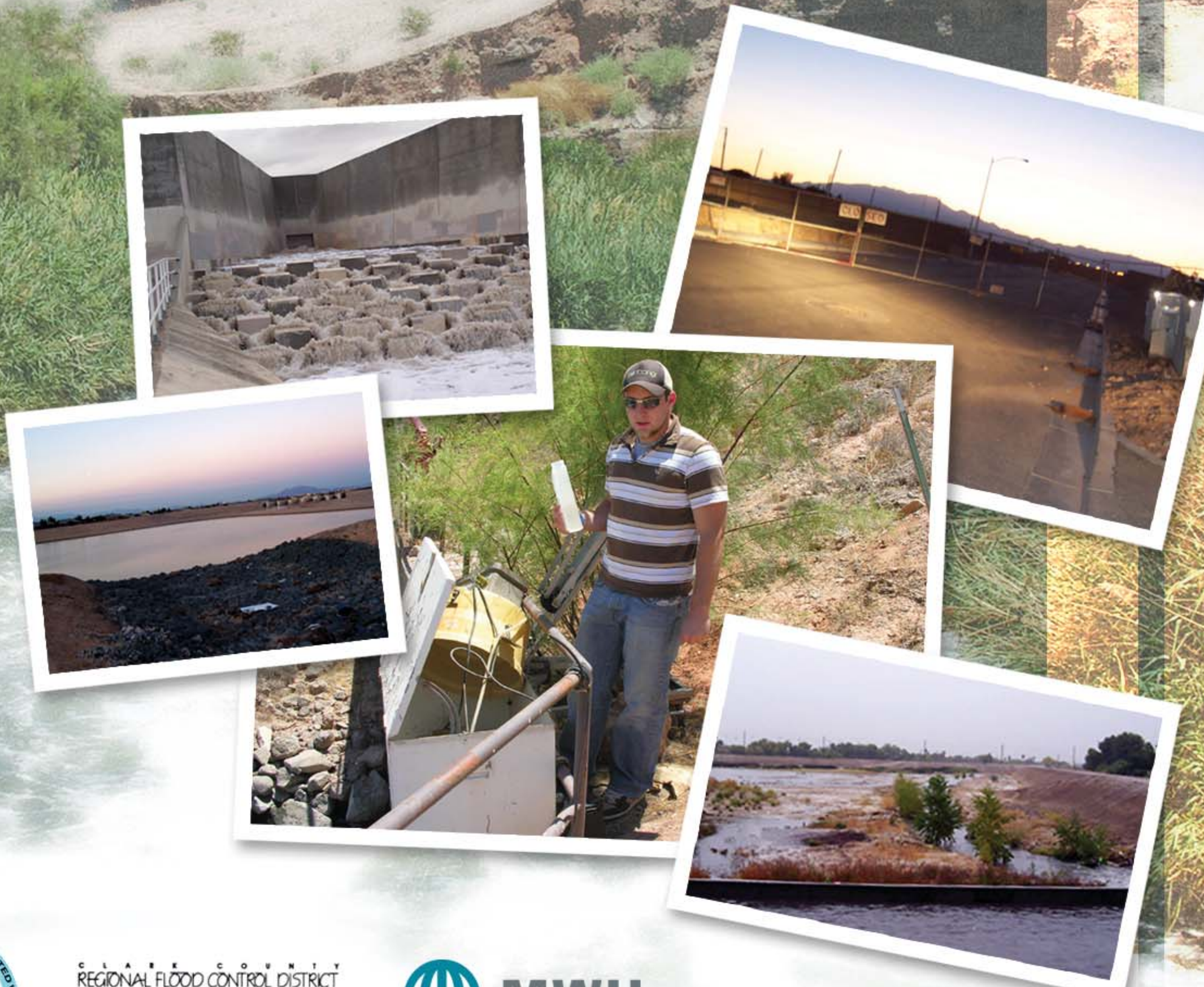
SEPTEMBER 2007

Las Vegas Valley NPDES Municipal Stormwater Discharge Permit

Annual Report 2006-2007



STORM DRAINS CARRY UNTREATED WATER TO LAKE MEAD
KEEP 'EM Clean

CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT

MWH

REGIONAL FLOOD CONTROL DISTRICT

September 26, 2007

Mr. Cliff Lawson
State of Nevada
Bureau of Water Pollution Control
333 West Nye Lane, Room 129
Carson City, NV 89706-0851

2006-2007 NPDES Annual Report

Dear Mr. Lawson:

Please find enclosed a copy of the 2006-2007 Annual Report for the Las Vegas Valley NPDES storm water discharge permit. This report was prepared by MWH and is hereby submitted for you use. The report details NPDES compliance activities for the period from July 2006 through June 2007. These activities were performed in accordance with Permit Number NV0021911 and the Storm Water Management Plan.

If you should have any questions, please do not hesitate to call.

Sincerely,

Kevin Eubanks, P.E., CFM
Assistant General Manager

Enclosure

KLE:jb

c: Regional Administrator
Environmental Protection Agency
75 Hawthorn Street
San Francisco, CA 94105

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NPDES PERMIT NO. NV0021911

2006-2007 ANNUAL REPORT FOR

LAS VEGAS VALLEY NPDES MUNICIPAL STORMWATER DISCHARGE PERMIT

Prepared for

LAS VEGAS VALLEY
STORMWATER QUALITY MANAGEMENT COMMITTEE

Clark County Regional Flood Control District
Clark County
City of Las Vegas
City of North Las Vegas
City of Henderson

prepared by

MWH

SEPTEMBER 2007

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ACRONYMS AND ABBREVIATIONS

BLM	Bureau of Land Management
BMP	Best Management Practices
BOD	Biochemical Oxygen Demand
CC	Clark County
CCDAQEM	Clark County Department of Air Quality and Environmental Management
CCPRO	Clark County Public Response Office
CCRFCD	Clark County Regional Flood Control District
CCSD	Clark County School District
CCWRD	Clark County Water Reclamation District
CLV	City of Las Vegas
CNLV	City of North Las Vegas
COD	Chemical Oxygen Demand
COH	City of Henderson
deg C	degrees Celsius
EPA	Environmental Protection Agency
GIS	Geographic Information System
LEPC	Local Emergency Planning Committee
LLV	Lake Las Vegas
LVVWD	Las Vegas Valley Water District
mg/L	milligrams per liter
mL	milliliter
mMhos	micro Mhos
MPN	Most Probable Number
MS4	Las Vegas Valley Municipal Separate Storm Sewer System
MTBE	methyl tert-butyl ether
MWH	MWH Americas, Inc.
NDEP	Nevada Division of Environmental Protection
NH_3-N	Ammonia-Nitrogen
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NTU	Nephelometric Turbidity Units
TCE	Tetrachloroethylene
pH	measure of acidity
PSA	public service announcement
RCRA	Resource Conservation and Recovery Act
SARA	Superfund Amendments and Reauthorization Act
SDSU	South Dakota State University
SIC	Standard Industrial Classification
SNWA	Southern Nevada Water Authority
SNWS	Southern Nevada Water System
SOC	Semi-Volatile Organic Compound
SQMC	Stormwater Quality Management Committee
SWMP	Stormwater Management Plan
TDS	Total Dissolved Solids
THM	Trihalomethane

ACRONYMS AND ABBREVIATIONS (Continued)

TKN	Total Kjeldahl Nitrogen
TM	Technical Memorandum
TRI	Toxic Release Inventory
TSS	Total Suspended Solids
µg/L	micrograms per liter
UNLV	University of Nevada, Las Vegas
USACOE	United States Army Corps of Engineers
USGS	United States Geological Survey
VOC	Volatile Organic Compound

SECTION 1
Introduction

Section 1
Introduction

1.1 INTRODUCTION

The United States Environmental Protection Agency (EPA) has adopted regulations to control pollutants entering the environment through storm drainage facilities associated with the Las Vegas Valley Municipal Separate Storm Sewer System (MS4). In compliance with these regulations, the Nevada Division of Environmental Protection (NDEP) issued National Pollutant Discharge Elimination System (NPDES) Permit No. NV0021911 jointly to Clark County Regional Flood Control District (CCRFCD), the City of Las Vegas (CLV), the City of North Las Vegas (CNLV), the City of Henderson (COH), and Clark County (CC). This permit, which was issued on June 19, 2003, authorizes agencies to discharge from stormwater outfalls on Las Vegas Wash and its tributaries. (The original MS4 permit was issued in 1992, and included Nevada Department of Transportation (NDOT) as a permittee. NDOT has subsequently received its own MS4 permit from NDEP.) A copy of the current permit is found in **Appendix A**. The appendices are separately bound, and also contain other documents that are referred to throughout this report.

The permit designates CCRFCD as the Lead Agency for permit implementation, with CCRFCD and the other four agencies identified together as Co-Permittees. The Lead Agency is responsible for general administration of the permit conditions, preparation of reports, coordination between Co-Permittees, and liaison with NDEP. The consulting firm MWH Americas, Inc. (MWH) was contracted to assist CCRFCD and the Co-Permittees with preparation of information required to comply with the conditions of the permit.

The permit requires that the Co-Permittees develop a Stormwater Management Plan (SWMP) to describe specific activities, responsibilities, and measurable goals adopted to comply with the various permit provisions. On September 29, 2003, the Co-Permittees submitted the SWMP to NDEP. A copy of the original SWMP is found in **Appendix B**. NDEP accepted the SWMP with comments and a copy of the approval letter is found in **Appendix B**. The Co-Permittees also updated the SWMP in the 2005-2006 permit year (see **Section 10**) at the request of the EPA through its audit of the MS4 permit program. The SWMP Update is provided in **Appendix B**.

This *Las Vegas Valley NPDES Municipal Stormwater Discharge Permit Annual Report 2006-2007* (*Annual Report)* covers the period from July 1, 2006 through June 30, 2007. The *Annual Report* presents the information specifically required by the MS4 permit and as described in the SWMP, and is organized as follows:

Section 1 - Introduction
Section 2 - Legal Authority
Section 3 - Source Identification
Section 4 - Stormwater Monitoring Program
Section 5 - Public Outreach and Education Program
Section 6 - Structural and Source Control Measure Program
Section 7 - Illicit Discharge Detection Program
Section 8 - Industrial Facility Monitoring and Control Program

Section 9 - Construction Site Program
Section 10 - Stormwater Management Program

1.2 COORDINATION

As Lead Agency, the CCRFCD has organized the project, encouraged coordination among the various Co-Permittees, and provided funding for many of the permit compliance efforts. A Stormwater Quality Management Committee (SQMC), comprised of representatives from the County, the cities, and other interested parties, conducted monthly meetings with MWH, and reviewed draft material prepared in compliance with the permit. In addition, the SQMC included other local agencies and public that have an interest in water quality issues, but are not directly involved with the NPDES permit. These agencies received copies of the monthly meeting minutes and were invited to attend all meetings. The list of Co-Permittees, other interested parties, and key contacts are presented in **Table 1-1**.

In January 2007, the SQMC adopted a more formal operating procedure to comply with Nevada's Open Meeting Law. Designated committee representatives and alternatives were assigned from each Co-Permittee to be official voting members. These representatives and alternates are shown in **Table 1-1**. Meeting agendas and minutes were made available to the public, and time was allowed in each meeting to take public comment.

1.3 EPA PERMIT AUDIT

In September 2005, EPA conducted an audit of the Las Vegas Valley MS4 permit. The audit report, dated April 20, 2006, indicated positive attributes, program deficiencies, and potential permit violations. The Co-Permittees invested considerable effort in assessing their programs in light of the audit findings and preparing a formal response, which was submitted on August 22, 2006.

In March 2007, EPA responded to the Co-Permittees' proposed audit response in a letter identifying a number of program enhancements required to meet the minimum MS4 permit requirements. NDEP then coordinated with EPA and provided the Co-Permittees with a letter that clarified the required program enhancements. In June 2007, the Co-Permittees sent a letter to NDEP describing their proposed process for complying with NDEP's requirements. These correspondences are included in **Appendix C**.

Some of the program changes resulting from the audit and subsequent guidance from EPA and NDEP have been accomplished in the past two permit years. These are listed in **Table 1-2**. A number of activities are ongoing and will be accomplished in the 2007-2008 permit year. These are discussed in **Sections 6, 8, 9** and **10**.

Table 1-1

Stormwater Quality Management Committee Permittee Regular Participants

Representatives and Alternates	
Gale Fraser Clark County Regional Flood Control District Phone Number (702) 455-3139	Kevin Eubanks Clark County Regional Flood Control District Phone Number (702) 455-3139
Les Henley Clark County Department of Public Works Phone Number (702) 455-6065	Mark Silverstein Clark County Department of Air Quality and Environmental Management Phone Number (702) 455-4728
Curt Chandler City of Henderson Phone Number (702) 267-3020	Al Jankowiak City of Henderson Phone Number (702) 267-3024
Dan Fischer City of Las Vegas Phone Number (702) 229-2440	Cheng Shih City of Las Vegas Phone Number (702) 229-2338
Kirk Medina City of North Las Vegas Phone Number (702) 633-1275	Jennifer Doody City of North Las Vegas Phone Number (702) 633-1223
Co-Permittee Staff Members	
Betty Hollister Clark County Regional Flood Control District Phone Number (702) 455-3136	Kerri Anne Mukhopadhyay Clark County Regional Flood Control District Phone Number (702) 455-3139
Ebrahim Juma Clark County Department of Air Quality and Environmental Management Phone Number (702) 455-5942	Chuck Richter Clark County Department of Air Quality and Environmental Management Phone Number (702) 455-1624
Rob Mrowka Clark County Department of Air Quality and Environmental Management Phone Number (702) 455-3119	Gil Suckow Clark County Department of Public Works Phone Number (702) 455-7540
Randy Fultz City of Las Vegas Phone Number (702) 229-2176	John Solvie City of Las Vegas Phone Number (702) 229-6547
Rob Welch City of Las Vegas Phone Number (702) 229-2177	Tom Rura City of North Las Vegas Phone Number (702) 633-1261

Table 1-1 (Continued)

Stormwater Quality Management Committee Permittee Regular Participants

Other Attendees	
Larry Bazel Clark County Regional Flood Control District Attorney Phone Number (415) 617-8900	Jennifer Szwejbka Conservation District of Southern Nevada Phone Number (702) 262-9047
Steve Ross Las Vegas Valley Water District Phone Number (702) 870-4194	Chip Paulson MWH Phone Number (303) 291-2132
Angie MacKinnon MWH Phone Number (702) 878-8010	Maria Jimenez MWH Phone Number (702) 878-8010
Dale Carter MWH Phone Number (702) 878-8010	Steve McGoff Nevada Division of Environmental Protection Phone Number (775) 687-9429
Maria Jimenez MWH Phone Number (702) 878-8010	Cliff Lawson Nevada Division of Environmental Protection Phone Number (775) 687-9429
Peggy Roefer Southern Nevada Water Authority Phone Number (702) 822-3359	Xiaoping Zhou Southern Nevada Water Authority Phone Number (702) 822-3302

Table 1-2

MS4 Program Changes Due to EPA Audit
Implemented in 2005-2006 and 2006-2007 Permit Years

Co-Permittee	Program Element/Activity
General – All Co-Permittees	1. Submitted formal response to NDEP comments on SWMP
	2. Updated SWMP
	3. Improved construction site inspection programs and timeliness of response to problems found in construction site inspections
	4. Clarified responsibilities of Co-Permittees in SWMP
	5. Tracked supplemental industrial site inspections
	6. Prepared coordinated Spill Response Strategy
	7. Agreed to develop program enhancements in the areas of construction site inspection / enforcement, post-construction program, industrial program and detention basin sediment removal.
	8. Formed Development Guidelines Working Group, Construction Program Working Group, and Detention Basin Working Group to develop specific program enhancement recommendations.
Clark County	1. Improved efficiency of handling stormwater issues and enforcing ordinances
	2. Clark County Water Reclamation District (CCWRD) conducting program to reduce exfiltration from sanitary sewer system
	3. Increased stormwater program awareness among County staff
	4. CCWRD began conducting industrial site inspections in Unincorporated Clark County.
City of Las Vegas	1. Submitted summary of industrial site inspections.
	2. Improved tracking of source control Best Management Practices (BMP) activities.
City of North Las Vegas	1. Submitted summary of industrial site inspections
	2. Improved coordination among city departments for spill response
	3. Improved tracking of source control BMP activities.
City of Henderson	1. Increased resources assigned to drain inlet maintenance
	2. Increased resources assigned to street sweeping.
	3. Engaged Fire Department inspectors in industrial program.

1.4 SUMMARY OF ANNUAL REPORT

This *Annual Report* was prepared to verify that the Co-Permittees have complied with the permit requirements and measurable goals identified in the SWMP for the 2006-2007 permit year.

Table 1-3 summarizes the Permit Year 4 (2006-2007) measurable goals and how they were satisfied.

Table 1-3

Las Vegas Valley MS4 NPDES Permit
Stormwater Management Plan

Status of Measurable Goals for Permit Year 4

Program Category		Measurable Goal/Milestone	Activities	Done
Legal Authority	1	Perform annual review of stormwater ordinances and update as necessary	No ordinance changes needed	X
Stormwater System Map	1	None	Updated Stormwater System Map	X
Monitoring Program	1	Develop proposed monitoring plan for Year 5 of permit	See *Annual Report,* **Section 4**	X
	2	Implement Year 4 monitoring program (2 sites on Las Vegas Wash (LVW), 3 detention basins)	7 detention basin samples; 3 LVW samples	X
Public Outreach and Education	1	Attend three community events and distribute materials	CCRFCD attended Emergency Management Expo, Clark County Fair, Earthfaire in Summerlin Centre Community Park, Whole Foods Earth Day event, Red Rock Spring Fling, National Night Out, and Helldorado Parade.	X
	2	Produce and broadcast Flood Channel Documentary with stormwater segment	Winter 06-07 program had updated stormwater segment; Spring 07 program had info on inlet marking program	X
	3	Produce or update and broadcast a public service announcement (PSA)	"Storm Drain Cowboy" PSA in Nov. and Dec; anti-litter PSA in April and May	X
	4	Maintain Las Vegas Valley stormwater website	Added links to other resources Added training presentations Tracked website access and usage	X
	5	Make five presentations in public schools	Made 60 presentations	X
	6	Determine feasibility of restarting storm drain inlet marking program	Participating in drain inlet marking program through CDSN 319 Program grant; expect to begin program in September 2007	X
	7	Track effectiveness of public outreach programs	Completed CCRFCD phone survey	X

Table 1-3 (Continued)

Las Vegas Valley MS4 NPDES Permit
Stormwater Management Plan

Status of Measurable Goals for Permit Year 4

Program Category		Measurable Goal/Milestone	Activities	Done
Structural and Source Control Measures	1	Implement storm drain system cleaning program developed in Year 1, as amended	Ongoing activities - see **Section 6** Met objectives	X
	2	Implement street sweeping program developed in Year 1, as amended	Ongoing activities – see **Section 6** Met objectives	X
	3	Review effectiveness of data collection and management of maintenance activity tracking, and make improvements if warranted	Entities are continuously improving date management processes	X
	4	Complete study of regional flood control facilities and determine if retrofits are needed	Detention basin monitoring shows mixed results; researched sediment removal; prepared technical memorandum (TM) on potential retrofit concepts; formed Detention Basin Working Group	X
Illicit Discharge Detection and Elimination Program	1	Conduct dry weather monitoring per **Section 4**	SNWA responsibility until further notice; data received in August	X
	2	Conduct semi-annual field inspections of open channels	Fall and Spring Wash Walks completed	X
	3	Complete all municipal maintenance staff training, and conduct regular refresher training courses	Formal training conducted by COH and CLV	X
	4	Work with outside organizations to implement recommended enhancements to existing spill response programs identified in the Spill Response Strategy	Worked through local Emergency Management Committee	X
	5	Review local spill response plans to identify and implement improvements	No changes for current permit year	X
	6	If warranted, improve ability to track activities associated with public complaints of illicit discharges	Current procedures are adequate	X

Table 1-3 (Continued)

Las Vegas Valley MS4 NPDES Permit
Stormwater Management Plan

Status of Measurable Goals for Permit Year 4

Program Category		Measurable Goal/Milestone	Activities	Done
Industrial Facility Monitoring and Control Program	1	Update industrial facility map		X
	2	Implement industrial site inspection program; track program activities, enforce ordinances	Ongoing by CLV, CNLV, COH and CCWRD	X
	3	Determine industrial sites that are or may be contributing a substantial pollutant load to the MS4	Reviews completed by CLV, CNLV, COH, and CC	X
	4	Review and, as necessary refine industrial inspector training programs	COH to add Fire Dept inspectors to program; will do stormwater training for them	X
	5	Review and, as necessary, refine tracking and data management programs	Ongoing	X
	6	Use monthly SQMC meeting to coordinate with NDEP on State industrial permit program	Ongoing	X
Construction Site BMP Program	1	Conduct routine construction site inspections Clark County Department of Air Quality and Environmental Management (CCDAQEM), COH	Ongoing	X
	2	Conduct post-storm construction site inspections for up to 3 storms (MWH)	19 post-storm construction site inspections were completed	X
	3	If necessary, modify standard BMP designs for local conditions	Dependent on detention basin sampling program findings. Currently under consideration by Construction Program Working Group	X
	4	Conduct one contractor training seminar	Conducted eight training seminars on November 15-16 and May 9-10.	X
	5	Conduct semi-annual wash and channel inspections (same as for Illicit Discharge Program)	Fall and Spring Wash Walks done	X
	6	Provide ongoing training for local construction site inspectors	COH did training program for inspectors in March. CCDAQEM added stormwater module to dust classes for contractors.	X
	7	Conduct review of processes for program tracking and record-keeping, and for transfer of information from inspectors to enforcement entities	CCDAQEM and COH improved processes for data management and follow-up for enforcement	X
	8	Use monthly SQMC meeting to coordinate with NDEP on State construction permit program	Ongoing	X

SECTION 2

Legal Authority

Section 2
Legal Authority

2.1 INTRODUCTION

The purpose of this section is to provide an update on the status of the legal authority of the Las Vegas Valley (MS4) Co-Permittees to carry out the activities required by the MS4 permit. This section summarizes the legal authority of each Co-Permittee to implement the various aspects of the SWMP and other requirements of the permit including:

- Prohibit illicit discharges to the municipal separate storm drain system.
- Control spills, dumping or disposal of materials other than stormwater to the storm drain.
- Require compliance with conditions in ordinances related to stormwater discharges.
- Carry out inspection and monitoring procedures necessary to determine compliance with the prohibition on illicit discharges to storm sewer system.

This section addresses the MS4 permit requirements in Paragraph 4.2 and the SWMP requirements in Section 2.2.

2.2 ORDINANCES AND REGULATIONS

Copies of the current ordinances and regulations for each agency are included in **Appendix D**. No additions were required to local ordinances during the 2006-2007 permit year. The Co-Permittees' ordinances pertaining to the MS4 are as follows:

- Chapter 24.40 of the Clark County Code: Water, Sewage, and Other Utilities. Sections 24.40.020, 24.40.030, and 24.40.040 pertain to the stormwater system.
- Chapter 13.16 of the City of Henderson Municipal Code: Regulation of industrial wastewater and pretreatment program. Section 13.16.020 (A) pertains to wastewater regulations and limitation. Section (B) pertains to prohibitions on storm drainage, groundwater, and unpolluted water.
- Chapter 14.17 of the City of Las Vegas Municipal Code: Wastewater Collection and Treatment. Sections 14.17.120 (D) and (E) and Sections 14.17.025 (66) and (67) pertain to the stormwater system.
- Chapter 13.28 of the North Las Vegas Municipal Code: Wastewater Collection and Treatment. Sections 13.28.025, 13.28.120 (D) and (E) pertain to the stormwater system discharges.

2.3 COMPLIANCE

Each entity requires compliance with its stormwater ordinances and regulations, as it does with all its ordinances. The public and business communities are made aware of local stormwater regulations through a variety of outreach measures, including the MS4 public outreach and education activities described in **Section 5** of this *Annual Report*. The Municipal Code of each entity describes enforcement measures (fines and other penalties) that could be used against violators of stormwater ordinances and regulations. Law enforcement officers, code enforcement officers, pretreatment officials for CLV and CNLV, and Clark County Public Response Office (CCPRO) staff have the authority to enforce stormwater ordinances and regulations. The Southern Nevada Health District (SNHD) enforces ordinances prohibiting dumping of solid waste and sewage to the Las Vegas Valley MS4. Members of the SQMC work together to coordinate and ensure cross-jurisdictional cooperation.

2.4 INSPECTION AND MONITORING PROCEDURES

Inspection and monitoring procedures used by the entities to track compliance with stormwater ordinances prohibiting illegal dumping and discharges to the MS4 are presented in **Section 7** of this report. Inspection and monitoring procedures used to track compliance with stormwater ordinances related to industrial sites and construction activities are presented in **Section 8** and **Section 9** of this report, respectively.

2.5 ADDITIONAL REQUIRED LEGAL AUTHORITY

A goal for this permit year was to address deficiencies in current legal authority. The existing ordinances were considered to be adequate for the needs of the program as understood at the beginning of the permit year, so no new ordinances or regulations were adopted by any of the Co-Permittees. The City of Henderson revised its ordinances relating to NPDES activities. Revision of these ordinances was also to have them rewritten to be similar to the language used by the CLV, and the CNLV based on comments from the EPA audit. The revised ordinances are now in both the Title 14 Utility Services and Title 19 Development Code. The ordinance is located in Chapter 14.09.040 – Wastewater Discharge Regulation, Section D and in Chapter 19.9.13 – Streets, Section H – Drainage, Subsection 1b. Copies of the pertinent sections are included in **Appendix D**.

Direction received from EPA and NDEP in Spring 2007 to upgrade existing construction and post-construction programs includes a requirement for new or improved ordinances governing erosion control at construction sites and management of runoff from areas of new development. Co-Permittees have formed working groups to draft these required ordinances and develop details of the enhanced programs in the 2007-2008 permit year. A report will be provided to NDEP by December 19, 2007, to describe proposed program enhancements, including any new ordinances or regulations.

2.6 CONCLUSION

The existing legal authority is adequate to prohibit illegal discharges to the stormwater system, control spills, require compliance, and determine compliance. Adequate penalties (including imprisonment, fines or both) are in place for violation of ordinances. New or modified ordinances will be developed in the 2007-2008 permit year in compliance with recent direction received from EPA and NDEP.

SECTION 3

Source Identification

Section 3
Source Identification

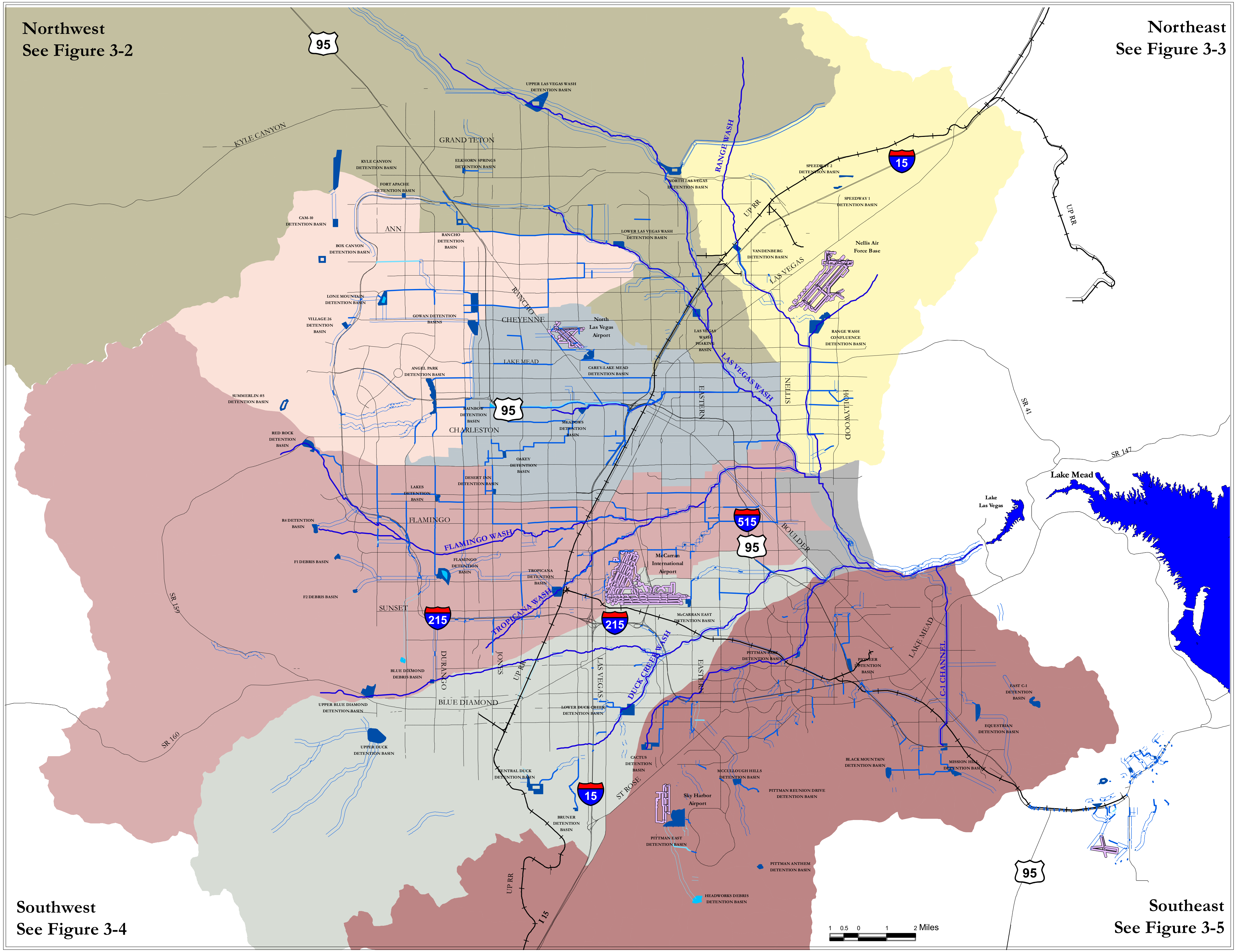
3.1 INTRODUCTION

This section summarizes the activities conducted for the source identification program, described in Section 3.2 of the SWMP, to satisfy the MS4 permit requirement described in paragraph 4.3.1. The goal was to develop a current stormwater system map for the Las Vegas Valley. The stormwater system map was generated to assist Co-Permittees, regulatory agencies, and others in determining where potential stormwater quality problems may exist or originate. The map is based on existing computerized inventory information from CCRFCD, which outlines the existing drainage and flood control system.

3.2 STORMWATER SYSTEM MAP

In Year 1 of the SWMP, a map of the existing regional storm drain system was prepared to document locations and contributing areas of major outfalls to receiving waters in the Las Vegas Valley. The map was prepared using information in the CCRFCD GIS system that was developed for the *Las Vegas Valley Master Plan Update (2002)*. Although no update to this map was required as a measurable goal for Year 4 of the permit, the overall Stormwater System Map has been updated this year to assure that it is current in light of the considerable growth that continues to occur in Las Vegas Valley. Locations of regional detention basins, channels, storm drains, and the washes in the Las Vegas Valley are shown in **Figure 3-1**. **Figures 3-2** through **3-5** are the sectional areas of the Las Vegas Valley (Northwest, Northeast, Southwest, and Southeast) as indicated in **Figure 3-1**.

The COH is in the process of creating a GIS database of the public storm drain system in its jurisdiction. This could assist in tracking the source of illicit discharges discovered during field observations, and managing maintenance activities.



LAS VEGAS VALLEY OVERALL STORMWATER SYSTEM MAP

Legend

Washes

Conveyance Facilities

Completed Pipe

Pipe Under Construction

Completed Channel

Channel Under Construction

Detention Basins

Complete

Under Construction

Airports

Railroads

Streets

Range Wash Watershed

Pittman / C-1 Watershed

North Basin Watershed

Lower Las Vegas Wash Watershed

Gowan Watershed

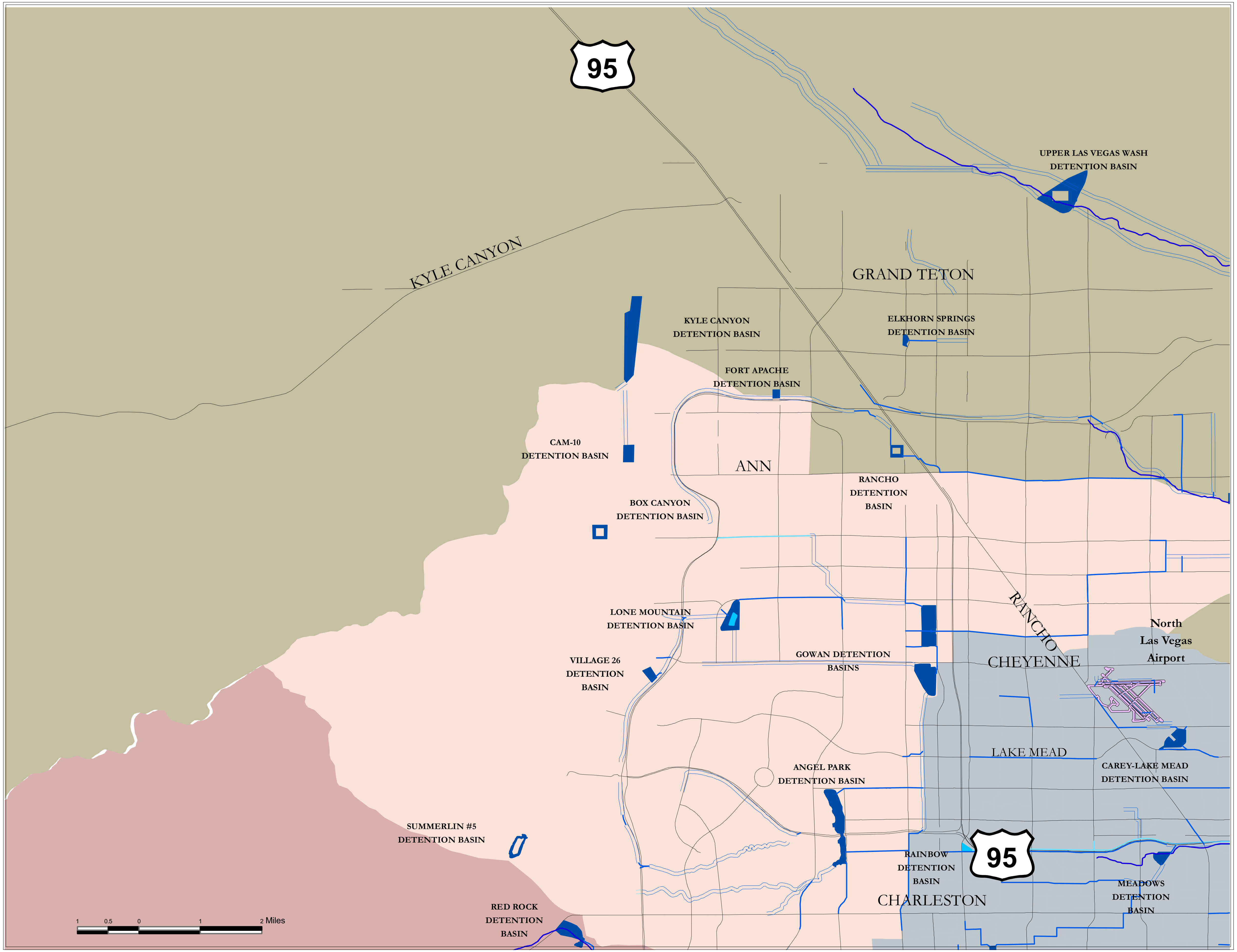
Flamingo / Tropicana Watershed

Duck Creek Watershed

Central Watershed

N
W E
S

Figure 3-1



LAS VEGAS VALLEY STORMWATER SYSTEM MAP - NORTHWEST AREA

Legend

- Washes

Conveyance Facilities

- Completed Pipe
- Pipe Under Construction
- Completed Channel
- Channel Under Construction

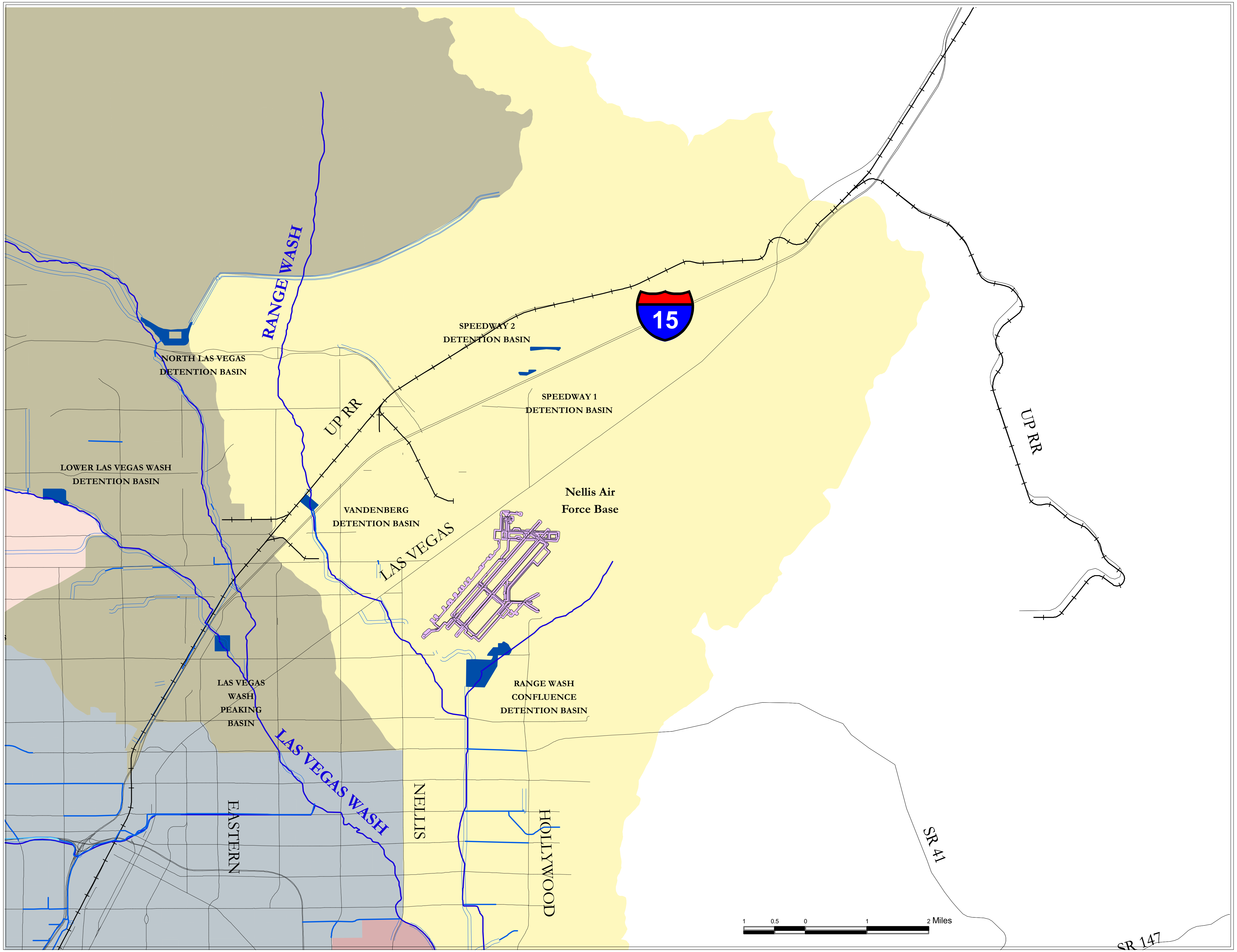
Detention Basins

- Complete
- Under Construction
- Airports
- Railroads
- Streets
- Range Wash Watershed
- Pittman / C-1 Watershed
- North Basin Watershed
- Lower Las Vegas Wash Watershed
- Gowan Watershed
- Flamingo / Tropicana Watershed
- Duck Creek Watershed
- Central Watershed

N W E S

Figure 3-2

LAS VEGAS VALLEY STORMWATER SYSTEM MAP - NORTHEAST AREA



Legend

- Washes

Conveyance Facilities

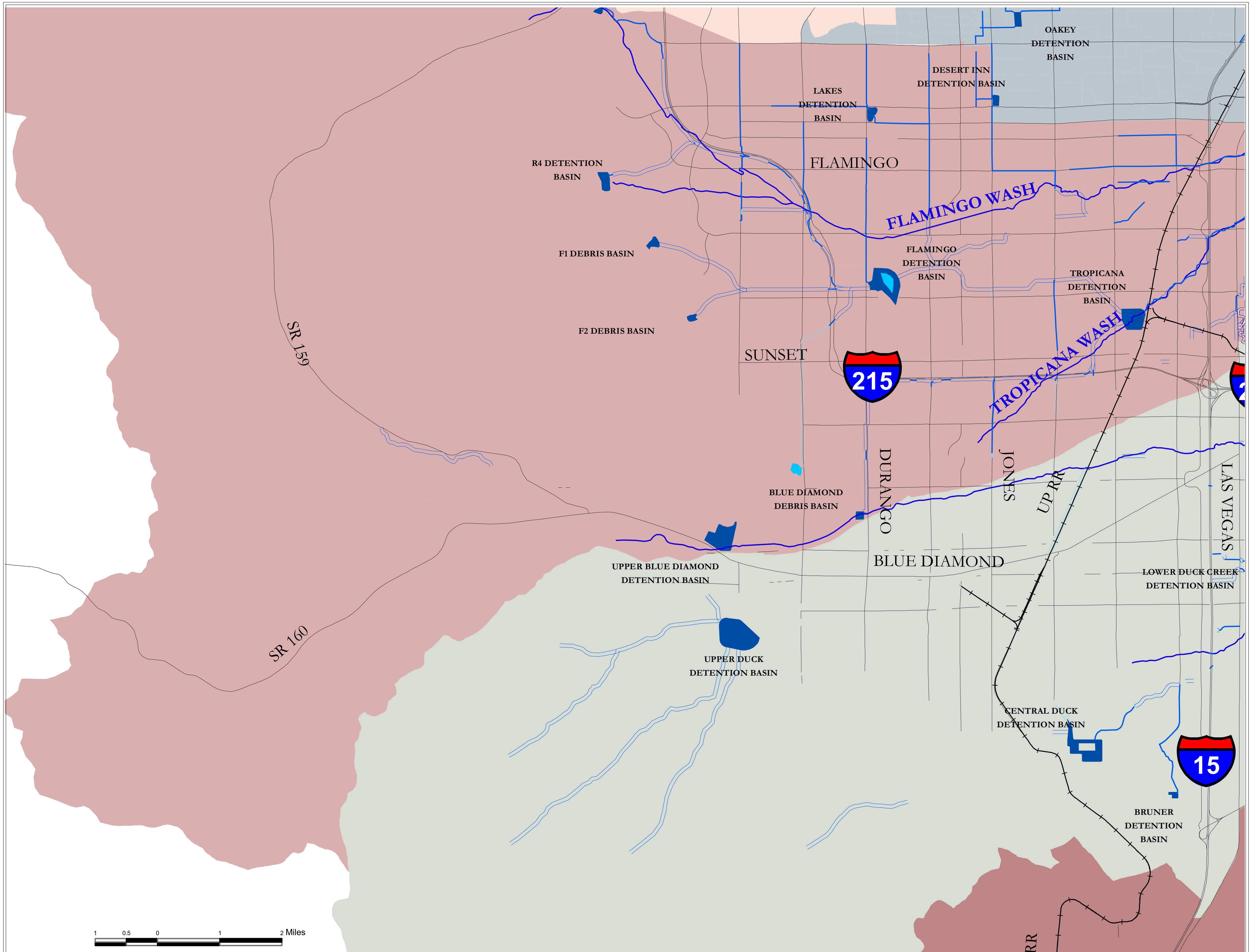
- Completed Pipe
- Pipe Under Construction
- Completed Channel
- Channel Under Construction

Detention Basins

- Complete
- Under Construction
- Airports
- Railroads
- Streets
- Range Wash Watershed
- Pittman / C-1 Watershed
- North Basin Watershed
- Lower Las Vegas Wash Watershed
- Gowan Watershed
- Flamingo / Tropicana Watershed
- Duck Creek Watershed
- Central Watershed

N
W E
S

Figure 3-3



LAS VEGAS VALLEY STORMWATER SYSTEM MAP - SOUTHWEST AREA

Legend

Washes

Conveyance Facilities

- Completed Pipe
- Pipe Under Construction
- Completed Channel
- Channel Under Construction

Detention Basins

- Complete
- Under Construction
- Airports
- Railroads
- Streets
- Range Wash Watershed
- Pittman / C-1 Watershed
- North Basin Watershed
- Lower Las Vegas Wash Watershed
- Gowan Watershed
- Flamingo / Tropicana Watershed
- Duck Creek Watershed
- Central Watershed

N W E S

Figure 3-4

LAS VEGAS VALLEY STORMWATER SYSTEM MAP - SOUTHEAST AREA

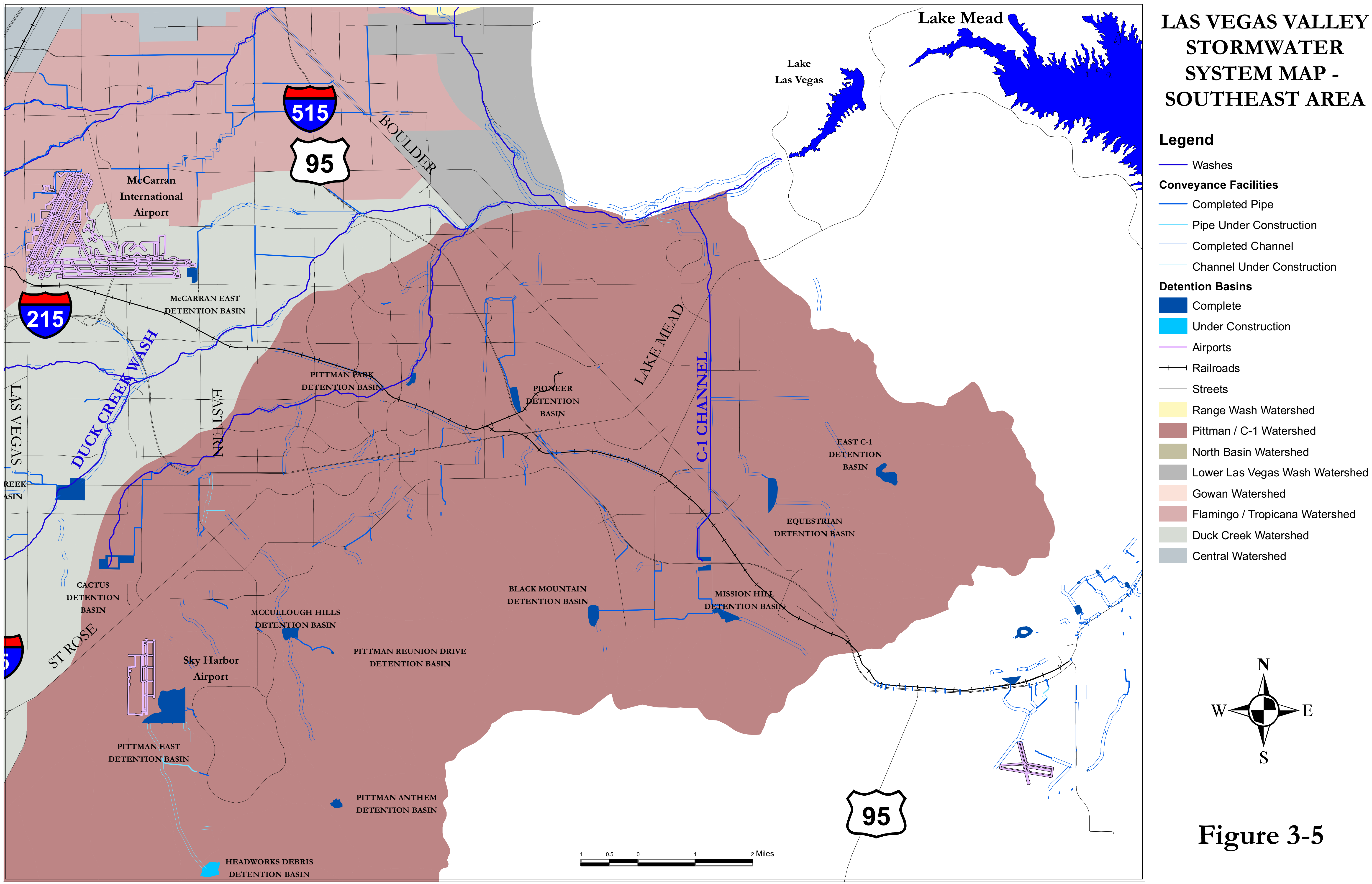


Figure 3-5

SECTION 4
Stormwater Monitoring Program

Section 4
Stormwater Monitoring Program

4.1 INTRODUCTION

Section 4 of the SWMP and paragraphs 4.4 and 5.1.1 of the MS4 permit describe the requirements of a stormwater monitoring program. This section presents the findings of that program as required for Year 4 of the MS4 program.

This section discusses the findings of the Dry Weather Monitoring Program, Wet Weather Monitoring Program, Detention Basin Monitoring Program, and the Year 5 Stormwater Monitoring Plan.

4.2 2006-2007 DRY WEATHER MONITORING PROGRAM

4.2.1 Introduction

The dry weather sampling program for the MS4 permit has two primary objectives:

1. To target potential illegal or illicit discharges to the municipal storm sewer system (e.g., from industrial activity).

2. To develop a baseline of dry weather surface water quality data against which future changes can be measured and which can be used to compute urban pollutant loading to receiving waters.

The Southern Nevada Water Authority (SNWA) conducted dry weather sampling for the NPDES stormwater discharge permit for the 2006-2007 permit year.

As of 2006, samples are no longer taken at GCS-5 Seeps or reported at Kerr-McGee Seeps. A new site, Burns Street Channel, located downstream from the BMI property had data reported for the 2006-2007 report year.

This subsection summarizes the results of the 2006-2007 dry weather sampling and the analysis of the data collected. The current program is evaluated to determine if changing conditions or opportunities to coordinate with other monitoring programs are warranted for the following year.

4.2.2 Comprehensive Sampling

The comprehensive sampling program was designed to gather a wide range of dry weather water quality characterization data for each major outfall, and to build upon the water quality database started in 1991. SNWA conducted the dry weather monitoring, analysis, and data tabulation under a cooperative agreement with CCRFCD.

