Industrial Waterfront Stormwater Conveyance Retrofit & Treatment

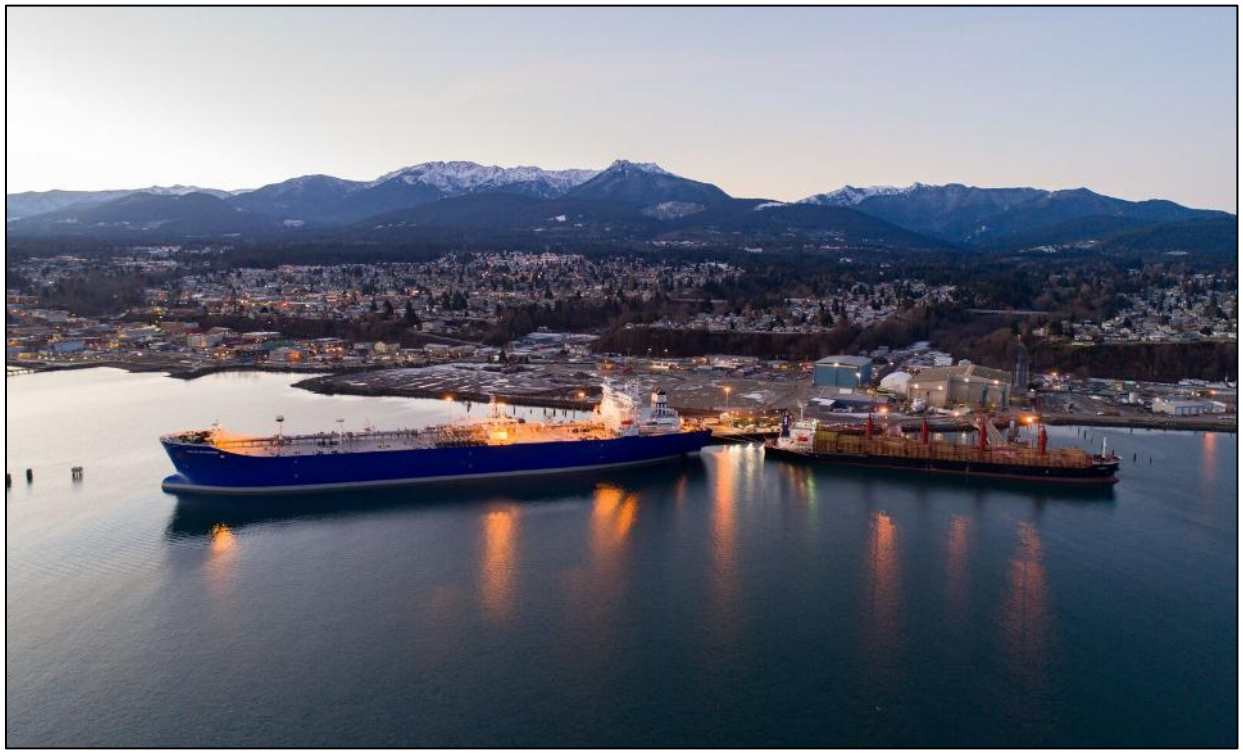
Chris Hartman, PE, Director of Engineering

September 26, 2019

PORT of Port Angeles

Discussion Topics

- Port of Port Angeles
- WA Industrial Stormwater General Permit (ISGP)
- Stormwater Treatment Alternatives
- Pilot Study
- Treatment Design
- Project Challenges & Updates



