APPENDICES

A Public Water System Coordination Act

- **A.1** Sample letter to request water service for a Group B project located inside a Critical Water Supply Service Area and a water utility's future service area (Section 2.4)
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B Sample letter requesting the services of a Satellite Management Agency (Section 2.5)

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Appendix A.1

Sample Letter to Request Water Service
Group B Project Located in a Critical Water Supply Service Area and Inside a Water Utility's Future Service Area
(See Section 2.4)

Date

Dear Local Purveyor,

I am pursuing approval of a project that requires approval of a new public water system, or approval of an existing public water system not yet approved by either the local health jurisdiction or the state Department of Health.

Under the Public Water System Coordination Act, I am required to request water service from you because my project lies within your utility's future service area. Details concerning my project, including its exact location and its water supply and fire suppression requirements, are attached for your reference.

Please provide me with a written response to my request for water service within 30 days of the date of this letter. In your response, please let me know if your utility can provide water service. If not, I will proceed with the design and/or approval of a Group B public water system.

If there are requirements that my project connect with your utility in the future, when such a connection is feasible, please provide me with whatever legal agreement you require me to sign before I may operate a new public water system within your future service area.

If you have any questions, please contact me at _____ or _____ .

Thank you in advance for your response to this inquiry.

Sincerely,

Appendix A.2

Sample Letter to Request Water Service
Group B Project Located in a Critical Water Supply Service Area and Outside any Water Utility's Future Service Area
(See Section 2.4)

Date

Dear Local Purveyor,

I am pursuing approval of a project that requires approval of a new public water system, or approval of an existing public water system not yet approved by either the local health jurisdiction or the state Department of Health.

Under the Public Water System Coordination Act, I am required to request water service from the nearest water supplier when my project is located outside of any purveyor's future service area. Details concerning my project, including its exact location and its water supply and fire suppression requirements, are attached for your reference.

Please provide me with a written response to my request for water service within 30 days of the date of this letter. In your response, please let me know if your utility can provide water service. If not, I will proceed with the design and approval of a Group B public water system.

If you have any questions, please contact me at _____ or _____ .

Thank you in advance for your response to this inquiry.

Sincerely,

Appendix B

Request for Satellite Management Services
(See Section 2.5)

Date

Dear Satellite Manager,

I am pursuing approval of a project that requires approval of a new public water system, or approval of an existing public water system not yet approved by either the local health jurisdiction or the state Department of Health.

Under the Satellite System Management Agency regulations, I am required to obtain the services of an approved satellite management agency (SMA) to own or operate my water system, if one is available. In order to gain approval of my water system without the services of an SMA, I must demonstrate that I have requested SMA services from all approved SMAs in my project area, and each SMA has declined my request for service.

Please provide me with a written response to my request for SMA services within 30 days of the date of this letter. In your response, please let me know if you can provide ownership or management services.

If you are available to provide SMA services to my water system, please provide me with information about the scope and cost of your services. I will consider your information as I explore all my options for compliance with the SMA requirement.

If you are not available to provide SMA services to my water system, please send me a note with your SMA name, signature, and date, and reference to this letter.

If you have any questions, please contact me at _____ or _____ .

Thank you in advance for your response to this inquiry.

Sincerely,

Appendix C

Informational Notice to Titles on Property Served

(See Section 2.6)

The Washington State Department of Health and local health jurisdictions share administration of drinking water regulations. Contact your local health jurisdiction to determine which agency has administrative responsibility at this time.

This property is served by a Group B public water system that received (check box that applies):

☐ Design approval under chapter 246-291 Washington Administrative Code from the Washington Department of Health

☐ Design approval under Lewis County Code 8.55. from Lewis County Public Health and Social Services

When this water system was approved:

Water System Name	
Water System Identification Number	
Water System Owner and address	

Record the parcel numbers of all parcels approved to be served by this water system:

1.	6.
2.	7.
3.	8.
4.	9.
5.	

There are legal limits on the volume of water that can be withdrawn from the ground, and there may be limits on the total area that can be irrigated from this water system. Based on the design of this water system, each of the above parcels is permitted to irrigate no more than _____ square feet of lawn and garden. This limitation runs with the land and is not transferable to another property.

This water system has been granted one or more exceptions from specific provisions of the regulations, or a waiver (check all boxes that apply):

☐ No exceptions or waivers were granted

☐ A reduction in sanitary control area from 100 feet to _____ feet was approved

☐ An exception or waiver was granted (describe) _____

_____

The capacity of the water supply for this water system was tested and (check the box that applies):

☐ Determined to yield more than 5 gallons per minute

☐ Determined to yield 5 gallons per minute or less, and a low water supply contingency plan is available for review.

Some small water systems are required by the local fire authority to provide fire suppression capacity. This water system (check box that applies):

☐ Is designed and constructed to provide fire suppression

☐ Is not designed and constructed to provide fire suppression

Ownership and/or operation and management by a Satellite Management Agency (SMA) was required at the time this water system was approved, provided an SMA was available at the time of approval (check box that applies).

☐ The name of the SMA is: _____.

☐ No SMA was available when this water system was approved. This requirement may be applied at any time in the future.

When this water system was approved, the financial plan indicated the following water rate structure would be implemented (check all boxes that apply):

☐ All customers are metered

☐ Water will be billed based on metered use

☐ Water bills will be issued every _____ months.

☐ The water rate will be $_____ every billing cycle, plus $_____ per _____ 1,000 gallons/100 cubic feet (circle one)

☐ The method for establishing the annual water system budget is attached.

☐ The process for funding a water system reserve account is attached.

☐ Other _____

Routine water quality sampling is required. At the time of approval, the owner of the water system (check box that applies):

☐ Intends to conduct the following required routine water quality sampling:

Analyte and Location	Frequency	Reporting Results
e.g., coliform bacteria in the distribution system	*e.g., every twelve months*	*e.g., by phone within 24 hours*

Source approval – Primary MCLs: (check box that applies)

☐ During development the source **did not indicate a primary contaminant** (i.e., a contaminant that is known to affect human health, such as bacteria or nitrate) **and is not treated**.

☐ During development the source indicated a primary contaminant, the proposed system demonstrated compliance with LCC8.55.140(5) and the source **is treated**. The primary contaminant(s) that is being removed or inactivated is:

_____

Source approval – Secondary MCLs:

☐ The source <u>is not</u> treated for a secondary contaminant (i.e., a contaminant that impacts the aesthetic quality of the water, but is not known to affect human health, such as iron or manganese).

☐ The source <u>is</u> treated for a secondary contaminant. The secondary contaminant being removed is from the well is _____

Describe the public notification procedure(s) that will be used to communicate with customers:

☐ By phone or email (assumes the maintenance of an accurate phone or email list)

☐ By posting to each customer's property (door hanger)

☐ Other: _____

Appendix D1

DECLARATION OF COVENANT

Public Well

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 Lewis County, State of Washington; to wit: (Insert tax parcel number and full legal description.)

