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# Technical Memorandum

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## Technical Memorandum

Subject: Infrastructure Retrofit and Hydromodification Assessment Update

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Reviewed by:

A handwritten signature in cursive script, appearing to read 'Angela Wieland', written over a horizontal line.

Angela Wieland, P.E.

### Limitations:

*This document was prepared solely for Oak Lodge Water Services in accordance with professional standards at the time the services were performed and in accordance with the contract between Oak Lodge Water Services and Brown and Caldwell dated September 14, 2023. This document is governed by the specific scope of work authorized by Oak Lodge Water Services; it is not intended to be relied upon by any other party except for regulatory authorities contemplated by the scope of work. We have relied on information or instructions provided by Oak Lodge Water Services and other parties and, unless otherwise expressly indicated, have made no independent investigation as to the validity, completeness, or accuracy of such information.*

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## Section 1: Introduction/Background

Oak Lodge Water Services (OLWS') 2012 Phase 1 National Pollutant Discharge Elimination System (NPDES) municipal separate storm sewer system (MS4) permit (Permit), Schedule A.5 required OLWS to conduct a hydromodification assessment to examine hydromodification impacts related to MS4 discharges, including erosion, sedimentation and/or alteration to stormwater flow, volume and duration that may cause or contribute to water quality degradation. The assessment and resulting report were required to "identify strategies and priorities for preventing or reducing hydromodification impacts related to the co-permittees MS4 discharges... and identify or develop effective tools to reduce hydromodification". The report was required for submittal to DEQ by July 1, 2015.

Also included in the 2012 NPDES MS4 Permit, in Schedule A.6., OLWS was required to develop a stormwater quality retrofit strategy applicable to developed areas of OLWS identified as impacting water quality and underserved or lacking stormwater controls. The strategy and resulting plan were required to include "a retrofit control measure project or approach priority list, including rationale, identification and map of potential stormwater retrofit locations where appropriate, and an estimated timeline and cost for implementation of each project or approach." As with the hydromodification assessment, the plan was also due to DEQ by July 1, 2015.

Schedule A.3.h of OLWS' 2021 NPDES MS4 Permit requires co-permittees by December 1, 2023, to "consider the impacts of policy, capital improvements, and retrofit projects on MS4 discharges to receiving waters, considering the goals and proposed actions described in the 2012 Permit's Hydromodification Assessment and Stormwater Retrofit Strategy reports (i.e., the 2015 submittals). Specifically, permittees are required to prepare "an assessment of any outcomes related to the Hydromodification Assessment and Stormwater Retrofit Strategy Reports." This assessment is required to include the following:

1. An assessment of how the Hydromodification Assessment and Stormwater Retrofit Strategy have been used, considered, or implemented since the time the reports were completed (see Sections 2.1 and 3.1);
2. Progress toward or completion of projects identified in the Retrofit Strategy priority list, and a qualitative assessment of the benefits of those projects (see Section 2.2);
3. Description of any further actions taken as a result of the Hydromodification Assessment, and a rationale for those actions since the writing of the reports (see Section 3.3);
4. Narrative describing progress toward addressing gaps in the hydromodification information or data related to waterbodies within the co-permittees' jurisdiction as identified in the Hydromodification Assessment (see Section 3.2); and,
5. New goals, tools, priorities, and planned or potential projects for addressing ongoing hydromodification and/or water quality impacts resulting from historical development/infrastructure, and for improving retrofit planning, considering information gathered in the time since the completion of the reports (see Sections 2.3 and 3.4).

The Permit requires the permittees to document this assessment in the third annual report (i.e., the 2023 annual report) as an appendix or subsection. This documented assessment was prepared to fulfill this requirement. Findings and results are based OLWS' review of completed and in-progress projects, historic code implementation, and pending programmatic and regulatory activities.



