Port of Tacoma Stormwater Management Program

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Port of Tacoma
People. Partnership. Performance.

Issue of Statewide Significance

- Stormwater is the #1 contributor of pollutant to to the Puget Sound
- Ecology's #1 priority
- Threatens our waterway clean-up efforts
- Significant compliance and citizen suit risks

- *"Stormwater runoff is damaging salmon habitat. It's the Number 1 water pollution problem in the urban areas of our state, and it causes and contributes to flooding,"* Ecology publication #07-10-058

Strategic Plan

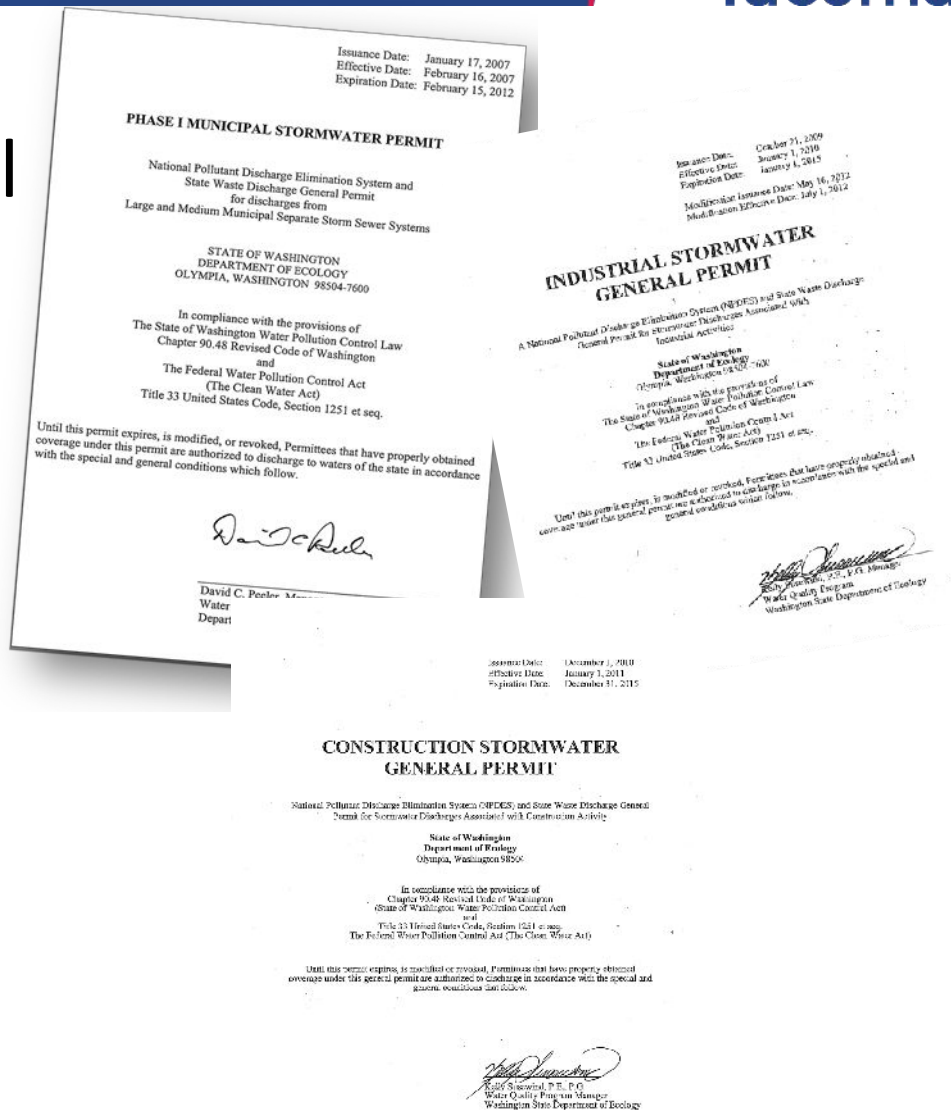
- **Goal #5**: Advance Environmental Stewardship
- **Objective:** Partner to find innovative solutions to our customers' environmental challenges
  - **Initiative:** Identify and develop maritime industrial stormwater treatment best management practices

Presentation Objectives

- Why stormwater management is so important
- How complex stormwater management has become
- What an integrated program looks like

Permit types that apply to Port property

- Phase I Municipal Permit (Municipal)
- Industrial Stormwater General Permits
- Construction Stormwater Permits