4.2.2.1 Sampling Procedures

The dry weather monitoring program followed the same protocols used by SNWA in previous years, and consisted of quarterly sampling at the following locations:

- Meadows Detention Basin – LVC_2
- Flamingo Wash at Nellis Boulevard – FW_0
- Sloan Channel at Charleston Boulevard – SC_1
- Monson Channel at Stephanie Street – MC_2
- Duck Creek at Broadbent – DC_1
- Las Vegas Wash at Desert Rose Golf Course – LW12.1
- Burns Street Channel – BS_1

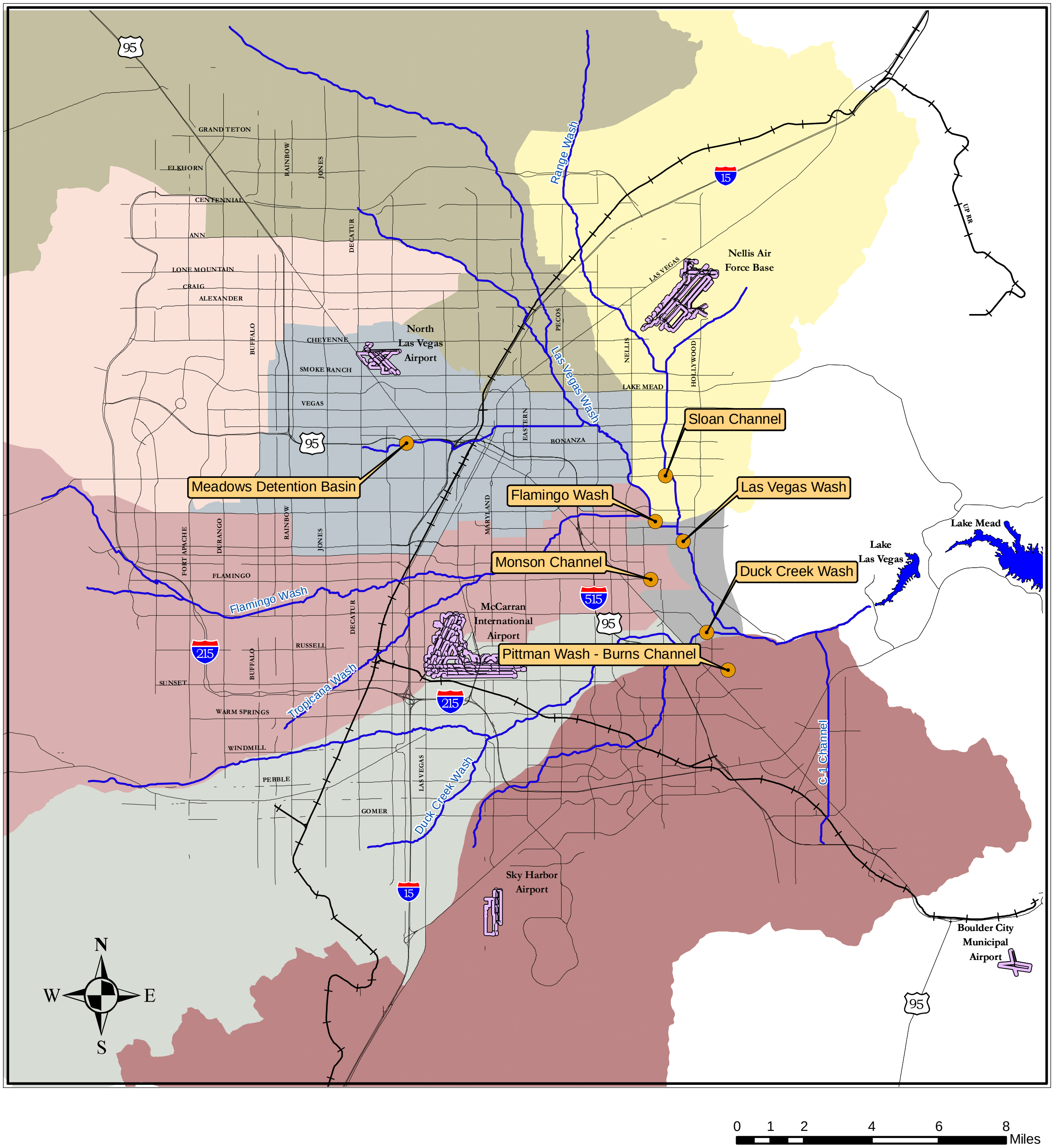
Quarterly samples are collected each year in January, April, July, and October. Single grab samples were collected at each monitoring site, see **Figure 4-1**. Major ions, trace metals, and organic compound analyses were performed by MWH Laboratories: phosphorus and other nutrient analyses were performed by Southern Nevada Water System (SNWS); and selenium analyses were performed by South Dakota State University (SDSU) Laboratories.

SNWA prepares an annual report, which includes the results from the dry weather monitoring program. The data and results from that report are summarized in the following section. This section satisfies the requirements for dry weather flow water quality characterization in the NPDES stormwater discharge permit Section 5.1.

4.2.3 Results

Results of the 2006-2007 comprehensive dry weather sampling program are summarized below. The tables show the analytical results of the individual grab samples at all of the sites in the July 2006, October 2006, January 2007, and April 2007 grab samples. A comprehensive database of all dry weather sampling data collected in the period of 1991-2007 is located in **Appendix E**.

The dry weather concentrations for all NPDES program samples and sample sites were compared to medians for SNWA samples in 2006-2007, see **Table 4-1**.



Legend

- Dry Weather Sampling Point
- Washes
- Streets
- Airports
- Railroads
- Central Watershed
- Duck Creek Watershed
- Flamingo / Tropicana Watershed
- Gowan Watershed
- Lower Las Vegas Wash Watershed
- North Basin Watershed
- Pittman / C-1 Watershed
- Range Wash Watershed

Figure 4-1

DRY WEATHER MONITORING SITES

Table 4-1

**Comparison of Period-of-Record
Dry Weather Concentrations for all NPDES Samples
to 2006-2007 Medians and Ranges for SNWA Sites 2006-2007**

Constituent	NPDES Median (1991-2007)	Median of 2006-2007 Data	Range of 2006-2007 Data
TDS	3,100 mg/L	3,500 mg/L	500 – 5,800 mg/L
Zinc	<20 µg/L	5.6 µg/L	<5.0 – 100.0 µg/L
Lead	<1.0 µg/L	<0.5 µg/L	<0.5 – 1.1 µg/L
Copper	<10 µg/L	2.0 µg/L	<1.0 – 18.0 µg/L
Nitrite	<0.08 mg/L	<0.09 mg/L	<0.08 – 0.21 mg/L
Nitrate	4.10 mg/L	5.30 mg/L	<0.08 – 8.35 mg/L
Orthophosphate	0.20 mg/L	0.004 mg/L	<0.002 – 0.044 mg/L
Total Phosphate	0.04 mg/L	0.014 mg/L	<0.01 – 0.089 mg/L
Conductance	3.70 mmhos	3.80 mmhos	1.81 – 5.98 mmhos
Temperature	20.3 Deg C	16.8 Deg C	0.4 – 31.1 Deg C
pH	8.3	8.2	7.7 – 9.4
NH3-N	<0.08 mg/L	0.08 mg/L	<0.08 – 0.15 mg/L
Chromium	<2.4 µg/L	1.0 µg/L	0.5 – 30.0 µg/L
Nickel	0.010 mg/L	0.002 mg/L	<0.0008– 0.014 mg/L
Selenium	0.010 mg/L	0.012 mg/L	0.0013 – 0.132 mg/L
Arsenic	<0.009 mg/L	0.014 mg/L	0.0028 – 0.059 mg/L
Turbidity	1.90 NTU	1.25 NTU	0.33 – 13.9 NTU
Fecal Coliform	650 MPN/100mL	1,600 MPN/100mL	<10 – 80,000 MPN/100mL

Total Dissolved Solids (TDS)

For the TDS concentrations for 2006-2007, see **Table 4-2.** TDS values varied from 500 mg/L to 5,800 mg/L. Duck Creek at Broadbent and Burns Street Channel provided the highest TDS concentrations. The 2006-2007 median TDS value was 3,250 mg/L, which is the same as the 2005-2006 median and the overall 1991-2007 median of 3,100 mg/L.

Nutrients

For nutrient concentrations for 2006-2007, see **Table 4-3**. The Meadows Detention Basin had the highest median total phosphate and orthophosphate values for 2006-2007 (0.089 mg/L and 0.044 mg/L, respectively). The 2005-2006 highest median total phosphate and orthophosphate concentrations were recorded at Kerr-McGee Seeps (1.19 mg/L and 0.280 mg/L, respectively). The 2004-2005 highest median total phosphate concentration was recorded at Meadows Detention Basin (0.29 mg/L) and Duck Creek had the highest median orthophosphate concentration (0.01 mg/L). During the 2005-2006 permit year, Kerr-McGee Seeps had the highest median concentrations for total phosphate and orthophosphate (1.19 mg/L and 0.280 mg/L, respectively).

Table 4-2

Quarterly Major Ion Chemistry of Water Samples From Tributary Locations

Location	ID	Date	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Biocarbonate as HCO3 (mg/L)	Carbonate CaCO3 (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Bromide (mg/L)	Fluoride (mg/L)	Silica (mg/L)	Total Dissolved Solids (mg/L)	TOC (mg/L)
Meadows Detention Basin	**LVC_2**	7/27/06	110	86	150	15	290	15.0	470	140	0.21	0.42	22	1,300	9.1
		10/25/06	58	30	51	5.2	210	<0.001	170	<10	0.08	0.38	12	500	1.6
		1/23/07	170	160	270	26	350	<0.001	870	270	0.33	0.39	16	2,000	3.5
		4/18/07	140	110	210	25	340	<2.0	690	230	0.26	0.54	19	1,600	8.0
	2006-2007 Median		**125**	**98**	**180**	**20**	**310**	**<0.001**	**580**	**185**	**0.24**	**0.41**	**18**	**1,450**	**5.8**
Las Vegas Wash at Desert Rose Golf Course	**LW12.1**	7/27/06	220	250	330	61	230	10.0	1,700	290	0.66	0.42	28	3,200	5.8
		10/25/06	220	250	330	60	270	<0.001	1,500	280	0.59	0.53	40	3,900	8.8
		1/23/07	260	310	380	64	300	<0.001	1,900	300	0.79	0.48	45	3,300	3.8
		4/18/07	210	230	270	60	320	<2.0	1,600	260	0.66	0.52	34	3,100	10.0
	2006-2007 Median		**220**	**250**	**330**	**61**	**285**	**<0.001**	**1,650**	**285**	**0.66**	**0.50**	**37**	**3,250**	**7.3**
Flamingo Wash at Nellis Boulevard	**FW_0**	7/27/06	300	180	300	27	240	<0.001	1,400	330	0.66	0.53	29	2,900	3.6
		10/25/06	300	180	320	30	230	<0.001	1,500	370	0.9	0.6	29	3,700	3.0
		1/23/07	330	200	290	27	240	<0.001	1,500	260	0.83	0.46	32	2,800	2.1
		4/18/07	290	180	250	30	290	<2.0	1,600	310	0.7	0.5	26	3,100	4.3
	2006-2007 Median		**300**	**180**	**295**	**29**	**240**	**<0.001**	**1,500**	**320**	**0.75**	**0.52**	**29**	**3,000**	**3.3**
Sloan Channel at Charleston Boulevard	**SC_1**	7/27/06	210	150	410	27	68	80.0	950	610	0.7	1.4	46	2,900	12.0
		10/25/06	130	190	280	15	220	<0.001	1,100	310	1.4	1.2	75	2,900	2.4
		1/23/07	150	210	320	17	210	<0.001	1,100	340	1.2	1.2	74	2,400	1.8
		4/18/07	130	200	280	18	280	<2.0	1,100	340	1.4	1.0	69	2,500	2.7
	2006-2007 Median		**140**	**195**	**300**	**18**	**225**	**<1.001**	**1,100**	**340**	**1.3**	**1.2**	**72**	**2,700**	**3.0**
Monson Channel at Stephanie Street	**MC_2**	7/27/06	420	300	420	38	260	<0.001	2,400	380	1.1	0.53	48	4,400	3.5
		10/25/06	410	310	440	40	260	<0.001	2,500	400	1.1	0.73	51	5,200	3.2
		1/23/07	400	300	460	37	260	<0.001	2,500	400	1.1	0.60	47	4,400	2.7
		4/18/07	400	320	390	41	280	<2.0	2,600	430	1.1	0.40	39	4,400	2.5
	2006-2007 Median		**405**	**305**	**430**	**39**	**260**	**<0.001**	**2,500**	**400**	**1.1**	**0.60**	**48**	**4,400**	**3.0**
Duck Creek at Broadbent	**DC_1**	7/27/06	490	280	580	81	230	<0.001	2,400	730	1.0	1.3	60	4,500	2.3
		10/25/06	450	270	580	65	200	<0.001	2,400	710	1.0	1.5	60	5,800	3.5
		1/23/07	440	270	600	70	230	<0.001	2,400	700	1.1	1.4	57	5,000	2.3
		4/18/07	460	270	540	79	260	<2.0	2,500	780	1.0	1.1	51	5,100	2.5
	2006-2007 Median		**455**	**270**	**580**	**75**	**230**	**<0.001**	**2,400**	**720**	**1.0**	**1.4**	**59**	**5,050**	**2.4**
Burns Street Channel	**BS_1**	7/27/06	480	190	690	45	110	14	1,800	930	1.3	1.1	67	4,500	2.6
		10/25/06	420	190	570	55	120	2.2	1,800	790	1.4	1.3	63	5,400	2.4
		1/23/07	390	180	570	45	140	<0.001	1,800	870	1.4	1.2	61	3,800	1.6
		4/18/07	390	190	430	47	190	<2.0	1,700	670	1.3	1	54	3,700	0.77
	2006-2007 Median		**405**	**190**	**570**	**46**	**130**	**2.1**	**1,800**	**830**	**1.4**	**1.2**	**62**	**4,150**	**2.0**
	Overall 2006-2007 Median		**300**	**200**	**355**	**39**	**240**	**<0.001**	**1,650**	**355**	**1.0**	**0.60**	**47**	**3,500**	**2.9**

NA = Not Analyzed
NS = Not Sampled

Table 4-3

Nutrient Concentrations of Water Samples From Tributary Locations

Location	ID	Sample Date	Ammonia mg N/L	Nitrite mg N/L	Nitrate mg N/L	Nitrate-Nitrite mg N/L	Total Kjeldahl Nitrogen (TKN) mg N/L	Orthophosphate mg P/L	Total Phosphate mg P/L
Meadows Detention Basin	LVC_2	7/27/06	0.15	0.12	1.11	1.20	1.10	0.036	0.089
		10/25/06	< 0.08	< 0.08	0.90	0.91	<0.2	NA	0.047
		1/23/07	< 0.08	< 0.08	5.19	5.20	1.00	0.003	< 0.01
		4/18/07	< 0.10	< 0.10	2.94	2.90	1.50	0.044	0.064
2006-2007 Median			**< 0.09**	**< 0.09**	**2.03**	**2.05**	**1.1**	**0.020**	**0.056**
Las Vegas Wash at Desert Rose Golf Course	LW12.1	7/27/06	< 0.08	0.20	2.71	3.00	0.92	< 0.010	0.060
		10/25/06	< 0.08	0.11	4.06	4.20	0.89	NA	0.083
		1/23/07	< 0.08	< 0.08	4.97	5.00	0.64	< 0.010	0.030
		4/18/07	< 0.10	< 0.10	3.16	3.10	1.40	0.020	0.032
2006-2007 Median			**< 0.08**	**0.11**	**4.07**	**3.65**	**0.91**	**< 0.010**	**0.046**
Flamingo Wash at Nellis Boulevard	FW_0	7/27/06	< 0.08	0.17	4.74	4.80	0.20	< 0.010	0.022
		10/25/06	< 0.08	< 0.08	4.74	4.60	0.26	NA	0.046
		1/23/07	< 0.08	< 0.08	5.87	5.90	<0.2	< 0.002	< 0.001
		4/18/07	< 0.10	< 0.10	4.29	4.30	0.80	0.006	< 0.001
2006-2007 Median			**< 0.08**	**< 0.09**	**4.74**	**4.70**	**0.23**	**< 0.002**	**0.012**
Sloan Channel at Charleston Boulevard	SC_1	7/27/06	0.52	< 0.08	3.16	3.30	25 *	0.003	0.052
		10/25/06	< 0.08	< 0.08	5.65	5.60	<0.2	NA	0.016
		1/23/07	< 0.08	< 0.08	5.65	5.70	<0.2	0.014	< 0.01
		4/18/07	< 0.10	< 0.10	6.32	6.30	<0.1	0.008	0.011
2006-2007 Median			**< 0.09**	**< 0.08**	**5.65**	**5.65**	**<0.2**	**0.006**	**0.014**
Monson Channel at Stephanie Street	MC_2	7/27/06	0.11	0.21	4.52	4.80	0.69	0.006	0.042
		10/25/06	< 0.08	< 0.08	5.65	5.70	0.36	NA	0.013
		1/23/07	< 0.08	< 0.08	5.42	5.50	1.00	< 0.002	< 0.010
		4/18/07	< 0.10	< 0.10	5.42	5.40	0.31	0.003	< 0.010
2006-2007 Median			**< 0.09**	**< 0.09**	**5.42**	**5.45**	**0.53**	**0.003**	**0.012**
Duck Creek at Broadbent	DC_1	7/27/06	< 0.08	< 0.08	5.42	5.40	<0.2	0.002	0.002
		10/25/06	< 0.08	< 0.08	6.77	6.80	0.32	< 0.010	0.024
		1/23/07	< 0.08	< 0.08	6.55	6.70	0.38	0.003	< 0.010
		4/18/07	< 0.10	< 0.10	7.23	7.30	0.84	0.010	< 0.010
2006-2007 Median			**< 0.08**	**< 0.08**	**6.66**	**6.75**	**0.35**	**0.003**	**0.010**
Burns Street Channel	BS_1	7/27/06	< 0.08	< 0.08	6.55	6.50	0.26	0.004	0.017
		10/25/06	< 0.08	< 0.08	< 0.08	< 0.01	0.46	< 0.010	0.026
		1/23/07	< 0.08	< 0.08	6.55	6.50	0.41	0.003	< 0.010
		4/18/07	< 0.10	< 0.10	8.35	8.40	<0.1	0.017	0.015
2006-2007 Median			**< 0.08**	**< 0.08**	**6.55**	**6.50**	**0.34**	**0.007**	**0.017**
Overall 2006-2007 Median			**< 0.08**	**< 0.09**	**5.42**	**5.3**	**0.4**	**0.004**	**0.014**

NA = Not Analyzed

NS = Not Sampled

* Analytical error, not used in median calculation

Nitrate concentrations ranged from <0.08 mg/L to 8.35 mg/L, and the highest value was recorded at Burns Street Channel. The highest median value was found at Duck Creek (6.66 mg/L). Comparing nitrate concentrations to previous years, the highest concentration was 24.0 mg/L recorded in 2005-2006 at the Meadows Detention Basin. Other than this one value, the 2003-2004 and 2004-2005 data concentrations did not show a significant increase.

Metals

For metals concentrations for 2006-2007, see **Table 4-4**. On average, concentrations of lead were below the detection limit of 0.5 µg/L, with the highest value (1.1 µg/L) detected at two sites, Monson Channel and Sloan Channel. In 2005-2006, concentrations of lead detected ranged from below the detection limit of 0.5 µg/L to 2.7 µg/L (Las Vegas Wash at Desert Rose Golf Course).

Copper concentrations ranged from below the detection limit of 1.0 µg/L to 18.0 µg/L, with the highest concentration found in Sloan Channel. In 2005-2006, the highest concentration was 10.0 µg/L at Meadows Detention Basin. Meadows Detention Basin also had the highest concentration in 2003-2004 and 2004-2005 (24.0 µg/L and 43 µg/L, respectively).

Concentrations of zinc ranged from below the detection limit of 5.0 µg/L to 100.0 µg/L, which was found in Duck Creek. In 2005-2006, the highest concentration was 66 µg/L, found in Sloan Channel. There was a recorded concentration of 210.0 µg/L at Meadows Detention Basin for the 2004-2005 monitoring period. During the 2003-2004 monitoring period, the highest concentration recorded was 54.0 µg/L (GCS-5 Seeps).

Perchlorate

For perchlorate concentrations for 2006-2007, see **Table 4-5**. Perchlorate is not a constituent specified for analysis by the MS4 permit of the Las Vegas Valley Stormwater Monitoring Program. SNWA analyzed perchlorate because of surface and groundwater contamination caused by past industrial activities near the Lower Las Vegas Valley Wash. Perchlorate concentrations ranged from 2.6 µg/L (Meadows Detention Basin) to 6.1 µg/L (Burns Street Channel). Burns Street Channel also had the highest median value for 2006-2007 (3200 µg/L).

Bacteria

For bacteria concentrations for 2006-2007, see **Table 4-5**.

Fecal coliform concentrations ranged from below the detection limit of 10 MPN/100mL to 80,000 MPN/100mL. The highest median value for 2006-2007 was found at Flamingo Wash and the highest detection was at Meadows Detention Basin. Overall median concentration for 2006-2007 is 2,900 MPN/100mL. This is higher than the overall median concentration of 1,749 MPN/100ml in 2005-2006.

Table 4-4

Quarterly Heavy Metal Concentrations From Tributary Locations

Sampling Location	Date	Aluminum (µg/L)	Arsenic (µg/L)	Barium (µg/L)	Chromium (µg/L)	Copper (µg/L)	Iron (µg/L)	Lead (µg/L)	Manganese (µg/L)	Nickel (µg/L)	Selenium (µg/L)	Zinc (µg/L)
Meadows Detention Basin	7/27/06	12.0	3.8	63.0	0.5	6.0	<0.010	0.3	3.0	1.2	4.0	12.0
	10/25/06	26.0	4.7	47.0	0.7	1.1	0.570	<0.5	24.0	2.1	1.3	45.0
	1/23/07	NA	2.8	35.0	0.6	1.6	0.056	<0.5	1.3	0.9	7.9	4.7
	4/18/07	29.0	3.1	59.0	0.7	5.3	<0.010	0.5	6.0	1.3	5.9	20.0
2006-2007 Median		**26.0**	**3.5**	**53.0**	**0.7**	**3.5**	**0.033**	**<0.5**	**4.5**	**1.3**	**5.0**	**16.0**
Las Vegas Wash at Desert Rose Golf Course	7/27/06	18.0	8.0	39.0	0.5	2.4	<0.010	0.2	21.0	2.1	9.2	5.4
	10/25/06	27.0	6.5	47.0	1.0	2.8	0.045	0.3	15.0	<5.0	9.3	9.1
	1/23/07	61.0	6.4	28.0	0.9	2.9	0.065	0.3	28.0	1.4	13.0	5.6
	4/18/07	31.0	6.9	57.0	0.6	3.1	0.033	<0.2	57.0	2.0	9.6	7.8
2006-2007 Median		**29.0**	**6.7**	**43.0**	**0.8**	**2.9**	**0.039**	**0.3**	**24.5**	**<2.1**	**9.5**	**6.7**
Flamingo Wash at Nellis Boulevard	7/27/06	36.0	5.5	54.0	0.9	2.7	<0.010	<0.5	9.0	2.3	132.0	8.7
	10/25/06	99.0	5.8	55.0	4.7	2.2	0.110	0.3	6.5	9.9	13.9	9.1
	1/23/07	8.0	4.1	35.0	2.1	1.2	<0.010	<0.5	1.3	1.3	16.0	4.0
	4/18/07	9.6	4.9	57.0	1.0	2.4	<0.020	<0.2	12.0	1.6	15.0	11.0
2005-2006 Median		**22.8**	**5.2**	**54.5**	**1.6**	**2.3**	**0.015**	**<0.4**	**7.8**	**2.0**	**15.5**	**8.9**
Sloan Channel at Charleston Boulevard	7/27/06	20.0	12.0	150.0	3.4	18.0	<0.010	1.1	2.6	1.6	10.8	24.0
	10/25/06	6.7	15.0	46.0	3.6	1.7	<0.010	<0.5	1.0	2.3	10.3	8.0
	1/23/07	8.9	14.0	60.0	3.6	0.9	0.032	<0.5	2.0	<5.0	12.0	5.5
	4/18/07	11.0	17.0	39.0	3.8	1.8	<0.020	<0.2	1.5	<0.8	12.0	<5.0
2006-2007 Median		**10.0**	**14.5**	**53.0**	**3.6**	**1.8**	**<0.015**	**<0.5**	**1.8**	**<2.0**	**11.4**	**6.8**
Monson Channel at Stephanie Street	7/27/06	190.0	16.0	29.0	0.9	3.0	<0.010	1.1	9.6	2.4	22.2	11.0
	10/25/06	21.0	16.0	27.0	0.8	1.5	0.042	0.2	4.5	13.0	21.6	6.6
	1/23/07	9.3	13.0	20.0	0.7	1.8	<0.010	<0.5	2.2	<5.0	25.0	2.5
	4/18/07	10.0	14.0	21.0	0.7	2.1	<0.020	<0.2	0.9	<0.8	25.0	<5.0
2006-2007 Median		**15.5**	**15.0**	**24.0**	**0.8**	**2.0**	**<0.015**	**<0.4**	**3.4**	**3.7**	**23.6**	**5.8**
Duck Creek	7/27/06	36.0	59.0	29.0	0.8	1.2	<0.010	<0.5	26.0	3.1	18.4	100.0
	10/25/06	18.0	54.0	27.0	1.1	1.1	0.0	<0.5	7.7	14.0	19.2	3.8
	1/23/07	26.0	49.0	21.0	1.0	1.0	0.0	<0.5	5.7	1.5	23.0	<5.0
	4/18/07	24.0	49.0	26.0	1.0	<1.0	<0.020	<0.2	6.9	1.4	22.0	<5.0
2006-2007 Median		**25.0**	**51.5**	**26.5**	**1.0**	**1.1**	**<0.005**	**<0.5**	**7.3**	**2.3**	**20.6**	**5.0**
Burns Street Channel	7/27/06	NA	50.0	31.0	30.0	1.3	<0.010	<0.5	8.4	1.9	12.5	3.1
	10/25/06	20.0	43.0	40.0	16.0	0.9	<0.010	<0.5	1.8	10.0	9.6	2.7
	1/23/07	16.0	38.0	37.0	13.0	<2.0	<0.010	<0.5	4.3	<5.0	11.0	2.4
	4/18/07	9.0	33.0	44.0	7.8	<1.0	<0.020	<0.2	0.07	<0.8	9.9	<5.0
2006-2007 Median		**12.5**	**40.5**	**38.5**	**14.5**	**<1.2**	**<0.010**	**<0.5**	**3.1**	**3.5**	**10.5**	**2.6**
Overall 2006-2007 Median		**19.0**	**14.5**	**38.5**	**1.0**	**2.0**	**<0.015**	**<0.5**	**5.9**	**2.1**	**12.3**	**5.6**

NA = Not Analyzed
NS = Not Sampled

Table 4-5

Field Measurements, Bacteriological Compositions, and Perchlorate Concentrations of Tributary Locations

Location	ID	Date	Conductivity µS/cm	DO mg/L	pH Units	Temperature ^{0}C	Turbidity NTU	Perchlorate µg/L	Ave # FC /100mL	Ave # E. coli /100mL
Meadows Detention Basin	LVC_2	7/27/06	1,809	6.10	8.44	25.1	2.66	7.1	80,000	4,600
		10/25/06	3,640	7.41	8.09	25.5	3.41	2.6	4,200	1,200
		1/23/07	2,608	13.26	8.30	0.4	0.74	16.0	<667	<400
		4/18/07	2,357	12.08	8.21	8.4	1.66	9.8	1,360	340
2006-2007 Median			**2,482**	**9.75**	**8.26**	**16.8**	**2.16**	**8.5**	**2,900**	**770**
Las Vegas Wash at Desert Rose Golf Course	LW12.1	7/27/06	3,940	10.51	8.58	26.8	2.96	8.3	3,400	550
		10/25/06	3,660	8.96	8.06	15.4	2.72	9.8	17,200	2,875
		1/23/07	3,951	12.65	8.38	8.0	1.21	11.0	<100	<667
		4/18/07	3,493	10.51	8.04	15.6	1.82	7.7	3,600	623
2006-2007 Median			**3,800**	**10.51**	**8.22**	**15.5**	**2.27**	**9.1**	**3,500**	**587**
Flamingo Wash at Nellis Boulevard	FW_0	7/27/06	3,640	7.41	8.09	25.5	3.41	14.0	4,200	1,200
		10/25/06	3,570	9.53	8.20	15.9	5.57	11.0	4,600	1,300
		1/23/07	3,347	10.14	8.26	9.4	0.63	14.0	<100	<400
		4/18/07	3,467	11.89	8.23	14.0	1.72	10.0	4,200	5300
2006-2007 Median			**3,519**	**9.84**	**8.22**	**15.0**	**2.57**	**12.5**	**4,200**	**1,250**
Sloan Channel at Charleston Boulevard	SC_1	7/27/06	3,550	12.90	9.43	31.1	2.87	10.0	3,600	840
		10/25/06	2,950	10.40	8.35	13.1	0.72	6.5	6,667	900
		1/23/07	2,990	13.00	8.51	6.4	1.07	7.0	<2,000	<400
		4/18/07	3,057	12.68	8.36	9.1	0.42	6.1	330	210
2006-2007 Median			**3,024**	**12.79**	**8.44**	**11.1**	**0.90**	**6.8**	**1,965**	**525**
Monson Channel at Stephanie Street	MC_2	7/27/06	4,980	9.87	8.16	28.1	13.90	12.0	6,400	<40
		10/25/06	5,010	8.96	8.22	17.0	1.35	18.0	7,800	600
		1/23/07	4,932	11.25	8.17	9.8	0.63	18.0	<400	180
		4/18/07	4,975	18.95	8.31	15.9	0.44	16.0	<100	<100
2006-2007 Median			**4,978**	**10.56**	**8.20**	**16.5**	**0.99**	**17.0**	**3,400**	**140**
Duck Creek at Broadbent	DC_1	7/27/06	5,950	5.69	7.74	27.2	1.29	26.0	1,800	128
		10/25/06	5,590	11.60	8.41	19.2	1.56	34.0	1,400	250
		1/23/07	5,975	9.87	7.82	16.6	0.46	31.0	<10	<40
		4/18/07	3,840	10.82	7.85	20.3	0.94	28.0	210	245
2006-2007 Median			**5,770**	**10.35**	**7.87**	**19.8**	**1.12**	**29.5**	**805**	**189**
Burns Street Channel	BS_1	7/27/06	5,720	10.6	8.44	26.6	1.14	6,100	880	<40
		10/25/06	5,490	9.75	8.59	22.0	0.66	2,600	420	119
		1/23/07	5,182	8.94	8.37	18.2	1.02	3,800	<200	<100
		4/18/07	4,984	10.31	8.17	21.7	0.33	740	<100	145
2006-2007 Median			**5,336**	**10.03**	**8.41**	**21.9**	**0.84**	**3,200**	**310**	**110**
Overall 2006-2007 Median			**3,750**	**10.46**	**8.25**	**16.8**	**1.25**	**13.0**	**1,600**	**400**

NA = Not Analyzed
NS = Not Sampled

Semi-Volatile Organic Compounds (SOCs) and Volatile Organic Compounds (VOCs)

For SOC and VOC pollutant concentrations for 2006-2007, see **Table 4-6**.

During the 2006-2007 permit year, one SOC were detected. The SOC detected was caffeine and three sites (Meadows Detention Basin, Sloan Channel, and Monson Channel) detected caffeine at least once, for a total of four detections. In 2005-2006, only one type of SOC was detected (caffeine), which was consistent with the 2006-2007 permit year. During the previous permit year (2004-2005), nine VOCs were detected. The number of SOC detections has decreased since the 2004-2005 permit year.

Nine VOCs were detected for the 2006-2007 permit year. VOCs detected were acetaldehyde, acetone, carbon disulfide, chloroform, formaldehyde, m-glyoxal (pyruvic aldehyde), molybdenum, unknown (total), and vanadium. At least one VOC was detected at each site during the 2006-2007 monitoring period. During the 2005-2006 permit year, 20 VOCs were detected and during the 2004-2005 monitoring period detected six VOCs were detected. Therefore, the number of VOCs detected decreased from 2005-2006, but the number of detections are greater than 2003-2004 and 2004-2005 (in which there were six detections).

Pesticides and Herbicides

Four types of pesticides beta-BHC, diuron, glyoxal, and lindane (gamma-BHC) were detected in the Las Vegas Valley dry weather samples during the 2006-2007 permit year, for a total of ten detections. During the 2005-2006 permit year, there were five detections of pesticides and one detection in 2004-2005.

Three types of herbicides (glyphosate, surrogate: DECA, and surrogate: TCmx) were detected during the 2006-2007 permit year, for a total of six detections. There were two detections of herbicides during the 2005-2006 permit year and four detections during 2004-2005. and 2003-2004 permit years both had four herbicide detections. Three pesticides were detected, while in the 2004-2005 monitoring period, one pesticide and four herbicides were detected. The number of detections for pesticides and herbicides varied from each year, but it appears that there may be a general upward trend in the number of samples in which pesticides and herbicides are detected.

4.2.4 Conclusion

This report satisfies the requirements for dry weather flow water quality characterization in the NPDES stormwater discharge permit. There were no significant changes in dry weather constituent concentrations in 2006-2007 that would indicate increased water quality impairment due to illegal discharges. The possible upward trend in detections of pesticides and herbicides will be watched in future years to see if it continues.

Table 4-6

Organic Compound Concentrations (µg/L) of Water Samples From Tributary Locations

Location	ID	Sample Date	1,1,2,2-Tetrachloroethane	1,1,1-Trichloropropanone	1,1-Dichloroethane	1,2-Dichloroethane	1,2,3-Trichlorobenzene	1,2,4-Trichlorobenzene	1,2,4,-Trimethylbenzene	2-Butanone (MEK)	2-(2-(2-butoxyethoxy)ethoxyeth	2,4-D	2-Butoxyethanol phosphate (3:1)	3,6,9,12-tetraoxahexadecan-1-o	2,3,5,6-Tetrafluorobenzaldehyd	4-Methylphenol	4,4 '-DDD	Acetaldehyde	Acetone	Aldrin	Alpha-BHC	Baygon	Benzo (k) Fluoranthene	Beta-BHC	Bromodichloromethane	Bromoform	Butanal	Butylbenzylphthalate
Meadows Detention Basin	**LVC_2**	7/27/06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		10/25/06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		1/23/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	88	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		4/18/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Las Vegas Wash at Desert Rose Golf Course	**LW12.1**	7/27/06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		10/25/06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.1	13	ND	ND	ND	ND	ND	ND	ND	ND	ND
		1/23/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		4/18/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Flamingo Wash	**FW_0**	7/27/06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		10/25/06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		1/23/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	84	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		4/18/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sloan Channel	**SC_1**	7/27/06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		10/25/06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.1	67	ND	ND	ND	ND	ND	ND	ND	ND	ND
		1/23/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	38	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		4/18/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Monson Channel	**MC_2**	7/27/06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		10/25/06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		1/23/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	19	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		4/18/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Duck Creek	**DC_1**	7/27/06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		10/25/06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.2	13	ND	ND	ND	ND	ND	ND	ND	ND	ND
		1/23/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	18	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		4/18/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Burns Street Channel	**BS_1**	7/27/06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.2	ND	ND	ND	ND
		10/25/06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.2	ND	ND	ND	ND	ND	ND	ND	ND	ND
		1/23/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	18	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		4/18/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Number of Detects			**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**12**	**3**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**

ND = Not Detected
NA = Not Analyzed

Table 4-6 (Continued)

Organic Compound Concentrations (µg/L) of Water Samples From Tributary Locations

Location	ID	Sample Date	Caffeine	Carbon disulfide	Chlorodibromomethane	Chloroform	Chloroform (Trichloromethane)	Dalapon	Diazinon	Dieldrin	Delta-BHC	Dibromoacetonitrile	Dibromochloromethane	Di(2-Ethylhexyl)phthalate	Dichloroiodomethane	Dichloromethane	Dichlorprop	Diethylphthalate	Dicamba	Di-n-Butylphthalate	Di-N-Octylphthalate	Disulfoton	Diuron	Dodecane	Endrin	Endrin Aldehyde	Formaldehyde	Glyoxal	Glyphosate	Hexadecanoic acid	Lindane	Lindane (gamma-BHC)	Oxamyl (Vydate)
Meadows Detention Basin	LVC_2	7/27/06	0.45	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	11	ND	ND	ND	ND
		10/25/06	ND	ND	ND	1.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.1	ND	ND	ND	ND	ND	ND
		1/23/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	21	ND	ND	ND	ND	ND	ND
		4/18/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	11	25	ND	ND	ND	ND	ND
Las Vegas Wash at Desert Rose Golf Course	LW12.1	7/27/06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		10/25/06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	14	ND	ND	ND	ND	ND	ND
		1/23/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	20	ND	ND	ND	ND	ND	ND
		4/18/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.1	ND	ND	ND	23	39	15	ND	ND	ND	ND
Flamingo Wash	FW_0	7/27/06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		10/25/06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.2	ND	ND	ND	ND	ND	ND
		1/23/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	14	ND	ND	ND	ND	0.24	ND
		4/18/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	9	29	ND	ND	ND	ND	ND
Sloan Channel	SC_1	7/27/06	ND	0.61	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		10/25/06	0.14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.7	ND	ND	ND	ND	ND	ND
		1/23/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	14	ND	ND	ND	ND	ND	ND
		4/18/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	14	25	ND	ND	ND	ND	ND
Monson Channel	MC_2	7/27/06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		10/25/06	0.22	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.6	ND	ND	ND	ND	ND	ND
		1/23/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		4/18/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.2	17	ND	ND	ND	ND	ND
Duck Creek	DC_1	7/27/06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		10/25/06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	12	ND	ND	ND	ND	ND	ND
		1/23/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		4/18/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.9	27	ND	ND	ND	ND	ND
Burns Street Channel	BS_1	7/27/06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		10/25/06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	12	ND	ND	ND	ND	ND	ND
		1/23/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		4/18/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	13	31	ND	ND	ND	ND	ND
			3	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	18	7	2	0	0	1	0

ND = Not Detected
NA = Not Analyzed

Table 4-6 (Continued)

Organic Compound Concentrations (µg/L) of Water Samples From Tributary Locations

Location	ID	Sample Date	Methylene Chloride	Methyl Tert-butyl ether (MTBE)	m-Dichlorobenzene (1,3-DCB)	M-Glyoxal (Pyruvic Aldehyde)	Molybdenum	Naphthalene	Nonadecane	p-Dichlorobenzene (1,4-DCB)	Pentachlorophenol	Pentanal	Phenanthrene	Propanal	Tetrachloroethylene (PCE)	Tetradecane	Simazine	Toluene	Total DCPA Mono and Diacid Degradate	Total Trihalomethanes	Total THM	Tri(2-chloroethyl)phosphate	Trichloroethylene (TCE)	Unknown (Total)	Unknown alcohol (Total)
Meadows Detention Basin	LVC_2	7/27/06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		10/25/06	ND	ND	ND	ND	2.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		1/23/07	ND	ND	ND	ND	7.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		4/18/07	ND	ND	ND	ND	8.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Las Vegas Wash at Desert Rose Golf Course	LW12.1	7/27/06	ND	ND	ND	ND	31	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		10/25/06	ND	ND	ND	ND	29	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		1/23/07	ND	ND	ND	ND	28	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.6	ND
		4/18/07	ND	ND	ND	28	27	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Flamingo Wash	FW_0	7/27/06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		10/25/06	ND	ND	ND	ND	15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		1/23/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		4/18/07	ND	ND	ND	13	15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sloan Channel	SC_1	7/27/06	ND	ND	ND	ND	36	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		10/25/06	ND	ND	ND	ND	51	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		1/23/07	ND	ND	ND	ND	46	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.5	ND
		4/18/07	ND	ND	ND	7.3	52	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Monson Channel	MC_2	7/27/06	ND	ND	ND	ND	12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		10/25/06	ND	ND	ND	ND	11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		1/23/07	ND	ND	ND	ND	9.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.7	ND
		4/18/07	ND	ND	ND	3	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Duck Creek	DC_1	7/27/06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		10/25/06	ND	ND	ND	ND	29	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		1/23/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	33	ND
		4/18/07	ND	ND	ND	9.5	26	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Burns Street Channel	BS_1	7/27/06	ND	ND	ND	ND	23	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		10/25/06	ND	ND	ND	ND	18	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		1/23/07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	21	ND
		4/18/07	ND	ND	ND	ND	14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Number of Detects			**0**	**0**	**0**	**5**	**22**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**0**

ND = Not Detected

NA = Not Analyzed

Table 4-6 (Continued)

Organic Compound Concentrations (µg/L) of Water Samples From Tributary Locations

Location	ID	Sample Date	Unknown	Surrogate: DECA (%)	Surrogate: TCmX (%)	Surrogate: Tributylphosphate (%)	Vanadium	2,3,7,8 –TCDD	Malation
Meadows Detention Basin	**LVC_2**	7/27/06	ND	ND	ND	ND	ND	ND	ND
		10/25/06	ND	ND	ND	ND	ND	ND	ND
		1/23/07	ND	111	119	ND	4.1	ND	ND
		4/18/07	ND	ND	ND	ND	4.4	ND	ND
Las Vegas Wash at Desert Rose Golf Course	**LW12.1**	7/27/06	ND	ND	ND	ND	7.4	ND	ND
		10/25/06	ND	ND	ND	ND	6.2	ND	ND
		1/23/07	ND	98.3	96.1	ND	9.2	ND	ND
		4/18/07	ND	ND	ND	ND	9.2	ND	ND
Flamingo Wash	**FW_0**	7/27/06	ND	ND	ND	ND	ND	ND	ND
		10/25/06	ND	ND	ND	ND	2.4	ND	ND
		1/23/07	ND	126	111	ND	4.3	ND	ND
		4/18/07	ND	ND	ND	ND	4.6	ND	ND
Sloan Channel	**SC_1**	7/27/06	ND	ND	ND	ND	8.8	ND	ND
		10/25/06	ND	ND	ND	ND	4.4	ND	ND
		1/23/07	ND	103	114	ND	10	ND	ND
		4/18/07	ND	ND	ND	ND	8.5	ND	ND
Monson Channel	**MC_2**	7/27/06	ND	ND	ND	ND	7	ND	ND
		10/25/06	ND	ND	ND	ND	4.7	ND	ND
		1/23/07	ND	103	119	ND	7.3	ND	ND
		4/18/07	ND	ND	ND	ND	8.5	ND	ND
Duck Creek	**DC_1**	7/27/06	ND	ND	ND	ND	14	ND	ND
		10/25/06	ND	ND	ND	ND	9.3	ND	ND
		1/23/07	ND	107	112	ND	13	ND	ND
		4/18/07	ND	ND	ND	ND	15	ND	ND
Burns Street Channel	**BS_1**	7/27/06	ND	ND	ND	ND	ND	ND	ND
		10/25/06	ND	ND	ND	ND	20	ND	ND
		1/23/07	ND	110	103	ND	25	ND	ND
		4/18/07	ND	ND	ND	ND	19	ND	ND
Total Number of Detects			**0**	**7**	**7**	**0**	**24**	**0**	**0**

ND = Not Detected
NA = Not Analyzed

4.3 2006-2007 WET WEATHER MONITORING PROGRAM

4.3.1 Introduction

One of the requirements for compliance with the MS4 permit is the performance of a Wet Weather Monitoring Program. This subsection discusses the work performed and the results obtained during the wet weather monitoring program in the July 2006 to June 2007 period of the MS4 permit. The monitoring program as implemented in 2006-2007 has the main elements described in the following section.

4.3.2 Wet Weather Characterization Monitoring Program

4.3.2.1 Monitoring Locations

Sampling was conducted at the following two locations:

- Las Vegas Wash at Desert Rose Golf Course
- Las Vegas Wash below Lake Las Vegas

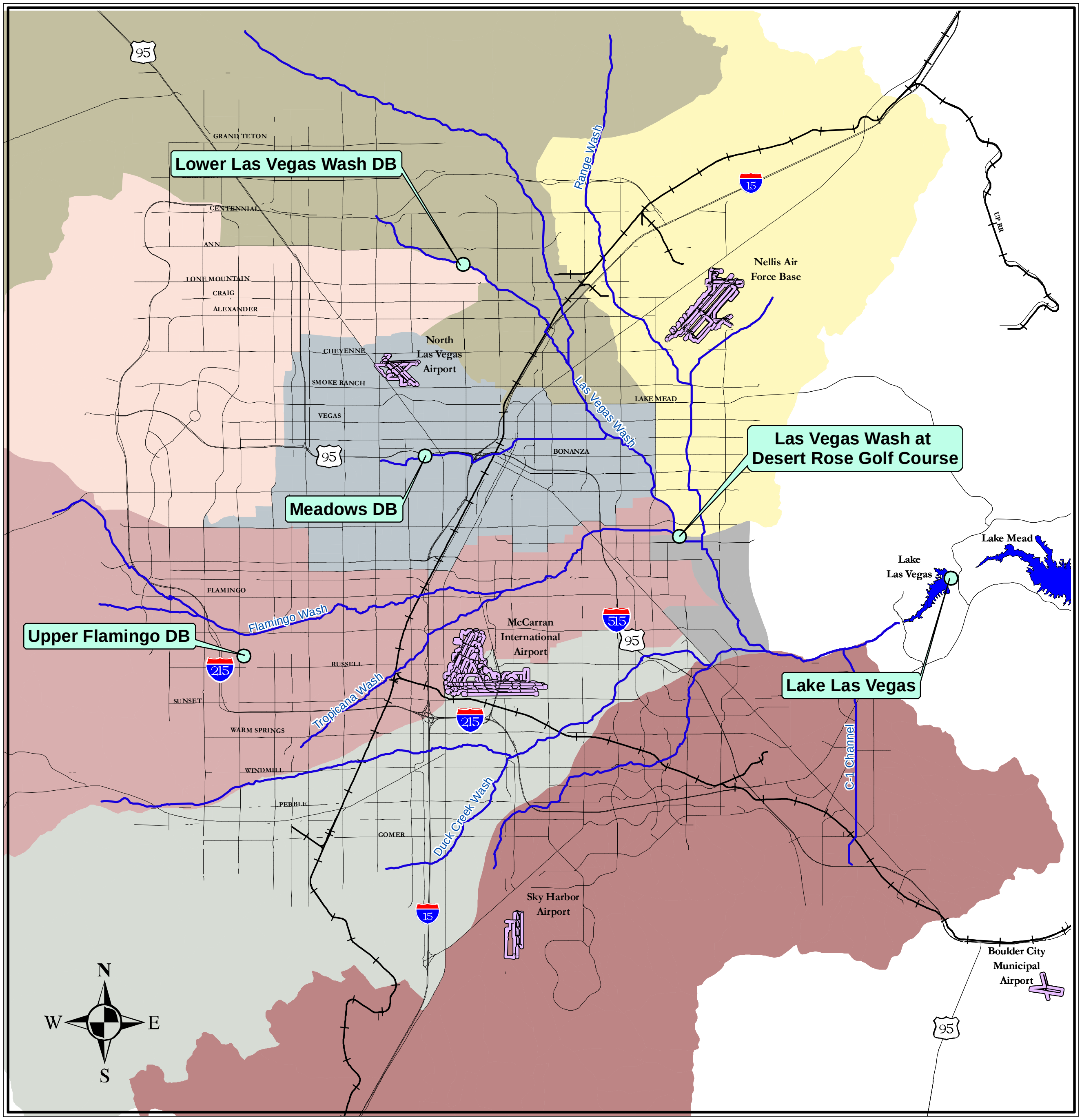
The wet weather monitoring is operated by MWH personnel at the Las Vegas Wash below Lake Las Vegas site, and the Las Vegas Wash site near Desert Rose Golf Course was operated by the United States Geological Survey (USGS). See **Figure 4-2**.

4.3.2.2 Sampling Analysis and Protocols

The wet weather sampling objective was to collect samples from all significant storm events, up to 10 per year from each of the sample sites. For the first three sample events, the full suite of constituents was analyzed. For subsequent storms (up to 10), the shorter list (NPDES constituents) were to be analyzed. Automated samplers were installed at both monitoring sites for sample collection.

4.3.2.3 Constituents Analyzed

The basic list of constituents analyzed for 2006-2007 is shown in **Table 4-7.** This list was also used during the 2004-2005 and 2005-2006 stormwater monitoring plan.



0 1 2 4 6 8 Miles

Legend

- Washes
- Wet Weather Sampling Point
- Railroads
- Streets
- Airports
- Range Wash Watershed
- Pittman / C-1 Watershed
- North Basin Watershed
- Lower Las Vegas Wash Watershed
- Gowan Watershed
- Flamingo / Tropicana Watershed
- Duck Creek Watershed
- Central Watershed

Figure 4-2

WET WEATHER MONITORING SITES

Table 4-7

Constituents Analyzed in Wet Weather Samples in 2006-2007

Constituent	Method	Constituent	Method
TDS	160.1	Nickel, total	200.8
TSS	160.2	Silver, total	200.8
Alkalinity	310.1	Thallium, total	200.8
Bicarbonate	310.1	Zinc, total	200.8
Carbonate	310.1	Mercury, total	245.1
Nitrate	300	Pesticides	614/619
Nitrite	300	Pesticides	508
Bromide	300	SVOC	625
Chloride	300	VOC	624
Sulfate	300	VOC	524.2
Bromate	300.1	Organics	551.1
Chlorate	300.1	Organics	6252
Chlorite	300.1	Organics	504.1
Calcium	200.7	Organics	525.1
Iron	200.7	Organics	531.1
Magnesium	200.7	Organics	515.1
Potassium	200.7	Diuron	532
Silica	200.7	Endothall	548.1
Sodium	200.7	Fluorine	4500
Selenium	200.9	Glyphosate	547
Arsenic	200.9	Hydroxide	2320
Anion/Cation	1040	Diquat	549.2
pH	150.1	Paraquat	549.2
Specific Conductance	S2510	Fecal Coliform	9221B
Hardness	2340B	Fecal Streptococcus	9230
Total Organic Carbon	5310C	Total Phosphorus	365.4
Surfactants	5540	TKN	351.2
Aluminum, total	200.8	Oil and Grease	413.1/1664A*
Antimony, total	200.8	Dissolved Copper	200.8
Barium, total	200.8	Dissolved Lead	200.8
Beryllium, total	200.8	Dissolved Zinc	200.8
Cadmium, total	200.8	Boron	200.7
Chromium, total	200.8	Herbicides	615
Copper, total	200.8	Carbon Dioxide	450-CO2-D
Lead, total	200.8	Total Coliform Bacteria	9221B
Manganese, total	200.8	Langelier Index	2330B

*April 16th samples were analyzed using the 1664A testing method.

4.3.3 Results

In 2006-2007, wet weather monitoring was possible during three storms: October 5, 2006, October 14, 2006, and April 16, 2007. Due to the variability in localized rainfall, not all sites were sampled for each storm. Each initial storm was tracked by the amount of rainfall occurring in the watershed tributary to each site. The CCRFCD website (www.ccrfcd.org) was used to view the rain maps of the Las Vegas Valley. Each map displayed the amount of rainfall located at various sites during different time increments. This data helped determine if the site met the stormwater sample criteria. Sampling crews were mobilized to track and gather samples during every potential storm event. Tracking of storms was completed by using weather sites (websites) and also the Clark County Regional Flood Control District website (rain maps). Not all samples were collected due to insufficient stream flow, damaged or vandalized automated samplers, or other factors.

The Lake Las Vegas site is set up for automated sampling; however samples at this location had to be collected as grab samples. Water levels fluctuate at this site due to variable discharges from the upstream wastewater treatment plants and there have been times when the sampler (while in operation) would pick-up water samples when a rain event has not occurred.

See **Table 4-8** for wet weather monitoring data. **Appendix F** contains the full 1992-2007 wet weather database of the MS4 NPDES program.

Total Suspended Solids (TSS), Total Dissolved Solids (TDS) and Surfactants

The median TSS concentration this year was 1,839 mg/L, which is slightly higher than the 2005-2006 median of 1,820 mg/L. The highest concentration in the 2006-2007 samples was recorded at Lake Las Vegas, which was 3,600 mg/L. This concentration was 50 percent greater than the highest detection of 2005-2006. However, it was three times lower than the highest recorded value in 2003, which was 11,000 mg/L.

The median TDS concentration was 1,250 mg/L in 2006-2007. TDS levels were more than two times higher than the 2005-2006 level of 490 mg/L and also higher than the 1992-2007 terms median of 580 mg/L. The only TDS concentrations recorded for 2006-2007 were at Las Vegas Wash at Desert Rose Golf Course during October and April.

The median concentration of surfactants was 0.09 mg/L in the 2006-2007 monitoring year. This is lower than the 2005-2006 median concentration was 0.12 mg/L. It is also lower than the 1992-2006 term median of 0.50 mg/L.

Nutrients

Total phosphate concentrations varied from 0.15 mg/L to 1.30 mg/L. The 2006-2007 median concentration of 0.75 mg/L was lower than the 2005-2006 median value of 1.60 mg/L and the overall 1992-2007 median of 0.96 mg/L.

The median nitrate concentration for 2006-2007 is 3.4 mg/L. This value is higher than the 2005-2006 median concentration of 1.5 mg/L and the overall 1992-2007 median of 1.76 mg/L.

