

# Construction Industry Coalition on Water Quality

August 22, 2007

Jeremy Haas, Environmental Scientist  
San Diego Regional Water Quality Control Board  
9174 Sky Park Court, Suite 100  
San Diego, CA 92123

RE: Public Comments Regarding Revised Tentative Order No. R9-2007-0002, NPDES No. CAS01087420 Waste Discharge Requirements for Discharges or Urban Runoff from the Municipal Separate Storm Sewer Systems (MS4s) Draining the Watersheds of the County of Orange, the Incorporated Cities of Orange County, and the Orange County Flood Control District Within the San Diego Region (July 6, 2007)

Dear Mr. Haas:

On behalf of the more than 3,300 member companies of the Construction Industry Coalition on Water Quality (CICWQ), we would like to thank the San Diego Regional Water Quality Control Board (Regional Board) for the opportunity to express our interest in the Draft south Orange County Municipal Separate Storm Sewer System Permit (2nd Tentative Order). We also appreciate staff's willingness to meet with CICWQ in early August 2007 and discuss issues we raised following the release of the 2<sup>nd</sup> Tentative Order. This cover letter briefly outlines these issues and constructive suggestions we have for the 2nd Tentative Order, and is supported by a technical memorandum authored by Geosyntec Consultants on behalf of CICWQ.

CICWQ is comprised of the four major construction and building industry trade associations in Southern California: the Associated General Contractors of California (AGC), the Building Industry Association of Southern California (BIA/SC), the Engineering Contractors Association (ECA) and the Southern California Contractors Association (SCCA). The membership of CICWQ is comprised of construction contractors, labor unions, landowners, developers, and homebuilders throughout the region and state.

These organizations work collectively to provide the necessary infrastructure and support for the region's business and residential building needs. Members from all of the above-referenced associations are affected by the 2<sup>nd</sup> Tentative Order, as are hundreds of thousands of construction employees and builders working to meet the ever-growing demand for modern infrastructure and housing in Orange County. Our membership supports efforts to improve water quality cost effectively and our comments and our suggestions have been developed with this goal in mind.

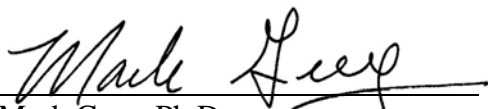
As CICWQ expressed to you in our meeting on August 3, 2007, we remain committed to crafting an MS4 permit that meets applicable water quality standards while at the same time maintaining necessary flexibility to implement its provisions. In our attached technical memorandum, we highlight the major issues where we believe the Regional Board staff and governing board need to make modifications in the 2<sup>nd</sup> Tentative Order: accommodating

pretreatment of infiltrated dry weather flows, providing sufficient hydromodification control waivers where alternatives for equal hydromodification protection exist, accommodating site design features for pollutant removal and hydromodification control that consider project scales, and substantially revising the construction requirements to account for the fact that grading limitations and advanced treatment systems for sediment removal can be best management practices in a contractor's "toolbox", but should in no way be mandated for use. In addition, while we did not discuss SUSUMP provisions with you during our August meeting, we are providing you at this time with some additional comments on standard SUSUMP provisions, especially those relevant to significant redevelopment and infill projects which were not addressed in release of the 2<sup>nd</sup> Tentative Order.

We are confident that by working together, CICWQ can assist the Regional Board in achieving regulatory balance that will improve water quality while also meeting south Orange County's housing and infrastructure needs. We thank you for your consideration of our comments.

If you have any questions, please feel free to contact me at (909) 396-9993 or [mgrey@biasec.org](mailto:mgrey@biasec.org).

Respectfully,

A handwritten signature in black ink, appearing to read "Mark Grey", written over a horizontal line.

Mark Grey, Ph.D.

Director of Environmental Affairs

Building Industry Association of Southern California

Construction Industry Coalition on Water Quality

## Memorandum

Date: August 22, 2007

To: Mark Grey, Building Industry Association of Southern California (BIASC) and Construction Industry Coalition on Water Quality (CICWQ)

From: Lisa Austin, Geosyntec Consultants

Subject: Comments Regarding Revised Tentative Order No. R9-2007-0002, NPDES No. CAS01087420 Waste Discharge Requirements for Discharges or Urban Runoff from the Municipal Separate Storm Sewer Systems (MS4s) Draining the Watersheds of the County of Orange, the Incorporated Cities of Orange County, and the Orange County Flood Control District Within the San Diego Region (July 6, 2007)

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We have reviewed the revised Draft Orange County MS4 Permit (NPDES No. Revised Tentative Order No. R9-2007-0002) and associated Fact Sheet, dated July 6, 2007. In light of our previous comments, the revised draft permit and fact sheet, and response to comments, we have identified and commented on the following outstanding technical issues and have provided suggested alternative permit language:

Comment No.	SECTION	COMMENT
1	Section D.1.c(6)(b) - Infiltration of dry weather flows	<p>The Revised Draft Tentative Order states:</p> <p style="text-align: center;"><i>“All dry weather flows containing significant pollutant loads must be diverted from infiltration devices;”</i></p> <p>Infiltration of <b>pretreated</b> dry weather flows is an important management tool to prevent dry weather flow hydromodification and water quality impacts to receiving waters. As this subsection is written in the Revised Tentative Order, it will be difficult to interpret the term “significant pollutant loads” and may lead to the direct discharge of dry weather flows to receiving waters instead of infiltration of these flows. The combination of pretreatment and the other restrictions on infiltration contained within this section are more than adequate to protect groundwater from impacts of infiltration of dry weather flows. Suggested edits are as follows:</p> <p style="text-align: center;">(b) All dry weather flows <u>shall undergo pretreatment, such as filtration in vegetated pretreatment BMPs, to reduce <del>containing</del> significant pollutant loads <u>prior to</u> <del>must be diverted from</del> infiltration devices;</u></p>