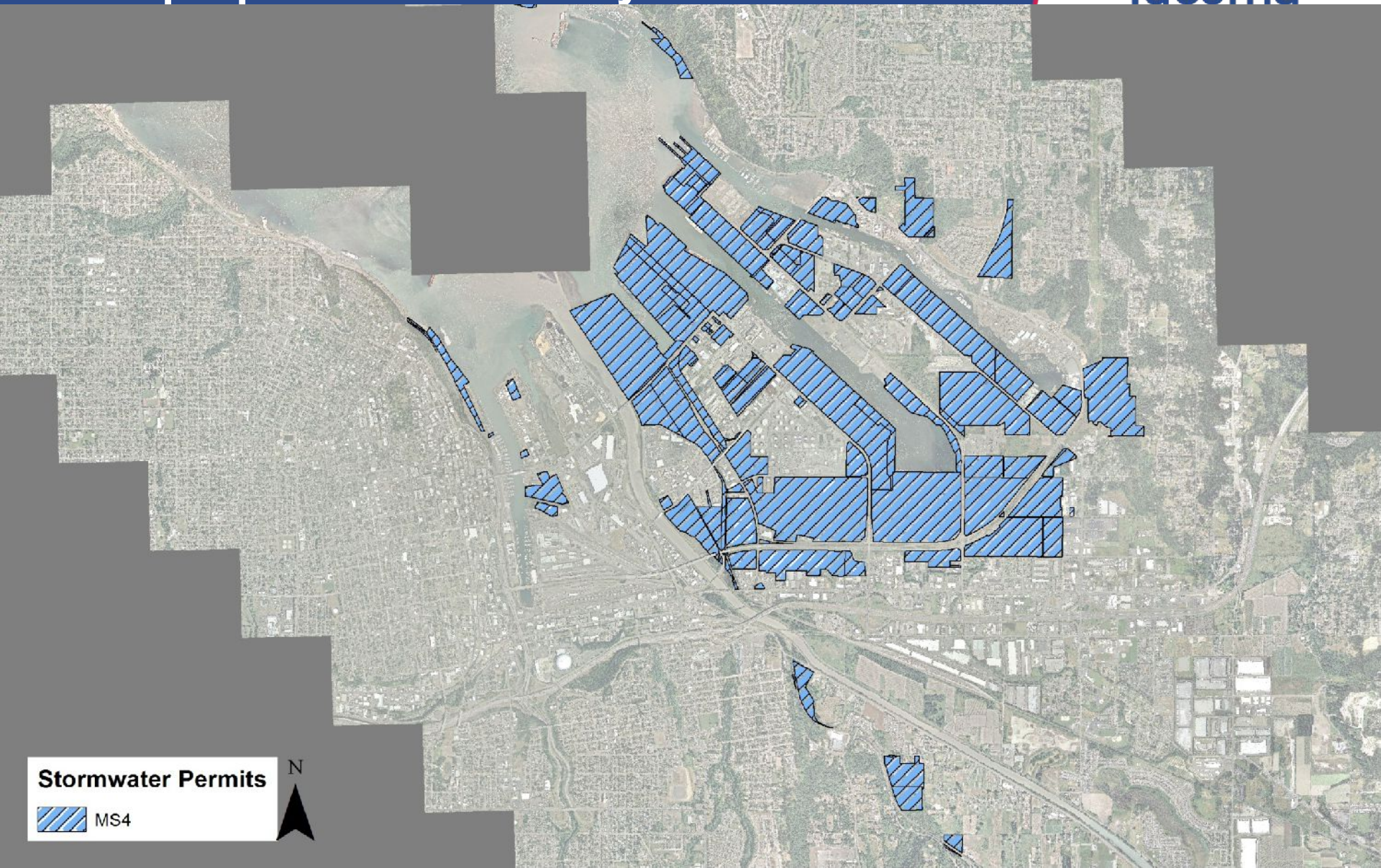
Phase I Municipal General Stormwater Permit

- Mandated to large container Ports
  - Port of Tacoma
  - Port of Seattle
- Requires the Port(s) to regulate like a city or county
  - Insure proper documentation
  - Inspect and report illicit discharges
- Substantial administrative requirements
  - Review and permit

Phase I Municipal General Stormwater Permit Continued

- Stormwater treatment requirements
  - Review and analyze proposed treatment
  - Port and tenant development
- Inter local Agreement with the City of Tacoma
  - Define roles and responsibilities
  - Cost for service

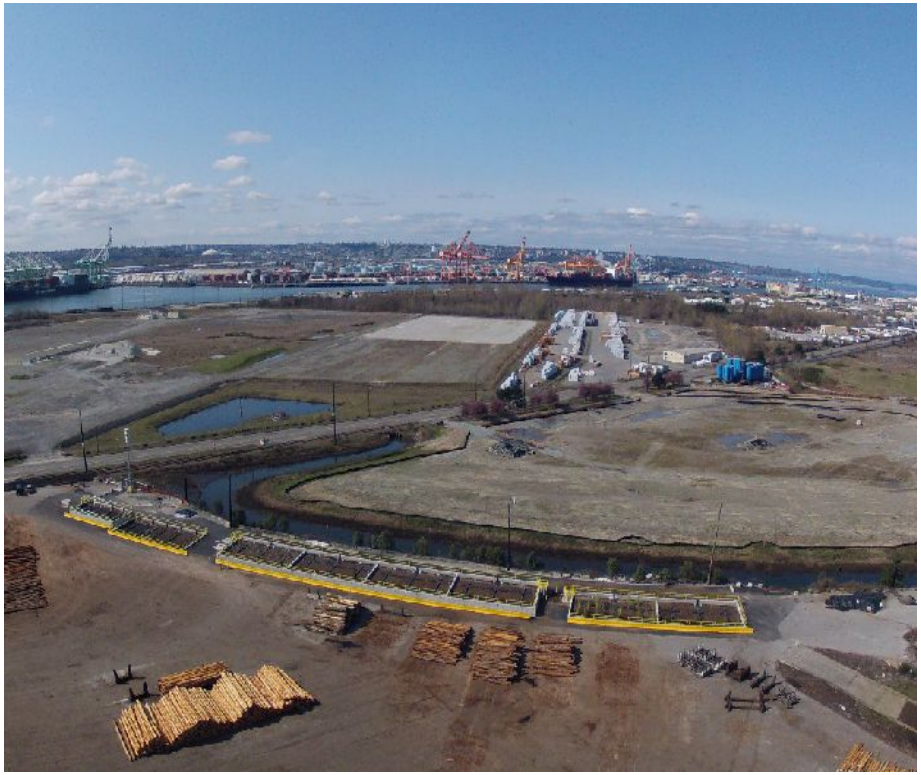
Port properties covered by MS4 Permit



Industrial Stormwater General Permit (ISGP)

- Applies to the majority of port related uses
- State Benchmarks

Parameter	Benchmark
Zinc	117 µg/L
Turbidity	25 NTU
pH	5.0 - 9.0
Copper	14 µg/L
Chemical Oxygen Demand	120 mg/L
Total Suspended Solids	30 mg/L
Diesel	10 mg/L
Oil Sheen	No visible