Table 4-8

Wet Weather Monitoring Data 2006-2007

	Parameter	Units	Las Vegas Wash at Desert Rose Golf Course	Lake Las Vegas	Lake Las Vegas	2006-2007 Median
			LVW-100-FW	LKV-100-FW	LKV-200-FW	
			Wet Weather Composite 5-Oct-06	Wet Weather Grab 14-Oct-06	Wet Weather Grab 16-Apr-07	
NPDES Constituents	Oil and Grease - Gravimetric	mg/L	NA	ND	ND	ND
	Total Dissolved Solid (TDS)	mg/L	298	1,250	1,730	1,250
	Total Suspended Solids (TSS)	mg/L	NA	3,600	78	1,839
	Total phosphorus-P	mg/L	0.75	1.30	0.15	0.75
	Orthophosphate-P	mg/L	0.19	0.13	0.15	0.15
	Nitrite, Nitrogen by IC	mg/L	NA	0.62	ND	0.62
	Nitrate-N by IC	mg/L	1.1	3.4	14	3.4
	Metal Digestion Performed	Y/N	Y	Y	Y	Y
	Kjeldahl Nitrogen	mg/L	2.0	2.3	0.97	2.00
	Ammonia Nitrogen	mg/L	NA	NA	NA	NA
	Copper, Total, ICAP	mg/L	0.069	0.120	0.150	0.120
	Lead, Total, ICAP	mg/L	0.002	0.130	0.0016	0.002
	Zinc, Total, ICAP	mg/L	0.730	0.45	0.087	0.450
	Copper,Dissolved	mg/L	0.013	0.0069	0.011	0.011
	Lead, Dissolved	mg/L	ND	0.00053	ND	0.001
	Zinc,Dissolved	mg/L	0.020	ND	0.03	0.03
	Boron, Total, ICAP	mg/L	0.12	0.37	0.70	0
	Turbidity	NTU	NA	NA	NA	NA
	Fecal Coliform Bacteria	MPN/100mL	300,000	220,000	23	220,000
	Fecal Streptococci	MPN/100mL	50,000	50,000	110	50,000
	SOCs	# of Detects	0	0	1 (jj)	0
	Volatile Organic Compounds	# of Detects	14 (ss,qq,9,14,1,12,13,7, 8,a,15,10,rr,tt)	12 (s,qq,14,11,12,13,15,8, 15,10,5,tt)	5 (qq,16,14,15,tt)	12
	Pesticides	# of Detects	1 (5)	0	0	0
	Herbicides	# of Detects	1 (6)	1 (uu)	0	1
SNWA Expansion Constituents	2-Chloroethylvinylether	µg/L		ND	ND	
	Alkalinity in CaCO3	mg/L	87	65	132	87
	Aluminum, Total, ICAP	mg/L	7.9	59	0.14	7.90
	Anion Sum, Calculated	meq/L	NA	19	27	23
	Antimony, Total, ICAP	µg/L	2.0	ND	NA	2.0
	Arsenic, Total GF	mg/L	0.006	0.049	0.0093	0.0093
	Barium, Total, ICAP	mg/L	0.17	0.93	0.047	0.17
	Beryllium, Total, ICAP	µg/L	ND	0.0033	ND	0.0033
	Bicarbonate Alkalinity as HCO3	mg/L	NA	79	160	120
	Bromide	mg/L	0.055	0.090	0.285	0.090
	Bromate by IC	µg/L	ND	ND	ND	ND
	CO2, Free, Calculated	mg/L		6.5	ND	
	Carbonate, Calculated	mg/L	NA	ND	2.1	2
	Cadmium, Total, ICAP	µg/L	ND	0.0012	ND	ND
	Calcium, Total, ICAP	mg/L	170	510	150	170
	Cation Sum, Calculated	meq/L	13	35	27	27
	Chlorate, IC	mg/L	0.116	0.052	0.385	0.116
	Chloride	mg/L	21	97	350	97
	Chlorite, IC	mg/L	ND	ND	ND	ND
	Chromium, Total, ICAP	µg/L	15	70	2.5	15
	Diuron	µg/L	NA	NA	NA	NA
	Diquat	µg/L	NA	NA	NA	NA
	Paraquat	µg/L	NA	NA	NA	NA
	Endothall	µg/L	NA	ND	ND	ND
	Fluoride	mg/L	NA	0.42	1.0	1
	Glyphosate	µg/L	6.6	ND	ND	7
	Hardness as CaCO3	mg/L	610	1,600	690	690
	Hydroxide as OH, Calc	mg/L	NA	ND	ND	ND
	Iron, Total, ICAP	mg/L	9.1	16	0.31	9
	Langelier Index – 25 degree	None	NA	0.5	1.2	1
	Magnesium, Total, ICAP	mg/L	44	71	76	71
	Manganese, Total, ICAP	mg/L	0.220	2.6	0.056	0.220
	Mercury	µg/L	ND	ND	ND	ND
	Nickel, Total, ICAP	mg/L	0.017	0.094	0.0093	0.017
	pH, Lab	Units	NA	NA	8.3	8.3
	Potassium, Total, ICAP	mg/L	7.6	22	28	22
	Reactive Silica	mg/L	12	130	20	20
	Selenium	mg/L	NA	ND	ND	ND
	Silver, Total, ICAP	µg/L	NA	1.0	ND	1.0
	Sodium, Total, ICAP	mg/L	23	82	290	82
	Specific Conductance	umho/cm	446	1,720	2,460	1,720
	Sulfate	mg/L	110	700	650	650
	Surfactants	mg/L	0.085	ND	ND	ND
	Thallium, Total, ICAP	µg/L	ND	ND	ND	ND
	Total Coliform Bacteria	MPN/100mL	NA	NA	NA	NA
	Total Organic Carbon	mg/L	21	14	5.6	14

(1) Total Nitrogen = TKN + NO3. If TKN or NO3 are below the detection limit, the concentration was assumed to be equal to the detection limit.
(2) N/A = Not Available
(2) ND = Non-detect

(a) VOC detected is Acetone
(b) VOC detected is p-Isopropyltoluene
(c) SOC detected is 2 (3H) - Furanone, 5-ethyldihydro
(d) SOC detected is 2 (3H) - Furanone, dihydro-5-methyl
(e) SOC detected is 2,5 - Hecanedione
(f) SOC detected is 2 - Cyclohexen-1-one, 3 - methyl
(g) SOC detected is Ethanol, 2 - [2 - (butoxyethoxy) eh
(h) SOC detected is Hexadecanoic acid
(i) SOC detected is Petanoic acid, 4-oxo
(j) SOC detected is Unknown Carbolic Acid
(k) VOC detected is 2 - Butanone
(l) SOC detected is fluoranthene
(m) SOC detected is 1,3,6,9,12 - Tetraoxahecadecan-1-ol
(n) SOC detected is Ethanol, 2 - butoxy
(o) SOC detected is Hexadecanoic acid
(p) SOC detected is Octadecanoic acid
(q) SOC detected is Oleic Acid
(r) SOC detected is Tetratetracontane
(s) SOC detected is Unknown phthalate
(t) Pesticide detected is heptachlor Epoxide
(u) Pesticide detected is Lindane (gamma-BHC)
(v) Pesticide detected is Methoxychlor
(w) Pesticide detected is Toxaphene
(x) Herbicide detected is Tot DCPA Mono&Diacid Degradate
(y) Herbicide detected is Pentachlorophenol
(z) SOC detected is 3,6,9,12-Tetraoxahecadecan-1-ol
(aa) SOC detected is Alpha.-Pinene
(bb) SOC detected is Caryophyllene
(cc) SOC detected is Ethanol, 2-(2-ethoxyethoxy)
(dd) SOC detected is Ethanol, 2-[2-(2-methoxyethoxy
(ee) SOC detected is Ethanol, 2 - [2 - (butoxyethoxy) eh
(ff) SOC detected is Formamide, N,N-dimethyl
(gg) SOC detected is Hexatriacontane
(hh) Herbicide detected is 2,4-D
(ii) SOC detected is Di(2-Ethylhexyl)phthalate
(jj) SOC detected is Caffeine
(kk) SOC detected is Diethylphthalate
(ll) SOC detected is Tetradecanoic acid
(mm) SOC detected is 2-(2-(20butozyethyoxy)ethoxyethyl
(nn) SOC detected is 3,6,9,12-Tetraoxahexadecan-1-ol
(oo) SOC detected is 3-methyl-2-cyclohexen-1-one
(pp) SOC detected is butylbenzylphthalate
(qq) VOC detected is chloroform
(rr) VOC detected is chlorodibromomethane
(ss) VOC detected is bromodichloromethane
(tt) VOC detected is total THM
(uu) Herbicide detected is 2,4-DB
(vv) SOC detected is pyrene
(xx) Herbicide detected is Dicamba
(yy) VOC detected is p-Dichloropropane
(zz) SOC detected is phenanthrene
(1) SOC detected is Di-(2-Ethylhexyl) adipate
(2) SOC detected is Di-n-Butylphthalate
(3) SOC detected is fluoranthene
(4) Pesticide detected is dieldrin
(5) Pesticide detected is glyoxal
(6) Herbicide detected is alachlor (alanex)
(7) VOC detected is m-glyoxal (pyruvic aldehyde)
(8) VOC detected is propanal
(9) VOC detected is dibromochloromethane
(10) VOC detected is dichlorobromomethane
(11) VOC detected is acetaldehyde
(12) VOC detected is butanal
(13) VOC detected is formaldehyde
(14) VOC detected is Total Trihalomethanes
(15) VOC detected is chloroform (trichloromethane)
(16) VOC detected is dichloroacetonitrile

Orthophosphate concentrations varied from 0.13 mg/L to 0.19 mg/L. The 2006-2007 median concentration of 0.15 mg/L was two times lower than the 2005-2006 median value of 0.31 mg/L and lower than the overall 1992-2007 median concentration of 0.19 mg/L.

Metals

Total lead concentration for 2006-2007 varied from 0.0016 mg/L to 0.130 mg/L. The 2006-2007 median concentration was 0.016 mg/L. This value is lower than the previous year's median of 0.046 mg/L and less than the 1992-2007 median of 0.076 mg/L.

Total copper concentrations in 2006-2007 ranged 0.12 mg/L to 0.69 mg/L. The median of 0.150 mg/L is higher than the 2005-2006 median of 0.083 mg/L and the 1992-2007 median of 0.044 mg/L.

Total zinc concentrations ranged from 0.087 mg/L to 0.73 mg/L, with the highest detection at Las Vegas Wash at Desert Rose. The median concentration of zinc was 0.45 mg/L, which was lower than the 2005-2006 median of 2.41 mg/L, but higher than the 1991-2007 median of 0.23 mg/L.

Dissolved copper concentrations ranged from non-detect levels to 0.03 mg/L. The 2006-2007 median of 0.025 mg/L is 40 percent higher than the 2005-2006 median of 0.018 mg/L and the 1992-2007 median of 0.010 mg/L.

Dissolved lead concentrations for 2006-2007 varied from non-detect levels to 0.00053 mg/L. The only detection was found in the sample of Lake Las Vegas from the October storm. The median of 0.001 mg/L is lower than the 2005-2006 median of 0.078 mg/L and the 1992-2007 median of 0.100 mg/L.

Bacteria

The median value for fecal coliform bacteria in 2006-2007 was 260,000 MPN/100mL. The highest value was detected at Las Vegas Wash at Desert Rose Golf Course during the October storm, and the concentration was recorded at 300,000 MPN/100mL. The concentration in the sample at Lake Las Vegas from the October storm was approximately 5 times lower than the highest detection in 2005-2006 (1,600,000 MPN/100mL).

Fecal streptococci median concentration was 50,000 MPN/100mL, which is lower than the 2005-2006 median concentration of 310,000 MPN/100mL.

SOCs, VOCs, Pesticides and Herbicides

There were a total of 16 different VOCs detected this year. Las Vegas Wash at Desert Rose Golf Course had a total of 14 different detections and Las Vegas Wash below Lake Las Vegas had a combined total, from both storms, of 13 different detections of VOC. Caffeine (an SOC) was detected at the Lake Las Vegas site. One pesticide was detected at Las Vegas Wash at Desert Rose Golf Course and it was glyoxal. There were two different types of herbicides detected at both sites, alachlor (alanex) and 2,4-DB.

4.3.3.1 Potential Sources of Bacteria in Wet Weather Flows

High bacteria levels have been recorded in wet weather flows at times over the 1992-2007 sampling period. In previous years, potential sources of bacteria in wet weather runoff were investigated. See the *2003-2004 Annual Report* on analysis of bacteria sources in the Las Vegas Valley. In 2001, the University of Nevada, Las Vegas (UNLV) prepared a study that reported tributary bacteria counts. Findings reported a moderate potential human influence and a stronger non-human influence. Possible human waste contributions are related to the large number of homeless people. No new research was performed for the 2006-2007 monitoring period.

4.3.3.2 Comparison of Wet Weather and Dry Weather Concentrations

Wet weather monitoring results from the 1992-2007 storms were compared to dry weather sampling data from 1991-2007 at the same locations. **Table 4-9** compares the typical dry weather concentrations, the typical wet weather concentrations, and the relative magnitude of wet weather versus dry weather concentrations. The following observations were drawn.

1. Bacteria counts are 85 times greater in wet weather flows.

2. TSS concentrations are about 73 times higher (same as 2005-2006) and turbidity is about 124 times higher than dry weather flows. This is due to sediment loads present in storm flows.

3. Hydrocarbons are at the same concentrations for wet and dry weather concentrations. Surfactants are an order of magnitude higher in wet weather flows.

4. Total nitrogen is a little over one and a half times higher in wet weather flows and total phosphorus is almost 24 times higher in wet weather flows.

5. Mercury, cadmium, and silver were below the detection limits in most samples of wet and dry weather flows. Nickel concentrations were a little over two and a half times higher than dry weather flows.

6. BOD and COD are about an order of magnitude higher in wet weather flows.

7. Wet weather flow pH remains within an acceptable range of 7.6 to 8.3. It is slightly higher in dry weather flows, compared to a typical wet weather concentration of 7.6.

Table 4-9

Comparison of Wet Weather and Dry Weather Pollutant Concentrations in Las Vegas Valley (1991-2007)

Constituent	Typical Dry Weather Concentration	Typical Wet Weather Concentration	Wet/Dry
Biochemical Oxygen Demand (mg/L)	<6	35	>6
Chemical Oxygen Demand (mg/L)	16	230	14
Total Suspended Solids (mg/L)	13	950	73
Total Dissolved Solids (mg/L)	3,100	580	0.19
Oil and Grease (mg/L)	<3.0	<3.0	1.0
Total Petroleum Hydrocarbons (mg/L)	<1.0	<1.0	1.0
Total Kjeldahl Nitrogen (mg/L)	0.90	4.9	5.4
Nitrate-N (mg/L)	4.10	1.76	0.4
Ammonia-N (mg/L)	<0.08	0.60	>7.5
Total Nitrogen (mg/L)	4.3	7.2	1.7
Orthophosphate - P (mg/L)	<0.020	0.19	>9.5
Total Phosphorus (mg/L)	0.04	0.96	24.0
Cadmium (mg/L)	<0.005	<0.005	1.0
Chromium (mg/L)	<0.002	0.018	>9.0
Copper (mg/L)	<0.01	0.044	>4.4
Lead (mg/L)	<0.001	0.076	>76
Nickel (mg/L)	0.010	0.026	2.6
Mercury (mg/L)	<0.0002	<0.0002	1.0
Silver (mg/L)	<0.010	<0.010	1.0
Zinc (mg/L)	<0.02	0.23	>11.5
Arsenic (mg/L)	<0.009	0.014	>1.56
Boron (mg/L)	0.96	0.24	0.25
Cyanide (mg/L)	<0.005	<0.005	>1.0
Turbidity (NTU)	1.90	235	124
pH	8.3	7.6	0.9
Surfactants (mg/L)	<0.06	0.50	>8.3
Phenol (mg/L)	<0.01	0	>0
Total Chlorine (mg/L)	<0.10	<0.10	1.0
Color (ACU)	15	100	6.7
Selenium (mg/L)	0.010	<0.010	>1.0
Fecal Coliform (MPN/100mL)	650	24,000	37
Salmonella (MPN/100mL)	<2.2	<2.0	0.9

4.3.4 Summary

Results and findings of the 2006-2007 wet-weather monitoring program for the NPDES stormwater discharge permit for Las Vegas Valley are summarized below.

1. Water quality samples were collected at two locations on Las Vegas Wash and analyzed for three storms. Grab samples were obtained during the storms.

2. The 2006-2007 data are consistent with the water quality data collected from 1992-2007 in the Las Vegas Valley.

3. Wet weather flows in the Las Vegas Wash contribute higher pollutant concentrations in the Las Vegas Wash than dry weather flows for most constituents.

4. Only two herbicides and one SOC were detected at one site. One pesticide was detected at one site in the 2006-2007 permit year. A combined total of 16 different types of VOCs were detected at both sites this year.

4.4 DETENTION BASIN MONITORING PROGRAM

In the 2004-2005 permit year, a detention basin monitoring program was proposed to evaluate the water quality benefits of existing detention basin and flood control channels in the Las Vegas Valley. Detention basins are important structural controls for sediments that are delivered to the Las Vegas Wash, and are a key component of the Las Vegas Valley post-construction controls program. Data was not available to show the effectiveness of detention basins in controlling pollutants and sediment discharge. Therefore, a program was implemented to sample detention basin inflow and outflow and determine the change in constituent concentrations attributable to the basins. **Appendix F** contains a technical memorandum describing the detention basin monitoring program first implemented in 2005-2006. The following is a summary of that program.

4.4.1 Monitoring Locations

Three basins were chosen for monitoring based upon criteria outlined in the *2003-2004 Annual Report*. These are shown in **Figure 4-2**, and are listed below:

- Meadows Detention Basin
- Lower Las Vegas Wash Detention Basin
- Upper Flamingo Detention Basin

In addition, qualitative observations of sediment deposition were made at Gowan North Detention Basin and Lower Duck Creek Detention Basin as part of the post-storm inspections conducted for the construction site program (see **Section 9**). The detention basin monitoring program is operated and conducted by MWH personnel.

4.4.2 Sampling Analysis and Protocols

The detention basin monitoring program objective was to collect inflow and outflow samples from three storms per basin per year. Automated samplers were installed at three monitoring sites for sample collection, and where automated samplers were not equipped, grab samples were collected.

4.4.3 Constituents Analyzed

The constituents analyzed for 2006-2007 were: TDS, TSS, total phosphorus, orthophosphate, nitrate, total copper, total lead, total zinc, dissolved copper, dissolved lead, dissolved zinc, turbidity, fecal coliform bacteria, and fecal streptococci. These constituents were selected to provide an indication of the effectiveness of existing detention basins in removing constituents of concern to downstream receiving waters.

4.4.4 Results

In 2006-2007, detention basin monitoring was possible during four storms: July 18, 2006, October 5, 2006, October 14, 2006, and April 16, 2007. Due to the variability in localized rainfall, not all sites were sampled for each storm. **Table 4-10** shows which sites were sampled for each storm and states if it was a flow-weighted composite or grab sample.

Table 4-10

2006-2007 Detention Basin Monitoring Events

Location	July 18, 2006	October 5, 2006	October 14, 2006	April 16, 2007
Meadows Detention Basin			Grab Sample	
Upper Flamingo Detention Basin	Composite		Grab Sample	Grab Sample
Lower Las Vegas Wash Detention Basin		Grab Sample	Grab Sample	Grab Sample

For each monitored basin, a table was created to present the constituent concentrations. The constituents were divided and analyzed based upon inflow and outflow concentrations. See **Table 4-11** for constituent concentrations for the July 18, 2006, October 5, 2006, October 14, 2006 and April 16, 2007 detention basin monitoring events. **Figure 4-3** through **Figure 4-6** display graphical results for four constituents (TDS, total lead, total phosphorus, and total zinc) that were detected during detention basin monitoring events.

Table 4-11

Detention Basin Monitoring Data for 2006-2007

Dention Basin Monitoring Lab Results		Upper Flamingo Detention Basin 07/18/06		Lower Las Vegas Wash Detention Basin		Lower Las Vegas Wash Detention Basin		Meadows Detention Basin		Upper Flamingo Detention Basin [1]		Upper Flamingo Detention Basin [1]		Lower Las Vegas Wash Detention Basin	
		Inflow FI-100-FW	Outflow FO-100-FW	Inflow LI-100-FW	Outflow LO-100-FW	Inflow LI-200-FW	Outflow LO-200-FW	Inflow MD-100-IN	Outflow MD-100-OUT	Inflow FI-200-FW	Outflow FO-200-FW	Inflow FI-300-FW	Outflow FO-300-FW	Inflow LI-300-FW	Outflow LO-300-FW
		Composite	Composite	Grab Sample	Grab Sample	Grab Sample	Grab Sample	Grab Sample	Grab Sample	Grab Sample	Grab Sample	Grab Sample	Grab Sample	Grab Sample	Grab Sample
Parameter	Units	18-Jul-06	18-Jul-06	5-Oct-06	5-Oct-06	14-Oct-06	14-Oct-06	14-Oct-06	14-Oct-06	14-Oct-06	14-Oct-06	16-Apr-07	16-Apr-07	16-Apr-07	16-Apr-07
Total Dissolved Solid (TDS)	mg/L	770	354	436	268	144	246	72	474	174	122	342	468	256	260
Total Suspended Solids (TSS)	mg/L	5,830	27	191	219	1,990	2,500	194	44	886	960	210	160	105	165
Total phosphorus-P	mg/L	1.7	0.19	0.30	0.34	1.20	1.20	0.59	0.28	1.00	0.75	0.89	0.88	0.40	0.45
Orthophosphate-P	mg/L	0.22	0.02	0.36	0.450	0.040	0.030	0.22	0.11	0.26	0.11	0.58	0.41	0.29	0.47
Nitrate-N by IC	mg/L	2.7	1.2	16	1.40	0.90	1.80	0.60	0.50	0.80	0.50	2.20	3.00	1.80	1.80
Metals digestion performed	Y/N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Copper, Total, ICAP	mg/L	0.036	0.0088	0.029	0.036	0.038	0.041	0.062	0.017	0.023	0.043	0.070	0.089	0.035	0.036
Lead, Total, ICAP	mg/L	0.022	<0.0005	0.0036	0.0046	0.019	0.031	0.032	0.0036	0.013	0.013	0.0056	0.0064	0.0034	0.0035
Zinc, Total, ICAP	mg/L	0.180	0.017	0.094	0.130	0.160	0.180	0.280	0.058	0.095	0.110	0.210	0.270	0.076	0.076
Copper, Total, ICAP, Dissolved	mg/L	0.0028	0.0088	0.0026	0.013	0.0033	0.0034	0.0073	0.005	0.0036	0.0038	0.017	0.022	0.024	0.019
Lead, Total, ICAP, Dissolved	mg/L	<0.00005	<0.00005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc, Total, ICAP, Dissolved	mg/L	<0.005	0.011	0.011	0.009	<0.005	<0.005	0.011	0.026	<0.005	<0.005	0.063	0.096	0.026	0.023
Turbidity	NTU	2,090	26	174	173	2,140	2,030	115	42	728	778	78	127	156	143
Fecal Coliform Bacteria	MPN/100mL	2,400	160,000	24,000	3,000	16,000	22,000	30,000	50,000	17,000	50,000	1,600	300	50	1,600
Fecal Streptococci	MPN/100mL	500	90,000	24,000	24,000	110,000	22,000	30,000	170,000	30,000	5,000	30,000	17,000	24,000	2,400

Notes:
1. Construction occuring in the basin.

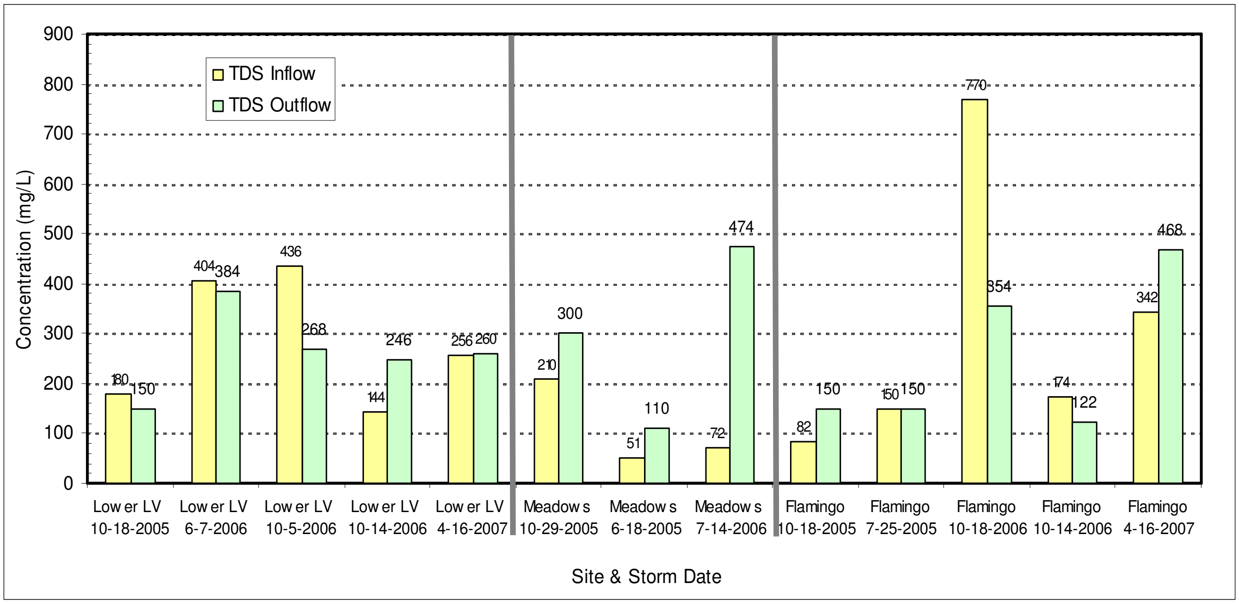


Figure 4-3
Detention Basin Monitoring Results for Total Dissolved Solids (TDS)

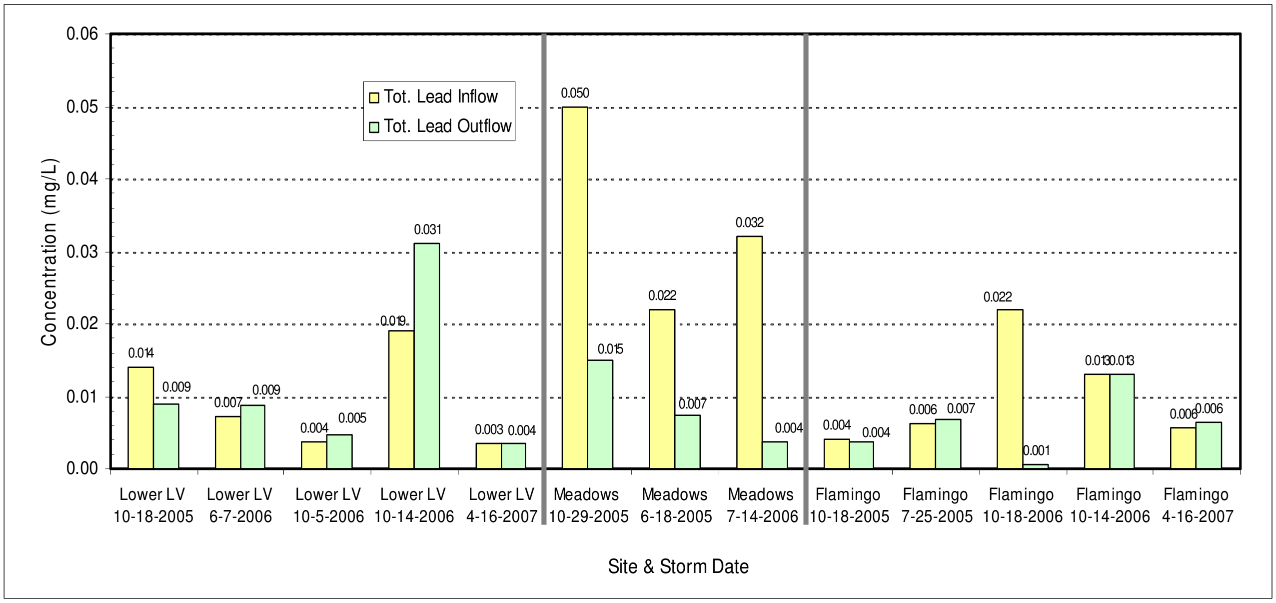


Figure 4-4
Detention Basin Monitoring Results for Total Lead

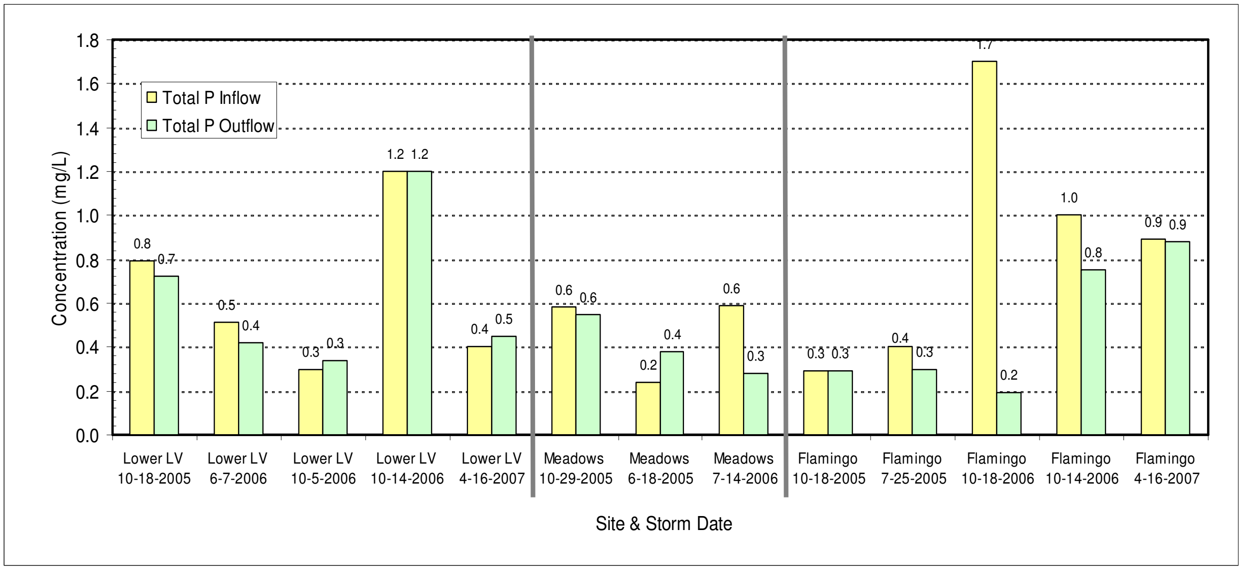


Figure 4-5
Detention Basin Monitoring Results for Total Phosphorus

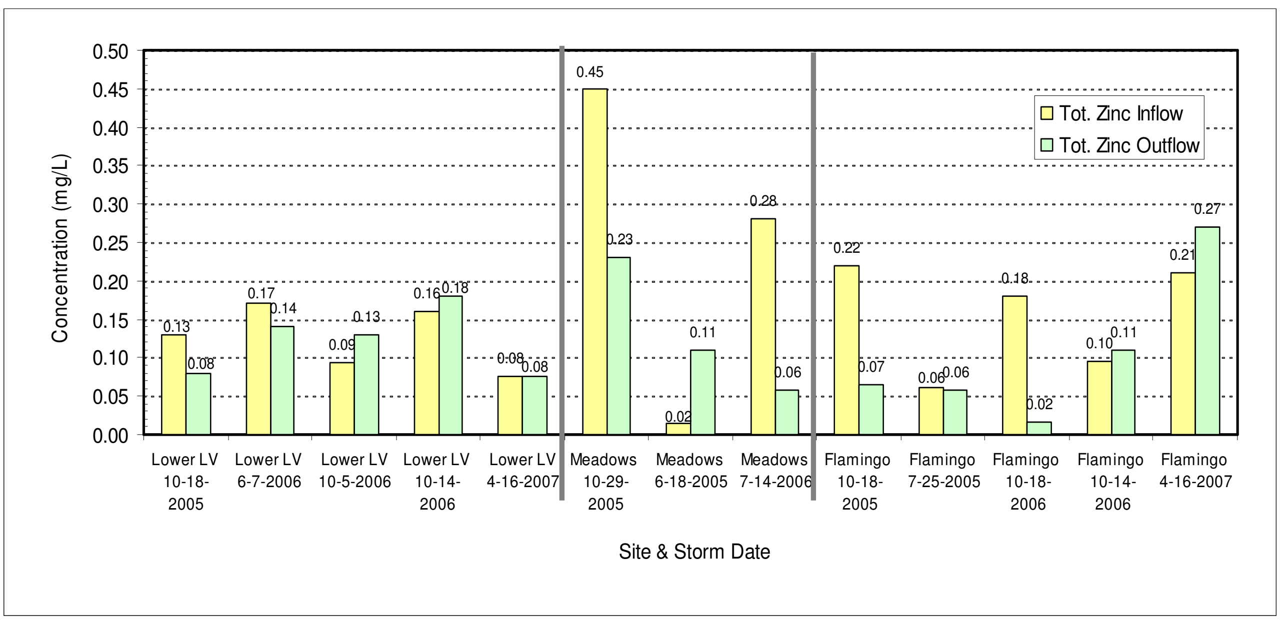


Figure 4-6
Detention Basin Monitoring Results for Total Zinc

The results of the Detention Basin Monitoring Program from 2005-2007 are described and analyzed in the results section of the Summary of Detention Basin Monitoring for Pollutant Removal Effectiveness – July 2005 through May 2007 Technical Memorandum in **Appendix F**.

4.4.5 Conclusion

The following conclusions can be drawn from the detention basin monitoring results.

- Overall, the three existing detention basins sampled to date are somewhat effective at reducing concentrations of the constituents analyzed.

- As expected, data demonstrates that detention basins are more effective at removing particulate constituents than dissolved constituents. Concentrations of primarily particulate constituents were reduced in 54 percent of the sample events, whereas concentrations of primarily dissolved constituents were reduced in only 41 percent of the sample events.

- Of the classes of constituents analyzed, the regional detention basin is most effective at reducing concentrations of metals; even dissolved metals were reduced in a significant number of events.

- Detention basins did not consistently reduce nutrient or bacteria concentrations.

- Surprisingly, sediment-related constituents (TSS and turbidity) were only reduced in 54 percent of the sample sets. This may be related in part to gravel mining in Upper Flamingo Detention Basin. Based on inspection and maintenance reports, detention basins are effective in removing sediment from inflows. However, the sampling data suggest that suspended (fine) sediment and associated particulates are not removed as effectively, possibly due to resuspension of previously deposited material.

- Meadows Detention Basin and Upper Flamingo Detention Basin reduced constituent concentrations in approximately half of the sample sets. However, Meadows Detention Basin had a higher percentage of increasing the constituent concentrations (43 percent) than did Upper Flamingo Detention Basin (37 percent). Storms occurring one week apart were sampled at Upper Flamingo Detention Basin. The basin showed significantly better performance in reducing constituent concentrations during the second storm; 12 constituents showed reduced concentrations or no change in the second storm, compared to 6 constituents showing reduced concentrations or no change in the first storm. This difference in performance may be evidence of the first flush effect during the first storm, or it may be due to differing effects of gravel mining occurring in the basin area.

4.5 2007-2008 STORMWATER MONITORING PLAN

Wet weather characterization monitoring will continue at the two existing Las Vegas Wash monitoring sites: Las Vegas Wash at Desert Rose Golf Course and Lake Las Vegas. Sampling and analysis objectives will be the same as those adopted for 2006-2007.

Dry weather characterization monitoring conducted for the NPDES program will be continued at the Desert Rose site. Data collected by SNWA for its Urban Tributaries Program and by the COH on the Lower Las Vegas Wash will be evaluated to continue to characterize dry weather flows in the Las Vegas Wash and the major tributaries.

Detention basin characterization monitoring will continue for at least one more year at the three currently sampled detention basins to increase the dataset for detention basin pollutant removal effectiveness. Other detention basins may be substituted based on recommendations of the Detention Basin Working Group.

SECTION 5

Public Outreach and Education Program

Section 5
Public Outreach and Education Program

5.1 INTRODUCTION

Part of the MS4 permit requirements (paragraph 4.5) for the Co-Permittees included developing a Public Outreach and Education Program as described in the SWMP Section 5.2. The objectives of the Public Outreach and Education Program are to:

- Inform the general public in the Las Vegas Valley about important water quality issues related to stormwater runoff.

- Influence behavior of the general public to reduce activities that have a negative impact on stormwater runoff quality and increase activities that have a positive impact on stormwater runoff quality.

The following sections describe the public outreach and education activities performed during the 2006-2007 permit year.

5.2 COMMUNITY EVENTS

During the 2006-2007 permit year, Co-Permittees attended several community events to educate the general public about water quality issues by handing out informational material and answering questions. These events are listed below.

- August 2006 – CNLV attended National Night Out, which was attended by about 1,600 people.

- March 2007 – CCRFCD staff attended an Emergency Management Expo and discussed stormwater quality issues.

- April 12-15, 2007 – CDSN attended the Clark County Fair and distributed stormwater educational material.

- April 21, 2007 – CCDAQEM, CCRFCD, CDSN and CLV distributed stormwater program information at the Summerlin Earthfaire in Summerlin Centre Community Park.

- April 22, 2007 – COH attended the Whole Foods Earth Day event where Curt Chandler made a presentation on various topics including stormwater quality and outreach materials were distributed.

- May 05, 2007 – CDSN attended the Red Rock Spring Fling and distributed stormwater educational material.

- May 19, 2007 – CLV participated in the Helldorado Parade by handing out various kinds of education material.

5.3 MEDIA MATERIALS

The *Storm Drain Cowboy* public service announcement (PSA) was produced by the CCRFCD to encourage Valley residents to look for clogged drop inlets and report them to the CCRFCD. During the months of November and December, this PSA was aired during news programs on local television stations (Channel 3 and Channel 13) generating about one call per day to report problems with drain inlets, such as clogged storm drains, or illegal dumping.

The CCRFCD produced an anti-litter public PSA, based on a similar campaign in California developed by Caltrans. During the months of April and May, this PSA titled *"Don't Trash Las Vegas"* was aired in rotation with the *Floods Happen* PSA on local television stations (Channel 3, Channel 8, and Channel 13). During its running time, CCRFCD received three to five calls per week reporting problems.

A new Flood Channel program titled *Protecting the Environment* was produced by CCRFCD and included an updated segment devoted to stormwater issues. The episode aired for six weeks on Channel 2 and Channel 4.

The CCRFCD won three awards at The Videographer Awards competition in 2007 for its educational DVD, *Desert Floods*, which included an expanded section on the environment, and an episode of the Flood Channel titled *Protecting the Environment*.

An annual survey is sent to Clark County residents to evaluate the effectiveness of the "Public Information Program." The survey has been conducted around the beginning of October every year since 1999. In the 2006 survey, 790 randomly selected residents took this survey. Ten percent of the surveys were in Spanish. The survey uses five demographic variables to create sub-sets for data analysis. These variables are:

1. Residence area of respondent within Clark County
2. Length of time in Clark County
3. Age
4. Level of education
5. Gender

Selected findings from the survey include:

- 790 residents were contacted,

- 235 respondents knew that stormwater runoff enters receiving waters with no treatment. This is a higher percentage than last year.

- 131 respondents who knew that stormwater runoff is not treated also stated that they have changed their behavior based on this knowledge. This is also a higher percentage than last year. Most behavior changes consisted of activities related to household hazardous waste disposal, waste oil disposal, car washing, and fertilizer usage.

- It was concluded that past PSAs have been effective, and residents are changing behaviors.
- There is a general preference for receiving information via the internet as compared to other media methods.

For further details, a copy of the survey results has been included in **Appendix G**.

5.4 PRINTED MATERIAL

A section was added to the CCRFCD Annual Report and flyer on stormwater pollution, including phone numbers to call to report potential violations of local ordinances.

Construction program brochures were printed and distributed at the contractor training workshops described in **Section 9.5**.

A one-page flyer to hand out during construction site inspections and contractor training was prepared in the 2004-2005 permit year to summarize the construction permit requirements and show pictures of acceptable and unacceptable construction site best management practices (BMPs). Text was in both English and Spanish. Flyers were distributed to contractors during inspections and at training work shops.

A magnetic refrigerator calendar with a flood safety and trash graphic was produced by the CCRFCD.

5.5 WEBSITE

The Las Vegas Valley Water District (LVVWD) and the SQMC host a helpful website, **www.lvstormwater.com**, which provides information about the storm drain system, monitoring programs, public outreach, community programs, monitoring programs, and Federal and State regulations. Several guidelines for the construction industry, home owners, and business and industry are also found on the website (as a link) to educate the public about reducing the quantity and improving the quality of stormwater runoff. Tracking measures are being added to the website to provide the SQMC with information on how the site is being used and which sections are accessed most frequently.

Co-Permittees maintain and periodically update their websites to provide the public with information on topics such as water quality, BMPs, and related links to other information sources.

5.6 SCHOOL PROGRAM

In 2006-2007, CCRFCD conducted a program about the importance of flood safety and stormwater quality at elementary schools. The video titled *Desert Floods* was updated and used in the elementary schools around Clark County. The updated portion included a segment on stormwater quality.

CCRFCD also distributed educational materials on flood safety and water quality to 324 teachers and 6,461 students. See **Table 5-1** for a list of the 2006-2007 Student Flood Safety Awareness Presentations. A teacher survey was added to the program to assess the effectiveness of presentations made to their students. A copy of the survey is provided in **Appendix G**.

Table 5-1

Elementary Schools
2006-2007 Student Flood Safety Awareness Presentations

Elementary School	Grade Level	Students	Teachers	Date
John Beatty Elementary School	2^{nd} & 4^{th}	60	2	07/06/06
Richard Priest Elementary School	2^{nd}	75	5	10/23/06
E. W. Griffith Elementary School	2^{nd} - 5^{th}	200	8	10/25/06
Eva G. Simmons Elementary School	3^{rd}	200	10	11/01/06
James Gibson Elementary School	2^{nd}	120	6	11/02/06
Richard C. Priest Elementary School	1^{st} - 3^{rd}	75	5	11/06/06
Lincoln Elementary School	2^{nd}	115	5	12/13/06
Aldeane Comito RiesElementary School	2^{nd}	140	7	01/10/07
Warren Walker Elementary School	2^{nd}	60	3	01/11/07
J. M. Ullom Elementary School	2^{nd}	120	7	01/16/07
Fredric W. Watson Elementary School	2^{nd}	100	5	01/17/07
Don E. Hayden Elementary School	2^{nd}	140	7	01/18/07
J. T. McWilliams Elementary School	2^{nd}	130	7	01/23/07
Ulis Newton Elementary School	3^{rd}	144	7	01/24/07
Roger Gehring Elementary School	2^{nd}	140	8	01/26/07
Sandy Searles Miller Elementary School	2^{nd}	120	7	01/29/07
O. K. Adcock Elementary School	2^{nd}	110	6	01/30/07
Theron H. Goynes Elementary School	3^{rd}	160	8	02/02/07
Joseph E. Thiriot Elementary School	2^{nd}	85	5	02/05/07
Joseph L. Bowler Elementary School	2^{nd}	110	5	02/06/07
Ulis Newton Elementary School	2^{nd}	115	7	02/07/07
Kit Carson Elementary School	2^{nd}	45	3	02/12/07
Joseph Neal Elementary School	3^{rd}	140	7	02/13/07
Don E. Hayden Elementary School	2^{nd}	140	7	02/15/07
Neil C. Twitchell Elementary School	3^{rd}	120	6	02/21/07
Whitney Elementary School	3^{rd}	110	5	02/22/07
Richard Bryan Elementary School	3^{rd}	110	5	02/23/07
Green Valley Christian School	3^{rd}	45	2	02/27/07
Mountain View Elementary School	3^{rd}	110	6	02/28/07
Nate Mack Elementary School	3^{rd}	90	5	03/02/07
Betsy Rhodes Elementary School	2^{nd}	80	4	03/06/07
D'Vorre & Hall Ober Elementary School	2^{nd}	100	5	03/08/07
R. E. Tobler Elementary School	3^{rd}	100	5	03/09/07
Ruby Thomas Elementary School	3^{rd}	110	6	03/13/07
Elizabeth Wilhelm Elementary School	2^{nd}	120	6	03/15/07
Roberta Cartwright Elementary School	3^{rd}	126	6	03/16/07
Betsy Rhodes Elementary School	2^{nd}	80	4	03/20/07

Table 5-1 (Continued)

Elementary Schools
2006-2007 Student Flood Safety Awareness Presentations

Elementary School	Grade Level	Students	Teachers	Date
Elizabeth Wilhelm Elementary School	2nd	120	6	03/22/07
Lomie G. Heard Elementary School	3rd	114	6	03/28/07
Lamb of God Luthern School	3rd	35	2	03/029/07
Robert Taylor Elementary School	2nd	100	6	03/30/07
Las Vegas Junior Academy	3rd - 4th	17	1	04/10/07
Arturo Cambeiro Elementary School	3rd	110	7	04/13/07
Grant Bowler Elementary School	2nd - 3rd	260	12	04/17/07
Paradise Elementary School	3rd	100	5	04/18/07
Glen C. Taylor Elementary School	3rd	140	7	04/24/07
Sandra Thompson Elementary School	3rd	130	6	05/03/07
Richard Rundle Elementary School	3rd	180	9	05/07/07
Helen Jydstrup Elementary School	3rd	62	2	05/08/07
Helen Jydstrup Elementary School	3rd	63	3	05/09/07
Mervin Iverson Elementary School	3rd	200	8	05/10/07
Lilly & Wing Fong Elementary School	2nd	130	7	05/23/07
Martha P. King Elementary School	3rd	150	6	05/24/07
Judith Steele Elementary School	2nd	300	15	05/25/07
Martin Lither King Elementary School	3rd	80	4	05/29/07
Crestwood Elementary School	3rd	100	5	06/26/07
Total		6,461	431	

5.7 INVOLVEMENT IN OTHER ORGANIZATIONS

In 2006-2007, Co-Permittees continued to actively participate in other organizations in the Las Vegas Valley to promote interagency cooperation and conduct common outreach and education functions. The primary cooperative activities are described below.

- Drought Ordinance – The Co-Permittees worked on public education programs associated with the regional Drought Ordinance adopted in 2004. These programs addressed excess outdoor water use and other behaviors that impact stormwater quality.

- SNWA Programs – The Co-Permittees support SNWA and its public outreach program that includes water quality components. The SNWA television program similar to the Flood Channel often addresses water quality topics.

Sustainable Building Initiatives – Co-Permittee planning departments supported promulgation of information supporting sustainable building initiatives in the Las Vegas Valley. Two such programs are Leadership in Energy and Environmental Design (LEED), which was supported by all local governments, and the Southern Nevada Homebuilders Association (SNHBA) Green Building Initiative (GBI), which was supported by CLV. Each of these initiatives encourages use of low impact development on runoff quantity and quality. Residential and commercial builders are increasingly interested in using "green" building techniques, with the encouragement of planners at Clark County, CLV, CNLV and COH.

5.8 STORM DRAIN INLET MARKING PROGRAM

The Co-Permittees are partnering with the Conservation District of Southern Nevada (CDSN) to implement a storm drain inlet marking program. The program is funded by a Section 319 Non-Point Source grant, with matching funds provided by Clark County, CLV and COH. A total of 8,000 plaques will be installed along MS4 storm drains. One thousand four hundred rectangular plaques are available from the previous Las Vegas Valley inlet marking program in the late 1990's (see **Figure 5-1**). One thousand four hundred new round plaques have been ordered in English, and 5,200 round plaques have been ordered with both English and Spanish text (see **Figure 5-2**). The plaques were ordered by the Conservation District of Southern Nevada in July from a private manufacturer. The City of Henderson and Clark County will be using in-house personnel from their Public Works Departments to perform the installations. The City of Las Vegas will be contracting out the installation work from a sub-contractor with the help from the Conservation District of Southern Nevada. The City of North Las Vegas chose not to participate in the storm drain inlet marking program.

In addition to purchasing and installing the storm drain inlet markers, the Co-Permittees will collect GIS data on the location of the installed markers in order to track their installation and maintenance. This information will also assist CDSN in reporting progress related to the Section 319 grant.

Figure 5-1
Storm Drain Plaque Used in Previous Marking Program

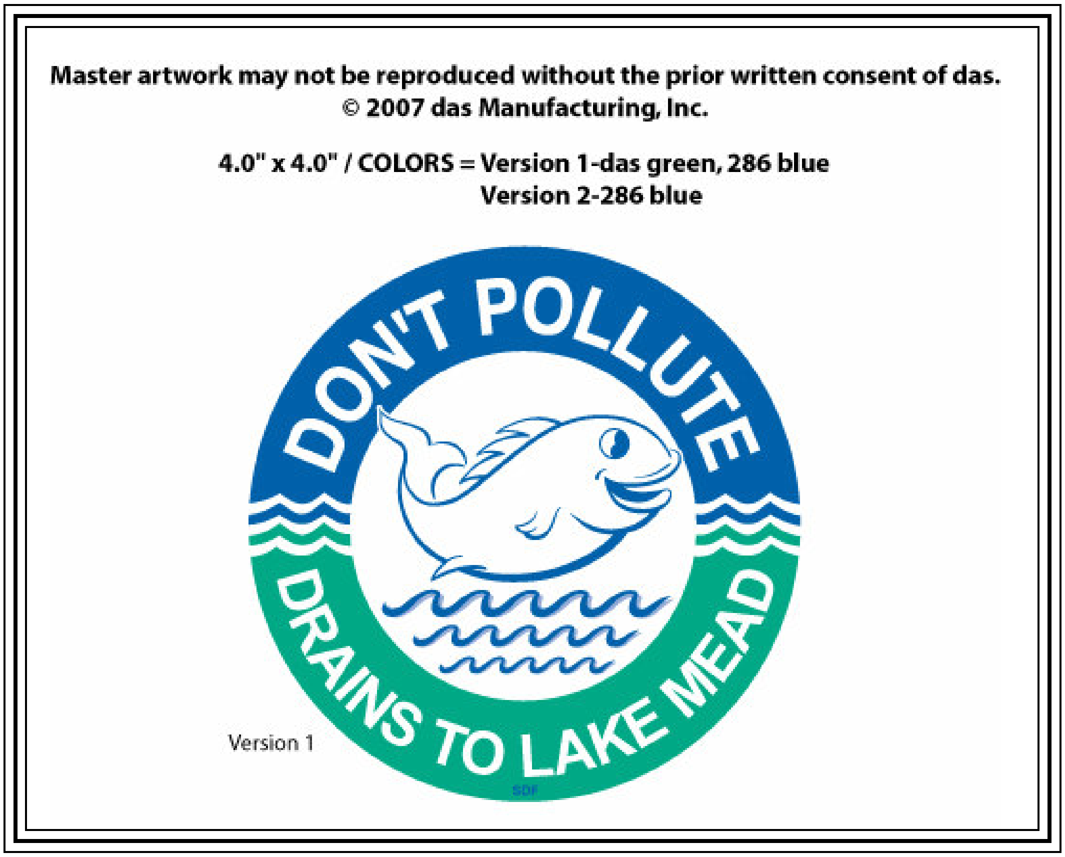


Figure 5-2
Storm Drain Plaque for 2006/2007 Marking Program

5.9 CONSTRUCTION AND INDUSTRIAL PROGRAM

In 2006-2007, Co-Permittees conducted education and outreach activities targeting construction industry organizations (i.e., developers, contractors, engineers) and permitted industries. Outreach activities to these groups are described below. Components of the education activities that deal with the construction and industrial programs are also described in **Section 8** and **Section 9**.

- The CCDAQEM conducts regular dust control classes that include a module on the stormwater program focusing on BMPs and construction practices. The module was developed and first implemented in the 2006-2007 permit year. Information is distributed to the contractor community via brochures discussing the program.

- The CCDAQEM includes a statement on their dust control permit application to notify applicants that are going to disturb ¼ acre or greater of land that compliance with regulations associated with stormwater is required by the State of Nevada. This statement is also included within the County's grading permit application language.

- Clark County Real Property Management includes language within their contracts for County construction projects notifying potential contractors of their responsibilities under the NPDES program and the transfer of monetary penalties if the County is found in violation. COH also has this language in Standard Section 637 of its contracts for public works projects.

- The COH attended a Southern Nevada Homebuilders Association meeting and conducted a presentation of the city's construction site inspection program.

- November 15-16, 2006 – CCRFCD, CLV, CNLV, COH and NDEP conducted four sessions of a workshop for the construction industry on aspects of the construction permit program and proper construction site BMPs. See **Section 9.5** for more information.

- May 9-10, 2007 – CCRFCD, CLV, CNLV, COH and NDEP conducted four sessions of a workshop for the construction industry on aspects of the construction permit program and proper construction site BMPs. See **Section 9.5** for more information.

SECTION 6
Structural and Source Control Measure Program

Section 6
Structural and Source Control Measure Program

6.1 INTRODUCTION

A Structural and Source Control Measure Program has been developed to mitigate the effects of urbanization on stormwater quality. These structural BMPs and source control measures address the miscellaneous requirements described in paragraph 4.6 of the permit. This program is also described in Section 6 of the SWMP.

6.2 STORM SEWER AND STREET MAINTENANCE

Sections 6.2 and 6.4 of the Las Vegas Valley SWMP require development of maintenance programs for drainage facilities and streets. This section describes the stormwater maintenance objectives, activities, and methods of tracking and reporting maintenance activities conducted for the SWMP.

6.2.1 Maintenance Objectives

Each of the municipal entities in the Las Vegas Valley developed storm drain system maintenance and street sweeping objectives based on standard practice as well as the expected benefit to stormwater quality. To the extent possible, these objectives were made consistent for all the Co-Permittees. **Table 6-1** summarizes the maintenance activity targets for each entity.

6.2.2 Activities Performed During the Permit Year

Each entity tracked information from the 2006-2007 permit year using internal tools and processes. These procedures and results are summarized in the following paragraphs and in **Table 6-2**. Entity's reports summarizing their BMP activities for the permit year are included in **Appendix H**.

