



General Permit

Economic Impact Analysis
for the
Construction Stormwater NPDES and State Waste
Discharge General Permit

August/2005

Publication Number: 05-10-063



General Permit

Economic Impact Analysis
for the
Construction Stormwater NPDES and State Waste
Discharge General Permit

August/2005

Publication Number: 05-10-063

*Download this report from the Department of Ecology's Web Site
at <http://www.ecy.wa.gov/biblio/0510063.html>*

If you need this information in an alternate format, please contact us at 360-407-6401. If you are a person with a speech or hearing impairment, call 711 or 800-833-6388 for TTY.

Table Of Contents

Findings.....	6
Description of the permit	6
What is analyzed?	8
What are the costs?	8
Monitoring:	9
Inspections:	10
Training:.....	10
Log books:	10
Provision for review:.....	11
Who is affected?	11
Employment.....	12
Employment and job site disturbed area.....	12
Site size and disturbed area.....	13
Time	14
What cost reducing features are included?	14
Background on decisions regarding preparing this analysis.....	15

Blank page

Economic Impact Analysis

Findings

The analysis finds the costs of compliance with the proposed general permit are disproportionate to business size. On a cost per employee basis the costs are generally greater for small businesses than for large firms. This is because most of the costs are a function of the size and topography of the job site.

Ecology has included cost minimizing features in the general permit to reduce the burden on small companies. Most of these features will benefit both large and small business.

Cost Savings:

The Construction Stormwater General Permit allows construction activity to proceed under the general permit rather than having to obtain a state or NPDES individual permit. Obtaining project specific individual permits is expensive and time consuming. The general permit therefore generates a savings. It provides individuals involved in construction another option, which is likely to be less expensive.

Description of the permit

The Construction Stormwater General Permit allows construction activity to proceed under the general permit rather than having to obtain a state or NPDES individual permit.

The Construction Stormwater General Permit requires:

- an application (Notice of Intent)
- the preparation and implementation of a Stormwater Pollution Prevention Plan (SWPPP) that describes stormwater best management practices (BMPs) to prevent erosion and sedimentation and protect water quality.
- permittees to conduct periodic site inspections to ensure that BMPs are properly installed and maintained. Inspections must be conducted by qualified personnel, and be documented in a site log book
- permittees to monitor stormwater discharges for turbidity/transparency; and if the project includes significant concrete work or engineered soils, pH monitoring is also required. In addition, the permit requires monitoring for other pollutants if there is a discharge to certain types of 303(d)-listed impaired water bodies or waterbodies with a Total Daily Maximum Load (TMDL)
- permittees to submit Discharge Monitoring Reports to document compliance with the numeric and narrative effluent limitations, and demonstrate SWPPP performance
- permittees to submit any documentation required by this permit to Ecology or the public upon request
- permittees to ensure that their project does not cause or contribute to violations of state water quality standards

Monitoring: Permittees at larger sites must monitor during discharges. Monitoring generally includes turbidity, at larger sites; and sites with significant concrete work or engineered soils, pH. The permittees must do more intensive monitoring on discharges to impaired waterbodies. Monitoring at these sites depends on the type of water quality impairment in the receiving water.

Minimum Treatment Technology: The permit does not have a specific minimum treatment required; rather a performance standard is used that is site specific. In accordance with 40 CFR 122.44(k) and 40 CFR 122.44 (s), the general permit includes requirements for the development and implementation of Storm Water Pollution Prevention Plans (SWPPPs) along with Best Management Practices (BMPs) to minimize or prevent the discharge of pollutants to waters of the state. BMPs constitute the Federal requirements for Best Conventional Pollutant Control Technology (BCT) and Best Available Technology Economically Achievable (BAT) for stormwater discharges. In addition Ecology has determined that development of a SWPPP and implementation of adequate BMPs in accordance with this permit constitutes “All Known and Reasonable Methods of Prevention Control and Treatment” (AKART).

The treatment of water is based on the appropriate selection of BMPs from approved technical manuals, as necessary to achieve performance standards and prevent violations of water quality standards. Some sites will require very basic erosion and sediment control BMPs (mulch, silt fence, etc.) while others will need extensive treatment technologies (sediment ponds, sand filters, etc.). The applicant identifies the necessary treatment BMPs in the SWPPP, and makes necessary modifications based on site inspections and stormwater monitoring.

