Guideline for Group B

Public Water System Approval

APPENDICES

July 1994

Environmental Health Programs

APPENDIX I

BASIC SYSTEM AND SOURCE INFORMATION

The purpose of this appendix is to provide explanations of the attachments and other information requested in Section I of the Group B Workbook. Please note that Section I is to be complete prior to source development.

Part A: BASIC INFORMATION

1. **System Information:**

For the purpose of maintaining accurate records, please provide the information requested on the new or existing system as accurately and completely as possible.

2. **Predevelopment Contacts:**

Coordinated water system plans are regional water system plans developed for areas designated as critical water supply service areas pursuant to the Public Water System Coordination Act. The Coordination Act generally prohibits the development of new, independent systems where an existing system is available to provide service. The burden is on the developer to justify why a new system is needed.

Outside of critical water supply service areas, developers may develop new, independent systems, provided that water is obtained from a protected ground water source (i.e. ground water that is not under the direct influence of surface water). However, prior to developing the new system, the developer is required to contact the following, in this order, to determine whether direct or satellite service is available.

i. The public water system which has a service area identified in a department approved water system plan that includes the proposed development area.

ii. Each existing public water system serving property within one thousand feet.

iii. Available department of health approved regional satellite management agencies.

The department will assist you in identifying which utilities to contact. The department strongly encourages you to consider these alternatives in lieu of developing an independent system.

In contacting the utilities, a letter for contacting local purveyors should be developed and utilized. These letters need to be sent by certified or registered mail. A copy of the letters and the verification of mailing must be submitted to the department prior to submitting the design for approval. An example of a letter requesting information from other local purveyors is included as Exhibit A or use the Certificate of Water Service Availability forms supplied by the Island County Health Department.

Part B: OWNERSHIP AND MANAGEMENT

Include appropriate names, addresses and phone numbers, as indicated. Owner must sign statements of responsibility and accuracy.

Ownership Statement / Joint Use And Maintenance Agreement

Owners of small water systems should, at a minimum, **sign and attach a simple statement of responsibility** for any future costs incurred or maintenance required in the continuing operation of a water system. However, it is strongly *recommended* that a formal legal agreement be drawn up between parties sharing a water system. **A copy of any water users agreement that is implemented should be included with your application.**

A water users agreement should include easements to system lots for the purpose of providing access for maintenance or repair to the well, pump, distribution lines, etc. It should also specify each customer's exact share (right) to the total amount of water available, their share of the maximum ½ acre that can be irrigated (see Water Right Permit, below) require installation of water meters, and provide for provide for financial responsibility for future repairs, maintenance and testing. The agreement should address future transfers of those rights/responsibilities that accompany sale or transfer of ownership of lots served, and other considerations.

Any agreement should be filed on all lots served with the local county auditor and its provisions should "run with the land." A model water users agreement (Exhibit B) is included with this Group B packet. Interested parties should consult with an attorney regarding its specific provisions.

Part C: WATER SOURCE INFORMATION

1. **Water Right Permit**

Water is considered to be a public resource and the State Water Code specifies that a water right permit, obtained from the Washington Department of Ecology (Ecology), is required for all appropriations of public water **except** for wells used for the purposes of stock watering, single or group domestic supply, industrial uses and **irrigation** of lawn and/or garden **not greater than 1/2 acre**, **provided that the water used shall not exceed 5000 gallons per day**. This exception is principally used to provide single family dwellings with wells for their domestic needs without requiring a formal water right.

In most cases the State will not require a water right permit for small domestic water systems serving **six or fewer connections in western Washington**. If you can show that *separate irrigation* is available (i.e., if your water system lies within the boundary of and is served by an irrigation district), applications will be considered from systems with more than two connections without a water right permit. (See "Appendix II, Small Water System Design" for specific requirements). **If your system does not meet these criteria, you must include a copy of your water right permit with your application before it can be approved**.

2. **Well Site Inspection Report**

Incompliance with WAC 173-160, all Group B water system applicants must have their wells sites inspected and approved prior to drilling, **include a copy of the well site inspection report with the application**. Some local health departments offer this service, or contact the DOH Regional Office serving your area to arrange for a state representative to conduct an inspection. If any repairs or improvements are requested, you must show proof that you have complied before your water system will be approved.

3. **Sanitary Control Zone**

Activities that occur on or near the ground surface near your well have been shown to affect the quality of the water beneath the surface. Protecting your water source from potential sources of contamination is *the* most important consideration in owning and operating a public water system.

Drinking Water Regulations require that public water sources be surrounded by a sanitary control area in which activities that could contaminate the water source are not allowed. Current state law specifies that the **minimum** area that must be protected is a one hundred foot radius circle about your well. In addition an inventory of potential sources of contamination within a 600 foot radius of the well must be completed. The department may occasionally require a larger area if necessary.

a. **Protective Covenants:**

A covenant is a written agreement that restricts the use of the property it is recorded on. Water System Owners use covenants as a legal tool to protect property from activities or practices that could contaminate their public water source.

There are two types of covenants used for this purpose. A **DECLARATION OF COVENANT** is used when the Water System Owner owns property in the sanitary control zone. The **RESTRICTIVE COVENANT** is used when any portion of the property within the sanitary control zone is owned by someone other than the Water System Owner. Sometimes both may be needed.

All Water System Owners are required to provide an area of sanitary control within 100 feet of the public water source.

i. **Declaration of Covenant**: Declaration Of Covenant must be drawn up by the owner of the land on which the well is located, declaring a 100 ft. protected zone around the well. This document should be signed (by the owner of the property where the well is located) in front of a notary and filed with the county auditor on the lot where the well is located. A map should be attached to the covenant showing the exact location of the well on the property. This document could be included with a Joint Use & Maintenance Agreement mentioned in section B.

ii. **Restrictive Covenant**: When all or part of the required sanitary control area is owned by someone other than the Water System Owner, the owner must obtain a restrictive covenant from that landowner. This document must be completed and

signed and notarized by any other property owner whose land lies within the sanitary control zone (if any).

NOTE: All covenants must be properly filled out, signed and notarized, and then filed with the local County Auditor. Include copies of all covenants with this Group B application showing clearly the auditor's stamp of the county in which they were filed.

DOH has blank covenant documents available (examples have been included in Appendix III) for your convenience. The use of these exact forms are not required; however, an equivalent form is required. As is the case with any legal document, it is wise to consult with an attorney regarding specific provisions in the covenants. A pamphlet is available, and has been included with this packet to better explain covenants and how to fill them out. See Covenants For Public Water Supply Protection.

b. **Site Protection Sketch**:

All Group B applicants **must submit a detailed drawing of the area around the well** with their application. A circle should be drawn to scale around the well representing the 600 ft. radius. *Everything within the 600 foot radius should be included in the drawing* even if part of the zone lies in a neighbor's property. **If a landfill or hazardous waste disposal site is located within 1000 feet of the property it must be shown on the drawing.** *(Note: A well cannot be constructed within 1000 feet of a landfill or hazardous waste disposal site pursuant to WAC 173-160.)* Show distances from the well to property lines and roads, as well as distances from the well to any potential source of contamination as per the instructions in Part C, #3 a).

c. **Plats / Short Plats**

Protective covenants with restrictive language filed on the face of a final plat will be accepted in lieu of the required covenants.

EXHIBIT A
EXAMPLE CONTACT LETTER

(Date)

(Name/Address of Water System Being Contacted)

To Whom It May Concern:

I am the owner of the property described below. I am considering developing a small public water system to serve this property. Prior to deciding whether to develop a separate system, I would appreciate finding out if you could provide service to this property.

In responding to this request for information, please provide the following information:

(a) Would service be provided by extending your existing system or by satellite operation as a separate system?

(b) Would you require ownership of this system or would you be willing to provide contract operation?

(c) What design standards you would require for my system?

(d) What other requirements do you have for providing service?

(e) What is the estimated cost of providing service?

(f) How soon could you provide service to my development?