## Section 2: 2015 Retrofit Strategy Summary

### 2.1 What was included in the Retrofit Strategy and how has it been used, considered, or implemented since 2015?

Incorporating water quality facilities into the existing stormwater system is known as a stormwater treatment retrofit. OLWS' 2015 Stormwater Retrofit Strategy and Plan (Retrofit Plan) established retrofit objectives and identified retrofit opportunities (projects) for future implementation.

Goals and objectives of OLWS's Retrofit Plan are like goals of OLWS' overall stormwater program and include:

- Emphasize use of non-structural methods as a preferred alternative in controlling runoff and pollution at the source.
- Emphasize protection of the ecological integrity of rivers, streams, wetlands, lakes, and riparian corridors.
- Integrate water quantity and quality to address the community's needs for surface water management with an emphasis on natural systems as a preferred alternative.
- Provide public involvement, public information, and public education to improve surface water management.
- Comply with local, state, and federal regulations regarding the protection of water quality.
- Provide funding for surface water management at a level that balances community needs and values.

These objectives aim to reduce damage to public and private property and hazards to public safety during floods, improve water quality by reducing discharge of pollutants into surface waters, and protect and enhance aquatic habitat along the creeks and wetlands within OLWS. Current measures outlined in the Retrofit Plan include implementation of capital projects, regulations, incentives, voluntary measures, and public education.

Capital project (CP) implementation is a key element of OLWS' Retrofit Plan. Project implementation status and future opportunities, along with a timeline update, are discussed in Section 2.2. CP focus has been on Boardman Creek watershed, as per recommendations of OLWS' 2011 Surface Water Management Strategic Plan, but new regional stormwater treatment facilities, retrofits of existing facilities, and natural resource restoration projects are also reflected.

To prioritize the CPs, OLWS evaluates project needs annually, and reviews previously planned projects for strategic and fiduciary viability. Most surface water CPs require multi-year funding to design and construct, which requires long term financial planning.

### 2.2 What progress has been made toward completion of projects identified in the Retrofit Strategy priority list, and what have been the benefits of those projects?

As detailed in the 2015 Retrofit Plan, seven projects were identified that reflect OLWS' objectives to 1) reduce damage to public and private property and hazards to public safety during floods; 2) improve water quality by reducing discharge of pollutants into surface waters; and 3) protect and enhance aquatic habitat along the creeks and wetlands within OLWS.

Since 2015, three identified projects were completed:



- SB-17 - Boardman Watershed Initiative: Boardman Wetland Complex (Boardman Ave to Jennings Ave). Project was completed in 2018 and includes clearing and planting of a 1.5-acre treatment wetland, as well as site improvements including construction of elevated boardwalks, walking paths, and a parking lot.
- CS-01 – Courtney Springs Basin: Regional Stormwater Facility and Riparian Restoration. Project was completed in 2016 and includes construction of a regional stormwater facility near the downstream end of the basin. Provides treatment for five acres of currently developed and untreated impervious area.
- CS-02 – New Urban High School Stormwater Retrofit. Project was completed in 2021 and includes installation of low impact development (LID) facilities including swales, cartridge filters and water quality signage in support of redevelopment.

BB-02/ BB-03 projects are both associated with the McLoughlin Blvd Corridor Stormwater Retrofits. Efforts were completed on BB-02 prior to 2015 Retrofit Plan. No additional efforts were conducted on either BB-02 or BB-03 since 2015, and there are no pending project opportunities so both projects are removed from future consideration.

Schedule of the remaining viable projects is uncertain, pending OLWS’ evaluation of funding and partnership opportunities.

OLWS is a unique jurisdiction in that they provide stormwater services for approximately 5.2 square miles of unincorporated Clackamas County. OLWS is not a city nor land use authority. As such, OLWS and Clackamas County Department of Land Use and Transportation (DTD) collectively manage stormwater assets within the OLWS boundary in accordance with a Memorandum of Understanding (MOU) dated 2013 and future updates to the MOU are anticipated in 2024.

