1 – UTILITY SUPPLEMENTAL TECHNICAL SPECIFICATIONS

1.1 Schedule 80 PVC Pipe and Fittings

Materials and Assembly:

The material used in the manufacture of the pipe shall be domestically produced rigid polyvinyl chloride (PVC) compound, Type I Grade I, with a Cell Classification of 12454 as defined in ASTM D1784, trade name designation H707 PVC. This compound shall be gray in color as specified, and shall be approved by NSF International for use with potable water (NSF Std 14 and 61).

PVC Schedule 80 pipe shall be manufactured in strict accordance to the requirements of ASTM D1785 for physical dimensions and tolerances. Each production run of pipe manufactured in compliance to this standard, shall also meet or exceed the test requirements for materials, workmanship, burst pressure, flattening, and extrusion quality defined in ASTM D1785. All belled-end pipe shall have tapered sockets to create an interference-type fit, which meet or exceed the dimensional requirements and the minimum socket length for pressure-type sockets as defined in ASTM D2672. All PVC Schedule 80 pipe must also meet the requirements of NSF Standard 14 and CSA Standard B137.3 rigid PVC pipe for pressure applications, and shall bear the mark of these Listing agencies. This pipe shall have a flame spread rating of 0-25 when tested for surface burning characteristics in accordance with CAN/ULC-S102-2-M88 or equivalent.

Schedule 80 PVC fittings products shall be manufactured to ASTM D 2467 for use with pipe manufactured to ASTM D 1785. All Schedule 80 PVC products shall be certified by NSF/ANSI Standard 14 and 61 for use in potable water systems. Prior to assembly, all piping system components should be inspected for damage or irregularities—do not use any components that appear irregular or do not fit properly.

Solvent weld connections shall be made with quality solvent cements and primers formulated for potable water systems, pipe size, and type of joint. Use of quality grade thread sealants are also required. All solvent cements used to conform to ASTM D-2564, listed by NSF for potable water use. All primer used to conform to ASTM F-656.

Placement of pipe shall be done with care such that all sections of pipes and joints are uniformly supported in the bedding prior to placing additional bedding material and tamping over pipe.

1.2 Fire Hydrants, Valves, Couplings, GSP Pipe, CIP Pipe, Nipples and Fittings

Fire hydrants shall be Mueller 2-1/8” A-411 Standard Fire Hydrant Dry Barrel Post Type with two 2-1/2” nozzle threads, and threaded shoe. Contractor to submit proposed operating nut size and style along with product submittal package. Mounting hardware shall be stainless steel.

Gate valves shall be 3” Mueller resilient wedge gate valves with threaded ends and 2” square operating nuts, meeting AWWA Standard C509, including NSF linings and coatings. Mounting hardware shall be stainless steel.

Swing Check Valves shall be 3" Mueller swing type gravity operated bronze disc facing, model A2600-06BB, meeting ANSI/AWWA C508 Standards including NSF linings and coatings. Mounting hardware shall be stainless steel.

Galvanized nipples shall be Schedule 40 ASTM A53/A53M ERW, Grade B, NPT threads conforming to ASME B1.20.1, ASTM A733, and NSF61 approved.

Galvanized fittings shall be hot-dipped minimum Class 150, and must resist rust and corrosion, be NSF/ANSI 61-4 & California AB1953 lead free and certified for use in potable water applications. NPT threads conforming to ASME B1.20.1shall be used throughout the assembly.

Malleable castings shall conform to ASTM A197, ASME B16.3, ASME B16.14 & ASME B16.39. Hot-dipped galvanized fittings shall conform to ASTM A153.

Ductile Iron and Gray Cast Iron Flanged Fittings for potable water applications shall fully conform to the required industry standards. Flanged Fittings are manufactured in accordance with ANSI/AWWA C110/A21.10 and ANSI B16.1, Class 125.

Flanged cast iron fittings and spools shall be factory applied interior cement lined and seal coated and exterior epoxy coated per ANSI/AWWA C104/A21.4. All coatings and linings shall be in full accordance with ANSI/NSF 61.

All flanged fittings shall be gasketed per manufacturers recommendations and be in full accordance with ANSI/NSF 61.

Brass valves and nipples shall have NPT threads, be lead free, conform to NSF 61, and be certified for use in potable water applications, such as manufactured NIBCO (Product no. T-FP600A-LF) or an approved equal.