6.2.2.1 Clark County

Street Sweeping. Clark County Department of Public Works (CCPW) tracks street maintenance through a comprehensive tracking program that is timecard and work order driven. The County is divided into 21 districts for street sweeping and maps are available for all County-owned paved streets with curb and gutter. The County tracks the number of lane miles in each district and the number of times they are swept each year. They also track the number of truckloads of material hauled to the landfill. This number can be used to compute the total volume of material captured in the sweeping process.

Table 6-1

Maintenance Goals for Municipal Permittees

Entity	Street Sweeping	Drop Inlet Cleaning	Detention Basin Maintenance
Clark County	Sweep curbed-and-paved public city streets in urban area once every 30 days[(1)]; as-needed in rural areas	Inspect/clean 20 percent of drop inlets a minimum of once per year; clean as appropriate[(4)]	Inspect during semi-annual channel inspections and after major storms[(5)]; clean as appropriate
City of Las Vegas	Sweep curbed-and-paved public city streets once every 30 days[(2)]	Inspect/clean 20 percent of drop inlets a minimum of once per year; clean as appropriate	Inspect during semi-annual channel inspections and after major storms; clean as appropriate
City of North Las Vegas	Sweep curbed-and-paved public city streets once every 30 days[(3)]	Inspect/clean 20 percent of drop inlets a minimum of once per year; clean as appropriate	Inspect during semi-annual channel inspections and after major storms; clean as appropriate
City of Henderson	Sweep curbed-and-paved public city streets once every 30 days	Inspect/clean 20 percent of drop inlets a minimum of once per year; clean as appropriate	Inspect during semi-annual channel inspections and after major storms; clean as appropriate

(1) Clark County sweeps most urban public streets on a 7- to 10-day schedule.

(2) CLV sweeps most urban public streets on a 14-day schedule.

(3) CNLV sweeps most urban public streets on a 14-day schedule.

(4) Unincorporated Clark County is divided into 9 zones. Maintenance Management Division estimates it will take 8 to 10 weeks to complete a full rotation through all 9 zones. Therefore, most inlets will be inspected/cleaned four times per year.

(5) County also currently routinely inspects all detention basins two times per year.

Table 6-2

Maintenance BMP Summary Report for 2006-2007

Maintenance BMP Activity	Clark County	Las Vegas	North Las Vegas [1]	Henderson
Street Sweeping				
Streets Swept (miles)	64,444	220,500	87,168	37,070
Material Removed (cubic yards)	25,594	[2]	19,309	[3]
Storm Drain Maintenance				
Number of Inlets Cleaned/Maintained	14,617	57,000	228	814
Material Removed (cubic yards)	N/A	[2]	1,970	[3] [4]
Detention Basins				
Number of Basins Inspected/Cleaned	14	18	9	8
Material Removed (cubic yards)	152	[2]	1,471	1,305
Sediment Removed (cubic yards)	121,615			
Number of Complaints Received	N/A	N/A	41	6

[1] Quarterly data is available in **Appendix H**.
[2] Total material removed from all maintenance activities = 48,500 cubic yards
[3] Material removed from combined street sweeping and drain inlet maintenance activities = 2,814 cubic yards
[4] 12,900 cubic yards of material was removed from maintenance of open channels
[5] All material removed from streets, drain inlets and detention basins was hauled to the Apex Landfill
NA = Data is not available.

The County sweeps most urban public streets on a 7- to 10-day schedule. The County maintains a total of 2,330 curb miles within the MS4 permit area. In the 2006-2007 permit year, Clark County swept 64,444 street miles and removed 25,594 cubic yards of debris. The County determined that the goal of the street sweeping BMP to sweep curbed-and-paved public streets in urban areas once every 30 days was met for the 2006-2007 permit year.

Drain Inlet Cleaning. CCPW tracks drain inlet maintenance through a comprehensive tracking program that is also timecard and work order driven. For drain inlets, the system tracks the number of inlets in each district and how often they are cleaned. The County currently maintains 5,509 drain inlets and catch basins. Clark County performed 14,617 drain inlet facility inspection and cleaning operations in the 2006-2007 permit year. The goal of the drain inlet cleaning BMP to inspect/clean 20 percent of drain inlets a minimum of once per year was greatly exceeded in the 2006-2007 permit year.

The volume or weight of material removed during storm drain system maintenance activities is not currently recorded. The County is reviewing its operational practices and database management systems and is planning to implement new software to capture this information in the future.

Detention Basin Maintenance. Clark County maintains 14 detention basins in the Las Vegas Valley. Each basin was inspected at least two times during the 2006-2007 permit period, meeting the goal for this activity. A total of over 121,000 cubic yards of sediment and debris were removed from the basins listed below.

- The Tropicana Detention Basin had 74 cubic yards of sediment and debris from storms removed.
- The F2 Debris Basin had 20 cubic yards of debris removed.
- The Upper Blue Diamond Detention Basin had 48,459 cubic yards of sediment removed.
- The Red Rock Detention Basin had 67,466 cubic yards of sediment removed.
- The Upper Duck Creek Detention Basin had 5,600 cubic yards removed.
- The Lower Duck Creek Detention Basin had 58 cubic yards of debris removed.

The Upper Flamingo Detention Basin remains under contract with the United States Army Corps of Engineers (USACOE), which is increasing the storage capacity of the facility.

Large amounts of sediment were removed from the Upper Blue Diamond, Red Rock, and Upper Duck Creek Detention Basins. Each of these basins captures runoff from entirely undeveloped, natural watersheds. This demonstrates the high sediment loads that are produced naturally by the desert landscape and alluvial fans that comprise Las Vegas Valley. Detention basins in urban areas collect much less sediment and require less post-storm maintenance. After construction is completed, urban development is expected to generate much less sediment than in pre-development conditions. This may be a factor in developing the Post-Construction Program discussed in **Section 6.4**.

6.2.2.2 City of Las Vegas

Street Sweeping. The CLV is separated into districts. Sediment and debris from each district was dumped into one of two central refuse piles at either the west or east city yards. The Field Operations Department, which details the number of street miles swept and the number of inlets cleaned, produced monthly reports.

CLV sweeps most urban public streets on a 14-day schedule. The CLV swept 220,500 miles of street in the 2006-2007 permit year.

Drain Inlet Cleaning. City maintenance staff currently keeps logs for drain inlet and drainage easement cleaning. Sediment and debris from each unit were dumped into one of two central refuse piles at either the west or east city yards. In the 2006-2007 permit year, 57,000 drain inlets and walk through drains were cleaned.

Detention Basin Maintenance. Sixteen detention basins were inspected twice a year as part of the Wash Walk program, and were also inspected after each major storm event. This satisfies the goal for this BMP. The basins were cleaned as needed after each inspection by the CLV maintenance contractor.

In the 2006-2007 permit year, the total volume of trash hauled from the east and west City yards to the Apex Landfill from all maintenance activities was 48,500 cubic yards.

6.2.2.3 City of North Las Vegas

Street Sweeping. The CNLV Public Works Department's Roadway Division was responsible for performing street sweeping duties on all CNLV-maintained streets (1,250 total miles). Street sweeping records were maintained at the CNLV Public Works Department's Roadway Division. The number of curb or lane miles of street sweeping was reported to the CNLV representative to the SQMC at the end of each month. The amount of debris collected from street sweeping was noted on the daily work order and was provided to the CNLV SQMC representative each month. The CNLV swept 87,168 miles of street and picked up 19,309 cubic yards of debris during the 2006-2007 permit year. CNLV sweeps most urban public streets on a 14-day schedule, meeting the goal of sweeping streets once every 30 days.

Drain Inlet Cleaning. The CNLV Utility Department's Field Services Section performed drain inlet cleaning and other storm drain system maintenance. Records for these maintenance activities were maintained at the Utility Department, and reporting was provided on a quarterly basis at the SQMC meeting. Reporting included the number of drain inlets inspected and cleaned and an estimate of the amount of material removed. The CNLV inspected and cleaned 228 drain inlets, catch basins, and storm drains and removed 1,970 cubic feet of waste during the 2006-2007 permit year.

Detention Basin Maintenance. The CNLV Utility Department's Environmental Section was responsible for performing semi-annual inspections of detention basins. The Public Works Department's Development and Flood Control Division performed inspections of detention basin outfalls after each major storm event. The Public Works Department's Roadway Division was notified if debris/sediment needed removal based on these inspection by the originating Department/Division. Documentation of inspections and any debris removed, including estimated quantities, was reported in the semi-annual Wash Walk reports, which were prepared as part of the Illegal Connection Detection and Elimination Program, and in the quarterly BMP reports. Nine detention basin cleaning operations were performed, and a total of 1,471 cubic yards of material was removed during the 2006-2007 permit year.

6.2.2.4 City of Henderson

Street Sweeping. The COH had an objective of sweeping the curbed and paved public streets once every 30 days, as outlined in the *2004-2005 Annual Report*. They are currently sweeping the streets once every 24 days with seven street sweepers in operation. The COH swept 37,070 miles of street in the 2006-2007 permit year.

Drain Inlet Cleaning. The COH hired additional maintenance staff to meet the drain inlet maintenance objectives of inspecting and maintaining 20 percent of the total number of drain inlets in the system every year. This objective was outlined in the *2004-2005 Annual Report*. The COH cleaned and maintained 707 drop inlets and catch basins in the 2006-2007 permit year. Material collected during the inlet clean up and street sweeping activities was delivered to the same drop off point. The City Maintenance Department is now working on measures to differentiate between the material collected from inlets and street sweeping. In the 2006-2007 permit year COH removed 2,814 cubic yards of trash from inlet cleaning and street sweeping. In addition, about 12,900 cubic yards of material was removed from open channels.

Detention Basin Maintenance. The COH inspects and maintains regional flood control facilities under a maintenance agreement with the CCRFCD. Inspections were performed twice per year and after major storm events, and approximately 1,305 cubic yards of material were removed in the 2006-2007 period.

6.3 POTABLE WATER DISCHARGES

NDEP has authorized discharges from the drinking water system into the stormwater system by SNWA/LVVWD and COH, and has allowed required documentation for these discharges to be submitted as part of the Las Vegas Valley MS4 Permit Annual Report. NDEP requires discharges greater than 100,000 gallons and reservoir draining or flushing to be reported. Copies of this information are found in **Appendix H**.

6.4 NEW DEVELOPMENT PLANNING PROCEDURES

Paragraph 4.6.1.2 of the MS4 permit requires development of *"a plan to reduce the discharge of pollutants from MS4s which receive discharges from areas of new development and significant redevelopment."* In the 2006-2007 permit year, the Co-Permittees addressed this requirement through two approaches: (1) detention basin evaluation program; and (2) various training programs to address pollution prevention methods of the MS4. The detention basin monitoring initiative is outlined below and in Section 4.4 of the *2005-2006 Annual Report.* The following sections of this *Annual Report* contain the training presentations: the Maintenance Training Program is described in **Section 7**, the Industrial Inspector Training Program is described in **Section 8**, and the Construction Inspector Training Program and the Contractor Training Program are described in **Section 9**.

As a result of the EPA audit of the MS4 Program, the Co-Permittees agreed to develop and implement improvements to current programs targeting runoff from areas of new development and redevelopment. The program components currently under investigation are discussed in the following sections.

6.4.1 Detention Basin Program

Regional detention basins are key components of the Las Vegas Valley MS4 system. These detention basins, funded by CCRFCD, are part of the regional flood control master plan for the Valley. Although existing detention basins have not been designed to intentionally provide water quality benefits, they cause sediment to drop out (and be removed by maintenance activities described previously) along with associated water quality constituents. The Co-Permittees believe the existing and proposed detention basins provide benefits to control runoff from developed areas, and thus are an important post-construction BMP for areas of new development and redevelopment.

In order to be an effective BMP, regional detention basins must meet two criteria: (1) they must control runoff from a majority of the developed area in the Valley; and (2) they must be effective in removing constituents of concern.

Figure 6-1 is a map showing the location of existing regional detention basins and the areas from which they capture runoff. This map demonstrates that all areas on the north, west and south sides of the urban core are controlled by one or more regional detention basins. These are the areas where the majority of new development is occurring. Therefore, runoff from most new development will be captured and detained in a regional detention basin. CCRFCD has plans to expand the system of regional detention basins as development continues.

A detention basin monitoring program was implemented in the 2005-2006 and 2006-2007 permit years. Inflow and outflow samples were collected at Meadows Detention Basin, Lower Las Vegas Wash Detention Basin and Upper Flamingo Detention Basin. Water quality data from the monitoring program is presented in **Section 4**. Results of the two years of the program are summarized as follows.

- Overall, the three existing detention basins sampled to date are somewhat effective at reducing concentrations of the constituents analyzed. However, in some cases outflow concentrations exceed inflow concentrations for various constituents.

- As expected, data demonstrates that detention basins are more effective at removing particulate constituents than dissolved constituents. Concentrations of primarily particulate constituents were reduced in 54 percent of the sample events, whereas primarily dissolved constituents were reduced in only 41 percent of the sample events.

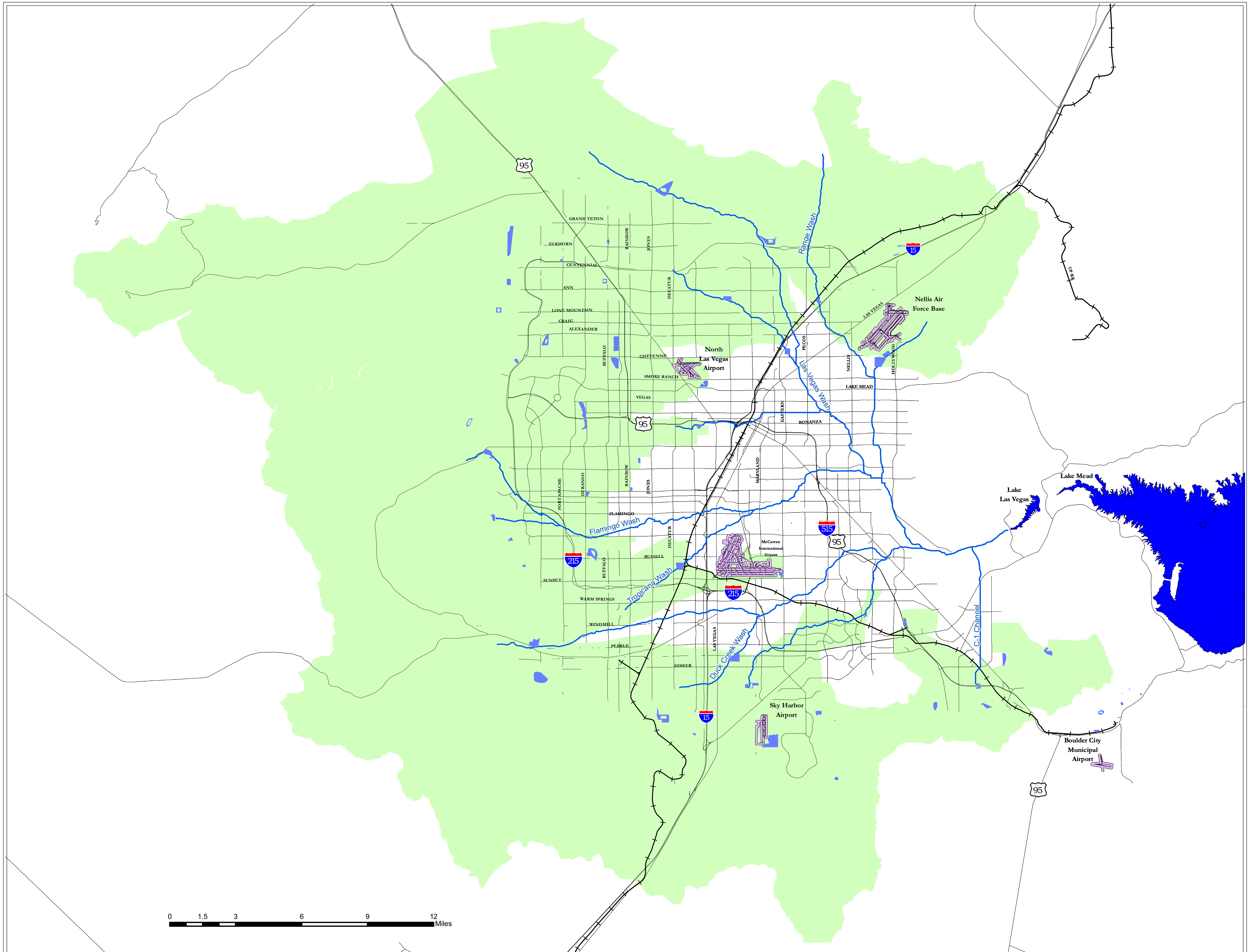
- Of the classes of constituents analyzed, the regional detention basins are most effective at reducing concentrations of nutrients.

- Detention basins did not consistently reduce bacteria concentrations.

- Surprisingly, sediment-related constituents (TSS and turbidity) were only reduced in about half of the sample sets. This may be related in part to construction and gravel mining in Upper Flamingo Detention Basin. Based on inspection and maintenance reports, detention basins are effective in removing sediment from inflows. However, the initial sampling data suggests that suspended (fine) sediment and associated particulates are not removed as effectively, possibly due to resuspension of previously deposited material.

- Meadows Detention Basin and Upper Flamingo Detention Basin reduced constituent concentrations in approximately half of the sample sets. Storms occurring one week apart were sampled at Upper Flamingo Detention Basin. The basin showed significantly better

Areas Draining To Regional Detention Basins



Legend

- Streets
- Airports
- Railroads
- Washes
- Detention Basins
- Detention Basin Watershed

N W E S

Figure 6-1

performance in reducing constituent concentrations during the second storm; 12 constituents showed reduced concentrations or no change in the second storm, compared to 6 constituents showing reduced concentrations or no change in the first storm. This difference in performance may be evidence of the first flush effect during the first storm, or it may be due to differing effects of construction occurring in the basin area.

Detention basin monitoring data for 2005-2007 suggests that existing regional detention basins provide moderate benefits for reducing certain constituent concentrations. These benefits apply more significantly to constituents occurring primarily in particulate form, but results can vary widely from storm to storm and from site to site. The detention basin monitoring program did not sample for reduction in sediment load between inflows and outflows. However, the previous section on detention basin maintenance demonstrates that the basins are effective in retaining sediment and preventing it from being conveyed into Las Vegas Wash and Lake Mead.

As a result of requirements imposed by NDEP in response to the EPA audit, the Co-Permittees agreed to investigate the feasibility of retrofitting regional detention basins to improve their pollutant removal effectiveness. This investigation is underway by the Detention Basin Working Group (DBWG), a subcommittee of the SQMC. The DBWG is considering the possibility of conducting a regional detention basin pilot retrofit project. A proposal for this project will be submitted to NDEP for review and approval by December 19, 2007.

6.4.2 Post-Construction Program

During the 2006-2007 permit year, MWH continued research started in 2005-2006 into the policies, ordinances and BMPs included in post-construction programs adopted by other large communities in the Western United States. This research was summarized in a technical memorandum, and provides background into how other communities are addressing requirements for post-construction BMP programs. The updated technical memorandum is found in **Appendix H.** EPA and NDEP have determined that the regional detention basins alone do not satisfy the minimum requirements for a post-construction program. Therefore, in compliance with direction received from NDEP, the Co-Permittees are developing an expanded program to address runoff from areas of new development and significant redevelopment. The enhanced program will include an ordinance or regulations specifying requirements for new development to manage runoff quantity and quality, and a process for selecting BMPs to be implemented by developers. It will also include a process for assuming adequate maintenance of BMPs. The Co-Permittees have formed a Development Guidelines Working Group to develop the details of a post-construction program and make recommendations for adoption by the SQMC. The Co-Permittees will submit the elements of their proposed post-construction program to NDEP by December 19, 2007.

6.4.3 Other Activities

The Co-Permittees have participated in or supported other activities that have helped control water quality in runoff from developed areas. These activities include the following:

- As members of CCRFCD, all Co-Permittees have supported programs to reduce sediment discharges by protecting channel banks from excessive erosion through channel stabilization and lining projects. In addition, the detention basin maintenance activities described previously are effective in removing sediment from the stormwater system and preventing this pollutant from entering downstream water bodies.

- Co-Permittees have enacted ordinances protecting natural washes and providing a buffer zone to protect them from development. They have supported the Clark County Wetlands Park, which maintains and enhances desert wetlands that provide natural water quality benefits to Lower Las Vegas Wash.

- As members of SNWA, Co-Permittees have participated in construction of several erosion control structures in Lower Las Vegas Wash. These structures effectively reduce bank erosion, reduce the volume of sediment transported to Lower Las Vegas Wash and Lake Mead, and encourage development of riparian wetlands that improve water quality. SNWA has plans to construct more erosion control structures in the future.

- Co-Permittees have implemented programs in association with the Clark County Drought Ordinance to reduce overwatering and associated pollutant runoff. The programs restrict the installation of lawns in new construction, restrict landscape watering to specified days in both existing and new construction, and pay for the replacement of existing lawns with xeriscape. An enforcement program ensures that water conservation requirements are followed. These measures reduce dry weather flows in municipal streets, the use of fertilizers and pesticides, and the wet weather wash off and discharge of these substances.

- Co-Permittees encourage the use of sustainable development practices by the local development community. Two examples are the LEED rating system, and the SNHBA GBI. The LEED program is a certification program that offers credits for stormwater management design techniques that minimize site runoff. It is supported by all the communities in Las Vegas Valley. The GBI is an initiative of SNHBA to encourage use of green building techniques by residential developers. These techniques include site design and irrigation system measures to reduce landscape watering runoff and the associated contribution of pollutants to the drainage system. To date, GBI standards are voluntary and only used as a guide for new residential development in CLV.

SECTION 7

Illicit Discharge Detection Program

Section 7
Illicit Discharge Detection Program

7.1 INTRODUCTION

The requirements of the Illicit Discharge Detection Program are described in paragraph 4.7 of the MS4 permit, and the adopted program elements are outlined in Section 7 of the SWMP. The program consists of four components: field screening, field inspections, public reporting opportunities, and a spill response strategy.

7.2 FIELD SCREENING PROGRAM

Field screening consisted of quarterly water quality sampling and analysis during dry weather conditions at eight locations in the Las Vegas Valley. One objective of the sampling program was to detect changes in dry weather water quality that could indicate the presence of illegal non-stormwater discharge to the drainage system. Dry weather monitoring was conducted by SNWA in 2006-2007 as part of its Urban Tributary Sampling program. See **Section 4.2** for dry weather results. Dry weather monitoring did not show any evidence of illegal non-stormwater discharge to the drainage system, compared to past years.

7.3 INSPECTION PROGRAM

7.3.1 Channel Inspections

Municipal separate storm sewers were inspected in Fall 2006 and Spring 2007. Inspections were performed by the staffs of the Co-Permittees and included visually inspecting exposed storm channels and detention basins, primarily focusing on those where dry weather flow persisted. The inspections were performed by visually observing open channel sections and looking for evidence of non-stormwater discharges. Emphasis was placed on those areas that had a reasonable potential of containing illicit discharges, exfiltration from the sanitary sewer system or other sources of non-stormwater. Also looked for were heavy sediment loads that may be associated with construction site runoff. Illicit discharge and dumping were referred to the proper local authorities for resolution. See **Appendix H** for complete channel inspection reports.

The Clark County Fall 2006 Wash Walk reported several potential illegal discharges and referred the findings on two occasions to the Clark County Public Response Office and on one instance to the Risk Management Department for further investigation and possible action.

Clark County Spring 2007 Wash Walk reported minor dry weather flow and minor inflows during the inspections. At Flamingo Wash and Duck Creek Channel, there were several potential problems reported to NDEP. It was noted that construction activity was taking place along and in the vicinity of each location and there were no apparent BMPs in place. Several locations (intersections) were listed and referred to NDEP.

The City of Las Vegas Fall 2006 Storm Channel Inspection reported minor debris and minor to moderate flows throughout the inspections. Overall, no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris was found. Minor graffiti was found in some channels. Observations included:

- Cheyenne Channel had a large inlet pipe repaired due to a collapse that was found during a previous inspection. A section of soil noted during the last inspection that washed out has deepened. Photos were taken and forwarded to the CLV Flood Control.

- Two cars were found burned in miscellaneous channels and they were reported to the Las Vegas Metropolitan Police Department.

- Overall, moderate vegetation was found during the basin inspections. Basins were dry and contained no visible evidence of illegal connections, excessive sediment or excessive debris.

The City of Las Vegas Spring 2007 Storm Channel Inspection reported minor flows, minor graffiti, and minor rocks. There was no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris. Observations included:

- A leak was found in the Beltway Channel and reported to LVVWD. There was also excessive construction sediment in this channel and a couch was found in the channel near Cheyenne Avenue. Inside the channel between Cheyenne Avenue and Gilmore Channel were excessive trash and debris.

- Construction activity continues in the Meadows Detention Basin. The LVVWD property and basin has become a public park.

- Minor to moderate vegetation was found during the detention basin inspections. Basins were generally dry and contained no visible evidence of illegal connections, excessive sediment or excessive debris.

- Lone Mountain Detention Basin is still under construction and the basin contained little to no vegetation. Ball fields are under construction in the south side of the basin.

- Summerlin 5 Detention Basin has a plant nursery on approximately nine acres. Four water tanks are located inside the basin. There was evidence of bonfires in the channel and numerous propane canisters in the channel.

The City of North Las Vegas Fall 2006 Storm Channel Inspection detected no illegal discharges during this inspection. Channels were in great to fair condition with no flows to moderate flows. Minor dirt, sediment, and debris were removed from several basins.

The City of North Las Vegas Spring 2007 Storm Channel Inspection detected no illegal discharges during this inspection. Some channels were recently cleaned and the channels were in great to good condition.

The City of Henderson Fall 2006 Channel Inspection Report found sediment and trash at various locations in the system. Minor trash and debris at various locations were in need of removal. A steady flow of water was found at various locations in the channel system. Other channels and basins in the system were found to be clean and dry.

The City of Henderson Spring 2007 Channel Inspection Report found a steady flow of water at a variety of locations in the channel system. Vegetation was found in many channels. Minor trash was in need of removal in the I-515 Channel. Pittman Pecos Channel had openings in the fence along the channel. Trash, debris and sediment were found in various detention basins. Other channels and basins that were inspected were found to be clean and dry with no needed maintenance required.

7.3.2 Training Municipal Maintenance Staff

In previous permit years, Co-Permittees developed materials for training municipal maintenance staff to look for evidence of non-stormwater discharges to the storm drain system during their normal duties. Co-Permittees performed informal internal training sessions with maintenance personnel to increase their awareness of conditions in their communities that could indicate illegal discharges or dumping. The COH conducted formal training with its public works crews.

7.4 PUBLIC REPORTING PROGRAM

There are several avenues by which the public can and has reported potential illicit discharges to the MS4. These are described below.

Website. The Co-Permittees' website, **www.lvstormwater.com**, has a link for reporting illicit discharges. This link gives contact information for reporting illicit discharges and clogged storm drains, and has an online complaint form through the SNHD.

SNHD. SNHD has the authority to enforce ordinances prohibiting dumping of solid waste and sewage to the Las Vegas Valley stormwater conveyance systems. The public can call SNHD and report problems directly, or a complaint form for reporting evidence of illegal dumping is found on the **www.lvstormwater.com** website.

CCPRO. CCPRO receives public complaints related to illegal dumping and other ordinance violations, and is empowered to respond to and address these problems.

Direct Contact With Co-Permittees. Each of the Co-Permittees receives direct calls from citizens reporting dumping, illegal discharges of non-stormwater to the drainage system, maintenance problems, and other activities that may affect water quality. The CLV, CNLV and COH follow up on these complaints within their jurisdiction; CCPRO follows up on complaints in unincorporated Clark County.

7.5 SPILL RESPONSE STRATEGY

The MS4 permit (paragraph 4.7.1.4) and the SWMP (Section 7.5) require development of a plan for responding to spills of non-stormwater liquids and solids to the drainage system. During the 2005-2006 permit year, the Co-Permittees prepared a Spill Response Strategy to summarize their coordinated approach to responding to illegal spills. The Spill Response Strategy was submitted to NDEP, and is contained in **Appendix I**.

Key components of the Spill Response Strategy are described below.

- The State and County each have hazardous material emergency response plans that adequately outline field procedures, roles and responsibilities, training requirements, and notifications. Each local entity also has standard operating procedures for dealing with illegal dumping or accidental spills. As a result, no complete new plans or programs were necessary.

- The Clark County Local Emergency Planning Committee (LEPC) meets regularly to coordinate the activities of all emergency response agencies in Las Vegas Valley. The LEPC encourages use of common policies and procedures and passes on information related to regulations and spill response techniques. Steve Ross of Las Vegas Valley Water District is a member of the LEPC and is also a regular attendee of SQMC meetings. He acts as an SQMC liaison to the LEPC, assuring that stormwater system concerns are adequately reflected in LEPC planning and coordination.

- H2O Environmental is a private contractor that is used by all entities in Las Vegas Valley to respond to and clean up hazardous material spills over 25 gallons. Standing contracts with H2O Environmental allow the firm to respond to spills quickly (within 45 minutes anywhere in Las Vegas Valley).

- The hazardous material emergency response plans contain extensive notification lists, of individuals and agencies that should be contacted in the event of a hazardous material spill. The CCRFCD has been added to the standard notification lists to assure that the MS4 representatives are aware of any hazardous material spills that could affect the stormwater systems in their jurisdictions.

SECTION 8

Industrial Facility Monitoring and Control Program

Section 8
Industrial Facility Monitoring and Control Program

8.1 INTRODUCTION

Industrial sites can be potential sources of urban stormwater pollution. This section describes the Industrial Facility Monitoring and Control Program that is covered in paragraph 4.8 of the MS4 permit and Section 8 of the SWMP. Activities consisted of identifying industrial facilities that could be potential pollutant sources, conducting inspections of industrial facilities, and conducting an ongoing training program for local industrial site inspectors. The Industrial Facility Monitoring and Control Program created in Year 2 of the SWMP provided Co-Permittees with the appropriate training materials for individual site inspectors. This program is intended to complement the separate industrial site permitting program conducted by NDEP.

8.2 IDENTIFICATION OF INDUSTRIAL FACILITIES

The purpose of this section is to identify industrial facilities in categories called out in the Las Vegas Valley MS4 NPDES permit. This section will identify industrial facilities in the Las Vegas Valley that are specifically regulated under the MS4 permit. This section addresses the MS4 permit requirements in paragraph 4.8 and the SWMP requirements in Section 8.2.

The MS4 permit (paragraph 4.8.1) specifically identifies four classes of industrial facilities for which a program to monitor and control pollutants must be developed. These classes of industrial facilities are:

- Industrial facilities that are subject to Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA)
- Municipal Landfills
- Hazardous waste treatment, disposal and recovery facilities
- Industrial facilities that the municipal permit applicant determines are contributing a substantial pollutant loading to the municipal storm sewer system

This subsection addresses facilities in each of these categories.

8.2.1 Industrial Facilities Subject to Section 313

The EPA regulates and keeps a list of industrial and other facilities that release certain amounts of regulated chemicals into the environment. The EPA's website (**www.epa.gov/enviro/html/tris/tris_query.html**) was used to search for and list all Toxic Release Inventory (TRI) facilities in Clark County. A total of 70 facilities were found. This list was compiled by the EPA based on reporting by regulated industries and therefore may be incomplete. NDEP agreed that this was a reasonable source of information for this purpose. EPA classifies facilities by Standard Industrial Classification (SIC) codes. A list of industrial facilities that are subject to Section 313 in the Las Vegas Valley was compiled (see **Table 8-1**).

Using the street addresses or the latitude and longitude provided in the EPA database, a map was created using GIS software to display the location of these facilities (see **Figure 8-1**).

8.2.2 Municipal Landfills

The only landfill within the Las Vegas Valley is the Sunrise Landfill. This landfill has been closed since 1993. The Apex Regional Landfill is currently the only active local landfill, but is located outside of the Las Vegas Wash Watershed. No municipal landfills are covered under the MS4 industrial program requirements since there are no active municipal landfills in the Las Vegas Wash drainage area.

8.2.3 Hazardous Waste Treatment, Disposal, and Recovery Facilities

The EPA keeps a list of hazardous waste treatment, disposal, and recovery facilities that are subject to the Resource Conservation and Recovery Act (RCRA). The EPA RCRAInfo web site (**www.epa.gov/enviro/html/rcris/rcris_query.html**) was searched to find hazardous waste treatment and disposal facilities within Clark County. The search returned nine facilities that are covered by the MS4 permit or that have a written determination on file and are all within the Las Vegas Valley. The hazardous waste treatment, disposal, and recovery facilities covered by the permit are listed below:

- Safety Kleen Systems Incorporated
  1655 Stocker Street
  North Las Vegas, NV 89030

- Safety Kleen Systems Incorporated
  4582 Donovan Way
  North Las Vegas, NV 89031

- Ev-Con Recycling Facility
  4920 North Lamb Boulevard
  Las Vegas, NV 89115

- Ev-Con Recycling Facility
  4560 East Hammer Lane
  Las Vegas, NV 89115

- Tronox LLC
  (DBA Kerr – McGee Chemical Corporation)
  8100 West Lake Mead Drive
  Henderson, NV 89015

Table 8-1

Industrial Facilities Subject To Section 313 in the Las Vegas Valley Based on Current EPA Website(1)

Facility Number	Facility Name	Facility Address	SIC Codes	Latitude	Longitude	Jurisdiction
1	Anderson Dairy	801 Searles Avenue Las Vegas, NV 89101	2024, 2026	36.184808	-115.131705	City of Las Vegas
2	Bardon Materials Gowan Asphalt	413 E. Gowan Road North Las Vegas, NV 89030	2951	36.225289	-115.124866	City of North Las Vegas
3	Capital Cabinet Corp	3645 Losee Road North Las Vegas, NV 89030	2434	36.22667	-115.119958	City of North Las Vegas
4	Casino Ready Mix	5355 N. Beesley Drive Las Vegas, NV 89115	3273			Clark County
5	Ergon Asphalt Products Inc. Las Vegas	6400 W. Richmar Avenue Las Vegas, NV 89118	2951, 5175	36.016916	-115.234389	Clark County
6	Georgia-Pacific Corp Las Vegas Gypsum	11401 U.S. Highway 91 North Las Vegas, NV 89030	3275	36.334722	-114.131944	City of North Las Vegas
7	Good Humor Corp	1001 Olsen Street Henderson, NV 89015	2024	36.074286	-115.1483	City of Henderson
8	Grand Products Nevada Inc	751 Pilot Road Suite A Las Vegas, NV 89119	3679	36.063791	-115.146173	Clark County
9	IGT	6811 Spencer Street Las Vegas, NV 89119	3699	36.066329	-115.12759	Clark County
10	Jensen Precast	3853 Losee Road North Las Vegas, NV 89030	3272	36.22963	-115.118546	City of North Las Vegas
11	Kalco Lighting LLC	6355 S Windy Street Suite 3 Las Vegas, NV 89119	2514, 3645, 3646	36.07227	-115.175217	Clark County
12	KC Asphalt LLC Las Vegas	3901 W. Ponderosa Way Las Vegas, NV 89118	2951	36.080822	-115.190148	Clark County
13	Las Vegas Cultured Marble Inc.	6875 Speedway Boulevard Building U-102 Las Vegas, NV 89115	3087	36.279459	-115.020549	Clark County
14	Las Vegas Finishing LLC	3261 Builders Avenue Las Vegas, NV 89101	3471	36.160777	-115.101728	City of Las Vegas
15	Las Vegas Paving	Eastgate Road and Capehorn Drive Henderson, NV 89015	2951	36.06008	-115.020056	City of Henderson
16	Las Vegas Paving	3400 N. 5th Street North Las Vegas, NV 89030	2951	36.221978	-115.133877	City of North Las Vegas
17	Las Vegas Paving	1.5 Miles N. of Hollywood and Las Vegas Boulevard Las Vegas, NV 89115	2951			Clark County
18	Las Vegas Paving	6600 Speedway Boulevard Las Vegas, NV 89115	2951			Clark County
19	Las Vegas Paving	9325 S. Jones Boulevard Las Vegas, NV 89119	2951	36.020286	-115.225743	Clark County
20	Las Vegas Paving	W. Lone Mountain Road Las Vegas, NV 89129	2951	36.1419	-115.1384	Clark County
21	Lighthouse VIP Products	4601 E. Cheyenne Avenue. Las Vegas, NV 89115	2851	36.217706	-115.073928	Clark County
22	May Manufacturing (DBA Artesian Spas)	4720 N Lamb Boulevard Las Vegas, NV 89115	3088	36.245624	-115.079814	Clark County
23	MCC-Uniflex LLC	1151 Grier Drive Las Vegas, NV 89119-3711	2754	36.068609	-115.139188	Clark County
24	Meadow Gold Dairies	6350 E. Centennial Parkway North Las Vegas, NV 89115	2026	36.276944	-115.031944	City of North Las Vegas
25	Monierlifetile LLC	430 Eastgate Road Henderson, NV 89015	3272	36.057656	-115.037802	City of Henderson
26	Nevada Ready Mix	601 W. Bonanza Road Las Vegas, NV 89106	2024	36.177261	-115.149327	City of Las Vegas
27	Nevada Ready Mix Arville	4301 W. Hacienda Las Vegas, NV 89109	3273	36.093613	-115.197222	Clark County
28	Nevada Ready Mix Le Reve	Sands and Las Vegas Boulevard S. Las Vegas, NV 89109	3273	36.123889	-115.166388	Clark County
29	Nevada Ready Mix South Coast	9777 S. Las Vegas Boulevard Las Vegas, NV 89123	3273	36.012222	-115.1725	Clark County
30	Ocean Spray Cranberries Inc.	1301 American Pacific Drive Henderson, NV 89014-8806	2086	36.04054	-115.037802	City of Henderson
31	Pacific Engineering & Production Co. of Nevada	8291 Gibson Road Henderson, NV 89015	2819	36.075222	-115.0215	City of Henderson

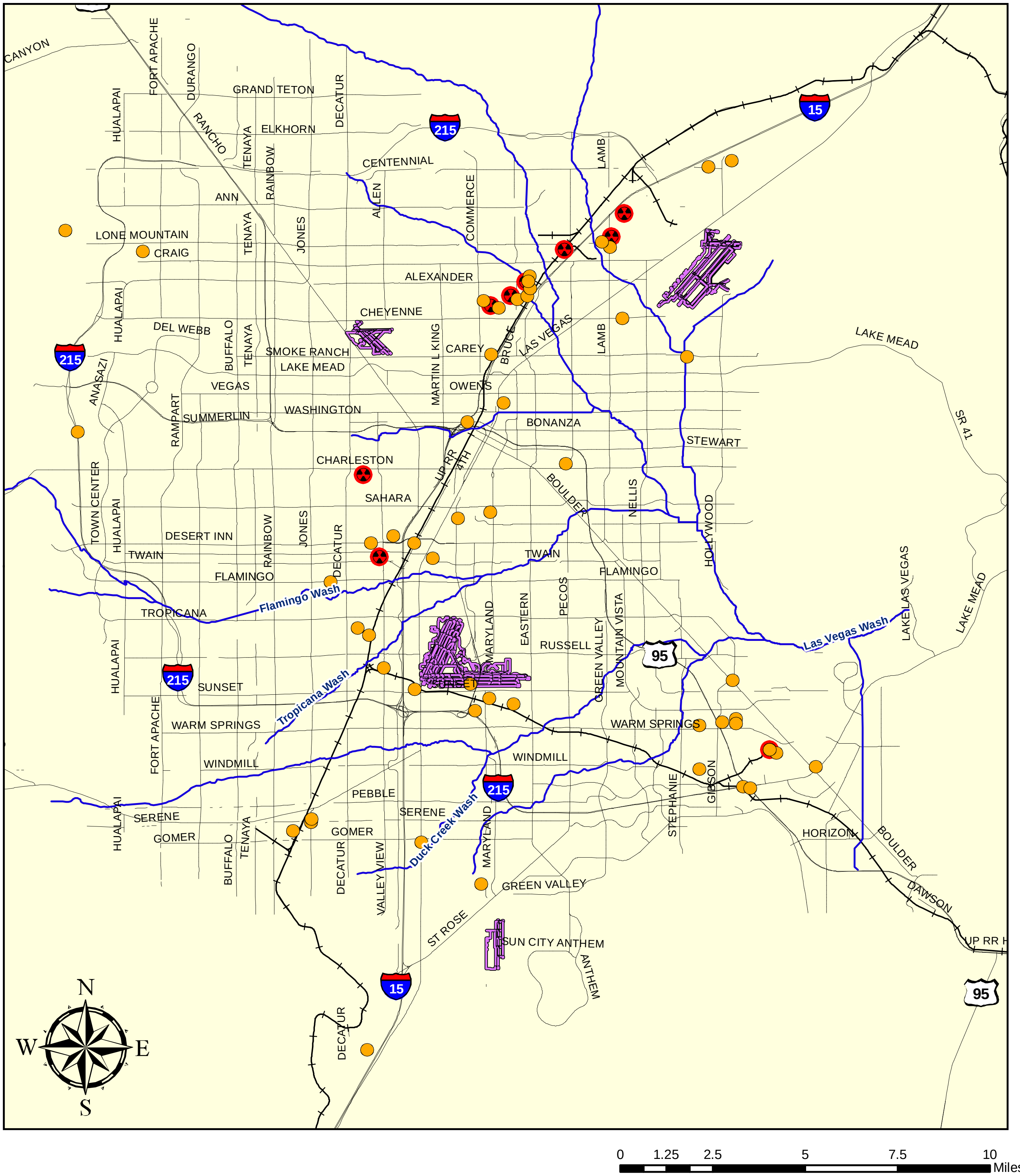
Table 8-1 (Continued)

Industrial Facilities Subject To Section 313 in the Las Vegas Valley
Based on Current EPA Website[1]

Facility Number	Facility Name	Facility Address	SIC Codes	Latitude	Longitude	Jurisdiction
32	Pioneer Americas LLC	8000 Lake Mead Parkway Henderson, NV 89015	2812	36.033371	-115.016804	City of Henderson
33	Rebel Oil Co. Inc.	5054 N. Sloan Lane Las Vegas, NV 89115	2171	36.202357	-115.042706	Clark County
34	Rinker Materials Blue Diamond 1894	9275 S. Jones Boulevard Las Vegas, NV 89139	3273	36.02161	-115.22547	Clark County
35	Rinker Materials Buffalo Main #1850	4511 S. Buffalo Road Las Vegas, NV 89147	3273	36.11472	-115.215833	Clark County
36	Rinker Materials Henderson #1854	750 Capehorn Henderson, NV 89015	3273	36.058889	-115.026666	City of Henderson
37	Rinker Materials North Las Vegas #1853	4001 Losee Road North Las Vegas, NV 89030	3273	36.4475	-114.851388	City of North Las Vegas
38	Rinker Materials Turnberry Plant	2777 Paradise Road Las Vegas, NV 89109	3273	36.13952	-115.15392	Clark County
39	Service Rock Products Inc. 4th Street	8350 4th Street Henderson, NV 89015	3273	36.041111	-114.981666	City of Henderson
40	Service Rock Products Inc. Las Vegas	800 Feet S. of Intersection of Cactus Road and Pollock Drive Las Vegas, NV 89102	3273	35.995833	-115.143611	Clark County
41	Service Rock Products Inc. Lone Mountain NV Facility	10815 W. Washburn Las Vegas, NV 89149	3273	36.253056	-115.343611	Clark County
42	Service Rock Products Inc. Sloan	14575 Arville Street Las Vegas, NV 89124	3273	35.930833	-115.198888	Clark County
43	Silver State Materials	450 Eastgate Road Henderson, NV 89014	3273	36.058346	-115.019958	City of Henderson
44	Silver State Materials	143 W. Gowan Road North Las Vegas, NV 89030	3273	36.224802	-115.141189	City of North Las Vegas
45	Silver State Materials	Range Road Las Vegas, NV 89115	3273			Clark County
46	Southern Nevada Paving (DBA Bardon Materials)	Summerlin Parkway and Interstate 215 Summerlin Asphalt Plant Las Vegas, NV 89145	2951	36.173889	-115.338055	City of Las Vegas
47	Sparkletts Drinking Water Corp.	4225 W. Desert Inn Road Las Vegas, NV 89102	2086	36.129942	-115.19618	Clark County
48	Sparkletts Water Systems Aqua Vend	3140 Polaris Suite 10 Las Vegas, NV 89102	7389	36.132592	-115.185412	City of Las Vegas
49	Spartan of Nevada Inc.	2441 W. Desert Inn Road Las Vegas, NV 89109	3088	36.129786	-115.175299	Clark County
50	Thatcher Co. of Nevada	850 W. Lake Mead Drive Henderson, NV 89014	2819	36.032881	-115.01334	City of Henderson
51	Thermo Fluids Inc. Antifreeze Services	4000 Arcata Way North Las Vegas, NV 89030	2899	36.232475	-115.119344	City of North Las Vegas
52	Titanium Metals Corp	8000 W. Lake Mead Parkway Gate 3 Henderson, NV 89015	3339	36.046667	-115.000555	City of Henderson
53	Tronox LLC	8000 W. Lake Mead Parkway Henderson, NV 89015	2819	36.04792	-115.0039	City of Henderson
54	Universal Urethane Inc.	4201 E. Lone Mountain Road North Las Vegas, NV 89030	3086	36.247869	-115.083633	City of North Las Vegas
55	Washington Group International	4610 N. Grand Canyon Drive Las Vegas, NV 89129	3273	36.244722	-115.30614	Clark County
56	White Cap Construction Supply (WC0059)	2437 1/2 Losee Road North Las Vegas, NV 89030	3449	36.203766	-115.137466	City of North Las Vegas
57	Young Electric Sign Co.	5119 S. Cameron Street Las Vegas, NV 89118	3993	36.096456	-115.202741	Clark County

Note:

(1) Data on EPA website was not verified. Historically, many businesses listed on the EPA website no longer exist, as the data is not regularly purged.



Legend

- Industrial Facilities Subject to Section 313
- Hazardous Waste Treatment, Disposal and Recovery Facilities
- Washes
- Railroads
- Streets
- Airports

Figure 8-1

INDUSTRIAL FACILITY LOCATIONS

- MBI Incorporated
  1353 Arville Street
  Las Vegas, NV 89102

- Merry X-ray Corporation
  4070 Schiff Drive
  Las Vegas, NV 89103

- Thermo Fluids Incorporated
  9 West Delhi Avenue
  North Las Vegas, NV 89032

- Thermo Fluids Incorporated
  4000 Arcata Way
  North Las Vegas, NV 89030

A map identifying the locations of these facilities is shown on **Figure 8-1**.

8.2.4 Other Industrial Facilities that Contribute A Substantial Pollutant Load

The MS4 Co-Permittees have not identified any facilities other than those already identified in the above categories that are contributing a substantial pollutant loading to the municipal storm sewer system. However, many industrial facilities in addition to those listed above are being inspected (see **Section 8.3**). In the coming permit year the Co-Permittees will develop criteria for determining whether other industrial sites are contributing a substantial pollutant load to the MS4.

8.2.5 Conclusion

This section completes the requirement to identify industrial facilities subject to Section 313 of SARA Title III; municipal landfills; hazardous waste treatment, and disposal facilities; and other industrial facilities determined by the Co-Permittees to be potential sources of substantial pollutant loading. The inventory of regulated industrial sites was used by the Co-Permittees in developing their industrial site inspection and management programs. The industrial pretreatment program staffs that conduct the industrial inspections for the MS4 program already routinely inspect these facilities. No special inspection requirements have been adopted for these facilities.

8.3 INDUSTRIAL FACILITY INSPECTION PROGRAM

Each MS4 Co-Permittee has developed an industrial facility monitoring and control program as required by the Las Vegas MS4 NPDES Permit. Each city is using its industrial pretreatment program staff to conduct stormwater inspections during their regular site visits. Clark County has entered into an inter-local agreement with CCWRD to allow its industrial pretreatment program inspectors to inspect sites in unincorporated Clark County. The Cities of Las Vegas, North Las Vegas, and Henderson are inspecting all applicable industrial sites visited by their pretreatment inspectors. Clark County is currently only inspecting those industrial sites specifically called out by the permit.

The COH's stormwater quality staff is currently working with the Building and Fire Safety Department to incorporate the fire safety inspectors into the industrial facility inspection program. The inspectors will identify and inspect facilities identified by the City as potential substantial contributors of pollutants to the MS4. The identification of facilities, inspection procedures, and enforcement of the industrial inspection program will be based on the hazardous materials requirements in the 2006 International Fire Code. The City plans to make the changes to the inspection program, finalize and implement a training program for the inspectors, and set up a reporting and tracking system for the inspection process in the next fiscal year.

8.3.1 Industrial Facility Inspector Training Materials

Training materials for industrial facility inspectors were developed in the 2004-2005 permit year. The training presentation includes a description of the Las Vegas MS4 NPDES Permit and the Las Vegas Valley SWMP. The local ordinances and the Industrial Facility Monitoring and Control Plans for each jurisdiction are described. A list of Section 313 facilities in the Las Vegas Valley was organized by jurisdiction. Contact information, such as names and phone numbers, for MS4 Co-Permittees and other interested parties were given for the inspectors' information. Training materials have been updated and customized to individual entities as needed.

8.3.2 Industrial Facility Inspector Training

Pretreatment inspectors performing stormwater inspections for CCWRD, CLV, CNLV and COH have been adequately trained. CLV did not conduct formal training sessions in this permit year because all inspectors had been previously trained. Inspector activities are informally discussed on a regular basis. COH is in the process of developing a stormwater training program for its Fire Safety inspectors.

8.3.3 Inspections

Table 8-2 lists the industrial facility inspections performed by each of the Co-Permittees in the 2006-2007 permit year. Documentation of the inspections performed by Clark County, CLV, CNLV and COH are provided in **Appendix J**.

The COH Utility Services Department – Pretreatment Division, currently inspects at least annually the sites identified on the SARA Section 313 list, as well as those identified with a potential to discharge a substantial pollutant load to the MS4. One hundred fifteen industrial sites are included in its inspection program.

The CLV inspected the five existing facilities identified by Section 313 of Title III of SARA that are within its jurisdiction. Two of the facilities were inspected twice, two were inspected once, and one was found to be out of business. No stormwater violations were found. Stormwater inspections were also conducted by the Industrial Waste Section during normal inspections for compliance with non-domestic discharges to the sanitary sewer. These inspections are summarized as follows:

Table 8-2

Summary of 2006-2007 Industrial Facility Inspections

Jurisdiction	Location	Date	Results / Violations	Action Taken	Follow-Up Action
Clark County	MCC - Uniflex	01/17/2007	No stormwater violations noted.		
	Service Rock Products	01/17/2007	No stormwater violations noted.		
	Rebel Oil	06/28/2007	No stormwater violations noted.		
City of Las Vegas	Anderson Dairy 801 Searles Avenue Las Vegas, NV 89101	12/29/2006	No stormwater violations noted.		
		06/15/2007	No stormwater violations noted.		
	Las Vegas Finishing LLC 3261 Builders Avenue Las Vegas, NV 89101	12/21/2006	No stormwater violations noted.		
		6/05/2007	No stormwater violations noted.		
City of Las Vegas (Continued)	Nevada Ready Mix 601 West Bonanza Road Las Vegas, NV 89106	6/15/2007	No stormwater violations noted.		
	Southern Nevada Paving Beltway I-215 and Summerlin Parkway Las Vegas, NV 89145	6/15/2007	No stormwater violations noted.		
	Sparkletts Water System Aqua Vend 3410 Polaris Avenue Las Vegas, NV 89102		Out of business. Inspection impossible.		
	16 inspections at Class I permitted facilities	-		All stormwater issues satisfactorily resolved	
	178 inspections at Class II permitted facilities	-		All stormwater issued satisfactorily resolved	
	42 complaint calls at industrial or residential sites	-		All stormwater issues satisfactorily resolved	
City of North Las Vegas	There were 1,444 industrial stormwater inspections and 41 illicit discharge report responses for the 2006-2007 permit year.				
City of Henderson	BMI Tenant - Chemical Lime Company	06/06/2007	No stormwater violations noted.		
	BMI Tenant - Saguaro Power Company	06/06/2007	No stormwater violations noted.		
	Pioneer Amerigas LLC	06/07/2007	No stormwater violations noted.		
	Titanium Metals Corporation	06/12/2007	No stormwater violations noted.		
	Tronox (formerly Kerr-McGee)	06/13/2007	No stormwater violations noted.		

- 16 stormwater inspections were performed at Class I permitted facilities,
- 178 stormwater inspections were performed at Class II permitted facilities, and
- 42 stormwater-related complaint calls were responded to.

In all cases, all stormwater issues that were discovered have been satisfactorily resolved.

