

GENERAL SPECIFICATIONS

1. THE TERM "OWNER" HEREFTER REFERRED TO IN THESE SPECIFICATIONS SHALL BE TOWN, CITY, VILLAGE, OR DISTRICT. THE TERM "ENGINEER" SHALL MEAN THE ENGINEER OR INSPECTING ENGINEER FOR THIS PROJECT. THE TERM "CONTRACTOR" SHALL MEAN THE BUILDER OF THIS PROJECT.

2. NOTWITHSTANDING THE FOLLOWING SPECIFICATIONS, ALL WORK SHALL CONFORM TO THE LOCAL STANDARDS FOR CONSTRUCTION. THESE CONSTRUCTION NOTES RECOGNIZE THE STATE OF VERMONT AGENCY OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION, LATEST EDITION, AS A SUPPLEMENTAL SOURCE FOR STANDARDS.

3. COORDINATION—ALL CONSTRUCTION SEQUENCING SHALL BE COORDINATED WITH THE OWNER, WITH RESPECT TO ACTIVELY RESTRICTING THE OWNER'S USE OF THE PROPERTY.

4. THE ENGINEER/CONTRACTOR OR THEIR AUTHORIZED AGENT/ENGINEER SHALL BE RESPONSIBLE FOR OBTAINING ALL RELEVANT FEDERAL, STATE AND LOCAL BUILDING PERMITS PRIOR TO COMMENCEMENT OF CONSTRUCTION. THE CONTRACTOR SHALL NOTIFY THE ENGINEER REPRESENTING THE OWNER, IN WRITING, WITHIN 24 HOURS OF THEIR RECEIVING ANY UTILITY FOR WHICH THE ENGINEER SHALL BE RESPONSIBLE TO CERTIFY TO THE CONSTRUCTION THEREOF. IN ADDITION, THE CONTRACTOR SHALL NOTIFY DIG SAFE @ 1-888-DIG-SAFE (1-888-344-7233), AND THE OWNER AT LEAST FORTY EIGHT HOURS PRIOR TO EXCAVATION OF WATER, SEWER OR UTILITIES LINES.

5. PROJECT SITE MANAGEMENT — THE CONTRACTOR SHALL ENSURE THAT AT THE END OF EACH WORKING DAY, THE JOB SITE SHALL BE LEFT IN A CONDITION SATISFACTORY TO THE ENGINEER OR OWNER. ALL EXCESS AND UNNECESSARY CONSTRUCTION EQUIPMENT AND DEBRIS SHALL BE REMOVED FROM THE JOB SITE AS WORK PROGRESSES.

6. PROTECTION OF THE PUBLIC—THE PUBLIC SHALL BE PROTECTED BY THE CONTRACTOR FROM ANY AND ALL HAZARDS CONNECTED WITH THE WORK. OPEN TRENCHES, MATERIALS OR OTHER EQUIPMENT WITHIN THE WORKING LIMITS ARE TO BE GUARDED BY THE USE OF ADEQUATE BARRICADES, SNOW FENCES OR FLAG MEN.

7. SITE PREPARATION AND DEBRIS REMOVAL—THE CONTRACTOR SHALL STRIP AND STOCKPILE ALL TOPSOIL IN THE AFFECTED AREA. NO TOPSOIL SHALL BE REMOVED FROM THE SITE. ALL CONSTRUCTION DEBRIS FROM THE DEMOLITION SHALL BE REMOVED FROM THE SITE BY THE CONTRACTOR AND DISPOSED OF IN AN ENVIRONMENTALLY SOUND, LAWFUL MANNER.

8. ALTERNATIVES—IF ALTERNATIVE MATERIALS AND/OR METHODS ARE PROPOSED, FULL SUBSTANTIATION MUST ACCOMPANY THE BID. SUCH ALTERNATIVES MUST BE LISTED IN DETAIL, WITH ACCOMPANYING COSTS ALONG WITH A CONCURRENT LISTING OF ITEMS AND THEIR COSTS FOR WHICH THE ALTERNATIVES ARE BEING MADE SO THAT AN ACCURATE COMPARISON AND EVALUATION MAY BE MADE BY THE ENGINEER OR OWNER. ALL BIDS MUST REFLECT THE USE OF THE EQUIPMENT AND MATERIALS STIPULATED BY THE LOW BIDDER, WITH THEIR BID, WILL BE EVALUATED AFTER THE AWARD OF CONTRACT.

9. PROTECTION AND REPAIR OF EXISTING UTILITIES—WHENEVER CULVERTS, MANHOLES, CATCH BASIN CONNECTIONS, WATER MAINS, VALVE CHAMBERS, UTILITY POLES, GUY WIRES, OVERHEAD LINES, FENCES OR OTHER UNDERGROUND CONSTRUCTIONS ARE ENCOUNTERED THEY SHALL BE PROTECTED AND FIRMLY SUPPORTED BY THE CONTRACTOR AT HIS OWN EXPENSE, BY METHODS APPROVED BY THE ENGINEER OR INVOLVED UTILITY. UNTIL THE EXCAVATION IS BACK FILLED AND THE EXISTING STRUCTURES ARE MADE SECURE. EXTEND EXISTING VALVE BOXES AND MANHOLES IN FILL AREAS. INJURY TO ANY SUCH STRUCTURE CAUSED BY OR RESULTING FROM CONTRACTOR'S METHODS WILL BE REPAIRED OR REPLACED AT THE CONTRACTOR'S EXPENSE WITHIN A TIME PERIOD THAT WILL NOT PLACE AN UNREASONABLE BURDEN ON THE USERS. THE OWNER, ENGINEER AND THE AUTHORITY HAVING CHARGE OF ANY PARTICULAR UNDERGROUND STRUCTURE SHALL BE NOTIFIED PROMPTLY OF INJURY TO ITS STRUCTURE.

