

## King County Road Maintenance Municipal NPDES Compliance Programs for 2003

The Road Maintenance Section of the King County Department of Transportation, Road Services Division is responsible for the maintenance of about 1900 miles of roadway system in unincorporated King County. The roadway system includes the roadway surface, shoulders, ditches and other water bodies in the road right-of-way (ROW) streams, culverts and enclosed drainage systems, and slopes adjacent to the roadway. This section also supplies support, equipment and personnel for projects for other King County Divisions and Departments.

Maintenance or reconstruction of any of these roadway features could have significant impacts on water quality. Careful management of ongoing road maintenance activities, together with habitat restoration and water quality pollution prevention projects in or adjacent to the road ROW, and in King County facilities, substantially contribute to the prevention of pollution of surface water, groundwater, and storm water in this region.

One of the most significant steps taken by the Roads Maintenance Section to address the goals of the municipal National Pollutant Discharge Elimination System (NPDES) permit, has been the implementation of environmental Best Management Practices (BMP's) and the increased environmental awareness and monitoring of road maintenance programs. Enhanced erosion/sediment controls during daily operations and changes in road maintenance approaches have resulted in the reduction or reversal of adverse impacts of maintenance activities on water quality conditions. The programs that provide water quality protection and meet the NPDES intentions of clean water are described below.

**ESA 4(d) Guidelines Program** – King County Roads Maintenance (KCRM) responded to the Endangered Species Act (ESA) listing of Puget Sound Chinook, Bull trout and other environmental regulations, such as the Clean Water Act and the King County Sensitive Areas Ordinance, by implementing a program that modifies roadway and roadside maintenance activities to avoid or minimize potential adverse impacts to fish species, and water quality. This program, known as the Regional Road Maintenance ESA Program, was developed in conjunction with about 35 other municipalities within Washington State, including cities, counties, and the Washington State Department of Transportation (WSDOT).

To assist local agencies in implementing the program, the Regional Road Maintenance ESA Guidelines (*Guidelines*) were written. The *Guidelines* were developed in cooperation with the Services, United States Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS). NMFS published a Notice of Intent in the Federal Register, notifying their intent to issue a take limit under Section 4(d) of the ESA. The program was approved and the Biological Opinion (BO) received on August 15, 2003, by the National Marine Fisheries Services (NMFS). These *Guidelines* were

developed to help agencies implement the Regional Road Maintenance ESA Program. The Regional Program consists of the following three parts:

- **Part 1: Regional Program Elements** is the basic framework for the Regional Road Maintenance ESA Program. It includes ten program elements that make up the Regional Program. Implementation of all ten of the program elements is required for a local agency to obtain 4(d) take limits.
- **Part 2: Best Management Practices** is a set of site-specific best management practices (BMPs) for road maintenance. Under the Regional Program, road maintenance, environmental, and engineering design staff can use these BMPs, in addition to routine BMPs presented in Part 1 to achieve conservation outcomes identified in the *Guidelines*. It is recognized that state regulations and local ordinances or site-specific permit conditions may all dictate use of specific BMPs. For that reason, Part 2 offers a menu of possible BMPs from which the most suitable method of maintenance activity can be selected.
- **Part 3: Application** is an individual agency application for 4(d) take limits under the Regional Program. The Part 3 Application, known as the “plug-and-play” part of the Regional Program, allows local agencies to “plug” into Parts 1 and 2 of the program to receive 4(d) take limits. The Part 3 Application is a specific commitment that an agency will comply with the ten program elements in Part 1.

There are ten program elements contained in the *Guidelines*. As proposed to the Services, an agency must implement all ten elements to receive approval. Each of the ten program elements has been implemented by KCRM. The ten program elements are as follows:

**Element 1. Regional Forum:** A Regional Forum has been created from participating agencies. The Regional Forum provides a regional meeting for program discussion, coordination, and adaptive management.