All nipples, fittings and ball valves shall be installed using standard PTFE thread sealant tape as a threaded pipe lubricant in conjunction with pipe joint compound (pipe dope) as the sealant and they must conform to NSF 61 Standard.

1.3 Trenching, Bedding, and Backfill:

Trenching, bedding, and backfill shall conform to the Project Plans. Pipe bedding (Pipe Zone) shall be moist clean sand and placed and tamped into place such that there are no voids and pipe is soundly bedded to the depths and cover as shown on the Project Plans. Clean native backfill may be used for the backfill zone, however no rocks greater than 3 inches in diameter (in any direction) will be allowed in the backfill zone. If the excavation is deeper than 5 feet, the contractor shall furnish and install cave-in hazard protection.

Backfill shall be compacted in layers not to exceed 8 inches and shall be compacted to a relative compaction of 95% within the Caltrans R/W, and 90% outside Caltrans R/W. Compaction methods and equipment used shall be such that excessive and abrupt stresses are avoided, and uniform compaction is achieved.

1.4 Furnish and Install Valve/Access Boxes

Furnish and install ”Duralite” valve boxes and access boxes, available from Oldcastle Infrastructure, per the sizes and types (including lids), as shown in the Project Plans. The valve boxes used must meet the minimum ratings described therein and shall be by the manufacturer specified or an government approved equivalent.

1.5 ¾-Inch Crushed Rock

The crushed rock where used shall be ¾ inch crushed rock per Section 90-1.02C(4)(b) of the Caltrans Standard Specifications. This material will also be used for the valve box bedding. Crushed rock shall be compacted to 95% for temporary surfacing.

1.6 Insulated Double Check Valve Enclosure

A freeze and vandal resistant enclosure shall be installed over the proposed above ground double check valve in accordance with the details in the Project Plans. The enclosure shall be constructed of 5052-H32 marine grade aluminum with a minimum R9 rigid insulation affixed to the walls and R18 rigid insulation affixed to the roof. Molded fiberglass enclosures will not be accepted. Rigid cut board insulation shall be used for uniform insulation thickness. Sprayed insulation will not be accepted by the government. Redwood post and beams shall be utilized for structural support, the use of “Particle board” shall be reason for rejection. The roof of the enclosure shall be removable for maintenance. Enclosures requiring tape to seal the roof seams will not be accepted by the government.

R9 and R18 insulation shall be rigid insulating board style made from polyisocyanurate non-wicking foam laminated to a glass fiber reinforced facer (each side). R9 insulation board shall have a nominal thickness of 1-½″ inches and R18 insulation board shall have a nominal thickness of 3 inches.

The enclosures shall have a fully insulated drain panel designed to remain closed, except when discharging water. The drain panel shall be sized to accommodate the maximum discharge for backflow installations. The enclosure shall be mounted securely to a concrete pad and remain locked even if outside screws are removed.

All anchorage and mounting hardware shall be 316 stainless steel. Anchor bolts shall be pre-drilled to match bolt diameter and installed plumb with 2-part epoxy (min 3500 psi) in pre-drilled hole before epoxy setup with a minimum of 2.5” embedment into concrete.

The enclosure shall withstand winds up to 110 mph with standard anchoring hardware. The enclosure shall be certified to the most recent ASSE Standard 1060 (Class I or Class II). The insulated enclosure shall be a Safe-T-Cover Model 300-AL.

1.7 Class 2 Aggregate Base

Class 2 Aggregate Base shall be placed and compacted to 95% relative compaction (RC) conforming to Section 26-1.02B of the Caltrans Standard Specifications.

1.8 Utility Locator Tape

Utility locator tape shall be 3" in width and buried at the depth shown in the Project Plans. The locator tape shall be color coded per the APWA standard for a waterline and labeled "Caution Potable Water Line Buried Below"; substitute "Electric" or "Communications" for "Water Line" as the case may be. The Utility locator tape shall be run continuously for the entire length of the trenched waterline.

1.9 Tracer Wire

Tracer wire shall be furnished and installed throughout the entire waterline replacement. The tracer wire shall be copper-clad steel 10-AWG with a minimum 30 mil HDPE insulation thickness and color coded per the APWA standard for a waterline. The wire shall be installed continuously when possible, otherwise, the use of a waterproofing splice kit specified for direct bury is permitted. No looping or coiling of wire is allowed, except for the excess wire left inside the valve boxes and the access box. Connectors shall be dielectric silicone filled to seal out moisture and corrosion and shall be installed in a manner as to prevent and uninsulated wire exposure. Non-locking, friction fit, twist on, spray-on waterproofing, and taped connectors are prohibited. The tracer wire shall be installed on the pipe as shown in the plans and secured (taped/tied) at 5' intervals. The tracer wire shall be located using a typical low frequency (512 Hz) line tracing equipment once the installation is complete, witnessed by the contractor and government official. Continuity testing in lieu of actual line tracing shall is not permitted.

