

# BENCHMARKS

*IF WE HAVE TO TREAT  
WILL THE ECOLOGY MANUAL  
GET US THERE?*

# Washington Permit - Treatment

**Treatment BMPs:** Treatment BMPs are required when operational and source control BMPs are not adequate to reduce pollutants below a significant amount and maintain compliance with water quality standards.

Compliance with water quality standards shall be presumed, unless discharge monitoring data or other information demonstrates that a discharge causes or contributes to violation of water quality standards, when the permittee is:

*“Presumptive”*

2. Fully implementing storm water best management practices contained in storm water technical manuals approved by the department, or practices that are demonstrably equivalent to practices contained in storm water technical manuals approved by the department, including the proper selection, implementation, and maintenance of all applicable storm water best management practices for on-site pollution control.

*“Performance based”*

# Washington Permit - Treatment

Compliance with monitoring data or contributes to violation of water quality standards, when the permittee is:

*“Presumptive”* shall be presumed, unless discharge information demonstrates that a discharge causes



- *Can we get to the benchmarks with the Ecology manual?*

# THE USUAL SUSPECTS

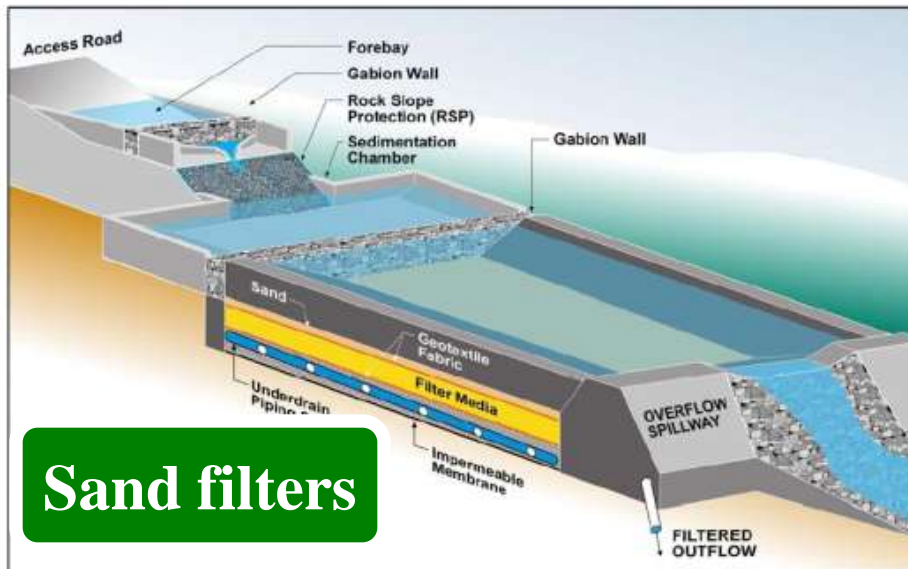


Wet ponds

- *In the Ecology manual*



Swales

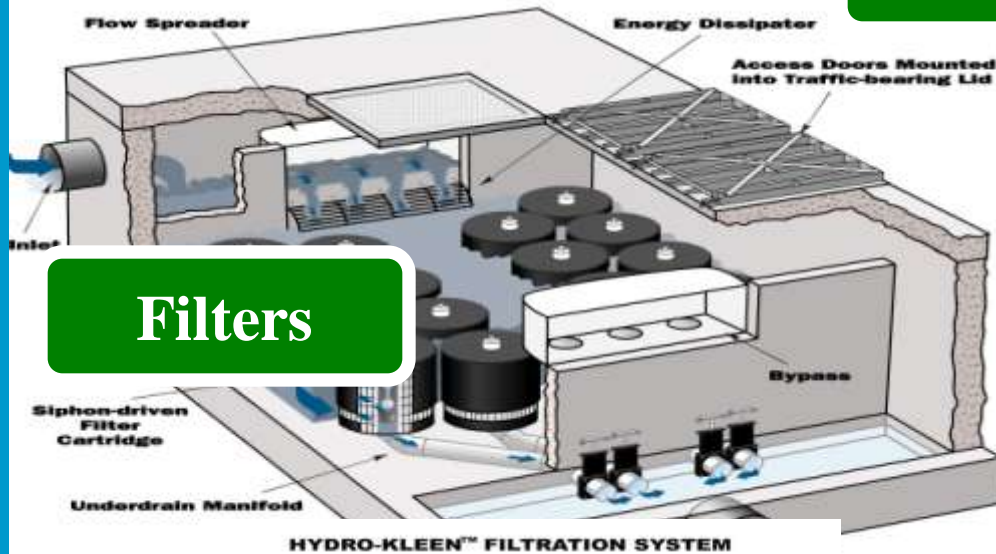


Sand filters

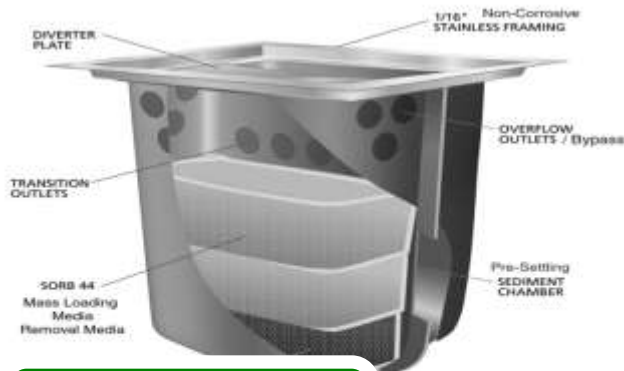
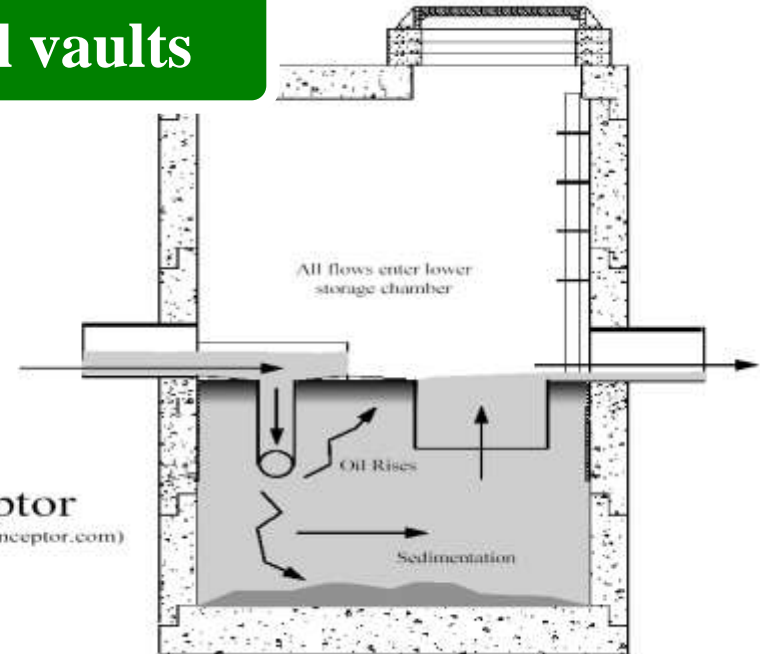
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# THE USUAL SUSPECTS

Small vaults



Filters



CB Inserts

- *Approved by Ecology*

Proprietary

# Presumptive Approach

Compliance with water quality standards shall be presumed, unless discharge monitoring data or other site specific information demonstrates that a discharge causes or contributes to violation of water quality standards, when the permittee is:

	ACTION	BENCHMARK
Turbidity	50	25 NTU
BOD	60	30 mg/L
pH	<5 or >10	6-9 SU
Petroleum	30	15 mg/L
Total Copper	149	63.6 ug/L
Total Lead	159	81.6 ug/L
Total Zinc	372	117 ug/L

*But benchmarks are our focus today*

**HOWEVER:** *Receiving water condition may allow discharge concentration higher than Benchmark*

**HOWEVER:** *TMDL may require discharge concentration lower than Benchmark*

# CAN WE GET THERE?

	ACTION	BENCHMARK
Turbidity	50	25 NTU
BOD	60	30 mg/L
pH	<5 or >10	6-9 SU
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Total Copper	149	63.6 ug/L
Total Lead	159	81.6 ug/L
Total Zinc	372	117 ug/L
Ammonia	38	19 mg/L
Nitrate/nitrite	1.36	0.68 mg/L