PORT of Port Angeles

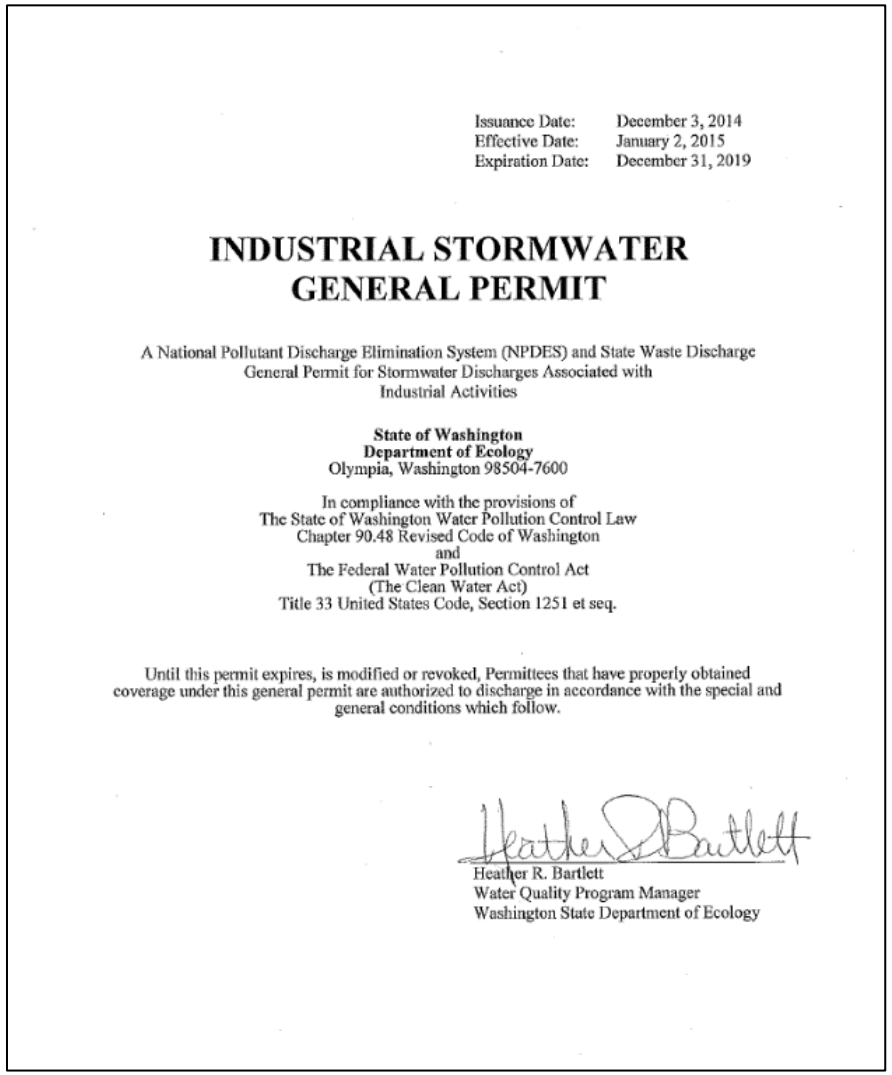
Port of Port Angeles Overview

- Established in 1923
- Located on WA's Olympic Peninsula
- Operates, manages, and makes capital improvements in marine facilities, marinas, airports, and industrial facilities

PORT of Port Angeles

WA Industrial Stormwater General Permit

- Requires monitoring to demonstrate compliance w/ water quality benchmarks
- Log handling facilities typically struggle to meet ISGP benchmarks
  - Log debris directly impacts TSS & COD
  - COD is difficult to remove
    - Largely dissolved
    - Fine particulate matter
- MT & CSA are no exception
  - Level 2: copper, TSS, COD
  - Level 3: turbidity & copper



Issuance Date: December 3, 2014
Effective Date: January 2, 2015
Expiration Date: December 31, 2019

INDUSTRIAL STORMWATER GENERAL PERMIT

A National Pollutant Discharge Elimination System (NPDES) and State Waste Discharge General Permit for Stormwater Discharges Associated with Industrial Activities

State of Washington
Department of Ecology
Olympia, Washington 98504-7600

In compliance with the provisions of
The State of Washington Water Pollution Control Law
Chapter 90.48 Revised Code of Washington
and
The Federal Water Pollution Control Act
(The Clean Water Act)
Title 33 United States Code, Section 1251 et seq.

Until this permit expires, is modified or revoked, Permittees that have properly obtained coverage under this general permit are authorized to discharge in accordance with the special and general conditions which follow.