The CNLV pretreatment inspector performed a total of 1,444 stormwater inspections associated with their normal inspections for compliance with regulations for discharges to the sanitary sewer system. All stormwater issues identified were satisfactorily resolved.

CCWRD conducted inspections of the three SARA Title III facilities in the unincorporated portion of Las Vegas Valley. All stormwater issues identified were satisfactorily resolved. Clark County is working on revising the inter-local agreement with CCWRD to allow them to inspect more sites in the 2007-2008 permit year. Eight new inspections have been performed thus far in the new permit year.

In response to direction received from NDEP after the EPA audit, CCDAQEM devised a multi-faceted strategy to implement an expansion of its industrial stormwater inspection program. Its elements include:

- Development of a more extensive inspection form,

- Increase in funding for, and expansion of the role of, the CCWRD inspection program, including modification of the inter-local agreement to reflect these changes,

- Categorizing and prioritizing the industries, facilities and sites to be inspected to include those that can be inspected (a) in the near term and at little or no additional cost relative to the current inter-local agreement and (b) in the longer term and likely incurring significant additional costs. This may include conducting inspections on an “industrial park” basis rather an only on an individual facility basis.

Elements of industrial program enhancements will be finalized in the coming permit year.

The BMI Complex is a County island within the COH boundaries that contains heavy industrial sites. The inter-jurisdictional nature of the site has created some confusion in the past over inspection responsibilities. Because of the site design conditions, there is rarely runoff from this complex to the MS4 system. The sanitary sewer system discharges to COH facilities and is inspected by COH pretreatment inspectors. However, these inspectors are not authorized to inspect the stormwater system. As described above, COH Fire Department inspectors are being integrated into the MS4 industrial inspection program, and have the authority to inspect the BMI Complex perimeter for illegal discharges. The BMI Complex has an individual stormwater permit with the State, and monitors and reports any violations to NDEP under this permit. Nonetheless, NDEP has indicated that the local entities must be conducting their own industrial site stormwater inspections. COH and the County have held discussions to coordinate inspections at the BMI Complex.

Inspections of the industrial facilities for compliance with the MS4 stormwater regulations will continue in the 2007-2008 permit year. The inspectors will fill out inspection forms after completing the inspection and will forward the form for recordkeeping and enforcement if necessary. CLV inspection forms are filed with the Industrial Waste Section, which also performs the inspection and enforcement.

SECTION 9

Construction Site Program

Section 9
Construction Site Program

9.1 INTRODUCTION

This section describes the Construction Site Program required by paragraph 4.9 of the permit and described in Section 9 of the SWMP. The program consists of required elements to minimize the impacts of new construction on the quality of downstream receiving waters. The Construction Site Program provides the Co-Permittees with the information necessary to enforce their local ordinances prohibiting discharge of pollutants to the MS4 system. This local program complements, but is independent of, the State's construction site permitting program.

9.2 DEVELOPER NOTIFICATION PROGRAM

In paragraph 9.2 of the SWMP, the Co-Permittees committed to notifying developers of the requirements of the State's construction site permitting program. This is intended to improve compliance with the NDEP construction site program.

Table 9-1 describes the program procedures each Co-Permittee has developed to notify developers, engineers, and contractors of the requirements of the NDEP's Construction Site BMP Program. No significant changes were made to these procedures during the 2006-2007 permit year.

Table 9-1

Summary of Procedures for Notifying Developers of Need for NDEP Construction Permit

Co-Permittee	Procedure
Clark County	• Distribute brochure on need for NDEP construction permit
	• Standard comment on Grading Permit review letter notifying developer of need for NDEP construction permit
	• Standard general condition for construction plans or specifications on Public Works projects assigning the owner or contractor the responsibility for obtaining the NDEP construction permit
	• CCDAQEM includes statement on dust permit applications that developer needs to submit a Notice of Intent (NOI) to NDEP for construction permit
City of Las Vegas	• Standard comment on Grading Permit review letter notifying developer of need for NDEP construction permit
	• Standard general condition for construction plans or specifications on Public Works projects assigning the owner or contractor the responsibility for obtaining the NDEP construction permit
City of North Las Vegas	• Standard comment on Drainage Study review letter notifying developer of need for NDEP construction permit
	• Standard general condition for construction plans or specifications assigning the owner or contractor the responsibility for obtaining the NDEP construction permit
City of Henderson	• Standard comment on Drainage Study review letter notifying developer of need for NDEP construction permit
	• Standard general condition for construction plans or specifications assigning the owner or contractor the responsibility for obtaining the NDEP construction permit

9.3 CONSTRUCTION SITE BMP MANUALS

Section 9.3 of the SWMP requires the Co-Permittees to review existing BMP manuals addressing construction practices and recommend modifications to them to be pertinent to local conditions if necessary. This task was completed during the 2003-2004 permit year. No modifications to BMP designs were proposed during the 2006-2007 permit year.

The SQMC formed a Construction Program Working Group (CPWG) made up of representatives of all the Co-Permittees to develop enhancements to the current construction site runoff management program. One of the tasks of this group is to recommend improvements to BMP guidance currently available to contractors in the Las Vegas Valley area. It is likely that this improved guidance will be incorporated into the CCRFCD Hydrologic Criteria and Drainage Design Manual.

The SQMC is in discussions with the Truckee Meadows MS4 Permittees to prepare a Nevada BMP Field Guide that could be used by construction site inspectors throughout the state. CCRFCD has committed to contribute $10,000 to the cost of printing the Field Guide. Preparation of the Field Guide is being managed by the Truckee Meadows MS4 Permittees.

9.4 CONSTRUCTION SITE INSPECTION PROGRAM

This section summarizes the inspection component of the Construction Site Program for the Las Vegas Valley MS4 SWMP. A construction site inspection program is required by the MS4 permit to assure that local ordinances are effectively prohibiting discharge of pollutants to the drainage system and are not being violated. Based on Section 9 of the SWMP, the construction site inspection program consists of two parts: routine inspections and post-storm inspections.

9.4.1 Routine Inspections

During the 2004-2005 permit year, construction site inspection protocols were developed and an inspector training program was developed and implemented. During the 2005-2006 permit year, the field component of the construction site inspection program was initiated.

CCDAQEM undertook inspections of active construction sites in unincorporated Clark County, CLV and CNLV, through an interagency agreement that included the two cities, the County and CCRFCD. CCDAQEM inspectors visit construction sites as part of the air quality permitting program, and have been trained in performing stormwater inspections as well. Simple checklists are completed by inspectors, documenting site information and any evidence of the potential for pollutants to leave the site in violation of local ordinances. CCDAQEM inspectors forward information on any problems to CCRFCD, which then distributes the information to the appropriate local entity. During the permit year, improvements were made in the process by which information gathered by inspectors was transferred to appropriate personnel for follow-up. In particular, the process for transferring inspection information from the inspectors to CCRFCD to the entities with jurisdiction was streamlined. Improvements were made both at the request of inspectors and in response to comments in the EPA audit of the MS4 permit.

The data in **Table 9-2** summarizes the CCDAQEM construction inspection program for the 2006-2007 permit year.

Table 9-2

Summary of Construction Site Inspections Conducted by CCDAQEM in Clark County, Las Vegas and North Las Vegas

Category	Number	Explanation
Inspections conducted	4,468	Actual inspections conducted
Sites Passing	4,071	Inspection was completed and site had no stormwater issues
Sites Failing - Serious	23	Inspection was completed and problem had to be forwarded to enforcement
Sites Failing - Minor	632	Inspection was completed and problem could be resolved by the inspector and site operator

The COH conducted construction site inspections with staff of the Public Works Department – Quality Control Division. All active construction sites received at least one inspection during the permit year. A training session for the current and new inspectors was provided on February 6, 2007, and a copy of the sign in sheet as well as training presentation is included in **Appendix K**. **Table 9-3** summarizes the results of the inspection process for the 2006-2007 permit year.

The City's process includes sending a letter to potential violators after an initial inspection informing them of the problem and notifying them that a follow-up inspection will occur shortly. The City's objective is to re-inspect failing sites within about 21 days to determine whether problems found in the initial inspection had been addressed. This process has been very effective; problems identified in the inspections were corrected at each site. The City has incorporated a reporting process to differentiate between inspections that identified a potential to violate the local stormwater ordinance from those identifying actual violations. The COH is considering other improvements to its program in coming years including incorporating Building Department inspectors as part of the program, reducing the turnaround time for re-inspections, ensure that the notification letters are sent to the correct address and using feedback from the inspectors to update the training based on experience gained last year, and update ordinances and other regulatory mechanisms to require erosion and sediment controls.

Documentation of the construction site inspections performed by CCDAQEM and the COH for the 2006-2007 permit year are provided in **Appendix K**.

Table 9-3

Summary of Construction Site Inspections Conducted by the City of Henderson

Category	Number	Explanation
Inspections Scheduled	1,277	Sites believed to have active construction for which an inspection was scheduled
Inspections Conducted	1,272	Actual inspections conducted
Inspections Cancelled	5	Inspections requested, but subsequently cancelled for various reasons; no inspection took place
Sites Passing	1,062	Inspection was completed and no potential to violate code/site had no stormwater issues
Sites Failing	54	Inspection was completed and problems of varying degrees were found, ranging from serious (e.g., a discharge was occurring and needed to be resolved immediately) to minor (e.g., no discharge, but site conditions should be changed to prevent a future discharge)

9.4.2 Post–Storm Inspections

Post-storm inspections were performed by MWH at selected construction sites and detention basins after a storm event. These inspections were completed to determine whether illegal discharges might be occurring. Approximately 10 construction sites and five detention basins were selected for post-storm inspections. The list of selected construction sites was updated on a need basis due to changes in construction activities.

9.4.2.1 Construction Sites

Construction sites were selected for inspection by MWH, according to the prioritization process as described in the *2003-2004 Annual Report*. A record of this process and inspection protocol can be found in the *2003-2004 Annual Report*.

In 2006-2007, ten construction sites were inspected after three separate storms. It was found that three sites that were selected for the construction site inspection program were no longer active. At the end of the monitoring year, three more sites were chosen for inspection for the 2006-2007 monitoring period. During the inspection period, there were four sites that showed evidence of minor sediment discharged from the property, mostly in the form of sand and gravel. The discharge of sediment or other pollutants would represent a violation of local ordinances if appropriate BMPs were not in place and adequately maintained. The post-storm inspection program did not check for BMP placement or condition. A list of the construction sites that were inspected in 2006-2007 is included in **Table 9-4**.

Table 9-4

Construction Sites for Post-Storm Monitoring

Jurisdiction	Project Name	Address / Location	Company	Date Inspected
Clark County	Sunset Pass	Wigwam Avenue and Decatur Boulevard	Southwest Homes	7/18/06
	Hacienda Estates	Marco Rossi Court and Spring Valley Parkway	Pacific Coast Development	10/06/06 10/16/06
	Four Seasons Medical Group Nevada	Durango Drive and Spring Valley Parkway	CSA Service Center, LLC	10/06/06 10/16/06
City of Las Vegas	Timothy Schuster	Tee Pee Lane and Florine Avenue	N/A	10/07/06 10/14/06
	Psychiatric Hospital	Oakey Boulevard and Jones Boulevard	Sletten Construction	07/18/06
City of North Las Vegas	Cambria-Tousa Homes	Commerce Street and Ann Road	Engle Homes	07/18/06
	Northpoint Office Park	Alexander Road and Martin Luther King Boulevard	SR Construction	07/18/06
	Temple Duplexes	Centennial Parkway and Commerce Street	Temple Development Corporation	07/18/06
	North Ranch	Centennial Parkway and Goldfield Street	DR Horton	02/20/07
City of Henderson	Henderson Industrial Park	Middlegate Road and Empire Mesa Way	Henderson Industrial Park, LLC	10/15/06 10/24/06 02/20/07
	Black Mountain Industrial Center	Eastgate Road and Commercial Way	Howell and Brothers Construction	02/20/07

9.4.2.2 Detention Basins

The objective is to inspect detention basins that are in a position to capture sediment from upstream construction sites, as a measure of the potential contribution of upstream construction activity to the drainage system. The selection criteria were described in the *2003-2004 Annual Report*. The five basins inspected were:

- Upper Flamingo Detention Basin
- Lower Las Vegas Wash Detention Basin
- Meadows Detention Basin
- Lower Duck Creek Detention Basin
- Gowan North Detention Basin

Post-storm inspections found the accumulation of sediment at Upper Flamingo Detention Basin and Meadows Detention Basin due to construction projects that are occurring in the basins. At Gowan North Detention Basin, a dog park and soccer field are located inside the basins. There was an accumulation of debris noted in the inlet and outlet boxes that did not appear to be construction related.

The potential for continuing the post-storm construction program in the 2007-2008 permit year will be considered by the Co-Permittees. It is possible that the success and comprehensiveness of the routine construction site inspection program, combined with the program improvements being developed by the CPWG, will make this program obsolete.

9.5 CONTRACTOR EDUCATION AND TRAINING PROGRAM

Section 9.5 of the SWMP describes requirements for developing and implementing a contractor education and training program. In compliance with the SWMP, in the 2006-2007 permit year, Co-Permittees conducted eight sessions of a contractor training workshop, with two sessions each held on November 15 and 16, 2006, and again on May 9 and 10, 2007. The workshops were hosted by LVVWD and conducted jointly by NDEP, CCRFCD, CLV and CNLV. They covered aspects of local stormwater ordinances, NDEP construction permit requirements and BMPs for construction sites. A total of over 500 construction industry personnel attended a workshop during the permit year. The attendance lists from these workshop sessions are contained in **Appendix K**.

CCDAQEM prepared a stormwater module for the dust permit training classes provided to contractors in Las Vegas Valley. The "dust class" is a 4-hour training session with a test at the end that informs contractors of compliance requirements and BMP, associated with dust and air quality regulations. Every construction site ¼ acre or larger must have someone onsite with a "dust card" verifying that they have been through the training. Recertification is required every three years. About 100 water truck operators, general construction workers and site supervisors are trained in dust classes each week. The stormwater module was incorporated into the dust class curriculum in the 2006-2007 permit year, and focuses on BMPs and construction practices. It is seen as a supplement to, not a substitute for, the more comprehensive contractor training workshops.

9.6 CONSTRUCTION PROGRAM WORKING GROUP

In order to more efficiently address the EPA audit issues concerning construction sites, the CPWG was formed with the purpose of reviewing the existing regulations, inspection, and enforcement procedures governing the construction program. The CPWG meets once a month with representatives from Clark County, CLV, CNLV, and COH.

The goal of the CPWG is to improve the inspection and enforcement procedures in order to improve compliance with local ordinances prohibiting the discharge of pollutants to the stormwater system. One direct outcome from this group's review of the current procedures is the addition of the "potential to violate" action item in the construction inspection form used by CCDAQEM, which performs the inspections for Clark County, CLV and CNLV. Another improvement to the current procedures recommended by the CPWG will be the way the entities are notified of potential problems and the type of inspections reported for follow up. Before, CCDAQEM inspected the sites and any violation notices would get forwarded to CCRFCD, and then CCRFCD would notify the appropriate entity. Now CCDAQEM will continue to notify CCRFCD while also notifying the particular entity directly. CCDAQEM will continue to notify the entities of any violation events and will also report any "potential to violate" events as well.

An objective of the CPWG is to provide more consistency between the CCDAQEM and COH inspection programs. Discussions are occurring at a staff level to work out those details. It is likely that CCDAQEM will adopt some of the procedures currently used by COH to conduct and document construction site inspections, in order to make the programs more compatible across the Valley.

The CPWG will also address the need for municipal Co-Permittees to adopt area ordinance or other regulatory mechanisms to require erosion control plans for new construction.

SECTION 10

Stormwater Management Program

Section 10
Stormwater Management Program

10.1 INTRODUCTION

The permit (paragraph 4.1) requires that the Co-Permittees develop, implement and enforce a Stormwater Management Plan (SWMP). The SWMP that applies to the 2006-2007 permit year was submitted to NDEP on September 29, 2003.

The SWMP was approved by NDEP with comments and additions on October 21, 2003. A copy of the current SWMP and approval letter can be found in **Appendix B**.

10.2 ANNUAL UPDATE TO SWMP

Permit paragraph 4.11.1 requires that the Co-Permittees complete an annual review of the SWMP as part of the annual report. A detailed review of the SWMP was performed during the course of supporting and then responding to the EPA audit of the MS4 permit program. The EPA audit report, dated April 20, 2006, indicated positive attributes, program deficiencies, and potential permit violations. The Co-Permittees invested considerable effort in assessing their programs in light of the audit findings and preparing a formal response. The audit response was submitted on August 22, 2006, and is included in **Appendix C**.

As a result of their program review, the Co-Permittees prepared a formal SWMP Update to document the program status and proposed changes as of the end of the 2005-2006 permit year. The Updated SWMP is contained in **Appendix B**.

No formal modifications were made to the SWMP during the 2006-2007 permit year. However, the EPA permit audit process that was started in 2005 concluded in 2007 with a letter from NDEP to the Co-Permittees outlining required MS4 program improvements. The Co-Permittees responded to NDEP in June 2007, proposing a process for addressing the program issues raised by NDEP. This correspondence is included in **Appendix C.**

In June 2007, the Co-Permittees committed to investigating and implementing the following enhancements to the SWMP in the 2007-2008 permit year.

- Construction Site Runoff Management Program – A Construction Program Working Group was formed to develop improvements to the current construction site inspection and management program implemented by CCDAQEM and COH. Specifically this working group is assigned to address the following requirements from NDEP.

  (a) An ordinance or other regulatory mechanism to require erosion and sediment controls, as well as sanctions to ensure compliance, to the extent allowable under State or local law;

  (b) Requirements for construction site operators to implement appropriate erosion and sediment control best management practices;

(c) Requirements for construction site operators to control waste such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste at the construction site that may cause adverse impacts to water quality;

(d) Procedures for site plan review which incorporate consideration of potential water quality impacts;

(e) Procedures for receipt and consideration of information submitted to the public;

(f) Procedures for site inspection and enforcement of control measures.

- Post-Construction Runoff Management Program – Two subcommittees were formed to develop recommendations for improving the existing post-construction runoff management program. First, a Detention Basin Working Group was formed to research methods for improving the water quality performance of existing and future regional detention basins. This will include implementing a pilot program for investigating effective detention basin retrofit approaches, including construction and monitoring of detention basin retrofits.

  Second, a Development Guidelines Working Group was formed to develop specific recommendations for components of a post-construction runoff management program that would meet the following requirements as outlined by NDEP.

  (a) Develop and implement strategies which include a combination of structural and/or non-structural BMPs appropriate for the permittees' community;

  (b) Use an ordinance or other regulatory mechanism to address post-construction runoff from new development and redevelopment projects to the extent allowable under State or local law;

  (c) Ensure adequate long-term operation and maintenance of BMPs.

  (d) Incorporate controls that provide for or address:

  - Runoff from commercial and residential areas;
  - Planning procedures;
  - Design standards, BMP fact sheets or guidance manuals that include site design;
  - Tracking and maintenance for structural BMPs;
  - Training and education;
  - Estimates of expected reductions in loads.

- Industrial Runoff Management Program – NDEP required the Co-Permittees to make the following improvements to their industrial runoff management programs.

  (a) Develop an inventory and plan for industrial facilities that are or may be contributing a substantial loading to the MS4;

(b) Revise the industrial facility monitoring and control program to include any newly identified facilities, and commence monitoring activities at these industrial facilities.

Clark County and the three cities have made enhancements to their industrial site inspection programs during the 2006-2007 permit year as described in **Section 8**. Additional improvements to meet NDEP's requirements are being developed during the first half of the 2007-2008 permit year, and will be incorporated into the SWMP at the end of the year.

- Operation and Maintenance of Treatment Systems and Controls – NDEP issued the following requirements.

  (a) Provide a plan to address or remove accumulated sediments in regional detention basins;

  (b) Develop and implement a specific schedule and protocol for inspecting and cleaning regional detention basins.

  CCRFCD already has adequate policies in place regarding the inspection and cleaning of regional detention basins, and has an adequate funding source for these activities. No additional programs are required by the Co-Permittees to address this issue.

The Co-Permittees agreed to determine the specific program elements they will adopt by December 19, 2007, and to have the new programs implemented by the end of the next permit year in June 2008. This coincides with the end of the current 5-year MS4 permit.

10.3 PERMIT YEAR 5 GOALS

The goals to be completed for Permit Year 5 (July 1, 2007 - June 30, 2008) as identified in the SWMP and in subsequent commitments made to NDEP by the Co-Permittees are shown in **Table 10-1**.

Table 10-1

Permit Year 5
Measurable Goals and Milestones

	Section	Measurable Goal / Milestone
2	Legal Authority	• Review and update ordinances and regulations if necessary • Adopt ordinance to require erosion and sediment controls • Adopt ordinance to establish post-construction runoff controls
3	Source Identification	• None
4	Stormwater Monitoring Program	• Develop monitoring program for Year 5 of permit
5	Public Outreach and Education Program	• Attend three community events and distribute materials
		• Produce Flood Channel documentary
		• Produce or update and broadcast one PSA
		• Maintain Las Vegas Valley stormwater website
		• Make five presentations in public schools
		• Implement storm drain inlet marking program
		• Track effectiveness of public outreach programs
6	Structural and Source Control Measure Program	• Implement storm drain system cleaning program developed in Permit Year 1, as amended
		• Implement street sweeping program developed in Permit Year 1, as amended
		• Review effectiveness of data collection and management for maintenance activity tracking, and make improvements if warranted
		• Conduct detention basin retrofit pilot program (DGWG) • Develop and implement post-storm construction program (DBWG) as required by NDEP
7	Illicit Discharge Detection Program	• Conduct dry weather monitoring per Section 4 of the SWMP
		• Conduct semi-annual field inspections of open channels
		• Review local Spill Response Strategy to identify and implement improvements
		• Conduct municipal maintenance staff training programs
8	Industrial Facility Monitoring and Control Program	• Update industrial facility map
		• Continue program for conducting industrial site inspections and tracking inspection reports and follow-up activities, as well as enforcement ordinances
		• Determine industrial sites that are contributing a substantial pollutant load to the MS4
		• Review and as necessary, refine tracking and data management methods
		• Conduct industrial inspector training course as needed
		• Use monthly SQMC meetings to coordinate with NDEP on State industrial programs
9	Construction Site Program	• Conduct semi-annual inspections and post-storm inspections
		• Conduct and track construction site inspections
		• Develop and implement construction site program improvements as required by NDEP (CPWG)
		• If necessary, modify standard BMP designs for local conditions
		• Conduct one contractor/developer training workshop
		• Provide ongoing training for local construction site inspectors
		• Review and improve tracking and recordkeeping processes
		• Use monthly SQMC meetings to coordinate with NDEP on State construction site programs

September 2007

Las Vegas Valley NPDES Municipal Stormwater Discharge Permit

Annual Report 2006-2007

Clark County Regional Flood Control District

MWH

SEPTEMBER 2007

Las Vegas Valley NPDES Municipal Stormwater Discharge Permit

Appendices 2006-2007

STORM DRAINS CARRY UNTREATED WATER TO LAKE MEAD
KEEP 'EM Clean
Stormwater Quality Management Committee

CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT

MWH

Appendices Table of Contents

Appendix A

APPENDIX A

LAS VEGAS VALLEY MUNICIPAL SEPARATE STORM SEWER SYSTEM NPDES PERMIT

Permit No. NV0021911

National Pollutant Discharge Elimination System

Permit for Discharges from Municipal Separate Storm Sewer Systems

Authorization to Discharge under the National Pollutant Discharge Elimination System

In compliance with the provisions of the Clean Water Act (CWA), as amended, (33 U.S.C. 1251 et. seq.), except as provided in Part 1.3 of this permit, and Chapter 445A of the Nevada Revised Statutes, the following Permittees are authorized to discharge municipal stormwater runoff to the Las Vegas Wash, its tributaries, and other waters of the United States in accordance with the conditions and requirements set forth herein:

> The City of Henderson, City of Las Vegas, City of North Las Vegas, Clark County, Clark County Regional Flood Control District, and the Nevada Department of Transportation (Permittees)

This permit becomes effective on JUNE 19, 2003.

This permit and the authorization to discharge expire at midnight, JUNE 18, 2008.

Signed and issued this 19th day of JUNE, 2003.

Clifford M. Lawson

Clifford M. Lawson
Staff II Associate Engineer
Bureau of Water Pollution Control

1 Coverage under this Permit

1.1 Permit Area

1.1.1 This permit covers discharges into receiving waters of the United States within the City of Henderson, City of Las Vegas, City of North Las Vegas, and Clark County not including Boulder City, Laughlin, Mesquite, and Nellis Air Force Base.

1.2 Coverage

1.2.1 This permit authorizes discharges of stormwater from the Permittees municipal separate storm sewer system (MS4s), as defined in 40 Code of Federal Regulations (CFR) §122.26. The Permittees are authorized to discharge in accordance with the terms and conditions of this permit.

1.2.2 The following are types of authorized discharges:

1.2.2.1 *Stormwater discharges.* This permit authorizes stormwater discharges to waters of the United States from the Permittees MS4s identified in Section 1.2.1, except as excluded in Section 1.3.

1.2.2.2 *Non-stormwater discharges*. The Permittees are authorized to discharge the following non-stormwater sources provided that the Nevada Division of Environmental Protection (NDEP) has not determined these sources to be substantial contributors of pollutants to the Permittees MS4:

- Water line flushing
- Diverted stream flows
- Rising ground waters
- Uncontaminated ground water infiltration (infiltration is defined as water other than wastewater that enters a sewer system, including sewer service connections and foundation drains, from the ground through such means as defective pipes, pipe joints, connections, or manholes. Infiltration does not include, and is distinguished from, inflow.)
- Discharges from potable water sources
- Foundation drains
- Footing drains
- Air conditioning condensate
- Irrigation water (to include lawn watering and landscape irrigation)
- Springs
- Water from crawl space pumps
- Individual residential car washing
- Flows from riparian habitats and wetlands
- Dechlorinated swimming pool discharges
- Street wash water
- Discharges or flows from fire fighting activities

1.3 Limitations on Coverage

1.3.1 This permit does not cover the following:

1.3.1.1 Discharges of non-stormwater, whether or not mixed with stormwater, unless such non-stormwater discharges are:

1.3.1.1.1 Currently covered under a separate National Pollutant Discharge Elimination System (NPDES) permit, or

1.3.1.1.2 Included in 1.2.2.2 or determined not to be a substantial contributor of pollutants to waters of the U.S. by NDEP.

1.3.1.2 Stormwater discharges currently covered under another permit.

1.3.1.3 Discharges that do not comply with the Nevada's anti-degradation policy for water quality standards.

1.3.2 Stormwater discharges associated with industrial activity as defined in 40 CFR §122.26(b)(14)(i)-(ix) and (xi) are identified and permitted through a separate NPDES General Industrial Activity permit.

1.3.3 Stormwater discharges associated with construction activity as defined in 40 CFR §122.26(b)(14)(x) or 40 CFR §122.26(b)(15) are identified and permitted through a separate NPDES General Construction Activity permit.

1.3.4 If it is determined that Permittees discharges cause or contribute to instream exceedances of water quality standards, NDEP may require corrective action or an application for a separate individual permit or alternative permit if an MS4 is determined to cause an instream exceedance of water quality standards.

1.4 Annual Fee

1.4.1 The Permittees shall remit an annual review and services fee in accordance with Nevada Administrative Code 445A.232 starting July 1, 2004 and every year thereafter until the permit is terminated.

2 Reapplication Requirements

2.1 Deadlines for Reapplication

2.1.1 The Permittees shall submit an application, or other form of written correspondence requesting permit coverage, not later than 180 days before this permit expires.

2.1.2 *Additional Designations after the Date of Permit Issuance.* Public entities not covered by this permit may apply for coverage as an additional Permittee. Following authorization by existing Permittees, the entity shall submit an application to NDEP along with a written request for inclusion. NDEP reserves the right to take appropriate enforcement actions for any unpermitted discharges.

2.1.3 *Submitting a Late Application*. The Permittees are not prohibited from submitting an application after the dates provided in 2.1. NDEP reserves the right to take appropriate enforcement actions for any unpermitted discharges.

2.2 Contents of the Application

2.2.1 The Application must be signed in accordance with Part 6.7 of this permit and must include the following information:

2.2.2 *Information on the Permittees*:

2.2.2.1 The name of the Permittees municipal entity/state agency/federal agency, mailing address, and telephone number;

2.2.3 *Information on the Municipal Separate Storm Sewer System:*

2.2.3.1 The name of the major receiving water(s) and an indication of whether any of the Permittees receiving waters are on the latest CWA §303(d) list of impaired waters.

2.2.3.2 Information on the Permittees' chosen best management practices (BMPs) and measurable goals, the Permittees timeframe for implementing each of the BMPs, and the person or persons responsible for implementing or coordinating the Permittees' Stormwater Management Program (SWMP).

2.3 Where to Submit

2.3.1 The Permittees are to submit the application, or other form of written correspondence requesting permit coverage, signed in accordance with the signatory requirements of Section 6.7 of this permit, to NDEP at the following address:

Stormwater Coordinator
Bureau of Water Pollution Control
Nevada Division of Environmental Protection
333 West Nye Lane
Carson City, NV 89706-0851

2.4 Permittees under a Single Permit

2.4.1 The Permittee may partner with other MS4s to develop and implement the Permittees SWMP. The description of the Permittees' SWMP must clearly describe which Permittees are responsible for implementing each of the control measures.

3 Special Conditions

3.1 Discharges to Water Quality Impaired Waters

3.1.1 *Applicability*: Based upon the year 2002-303(d) list and subsequent updates, the Permittees must evaluate whether stormwater discharge from any part of the MS4 significantly contributes directly or indirectly to the listing of a waterbody on the 303(d) list (i.e., impaired waterbody). If Permittees have discharges meeting this criterion, the Permittees must comply with Part 3.1.2; if the Permittees do not have discharges meeting this criterion, Part 3.1 does not apply.

3.1.2 If the Permittees have "303(d)" discharges described above, the Permittees must also determine whether a TMDL has been developed and approved by NDEP for the listed waterbody. If there is a TMDL, the Permittees must comply with Part 3.1.3; if no TMDL has been approved, the Permittees must comply with Part 3.1.4.

3.1.3 When a TMDL has been established as described in paragraph 3.1.2, the Permittees must notify NDEP if the TMDL includes a wasteload allocation applicable to stormwater discharges covered by this permit.

3.1.3.1 *Consistency with Total Maximum Daily Load (TMDL) Allocations*. If a TMDL is approved for any waterbody into which the Permittees discharge, the Permittees must:

3.1.3.1.1 Determine or report whether the approved TMDL is for a pollutant likely to be found in stormwater discharges from the Permittees MS4;

3.1.3.1.2 Determine or report whether the TMDL includes a pollutant load allocation (LA) or other performance requirements specifically for stormwater discharge from the Permittees MS4;

3.1.3.1.3 Determine or report whether the TMDL addresses a flow regime likely to occur during periods of stormwater discharge;

3.1.3.1.4 After the determinations above have been made and if it is found that the Permittees MS4 must implement specific LA provisions under the TMDL, assess whether the LAs are being met through implementation of existing stormwater control measures or if additional control measures are necessary;

3.1.3.1.5 Document all control measures currently being implemented or planned to be implemented. Also include a schedule of implementation for all planned controls. Document the calculations or other evidence that shows that the LA will be met;

3.1.3.1.6 Describe a monitoring program to determine whether the stormwater controls are adequate to meet the LA; and,

3.1.3.1.7 If the evaluation shows that additional or modified controls are necessary, describe the type and schedule for the control additions/revisions, and an analysis that demonstrates the overall effectiveness.

3.1.4 When a TMDL has not been established as described in paragraph 3.1.2, the Permittees must include a section in the annual report describing the condition for which the water has been listed, evaluating possible BMPs that might practicably be implemented, examining whether these BMPs would have a substantial effect on achieving compliance, and identifying any BMPs that are selected for implementation.

3.1.5 The SWMP shall identify additional BMPs, if appropriate, to help achieve the TMDL for phosphorus or ammonia loadings into Lake Mead and shall be submitted in accordance with section 4.1.2.

4 Stormwater Management Program. Permittees must comply with the following:

4.1 General Requirements: Develop, implement, and enforce a SWMP designed to reduce the discharge of pollutants from the Permittees MS4 to the maximum extent practicable (MEP) to protect water quality, and to satisfy the appropriate water quality requirements of the CWA;

4.1.1 Submit the SWMP to NDEP no later than October 1, 2003;

4.1.2 Fully implement the SWMP within three (3) years of the authorization date of this permit;

4.1.3 Identify the best management practices (BMPs) that the Permittees or another entity will implement;

4.1.4 Identify the measurable goals for BMPs, as appropriate, including the months and years in which the Permittees will undertake required actions;

4.1.5 Provide a rationale for how and why the Permittees selected each of the BMPs and measurable goals for the SWMP.

4.1.6 Implementation of best management practices consistent with the provisions of the stormwater management program as required by this permit constitutes compliance with the standard of reducing pollutants to the “maximum extent practicable”.

4.1.7 The scope and coverage of the SWMP shall extend at least to the limits of the urbanized area in Las Vegas Valley.

4.1.8 The management program shall include a description of staff and resources available to implement the program elements.

4.1.9 Separate proposed programs, or one or more joint programs, may be submitted by each co applicant.

4.1.10 Proposed programs may impose controls on a system wide basis, a watershed basis, a jurisdiction basis, or on individual outfalls.

4.1.11 Proposed management programs shall describe priorities for implementing controls and shall be based on Public Outreach and Education; Illicit Discharge and Detection; Industrial Facility Monitoring and Control; and a Construction Site BMP Program.

4.1.12 Implement other BMPs identified in this permit.

4.1.13 Pending submittal of the SWMP, the Permittees shall continue to implement current BMPs.

4.2 ***Adequate legal authority:***

4.2.1 DEP has previously reviewed and approved the Permittees legal authority and interlocal agreements, in some cases after modifications. The SWMP shall include an update on the status of the Permittees’ legal authority, established by statute, ordinance or series of contracts which authorizes or enables the applicant to:

4.2.1.1 Prohibit through ordinance, order, or similar means, illicit discharges to the municipal separate storm sewer;

4.2.1.2 Control through ordinance, order, or similar means the discharge to a municipal separate storm sewer from spills, dumping or disposal of materials other than stormwater;

4.2.1.3 Require compliance with conditions in ordinances, permits, contracts or orders; and

4.2.1.4 Carry out all inspection, surveillance, and monitoring procedures necessary to determine compliance and noncompliance with the prohibition of illicit discharges to the MS4s.

4.2.2 The Permittees shall provide written notice to NDEP of any formal proposal to modify the ordinances regulating stormwater discharges into the municipal storm sewers. Before any ordinance is modified, NDEP shall have an opportunity to comment on the proposed modification.

4.3 ***Source identification:***

4.3.1 The SWMP shall provide, at a minimum: updated maps of the Permittees' MS4s, including the location of any major outfall that discharges to waters of the United States that was not previously reported.

4.3.2 If requested, the Permittees shall assist DEP in developing lists of industrial facilities subject to stormwater permitting requirements within their boundaries.

4.4 ***Characterization data:***

4.4.1 The SWMP shall evaluate, and if necessary update, characterization data previously submitted to include additional data collected in the same manner, and evaluate whether existing data collection programs should be modified to improve characterization of stormwater discharges, effects of BMPs, or ambient water quality. This information shall be submitted for approval as part of the annual monitoring plan required in section 5.1.1.

4.5 ***Public Outreach and Education, and Intergovernmental Coordination:***

4.5.1 The management program covering the duration of the permit shall include a section which involves public outreach and education, and where necessary intergovernmental coordination, to reduce the discharge of pollutants to the maximum extent practicable using management practices, control techniques and system, design and engineering methods, and such other provisions which are appropriate.

4.6 ***Best Management Practices*:**

4.6.1 A description of structural and source control measures expected to reduce pollutants from runoff from commercial and residential areas that are discharged from the municipal storm sewer system that are to be implemented during the life of the permit, accompanied with a discussion of the basis for the expected reduction of pollutant loads and a proposed schedule for implementing such controls. At a minimum, the description shall include:

4.6.1.1 A description of maintenance activities and a maintenance schedule to reduce pollutants in discharges from MS4s;

4.6.1.2 A description of planning procedures including a plan to reduce the discharge of pollutants from MS4s which receive discharges from areas of new development and significant redevelopment;

4.6.1.3 A description of practices for operating and maintaining public streets, roads and highways and procedures for reducing the impact on receiving waters of discharges from municipal storm sewer systems;

4.6.1.4 A description of procedures to assure that flood management projects assess the impacts on the water quality of receiving water bodies and that existing structural flood control devices have been evaluated to determine if retrofitting the device to provide additional pollutant removal from stormwater is feasible;

4.6.1.5 A description of a program to evaluate and as necessary monitor pollutants in runoff from operating or closed municipal landfills or other treatment, storage or disposal facilities for municipal waste; and

4.6.1.6 A description of a program to evaluate and as necessary reduce pollutants in discharges from MS4s associated with the application of pesticides, herbicides, and fertilizer.

4.7 **Illicit Discharge and Detection:**

4.7.1 A description of a program, including a schedule, to detect and remove illicit discharges and improper disposal into the MS4. The proposed program shall include:

4.7.1.1 A description of a program, including inspections, to implement and enforce an ordinance, orders or similar means to prevent illicit discharges to the MS4 This program description shall address all types of illicit discharges, however the following category of non-stormwater discharges or flows shall only be addressed where such discharges are identified by the Permittee as sources of pollutants to waters of the United States: water line flushing, landscape irrigation, diverted stream flows, rising ground waters, uncontaminated ground water infiltration (as defined at 40 CFR 35.2005(20)) to separate storm sewers, uncontaminated pumped ground water, discharges from potable water sources, foundation drains, air conditioning condensation, irrigation water, springs, water from crawl space pumps, footing drains, lawn watering, individual residential car washing, flows from riparian habitats and wetlands, dechlorinated swimming pool discharges, and street wash water (program descriptions shall address discharges or flows from fire fighting only where such discharges or flows are identified as significant sources of pollutants to waters of the United States);

4.7.1.2 A description of procedures to conduct on-going field screening activities during the life of the permit, including areas or locations that will be evaluated by such field screens;

4.7.1.3 A description of procedures to be followed to investigate portions of the separate storm sewer system that, based on the results of the field screen, or other appropriate information, indicate a reasonable potential of containing illicit discharges or other sources of non-stormwater ;

4.7.1.4 A description of procedures to prevent, contain, and respond to spills that may discharge into the municipal separate storm sewer;

4.7.1.5 A description of a program to facilitate public reporting of the presence of illicit discharges or water quality impacts associated with discharges from MS4s;

4.7.1.6 A description of educational activities, public information activities, and other appropriate activities to facilitate the proper management and disposal of used oil and toxic materials; and

4.7.1.7 An assessment of whether the procedures otherwise implemented in response to this paragraph are sufficient to identify instances of exfiltration from the sanitary sewer to the storm sewers, and if not a description of additional activities to be undertaken to control exfiltration

4.8 **Industrial Facility Monitoring and Control:**

4.8.1 A description of a program to monitor and control pollutants in stormwater discharges to municipal systems from municipal landfills, hazardous waste treatment, disposal and recovery facilities, industrial facilities that are subject to section 313 of title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA), and industrial facilities that the municipal permit applicant determines are contributing a substantial pollutant loading to the municipal storm sewer system. The program shall:

4.8.1.1 Identify priorities and procedures for inspections and establishing and implementing control measures for such discharges; and,

4.8.1.2 Describe a monitoring program for stormwater discharges associated with the industrial facilities identified in this section, to be implemented during the term of the permit in accordance with the monitoring programs defined in section 5.1.1.

4.9 **Construction Site BMP Program:**

4.9.1 A description of a program to implement and maintain structural and non-structural best management practices to reduce pollutants in stormwater runoff from construction sites to the municipal storm sewer system, which shall include:

4.9.1.1 A description of procedures for notifying developers of properties of one acre or more of requirements applicable to stormwater runoff;

4.9.1.2 A description of nonstructural and structural best management practices for construction sites; and

4.9.1.3 A description of procedures for identifying priorities for inspecting sites and enforcing control measures which consider the nature of the construction activity, topography, and the characteristics of soils and receiving water quality;; and,

4.9.1.4 A description of appropriate educational and training measures for construction site operators.

4.10 **Sharing Responsibility:**

4.10.1 The Permittees may either share responsibility or assign responsibility to one or more Permittees, and may implement BMPs individually, as a group, or through consultants. The SWMP shall include a description of how responsibilty is being shared or assigned.

4.11 **Reviewing and Updating Stormwater Management Programs**

4.11.1 The Permittees must complete an annual review of the SWMP in conjunction with preparation of the annual report required under Part 5.3

4.11.2 The Permittees may change the SWMP during the life of the permit in accordance with the following procedures:

4.11.2.1 Changes adding (but not subtracting or replacing) components, controls, or requirements to the SWMP may be made at any time upon written notification to NDEP.

4.11.2.2 Requests for changes replacing an ineffective, unfeasible, or inappropriate BMP specifically identified in the SWMP with an alternate BMP may be submitted to NDEP for approval at any time. If request is denied, NDEP will send the Permittees a written response giving a reason for the decision. The Permittees modification requests must include the following:

4.11.2.2.1 An analysis of why the BMP is ineffective, infeasible (including cost prohibitive), or otherwise should be revised or replaced, and

4.11.2.2.2 An analysis of why the replacement BMP is expected to be more effective, feasible, or approriate than the BMP to be replaced.

4.12 **Changes by NDEP:**

4.12.1 Formal changes requested by NDEP must be made in writing, set forth the time schedule for the Permittees to develop the changes, and offer the Permittees the opportunity to propose alternative program changes to meet the objective of the requested modification. If the Permittees do not agree to the requested changes, changes required by NDEP will be made in accordance with 40 CFR 124.5, 40 CFR 122.62, or as appropriate 40 CFR 122.63.

4.12.2 NDEP may request formal changes to the SWMP as needed to:

4.12.2.1 Address impacts on receiving water quality caused, or contributed to, by discharges from the Municipal Separate Storm Sewer System;

4.12.2.2 Include more stringent requirements necessary to comply with new Federal statutory or regulatory requirements; and,

4.12.2.3 Include such other conditions deemed necessary by NDEP to comply with the requirements of the Clean Water Act.

4.13 **Responsibility for Stormwater Management Program Implementation:**

4.13.1 The Permittees must implement the SWMP on all new areas added to the Permittees portion of the MS4 (or for which the Permittees become responsible for implementation of stormwater quality controls) not later than one year from addition of the new areas.

4.13.2 Information on all new annexed areas and any resulting updates required to the SWMP must be included in the annual report.

5 Monitoring, Recordkeeping, and Reporting

5.1 Monitoring

5.1.1 The Permittees shall submit to NDEP a stormwater monitoring plan for the following year on or before October 1 each year. In developing the plan, the Permittees must evaluate and update as necessary how monitoring may assist in making decisions about program compliance, the appropriateness of identified best management practices, and progress toward achieving identified measurable goals. Pending submittal of the annual monitoring plan, the Permittees shall continue to implement the existing monitoring plan.

5.1.2 When the Permittees conduct monitoring at the Permittees permitted MS4, the Permittees is required to comply with the following:

5.1.2.1 Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge. This requirement does not prevent Permittees from analyzing or reporting samples that are representative of a limited situation (e.g. concentration at peak flow).

5.1.2.2 Test procedures for the analysis of pollutants shall conform to regulations (40 CFR, Part 136) published pursuant to Section 304(h) of the Act, unless other procedures are approved by NDEP.

5.1.3 Records of monitoring information shall include:

5.1.3.1 The date, exact place, and time of sampling or measurements;

5.1.3.2 The names(s) of the individual(s) who performed the sampling or measurements;

5.1.3.3 The date(s) analyses were performed;

5.1.3.4 The names of the individuals who performed the analyses;

5.1.3.5 The analytical techniques or methods used; and

5.1.3.6 The results of such analyses.

5.1.4 Analyses shall be performed by a State of Nevada certified laboratory. Laboratory reports shall be provided if requested by NDEP.

5.1.5 If the Permittees perform stormwater monitoring more frequently than required by the stormwater monitoring plan the results of such monitoring shall be reported.

5.2 Record keeping

5.2.1 The Permittees must retain records of all monitoring information, including, all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, a copy of the NPDES permit, and records of all data used to complete the application for this permit, for a period of at least three (3) years from the termination date of this permit. This period may be extended at the direction of NDEP at any time.

5.2.2 The Permittees must submit the records to NDEP only when specifically asked to do so. The Permittees must retain a copy of the SWMP required by this permit (including a copy of the permit language) at a location accessible to NDEP. The Permittees must make the records, including a copy of the SWMP, available to the public if requested to do so in writing.

5.2.3 For public requests of records, the Permittees may impose a reasonable fee for personnel time and copying expenses.

5.3 Reporting

5.3.1 Beginning one year after the submission of the SWMP, Permittees must submit annual reports to NDEP by October 1 of each year of the permit term. Each annual report shall cover the period beginning July of the previous year through June of the current year.

5.3.2 Each year, Permittees shall review the program defined under section 4 of this permit, and report to NDEP on the status of the program, whether Permittees have identified any modifications, and the plans for implementing those modifications.

5.3.3 At a minimum the Annual Report shall include:

5.3.3.1 Status of the Permittees compliance with permit conditions;

5.3.3.2 An assessment of the appropriateness of the identified BMP’s, and revisions to previous assessments if appropriate;

5.3.3.3 Progress towards achieving the statutory goal of reducing the discharge of pollutants to the MEP;

5.3.3.4 Status of the achievement of measurable goals;

5.3.3.5 Results of information collected and analyzed, if any, during the reporting period, including monitoring data used to assess the success of the program at reducing the discharge of pollutants to the MEP, a description of any identified improvements to or degradation in water quality attributable to the program, and a description of any identified effects on attainment of water quality standards attributable to the program;

5.3.3.6 A summary of the stormwater activities the Permittees plan to undertake during the next reporting cycle (including an implementation schedule and a fiscal analysis);

5.3.3.7 Changes to the SWMP, including changes to any BMPs or any identified measurable goals that apply to the program elements;

5.3.3.8 Notice that the Permittees are relying on another government entity to satisfy some of the permit obligations (if applicable); and

5.3.3.9 Estimated reductions in loadings of pollutants from discharges of municipal storm sewer constituents from municipal storm sewer systems expected as the result of the municipal stormwater quality management program. The assessment shall also identify known impacts of stormwater controls on ground water.

5.3.4 A summary of inspections performed and enforcement activity taken during the report cycle.

5.3.5 Annual expenditures for the reporting period, with a breakdown for the major elements of the Stormwater Management Program, and the budget for the year following each annual report.

5.3.6 An original signed copy of all reports and plans required herein shall be submitted to the State at the following address:

Stormwater Coordinator
Bureau of Water Pollution Control
Nevada Division of Environmental Protection
333 West Nye Lane
Carson City, NV 89706-0851

6 Standard Permit Conditions

6.1 Duty to Comply

6.1.1 The Permittees must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of CWA and is grounds for enforcement action; permit termination; revocation and reissuance; modification; or for denial of a permit renewal application. Each Permittee is responsible for its own compliance with this permit, but not for any noncompliance of another Permittee. No Permittee shall be held liable for the violation of this permit by another Permittee.

6.2 Continuation of the Expired Permit

6.2.1 If this permit is not reissued or replaced prior to the expiration date, it will be administratively continued in accordance with the Administrative Procedures Act and remain in force and effect. Any Permittee who was granted permit coverage prior to the expiration date will automatically remain covered by the continued permit until the earlier of:

6.2.1.1 Reissuance or replacement of this permit; or

6.2.1.2 Issuance of another individual permit for the Permittees discharges.

6.3 Need to Halt or Reduce Activity Not a Defense

6.3.1 It shall not be a defense for the Permittees in an enforcement action that it would have been necessary to halt or reduce the permitted activity under the Permittees control in order to maintain compliance with the conditions of this permit.

6.4 Duty to Mitigate

6.4.1 The Permittees must take all reasonable steps to minimize or prevent any discharge in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment.

6.5 Duty to Provide Information

6.5.1 The Permittees must furnish to NDEP any information that is requested by NDEP and needed to determine compliance with this permit or other information.

6.6 Other Information

6.6.1 If the Permittees becomes aware that the Permittees have failed to submit any relevant facts in the Permittees application or submitted incorrect information in the application or in any other report to NDEP, the Permittees must promptly submit such facts or information.

6.7 Signatory Requirements

6.7.1 All applications, reports, certifications, or information submitted to NDEP, or that this permit requires be maintained by the Permittees shall be signed and certified as follows:

6.7.1.1 *Applications*. All applications shall be signed by either a principal executive officer or ranking elected official.

6.7.1.2 *Reports and other information.* All reports required by the permit and other information requested by NDEP or authorized representative of NDEP shall be signed by a person described above from the lead agency (Clark County Regional Flood Control District) or by a duly authorized representative of that person. A person is a duly authorized representative only if:

6.7.1.2.1 *Signed authorization*. The authorization is made in writing by a person described above and submitted to NDEP.

6.7.1.2.2 *Authorization with specified responsibility.* The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of manager, operator, superintendent, or position of equivalent responsibility for environmental matter for the regulated entity.

6.7.2 *Changes to authorization*. If an authorization is no longer accurate because a different operator has the responsibility for the overall operation of the MS4, a new authorization satisfying the requirement of (6.7.2.2) above must be submitted to NDEP prior to or together with any reports, information, or applications to be signed by an authorized representative.

6.8 Property Rights

6.8.1 The issuance of this permit does not convey any property rights of any sort, or any exclusive privilege, nor does it authorize any injury to private property nor any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations

6.9 Proper Operation and Maintenance

6.9.1 The Permittees must at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Permittees to achieve compliance with the conditions of this permit.

6.10 Inspection and Entry

6.10.1 The Permittees shall allow NDEP or an authorized representative (including an authorized contractor acting as a representative of the Administrator) upon the presentation of credentials and other documents as may be required by law, to do any of the following:

6.10.1.1 Enter the Permittees premises where a regulated facility or activity is located or conducted or where records must be kept under the conditions of this permit;

6.10.1.2 Have access to and copy at reasonable times, any records that must be kept under the conditions of this permit;

6.10.1.3 Inspect at reasonable times any facilities or equipment (including monitoring and control equipment) practices, or operations regulated or required under this permit; and

6.10.1.4 Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the CWA, any substances or parameters at any location.

6.11 Permit Actions

6.11.1 This permit may be modified, revoked and reissued, or terminated for cause. The Permittees filing of a request for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

6.12 Permit Transfers

6.12.1 This permit is not transferable to any person except after notice to NDEP. NDEP may require modification or revocation and reissuance of the permit to change the name of the Permittee and incorporate such other requirements as may be necessary under the CWA.

6.13 Anticipated Noncompliance

6.13.1 The Permittees must give advance notice to NDEP of any planned changes in the permitted MS4 or activity which may result in noncompliance with this permit.

6.14 State Environmental Laws

6.14.1 Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the Permittees from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or regulation under authority preserved by section 510 of the CWA.

6.14.2 No condition of this permit releases the Permittees from any responsibility or requirements under other environmental statutes or regulations.

6.15 Severability

6.15.1 The provisions of this permit are severable, and if any provision of this permit or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit shall not be affected thereby.

6.16 Procedures for Modification or Revocation

6.16.1 Permit modification or revocation will be conducted according to 40 CFR 122.62, 122.63, 122.64 and 124.5.

6.17 Requiring a Separate Individual Permit or an Alternative General Permit

6.17.1 *Request by NDEP.* NDEP may require any person authorized by this permit to apply for and/or obtain either a separate individual NPDES permit or an alternative NPDES general permit. Any interested person may petition NDEP to take action under this paragraph. Where NDEP requires the Permittees to apply for an individual NPDES permit, NDEP will notify the Permittees in writing that a permit application is required. This notification shall include a brief statement of the reasons for this decision, an application form, a statement setting a deadline for the Permittees to file the application, and a statement that on the effective date of issuance or denial of the individual NPDES permit or the alternative general permit as it applies to the individual Permittee, coverage under this general permit shall automatically terminate. Applications must be submitted to NDEP. NDEP may grant additional time to submit the application upon request of the applicant. If the Permittee fails to submit in a timely manner an individual NPDES permit application as required by NDEP under this paragraph, then the applicability of this permit to the Permittee is automatically terminated at the end of the day specified by NDEP for application submittal.

6.17.2 *Request by Permittee.* Any discharger authorized by this permit may request to be excluded from the coverage of this permit by applying for a separate individual permit. In such cases, the Permittee must submit an individual application, with reasons supporting the request, to NDEP at the address for the appropriate Regional Office. The request may be granted by issuance of any individual permit or an alternative general permit if the reasons cited by the Permittee are adequate to support the request.

