cross-connections of any type that may permit a backflow of water from a supply other than that of the District, into the District's potable water system, are strictly prohibited. All cross-connection control devices shall be of a model and size approved by the District Engineer. **All devices shall be installed in a horizontal position.** The term "Approved Cross Connection Control Device" shall mean a device that has been manufactured in full conformance with the standards established by the American Water Works Association Standard C506-78 "Standards for Reduced Pressure Principle and Double Check Valve Backflow Prevention Devices" and has met the laboratory and field performance specifications of the Foundation for Cross-Connection Control and Hydraulic Research of the University of Southern California. The Foundation for Cross-Connection Control frequently revises its standards for backflow prevention and cross connection devices. It shall be the responsibility of the Customer to ensure that the correct device is utilized. A current list of devices is available from the District Engineer.

4.08-B Types of Cross-Connection Control Devices

The design, installation and maintenances of all cross-connection control devices shall be the sole responsibility of the Customer. The following standards shall apply to cross-connection control devices:

1. Air Gap (AG)

An air gap is the unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet supplying water to a tank, plumbing fixture, or other device and the flood level rim of said vessel. The air gap shall be at least double the diameter of the supply pipe, measured vertically above the top of the rim of the vessel, and in no case less than 2". When an air gap is used at the service connection, to prevent the contamination or pollution of the public potable water system, an emergency bypass is installed around the air-gap system and an approved reduced pressure principle assembly shall be installed in the bypass system. All air gaps shall be permanently constructed with rigid piping. Flexible hose or tubing shall not be acceptable for an air gap.

2. Double Check Valve Assembly (DCVA)

Double check valve assemblies shall consist of an assembly of two independently operating check valves with tightly closing shut-off valves on each side of the check valves, plus properly located test cocks for the testing of each check valve. The entire assembly shall meet the design and performance specifications and approval of a recognized and approved testing agency for backflow prevention devices. These devices shall be readily accessible for in-line maintenance and testing. Double check valve assemblies shall be placed in a location that is protected from freezing.

3. Pressure Vacuum Breaker with Internal Check Valve (PVB)

Pressure vacuum breaker assemblies shall consist of at least one check valve, vacuum relief, inlet and discharge shutoff and properly installed test cocks. The pressure vacuum breaker shall have a vacuum relief valve which is internally loaded, normally by means of a spring. The PVB shall be installed a minimum of 12" above the highest outlet and/or overflow level on the non-potable system. Pressure vacuum breakers shall not be installed more than 5' above the ground. Adequate room shall be made available for maintenance and testing.

4. Atmospheric Vacuum Breaker (AVB)

An atmospheric vacuum breaker is a device that allows air to enter the water line when the line pressure is reduced to a gauge pressure of zero or below. The atmospheric vacuum breaker is designed to prevent back-siphonage only. It is not effective against backflow due to back pressure and shall not be installed where it will be under continuous operating pressure for more than 12 hours in any 24-hour period. Poppets of all atmospheric vacuum breakers shall be precision fitted to insure positive closure. An AVB shall be installed downstream of the last shutoff valve and a minimum of 6" above the highest outlet and/or overflow level on the non-potable system. Atmospheric breakers shall not be installed more than 5' above the ground.

5. Reduced Pressure Principle Device (RPPD)

A reduced pressure principle device is an assembly of two independently operating approved check valves with automatically operating differential relief valves between the two check valves, tightly closing shut-off valves on either side of the check valves, plus properly located test cocks for the testing of the check and relief valves. The entire assembly shall meet the design and performance specifications and approval of a recognized and approved testing agency for backflow prevention assemblies. The device shall operate to maintain the pressure in the zone between the two check valves at a level less than the pressure on the public water supply side of the device. In case of leakage of either of the check valves the differential relief valve shall operate to maintain the reduced pressure in the zone between the check valves by discharging to the atmosphere. When the inlet pressure is two pounds per square inch or less, the relief valve shall open to the atmosphere. These devices must be readily accessible for in-line maintenance and testing and must be installed in a location where no part of the device will be submerged. Under no circumstances shall a RPPD device be placed underground in a pit. The device shall not be installed where the pressure can be maintained above the device's rated capacity. When the RPPD is located within a structure, it is recommended that a drain pipe be provided under the relief valve port of the device. An approved air gap between the port and the drain is required. All manufacturers' recommendations for the device shall be followed.

6. Hose Bibs

Hose bibs shall be directional with built in backflow preventer. Hose bibs will also have a drain down feature built into the unit.

4.08-C Application of Devices

The type and complexity of the cross-connection control device shall be determined by the District's Engineer in accordance with all rules and regulations pertaining to these devices. All applications shall be submitted to the District Engineer for review and approval. The determination of the type of device required shall be based on the degree of hazard caused to the public from contamination. All devices shall be installed in a horizontal position with no electrical devices, lights, wiring, heaters, etc. within 30" of meter or backflow preventer.

The applications listed below may be used as a guideline but are not to be construed as the sole determining factor in selecting a device:

1. Residential irrigation systems (3/4" to 1") shall have: a single pressure vacuum breaker prior to all valves within a system (including solenoid valves; or an atmospheric vacuum breaker with a single check valve downstream (or after) every valve, including solenoid valves and gate valves for each zone.
2. Commercial irrigation systems shall have an approved reduced pressure principle device. The backflow preventer shall be located a minimum of 5' or a maximum of 8' from the edge of the meter pit.
3. Fire protection sprinklers for buildings shall have an approved reduced pressure principle device.
4. Stock tanks require a reduced pressure principle device or an air gap.
5. Structures larger than 40' in height measured from the water main to the highest fixture within the structure shall have a Reduced Pressure Principle Device.
6. Sewage treatment plants shall have a reduced pressure principle device.
7. Lift stations and recreational vehicle sewage dumps shall have a reduced pressure principle device.
8. All commercial and industrial buildings require a reduced pressure principle device (containment backflow). The type and location of the device shall be shown on the construction drawings.

4.08-D Water Conservation Devices

All devices shall conform to NDEP, Bureau of Safe Drinking, guidelines for water conservation devices.

This document is not all inclusive with meeting the codes and regulations for the State of Nevada, NDEP, and other regulators. It serves as a guidance document.

The signatures below document the developer and/or customer has received a copy of these specifications.

Rob Shirley, General Manager

Date: _____

Developer/Customer

Date: _____