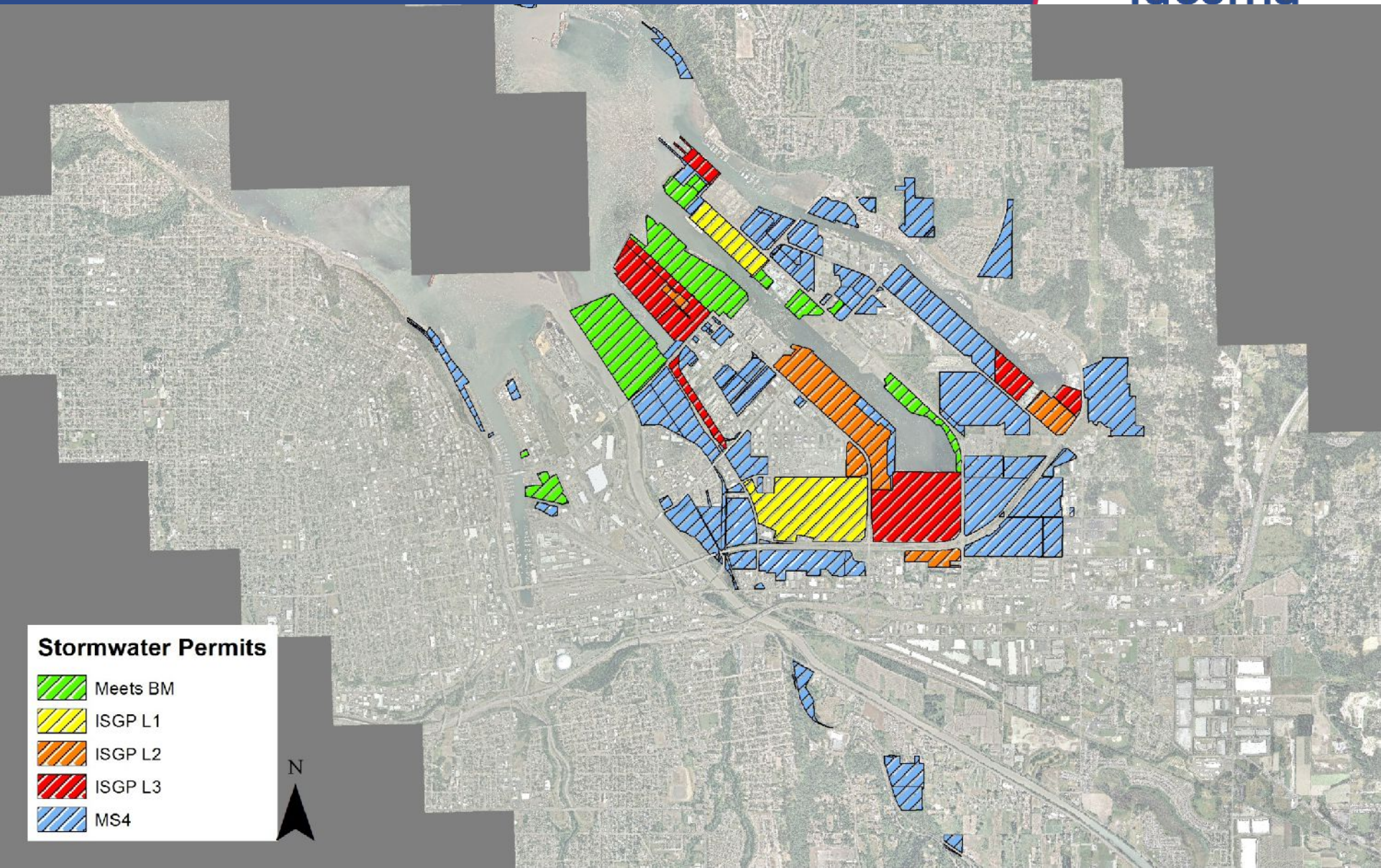
Log yard biofiltration system

Industrial Stormwater Permit General (ISGP)

- Discharges above benchmarks must take actions
- Action Levels

1 QTR	Level 1	Operational BMPs
2 QTR	Level 2	Structural BMPs
3 QTR	Level 3	Treatment BMPs

2014 ISGP Facilities in Corrective Actions



Industrial Permit Corrective Action Examples

- Log Yards
- Rail Yards
- Container Terminals

Logyard ISGP Retrofit from September 2013 To December 2014

TPT	Bench-marks	Q1/2015	Q4/2014	Q3-2014	Q2-2014	Q1-2014	Biofiltration system constructed	Q4-2013	Q3/2013	Q2/2013	Q1-2013
Turbidity	25	3.6	13.5	23.2	11.4	24.5		212	428	>1000	>1000
Zinc	117	21.2	5.7	<0.5	9	16.4		102	281	149	302
Copper	14	4.2	12.5	<0.5	2.8	6		10.3	26.3	24	36.6
COD	120	38	85	76	200	310		290	890	1100	2200
TSS	100	1.5	3.5	15	9.5	12		94	410	610	570