Comment No.	SECTION	COMMENT
2	Section D.1.h (3)(c)(i) – Hydromodification Control Waivers, lack of discharge-caused hydrology changes	<p>The hydromodification control waivers contained in this subsection should include waivers for projects that do not increase the potential for hydromodification impacts over the existing site conditions or that discharge to a receiving water that is not susceptible to hydromodification impacts. Suggested edits are as follows:</p> <p>(c) On-site hydromodification control waivers: Copermittees may develop a strategy for waiving hydromodification requirements for on-site controls (not site design BMPs) in situations where assessments of downstream channel conditions and proposed discharge hydrology clearly indicate that adverse hydromodification effects to present and future beneficial uses are unlikely. The waivers must be based on the following determinations:</p> <p>(i) Lack of discharge-caused hydrology changes: Waivers may be implemented where the total impervious cover <del>on a site is increased by less than 5% in new developments and decreased by at least 0% in redevelopments</del> <u>within the site's watershed at planned buildout is less than 5%. These</u> <u>This</u> numeric criteria may be revised to be consistent with findings from reports from the Storm Water Monitoring Coalition and Southern California Coastal Waters Research Program. Alternatively, directly-connected impervious area or effective impervious cover may be used as an indicator, provided that numeric criteria for the indicators are used and are based on hydromodification studies conducted in southern California.</p> <p><u>Waivers may also be implemented for the following projects that do not increase the potential for hydromodification impacts over the existing site conditions:</u></p> <p><u>(A) Projects within a natural watershed where a geomorphically-based watershed study has been prepared that establishes that the potential for hydromodification impacts is not present or which includes measures that if implemented prior to the project would prevent hydromodification impacts..</u></p> <p><u>(B) Significant redevelopment projects that do not do not increase impervious area or decrease the infiltration capacity of pervious areas compared to the pre-project conditions.</u></p> <p><u>(C) Projects that discharge directly or via a storm drain to a substantially hardened channel, sump, a lake, area under tidal influence, or other receiving water that is not susceptible to hydromodification impacts.</u></p>

Comment No.	SECTION	COMMENT
3	Section D.1.h (3)(c)(ii)(b) – Hydromodification Control Waivers, degraded stream channel condition	<p>This subsection as written in the Revised Tentative Order appears to require projects to implement in-stream measures in channels that are significantly hardened, such as concrete-lined channels, in order to obtain on on-site hydromodification control waiver. Suggested edits are as follows:</p> <p>[b] Modified channel conditions: Conditional waivers in situations where receiving waters are <del>severely degraded</del> or significantly <u>degraded</u> or hardened must include requirements for <u>participation in projects that implement regional or subregional LID strategies and/or hydromodification control BMPs, or in-stream measures designed to improve the beneficial uses adversely affected by hydromodification. The <del>measures</del> regional or subregional LID strategies and/or hydromodification control BMPs, or in-stream</u> measures must be implemented within the same watershed as the Priority Development Project.</p>
4	Section D.1.h(4) – Interim Hydromodification Requirements	Final Hydromod Requirements. Local HMPs should incorporate the results of the SCCWRP study, but should be allowed to deviate from it as technically appropriate as long as the HMPs address certain minimum elements.
5	Section D.1.h(5) – Interim Hydromodification Requirements	Interim hydromodification criteria should only apply to larger projects rather than 20 acre sites. It is unreasonable to expect that small sites can successfully employ sophisticated HMP measures. Instead they should be required to implement hydrological source control BMPs (LID measures as required in the tentative order) as well as comply with the local HMP plans once developed.
6	Section D.2.d(1)(a) and (b) – Construction BMP Implementation, Designate BMPs, general site management and erosion and sediment controls	The minimum set of BMPs and other measures to be implemented at construction sites provided in subsections (a) and (b) does not provide the desired degree of specificity and guidance for the Copermittees, designers or contractors to decide when and what types of erosion and sediment control practices are needed, and how much erosion and sediment control is enough. Additional language with more specific design criteria applicable to all sites to enhance BMPs is suggested in Attachment A to this memo. Included in this attachment are lists of enhanced BMPs that can be used at sites discharging to 303(d)-listed waterbodies and ESAs. With implementation of appropriate enhanced BMPs such as those provided in Attachment A, it is unnecessary and inappropriate for the Copermittees to determine a preset maximum disturbed area for each construction project per the requirement in Section D.2.d(1)(a)(vi).
7	Section D.2.d(1)(c)(1) – Construction BMP Implementation, Designate BMPs, enhanced BMP for 303(d) impairments and	The requirement in subsection (c)(1) that each Copermittee <b>must require</b> implementation of advanced treatment for sediment control at construction sites (or portions thereof) that are determined by the Copermittee to be an exceptional threat to water quality is premature at this time. Use of ATS must be very selective, and the Copermittees should not be mandated to require its use, but instead should only permit its use when it can be shown to be environmentally appropriate and sensitive. Advanced treatment is only potentially required in situations requiring extraordinary water quality

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	ESAs, Advanced Sediment Treatment	<p>protection, such as direct discharge into a water body that is not naturally turbid, and that is (a) 303(d)-listed for sediment or turbidity but where controls implemented pursuant to a TMDL are ineffective, or (b) contains sensitive habitat, such as known salmonid spawning areas.</p> <p>As stated previously, the report by the State Water Resource Control Board's Stormwater Panel on Numeric Limits (SWRCB, 2007) included the following "reservations and concerns" on Advanced Sediment Treatment (called Active Treatment Systems in the Report):</p> <ol style="list-style-type: none"> <li>1. Active treatment systems have generally been employed on sites five acres or larger. While the systems are technically implementable for sites of any size, including sites or drainages as small as an acre or less, the cost may be prohibitive. The cost-effectiveness of active treatment systems is greatly enhanced for large drainage areas, at which construction occurs for an extended period of time, over one or more wet season. There is also a more "passive" active system that is employed in New Zealand that uses captured rainfall to release the chemical into flows entering a detention system that requires less instrumentation and flow measurement infrastructure. Even more passive systems such as the use of polymer logs and filter bags are currently under development for small sites. Regardless, the Panel recommends that the Board give particular attention to improving the application of cost-effective source controls to small construction sites.</li> <li>2. In considering widespread use of active treatment systems, full consideration must be given to whether issues related to toxicity or other environmental effects of the use of chemicals has been fully answered. Consideration should be given to longer-term effects of chemical use, including operational and equipment failures or other accidental excess releases.</li> <li>3. Active treatment systems could result in turbidity and TSS levels well below natural levels, which can also be a problem for receiving waters. One of the causes of stream degradation impacts is the elimination of sediment producing areas in a watershed. Releasing runoff with virtually no sediment load can increase channel downcutting or bank erosion.</li> </ol> <p>Following are our additional concerns with the mandating of use of ATS:</p> <ul style="list-style-type: none"> <li>• The construction site ATS systems being implemented in Washington State, Oregon, and the few sites that have implemented ATS in California are predominantly designed as flow through systems. This types of ATS setup consists of the stormwater collection system, a storage pond, and a</li> </ul>