_____

_____

_____

On which the grantor(s) owns and operates a well supplying water for public use located on said real estate, at: (Please describe the exact location of the well, referring to the example provided, if necessary.)

_____

_____

_____

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 practice hereinafter enumerated in the use of said grantor(s) water supply.

NOW, THEREFORE, the grantor(s) agree(s) and covenant(s) that the 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 drain fields, sewer lines, 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.

Signed: _____ _____

Grantor(s)

Print Name: _____ _____

State of Washington)

)ss

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 _____, 20____, personally appeared before me _____ to me known to be the individual(s) described in and who executed the within instrument, and acknowledge that he (she) (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 in:_____

My Commission Expires: _____

RESTRICTIVE COVENANT

Public Well

The grantor(s) herein, is (are) the owner(s) of (an interest in) the following described real estate situated in Lewis County, State of Washington; to wit: (Insert tax parcel number and full legal description of parcel adjacent to well.)

_____

_____

_____

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 Lewis County, State of Washington, to wit:
(Include tax parcel number, full legal description, and exact location of the well relative to property lines.)

_____

_____

_____

_____

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 practice hereinafter enumerated in the use of said grantor(s) water supply.

NOW, THEREFORE, the grantor(s) agree(s) and covenant(s) that said grantee(s), his (her) (their) successors and assigns, said covenants to run with the land for the benefit of the land of the grantee(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 drain fields, sewer lines, 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.

Signed: _____ _____
Grantor(s)

Print Name: _____ _____

State of Washington_____)
)ss
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 _____, 20____, personally appeared before me _____ to me known to be the individual(s) described in and who executed the within instrument, and acknowledge that he (she) (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 in:_____
My Commission Expires: _

Group B Water Facilities Inventory (WFI) Form

INSTRUCTIONS (See WFI Form on Page 82)

Cross out outdated information on the WFI, and then write corrections in any adjacent space available

	Field Number and Field Name	Instruction
ADDRESSES & PHONE NUMBERS	**6. PRIMARY CONTACT NAME & MAILING ADDRESS**	Enter the name of the person we should contact about the water system's day-to-day operations. Most DOH mailings will be sent to this person. Enter only the mailing address in this part of the box Do **not** combine a PO Box with a street address). Enter the *Physical Delivery Address* for the contact person if it is different than the normal mailing address. (This address will be used to ship sampling containers or other materials that cannot be delivered to a P.O. Box). Example: Name & Mailing Address ANN SMITH ATTN (optional) P O BOX 3030 ANYTOWN WA 98000 Physical Delivery Address, if different from Above ATTN (Optional) 1231 MAIN ST ANYTOWN WA 98000
	7. OWNER NAME & MAILING ADDRESS	Enter the name of the person or organization that is the legal owner of the water system. Follow the directions and example in field 6 (above). I*f the owner is an organization, you must list an individual as the contact for the organization.*
	9. 24 HOUR PRIMARY CONTACT INFORMATION	Enter phone and fax numbers including area code (and extension, if applicable) for the primary contact for the water system. The email address may be for the system or the primary contact.
	10. OWNER CONTACT INFORMATION	Enter the phone and fax numbers including area code (and extension, if applicable) for the owner of the water system.
CHECK BOXES	**11. SATELLITE MANAGEMENT AGENCY (SMA)**	If the system is NOT owned or managed by a Satellite Management Agency (SMA), check "Not Applicable" and go to12. If the system IS owned or managed by a SMA, check the applicable box and enter the name of the SMA. *The SMA number is assigned by DOH*.
	12. WATER SYSTEM CHARACTERISTICS	Mark **ALL** boxes that apply to your system. You may check more than one box for each service. For example, a restaurant may be "Food Service" and "Commercial." * **Agricultural:** Commercial crop irrigation/Farming * **Commercial / Business:** Office & retail complexes, nurseries, golf courses. * **Day Care:** Child or adult care facilities (in home or stand alone where the clients do not live 24 hrs. per day). * **Food Service/Food Permit:** Restaurant, coffee shop, bakery, tavern, catering facility, deli, grocer, mini-mart. * **1,000 or more person event for 2 or more days per year:** Major event that significantly effects your system, such as a fair, town festival, or major concert. * **Hospital/Clinic**: Medical / Dental office or clinic, Surgery Center, Emergency Care Facility. * **Industrial:** Manufacturing, assembly facility, food processing facility. * **Licensed Residential Facility:** Nursing home, adult boarding home, foster home. * **Lodging:** Hotel, motel, inn, bed and breakfast, resort. * **Recreational / RV Park:** Connections serving parks, beaches, ball fields, playground, campgrounds, picnic areas, ski areas, transient recreational vehicle facilities. * **Residential:** Units designed to house one or more family (such as single family houses, apartments, duplexes, condominiums, mobile home parks, etc.) no matter how many days per year they are occupied. * **School:** K-12 grades, community college, technical training facility, colleges. * **Temporary Farm Worker Housing / Labor Camp:** Facility that provides temporary facilities for workers and their families. May or may not meet the criteria for DOH Temporary Worker Housing licensing. * **Other:** If choosing "other," please write a brief description in the blank provided (fire station, fraternal organization, grange).