10. RECONSTRUCTION OF EXISTING UTILITIES—IN CASE IT SHALL BECOME NECESSARY, IN THE OPINION OF THE ENGINEER, TO MOVE OR RECONSTRUCT ANY WATER MAIN, ELECTRIC TELEPHONE CONDUIT, ANY CONNECTIONS THERETO OR ANY APPURTENANT STRUCTURES, WORK WILL BE DONE BY THE CONTRACTOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING NOTICE TO USERS BEFORE INTERRUPTING SERVICE, UNLESS SPECIFICALLY PROVIDED FOR IN THE CONTRACT. RECONSTRUCTION OF UTILITIES SHALL BE AT THE CONTRACTOR'S EXPENSE. IN NO CASE SHALL THE CONTRACTOR ALTER ANY WATER MAIN, ELECTRIC CONDUIT, TELEPHONE CONDUIT OR ANY UNDERGROUND CABLES, CONDUIT OR STRUCTURES, WITHOUT THE WRITTEN PERMISSION OF THE UTILITY OWNER OR UNTIL THE ENGINEER/CITY IS SATISFIED THAT ADEQUATE WARNING TO THE USERS HAS BEEN PROVIDED.

11. WORK TO CONFORM—DURING THE PROGRESS AND UPON ITS COMPLETION, ALL WORK SHALL CONFORM TO THE LINES, LEVELS AND GRADES INDICATED ON THE DRAWINGS OR GIVEN BY THE ENGINEER AND SHALL BE BUILT IN A THOROUGHLY SUBSTANTIAL AND WORKMANLIKE MANNER, IN ACCORDANCE WITH THE DRAWINGS AND SPECIFICATIONS AND THE DIRECTIONS, GIVEN FROM TIME TO TIME BY THE OWNER. IN NO CASE SHALL ANY WORK IN EXCESS OF THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS BE PAID FOR UNLESS ORDERED IN WRITING BY THE OWNER.

12. COMPACTION—WHERE BACKFILL IS DESIGNATED COMPACTED ON THE DRAWINGS, COMPACTION SHALL BE AT LEAST 90 % TO 95 % STANDARD PROCTOR. ROADWAY AND PARKING SURF GRADES SHALL BE COMPACTED TO AT LEAST 95 % STANDARD PROCTOR. THE CONTRACTOR WILL BE REQUIRED TO HAVE SPECIALIZED COMPACTION EQUIPMENT ON THE JOB SITE AS MAY BE NEEDED TO PROPERLY COMPACT MATERIAL SPECIFICALLY FOR THIS PROJECT.

13. STORM RUNOFF CONTROL—CONTRACTOR SHALL ASSURE THAT NO PART OF A SANITARY OF STORM SEWER SYSTEM IS SUBJECT AT THE END OF EACH WORKDAY TO THE INFLOW OF STORM WATER RUNOFF AND THE SEDIMENT THAT IS OFTEN ASSOCIATED WITH CONSTRUCTION SITE RUNOFF. AT ALL MANHOLES AND CATCH BASINS, A SEWER SHALL BE INSTALLED AND SEALED IN ALL OPENINGS. ANY OPENINGS INTO WHICH SEWERS HAVE NOT BEEN INSTALLED SHALL BE PLUGGED. MANHOLE AND CATCH BASIN TOPS SHALL BE SURFICELY HIGH AND SEALED TO PREVENT RUNOFF FROM FLOWING INTO THESE STRUCTURES. THE OPEN ENDS OF SEWER LINES, INCLUDING LOT OR BUILDING SERVICES, SHALL BE CAPPED OR PLUGGED.

14. SUPERVISORS ON THE JOB SITE—THE CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING THAT THERE IS A SUPERVISOR EMPLOYED ON THE JOB SITE AT ALL TIMES THAT CONSTRUCTION IS BEING PERFORMED UNDERWAY, WHETHER OR NOT THE CONSTRUCTION IS BEING ACCOMPLISHED BY THE PRIME CONTRACTOR OR SUBCONTRACTOR HIRED BY THE GENERAL CONTRACTOR.

15. INSPECTION AND TESTING—UPON COMPLETION OF CONSTRUCTION AND WRITTEN CERTIFICATION THAT THE REQUIRED TESTING HAS BEEN CONDUCTED, A FINAL QUALITY INSPECTION SHALL BE CONDUCTED WITH THE ENGINEER, CONTRACTOR AND THE OWNER. ONCE A SATISFACTORY WALK-THROUGH INSPECTION HAS BEEN COMPLETED, AND THE AS-BUILT DRAWINGS ACCEPTED, THE OWNER WILL ACCEPT THE CONSTRUCTION AND WARRANTY PERIOD WILL BEGIN.

WATER SPECIFICATIONS

AT LEAST SEVEN (7) DAYS BEFORE THE START OF ACTUAL CONSTRUCTION OF ANY UTILITIES OR IMPROVEMENTS, THE APPLICANT, ENGINEER, OWNER, OR CONTRACTOR SHALL NOTIFY THE TOWN OF RICHMOND OF HIS INTENT TO PROCEED, AND SHALL ARRANGE A MEETING WITH THE TOWN OF RICHMOND, APPLICANT, ENGINEER, AND THE CONTRACTOR TO DISCUSS THE PROJECT.

RICHMOND SPECIFICATIONS: ALL WATERLINE AND RELATED WORK TO BE PERFORMED IN ACCORDANCE WITH THE TOWN SPECIFICATIONS AND DETAILS FOR THE INSTALLATION OF WATERLINES AND APPURTENANCES.

ALL SERVICE CONNECTIONS AND WATER MAINS SHALL BE BURIED TO A DEPTH OF AT LEAST SIX FEET (6') TO THE TOP OF THE PIPE UNLESS WAIVED BY THE TOWN OF RICHMOND.

THE TOWN OF RICHMOND SHALL BE NOTIFIED IN ADVANCE TO INSPECT ALL MECHANICAL JOINT FITTINGS, MAIN LINE TAPS, APPURTENANCES, AND WATER LINE CROSSINGS PRIOR TO BACK FILLING.