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		<p>chemically enhanced sand filtration system where the polymer is added, which then discharges from the site. The most common polymers used as coagulants in stormwater treatment systems at this time are chitosan, DADMAC (Polydiallyldimethylammonium chloride), PAM (Polyacrylamide) and Aluminum chlorhydroxide. Very few test results are available on the aquatic toxicity of these polymers. Of the toxicity tests that are available, the majority have been conducted by the various private companies that manufacture stormwater treatment systems that utilize polymers for flocculation/coagulation. There have been some tests performed by researchers and horticultural interests.</p> <p>In order to protect against toxicity in ATS discharges, it is important to know the concentration of the coagulant chemical in treated effluent so as to compare this value to known toxic concentrations, if available. As it has been found to be impractical to test directly for coagulant chemical residual in flow through systems, or to test directly for whole effluent toxicity prior to discharge of treated water, surrogate testing methods have been developed such as colorimetric field testing methods, flocculation field tests, photometric tests, and turbidity measurements. These surrogate methods are only able to detect the presence of the chemical at a concentration greater than some value in the treated runoff, but not to quantify the concentration. For example, one of the field testing methods for DADMAC proposed by treatment system manufacturers are photometric tests. In the photometric tests, the discharge sample is treated with a reagent which causes the sample to change color depending on the concentration of residual polymer. Detection limits for these tests range between 0.5 and 1.0 mg/L. Reported LC50s for DADMAC range from 0.32 mg/L for Ceriodaphnia dubia, 0.49 for Fathead minnow, to 17.5 mg/L for Daphnia magna. Therefore, there is potential risk for ATS discharges to be toxic to receiving waters given the current status of testing methods for residual coagulant.</p> <ul style="list-style-type: none"> <li>• It is unclear what activity would trigger the transition from ATS to conventional erosion and sediment control BMPs. For example, it is unclear if ATS would no longer be required when streets and slabs are fully installed and when storm drains become active and functional.</li> <li>• There are currently not enough trained personnel or equipment suppliers to implement the ATS requirements.</li> <li>• ATS effectiveness will vary based on system design, selected coagulant, and other site specific conditions. Coagulant/flocculent dosing will vary with ambient soil characteristics. Additional research is required on the varying types of soils and components that will affect ATS effectiveness</li> </ul>

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		<p>prior to implementation of this requirement.</p> <p>As detailed throughout these comments, we recommend that the permit be modified to allow a comprehensive, well-designed SWPPP with enhanced sediment and erosion control BMPs as outlined in Attachment A to be implemented in lieu of mandating ATS, particularly where downstream receiving waters are not impaired for sediment and do not contain sediment-sensitive habitat. These concerns and recommendations should be considered by the Board prior to mandating the use of active treatment systems.</p>
8	Section D.1.d(1) – Standard SUSMP, Definition of Priority Development Project	<p>The following project types should not be considered Priority Development Projects for the consideration of SUSMP provisions:</p> <ul style="list-style-type: none"> <li>• Pothole repair and square cut patching, overlaying existing asphalt or concrete pavement with asphalt or concrete without expanding the area of coverage, shoulder grading, reshaping/regarding drainage systems, crack sealing, resurfacing with in-kind material without expanding the road prism, and vegetation maintenance.</li> <li>• Underground utility installation or refurbishment projects that replace the ground surface with in-kind material or materials with similar runoff characteristics.</li> </ul>
9	Section D.1. – Standard SUSMP	<p>Following are our additional concerns with the Section D.1. of the Tentative Order:</p> <ul style="list-style-type: none"> <li>• The Copermittees should be able to allow for the implementation of subregional or regional LID, hydromodification control, and/or treatment control measures and BMPs, provided that the regional or subregional measures and BMPs provide the level of pollutant and flow control mandated by this section of the Tentative Order, and discharge to the same receiving water as would have been the case if on-site and/or site specific controls had been incorporated into the SUSMP.</li> <li>• In SUSMPs for Significant Redevelopment and infill development, the Copermittees should be able to allow for the hydromodification control and treatment control requirements for all or a portion of the project area to be met by controlling a substitute area that drains to the same receiving water so long as the substitute area has equivalent flow and pollutant characteristics to the project area.</li> <li>• In SUSMPs for Significant Redevelopment and infill development, the Copermittees should be able to allow for the payment of fees toward installation, implementation, maintenance and operation of approved subregional and regional hydromodification, control and/or treatment control BMPs, provided that the subregional or regional measures and</li> </ul>



Comment No.	SECTION	COMMENT
		<p>BMPs: are reasonably likely to be funded and implemented in a period of time sufficient to mitigate post-construction adverse water quality impacts, provide the level of pollutant and flow control mandated by this section, and discharge to the same receiving water as would have been the case if on-site and/or site specific controls had been incorporated into the SUSMP.</p> <ul style="list-style-type: none"> <li>• In determining the degree to which LID strategies must be or have been implemented, it is appropriate for Permittees to consider the scale of development, site planning BMPs employed, and volume and flow controls achieved by other BMPs and measures implemented for a project area, including, without limitation, regional, subregional and site-specific treatment control, hydromodification, and LID measures and BMPs.</li> <li>• In determining compliance with the numeric treatment control and hydrologic control criteria of the Tentative Order, peak, volume and duration reductions achieved by all BMPs and control measures cumulatively, including, without limitation, those achieved by LID strategies, treatment control BMPs, and hydromodification control BMPs, should be considered.</li> </ul>