	13. WATER SYSTEM OWNERSHIP	*Mark only one* type of organization that best describes the owner of the water system. **Association:** A non-government water system owned by its consumers (sometimes called "members"). It includes "mutual" water companies. **City / Town:** A city or town that has been in**c**orporated according to the applicable RCW. **County:** A water system owned by county government, such as a county park, or public works maintenance facility. **Federal:** A water system owned by the federal government, such as a veterans' hospital, national park, forest service facility. **Investor:** A privately owned water system operated with the intent of making profit. The owner may be regulated (or potentially regulated) by the Washington Utilities and Transportation Commission (WUTC). **Private:** A privately owned water system, not including Associations, that is not operated with the intent of making a profit. Examples are water systems serving mobile home parks, stores, industries, and so on. **Special District:** A special purpose district created according to applicable RCW, such as a Water or Sewer District, Public Utility District, School District, Fire District or Port District. **State:** A water system owned by the state, such as a state park, correctional facility, or a Department of Transportation rest area or maintenance facility.
	14. STORAGE CAPACITY	Enter the total storage capacity (in gallons) available for distribution to users (if 1,000 gallons or greater). Do not include pressure tank(s) in the total.
SOURCES	**16. SOURCE NAME**	Enter your name for the source (such as, Park Well). If the source is purchased or an intertie, list the name of the system providing the water. Each well in a well field or spring in a spring field must be identified. Please provide Well Tag number if available.
	17. INTERTIE	Enter the ID number of the system providing purchased water or intertie. If you do not know the ID number, contact your DOH regional office.
	18. SOURCE CATEGORY	Mark the box that best describes this source. Each source can have only one code. Each well in a well field, and spring in a spring field must be identified individually.
	19. USE	Mark the box that best describes how this source is used. **Permanent:** A source that is used regularly each year for more than 3 consecutive months within a 12-month period. For systems that are in operation for 3 or less months, their sources shall also be considered permanent. **Seasonal:** A source that is used on a regular basis and does not meet the definition of either permanent or emergency source. Seasonal source *could* be used to supply peak demand. **Emergency:** A *s*ource that has been approved by DOH for emergency use and is *not* used for routine or seasonal peak water demands.
	20. SOURCE METERED	Mark this box if this source has a water meter installed.
	21. TREATMENT	If this source is not treated, mark "none," otherwise mark the box(es) for each type of treatment provided for this source. If a well in a well field or a spring in a spring field has its own individual treatment, mark the appropriate box. If all the wells in a well field or springs in a spring field are treated together at one location, mark the appropriate box on the well or spring field line. Treatment for an intertie refers only to additional treatment by the receiving system.
	22. DEPTH TO FIRST OPEN INTERVAL	For cased wells, enter depth to top of uppermost well screen or perforated casing; for wells completed in rock, enter depth to bottom of sealed casing; for dug wells, enter depth to first unsealed casing joint below the well seal; and for well fields, enter depth of shallowest well. Round off to the nearest whole number.
	23. CAPACITY	Enter the actual current capacity of the source, in gallons per minute (gpm) that is available to enter the distribution system under operating conditions. For example, if the source is a well with a pump test of 100 gpm, but only has a 20-gpm pump installed, enter 20 gpm.
	24. SOURCE LOCATION	Enter the quarter / quarter designation, section number, township and range location for each source. For Example, SE/SW, Sec.1, T18N, R3E. Source locations can be found on well logs, water right documents, or property descriptions.

CON	**25-A. FULL TIME SINGLE-FAMILY RESIDENCES**	Enter the number of single-family residences (including mobile homes) occupied any 180 days or more a year that are served by the water system. If you enter a number in this field, you also need to enter a number for the corresponding population residing in these connections in field 29. A connection is considered active until it is physically disconnected from the water system.

	25-B. PART TIME SINGLE-FAMILY RESIDENCES	Enter the number of single-family residences (including mobile homes) occupied less than 180 days a year that are served by the water system. (These part-timers most likely inhabit vacation homes that are not used as a primary residence) If you enter a number in this field, you also need to enter data for the corresponding population residing in these connections in rows 30A and 30B. A connection is considered active until it is physically disconnected from the water system.	
	26-A. APARTMENT BUILDINGS, CONDOS, OTHER MULTIFAMILY BUILDINGS, BARRACKS, DORMS	Enter the number of apartment buildings, condominium buildings, duplex buildings, barracks, and dormitory buildings, and so on served by your water system.	
	26-B. FULL TIME RESIDENTIAL UNITS	*If the water system serves multifamily residential buildings*, enter the total number of residential units that are occupied any 180 days or more a year. If you enter a number in this field, you also need to enter a number for the corresponding population residing in these connections in field 29.	
	26-C. PART TIME RESIDENTIAL UNITS	*If the water system serves multifamily residential buildings*, enter the number of individual dwelling units that are occupied less than 180 days a year. If you enter a number in this field, you also need to enter data for the corresponding population residing in these connections in rows 30A and 30B.	
	27-A. RECREATIONAL SERVICES OR TRANSIENT ACCOMMODATIONS CALL YOUR REGIONAL OFFICE IF YOU ARE UNSURE WHETHER YOURS IS A COMMUNITY, NONCOMMUNITY, OR GROUP B SYSTEM	**COMMUNITY SYSTEMS**: Leave this field empty. Include in field 27B the actual number of RV parks, campgrounds, hotels, motels, and so on served.	**NONCOMMUNITY and GROUP B SYSTEMS**: Enter the actual number of RV sites, campsites, spigots, etc., and hotel/motel/overnight units that are served by the water system. Enter the corresponding nonresidential population and use-days in rows 31A and 31B.
	27-B. INSTITUTIONAL, COMMERCIAL, OR INDUSTRIAL SERVICES	**COMMUNITY SYSTEMS**: Enter the number of all service connections not used for residential purposes. Include RV parks, campgrounds, hotels, motels, etc. in your count of commercial connections. If you enter a number in this field, enter the corresponding non-resident population and use-days in rows 31A, 31B, 32A, and 32B.	**NONCOMMUNITY and GROUP B SYSTEMS**: Enter the number of all service connections not used for residential purposes and not otherwise accounted for in field 27A. If you enter a number in this field, enter the corresponding non-resident population and use-days in rows 31A, 31B, 32A, and 32B.
POPULATIONS	**29. FULL TIME RESIDENTIAL POPULATION**	Enter the total number of residents that are served by the water system for any 180 days or more per year.	
	30-A. PART TIME RESIDENTS PER MONTH	Enter the ***TOTAL*** number of seasonal or weekend residents that are present ***each month***. (These part-timers most likely inhabit vacation homes that are not used as a primary residence).	
	30-B. PART TIME RESIDENT USE DAYS PER MONTH	Enter how many days part-time residents are present each month.	
	31-A. TEMPORARY & TRANSIENT USERS PER MONTH	Enter the ***TOTAL*** number of temporary or transient users served by the water system ***each month***. This includes all visitors, attendees, travelers, campers, patients, or customers with access to establishments connected to the water system. *Visitors must be counted for every day that they have access to the water system. For example, an individual attending a weeklong camping session (seven days) must be counted seven times.*	
	31-B. TEMPORARY & TRANSIENT USE DAYS PER MONTH	Enter the TOTAL number of **days per month** this system is accessible or available to the public.	
	32-A. REGULAR NONRESIDENTIAL USERS PER MONTH	Enter the number of students, daycare children, and all employees that are served by the water system during each month.	
	32-B. REGULAR NONRESIDENTIAL USE DAYS PER MONTH	Enter the number of **days per month** that students, daycare children, and employees have access to the water.	
SIGNATURE	**35. REASON FOR SUBMITTING THE WFI**	Check the appropriate box. If you are submitting this WFI as requested by DOH, please refer to the instructions in the letter.	
	36. CERTIFICATION	Please sign and print your name and the date you are signing the WFI. Please include your title or relationship with this water system.	