2013 Project cost: $4.7M

August 2011

July 2014

ISGP Level 3 Retrofit - Logyard

COD reduced 98.7%

Turbidity reduced 99.6%

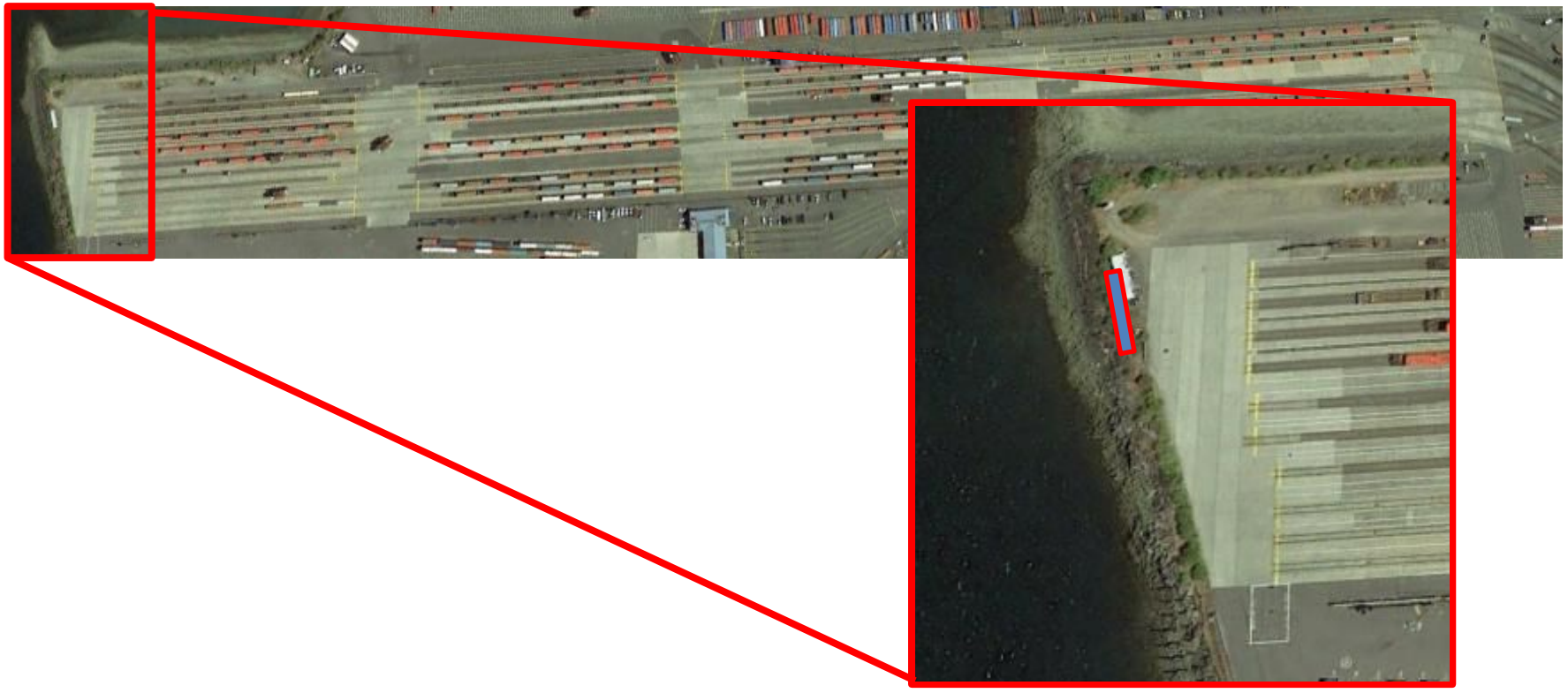
TSS reduced 98.7%

Biofiltration using compost, biochar and sand

NIM ISGP Retrofits from September 2013 To December 2014

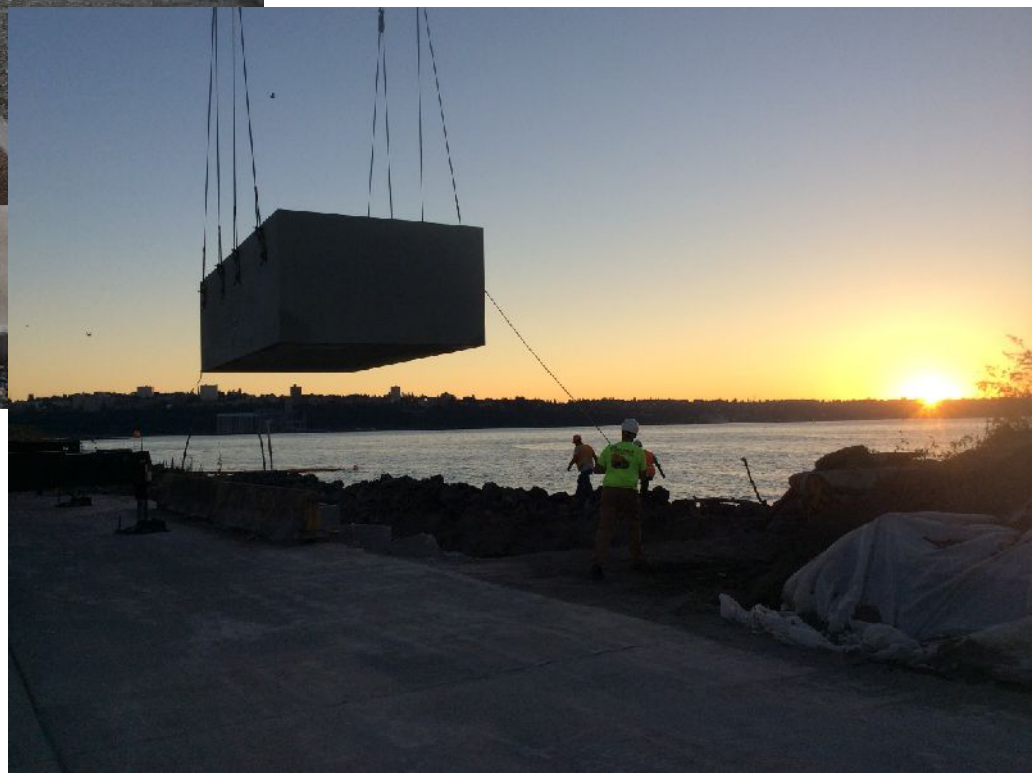
• NIM	Bench-marks	Q1-2015	Q4-2014	Modular Wetland installation	Q3-2014	Q2-2014	Q1-2014	Q4-2013	Q3-2013	Q2-2013	Q1-2013
Turbidity	25	17	22		185	9.29	74.4	30.8	19	31.6	216
• Zinc	117	52	76.1		488	38.2	194	138	192	116	324
Copper	14	CA	CA		CA	CA	CA	CA	CA	CA	CA