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## ATTACHMENT A

### 1. Minimum Construction BMP Implementation

- (a) Each Permittee shall implement a minimum set of BMPs as listed in Tables 1 (low risk), 2 (standard risk), or 3 (high risk) depending on the risk category calculated for the site and to effectively control pollutants in discharges from construction sites<sup>1</sup>. An effective combination of erosion and sediment control practices shall be implemented on disturbed areas without regard to time of season. Erosion control BMPs shall be emphasized. The erosion and sediment control practices shall be selected to:
  - (i) Minimize exposed areas during the rainy season;
  - (ii) Provide erosion control practices on disturbed areas, slopes, and stockpiles;
  - (iii) Provide properly designed drainage facilities to control concentrated flows;
  - (iv) Provide sediment control practices around the perimeter of the construction site, at all transition areas within the project site (e.g., transition from slope to flat areas), and at all internal inlets to the storm drain system;
  - (v) Reduce the tracking of sediment off site; and
  - (vi) Reduce wind erosion.
- (b) All disturbed areas that will not be re-disturbed shall be provided with erosion control measures. The erosion control practices should achieve control equivalent to 70-90 percent soil coverage until the permanent vegetation or other permanent stabilization provides the intended long-term erosion control function at the site.
- (c) On-site drainage facilities for carrying concentrated flows shall be designed to control erosion and to prevent damage to downstream properties.
- (d) Sediment control practices shall be provided around the down gradient perimeter of the construction site and at all internal inlets to the storm drain system during the rainy season. These sediment control measures may include filtration devices (such as silt fences, straw bale barriers, and inlet filters) and/or settling devices (such as sediment traps or basins). Filtration devices that are designed for sheet flow shall be installed and maintained properly in order to perform effectively (i.e., after each rain event accumulated sediments shall be removed). Sediment traps or basins shall be designed and maintained in accordance with requirements of the GCP.

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<sup>1</sup> The BMPs are taken from the *California BMP Handbook, Construction, January 2003* and the *Caltrans Stormwater Quality Handbooks, Construction Site Best Management Practices (BMPs) Manual, March 2003*, and addenda. This list is not meant to endorse any specific product or manufacturer. BMPs of equivalent effectiveness from other Construction Sediment and Erosion control guidance documents may also be utilized.

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2. Enhanced Construction BMP Implementation

Each high risk site shall implement, or require implementation of, the minimum BMPs listed in Table 3 and enhanced practices to address the exceptional threat to water quality posed by high risk construction sites.

(a) Enhanced practices for high risk sites shall include increased BMP inspection and maintenance requirements.

(i) High risk sites shall be inspected by the SWPPP preparer/engineer of record, or qualified construction water quality compliance personnel or consultants who are Certified Professionals in Erosion and Sediment Control (CPESC) at the time of BMP installation, at least weekly during the rainy season, within the 24 hours prior to a predicted rainfall event, with 50% probability of occurrence, of 0.25 inch or greater, and monthly during the dry season.

(ii) During the rainy season, the area of disturbance shall be limited to the area that can be controlled with an effective combination of erosion and sediment control BMPs. Enhanced controls for high risk sites should be used in combination with erosion and sediment controls required for standard sites. Enhanced sediment controls (i.e., advanced treatment) should target portions of the site that cannot be effectively controlled by erosion and sediment controls for high risk sites identified in Table 3

**Table 1: BMP Menu for Low Risk Construction Sites.**

Control Type	Construction Site BMPs	CASQA Handbook	Caltrans Handbook	Applicability
<b>Phase I – Site Preparation / Mass Grading</b>				
Planning	Scheduling	EC-1	SS-1	Required
	Preservation of Existing Vegetation	EC-2	SS-2	Required, as site conditions allow
Tracking Controls	Stabilized Construction Entrance/Exit – Minimum 25'	TC-1	TC-1	Required
	Street Sweeping and Vacuuming	SE-7	SC-7	Required, implement as needed
Perimeter Controls	Silt Fence – standard	SE-1	SC-1	Required (select one or combination)
	Fiber Rolls – 9"	SE-5	SC-5	
	Gravel Bag Berm	SE-6	SC-6	
	Triangular silt dike – paved surfaces <sup>2</sup>	None	None	
Drainage Control	Storm Drain Inlet Protection	SE-10	SC-10	Required (if existing inlets are present)

<sup>2</sup> Refer to the Stormwater Management Manual for Western Washington - BMP C208 – found at <http://www.ecy.wa.gov/pubs/0510030.pdf>

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<b>Control Type</b>	<b>Construction Site BMPs</b>	<b>CASQA Handbook</b>	<b>Caltrans Handbook</b>	<b>Applicability</b>
Energy Dissipation	Outlet Protection / Velocity Dissipation Devices	EC-10	SS-10	Required, (if existing outlets are present)
Dust Control	Wind Erosion Controls	WE-1	WE-1	Required
Stockpile Management	Stockpile Management	WM-3	WM-3	Required
<b>Phase II – Utility Installation, Paving, and Building Pad Construction</b>				
<i>All Phase I BMPs already installed should be regularly inspected and maintained; many Phase II BMPs are the same as required in Phase I. A full list of Phase II BMPs follows:</i>				
Planning	Scheduling	EC-1	SS-1	Required
	Preservation of Existing Vegetation	EC-2	SS-2	Required, as site conditions allow
Tracking Controls	Stabilized Construction Entrance/Exit	TC-1	TC-1	Required
	Street Sweeping and Vacuuming	SE-7	SC-7	Required, implement as needed
Perimeter Controls	Silt Fence – standard	SE-1	SC-1	Required (select one or combination)
	Fiber Rolls – 9”	SE-5	SC-5	
	Gravel Bag Berm	SE-6	SC-6	
	Triangular silt dike – paved surfaces <sup>2</sup>	None	None	
Drainage Control	Storm Drain Inlet Protection	SE-10	SC-10	Required (within <b>48</b> hours of inlet installation)
Energy Dissipation	Outlet Protection / Velocity Dissipation Devices	EC-10	SS-10	Required, (within <b>48</b> hours of inlet installation)
Dust Control	Wind Erosion Controls	WE-1	WE-1	Required
Stockpile Management	Stockpile Management	WM-3	WM-3	Required
<i>Additional Phase II BMPs are as follows:</i>				
Paving / Concrete Installation	Concrete Waste Management	WM-8	WM-8	As utilized in construction activities
	Paving and Grinding Operations	NS-3	NS-3	
	Concrete Curing	NS-12	NS-12	
	Concrete Finishing	NS-13	NS-14	
	Temporary Batch Plants	NS-16	None	
<b>Phase III – Vertical / Building Construction</b>				
<i>All Phase I and II BMPs should remain in place until final stabilization or cessation of activity that was the cause for their use and should be regularly inspected and maintained; additional BMPs are as follows:</i>				
Paving / Concrete Installation	Concrete Waste Management	WM-8	WM-8	As utilized in construction activities
	Paving and Grinding Operations	NS-3	NS-3	
	Concrete Curing	NS-12	NS-12	
	Concrete Finishing	NS-13	NS-14	
	Temporary Batch Plants	NS-16	None	