Group B Water Facilities Inventory (WFI) Form

ONE FORM PER SYSTEM

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE

6. PRIMARY CONTACT NAME & MAILING ADDRESS	7. OWNER NAME & MAILING ADDRESS	8. Owner Number:
ORGANIZATION NAME	ORGANIZATION NAME	
PRIMARY CONTACT NAME TITLE:	NAME TITLE:	
ADDRESS	ADDRESS	
CITY STATE ZIP	CITY STATE ZIP	
STREET ADDRESS IF DIFFERENT FROM ABOVE	**STREET ADDRESS IF DIFFERENT FROM ABOVE**	
ADDRESS	ADDRESS	
CITY STATE ZIP	CITY STATE ZIP	

9. 24-HOUR PRIMARY CONTACT INFORMATION		10. OWNER CONTACT INFORMATION	
Primary Contact Daytime Phone:		Owner Daytime Phone:	
Primary Contact Evening Phone:		Owner Evening Phone:	
Primary Contact Mobile/Cell Phone:		Owner Mobile/Cell Phone:	
Fax:	Email:	Fax:	Email:

LCC8.55 requires water systems to provide 24-hour contact information for emergencies.

11. SATELLITE MANAGEMENT AGENCY – SMA (check only one)

☐ **Not applicable (Skip to #12)**
☐ **Owned and Managed** **SMA NAME:**_____ **SMA Number:** _____
☐ **Managed Only**

12. WATER SYSTEM CHARACTERISTICS (mark ALL that apply)

☐ **Agricultural**	☐ **Hospital/Clinic**	☐ **Residential**
☐ **Commercial / Business**	☐ **Industrial**	☐ **School**
☐ **Day Care**	☐ **Licensed Residential Facility**	☐ **Temporary Farm Worker**
☐ **Food Service/Food Permit**	☐ **Lodging**	☐ **Other (church, fire station, etc.):**
☐ **1,000 or more person event for 2 or more days per year**	☐ **Recreational / RV Park**	_____

13. WATER SYSTEM OWNERSHIP (mark only one)

☐ **Association**	☐ **County**	☐ **Investor**	☐ **Special District**
☐ **City / Town**	☐ **Federal**	☐ **Private**	☐ **State**

14. STORAGE CAPACITY (gallons)

15.	16. SOURCE NAME	17. INTERTIE	18. SOURCE CAPACITY										19. USE			20.	21. TREATMENT						22. DEPTH	23.	24. SOURCE LOCATION			
	LIST UTILITY'S NAME FOR SOURCE AND WELL TAG ID NUMBER. Example: WELL #1 XYZ456 IF SOURCE IS PURCHASED OR INTERTIED, LIST SELLER'S NAME Example: SEATTLE	INTERTIE SYSTEM ID NUMBER	WELL	WELL FIELD	WELL IN A WELLFIELD	SPRING	SPRING FIELD	SPRING IN A SPRINGFIELD	SEAWATER	SURFACE WATER	RANNEY INF. GALLERY	OTHER	PERMANENT	SEASONAL	EMERGENCY	SOURCE METERED	NONE	CHLORINATION	FILTRATION	FLUORIDATION	IRRADIATION (UV)	OTHER	(DEPTH TO FIRST OPEN INTERVAL)	CAPACITY GALLONS PER MINUTE	¼, ¼ SECTION	SECTION NUMBER	TOWNSHIP	RANGE
S01																												
S02																												
S03																												
S04																												
S05																												
S06																												
S07																												

	ACTIVE SERVICE CONNECTIONS	DOH USE ONLY! CALCULATED ACTIVE CONNECTIONS	DOH USE ONLY! APPROVED CONNECTIONS
25. SINGLE FAMILY RESIDENCES (How many of the following do you have?)			
A. Full Time Single Family Residences (Occupied 180 days or more per year)			
B. Part Time Single Family Residences (Occupied less than 180 days per year)			
26. MULTIFAMILY RESIDENTIAL BUILDINGS (How many of the following do you have?)			
A. Apartment Buildings, condos, duplexes, barracks, dorms			
B. Full Time Residential Units in Apartments, Condos, Duplexes, Dorms that are occupied more than 180 days/year			
C. Part Time Residential Units in the Apartments, Condos, Duplexes, Dorms, that are occupied less than 180 days/year			
27. NONRESIDENTIAL CONNECTIONS (How many of the following do you have?)			
A. Recreational Services (Campsites, RV Sites, Spigots, etc.)			
B. Institutional, Commercial/Business or Industrial Services			
28. TOTAL SERVICE CONNECTIONS			

29. FULL-TIME RESIDENTIAL POPULATION

How many residents are served by this system 180 or more days per year? _____

30. PART-TIME RESIDENTIAL POPULATION	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**
A. How many part-time residents are present each month?												
B. How many days per month are they present?												
31. TEMPORARY & TRANSIENT USERS	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**
A. How many total visitors, attendees, travelers, campers, patients, or customers have access to the water system each month?												
B. How many days per month is water accessible to the public?												
32. REGULAR NONRESIDENTIAL USERS	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**
A. If you have schools, daycares, or businesses connected to your water system, how many students, daycare children, or employees are present each month?												
B. How many days per month are they present?												

Comments:

33. ROUTINE COLIFORM SCHEDULE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

34. GROUP B NITRATE SCHEDULE	QUARTERLY	ANNUALLY	ONCE EVERY 3 YEARS
	N/A	N/A	N/A

35. REASON FOR SUBMITTING WFI:

☐ **New System** ☐ **Other**_____

36. I CERTIFY THAT THE INFORMATION STATED ON THIS WFI FORM IS CORRECT TO THE BEST OF MY KNOWLEDGE.

SIGNATURE: _____ **DATE:** _____

PRINT NAME: _____ **TITLE:** _____

Group B Pump Test Guidance

Objective: To demonstrate that a proposed well (or wells) can provide sustainable and reliable water production equal to or exceeding the minimum supply requirements needed to supply the proposed number of water systems connections (LCC8.55.110(3)(d)). A pump test is the best way to demonstrate this. A pump test is a well and localized aquifer stress test. It involves recording and evaluating periodic measurement of pumping rate and water level changes during a series of controlled pump and recovery ("rest") test cycles. The results show how both the well and the localized aquifer react to periods of intense pumping. Evaluating the degree of water level drawdown and the rate of water level recovery helps to characterize the aquifer's yield and establish optimal well pump placement and operating conditions.

When executed correctly, a pump test provides sufficient information to demonstrate the capacity of a well or collection of wells to produce enough water in a 24-hour period to service the water system as designed.

- A successful pump test must show the proposed well (or combination of wells) can provide a sustainable and reliable production of water (yield) equal to or exceeding the minimum supply requirements in LCC8.55.110(3)(d) and recover to pre-pumping level within a normal 24-hour operational period.
- A failed pump test is one that cannot demonstrate the required level of production and recovery within a normal 24-hour operational period.

