Protection	Detection Method
Dry run	Wet well low level, via level instrument in the suction Wet well Suction pressure low level. Non-return valve not opened, via proximity or limit switch No discharge flow zero, via flow meter or switch on pump discharge pipe
Blocked discharge or closed discharge valve	Non-return valve not opened, via proximity or limit switch No discharge flow zero, via flow meter or switch on pump discharge pipe
Pump/Pump Motor Bearing Temperature	Temperature sensors such as PT 100 embedded in the bearing housing
Motor Winding Temperature	Temperature sensors such as PT 100 embedded in the winding
Pump/Pump Motor vibration	Vibration sensors such as accelerometers embedded in the pump/motor casing or bearing housing, depending on where the measurement is to be taken or noise sensor fixed at the pump house.

Table 6-11 – Pump Protection Measures:

6.6.6. Fieldbuses

Fieldbuses shall be designed in accordance with IEC 61158 Industrial communication networks - Fieldbus specifications.

6.6.7. SCADA System

Each pumping station location shall be provided with a Programmable Logic Controller (PLC) and Remote Terminal unit (RTU). Both PLC and RTU shall be installed within the same cubicle. The cubicle door shall have a door mounted HMI which shall be connected to the PLC and RTU via Ethernet switches.

The PLC and RTU shall be programmed through HMI. PLC, RTU Instrumentation shall be connected with battery back-up. PLC and RTU shall be programed with the following functions:

1 PLC back-up to RTU
2 Float switches back-up to level transmitter
3 Level/float control selection
4 Pump duty selection
5 Dry run float switch prevent pumps to start and shall reset control cycle
6 Power supply OFF/ON shall not trip pumps
7 Pumps start/stop delay shall be applicable
8 Duty pump shall be changed to other if pump running time exceeds set point

In normal operation the RTU shall control the station. Where the RTU fails the PLC shall take over control seamlessly.

The cubicle shall be fully assembled by one system integrator.