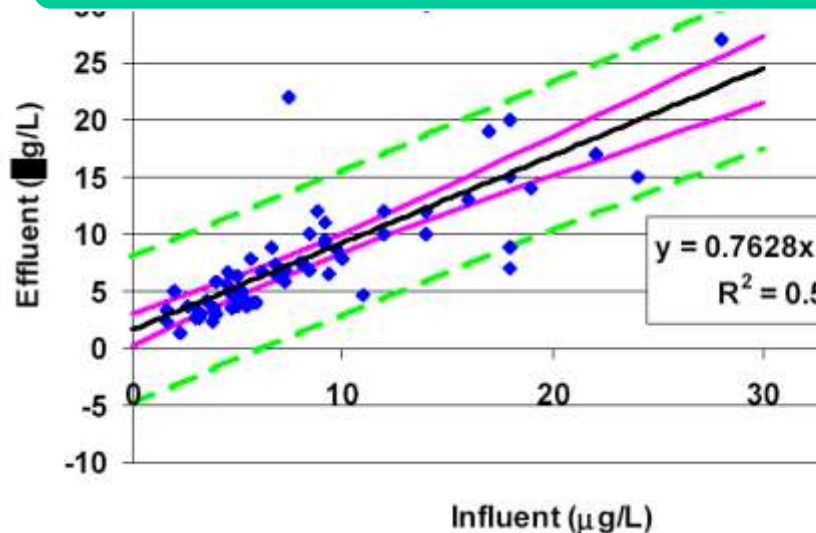
URBAN STORMWATER PUBLIC TREATMENT BMPS	
90 <sup>th</sup> PERCENTILE EFFLUENT	
Turbidity (TSS)	~ 78
BOD	~ 23
pH	
Petroleum	
Total Copper	~ 30
Total Lead	~ 39
Total Zinc	~ 150
Ammonia	~ 0.39
Nitrate/nitrite	~ 1.6

**DATA SOURCE:** *International  
BMP Data Base*

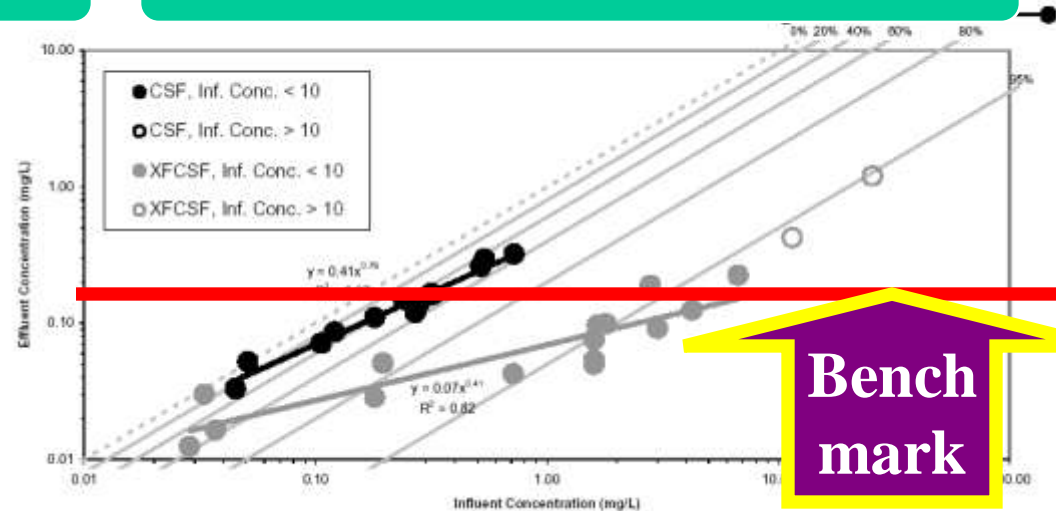
# WHAT WE KNOW

- FROM FIELD WORK RESIDENTIAL/ COMMERCIAL FACILITIES
- *Influent concentration affects effluent concentration*