2014 Project cost: $574,000



ISGP Level 3 Retrofit – NIM

Modified Modular Wetland – biofiltration using manufactured media made from shale

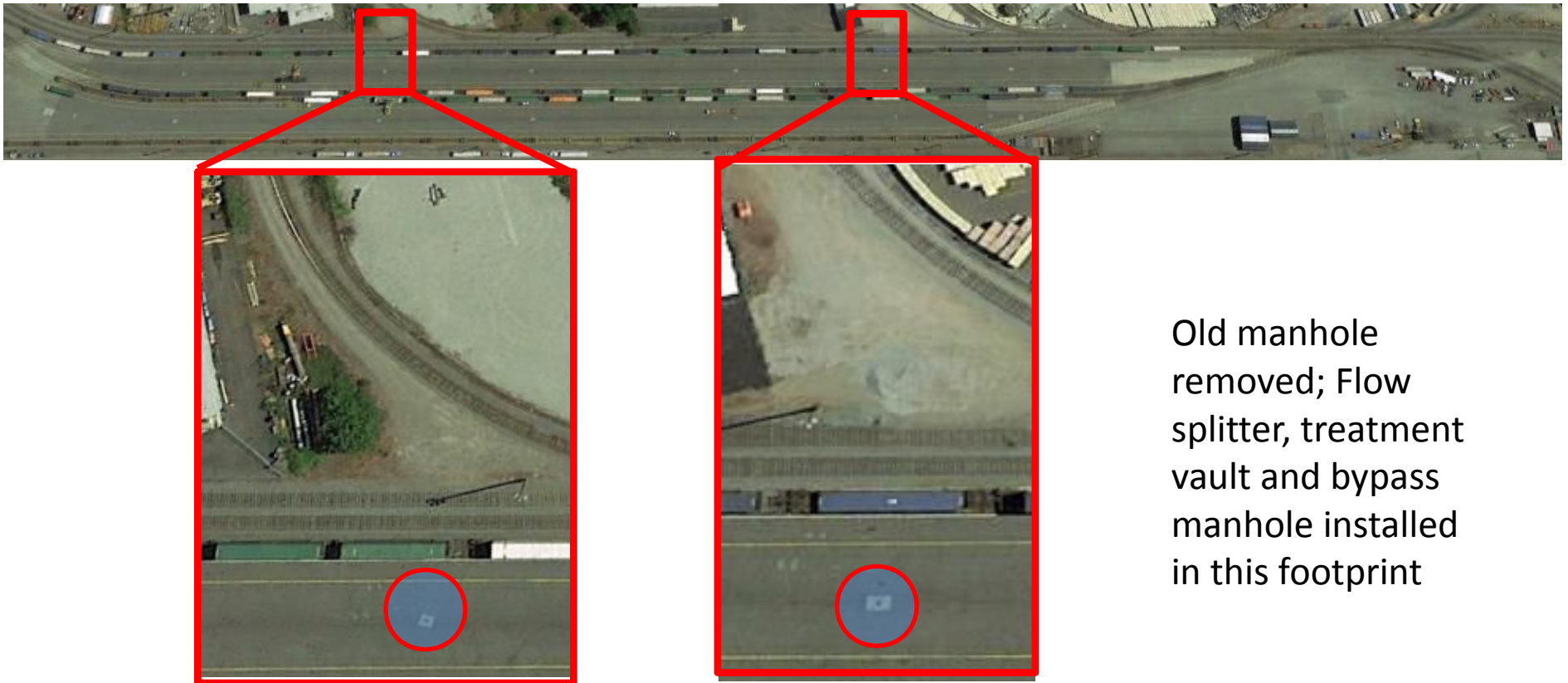


Zinc reduced 60%

SIM ISGP Retrofits from September 2013 To December 2014

SIM-1	Bench-marks	Q1-2015	Q4-2014	Jellyfish installed	Q3-2014	Q2-2014	Q1-2014	Q4-2013	Q3-2013	Q2-2013	Q1-2013
Turbidity	25	15	14.6		30.3	33.4	123	19.3	153	39.1	109.5
Zinc	117	15.3	65.7		85.5	80	167	32.9	313	89.4	108
Copper	14	1.8	2.85		18.5	11	7	4.4	26.6	8.1	11.4

2014 Project cost: $811,000



Old manhole removed; Flow splitter, treatment vault and bypass manhole installed in this footprint

ISGP Level 3 Retrofit – SIM Rail Yard

Jellyfish – solids removal using membrane filtration

Turbidity reduced 70%

TSS reduced 77%

OCT ISGP Retrofits from September 2013 To December 2014

OCT	Bench-marks	Q1-2015	UpFlo installed	Q4-2014	Q3-2014	Q2-2014	Q1-2014	Q4-2013	Q3-2013	Q2-2013	Q1-2013
Turbidity	25	7.2		58.8	16.6	9.4	84.8	17.8	14.7	14.8	290
Zinc	117	57.9		239	170	113	271	188	236	127	577
Copper	14	CA		CA	CA	CA	CA	CA	CA	CA	CA

2014 Project cost: $1.9M

ISGP Level 3 Retrofit – Container Terminal

UpFlo treatment device using compost and sand media

- Turbidity reduced 84%
- TSS reduced 82%
- Zinc reduced 66%

Treatment System Selection – Lessons Learned

- **Know your discharge – take the time to characterize**
- **Manufacturer c cannot always be**

