Stantec

Memo

To:	City of Tualatin Engineering Division 10699 SW Herman Rd Tualatin, OR 97062	From:	Luis Giron 601 2nd Ave, Ste 1400 Portland, OR 97204 Direct: 503-419-2510 luis.giron@stantec.com
Project/File:	2042713800	Date:	December 18, 2025

Reference: Tualatin HS Restroom Improvements

Summary

This memo is intended to document the stormwater management approach for the Tualatin High School (TuHS) Restroom Improvements project. The project site is located at 22300 SW Boones Ferry Rd. Tigard-Tualatin School District (TTSD) is proposing construction of a new CMU restroom building and sidewalks for pedestrian connection to the track/football field. The new restrooms will be constructed to the east of the TuHS theater. New impervious areas will be treated using an existing extended detention basin located along SW Boones Ferry Rd. The facility is owned by TTSD and is currently maintained by a third party. TTSD intends to pay a fee-in-lieu of hydromodification approach implementation for 2,000 sf of new impervious area.

In 2018 Cardno (now Stantec) prepared a drainage report for the TuHS Building and Athletic Improvements project which included detailed sizing of the extended detention basin. The proposed restroom improvements are located within drainage area A7, which drains to this facility. It appears all impervious areas within drainage areas A1 through A7 are being treated by the extended detention facility, so the project is only required to treat new impervious areas (no treatment of 3x modified impervious). See the attached 2018 drainage report excerpt for additional information.

Water quality orifice calculations show the existing facility can treat just under 3,850 sf of new impervious area before a 0.01’ (1/8”) increase in the WQ depth. See the attached water quality orifice sizing calculations for additional information. The extended detention basin is anticipated to have sufficient capacity to treat new impervious areas, so the project does not propose any modifications to the existing facility.

Reference: Tualatin HS Restroom Improvements

Existing and Proposed Conditions

Drainage area A7 currently contains approximately 1.657 ac of impervious area according to the 2018 drainage report, and proposed improvements will add approximately 2,000 sf (0.046 ac) of impervious area. Table 1 summarizes existing and proposed data for drainage area A7.

Table 1. Drainage Area A7 Summary

Condition	Discharge Location	Pervious Area (ac)	Impervious Area (ac)	Total Area (ac)	% Impervious
Existing	Extended Detention Basin	0.860	1.657	2.517	66
Proposed	Extended Detention Basin	0.814	1.703	2.517	68

Water Quality

Per section 4.08.5 of the CWS design manual, the water quality volume (WQV) and flow rate (WQF) are calculated according to the following equations.

$$WQV\ (cf) = \frac{0.36\ (\text{in})\ \text{x Area}\ (\text{sf})}{12\ (\text{in/ft})}$$

$$WQF\ (cfs) = \frac{\text{WQV}\ (\text{cf})}{4\ (\text{hr})\ \text{x}\ 3600\ (\text{s/hr})}$$

The CWS water quality calculations assume a dry weather rainfall depth of 0.36 in over 4-hours. The table below summarizes the anticipated impacts to the existing extended detention basin resulting from the proposed improvements. See the attached water quality orifice sizing calculations for additional information.

Table 2. Boones Ferry Rd Extended Detention Basin Data

Condition	Impervious Area (sf)	WQV (cf)	WQ Depth (ft)	WQ Orifice Diameter (in)
Existing	384,990	11,550	0.57	2.00
Proposed	386,990	11,610	0.57	2.00

Table 2 shows no net increase to the WQ depth with the addition of 2,000 sf of impervious area. The extended detention pond appears to have sufficient treatment capacity as-is and will not require any modifications.

8 WATER QUALITY

8.1 Water Quality Guidelines

The proposed water quality facilities were designed per Clean Water Services standards. The sizing of each facility is determined based on the impervious area flowing into the facility.

8.2 Treatment Area

The impervious area required to be treated is defined by the following equation:

$$Treatment\ Area\ = New\ Impervious\ + 3 * (Modified\ Impervious\ - Permanently\ Removed\ Impervious)$$

The area in square feet required to be treated is defined by this equation up to the total impervious area of the site. Table 8-1 outlines the impervious area required to be treated as part of the proposed development.

