

TURNING RAW LAND INTO A RESIDENTIAL SUBDIVISION

By: Ben Kennedy

Project Engineer – Rausch Coleman Homes

Certified Preparer of Storm Water Prevention Pollution Plans

Certified Compliance Inspector of Stormwater

CHAPTER 1

THE SWPPP (STORM WATER PREVENTION POLLUTION PLAN)

WHY DO WE CREATE A SWPPP

- ▶ A SWPPP (Storm Water Pollution Prevention Plan) is required by law
 - ▶ Federal
 - ▶ State
 - ▶ County
 - ▶ City

WHAT DOES THE SWPPP DO

- ▶ A SWPPP is your plan to minimize pollution
 - ▶ What is pollution?
 - ▶ Gas, paint, dry wall, cement, and other various chemicals are potential pollutants.
 - ▶ Dirt and silt

WHO CAN CREATE A SWPPP

- ▶ Different regulatory agencies have different requirements
 - ▶ An engineer licensed in the state where the SWPPP is to be implemented can create the SWPPP.
 - ▶ Most regulatory agencies also recognize qualifications provided by nationally accredited companies such as - Stormwater One and Envirocert.

WHEN IS A SWPPP NECESSARY

- ▶ A SWPPP should be created any time dirt moving activities occur
 - ▶ Regulatory agency's have different requirements on when a SWPPP is necessary
 - ▶ Typically if less than 1 acre is disturbed a SWPPP is not required to be formally submitted.
 - ▶ When more than 1 acre is disturbed a SWPPP should be submitted to the appropriate regulatory agencies and posted on site .

WHEN IS A SWPPP NECESSARY

- ▶ Who needs a SWPPP?
 - ▶ The owner of the land is ultimately responsible for any activities that occur on the land.
- ▶ Do I need a SWPPP to work as a sub contractor?
 - ▶ No – you do not need to create your own SWPPP, but it is a good idea to make sure the owner of the property has a SWPPP in place.
- ▶ Do I need a SWPPP to dig in my back yard?
 - ▶ Yes – even if a SWPPP is not physically created, it is always a good idea to think about where the dirt will go.

CHAPTER 2

BMP (BEST MANAGEMENT PRACTICE)

WHAT ARE BMP'S

- ▶ Common BMP's (Best Management Practice's) found on a residential construction site
 - ▶ Grass – Sod, Hydromulch, Seed and Straw
 - ▶ Silt fence
 - ▶ Wattle
 - ▶ Check dam
 - ▶ Inlet protection
 - ▶ Concrete washout
 - ▶ Construction entrance

BMP'S WORK AS A TEAM



BMP'S WORK AS A TEAM



COMMON BMP'S FOUND ON A RESIDENTIAL CONSTRUCTION SITE

- ▶ Grass – Sod, Seed, Hydromulch, and Straw
 - ▶ When ever possible it is always best to leave native vegetation in place
 - ▶ Sod is a great option for areas of high concern
 - ▶ Sod is great for lining drainage channels
 - ▶ Sod is great for steep slopes such as pond banks
 - ▶ Hydromulch is also a great option for areas of high concern
 - ▶ Hydromulch has a tackifier for short term stabilization
 - ▶ Hydromulch has seed for long time stabilization
 - ▶ Seed and straw is the most economic way to cover large areas of bare soil

NATIVE VEGETATION



DETENTION POND (NO HELD WATER)



RETENTION POND (HOLDS WATER)



SOD LINED SWALE



HYDROMULCH



COMMON BMP'S FOUND ON A RESIDENTIAL CONSTRUCTION SITE

- ▶ Silt fence
 - ▶ Standard single and or double row of silt fence
 - ▶ Great for perimeter control
 - ▶ Wire backed silt fence
 - ▶ Better durability than standard silt fence
 - ▶ Not to be used in channelized locations
 - ▶ Requires maintenance or replacement when half full
 - ▶ All silt fence must be trenched in 6" to work properly

SILT FENCE FAIL



SILT FENCE FAIL



SILT FENCE FAIL



SILT FENCE DONE RIGHT



SILT FENCE WORKING HARD



COMMON BMP'S FOUND ON A RESIDENTIAL CONSTRUCTION SITE

- ▶ Wattle
 - ▶ Great for locations that require regular access
 - ▶ Good on steep slopes to reduce water velocity
 - ▶ Straw wattles are the most common type
 - ▶ Straw wattles are required to be trenched in 2"
 - ▶ Silt Sock is another form of wattle filled with mulch
 - ▶ Does not require trenching per manufacturer's specification