Part 1: Select and Run a Recommended Group B Pump Test

Pump Test Procedure	Recommended Conditions for Use
Standard Step Drawdown/Constant Rate Test See Appendix F-1	For sources located in: • Fractured rock, shale, bedrock, or hard rock (consolidated) aquifers. • Areas of known or suspected seawater intrusion. • Aquifers with highly variable seasonal water tables. • Aquifers with limited recharge. • An area with nearby large capacity wells that could affect local water levels and well yields.
Extended Step Drawdown Test See Appendix F-2	• Low projected water demand wells in a high-flow aquifer setting. • *Most common for small Group B systems with proposed wells in sand and gravel aquifers.*
Alternating Pump and Recovery Test See Appendix F-3	• Very small systems (2-6 connections) ***and*** • Very low flow aquifer conditions ***or*** • Failure on other tests

Part 2: Pump Test Report and Analysis:

The Pump Test Report (See Appendix F-4) documents the results of the pump tests, provides an analysis of the well, and localized aquifer responses to the challenge of sustained pumping. The engineer can use that data to estimate aquifer characteristics, and determine pump and well operational factors and well efficiency. Elements of a complete report should discuss:

- ✓ Well yield
- ✓ Expected operational drawdown
- ✓ Pumping rates and recommended pump operational cycles
- ✓ Recommended pump placement
- ✓ Estimate of well efficiency

- ✓ An estimate of the aquifer's specific yield, hydraulic conductivity, or transmissivity (to support evidence of sustainability and aquifer capacity consistent with proposed use of the well)

If a pump test is unable to demonstrate a clear sustained yield as defined above, then the engineer should re-run the test with different operational assumptions and conditions (lower pumping rate, add additional sources, or reduced total volume and associated connections). The engineer might need to consider using an alternative test.

Part 3: Additional considerations

- Low well yield contingency plan.
- Water quality test results.
- Risks of seawater intrusion (if appropriate).
- Reasons why stabilization was not achieved during testing.
- Well interference and well field considerations.

In challenging aquifer settings, a pump test can provide a starting point in the analysis and potential mitigation of any localized aquifer conditions that could adversely affect long-term use of the well (including concerns about saltwater intrusion, declining aquifer levels, consolidated and fracture rock aquifers, aquifers with limited recharge, and high seasonal water level variability). The pump test report is an appropriate place to highlight those issues and discuss supply-related options.

Part 4: Recommended Pump Test Procedures:

The following sections lay out step-by-step procedures for the three recommended pump tests. Site conditions and equipment must be factored into any pump test design and implementation. While we recommend these procedures, they are still guidelines so the engineer may modify them based on professional expertise, experience, and on-site conditions. The result should be a test, analysis and report that documents the sustainable use of the well as dictated by the water system design criteria and Lewis County Code.

In addition to the recommended pump test procedures, this Appendix includes data collection templates for both the drawdown and recovery phases of a pump test. A successful test will likely require multiple pages of each.

Examples of pump and recovery test data collected under the different test procedures are online at http://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/WaterSystemAssistance/GroupB/GroupBResources.aspx

Step Drawdown/Constant Rate Pump Test Procedure

Phase 1: Step Drawdown Pump Test

Objective: To evaluate well performance, and identify successful pumping conditions for phase 2 of the pump test (constant rate). This information will allow a determination of the optimal pump settings (depth and pumping rate) and well efficiency for the well.

Elements:

1. We recommend that a qualified water professional (hydrogeologist or engineer) oversee testing of the well and review data analysis and interpretations.
2. An access port to allow depth-to-water measurements **must** be installed, if not already present, and maintained (WAC 173-160-355).
3. The step drawdown test should include at least four consecutive constant rate discharge steps as described below, with a higher pumping rate used for each step. Each step should be at least 60 minutes long.
4. The third step of the drawdown test should use a flow rate no less than the minimum supply requirement in LCC8.55.110(3)(d). The remaining pumping rates should be determined by multiplying this flow rate (in gallons per minute) by 0.50, 0.75, and 1.25.
5. Drawdown should be measured in the pumped well at least as frequently as:

Time after pumping started	Time Intervals
0 to 10 minutes	1 minute
10 to 60 minutes	5 minutes
60 to 240 minutes	15 minutes
240 to 600 minutes	60 minutes
600 to 1,440 minutes	120 minutes

6. Recovery should be measured beginning at the end of the last step (immediately after the pump is turned off) and ending when the water level returns to at least 95 percent of the initial, pre-pumping static water level. Measurement frequency should follow the specifications in the table above measured from the moment when pumping stopped. Initial measurement intervals will be short and expand as recovery progresses. The pump should not be removed until the water level returns to 95 percent of the pre-pumping static water level.
7. Determine the maximum pumping rate and pumping depth as established from the step drawdown test. Use these values for conducting the constant rate discharge test, if the test is applicable.

Phase 2: Constant Rate Pump Test

Objective: To determine the capacity of the well and aquifer to provide a reliable yield of water at the desired rate. The pumping and recovery data from the test can be used to estimate aquifer transmissivity and a sustainable yield for the well. This test procedure is recommended for sources in complex hydrologic settings where the nature of the aquifer could adversely affect long-term continuous use of the source. Sources with the potential for seawater intrusion should also conduct the additional elements provided at the end of this document.

Elements:

1. We recommend that a qualified water professional (hydrogeologist or engineer) oversee testing of the well.
2. An access port to allow depth to water measurements **must** be installed, if not already present, and maintained (WAC 173-160-355).
3. The source should be pump tested at no less than the maximum rate determined from the step drawdown test. The constant rate discharge test should not be conducted until after the water levels in the aquifer have achieved at least 95 percent recovery from the step drawdown test pre-pumping static water level conditions.
4. The constant rate discharge test should be at least 24 hours long. If, at 24 hours, four hours of stabilized drawdown have been observed, the pump may be shut off and measurements of recovery begun. If stabilized drawdown has not been observed within a total of 36 hours, the pump may be shut off and recovery measurements begun. Stabilization is defined as a drop in water level of less than or equal to 0.1 feet per hour.
5. Drawdown should be measured in the pumped well at least as frequently as:

Time after pumping started	Time intervals
0 to 10 minutes	1 minute
10 to 60 minutes	5 minutes
60 to 240 minutes	30 minutes
240 to 600 minutes	60 minutes
600 to 1440 minutes	120 minutes

6. Water samples must be collected from the source using proper sampling procedures and analyzed by a DOH-certified laboratory. Water samples must be taken within the last 15 minutes of pumping and analyzed for the following water quality parameters:

   - Coliform (bacteria)

   - Inorganic Chemicals (IOCs)

   - Additional Volatile and/or Synthetic Organic Chemicals (VOCs /SOCs)*

**If required by the department because the well is in an area of known or expected contamination*

7. After pumping, recovery data should collected until 95 percent recovery of the pre-pumping static water level is achieved. Recovery should be measured in the same manner and at the same frequency as the table above. To facilitate accurate recovery data collection, the pump test piping should incorporate backflow check-valve(s) that prevent water within the riser pipe from flowing back into the well when the pump is shut off.