Sand filter – Dissolved copper



Manufactured filter – Zinc



# CAN WE GET THERE?

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URBAN STORMWATER PUBLIC TREATMENT BMPS		
	“90 <sup>th</sup> PERCENTILE INFLUENT	90 <sup>th</sup> PERCENTILE EFFLUENT
Turbidity (TSS)	~ 214	~ 78
BOD	~ 22	~ 23
pH		
Petroleum		
Total Copper	~ 53	~ 30
Total Lead	~ 170	~ 39
Total Zinc	~ 360	~ 150
Ammonia	~0.30	~0.39
Nitrate/nitrite	~ 2	~ 1.6

**DATA SOURCE: *International  
BMP Data Base***

# PERFORMANCE BASED

2. Fully implementing storm water best management practices contained in storm water technical manuals approved by the department, or practices that are demonstrably equivalent to practices contained in storm water technical manuals approved by the department, including the proper selection, implementation, and maintenance of all applicable and appropriate best management practices for on-site pollution control.



- *Is there a more Cost-effective way?*

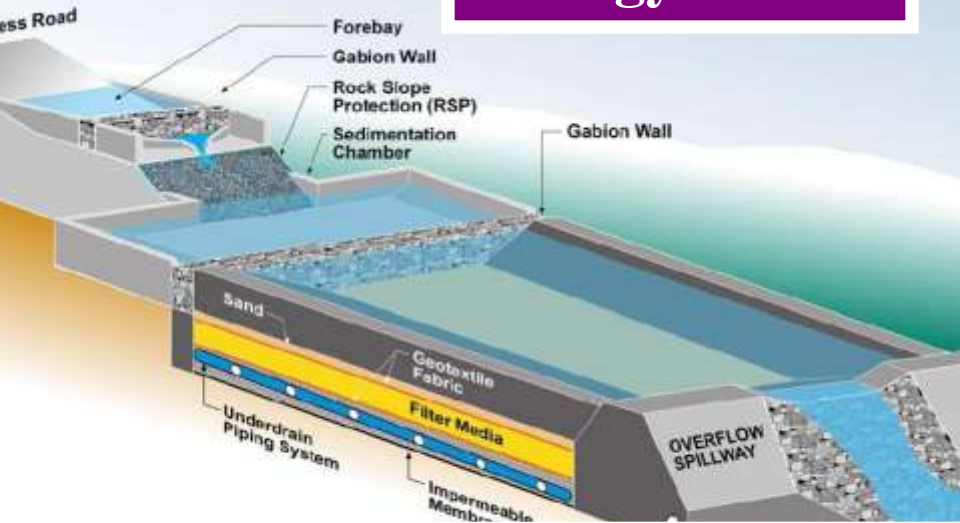
# PERFORMANCE BASED

- *Don't presume the Ecology stormwater manual will get you there.*
- *System may be too big, too small, and/or not the most cost-effective – Ecology manual may not have the most appropriate design criteria.*
- *Design criteria in the manual don't recognize on-site availability of qualified labor and electricity.*
- *Don't wed yourself to the 91% requirement*