**Element 2. Program Review and Approval:** The program review and approval process will require that each agency participating in the Regional Program comply with the ten program elements. The Washington State Department of Transportation (WSDOT) Highways and Local Programs (H&LP), Olympia Service Center, will review each agency’s Part 3 Application to ensure that it includes all program elements. **The Services will issue approval for each agency to receive a take limit.**

**Element 3. Training:** Courses include the topics of basic ESA, design, biological review, permit activities, maintenance BMPs, and monitoring work activities. The WSDOT Technology Transfer (T2) Center, in conjunction with the Regional Forum, will develop a curriculum that may be taught by T2 instructors or other trainers. The Services will approve the training.

**Element 4. Compliance Monitoring:** Compliance monitoring will take place at several levels: local agency supervisory staff, local agency permitting authorities,

and state and federal permitting authorities evaluating BMPs for use and implementation. Each local agency will establish a formal compliance monitoring program for monitoring BMP outcomes and any monitoring that is part of various research projects.

To ensure full implementation of BMPs at all work sites, KCRM hired an Environmental Supervisor to oversee the work of crews from an environmental perspective. The Environmental Supervisor works closely with the KCRM environmental engineering staff, senior ecologists, and regulatory agencies to make sure that crews fully comply with all environmental permit requirements. The Environmental Supervisor also works with engineering staff and regulatory agencies to assist crews in addressing practical difficulties that arise during the course of maintenance operations. Environmental staff from KCRM is assigned to work sites in sensitive areas during critical phases of projects to monitor water quality and habitat impacts, ensure proper use of BMPs, and to conduct post construction monitoring of those sites.

**Element 5. Scientific Research:** Case studies in the field, as well as literature research done by others, are included in this program element. The scientific research element will serve to verify effectiveness of BMPs and update BMPs based on the latest technologies.

KCRM staff has begun selected BMP case studies. Experimental studies were conducted in 2001 to determine cost and effectiveness of use for recycled water from the wastewater treatment plant in Renton. Water was used in dust control, watering newly planted vegetation, charging Renton's decant settling vault, and use in sweeper trucks.

**Element 6. Adaptive Management:** The adaptive management philosophy will apply to all ten elements of the Regional Program. The training, research, biological data collection, and program monitoring elements are the basis for adaptive management.

**Element 7. Emergency Response:** This element provides a framework under which road maintenance organizations can operate during emergencies.

KCRM must respond to natural and human caused emergencies. Emergency responses conducted during 2001 included earthquake damages along the Cedar River, landslides, spills, flooding, and other kinds of impacts. The level and effectiveness of the responses made by KCRM successfully minimized the environmental impacts of these emergencies.

**Element 8. Biological Data Collection:** This element includes habitat location information within the ROW and development of a process to train and alert staff where the *Guidelines* need to be applied.

**Element 9. Biennial Reports:** The Regional Forum will provide biennial (every two years) reports to the Services. Biennial Reports will include a review of the ten program elements, updates on research, recommended BMP changes, and recommended updates on each program element.

**Element 10. Best Management Practices (BMPs) and Conservation Outcomes:** Under the Regional Program, BMPs and desired conservation outcomes have been developed for road maintenance activities. The Regional Forum will annually review and update the BMPs. Local agencies and the Services will review the changes the Regional Forum recommends for adoption.

In addition to the ten program elements included in the Guidelines, KCRM has implemented the following environmental programs that benefit water quality.

**Habitat Inventory and Assessment Program** - There are over 500 miles of County roadway within stream, wetland, and lake buffers in unincorporated King County. There are thousands of cross culverts in the County roadway system. Habitat improvement projects and fish passage projects are identified, prioritized, funded, and constructed.

To identify and evaluate potential future environmental related projects, KCRM has been conducting an inventory and assessment of sensitive area habitats in the road right-of-way (ROW). There are four components to the inventory and habitat assessment; mapping, habitat evaluation, water quality assessment, and macro-invertebrate study .

- **Mapping Program** – Under the County’s Municipal NPDES Permit, KCRM is required to inventory and map all major outfalls and related surface water data in the road right-of-way. To address ESA inventory requirements, the NPDES mapping program was expanded to include locating and mapping all streams, wetlands, and stream crossing culverts within the road ROW. About 2,200 stream locations were mapped.