WATTLE IN A SWALE



WATTLE VS SILT FENCE



SILT SOCK



COMMON BMP'S FOUND ON A RESIDENTIAL CONSTRUCTION SITE

- ▶ Check dam
 - ▶ Great for slowing the velocity of channelized water
 - ▶ Most commonly made out of rip rap
 - ▶ Wattles can be utilized as check dams
 - ▶ Silt needs to be removed once a check dam is half full
 - ▶ Sometimes check dams can be permeant structures

CHECK DAM



CHECK DAM



CHECK DAM



COMMON BMP'S FOUND ON A RESIDENTIAL CONSTRUCTION SITE

- ▶ Inlet Protection
 - ▶ Last line of defense before pollutants enter the storm system
 - ▶ Require maintenance and clean out regularly
 - ▶ Many different options available
 - ▶ Silt sock
 - ▶ Rock bags
 - ▶ Frye Flow System

INLET PROTECTION FAIL



INLET PROTECTION FAIL



BIG RED INLET PROTECTION



SILT SOCK INLET PROTECTION



AREA INLET PROTECTION



COMMON BMP'S FOUND ON A RESIDENTIAL CONSTRUCTION SITE

- ▶ Concrete Washout
 - ▶ Different regulatory agencies have different minimum specifications
 - ▶ A large pit lined with Visqueen is one of the most common methods to create a concrete washout
 - ▶ A concrete washout must be disposed of properly once it reaches capacity
 - ▶ A concrete washout should be well labeled and easily accessible
 - ▶ All substances containing Portland Cement should be disposed of in a concrete washout
 - ▶ Cement from a cement truck
 - ▶ Mortar used to lay brick and stone

CONCRETE WASHOUT FAIL



CONCRETE WASHOUT FAIL



MASON WASHOUT FAIL



CONCRETE WASHOUT



CONCRETE WASHOUT



COMMON BMP'S FOUND ON A RESIDENTIAL CONSTRUCTION SITE

▶ Construction Entrance

- ▶ A construction entrance reduces the amount of dirt tracked off site
- ▶ A construction entrance usually has at least one way to remove dirt from truck tires
 - ▶ Coarse aggregate 3"-4" or rumble strips used to shake dirt loose from truck tires
 - ▶ Tire washing station used to wash dirt from truck tires
- ▶ A construction entrance should be properly labeled to warn traffic of trucks entering or exiting the roadway
- ▶ Tracking dirt onto public streets is one of the fastest ways to get complaints called on a job

CONCRETE WASHOUT



CHAPTER 3

PAPERWORK

DOCUMENTATION & “DOING PAPERWORK”

- ▶ Learn local regulations
 - ▶ Rules and regulations vary from city to city
- ▶ Inform subcontractors
 - ▶ If a subcontractor violates your SWPPP you are ultimately responsible
- ▶ Do your inspections
 - ▶ Fill out the weekly inspection form
 - ▶ Update the corrective actions log
 - ▶ Keep the erosion control plan current



Site Level – Inspection Form

Document F

Home Office Stormwater Management Policy
Version 1.0 – August 2012

Site Level – Inspection Form

Purpose:

This form is to be used to document the site level compliance inspection process. It is to be used in conjunction with the "Corrective Action Log" see "Document G"

General Information			
Project Name			
NPDES Tracking No.		Location	
Date of Inspection		Start/End Time	
Inspector's Name(s)			
Inspector's Title(s)			
Inspector's Contact Information			
Inspector's Qualifications			
Describe present phase of construction			
Type of Inspection:			
<input type="checkbox"/> Regular	<input type="checkbox"/> Pre-storm event	<input type="checkbox"/> During storm event	<input type="checkbox"/> Post-storm event
Weather Information			
Has there been a storm event since the last inspection? <input type="checkbox"/> Yes <input type="checkbox"/> No			
If yes, provide:			
Storm Start Date & Time:	Storm Duration (hrs):	Approximate Amount of Precipitation (in):	
Weather at time of this inspection?			
<input type="checkbox"/> Clear <input type="checkbox"/> Cloudy <input type="checkbox"/> Rain <input type="checkbox"/> Sleet <input type="checkbox"/> Fog <input type="checkbox"/> Snowing <input type="checkbox"/> High Winds			
<input type="checkbox"/> Other: Temperature:			
Have any discharges occurred since the last inspection? <input type="checkbox"/> Yes <input type="checkbox"/> No			
If yes, describe:			
Are there any discharges at the time of inspection? <input type="checkbox"/> Yes <input type="checkbox"/> No			
If yes, describe:			

