



Memorandum

April 27, 2015

FROM: Amy Blain, P.E.

SUBJECT: Seattle Public Utility Taste & Odor Report

The results of the samples tested by Seattle Public Utility for Flavor Rating Assessment (FRA) consistently rated well for taste and odors. Samples were scored on a 1 to 9 scale where a score of (1) indicates the taster “would be very happy to accept this water as [their] everyday drinking water” and a score of (9) indicates the taster “can’t stand this water in [their] mouth and [they] could never drink it”. The target performance measure for the City of Seattle is a FRA score of (3) or better. A score of (5) or higher is considered failing. Based on the 29 samples tested throughout our combined Longview/Beacon Hill distribution system, the FRA panel indicated Longview’s drinking water is on par with the City of Seattle. Sample locations are shown on the attached map, along with the locations of customers who responded to the value criteria survey question regarding the importance of taste in evaluating water supply options.

The FRA is conducted in accordance with *Standard Methods*, a mutual publication of the American Public Health Association, American Water Works Association and the Water Environment Federation. Seattle’s tasting panel is made of up five members who attend weekly/bi-weekly sessions to regularly test Seattle’s water as well as samples from other utilities. In order to be selected for the panel, members must first pass two rounds of pre-qualification tests to demonstrate keen olfactory and chemosensory function by identifying odors with 90% minimum accuracy using scratch and sniff tests and palate sensitivity by identifying tastes using triangle tests with 65% minimum accuracy. Qualified panelists then receive 12 one-hour monthly training sessions and must commit to serving no less than two years and three months on the panel due to their extensive training.

Chlorine was commonly identified as the dominant taste and odor in Longview’s samples due to treatment methods. Sulfur was noted in a few samples and is indicative of a groundwater source. But tar and metallic flavors were also identified, suggesting taste and odor contributions from asphaltic coatings in cement lined ductile iron mains and scale from unlined cast iron mains. The table below sorts the sample sets results from best to worst and includes pipe material and approximate age in years at each location. However, no obvious correlation between taste and odor effects and pipe age/material is readily observed in the limited data set, most likely due to other controlling factors including water age and upstream pipe materials which come into contact with the bulk water before it travels to the specific locations.

| Sample | Description | | FRA Average | Pipe Material | |
|-----------------------------------|-------------|------------------|-------------|-------------------|-----|
| | Odor | Taste | | Type | Age |
| 136 Tanglewood | chlorine | chlorine | 1.5 | DI ^(c) | 30 |
| 1155 Weber Well #2 ^(b) | chlorine | chlorine | 1.8 | DI | 3 |
| 16 Clearview | chlorine | chlorine, sulfur | 1.9 | DI | 20 |
| 188 Curtis Drive | chlorine | chlorine | 2.0 | DI | 30 |

| Sample | Description | | FRA Average | Pipe Material | |
|------------------------------------|------------------|---------------------------|----------------|--------------------|-----|
| | Odor | Taste | | Type | Age |
| 1824 Coal Creek | chlorine | chlorine | 2.0 | LCI ^(d) | 60 |
| Hillside Pump Station | chlorine | chlorine | 2.0 | LCI | 60 |
| 1100 Commerce | chlorine | chlorine | 2.0 | UCI ^(e) | 80 |
| 637 17 th | chlorine | chlorine, sulfur, plastic | 2.13 | UCI | 90 |
| 2105 Larch St | chlorine | chlorine, plastic | 2.13 | UCI | 90 |
| 3170 N. Ammons Dr. | - | chlorine, tar | 2.2 | DI | 5 |
| 150 Clark Creek | chlorine | chlorine | 2.2 | DI | 10 |
| 3544 Fairway ^(a) | chlorine | chlorine, metallic | 2.2 | LCI | 40 |
| 551 Lone Oak | chlorine | chlorine, plastic | 2.2 | CI | 60 |
| Maplewood Dr | chlorine | chlorine, sulfur | 2.2 | LCI | 50 |
| 2302 Cedar Place | chlorine | chlorine | 2.2 | LCI | 60 |
| 1155 Weber Well #3 ^(b) | chlorine | chlorine | 2.25 | DI | 3 |
| 101 Fishers Lane | chlorine | chlorine, plastic | 2.25 | Steel | 70 |
| 2853 Florida St | chlorine | chlorine, sulfur | 2.25 | UCI | 80 |
| 3747 Sunset | chlorine | chlorine, tar | 2.3 | LCI | 40 |
| 2770 48 th | - | chlorine | 2.3 | LCI | 50 |
| 2430 Park Hill Drive | chlorine | chlorine | 2.4 | LCI | 40 |
| 345 19 th | chlorine | chlorine, sulfur | 2.5 | UCI | 90 |
| 5304 Oriole Drive | chlorine | chlorine, plastic | 3.0 | DI | 40 |
| 7400 Blk Willow Grove | chlorine | chlorine, tar | 3.0 | LCI | 50 |
| 3069 Pennsylvania | - | chlorine | 3.25 | UCI | 60 |
| Ponderosa & Ventura ^(a) | chlorine | chlorine, plastic | 3.25 | AC ^(f) | 50 |
| 1051 Coal Creek | chlorine | chlorine, tar, plastic | 3.25 | LCI | 60 |
| Olive Way / Memorial Park | chlorine, sulfur | chlorine, sulfur | 3.4 | LCI | 50 |
| 2505 Taylor Ave | chlorine | chlorine, tar | 3.5 | UCI | 60 |