1.10 Disinfect, Sample, and Test Potable Water System

Prior to placing the installed waterline in service, the new pipe and all exposed sections and appurtenances of existing pipelines shall be cleaned and disinfected in accordance with ANSI/AWWA C651, unless otherwise specified. Pipelines shall be flushed following the completion of the disinfection procedures. Disposal or neutralization of disinfection water shall comply with applicable regulations. (Refer to Appendix B of ANSI/AWWA C651.) The contractor will decide which disinfection method is appropriate. The water system is shared with 2 other campgrounds. Disinfecting from the storage tank will not be permitted as the other 2 campgrounds will remain open.

Warning: Do not use calcium hypochlorite. This procedure must not be used on solvent-welded plastic or screwed-joint steel pipe because of the danger of fire or explosion from the reaction of the joint compounds with the calcium hypochlorite.

Sampling and testing shall be in accordance with California Code of Regulations, Title 22 Social Security, Division 4 Environmental Health. Water sampling and testing laboratory shall be certified by the State of California for public water systems. If the results from the bacteriological testing results are positive, the contractor must disinfect the system again and resample until the bacteriological testing results are negative. The contractor is responsible for obtaining the additional disinfection(s) and resample(s).

1.11 Pressure Test and Leak Detection Test

The contractor is required to perform pressure and leakage test per the American Water Works Association standards. The contractor may perform simultaneous or separate pressure and leakage tests on the installed system at test durations and pressures specified in the herein. Tests shall be witnessed by the government official and contractor. The equipment used shall be subject to approval by the government official. The contractor shall furnish the gauges and measuring device for the leakage test, pump, pipe, connections, and all other necessary apparatus, unless otherwise specified, and shall furnish the necessary assistance to conduct the test. The simultaneous test method shall be conducted no less than 2 hours, a separate pressure test will have a duration no less than 1 hour, and a separate leakage test will have a duration no less than 2 hours. The pressure during the tests will be 150% of the working pressure at the point of the test. The working pressure is calculated as 60 psi, so the testing pressure is 90 psi. The contractor must confirm the working pressure at Connection Detail 3 and calculate the test pressure. Leakage shall be defined as the quantity of water that must be supplied into the pipe section being tested to maintain a pressure within 5 psi of the specified leakage test pressure after the pipe has been filled with water and the air in the pipeline has been expelled. No installation will be accepted if the leakage is greater than the following formula:

$$L = \frac{\mathrm{ND}\sqrt{\mathrm{P}}}{7{,}400}$$

Where:
L = allowable leakage, in gph
N = number of joints in the length of pipeline tested
D = nominal diameter of the pipe, in
P = average test pressure during the leakage test, in psi (gauge)

N = 99, D = 2.5 in, P = 90 psi (to be confirmed on-site)

If the working pressure is confirmed to be 60 psi (90 psi testing pressure), then L, allowable leakage, is equal to 0.32 gph. If the working pressure is not 60 psi, adjust the testing pressure and recalculate the Allowable Leakage.

The following general procedures apply:

- Thrust blocks must have cured for at least 5 days before testing waterline.
- Follow manufacturer's recommendations for pipe joint sealant cure times prior to pressure and bacteriological testing.
- Fill the new main with water and be sure to allow the air to pass through the testing pipe. Fill very slowly so that the chlorine tablets will not be dislodged.
- Connect a pressure pump to a corporation stop in the main. The pump must have a pressure gauge and connection to a small tank of makeup water.
- Apply partial pressure and allow the pipe to stand with pressure on it for 24 hours to stabilize.
- Pump up the pressure as specified from the working pressure to the testing pressure for a period of 30 minutes.
- Examine the piping and fittings for visible leaks.
- Again pump up the pressure and wait for at least 2 hours.

- During the wait period, pump up the pressure as required to maintain the minimum test pressure. Pump from a calibrated container and record the quantity of makeup water used.

Compare the amount of leakage (the quantity of water required to bring the pressure back up) with the maximum allowable leakage described above.