Educational Tools for Managing Stormwater at the Port of Tacoma:
Resources for our tenants, customers, and community

I. Summary

In Washington State, ports and their tenants are often subject to the Industrial Stormwater General Permit, part of the National Pollutant Discharge Elimination System (NPDES) regulations of the Clean Water Act. This permit has some of the lowest benchmark values in the county and has a goal of obligating all permit holders to install filtration treatment on their operations. Stormwater is the leading contributor to water quality pollution in our waterways because it picks up pollutants on roadways, sidewalks, parking lots, industrial and municipal properties. These pollutants can cause a wide range of impacts. Untreated stormwater is not safe for people to drink and is not recommended for swimming because it contains toxic metals, organic compounds, and bacteria. The Port of Tacoma (POT / the Port) and the Northwest Seaport Alliance (NWSA) hold four of these permits and have over 45 tenants who also hold the permit. Few of our tenants have dedicated water quality staff; POT and NWSA are committed to helping tenants successfully manage compliance for their operations.

The POT and NWA's entry is a package of documents and a web tool used to raise awareness concerning water quality in a port setting. The Port Environmental team has committed to cleaning up and improving both habitat and water quality. To accomplish

this goal, the Port Water Quality team has created a series of informational documents and web features for different levels of involvement around Stormwater Management including the Port of Tacoma BMP Playbook (2021) and our *Tenant Support Materials* which include the Stormwater Management Program Plan (2022), the Stormwater Management Compliance Guide for Tenants (updated 2022), and the Effluent Curve Template (updated 2022). The water quality team also developed the Port of Tacoma Stormwater Quality StoryMap (updated March 2022) as a summary of actions POT and NWSA have taken to successfully manage water quality.

The Port developed each of these educational resources to share the story of our successes, challenges, and lessons learned minimizing stormwater impacts on receiving water bodies.

The first document is the *BMP Playbook.* For each facility operation or activity, multiple BMPs may be applicable. To simplify BMP selection for tenants, the common types of operations have been categorized into ten operational categories in this document. The facility operational categories are as follows:

- Breakbulk Operations: includes stevedoring (i.e., loading and unloading) of large individually stored products and materials such as machinery, equipment, and scrap metals.
- Bulk Facilities: includes log yards; refineries; and concrete, cement, aggregate, and grain facilities.
- Commercial Facilities: includes leased buildings, parking facilities, and office buildings.
- Foundries: includes metal casting.
- Maintenance Facilities: includes boat, automotive, and equipment maintenance.

- Manufacturing Facilities: includes chemical wholesalers, wood product, and asphalt-shingle manufacturing.
- Railroad Yards: includes paved and unpaved rail and sort yards.
- Recycling, Hazardous Waste, and Treatment, Storage, and Disposal (TSD) Facilities: includes scrap metal recycling and solid waste disposal facilities.
- Warehousing and Transload Facilities: includes refrigerated warehouse and shipping facilities.
- Wheeled Operations: includes intermodal yards, auto warehousing, trailer chassis operations, transload truck and container services.

The *BMP Playbook* includes tables describing the ranges of pollutant loading at POT facilities observed from 2010-2020, and specific treatment BMP effectiveness and maintenance costs for operational facility categories. For example, based on the type of pollutant loading at a rail yard, POT staff installed membrane filtration to capture the solids from rail operations. Additional polishing, if needed, can be matched up with media filtration for dissolved metals. Further, *BMP Guidance* are included and titled in accordance with the various facility types. The *BMP Guidance Sheets* demonstrate typical pollutant sources and associated stormwater contaminants correlated with applicable operations and treatment solutions (BMPs) at a facility.