Table 8-1 Onsite Treatment Area Calculation

Area Type	Area, sq-ft
New Impervious	298,388
Permanently Removed Impervious	2,279
Modified Impervious	21,099
Required Treatment Area	**354,847**
Proposed Treatment Area	**737,306**

All newly constructed impervious area are treated to 2017 Clean Water Services standards as existing basins either lack an existing treatment mechanism, or lack a treatment mechanism that holds to 2017 standards. The constructed ADS BayFilter systems treat a total of 289,944 sq-ft of impervious area, and the regrading and replanting of the existing Boones Ferry extended dry pond on site captures and treats 382,459 sq-ft of impervious area. In total, the constructed improvements treat 382,459 sq-ft of impervious area beyond what is expressly required per Clean Water Services (See Technical Appendix: Exhibit 2 – Post-Developed Basin Delineation).

8.3 Pre-Treatment Design

Per Section 4.05.7 of the 2017 Clean Water Services design manual, flow from impervious surfaces to water quality facilities are required to pass through pre-treatment before discharging to said facilities. Flow discharging to the regraded extended dry pond and flows from the multi-use and softball turf fields will pass through sedimentation manholes. Undetained basins B6 and B7 will have trapped catch basins, while flow from the proposed baseball turf field will pass through the proposed StormTech MC-3500 Isolator Row for pre-treatment. Table 8-2 outlines the design for the proposed sedimentation manholes per Section 4.06.1 of the 2017 Clean Water Services design manual (See Technical Appendix: Water Quality Hydrographs).

Table 8-2 Sedimentation Manhole Design

Structure	Location	25-year Flow Rate, cfs	Inner Diameter, ft	Required Sump Depth, ft	Proposed Sump Depth, ft
SDMH 4	North of Boones Ferry Dry Pond	1.320	60	1.34	2.00
SDMH 5	South of Boones Ferry Dry Pond	5.357	72	3.79	4.00
SDMH 6	Multi-Use and Softball Fields	2.443	60	2.49	2.50

8.4 Water Quality Facilities

Per Section 4.05.5 of the **Clean** Water Services design manual all created impervious area will be treated. Per Section 4.05.6 of the Clean Water Services design manual, the water quality volume and flow rate are calculated according to the equations below:

Water Quality Volume (cf) = 0.36 (in) x Area (sf) Water Quality Flow = WQV (cf)

12 (in/ft) 14,400

These water quality calculations are based on 0.36 inches of rainfall during a dry weather, 4-hour duration storm.

Water quality is provided within an extended dry pond, ADS BayFilter catch basins, and ADS BayFilter Vault and Manhole. Table 8-3 outlines the water quality design for the SW Boones Ferry Road extended dry pond. Water quality orifice diameter is calculated per Section 4.06.3 of the 2017 Clean Water Services standards:

$$D = 24 * \sqrt{\frac{Q}{\pi * C * \sqrt{2 * g * H}}}$$

Where:

D (in) = diameter of orifice
Q (cfs) = WQV (cf) / (48*60*60)
C = 0.62
H (ft) = 2/3 * WQ Depth

EXISTING EXTENDED DETENTION BASIN DATA

Table 8-3 Extended Dry Pond Information

Facility	Impervious Area, sq-ft	Required WQ Volume, cu-ft	WQ Depth, ft	Total Depth, ft	WQ Orifice Diameter, in
Boones Ferry Road Extended Dry Pond	384,990	11,550	0.57	4.00	2.00

For the constructed ADA ramp access to the constructed baseball turf field, and the fire access on the east side of the existing auditorium (basins B6, and B7), existing inlets were retrofitted with an ADS BayFilter catch basin.

Because runoff from the proposed baseball turf field is detained prior to water quality treatment, a 4-hour storm totaling 0.36 inches of total runoff was routed through the hydraulic model. The outlet flow from the model was used to calculate the water quality flow. This is in line with 2017 Clean Water Services Requirements. All other BayFilter systems were sized using the CWS water quality flow equation. Table 8-4 outlines the water quality design for the proposed ADS BayFilter catch basins, and water quality vaults.

Table 8-4 ADS BayFilter Water Quality Design

Basin	Location	Impervious Area, sq-ft	CWS WQ Flow, cfs	Modeled WQ Flow, cfs	BayFilter Cartrige Model	Single Cartridge Treatment Rate, gpm	Required Number of Cartridges	Structure
Basins B1 & B2	Baseball Field	136,646	0.285	0.243	545	45	3	72" Manhole
Basins B3 & B4	Multi-Use and Softball Fields	135,959	0.283	-	522	22.5	6	6'x12' Vault
Basin B6	South Fire Lane	7,710	0.016	-	522	11.25	1	Catch Basin
Basin B7	Basball Field ADA Access	9,629	0.020	-	522	11.25	1	Catch Basin

All remaining area on the Tualatin High School property outside the bounds of the impacted area is assumed treated to a previous standard by existing onsite facilities.