Heather R. Bartlett
Water Quality Program Manager
Washington State Department of Ecology

PORT of Port Angeles

WA Industrial Stormwater General Permit

Table 2: Benchmarks and Sampling Requirements Applicable to All Facilities

Parameter	Units	Benchmark Value	Analytical Method	Laboratory Quantitation Level [a]	Minimum Sampling Frequency [b]
Turbidity	NTU	25	EPA 180.1 Meter	0.5	1/quarter
pH	Standard Units	Between 5.0 and 9.0	Meter/Paper [c]	±0.5	1/quarter
Oil Sheen	Yes/No	No Visible Oil Sheen	N/A	N/A	1/quarter
Copper, Total	µg/L	Western WA: 14 Eastern WA: 32	EPA 200.8	2.0	1/quarter
Zinc, Total	µg/L	117	EPA 200.8	2.5	1/quarter

Parameter	Units	Benchmark Value	Analytical Method	Laboratory Quantitation Level [a]	Minimum Sampling Frequency [b]
5. Timber Product Industry (24xx), Paper and Allied Products (26xx)					
COD	mg/L	120	SM5220-D	10	1/quarter
TSS	mg/L	100	SM2540-D	5	1/quarter
6. Transportation (40xx – 44xx, except 4221-25), Petroleum Bulk Stations and Terminals (5171)					
Petroleum Hydrocarbons (Diesel Fraction)	mg/L	10	NWTPH-Dx	0.1	1/quarter

PORT of Port Angeles

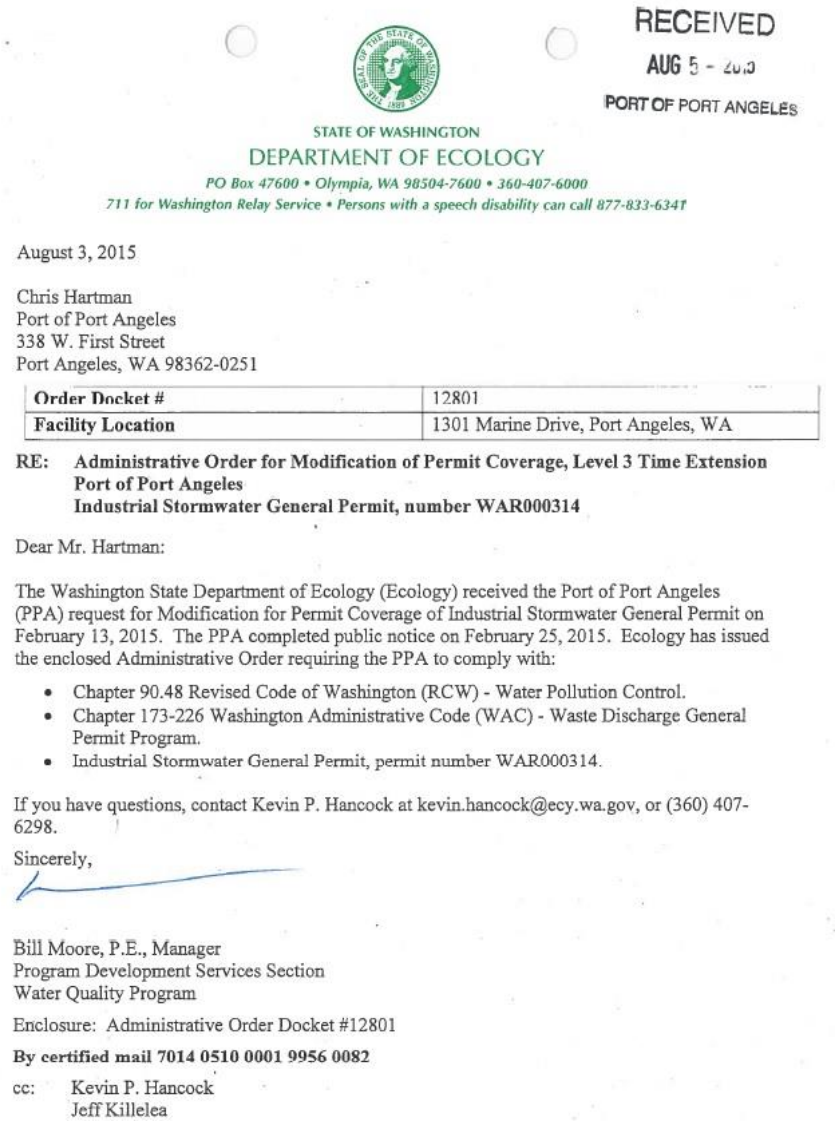
ISGP Corrective Action Process

- Level 1
  - Exceed parameter benchmark once w/in year
  - Operational BMP
- Level 2
  - Exceed parameter benchmark twice w/in year
  - Structural BMP
- Level 3
  - Exceed parameter benchmark three times w/in year
  - Prepare & submit engineering report
  - Install Treatment