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<b>Control Type</b>	<b>Construction Site BMPs</b>	<b>CASQA Handbook</b>	<b>Caltrans Handbook</b>	<b>Applicability</b>
<b>Phase IV – Final Stabilization / Landscaping</b>				
<i>All installed BMPs should remain in place until final stabilization is achieved on-site or until the cessation of the activity that was the cause for their use.</i>				
<i>Select one of the three methods of final stabilization</i>				
Final Stabilization - Hydraulically applied	Hydraulic Mulch	EC-3	SS-3	If selected– combine to form hydraulic matrix – apply within <b>14</b> days of achieving final grade
	Hydroseeding	EC-4	SS-4	
	Soil Binders	EC-5	SS-5	
Final Stabilization – Non Hydraulically applied	Seed w/ Straw Mulch	EC-6	SS-6	If selected – apply within <b>14</b> days of achieving final grade
	Seed w/ Geotextiles and Erosion Control Mats	EC-7	SS-7	
	Wood Mulch	EC-8	SS-8	
	Sod <sup>3</sup>	None	None	
	Seed w/Compost <sup>4</sup>	None	None	
Final Stabilization - NonVegetative	Rock, Gravel or Rip-Rap <sup>5</sup>	None	None	If selected – apply within <b>14</b> days of achieving final grade
Water Use	Potable Water / Irrigation	NS-7	NS-7	Required
<b>Non-Storm Water Management – Common, applicable during all Phases of Construction</b>				
Water Use	Water Conservation Practices	NS-1	NS-1	Required
	Dewatering Operations	NS-2	NS-2	Required, implement as needed
Equipment Care	Vehicle and Equipment Washing	NS-8	NS-8	Required
	Vehicle and Equipment Fueling	NS-9	NS-9	
	Vehicle and Equipment Maintenance	NS-10	NS-10	
Material Usage	Material Delivery and Storage	WM-1	WM-1	Required
	Material Use	WM-2	WM-2	
	Spill Prevention and Control	WM-4	WM-4	
Waste Management / Housekeeping	Solid Waste Management	WM-5	WM-5	Required
	Sanitary/Septic Waste Management	WM-9	WM-9	Required, implement as needed
	Liquid Waste Management	WM-10	WM-10	Required, implement as needed
<b>Non-Storm Water Management – Uncommon, applicable during any Phase; however, triggered by specific circumstances</b>				
Exceptional	Temporary Stream Crossing	NS-4	NS-4	Required, if

<sup>3</sup> Refer to the Oregon Department of Environmental Quality (ODEQ) Erosion and Sediment Control Manual section EP-21 – Sodding, found at <http://www.deq.state.or.us/wq/stormwater/escmanual.htm>

<sup>4</sup> Refer to the Oregon Department of Environmental Quality (ODEQ) Erosion and Sediment Control Manual section EP-9 – Compost Blanket, found at <http://www.deq.state.or.us/wq/stormwater/escmanual.htm>

<sup>5</sup> Refer to the Nevada BMP Handbook BMP 3-6 Rock and Gravel Mulches found at <http://ndep.nv.gov/bwqp/bmp05.htm>

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<b>Control Type</b>	<b>Construction Site BMPs</b>	<b>CASQA Handbook</b>	<b>Caltrans Handbook</b>	<b>Applicability</b>
Circumstance BMPs	Clear Water Diversion	NS-5	NS-5	construction activity demands
	Pile Driving Operations	NS-11	NS-11	
	Demolition Adjacent to Water	NS-15	NS-15	
	Hazardous Waste Management	WM-6	WM-6	
	Contaminated Soil Management	WM-7	WM-7	

**Table 2: BMP Menu for Standard Risk Sites**

<b>Control Type</b>	<b>Construction Site BMPs</b>	<b>CASQA Handbook</b>	<b>Caltrans Handbook</b>	<b>Applicability</b>
<b>Phase I – Site Preparation / Mass Grading</b>				
Planning	Scheduling	EC-1	SS-1	Required
	Preservation of Existing Vegetation	EC-2	SS-2	Required, as allowable by site conditions
Tracking Controls	Stabilized Construction Entrance/Exit – Minimum 25'	TC-1	TC-1	Required
	Street Sweeping and Vacuuming	SE-7	SC-7	Required, implement as needed
	Entrance/Exit Tire Wash	TC-3	TC-3	
Perimeter Controls	Silt Fence – standard	SE-1	SC-1	Required (select one or combination)
	Fiber Rolls – 9"	SE-5	SC-5	
	Gravel Bag Berm	SE-6	SC-6	
	Triangular silt dike – paved surfaces <sup>6</sup>	None	None	
Drainage Controls	Storm Drain Inlet Protection	SE-10	SC-10	Required (if existing inlets are present)
	Earth Dikes and Drainage Swales	EC-9	SS-9	As needed
	Slope Drains	EC-11	SS-11	
Detention Facilities	Sediment Basin	SE-2	SC-2	As needed
	Sediment Traps	SE-3	SC-3	
Energy Dissipation	Outlet Protection / Velocity Dissipation Devices	EC-10	SS-10	Required, (if existing outlets are present)
	Check Dam	SE-4	SC-4	Required (if using conveyance channels or drainage swales)
	Gravel Bag Berm	SE-6	SC-6	As needed
	Sand Bag Barrier	SE-8	SC-8	
	Fiber Rolls	SE-5	SC-5	
Dust Control	Wind Erosion Controls	WE-1	WE-1	Required

<sup>6</sup> Refer to the Stormwater Management Manual for Western Washington - BMP C208 – found at <http://www.ecy.wa.gov/pubs/0510030.pdf>