6.17.3 *Permit termination*. When an individual NPDES permit is issued to a discharger otherwise subject to this permit, or the Permittee is authorized to discharge under an alternative NPDES general permit, the applicability of this permit to the individual NPDES Permittee is automatically terminated on the effective date of the separate individual permit or the date of authorization of coverage under the alternative general permit, whichever the case may be. When an individual NPDES permit is denied to an operator otherwise subject to this permit or the operator is denied for coverage under an alternative NPDES general permit, the applicability of this permit to the individual NPDES Permittee is automatically terminated on the date of such denial, unless otherwise specified by NDEP.

6.18 Availability of Reports

6.18.1 Except for data determined to be confidential under NRS 445A.665, all reports and plans submitted in accordance with the terms of this permit shall be available for public inspection at the office of NDEP. As required by the CWA, effluent data shall not be considered confidential. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in NRS 445A.710.

6.19 Furnishing False Information and Tampering with Monitoring Devices

6.19.1 Any person who knowingly makes any false statement, representation, or certification in any application, record, report, plan or other document submitted or required to be maintained by the provisions of NRS 445A.300 to 445A.730, inclusive, or by any permit, rule, regulation or order issued pursuant thereto, or who falsifies, tampers with or knowingly renders inaccurate any monitoring device or method required to be maintained under the provisions of NRS 445A.300 to 445A.730, inclusive, or by any permit, rule, regulation or order issued pursuant thereto, is guilty of a gross misdemeanor and shall be punished by a fine of not more than $10,000 or by imprisonment. This penalty is in addition to any other penalties, civil or criminal, pursuant to NRS 445A.300 to 445A.730, inclusive.

6.20 Penalty for Violation of Permit Conditions

6.20.1 NRS 445A.675 provides that any person who violates a permit condition is subject to administrative and judicial sanctions as outlined in NRS 445A.690 through 445A.710.

6.21 Permit Modification, Suspension or Revocation

6.21.1 After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including, but not limited to, the following:

6.21.1.1 Violation of any terms or conditions of this permit;

6.21.1.2 Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts;

6.21.1.3 A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge; or

6.21.1.4 To impose specific requirements for BMPs or annual reporting requirements in accordance with 40 CFR § 122.62 or §122.63.

6.21.2 Any Permittee may request that NDEP reopen and modify this permit.

7 Definitions

7.1 All definition contained in Section 502 of the CWA and 40 CFR 122 shall apply to this permit and are incorporated herein by reference. For convenience, simplified explanations of some regulatory/statutory definitions have been provided, but in the even of a conflict, the definition found in the Statute or Regulation takes precedence.

7.2 *Best Management Practices (BMPs)* means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States. BMPs also include treatment requirements, operating procedures, and practices to control runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

7.3 *Control Measure* as used in this permit, refers to any Best Management Practice or other method used to prevent or reduce the discharge of pollutants to waters of the United States.

7.4 *CWA or The Act* means the Clean Water Act (formerly referred to as the Federal Water Pollution Control Act or Federal Water Pollution Control Act Amendments of 1972) Pub.L. 92-500, as amended Pub. L. 95-217, Pub. L. 95-576, Pub. L. 96-483 and Pub. L. 97-117, 33 U.S.C. 1251 et.seq.

7.5 *Discharge*, when used without a qualifier, refers to “discharge of a pollutant” as defined at 40 CFR 122.2.

7.6 *Illicit Connection* means any man-made conveyance connecting an illicit discharge directly to a municipal separate storm sewer.

7.7 *Illicit Discharge* is defined at 40 CFR 122.26(b)(2) and refers to any discharge to a municipal separate storm sewer that is not entirely composed of stormwater, except discharges authorized under an NPDES permit (other than the NPDES permit for discharges from the MS4) and discharges resulting from fire fighting activities.

7.8 *Indian Country*, as defined in 18 USC 1151, means (a) all land within the limits of any Indian reservation under the jurisdiction of the United States Government, notwithstanding the issuance of any patent, and including rights-of-way running through the reservation; (b) all dependent Indian communities within the borders of the United States whether within the original or subsequently acquired territory thereof, and whether within or without the limits of a state, and (c) all Indian allotments, the Indian titles to which have not been extinguished, including rights-of-way running through the same. This definition includes all land held in trust for an Indian tribe.

7.9 *MEP* is an acronym for "Maximum Extent Practicable,” the technology-based discharge standard for Municipal Separate Storm Sewer Systems to reduce pollutants in stormwater discharges that was established by CWA §402(p).

7.10 *MS4* is an acronym for "Municipal Separate Storm Sewer System" and is used to refer to either a Large, Medium, or Small Municipal Separate Storm Sewer System (e.g. "the Clark County MS4"). The term is used to refer to either the system operated by a single entity or a group of systems within an area that are operated by multiple entities (e.g., the Clark County MS4 includes MS4s operated by the City of Las Vegas, the City of North Las Vegas, the City of Henderson, the Nevada Department of Transportation, the Clark County Regional Flood Control District, and Clark County).

7.11 *Municipal Separate Storm Sewer* is defined at 40 CFR 122.26(b)(8) and means a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains): (i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to waters of the United States; (ii) Designed or used for collecting or conveying stormwater; (iii) Which is not a combined sewer; and (iv) Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.

7.12 *Permitting Authority* means the Nevada Division of Environmental Protection.

7.13 *Small Municipal Separate Storm Sewer System* is defined at 40 CFR 122.26(b)(16) and refers to all separate storm sewers that are owned or operated by the United States, a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to waters of the United States, but is not defined as “large”' or “medium” MS4. This term includes systems similar to separate storm sewer systems in municipalities, such as systems at military bases, large hospital or prison complexes, and highways and other thoroughfares. The term does not include separate storm sewers in very discrete areas, such as individual buildings.

7.14 *Stormwater* is defined at 40 CFR 122.26(b)(13) and means stormwater runoff, snowmelt runoff, and surface runoff and drainage.

7.15 *Stormwater Management Program (SWMP)* refers to a comprehensive program to manage the quality of stormwater discharged from the MS4.

7.16 *SWMP* is an acronym for “Stormwater Management Program.”

ACRONYMS

BMP	Best Management Practice
CFR	Code of Federal Regulations
CWA	Clean Water Act
MEP	Maximum Extent Practicable
MS4	Municipal Separate Storm Sewer System
NAC	Nevada Administrative Code
NAC	Nevada Administrative Code
NDEP	Nevada Division of Environmental Protection
NPDES	National Pollutant Discharge Elimination System
NRS	Nevada Revised Statute
SARA	Superfund Amendments and Reauthorization Act
SWMP	Stormwater Management Program
TMDL	Total Maximum Daily Load
USC	United States Code

Appendix B

APPENDIX B

LAS VEGAS VALLEY
STORM WATER MANAGEMENT PLAN FOR
MUNICIPAL SEPARATE STORM SEWER SYSTEM

- **Las Vegas Valley MS4 Permit Stormwater Management Plan – 2003**

- **NDEP Approval Letter**

- **Las Vegas Valley MS4 Permit Stormwater Management Plan Update**

Las Vegas Valley Storm Water Management Plan for Municipal Separate Storm Sewer System

September 2003

prepared by the

Las Vegas Valley Stormwater Quality Mangement Committee




Table of Contents

SECTION 1
Introduction

1.1 Purpose
The purpose of this Storm Water Management Plan (SWMP) is to describe the programs, practices and responsibilities adopted by the Las Vegas Valley Municipal Separate Storm Sewer System (MS4) permittees to implement the current NPDES Permit No. NV0021911. The SWMP describes the activities that will be performed to comply with the MS4 permit conditions, provides measurable goals for key activities, and outlines staffing and funding responsibilities for the permittees. The SWMP will apply to the 5-year duration of the current MS4 permit. Annual updates will be provided if necessary as part of the required annual reports to address changes in proposed program elements or in conditions in the permit area.

1.2 Authorization
This SWMP was prepared by the Las Vegas Valley MS4 permittees - Clark County Regional Flood Control District (CCRFCD), Clark County, the City of Las Vegas, the City of North Las Vegas, and the City of Henderson. Funding for development of the SWMP was provided by CCRFCD and Nevada Department of Transportation (NDOT).

1.3 Area of Coverage
The area of coverage is defined in paragraph 1.1 of the MS4 permit:

"This permit covers discharges into receiving waters of the United States within the City of Henderson, City of Las Vegas, City of North Las Vegas, and Clark County not including Boulder City, Laughlin, Mesquite, and Nellis Air Force Base."

However, the focus is on the discharge of municipal storm water runoff into "Las Vegas Wash, its tributaries, and other waters of the United States" as authorized on the cover page of the permit. Consistent with this focus, the activities described in the SWMP will be conducted within the urbanized area of Las Vegas Valley.

NDOT has been a permittee for the Las Vegas Valley MS4 permit since 1990. NDOT is currently in the process of obtaining its own MS4 permit with Nevada Division of Environmental Protection (NDEP). Once NDOT is issued its own permit, it will withdraw from the present MS4 permit. Because this is expected to occur early in the first permit year, and because NDOT is expected to submit its own SWMP, this SWMP does not address NDOT issues.

1.4 Period of Performance
This SWMP applies to the 5-year effective period of the MS4 permit, or from July 2003 to June 2008. The SWMP refers to Permit Years when specifying when various activities are scheduled to occur. Permit Years are defined as follows:

Permit Year	Start	End
Permit Year 1	July 1, 2003	June 30, 2004
Permit Year 2	July 1, 2004	June 30, 2005
Permit Year 3	July 1, 2005	June 30, 2006
Permit Year 4	July 1, 2006	June 30, 2007
Permit Year 5	July 1, 2007	June 30, 2008

SECTION 2

Legal Authority

2.1 Introduction and Rationale

This section addresses the MS4 permit requirements in paragraph 4.2 dealing with legal authority of the permittees to implement the various aspects of the proposed Storm Water Management Plan and other requirements of the permit. The objective is to provide documentation that the permittees either currently have adequate legal authority to conduct all necessary activities, or have a plan for obtaining that authority. The adopted activities satisfy the specific requirements of the permit in this category.

2.2 Existing Legal Authority

Documentation will be provided to update the status of the legal authority of each permittee to conduct the following types of activities.

- Prohibit illicit discharges to the municipal separate storm sewer system.
- Control spills, dumping or disposal of materials other than storm water to the storm sewer system.
- Require compliance with conditions in ordinances related to storm water discharges.
- Carry out inspection and monitoring procedures necessary to determine compliance with the prohibition on illicit discharges to the storm sewer system.

Copies of current ordinances will be assembled and summarized by the permittees.

2.3 Additional Required Legal Authority

If the review of current regulations and ordinances identifies deficiencies in the ability to implement SWMP programs, a plan for addressing those deficiencies will be developed.

2.4 Priorities and Measurable Goals

Existing legal authority will be documented first, followed by development of a plan to address any deficiencies in current ordinances, etc. Measurable goals are defined below.

Completed by	Measureable Goal/Milestone
End of Permit Year 1	Assemble and summarize existing legal authority
End of Permit Year 2	If necessary, develop plan for addressing deficiencies in current legal authority
End of Permit Year 3	None
End of Permit Year 4	None
End of Permit Year 5	None

2.5 Staffing and Funding

Funding for review of legal authority will be provided by CCRFCD. Staffing for review of legal authority will be provided by CCRFCD.

SECTION 3

Storm Water System Maps

3.1 Introduction and Rationale

This section describes the adopted plan for satisfying the MS4 permit requirement in paragraph 4.3.1 to prepare a storm water system map for the permitted area of Las Vegas Valley. A storm water system map will be valuable to the permittees, regulatory agencies and others in determining where potential storm water quality problems may exist or originate. The adopted plan relies on existing computerized inventory information from CCRFCD, which is adequate to describe the existing drainage and flood control system.

3.2 Storm Water System Map

A map of the existing regional storm drain system will be prepared to document locations and contributing areas of major outfalls to receiving waters in Las Vegas Valley. The map will be prepared using information in the CCRFCD GIS system that was developed for the Las Vegas Valley Flood Control Master Plan Update (2002). The map will show locations of major regional storm drains (e.g., 36-inch and larger) and regional detention basins.

3.3 Priorities and Measurable Goals

There is only one activity in this category; it will be conducted in Permit Year 1, as defined below.

Completed by	Measureable Goal/Milestone
End of Permit Year 1	Prepare regional storm water system infrastructure map
End of Permit Year 2	None
End of Permit Year 3	None
End of Permit Year 4	None
End of Permit Year 5	None

3.4 Staffing and Funding

Funding for the storm water system infrastructure map will be provided by CCRFCD. Staffing for map preparation will be provided by CCRFCD.

SECTION 4

Monitoring Program

4.1 Introduction and Rationale

This section describes the adopted plan for preparing a monitoring program for wet and dry weather discharges, as required by the MS4 permit (paragraphs 4.4 and 5.1.1). The monitoring program will be related to Las Vegas Valley water quality problems identified by previous sampling by CCRFCD and others. CCRFCD has implemented a storm water characterization monitoring program since 1991, in which characterization data are updated annually. The proposed monitoring program will be coordinated annually with other regional monitoring programs to make the best use of resources and to avoid duplication of effort.

4.2 Evaluation of Previously Collected Data

Monitoring results from previous sampling activities for the NPDES program and other monitoring programs will be summarized and compared to water quality objectives and other stream standards. Constituents contributing to water quality problems or concerns will be identified. Regional water quality concerns in the Las Vegas Wash Basin will be summarized. Based on the data review, constituents and locations of concern will be identified.

4.3 Proposed Monitoring Program

Based on the data summary, regional water quality concerns, and EPA guidelines for storm water permit monitoring, a wet and dry weather sampling program will be developed. The program will be coordinated with other Las Vegas Valley sampling programs to avoid duplication of effort and make the maximum use of monitoring resources.

The monitoring program will be revised annually to adapt to changing conditions, new information, and opportunities to coordinate with other monitoring programs. An annual monitoring program will be submitted to NDEP for review and approval at the beginning of each permit year.

The annual monitoring program will include activities required by the other SWMP program elements. This may include monitoring of detention basins, structural BMPs, landfills, or other facilities as required by the plans and programs developed for other SWMP elements.

The wet and dry weather monitoring programs currently being implemented by the permittees will continue to be followed until a new program is approved by NDEP.

4.4 Priorities and Measurable Goals

The first activity will be to review and analyze existing characterization data. Based on this analysis, a monitoring plan will be developed and submitted for approval. The monitoring plan will be updated in subsequent years, as defined below.

Completed by	Measureable Goal/Milestone
End of Permit Year 1	• Review and analyze existing wet and dry weather data for storm water system • Approved monitoring program for Year 2
End of Permit Year 2	Approved monitoring program for Year 3
End of Permit Year 3	Approved monitoring program for Year 4
End of Permit Year 4	Approved monitoring program for Year 5
End of Permit Year 5	Approved monitoring program for Year 1 of next permit cycle

4.5 Staffing and Funding

Studies of water quality data, development of annual monitoring plans, and execution of those plans will be funded by CCRFCD. Staffing will be provided by CCRFCD.

SECTION 5

Public Outreach and Education

5.1 Introduction and Rationale

This section describes the public education and outreach activities adopted by the permittees in response to the MS4 permit requirements for such a program (paragraph 4.5). The rationale for the program is to inform the general public as to the importance of storm water quality issues, and to influence behavior in a way that benefits regional water quality. Activities were selected to take advantage of existing programs, and to target specific water quality problems and audiences that are important in Las Vegas Valley.

5.2 Public Outreach and Education Program Elements

5.2.1 Objectives for Public Education and Outreach

The overall objectives of the Public Education and Outreach Program are to:

- Inform the general public in Las Vegas Valley about important water quality issues related to storm water runoff;
- Influence behavior of the general public to reduce activities that have a negative impact on storm water runoff quality and increase activities that have a positive impact on storm water runoff quality.

5.2.2 Public Education and Outreach Activities

The following activities will be part of the public education and outreach program.

a) **Community Events.** Permittees will continue to use major community events related to environmental awareness and regional water issues as opportunities for education and outreach. Booths will be staffed by volunteers from the permittees and/or other local organizations (e.g., Conservation District of Southern Nevada), who will hand out informational materials and answer questions.

b) **Media Materials.** Permittees will continue to produce or distribute media materials to disseminate public education and outreach information. Media materials will include: (1) a program (The Flood Channel) for local public television including general information on storm water quality issues; (2) Public Service Announcements for targeted messages and audiences; (3) occasional billboards with targeted messages.

c) **Printed Materials.** Permittees will continue to develop, produce or distribute printed materials (e.g., brochures, flyers, promotional items) for specific topics related to storm water quality. Older printed materials will be updated as necessary.

d) **Section 319 Grants.** Permittees will continue to pursue opportunities for obtaining Section 319 Nonpoint Source Management grants through NDEP for specific projects addressing storm water quality issues. This will be done in cooperation with Conservation District of Southern Nevada and other regional planning and management agencies.

e) **Website.** Permittees will continue to maintain and update a website to provide information to the public on storm water permitting, Las Vegas Valley water quality issues, BMPs, and links to other related websites.

f) **School Programs.** Permittees will continue to conduct outreach activities in public schools in Las Vegas Valley to promote awareness of water quality issues and basic watershed principles.

g) **Involvement in Other Organizations.** Permittees will continue to be active in other organizations in Las Vegas Valley that promote inter-agency cooperation and have outreach and education functions. These include the Lake Mead Water Quality Forum and the Las Vegas Wash Coordination Committee.

h) **Construction and Industrial Program.** Permittees will conduct education and outreach activities targeting construction industry organizations (developers, contractors, engineers) and permitted industries. These activities are described in the respective sections of the SWMP.

5.3 Priorities and Measurable Goals

All outreach and education activities have similar priorities, and all will be conducted in each permit year. Measurable goals are defined in the following table.

Completed by	Measureable Goal/Milestone
End of Permit Year 1	• Attend three community events and distribute materials • Produce Flood Channel documentary • Produce or update one Public Service Announcement (PSA) • Maintain LVV storm water website • Make five presentations in public schools
End of Permit Year 2	• Attend three community events and distribute materials • Produce Flood Channel documentary • Produce or update one PSA • Maintain LVV storm water website • Make five presentations in public schools
End of Permit Year 3	• Attend three community events and distribute materials • Produce Flood Channel documentary • Produce or update one PSA • Maintain LVV storm water website • Make five presentations in public schools
End of Permit Year 4	• Attend three community events and distribute materials • Produce Flood Channel documentary • Produce or update one PSA • Maintain LVV storm water website • Make five presentations in public schools
End of Permit Year 5	• Attend three community events and distribute materials • Produce Flood Channel documentary • Produce or update one PSA • Maintain LVV storm water website • Make five presentations in public schools

5.4 Staffing and Funding

CCRFCD has an annual budget for public education and outreach. This will provide funding for producing PSAs, Flood Channel documentaries, printed material, billboards, and other outreach and education materials. CCRFCD funds a staff position that will coordinate these education and outreach activities, and assist in developing long-term education and outreach strategies and methods. CCRFCD also funds staff time to make presentations in public schools every spring.

Attendance of permittee staff members at community outreach events, where part of staff employment responsibilities, will be funded by the individual permittees. Staff may also volunteer time at some of these events.

SECTION 6

Structural and Source Control Measures

6.1 Introduction and Rationale

This section describes the various structural BMPs and source control measures that will be applied to existing and new development to mitigate the effects of urbanization on storm water quality. These practices and measures address the miscellaneous requirements described in paragraph 4.6 of the MS4 permit. Specific activities and programs were selected because of their link to existing permittee activities (e.g., for street and storm sewer system maintenance) and their relevance to the arid desert environment. Emphasis is on enhancing and documenting existing programs and activities. Information on a plan to address anticipated pollutant reduction from adopted BMPs is described in Section 10.4.

6.2 Storm Sewer Maintenance Program Elements

Appropriate frequencies will be determined for cleaning catch basins, inlets and storm drains. Cleaning frequency goals will be adopted by all permittees.

Common procedures for tracking and reporting storm sewer system maintenance activities by all the permittees will be established. This will include standardization of the data that will be collected, and how it will be reported.

6.3 New Development Planning Procedures

6.3.1 Regional Drainage and Flood Control Improvements

CCRFCD has a comprehensive flood control program for Las Vegas Valley that includes numerous detention basins spread throughout the Valley. Many of these regional detention basins have already been constructed (these will be shown on the map to be prepared as part of SWMP Element 3.1). Runoff from most areas of new development and significant redevelopment will be captured by existing or proposed detention basins. These basins provide water quality benefits by settling out sediment and settlable solids and the pollutants commonly adhering to those solids (e.g., phosphorus, metals).

In areas of new development, CCRFCD will evaluate whether new structural regional flood control facilities, including detention basins, may provide useful storm water quality management benefits. CCRFCD will continue to plan, design and construct these facilities. For information about monitoring studies to determine effectiveness of structural and other BMPs, see section 4.

6.3.2 CCRFCD Design Manual Best Management Practices

The current CCRFCD Hydrologic Criteria and Drainage Design Manual (HCDDM) includes a section on recommended design criteria for structural BMPs that could be applied to new development and redevelopment. The HCDDM includes criteria for extended detention ponds, oil-grit separators, grassed swales, and other BMPs. If improved structural BMPS are developed, the manual will be reviewed and updated to include the improved BMPs.

6.4 Street Maintenance Program Elements

Appropriate frequencies will be determined for sweeping local and arterial streets. Cleaning frequency goals will be adopted by all permittees. Air quality regulations also affect street sweeping goals, and will be considered when developing street sweeping guidelines.

Common procedures for tracking and reporting street sweeping activities by all the permittees will be established. This will include standardization of the data that will be collected, and how it will be reported.

6.5 Flood Control Structure Review Program Elements

6.5.1 Water Quality Benefits of Existing Flood Control Structures

A desktop study will be conducted to assess the water quality benefits of existing detention basins and flood control channels in Las Vegas Valley. It is anticipated that this study will include the following tasks.

- Collect records for the amount of sediment removed from regional detention basins and channels (e.g., for past 10 years), and any testing that may have been performed on that sediment.
- Ensure future records are maintained for sediment removed from detention basins and channels.
- Collect data for total miles of hard-lined channels and total capacity and design sediment storage of CCRFCD detention basins.
- Collect available data on sediment loading to Lake Mead during relevant times.
- Use available pollutant load models (e.g. those developed by MWH, UNLV) to estimate changes in concentrations and loads of TSS and other indicator pollutants attributable to development.
- Use analysis of available data to estimate effect of detention basins and other structural BMPs in controlling sediment.
- Consider need for additional data.
- Research published estimates of historical sediment production from LVV watersheds and channels, and extrapolate to current conditions.
- Determine appropriate baseline for comparison of potential construction impacts.

If necessary based on the results of the desktop study, water quality monitoring of detention basin inflows and outflows will be conducted to document pollutant reduction benefits of existing regional detention basins.

6.5.2 Potential Flood Control Structure Retrofits for Water Quality Improvement

If warranted based on the results of the investigations, the availability of additional BMPs and proposed structural modifications, the cost of additional BMPs or modifications, the benefits of additional BMPs or modifications, and the relative costs and benefits of other programs for structural storm water improvements, a program will be evaluated for retrofitting existing flood control structures to increase water quality benefits.

6.6 Municipal Landfill and Waste Disposal Management Program Elements

See section 8 for program elements. Monitoring programs are described in section 4.

6.7 Pesticide, Herbicide and Fertilizer Management Program Elements

Current monitoring data shows very few detections of pesticides, herbicides and organic compounds associated with fertilizers in wet or dry weather flows. Data will be reviewed and summarized to assess the potential impacts of pesticides, herbicides and fertilizers on Las Vegas Wash water quality.

Proper handling and application of pesticides, herbicides and fertilizers will be the subject of public education and outreach activities described in Section 5.

Las Vegas Valley communities are implementing water conservation plans that have guidelines and ordinances addressing outdoor landscape irrigation. The plans are aimed at reducing water waste through overwatering. This will also reduce the contribution of pesticides, herbicides and fertilizers to downstream receiving waters.

6.8 Priorities and Measurable Goals

The first priority is to coordinate the desired maintenance frequencies and tracking/reporting procedures among the permittees in the first year, in order to establish goals for following years. The next priority will be to prepare and execute a work plan to assess the water quality benefits of existing flood control facilities. These and other measurable goals are listed below.

Completed by	Measureable Goal/Milestone
End of Permit Year 1	• Establish expected frequency of cleaning catch basins, inlets and storm drains • Establish procedures for tracking and reporting of storm drain system maintenance • Establish expected frequency of street sweeping • Establish procedures for tracking and reporting of street sweeping • Develop study work plan to assess water quality benefits of existing regional flood control facilities and potential benefits of structural BMPs in areas of new development • Summarize available pesticide, herbicide and fertilizer monitoring data and existing management programs
End of Permit Year 2	• Implement storm drain system cleaning program developed in Permit Year 1 • Implement street sweeping program developed in Permit Year 1 • Conduct study of regional flood control facilities and new development impacts proposed in Year 1
End of Permit Year 3	• Implement storm drain system cleaning program developed in Permit Year 1 • Implement street sweeping program developed in Permit Year 1 • Based on results of Year 2 study, evaluate whether to modify program for implementing structural BMPs
End of Permit Year 4	• Implement storm drain system cleaning program developed in Permit Year 1 • Implement street sweeping program developed in Permit Year 1
End of Permit Year 5	• Implement storm drain system cleaning program developed in Permit Year 1 • Implement street sweeping program developed in Permit Year 1

6.9 Staffing and Funding

Studies required to assess existing water quality conditions and propose appropriate levels of management activities will be funded by CCRFCD. Staffing will be provided by CCRFCD and the entities.

Staffing and funding for source control measures (storm sewer maintenance, street maintenance, O&M manuals, plan reviews) will be provided by each individual permittee. Funding for source control measures for regional flood control facilities storm sewer systems will be provided by CCRFCD.

SECTION 7

Illicit Discharge Detection and Elimination

7.1 Introduction and Rationale

This section describes the elements of the Illicit Discharge Detection and Elimination Program required by the MS4 permit in paragraph 4.7. Preventing illegal and illicit discharges to the storm water system is a key factor in the permittees' obligation to prevent the discharge of non-storm water to the regional drainage system. Program elements implemented by the permittees in previous years of the past MS4 permits have been successful in detecting and eliminating significant illegal and illicit discharges to the storm water system. Therefore, the proposed elements are based on formalizing and documenting activities that are presently conducted by the permittees.

7.2 Legal Authority

See section 2 for legal authority.

7.3 Field Screening Program Elements

Dry weather screening will be conducted to improve understanding of dry weather water quality from urban areas and background water quality of receiving waters. Existing dry weather water quality data will be summarized to identify data gaps. Specific monitoring program elements are described in Section 4.

7.4 Inspection Program Elements

Municipal separate storm sewer systems will be formally inspected two times per year by visually observing open channel sections in which dry weather flow persists and looking for evidence of non-storm water discharges. Emphasis will be on those areas that, based on the results of field screening or other appropriate information, indicate a reasonable potential of containing illicit discharges, exfiltration from the sanitary sewer system, or other sources of non-storm water. Inspections will be performed by permittee staffs or designated representatives. Problems will be reported to the proper authorities.

Municipal maintenance staffs for streets and storm drains from each permittee will be trained to look for evidence of non-storm water discharges to the drainage system during their normal duties. A process for reporting potential problems will be established. See Section 8.2 for industrial facility program elements.

7.5 Spill Prevention and Response Program Elements

All entities currently have spill prevention and response regulations and programs in place through their fire departments and contracts with special emergency response contractors. No additional program elements are required.

7.6 Public Reporting Program Elements

Public reporting of illegal discharges or other water quality problems is currently available through the following avenues:

- Calls to the Clark County Public Response Office (CCPRO) hotline
- Calls to Clark County Health District, which is in the process of establishing a hotline phone number
- Calls directly to the entities and CCRFCD
- Entries to the lvstorm water.com web site

These procedures have proven adequate in the past for public reporting of illegal discharges or dumping. No new program elements are necessary.

7.7 Household Hazardous Waste Disposal Program Elements

Republic Silver State Services has an exclusive franchise agreement to manage a valley-wide household hazardous waste disposal program. Bi-annual curb-side pickup days and weekly Wednesday through Saturday drop-off opportunities are provided for residents to dispose of hazardous materials or other similar items. Promotion is provided by Republic Silver State Services and the entities.

Several of the public education and outreach elements of Section 5 address household hazardous waste disposal.

No additional program elements are required.

7.8 Priorities and Measurable Goals

In addition to the annual activities of dry weather monitoring and field inspections (which are continuations of present programs), the first priority will be to identify existing inspection programs that are conducted by municipal maintenance staff, followed by the development of training materials and a training program. These and other measurable goals are defined below.

Completed by	Measureable Goal/Milestone
End of Permit Year 1	• Develop and conduct dry weather monitoring per Section 4 • Conduct semi-annual field inspections of open channels • Develop training materials for municipal maintenance staffs
End of Permit Year 2	• Conduct dry weather monitoring per Section 4 • Conduct semi-annual field inspections of open channels • Implement training program for municipal maintenance staffs
End of Permit Year 3	• Conduct dry weather monitoring per Section 4 • Conduct semi-annual field inspections of open channels
End of Permit Year 4	• Conduct dry weather monitoring per Section 4 • Conduct semi-annual field inspections of open channels
End of Permit Year 5	• Conduct dry weather monitoring per Section 4 • Conduct semi-annual field inspections of open channels

7.9 Staffing and Funding

Funding for dry weather monitoring will be provided by CCRFCD. Staffing for dry weather monitoring will be provided by CCRFCD or by SNWA under an existing cooperative agreement with CCRFCD.

Staffing and funding for field inspection activities, spill response programs, and follow-up to reported incidents will be provided by each individual entity.

SECTION 8

Industrial Facility Monitoring and Control Program

8.1 Introduction and Rationale

This section describes the Industrial Facility Monitoring and Control Program required in paragraph 4.8 of the MS4 permit. Industrial sites can be potential sources of urban pollutants, and are particularly identified by the EPA for regulation under the NPDES storm water discharge permit program. The BMP program consists of inventorying industrial facilities in categories specifically called out in the permit, and developing an inspection program to assist NDEP in implementing its industrial permitting program. Because comprehensive industrial pretreatment programs and other inspection programs are currently conducted in all Las Vegas Valley entities, these existing programs will serve as the basis for identifying any industrial storm water pollution problems.

8.2 Industrial Facilities Covered

The following industrial facilities in Las Vegas Valley will be identified using best available information.

- Municipal landfills
- Hazardous waste treatment, disposal and recovery facilities
- Industrial facilities subject to Section 313 of Title III of Superfund Amendments and Reauthorization Act of 1986
- Industrial facilities that could contribute a substantial pollutant load to the municipal storm sewer system

Facilities identified above will be shown on a map. Current permit requirements and available information about onsite BMPs will be identified, and any monitoring activities will be summarized. The industrial facility map will be updated annually.

8.3 Industrial Facility Inspection Program Elements

Existing inspection programs that visit industrial sites (e.g., Industrial Pretreatment Programs, etc.) will be identified.

A training program for existing inspectors to identify and report potential, industrial, site-storm water management deficiencies during their normal duties will be developed and implemented. Materials will be prepared for a training workshop for existing inspectors. A process will be developed for existing inspectors to report identified problems.

A process will be adopted to manage forms and information received from inspectors. Problems identified from inspector reports and information gathered in Element 8.1 will be summarized. Reported problems will be forwarded to NDEP for follow-up.

An inventory of operating or closed municipal landfills and other treatment, storage and disposal facilities for municipal waste will be prepared. Documentation will be gathered for existing permits, management plans and monitoring programs that were or are implemented at the identified facilities. Potential impacts of storm water runoff from these facilities will be assessed.

8.4 Industrial Facility Monitoring Program Elements

A program to track inspection reports and follow-up activities for problems reported at industrial sites covered under Element 8.2 will be developed and implemented.

8.5 Priorities and Measurable Goals

The first priority is to prepare the inventory of industrial sites covered by the MS4 permit. The second priority is to identify existing programs that currently inspect industrial sites and implement a training program for these inspectors. Other measurable goals are defined below.

Completed by	Measureable Goal/Milestone
End of Permit Year 1	• Identify (map and description) all industrial facilities covered under this section of the permit • Identify existing industrial site inspection programs • Develop program for tracking inspection reports and follow-up activities • Prepare inventory of operating and closed municipal waste landfills and treatment, storage and disposal facilities
End of Permit Year 2	• Update industrial facility map • Develop training materials for inspectors • Summarize potential industrial problem areas • Assess potential impacts of landfill runoff on water quality
End of Permit Year 3	• Update industrial facility map • Implement program for tracking inspection reports and follow-up activities
End of Permit Year 4	• Update industrial facility map • Continue program for tracking inspection reports and follow-up activities
End of Permit Year 5	• Update industrial facility map • Continue program for tracking inspection reports and follow-up activities

8.6 Staffing and Funding

Staffing and funding for identifying covered industries will be provided by CCRFCD and the entities.

Development of inspection program training materials will be funded by CCRFCD. Training

SECTION 9

Construction Site BMP program

9.1 Introduction and Rationale

This section describes the construction site BMP program required by paragraph 4.9 of the MS4 permit. Construction activity was singled out by the EPA as a potential source of pollutants that require special permitting attention. The proposed program includes activities intended to provide guidance to public and private groups in Las Vegas Valley regarding appropriate construction practices, as well as activities intended to support NDEP in implementing its construction permitting program. The adopted BMPs are suited to the arid Las Vegas Valley environment.

9.2 Developer Notification Program Elements

A brief description of the development review/approval process will be prepared for each community. A process will be developed and adopted for notifying developers in each entity of the requirements of the NDEP construction site permitting program. The goal will be to provide notification to the developer of every property of one acre or more.

9.3 Construction Site BMP Elements

Existing construction site BMP manuals developed for Nevada and Las Vegas Valley will be reviewed. This will include the CCRFCD Hydrologic Criteria and Drainage Design Manual (HCDDM), the State of Nevada Best Management Practices Manual, and the BMP manual developed by Northern Nevada MS4 permittees. A summary of practices recommended for Las Vegas Valley will be prepared, referencing these manuals. If necessary based on the review of current construction practices, BMP designs in one or more of these manuals will be modified to be more applicable to local Southern Nevada conditions.

9.4 Construction Site Inspection Program Elements

a) The list of State-permitted construction sites will be requested from NDEP. This, combined with local information and other tools, will be used to identify areas of high construction activity in Las Vegas Valley.

b) Information available from the entities regarding construction projects (e.g., size, location, date, ownership) will be identified. If information is available that would be useful to NDEP in conducting inspections for its construction site permit program, this information can be provided to NDEP.

c) Semi-annual inspections of washes and open channels will be conducted by the permittees for the purpose of identifying locations of heavy sediment loads that may be associated with construction site runoff. Inspected channel reaches will include the dry weather flow reaches identified in section 7.3, plus reaches downstream of areas with high construction activity as identified in section 9.3(a). If problems are found, these will be reported for follow-up.

d) Routinely after significant storm events, priority detention basins and channels subject to storm flows will be inspected. If during the course of this inspection, it is determined that construction sites may not be maintaining their BMP's, the appropriate NDEP authorities will be contacted.

e) The information developed from (a) through (d) above will be used to develop a procedure for identifying priorities for inspecting construction areas.

9.5 Contractor Education and Training Program Elements

The permittees will support NDEP in conducting local construction site permit program workshops for developers, contractors and engineers. This will include providing venues for workshops, handling local logistics, assisting with advertising, and providing staff to assist with workshop activities.

Printed outreach and education materials for the construction site management program will be prepared with assistance from NDEP. Possible examples include NDEP Construction Site Permit Program, How to Prepare a Storm Water Pollution Prevention Plan, and Proper Selection and Installation of Construction Site BMPs. Printed materials will be distributed to developers and contractors during the land use application process, and will also be available to NDEP and permittee staff to distribute at construction sites during field visits.

9.6 Priorities and Measurable Goals

All of the program set-up activities are given high priority and scheduled in Permit Year 1. The contractor education and training program is delayed to Year 2 because it is dependent on the results of the BMP manual review scheduled for Year 1. Other measurable goals are defined below.

Completed by	Measureable Goal/Milestone
End of Permit Year 1	* Develop process for notifying developers in each community of construction site permit program * Develop process for identifying high construction activity areas * Develop program for post-storm inspections * Review existing BMP manuals and modify for local conditions if necessary
End of Permit Year 2	* Conduct semi-annual inspections and post-storm inspections * Prepare contractor education and training materials
End of Permit Year 3	* If necessary, modify standard BMP designs for local conditions * Conduct semi-annual inspections and post-storm inspections
End of Permit Year 4	* Conduct semi-annual inspections and post-storm inspections
End of Permit Year 5	* Conduct semi-annual inspections and post-storm inspections

9.7 Staffing and Funding

CCRFCD will be responsible for preparation of materials and development of a process with each entity for notifying developers of NDEP requirements. Post-storm inspections for significant events will be the responsibility of the entities. CCRFCD will provide staff resources and printing costs for producing contractor education and training materials.

CCRFCD will work with individual permittees to summarize and develop a process to distribute materials in their jurisdictions. The entities will also provide to CCRFCD any information they normally collect that would be useful in preparing an inventory of construction sites.

SECTION 10

SWMP Implementation Responsibilities

10.1 Introduction and Rationale

This section describes how the responsibilities for implementing the adopted SWMP programs will be shared among the various MS4 permittees. This complies with the requirement in paragraph 4.10 of the MS4 permit. Responsibilities are assigned to permittees that currently have the authority and/or funding capability to implement them, and have been discussed by members of the Las Vegas Valley Storm water Quality Management Committee.

10.2 Implementation Responsibilities

Responsibility for implementing the various elements of the SWMP will be shared among the permittees as described in the Staffing and Funding portions of the previous sections. In general, CCRFCD provides overall program oversight, funding, and staffing for activities that are common to all permittees (e.g., storm water monitoring, public education and outreach, annual reports), while municipalities are responsible for activities specific to their jurisdictions (e.g., storm system inspections, maintenance BMPs).

Implementation responsibilities and activities will be coordinated through the Las Vegas Valley Storm water Quality Management Committee (SQMC). The SQMC meets monthly, and is comprised of representatives of all permittees as well as other interested organizations.

10.3 Implementation in New Areas

The programs outlined in this SWMP will be applied to areas within Las Vegas Valley that become urbanized during the period of the current MS4 permit. Maintenance and management BMPs will be extended to new urban areas with a goal of implementation within one year of development. Information on new annexed areas and any resulting updates to the SWMP will be included in annual reports.

10.4 Anticipated Pollutant Load Reductions

Anticipated pollutant load reductions resulting from implementation of the BMPs as part of this SWMP will be estimated using one of the following approaches:

- Published information from storm water BMP research
- Experience of other communities in implementing similar BMPs
- Desktop calculations using the Las Vegas Valley storm water quality monitoring database
- Application of GIS-based pollutant load models for Las Vegas Valley developed by MWH and UNLV
- Analysis of data collected within Las Vegas Valley
- Engineering judgement

SECTION 11

Year 1 Measurable Goals

This section summarizes the measurable goals proposed in the previous sections for Year 1 of the 5-year permit. Many activities are proposed for Year 1 that will establish a foundation for future BMPs, monitoring programs, etc.

Year 1 measurable goals are summarized in the following table.

Program Category	Measureable Goal/Milestone
Legal Authority	• Assemble and summarize existing legal authority
Storm Water System Map	• Prepare regional storm water system infrastructure map
Monitoring Program	• Review and analyze existing wet and dry weather data for storm water system • Approved monitoring program for Year 2
Public Outreach and Education	• Attend three community events and distribute materials • Produce Flood Channel documentary • Produce or update one PSA • Maintain LVV storm water website • Make five presentations in public schools
Structural and Source Control Measures	• Establish expected frequency of cleaning catch basins, inlets and storm drains • Establish procedures for tracking and reporting of storm drain system maintenance • Establish expected frequency of street sweeping • Establish procedures for tracking and reporting of street sweeping • Develop study work plan to assess water quality benefits of existing regional flood control facilities and potential benefits of structural BMPs in areas of new development • Summarize available pesticide, herbicide and fertilizer monitoring data and existing management programs
Illicit Discharge Detection and Elimination Program	• Develop and conduct dry weather monitoring per Section 4 • Conduct semi-annual field inspections of open channels • Develop training materials for municipal maintenance staffs
Industrial Facility Monitoring and Control Program	• Identify (map and description) all industrial facilities covered under this section of the permit • Identify existing industrial site inspection programs • Develop program for tracking inspection reports and follow-up activities • Prepare inventory of operating and closed municipal waste landfills and treatment, storage and disposal facilities
Construction Site BMP Program	• Develop process for notifying developers in each community of construction site permit programs • Develop process for identifying high construction activity areas • Develop program for post-storm inspections • Review existing BMP manuals and modify for local conditions if necessary

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DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL PROTECTION

333 W. Nye Lane, Room 138
Carson City, Nevada 89706

October 21, 2003

Kevin Eubanks, P.E.
Assistant General Manager
Regional Flood Control District
600 S Grand Central Parkway, Ste 300
Las Vegas, NV 89106-4511

Dear Mr. Eubanks:

RE: MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4)
STORM WATER MANAGEMENT PLAN (SWMP)

The Nevada Division of Environmental Protection (NDEP) has received and reviewed the Clark County MS4 submittal of the SWMP dated September 29, 2003. With the following comments and conditions, the SWMP meets the minimum terms outlined in NPDES Permit # NV0021911.

General Comments:

- While this permits supercedes the previous permit, all permit practices and procedures in place prior to this issuance of the permit must continue until the appropriate current New Permit requirement has been implemented.
- For each section with respect to each MS4 permittee, provide the location of where the documentation will be housed and maintained.
- Are the measurable goals to be performed by each co-permittee or the group as a whole?
- This permit and the programs defined within it are the responsibility of the Clark County MS4.

Section 4 – Monitoring Program

- All data, to avoid duplication, must be collected and compared in accordance with permit items 5.1.2.2 and/or 5.1.3.

Section 6 Structural and Source Control Measures

- Detention basins can be used as part of sequential system for the MS4 but cannot be the sole source of structural control. Structural controls must address any pollutant that enters the Clark County MS4.

> 40 CFR 122.26(b)(8), "***municipal separate storm sewer*** means a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains):
>
> (i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law)...including special districts under State
> law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the Clean Water Act that discharges into waters of the United States.
>
> (ii) Designed or used for collecting or conveying storm water;
>
> (iii) Which is not a combined sewer; and
>
> (iv) Which is not part of a Publicly Owned Treatment Works
> (POTW) as defined at 40 CFR 122.2."

Section 7 – Illicit Discharge Detection and Elimination

- Describe the formal process that is followed once the MS4 receives a report of illegal / Illicit discharge.

- The training program and implementation time frame for municipal maintenance staff and field inspections are not acceptable. With both the input from Clark and Washoe Counties, NDEP's committed on September 5, 2002 to EPA a time frame of two years for implementation of an inspection and enforcement program.

Section 8 – Industrial Facility Monitoring and Control Program

- This BMP program is not to assist NDEP with its Industrial Permitting program but a required program for the MS4 to develop, implement and maintain.

- It appears that part of the text is missing from the last paragraph.

Section 9 - Construction Site BMP Program

- An acceptable program must include elements that address the construction activity while in process. Referring to NDEP for inspections does not remove the MS4 of its responsibility of ensuring that there are no pollutants entering their site as a result of the construction activity. NDEP can be notified to assist in the MS4 enforcement of the program to protect their system.

- As stated previously, this program is not to assist or support NDEP with its Permitting program but a required program for the MS4 to develop, implement and maintain.

Should you have any questions, I can be reached at (775) 687-9429.

Sincerely,

Clifford M. Lawson
Staff II Associate Engineer
Bureau of Water Pollution Control

Cc: Jon Palm
Darrell Rasner

LAS VEGAS VALLEY
MUNICIPAL SEPARATE STORM SEWER SYSTEM

NPDES PERMIT No. NV0021911

STORM WATER MANAGEMENT PLAN UPDATE

SEPTEMBER 2006

Prepared by MWH Americas, Inc.

for

Las Vegas Valley
Stormwater Quality Management Committee

LAS VEGAS VALLEY
MUNICIPAL SEPARATE STORM SEWER SYSTEM
STORM WATER MANAGEMENT PLAN UPDATE
SEPTEMBER 2006

SECTION 1

INTRODUCTION

This Storm Water Management Plan Update constitutes an update to the ***Las Vegas Valley Storm Water Management Plan for Municipal Separate Storm Sewer System*** dated September 2003. The update describes modifications made to the original Storm Water Management Plan (SWMP) in response to several factors, including:

- Progress made in implementing the SWMP over the first three years of the current Municipal Separate Storm Sewer System (MS4) permit for Las Vegas Valley (NPDES Permit No. NV0021911);
- Updates identified in the MS4 Annual Reports for 2003-2004 and 2004-2004;
- Official comments received from Nevada Division of Environmental Protection (NDEP) on the SWMP in September 2003, and official responses provided by the permittees correspondence dated July 12, 2006, and over the course of the past three years; and
- Comments received from the Environmental Protection Agency (EPA) as part of the formal audit of the Las Vegas Valley MS4 permit program (April 20, 2006).

This SWMP Update contains modified sections of the 2003 SWMP, using the same section names and numbers as the original SWMP to facilitate correlation with the original document. Only those sections that are being updated are included in the SWMP Update; sections from the 2003 SWMP that are omitted from the SWMP Update remain the same as the 2003 SWMP.

Provisions of the SWMP Update apply to Permit Year 4 and Permit Year 5, as Permit Years 1 through 3 have been completed.

SECTION 2

LEGAL AUTHORITY

2.2 Existing Legal Authority

Documentation has been provided in previous Annual Reports demonstrating that the permittees have adequate legal authority to:

- Prohibit illicit discharges to the municipal separate storm sewer system;
- Control spills, dumping or disposal of materials other than storm water to the storm sewer system;
- Require compliance with conditions in ordinances related to stormwater discharges;
- Carry out inspection and monitoring procedures necessary to determine compliance with the prohibition on illicit discharges to the storm sewer system.

Deficiencies in municipal ordinances have been addressed over the past three years where necessary.

2.3 Additional Required Legal Authority

The permittees will annually review their stormwater-related ordinances to determine whether enhancements to these ordinances are required.

2.4 Priorities and Measurable Goals

Measurable goals for the remainder of the current permit period are defined below.

Completed by	Measurable Goal/Milestone
End of Permit Year 4	• Review and update ordinances as needed
End of Permit Year 5	• Review and update ordinances as needed

2.5 Staffing and Funding

Funding and staffing for review and update of municipal ordinances will be provided by Clark County Department of Air Quality and Environmental Management, City of Las Vegas, City of North Las Vegas, and City of Henderson.

SECTION 5

PUBLIC OUTREACH AND EDUCATION

5.2.2 Public Education and Outreach Activities

Public education and outreach strategies will be focused on behaviors believed to affect local water quality issues. Current information and observations suggest that these issues include illegal dumping and pet waste, among others.

The public education and outreach activities described in SWMP Section 5.2.2 to address these and other issues are unchanged. The following activity is added:

i) **Storm Drain Inlet Marking.** The permittees conducted a storm drain inlet marking program several years ago, in which small plaques were placed at drain inlets discouraging dumping to the MS4 system. The program was terminated due to concerns over safety of plaque installers and other issues. The permittees will review the relative advantages and drawbacks of a storm drain inlet marking program, and decide whether they want to re-institute the program.

5.3 Priorities and Measurable Goals

Measurable goals for the remainder of the current permit period are defined below.

Completed by	Measurable Goal/Milestone
End of Permit Year 4	• Attend three community events and distribute materials • Produce Flood Channel documentary • Produce or update and broadcast one PSA • Maintain Las Vegas Valley stormwater website • Make five presentations in public schools • Decide whether or not to re-institute storm drain inlet marking program
End of Permit Year 5	• Attend three community events and distribute materials • Produce Flood Channel documentary • Produce or update and broadcast one PSA • Maintain Las Vegas Valley stormwater website • Make five presentations in public schools • If re-instituted, implement the storm drain inlet marking program

5.4 Staffing and Funding

CCRFCD has an annual budget for public education and outreach. This will provide funding for producing PSAs, Flood Channel documentaries, printed material, billboards, and other outreach and education materials. CCRFCD funds two staff positions that will coordinate these education and outreach activities, and assist in developing long-term education and outreach strategies and methods. CCRFCD also funds staff time to make presentations in public elementary schools.

Attendance of permittee staff members at community outreach events, which are part of staff employment responsibilities, will be funded by the individual permittee organizations. Staff may also volunteer time at some of these events.

The previous storm drain marking program was funded in part by a Section 319 grant (which was used to purchase the plaques) and by individual permittees (who provided labor for plaque installation or for coordinating volunteers). At this time it has not been determined how a renewed storm drain marking program would be funded or staffed.

SECTION 6

STRUCTURAL AND SOURCE CONTROL MEASURES

6.2 Storm Sewer Maintenance Program Elements

Permittees have reviewed potential frequencies for inspecting and, if necessary, cleaning storm drain inlets (catch basins, drop inlets, sidewalk inlets, etc.). Adopted inspection and cleaning frequency goals are summarized in **Table 6-1**.

Each permittee has established its own procedures for tracking and reporting storm drain system maintenance activities. The types of information tracked and reported will be standardized to the extent possible, but individual systems for data collection and management will continue to be unique to each permittee. Permittees will assess the effectiveness of their storm drain maintenance data collection and management processes on an annual basis to determine whether improvements are warranted.

Table 6-1
Maintenance Goals for Entities

Entity	Street Sweeping	Drop Inlet Cleaning	Detention Basin Maintenance
County	Sweep curbed-and-paved public city streets in urban area once every 30 days[(1)] ; as-needed in rural areas	Inspect/clean 20 percent of drop inlets a minimum of once per year; clean as appropriate[(4)]	Inspect during semi-annual channel inspections and after major storms[(5)]; clean as appropriate
CLV	Sweep curbed-and-paved public city streets once every 30 days[(2)]	Inspect/clean 20 percent of drop inlets a minimum of once per year; clean as appropriate	Inspect during semi-annual channel inspections and after major storms; clean as appropriate
CNLV	Sweep curbed-and-paved public city streets once every 30 days[(3)]	Inspect/clean 20 percent of drop inlets a minimum of once per year; clean as appropriate	Inspect during semi-annual channel inspections and after major storms; clean as appropriate
COH	Sweep curbed-and-paved public city streets once every 30 days	Inspect/clean 20 percent of drop inlets a minimum of once per year; clean as appropriate	Inspect during semi-annual channel inspections and after major storms; clean as appropriate

6.3 New Development Planning Procedures

CCRFCD has a comprehensive flood control program for Las Vegas Valley that includes numerous detention basins spread throughout the Valley. Many of these regional detention basins have already been constructed, and are shown on the most current Storm

Drain System Map prepared to comply with SWMP Element 3.1. Runoff from most areas of new development and significant redevelopment will be captured by existing or proposed detention basins. A map has been prepared to depict the drainage areas captured by existing detention basins; this is included in the 2005-2006 Annual Report. These basins provide water quality benefits by settling out sediment and settlable solids and the pollutants commonly adhering to those solids (e.g., phosphorus, metals). Detention basin pollutant removal effectiveness will be measured as described in Section 6.5.

CCRFCD will continue to plan, design and construct regional detention basins in accordance with its current flood control master plan for Las Vegas Valley. Based on the results of the ongoing detention basin pollutant removal effectiveness monitoring program, CCRFCD and the permittees will consider whether re-design of existing detention basin outlets is warranted to improve water quality benefits.

6.3.2 CCRFCD Design Manual Best Management Practices

The current CCRFCD Hydrologic Criteria and Drainage Design Manual (HCDDM) includes a section on recommended design criteria for structural BMPs that could be applied to new development and redevelopment. The HCDDM includes criteria for extended detention ponds, oil-grit separators, grassed swales, and other post-construction and during-construction BMPs.

In the 2003-2004 permit year, the permittees conducted a review of BMPs that could be appropriate to the Las Vegas Valley climate and environment, and considered whether revisions to the HCDDM recommended BMPs or design criteria were warranted. It was determined that the HCDDM, in combination with other readily available BMP manuals such as the State of Nevada Handbook of Best Management Practices, is adequate to meet the present needs in Las Vegas Valley. It was recommended that the BMP section be updated the next time the HCDMM is formally updated.

If a future decision is made to make the HCDDM BMPs mandatory rather than voluntary, or if other structural BMPs with demonstrated effectiveness are developed by the stormwater industry, the HCDDM will be formally updated.

