

Site C Pumphouses

Fort St. John, BC, 2015-2017

Contractors for BC Hydro’s Site C dam, under construction near Fort St. John, enlist BI Pure Water for custom package water pumping plants and intakes. The package built pre-tested systems help speed construction and lower build costs for the remote site. BI Pure Water staff are providing technical support.



Supplying Water For Construction Workers

The first project for Site C was an intake and pumphouse on the fast-moving Peace River to supply hundreds of construction workers with water. The water is treated for potable at the top of the bank. The floating dock intake was however damaged by detritus and construction materials flying down the river, so the intake was redesigned for well below surface.

Intake water is filtered and sent to a 2100 GAL settling tank, then to a 720 GAL storage tank inside the container pumphouse. Multiple high pressure booster pumps transfer the water to distribution lines at higher elevations. The raw water is filtered by hydrocyclone.



Supplying Water for Making Concrete

Site C required a raw water pumphouse for supplying the concrete plant with filtered water. A “double-decker” custom steel frame building was designed to be portable and house a 5000GAL buffer tank and 3000 GAL sediment tank as well as control panels, flow meters, and a filtration system. The entire system was factory assembled and tested and shipped in two sections for re-assembly on site.

The insulated, heated and ventilated steel building has an electrical and control system to provide full operational flexibility. A cross-over valve arrangement allows the operator to back-wash the intake screens as required in the event that debris clogs one of the intake screens.

Above left: Intake to the raw water pumphouse (above) for potable water

Left: Concrete plant pumphouse

Water and sediment, once removed from the river, is not allowed to be returned to the source. Unlike typical self-cleaning filters, which can require between 10 and 20% of the flow rate to be wasted as part of the backwash cleaning process, BI Pure Water's design minimizes the volume of waste water.



A three-stage filtration process screens particles to 75 to 100 micron level.

The pump house produces 480 L/min (127 USGPM) of raw water and delivers it at 288 psi, with a peak flow of 1000 USGPM when all pumps are in operation. Variable frequency drives allow for additional energy savings when lower than peak flow rates are required. The pump house building offers high thermal efficiency, requiring minimal electric power for heating during winter conditions. Energy efficient LED lighting is used.

Supplying Liquid Storage Buildings For Concrete Making

To assist with concrete making, two custom steel frame buildings for admixture containments were required. Each building is insulated and heated against freezing and feature two roll-up bay doors that allow easy access for servicing.

Four 10m³ (3000 USGAL) mix tanks are housed inside each building, with one feed pump per tank. Each building's base is water-tight and situated on a spill containment.

Top: Water supply to concrete plant pumphouse, Left: Admixture buildings at Site C's concrete making plant; Bottom: VFD portable pumphouses

Moving Water Between Construction Plants

Four identical pumphouses—each pressure controlled systems with control panels—were required for moving water between plants. Their flow rates are 155 USGPM and they are equipped with 100% redundancy (pump backup in event of a failure). The pump systems are contained in portable, insulated steel 8-and-10ft containers.

VFDs controlling the pump motors allow for energy savings when lower than peak flow rates are required. The pump house enclosure offers high thermal efficiency, requiring minimal electric power for heating during winter conditions and energy efficient LED lighting.