PORT of Port Angeles

Ecology Administrative Order

- Port received Administrative Order August 2015.
- Negotiated time extension. Originally requested 5 years, but was granted 3 years to implement treatment



RECEIVED
AUG 5 - 2015
PORT OF PORT ANGELES

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 47600 • Olympia, WA 98504-7600 • 360-407-6000
711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

August 3, 2015

Chris Hartman
Port of Port Angeles
338 W. First Street
Port Angeles, WA 98362-0251

Order Docket #	12801
Facility Location	1301 Marine Drive, Port Angeles, WA

RE: Administrative Order for Modification of Permit Coverage, Level 3 Time Extension
Port of Port Angeles
Industrial Stormwater General Permit, number WAR000314

Dear Mr. Hartman:

The Washington State Department of Ecology (Ecology) received the Port of Port Angeles (PPA) request for Modification for Permit Coverage of Industrial Stormwater General Permit on February 13, 2015. The PPA completed public notice on February 25, 2015. Ecology has issued the enclosed Administrative Order requiring the PPA to comply with:

- Chapter 90.48 Revised Code of Washington (RCW) - Water Pollution Control.
- Chapter 173-226 Washington Administrative Code (WAC) - Waste Discharge General Permit Program.
- Industrial Stormwater General Permit, permit number WAR000314.

If you have questions, contact Kevin P. Hancock at kevin.hancock@ecy.wa.gov, or (360) 407-6298.

Sincerely,

Bill Moore, P.E., Manager
Program Development Services Section
Water Quality Program