Summary of Monitoring Requirements				
Sites With Fewer than 5 Acres Soil Disturbance				
Type of Construction Activity	Site Inspections	Sampling w/ Turbidity Meter	Sampling w/ Transparency Tube	pH sampling
All sites less than 1 acre	Required	Sampling Not Required		Required
All other sites less than 5 acres	Required	Sampling Required – either method		Required
Sites With Greater than or Equal to 5 Acres but Less than 20 Acres Soil Disturbance				
All sites	Required	Sampling Required – either method		Required
Sites with 20 Acres Or Greater Soil Disturbance				
All sites	Required	Required	No	Required

Reporting and Record Keeping: Permittees must submit sampling data on monthly Discharge Monitoring Reports (DMRs). DMRs may be submitted by mail or over the internet. Ecology may or may not request additional records from permittees. However, the public may review a permittee’s records to assess compliance with the general permit. To do this, they can review copies of the SWPPP and any records or reports at an Ecology office. This may protect the permittee from liability by preventing people from coming to the job site to review materials. The permit requires an application, a SWPPP, monitoring reports, a site log book, and reporting of violations. Permittees must keep records for 3 years.

Plan Submittal: An applicant must submit an application but does not have to submit the SWPPP unless Ecology specifically requests it.

Equipment: The permittees will probably buy monitoring equipment as it is likely to be less expensive than having monitoring done by a professional service. The SWPPP may call for equipment such as pumps or tanks to manage stormwater. On large complex sites the SWPPP may require the use of heavy equipment to build a retention pond or other engineered structures.

Labor: The permittee will need to dedicate time and effort to both apply for the permit and to write and comply with the SWPPP.

Supplies: The permittee may need pH strips and sampling supplies, paper and a note book. The SWPPP may call for BMP materials and supplies such as silt fence, erosion control matting, and straw bales.

Administration: The site manager will need to ensure compliance with the SWPPP and the reporting requirements.

What is analyzed?

- Ecology analyzed those costs of complying with the general permit that were generated by Ecology's decisions. In other words if Ecology had flexibility in the means of obtaining compliance with the statutes that drive the permit requirements, then the costs were analyzed.
- The costs of compliance that are generated directly by other statutes are not analyzed in this Economic Impact Analysis.

What are the costs?

Ecology analyzed five components of the permit; monitoring; inspections, log books, training, and records. The table below presents these costs of compliance. **For each compliance area, the expected impact is disproportionate, even if small job sites are paired with small businesses and large job sites are paired with large businesses.**

The listed costs should be interpreted as average annual costs for a single site.

Cost per employee ratios			Small Businesses	Large Businesses
			Employment	Employment
			12	1247
Sections	Cost 1 - 5 acre	Cost 20+ acres	\$/employee	\$/employee
Monitoring	\$ 620	\$ 1,000	53	1
Inspections	\$ 2,000	\$ 4,000	170	3
Log Book	\$ 240	\$ 240	20	0
Training	\$ 260	\$ 260	22	0
Records	\$ 340	\$ 340	29	0
Total	\$ 3,460	\$ 5,840		
1 - 5 acres and small employer			295	
1 - 5 acres and large employer				3
20+ acres and small employer			498	
20+ acres and large employer				5

Monitoring:

Monitoring costs will depend on both the frequency of heavy rain¹ and the number of discharges from a disturbed area. Sites in Western Washington will require more monitoring and have higher costs as the number of rainfall events that are sufficient to generate discharges is greater.

Likewise, large sites may have more discharge points than small sites; however the number of discharges is actually more dependent on the shape of the disturbed area. A large site with a single discharge point may require less effort than a small site with an odd topography and several discharges. Thus these costs are not strictly proportional to the size of the property. The cost of monitoring is also not a function of the size of the business running the site.

Average annual number of rainfall events likely to result in a discharge from the site (0.5"/24 hr event).		
	Events / yr	# permits
Western WA		
Port Angeles	13	10
Mt Vernon	16	29
Bellingham	18	38
Seattle (UW)	21	222
Tacoma	22	111
Vancouver	23	88
Eastern WA		
Richland	1	15
Yakima	2	6
Spokane	9	11

Ecology estimated monitoring costs for turbidity and pH at \$620 per year for a 1 to 5 acre site and \$1000 per year for a 20+ acre site. These estimates are based on the following:

1. The estimated cost of labor is \$28 per hour.²
2. There are an estimated 19.9 weeks during which there would be a discharge to monitor.³
3. Monitoring and entering results is expected to require an hour for turbidity for a 1 to 5 acre site and 2 hours for a 20 acre site.⁴ Extra Ph testing is expected to require 10 minutes.⁵

¹ Jeff Killelea, Washington State Dept. of Ecology, Water Quality Program, Source: Western Regional Climate Center, downloaded 6/23/05: <http://www.wrcc.dri.edu>

² Ecology has assumed that the monitoring and inspections will be done by job site employees. Thus the training of the employee is handled as a separate cost to the business.

