

ENGINEERING REPORT AND COMPREHENSIVE WATER SUPPLY PLAN FOR THE
RIVERVIEW FEEDERS DOMESTIC WATER SYSTEM



Prepared by: EVERETT A. PHILIPS, P.E., Omak, Washington - March 1980

SCOPE OF REPORT

This Report is prepared to meet the requirements of the Department of Social and Health Services for a Class II domestic water system. It reviews the existing system, analyses its adequacy to provide a safe, potable, and reliable water supply for the area it is to serve, and its ability to satisfy State Regulations. The Report recites deficiencies in the existing system and recommends immediate measures to correct them. It further provides plans for the ultimate development of the properties and a time table for the installation on necessary improvements.

DESCRIPTION AND SHORT HISTORY

The Riverview Feeders Domestic Water System serves 160 acres of rural, agricultural properties located $2\frac{1}{2}$ miles north east of the City of Omak, Washington, and can be more particularly described as the NW $\frac{1}{4}$ of the SW $\frac{1}{4}$ of Section 20, T34, R27E; also known as Government Lot 3.

The properties consist of one 40 acre parcel, ten 10 acre parcels, and four 5 acre parcels. All existing and future buildible sites are located on a relatively flat plateau or bench overlooking the Okanogan River. The ground is well drained, consisting of mostly sands and gravel.

Installation of the Water System was begun in the summer of 1978, and consists of an eight inch well drilled 204 feet deep, located at the bottom of the "bench" in the northeast corner of the quarter section; a 4" Class 160 PVC transmission main 900 feet long which raises the water to a 10,000 gallon capacity steel tank reservoir located atop of the bench. The well has an estimated safe yield of 200 gpm. The pump installed is producing approximately 180 gpm to the reservoir. Adjacent to the reservoir is a booster station, which like the steel tank is buried to reduce freezing problems. The booster station consists of two pumps, pressure tanks, and the electrical controls to go with them. Pump No. One is a horizontal centrifugal unit pumping 40 gpm @ 100 ft TDH and Pump No. Two is a like unit pumping 100 gpm @ 140 TDH. The two pressure tanks are each of 100 gallon capacity and operate as a cushion to the system.

The existing Distribution System includes 2,400 feet of Class 160 PVC 4" main, 680 feet of same 3" main, 1,180 feet of same 2" main and 660 feet of 1 $\frac{1}{2}$ " in two sections each providing supply to only one service. No freezing problems during the winter seasons of 1978 or 1979. Services are not presently metered, and there are six active at this time.

EST. 40 - 50 GPM

180' ELEVATION

ADEQUACY OF THE SYSTEM

Generally speaking, the existing physical plant is more than adequate for the present six services. Operation problems appear to be minimal. The two pressure tanks serve poorly as a hydropneumatic system and hold little value in the future except as cushion vessels. This lack can be easily overcome with the installation of return piping from the distribution system to the reservoir, equipped with a pressure relief valve set at the desired maximum distribution pressure. No One Pump would then operate continuously with excess water (not used by consumers) returned to storage.

The Well and its pump need several things done to meet State Requirements. At present, there is no check valve on the discharge side of the well pump. This allows the water in the transmission main to return to the well when the pump is shut off. The well pump may have a foot valve, but such a valve is not reliable and return water may cause major problems in the well itself. Installation of a check valve in the well pit would be an inexpensive and sure solution to the need.

The bottom of the well pump pit should be ported at ground level to drain any accumulations of water in the pit. The method of insulating the pump pit by covering the top with hay and other materials is not acceptable. I recommend a small insulated building or "dog-house" be erected over the pump pit in such a way that there is easy access for inspection and servicing.

The 10,000 gallon buried tank reservoir may have corrosion problems in the future, but at present, it is quite adequate for its purposes. The reservoir overflow piping and vent should be immediately equipped with screens to prevent entry by birds, rodents etc. The screen should be of 1/8" mesh or smaller.

DISTRIBUTION SYSTEM

The distribution mains appear to be properly sized and installed. There is plenty of capacity for maximum demand (M.I.F. for 6 services = 32 gpm, and for 16 services = 54 gpm). Valve placement, at this time, is unknown. This Report establishes where distribution gate valves should be installed. The owner of the system is requested to install such valves shown on the map, which are not already in, prior to January 1, 1982. We also recommend that 1½" fire hydrant risers be placed as shown on map during that period.

It is DSHS policy that all services be metered. All future services should be metered at time of installation and existing services should be equipped with meters within the next five years. Equity in sharing costs by the water users can only be accomplished by metering of the water used.

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The existing distribution system is piped with ASTM Class 160 PVC mains. This pipe is less strong than AWWA Class 100. Since July 1976, the DSHS Plan Approval Policy has been to require all Class I Water Systems to meet AWWA Standards and all Class II systems to plan to meet said standards in future installations. Where operating pressures in water mains are from 40 psi to 80 psi, AWWA Standards call for the use of AWWA Class 150 pipe in water mains. This is equivalent to ASTM Class 250 PVC pipe. Also, because of the wide range of temperatures annually in the ground in Okanogan County and the relatively large coefficient of expansion of PVC pipe, 20 foot lengths of "O"ring or rubber gasketed joint PVC pipe is superior to "glue-joint" PVC pipe when installed. It is the recommendation of this Report that all future installation of PVC water mains be with ASTM Class 250 PVC pipe in 20 foot lengths and gasketed joints.