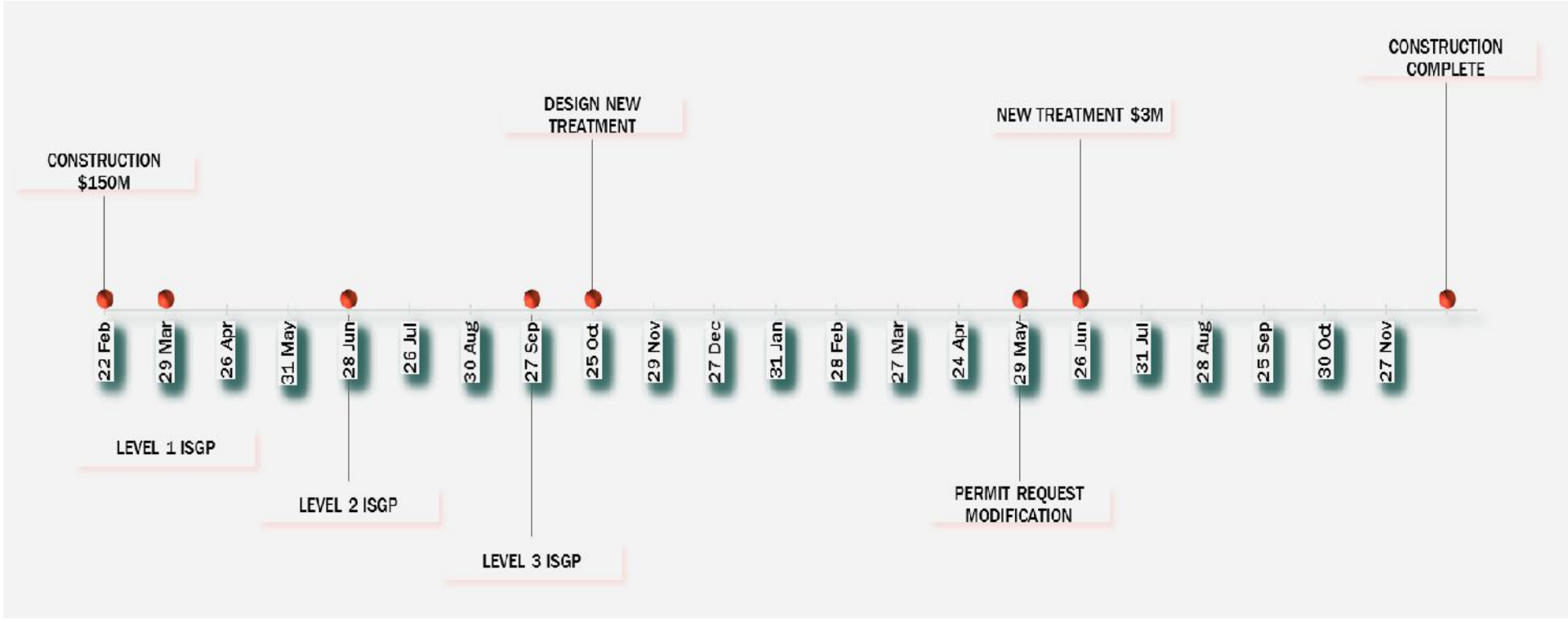
Need To Think Ahead!

- Need for integrating permits
  - Take a holistic approach to managing stormwater
- Integrating MS4 treatment **requirements** and ISGP treatment **needs** was a logical connection
- Control costs for construction and O&M

Need to integrate the permits?

- Take advantage of the opportunity to reduce risk of expensive retrofit in near future
- Ability to capitalize costs for a return on investment
- Simplify the treatment selection process during design phase
- Standardized guidance manual for all types of port-related projects

Example: Completed $150M and began operation in Feb 2015; does not meet benchmarks Q1, Q2 or Q3; More treatment required by Dec 2016 – additional $3M



Port-wide Stormwater Program Opportunities

- Develop the program around integration of permits
- Develop Port-specific Best Management Practices to help customers
- Stakeholder Collaboration
  - ✓ City of Tacoma Inter Local Agreement
  - ✓ UW/WSU research and development
  - ✓ Tenant assistance and workshops

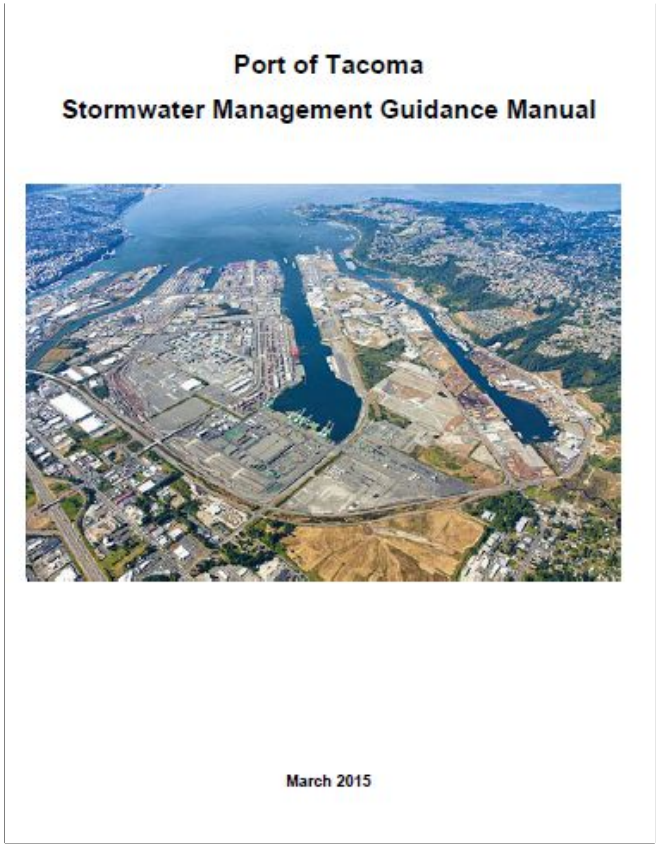
Port of Tacoma Stormwater Management Guidance Manual

- Inter-local Agreement with City of Tacoma
  - Required Port to implement program to conduct in-house stormwater review of projects
  - Applies to Port project draining to Port MS4 infrastructure and receiving waters
  - Coordination on all projects
- Companion document to
  - Stormwater Management Manual for Western Washington
  - City of Tacoma Surface Water