³ This is the weighted average of the number of events. Weights are based on the number of job sites in each area.

4. Transparency tubes are estimated to cost \$34⁶ and the average cost per use of a turbidity meter is estimated to cost \$13.50. The company may also purchase a turbidity meter for field work which costs \$700 to \$800.
5. pH strips are estimated to cost \$12.99 for 80 strips including shipping and handling.

Inspections:

Inspections⁷ are expected to cost \$2000 per year for 1 to 5 acre sites and \$4000 per year for 20+ acre sites. These estimates are based on the following assumptions:

1. The estimated cost of labor is \$28 per hour.⁸
2. There are an estimated 19.9 weeks during which there would be rain events requiring inspection, in addition to the weekly inspections.
3. Inspection is expected to require 1 hour for a 1 to 5 acre site and 2 hours for a 20 acre site.⁹

Inspection costs will depend on the number of discharges from a disturbed area and the complexity of Best Management Practices (BMPs) in place to prevent stormwater contamination, and treat stormwater when necessary. These costs vary in part based on the site characteristics, including topography, soils, and the size of the site. Thus these costs are not strictly proportional to the size of the property. The cost of inspections is also not a function of the size of the business running the site.

Training:

The person doing the inspections must have training to certify the inspection. The cost of training is unrelated to the job site and the number of employees in the firm. Ecology **estimated the annualized cost of \$260 based on one 16-hour class and one refresher course within the 5-year period.** The price of the class is \$400 plus a labor cost for the 16 hours, plus travel to and from the class of 60 miles. Ecology assumes the cost of the refresher is 30% of the cost of the initial training.

Log books:

The log book entry is expected to take 10 minutes during each inspection and cost \$240 per year.

⁴ Nancy Winters, Washington State Dept. of Ecology, Water Quality Program, scenario construction, 6/23/05.

⁵ Note that some job sites that discharge to an impaired water body may have additional monitoring. Phosphorus and Copper would cost \$25 and \$15 respectively and would probably have to be done off site. These costs were not included because they are not typical. They are also more likely to be needed at a job site with a large disturbed area that cannot provide sufficient impoundment to prevent a discharge.

⁶ Price downloaded 6/22/05 from <http://watermonitoringequip.com/pages/stream.html>

⁷ Inspection does not include the cost of correction of a problem.

⁸ Journey man carpenter union wage rate to individuals including benefits.

⁹ Nancy Winters, Washington State Dept. of Ecology, Water Quality Program, scenario construction, 6/23/05.

Provision for review:

Permittees must keep records and the public may ask to review them. Permittees must file discharge monitoring reports monthly. The estimated cost is \$340 per year. This is based on the assumption that companies will choose to do electronic filings and that the time needed is at most 1-hour a month.¹⁰

Who is affected?

Disturbed Acres	
Acreage	# sites
1 to 5	101
5 to 20	465
20+	230

The General Permit is sometimes issued to a contractor and sometimes to the individual who owns and is developing the site.

Based on the current list of companies with permits, the General Permit affects a wide variety of individuals and industry classifications from nearly every major sector of the economy.

The data above reflects the current permittee population. Any company can use the General Permit if they have responsibility for acreage disturbed by construction. Most existing permits were written for sites with 5 to 20 acres of disturbed area. The average disturbed acreage is 21 acres. Sites under 1 acre may form 6% of the permits.¹¹

Affected construction sectors include:

- PBA 233110 – Land Subdividers and Developers
- PBA 233205 – Building Construction and General Contractors

SIC	Average Employees
191	14.5
782	7.0
1521	7.2
1611	174.5
1731	2.5
3721	9374.9
4212	174.5
4213	188.5
4581	34.5
4612	14.5
4812	7.0
4851	34.5
4925	174.5
5093	34.5
5211	174.5
5251	90.8
5311	345.9
5411	50.5
5531	174.5
6162	14.5
6531	4.0
6552	26.6
7382	7.0
7948	749.5
7999	2.5
8059	141.2
8211	47.8
8361	74.5
8422	174.5
8661	40.8
9121	7.0
9631	14.5
9999	0.0
Grand Total	525.8

¹⁰ Nancy Winters, Washington State Dept. of Ecology, Water Quality Program, scenario construction, 6/23/05.