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<b>Control Type</b>	<b>Construction Site BMPs</b>	<b>CASQA Handbook</b>	<b>Caltrans Handbook</b>	<b>Applicability</b>
Soil Roughening	Soil Roughening (e.g. trackwalking) <sup>7</sup>	None	None	As needed
Stockpile Management	Stockpile Management	WM-3	WM-3	Required
Erosion Control / Temporary Stabilization	Hydraulic Mulch	EC-3	SS-3	Required (select one or more to stabilize all areas that will be inactive for > 20 days within 14 days of cessation of activity).
	Hydroseeding	EC-4	SS-4	
	Soil Binders	EC-5	SS-5	
	Straw Mulch	EC-6	SS-6	
	Geotextiles and Erosion Control Mats	EC-7	SS-7	
	Wood Mulch	EC-8	SS-8	
	Compost <sup>8</sup>	None	None	
<b>Phase II – Utility Installation, Paving, and Building Pad Construction</b>				
<i>All Phase I BMPs already installed should be regularly inspected and maintained; many Phase I BMPs may be required in Phase II and are as follows:</i>				
Planning	Scheduling	EC-1	SS-1	Required
	Preservation of Existing Vegetation	EC-2	SS-2	Required as allowable by site conditions
Tracking Controls	Stabilized Construction Entrance/Exit – Minimum 25'	TC-1	TC-1	Required
	Street Sweeping and Vacuuming	SE-7	SC-7	Required, implement as needed
	Entrance/Exit Tire Wash	TC-3	TC-3	As needed
Perimeter Controls	Silt Fence – standard	SE-1	SC-1	Required (select one or combination)
	Fiber Rolls – 9"	SE-5	SC-5	
	Gravel Bag Berm	SE-6	SC-6	
	Triangular silt dike – paved surfaces <sup>9</sup>	None	None	
Drainage Control	Storm Drain Inlet Protection	SE-10	SC-10	Required (within 24 hours of inlet installation)
	Earth Dikes and Drainage Swales	EC-9	SS-9	As needed
	Slope Drains	EC-11	SS-11	
Detention Facilities	Sediment Basin	SE-2	SC-2	As needed
	Sediment Traps	SE-3	SC-3	

<sup>7</sup> Refer to the Oregon Department of Environmental Quality (ODEQ) Erosion and Sediment Control Manual section EP-3 – Soil Roughening, found at <http://www.deq.state.or.us/wq/stormwater/escmanual.htm>

<sup>8</sup> Refer to the Oregon Department of Environmental Quality (ODEQ) Erosion and Sediment Control Manual section EP-9 – Compost Blanket, found at <http://www.deq.state.or.us/wq/stormwater/escmanual.htm>

<sup>9</sup> Refer to the Stormwater Management Manual for Western Washington - BMP C208 – found at <http://www.ecy.wa.gov/pubs/0510030.pdf>

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<b>Control Type</b>	<b>Construction Site BMPs</b>	<b>CASQA Handbook</b>	<b>Caltrans Handbook</b>	<b>Applicability</b>
Energy Dissipation	Outlet Protection / Velocity Dissipation Devices	EC-10	SS-10	Required, (within 24 hours of outfall installation)
	Check Dam	SE-4	SC-4	Required (if using conveyance channels or drainage swales)
	Gravel Bag Berm	SE-6	SC-6	As needed
	Sand Bag Barrier	SE-8	SC-8	
	Fiber Rolls	SE-5	SC-5	
Dust Control	Wind Erosion Controls	WE-1	WE-1	Required
Soil Roughening	Soil Roughening (e.g. trackwalking) <sup>10</sup>	None	None	As needed
Stockpile Management	Stockpile Management	WM-3	WM-3	Required
Erosion Control / Temporary Stabilization	Hydraulic Mulch	EC-3	SS-3	Required (select one or more to stabilize all areas that will be inactive for > 20 days within 14 days of cessation of activity).
	Hydroseeding	EC-4	SS-4	
	Soil Binders	EC-5	SS-5	
	Straw Mulch	EC-6	SS-6	
	Geotextiles and Erosion Control Mats	EC-7	SS-7	
	Wood Mulch	EC-8	SS-8	
	Compost <sup>11</sup>	None	None	
<i>Additional Phase II BMPs are as follows:</i>				
Paving / Concrete Installation	Concrete Waste Management	WM-8	WM-8	As utilized
	Paving and Grinding Operations	NS-3	NS-3	
	Concrete Curing	NS-12	NS-12	
	Concrete Finishing	NS-13	NS-14	
	Temporary Batch Plants	NS-16	None	
<b>Phase III – Vertical / Building Construction</b>				
<i>All Phase I and II BMPs should remain in place until final stabilization or cessation of activity that was the cause for their use and should be regularly inspected and maintained; additional BMPs are as follows:</i>				
Paving / Concrete Installation	Concrete Waste Management	WM-8	WM-8	As utilized
	Paving and Grinding Operations	NS-3	NS-3	
	Concrete Curing	NS-12	NS-12	
	Concrete Finishing	NS-13	NS-14	
	Temporary Batch Plants	NS-16	None	

<sup>10</sup> Refer to the Oregon Department of Environmental Quality (ODEQ) Erosion and Sediment Control Manual section EP-3 – Soil Roughening, found at <http://www.deq.state.or.us/wq/stormwater/escmanual.htm>

<sup>11</sup> Refer to the Oregon Department of Environmental Quality (ODEQ) Erosion and Sediment Control Manual section EP-9 – Compost Blanket, found at <http://www.deq.state.or.us/wq/stormwater/escmanual.htm>



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<b>Control Type</b>	<b>Construction Site BMPs</b>	<b>CASQA Handbook</b>	<b>Caltrans Handbook</b>	<b>Applicability</b>
<b>Phase IV – Final Stabilization / Landscaping</b>				
<i>All installed BMPs should remain in place until final stabilization is achieved on-site or until the cessation of the activity that was the cause for their use.</i>				
<i>Select one of the three methods of final stabilization</i>				
Final Stabilization - Hydraulically applied	Hydraulic Mulch	EC-3	SS-3	If selected– combine to form hydraulic matrix – apply within <b>14</b> days of achieving final grade
	Hydroseeding	EC-4	SS-4	
	Soil Binders	EC-5	SS-5	
Final Stabilization – Non Hydraulically applied	Seed w/ Straw Mulch	EC-6	SS-6	If selected – apply within <b>14</b> days of achieving final grade
	Seed w/ Geotextiles and Erosion Control Mats	EC-7	SS-7	
	Wood Mulch	EC-8	SS-8	
	Sod <sup>12</sup>	None	None	
	Seed w/Compost <sup>13</sup>	None	None	
Final Stabilization - Non-Vegetative	Rock, Gravel or Rip-Rap <sup>14</sup>	None	None	If selected – apply within <b>14</b> days of achieving final grade
Water Use	Potable Water / Irrigation	NS-7	NS-7	Required
<b>Non-Storm Water Management – Common, applicable during all Phases of Construction</b>				
Water Use	Water Conservation Practices	NS-1	NS-1	Required
	Dewatering Operations	NS-2	NS-2	Required, implement as needed
Equipment Care	Vehicle and Equipment Washing	NS-8	NS-8	Required
	Vehicle and Equipment Fueling	NS-9	NS-9	
	Vehicle and Equipment Maintenance	NS-10	NS-10	
Material Usage	Material Delivery and Storage	WM-1	WM-1	Required
	Material Use	WM-2	WM-2	
	Spill Prevention and Control	WM-4	WM-4	
Waste Management / Housekeeping	Solid Waste Management	WM-5	WM-5	Required
	Sanitary/Septic Waste Management	WM-9	WM-9	Required, implement as needed
	Liquid Waste Management	WM-10	WM-10	Required, implement as needed