^(a) Sample location in Beacon Hill Water & Sewer District service area

^(b) Sample location leaving Mint Farm Regional Water Treatment Plant and entering distribution system

^(c) Ductile iron

^(d) Lined cast iron

^(e) Unlined cast iron

^(f) Asbestos cement

Seattle Public Utilities
Water Quality Laboratory - Report
 800 South Stacy, Seattle WA 98134
 Phone: (206) 233-2057

Taste & Odor Report

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| Client: City of Longview 1460 Industrial Way Longview, WA 98632 Taste and Odor Investigation PO# 36-4604 | Contact: Amy Blain Email: Amy Phone: |
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Narrative: The samples were received in good condition. Two sample sets were collected, April 1, 2015 and April 8, 2015.
 METHOD: 2160 (FRA), 2170 (FPA)

| | | | | |
|--------------------------------|-------|------------------------------------|-------------|---------------------------|
| COLLECTION DATE: 4/1/15 | | DATE ANALYZED: 4/2/15 | | |
| COLLECTED BY: TD | | ANALYSTS: SPU Flavor Profile Panel | | |
| | | | Description | |
| Sample | Scale | Average | Odor | Taste |
| 1155 Weber Well #3 | FRA: | 2.25 | chlorine | chlorine |
| 7400 Black Willow Grove | FRA: | 3.0 | chlorine | chlorine, tar |
| 136 Tanglewood | FRA: | 1.5 | chlorine | chlorine |
| 1824 Coal Creek | FRA: | 2.0 | chlorine | chlorine |
| 1051 Coal Creek | FRA: | 3.25 | chlorine | chlorine, tar, plastic |
| 5304 Oriole Drive | FRA: | 3.0 | chlorine | chlorine, plastic |
| 3069 Pennsylvania | FRA: | 3.25 | - | chlorine |
| 2505 Taylor Ave | FRA: | 3.5 | chlorine | chlorine, tar |
| 101 Fishers Lane | FRA: | 2.25 | chlorine | chlorine, plastic |
| Ponderosa & Ventura | FRA: | 3.25 | chlorine | chlorine, plastic |
| 2105 Larch St | FRA: | 2.13 | chlorine | chlorine, plastic |
| 2853 Florida St | FRA: | 2.25 | chlorine | chlorine, sulfur |
| 345 19th | FRA: | 2.5 | chlorine | chlorine, sulfur |
| 637 17th | FRA: | 2.13 | chlorine | chlorine, sulfur, plastic |

Flavor Rating Assessment (FRA) rates the offensiveness of a sample on a scale of 1-9 with 9 indicating very poor tasting water.