¹¹ Site size was important to selecting the scenarios. The existing distribution is artificially truncated at 1 acre. Never-the-less, there is a peak in the distribution above 1 acre. The Mode is actually 10 acres. Based on existing permits, the distribution of disturbed acreage covered by the general permit is Gamma distribution with the following parameters. Based on this distribution the extrapolated probability of a permit being less than 1 acre is .06. The distribution was extrapolated using CrystalBall 7, using the Anderson Darling measure of fit. It is a modification of the Kolmogorov-Smirnov (K-S) test and gives more weight to the tails than does the K-S test. Gamma Distribution: Location = 0.29, Scale = 20.94, Shape = 1.003449503. However, some members of the public believe the mode may be the less than one acre sites. Arbitrarily selecting a Weibull distribution that matches the right hand side of the existing distribution, and extending the distribution to .1 acre, yields a Weibull with Location = 0.10, Scale = 15.00, Shape = 0.75. Even this distribution would yield 10% to 15% <1 acre sites. Further, a 1 acres site will not have substantially different costs than a .5 acre site. Thus the scenarios were set for the 1 to 5 acres sites and the 20+ acre sites. Finally, for the states where EPA is the permitting authority (NH, MA, AK, ID, NM, plus territories), a total of 823 out of 15490 permits have been issued to sites under 1 acre going back to July 1, 2003. That is 5.3%. Nikos Singelis, Office of Wastewater Management, U.S. EPA.

- PBA 234000 – Heavy Construction

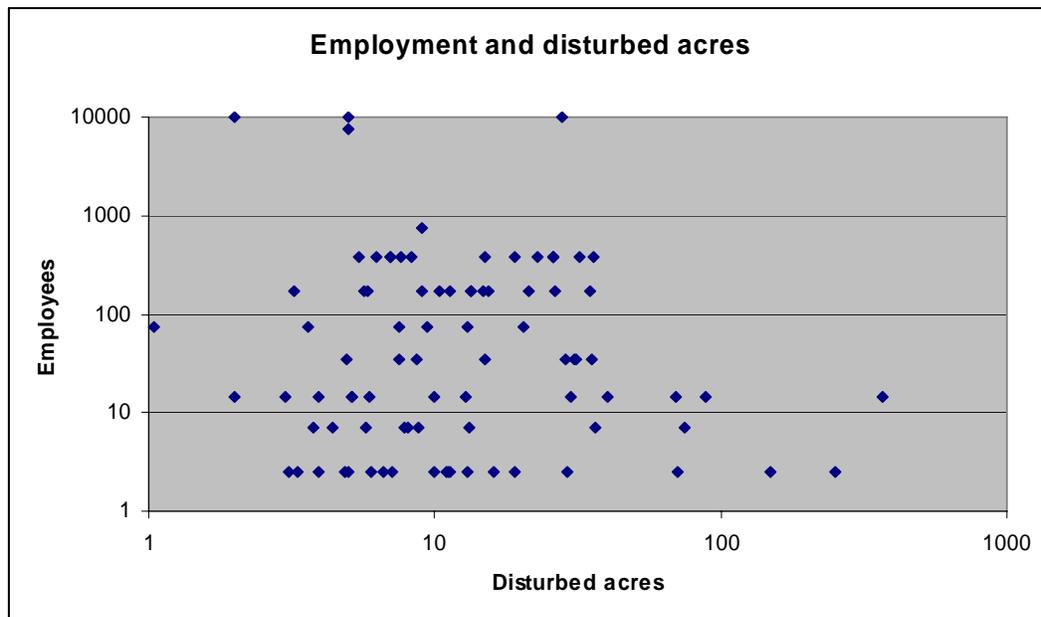
Employment

Ecology has elected to use 12 employees as representative employment for small businesses and 1274 as representative employment for large business. This is based on average overall employment for companies with fewer than 50 employees and average overall employment for companies with 50 or more employees.

A wide range of SIC codes is reflected in the current data base. These reflect a wide range of employment values. In addition, the data indicates there are many private individuals and public projects.

NOTE: The data available on employment was extremely limited. Most permittees are not listed in Work Force Explorer. Ecology cannot protect employment data gathered from any non-public source for this kind of analysis. Therefore the use of the extremely sparse publicly available data was necessary.