6.4 Street Maintenance Program Elements

Permittees have reviewed potential frequencies for sweeping local and arterial streets, and have adopted street sweeping frequency goals. Air quality regulations were also considered when developing street sweeping guidelines. Adopted street sweeping frequency goals are summarized in **Table 6-1**.

Each permittee has established its own procedures for tracking and reporting street sweeping activities. The types of information tracked and reported will be standardized to the extent possible, but individual systems for data collection and management will be unique to each permittee. Permittees will assess the effectiveness of their street sweeping data collection and management processes on an annual basis to determine whether improvements are warranted.

6.5 Flood Control Structure Review Program Elements

6.5.1 Water Quality Benefits of Existing Flood Control Structures

Existing and planned regional detention basins are the centerpiece of the MS4 approach to controlling post-construction runoff quality. Because these are critical facilities in the adopted post-construction source control program, a monitoring program is being implemented to determine the effectiveness of existing detention basin in removing selected constituents. Data collected after one year of sampling is inconclusive, and the monitoring program is being extended to a second year. In addition, a map has been prepared showing the portion of Las Vegas Valley that drains to existing detention basins. At the end of the 2006-2007 permit year, a determination will be made as to whether regional detention basins are effective enough and control enough area to be relied upon for providing adequate post-construction runoff quality control. This decision will be reported in the 2006-2007 Annual Report.

6.5.2 Potential Flood Control Structure Retrofits for Water Quality Improvement

If it is determined that existing and proposed regional detention basins do not provide adequate post-construction runoff quality control, the potential for retrofitting existing detention basins (e.g., by modifying the outlet structure to restrict outflows during common, low-magnitude runoff events) will be investigated.

If detention basin retrofitting is determined to be infeasible or ineffective, the permittees will evaluate other programs to address post-construction runoff from new development and significant redevelopment.

6.8 Priorities and Measurable Goals

Measurable goals for the remainder of the current permit period are defined below.

Completed by	Measurable Goal/Milestone
End of Permit Year 4	• Implement storm drain inlet maintenance program developed in Permit Year 1, as amended by subsequent enhancements • Implement street sweeping program developed in Permit Year 1, as amended by subsequent enhancements • Review effectiveness of data collection and management for maintenance activity tracking, and make improvements if warranted • Determine pollutant removal effectiveness of regional detention basins and determine if retrofits are needed
End of Permit Year 5	• Implement storm drain inlet maintenance program developed in Permit Year 1, as amended by subsequent enhancements • Implement street sweeping program developed in Permit Year 1, as amended by subsequent enhancements • Review effectiveness of data collection and management for maintenance activity tracking, and make improvements if warranted • If needed, determine appropriate detention basin retrofit design criteria and standard design details

6.9 Staffing and Funding

Detention basin monitoring studies and, if needed, retrofit designs will be funded by CCRFCD. Staffing will be provided by CCRFCD through its consultant contract.

Staffing and funding for source control measures (storm sewer maintenance, street maintenance, plan reviews) will be provided by each individual permittee. Funding for source control measures for regional flood control facilities will be provided by CCRFCD.

SECTION 7

ILLICIT DISCHARGE DETECTION AND ELIMINATION

7.4 Inspection Program Elements

Municipal maintenance staffs for street and storm drain maintenance for most entities have been trained to look for evidence of non-storm water discharges to the drainage system during their normal duties, and report this evidence to the proper internal authorities. Training will be completed by the remaining permittees, and continued on a regular basis to assure that all maintenance personnel are aware of what to look for in the field and how to report potential problems.

7.5 Spill Prevention and Response Program Elements

All entities currently have spill prevention and response regulations and programs in place through their fire departments, public works departments, and contracts with special emergency response contractors (e.g., H2O Environmental). The current spill response measures have been summarized in an Illicit Discharge Detection and Elimination Program Spill Response Strategy. This was completed in the 2005-2006 permit year and is contained in the Annual Report. The Spill Response Strategy describes how existing State and local hazardous material programs will be relied upon to provide first responder training, interagency coordination, and spill response and cleanup. The Strategy identified enhancements to existing programs that will improve the coordination between agencies to protect the MS4 system from hazardous material spills. Recommended enhancements to existing programs will be promoted to the pertinent organizations in the 2006-2007 permit year.

Permittees will annually review spill response plans, programs and interagency coordination to seek ways to improve program efficiency and effectiveness.

7.6 Public Report Program Elements

The SWMP describes several methods by which the public can report evidence of illicit discharges to the MS4. Not all permittees are tracking this information or keeping records of followup activities. Permittees will review their current record-keeping processes and determine if improvements are warranted.

7.8 Priorities and Measurable Goals

Measurable goals for the remainder of the current permit period are defined below.

Completed by	Measurable Goal/Milestone
End of Permit Year 4	• Develop and conduct dry weather monitoring per Section 4 • Conduct semi-annual field inspections of open channels • Complete all municipal maintenance staff training, and conduct regular refresher training courses • Work with outside organizations to implement recommended enhancements to existing spill response programs identified in the Spill Response Strategy • Review local spill response plans to identify and implement improvements • If warranted, improve ability to track activities associated with public complaints of illicit discharges
End of Permit Year 5	• Develop and conduct dry weather monitoring per Section 4 • Conduct semi-annual field inspections of open channels • Conduct regular refresher training courses for municipal maintenance staffs • Review local spill response plans to identify and implement improvements

7.9 Staffing and Funding

Funding and staffing for dry weather monitoring will be provided by SNWA, in a cooperative agreement with CCRFCD.

Staffing and funding for field inspection activities, spill response programs, municipal maintenance staff training, and follow-up to respond to reported incidents will be provided by each individual entity.

SECTION 8

INDUSTRIAL FACILITY MONITORING AND CONTROL PROGRAM

8.2 Industrial Facilities Covered

The MS4 permit identifies four classes of industrial facilities that must be addressed by the local industrial program. The current status inventorying these classes of facilities is described as follows.

- Municipal landfills – There are no active municipal landfills in the area covered by the MS4 permit.
- Hazardous waste treatment, disposal and recovery facilities - The EPA RCRAInfo website (www.epa.gov/enviro/html/rcris/rcris_query.html) will be used as the source of hazardous waste treatment and disposal facilities within Clark County. There are currently five sites shown in the current database.
- Industrial facilities subject to Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 - The EPA's web site (www.epa.gov/enviro/html/tris/tris_query.html) will be used as the source for TRI facilities in Clark County. A total of 43 facilities were found in 2005-2006.
- Industrial facilities that are contributing a substantial pollutant load to the municipal storm sewer system – Permittees will develop prioritized criteria for determining which facilities are contributing a substantial pollutant load to the storm drain system. Information from pretreatment programs and other existing industrial programs will be used to determine which industrial sites should be specifically added to the inspection program.

Permittees will assure that appropriate municipal operations are included in the industrial program.

Facilities in the above four classes will be shown on a map. The industrial facility map will be updated annually.

8.3 Industrial Facility Inspection Program Elements

The permittees have established industrial inspection programs using existing pretreatment staff. For CLV and CNLV, industrial pretreatment inspectors currently conduct stormwater inspections at all sites visited for the pretreatment program. For COH, pretreatment staff currently conduct inspections for industrial sites in the categories described in Section 8.2. Clark County Water Reclamation District (CCWRD) currently conducts inspections for industrial facilities in unincorporated Clark County. Sites in the categories described in Section 8.2 are inspected.

The permittees have developed training programs for industrial site inspectors. These programs will be refined by each permittee as the industrial program matures.

The permittees will use monthly SQMC meetings to coordinate with NDEP on the State's industrial permitting and inspection program to improve control of discharges from industrial facilities.

8.4 Industrial Facility Monitoring Program Elements

Permittees have developed initial methods of tracking and maintaining records for industrial facility inspections. Methods of record-keeping vary among the permittees, and are often integrated with their individual industrial pretreatment inspection programs. As the industrial inspection program matures, the permittees will improve tracking and record-keeping for this program; a formal review of monitoring and data management methods will be performed by each permittee annually.

8.5 Priorities and Measurable Goals

Measurable goals for the remainder of the current permit period are defined below.

Completed by	Measurable Goal/Milestone
End of Permit Year 4	• Update industrial facility map • Conduct industrial site inspections, tracking and enforcement activities • Determine industrial sites that are contributing a substantial pollutant load to the MS4 • Review and, as necessary, refine industrial inspector training programs • Review and, as necessary, refine tracking and data management methods • Use monthly SQMC meetings to coordinate with NDEP on State industrial permit program
End of Permit Year 5	• Update industrial facility map • Conduct industrial site inspections, tracking and enforcement activities • Review and, as necessary, refine industrial inspector training programs • Review and, as necessary, refine tracking and data management methods • Use monthly SQMC meetings to coordinate with NDEP on State industrial permit program

8.6 Staffing and Funding

Staffing and funding for identifying covered industries will be provided by CCDAQEM, CCWRD, CLV, CNLV, and COH. Coordination will be provided by CCRFCD. An updated industrial facility map combining facilities from all entities will be developed annually by CCRFCD for inclusion in the Annual Report.

Industrial site inspections, inspector training, and tracking/record-keeping will be staffed and funded by CCDAQEM, CCWRD, CLV, CNLV, and COH. Assistance in developing training materials may be provided by CCRFCD if desired.

All permittees will participate in coordination with NDEP as part of the regularly scheduled monthly SQMC meetings.

SECTION 9

CONSTRUCTION SITE BMP PROGRAM

9.2 Developer Notification Program Elements

A process for notifying developers of the requirements of the NDEP construction site permitting program and local ordinances related to construction site runoff has been developed and implemented by each permittee. Current program elements are described in the Annual Report. The goal is to provide notification of applicable regulations to the developer of every property of one acre or more.

9.3 Construction Site BMP Elements

Existing construction site BMP manuals developed for Las Vegas Valley, Truckee Meadows, the State of Nevada, and several other agencies were reviewed and summarized in the 2003-2004 permit year. The objective was to determine whether BMPs currently recommended for use by CCRFCD in the HCDDM are appropriate for environmental conditions in Southern Nevada. No recommendations were made for changing BMPs or their designs as long as BMPs are not a mandatory requirement in the HCDDM.

9.4 Construction Site Inspection Program

The construction site inspection program consists of the following elements.

a) Semi-annual inspections of washes and open channels are conducted by the permittees for the purpose of identifying locations of heavy sediment loads that may be associated with construction site runoff. Inspected channel reaches include the dry weather flow reaches inspected as part of the Illicit Discharge Detection and Elimination Program. If problems are found, they are addressed by the entity performing the inspection or forwarded to Clark County Public Response Office (CCPRO) or Southern Nevada Health District (SNHD).

b) During the 2005-2006 permit year, permittees began implementation of their construction site inspection programs to enforce local ordinances. CCDAQEM inspects construction sites in unincorporated Clark County, CLV and CNLV under a cooperative agreement. Dust permit inspectors, who visit all sites holding dust permits, have been trained in the requirements of the stormwater program and perform storm water inspections. Reports of inspections finding possible ordinance violations are forwarded to CCRFCD, which distributes the information to the appropriate entity for follow-up. COH inspects construction sites in its jurisdiction using inspectors from the Public Works Department – Quality Control Division. All active construction sites receive at least one inspection during the permit year. Methods for improving coordination among inspection personnel and enforcement personnel and improving the timeliness of response to potential stormwater problems will be investigated on a continuous basis, with a formal review conducted at the end of each permit year.

c) CCRFCD has conducted a post-storm inspection program, consisting of inspecting 8-10 construction sites after up to 3 significant storm events for evidence of non-stormwater discharges. Construction sites are selected to provide geographical and jurisdictional diversity. The post-storm inspection program will be continued through the 2006-2007 permit year, after which its validity will be evaluated by the permittees and the program could be extended or terminated.

Current construction inspectors have been trained to conduct stormwater inspections by SQMC representatives and by NDEP at contractor workshops. Inspectors will receive refresher training at either internal training sessions or at contractor workshops taught by NDEP.

The permittees will use monthly SQMC meetings to coordinate with NDEP on the State's construction site permitting and inspection program to improve control of discharges from construction sites.

9.6 Priorities and Measurable Goals

Measurable goals for the remainder of the current permit period are defined in the table on the following page.

9.7 Staffing and Funding

Each permittee will be responsible for conducting semi-annual channel inspections.

CCDAQEM will provide staff for construction site inspections in unincorporated Clark County, CLV and CNLV. CCRFCD will provide funding for this activity. CCDAQEM will be responsible for training its inspectors. COH will provide staff and funding for construction site inspections in its jurisdiction and for training inspectors. CCDAQEM, COH and CCRFCD will be responsible for conducting annual program reviews to determine whether improvements to tracking and coordination are feasible and warranted.

CCRFCD will provide funding and staffing for the post-storm inspection program and for printing of contractor education and training materials.

All permittees will participate in coordination with the NDEP construction site permitting program through attendance at SQMC meetings.

Completed by	**Measurable Goal/Milestone**
End of Permit Year 4	• Conduct semi-annual wash and channel inspections • Conduct construction site inspections for dust permit holders in Clark County, CLV and CNLV, and for all sites of 1.0 acre or larger in COH • Conduct post-storm construction site inspections at 8-10 sites for up to 3 storms each • Conduct one general training workshop for the construction industry • Provide ongoing training for local construction site inspectors • Conduct review of processes for program tracking and record-keeping, and for transfer of information from inspectors to enforcement entities • Use monthly SQMC meetings to coordinate with NDEP on State construction permit program
End of Permit Year 5	• Conduct semi-annual wash and channel inspections • Conduct construction site inspections for dust permit holders in Clark County, CLV and CNLV, and for all sites of 1.0 acre or larger in COH • Conduct post-storm construction site inspections at 8-10 sites for up to 3 storms each, if it is decided to continue this element • Conduct one general training workshop for the construction industry • Provide ongoing training for local construction site inspectors • Conduct review of processes for program tracking and record-keeping, and for transfer of information from inspectors to enforcement entities • Use monthly SQMC meetings to coordinate with NDEP on State construction permit program

Appendix C

APPENDIX C

EPA AUDIT AND RELATED CORRESPONDENCE

REGIONAL FLOOD CONTROL DISTRICT

August 22, 2006

Jeremy Johnstone
Senior Environmental Engineer
Water Division
U.S. Environmental Protection Agency, Region IX
75 Hawthorne Street
San Francisco CA 94105-3901

Re: Las Vegas Storm Water Management Program, NPDES Permit No. NV0021911, Transmittal of Program Audit Report

Dear Mr. Johnstone:

Thank you for your letter transmitting the Program Audit Report, Las Vegas Valley Storm Water Management Program: Clark County Regional Flood Control District; Clark County; City of Las Vegas; City of North Las Vegas; and City of Henderson (NPDES Permit No. NV0021911), September 19-23, 2005, prepared for EPA Region 9 by Science Applications International Corporation, Reston VA.

On behalf of the co-permittees the District would like to thank EPA and SAIC for the positive feedback and constructive criticism provided in the audit report. We are proud of our program, which provides innovative and effective means of protecting water quality as well as life and property against the flash flooding common in the Mohave Desert, and look forward to making the program even better by implementing program improvements identified in the audit report.

A point by point response is attached. Please contact me with any questions or comments.

Sincerely,

Kevin Eubanks, P.E., CFM
Assistant General Manager

KLE:jb

Attachment

P:\Letters and Memos\Environmental Impact\2006\Final response to epa audit letter.doc

600 S. Grand Central Parkway, Suite 300 • Las Vegas, Nevada 89106-4511
(702) 455-3139 • FAX: (702) 455-3870
Website: *http://www.regionalflood.org*

monitoring programs in association with the Southern Nevada Water Authority and the U.S. Geological Survey. In response to this comment, the SWMP will be revised to clarify responsibilities associated with the identified tasks.

2.2 Public Outreach and Education (Permit Section 4.5)

- *The CCRFCD has developed excellent Public Service Announcements (PSAs) that target identified areas of concern.*

The District and co-permittees thank EPA and SAIC.

- *The web site is thorough, frequently updated, and provides a good source of information for the community.*

The District and co-permittees thank EPA and SAIC.

- *Results from public outreach activities are not being tracked or measured.*

The District conducts telephone surveys and uses web tracking to evaluate public responses to outreach programs. In response to this comment in the audit report, the telephone surveys and web tracking programs have been re-evaluated and revised to include additional survey questions and tracking activities. Information is being included in the annual report.

- *Except for 5,000 inlets initially marked by the City of Las Vegas and inlets marked by the City of North Las Vegas, the co-permittees do not have an effective inlet stenciling or marking program.*

The marking of inlets is a component of the public outreach program conducted in accordance with the SWMP. For clarification, all of the co-permittees participated in the installation of the initial 5000 inlet markers organized by City of North Las Vegas through a 319 grant. For example, Clark County installed 2982 of these inlet plaques. Consideration was given to having civic groups; Boy Scouts, etc. participate in the marking program. Concerns about the safety of workers in the street have increased as a result of the deaths of local juvenile offenders impacted by cars during a highway trash pick up program. Emphasis lately has been placed on other public outreach activities, including television spots, with wide distribution. In response to this comment in the audit report, additional consideration will be given to resuming the inlet marking program.

2.3 New Development Controls

- *The Meadows Detention Basin is being modified to incorporate a natural, meandering waterway, and will become part of a regional park.*

Response To EPA's
Program Audit Report
Las Vegas Valley Storm Water Management Program:
Clark County Regional Flood Control District; Clark County;
City of Las Vegas; City of North Las Vegas; and City of Henderson
(NPDES Permit No. NV0021911)
September 19-23, 2005

1 INTRODUCTION

1.1 Program Audit Purpose

The co-permittees recognize that EPA and SAIC devoted a substantial effort to the review.

1.2 Permit History

The audit report identifies the current NPDES permit as the second issued to the permittees. It is actually the third. The first NPDES permit was issued in December 1990 followed by renewed permits issued in June 1997 and June 2003.

1.3 Logistics and Program Audit Preparation

The co-permittees cooperated in the audit, and assisted the audit team by providing documentation and responding to questions.

1.4 Program Areas Evaluated

The audit report accurately identifies the program areas evaluated.

1.5 Program Areas Not Evaluated

The audit report accurately identifies the program areas not evaluated.

1.6 Program Audit Results

All comments in the audit report have been considered. Audit report comments have been discussed with other co-permittees. Conditions identified in the audit report have been investigated, and responses to comments and revisions to the program elements have been developed.

2 PROGRAM-WIDE GENERAL FINDINGS

2.1 Program Management, Reporting & Monitoring

- *The CCRFCD provides a good structural foundation for program oversight, logistics, and communications among the co-permittees.*

The District and co-permittees thank EPA and SAIC for the positive comment.

- *CCRFCD is developing an integrated GIS system with features such as area photography and topographic maps that could be used to support storm water programs.*

The District and co-permittees thank EPA and SAIC. Numerous improvements have been implemented by the District through the use of advancing technology. Advances in technology continue to be reviewed and considered, and additional improvements are expected to be implemented in the future.

- *The SWMP has not been updated to address current activities and has not been updated to address NDEP's comments (Permit Sections 4.1 and 4.12).*

After submitting the SWMP, the District and co-permittees received feedback from NDEP, met with NDEP to discuss relevant issues, and followed up informally and in the annual reports. Each annual report included a section listing changes in the SWMP provisions, if needed the District and co-permittees have continued to meet regularly with NDEP, respond appropriately to formal and informal requests from NDEP, and improve implementation of the SWMP. In response to this comment in the audit report, formal written responses to NDEP's comments in correspondence dated October 21, 2003 have been prepared and submitted on July 12, 2006, and the SWMP will be formally updated for submission with the 2005-2006 annual report. Additional meetings will be held with NDEP to identify whether additional formal responses are required. A process will be developed for future SWMP updating.

- *The co-permittees do not have an inter-jurisdictional agreement or a description in the SWMP that outlines the responsibilities of each co-permittee with respect to the current permit.*

As part of the process relating to the issuance of the initial stormwater permit in 1990, the co-permittees prepared and signed an inter-jurisdictional agreement. The co-permittees are reviewing and updating the agreement. In addition, the SWMP outlines the responsibilities of each co-permittee, in association with the tables of priorities and measurable goals. Following each table is a section on staffing and funding, which describes which co-permittees will be responsible for the activities identified in the tables. The co-permittees have also developed programs with non-permittees, including

The District and co-permittees thank EPA and SAIC for the positive comment. Many other detention basins are open to the public and used for recreational activities.

- *The co-permittees have not developed a plan nor developed requirements to reduce the discharge of pollutants from areas of new development and significant redevelopment (Permit Section 4.6.1.2).*

The co-permittees' current plan to reduce the discharge of pollutants from areas of new development and redevelopment relies on the extensive system of regional detention basins. Detention basins have been constructed in every area of new development and significant redevelopment and are planned for areas of future development.. Detention basins in Las Vegas Valley have been designed to detain storm water flowing into them, in particular flash floods and other high flows, and release them at a rate more appropriate for the downstream channel. Detention basins effectively reduce sediment concentrations and loadings, and improve water quality and human health and safety, in the following ways.

When storm water enters a detention basin the flow velocity decreases, which allows settleable solids, including sediment, to deposit within the basin. Settleable material also includes metals, organics, oils and greases adhering to soils, and bacteria. The basins effectively remove not just large dense material, but also smaller diameter soil particles, including sands and silts. Deposited materials are routinely removed from detention basins and disposed of in a municipal landfill as part of the CCRFCD Maintenance Work Program. The basins have been determined to be very effective in removing sediment. One detention basin removed and retained 82,000 cubic yards of sediment carried by back-to-back storms.

By holding back stormwater flows and limiting discharges from the basin to a relatively small flow, detention basins also decrease peak flows and velocities downstream from the basin. Flows are generally decreased from 50% to 90%. The effect of the decrease in peak flows and velocities is to decrease scour and erosion downstream, thereby improving suspended solids concentrations and water quality generally. To date 57 detention basins have been built in the Las Vegas Valley and 34 more are planned.

Co-permittees have also protected water quality from sediment discharges by participating in the programs of the Clark County Regional Flood Control District, which supports measures to protect channels and banks from excessive erosion.

Co-permittees have enacted ordinances protecting natural washes and providing a buffer zone to protect them from development. Co-permittees participate in the Clark County Wetlands Park, which maintains desert wetlands that provide natural water polishing in lower Las Vegas Wash.

As members of the Southern Nevada Water Authority, co-permittees have also participated in the construction of erosion control structures (ECSs) in lower Las Vegas Wash. These structures have been designed to prevent erosion in the lower wash and thereby reduce discharges of excessive sediment. Soils in lower Las Vegas Wash are easily eroded, and were formerly carried off by every significant flood. Before the ECSs were installed, canyons as deep as forty feet were cut into the desert. In addition to preventing erosion, ECSs establish ponds and wetlands and promote riparian vegetation that naturally improves water quality. The programs of installing ECSs, along with other erosion-control measures for the Lower Las Vegas Wash, is continuing. Because of the presence of readily erodable desert soils in Las Vegas Valley, ECSs and detention basins are considered more effective than onsite BMPs in preventing sediment discharge and erosion. Onsite BMPs may allow the discharge of sediment-depleted stormwater flows that are "hungry" for sediment, which causes them to scour sediment from the channel bottoms and erode sediment from the banks.

The co-permittees have implemented programs in association with the Clark County Drought Ordinance to reduce pollutant runoff from summer over watering. The programs restrict the installation of lawns in new construction, restrict landscape watering to specified days in both new and existing construction, and pay for the replacement of existing lawns with xeriscape. An enforcement program ensures that water conservation requirements are followed. These measures reduce the dry-weather flows of water down gutters in municipal streets, the use of fertilizers and pesticides, and the dry-weather wash off and discharge of these substances.

The co-permittees will continue to implement these programs, and continue to search for improvements.

- *The co-permittees have not evaluated existing structural flood control devices to determine if retrofitting the device to provide additional pollutant removal from storm water is feasible.*

The co-permittees have evaluated existing and proposed detention basins to determine whether additional berms, structures, or design additions would promote effectiveness and improve pollutant removal. At least two basins have been retrofitted, and several basins have been designed with berms to trap sediment. Each of the ECSs has been designed to drop out sediment.

Section 6.5 of the SWMP includes a Flood Control Structure Review Program. As part of that program detention basin are being sampled during flood events. The data retrieved will document current water quality benefits and help identify opportunities to improve on those benefits. Development of the program work plan was completed in Year 1. Implementation of the program commenced in Year 2 shortly after the audit. The co-permittees will continue this program.

2.4 Illicit Discharge and Detection (Permit Section 4.7)

- *The co-permittees do not generally track or evaluate the effectiveness of illicit discharge and detection programs.*

For many years, the co-permittees have been routinely walking the many miles of open channels to identify any illicit discharges. Any discharges into storm drains are readily observed by this program. When an illicit discharge is identified, the co-permittees take action to eliminate the discharge. The program includes a training component, and a public awareness component that informs the public about who to contact when an illicit discharge is observed. These procedures have been highly effective. Illicit discharges are minor and uncommon, and recidivists are very rare or nonexistent. In response to this comment in the audit report, additional efforts will be made immediately to improve tracking and evaluation of effectiveness.

- *CCRFCD has published two different phone numbers for the reporting of illegal dumping.*

The District will identify instances of duplicative or incorrect numbers, and correct them.

- *Although co-permittees' semi-annual Wash Walks proactively detect illicit discharges, information collected could be improved.*

The co-permittees have considered sampling and analysis during inspections, but initial efforts were not effective in improving information collection and illicit discharge identification. In response to the comment in the audit report, the co-permittees will test the effectiveness of hand-held meters in identifying illicit discharges.

2.5 Industrial Facility Monitoring and Control (Permit Section 4.8)

- *The co-permittees have not identified the industrial facilities that are contributing a substantial loading to the MS4 and have not developed an industrial facility monitoring and control program for those industrial facilities. (Permit Section 4.8.1)*

By considering stormwater issues during all pretreatment inspections of significant industrial users, co-permittees have gone beyond the minimum permit requirements and included as part of the stormwater program industries that do not contribute a substantial loading to the MS4. Las Vegas Valley is not a heavily industrialized area, and no industries beyond those in categories specifically identified in the MS4 permit have been identified as contributing a substantial loading to the MS4. In response to the comment in the audit report, additional review of industries that might potentially be contributing a substantial load will be conducted, and any that are contributing a substantial loading will be identified by the end of 2006.

- *The program does not track or acknowledge many of the inspection activities being conducted to control pollutants at industrial facilities.*

The District and co-permittees thank EPA and SAIC for this recognition that the co-permittees go beyond the requirements of the permit and inspect many industrial facilities. In response to this comment in the audit report, the co-permittees will improve documentation for the inspections and the program.

- *The co-permittees and NDEP do not coordinate activities to control discharges from industrial facilities.*

The co-permittees meet regularly with NDEP to discuss pending issues. As part of these meetings, significant observations about inspections are reported, in addition to local enforcement action and activities. In response to this comment in the audit report, the District and co-permittees will coordinate with NDEP in considering whether additional procedures should be implemented.

2.6 Construction Site BMP Program (Permit Section 4.9)

- *The co-permittees do not appear to have the authority to require structural and nonstructural BMPs for erosion and sediment control at construction sites. (Permit Section 4.9.1.2)*

The co-permittees excercise their authority to implement local ordinances preventing the discharge of sediment and other pollutants from construction sites. As part of the inspection program that was just being initiated at the time of the audit, the inspectors assess whether construction site BMPs are effectively controlling the discharge of sediment and other pollutants. If they are not, the matter is referred to co-permittees, which have authority to enforce local ordinances and prevent illicit discharges into public rights-of-way and the municipal storm drain system.

In the case of Clark County, City of Las Vegas and City of North Las Vegas, the initial storm water inspections are performed by CCDAQEM Dust Control inspectors. Many of the same BMPs to control dust benefit storm water. These dust control BMPs are also inspected by CCDAQEM within City of Henderson. Construction site operators are required to employ BMPs to control sediment track out and daily street sweeping at the MS4 outlets from construction sites for dust control.

- *Timely and appropriate response to storm water problems at construction sites is not occurring. (Permit Section 4.9.1.3)*

At the time of the audit, the Las Vegas Valley inspection program had been operating only a very short time. Since then, the co-permittees have worked out initial issues and are working to improve overall performance. It should be noted that between July 1, 2005 and June 30, 2006 2953 inspections were completed by CCDAQEM inspectors for construction sites located in Clark County, and the cities of Las Vegas and North Las Vegas. Of the inspections completed 2400 (81%) sites inspected revealed no potential to violate code and general compliance with State and local construction site requirements; 497 (17%) revealed potential to violate code and were corrected at the site prior to discharge of pollutants to the MS4. With an average annual occurrence of thunderstorms of less than 13 days per year (National Weather Service), there is often time to resolve issues of potential code violation in our climate and effectively preclude discharge of pollutants to the MS4; 56 (2%) revealed code violations which were immediately forwarded to the appropriate jurisdiction for enforcement action. The City of Henderson utilizes the inspectors from their Publ;ic Works Department-Quality Control Division to implement its Construction Site Inspection Program. Of the 1691 inspections completed during the same period, 1527 (90%) sites inspected revealed no potential to violate code and general compliance with State and local construction site requirements; 164 (10%) revealed potential to violate code or actually had violations to the code. The problems identified in the inspections were corrected at the site. The City of Henderson is working on the reporting process to differentiate between the inspections that identified the potential to violate and those with actual violations. The results represent a vast increase in inspection frequency and has provided valuable information for further program development. In that regard, this program's first year is considered a huge success. In response to the comment in the audit report, the co-permittees conducted an overall program review on August 8, 2006 to investigate opportunities to improve timeliness and response to problems at construction sites. Improvements identified for immediate incorporation in the CCDAQEM program include modification of the inspection form to include jurisdiction where inspected site lies, direct notification from the inspector to the agency follow-up and enforcement individual and follow-up reporting to CCRFCD and the inspector. The improvements identified for updating the City of Henderson program include incorporating the Building Department inspectors as part of the program, revising the reports to filter for violations versus potential to violate, reducing the turnaround time for re-inspections, and using feedback from the inspectors to update the training based on experiences from the last year. The co-permittees will continue to meet and implement program improvements in the coming year.

- *The co-permittees and the State do not coordinate activities to control discharges from construction sites.*

NDEP is notified of every potential violation that the co-permittees intend to take action on. This coordination provides NDEP with information on repeat violators and helps NDEP focus its limited resources. In response to this comment in the audit report, the co-permittees with meet with NDEP and consider whether additional coordination would be appropriate.

3 CLARK COUNTY FINDINGS

3.1 Adequate Legal Authority (Permit Section 4.2)

- *The Clark County legal authority provides good description and control of pollutants and/or materials discharged either intentionally or unintentionally to the storm water system.*

Clark County thanks EPA and SAIC for this comment.

- *Clark County has not required compliance with conditions in ordinances, permits, contracts or orders. (Permit Section 4.2.1.3.) Appropriate storm water enforcement has not occurred due to a cumbersome and lengthy process of handling construction site violations and a possible lack of adequate Code Enforcement staff.*

See response to section 2.6. At the time of the audit, the inspection and enforcement program was just being initiated, and may not have been fully implemented. Since that time the process has improved, and is believed to be fully compliant with permit conditions. In response to this comment, Clark County will look for ways to streamline and improve the process.

3.2 Public Outreach and Education, and Intergovernmental Coordination (Permit Section 4.5)

No comments provided.

3.3 Best Management Practices (Permit Section 4.6)

- *Clark County has not implemented a plan to reduce the discharge of pollutants from MS4s which receive discharges from areas of new development and significant redevelopment. (Permit Section 4.6.1.2)*

See response to second bullet in section 2.3.

- *Clark County has not implemented a program to evaluate and as necessary reduce pollutants in discharges from MS4s associated with the application of pesticides, herbicides, and fertilizers. (Permit Section 4.6.1.6)*

Clark County has evaluated pollutants associated with pesticides, herbicides, and fertilizers and developed programs to reduce possible discharges. These substances are included in monitoring programs, and the results are regularly reported. Pesticide and herbicide applicators are regulated, and receive training on their proper storage, use, and disposal. Clark County Public Works has developed standard operating procedures in which all products are used according to manufacturer's labeling. All containers are triple washed and properly disposed. Photos in Appendix B2 show containers that have been sawed in half per manufacturers recommendations; what appeared to the auditor to be residual product was actually plastic particles created by the sawing. Monitoring data show programs for herbicides are effective. Dry weather monitoring from 1991-2005 show zero detects for herbicides. Wet weather combined data from storms from 2002-2005 show an average of 8.7 ug/L of diuron. In addition, see response to first bullet in section 2.3.

- *Clark County Parks and Recreation staff and many Public Works staff have not received formal storm water training.*

Clark County Public Works staff have received training. In response to this comment, additional classes are being developed and scheduled for all remaining Public Works field staff, and appropriate Parks & Recreation and Real Property Management staff.

- *Clark County has not used the tools available to ensure implementation of appropriate Best Management Practices (BMPs) in a timely manner.*

At the time of the audit, the inspection and enforcement program was just being initiated, and may not have been fully implemented. Since then, the inspection program has been implemented, and Clark County Public Works has recently adopted a formal inspection reporting system. These programs will ensure that appropriate BMPs are implemented. In addition, Clark County Public Works has evaluated, identified, and implemented means to reduce erosion within detention basins, and has budgeted for improvements to County installed BMPs.

- *Clark County has not evaluated the effectiveness of its street sweeping and catch basin and inlet cleaning programs.*

Clark County Public Works evaluates its street sweeping program on an annual basis. The 2003-2004 Annual Report and the 2004-2005 Annual Report indicate the volumes of materials removed from street sweeping as indicated in the Appendix. The volume of material removed from inlets and catch basins is not recorded. County Public Works is currently reviewing its operational practices and database management systems and is implementing new software to capture this information in the future.

3.4 Illicit Discharge and Detection (Permit Section 4.7)

- *Clark County has not implemented a program that includes inspections to implement and enforce an ordinance, orders or similar means to prevent illicit discharges to the MS4. (Permit Section 4.7.1.1)*

See response to first bullet under section 2.4. In addition, the Clark County Fire Department routinely handles calls for disposal of household hazardous wastes. Callers are instructed to contact Republic Services for free disposal. Republic Services offers a household hazardous waste disposal program at no charge to local residents which include a drop-off facility and curbside pick-up. The Fire Prevention Bureau maintains a "Household Hazardous Waste Guide" which explains how to handle and dispose of unwanted chemicals.

- *Clark County has not implemented procedures to prevent, contain, and respond to spills that may discharge into the municipal separate storm sewer. (Permit Section 4.7.1.4)*

Standard operating procedures have been developed for responding to hazardous spills. The Clark County Fire Department Fire Prevention Bureau (FPB) responds to hazardous materials spills and discharges on any County right of ways, including storm drains or waterways. When the Fire Dept responds to a hazardous materials spill, cleanup is coordinated through a licensed clean-up contractor, and Clark County Risk Management is notified. The clean-up contractor is required to provide a final report to the Fire Department showing that all federal, state, and local ordinances and regulations have been met and satisfied.

Standard operating procedures have also been developed for responding to sewer backups. Clark County Water Reclamation District has recently met with NDEP to discuss the response to and reporting of sanitary sewer overflows. Staff is rewriting standard operating procedures for responding to overflows. These procedures will be finalized within FY 06/07.

In addition to these County-specific standard operating procedures, the co-permittees recently prepared a valley wide coordinated spill response strategy for their illicit discharge detection and elimination program. This submitted to NDEP on July 12, 2006 as part of a response to comments offered by NDEP regarding the SWMP dated October 21, 2003.

- *Clark County has not conducted an assessment of whether the procedures otherwise implemented are sufficient to identify instances of exfiltration from the sanitary sewer to the storm sewers, and if not, additional activities to be undertaken to control exfiltration. (Permit Section 4.7.1.7)*

Although the majority of the sanitary sewers are too deep for connections to storm drains, in some instances storm drains are temporarily connected to the sanitary sewers. Clark County Water Reclamation District is conducting a five-year multimillion dollar pipeline rehabilitation project. During this project, the District is televising and inspecting pipelines in the valley. Older lines, instances where exfiltration has been discovered, and lines that are under undue stress are being relined and repaired, using a cured-in-place-pipe process. The relining process will eliminate any exfiltration from older lines. Clark County Water Reclamation District staff have met with Clark County Public Works staff to continue ongoing discussions about possible improper connections.

- *Clark County Public Works appeared to consider storm water to be a low priority as demonstrated by municipal facilities not addressing basic storm water issues.*

Clark County Public Works is concerned about storm water issues, maintains an active stormwater program, and has taken steps to ensure compliance with permit requirements. In response to the audit comments, additional steps were taken to respond to all issues identified.

- *The Clark County mapping of facilities does not include structure history and maintenance (e.g., date constructed, date and type of maintenance, number and cause of blockages).*

Public Works is populating the data fields for structure history for regional facilities. Additional items have been identified in the budget and are awaiting funding.

• *Clark County Public Works staff appeared to lack general storm water knowledge. For example, a Clark County staff person stated that an incident involving a discharge of a herbicide to a wash was not a concern.*

The incident referenced appeared not to have been an illegal discharge of herbicide, but rather an application of an EPA approved aquatic dye in accordance with the manufacturer's label. The isolated incident occurred in 1998, and repeated inspections have not identified any recurrence of the issue.

• *Clark County Public Works appeared to lack internal coordination between various county departments. For example, staff from two County departments stated that they were the individuals to be notified of a spill at a Public Works location. Signage at the Public Works Fuel Point directs that spills be reported by calling 911, yet a third option.*

Several County departments have responsibilities in emergency response situations, which include gasoline spills of more than 25 gallons. Response actions may be initiated by a call to 911, but other procedures are also effective. The Clark County Fire Department is likely to be dispatched, because it can often reach the scene most quickly. When staff from the Clark County Department of Risk Management arrive, they are likely to take over the response to spills, and may call in a response contractor. Coordination procedures are established in the Clark County Public Works Emergency Response Plan.

3.5 Industrial Facility Monitoring and Control (Permit Section 4.8)

• *Clark County uses CCWRD for the industrial inspection program. CCWRD staff conduct very thorough inspections (see Appendix B.4).*

Clark County DAQEM and Clark County Water Reclamation District thank EPA and SAIC for this comment.

• *Clark County has not implemented a program to monitor and control pollutants in storm water discharges to the MS4 from industrial facilities that are contributing a substantial pollutant loading to the MS4. (Permit Section 4.8)*

See response to first bullet under section 2.5. In addition, a threats analysis is currently being conducted to identify high priority sites to begin inspection. Clark County intends to expand its industrial inspection program in its FY 06/07.

• *Clark County does not determine whether the inspected industry has applied for and/or received the required NPDES Industrial General Permit during inspections. Thus,* *follow-up notification to NDEP of non-permitted industries and/or directing non-permitted industries to contact NDEP to secure the required permit does not occur.*

The focus of inspections is on code compliance. The industries being inspected are reminded that an NPDES Industrial General Permit may be required. Any code violations encountered are brought to NDEP's attention immediately. Clark County will continue to coordinate any negative inspection findings with NDEP through immediate correspondence and regular committee meetings.

- *Clark County does not include appropriate municipal operations in the industrial program.*

The County has carefully examined the 11 categories of storm water discharges associated with industrial activity described in 40 CFR 122.26(b)(14)(i)-(xi) and believes that no applicable industrial activity occurs within the cited facilities. However, Clark County concurs that the potential for pollutant discharge into the MS4 may exist in several county-maintained locations and is in the process of (1) developing comprehensive and regularly scheduled awareness training on storm water issues and pollution prevention planning for the Public Works and other relevant county departments, and (2) evaluating BMPs other than those currently in place at these locations. All of these actions are intended and expected to mitigate these concerns.

3.6 Construction Site BMP Program (Permit Section 4.9)

- *The CCDAQEM inspector exhibited a desire to conduct a viable construction site storm water inspection and ensure control of runoff from the site.*

Clark County and the co-permittees regard the construction site inspection program as viable in controlling polluted runoff from construction sites. This program just completed its first year of execution. The information gathered along with feedback from all involved, including the inspectors, has been valuable in identifying opportunities for improvement of the program. One such improvement discussed at a meeting on August 8, 2006 is to have the DAQEM inspectors report problems directly to the agency representative responsible for follow up and enforcement actions. Additionally, an agency follow-up report will be forwarded to CCRFCD and the DAQEM inspector to close the loop on the case. This will improve the sense of effectiveness felt by the DAQEM inspectors. These improvements will be incorporated immediately.

- *Clark County has not adopted an ordinance that would provide the authority to require structural and nonstructural BMPs for erosion and sediment control at construction sites (Permit Section 4.9.1.2)*

See response to first bullet under section 2.6.

- *Clark County's inspectors (CCDAQEM) do not have specific authority to enter and inspect construction sites for storm water and to enforce storm water regulations. (Permit Sections 4.2.1.4 and 4.9.1.3)*

See response to first bullet under section 2.6. Clark County codes and inspections and enforcement procedures are in place, and provide authority to prevent violations at construction sites.

- *Clark County has not enforced control measures to reduce pollutants in storm water runoff from construction sites to the MS4. (Permit Section 4.9.1.3)*

See response to first bullet under section 2.6.

- *Clark County has not conducted semi-annual inspections of washes and open channels for the purpose of identifying locations of heavy sediment loads that may be associated with construction site runoff. (SWMP Section 9.4.c)*

Semi-annual wash inspections are conducted by Public Works, and the findings are reported in the Las Vegas Valley NPDES Annual Reports. These inspections identify sediment loading that may be associated with construction site runoff and are referred to the Public Response Office and NDEP.

- *Clark County does not handle storm water discharge noncompliance reports in an effective and expeditious manner and does not proactively take actions to ensure timely correction of storm water noncompliance.*

Clark County DAQEM will work with the Regional Flood Control District and Public Response Office (CCPRO) to streamline and improve the response time.

- *Clark County does not adequately regulate its own construction sites.*

See response to first bullet under section 2.6.

- *The CCDAQEM inspectors do not verify whether the construction site has a NPDES permit.*

As part of the construction site inspection program inspectors assess whether construction site BMPs are effectively controlling the discharge of sediment and other materials. If they are not, the matter is referred to co-permittees for enforcement of local ordinances to prevent improper discharges into municipal storm drains. There is no local code or ordinance requiring a construction site to have an NPDES permit. NDEP is notified of every potential violation that the co-permittees intend to take action on. This coordination provides NDEP with information on repeat violators and helps NDEP focus its limited resources. In response to this comment in the audit report, the co-permittees will meet with NDEP and consider whether additional coordination would be appropriate.

- *Clark County neither provides formal training for construction site operators, nor directs them to periodic training held by NDEP.*

Formal training is periodically provided for contractors and operators. DAQEM and the co-permittees participate with NDEP in developing and implementing the training. The contractor training program attempts to provide training twice each year. Training opportunities are advertised to all dust permit holders through DAQEM's Dust Fax Line. Thus far we have reached approximately 400 individuals at each of 3 session since implementation. Clark County and the co-permittees will continue this contractor training program.

4 CITY OF LAS VEGAS FINDINGS

4.1 Adequate Legal Authority (Permit Section 4.2)

- *The Las Vegas Municipal Code does not appear to contain the legal authority to require compliance, monitor, inspect, or take enforcement action against an illicit discharge by a person or entity that does not meet the definition of an industrial user.(Permit Sections 4.2.1.1 and 4.2.1.3.*

The City has identified illicit discharges and taken enforcement action without having had its authority challenged. The City will review and revise its ordinances as necessary within FY 07 to ensure that enforcement action can be taken against any illicit discharge.

4.2 Public Outreach and Education, and Intergovernmental Coordination (Permit Section 4.5)

- *Las Vegas has good interagency coordination that benefits program implementation.*

The City thanks EPA and SAIC.

4.3 Best Management Practices (Permit Section 4.6)

- *Las Vegas has developed an excellent spreadsheet for basin maintenance that may serve as a model to other co-permittees.*

The City thanks EPA and SAIC.

- *Las Vegas has not developed a plan nor developed requirements to reduce the discharge of pollutants from areas of new development and significant redevelopment (Permit Section 4.6.1.2)*

See response to second bullet under section 2.3.

- *Las Vegas does not evaluate the effectiveness of its street sweeping and catch basin programs.*

The City keeps records of the frequency of street sweeping and catch basin maintenance. These records are summarized in the annual report.

- *Las Vegas does not have a data management system for its storm drain structures.*

The City is developing a database for managing storm drain maintenance.

- *Trash containers are located within detention basins that are used for additional purposes (e.g., playing fields).*

Trash containers are appropriate for use within detention basins that are also used for public recreation. Detention basins are often very large, and trash containers sited outside the basins are not likely to be used.

4.4 Illicit Discharge and Detection (Permit Section 4.7)

- *Las Vegas was observed to respond appropriately when an illicit discharge was observed.*

The City thanks EPA and SAIC for this comment.

- *A Hazmat team responding to a spill may flush the material to a storm drain if it determines there might be danger from fumes.*

City HazMat response procedures are those recommended in the audit. HazMat crews contain spills and immobilize them with adsorbent material. HazMat crews dilute and flush materials that have already entered the storm system only in rare cases where it is necessary to protect public health and safety.

- *The City should track 911 calls that involve events that could impact the MS4.*

The City tracks all 911 calls. Records of responses to all 911 calls are kept. Operators monitoring 911 calls notify the appropriate HazMat team when they receive a report of a chemical spill.

4.5 Industrial Facility Monitoring and Control (Permit Section 4.8)

- *City pretreatment inspectors inspect and report on City-owned sites the same as all other industrial permitted sites [including the publicly Owned Treatment Works (POTW)].*

The City thanks EPA and SAIC for this positive comment.

- *Experienced pretreatment inspectors include storm water evaluations in their pretreatment inspections for a comprehensive list of industrial facilities.*

The City thanks EPA and SAIC for this comment.

- *Las Vegas must provide a summary of storm water inspections performed for inclusion in the Annual Report. (Permit Section 5.3.4)*

The City will provide the summary.

- *Las Vegas does not determine whether the inspected industry has applied for and/or received the required NPDES industrial storm water permit during inspections. Thus, follow-up notification to NDEP of non-permitted industries and/or directing non-permitted industries to contact NDEP to secure the required permit does not occur.*

The City has met and discussed additional coordination with NDEP, and offered to assist NDEP by providing additional information. The City understands that NDEP is implementing a procedure for identifying industries requiring stormwater permits. The City expects discussions to continue and information sharing to be implemented in areas where it would be productive.

- *The City Maintenance East yard had not filed a NOI and did not have a SWPPP on site as required by the NDEP Industrial Storm Water General Permit.*

The City has carefully examined the 11 categories of stormwater discharges associated with industrial activity described in 40 CFR 122.26(b)(14)(i)-(xi). The City believes that no applicable industrial activity occurs at the East Yard.

- *Minor City yard violations were observed, but were corrected promptly.*

The City Industrial Waste Section routinely inspects the East Yard for compliance with the City's stormwater requirements. Any issues are corrected promptly.

4.6 Construction Site BMP Program (Permit Section 4.9)

- *Las Vegas does not have an ordinance that would provide the authority to require structural and nonstructural BMPs for erosion and sediment control at construction sites. (Permit Section 4.9.1.2)*

See response to first bullet in section 2.6.

- *Las Vegas does not have the legal authority to conduct inspections of construction sites. (Permit Sections 4.2.1.4 and 4.9.1.3)*

The City has the legal authority to inspect construction sites to determine compliance with City ordinances, including requirements on discharges into storm drains.

- *Inefficiencies in the transfer of information regarding problems found by CCDAQEM inspectors to co-permittees were previously discussed in Section 3.6.*

Information transfer has been improved since the initiation of the program.

5 CITY OF NORTH LAS VEGAS FINDINGS

5.1 Adequate Legal Authority (Permit Section 4.2)

- *The North Las Vegas legal authority provides a good description and control of pollutants and/or materials discharged intentionally or unintentionally to the storm water system. The restrictions on uncontaminated discharges appear to go beyond the requirements of the Permit.*

The City thanks EPA and SAIC for this comment.

- *North Las Vegas has not provided Utilities Department staff with the authority to enforce the requirements of Chapter 13.28 of the Municipal Code. (Permit Sections 4.2.1.3 and 4.2.1.4)*

During the audit, the EPA may have inadvertently been given an outdated copy of Chapter 13.28. The Municipal Code, which was changed in June of 2004 at the time the Utilities Department was created, provides authority to the Department. The current section of the Municipal Code is available online at the City of North Las Vegas website.

- *North Las Vegas does not have an ordinance that requires the timely pickup, and proper disposal, of pet wastes.*

The City utilizes our litter ordinance to police this item. The following are excerpts from our Municipal Code.

8.24.20 Definitions
"Litter" means garbage, refuse or rubbish as defined herein and all other waste material which, if thrown or deposited as herein prohibited, is unsightly, dirty or offensive, creates or tends to create a fire hazard or danger to public health, safety or welfare.

8.24.30 Litter declared a nuisance
Litter, as defined in Section 8.24.020 of this chapter, and for the purpose of this chapter, is declared to be a nuisance. (Ord. 744 § 4, 1982)

8.24.70 Litter in public places
No person shall throw or deposit, or cause to be thrown or deposited, in or upon any public place, sewer, storm drain, ditch, drainage canal, lake, river or tidal waterway within the city any litter, junk or trash. (Ord. 1063 § 2, 1992: Ord. 744 § 8, 1982)

8.24.90 Violation – Penalty
Any person violating any of the provisions of this chapter shall be guilty of a misdemeanor and upon conviction thereof, be punished by a fine of not less than fifty dollars ($50.00) nor more than one thousand dollars ($1,000.00), and to be credited to a special fund to cover the cost of enforcement of this chapter. Any moneys derived thereafter will be credited to the general fund. Every day of such violation shall constitute a separate offense. Additionally, any person found guilty of violating this chapter shall be assessed court costs. (Ord. 744 § 10, 1982)

5.2 Public Outreach and Education, and Intergovernmental Coordination (Permit Section 4.5)

- *North Las Vegas has an active and innovative public outreach and education program.*

The City thanks EPA and SAIC for this comment.

5.3 Best Management Practices (Permit Section 4.6)

- *North Las Vegas is adding staff and equipment to enhance its street sweeping program.*

The City thanks EPA and SAIC for this positive comment.

- *The PHF procedures implemented by the Parks Department have resulted in a reported reduction in the amount of PHF materials used.*

The City thanks EPA and SAIC for this positive comment.

- *North Las Vegas has not implemented a plan to reduce the discharge of pollutants from MS4s which receive discharges from areas of new development and significant redevelopment. (Permit Section 4.6.1.2)*

See response to second bullet in section 2.3.

- *North Las Vegas should identify priority streets for street sweeping and post parking limitations to ensure that these streets are swept at least every two weeks. If voluntary compliance with the street posting is insufficient, North Las Vegas should enact an ordinance which provides the authority to issue parking violations to vehicles that prevent effective street sweeping.*

The City of North Las Vegas currently has a street sweeping schedule that addresses all City streets on a once every two week basis. Targeted streets within the City's downtown core area are being swept on a weekly basis. The City is currently working with citizens on voluntary parking compliance by implementing an assigned day/route system to assist citizens of knowing when to remove their cars from the roadways. Staff will be continually evaluating the success of the current voluntary parking compliance program. As future needs warrant, additional parking restrictions may be pursued.

5.4 Illicit Discharge and Detection (Permit Section 4.7)

• *North Las Vegas responds quickly and effectively to citizen complaints of illicit discharges.*

The City thanks EPA and SAIC for this comment.

• *North Las Vegas must consider sediment being discharged to a wash to be an illicit discharge, conduct an investigation of the source, and take appropriate actions to reduce or eliminate the discharge. (Permit Section 4.7.1.3)*

The City will take appropriate action in response to excessive sediment discharges in violation of the City ordinance. Sediment deposits in channels, however, are likely to result from natural forces. The City of North Las Vegas is located within a desert environment in which the vast majority of the undeveloped land in the Las Vegas Valley consists of alluvium. This alluvium, or fine soil, is highly erodable by both wind and water.

• *North Las Vegas has not consolidated the illicit discharge response reports from the three City Departments that may respond.*

The Utility Operations Division of the Utilities Department is the primary respondent to illicit discharge complaints for the City. The City will begin to include the total number of illicit discharge complaint responses in our quarterly reports to CCRFCD for inclusion in the Annual Report.

5.5 Industrial Facility Monitoring and Control (Permit Section 4.8)

• *North Las Vegas has developed an effective storm water inspection program by incorporating storm water inspection elements into its existing permitted facility inspection program.*

The City thanks EPA and SAIC for this comment.

• *North Las Vegas must forward to the CCRFCD a summary of storm water inspections performed for inclusion in the Annual Report. (Permit Section 5.3.4)*

The City will provide this summary.