<sup>12</sup> Refer to the Oregon Department of Environmental Quality (ODEQ) Erosion and Sediment Control Manual section EP-21 – Sodding, found at <http://www.deq.state.or.us/wq/stormwater/escmanual.htm>

<sup>13</sup> Refer to the Oregon Department of Environmental Quality (ODEQ) Erosion and Sediment Control Manual section EP-9 – Compost Blanket, found at <http://www.deq.state.or.us/wq/stormwater/escmanual.htm>

<sup>14</sup> Refer to the Nevada BMP Handbook BMP 3-6 Rock and Gravel Mulches found at <http://ndep.nv.gov/bwqp/bmp05.htm>

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<b>Control Type</b>	<b>Construction Site BMPs</b>	<b>CASQA Handbook</b>	<b>Caltrans Handbook</b>	<b>Applicability</b>
<b>Non-Storm Water Management – Uncommon, applicable during any Phase; however, triggered by specific circumstances</b>				
Exceptional Circumstance BMPs	Temporary Stream Crossing	NS-4	NS-4	Required, implement as needed
	Clear Water Diversion	NS-5	NS-5	
	Pile Driving Operations	NS-11	NS-11	
	Demolition Adjacent to Water	NS-15	NS-15	
	Hazardous Waste Management	WM-6	WM-6	
	Contaminated Soil Management	WM-7	WM-7	

**Table 3 – BMP Menu for High Risk Sites**

<b>Control Type</b>	<b>Construction Site BMPs</b>	<b>CASQA Handbook</b>	<b>Caltrans Handbook</b>	<b>Applicability</b>
<b>Phase I – Site Preparation / Mass Grading</b>				
Perimeter Controls	Silt Fence – steel post, wire reinforced	SE-1	SC-1	Required (select one)
	Fiber Rolls – 12”	SE-5	SC-5	
Tracking Controls	Stabilized Construction Entrance/Exit – Minimum 25’	TC-1	TC-1	Required
	Entrance/Exit Tire Wash	TC-3	TC-3	As needed
	Stabilized Construction Roadway	TC-2	TC-2	
Drainage Controls	Storm Drain Inlet Protection	SE-10	SC-10	Required (if existing inlets are present)
	Earth Dikes and Drainage Swales	EC-9	SS-9	As needed
	Slope Drains	EC-11	SS-11	
Detention Facilities	Sediment Basin	SE-2	SC-2	As needed
	Sediment Traps	SE-3	SC-3	
Energy Dissipation	Outlet Protection / Velocity Dissipation Devices	EC-10	SS-10	Required, (if existing outlets are present)
	Check Dam	SE-4	SC-4	Required (if using conveyance channels or drainage swales)
	Gravel Bag Berm	SE-6	SC-6	As needed
	Sand Bag Barrier	SE-8	SC-8	
	Fiber Rolls	SE-5	SC-5	
Dust Control	Wind Erosion Controls	WE-1	WE-1	Required
Soil Roughening	Soil Roughening (e.g. trackwalking) <sup>15</sup>	None	None	As needed

<sup>15</sup> Refer to the Oregon Department of Environmental Quality (ODEQ) Erosion and Sediment Control Manual section EP-3 – Soil Roughening, found at <http://www.deq.state.or.us/wq/stormwater/escmanual.htm>

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<b>Control Type</b>	<b>Construction Site BMPs</b>	<b>CASQA Handbook</b>	<b>Caltrans Handbook</b>	<b>Applicability</b>
Erosion Control / Temporary Stabilization	Hydraulic Mulch	EC-3	SS-3	Required (select one or more to stabilize all areas that will be inactive for > 20 days within 7 days of cessation of activity).
	Hydroseeding	EC-4	SS-4	
	Soil Binders	EC-5	SS-5	
	Straw Mulch	EC-6	SS-6	
	Geotextiles and Erosion Control Mats	EC-7	SS-7	
	Wood Mulch	EC-8	SS-8	
	Compost <sup>16</sup>	None	None	
Advanced Treatment	Chemical Treatment – Sediment removal	SE-11	None	As appropriate for site and environmental conditions/ must be approved prior to use
<b>Phase II – Utility Installation, Paving, and Building Pad Construction</b>				
<i>All Phase I BMPs already installed should be regularly inspected and maintained; many Phase II BMPs are the same as required in Phase I. A full list of Phase II BMPs follows:</i>				
Perimeter Controls	Silt Fence – steel post, wire reinforced Fiber Rolls – 12”	SE-1	SC-1	Required (select one)
		SE-5	SC-5	
Tracking Controls	Stabilized Construction Entrance/Exit – Minimum 50’	TC-1	TC-1	Required
	Entrance/Exit Tire Wash	TC-3	TC-3	As needed
	Stabilized Construction Roadway	TC-2	TC-2	Required, implement as needed
Drainage Controls	Storm Drain Inlet Protection	SE-10	SC-10	Required (if existing inlets are present)
	Earth Dikes and Drainage Swales	EC-9	SS-9	As needed
	Slope Drains	EC-11	SS-11	
Detention Facilities	Sediment Basin	SE-2	SC-2	As needed
	Sediment Traps	SE-3	SC-3	
Energy Dissipation	Outlet Protection / Velocity Dissipation Devices	EC-10	SS-10	Required, (if existing outlets are present)
	Check Dam	SE-4	SC-4	Required (if using conveyance channels or drainage swales)
	Gravel Bag Berm	SE-6	SC-6	As needed
	Sand Bag Barrier	SE-8	SC-8	
	Fiber Rolls	SE-5	SC-5	
Dust Control	Wind Erosion Controls	WE-1	WE-1	Required