REPORT DOCUMENTATION

Accompanying this Report is a copy of a Letter to Mr. Bill Sewell, re: Bill Sewell Plat - Water System, from Tom Justus, P.E. Regional Engineer, DSHS. The Letter sets forth necessary information required of the submittal and was dated: January 18, 1980. In response to said letter, the following is submitted:

1. The engineering report is being submitted herein.
2. The well site has been inspected by DSHS.
3. Copies of covenants protecting well site are enclosed.
4. Pump test results are enclosed.
5. Chemical test samples have been submitted to Smith Tower.
6. Bacteriological sample has been sent to Wenatchee Lab.
7. Well log is enclosed.
8. Plans for source & distribution system are part of Report.
9. Copy of Water Right Application is enclosed.
10. Construction Specifications are included in Report.
11. Ownership & future operation of System will be by Water Users Association.

COMPREHENSIVE WATER PLAN

Because of the covenants limiting minimum lot sizes to 5 acres, and the fact that the northwest 40 acres of the 160 acres is just been planted in apple orchard, we estimate that the maximum number of services to be ultimately served by this system is 24. We project that 75% of those services (18 in all) will be active by 1990. We therefor establish our design criteria for the Comprehensive Plan to be 20 domestic services.

To the extent which it is presently installed, the present system is quite capable of serving the "20 domestic services.

1. The well produces 200 gpm - 30 gpm would suffice.
2. The Storage is 10,000 gallons capacity - 16,000 is required. (present tank will support 13 services.)
3. 20 domestic Services require a Maximum Instantaneous Flow of 60 gpm. The existing Booster Plant can pump 140 gpm.
4. The primary distribution main (4" PVC) is capable of flowing 65 gpm through its 1,000 feet length with a 2psi head loss - quite acceptable. Other distribution mains are reasonably sized for domestic services, but should be supported (looped) where possible.

TIMETABLE OF IMPROVEMENTS

The timetable of improvements is geared to the future addition of services. Several improvements are needed now - and are so stated.

Need Now

- Well - Pump House: Install drain to day-light through concrete casing. Erect insulated building over it.
Install check-valve ahead of gate valve.
- Steel Tank Reservoir: Equip Overflow & Breathing Vents with screens to prevent rodent and insect entry.
- Booster Pump Station: Install permanent safety access ladder from top of manhole to bottom of pit.
- New Services: Install meters, boxes, and services valves on all new services.

When 12 Services are active

- Install distribution gate valves (not existing) as shown on Plan.
- Install 2" ASTM Class 250 PVC main from north east corner of Sewell Tracts Lot 3 - east 1,200 feet to connect into south end of existing 2" PVC main in cul-de-sac.

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Install additional 8,000 gallons of reservoir storage.

Install pressure relief bypass return line (2") to reservoir.
Set valve to activate at approximately 75 psi.

Before 17th Service is Active

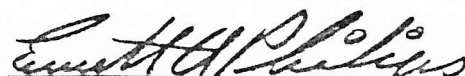
Install water meters on all remaining existing Services.

Install 3rd booster pump in Booster Station. This should be duplicate of Pump No. One with time delay start.

CONCLUSION

As soon as Water Users Association becomes active, they should be directing their attention to the problems of competent supervision of system operations. A complete set of system plans with proper ties should be kept up to date. Plant operations should be properly recorded and kept current. They should train themselves, or acquire the assistance of a trained waterworks operator, conversant in DSHS regulations, to supervise and operate the System. With good management, supervision, and regular preventative maintenance, this System should give good service and little trouble. Without it, there will be many headaches and much unnecessary expense.

Respectfully submitted,


EVERETT A. PHILIPS, P.E.
Box 385, Omak, Washington

826-4725

January 18, 1980

Mr. Bill Sewell
Aquish Rd.
Okanogan, Wa. 98841

Re: Bill Sewell Plat - Water System

Gentlemen:

Plans and Specifications for the above project which you have submitted to this Department for review have received preliminary screening and the following necessary information was not included in the submittal:

1. Evidence of either having an approved engineering report or inclusion of an engineering report with the submittal.
2. Have well site inspection made by the Department of Social and Health Services (DSHS) or County Health Department representative.
3. Copies of easements or covenants where necessary for well site protection. *Easements to water users Assoc.*
4. Pump test results.
5. Well log.
6. Chemical test results.
7. Bacteriological test results.
8. Plans for source and distribution system.
a) source c) storage
b) pumping d) distribution
9. Water right.
10. Construction specifications (indication of which standard specification will be followed will be satisfactory).
11. Plan for ownership and future operation of the system.

When this information has been received, this project will be scheduled for review. If this material is not received within 90 days, the plans and specifications will be returned to you.

Sincerely,

Tom Justus, P.E.
Regional Engineer

Water Supply and Waste Section
Mail Stop -

: ei

: Okanogan C.H.D.
State Health
Mr. Monty Stevens

Monte L. Stevens
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973-2381