| COLLECTION DATE: 4/8/15 | | DATE ANALYZED: 4/9/15 | | |
|--------------------------------------|-------|------------------------------------|------------------|--------------------|
| COLLECTED BY: TD | | ANALYSTS: SPU Flavor Profile Panel | | |
| | | | Description | |
| Sample | Scale | Average | Odor | Taste |
| Hillside Pump Station | FRA: | 2 | chlorine | chlorine |
| Maplewood Dr (BHWSD) | FRA: | 2.2 | chlorine | chlorine, sulfur |
| 2430 Park Hill Drive | FRA: | 2.4 | chlorine | chlorine |
| 2302 Cedar Place | FRA: | 2.2 | chlorine | chlorine |
| 1100 Commerce | FRA: | 2.0 | chlorine | chlorine |
| 3544 Fairway | FRA: | 2.2 | chlorine | chlorine, metallic |
| 3170 N. Ammons | FRA: | 2.2 | - | chlorine, tar |
| 188 Curtis | FRA: | 2.0 | chlorine | chlorine |
| 16 Clearview | FRA: | 1.9 | chlorine | chlorine, sulfur |
| 3747 Sunset | FRA: | 2.3 | chlorine | chlorine, tar |
| 150 Clark Creek | FRA: | 2.2 | chlorine | chlorine |
| 2770 48th | FRA: | 2.3 | - | chlorine |
| 551 Lone Oak (Hydrant) | FRA: | 2.2 | chlorine | chlorine, plastic |
| Olive Way & Memorial Park | FRA: | 3.4 | chlorine, sulfur | chlorine, sulfur |
| 1155 Weber Well #2 | FRA: | 1.8 | chlorine | chlorine |

Flavor Rating Assessment (FRA) rates the offensiveness of a sample on a scale of 1-9 with 9 indicating very poor tasting water.

The taste and odor results from both sample sets did not identify a specific taste and odor issue. Chlorine was the most commonly identified flavor which is added at the treatment plant. Sulfur was detected in a few samples and is indicative of a ground water source. Plastic flavors can occur when chlorine is in contact with organics in the water. Tar flavor may come from the asphaltic paint in cement lined ductile iron water mains and metallic flavors come from unlined pipes. Chlorine was the dominant taste identified; all other tastes were at the lower end of the detection limit.

Report Approval: *Moya Joubert*

Senior Water Quality Analyst

Date: 4/14/15

Flavor Rating Assessment Scale

1. I would be very happy to accept this water as my everyday drinking water.
2. I would be happy to accept this water as my everyday drinking water.
3. I am sure that I could accept this water as my everyday drinking water.
4. I could accept this water as my everyday drinking water.
5. Maybe I could accept this water as my everyday drinking water.
6. I don't think I could accept this water as my everyday drinking water.
7. I could not accept this water as my everyday drinking water.
8. I could never drink this water.
9. I can't stand this water in my mouth and I could never drink it.

SPU's Flavor Profile Panel

The Flavor Profile Panel (FPP) performs routine taste and odor analysis of Seattle's source, transmission, and distribution waters. In addition, the FPP may perform analysis for other utilities and special projects as needed. Samples are tested for both Flavor Profile Analysis (FPA) and Flavor Rating Assessment (FRA). A new FPP is qualified and trained every other year. During training, the panel meets for 12 one-hour training sessions beginning in January. The FPP meets for testing once a week (for 1 hour) from May through October and every other week during the winter months. FPP testing and training times will have a consistent meeting time based on sampling and reporting requirements; however the panel members will have some say in determining the weekly meeting schedule (we have been meeting at 2:00 pm on Thursdays for the last 3 years). The extensive training for FPP members necessitates that panelists serve 2 years and 3 months on the panel. Training and testing take place at the SPU Water Quality Laboratory Taste and Odor Free Room. Because of the sensitive nature of taste and odor testing, all panelists must be odor-free during qualification, training, and testing (no perfume, aftershave, etc.). Flavor Profile Analysis originated with the food industry and the training is based upon food tastes, therefore every session will end with a food analysis. Please contact Moya Joubert at 206-233-2057 or e-mail moya.joubert@seattle.gov if you are interested in serving on the Flavor Profile Panel.

Flavor Profile Panel Qualification

1. All potential panelists must pass the Sensonics 40-item scratch and sniff tests. Males pass with a score of 36 while females must get a score of 37.
2. The second round of testing requires that potential panelists pass two out of three triangle tests: Difference between two bottled waters (usually use Evian and the current T&O free); Difference between MIB (8 ng/L) and geosmin (20 ng/L); and a cola challenge.
3. Panelists must be able to describe flavors while at the same time have enough independent character to withstand fellow panelist influence.
4. Panelists must get their supervisor's permission to serve and will be given a charge number for their time.