Enclosure: Administrative Order Docket #12801

By certified mail 7014 0510 0001 9956 0082

cc: Kevin P. Hancock
Jeff Killelea

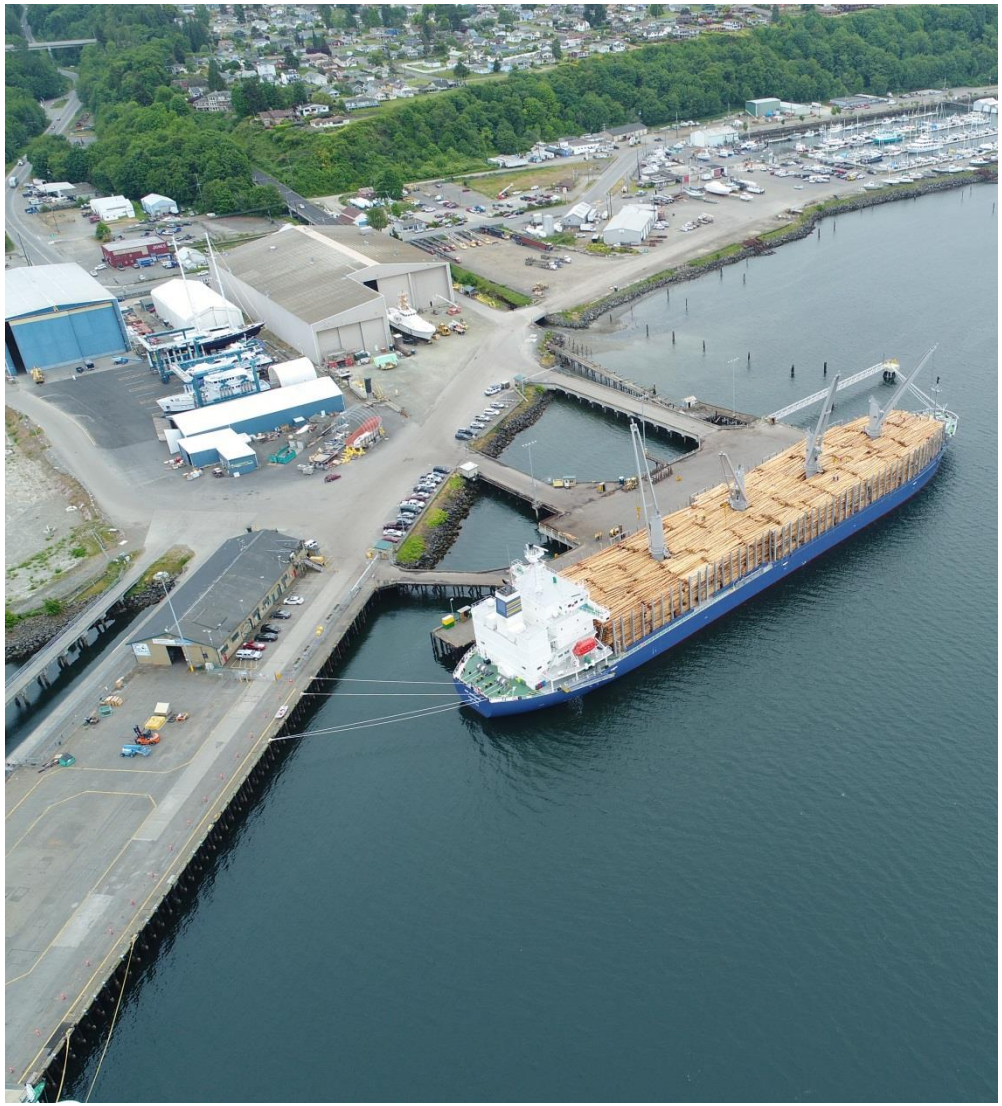
PORT of Port Angeles

Project Overview

PORT of Port Angeles

Marine Terminal & Cargo Surge Area

- Marine Terminal (MT)
  - Approx. 8 acres
  - Over-water pier & upland areas
  - Log loading & transport
- Cargo Surge Area (CSA)
  - Approx. 5 acres
  - Log handling & chip storage



PORT of Port Angeles

Phase 1 - Conveyance and Source Control

PORT of Port Angeles

Phase 1 - Conveyance and Source Control

PORT of Port Angeles

2017 -Stormwater Treatment Alternatives

- Bench-scale testing
  - Sand Filtration
  - CESF
  - Biochar
  - Coagulant + Treatment
- Indicated that a passive, biofiltration system may be a viable option

Figure 4: Raw and Treated Water Comparison

From left to right: Raw water, Post-decant, Post-CESF, Post-Biochar

PORT of Port Angeles

Pilot Scale Study

- Goal: meet benchmarks while minimizing footprint
- Port constructed, trouble-shot, & ran study
- Used 250 gallon totes to mimic biofiltration system
  - Layers BSM & drain rock
  - Used head tank to load totes
  - Vary flowrate to test different infiltration rates