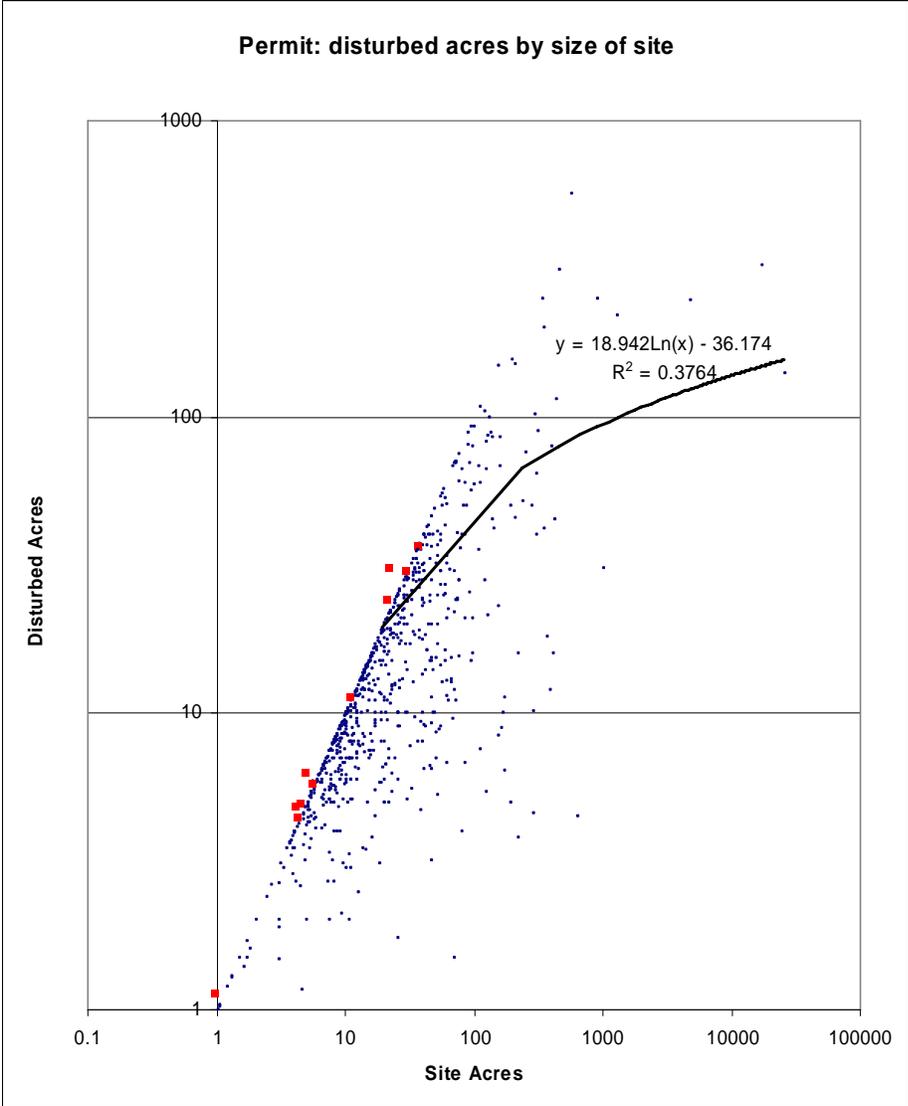
Employment and job site disturbed area



A review of the existing permittees indicates that businesses in each of the broad employment categories may have either large or small job sites.

Indeed, if there is any trend what-so-ever the smaller companies may have larger sites. However, the statistical relationship is not significant.

Site size and disturbed area



The size and complexity of a site may alter the costs presented above.

The developer of a small site is more likely to have a large share of the site in the category, disturbed acreage.

All jobsites with disturbed acreage of over 100% due to roads, access areas, storage, waterlines or other issues, were less than 35 acres.

In general the smaller the disturbed area, the less complex the SWPPP and the monitoring needs will be. On the other hand, large job sites with a smaller percentage of the area disturbed offer less expensive options for buffering disturbed

areas from surface water. Thus there may never be a discharge that requires monitoring.

Time

All of the values are annual. Equipment purchases were treated as average costs over the 5 years of the permit.¹² Many sites will not require a permit for a full year. These sites may have no monitoring costs and will have lower costs. On the other hand, at these same sites, they will have to train an employee to do inspections and will have higher costs in this area. Thus the choice of the timeline allows the “typical” construction firm to dominate the analysis. These companies, doing building as their primary income source, will simply move on to another site. Treating costs as annual recognizes their dominant position as the primary type of permittee.