POT / NWSA *Tenant Support Materials* including the *Stormwater Management Program Plan* (SWMP) and *Stormwater Management Compliance Guide for Tenants* provide compliance information to Port and tenant employees, document how staff find and eliminate illicit discharges, map stormwater conveyance systems, monitor water quality, implement best management practices (BMPs), and treat stormwater where appropriate. Highlights of the *Stormwater Management Compliance Guide for Tenants* include repairs

and maintenance, illicit discharges, Stormwater Pollution Prevention Plan (SWPPP) development and implementation, emergency spill response, mandatory operational best management practices, and treatment source control. These tools help our tenants with the required Port policies as well as BMPs required by stormwater permits.

Created for Earth Day 2021, *the Port of Tacoma Stormwater StoryMap* is a web-based graphic publication generated through the ESRI platform. POT used this tool to showcase the strategic water quality investments the Port and its tenants have made in our harbor and community to protect and enhance our environment. POT protects and enhances the environment of Commencement Bay and the Puyallup River by continuing to clean up contaminated land, improve habitat and water quality, and minimize air emissions from Port operations. The Water Quality team supports this vision by investing in projects that improve the quality of stormwater runoff from Port properties, embodying best practices and empowering our tenants to comply with complex permits. The StoryMap allows users to learn about POT's water quality improvement projects and how they provide continuous improvement and enhancement to the Tacoma Tideflats.

II. Goals and Objectives

The goal of these educational tools is to provide a comprehensive package of resources for our tenants and other partners to highlight the lessons learned from navigating the complex nature of stormwater management in a port setting, and to share our expertise with the industry and community. POT / NWSA staff developed this resource with the goal of helping Port customers and other ports benefit from the stormwater treatment systems POT has piloted and successfully implemented. The *BMP Playbook* in combination with the *Tenant Support Materials* and our *Stormwater StoryMap* dives into how the NWSA / POT

tackles the issue of managing stormwater compliance and the challenges of doing so in a predominantly industrial and commercial area. The intent is to provide awareness and tools to our partners, educate our tenants and Port customers, and involve the community in how to successfully mitigate negative impacts to water quality.

The objective of the *BMP Playbook* was to showcase the lessons the Port has learned over the last decade in stormwater run-off treatment. It highlights the challenges of the various operations found in a port setting, and how the Port worked to address those challenges with innovative solutions. Most importantly, it was designed as a tool for various partners that include our tenants, government agencies, and others with operations classified under the industrial activities described in the Industrial Stormwater General Permit (ISGP).

The overall objective of the *Port of Tacoma Stormwater Quality StoryMap* is to share with the community how the Port manages water quality in a port setting and the challenges that accompany that task. It allowed the Port to integrate information (narrative, pictures, videos) and interactive maps into an easily accessible web-based platform available to the anyone with internet access. This online resource is a straightforward way for the public to interact with the displayed data, and for the Port of Tacoma to tell its story on how and where the work is done. The StoryMap includes opportunities for community involvement, including simulations of ways users can reduce the amount of run-off and help reduce stormwater pollution at the source.

The objective of the tenant support materials, including the *Stormwater Management Compliance Guide for Tenants*, *Stormwater Management Program Plan* (SWMP) and *Effluent Curve Template,* are to explain to our tenants what stormwater is, how it is regulated, and their responsibilities. These responsibilities include but are not limited to: determining if their operations require ISGP coverage, illicit discharges, spill response,

Stormwater Pollution Prevention Plan (SWPPP) implementation, and the basics of stormwater management, which includes mandatory operational BMP's, treatment source control, and SWPPP's.

The objective of the Stormwater Management Plan is to provide an overall view of how the Port plans to address each component of MS4 permit, detailing what the permit requires and details what the Port is doing about it. This information is pertinent to our tenants who do not hold an ISGP and are subject to the POT's MS4 permit. This plan is updated annually.

The purpose of the *Effluent Curve Template* is to generate a percent-exceedance curve, which is useful to calculate the theoretical performance of a treatment technology prior to purchasing and installing a device. For instance, if a customer has a treatment system design different from the ones listed in the manuals, the *Effluent Curve Template* is an effluent curve based on the ISGP common benchmark values. The Port encourages our tenants to conduct pilot studies to ensure the treatment they choose will meet their operational permit requirements after construction.