PORT of Port Angeles

Pilot Study Results

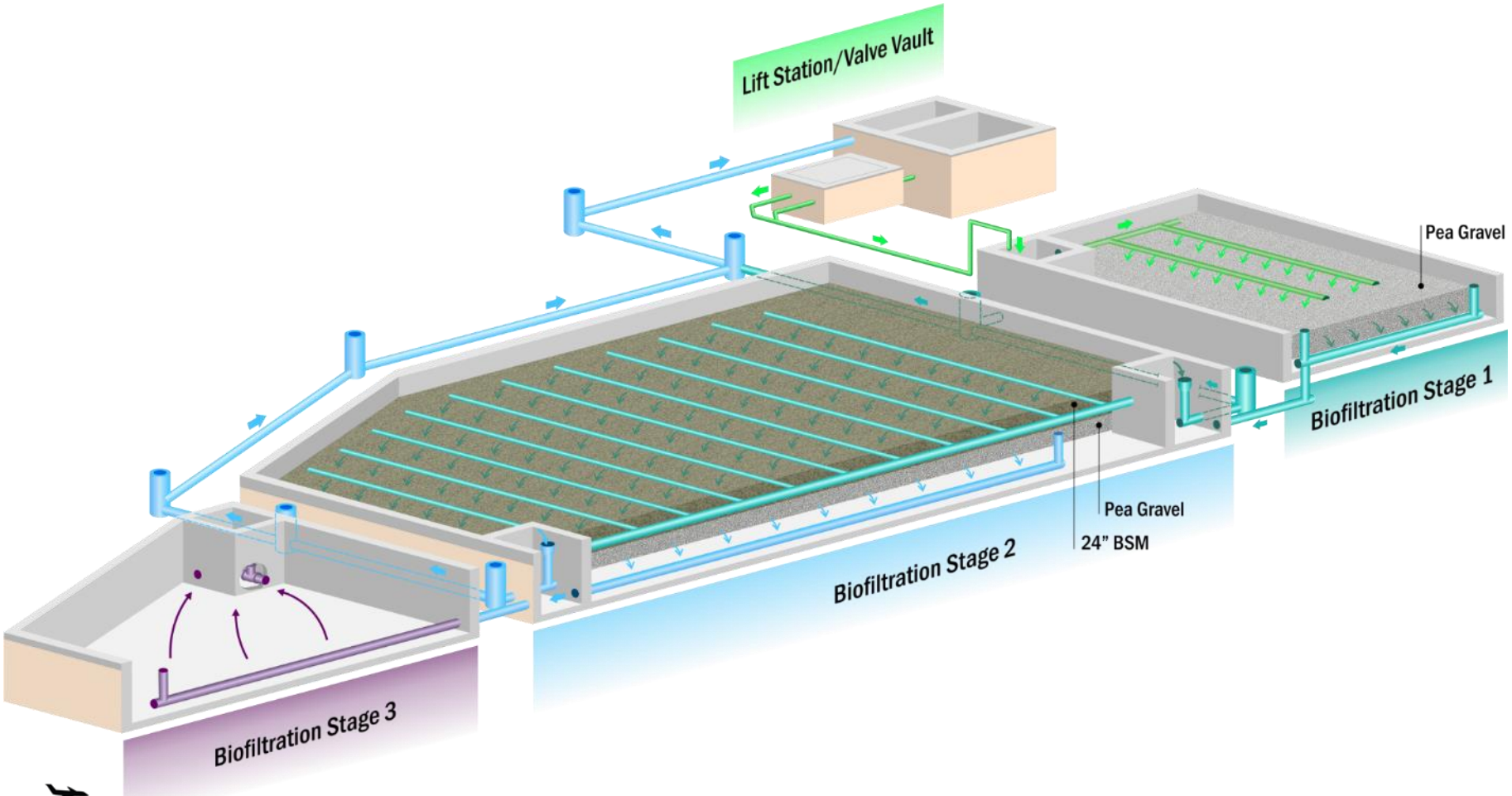
Average % Reduction seen in test

Parameter	24”/hr.	18”/hr.
Turbidity (NTU)	89%	93%
TSS (mg/L)	94%	94%
Total Cu (ug/L)	92%	89%
Total Zn (ug/L)	91%	93%
Total COD (mg/L)	8%	22%

- Biofiltration reduced concentrations of most parameters by 90%
  - Parameter concentrations were reduced below benchmarks
- Biofiltration is an applicable treatment option