The NPDES field mapping group used Global Positioning System (GPS) equipment to gather data locating and describing the existing drainage systems in the ROW of all unincorporated King County roads. The data was collected daily and incorporated into a Geographic Information Systems (GIS) map. Field crews reported anomalous conditions i.e. oil sheens, illicit hook ups, foul smelling water and various other water quality concerns, as they encounter them, to the proper authorities.

- **Habitat Evaluation Program** - In addition to the mapping program, KCRM conducted a detailed assessment of freshwater habitat areas in and adjacent to road ROW. This program is used to develop the scientific information necessary to aid in the management of new and ongoing road maintenance, and develop a baseline of existing conditions. This program has identified additional sampling/evaluation needs, set drainage and ESA project priorities, justify joint projects with other agencies, land owners or other jurisdictions, and assess impacts of future projects. This program is conducted, in part, to meet the ESA 4(d) program for biological data collection, and the Municipal NPDES requirement for the delineation of baseline conditions in stormwater dominated or impacted water.

The purpose of this program has been to evaluate the fish habitat in streams and ditches in the unincorporated King County maintained road ROW. This program consisted of conducting annual habitat surveys upstream and downstream from road crossings. As part of the assessment, the following factors were evaluated: sedimentation; streambed instability; loss of large woody debris; loss of pool habitat; blockage or passage problems; water quality degradation; and loss of side channel, off-channel habitats. Field crews report anomalous conditions i.e. oil sheens, illicit hook ups, foul smelling water and various other water quality concerns, as they encounter them, to the proper authorities.

- **Water Quality Sampling Program** - The purpose of this program was to evaluate the water quality in selected streams and ditches in the unincorporated King County road ROW. This program, in coordination with the inventory and mapping, habitat evaluation, and macro-invertebrate collection programs, has helped identify additional sampling/evaluation needs, set drainage project priorities, justify joint projects with other agencies, and assess impacts of future projects. This program is conducted, in part, to meet the ESA 4(d) program biological data collection, and the Municipal NPDES requirement for delineation of baseline conditions in stormwater dominated or impacted water bodies.

Water quality data were collected monthly, from 240 sampling sites, for one year. Data was collected twice monthly, four times a year, during high and low flow months. The water quality parameters collected were dissolved oxygen (DO), turbidity, pH, and temperature using YSI multi-probes and discharge. The water quality parameters noted above are used to assess the water quality and the ability of the water body to support fish and other aquatic life. Other field observations were made on adjacent land use, upstream activities, road usage and drainage, and unusual conditions observed in the field. Field crews reported anomalous conditions i.e. oil sheens, illicit hook ups, foul smelling water and various other water quality concerns, as they encounter them, to the proper authorities. Five percent of the sites had water samples collected for laboratory analysis to meet quality control requirements. A detailed water quality sampling plan has been developed and is available upon request.

- **Macro-Invertebrate Program** - To further assess the condition of habitat within the road ROW, KCRM annually collects replicate samples of benthic macro-invertebrates at 50 stream sites located in road ROW throughout unincorporated King County. This program is conducted, in part, to meet the ESA 4(d) program biological data collection, and the Municipal NPDES requirement for delineation of baseline conditions in stormwater dominated or impacted water bodies.

Benthic macro-invertebrates are frequently used as environmental indicators of biological integrity because they are found in most aquatic habitats. They can be used to describe the water quality conditions or health of the ecosystem components and to identify causes or impaired conditions. Macro-invertebrate data collected will be used to assess chronic habitat alteration, as well as point and

non-point pollution sources. The macro-invertebrate sampling stations were selected from existing KCRM water quality monitoring stations. Field crews reported anomalous conditions i.e. oil sheens, illicit hook ups, foul smelling water and various other water quality concerns, as they encounter them, to the proper authorities.

**Fish Passage/Culvert Replacement Program** – KCRM crews do about 230 drainage projects annually. About one third of those projects annually involve stream crossings, or streams adjacent to ROW. Significant improvements to water quality, habitat and fish passage have been achieved through a shift in focus of this program. A process was developed for rating potential habitat enhancement and fish passage projects based on environmental factors, as well as road maintenance priorities (such as safety, preservation of infrastructure, reduction in maintenance costs). This identified and prioritized projects which replaced structures in the road ROW to meet current design standards. Changes in road crossing designs improved habitat and water quality by allowing for natural flow regimes in the ROW which reduces erosional events as well as creating more natural habitats.