As a result, OLWS is currently prioritizing smaller projects through their Localized Enhancement Program, while they work with neighboring jurisdictions including Clackamas County to fund larger, regional projects in the future. The Localized Enhancement Program is reflected in OLWS’ 2024-2029 Draft Capital Improvement Plan (CIP) and dedicates funding (i.e., \$300,000 annually) to fix small to medium scale, localized stormwater issues including installation of roadside surface water treatment. Funding may also support the phased implementation of CPs per the Retrofit Plan.

Table 1 summarizes those in progress or future retrofit projects per the 2015 Retrofit Plan, as well as identification of other pending CPs that provide hydromodification benefit, as discussed in Section 3.



Table 1. Oak Lodge Water Services Retrofit and Hydromodification Project Status							
Project ID	Identified in the 2015 Retrofit Plan (Y/N)	Identified in the 2015 Hydromodification Assessment (Y/N)	Project Name	Originally Anticipated Construction Date	Current Anticipated Construction Date	Project Description	Notes
SB-01		Y	Boardman Watershed Initiative: Paradise Subdivision Stormwater Retrofit	2018	TBD	Retrofit existing stormwater facility for additional treatment and flow control benefit	Boardman and Arista project is upstream, so need for this project may be impacted.
SB-08	Y	Y	Boardman Watershed Initiative: Phase 2 (Walta Vista and River Road Culvert Replacement)	2017	TBD	Culvert replacement to stabilize existing channels and minimize sediment discharge. Restore ~500' of Boeckman Creek for fish passage.	Clackamas County is the lead agency, so timing is depending on County funding. Currently on County CIP
SB-16	Y	Y	Boardman Watershed Initiative: Naef Road Culvert Replacement and Channel Restoration	2017	TBD	Daylight and restore 150' piped corridor to a natural stream channel	Dependent on Clackamas County priority.
SB-18		Y	Jennings Avenue Sidewalk: Green Infrastructure Demonstration Project	Unspecified	2024	Install LID with new sidewalk from Oatfield to River Road.	Clackamas County is the lead agency for this project.
	N	N	Boardman and Arista Flooding (at Trolley Trail)	2024	TBD	Hydraulic modeling and concept design to ease or eliminate flooding.	Pre-design efforts complete. OLWS is looking for partner agencies.



## 2.3 What are the new goals, tools, priorities, and planned or potential projects for improving retrofit planning to address water quality impacts resulting from historical development/infrastructure?

OLWS has altered their approach to their retrofit strategy by implementing a Localized Enhancement Program instead of large-scale regional capital improvements. This change allows for OLWS to complete more projects while working on funding assistance from neighboring jurisdictions.

OLWS' 2024-2029 CIP also includes the Boardman and Arista Flooding project to be initiated in 2024. Although specific water quality features are not yet identified, this project will evaluate hydraulic conditions to ease or eliminate localized flooding due to flat grade and beaver activity (see Table 1).

## Section 3: 2015 Hydromodification Assessment Summary

### 3.1 What were the results of the Hydromodification Assessment and how has it been used, considered, or implemented since 2015?

OLWS' 2015 Hydromodification Assessment included a desktop GIS evaluation and targeted field assessment, as well as a review of existing planning documents to develop strategies and approaches for addressing identified hydromodification impacts.

Per the 2015 Hydromodification Assessment, stream channels in OLWS show hydromodification impacts from past development. Observed hydromodification impacts include areas of channel incision and bed/bank erosion, areas of stream channel widening, flooding, and stream channel aggradation. Sources of hydromodification include the channelization and piping of natural stream channels, development encroachment into riparian areas, and construction of culverts and other structures. These sources of hydromodification are the result of past development activity and future development in OLWS is expected to be limited to small-scale redevelopment projects.