PORT of Port Angeles

Treatment Design



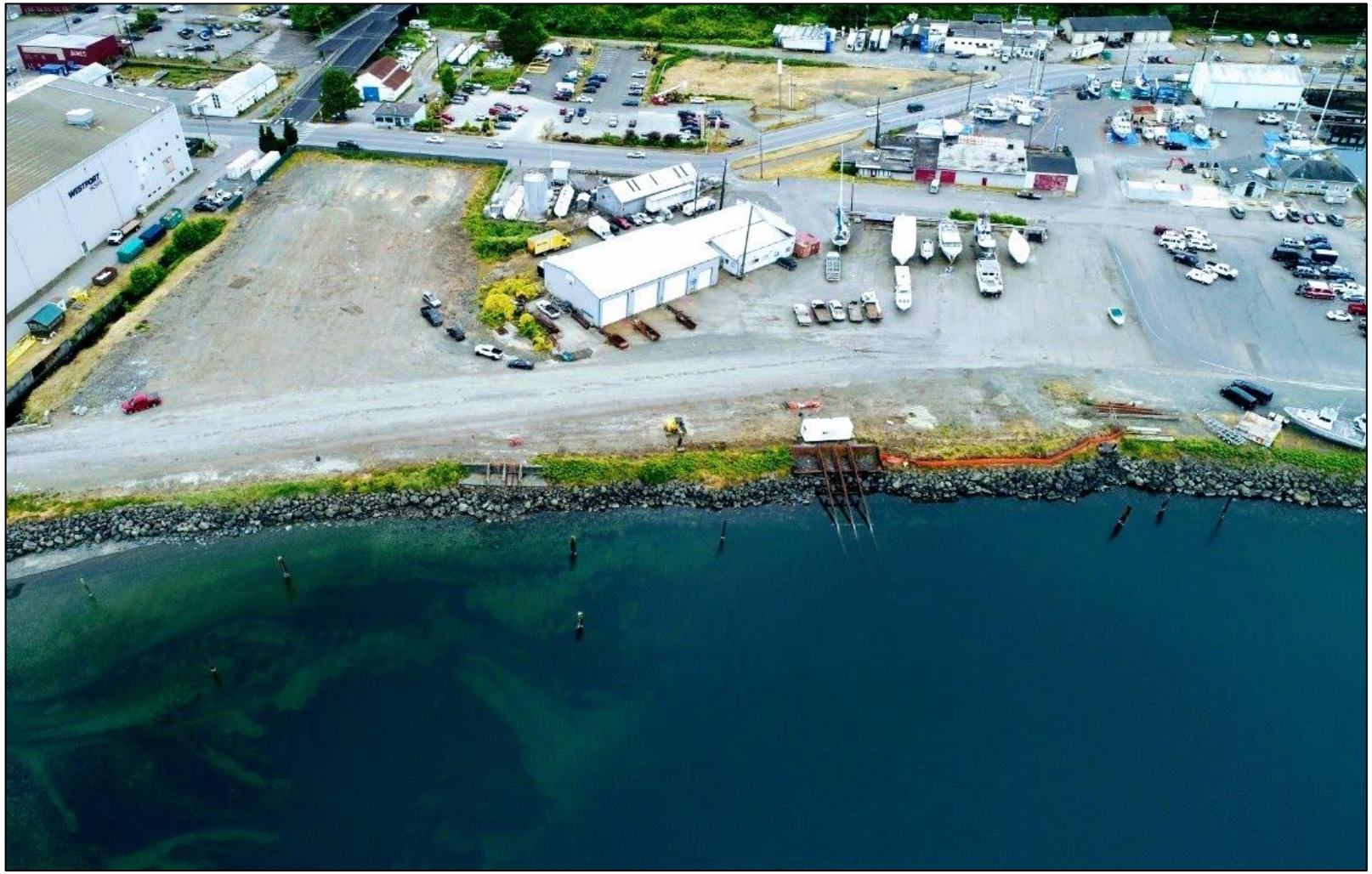
PORT of Port Angeles

Treatment Design

- 3-stage biofiltration system
  - Stage 1: Pretreatment (pea gravel)
  - Stage 2: Treatment (BSM)
  - Stage 3: Polishing
    - To be determined adsorptive media mix
- 24”/hr. design infiltration rate
- Benefits
  - Passive Treatment
  - Easy to maintain
  - Allows easy visual inspection
  - No chemicals
  - Low O&M costs
- Similar system at Port of Tacoma has achieved consistent attainment