THE TOWN OF RICHMOND SHALL BE NOTIFIED NO LESS THAN TWO (2) WORKING DAYS IN ADVANCE OF ANY PROPOSED TESTING OF ANY COMPLETED MAINS BY THE PROJECT ENGINEER, AND MUST BE PRESENT TO WITNESS AND ACCEPT ALL TESTS.

THE TOWN OF RICHMOND RESERVES THE RIGHT TO DIRECT THE CONTRACTOR TO "DIG UP" ANY INSTALLATION NOT MEETING THESE REQUIREMENTS OR THAT HAVE BEEN INSTALLED WITHOUT PRIOR APPROVAL OR INSPECTION, AT THE CONTRACTORS EXPENSE.

NO UNDERGROUND UTILITY SHOULD BE DESIGNED OR INSTALLED WITHIN FOUR FEET (4') OF THE WATER MAIN FROM EITHER SIDE, FROM THE TOP OF THE MAIN TO FINISH GRADE, WITH THE EXCEPTION OF STORM SEWER AND SANITARY SEWER AS ALLOWED THESE SPECIFICATIONS AND THE VT WATER SUPPLY RULE. NO UNAPPROVED BUILDING OR STRUCTURE SHALL BE BUILT ABOVE THE WATER LINE OR WITHIN THE WATER LINE EASEMENT.

UPON COMPLETION OF THE OF THE WATER SYSTEM CONSTRUCTION PROJECT, "AS-BUILTS" SHALL BE SUPPLIED TO THE TOWN OF RICHMOND. ALL AS-BUILTS ARE TO INCLUDE VALVE TIES, AND MANUFACTURER MAKE AND CASTING DATE FOR ALL GATE VALVES.

FINAL ACCEPTANCE, AFTER A ONE-YEAR WARRANTY PERIOD, SHALL NOT TAKE PLACE UNTIL THE TOWN OF RICHMOND HAS DETERMINED THAT THE WATER SYSTEM AS-BUILTS HAVE BEEN RECEIVED AND ALL REQUIRED IMPROVEMENTS HAVE BEEN SATISFACTORILY COMPLETED. WATER SYSTEM AS-BUILTS SHALL BE PREPARED AND SUBMITTED TO THE TOWN OF RICHMOND AT THE COMPLETION OF THE WATER SYSTEM CONSTRUCTION. THE TOWN OF RICHMOND WILL PROVIDE A FORMAL RESPONSE DOCUMENTING THE COMPLETION DATE OF THE WATER SYSTEM WORK, TESTING SUMMARY, AND ONE-YEAR WARRANTY PERIOD REQUIRED. THE CONTRACTOR SHALL REPAIR, REPLACE OR RETEST PROMPTLY AS DIRECTED BY THE TOWN AND WITHOUT FURTHER CHARGES. ALL WORK, EQUIPMENT, MATERIALS OR PARTS, WHICH MAY FAIL DURING THE ONE YEAR WARRANTY PERIOD.

PVC WATER PIPE

PIPE SHALL BE POLYVINYL CHLORIDE (PVC) WITH A MINIMUM DIAMETER OR 8" AND SHALL CONFORM TO CURRENT AWWA SPECIFICATION C900 (C905 FOR LARGE SIZES). THE MINIMUM THICKNESS CLASS SHALL BE DR-14 (205 PSJ) AND JOINTS SHALL BE THE PUSH-ON, EXCEPT AT FITTINGS WHERE THEY SHALL BE MECHANICAL.

FITTINGS

DUCTILE IRON FITTINGS SHALL CONFORM TO ANS/AWWA C110/A21.10. 350 POUNDS WORKING PRESSURE. DUCTILE IRON FITTINGS LARGER THAN TWELVE INCHES (12") SHALL HAVE A STANDARD BORE LENGTH EQUAL TO CLASS 250 CAST IRON FITTINGS. CAST IRON CLASS 250 FITTINGS WILL BE ALLOWED IN LIEU OF DUCTILE IRON FITTINGS IN SIZES LARGER THAN TWELVE INCHES (12"). DUCTILE IRON FITTINGS SHALL BE RATED FOR 250 P.S.I. HOWEVER, TWELVE INCH (12") AND SMALLER MAY BE RATED FOR 350 P.S.I. WITH THE USE OF SPECIAL GASKETS. ALL DUCTILE IRON COMPACT FITTINGS SHALL CONFORM TO ANWA/ANSI C153/A21.53 STANDARDS.

ANCHOR TEES SHALL BE STANDARD MECHANICAL JOINT TEES EXCEPT THAT THE BRANCH IS FLAIN CLASS 250 CAST IRON OR CLASS 350 DUCTILE IRON, CEMENT LINED, CONFORMING TO ANS/AWWA C110/A21.10, C111/A21.11, AND C104/A21.4. ANCHOR TEES SHALL BE CLOW F-1217, U.S. PIPE US-92 OR EQUAL.

MECHANICAL JOINT RESTRAINTS SHALL BE INCORPORATED INTO THE DESIGN OF THE FOLLOWING GLAND AND SHALL INCLUDE A RESTRAINING MECHANISM WHICH, WHEN ACTUATED, IMPARTS MULTIPLE WEAVING ACTION AGAINST THE PIPE INCREASING ITS RESISTANCE AS THE PRESSURE INCREASES. FLEXIBILITY OF THE JOINT SHALL BE MAINTAINED AFTER BURIAL. GLANDS SHALL BE MANUFACTURED OF DUCTILE IRON, AND HAVE A MINIMUM WORKING PRESSURE OF 350 PSI. TWIST OFF NUTS (I.E. MEGA-LOG) OR EQUAL SHALL BE USED TO ENSURE PROPER ACTUATING OF THE RESTRAINING DEVICES. CONTRACTORS MAY ALSO USE APPROVED GRIP RING (OR EQUAL) RETAINER GLANDS.

BOLTS SHALL CONFORM TO ANSI SPECIFICATION A21.1 0.

