REPLACEMENT PAGES FOR ATTACHMENT 1 – SPECIFICATIONS
(Please remove Sections 5.1, 5.2, 5.3and 5.4 from the original Attachment 1 and replace those sections with this document.)

5. HYDRAULIC INSTALLATIONS

5.1 External network for water supply and distribution

Consists of supply and installation of the external water system for supply and distribution of potable water to the storage tank and from storage tank to water points in wash rack area. This includes valves at the beginning and at the end of the connection piping.

The pipe will be buried at a depth of 0.60 meters minimum. For the installation, the corresponding excavations must be done; a width of 0.30 meters additional to the exterior diameter of the pipe is satisfactory.
The excavation must be examined at the bottom to avoid hard objects such as rocks, or any other material that can puncture piping. The pipe must be installed over a 0.05 m sand bed, locked in sand and at least another 0.05m of fill before placing the fill-in.

Once the piping is installed, the ditch must be filled to protect piping. Initial fill-in material must be fine and can be selected from the excavation or a material that is deemed adequate by the COR. It shall be filled with this material, compacting carefully around piping until reaching 0.15 m over it. Over this layer the ditch can be finished with a fill product coming out of the excavation, as long as no big rocks that could affect piping will be included. In pipe installation, care shall be taken in cleaning the pipes, especially in surfaces that will be joined.

The piping set-up will be in P.V.C pressure pipes for work pressures no less than 200 PSI (RDE 21).The pipe brand must be quality certified by ICONTEC and the installation completed in accordance with norms and recommendations of the manufacturer. All direction, reduction, valves, plugs changes, where the flow generate forces over the piping, must be anchored with concrete blocks, placing a polyethylene membrane between concrete and piping to protect it from abrasion.

It is convenient that accessories have the greatest part of their external wall in contact with concrete; nevertheless, concrete must not wrap completely the pipe or accessory.

Before doing the hydraulic test, the ditch must be filled-in leaving joints exposed; if it is necessary to cover joints, their location must be marked.

Tolerance for acceptance: NAS will accept piping installation, in accordance with check results done during construction and in accordance with specified tolerances for hydraulic tests.

Test to be done: The pipe must be tested by hydrostatic tests, in accordance with indications in correspondent specifications.

Hydrostatic test for Distribution Pipes: When distribution pipes for each building are finished, the system shall be tested by hydrostatic test.

After the installation is finished, Contractor must wait 24 hours to do the test, following these steps:

- Open highest valves to allow exit of air existing inside piping
- Fill piping completely with water
- Once the pipe is filled with water, close all open valves
- Close water inlet and connect the pump to the system. It shall have a register, retention valve and indicator gauge between 0 and 200 PSI
- Pump water until reaching a pressure of 150 PSI
- Close the register completely and wait 1 hour
- If the indicator gauge remains at 150 PSI, the test is approved but if the indicator gauge is less than 150 PSI, contractor must proceed to find the leak and do the respective repair.
- Once the leak has been repaired, contractor shall wait 24 hours and do the test again

5.2 Hydro-pneumatic equipment

The contractor shall supply, install, and demonstrate proper start-up and functioning of following equipment:

- Two (2) iron vertical water pumps of 3 HP each, multistage, three phases for heavy duty, designed to work with variable speed controller Controls for variable speed controller, electronic control card, transducer that detects pressure fluctuations, digital control panel with LCD.
  The digital control panel should allow synchronize pumps, pumps interchangeability, manual operation, automatic pump alternation, administers motor speed (RPM), status information and digital control and protect pumps.
- The equipment shall be factory pre-assembled and include suction and discharge pipe, common base frame for pumps and control panel, complete electrical connections, gate valves and check valve for suction and discharge.
- One (1) 200 liter pressurized tank with membrane and built in sheet metal shall be supplied and installed including all necessary materials and accessories required for the proper and optimal functioning and operation.
- A start-off switch shall be installed at the washing point to operate hydraulic system.
- These system shall guarantee a minimum flow 50 GPM and a pressure between 80-100 psi.

The contractor shall submit plans and technical data sheet to the COR for approval, prior to performing the installations. The pipes to connect the Hydro-pneumatic equipment shall be metallic like galvanized iron.

This equipment shall be used to pumping water from the water storage tank to water point in the wash rack area.

The contractor shall provide, install and demonstrate proper start-up and functioning and operation of hydro-pneumatic equipment that shall be used to ensure a constant pressure and flow of the all hydraulic system.

5.3 Washing point

The contractor shall provide, install and demonstrate proper start-up and functioning of two (2) water points that shall have a pressure between 80-100 psi and a flow of 25 GPM each one.

Each water point shall include a ball valve, a ¾-inch hose 20 m. long with manual reel and a gun with variable flow trigger for controlled flow. These accessories shall be for heavy-duty work.

The contractor shall submit catalogs and technical spread sheets for all the materials to be used during the construction project.