

Truckee Meadows Regional Stormwater Quality Management Program



SAMPLE ANALYSIS PLAN

January 5, 2004

The Truckee Meadows Regional Stormwater Quality Management Program is a comprehensive program comprised of efforts by local governments and private citizens to reduce the pollution associated with urban runoff in the Truckee Meadows. This program is required by the National Pollutant Discharge Elimination System (NPDES) permit issued jointly to the Cities of Reno and Sparks, Washoe County, and the Nevada Department of Transportation on January 14, 2000. The Truckee Meadows Interlocal Stormwater Committee has been working to develop the program through a series of public workshops. The program will include the following required program elements:

Intergovernmental Coordination
Public Outreach
Municipal Operations
Stormwater Monitoring Program
Land Use Planning
Structural Controls
Construction Site Discharge
Illicit Discharge Detection and Elimination

The **SAMPLE ANALYSIS PLAN** is part of the program element associated with the *Stormwater Monitoring Program*

Table of Contents

I. Stormwater Discharge Monitoring Program.....	1
II. Monitoring Locations.....	1
III. Procedures and Protocols for Collecting Quarterly Base Line Samples.....	2
IV. Procedures and Protocols for Stormwater Sampling during Storm Events...3	

List of Appendices

A. Contact List.....	6
B. Location Map.....	7
C. TMWRF Labels for Sample Bottles.....	8
D. Isco Equipment for Sample Collection.....	9

I. Stormwater Discharge Monitoring Program

The data collected from the Monitoring Program will be used to assess the effectiveness of the nonstructural and structural BMPs. Many years of baseline data has been collected on first and second order tributaries to the Truckee River by the Nevada Division of Environmental Protection (NDEP), Desert Research Institute (DRI), Truckee Meadows Wastewater Reclamation Facility (TMWRF) and Washoe County. The existing data will eventually be compared with the current sample data to demonstrate measurable goals for the Truckee Meadows Regional Stormwater Quality Management Program.

II. Monitoring Locations

The Stormwater Monitoring Subcommittee selected 8 fixed sites on four tributaries to the Truckee River. The four tributaries are: Steamboat Creek, Whites Creek, Thomas Creek and North Truckee Drain. Each tributary has two sample locations, one upstream of urban development and one downstream or within urban development. The sites were selected on the basis of existing data and locations near existing stream flow gage equipment. Five of the sites have approximately 13 years of existing data collected by NDEP, DRI or TMWRF and all five sites are equipped with USGS stream flow gages. The five sites are:

- Upper Steamboat Creek (Steamboat Cr @ Rhodes Road)
- Lower Steamboat Creek (Steamboat Cr @ Clean Water Way)
- Lower North Truckee Drain (NTD @ Kleppe Lane)
- Upper Whites Creek (Whites Cr @ Timberline Rd)
- Upper Thomas Creek (Thomas Cr @ Timberline Rd)

The other three sites only have the current 2003 data and one site (Upper North Truckee Drain) has a USGS stream flow gage currently installed. The other two sites are scheduled for installation of stream flow gage equipment in September 2003. The three sites are:

- Upper North Truckee Drain (NTD @ Orr Ditch)
- Lower Whites Creek (Whites Cr @ Old Virginia St)
- Lower Thomas Creek (Thomas Cr @ Virginia St).

The Stormwater Subcommittee collects all 8 sites on a quarterly basis. One of the four tributaries is sampled for one full year during storm events. Steamboat Creek was selected for storm event sampling in year 2003.

III. Procedures and Protocols for Collecting Quarterly Base Line Samples

Quarterly samples are collected in January, April, September, and December. The method of sampling is the 'grab sample method'. During each grab sample the flows must be recorded either by reading the existing staff gage or by measuring the in stream flows with a USGS certified current meter. The stream flow information is used to calculate the mass loading of nutrients within the stream. Comparisons between mass loading and the analyzed milligrams per liter (mg/l) are used to evaluate the relationship between the stream flow and the water-quality characteristics. The grab sample method was chosen for the quarterly samples since these samples are taken from the stream during periods of consistent flows. The samples are taken from the thalweg of the streams where the water is well mixed and homogenous. A hand held sampler known as a splitter, is used to collect the grab sample. The person collecting the sample is responsible for washing the hand held sampler, the pour spout and the lid to the sampler with sample water at least two times before each sample is collected. The person collecting the sample must be careful not to disturb the bottom sediments, any in stream activity, such as equipment rinsing, should occur down stream of sample collection area in order to prevent any sample contamination.