PIPELINE COUPLINGS SHALL CONFORM TO AWWA STANDARDS C110 AND ANSI A21.10. MECHANICAL JOINT CONNECTING PIECES OF PROPER DIAMETER SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER RECOMMENDATIONS AND AT LOCATIONS DIRECTED BY THE PLANS OR THE TOWN OF RICHMOND.

PIPELINE COUPLINGS SHALL CONFORM TO AWWA STANDARDS C110 AND ANSI A21.10. MECHANICAL JOINT CONNECTING PIECES OF PROPER DIAMETER SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER RECOMMENDATIONS AND AT LOCATIONS DIRECTED BY THE PLANS OR THE TOWN OF RICHMOND.

GATE VALVES— RESILIENT SEAT

VALVES SHALL BE MANUFACTURED TO MEET ALL REQUIREMENTS OF AWWA SPECIFICATION C509. VALVES TWELVE INCHES (12") AND SMALLER SHALL BE BUBBLE TIGHT, ZERO LEAKAGE AT 200 PSI WORKING PRESSURE. VALVES SHALL HAVE NON-RISING STEMS, OPEN COUNTER CLOCKWISE AND PROVIDE A TWO (2) SQUARE OPERATING NUT WITH AN ARROW CAST IN THE METAL INDICATING DIRECTION OF OPENING.

EACH VALVE SHALL HAVE THE MAKERS NAME, PRESSURE RATING AND YEAR IN WHICH IT WAS MANUFACTURED CAST ON THE BODY. VALVES SHALL BE MECHANICAL JOINT ON EACH END EXCEPT FOR TAPPING. VALVES SHALL BE MANUFACTURED FROM THE FAVORITE EXHIBIT. VALVES SHALL BE TESTED BY HYDROSTATIC PRESSURE EQUAL TO TWICE THE SPECIFIED WORKING PRESSURE. GATE VALVES SHALL BE MUELLER, DRESSER, KENNEDY, OR APPROVED EQUAL.

VALVE BOXES

VALVE BOXES SHALL BE OF THE THREE-PIECE CAST IRON SCREW TYPE WITH A MINIMUM INSIDE SHAFT DIAMETER OF FIVE AND ONE QUARTER INCHES (5 1/4") AND A SIX FOOT (6') TRENCH DEPTH. VALVE BOXES SHALL NOT BE USED FOR ANY OTHER PURPOSE. VALVE BOXES SHALL HAVE A CAST IRON COVER MARKED "WATER". THE BOXES SHALL BE DIRT TIGHT WITH THE TOP OF THE COVER FLUSH WITH THE TOP OF THE BOX RIM.

FIRE HYDRANTS AND HYDRANT BRANCHES

FIRE HYDRANTS SHALL BE AMERICAN FLOW CONTROL, WATEROUS PACER AND SHALL CONFORM TO AWWA C502 WITH THE FOLLOWING SPECIFICATIONS:

MAIN VALVE OPENING: 5 1/4 INCHES

NOZZLE ARRANGEMENT: TWO-21/2 INCH HOSE NOZZLES WITH NATIONAL STANDARD THREAD (NST)

ONE 41/2-INCH PUMPER NOZZLE WITH NATIONAL STANDARD THREAD (NST) OR STORZ CONNECTION AS REQUIRED BY THE WATER SYSTEM MANAGER.

INLET CONNECTION: 8 INCH MECHANICAL JOINT, "MEGA-LUG" OR EQUIVALENT RETAINING GLAND AND CONCRETE THRUST BLOCK

OPERATING NUT: STANDARD 1 1/2 INCH PENTAGON

DIRECTION OF OPENING: COUNTERCLOCKWISE

DEPTH OF BURY: SIX-FOOT COVER. THE HYDRANT SHALL HAVE AT LEAST 15 INCHES AND NO MORE THAN 21 INCHES BETWEEN THE BOTTOM OF THE STEAMER CAP AND THE GROUND.

DRAIN: THE HYDRANT SHALL BE INSTALLED TO DRAIN (PLUG PULLED)

COLOR: YELLOW ENAMEL

OTHER: HYDRANTS SHALL BE COMPRESSION TYPE CLOSING WITH THE PRESSURE HOSE AND PUMPER NOZZLES SHALL BE 1/4 TURN TYPE SECURED BY STAINLESS STEEL OR CORROSION RESISTANT PINS OR SCREWS. PRESSURE SLEBS BEHIND NOZZLE FLANGES SHALL BE "O" RINGS. A BREAKABLE COUPLING RETAINED IN PLACE BY STAINLESS STEEL OR CORROSION RESISTANT PINS SHALL MAKE THE UNION BETWEEN THE UPPER AND LOWER STEMS. THE TWO-PIECE TRAP FLANGE SHALL BE HELD IN PLACE BY NUTS AND BOLTS. THE UPPER BARREL SHALL BE ABLE TO ROTATE 360 DEGREES WITHOUT REMOVING ANY BOLTS. HYDRANT FLANGES SHALL BE REQUIRED AND SUPPLIED EXCEPT FOR EACH HYDRANT WHERE A TRAP FLANGE APPEARS TO EXIST, CURBING AND/OR BOLLARDS SHALL PROTECT THE HYDRANT EXCEPT WITHIN MUNICIPAL RIGHT-OF-WAYS.

WHEN SET IN LAWN SPACE BETWEEN THE CURB AND SIDEWALK NO PORTION OF THE HYDRANT OR NOZZLE CAP WILL BE LESS THAN ONE FOOT OF THE GUTTER FACE OF THE CURB OR EDGE OF THE SIDEWALK. HYDRANTS SHALL BE A MINIMUM OF FOUR FEET (4') AND A MAXIMUM OF SIX FEET (6') FROM THE EDGE OF THE SIDEWALK TO THE CLOSEST POINT ON THE HYDRANT WHEN PLACED BEHIND THE SIDEWALK. IN THE ABSENCE OF A CURB OR SIDEWALK NO HYDRANT SHALL BE PLACED MORE THAN SIX FEET (6') FROM THE EDGE OF THE PAVEMENT. HYDRANTS SHALL BE LOCATED SO AS TO PROVIDE COMPLETE ACCESSIBILITY AND MINIMIZE THE POSSIBILITY OF DAMAGE FROM VEHICLES OR INJURY TO PEDESTRIANS.