I have enclosed a vicinity sketch to assist you in locating my property. The following is additional information to assist you in responding to my questions:

(a) Property Tax Account Number: *(Number)*

(b) Location: Sixteenth Section *(Number)*, Section *(Number)*, Township *(Number)*, Range *(Number)*

(c) Approximate Address: *(Address)*

(d) Subdivision Name or Number: *(Name or Number)*

(e) Number of Parcels To Be Served: *(Number)*

(f) Average Lot Size: *(Number)* Acre(s)

I would appreciate receiving a response to this request within fourteen (14) days. If you have any questions, please contact me at *(telephone number)*.

Sincerely yours,

(Signature)
(Name of Owner)
(Mailing Address)

EXHIBIT B
EXAMPLE WATER USERS AGREEMENT

OWNERSHIP OF THE WELL AND WATERWORKS

It is agreed by the parties that each of said parties shall be and is hereby granted an undivided one-half interest in and to the use of the well and water system to be constructed. Each party shall be entitled to receive a supply of water for one residential dwelling and shall be furnished a reasonable supply of potable and healthful water for domestic purposes. The following parcels have the right of usage of this water source:

_____.

COST OF WATER SYSTEM CONSTRUCTION

Both parties herein agree to share equally in the cost incurred in well site approval, well construction, design of the water system for approval by the Health Officer, and construction and/or installation of the waterworks equipment, the pumphouse and water distribution pipes, and initial well water quality tests.

COST OF MAINTENANCE OF WATER SYSTEM

Each party hereto covenants and agrees that they shall equally share the maintenance and operational costs of the well and water system herein described. The expense of water quality sampling as required by the State of Washington and _____ county shall be shared equally by both parties. The parties shall establish and maintain a reserve account at a mutually agreed upon banking institution. Each party shall be entitled to receive an annual statement from said banking institution regarding the status of the reserve account. The monetary funds in the reserve account shall be utilized for the sole purpose of submitting water samples for quality analysis and maintaining, repairing or replacing the well and common waterworks equipment or appurtenance thereto.

EASEMENT OF WELL SITE AND PUMPHOUSE

There shall be an easement for the purpose of maintaining or repairing the well and appurtenances thereto, within 30 feet of the well site in any direction. Said easement shall allow the installation of well house, pumps, water storage reservoirs, pressure tanks, and anything necessary to the operation of the water system.

WATER LINE EASEMENTS

Smith grants Jones an easement for the use and purpose of conveying water from the well to the property of Jones. Said easement shall be five (5) feet in width and shall extend on, over, across, and underneath said strip of land from designated well site to common point as referred to. The centerline of said five (5) foot strip of land shall be the west line of the east 32 feet of the south 75 feet of Smith's _____ herein described. No permanent type of building shall be constructed upon the water line easement except as needed for the operation of the well and water system.

MAINTENANCE AND REPAIR OF PIPELINES

All pipelines in the water system shall be maintained so that there will be no leakage or seepage, or other defects which may cause contamination of the water, or injury, or damage to persons or property. Pipe material used in repairs shall meet approval of the Health Officer. Cost of repairing or maintaining common distribution pipelines shall be born equally by both parties. Each party in this agreement shall be responsible for the maintenance, repair, and replacement of pipe supplying water from the common water distribution piping to their own particular dwelling and property. Water pipelines shall not be installed within ___ feet of a septic tank or within 10 feet of sewage disposal drainfield lines.

PROHIBITED PRACTICES

The parties herein, their heirs, successors and/or assigns, will not construct, maintain or suffer to be constructed or maintained upon the said land and within 100 feet of the well herein described, so long as the same is operated to furnish water for public consumption, any of the following: septic tanks and drainfields, sewerlines, underground storage tanks, county or state roads, railroad tracks, vehicles, structures, barns, feeding stations, grazing animals, enclosures for maintaining fowl or animal manure, liquid or dry chemical storage, herbicides, insecticides, hazardous waste or garbage of any kind. The parties will not cross connect any portion or segment of the water system with any other water source without prior written approval of the _____ County Department of Public Health and/or other appropriate governmental agency.

WATER SYSTEM PURVEYOR

Smith is designated "Purveyor" of the water system. The purveyor shall be responsible for arranging submission of all necessary water samples as required in the Washington Administrative Code, and _____ County Rules and Regulations No._____ and handling emergencies such as system shutdown and repair. The purveyor shall provide his/her name, address and telephone number to the Health Officer and shall serve as a contact person to the Health Officer. The purveyor shall organize and maintain the water system records and notify the Health Officer and all parties, service connections and lots that are included in this agreement, of the water quality tests that are required by WAC 246-291 and _____ County Rules and Regulations No._____. Water system records shall be available for review and inspection by all parties in this agreement and the Health Officer.

PROVISIONS FOR CONTINUATION OF WATER SERVICE

The parties agree to maintain a continuous flow of water from the well and water system, herein described in accordance with public water supply requirements of the State of Washington and ___County. In the event that the quality or quantity of water from the well becomes unsatisfactory as determined by the Health Officer, the parties shall develop a new source of water. Prior to development of, or connection to a new source of water, the parties shall obtain written approval from the Health Officer. Each undivided interest and/or party shall share equally in the cost of developing the new source of water and installing the necessary equipment associated with the new source.

RESTRICTION ON FURNISHING WATER TO ADDITIONAL PARTIES

It is further agreed by the parties hereto that they shall not furnish water from the well and water system herein above described to any other persons, properties or dwelling without prior consent of both properties and written approval from the _____ County Department of Public Health.

HEIRS, SUCCESSORS AND ASSIGNS

These covenants and agreements shall run with the land and shall be binding on all parties having or acquiring any right, title, or interest in this land described herein or any part hereof, and it shall pass to and be for the benefit of each owner thereof.

ENFORCEMENT OF AGREEMENT ON NON-CONFORMING PARTIES AND PROPERTIES

The parties herein agree to establish the right to make reasonable regulations for the operation of the system, such as the termination of service if bills are not paid within forty-five days of the due date, additional charges for disconnection, reconnection, etc. Parties not conforming with the provisions of this agreement shall be subject to interest charges of ____% per annum together with all collection fees.

Dated this _____ day of _____, 19___

_____ _____

State of Washington)
County of _____)ss

I, The undersigned, A notary Public in and for the above named County and State, do hereby certify that on this _____ day of _____, 19____, personally appeared before me _____ to me known to be the individual _____ described in and who executed the within instrument, and acknowledge that he (they) signed and sealed the same as _____ free and voluntary act and deed, for the uses and purposes therein mentioned.

_____
Notary Public in and for the
State of Washington, residing at
_____

APPENDIX II

GROUP B WATER SYSTEM DESIGN

The purpose of this section is to assist in the design of a small public water system. Included is information to help size and select pumps, distribution lines, storage tanks, and pressure tanks.

The first consideration and a potential limiting factor in small water system design is the capacity of your water source. The ultimate goal is to provide the quantity of water needed to meet the peak and daily demands of the water users at all times.

Part D: WATER SOURCE INFORMATION:

1. **Well Log**

The well log provides important information about the construction of your well and its vulnerability to contamination. It also contains information about your aquifer and sometimes your well capacity and pump setting. **A copy of the well log is required and should be included with this application** for all *new* systems and desired, if obtainable, for older *existing* systems.

The Washington Department of Ecology (Ecology) requires well drillers to fill out the well log and file a copy with their office, with a copy going to the owner of the well and a third copy to be retained by the driller. If the owner's copy cannot be located, check with the company who drilled the well, the previous property owner, or with the Ecology to see if they have a copy on file.

If a well log is not available, as much information as is available regarding the well should be provided. The Department may require additional information prior to approving the source.

Totalizing Source Meters: Totalizing source meters are required on all new sources to accurately monitor the quantity of water produced which will assist in the management of water resources and withdrawal of ground water amount in conformance with the requirement of water rights. After the system is in operation, the owner must maintain a record of monthly meter readings. Individual service meters are recommended as these meters can provide information regarding the loss of water due to leakage in the distribution system. Individual meters are required per I.C.C. 13.03A.

