



TO: Cities of South Bend and Raymond  
FROM: Jay Swift, P.E. (G&O)  
Jim D'Aboy (CEG)  
DATE: March 24, 2009  
SUBJECT: Regional WWTP Pre-Design Technical Memo No. 16  
– Raymond Pump Station No. 11

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Attached is a preliminary pre-design memorandum prepared by our subconsultant, Cosmopolitan Engineering Group (CEG) regarding Raymond Pump Station No. 11. CEG is responsible for mechanical design and G&O for electrical and instrumentation and control design for this pump station. Additional information will be provided as design progresses. In this cover letter to CEG's memo, we have provided supplemental information including an update regarding system hydraulics and the proposed SCADA system for Pump Station No. 11, the other pump stations conveying wastewater to the WWTP and the WWTP itself.

## **SYSTEM HYDRAULICS**

In Technical Memorandum No. 13, CEG recommended SDR 11 HDPE pipe for the Willapa River crossing, based on installation requirements associated with directional drilling. This is thicker-walled pipe than originally considered in Technical Memorandum No. 2 and No. 3, reducing the inside diameter of the pipe. This revision to the internal pipe diameter impacts the head losses for all of the pump stations conveying sewage through the Willapa River crossing. Consequently, we have re-evaluated system hydraulics and our previous recommendations. Based on this evaluation, we will reconsider the possibility of a 20-inch river crossing, instead of the 18-inch previously recommended. The recommended pumps for Pump Station No. 11 will not change with a 20-inch crossing, but would with the 18-inch SDR 11, due to the smaller inner diameter. Attached are pump curves associated with the 20-inch SDR 11 option.

## **SCADA**

The pump stations that will be modified to convey wastewater to the Regional Wastewater Treatment Plant include Raymond Pump Stations No. 1 and No. 11 and South Bend Pump Station No. 3. These pump stations will be equipped with SCADA (Supervisory Control And Data Acquisition) including telemetry and Human Machine Interface (HMI) software to be able to communicate with the new WWTP. In 2005, Raymond purchased a SCADA / telemetry system that was installed by Pacific County

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for the City to monitor alarms at ten of its pump stations, including Pump Stations No. 1 and No. 11. The system uses ZETRON Remote Telemetry Units (RTUs), telephone communication and LOOKOUT HMI software. This SCADA system also has the capability to monitor and record pump run-time and pump cycles.

As noted in Technical Memoranda No. 2 and No. 5, a control algorithm will be developed for coordination of operation of Raymond Pump Stations No. 3 and No. 11 and South Bend Pump Station No. 3 in order to scour solids from the pipe crossing. The objective will be to increase the flow velocity to above 3 feet per second for a period long enough to pump the volume of the river crossing from the low point (located in the approximate center of the river channel) to the new WWTP headworks. Approximately 650 lineal feet of pipe would need to be cleared to remove the settled solids. This equates to approximately 6,900 gallons in a 20-inch HDPE diameter pipe (SDR 11, 16.145-in. I.D.). To pump the required volume and velocity, it will be necessary to operate pumps in more than one pump stations simultaneously. As mentioned in Technical Memorandum No. 2, the pump station control logic will be programmed to periodically operate the pump stations in a manner to provide scouring of the pipe. Additionally, pump station flow and discharge pressure information will be monitored and conveyed to the WWTP.

### **Pump Station Construction and SCADA Implementation**

It is anticipated that Raymond's existing ZETRON RTUs and LOOKOUT SCADA software can be utilized for the upgraded Pump Stations No. 1 and No. 11 for Raymond. It is recommended that the SCADA system programs be modified during construction of the pump station upgrades to accommodate the station modifications.

The new South Bend Pump Station No. 3 will not operate until the new Regional WWTP is constructed. A SCADA system can be selected to match Raymond's at that time, as described below.

### **WWTP Construction and SCADA Implementation**

During construction of the WWTP, the Cities should consider standardizing SCADA components. It is anticipated that Raymond's existing ZETRON RTUs and LOOKOUT SCADA software could be utilized for communication in the new regional conveyance scheme. However, the Cities may select a more common HMI software package for the WWTP instead of the LOOKOUT system, such as Wonderware or RSVIEW. These alternate software packages would also work with the existing Raymond ZETRON RTUs.

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It is recommended that the Cities make decisions on a SCADA system for the new WWTP after bids for the WWTP are received. This would allow the most recent software to be purchased and programmed, and the software could be selected after the programmable logic controller (PLC) instrumentation is competitively bid and thus be optimal for the PLC systems selected. Development and implementation of the control algorithms described above thus would occur during WWTP construction.

As part of the SCADA design and implementation, use of radio communication will be considered.