The Hydromodification Assessment included a variety of recommendations that centered on 1) implementation of key capital projects to increase stream corridor storage and mitigate peak flows; 2) enhancement of stormwater design standards to prioritize infiltration and low-impact development (LID) approaches to stormwater management; 3) development of an updated Surface Water Master Plan (SMP) to enhance existing data and planning for capital projects; 4) continued monitoring of known problem areas through annual inspections and documentation; and 5) prioritize locations for future property acquisition along stream channel corridors.

**Implementation of Capital Projects:** Five capital projects were recommended in Section 8 of the 2015 Hydromodification Assessment. One identified project (SB-17) was completed as detailed in Section 2.2. The remaining, identified capital projects as identified per the Hydromodification Assessment have not been completed, and three of them overlap with identified projects per the Retrofit Assessment (see Table 1). One project (SB-18) is in final design and agency permitting.

**Enhancement of Stormwater Design Standards:** Given the identified hydromodification risks per the Hydromodification Assessment, as well as new requirements per the reissued 2021 NPDES MS4 permit, OLWS anticipates completion of a more substantial update to their Design and Construction Standards by December 1, 2024. OLWS recently completed their Low Impact Development (LID)/ Green Infrastructure (GI) Strategy after completion of a larger code evaluation and literature review of other local stormwater standards that meet the retention-based performance standards per the permit.



**Development of an updated SMP:** As described previously, OLWS works in partnership with Clackamas County (CC) as CC owns the stormwater system and OLWS is responsible for cleaning and inspecting the catch basins and storm piping. In accordance with OLWS' Stormwater Management Program (SWMP) Document, OLWS is currently working with CC to update the Memorandum of Understanding (MOU) to better define the roles of OLWS and CC regarding stormwater system asset ownership by December 1, 2024.

Until ownership obligations are clarified, development of an SMP including detailed hydrologic/ hydraulic modeling of pipe capacity and identification of capital projects requiring replacement of stormwater conveyance in the right-of-way may not be appropriate given OLWS limited ownership.

**Monitoring and Property Acquisition:** Annual inspections were recommended in the Hydromodification Assessment to monitor known problem areas and proposed capital project locations. To date, OLWS monitors problem areas primarily based on communication from community members. Physical condition monitoring (in conjunction with macroinvertebrate sampling) is also reflected in the updated Clackamas County Coordinated Stormwater Monitoring Plan (CCCSMP), updated in 2023 and reflecting a July 1, 2023 implementation start date.

Property acquisition is considered an opportunistic approach and triggered if prioritized properties are subject to sale from willing owners.

### **3.2 Were there any identified gaps in the hydromodification information or data related to waterbodies within the City's jurisdiction and, if so, what progress has been made in addressing gaps?**

OLWS' Hydromodification Assessment did not identify any data gaps in either the hydromodification information or data related to waterbodies within OLWS' jurisdiction.

### **3.3 What further actions have been taken as a direct result of the Hydromodification Assessment, and what was the rationale for those actions?**

Because hydromodification impacts and risk was identified per the 2015 Hydromodification Assessment, OLWS is currently (2023) updating and refining their Design and Construction Standards for consistency with the 2021 NPDES MS4 permit, specifically to clarify the use of infiltration-based facilities (i.e., GSI). OLWS has preliminarily identified Clackamas County Water Environment Services (WES) stormwater standards as the template for their update, which also incorporate peak flow and flow duration matching standards to mitigate hydromodification risk. The update will be completed by December 1, 2024 to meet the 2021 NPDES MS4 Permit deadline.

### **3.4 What are OLWS' new goals, tools, priorities, and planned or potential projects for addressing ongoing hydromodification?**

Although no immediate implementation schedule for all CPs outlined in Table 1, the hydromodification benefit and need is understood, and OLWS will continue to coordinate with regional partners to support project implementation efforts.

Given the conclusions from the 2015 Hydromodification Assessment provided in Section 3.2 above, OLWS is focused on updating their Design and Construction standards to prioritize LID and infiltration and incorporate hydromodification-based flow control standards. This will allow for District-wide incorporation of flow mitigation in accordance with new and redevelopment.