2. **Pump/Well Yield Test Results**

Establishing well and/or pump capacity is critical to the formation of a small water system. A good well/pump test provides information regarding the capacity and reliability of your well, and also defines the area of influence of your well. The duration of the pump test must be for a sufficient period of time to ensure that the well can produce enough water to supply the required daily production of the system, but *never for less than four hours after drawdown has stabilized*. **A copy of the Well/Pump Test Report must be included with all applications.** For new systems, the results of this test are used to size and select your pump and storage system. See information pamphlet on pump tests included with this Group B packet: Well Development: A Summary Guide To Well Yield Tests, Pump Selection And Initial Disinfection

Many well drillers and pump dealers offer this service for a fee, but all do not provide the same level of service for your money. A well/pump test should conform to state standards. The report should show the static water level, yield, drawdown, recovery rate and duration of pumping. The duration of the test shall be **for no less than four hours after stabilization has occurred**, but for at least long enough to supply the *required daily production of the system*. If this well is located in close proximity to an adjacent well, the department may require that both wells be test pumped simultaneously to verify that the aquifer can adequately supply both wells.

The department recommends, and may require that the well have an airline installed to facilitate future water level measurements. Air lines must be installed at the same time the pump drop pipe is installed. I.C.C. 13.03A requires installation of a device for measurement of depth to water in all new ground water sources.

3. **Water Quality Tests**

Water samples from your system must be submitted to state certified laboratories and **copies of current test results must be included with your application**.

Current regulations (WAC 246-291-100) require that all Group B water systems must have an initial **complete inorganic chemical and physical analysis** and a **bacteriological test**. The Department may require analyses for additional chemicals. Primary inorganic chemical and physical standards are antimony, arsenic, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, nitrate (as N), nitrite (as N), selenium, sodium, thallium, and turbidity. Secondary chemical and physical standards are chloride, color, hardness, iron, manganese, silver, specific conductivity, sulfate*, total dissolved solids*, and zinc.

*Required only when specific conductivity exceeds 700 micromhos/centimeter.

Other water quality tests may be required, if the department determines they are necessary (WAC 246-291-300). Some groundwater contamination areas have been identified by the State and water systems near these areas may be required to submit additional tests at a frequency determined by the department. Other water quality tests that may be required can include analyses for volatile organic chemicals (VOCs), synthetic organic chemicals (SOCs) or pesticides, and radionuclides.

After approval, a <u>bacteriological sample</u> must be submitted for analysis *annually* and at least one <u>nitrate sample</u> submitted *every three years*. Included with this application is a list of labs currently state certified to test for nitrates, as well as all analities included in the complete inorganic chemical and physical analysis. A separate list of labs currently certified to perform the bacteriological test is also included.

4. **Covenants:**

For a descriptio of the information required in this part, refer to Part 3a, Appendix I. In addition, examples of the protective covenants are provided at the end of Appendix III.

Part E: FINANCIAL VIABILITY

Through the development of a projected budget, the goal of the Financial Viability worksheet is to set in place plans, policies and procedures that will enable the system owner(s) to have the ability to obtain sufficient funds, on a continuing basis, to cover the total cost of developing, constructing, operating, and maintaining the system in compliance with State and Local drinking water regulations.

The rates calculated on the worksheet (Line 18) must be adequate to cover the operation and maintenance costs of the system and any budget deficits identified in line 16. It is important to remember that the line items on the Financial Viability worksheet are intended to be areas requiring consideration and may not be applicable a particular Group B water system and may be skipped if not applicable to your system. **(NOTE: Use the rate calculated after full development on the Notice To Future Property Owners.)**

In completing Part E of the workbook, information for the various line items may be obtained from various service providers. These could include equipment suppliers, chemical suppliers, tax assessor, utility companies, insurance agents, etc.

The following items are a brief explanation of each of the line items:

Annual Expenses (For One Full Year)

Line #1 Wages and Benefits: Includes all compensation to employees of your utility in which the work is related to the administration and operation of the utility, such as officers, directors, secretarial, operators, and meter-reading.

Line #2 Electricity and Other Utilities: Includes the cost of all electric power, water, telephone, and any other utility-related expenses incurred in producing and delivering water.

Line #3 Chemicals and Treatment: Includes the cost of all chemicals used in the treatment of water.

Line #4 Monitoring Costs: Includes all water monitoring costs incurred by the utility. This would include all costs associated with bacteriological, nitrate, inorganic chemical and any other types of monitoring required, or voluntarily conducted. In addition, this should include both in-house monitoring costs, and monitoring that is sent to an outside agency for analysis.

Line #5 Materials, Supplies and Repairs: Includes all materials, supplies, and replacement parts used in the operation and maintenance of the water system and in producing and delivering water to the customer.

Line #6 Taxes/ Assessments: Your utility can incur a variety of taxes such as state utility tax, business and occupation (B&O) tax, property tax, etc. A summation of all taxes should be entered into line #6.

Line #7 Insurance/ Misc. Expenses: Insurance costs include all the coverage costs related to the operation and administration of the water system. Miscellaneous expenses are those water system expenses not previous included in Lines 1 through 6.

Line #8 Subtotal- Operating Expenses: This subtotal is the expense of running a Group B water system on a yearly basis and should include the costs identified in Lines 1 through 7.

Line #9 10% Contingency: A Group B system should budget for unexpected expenses equaling 10% of their total annual operating expenses. A 10% contingency charge, built into the rates, will help prevent cash flow shortfalls. This contingency charge, when accumulated, will also enable the system to fund a reserve for other unexpected costs.

Line #10 Principal and Interest Payments (Debt Payment): Includes the annual costs of all short-term and/or long term system debt.

Line #11 System Replacement: Group B systems should start to generate funds to replace the system. This expense reflects the cost for replacing all major components of the water system assuming a 20 year life expectancy. 1/20th of the original cost of the system should be included in the budget.

Line #12 Total Revenue Required: Line 12 is the summation of Lines 8 through 11.

Annual Revenue From Sources Other Than Water Rates

Line #13 Hook Up/ Other User Fees: Includes the fees to be charged to connect new users to the system and all other miscellaneous fees and charges for service provided other than for water service.

Line #14 Other Revenue: Includes all other revenues that do not apply to the categories above.

Line #15 Total Non Water Rate Revenue: Line #15 is the summation of Lines 13 and 14.

Annual Water Rate Calculations

Line #16 Budget Surplus (Deficit): Line 16 is the result of subtracting Line 12 from Line 15.

Line #17 Number of Connections: Line #17 is the total number of service connections served by your water system in at initial development and after full development of the system.

Line #18 Annual Water Rate: The annual water rate for your system is calculated by dividing Line #16 by the number of service connections on your system. The rate calculated must be sufficient to cover all of the operation and maintenance costs for your system and can be charged on a monthly, bimonthly, semiannual or annual basis.

Part F: SOURCE CAPACITY

Your well *must* be capable of supplying enough water to meet the *state estimated daily demand* for the number of connections in your system and the water system design rate cannot exceed the well capacity. For all new systems a **pump test** of the well must be performed to establish well capacity. Your well (supplemented by storage if necessary) should also be capable of providing the required peak hourly design flow or *peak flow* of your system.

If your well can produce the daily demand, but not the peak flow, you will need to provide water storage. If water storage is required, but can not be provided with one or more simple pressure tanks, you must hire a professional engineer to design the storage tank and installation.

The *capacity of the well* (in gallons per minute), established from the pump test, along with *the required pump head* (in feet) (to be calculated in the next section), can then be used to select the proper pump size. If the pumping rate of the well is *less* than the required peak flow, storage is required.

Systems located in **Western Washington** may use an average daily use of 400 gallons per day and a peak day use of 750 gpd as the design flow (See Tables 3 and 4).