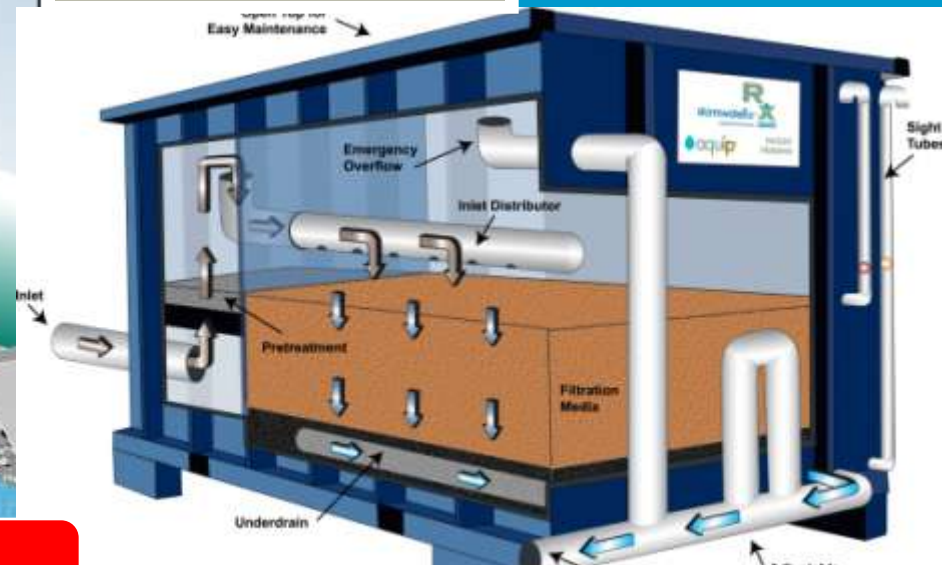
# PERFORMANCE BASED

## CASE-IN-POINT # 1 – SAND FILTERS

Ecology manual



StormwaterRx



Unattended, infrequent maintenance

Attended

*Very conservative design criteria, very low flow rate (0.02 GPM/ft<sup>2</sup>) resulting in very large sand filters*

*High unit flow rate (1 GPM/ft<sup>2</sup>) resulting in much smaller filter with layered media*

# RECOMMENDATIONS

- *Recognize that the Ecology manual is intended for residential, commercial, and highway development.*
- *Encourage the development of a agreed-upon process for Ecology to consider deviations from the manual.*
- *Source control, source control, source control.*
- *Involve environmental engineers with a background in UOPs – unit operations and processes.*

# SHORT COURSE – ONE DAY PERMIT COMPLIANCE

- *Everett - October 6*
- *Olympia - October 8*
- *Yakima - October 13*
- *Spokane - October 15*
- *Oregon (Portland, Eugene, Medford) - November*

**SWPPPs, Monitoring, Source Control, Treatment**

**On-site exhibits by vendors of industrial products**

**QUESTIONS?**

# PERSPECTIVE OF AN ENVIRONMENTAL ENGINEER

- *20 plus years into stormwater treatment*
- *Countless design manuals of local and state agencies*
- *Book on stormwater treatment*
- *One and two-day short courses on stormwater treatment, primarily related to post-development treatment of commercial and residential developments.*
- *Consulting to manufacturers of stormwater products*

**INDUSTRIAL: SWPPPs, manuals, treatment process selection**

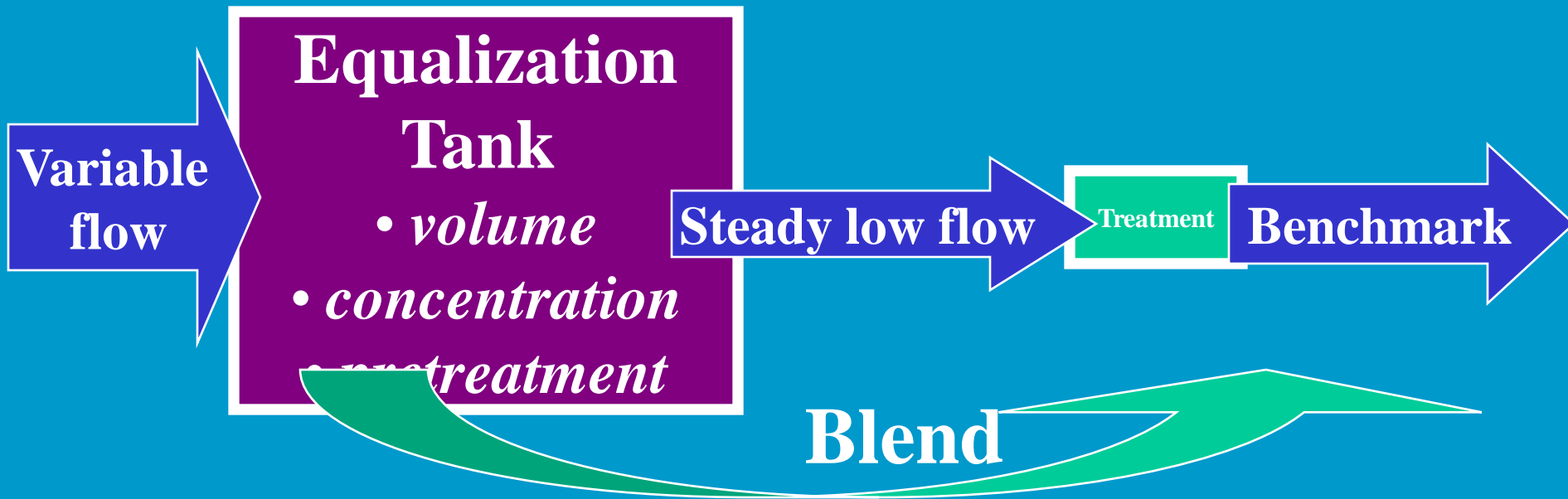
# THE USUAL SUSPECTS

## ISSUES

- Space - wet ponds, sand filters
- Vertical drop - sand filters, infiltration basins, swales, manufactured filters
- Cost – a bunch
- Benchmarks: Can they be met?