Once the sample is collected with the hand held sampler the sample is continually mixed while the sample containers are filled. Each sample container and lid is first rinsed with the sample water two times before the containers are filled with the actual sample water used for analysis. The total amount of sample needed for analysis is approximately one-half gallon. Each container is labeled with a waterproof marker identifying the location name, the date and the time of the sample. The sample is immediately put into a cooler filled with ice and must remain chilled until actual analysis is preformed. All quarterly samples are transported to TMWRF for analysis.

The grab samples are used to assess the physical and chemical characteristics of the urbanized streams. The samples are analyzed for total suspended solids (TSS), total dissolved solids (TDS), total nitrates (TN), and total phosphorous (TP). These parameters were based on the Total Maximum Daily Loads (TMDL) defined by NDEP for the Truckee River. Since all quarterly samples are to be analyzed at TMWRF, the Laboratory Services Manager shall be notified by the Designated Staff member of the quarterly sampling schedule a month in advance. Further confirmation should then be made 48 hours prior to delivery of samples to the TMWRF lab. All quarterly samples must be collected during the week from Monday through Thursday. No quarterly samples will be accepted at TMWRF lab on Fridays.

Field measurements must be collected at the same time as the sample collection. The field measurements are collected with a YSI 600 XLM Sonde. The Sonde is

calibrated no more than one day before the scheduled day of sampling. The four field parameters that need to be calibrated for and measured at the time of sampling are:

- pH
- Conductivity
- Temperature
- Dissolved Oxygen

IV. Procedures and Protocols for Stormwater Sampling during Storm Events

One stream will be sampled for storm events for one full year before moving sample locations to a different stream the following year. At least four storm events must be sampled at the two designated locations on the selected stream within the calendar year. Two of the four storm samples must be collected during wet season storm events (November through May) and two storm samples must be collected during the dry season storm events (June through October). The amount of precipitation from the storm event must generate enough runoff to raise the hydrograph of the stream. The Designated Staff member will rely on the National Weather Service for up to date estimations of time and predictions of precipitation amounts for each storm. All precipitation data will be downloaded from the flood alert DIAD Advisor program after the actual storm event has occurred and samples have been collected. Stormwater samples are to be taken to TMWRF laboratory.

Notification of sample collection shall be given to the Laboratory Services Manager at least 24 hours prior to dropping samples off at the laboratory. Notification with intent to sample the storm shall be given to all of the Storm water Monitoring Subcommittee Members at least 24-48 hours prior to sampling. Each Storm water Monitoring Subcommittee Member and the Laboratory Services Manager will be notified by email. All of the above personnel will also be notified after the storm as to whether or not a sample was collected.

The samples will be collected during the storm event using an ISCO model 3700 automated sampler. The automated sampler will be activated before the storm and will continue to collect samples throughout the first 24 hours of the storm event. The sampler is programmed to start sampling approximately 2-3 hours before each predicted storm event. The automated sampler is programmed to collect 250 milliliters every 15 minutes for a composite sample of 1000 milliliters

in one hour. The sampler will continue to collect samples every 15 minutes for 24 composite samples over 24 hours. The first 24 hours of the storm will be divided into five composite samples reflecting major changes in the streams chemistry recorded by the streams hydrograph.

The streams hydrograph will be recorded during the storm event by the existing stream flow gage equipment. An initial stream gage height will be recorded before the storm and changes in gage heights will be measured during the entire length of the storm. The samples collected from the storm event will coincide with the changes in the gage heights related to the changes in flows. A maximum of five composite samples will be analyzed reflecting five major changes to the streams hydrograph. Based on the streams hydrograph, the hourly samples are combined together for a single composite sample. The first sample will be a composite sample representing the stream before the actual storm event. This sample represents the initial stream chemistry before the storm. The second composite sample will measure the first flush of nutrients and sediments to the streams system (rise in the hydrograph). The third composite sample will represent the maximum transport of sediments and nutrients associated with the maximum flows (peak in the hydrograph). The fourth composite sample will measure the lag travel time of nutrients from adjacent streams and drainages and their contribution to the main sample site (receding hydrograph). The final sample will be a composite sample representing the streams chemistry after the storm has passed and the stream has returned to the initial stream flow. If a "steady state" has not been achieved within the 24 hour sampling period, additional grab samples will be collected within the next 24 hours after completion of the storm