EXISTING BASIN DELINEATION
TUALATIN HIGH SCHOOL IMPROVEMENTS

Tigard-Tualatin School District
Tualatin, Oregon

Existing Basin Areas				
Basin ID	Pervious *acres*	Impervious *acres*	Percent Impervious	Total *acres*
A	4.813	9.564	66.5%	14.377
B	13.765	0.604	4.2%	14.369
Total	**18.578**	**10.168**	**35.4%**	**28.746**

PROJECT NO. 21712290
DATE: 07/11/2019
BY: DEC
EXHIBIT: 1

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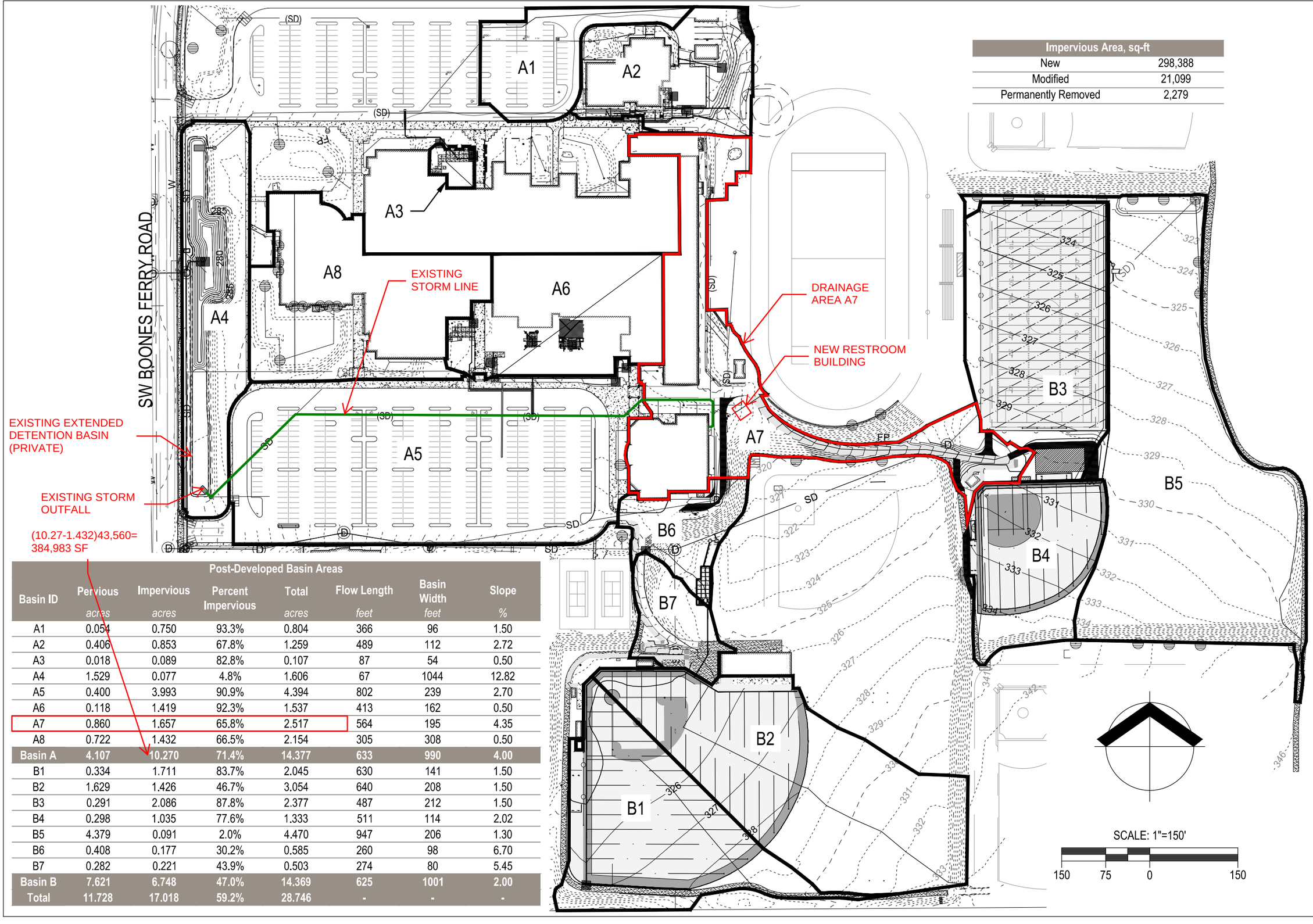

