



Chapter Eight

WATER SYSTEM

Lawson Hills
Master Planned Development

OVERVIEW

The Master Developer controls property with the rights to approximately 258,750 gallons of water per day. This is determined through the “Three Party Agreement” dated August 8, 2003, wherein the property was allocated 1,125 ERUs through payment of the Tacoma System Development Charge. An ERU is defined in the “Three Party Agreement” as equal to 230 gallons. The total amount of water available can serve up to 1,437 ERUs assuming water use at 180 gallons per Day per ERU. The Master Developer owns other improved residential properties with a right to a total additional nine (9) water services. Since water use can vary significantly depending on the land use, water conservation features, building size and site plan; projected water use per ERU will be determined at the preliminary plat, binding site plan or site plan approval stage and confirmed prior to Occupancy.

PROPOSED WATER SYSTEM

Water service to the Lawson main property is provided via existing City of Black Diamond mains located in Botts Drive, McKay Lane, Park Street and 4th Avenue, and SR 169. New water mains will be constructed within roads, utility tracts and easements on the site and will connect to the existing water system in at least two locations. Connections will be made to the existing system as necessary to provide appropriate fire-flow looping, and minimize water quality degradation due to long residence times. A new reservoir is proposed at the eastern edge of the East Annexation area to serve the remainder of the site that can not be served from the existing pressure zones. This new reservoir would serve the upper portions of the project site via gravity mains.

Capacity of the 965 reservoir will be evaluated and upgraded as necessary to meet existing and proposed project demand on this reservoir. The 2000 Comprehensive Water Plan includes Project (J) which is a new 2.5 MG reservoir located adjacent to the existing 965 zone reservoir. As an alternative to a new reservoir at the 965 reservoir site, increased demands on the existing reservoir may be met by the new upper pressure zone reservoir proposed along the east project boundary and pressure reducing valves. It is anticipated that a pump station will be constructed near the 965 zone reservoir to pump water up to the new proposed reservoir.

There are several options for the new reservoir depending on final design considerations. This new reservoir could be up to 70 feet in diameter and up to 105 feet tall based on preliminary sizing. Figure 8-1 shows the existing reservoir locations and the location of the proposed reservoir.

NORTH TRIANGLE

Water service to the North Triangle is shown in the Comprehensive Water System Plan as a looped main. Alternatively a single 16” main may be extended from the existing main located in SR 169 south of the site (fire flow requirements would need to be verified). The

alignment of this extension may be within SR 169, or there may be an alternate alignment based on City review or final engineering design. Upgrades to the existing water system lines between the connection point and the 850 reservoir will be evaluated and upgraded as necessary to meet fire flow requirements and City standards. Fire flow will be evaluated for both the North Triangle and Lawson Main Property and system improvements will be provided as necessary. The proposed extension and any necessary upgrades will meet the proposed standards (as they are ultimately adopted) in the pending 2008 City of Black Diamond Comprehensive Water System Plan.

LAWSON HILLS WATER CONSERVATION PLAN

The Lawson Hills MPD has been proposed with an emphasis on reducing the overall impact of the development on the environment. Water conservation is a critical element of the comprehensive environmental plan for the MPD. The proposed Water Conservation Plan for Lawson Hills is to require that indoor appliances and plumbing fixtures meet the EPA WaterSense specifications in effect at the time of building permit application. Specifications equivalent to the EPA WaterSense specifications may be used with the concurrence of the City and Master Developer.

The current EPA WaterSense specifications are summarized below:

A. TOILETS

Single Flush Toilets - The effective flush volume shall not exceed 1.28 gallons (4.8 liters).

Dual Flush Toilets - The effective flush volume shall not exceed 1.28 gallons (4.8 liters). The effective flush volume is defined as the composite, average flush volume of two reduced flushes and one full flush.

B. LAVATORY FAUCETS

The maximum flow rate shall not exceed 1.5 gallons per minute (gpm) at a pressure of 60 pounds per square inch (psi) at the inlet, when water is flowing; and
The minimum flow rate shall not be less than 0.8 gpm (3.0 L/min) at a pressure of 20 psi at the inlet, when water is flowing. A lavatory faucet is also considered to meet this flow rate requirement if equipped with a lavatory faucet accessory that meets this requirement.