BLOW-OFF ASSEMBLIES

BLOW-OFF ASSEMBLIES WILL BE CONSTRUCTED AS DETAILED IN THE DRAWINGS. THEY SHALL CONSIST OF AN ANCHOR TEE, A SIX INCH (6") MECHANICAL JOINT GATE VALVE CONFORMING TO THESE SPECIFICATIONS, THE APPROPRIATE LENGTH OF SIX INCH (6") DUCTILE IRON CEMENT LINED, CLASS 52 PIPE, ALL NECESSARY ANCHOR COUPLINGS, APPROVED RESTRAINING GLANDS, MJ AND FLANGED FITTINGS, AND CAP OR RODENT SCREEN. SMALLER BLOW-OFF ASSEMBLIES MAY BE ALLOWED WITH APPROVAL OF THE CWD RETAIL SUPERINTENDENT.

BLOW-OFFS SHALL NOT BE CONNECTED TO ANY SEWER, SUBMERGED IN ANY STREAM OR DITCH, OR INSTALLED IN ANY MANNER THAT WILL PERMIT BACK SIPHONAGE INTO THE DISTRIBUTION SYSTEM. THE OPEN END OF THE BLOW-OFF MUST BE CAPPED AND TERMINATE AT LEAST EIGHTEEN INCHES (18") ABOVE GRADE. (VT WATER SUPPLY RULE, A-8-817)

SERVICE CONNECTIONS

SERVICE LINES SHALL BE INSTALLED SO AS TO RUN PERPENDICULAR, IN A STRAIGHT LINE FROM THE WATER MAIN TO THE CURB STOP.

EACH SERVICE SHALL CONSIST OF A CORPORATION, CURB STOP, COPPER TUBING AND A CURB BOX WITH A CAST IRON OR STAINLESS STEEL SERVICE ROD. SERVICE LINES FROM THREE QUARTER TO TWO INCH (3/4" TO 2") SHALL BE COPPER TUBING FROM THE CORPORATION STOP TO THE CURB STOP. COPPER TUBING SHALL BE TYPE "K", SOFT TEMPER, CONFORMING TO ASTM B88. THE NAME OR TRADEMARK OF THE MANUFACTURER AND TYPE SHALL BE STAMPED AT REGULAR INTERVALS ALONG THE PIPE. COPPER SERVICE PIPE SHALL BE ONE PIECE FROM THE CORPORATION TO THE CURB STOP. THE MINIMUM SERVICE FOR A SINGLE-FAMILY RESIDENCE SHALL BE THREE-QUARTER INCH (3/4"). THE MINIMUM SERVICE FOR A DUPLEX SHALL BE ONE INCH (1").

CORPORATIONS SHALL BE WATERWORKS BRASS MUELLER H1509 AND MANUFACTURED IN ACCORDANCE WITH APPLICABLE AWWA STANDARDS. CORPORATIONS SHALL HAVE MUELLER THREADS, ADOPTED AS AWWA FIGURE 1, AT THE INLET AND A COMPRESSION-TYPE FITTING AT THE OUTLET. BOTH INLET AND OUTLET SHALL BE OF THE SAME SIZE. CORPORATIONS SHALL BE DIRECTLY TAPPED INTO DUCTILE IRON PIPE LARGER THAN 2" IN DIAMETER. IN NO OTHER INSTANCE, EXCEPT WHEN A TAPPING SLEEVE AND VALVE IS USED, SHALL A TAP BE MADE WITHOUT A CORPORATION. CORPORATIONS SHALL BE MUELLER H1509 OR EQUAL. CORPORATIONS SHALL BE INSTALLED ON PVC PIPE WITH THE USE OF AN APPROVED STAINLESS STEEL BAND SADDLE.

CURBSTOPS SHALL BE A QUARTER-TURN, PLUG-TYPE VALVE WITH AN "O" RING-TYPE SEAL AND MANUFACTURED OF WATERWORKS BRASS IN ACCORDANCE WITH APPLICABLE AWWA STANDARDS. THE CURBSTOP SHALL OPEN LEFT AND HAVE A POSITIVE STOP. NO CURBSTOP SHALL HAVE THE ABILITY TO DRAIN THE SERVICE LINE. BOTH INLET AND OUTLET OF THE CURBSTOP SHALL HAVE COMPRESSION-TYPE FITTINGS. THE TEE HEAD OF THE CURBSTOP SHALL HAVE PROVISION FOR THE CONNECTION OF A SERVICE ROD. CURBSTOPS SHALL BE MUELLER H-1504-2 OR EQUAL.

BACKFLOW PREVENTION DEVICES

NO WATER SERVICE CONNECTION SHALL BE APPROVED OR MAINTAINED BY THE CWD RETAIL DEPARTMENT, THE CITY OF SOUTH BURLINGTON OR THE VILLAGE OF JERICHO UNLESS THE WATER SUPPLY IS PROTECTED AS REQUIRED BY STATE LAWS, REGULATIONS AND ORDINANCES. THE TYPE OF PROTECTIVE DEVICE SHALL DEPEND ON THE DEGREE OF HAZARD THAT EXISTS. IN GENERAL, BACKFLOW DEVICES DESIGNED TO PROTECT POTABLE WATER SUPPLIES IN ACCORDANCE WITH NATIONAL PLUMBING CODES FOR NON-HEALTH HAZARD CROSS CONNECTIONS AND CONTINUOUS PRESSURE APPLICATIONS SHALL BE USED, I.E. WATTS SERIES 7 FOR RESIDENTIAL CONNECTIONS OR DEPARTMENT APPROVED EQUAL. SPRINKLER SYSTEMS SHALL USE A DOUBLE CHECK VALVE ASSEMBLY EG: WATTS SERIES 007, 709 OR DEPARTMENT APPROVED EQUAL. A SHOP DRAWING DETAIL ASSEMBLY SHOWING BACKFLOW DEVICES AND METER PLACEMENTS SHALL BE REQUIRED BY THE CWD RETAIL SUPERINTENDENT.