Impervious Area, sq-ft	
New	298,388
Modified	21,099
Permanently Removed	2,279

Post-Developed Basin Areas

Basin ID	Pervious	Impervious	Percent Impervious	Total	Flow Length	Basin Width	Slope
	acres	*acres*		*acres*	*feet*	*feet*	*%*
A1	0.054	0.750	93.3%	0.804	366	96	1.50
A2	0.406	0.853	67.8%	1.259	489	112	2.72
A3	0.018	0.089	82.8%	0.107	87	54	0.50
A4	1.529	0.077	4.8%	1.606	67	1044	12.82
A5	0.400	3.993	90.9%	4.394	802	239	2.70
A6	0.118	1.419	92.3%	1.537	413	162	0.50
A7	0.860	1.657	65.8%	2.517	564	195	4.35
A8	0.722	1.432	66.5%	2.154	305	308	0.50
Basin A	**4.107**	**10.270**	**71.4%**	**14.377**	**633**	**990**	**4.00**
B1	0.334	1.711	83.7%	2.045	630	141	1.50
B2	1.629	1.426	46.7%	3.054	640	208	1.50
B3	0.291	2.086	87.8%	2.377	487	212	1.50
B4	0.298	1.035	77.6%	1.333	511	114	2.02
B5	4.379	0.091	2.0%	4.470	947	206	1.30
B6	0.408	0.177	30.2%	0.585	260	98	6.70
B7	0.282	0.221	43.9%	0.503	274	80	5.45
Basin B	**7.621**	**6.748**	**47.0%**	**14.369**	**625**	**1001**	**2.00**
Total	**11.728**	**17.018**	**59.2%**	**28.746**	**-**	**-**	**-**

POST-DEVELOPED BASIN DELINEATION
TUALATIN HIGH SCHOOL IMPROVEMENTS

Tigard-Tualatin School District
Tualatin, Oregon

PROJECT NO. 21712290
DATE: 07/11/2019
BY: DEC
EXHIBIT: 2

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Water Quality Orifice Sizing

Last Modified: *11/4/2025*

SUBJECT	Tualatin HS-Existing Condition	**BY**	LAG	**DATE**	11/4/2025
PROJECT NO.	2042713800	**CHECKED**	MCL	**DATE**	11/4/2025

Equations:

$$Q = \frac{WQV}{t \times 60 \times 60} \qquad H = \frac{2}{3} \times h' \qquad D = 24 \times \sqrt{\frac{Q}{C \times \Pi \times \sqrt{2 \times g \times H}}}$$

Input	Description	Pond 1
A	Impervious Area	**384,990** sf
WQV	Water Quality Volume	**11,550** ft^3
t	Detention time	**48** hr
Q	Water Quality Release Rate	0.067 cfs
C	Coefficient of Discharge (plate orifice)	**0.62**
g	Gravity	32.2 ft/sec^2
h'	Temp. Detention Height to CL of Orifice	**0.57** ft
H	Hydraulic head	0.380 ft
Output		
D	Orifice Diameter	**2.00** in

Water Quality Orifice Sizing

Last Modified: *11/4/2025*

SUBJECT	Tualatin HS-Restroom Improvements	**BY**	LAG	**DATE**	11/4/2025
PROJECT NO.	2042713800	**CHECKED**	MCL	**DATE**	11/4/2025

Equations:

$$Q = \frac{WQV}{t \times 60 \times 60} \qquad H = \frac{2}{3} \times h' \qquad D = 24 \times \sqrt{\frac{Q}{C \times \Pi \times \sqrt{2 \times g \times H}}}$$

Input	Description	Pond 1
A	Impervious Area	**386,990** sf
WQV	Water Quality Volume	**11,610** ft^3
t	Detention time	**48** hr
Q	Water Quality Release Rate	0.067 cfs
C	Coefficient of Discharge (plate orifice)	**0.62**
g	Gravity	32.2 ft/sec^2
h'	Temp. Detention Height to CL of Orifice	**0.57** ft
H	Hydraulic head	0.380 ft
Output		
D	Orifice Diameter	**2.00** in