Site-specific BMPs

- Carry a copy of the numbered site map with you during your inspections. This list will ensure that you are inspecting all required BMPs at your site.
- Describe corrective actions initiated, date completed, and note the person that completed the work in the Corrective Action Log.

	BMP	BMP Installed?	BMP Maintenance Required?	Corrective Action Needed and Notes
1	Silt Fence	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
2	Concrete Washout	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
3	Dumpster	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
4	Portable Toilet	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
5	Parking /Staging Area	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
6	Inlet Protection	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
7	Fuel Storage Area	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
8	Rock Check Dam	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
9	Temporary Seeding	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
10	Soil Stockpile Protection	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
11	Construction Entrance	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

*Make Copies of this Document or access on FTP Site

*Field Managers – Remember to retain this document at the site level in your SWPPP

*Document modeled from EPA-SWPPP Template-Appendix B Version 1.1

Page 1 of 3



Site Level – Inspection Form

Document F

Home Office Stormwater Management Policy
Version 1.0 – August 2012

	BMP	BMP Installed?	BMP Maintenance Required?	Corrective Action Needed and Notes
12		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
13		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
14		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
15		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
16		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
17		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
8		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
19		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
20		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

	BMP/activity	Implemented	Maintenance Required?	Corrective Action Needed and Notes
1	Are all slopes and disturbed areas not actively being worked properly stabilized?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
2	Are natural resource areas (e.g., streams, wetlands, mature trees, etc.) protected with barriers or similar BMPs?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
3	Are perimeter controls and sediment barriers adequately installed (keyed into substrate) and maintained?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
4	Are discharge points and receiving waters free of any sediment deposits?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
5	Are storm drain inlets properly protected?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
6	Is the construction exit preventing sediment from being tracked into the street?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
7	Is trash/litter from work areas collected and placed in covered dumpsters?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
8	Are washout facilities (e.g., paint, stucco, concrete) available, clearly marked, and maintained?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
9	Are vehicle and equipment fueling, cleaning, and maintenance areas free of spills, leaks, or any other deleterious material?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
10	Are materials that are potential stormwater contaminants stored inside or under cover?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
11	Are non-storm water discharges (e.g., wash water, dewatering) properly controlled?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

*Make Copies of this Document or access on FTP Site

*Field Managers – Remember to retain this document at the site level in your SWPPP

*Document modeled from EPA-SWPPP Template-Appendix B Version 1.1

Page 2 of 3



Site Level – Inspection Form

Document F

Home Office Stormwater Management Policy
Version 1.0 – August 2012

	BMP/activity	Implemented	Maintenance Required?	Corrective Action Needed and Notes
12	(Other)	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

Non-Compliance

Describe any incidents of non-compliance not described above:

CERTIFICATION STATEMENT

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Print name and title: _____

Signature: _____ Date: _____

*Make Copies of this Document or access on FTP Site

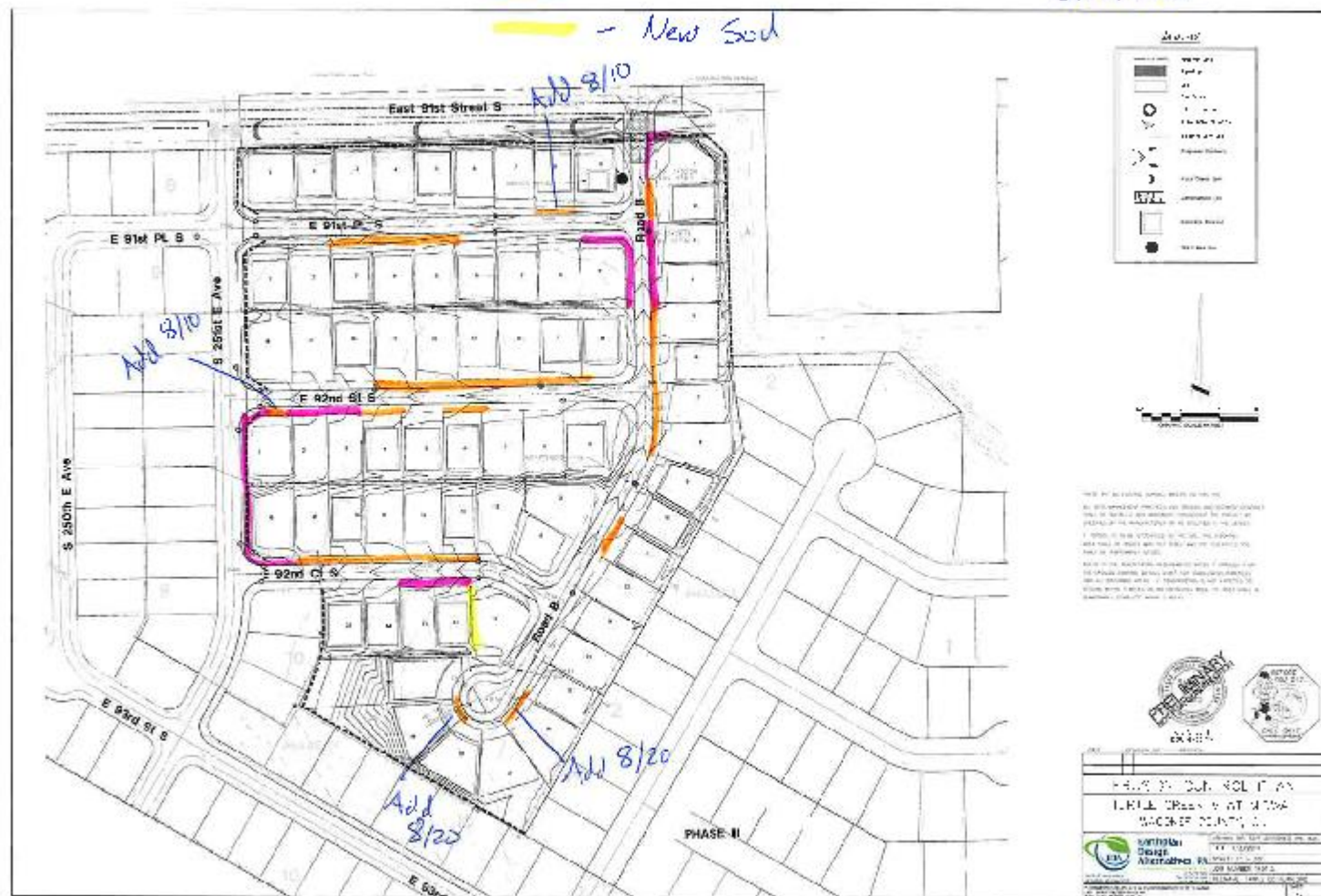
*Field Managers – Remember to retain this document at the site level in your SWPPP

*Document modeled from EPA-SWPPP Template-Appendix B Version 1.1

Page 3 of 3

— New Seed

8/3/2015 8/20/2015
~~8/10/2015~~



~~8/3/2015~~ 8/20/2015
~~8/10/2015~~

— under construction
— Finished with Soil

No Color - Stabilized awaiting construction



USE A TYPE ON PDF APPLICATION

- ▶ Give your boss a reason to buy you a new iPad
- ▶ People are more likely to do “paper work” the easier it is
- ▶ Once a site inspection form is set up for a specific job future inspections take less time
- ▶ Keeping a digital record of your inspections ensures that even if they become lost or damaged you will still have back-up records
- ▶ Go green and host everything on an FTP site if your local municipality allows

UMMM YEAH...

**HOW'S THAT TPS REPORT
COMING ALONG?**

makeameme.org

CHAPTER 4

BMP'S IN ACTION

(MORE PICTURES)

DRAINAGE FLUME



DRAINAGE FLUME



DRAINAGE FLUME



DRAINAGE FLUME



DRAINAGE FLUME



POND CONSTRUCTION



POND CONSTRUCTION



POND CONSTRUCTION



POND CONSTRUCTION



POND CONSTRUCTION



POND CONSTRUCTION



POND CONSTRUCTION



?? QUESTIONS ??

Arguing with an Engineer is
a lot like wrestling in the
mud with a pig. After a
couple of hours, you realize
the pig likes it.