The hourly composites are combined within a splitter that is pre-rinsed at least two times with the sample water representing the time associated with the hydrograph. Samples are then split into two ½ gallon plastic sample bottles that have been pre-rinsed twice with the sample. Samplers will be iced with ice cubes (water ice not blue ice) during the dry weather sampling period but not during the wet weather period. All of the samples will be directly transported to TMWRF and analyzed for the following constituents: total dissolved solids (TDS), total suspended solids (TSS), total nitrogen (TN), and total phosphorous (TP). All sample bottles must be labeled using labels provided by TMWRF. The labels must be marked with the information related to the location of the sample, description of sample, date and time related to hydrograph of the sample, nutrients being analyzed, and type of preservation. One ½ gallon bottle will be marked for TN and TP and is preserved with six drops of H₂SO₄ by the sampling staff when the samples are dropped off at the TMWRF laboratory. The second ½ gallon bottle is left unpreserved and marked for analysis of TSS and TDS.

If upon analysis of the hydrograph during sample collection there is a question as to whether or not a storm occurred it will be requested of the TMWRF Laboratory Services Manager that the samples be held for 24 hours before analysis. During this time period the Designated Staff member will contact the Stormwater Monitoring Subcommittee members and come to a consensus as to whether or not a enough precipitation occurred to change the hydrograph of the creek to warrant a sample. If it is decided that a storm did not create enough runoff for a representative sample, the Designated Staff member will contact the TMWRF Laboratory Services Director and request that the samples are not analyzed. If samplers are set out and there is no storm the Designated Staff member must notify the TMWRF laboratory that no samples will be brought in for analysis.

After a successful sampling of a storm event, a dry period of 10 days must occur before another storm event may be sampled. The storms must generate enough precipitation to raise the hydrograph of the creek being sampled. Each year a new creek will be sampled until all four creeks have successfully been sampled for four storm events. All of the data that is collected from the sampling program must be tabulated for the annual report. The data collected from the storm events will be compared to the quarterly data for measurable goals associated with Best Management Practices (BMPs) enforced through the construction and industrial portions of the Stormwater Program.

**Appendix A. Contact List of Designated Staff and Stormwater
Monitoring Subcommittee Members**

Terry Svetich	City of Reno Stormwater Coordinator	334 - 3314
Lee Carson	City of Sparks Environmental Control	861 - 4152
Toby Ebens	City of Sparks Environmental Control	861 - 4152
David Poore	City of Sparks Environmental Control	861 - 4152
Gil Ellis	City of Reno Industrial Waste Program	334 - 3115
Penny Oteri	City of Reno Industrial Waste Program	334 - 3115
Gail Prockish	Washoe County Dept of Water Resources	954 - 4634
Ed Evans	Washoe County Dept of Water Resources	954 - 4636

Appendix C. TMWRF Labels for Sample Bottles

Site: Stmbt @ RR Date: 1/5/04
ID#: A Prep: _____ Time: 1400

Filt: (none) Mem GFF Temp: ____ (°C)

Pres: (none) H₂SO₄ pH: _____

Analysis: OP TP NO₃ NH₄ SKN TKN
TOC POC DOC CL (TDS) ALK
TURB SO₄ EC (TSS)

Site: Stmbt @ RR Date: 1/5/04
ID#: A Prep: _____ Time: 1400

Filt: (none) Mem GFF Temp: ____ (°C)

Pres: none (H₂SO₄) pH: _____

Analysis: OP (TP) (NO₃) (NH₄) SKN TKN
TOC POC DOC CL TDS ALK
TURB SO₄ EC

Software	
Sample frequency:	1 minute to 99 hours 59 minutes, in 1 minute increments. Non-uniform times in minutes or clock times 1 to 9,999 flow pulses
Sample pacing:	Uniform time, non-uniform time, flow, flow paced/time switched, STORM (time and flow paced sampling during sample collection.) Flow pacing is controlled by external flow pulses.
Multiplexing:	Samples per bottle (1 to 50 with 1000 ml bottles; 1 to 17 with 350 ml bottles), bottles per sample (1 to 24), multiple bottle compositing.
Sample volumes:	Programmable from 10 to 9,990 ml in 1 ml increments
Sample retries:	If no sample is detected, up to 3 attempts; user selectable
Rinse cycles:	Automatic rinsing of suction line up to 3 rinses for each sample collection
Program storage:	3 sampling programs
Programming modes:	Basic, extended and STORM
Sampling stop/resume:	Up to 24 real time/date sample stop/resume commands.
Controller diagnostics:	Tests for RAM