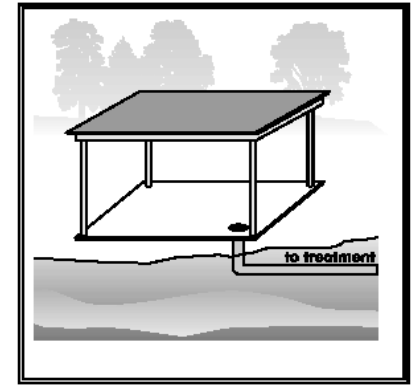
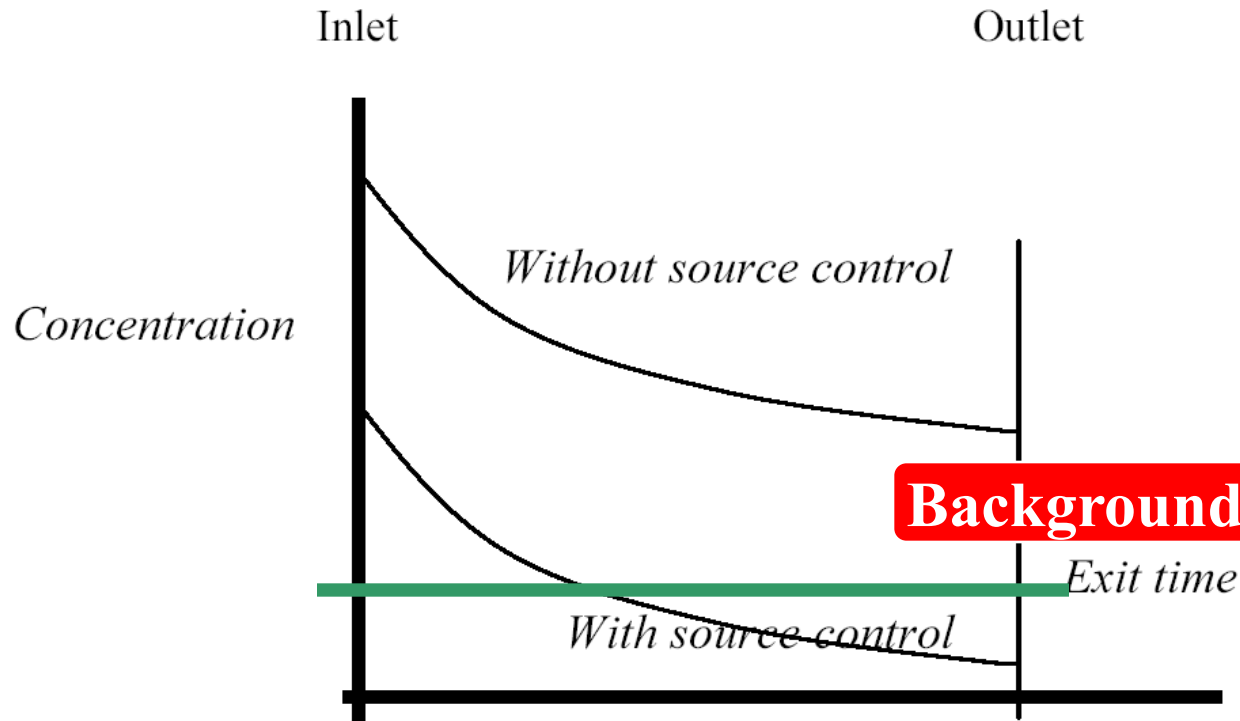
# PERFORMANCE BASED

## CASE-IN-POINT # 2 – *91% SPECIFICATION*



*Don't get fixated on the 91% volume requirement*

# IMPACT OF SOURCE CONTROL



*Residence time of treatment facility*

**Effect of source control related to retention time**