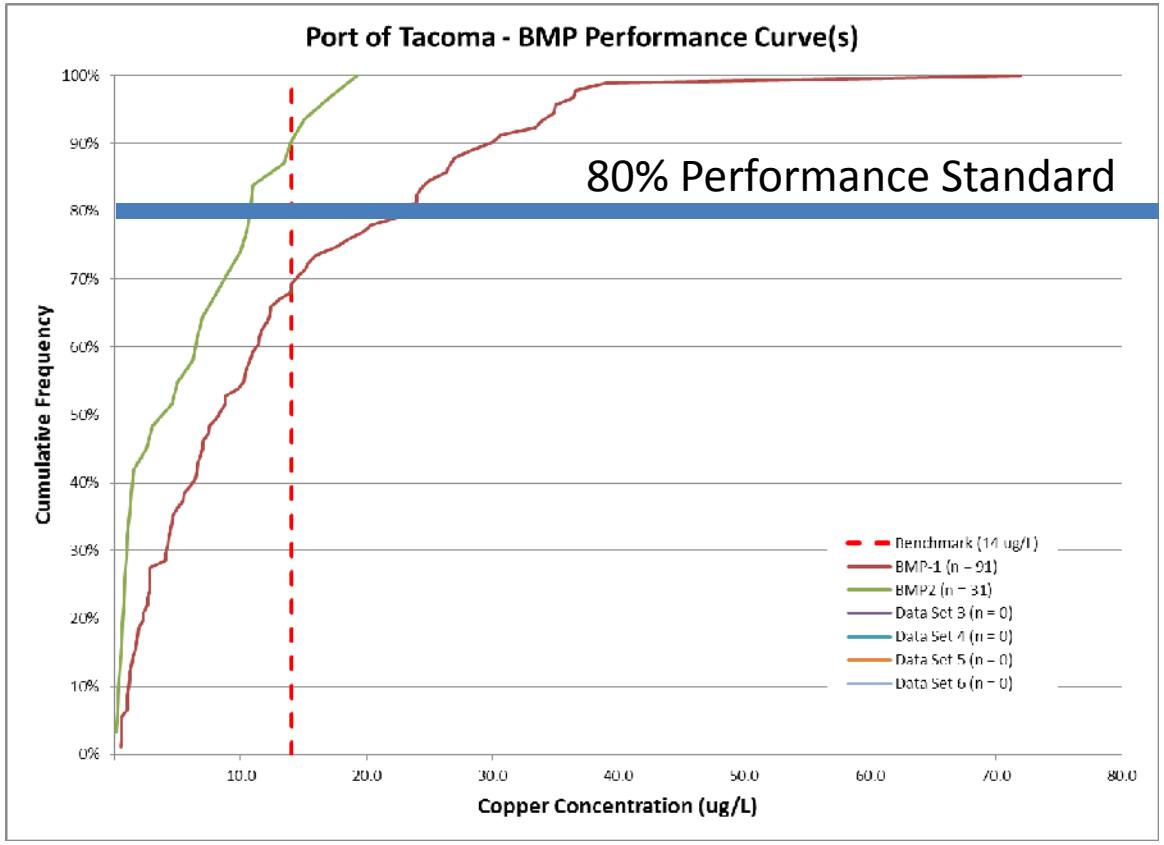
Port of Tacoma Stormwater Management Guidance Manual Continued

- Port-specific supplemental guidance
  - Stormwater review required on all projects/leases (**in partnership with Port Engineering**)
  - Preferred, conditionally preferred, and not preferred treatment BMPs
  - **Land Use – activity trigger**

- Treatment selection



Performance Curves



Port of Tacoma - Data for Percent-Exceedance Curve

Type in constituent here

Constituent: Copper

Type in units for all data sets here

Units: ug/L

Add Benchmark value here

Benchmark: 14 ug/L

Type in Set na

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Data Name:	BMP-1
Label:	BMP-1 (n = 91)
mean =	12.4
sd =	12.37332
n =	91