**Programmatic Permits** – KCRM has focused on coordinating with federal, state, and local permitting agencies in developing programmatic permits. These permits reduce the cost and time in processing permits and, by implementing a programmatic approach, increase water quality protection. The increase in protection results from the consistency of implementation of BMP's and the increased monitoring of road maintenance activities within sensitive areas.

An Army Corps of Engineers (ACOE) near shore fill programmatic permit will streamline culvert replacement/fish passage projects. NMFS has approved this programmatic permit and USFWS is expected to approve it in the spring of 2002. A second phase ACOE programmatic permit is expected in 2002 for habitat improvement projects.

KCRM has been in negotiation with Washington State Department of Fish and Wildlife (WDFW) for the development of programmatic Hydraulic Project Approval (HPA) program. An initial programmatic permit for maintenance projects in non fish-bearing streams was issued in the spring of 2002.

Four programmatic permits are in negotiations with King County's permitting authority, Department of Development and Environmental Services (DDES). These permits will result in increased training, reporting, monitoring, mitigation and management. The KCRM environmental unit will be tasked with the responsibility of assessing BMP effectiveness, and assessing the environmental performance of road maintenance activities.

**Pit Site Compliance Program-** KCRM operates 25 sites known as road maintenance pit sites. The pit sites are operational headquarters, or mining/filling sites. The comprehensive pit site compliance program was begun in the early 1990's to bring all

operating headquarters and mining/filling sites into compliance with environmental regulations. The pit site compliance program has involved installation of surface water treatment facilities, construction of equipment wash racks, paving and covering of material storage areas, and other measures to prevent pollutants from leaving the pit sites.

This program has provided support in the issuance process, public and agencies review and compliance of permits required for the pit site operations. These permits include State Environmental Act (SEPA), Clearing and Grading permits, Building permits, Surface Mining permits, Forest Practices permits and city equivalent permits. This support has included collecting data needed for the permits, writing the permits, negotiating with agencies, conducting public forums, addressing compliance monitoring requirements and producing compliance monitoring reports as needed. The program has included the following elements:

- **Groundwater Monitoring Program** – This program has collected groundwater samples from wells located at various pit sites for water quality analysis and to monitor the groundwater level in selected locations. This study has investigated the impact of road maintenance activities on groundwater quality at selected King County pit sites. This sampling has been conducted to provide data for reports to be written in support of the supplemental SEPA checklist currently being created which addresses the environmental impact of pit fill and mining activities. This program has operated in support of the design groups providing information to meet King County stormwater manual design standards, and DDES permit design requirements. This support is required for design and compliance under King County Codes such as the water quality code, source control requirements, the stormwater codes and the grading code. The program supplies data that demonstrates that KCRM pit fill, mining, and other pit site activities are meeting Washington State sediment management standards, groundwater standards and surface water standards. This program also addresses the Resource Conservation and Recovery Act (RCRA), the Model Toxics Control Act (MTCA), the Clean Water Act (CWA), Municipal NPDES requirements and the minimum functional standards for solid waste handling. The program fulfills compliance requirements for surface mining permits, clearing and grading permits, and other permits.
- **Pit Fill Sampling** – The intent of this program has been to sample pit fill material for contaminant characterization analysis to provide data for environmental studies of pit site activities. This program took soil samples from pit fill material (dirt from slides, ditch cleaning, and other maintenance activities) for laboratory analysis. This sampling was conducted to provide data for reports written in concurrence with the supplemental SEPA checklist addressing the environmental impact of pit fill and mining activities. This program also addresses requirements found in RCRA, Municipal NPDES permit, MTCA, solid waste handling regulations, SEPA, clearing and grading permit, and surface mining permits.
- **Industrial NPDES Sand & Gravel Permits** – Twenty of the KCRM pit sites are permitted under the Industrial NPDES Sand & Gravel Permits sites. The five

other pit sites do not need permits but are contained under the program requirements. These permits require that the pit sites meet stormwater pollution prevention requirements. The program requirements have been met by the following actions:

- Implementation of BMP's which prevents or minimizes the potential pollution impacts to surface and groundwater from road maintenance activities. This included source control, operational, and treatment BMP's which prevent stormwater pollution.
  - Instituting a training program for KCRM personnel in implementation of housekeeping BMP's, proper materials handling and spill response. This training includes maintenance standards for stormwater treatment facilities and operational procedures for each pit site.
  - Stormwater monitoring and reporting per permit requirements.
  - Stormwater pollution prevention plan (SWPPP) has been developed and implemented at pit sites, in compliance with the permit.
- **SPCC Program** –Spill Prevention, Control and Countermeasure (SPCC) Plans have been developed in response federal and state requirements due to the presence of fuel stations certain pit site. This program has included the development of spill response measures, training, and placement of spill response materials.

**Coordinated Reduction of Waste** - The Coordinated Reduction of Waste (CROW) program was a comprehensive construction waste recycling program. Road maintenance and construction waste material, such as fill, asphalt, cement, street sweepings, and brush, are sorted, stored, and recycled. This program replaced the past practice of dumping nearly all waste materials at fill sites. This program protects the environmental resources and water quality by recycling materials to the greatest extent possible, diverting material from the landfill. The program promotes recycling, proper disposal, and storage of road construction debris reducing stormwater runoff from debris stockpiles and protect surface and groundwater from pollutants that would enter the systems.

The program has constructed a network of CROW pads at many of the County maintenance sites and pits. A CROW pad consists of an asphalt pad with ecology block walls to temporarily store and separate out different waste materials. Runoff from these materials is diverted to a water quality facility prior to infiltration.

**Storm Drain Maintenance Program** - The goal of this program is to keep drainage systems in good working condition. Storm Drain Maintenance activities included removal of sediment from drainage features such as catch-basins, storm drains, retention/detention ponds, etc. The treatment and disposal of this sediment is addressed by the vector waste disposal program/decant station program. This activity protected water quality by removing sediments and oils from the storm drain systems during cleaning of catch-basins, pipes and oil-water separators. Removing sediments from storm drain systems allows new sediment to settle in catch-basin sumps rather than

discharging downstream. These activities support the environmental restoration efforts by identifying trouble spots such as broken pipes or areas with high sediment run-off.

**Street sweeping Program** - Street sweeping removes dust and other debris from the roadway for dust and pollution control purposes. Sand from snow and ice operations and leaves are significant sources of debris that is removed. Sweeper trucks collect sweepings and transport them to appropriate treatment or disposal facilities. The resulting materials are addressed by the vector waste disposal program/decant station program. Sediment is collected before it can contribute to water quality degradation. Removal of the sediment before it reaches storm drain systems or streams has a large positive net effect on water quality elements.

**Catch Basin Program** –Enclosed drainage systems in the roadway are cleaned frequently to ensure that the systems remain functional, and to prevent pollutants from entering the open stream system. Enclosed drainage systems and catch basins are cleaned using a vacuum flush truck which is used to remove both solids (sediment) and liquids from drainage catch basins and pipes. The resulting materials are addressed by the vector waste disposal program/decant station program.

**Vector Waste Disposal Program/Decant Station Program** - This program has been created in response to the Municipal NPDES requirements to meet the CWA. Liquids vactored out of catch basins and other like operations cannot be re-introduced into the surface waters of Washington State and must be disposed of at a decant station. KCRM has been responsible for the development and operation of a county-wide regional vector waste disposal program, which involves operation of decant stations throughout the County. King County, other governmental agencies, and private vendors use the sites to properly dispose of vector waste material. The regional vector waste disposal program has provided an environmentally sound system for disposing of waste generated from the cleaning of stormwater drainage systems.

The county has provided vector decant stations open to the County, private vector companies, and other public agencies. This program has promoted the treatment and recycling of the solid material by hauling to vendors which treats the solids through bioremediation, thermal desorption, and/or burning in a cement kiln to reduce contaminant levels below solid waste regulation. The program provided pre-treatment to decanted liquids prior to discharging to sanitary sewer, and researched additional treatment and recycling disposal options. The program has promoted protection of water quality by removing sediment from stormwater drainage systems and provided proper disposal.