Please note that the design flow standards used in this appendix account for domestic use and watering of a typical lawn and garden space only. These design standards assume that **all** residences will be equipped with ultra low flow fixtures. If you anticipate additional uses or extensive irrigation, the system should be designed to a higher standard. If your property is served by separate irrigation you may use a lower design standard than specified in the tables below. Contact the department for further information.

In selecting a design standard (Option A or B) to use for your system there are some concerns that must be taken into account. In general if the source is capable of meeting the state estimated daily demand for the number of connections in your system it may be more cost effective to use Option A (Tables 1 or 3). Also Option A should be considered for systems in areas where conservation is encouraged. Option B (Tables 2 or 4) would be cost effective for those systems utilizing a source capable of producing slightly less than the state estimated daily demand or is located in areas where conservation is not required. **Note: It is important to remember that it is owner option as to which sizing guideline is used. However, when either option is selected, it must be utilized throughout the system design.**

Fireflow requirements vary. Fireflows may be prohibited in some areas. Fire protection may be *required* in other areas, but is not considered in this appendix. For more information consult with your local county fire marshall, or county code enforcement official. **When fire flow *is* required, a professional engineer must be retained to perform a hydraulic analysis and design storage facilities.**

Systems located in **Western Washington**, refer to Table 3 or 4 to determine the required maximum instantaneous (peak) flows, and minimum daily production for your system.

TABLE 3: OPTION A- WESTERN WASHINGTON

MAXIMUM INSTANTANEOUS DEMAND (MID) FLOWS AND MINIMUM DAILY PRODUCTION FOR WATER SYSTEMS WITH ONE TO NINE CONNECTIONS									
NUMBER OF CONNECTIONS	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
MID (GPM)	15	17	19	21	23	25	27	29	31
REQUIRED *MINIMUM* DAILY PRODUCTION (GPD) *	750	1500	2250	3000	3750	4500	5250	6000	6750
(GPM)	1.0	1.2	1.6	2.1	2.7	3.2	3.7	4.2	4.7

*Note: Required Minimum Daily Production Levels reduced to comply with the requirements for Ultra Low Flow Plumbing Fixtures in new buildings. GPM = gallons per minute, GPD = gallons per day

TABLE 4: OPTION B- WESTERN WASHINGTON

MAXIMUM INSTANTANEOUS DEMAND (MID) FLOWS AND MINIMUM DAILY PRODUCTION FOR WATER SYSTEMS WITH ONE TO NINE CONNECTIONS									
NUMBER OF CONNECTIONS	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
MID (GPM)	20	22.1	24.2	26.3	28.4	30.5	32.6	34.7	36.8
REQUIRED *MINIMUM* DAILY PRODUCTION (GPD) *	750	1500	2250	3000	3750	4500	5250	6000	6750
(GPM)	1.0	1.2	1.6	2.1	2.7	3.2	3.7	4.2	4.7

*Note: Required Minimum Daily Production Levels reduced to comply with the requirements for Ultra Low Flow Plumbing Fixtures in new buildings. GPM = gallons per minute, GPD = gallons per day

Knowing the peak and daily demands for *your* system, you can now proceed to determine the **required pump head**. The required pump head (usually expressed in feet) is the equivalent height of a column of water above it that the pump must work against in order to deliver the design flow at the desired pressure to a specified point.

The required pump head will depend on whether storage is required.

For a system that requires no storage, the required minimum pump head (also called the total operating head) includes the vertical distance from the pumping level in the well (static water level plus draw-down) to ground surface (A), plus any elevation difference between ground surface at the well head and the point of delivery (B), plus the maximum frictional losses that can occur in the system (this is converted to an equivalent amount of head) (C), plus a residual head (70 ft.) necessary to maintain the required pressure of 30 psi at each residence (D). (See Fig. 1)

If storage *is* required, the *well pump* head is the elevation difference from pumping level in the well to the storage tank, plus any headloss (residual=0). The *booster pump* head is the elevation

difference from the booster pump to the residence (B) plus headloss and a 70 ft. residual (C+D). (See Fig.2) Elevation differences can be positive, negative or zero.

To calculate the required pump head you will need to perform a *hydraulic analysis* in order to figure what the maximum headloss will be in your distribution system. To perform a hydraulic analysis you must first complete your system layout sketch, including elevation differences, pipe material, pipe diameter and distances of pipe runs. Use Table 2 to determine headloss for various PVC* pipe diameters at varying maximum design (peak) flows. With this information complete your hydraulic analysis in the space provided. (*Table 2 headloss figures assume plastic (PVC) pipe is used - this is the most commonly available piping and results in the least headloss)

For systems built on level terrain (maximum elevation difference of 40 feet) using **2 inch diameter PVC pipe or larger**, with a maximum length of pipe run of 300 feet, no hydraulic analysis is necessary (use headloss = 0).

REQUIRED PUMP HEAD

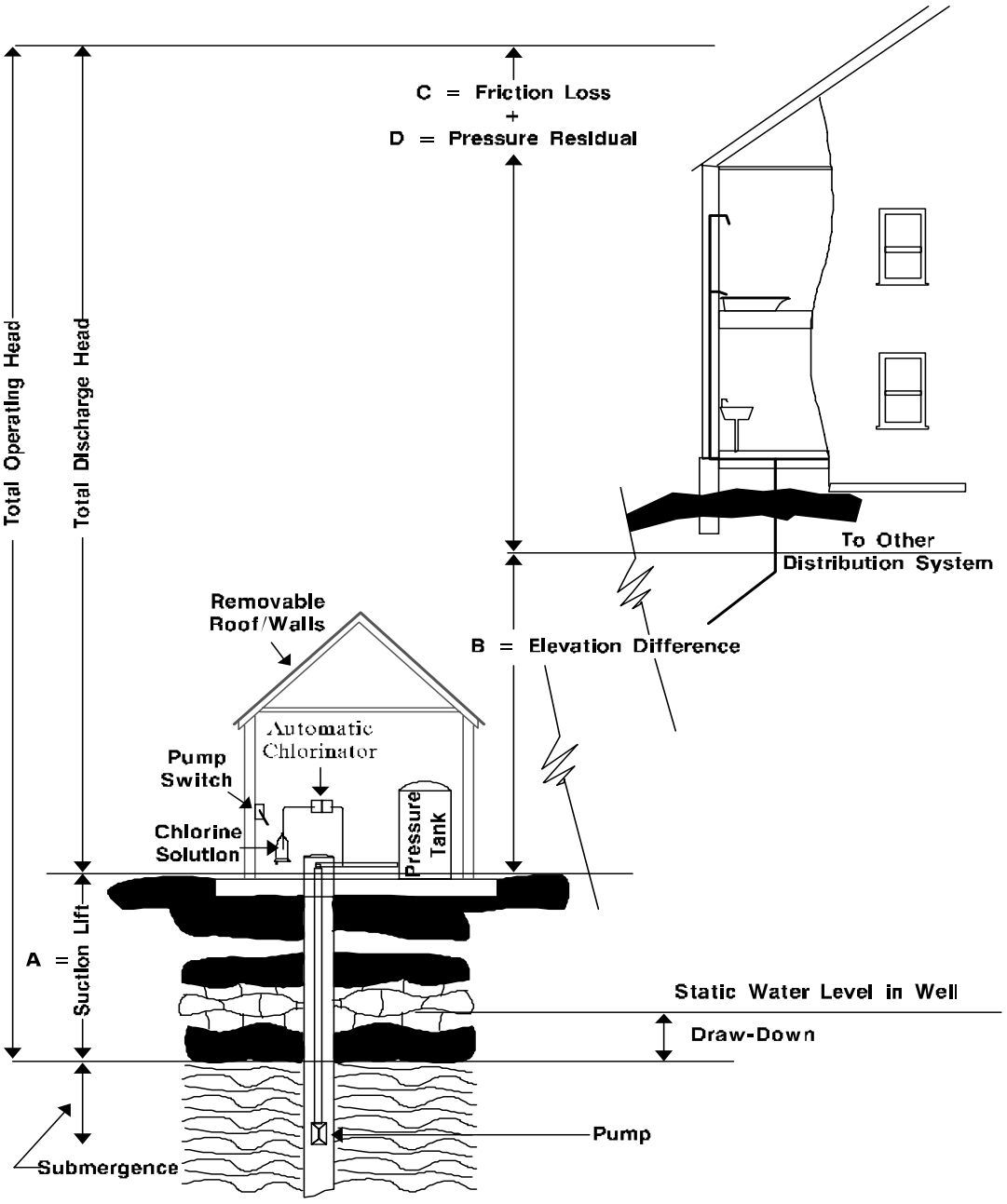


FIGURE 1

REQUIRED PUMP HEAD

For Well Pump

Required Pump Head - expressed as follows:

Total Operating Head = A + B + C +D

A = Total well lift, from pumping level in well to ground surface, in ft.