What cost reducing features are included?

WAC 173-226-120 requires that Ecology reduce the economic impact of the general permit in the following ways if it is legal and feasible to do so. In each of the features listed below Ecology used the flexibility available to reduce costs. This will reduce costs for the affected small businesses but will also reduce costs for large companies.

A. Establish differing compliance or reporting requirements or time tables for small business:

S4.C.2 - Sites <20 ac are given the option to use a lower cost transparency tube (\$35) instead of turbidity meter (\$800).

S4.C; S4.D.1; S4.E.1a - Water Quality Sampling (turbidity/transparency) is phased in (begins Oct 1, 2006) and thus the timetable is postponed for all sites.

S2.F - Low Rainfall Erosivity Waiver is available for certain projects smaller than 5 acres. This will only affect sites that meet the criteria, but should significantly lower costs.

S4.B.3 - Phasing in CESCL requirements will allow <5 acre operators to schedule and attend training (certification deadline Oct 1, 2006).

B. Clarify, consolidate, or simplify the compliance and reporting requirements for small business:

S2.E. – This consolidates requirements by allowing small sites to work under a Qualified Local Programs if they are located within the jurisdiction of a Qualified Local Program. In these jurisdictions, sites smaller than 5 acres would not need to apply for and obtain Ecology’s general permit. In effect, compliance with the Qualified Local Program’s applicable permit would constitute compliance with NPDES requirements.

C. Establish performance rather than design standards:

S9.D – This allows operators to omit aspects of the SWPPP (and not implement BMPs), if site conditions render that element unnecessary. This allows small or “uncomplex” sites to have fewer BMPs than large or complex sites. Small sites should have lower SWPPP/BMP costs.

¹² Given the short time frame discounting was not used.

D. Exempt small businesses:

S4.C.3 - Sites smaller than 1 ac exempt from turbidity/transparency monitoring

Background on decisions regarding preparing this analysis

This document has been prepared to satisfy the requirements of WAC 173-226-120. This section requires that the economic impacts of all draft general permits intended to directly cover small businesses be assessed in comparison to economic impacts on covered large business in order to determine if the impacts upon small businesses are disproportionate to those borne by large businesses. If so, cost-reducing mitigation is to be provided to small business to the extent legal and feasible.¹³

The general permit is written in order to make it easier for companies to come into compliance with all of the following laws without obtaining a site specific individual permit. WAC 173-226-120(4) provides that the economic impact assessment shall not include costs associated with compliance with the following federal and state law and rules:

- CWA Sec. 308(a)
- CWA Sec. 309
- 40 CFR 122.44(i)(2)
- 40 CFR 122.48(b)
- 40 CFR 122.44(i)(1)(iii) in combination with 122.45(f)(2) Monitoring requirements and mass limitations.
- 40 CFR 122.41(j)(4) Monitoring results must be conducted according to test procedures under Part 136. Specify alternative test methods if methods other than Part 136 are required.
- 40 CFR 122.44(i) Establishing limitations, standards, and other permit conditions: Monitoring requirements.
- 40 CFR 122.41(j)(1) Monitoring shall be representative of monitored activity
- 40 CFR 136 Guidelines for Establishing Test Procedures for the Analysis of Pollutants
- 40 CFR 122.41(l)(4) Monitoring Reports: use approved DMR forms, report all data, use arithmetic average
- 40 CFR 122.44(i)(3-4) (see FR Vol.57. No.64) authority to require reporting of storm water monitoring
- 40 CFR 122.48 Requirements for recording and reporting monitoring results: What permits shall specify, factors for monitoring frequency.
- 40 CFR 122.41(j)(2) Monitoring & records, keep records 3 years
- 40 CFR 122.41(j)(3) What monitoring records shall contain
- 40 CFR 122.41(l)(4)(ii) Specific requirement for the permittee to report additional monitoring
- 40 CFR 122.41 (l)(6)(i) Immediate reporting noncompliance that may endanger human health or the environment

¹³ A small businesses are define as “any business entity ... which is owned and operated independently from all other businesses, which has the purpose of making a profit, and which has fifty or fewer employees.

- Chapter 173-200 WAC – Water Quality Standards for Ground Waters of the State of Washington
- Chapter 173-201A WAC – Water Quality Standards for Surface Water of the State of Washington
- Chapter 173-204 WAC – Sediment Management Standards
- Chapter 173-224 WAC – Wastewater Discharge Permit Fees

In addition the permit provides for compliance with 90.48.555 RCW.