8. When the pumping test is completed, the data should be compiled into a report and submitted to the county. The report should include:
    a. All data on pumping rates and water levels (including static water levels) from the pumping test and recovery period, and appropriate graphical presentations of the data.
    b. An estimate of the aquifer's specific yield, hydraulic conductivity, and transmissivity (to support evidence of sustainability and aquifer capacity consistent with proposed use of the well).
    c. A map and description (¼, ¼, Section Township Range) accurately indicating the well location, and the land surface elevation to the nearest foot above sea level. Address and parcel number should be provided.
    d. Summary, conclusions, and recommendations on pump settings, operational regimes, and source reliability.
    e. A well construction report (well log) for the pumping well and all observation wells (if any).
    f. Distance, to the nearest foot, from pumping well to all observation wells and a map indicating all well locations.
    g. A copy of all laboratory test results.

Extended Step Drawdown Pump Test Procedure

Objective: To evaluate well performance and determine whether a source over an aquifer with an expected high yield can produce a sustainable yield. The test results can be used to determine optimal pump settings and well efficiency. The extended pumping and recovery data is used to estimate aquifer transmissivity and confirm that there are no underlying aquifer conditions likely to adversely affect long term use of the source. This test is most appropriate for sources with a small demand within a high yield aquifer.

Elements:

1. We recommend that a qualified water professional (hydrogeologist or engineer) oversee testing of the well and review data analysis and interpretations.
2. An access port to allow depth to water measurements **must** be installed, if not already present, and maintained (WAC 173-160-355).
3. The step drawdown test should include at least four consecutive constant rate discharge steps, with a higher pumping rate used at each step. The first three steps should be at least 60 minutes long. The fourth step is extended until 4 hours of stabilization occurs or until 12 hours total pumping time has elapsed. Stabilization means less than 0.1 foot of drawdown fluctuation per hour in 4 hours of drawdown measurement.
4. The third step of the drawdown test should use a flow rate no less than the minimum supply requirement in LCC8.55.110(3)(d). The remaining pumping rates should be determined by multiplying this flow rate (in gallons per minute) by 0.50, 0.75, and 1.25.
5. Drawdown should be measured in the pumped well at least as frequently as:

Time After Pumping Started	Time Intervals
0 to 10 minutes	1 minute
10 to 60 minutes	5 minutes
60 to 240 minutes	15 minutes
240 to 600 minutes	60 minutes
600 to 1440 minutes	120 minutes

6. Water samples must be collected from the source using proper sampling procedures and analyzed by a DOH-certified laboratory. Water samples should be taken within the last 15 minutes of pumping and must be analyzed for the following water quality parameters:
   - Coliform (bacteria)
   - Inorganic Chemicals (IOCs)
   - Additional Volatile and/or Synthetic Organic Chemicals (VOCs /SOCs)*

**If required by the department because the well is in an area of known or expected contamination*

7. Recovery should be measured beginning at the end of the last step (immediately after the pump is turned off) and ending when the water level returns to within 95 percent of the initial, pre-pumping static water level. Measurement frequency should follow the specifications in the table above measured from the moment pumping stopped. Initial measurement intervals will be short and expand as recovery progresses. The pump should not be removed until the water level returns to 95 percent of the pre-pumping static water level.
8. Determine the maximum pumping rate and pumping depth as established from the step drawdown test. Use the data from this final step to plot the time (drawdown graph) and determine transmissivity, storage coefficient, and hydraulic conductivity.
9. When the pump test is complete, the data should be compiled into a report and submitted to the county. The report should include:
    a. All data on pumping rates and water levels (including static water levels) from the pumping test and recovery period, and appropriate graphical presentations of the data.
    b. An estimate of the aquifer's specific yield, hydraulic conductivity, and transmissivity (to support evidence of sustainability and aquifer capacity consistent with proposed use of the well).
    c. A map and description (¼, ¼, Section Township Range) accurately indicating the well location and the land surface elevation to the nearest foot above sea level. Address and parcel number should be provided.
    d. Summary, conclusions, and recommendations on pump settings, operational regimes, and source reliability.
    e. A well construction report (well log) for the pumping well and all observation wells (if any).
    f. Distance, to the nearest foot, from pumping well to all observation wells and a map indicating all well locations.
    g. A copy of all laboratory test results.

Alternating Pump and Recovery Test

Objective: To evaluate whether a proposed source in a low-flow environment can produce the estimated daily demand and recover within a 24-hour operational period. You should use this test only when aquifer yield is low and cannot maintain the sustained periods of pumping needed for either a step-drawdown or a constant-rate test. The pumping and recovery data obtained during the test will help identify a sustainable operating regime that supports approval of a water source for a Group B water system.

Elements:

1. **Because of the complex and nonstandard nature of this test, we recommend that a licensed water resource professional direct the work needed to complete it.**
2. An access port to allow depth-to-water measurements **must** be installed, if not already present, and maintained (WAC 173-160-355).
3. The test consists of a series of alternating pump and recovery cycles.
   - Each pumping cycle should last for a standard period of time at an intermediate flow rate (usually 2-6 hours). At the end of that time, the pump is turned off and water levels are allowed to recover to pre-pumping or near normal condition. During both pumping and recovery parts of the cycle, water levels are recorded at the time intervals described below.
   - The pump and recovery cycle is continued for at least 24 hours or until the combined pumped volume equals or exceeds the maximum daily demand. Pumping rate and periods can be changed between cycles, but pumping rate must be constant within each cycle. Pumping time, volume pumped and water level changes must be recorded for each cycle. Pumping periods should be no shorter than 2 hours.
   - Because of the iterative nature of the test, it may be necessary to run the test longer than 24 hours to identify the appropriate combination of operational conditions that will produce maximum daily demand and still allow for recovery within a 24-hour operational regime.
   - The pump test cycle must be repeated until a combined pumping volume from all pump cycles has produced a total volume in excess of the *minimum maximum daily demand* for the proposed system**. The test is not complete until recovery occurs after the last pump cycle is completed.**
4. Drawdown and recovery should be measured in the pumped well for each pump and recovery cycle at least as frequently as:

Time after pumping started	Time intervals
0 to 10 minutes	1 minute
10 to 60 minutes	5 minutes
60 to 240 minutes	15 minutes
240 to 600 minutes	60 minutes
600 to 1440 minutes	120 minutes

5. Water samples must be collected from the source using proper sampling procedures and analyzed by a DOH-certified laboratory. Water samples should be taken within the last 15 minutes of pumping and must be analyzed for the following water quality parameters:
   - Coliform (bacteria)
   - Inorganic Chemicals (IOCs)
   - Additional Volatile and/or Synthetic Organic Chemicals (VOCs /SOCs)*