PIPELINE INSULATION

APPROVED WATERLINES WITH LESS THAN FIVE FEET (5') OF COVER OVER THE CROWN, THAT CROSS A STORM SEWER, OR WHERE INDICATED ON THE PLANS, SHALL BE PROTECTED AGAINST FREEZING BY THE INSTALLATION OF FOUR INCHES (4") THICK HIGHEST AVAILABLE DENSITY EXTRUDED POLYSTYRENE INSULATING SHEETS OR EQUIVALENT. SHEETS SHALL BE THE TOTAL WIDTH OF THE TRENCH, FOR A TYPICAL FOUR (4) TRENCH, THE SHEETS SHALL BE PLACED SIX INCHES (6") ABOVE THE CROWN AFTER PLACEMENT OF FOUR TO SIX INCHES (4"-6") OF CLEAN MEDIUM OR COARSE SAND BELOW THE PIPE BOTTOM AND FLOW TO SIX INCHES (4"-6") ABOVE THE CROWN. JOINTS SHALL BE OVERLAPPED SO THERE IS NO GAP THAT WILL ALLOW FROST TO PENETRATE. CARE SHALL BE EXERCISED DURING BACKFILL AND COMPACTION OVER THE POLYSTYRENE SHEETS TO PREVENT DAMAGE TO THE SHEETS. THE POLYSTYRENE SHEETS SHALL MEET THE COMPREHENSIVE STRENGTH REQUIREMENTS OF ASTM D1821-73. IN NO CASES SHALL THE WATERLINE HAVE LESS THAN FOUR FEET (4') OF COVER OVER THE TOP OF THE PIPE.

AIR RELEASE VALVES

VALVES SHALL HAVE A STAINLESS STEEL FLOAT AND STAINLESS STEEL OR BRONZE TRIM. A BRASS GATE VALVE OR BALL VALVE SHALL BE PROVIDED IN THE CONNECTING PIPE AHEAD OF THE VALVE. VALVES SHALL BE APED NO. 200 A OR APPROVED EQUAL. ORIFICE SHALL BE 3/16" AND VALVE, ISOLATING VALVE AND CONNECTION PIPING SHALL BE ONE INCH (1") UNLESS OTHERWISE SPECIFIED. AUTOMATIC AIR RELIEF VALVES SHALL NOT BE USED IN SITUATIONS WHERE FLOODING OF THE ACCESS-WAY OR CHAMBER MAY OCCUR. ALL AIR RELEASE VALVES SHALL CONFORM TO ANS/AWWA C512 AND BE INSTALLED ACCORDING TO THE VT WATER SUPPLY RULE, A-8-4.

INSTALLATION

CONTRACTORS SHALL NOTIFY THE TOWN OF RICHMOND AND DIG SAFE AT LEAST SEVEN DAYS PRIOR TO ANY WORK ON THE WATER SYSTEM.

INSTALLATION OF ALL WATER LINES SHALL BE IN ACCORDANCE WITH THE LATEST VERSION OF AWWA C600.

CONNECTION TO AN EXISTING WATER MAIN SHALL BE DONE UNDER THE SUPERVISION OF THE TOWN OF RICHMOND. THE ENGINEER AND THE TOWN SHALL BE NOTIFIED AT LEAST TWO WORKING DAYS IN ADVANCE OF THE INTENDED CONNECTION TIME. NO EXISTING VALVES, HYDRANTS, CURB STOPS, ETC SHALL BE OPERATED WITHOUT PRIOR APPROVAL OF THE TOWN. THE TOWN SHALL OPERATE ALL VALVES INITIALLY TO VERIFY THE INTEGRITY OF THE VALVE. THE TOWN MAY THEN ALLOW THE CONTRACTOR TO OPERATE THOSE VALVES. ANY DAMAGE OCCURRING AFTER THE USE OF ANY VALVE OPERATED BY THE CONTRACTOR SHALL BE THE CONTRACTORS' RESPONSIBILITY.

ANY DEFLECTION OF JOINTS IN PIPE UP TO TWELVE-INCH (12") DIAMETER SHALL BE WITHIN THE LIMITS SPECIFIED BY THE MANUFACTURER, BUT NOT TO EXCEED FIVE DEGREES OR NINETEEN INCHES (19") PER EIGHTEEN FEET (18) OF PIPE LENGTH.

CONCRETE THRUST BLOCKS SHALL BE INSTALLED ON ALL VALVES, PLUGS, TEES, AND GAS DEFLECTING 11 1/4 DEGREES OR MORE. ALL THRUST BLOCKS SHALL BE PRECAST.

NO WATER LINES SHALL BE INSTALLED AFTER NOVEMBER 15 OR BEFORE APRIL 1 WITHOUT PRIOR APPROVAL OF THE TOWN OF RICHMOND. THE TOWN MAY RESTRICT WORK BEFORE NOVEMBER 15 AND AFTER APRIL 1 DURING ADVERSE WEATHER CONDITIONS.

FINAL INSPECTION

FOR ONE YEAR FROM THE DATE THE NEW SYSTEM IS PLACED INTO SERVICE, THE APPLICANT, DEVELOPER/CONTRACTOR WILL BE RESPONSIBLE FOR ANY NECESSARY REPAIRS OR CORRECTIONS AS PART OF THE PROJECT WARRANTY. AT THE END OF A ONE-YEAR PERIOD, AN INSPECTION WILL BE PERFORMED BY THE TOWN OF RICHMOND PRIOR TO THE SYSTEM OWNER ASSUMING OWNERSHIP OF ANY OF THE LINES AND APPURTENANCES.