There is a special incident load policy in place, associated with this program. This policy activates when King County eductor trucks loads of water and/or solids are identified as containing contaminants that should not be put down the decant station without sampling. These materials are placed in special holding tanks, tested, and appropriately disposed of based on the test results.

**Street Waste Monitoring Program** – Many of the road maintenance activities generate waste materials. Solids and liquids generated from sweepings, vactor operations, and pit fill operations are regularly sampled for laboratory analysis and reviewed for contaminants. This program is to ensure that the materials can be classified as solid waste and not dangerous or hazardous waste. Sampling liquids at the decant stations are required for discharge to sewer. Solids from sweeping and vactoring are tested to meet RCRA requirements.

**Underground Storage Tank Removal/Monitoring Program** - This program has removed, replaced or upgraded all King County fuel station underground storage tanks (UST's) at Road Maintenance facilities. This program has included the installation of spill prevention protection and leak detection to meet new standards. The program has also included the removal of contaminated soil. Long-term groundwater monitoring has been conducted under the Model Toxics Control Act (MTCA) Voluntary Cleanup Program. The upgrades of the fueling facilities offer better protection against spills, leaks resulting in less opportunities for soil and groundwater contamination.

This program has responded to the unexpected discoveries of UST's at sites owned or previously owned by the county, where underground storage tanks were ever in use. This program conducted the evacuation and removal of the UST's and their contents, excavation of contaminated soils, and testing of the soils and groundwater for contamination. This program has resulted in long term groundwater monitoring under the MTCA Voluntary Cleanup Program.

Experimental studies were conducted to determine the effectiveness of *in-situ* treatment of contaminated soils using bioremediation. Oxygen Release Compounds (ORCs) have been introduced to oxygen-poor groundwater. This has resulted in an initial decrease in Benzene, Ethylene, Toluene and Xylenes (BETX) concentrations which may be attributable to increase in microbial activity.

**Hazardous Materials/ Spill Response Program** – KCRM has had an extensive program addressing hazardous and dangerous materials. There are multiple programs that address spills and response procedures:

- The ESA 4(d) Guidelines Program, Emergency Response element addresses events such as landslides, spills and flooding.
- The Habitat Inventory and Assessment Program have field crews report anomalous conditions i.e. oil sheens, illicit hook ups, foul smelling water and various other water quality concerns, as they encounter them.
- Pit Site Compliance Program has a spill response program for spills that occur at pit sites and has Spill Prevention, Control and Countermeasure (SPCC) Plans for pit sites with fuel stations.
- Vactor Waste Disposal Program/Decant Station Program has the special incident load policy.

In addition to the programs listed above, King County Road Maintenance also has had the Hazardous Materials/Spill Response Program. This program addressed the handling of abandoned waste containers, spills and other miscellaneous hazardous materials found in the road ROW by KCRM staff. The purpose of this program has been to have safe, standard methods for the KCRM staff in dealing with potential hazardous waste encountered in the road ROW. The development of safe operating procedures and the associated training for KCRM staff was accomplished. This program addressed safe ways to inspect, categorize, contain, and transport potentially hazardous waste from the field to one of the ten hazardous waste storage facilities operated by KCRM. This program has been closely coordinated with Washington State Department of Ecology Spill Response Team.

One element of this program which has increased exponentially has been the discovery and disposal of abandoned meth-amphetamine laboratories and the associated paraphernalia.

**Pollution Prevention Program** - KCRM is required to track and report all the waste created to Washington State Department of Ecology in the Annual Hazardous Waste Report, a requirement of the Dangerous Waste Regulation Chapter 173-303 WAC. The Pollution Prevention Program was conducted to reduce KCRM generated hazardous waste products. Generated hazardous waste is waste product from job activities performed by KCRM. This program improved the practices for reducing and tracking the amount of waste generated by KCRM activities. Waste reduction included training of staff to create proper waste prevention practices and tracking procedures, reducing the amount of waste created.