   **If required by the department because the well is in an area of known or expected contamination*

6. Recovery should be measured beginning at the end of each pump cycle (immediately after the pump is turned off) and ending when the water level returns to within 95 percent of the initial, pre-pumping static water level. Measurement frequency should follow the specifications in the table above.
7. Determine the maximum pumping rate and pumping depth and plot the time (drawdown graph) and recovery data to determine transmissivity, storage coefficient, and hydraulic conductivity.
8. When the pump test is complete, the data should be compiled into a report and submitted to the department. The report should include:
   a. All data on pumping rates and water levels (including static water levels) from the pumping and recovery periods, and appropriate graphical presentations of the data.
   b. An estimate of the aquifer's specific yield, hydraulic conductivity, and transmissivity (to support evidence of sustainability and aquifer capacity consistent with proposed use of the well).
   c. A map and description (¼, ¼, Section Township Range) accurately indicating the well location and the land surface elevation to the nearest foot above sea level. Address and parcel number should be provided.
   d. Summary, conclusions, and recommendations on pump settings, operational regimes, and source reliability.
   e. A well construction report (well log) for the pumping well and all observation wells (if any).
   f. Distance, to the nearest foot, from pumping well to all observation wells and a map indicating all well locations.
   g. A copy of all laboratory test results.

Pump Test Data Collection Form

System ID:	Owner:	Well Tag No.:
DOH Source ID:	System Name:	Well Name:
Type of Test:	Conducted By:	Date:
Static Water Level (as measured from reference point):		Lewis County
Observation Wells?		Well Elevation (MSL):
Distance of observation well (r) from pumped well (ft):		

Time	Time (t) since pumping began (min)	Depth to Water Level (ft)	Drawdown (ft)	t/r^2	Pumping Rate (Q) [gpm]	Comments

Recovery Data Collection Form

System ID:	Owner:	Well Tag No.:
DOH Source ID:	System Name:	Well Name:
Type of Test:	Conducted By:	Date:
Static Water Level (as measured from reference point):		Lewis County:
Observation Wells?		Well Elevation (MSL):
Distance of observation well (r) from pumped well (ft):		

Time	Time (t) since pumping began (min)	Time (t') since pumping stopped (min))	t/t'	Depth to Water Level (ft)	Residual Drawdown (ft)	Comments

Cycle Stop Valves

A device called a "cycle stop valve (CSV)" was developed to maintain and control the pressure in a distribution system. Essentially a modified pressure-reducing valve, it maintains a constant downstream pressure over a wide range of flows. Depending on the model, the CSV will stop pump operation at a pre-set threshold flow of 1 to 2 gpm for wells sized to supply Group B water systems. At flows higher than that, the valve will open or close in response to system demands for water while the pump is in continuous operation.

The CSV will maintain pressure until the flow goes to some prescribed low level, at which point the CSV will signal shut-off of the pump. One or more pressure tanks are needed with the CSV to accommodate the need for pump motor cycling control at the low flow settings. The number and size of pressure tanks will depend on the design setting pre-established for the CSV, but the number and size always will be less than that required if a CSV had not been installed.

The advantages of using a CSV with a well pump include:

1. Limiting well pump on-off cycling.
2. Reducing the size or number of pressure tanks required for any given installation.
3. Reducing the potential for damaging transient pressure waves ("water hammer") resulting from pump-start and pump-stop conditions.

The CSV is installed between the pump(s) and pressure switch (the pressure switch determines whether the well pump is "on" or "off"). The CSV downstream pressure setting should be a little bit below the "pump-off" pressure setting of the pressure switch. As the demand in the water system varies, the CSV adjusts the flow coming from the well pump while maintaining a constant downstream pressure. In essence, with the CSV the pump acts as a variable capacity pump whose output matches the water system demand on an instantaneous basis. The pump-on phase of the pump cycle will be extended until the water system demand drops below 2 gpm. For some water systems where the demand (including leaks) seldom if ever drops below the set-point of 2 gpm, the pump may be "on" indefinitely.

Only when water system demand drops below the minimum flow setting of the CSV (recommended at no less than 2 gpm) would the well pump shut off. At that point, all water demand would be satisfied by water released from a pressure tank. The length of the "pump-off" period depends on water system demand and the available withdrawal volume of the pressure tank(s). The sizing of the tank(s), therefore, consists of determining both the:

- Probable water system demand during the pump-off period.
- Recommended length of time before the pump re-starts, for example, the pump-off period.

DOH and LCPHSS recommends a minimum drawdown volume of 10 times the minimum flow designed for the CSV, giving an estimated 10 minutes of pump-off time when the demand is low before restarting.

Considering the DOH and department recommendation, a CSV manufacturer's suggestions, and the drawdown volume of bladder tanks, the following number and size of pressure tanks should be used:

Size/Number of Pressure Tanks with Cycle Stop Valve

Operating Pressure Range (P_1/P_2)	Bladder Tank Nominal Size, gal	Number of Bladder Tanks Needed with CSV
60-40	42	2
	86	1
	119	1
80-60	42	3
	86	2
	119	1

CSV Design Considerations

- The CSV itself can impose significant energy loss ("head loss") at the high end of its flow range (a 1¼-inch CSV valve causes the loss of about 10 psi at 50 gpm). The well pump design must account for the head loss imposed by the CSV.
- It is difficult to predict whether the savings through limiting the number of "pump-start" events and reduced initial capital cost associated with fewer bladder tanks will offset the cost of the additional energy used in prolonging the pump-on portion of the cycle.
- Water quality may affect CSV performance. Particulate matter (sand) may adversely affect the performance of the CSV.
- At low flow conditions, the pressure on the upstream side of the CSV could approach the shut-off head of the pump, which could be very high. You should pay attention to the design, material specifications, and construction of the well pump to ensure it can operate at or near its shut-off head for extended periods, and for the pressure rating of the piping on the upstream side of the CSV.

Variable-Frequency Drive[1]

A variable-frequency drive is an electronic controller that adjusts the speed of an electric motor by modulating the delivered power. Variable-frequency drives provide continuous control by matching motor speed to the specific demands of the work being performed.

Variable-frequency drives are an excellent choice for adjustable-speed drive users because they allow operators to fine-tune processes while reducing costs for energy and equipment maintenance.

Use in the water or wastewater treatment process

Variable-frequency drives are becoming more popular at water and wastewater facilities, where the greatest energy draw comes from pumping and aeration—two applications particularly suited to variable-frequency drives.

Using mechanical devices, such as flow-restricting valves, to control flow for applications where flow requirements vary is akin to driving a car at full throttle while using the brake to control speed. It uses excessive energy and may create punishing conditions for the mechanical equipment involved. Variable-frequency drives enable pumps to accommodate fluctuating demand, running pumps at lower speeds and drawing less energy while still meeting pumping needs. Figure 1 illustrates the reduced energy consumption of variable-frequency drives over throttled valve control systems (such as cycle stop valves).