III. Discussion

A. Background

As part of the Port of Tacoma Strategic Plan 2021-2026, our mission at the Port is to make strategic investments in our harbor and community to promote prosperity, trade and jobs, while protecting and enhancing our environment. To further our key role in the community and beyond, the Port has established environmental leadership as one of five foundational goals that guides our priorities through 2026.

Environmental leadership means is the Port protects and enhances the environment of Commencement Bay and the Puyallup River by continuing to clean up contaminated land, improve habitat and water quality, and minimize air emissions from Port operations. The Port strives towards this goal by investing in projects that improve the quality of stormwater runoff from Port properties, embodying best practices, and empowering tenants to comply with complex permits. With those objectives in mind, these educational tools were created as a compilation of resources to educate and raise awareness to our tenants and other community partners.

The Port has piloted dozens of treatment systems, tuning filtration media to meet the specific stormwater chemistry of each operational type. The valuable information attained through experimentation led to the creation of the *BMP Playbook*. The simplified layout allows a facility operator to easily categorize their operation, use the associated *BMP Guidance Sheets* to determine which BMPs need to be implemented, and if treatment is necessary, a comparison of treatment types and cost effectiveness.

The *Port of Tacoma Stormwater Quality StoryMap* is user friendly, easily accessible, and consistently updated to display the story of our Water Quality program and the strategies used to ensure stormwater run-off is safe to discharge into the environment. Port GIS staff update treatment system types and locations to give the most current snapshot of water quality treatment in the Tacoma Tideflats. This allows current tenants to view what other similar operations are using to successfully manage their stormwater.

The *Tenant Support Materials* are provided not only to all tenants on Port property, but to anyone who will benefit from them. Many Port tenants need assistance with stringent requirements of stormwater permits in Washington State. This comprehensive package of educational resources was developed with the specific purpose of creating a roadmap for

success to managing pollution prevention on Port property. With this work, POT and NWSA strives to change the narrative that this industry causes more harm than good to the environment. POT and NWSA will continue to utilize our voice in the industry and community to promote strategic, cost-efficient solutions to stormwater management and compliance.

B. Methodology

The Port strategically communicated quality information to our partners to educate and raise awareness about stormwater management compliance and how to mitigate the challenges. Staff determined the best way to reach a wide audience was to diversify the communications approach. In turn, the ability to share these educational tools both in-person and online has allowed more opportunities for the information to be accessed and implemented. When staff participates in conferences or workshops, they are equipped with all these resources and are readily available to assist whoever is interested in how the Port addresses stormwater management.

C. How the Project Meets the Award Criteria

1. The level and nature of benefits to environmental quality, beautification, or community involvement

Managing stormwater compliance in a Port setting is challenging; the Washington State Department of Ecology permit is particularly stringent. The goal of these publications is to raise community awareness and help NWSA / POT tenants manage their permit compliance by implementing the proven effective best management practices for their operations. POT / NWSA tenants are the primary audience for these materials, as the greatest benefit is for them to implement operation specific BMPs so they can minimize their operations impact on the environment and minimize potential pollution sources from entering the

waterways. By educating our partners about the issues, NWSA / POT is creating an educated community that can promote and participate with NWSA / POT stewardship opportunities. An elevated focus on water quality standards ensures a healthy ecosystem and environment for the community to enjoy.