B = System elevation difference, from point of discharge to point of delivery of water, in ft.

C = Friction losses, expressed in ft.

D = Pressure residual (30 psi), expressed in ft. (70 ft.)

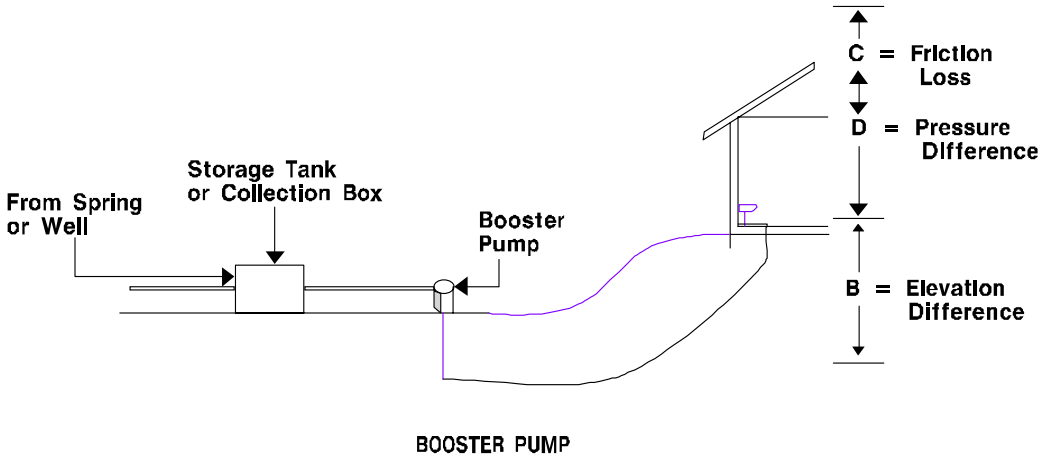
A + B = Static Head (Total)

NOTE: B may be positive, negative or zero.

If zero, there is no effect.

If positive, it is added into the required pumphead as above.

If negative, it should be treated as zero unless greater than 50 ft., then will be subtracted.



BOOSTER PUMP

For Booster Pump

Required Pump Head - B, C & D are for a well pump. Again B may be positive, negative or zero.

If zero, the required head = B + D

If positive, the required head = B + C + D

If negative, the required head = same as for zero, unless C is greater than 70 ft. to the first service. At that point, the gravity head available may be so great that no pump with be necessary.

FIGURE 2

TABLE 5- OPTION A

NO. CONNECTIONS / DESIGN FLOW (GPM)

PIPE DIAMETER (INCHES)	1/15	2/17	3/19	4/21	5/23	6/25	7/27	8/29	9/31
	** HEADLOSS PER 100 FEET OF PVC PIPE (IN FEET)								
3/4*	59.7	75.3	92.5	111.3	131.7	153.7	177.2	202.3	228.8
1*	14.7	18.6	22.8	27.5	32.5	37.9	43.7	49.9	56.4
1 1/4	5.0	6.3	7.7	9.3	11.0	12.8	14.8	16.8	19.1
1 1/2	2.0	2.6	3.2	3.8	4.5	5.3	6.1	6.9	7.9
1 3/4	1.0	1.2	1.5	1.8	2.1	2.5	2.9	3.3	3.7
2	0.5	0.6	0.8	0.9	1.1	1.3	1.5	1.7	1.9
3	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3
4	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

* PROVISION IS MADE IN THE HEADLOSS TABLE FOR ANALYSIS USING 3/4 AND 1 INCH PIPE. HOWEVER, EXTENSIVE USE OF THESE PIPE SIZES IS NOT RECOMMENDED, SINCE IT RESULTS IN VERY LARGE HEADLOSS, REQUIRING A LARGER, MORE EXPENSIVE PUMP IN MANY CASES
** Values calculated using Hazen-Williams formula assuming smooth (PVC) pipe and CH 140.

TABLE 6- OPTION B

NO. CONNECTIONS / DESIGN FLOW (GPM)

PIPE DIA. (")	1/20	2/22.1	3/24.2	4/26.3	5/28.4	6/30.5	7/32.6	8/34.7	9/36.8
	** HEADLOSS PER 100 FEET OF PVC PIPE (IN FEET)								
3/4*	108.3	130.3	154.1	179.8	207.2	236.4	267.4	300.2	334.6
1*	26.7	32.1	38.0	44.3	51.1	58.3	66.0	74.0	82.5
1 1/4	9.0	10.9	12.8	15.0	17.3	19.7	22.3	25.0	27.9
1 1/2	3.7	4.5	5.3	6.2	7.1	8.1	9.2	10.3	11.5
1 3/4	1.8	2.1	2.5	2.9	3.4	3.8	4.3	4.9	5.4
2	.90	1.1	1.3	1.5	1.8	2.0	2.3	2.5	2.8
3	.1	.2	.2	.2	.2	.3	.3	.4	.4
4	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

*PROVISION IS MADE IN THE HEADLOSS TABLE FOR ANALYSIS USING 3/4 AND 1 INCH PIPE. HOWEVER, EXTENSIVE USE OF THESE PIPE SIZES IS NOT RECOMMENDED, SINCE IT RESULTS IN VERY LARGE HEADLOSS, REQUIRING A LARGER, MORE EXPENSIVE PUMP IN MANY CASES

** Values calculated using Hazen-Williams formula assuming smooth (PVC) pipe and CH 140.

The calculations for pipe headloss are performed as follows:

1. Refer to the system layout sketch. The system is broken into links; a,b,c,d,e, etc., (see example A at end of this section). In the example, the analysis for the pairs of services 1 and 2, 3 and 4, and 5 and 6, are performed only once. This is because the pipe type, lengths and flows are the same for each of these pairs. There is no need to repeat calculations unnecessarily.

2. Using information from your system layout sketch, enter the pipe information (material, diameter and length) for each link leading to a given connection into each of the appropriate columns in the hydraulic analysis table. Enter the number of services (connections) downline from each link in the next column. Enter the peak flow from Table 1 that corresponds to the number of downline services in the next column. Enter the headloss per 100 feet of pipe from Table 5 that corresponds to the peak flow for that diameter pipe in the next column. Multiply the headloss per 100 feet by the number of hundred feet of pipe in each link and enter that figure in the last column (example - 480 feet of pipe = 4.8 times headloss per 100 feet).

3. For each connection in your distribution system, add up the headloss associated with each link leading to that service and enter it in the chart under "TOTAL".

4. When the total headloss for each connection has been calculated, compare the values and use the greatest value obtained anywhere in your system for the headloss when completing Table B (Required Pump Head).

For further clarification of calculating headloss, refer to the following example problem. Please note that this example utilizes Option A throughout the example.