C. KITCHEN FAUCET

Maximum flow rate of 2.2 gpm at 60 psi

D. SHOWERHEADS

Maximum flow rate of 2.5 gpm @ 80 psi

E. APPLIANCES

Dishwashers must be ENERGY STAR qualified or equivalent.

Clothes washers must be ENERGY STAR qualified with a water factor of less than or equal to 6.0 gallons of water per cycle per cubic foot of capacity.

In order to reduce the overall consumption of water below the threshold of 230 gallons per day per equivalent residential unit (as per BDMC 18.98.190) both indoor and outdoor water uses were evaluated. According to the American Water Works Association (AWWA) Research Foundation study of Residential End Uses of Water the mean per capita indoor daily water use was 69.3 gallons. Multiply this by the 2.63 person per household ratio provided in the Black Diamond Comprehensive Plan and the result is 182.23 gallons per day of indoor water use per residential household. By utilizing water efficient plumbing fixtures, indoor water use can be significantly reduced. According to the US EPA, utilizing fixtures that meet the WaterSense specifications, a potential water savings of 20% can be achieved as compared to conventional fixtures. A table comparing conventional fixtures to newer water efficient fixtures is provided below.

Fixture /End Use	Conventional Fixture Water Use	Water Efficient Fixture Water Use
Toilet	1.6 gallons per flush	1.3 gallons per flush
Clothes washer	40-50 gal. per load	20-25 gal. per load
Shower	2.5 gallons per min.	2.0 gallons per min.
Lavatory Faucet	2.5 gallons per min.	1.8 gallons per min.
Kitchen Faucet	2.5 gallons per min.	1.8 gallons per min.
Dishwasher	8-12 gal. per load	6-8 gal. per load

OPTIONAL WATER CONSUMPTION REDUCTION MEASURES

Exterior water use conservation generally focuses on landscape design techniques, the use of efficient irrigation products, and water reuse. The AWWA study shows that exterior water use can be as much as 58% of the overall water use annually per household. Placing specific parameters on the landscape design utilized within the Lawson Hills MPD is an effective tool in reducing exterior water use. These parameters include techniques such as; restricting lawn to no more than 40% of the overall landscaped area, requiring drought tolerant plant material, the use of compost rich soil mixes, and placing a layer of mulch in planting areas. Efficient irrigation design and scheduling is another proven exterior water saving technique. The use of weather based control systems, drip irrigation products, and water budget requirements are all effective means of achieving water savings in the landscape. Water reuse techniques can also greatly reduce the overall potable water use for irrigation. By encouraging the installation of rain barrels and other water re-use techniques for residents; significant savings in irrigation are possible.

In addition to implementing EPA WaterSense specifications throughout Lawson Hills, the following is a description of additional water conservation measures that may be implemented on the site at the discretion of the Applicant/Master Developer:

Water Conservation Techniques

Exterior Water Use

IRRIGATION / LANDSCAPE

- Drought tolerant landscaping (xeriscape)
- Highly efficient irrigation products (drip, ET based controls, rain sensors)
- Reduce or restrict the use of lawn
- Compost amended soil
- Mulch layer
- Rain barrels for individual homes

Indoor Water Use – Fixture restrictions

TOILETS

- Low Flow Toilets – flow rate less than 1.3 gallons per flush
- Toilets to meet US E.P.A Water Sense specification
- Public use toilets must be dual flush and meet requirements of ASME A112.19.14 or meet the same flow requirements of residential toilets

FAUCETS

- Flow rates for lavatory and kitchen faucets must be less than or equal to 2 gallons per minute

SHOWERS

- Flow rates for shower fixtures must be less than or equal to 2 gallons per minute

EFFICIENT HOT WATER DISTRIBUTION SYSTEM

- Design and install efficient hot water distribution system. Including limiting the length of hot water branch lines, consider central manifold distribution systems, structured plumbing systems, and compact design for conventional hot water systems.