SANITARY SPECIFICATIONS

1. ALL GRAVITY SANITARY SEWERS SHALL BE PVC SEWER PIPE MEETING ASTM STANDARD D3034--SDR35, OR AN APPROVED EQUAL. POLYVINYL CHLORIDE (PVC) SEWER PIPE SHALL CONFORM TO THE LATEST ASTM STANDARD D3034--SDR35. JOINTS SHALL BE PUSH-ON TYPE USING ELASTOMERIC GASKETS CONFORMING RO ASTM D-3212. FOR PVC SEWER PIPE THE OWNER REQUIRES THE USE OF SAND OR TYPE II MATERIAL FOR BEDDING AND LINING, AS INDICATED ON THE TYPICAL DETAILS.

2. ALL SANITARY SEWER MANHOLES SHALL BE CONSTRUCTED AS DETAILED ON THE PLANS. ALL MANHOLES SHALL HAVE SMOOTH INVERTS, ROUNDED TO THE RADIUS OF THE SEWER PIPE. EVERY SANITARY SEWER MANHOLE SHALL HAVE A CONCRETE BENCH, AS SHOWN ON THE PLANS, WHICH SLOPES ONE TOWARD THE INVERT AND BE FINISHED SMOOTHLY. ALL SANITARY MANHOLES SHALL BE CONSTRUCTED WATER TIGHT, BOTH INLET AND OUTLET PIPES JOINED TO THE MANHOLES WITH A GASKETED, FLEXIBLE WATER TIGHT CONNECTION USING CAST-IN PLACE OR PIPE-TO-MANHOLE CONNECTOR (KOR-H) SEAL OR EQUAL. NO SANITARY SEWER MANHOLES SHALL BE LOCATED WHERE THEY WILL NORMALLY BE INUNDATED BY STORMWATER.

3. IT IS THE CONTRACTOR'S RESPONSIBILITY TO INSURE THAT ALL MANHOLES ARE WATER TIGHT IN ALL PLACES (JOINTS, WALLS, BASE ETC.) EXCLUDING THE COVER. THE CONTRACTOR SHALL HAVE THE MANHOLE COVERED WITH A WATERPROOFING AGENT, TO ACCOMPLISH THE WATER TIGHT CONDITION. ALL LIFT STATIONS AND MANHOLES SHALL BE TESTED FOR INFILTRATION BY THE VACUUM TEST PRESCRIBED BY THE PROJECT ENGINEER. SUCH TESTING SHALL BE CONDUCTED WITH PRIOR WRITTEN NOTICE TO THE OWNER AND THE ENGINEER.

4. ALL SERVICE LATERALS TO BE CONNECTED TO THE MAIN SEWER SHALL UTILIZE AN "ELBOW AND WYE" CONNECTION, MINIMUM SIZE IS 4" DIAMETER. CLEANOUTS SHALL BE PLACES AT 100 FOOT INTERVALS FOR LONG SERVICES. WHERE IMMEDIATE HOOK UP OF THE BUILDING SEWER IN NOT CONCORDENT WITH SEWER MAIN CONSTRUCTION, A STABLE TEMPORARY MARKER SHALL BE PROVIDED BY THE CONTRACTOR.

5. THE CONTRACTOR SHALL NOTIFY THE OWNER, AND THE ENGINEER, IN WRITING, BEFORE HE COMMENCES ANY SANITARY SEWER CONSTRUCTION.

6. ANY CONFLICTS BETWEEN THESE DRAWINGS AND/OR SPECIFICATIONS AND OTHER CONTRACT DOCUMENTS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE OWNER AND ENGINEER FOR RESOLUTION. THE OWNER SHALL NOT BE RESPONSIBLE FOR EXPENSES INCURRED BY THE CONTRACTOR WHERE DISCREPANCIES ARE NOT RESOLVED.

INSPECTION AND TESTING

PRIOR TO COMMENCEMENT OF CONSTRUCTION A MEETING SHALL BE HELD BETWEEN THE DEVELOPER, THE CONTRACTOR AND THE ENGINEER TO DETERMINE THE NATURE AND EXTENT OF THE INSPECTION SCHEDULE.

ROADWAY INSPECTION

1. A SAMPLE OF ALL SUBBASE AND BASE MATERIALS SHALL BE TESTED FOR CONFORMANCE WITH THE STANDARDS OUTLINED ON THESE PLANS. TESTING OF ALL SUBBASE AND BASE MATERIALS SHALL BE AT THE CONTRACTORS EXPENSE.

WATER INSPECTION

1. THE OWNER'S AUTHORIZED REPRESENTATIVE SHALL BE PRESENT WHEN ANY CONNECTION TO THE EXISTING WATER SYSTEM IS MADE AND DURING TESTING, FLUSHING, DISINFECTION, AND SAMPLING OF THE NEW MAINS.

2. INSPECTION BY THE ENGINEER AND THE OWNER WILL BE AS NECESSARY IN ACCORDANCE WITH THE CRITERIA ESTABLISHED BY THE VERMONT AGENCY OF NATURAL RESOURCES, WATER SUPPLY DIVISION.

3. ALL WATER LINES AND APPURTENANCES CONSTRUCTED UNDER THIS PROJECT SHALL BE PRESSURE AND LEAK TESTED BEFORE BEING PLACED INTO SERVICE. ACCORDING TO AWWA STANDARD C-851-14, THE TOWN OF RICHMOND WILL NOT ALLOW THE CONNECTION OF UNTESTED MAINS TO EXISTING TOWN INFRASTRUCTURE WITHOUT A BACKFLOW PREVENTOR.

THE TEST PRESSURE SHALL BE 1.5 TIMES THE WORKING PRESSURE OR 200 PSI, WHICHEVER IS GREATER. MEASURED AT OR NEAR THE HIGH POINT IN THE PORTION OF THE SYSTEM BEING TESTED. THE TEST SHALL BE RUN FOR TWO (2) HOURS. THE ENGINEER AND THE OWNER SHALL BE GIVEN AT LEAST TWENTY-FOUR (24) HOURS NOTICE BEFORE THE TEST IS TO BE CONDUCTED, AND THE ENGINEER OR OWNER SHALL WITNESS THE TEST. ALLOWABLE LEAKAGE SHALL BE COMPUTED BY THE FORMULA: L = (S X D X SQUARE ROOT OF P)/148,000, WHERE: L=NUMBER OF GALLONS ALLOWED LEAKAGE IN 1 HOURS, S=LENGTH OF PIPE TESTED IN FEET, D= NOMINAL DIAMETER OF PIPE, IN INCHES, P=TEST PRESSURE (PSI). A DROP OF NOT MORE THAN 5 PSI DURING THE TEST DURATION IS ACCEPTABLE. THE ENGINEER OR OWNER SHALL WITNESS AND CERTIFY IN WRITING THE RESULTS OF THE TESTING.