2. The level of independent involvement and effort by the Port

The *BMP Playbook* was created using information from past Port water quality projects. Many of these projects were "first of their kind" installations and required iterations on media and fine tuning to obtain the highest pollutant loading possible. NWSA / POT utilized consulting services to organize the final publication. The information in the tables describing ranges of pollutant loading at POT Facilities, and treatment BMP effectiveness and maintenance costs for operational facility categories, stem from over a decade of data collection by Port staff. The Port's Water Quality staff created the *BMP Playbook One-pager* advertisement. The Stormwater Management Compliance Guide for Tenants was produced internally as well, with minimal involvement of a graphic design consultant. The *Port of Tacoma Water Quality StoryMap* was also a project built independently by POT / NWSA Water quality and GIS staff. The information on treatment devices and source control measures are updated periodically to reflect accurate data and current conditions. We partner with our tenants and work together to set them up for success.

3. The creativity of the solution or programs

The NWSA / POT Water Quality team realized it would take multiple pathways to reach the entire community. The concept of the *BMP Playbook* was to share what the Port has learned in 15 years of treatment system experimentation to the broadest possible audience. The playbook is an educational piece that shares useful information to our tenants, ports, and others who likely encounter similar obstacles to managing water

quality. The next iteration of the playbook will include a pollutant loading calculations "how to" and a guide to retrofit existing infrastructure to save construction costs and operational downtime. Creativity is evident in the development of the *StoryMap* and *Tenant Support Materials* as Port GIS staff strategically identified and communicated pertinent information in a logistical manner. These tools are educational, easy to navigate, and provide innovative solutions to overcome the challenges expressed within.

4. Whether the project or program results are apparent

The StoryMap generated 151 views in April 2022. The below table shows the StoryMap performance statistics since December 18, 2020.

Platform	Impressions	Likes	Comments	Shares
LinkedIn	3,095	85	4	0
Facebook	1,488	54	2	2
Instagram	788	78	0	0
Twitter	484	5	0	1
Total	**5,855**	**222**	**6**	**3**

In the past 365 days, the url "Water Quality | Port of Tacoma" received 484 unique page views. Since January 1, 2022, it has received 235 unique page views. In the month of April 2022, it received 57 unique page views which is a 40% increase in monthly traffic. During the month of April, the port and NWSA communications teams were creating daily social media posts about the environmental work that has occurred and is ongoing in the Tacoma Tideflats.

5. Cost effectiveness of the activity or program

The water quality team had a dedicated budget of $20,000 for contracted services work developing the *BMP Playbook*. The findings and guidance came from data extracted from internal stormwater treatment pilot studies at the Port and from sampling data in the Washington State environmental database. The *BMP Playbook One-Pager* and the *Port of Tacoma Stormwater Quality StoryMap* were developed solely by internal staff without a dedicated budget. Port staff were solely responsible for all the narrative, video production, design, animation, and media placement. Periodic updates to the StoryMap are managed internally as well, providing routine maintenance of relevant information. The tenant support materials were mainly developed by internal staff with the help of some graphic design consultant work. All these resources are posted in a digital format to our website, cutting costs associated with printing and distributing the materials. Overall, the use of internal Port staff to compile these resources was done so in an efficient and cost-effective manner.

6. The transferability of the technology or idea to the port industry

The technology and idea of the publications in this entry are easily transferrable to the port industry as they are available digitally. The *BMP Playbook, StoryMap*, and *Tenant Support Materials* are conveniently posted on our organization's Water Quality website, providing 24-hour access to the public. Additionally, since new technology was not purchased to create the *StoryMap*, ongoing maintenance and support beyond internal staff is not needed. The technology is easily transferable to other entities that have GIS capabilities and staff dedicated to making and maintaining a quality product. The ESRI StoryMap platform is a dynamic informational tool that ports can use for a variety of

subjects, not just water quality, and is envisioned to be a living timeline for not only today, but also into the future to update, refine, and build upon the Port's story.

The most important outcome of these materials is the transfer of POT / NWSA's 15 years of treatment system design to other ports. Our trials, experiments, pilot studies, and successes can save other, similar operations significant time and capital. The use of mixed media–video and print–increases accessibility to the broadest possible audience. Working with our communications team, we have ensured that we can reach the near-Port community as well as other stormwater practitioners and those subject to the permit.