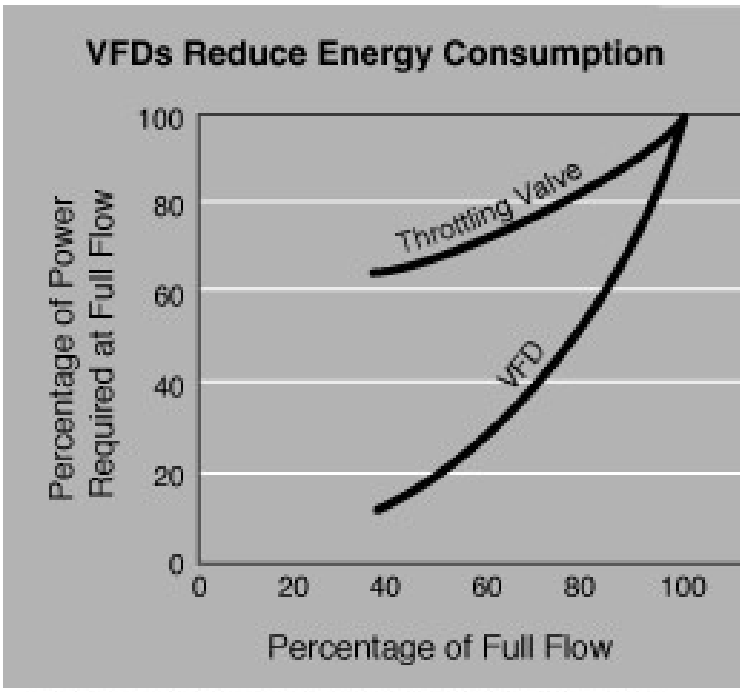

Figure 1. Energy consumption of VFDs and throttling valves.

Variable-frequency drives work with most three-phase electric motors. Therefore, you can specify variable-frequency drives for new equipment or retrofit existing pumps that use throttling devices.

Benefits

Single-speed drives start motors abruptly, subjecting the motor to high torque and current surges up to 10 times the full-load current. In contrast, variable-frequency drives offer a "soft start" capability, gradually ramping up a motor to operating speed. This lessens mechanical and electrical stress on the motor system, can reduce maintenance and repair costs, and extend motor life.

Variable-frequency drives allow precise control of processes, such as water production and distribution. They can also maintain pressure in water distribution systems to closer tolerances.

Energy savings from variable-frequency drives can be significant. Affinity laws for centrifugal pumps suggest that even a small reduction in motor speed will highly leverage your energy savings. Variable-frequency drives can reduce a pump's energy use by as much as 50 percent. A variable frequency drive controlling a pump motor that usually runs less than full speed can substantially reduce energy consumption over a motor running at constant speed for the same period. For example:

Consider a 25 horsepower motor running 23 hours per day (2 hours at 100 percent speed; 8 hours at 75 percent; 8 hours at 67 percent; and 5 hours at 50 percent). A variable-frequency drive can reduce energy use by 45 percent. At $0.10 per kilowatt-hour, this saves $5,374 annually. Because benefits vary from application to application, it is important to calculate benefits for each application before specifying a variable-frequency drive.

1. Adapted from the State of California's Energy Office publication on VFDs

CHLORINATION REPORT FORM

System Name:		**ID#:**	**County:** Lewis County
Mailing Address:		**Month:**	
City	Zip Code	**Source #** (i.e., S01, S02):	
Manager: Contact Person		**Source Name:**	

Water Quality Parameter Requirements:
Cl_2 Residual after Contact Pipe-at least .___ mg/L
Cl_2 Residual in Distribution System-at least .__mg/L
Maximum Flow Rate-___ gpm

	OPTIONAL INFORMATION				REQUIRED INFORMATION		
	Water Production (Gallons)		Chlorine Solution Used		Chlorine Residual		
Day	Meter Reading (gal or ft^3) Circle one	Total Treated Water to System (gal/ft^3)	Tank Level (Gallons)	Volume Used (Gallons)	Residual after Contact Pipe (mg/L)	Residual in Distribution (mg/L)	Chlorine Sampling Location/Initials of Sampler
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
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Submitted by: _____ Date: _____

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO:

E-mail: Sue.Kennedy@lewiscountywa.gov or
Mail: Lewis County Public Health and Social Services
Environmental Health Division
2025 NE Kresky Ave ◆ Chehalis, Washington 98532
FAX (360) 740-1245

INSTRUCTIONS– CT6 CHLORINATION REPORT FORM

IF THE FREE RESIDUAL FALLS BELOW THE REQUIRED LEVEL CONTACT THE SYSTEM MANAGER IMMEDIATELY.

The following is a description of what is on the Chlorination Report form.

REQUIRED INFORMATION

Residual after Contact Pipe (mg/L) – This is a measurement of the chlorine residual from the location after your contact pipe (or volume) and is measured using an approved free chlorine residual test kit. Your system is required to meet CT6 and must record this measurement every day that water is served to the public in order to assure an adequate and consistent level of chlorine in the system in accordance with LCC8.55.190. Daily monitoring will also help you identify failures of the chlorine feed equipment which must be addressed within four hours of discovery. If the chlorine residual drops below the required level, the system has 4 hours to return residual to required levels or a treatment technique violation occurs. Your specific CT6 free chlorine residual requirement should be listed in the "Water Quality Parameter Requirements" section. If it is not listed, please enter the information from your approval letter.

Residual in Distribution System (mg/L) – This is a measurement of the chlorine residual from a representative point within your distribution system. If you have a specific distribution residual requirement, it will be listed in your chlorination approval letter; otherwise, the requirement is to maintain a detectable residual disinfectant concentration in all active parts of the distribution system, measured as total chlorine, free chlorine, combined chlorine, or chlorine dioxide. Your approval letter will also list how frequently this measurement must be taken.

Chlorine Sampling Location – This section refers to the location where the chlorine residual was measured. The location should be representative of your distribution system and should demonstrate that the system has adequate residual in all active parts of the distribution system. It can be identified by a physical address or specific location in your system (i.e. dedicated sampling station X1).

Initials of Sampler – The initials of the person that measured the chlorine residual.

Please note:

1. **In addition to the daily residual measurement, the chlorine residual should be tested at the same time and location that you collect a routine or repeat coliform sample and the residual should be marked on the coliform lab slip.**

OPTIONAL INFORMATION

Meter Reading (gal or ft^3) – This refers to the source meter reading and should be reported a minimum of once per week.

Total Treated Water to System (gal or ft^3) – This is the total volume of water used and is calculated as the difference between the source meter readings. This should be reported a minimum of once per week.

Tank Level (in gallons) – This is the amount of solution remaining in the chemical feed tank and should be reported a minimum of once per week.

Volume Used (in gallons) – This is the amount of chlorine solution that has been used since the last time it was checked. This should be reported a minimum of once per week.