TABLE A - Headloss

From:	To:	Connections:	MID	Diameter	Headloss per 100'	Length	Total Headloss
Well	A	9	31	2"	0.30	280	0.84
A	B	4	21	2"	0.86	90	0.77
B	C	2	17	2"	0.73	210	1.53
A	D	5	23	2"	1.08	170	1.84
D	E	3	19	2"	0.86	70	0.60

Where: MID = Maximum Instantaneous Demand. The value used is from either Tables 1 or 3-Option A. If using Option B refer to Tables 2 or 4 for values.
Headloss per 100 ft.= Friction loss through PVC pipe. These values are from Table 5 since Option A is being used. If Option B were used, the values would be from Table 6.
Headloss per 100 feet = See Table 5 or 6.
Headloss = Headlosses of the system at that point. To determine this figure multiply the friction loss by the length of pipe and divide this result by 100.

Having calculated what the maximum headloss will be in your distribution system, you can complete the section for well pumps in Table B to determine what the Required Pump Head is.

Pumping Equipment

The Required Pump Head is the sum of the static head of the well, the residual head, and the greatest headloss determined in the hydraulic analysis.

The Static Head is the distance in feet from the water surface in the well during pumping to the point to which water service is to be delivered. In other words the Static Head is the summation of Static water level, the amount of draw down during pumping and the increase in elevation between the well and the highest service connection.

The Residual Head is the pressure required at each connection in the system. The pressure required is 30 psi or 70 feet residual. (To convert psi to feet of water multiply by 2.307)

Headloss is the equivalent distance in feet that the pump must work against due to the resistance of pipe friction and similar causes.

As an example, if one were to assume that the well in Example 1 above was 250 feet deep with a static head of 220 feet, one could complete Table B on the following page.

Table B- Required Pump Head

	WELL PUMP	PUMP #2 (BOOSTER PUMP IF NEEDED)❍
DISTANCE FROM PUMPING LEVEL IN WELL TO GROUND SURFACE (WELL HEAD)	220 FEET	------FEET
ELEVATION DIFFERENCE FROM WELL HEAD TO POINT OF DELIVERY	10 FEET	------FEET
GREATEST HEADLOSS (Note: This number from hydraulic analysis)	1.84 FEET	------FEET
PRESSURE RESIDUAL HEAD (30 PSI = 70 FEET OF HEAD)	70 FEET	------FEET
TOTAL REQUIRED PUMP HEAD	302 FEET	------FEET

❍ **For Booster pumps a licensed Professional Engineer is required.**

Knowing the required pump head (in feet) and the pump rate your well is capable of (in gpm), you can select the pump that best fits your needs. Enter the requested pump information in PARTS F-3 and 4 on page 12 of the workbook and attach pump curve and specifications.

Booster Pumps

In situations where booster pumping is performed, the calculation is the same as for a well pump sizing. Most frequently this calculation will be necessary when the storage requirement is so large (and expensive) that it cannot be provided utilizing a pressure tank. For booster pump sizing the second half of Table B should be completed. Enter the requested information in Part F, #5 on page 13 of the workbook and attach pump curve and specifications. **NOTE: If the system requires booster pumping, the system must be designed by a professional engineer.**

Pumphouses

If a pumphouse is to provided, it should be installed above the surface of the ground (see Figure 3). The pumphouse floor should be watertight, preferably concrete, and should slope uniformly away in all directions from the well casing or pipesleeve. It should be unnecessary to use an underground discharge connection if the pumphouse is insulated and heated. For individual pumphouses adequate lighting and a thermostatically controlled electric heater should be provided.

Typical Pumphouse

(Not Drawn to Scale)

NOTE:

a) The roof may be one surface, sloping, with a hatch.

b) There should normally be one foot access between the wall and equipment.

c) A pitless unit or submersible pump may be installed when approved by the Local Health Agency.

d) Plumbing should be installed for pumping to waste.

e) Where chlorination is practiced, provisions must be made for an adequate chlorine chamber.

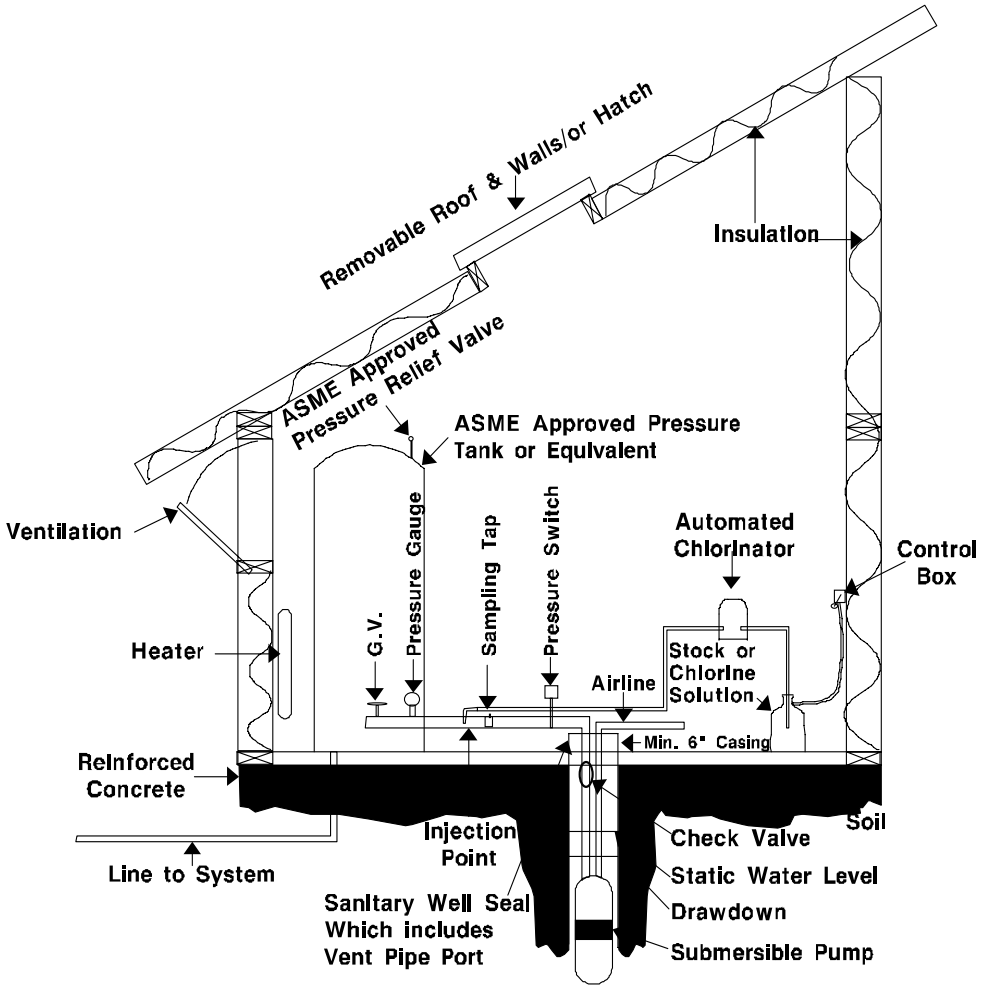


FIGURE 3

Part G: PRESSURE TANK/STORAGE FACILITIES

If the pumping rate capacity of your well is *less* than the required peak flow listed for the number of connections *you have* in one of the MID Tables (Table 1,2,3 or 4), you will need to provide storage. If nonpressurized storage is required a professional engineer must be consulted. The volume of storage (called equalizing storage) required can be calculated by either Option A or Option B below: (**Reminder: Once you choose between Option A and Option B for sizing guidelines, you must follow through the entire workbook with the method selected.**)

OPTION A: EQUALIZING STORAGE = (MID-PUMP RATE OF WELL) x 150 MIN.

As an example utilizing Option A, if you are designing a 4-connection system and the pump rate of your well is 20 gpm, you will need (21 gpm - 20 gpm) x 150 minutes = 150 gallons of storage.

OPTION B: EQUALIZING STORAGE = (MID-PUMP RATE OF WELL) X 20 MIN.