Attendance

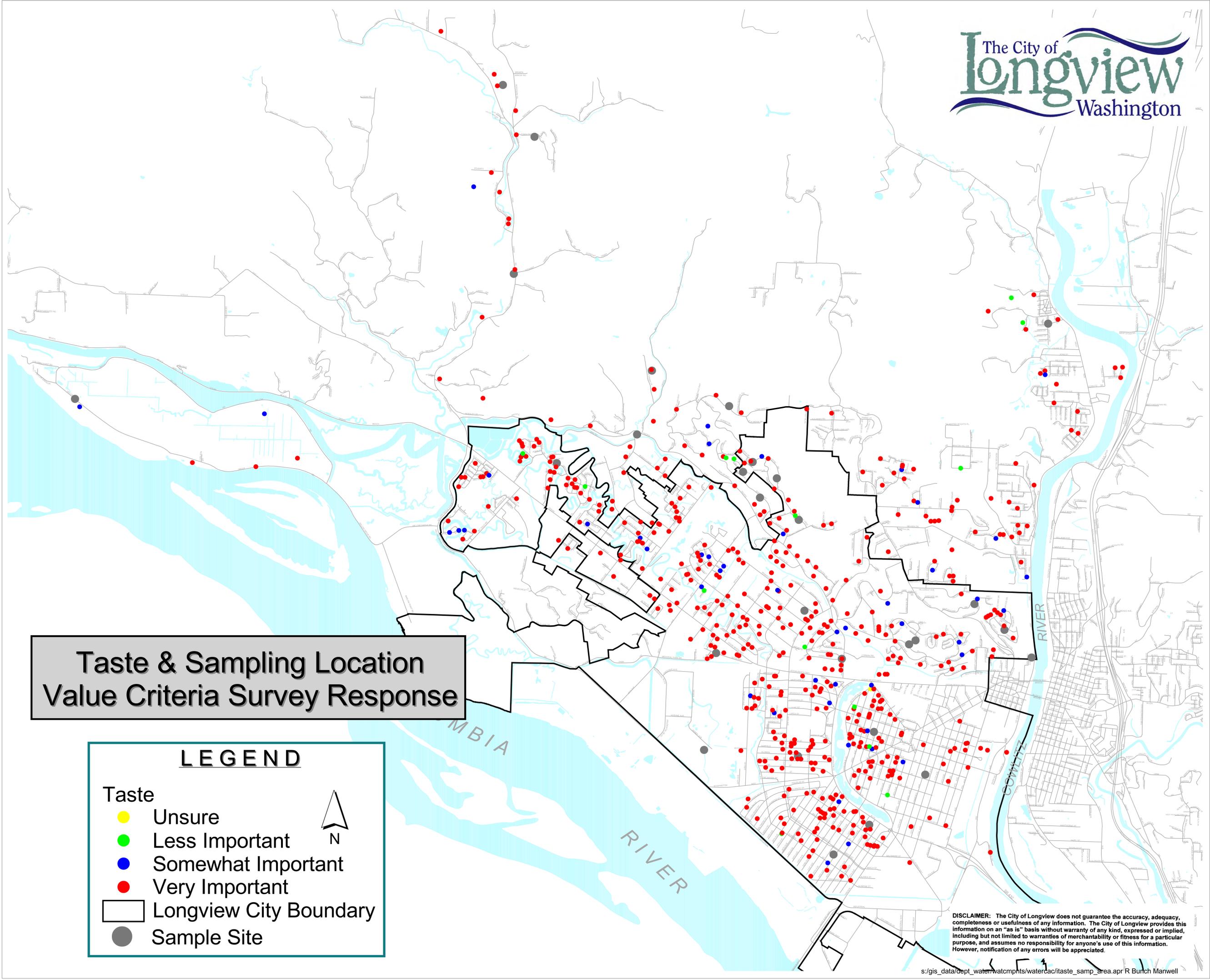
Panelists in training may only miss one training session for any reason other than illness. Once trained a panelist will be removed from the panel if he/she misses more than 3 sessions in a row in the first 2 years of the panelist service. After two years the panelist may act as a back up and will be invited to attend training sessions. In addition, panelists that served more than 2 terms can remain on the panel while attending only minimal training sessions.

**Taste & Sampling Location
 Value Criteria Survey Response**

LEGEND

Taste

- Unsure
- Less Important
- Somewhat Important
- Very Important
- Longview City Boundary
- Sample Site

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