PORT of Port Angeles

Phase 2 - Treatment - Initial



PORT of Port Angeles

Phase 2 – Treatment – Subgrade Prep

PORT of Port Angeles

Phase 2 – Treatment - Footings

PORT of Port Angeles

Phase 2 – Treatment System

PORT of Port Angeles

Phase 2 – Treatment System

PORT of Port Angeles

Phase 2 – Conveyance & Source Control

PORT of Port Angeles

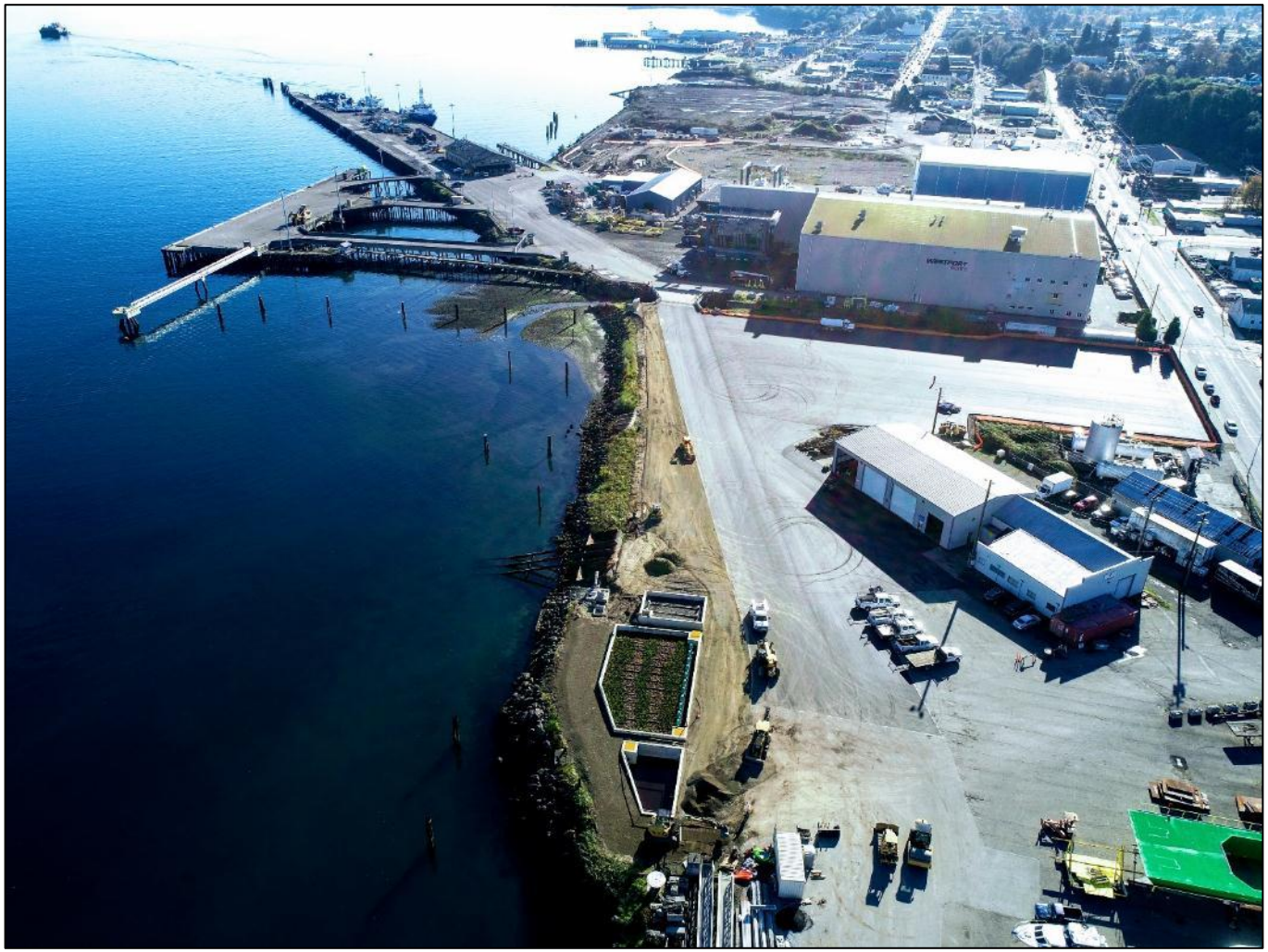
Phase 2 – Treatment – Media Install

PORT of Port Angeles

Phase 2 – Treatment – Media Install

PORT of Port Angeles

Project Complete



PORT of Port Angeles

Project Complete

PORT of Port Angeles

Project Complete

PORT of Port Angeles

BEFORE

PORT of Port Angeles

AFTER

PORT of Port Angeles

Project Challenges & Updates

- **Challenges:**
  - Tribal coordination / archaeology
  - Short construction schedule – administrative order
  - Existing tenants & ship loading
  - Operator strike
  - BSM mix failed infiltration testing
  - Pilot test for Polishing stage will take place this fall / winter

PORT of Port Angeles

PORT of Port Angeles