Utilizing Option B, if you are designing a 4-connection system and the pump rate of your well is 20 gpm, you will need (26.3 gpm - 20 gpm) x 20 minutes = 126 gallons of storage.

If storage is required, complete PART G - 2 on page 14 of the workbook.

1. PRESSURE TANKS

When pressure tanks are utilized, they must be of a type approved by the American Society Of Mechanical Engineers (ASME), or built to ASME standards in order to avoid danger of explosion. Whenever a pressure tank is installed, an ASME pressure relief valve must also be installed.

Pressure tanks can be used in a system to provide pump protection from excessive cycling. (By storing (air) pressure and some water (a portion of which is called *working storage*, i.e.the volume that can be withdrawn between pumping cycles) in your system, they eliminate the need for your pump to turn on every time a small amount of water is used.

A pressure tank is generally used for pump protection. In system of nine or fewer connections, where only a **limited** amount of storage is necessary, storage can sometimes be provided by installation of additional pressure tanks.

There are two basic types of pressure tanks, classified as either "conventional" tanks or "bladder" tanks. Conventional tanks are those that allow air-water contact whereas bladder tanks have some type of membrane separating the air from the water. In either type, maintaining the proper air vs. water volume is important to the efficient operation of the tank. Some mechanism for recharging the pressure tank with air is needed. This is generally a system using a small compressor or snifter valve arrangement.

PRESSURE TANK SIZING

A. CONVENTIONAL TANKS:

In sizing conventional tanks, the working storage is first calculated, then a table will be used to select the actual pressure tank size.

(A) If a tank is sized for pump protection only, the following formula may be used: **WORKING STORAGE = (2.5 X PUMP RATE)**.

(B) When the tank is sized for pump protection and equalizing storage, the required equalizing storage (if it is not too much) becomes the *working storage* of the pressure tank and can be calculated using the larger of the value calculated in (A) or (B) **WORKING STORAGE = (MID - PUMP RATE) X 150** or **WORKING STORAGE = (MID - PUMP RATE) X 20**

Once a value for *working storage* volume has been determined (either A or B), refer to TABLE 4 to select the *actual storage* tank size. For the selected pressure range, select the value in the corresponding vertical working storage column. The top value in each box is the horizontal model, and the bottom value is the vertical type.

Before using this table you will need to determine what will be the minimum pressure setting. Minimum pressure setting (in psi) = [elevation difference from well head to point of delivery (in ft.) + maximum headloss in system (in ft.) + 70 ft. residual head] x .433. If this value is not an even increment of 10, select the next highest minimum pressure (example: min. press. setting = (0 + 9 + 70) x .433 = 34.2 psi so select 40/60 psi pressure range in TABLE 4.

Similarly, if you can't find the exact value you calculated for working storage in TABLE 4, it is suggested that you choose the next highest value in the table.

TABLE 7
AVAILABLE HORIZONTAL / VERTICAL COMMERCIAL TANK SIZES

PRESSURE RANGE LOW PRESSURE/ HIGH PRESSURE	WORKING STORAGE (A OR B) IN GALLONS											
	25	50	75	100	150	200	250	300	350	400	450	500
30 / 50 (psi)	109/ 93	223/ 186	333/ 296	370/ 370	594/ 594	749/ 749	965/ 965	1110/ 1110	1371/ 1371	1517/ 1517	1755/ 1755	1874/ 1874
40 / 60 (psi)	135/ 113	260/ 260	370/ 370	489/ 489	712/ 712	965/ 821	1160/ 962	1371/ 1183	1636/ 1371	1874/ 1636	2045/ 1874	2338/ 1993
50 / 70 (psi)	137/ 137	296/ 260	405/ 370	542/ 489	712/ 712	1089/ 962	1183/ 1183	1398/ 1398	1636/ 1636	1874/ 1874	2112/ 2112	2338/ 2338
60 / 80 (psi)	156/ 137	333/ 260	436/ 436	533/ 806	806/ 806	1089/ 1089	1371/ 1371	1636/ 1636	1874/ 1874	2112/ 2112	2609/ 2609	2632/ 2632

Example: Pump Rate = 25 gpm

For pump protection only (A) use formula
2.5 x 25 = 62.5 gal.
For seven connections, design flow is 27 gpm. Storage required is
(27 - 25) x 150 = 300 gal (B) (use larger value B)
For 40 / 60 psi pressure range, vertical tank selected is 1183 gallons.

B. BLADDER TANK SIZING:

Bladder tanks are mainly used for pump protection. The procedure for selecting or sizing bladder tanks differs from that used for conventional tanks in that the actual tank size is selected first and then the number of that size tank needed to provide pump protection is determined. The low operating pressure is calculated in a similar fashion as with conventional tanks, but the bladder tank must be precharged with air to a pressure 5 psi below the low operating (cut-on) pressure for the system.

The sizing equation for bladder tanks is:

$$T_B \geq \frac{R*Q}{N*V_B}$$

Where: V_B = the volume of an individual bladder tank, in gallons
T_B = number of bladder tanks of size V_B required
N = operating cycles of the pump per hour (use N = 4 for single phase, higher horsepower pumps but never greater than 6 unless larger values can be justified by documented manufacturers guarantees)
Q = the delivery capacity (pump rate) of your pump, in gallons per minute (values for R can be found in TABLE 5)

Example: pump rate = 25 gpm. Use N = 4. Tank desired is 86 gal. (one of the most common sizes available). For 40/60 psi pressure range (From table 5), R = 61.7.

T_B = 61.7 x [25/(4 x 86)]
= 4.48 (round off to next highest whole number)
= 5 Tanks Required

TABLE 8
VALUES OF R FOR VARIOUS MAXIMUM AND MINIMUM PRESSURE TANK RANGES

MAXIMUM PRESSURE (GAUGE)	55 p.s.i.	60 p.s.i.	65 p.s.i.	70 p.s.i.
MINIMUM PRESSURE (GAUGE)	**R**			
35 p.s.i.	58.1	49.8	44.3	40.4
40 p.s.i.	76.7	61.7	52.6	46.6
45 p.s.i	114.1	81.5	65.2	55.5
50 p.s.i.	226.6	121.4	86.4	68.8

2. **STORAGE TANKS:** **(NOTE: If system design requires nonpressurized storage, the system must be designed by a licensed Professional Engineer.)**

All storage tanks, distribution lines, and other surfaces of a public water system in direct contact with water must be constructed of materials that will not impart contaminants or impurities indirectly into the water. As a result, all system components must meet the requirements of either of the following two alternatives:

1. Product acceptability shall be established under the applicable ANSI/NSF Standard 60 or 61 and be certified to that effect by an ANSI-accredited listing agency, or;

2. Product shall have appeared on the final (May 8, 1989) EPA advisory listing entitled, "Report on Acceptable Drinking Water Additives".

Part H: TREATMENT

For information on chlorination or other treatment systems to be included in the water system, please contact the department.

If treatment equipment is provided, measures will be required to insure that the equipment is properly maintained and monitored. For all treatment systems an Operation and Maintenance (O&M) manual and the appropriate test kits will also be required.

Part I: DISTRIBUTION SYSTEM

In this section a sketch or system diagram is to be provided in order to determine the location of the various system components and their relation to each other. This sketch or diagram must be as accurate and complete as possible in order to determine that the system was properly designed and located. The sketch or diagram must include the items listed in Part I of the workbook.

With reference to the construction of the distribution system, all pipe, fittings, valves, and fire hydrants (if required) shall conform to the latest standards issues by the AWWA and/or NSF (i.e. AWWA Standards C900-89, C907-91, etc.). Special attention shall be given to selecting pipe materials which will protect against both internal and external pipe corrosion. Pipes and pipe fittings containing more than 8% lead shall not be used. All products shall comply with ANSI/NSF standards.

The installation of all components of the distribution system must be accomplished according to good engineering practices as identified in manuals such as AWWA Manual 23, PVC Pipe - Design and Installation, the Pacific Northwest AWWA Section's Cross-Connection Control Manual, and the AWWA Standards for Disinfecting Wells, Water Mains and Water Storage Facilities.