<sup>16</sup> Refer to the Oregon Department of Environmental Quality (ODEQ) Erosion and Sediment Control Manual section EP-9 – Compost Blanket, found at <http://www.deq.state.or.us/wq/stormwater/escmanual.htm>

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<b>Control Type</b>	<b>Construction Site BMPs</b>	<b>CASQA Handbook</b>	<b>Caltrans Handbook</b>	<b>Applicability</b>
Soil Roughening	Soil Roughening (e.g. trackwalking) <sup>17</sup>	None	None	As needed
Erosion Control / Temporary Stabilization	Hydraulic Mulch	EC-3	SS-3	Required (select one or more to stabilize all areas that will be inactive for > 20 days within 7 days of cessation of activity).
	Hydroseeding	EC-4	SS-4	
	Soil Binders	EC-5	SS-5	
	Straw Mulch	EC-6	SS-6	
	Geotextiles and Erosion Control Mats	EC-7	SS-7	
	Wood Mulch	EC-8	SS-8	
	Compost <sup>18</sup>	None	None	
Paving / Concrete Installation	Concrete Waste Management	WM-8	WM-8	As utilized
	Paving and Grinding Operations	NS-3	NS-3	
	Concrete Curing	NS-12	NS-12	
	Concrete Finishing	NS-13	NS-14	
	Temporary Batch Plants	NS-16	None	
Advanced Treatment	Chemical Treatment – Sediment removal	SE-11	None	As needed / must be approved prior to use
	Chemical Treatment – pH regulation	SE-11	None	As needed / must be approved prior to use
<b>Phase III – Vertical / Building Construction</b>				
<i>All Phase I and II BMPs should remain in place until final stabilization or cessation of activity that was the cause for their use and should be regularly inspected and maintained; additional Phase III BMPs are as follows:</i>				
Paving / Concrete Installation	Concrete Waste Management	WM-8	WM-8	As utilized
	Paving and Grinding Operations	NS-3	NS-3	
	Concrete Curing	NS-12	NS-12	
	Concrete Finishing	NS-13	NS-14	
	Temporary Batch Plants	NS-16	None	
Advanced Treatment	Chemical Treatment – pH regulation	SE-11	None	As needed / must be approved prior to use
<b>Phase IV – Final Stabilization / Landscaping</b>				
<i>All installed BMPs should remain in place until final stabilization is achieved on-site or until the cessation of the activity that was the cause for their use.</i>				
<i>Select one of the three methods of final stabilization</i>				
Final Stabilization -	Hydraulic Mulch	EC-3	SS-3	Required – combine
	Hydroseeding	EC-4	SS-4	

<sup>17</sup> Refer to the Oregon Department of Environmental Quality (ODEQ) Erosion and Sediment Control Manual section EP-3 – Soil Roughening, found at <http://www.deq.state.or.us/wq/stormwater/escmanual.htm>

<sup>18</sup> Refer to the Oregon Department of Environmental Quality (ODEQ) Erosion and Sediment Control Manual section EP-9 – Compost Blanket, found at <http://www.deq.state.or.us/wq/stormwater/escmanual.htm>

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<b>Control Type</b>	<b>Construction Site BMPs</b>	<b>CASQA Handbook</b>	<b>Caltrans Handbook</b>	<b>Applicability</b>
Hydraulically applied	Soil Binders	EC-5	SS-5	to form hydraulic matrix – apply within 7 days of achieving final grade
Final Stabilization – Non Hydraulically applied	Seed w/ Straw Mulch	EC-6	SS-6	Required – apply within 7 days of achieving final grade
	Seed w/ Geotextiles and Erosion Control Mats	EC-7	SS-7	
	Wood Mulch	EC-8	SS-8	
	Sod <sup>19</sup>	None	None	
	Seed w/Compost <sup>20</sup>	None	None	
Final Stabilization - NonVegetative	Rock, Gravel or Rip-Rap <sup>21</sup>	None	None	Required – apply within 7 days of achieving final grade
Water Use	Potable Water / Irrigation	NS-7	NS-7	Required
<b>Non-Storm Water Management – Common, applicable during all Phases of Construction</b>				
Water Use	Water Conservation Practices	NS-1	NS-1	Required
	Dewatering Operations	NS-2	NS-2	As needed
Equipment Care	Vehicle and Equipment Washing	NS-8	NS-8	Required
	Vehicle and Equipment Fueling	NS-9	NS-9	
	Vehicle and Equipment Maintenance	NS-10	NS-10	
Material Usage	Material Delivery and Storage	WM-1	WM-1	Required
	Material Use	WM-2	WM-2	
	Spill Prevention and Control	WM-4	WM-4	
Waste Management / Housekeeping	Solid Waste Management	WM-5	WM-5	Required
	Sanitary/Septic Waste Management	WM-9	WM-9	As needed
	Liquid Waste Management	WM-10	WM-10	As needed
<b>Non-Storm Water Management – Uncommon, applicable during any Phase; however, triggered by specific circumstances</b>				
Exceptional Circumstance BMPs	Temporary Stream Crossing	NS-4	NS-4	Required, if site conditions indicate necessary
	Clear Water Diversion	NS-5	NS-5	
	Pile Driving Operations	NS-11	NS-11	
	Demolition Adjacent to Water	NS-15	NS-15	
	Hazardous Waste Management	WM-6	WM-6	
	Contaminated Soil Management	WM-7	WM-7	

<sup>19</sup> Refer to the Oregon Department of Environmental Quality (ODEQ) Erosion and Sediment Control Manual section EP-21 – Sodding, found at <http://www.deq.state.or.us/wq/stormwater/escmanual.htm>

<sup>20</sup> Refer to the Oregon Department of Environmental Quality (ODEQ) Erosion and Sediment Control Manual section EP-9 – Compost Blanket, found at <http://www.deq.state.or.us/wq/stormwater/escmanual.htm>

<sup>21</sup> Refer to the Nevada BMP Handbook BMP 3-6 Rock and Gravel Mulches found at <http://ndep.nv.gov/bwqp/bmp05.htm>