4. ALL WATER LINES, BEFORE BEING PUT INTO SERVICE SHALL BE DISINFECTED IN ACCORDANCE WITH AWWA C-651, WITH THE EXCEPTION OF THE TABLE METHOD OF DISINFECTION. CONTINUOUS FEED METHOD SECTION 5.2.3. DISINFECTION SHALL BE ACCOMPLISHED BY INTRODUCING A CONCENTRATION OF 50 MG/L AVAILABLE CHLORINE INTO A RECENTLY FLUSHED WATER MAIN. THE DISINFECTING SOLUTION, AFTER REMAINING IN THE WATER MAIN FOR 24 HOURS, SHALL HAVE A CONCENTRATION OF AT LEAST 20 MG/L OF CHLORINE. THE PERSON(S) RESPONSIBLE FOR DISINFECTION SHALL CLARIFY IN WRITING TO THE OWNER THAT THE DISINFECTION PROCEDURE WAS FOLLOWED AND THE REQUIRED MINIMUM RESULTS WERE OBTAINED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SAMPLING AND ANALYSIS COSTS.

5. ONCE THE DISINFECTION PROCEDURE HAS TAKEN PLACE, THE CONTRACTOR SHALL FLUSH THE LINE AND COLLECT AT LEAST TWO WATER SAMPLES FOR ANALYSIS. THE SAMPLE(S) SHALL BE ANALYZED FOR MAXIMUM CONTAMINANT LEVELS OUTLINED UNDER THE LATEST GUIDELINES FOR AN EXTENSION OF A PUBLIC WATER SYSTEM (LATEST VERSION). THIS ANALYSIS IS REQUIRED BY THE VERMONT DEPARTMENT OF HEALTH LABORATORY ON COLONESTER AVENUE IN THE CITY OF BURLINGTON. IF THE WATER SAMPLE FAILS THE BACTERIOLOGICAL TEST, THE PIPE MUST BE FLUSHED, CHLORINATED AND RETESTED AGAIN, UNTIL THE WATER SAMPLE PASSES THE BACTERIOLOGICAL TEST.

SANITARY SEWER INSPECTION

1. THE DEVELOPER OR HIS REPRESENTATIVE SHALL PERFORM SANITARY SEWER INSPECTIONS DURING CONSTRUCTION OF THE PROJECT. IN ADDITION A DEFLECTION TEST SHALL BE PERFORMED AS PART OF THE INSPECTION REQUIREMENTS. THE CONTRACTOR SHALL PULL A 95R MANDREL THROUGH ALL SANITARY SEWER LINES TO ENSURE PROPER ALIGNMENT.

2. INSPECTION BY THE ENGINEER AND THE CITY WILL INCLUDE BUT NOT BE LIMITED TO THE REQUIREMENTS BY THE VERMONT AGENCY OF NATURAL RESOURCES, WASTEWATER MANAGEMENT DIVISION.

3. MANHOLE TESTING — THE MAXIMUM ALLOWABLE INFILTRATION FOR THE WATER TEST SHALL NOT EXCEED ONE GALLON PER VERTICAL FOOT PER 24 HOURS, AND THERE SHALL BE NO VISIBLE INFILTRATION. TEST PARAMETERS ARE OUTLINED IN THE VERMONT ENVIRONMENTAL PROTECTION RULES (APPENDIX A). FOR VACUUM TESTING, THE VACUUM SHALL NOT DROP FROM 10 INCHES TO LESS THAN 9 INCHES WITHIN A 2 MINUTE TEST PERIOD. VACUUM TESTING OF MANHOLES MUST BE COMPLETED PRIOR TO BACK FILLING THE STRUCTURE. MANHOLE LEAKAGE TESTS SHALL BE CONDUCTED WITH ALL PIPES IN PLACE.

4. ALL SANITARY SEWER SHALL BE LEAK-TESTED BEFORE ACCEPTANCE BY THE OWNER. SUCH TESTING SHALL BE CONDUCTED WITH PRIOR WRITTEN NOTICE TO THE OWNER AND ENGINEER. EITHER THE WATER TEST OR THE AIR TEST METHOD MAY BE USED. AT THE OPTION OF THE CONTRACTOR, THE MAXIMUM ALLOWED LEAKAGE USING THE WATER TEST SHALL BE 200 GALLONS PER DIAMETER INCH PER HOUR PER LINE PER HOUR, UNDER A MINIMUM OF 2 FEET OF HEAD, MEASURED AT THE HIGHEST POINT TESTED. AIR TESTING SHALL BE PERFORMED IN ACCORDANCE WITH STANDARD C828-80. THE STARTING TEST PRESSURE SHALL BE 3.5 PSI. THE PRESSURE DROP SHALL NOT BE MORE THAN 1.0 PSI DURING THE TEST TIME. THE MINIMUM ALLOWED TIME FOR A PRESSURE DROP FROM 3.5 PSI TO 2.5 PSI SHALL BE DETERMINED BY THE FOLLOWING CHART:

PIPE SIZE IN.	T (TIME) MIN./100 FT.	PIPE SIZE IN.	T (TIME) MIN./100 FT.
3	0.2	21	3.0
4	0.3	24	3.6
6	0.7	27	4.2
8	1.2	30	4.8
10	1.5	33	5.4
12	1.8	36	6.0
14	2.1	39	6.6
18	2.4	42	7.3

THE RESULT(S) OF THE SEWER TEST(S) SHALL BE WITNESSED AND CERTIFIED BY THE ENGINEER.