Part J: RELIABILITY

Owners of Group B public water systems shall ensure that their systems are constructed, operated and maintained to protect against failures. While it is hoped that the construction, operation, and maintenance of a Group B water system will minimize system failures, some system failures will occur. With this in mind, all Group B water system applicants must provide information on what provisions, if any, have been or will be made to ensure that their system is capable of providing an adequate quantity and quality of water in a reliable manner.

There are no requirements in WAC 246-291 which compel the owner of a Group B water system to provide any type of system back-up in the event of a system failure. However, all source and booster pump facilities required for primary supply in an emergency should be equipped with auxiliary power or with power pigtail outlets and at least manual transfer switching devices. Customers of Group B water systems have a right to know about the reliability of their system during periods of power outages, pump failures, or other system component failures.

APPENDIX III

INFORMATION RECORDED ON PROPERTY TITLES

As a condition of system approval, certain documents must be recorded on property titles. These fall into two broad categories, including protective covenants and informational notices. Additionally, we recommend that ownership and maintenance agreements be recorded.

PROTECTIVE COVENANTS are required to prohibit placing certain potential sources of contamination in the vicinity of ground water and GWI sources in accordance with the provisions of WAC 246-291-100(2)(h) or WAC 246-291-110(3)(f)(ii), respectively. For the property containing the well, use the *Declaration of Covenant* form. Use the *Restrictive Covenant* form for any adjacent property(ies) which are within the required area of protection.

INFORMATIONAL NOTICES are to be recorded for each property which will be served by the public water system. This is intended to provide basic information which will be useful to future property owners. The *Notice To Future Property Owners* form is to be used for this purpose. This form may be recorded with the joint Use and Maintenance Agreement.

NOTICE TO FUTURE PROPERTY OWNERS

This property is served by a public water system which is subject to the provisions of Chapter 246-291 WAC. This system may also be subject to other state and local regulations. The system owner is responsible for maintaining this system in compliance.

The name of this system is:_____

The state Department of Health and local health departments share administration of the drinking water regulations. Therefore, when the term "department" is used, it refers to whichever agency regulates this particular system. You can contact the local health department to find out which agency is applicable.

This water system is designed to provide for _____ services. Additional planning and design approvals must be obtained from the department prior to expanding beyond this number of services. Please note that the design flow standards account for domestic use and watering of a typical lawn and garden space only. The design assumes that all residences will be equipped with ultra low flow plumbing fixtures and that all users will keep conservation in mind whenever they use this system. Additionally, if system wide water use exceeds 5000 gallons per day or if the total property being irrigated by the system exceeds 1/2 acre, a water right permit must be obtained from the Department of Ecology.

Public water systems are subject to on-going requirements. These include periodic water quality monitoring, system maintenance and various record keeping. Prior to purchasing this property, it is recommended that you contact the department to determine whether this system is in compliance with applicable regulations. Fees may be charged by the department for providing various services.

The department maintains current information on this system to expedite retrieval of information for your use or for lending institutions which require information on the system as part of their loan approval process. Each time information changes, such as a change in the number of homes connected to the system; a change in owner/operator name, address or phone number; etc., the owner of your system must submit an updated *Water Facilities Report Form* to the department.

Group B public water systems are not required to have back-up facilities to cover power outages or other system failures. Contact the system owner for information regarding the reliability of this system.

This system (has/has not) been granted one or more waivers from specific provisions of the regulations. (Attach a brief summary of waivers, if any, which were granted.)

At the time this system is fully developed, the financial plan indicates an average cost of _____/year per home to properly operate and maintain the system in compliance with state and local drinking water regulations. Current information on costs is available from the system owner.

The department recommends and may require ownership and/or operation by a state-approved satellite management agency.

DECLARATION OF COVENANT

I (we) the undersigned, owner(s) in fee simple of the land described herein, hereby declare this covenant and place same on record.

I (we) the grantor(s) herein, am (are) the owner(s) in fee simple of (an interest in) the following described real estate situated in _____ County, State of Washington; to wit: _____
_____

on which the grantor(s) owns and operates a well and waterworks supplying water for public use located on said real estate, at: _____
_____

and grantor(s) is (are) required to keep the water supplied from said well free from impurities which might be injurious to the public health.

It is the purpose of these grants and covenants to prevent certain practices hereinafter enumerated in the use of said grantor(s) water supply.

NOW, THEREFORE, the grantor(s) agree(s) and covenant(s) that said grantor(s), his (her) (their) heirs, successors and assigns will not construct, maintain, or suffer to be constructed or maintained upon the said land of the grantor(s) and within 100 (One Hundred) feet of the well herein described, so long as the same is operated to furnish water for public consumption, any potential source of contamination, such as septic tanks and drainfields, sewerlines, underground storage tanks, roads, railroad tracks, vehicles, structures, barns, feed stations, grazing animals, enclosures for maintaining fowl or animal manure, liquid or dry chemical storage, herbicides, insecticides, hazardous waste, or garbage of any kind or description.

These covenants shall run with the land and shall be binding to all parties having or acquiring any right, title, or interest in the land described herein or any part thereof, and shall inure to the benefit of each owner thereof.

WITNESS _____hand _____this _____day of _____, 19____.

_____(Seal)

_____(Seal)
Grantor(s)

State of Washington)
County of_____)

I, the undersigned, a Notary Public in and for the above named County and State, do hereby certify that on this _____day of _____, 19_____, personally appeared before me _____ to me known to be the individual described in and who executed the within instrument, and acknowledge that he (they) signed and sealed the same as free and voluntary act and deed, for the uses and purposes therein mentioned.

GIVEN under my hand and official seal the day and year last above written.

_____
Notary Public in and for the State of Washington, residing at _____
My Commission Expires: _____

RESTRICTIVE COVENANT

The grantor(s) herein is (are) the owner(s) of (an interest in) the following described real estate situated in _____ County, State of Washington:_____
_____

The grantee(s) herein, _____, own(s) and operate(s) a well and waterworks supplying water for public use, located upon the following described real estate situated in _____ County, State of Washington:
_____
_____

which well and waterworks is in close proximity to the land of the grantor(s), and said grantee(s) is (are) required to keep the water supplied from said well free from impurities which might be injurious to the public health.

It is the purpose of these grants and covenants to prevent certain practices hereinafter enumerated in the use of the said grantor(s) land which might contaminate said water supply.

NOW, THEREFORE, the grantor(s) agree(s) and covenant(s) that said grantee(s), its successors and assigns said covenants to run with the land for the benefit of the land of the grantee(s), that said his (her) grantor(s), (their) heirs, successors and assigns will not construct, maintain, or suffer to be constructed or maintained upon the said land of the grantor(s) and within 100 (One Hundred) feet of the well herein described, so long as the same is operated to furnish water for public consumption, any potential source of contamination, such as septic tanks and drainfields, sewerlines, underground storage tanks, roads, railroad tracks, vehicles, structures, barns, feed stations, grazing animals, enclosures for maintaining fowl or animal manure, liquid or dry chemical storage, herbicides, insecticides, hazardous waste, or garbage of any kind or description.

These covenants shall run with the land and shall be binding to all parties having or acquiring any right, title, or interest in the land described herein or any part thereof, and shall inure to the benefit of each owner thereof.

WITNESS _____hand _____this _____day of _____, 19____.

_____(Seal)

_____(Seal)
Grantor(s)

State of Washington)
County of_____)

I, the undersigned, a Notary Public in and for the above named County and State, do hereby certify that on this ____ day of _____, 19_____, personally appeared before me _____ to me known to be the individual described in and who executed the within instrument, and acknowledge that he (they) signed and sealed the same as free and voluntary act and deed, for the uses and purposes therein mentioned.

GIVEN under my hand and official seal the day and year last above written.

_____
Notary Public in and for the State of Washington, residing at _____
My Commission Expires:_____