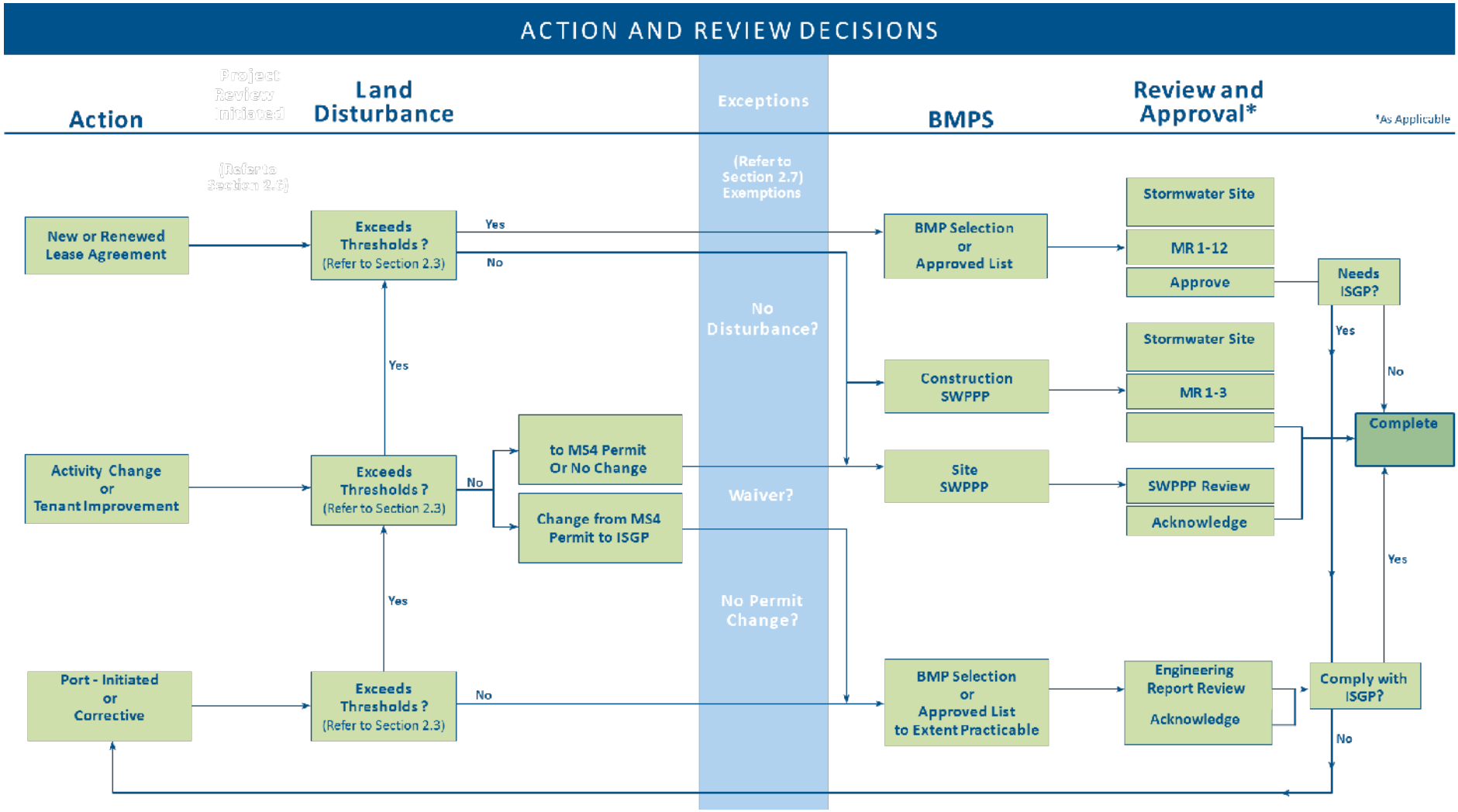
			Sorted Data	Index	Cum%
			0.45	1	1.1%
			0.5	2	2.2%
			0.5	3	3.3%
			0.5	4	4.4%
			0.5	5	5.5%
14.0	0%		1	6	6.6%
14.0	50%		1	7	7.7%
14.0	100%		1	8	8.8%
			1.1	9	9.9%
			1.2	10	11.0%
			1.2	11	12.1%
Automatically Calculated:			1.3	12	13.2%
X-axis Label			1.4	13	14.3%
Copper Concentration (ug/L)			1.6	14	15.4%
Benchmark Label			1.7	15	16.5%
Benchmark (14 ug/L)			1.8	16	17.6%
			1.9	17	18.7%
			2.3	18	19.8%
			2.3	19	20.9%
			2.6	20	22.0%

Navigating stormwater requirements

- Easy to follow process flow for improvements or activity changes
- MS4 for new development
- ISGP for Level 3 corrective actions
- CSWP for projects not requiring treatment
- MS4 to ISGP – change in land use

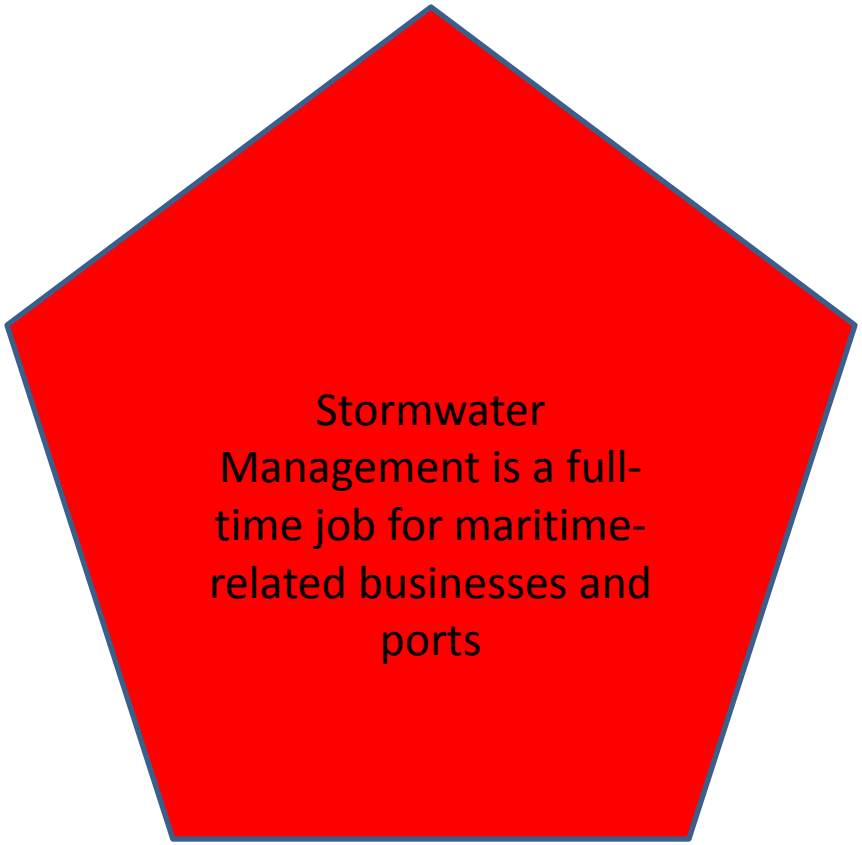
Stormwater Pollution Prevention Plans required for every type of action

Port of Tacoma Stormwater Management Guidance Manual



Other Issues – Rules are constantly changing

- Updated MS4 permit issued December 2014
- New ISGP issued 2015
- New Construction Stormwater Permit coming in 2015
- New Sand and Gravel Permit coming in 2015



Stormwater Management Program

- Thank you
- Questions?