5.6 Construction Site BMP Program (Permit Section 4.9)

• *North Las Vegas does not have an ordinance that would provide the authority to require structural and nonstructural BMPs for erosion and sediment control at construction sites. (Permit Section 4.9.1.1)*

See response to first bullet under section 2.6.

- *Clark County's inspectors (CCDAQEM) do not have specific authority to enter and inspect construction sites for storm water and to enforce storm water regulations. (Permit Sections 4.2.1.4 and 4.9.1.3)*

See response to first bullet under section 2.6. County inspectors have authority to enter construction sites, and to collect information on stormwater conditions that is reported back to the co-permittees for enforcement response.

- *North Las Vegas has not enforced control measures to reduce pollutants in storm water runoff from construction sites to the MS4. (Permit Section 4.9.1.3)*

See response to second bullet under section 2.6.

- *The transfer of information regarding problems found by CCDAQEM inspectors to North Las Vegas is an inefficient and cumbersome process.*

Information transfer has been improved since the initiation of the program.

- *North Las Vegas should require that the SWPPP prepared for any Capital Improvement Program (CIP) project be submitted to the City and conduct inspections to ensure compliance with the SWPPP as part of its normal CIP project oversight.*

Our CIP Construction Managers already perform this type of service. Capital Improvement Program contractors are contractually required to obtain stormwater discharge permits. The SWPPP is provided to the City and a copy is kept at the project office. Compliance with the SWPPP is monitored by the construction inspector and the construction manager.

6 CITY OF HENDERSON FINDINGS

6.1 Adequate Legal Authority (Permit Section 4.2)

- *Several piles of pet waste were observed during the channel inspection of Upper Pittman Wash, including Project Green.*

The City of Henderson has a pet waste program in place that provides baggies on kiosks located along the banks of the Upper Pittman Wash for owners to clean-up after their pets. The City will develop public outreach programs to alert the citizens of this service.

6.2 Public Outreach and Education, and Intergovernmental Coordination (Permit Section 4.5)

- *Henderson provided advice and funding for Project Green, which created an open space for recreational use along Pittman Wash with the help of volunteers.*

The City thanks EPA and SAIC for this positive comment.

6.3 Best Management Practices (Permit Section 4.6)

- *Henderson has not implemented a plan to reduce the discharge of pollutants from MS4s which receive discharges from areas of new development and significant redevelopment. (Permit Section 4.6.1.2)*

See response to second bullet in section 2.3. In addition, the City of Henderson also has ordinances in place for the development of projects on the hillside and in sensitive lands. These ordinances have restrictions on the amount grading that can take place in a development based on ground slopes, preservation of natural habitats and historical lands, and preservations of natural drainage paths. The City of Henderson has also recently adopted on Open Space and Trails Plan that can be used to set up a framework for preserving natural washes, creating buffer zones, identifying trail corridors, and development at the transition between urban and protected resources.

- *Henderson is considering adopting an "Open Space Plan" that will require developments to retain more open space and will focus on keeping flood channels natural rather than concrete-lined.*

The City thanks EPA and SAIC for this positive comment.

- *Catch basin cleaning is behind schedule this year.*

The City has hired a dedicated crew for the inspection and maintenance of drop inlets. The City is currently operating in compliance with the schedule outlined in the Annual Report.

- *Henderson does not have a regular cleaning schedule for storm sewer pipes.*

The City maintains drop inlets through a regular inspection program and removes debris intercepted at the entrance to the system. The City is currently working on an asset management policy to regularly inspect and maintain the local storm drain system.

6.4 Illicit Discharge and Detection (Permit Section 4.7)

- *Henderson has not trained its municipal maintenance staff to look for evidence of non-storm water discharges to the drainage system during their normal duties (Section 7.4 of the SWMP).*

Municipal Maintenance staff is trained to investigate flows to the storm drain/flood control system. They track unidentified flows to the source. If a potable water source they contact the Utility Services Department for enforcement action under the drought regulations or to provide repairs as necessary. If an unidentified source they contact the Public Works Department for investigation and clean-up. The City will set up a formal procedure for evaluation, identification, and response within FY 06/07.

- *The Municipal Codes prohibiting illicit discharges or illegal dumping are not enforced unless someone actually observes the illegal dumping.*

The City is working to review its enforcement procedures with respect to illegal dumping. Also, the City will review the current public outreach program for illegal dumping to identify areas for improvement.

- *Henderson does not sample dry weather flow to ensure that it is unpolluted irrigation or groundwater flow.*

Samples are routinely taken and analyzed in many places within the storm drain and channel system. These samples, as expected, show that many channels within the City contain a typical base flow consisting of surfacing groundwater and surface runoff attributable to over-watering. City staff recognizes this base flow, and have conducted investigations in the past to identify atypical sources. If City staffs observe atypical flows, additional investigation is conducted to determine the source.

- *Henderson maintenance staff do not carry spill containment supplies in their vehicles and would need to return to the yard for event a minor incident.*

Due to the limited amount of vehicle space available,containment supplies are located in an easily accessible area of the maintenance facility for a quick response to a spill situation. The City will review the current procedures to determine if changes are necessary.

- *Henderson documents the locations of illicit discharges and illegal dump sites, but has not mapped these locations.*

The City will work with GIS staff to create a layer on City View that shows the location of complaints, discharges, and dump sites.

6.5 Industrial Facility Monitoring and Control (Permit Section 4.8)

- *Henderson has not implemented a program to monitor and control pollutants in storm water discharges to the MS4 from industrial facilities that are contributing a substantial pollutant loading to the MS4. (Permit Section 4.8)*

See response to first bullet in section 2.5. In addition, the Utility Services Department Pre-treatment Division currently inspects at least annually the sites identified on the SARA Section 313 list as well as those identified with a potential to discharge. The inspectors include storm water issues as part of their inspection procedures. The City is currently working with Pre-treatment staff to review the industrial categories and identify any other facilities with the potential to discharge for future inspections.

- *Henderson does not include municipal operations that have potential to contribute substantial pollutant loading to the MS4 in its industrial program. The municipal operations do not have SWPPPs and are not inspected for storm water.*

The City has examined the 11 categories of stormwater discharges associated with industrial activity described in 40 CFR 122.26(b)(14)(i)-(xi) and believes that no applicable industrial activity occurs at the municipal operations. The City will review the municipal operations, prepare SWPPPS as necessary, and conduct regular stormwater inspections.

- *Henderson has not finalized a checklist or guide for the inspection of storm water controls. The pretreatment inspectors have a general knowledge of storm water requirements, but have not been formally trained.*

The City has created a preliminary inspection checklist that is being used by the Pre-treatment inspectors during their regularly scheduled Utility Services inspections. The City will complete an Industrial Facility Training presentation and set dates for training the Pre-treatment staff. The inspection checklist will be updated as necessary based on the current inspection process.

- *The Henderson industrial facility inspection program does not include determining whether the inspected industries have applied for and/or received the required NPDES industrial storm water permit. Thus, Henderson cannot notify NDEP of non-permitted industries and/or direct non-permitted industries to contact NDEP to secure the required permit.*

See response to third bullet in section 2.5. The City has reviewed the NDEP web site for information on industrial discharges and a list of facilities within the City limits that have received a Notice of Intent from the State. The City understands that NDEP is developing a method of identifying industrial discharges that require stormwater permits.

6.6 Construction Site BMP Program (Permit Section 4.9)

- *Henderson's storm water inspectors have been given an in-house training regarding storm water BMPs on construction sites and are encouraged to contact supervisory staff if they have questions regarding storm water BMPs or potential violations.*

The City thanks EPA and SAIC for this positive comment.

- *As of September 2005, Henderson had conducted 767 storm water inspections, which is more than the commitment of 300 that the City made to CCRFCD. Henderson established an inspection frequency of once every 45 days and is not limiting inspections to its commitment of 300 (see Appendix E.1 for additional information).*

The City thanks EPA and SAIC for this positive comment.

- *Henderson uses a database to track plan approval for construction sites and all types of construction site inspections, including storm water inspections.*

The City thanks EPA and SAIC for this positive comment.

- *Henderson does not have an ordinance that would provide the authority to require structural and nonstructural BMPs for erosion and sediment control at construction sites. (Permit Section 4.9.1.1)*

See response to first bullet in section 2.6.

- *Henderson does not enforce its requirement that sites correct storm water BMP deficiencies and schedule a follow-up inspection within 21 days.*

The City has commenced meetings with the Quality Control inspectors to develop and implement improvements in the inspection process. The improvements identified for updating the City of Henderson program include incorporating the Building Department inspectors as part of the program, revising the reports to filter for violations versus potential to violate, reducing the turnaround time for re-inspections, and using feedback from the inspectors to update the training based on experiences from the last year. The City will continue to meet with staff and the co-permittees to implement program improvements in the coming year.

- *Henderson does not have an enforcement guide or procedures that indicate in what circumstances enforcement should be escalated.*

The City will establish a procedure that will identify the circumstances for moving to enforcement as part of updating the Construction Inspection Program.

- *Henderson has not trained building inspectors to recognize storm water issues and contact the other inspectors if they see a construction site with the potential to discharge pollutants to the MS4.*

The City is updating the inspection program to include building inspectors as an integral part of the program. It is envisioned that the building inspectors will pick up where the offsite inspectors leave off thus providing storm water inspections for the duration of the construction project. Building inspectors will be thoroughly trained to perform this function. The city has developed a program for training building inspectors, and is in the process of implementing it during the 2006-2007 permit year.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

MAR 3 0 2007

Kevin Eubanks, P.E.
Assistant General Manager
Clark County Regional Flood Control District
600 S. Grand Central Parkway, Suite 300
Las Vegas, NV 89106-4511

Subject: Las Vegas Valley Storm Water Management Program, NPDES Permit No. NV0021911, Program Audit

Dear Mr. Eubanks:

Following our program audit of September 19-23, 2005, we sent you and the other copermittees the audit report on April 20, 2006 which identified several program deficiencies. The co-permittees responded to these conclusions in a letter dated August 22, 2006. In September 2006, the co-permittees submitted the 2005-2006 Annual Report under the permit, which included some revisions to the Storm Water Management Plan (SWMP) in response to findings in the audit report.

Since that time, EPA and NDEP have continued to evaluate the Las Vegas Valley program's compliance with the NPDES permit. We agree there have been, and continue to be, significant deficiencies with the permittees' storm water management program. EPA understands that the co-permittees and NDEP have met to discuss these problem areas and commence development of a plan to promptly correct the deficiencies in an expeditious manner. We believe that corrections to the program should be made prior to the next NPDES permit taking effect.

Without repeating the audit report's findings, we believe that the most significant deficiencies concern the Las Vegas Valley program's failures to reduce pollutants to the maximum extent practicable ("MEP") with regard to the following program elements:

1. Construction site storm water runoff management;
2. Post-construction storm water runoff management from areas of new development and significant redevelopment;
3. Storm water runoff management from areas of industrial activity; and
4. Storm water runoff management related to operation and maintenance of treatment systems and controls. This issue was not identified in the audit report. A review of the co-permittees' 2005-2006 Annual Report indicated accumulations of sediment reducing the potential effectiveness of detention basins. Two County detention basins have accumulated sediments of 81,000 and 56,000 cu. yds, respectively, yet County removed only 313 cu. yds in 05/06 reporting period.

As the co-permittees and NDEP work to remedy these deficiencies, I would like to share EPA's expectations as to substance and timing of necessary corrective actions. Enclosed is a brief discussion of the program and implementation changes we consider essential to the co-permittees' compliance with storm water program requirements.

EPA requests copies of all submittals developed by the co-permittees to assure us you are making the needed corrections in a timely manner. Please direct any questions to Mr. Jeremy Johnstone at 415-972-3499 or via email at johnstone.jeremy@epa.gov. Thank you for your continuing cooperation in this matter.

Sincerely,

Alexis Strauss 30 March 2007
Alexis Strauss, Director
Water Division

Enclosure

cc (w/enclosure):
T. Reilly, Clark County
R. Fultz, City of Las Vegas
J. Doody, City of North Las Vegas
C. Chandler, City of Henderson
T. Porta, NDEP

Enclosure
Las Vegas Valley MS4
EPA's Recommendations for Correcting Select Identified Deficiencies

1. Construction site storm water runoff management

The co-permittees should revise their construction site runoff management program to at least comply with the requirements of the Phase 2 rule[1], which requires that programs include, at a minimum:

- An ordinance;
- Requirements to implement erosion and sediment control BMPs;
- Requirements to control other waste at the construction site;
- Procedures for reviewing construction site plans;
- Procedures to receive and consider information submitted by the public; and
- Procedures and authority for inspections and enforcement of storm water requirements at construction sites.

Guidance for complying with these requirements may be found on EPA's website at: http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=min_measure&min_measure_id=4

We believe that these revisions should be completed, by the time of permit reapplication (Dec. 2007) so that these minimum requirements are being complied with by the time the next NPDES permit goes into effect.

2. Post-construction site runoff management from areas of new development and significant redevelopment

The existing large flood control detention basins provide little, if any, water quality benefit, as evidenced by the detention basin pollutant removal monitoring that was reported in the most recent annual report. They may be utilized as part of an effective post-construction control system (in conjunction with other measures, as discussed below) if they are:

- converted/retrofitted to address water quality. Retrofits should include inlet and outflow structures designed to control floatables, sediment, and toxic fractions associated with sediment particles; and
- maintained to address water quality, and prevent resuspension of sediment.

---

[1] The Phase 2 rule established minimum program elements that meet the required MEP standard for Phase 2 MS4s. As such, the Phase 2 requirements provide useful guidance to all MS4s regarding the content and expectations of programs that meet this required standard.

In addition to detention basin retrofit the co-permittees should revise their program to, at a minimum, comply with the requirements as stated in the Phase 2 rule. In summary, these minimum requirements include:

- Strategies to implement a combination of structural and non-structural BMPs;
- An ordinance to address post-construction runoff; and
- A program to ensure adequate long-term operation and maintenance of BMPs.

As stated above, source controls (non-structural measures) must be incorporated into the program in addition to detention basin retrofits. Such controls should provide for or address:

- runoff from commercial and residential areas;
- planning procedures;
- design standards, BMP fact sheets or guidance manuals that include site design source control, and storm water treatment BMPs;
- tracking & maintenance for structural BMPs;
- training and education; and
- estimates of expected reductions in loads.

Guidance for complying with these requirements may be found on EPA's website at: http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=min_measure&min_measure_id=5

Additionally, we encourage the Las Vegas Valley co-permittees to include Low Impact Development (LID) principles in the revised program. Information on LID principles may be found at http://www.epa.gov/owow/nps/lid/lid.pdf.

These program revisions should be completed as expeditiously as possible. We recognize that some work will certainly be required to continue beyond the12/07 permit reapplication date. Any such tasks should clearly be identified along with progress milestones and due dates.

3. Storm water runoff management from areas of industrial activity

The co-permittees should complete their search for industrial facilities that are or may be contributing a substantial loading to the MS4 by 30 June 2007, in accordance with the commitment made in the Sept. 2006 SWMP revisions. The co-permittees should revise their industrial facility monitoring and control program to include any newly identified facilities, and commence monitoring activities at these industrial facilities by the time of permit reapplication (Dec. 2007).

4. Storm water runoff management related to operation and maintenance of treatment systems and controls

The co-permittees should remove accumulated sediments in regional detention basins (e.g. 82,000 cu. yds. at the Red Rock DB and 51,000 cu. yds. at the Blue Diamond DB) before the summer monsoon season and should, by the time of permit reapplication (Dec. 2007), develop and implement a specific schedule and protocol for inspecting and cleaning these basins.

ndep
NEVADA DIVISION OF ENVIRONMENTAL PROTECTION
protecting the future for generations

STATE OF NEVADA
Department of Conservation & Natural Resources
DIVISION OF ENVIRONMENTAL PROTECTION

Jim Gibbons, Governor
Allen Biaggi, Director
Leo M. Drozdoff, P.E., Administrator

May 2, 2007

Kevin Eubanks, P.E.
Assistant General Manager
Clark County Regional Flood Control District
600 South Grand Central Parkway
Suite 300
Las Vegas, NV 89106-4511

RE: Municipal Separate Storm Sewer System (MS4) Program,
NPDES Permit No. NV0021911

Dear Mr. Eubanks:

The Nevada Division of Environmental Protection (NDEP) thanks the MS4 Permit NV0021911 Permittees (Permittees) for their continued efforts to collectively strengthen the Clark County Storm water program. As a growing community, this task is less than simple and requires a dynamic approach. To ensure the continued integrity of the MS4 Storm water program and consistent with your proactive approach to environmental compliance, please provide a plan and schedule to address the following items by no later than June 12, 2007. Please carbon copy EPA on your response, as well as future reports that are submitted in response to the items below.

1. For the construction site runoff management program, please provide copies of the following:

   a. An ordinance or other regulatory mechanism to require erosion and sediment controls, as well as sanctions to ensure compliance, to the extent allowable under State, or local law;
   b. Requirements for construction site operators to implement appropriate erosion and sediment control best management practices;
   c. Requirements for construction site operators to control waste such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste at the construction site that may cause adverse impacts to water quality;
   d. Procedures for site plan review which incorporate consideration of potential water quality impacts;
   e. Procedures for receipt and consideration of information submitted by the public;
   f. Procedures for site inspection and enforcement of control measures;
   g. Please complete these revisions and provide supporting documentation to NDEP no later than December 19, 2007; and
   h. Please implement the revisions by June 19, 2008.

2. The existing large flood control detention basins appear to provide little water quality benefit. They may be utilized as part of an effective post-construction control system (in conjunction with other measures, as discussed below) if they are converted/retrofitted to address water quality. Retrofits should outflow structures designed to control floatables, sediment, and toxic fractions associated with sediment particles; and maintained to address water quality, and prevent re-suspension of sediment. Please incorporate the following and provide applicable supporting documentation:

    a. Develop and implement strategies which include a combination of structural and/or non-structural BMPs appropriate for the permittees community;
    b. Use an ordinance or other regulatory mechanism to address post-construction runoff from new development and redevelopment projects to the extent allowable under State, or local law; and
    c. Ensure adequate long-term operation and maintenance of BMPs.

    As stated above, source controls (non-structural measures) must be incorporated into the program in addition to detention basin retrofits. Such controls shall provide for or address:

    d. Runoff from commercial and residential areas;
    e. Planning procedures;
    f. Design standards, BMP fact sheets or guidance manuals that include site design
    g. Tracking & maintenance for structural BMPs;
    h. Training and education;
    i. Estimates of expected reductions in loads; and
    j. Provide to NDEP a proposed schedule and or plan, to address these items no later than December 19, 2007.

3. For storm water runoff management from areas of industrial activity, please provide the following:

    a. Develop an inventory and plan for industrial facilities that are or may be contributing a substantial loading to the MS4;
    b. Revise the industrial facility monitoring and control program to include any newly identified facilities, and commence monitoring activities at these industrial facilities; and
    c. Please complete these revisions and provide supporting documentation to NDEP no later than December 19, 2007; and
    d. Implement the revisions by June 19, 2008.

4. For storm water runoff management related to operation and maintenance of treatment systems and controls, please provide to NDEP a plan to address or remove accumulated sediments in regional detention basins and develop and implement a specific schedule and protocol for inspecting and cleaning these basins no later than December 19, 2007.

5. Where the above timelines can not be reasonably met, please provide the supporting information and a proposed schedule and or plan to comply with the requirements.

Finally, the above requirements must meet the intent of section 4.1 of the permit. Section 4.1 requires the permittees develop, implement, and enforce a SWMP designed to reduce the discharge of pollutants from the Permittees MS4 to the maximum extent practicable (MEP) to protect water quality, and to satisfy the appropriate water quality requirements of the Clean Water Act.

NDEP appreciates the Permittees proactive approach to environmental compliance and values our strong working relationship. We look forward to continuing this relationship as we move forward. If you have any questions, please call me at your earliest convenience at (775) 687-9435.

Sincerely,

Clifford M. Lawson, P.E.
Supervisor, Technical Services
Bureau of Water Pollution Control
Nevada Division of Environmental Protection

CC: Leo Drozdoff, Administrator, NDEP
Tom Porta, Deputy Administrator, NDEP
Jon Palm, Chief, BWPC
Valerie King, Supervisor, Compliance and Enforcement Branch
Jeremy Johnstone, EPA, Region 9

June 12, 2007

Mr. Clifford Lawson
Bureau of Water Pollution Control
Nevada Division of Environmental Protection
901 S. Stewart Street, Suite 4001
Carson City, NV 89701

Subject: Municipal Separate Storm Sewer System (MS4) Program
NPDES Permit No. NV0021911
Response to May 2, 2007 Letter

Dear Mr. Lawson:

On behalf of the Las Vegas Valley MS4 NPDES Permittees, I want to thank you for your letter of May 2, 2007 providing direction on steps to be taken to comply with the requirements of NPDES Permit NV0021911. We understand that these steps are intended as clarification of the similar requirements outlined in EPA's letter of March 30, 2007 describing activities to be performed in response to the permit audit of September 2005.

The Permittees are committed to continuing to develop and implement stormwater management programs that are appropriately suited to the Las Vegas Valley region and climate, and appreciate your willingness to work cooperatively to that end.

In your May 2, 2007 letter you requested that the Permittees submit, by June 12, 2007, a plan and schedule to address specific aspects of four components of the MS4 program. These components are:

- Construction Site Runoff Management Program
- Post-Construction Runoff Management Program
- Industrial Site Runoff Management Program
- Operation and Maintenance of Treatment Systems and Controls

The following sections describe our plan and schedule for addressing the specific requirements in your letter.

Construction Site Runoff Management Program

The following requirements were specified in your May 2, 2007 letter.

(a) An ordinance or other regulatory mechanism to require erosion and sediment controls, as well as sanctions to ensure compliance, to the extent allowable under State or local law;
(b) Requirements for construction site operators to implement appropriate erosion and sediment control best management practices;

(c) Requirements for construction site operators to control waste such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste at the construction site that may cause adverse impacts to water quality;
(d) Procedures for site plan review which incorporate consideration of potential water quality impacts;
(e) Procedures for receipt and consideration of information submitted to the public;
(f) Procedures for site inspection and enforcement of control measures.

As you know, the Permittees have made substantial progress in improving their construction site runoff management programs since the time the EPA audit was performed. This progress includes expanding construction site inspection programs and improving mechanisms for follow-up and enforcement of local ordinances. However, it is recognized that additional improvements to the construction program will be required to comply with the above requirements.

Plan

Items (a), (b), (d) and (f) will require new ordinances or modifications to existing ordinances to require development and implementation of erosion and sediment control measures (e.g., through construction site BMPs) by contractors, and the corollary plan reviews, inspections and enforcement authority for these measures by the Permittees. We believe that Item (c) is already adequately addressed by current local ordinances prohibiting the discharge of any non-stormwater to the MS4. Nonetheless, this item could be covered more fully in a new or revised set of ordinances.

The Permittees have formed a new Construction Program Working Group (CPWG), which will be a subcommittee of the Las Vegas Valley Stormwater Quality Management Committee (SQMC). The CPWG is tasked with recommending modifications to local ordinances and construction site runoff management programs to address Items (a), (b), (d) and (f). Specifically, the CPWG will address the following issues:

- Determine whether a uniform construction ordinance can be adopted by all Permittees to require implementation of erosion and sediment control practices (this is the preference of the SQMC), and recommend language for such a draft ordinance.
- Determine whether current CCRFCD regulations can or should be used to promulgate guidance for construction site runoff management.
- Recommend improvements to current construction site inspection practices, if warranted, to assure compliance with proposed new local construction ordinances.
- Determine feasible enforcement mechanisms to be implemented on either a local or regional level, and include these mechanisms in draft ordinance language.
- Recommend procedures at the local level for assuring that contractors have received State construction permits prior to issuing a grading permit.

In addition to the above issues, the CPWG will consider possible opportunities for better integrating the State and local construction management programs as the State's general construction permit is being reissued later this year.

The CPWG will be comprised of the following members initially. Others may be added as needed.

Al Jankowiak, COH (Group Leader)
Kevin Eubanks, CCRFCD
Rob Mrowka, DAQEM
Chuck Richter, DAQEM
Randy Fultz, CLV
Rob Welch, CLV
Greg McDermott, CLV (alternate)
Dale Daffern, CNLV
Jan Schweitzer, CNLV

The CPWG will carry recommendations to the full SQMC, which will then act on them and direct members to implement adopted program changes in their respective organizations.

The Permittees believe that Item (e), which addresses response to information submitted by the public, is adequately addressed by current practices and programs, as long as the intent of this item is to respond to public complaints regarding conditions at construction sites. If this is not what is intended by this item, please clarify your intent for us.

Schedule

Consistent with the requested deadline in your May 2, 2007 letter, construction site runoff management program revisions and documentation will be submitted to NDEP no later than December 19, 2007. In order to meet this deadline, the CPWG will develop initial recommendations for consideration by the SQMC at its regularly scheduled meeting of August 14, 2007. Program revisions will be implemented no later than June 19, 2008.

Post-Construction Runoff Management Program

Your May 2, 2007 letter repeats EPA's assertion that the existing large regional detention basins in Las Vegas Valley appear to provide little water quality benefit. We respectfully disagree with this assertion. While it is true that the limited available water quality monitoring data show little demonstrated improvement in water chemistry between detention basin inflows and outflows, the regional detention basins are very effective at removing sediment and debris generated in upstream urban and natural watersheds. We have documented some of this sediment and debris removal in past MS4 Permit Annual Reports, and are working to further document this benefit. We are confident that the regional detention basins will be shown to have a very positive impact on downstream water quality with regard to sediment transport, a key constituent in EPA's view, and consider them to be a significant component of any post-construction runoff management program. In addition, other regional programs such as ongoing construction of a system of channel stabilization structures in lower Las Vegas Wash to arrest channel erosion and reduce sediment transport to Lake Mead, have had significant water quality benefits to receiving waters downstream of the MS4.

The above notwithstanding, the Permittees agree that certain enhancements to the Post-Construction Runoff Management Program will be necessary to comply with the requirements in the May 2, 2007 letter. This letter lists the following activities to be performed.

(a) Develop and implement strategies which include a combination of structural and/or non-structural BMPs appropriate for the permittees' community;
(b) Use an ordinance or other regulatory mechanism to address post-construction runoff from new development and redevelopment projects to the extent allowable under State or local law;
(c) Ensure adequate long-term operation and maintenance of BMPs.

Incorporate controls that provide for or address:
(d) Runoff from commercial and residential areas;
(e) Planning procedures;
(f) Design standards, BMP fact sheets or guidance manuals that include site design;
(g) Tracking and maintenance for structural BMPs;
(h) Training and education;
(i) Estimates of expected reductions in loads.

<u>Plan</u>

The Permittees have formed a new Detention Basin Working Group (DBWG) to research methods for improving the water quality performance of existing and future regional detention basins. The DBWG has been tasked with formulating a pilot program for investigating effective detention basin retrofit approaches, including construction and monitoring of basin retrofits. MWH has prepared a technical memorandum outlining detention basin retrofit measures that have been successfully used in other communities; this will be the starting point of this investigation.

The DBWG will consist of the following members initially. Others may be added as needed.

Kevin Eubanks, CCRFCD – Group Leader
Chip Paulson, MWH
Les Henley, Clark County
Gil Suckow, Clark County
Rob Welch, CLV
Randy Fultz, CLV

Greg McDermott, CLV (alternate)
Dennis Scott, CNLV
Jennifer Doody, CNLV
Joe Damiani, COH
Al Jankowiak, COH (alternate)

In order to address the issues raised in Items (a), (b), (c), (d), (e), (h) and (i) above, the Permittees have formed a new Development Guidelines Working Group (DGWG). The DGWG is tasked with the following responsibilities:

- Determine which post-construction planning measures, such as low impact development, would be appropriate for, and implementable in, the Las Vegas Valley MS4 region.
- Investigate impacts of changed planning policies and guidelines on community services (e.g., plan reviews, inspections), developers, and land values.
- Determine changes to ordinances, policies or guidelines that will be required to implement the recommended planning measures, and prepare draft language for new or revised ordinances, policies or guidelines.
- Determine whether regional agencies (e.g., CCRFCD, DAQEM) can provide planning authority, or whether this must be done at the local level.
- Determine recommended structural or non-structural approaches to addressing stormwater runoff from commercial and residential areas in Las Vegas Valley.
- Determine appropriate strategies for ensuring adequate long-term maintenance of post-construction BMPs.

The DGWG will consist of the following members initially. Others may be added as needed.

Mark Silverstein, DAQEM - Group Leader
TBD, Clark County Development Services
Flinn Fagg, CLV
Cheng Shih, CLV
Jory Stewart, CNLV
Jennifer Doody, CNLV
Bristol Ellington, COH

Items (f) and (g) relate to site design and O&M issues for new development and significant redevelopment. At the present time the DGWG is tasked with addressing these topics; however, we may decide to form a separate working group to evaluate these issues in more detail. Specifically, the DGWG or a separate Site Design Working Group will have the following responsibilities related to site design.

- Develop design criteria for structural BMPs that are specific to the Las Vegas Valley MS4 area (note: the 2003-2004 Annual Report contains a review of BMP design criteria used by other MS4 agencies and their applicability to Las Vegas Valley).
- Prepare BMP fact sheets and design specifications based on the recommended design criteria.

- Promulgate design criteria through the CCRFCD Hydrologic Criteria and Drainage Design Manual or other means.
- Develop maintenance guidelines for structural BMPs that are specific to the Las Vegas Valley region.

Schedule

Consistent with the requested deadline in your May 2, 2007 letter, preliminary post-construction runoff management program elements and a preliminary implementation schedule will be submitted to NDEP no later than December 19, 2007. In order to meet this deadline, the DBWG will develop initial recommendations for consideration by the SQMC at its regularly scheduled meeting of September 11, 2007, and the DGWG will develop initial elements to be considered by the SQMC at its regularly scheduled meeting of October 9, 2007.

It is likely that the detention basin retrofit pilot project will require about 3 years to complete (1 year for design and construction and 2 years for monitoring). The DBWG will develop a firm schedule as part of their tasks; this will be presented to NDEP no later than December 19, 2007.

Depending on the final adopted revisions to the post-construction program, full implementation could take several years. Activities such as adopting ordinances, educating the development community, expanding community services and establishing a funding source (should those activities be necessary) would be challenging and would require considerable time and effort. The DGWG will develop an anticipated implementation schedule as part of it work assignment; this will be presented to NDEP no later than December 19, 2007.

Industrial Runoff Management Program

The following requirements were specified in your May 2, 2007 letter.

(a) Develop an inventory and plan for industrial facilities that are or may be contributing a substantial loading to the MS4;
(b) Revise the industrial facility monitoring and control program to include any newly identified facilities, and commence monitoring activities at these industrial facilities.

Plan

All Permittees have made extensive improvements to their industrial runoff management programs since the time of the EPA audit. The City of Las Vegas industrial waste/pretreatment program oversees approximately 1,000 industrial sites, 700 restaurants, and specific sites identified as Section 313 facilities. The City routinely inspects these facilities. All such inspections at applicable facilities include a stormwater inspection per an established checklist. Similarly, the City of North Las Vegas currently routinely inspects all industrial facilities covered under its industrial pretreatment program, consisting of over 600 industrial sites, 300 restaurants, Section 313 facilities, and all facilities requiring a business license inspection within its jurisdiction. The City of Henderson is greatly expanding its industrial inspection program to utilize the services of Fire Department inspectors to conduct stormwater inspections at about 115 industries identified to be high-risk for potential stormwater pollution based on the types of chemicals used on site. The expanded program will be operational in Fall 2007. As a result, each of the cities will have industrial site inspection programs that meet or exceed the requirements of Items (a) and (b) by the end of this year.

Clark County has been inspecting Section 313 facilities and other selected facilities, and is currently in the process of developing criteria to identify other industrial sites that "are or may be contributing a substantial loading to the MS4." Application of these criteria to County industrial sites will satisfy the requirements of Item (a). Industrial inspections are currently performed by the Clark County Water Reclamation District (CCWRD) inspectors under an interlocal agreement with the County (i.e., DAQEM). DAQEM has, in consultation with CCWRD, devised a multifaceted strategy to implement an expansion of its industrial stormwater inspection program for Clark County that will satisfy and exceed the requirements of Item (b). Its elements include:

- Developing a more extensive inspection form;
- Increasing funding for, and the expansion of the role of, the CCWRD inspection program, including making relevant modifications to the interlocal contract;
- Categorizing and prioritizing the sites to be inspected to include those that can be inspected (1) in the near-term (i.e., within the next 18 to 24 months) and/or at little or no addition cost with respect to the current interlocal contract, and (2) in the longer term, likely incurring significant additional planning and costs.

Near-term categories include any remaining 313 sites, CCWRD pretreatment industrial sites and grease trap/interceptor inspection facilities, NDEP industrial stormwater permit holders, and any municipal landfills and hazardous waste facilities located within the Clark County MS4 boundaries. Longer-term categories are transportation-related operations (e.g., auto repair and maintenance and fleet servicing facilities) and other priority facilities (e.g., electroplating shops), developing industrial park inspection approach, Clark County School District bus yards, federally operated facilities (e.g., USPS yards), reviewing NDEP's large- and small-quantity generators lists and Clark County Fire Department Business Licensing Disclosure Forms for potential non-filers.

However, DAQEM and its CCWRD partner (and the other co-permitees) require close coordination with NDEP to include ready access to information from NDEP, including: (1) inspection strategies in the Las Vegas Valley MS4 area, (2) schedules for its industrial inspections, (3) results of those inspections, and (4) up-to-date online NPDES Industrial Stormwater General Permit database. This proposed program will be submitted to NDEP for review and included in the Annual Report.

Through the above existing and proposed activities, each entity will prepare an inventory of industrial facilities (either specifically or by category) that it will address as part of its

MS4 local industrial program. Expansions of inspection programs, if needed, will be described by each Permittee.

The Permittees will seek opportunities to work with NDEP to integrate the components of the State and local industrial site stormwater programs as the State's general industrial permit is being revised in early 2008.

Schedule

The three cities either currently meet the industrial program requirements, or will fully comply by the end of 2007. Clark County will provide documentation of revisions to their industrial program no later than the deadline of December 19, 2007 specified in your letter, and will have their proposed revisions implemented by the deadline of June 19, 2008.

Operation and Maintenance of Treatment Systems and Controls

The following requirements were specified in your May 2, 2007 letter.

(a) Provide a plan to address or remove accumulated sediments in regional detention basins;
(b) Develop and implement a specific schedule and protocol for inspecting and cleaning regional detention basins.

Plan

CCRFCD has an existing Operation and Maintenance Manual that guides removal of sediment and debris from regional detention basins. This Manual is used by CCRFCD and the MS4 Permittees to determine schedules and procedures for cleaning regional detention basins and other regional flood control facilities. These procedures are designed to maintain the flood control function of the basins, but also serve to protect water quality by specifying timely removal of sediment and debris. In addition, detention facilities in the Valley that were constructed by the U.S. Army Corps of Engineers (USACE) have additional O&M requirements as specified by the USACE. CCRFCD provides funds to local entities for performing O&M activities at regional detention basins.

The Permittees will provide NDEP with a copy of pertinent sections of the CCRFCD O&M Manual to demonstrate compliance with Items (a) and (b) above.

It is noted that detention basins on property managed by the Bureau of Land Management (BLM), such as Red Rocks Detention Basin, are subject to restrictions on removal and disposal of accumulated sediment and debris imposed by BLM. The MS4 Permittees must work within these restrictions when planning and executing detention basin maintenance at these facilities.

Schedule

A copy of pertinent sections of the CCRFCD O&M Manual will be provided in the 2006-2007 Annual Report. This report must be submitted to NDEP by October 1, 2007.

Conclusion

As indicted by our responses above, the Las Vegas Valley MS4 Permittees remain committed to developing components of a stormwater program that meet the requirements outlined by NDEP and that will be practical and effective in this region. We appreciate the opportunity to work cooperatively with you and your agency to refine our program components accordingly.

If you have any questions regarding our response to your May 2, 2007 letter, please contact me at 702-455-3139.

Respectfully submitted,

Kevin Eubanks

cc:
Gale Fraser, Clark County Regional Flood Control District
Les Henley, Clark County
Mark Silverstein, Clark County
Dan Fischer, City of Las Vegas
Cheng Shih, City of Las Vegas
Kirk Medina, City of North Las Vegas
Jennifer Doody, City of North Las Vegas
Curt Chandler, City of Henderson
Al Jankowiak, City of Henderson
Chip Paulson, MWH
Alexis Strauss, EPA

Appendix D

APPENDIX D

MUNICIPAL CODES

- Clark County
- City of Henderson
- City of Las Vegas
- City of North Las Vegas

Title 24 WATER, SEWAGE AND OTHER UTILITIES
Chapter 24.40 STORMWATER SYSTEM DISCHARGE

24.40.010 Definitions.

The following words and phrases used in this chapter shall have the meanings hereinafter set forth in this section:

(a) "Discharge permit" means any permit issued by the state of Nevada pursuant to Chapter 445A of the Nevada Revised Statutes.

(b) "Storm sewer" means any sewer designed or intended to convey only stormwater, surface runoff, street wash waters, and drainage, and not intended for sanitary sewage and industrial wastes other than unpolluted cooling water. The portion of a sewer intended to carry stormwater only, which begins at the gutter and grating where water enters said sewer, through the sewer and other conduits to the outlet structure where the water enters a channel or natural watercourse.

(c) "Stormwater system" means all constructed facilities and natural watercourses and drainage ways, under the ownership or within the jurisdiction of the county, used for collecting and conducting stormwater to, through and from drainage areas to the point of final outlet, including, but not limited to, any and all of the following: inlets, conduits and appurtenant features, creeks, channels, catch basins, ditches, streams, culverts, washes, retention or detention basins and pumping stations.

(d) "Stormwater facilities" means various stormwater and drainage works within the county which may include inlets, conduits, pipes, pumping stations, manholes, structures, channels, other structural components and equipment designed to transport, move, or regulate stormwater. (Ord. 1957 § 1 (part), 1997)

24.40.020 Discharge of wastewater to stormwater system prohibited.

It shall be unlawful for any person to discharge or cause to be discharged any wastewater in any form, other than stormwater, into the stormwater system, stormwater facilities, storm sewer, or, onto the curb, gutter, highway, or other area which may drain to the stormwater system, within the county without first obtaining a discharge permit from the state of Nevada. (Ord. 1957 § 1 (part), 1997)

24.40.030 Discharge of pollutant to storm sewer prohibited.

It shall be unlawful for any person to discharge or cause to be discharged any pollutant, as defined in NRS 445A.400, into the stormwater system, stormwater facilities, or storm sewer, or, onto the curb, gutter, highway, or other area which may drain to the stormwater system within the county, without first obtaining a discharge permit from the state of Nevada. (Ord. 1957 § 1 (part), 1997)

24.40.040 Discharge of solid or viscous material to stormwater system prohibited.

It shall be unlawful for any person to discharge or cause to be discharged any solid or viscous material which could cause an obstruction to the flow, or cause an interference to the operation of the stormwater system, stormwater facilities, or storm sewer; or any waste which is capable of damage or hazard to the stormwater facilities, including structures, equipment; or personnel of the county. (Ord. 1957 § 1 (part), 1997)

24.40.050 Violation -- Penalties.

(a) Any person who violates or aids or abets in the violation of any provision of Sections 24.40.020 to 24.40.040, inclusive, is guilty of a misdemeanor and upon conviction shall be punished by imprisonment in the county jail for not more than six months, or by a fine of not more than one thousand dollars, or by both imprisonment and fine. A separate offense shall be deemed committed on each day during or on which a violation occurs or continues.

(b) In addition to the penalty provided in subsection (a) of this section, the county may recover from the person actual damages to the county resulting from the violation of Sections 24.40.020 to 24.40.040, inclusive. (Ord. 1957 § 1 (part), 1997)

Title 14 UTILITY SERVICES

Chapter 14.09 PRETREATMENT REGULATIONS

14.09.040 Wastewater discharge regulations.

A. It is unlawful for any user to discharge or cause to be discharged into the publicly-owned treatment works, the stormwater system, or the waters of the state any wastewater which is prohibited by federal, state, and/or local regulations, and/or that the director has determined may have an adverse or harmful effect upon any part of the publicly-owned treatment works, any person who operates or maintains the publicly-owned treatment works, treatment plant effluent quality, any public or private property, or may otherwise endanger the public or local ecological systems or tend to create a nuisance. The director, in determining the acceptability of specific wastewaters, shall consider the nature of the wastewater and the adequacy and nature of the publicly-owned treatment works to accept such wastewater.

B. The following discharges are expressly prohibited:

1. Any pollutants which create a fire or explosive hazard in the publicly-owned treatment works, including, but not limited to, waste streams with a closed-cup flashpoint of less than sixty degrees Celsius (one hundred forty degrees Fahrenheit) using the test methods specified in 40 CFR 261.21.
a. Prohibited materials include, but are not limited to gasoline, kerosene, naphtha, benzene, toluene, xylene, ethers, alcohol, ketones, aldehydes, peroxides, chlorates, perchlorates, bromates, carbides, hydrides, and/or sulfides.
b. At no time shall two successive readings on an explosion hazard meter, at the point of discharge into the system (or at any point in the system), be more than five percent nor any single reading over ten percent of the lower explosive limit (LEL) of the meter.

2. Any wastewater having a pH less than 5.5 standard units (s.u.) or having any corrosive properties capable of causing damage or hazard to structures, equipment or personnel of the system, except an effluent excursion not to fall below a pH of 5.0 s.u.

3. Any wastewater having a pH greater than 10.5 s.u. or high enough alkalinity to cause encrustations on wastewater walls or other adverse effects on the publicly-owned treatment works, except an excursion not to exceed a pH of 11.0 s.u..

4. Any pollutants, including oxygen demanding pollutants in sufficient quantity or concentration released in a discharge which will cause interference with the publicly-owned treatment works.

5. Any solid or viscous substances of such size or quantity that may cause obstruction to the flow or be detrimental to the publicly-owned treatment works, such as, but not limited to: asphalt, dead animals, offal, ashes, sand, mud, straw, industrial process shavings, metal, glass, rags, feathers, tar, plastics, diapers, wood, whole blood, paunch manure, bones, hair and/or fleshings, entrails, paper, dishes, paper cups, milk containers, or other similar paper products, either whole or ground.

6. Any petroleum oil, non-biodegradable cutting oil or products of mineral oil origin, which may cause interference or pass-through.

7. Any pollutant or malodorous liquids, gases or solids which either singly or by interaction are capable of creating a public nuisance or, hazard to health, life and the environment, or be detrimental to the publicly-owned treatment works.

8. Any substance, which may cause the publicly-owned treatment works' effluent or treatment residues, sludges or scums to be unsuitable for reclamation and reuse or to interfere with the reclamation process.

9. Any substance with objectionable color or discoloration not removed in the treatment process, such as, but no limited to, dye waste and vegetable tanning solutions.

10. Any wastewater having a temperature which will inhibit biological activity in the publicly-owned treatment works resulting in interference; but in no case, wastewater with a temperature at the introduction into the publicly-owned treatment works which exceeds forty degrees Celsius (one hundred four degrees Fahrenheit). If, in the opinion of the city, lower temperatures of such wastes could harm either the wastewaters, sewage treatment process or equipment; have an adverse effect on the receiving streams or otherwise endanger life, health of property; or constitute a nuisance, the city may prohibit such discharges.

11. Any wastewater at a flow rate which may interfere with collection sewer capacity or upset the publicly-owned treatment works.

12. Any wastewater containing any radioactive wastes or isotopes of such half-life or concentration which exceed federal, state, or local regulations.

13. Any water added for the purpose of diluting wastes that would otherwise exceed applicable maximum concentration limitations.

14. Discharges with concentrations exceeding national categorical pretreatment standards promulgated by federal, state, and local regulations.

15. Any material, which affects the survival, growth or reproduction of organisms, used in whole effluent toxicity test.

16. Discharge constituents in excess of those listed in pollutant daily maximum concentration table below:

Table 14.09.040a
Pollutant Daily Maximum Concentrations

Pollutant	Maximum Influent Concentration (mg/L)	Pretreatment Standard (mg/L)
Non-priority Pollutants		
Aluminum	5.000	-----
Barium	1.000	-----
Boron	0.750	-----
Cobalt	0.500	-----
Fluoride	1.000	-----
Iron	5.000	25.000
Lithium	2.500	-----
Manganese	1.000	5.300
Molybdenum	0.100	-----
Total Petroleum Hydrocarbons		100
Vanadium	0.100	-----
Organic Priority Pollutants		
Total Volatile Organics	0.100	-----
Total Phenols	0.100	0.350
Other Priority Pollutants		
Antimony	0.150	1.500
Arsenic	0.100	0.420
Asbestos	0.001	-----
Beryllium	0.100	-----
Cadmium	0.010	0.050
Chromium	0.100	0.540
Copper	0.500	1.800
Cyanide	0.040	0.210
Lead	0.200	1.000
Mercury	0.002	0.010
Nickel	0.500	1.900
Selenium	0.010	0.040
Silver	0.050	0.500
Thallium	0.020	0.050
Zinc	2.000	5.000
Note: The limitations imposed under this chapter may be exceeded when said limitation is unattainable based on best available technology as determined by the city, with the approval of the director as in accordance with the 40 CFR as amended (40 CFR 401.12(b)). Biochemical oxygen demand (BOD) in excess of thee hundred mg/L shall be surcharged. Total system suspended solids (TSS) in excess of three hundred mg/L shall be surcharged.		

C. It is unlawful for any user to discharge or cause to be discharged any trucked or hauled waste into the publicly-owned treatment works, unless such discharge is approved by the director.

D. It shall be prohibited for rainwater, storm water, groundwater, street drainage, subsurface drainage, roof drainage, yard drainage, water from yard fountains or water features, ponds or lawn sprays or other non-potable water as determined by the city to be discharged to the publicly-owned treatment works without prior authorization. The director may approve the discharge of such water only when, in the opinion of the city, there is no other reasonable method of disposal available. If authorization is granted for the discharge of such water into the publicly-owned treatment works, the user shall pay an applicable user charge, fees and meet all conditions as required. No discharge of wastewater or stormwater in any form, as defined in the Federal Water Pollution Control Act (33 U.S.C. 1251 et seq.), shall be made into the storm water system or waters of the state of Nevada that would cause a violation of the NPDES storm water permit.

E. No user shall discharge or cause to be discharged without prior approval any substance directly into a publicly-owned treatment works manhole, a private manhole which discharges to the publicly-owned treatment works, or any other opening into the publicly-owned treatment works except through an approved wastewater connection. Upon written application by the user, the director may authorize the user temporary permission for such discharge into the publicly-owned treatment works.

F. A significant industrial user who introduces wastewater into the publicly-owned treatment works, must submit upon request a salinity control plan. This plan shall contain a description of the chemicals and materials used that contribute to the total dissolved solids concentration and the source control measures that will be incorporated to consistently reduce the total dissolved solids concentration to less than one thousand two hundred mg/L or the lowest concentration to be reasonably practical as is determined by the director. In the event the user does not consistently reduce the total dissolved solids concentration to the required concentration, the director may require the user to submit another salinity control plan with additional control measures.

G. A user who is affected by director discharge determination(s) shall have the right to appeal the determination in a manner as outlined in Chapter 14.21 of this title, and to have such appeal finally decided before any criminal proceeding may be instituted against such user. (Ord. 2536 § 62, 2006)

Title 19 DEVELOPMENT CODE (ZONING)

Chapter 19.9 SUBDIVISION DESIGN AND IMPROVEMENTS

19.9.13 Streets.

A. Alignment. Streets shall be aligned in accordance with the master streets and highways plan. Street layouts and alignments shall be subject to the transportation and circulation standards of Section 19.10.9.

B. Street and Right-of-Way Widths.
1. Minimum Standards. The minimum widths of public and private streets and rights-of-way shall be as follows:

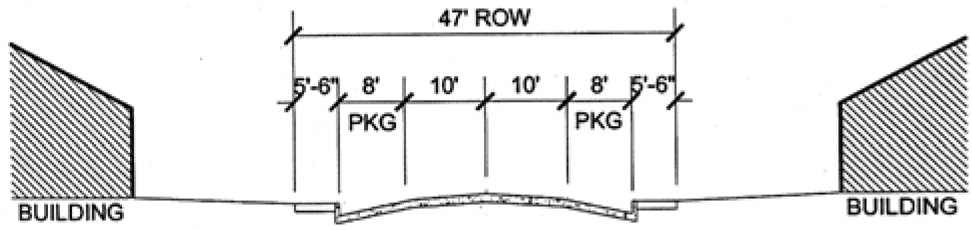
Street Type	Right-of-Way Width (Feet)	Pavement Width [1] (Feet)	
		No On-Street Parking	On-Street Parking
Cul-de-Sac	See Section 19.9.13(B)(2).		
Minor Local/Interior Subdivision			
Minor or Industrial Collector	60	36	49
Secondary Arterial	80 [3]	[2]	[2]
Primary Arterial	100 [4]	[2]	[2]
Controlled Access Arterial	120 [5]	[2]	[2]

Note:
[1] Pavement width measured from face of curb to face of curb.
[2] Per standard drawings/specifications and master streets and highways plan.
[3] Where a secondary arterial street intersects another secondary arterial or larger street, each secondary arterial or larger street right-of-way shall be increased in width to accommodate dual left- and right-turn lanes, as specified in the standard drawings/specifications.
[4] Where a primary arterial street intersects a secondary arterial or larger street, each arterial right-of-way shall be increased to a one hundred twenty-foot width for six hundred sixty feet in each direction from the intersection as specified in the standard drawings/specifications to accommodate dual left- and right-turn lanes.
[5] Where a controlled access arterial street intersects a secondary arterial or larger street, each arterial right-of-way shall be increased to a one hundred forty-foot width for six hundred sixty feet in each direction from the intersection as specified in the standard drawings/ specifications to accommodate dual left- and right-turn lanes.

2. Options for Minor Local/Interior Subdivision Streets. The following design options shall be allowed for minor local streets and interior subdivision streets, including cul-de-sacs:

Right-of-Way Width (Feet)	Pavement Width [1] (Feet)	Parking Lanes: Sides of Street	Parking Lanes: Width [1]	Sidewalks: Sides of Street	Sidewalks: Width
47	36	2	8	2	5

Note:
[1] Pavement and parking lane widths measured from face of curb.



Minor Local/Interior Subdivision Streets

In addition to the street width design options described above, a single-family subdivision with attached or detached housing product is permitted to have streets that provide a minimum twenty-four-foot-wide flowline when all of the following are provided:
a. Fire lanes (including signage, curb painting, and stenciling) shall be complete before the issuance of any certificates of occupancy;
b. The subdivision shall be gated;
c. The streets shall be privately owned and maintained;
d. The project shall contain no cul-de-sacs, dead-ends or stub streets;
e. Guest parking shall be provided in locations approved by the fire chief and the community development director;
f. All purchasers shall sign a disclaimer at the close of escrow acknowledging the prohibition of on street parking;
g. The codes, covenants and restrictions (CC&Rs) shall be irrevocably written and recorded so that the maintenance and enforcement of the on-street parking prohibition is the responsibility of the Homeowners' Association (HOA) for the life of the project. The CC&Rs shall clearly state that the HOA officers are responsible for the enforcement of the on-street parking prohibition and are personally liable for any penalties, including citations, for the failure to follow through with their responsibilities.
3. Subdivision Boundary Streets. Subdivision boundary streets shown on the master streets and highways plan shall be dedicated for one-half of the otherwise required width, and one-half the otherwise required street improvement section shall be required.
4. Half-Streets. Half-streets shall not be permitted within the interior of a subdivision. They shall be permitted along the exterior boundaries of subdivisions when they are major streets or when the need is dictated by traffic, topography or drainage factors. Where a dedicated half-street or alley abutting the proposed subdivision exists, the other half shall be dedicated to make the street or alley complete. In the event that the abutting half-street is unimproved or partially unimproved, the developer shall be required to construct a half-street or complete the partially improved half-street, which for the purposes of this section shall consist of:
a. Curb and gutter, streetlights, sidewalk, one eight-foot-wide parking lane, and two twelve-foot-wide travel lanes for fifty-one-foot and narrower rights-of-way.
b. Curb and gutter, streetlights, sidewalk, one nine-foot-wide parking lane, and two fifteen-foot-wide travel lanes for fifty-two to eighty-foot rights-of-way.
c. As prescribed by the public works director for all other rights-of-way.
5. Waiver of Street Width Standards. The city council, upon recommendation of the public works director and the planning commission, may waive or modify otherwise required street width standards upon finding that such waivers or modifications are justified by compensating benefits, such as public open space, recreational amenities or enhanced landscaping and that adequate provision for utilities service and emergency vehicle access are provided.
6. Private Driveways and Drive Aisles. Multifamily, commercial, and industrial developments served by private driveways or drive aisles shall comply with the paving materials, width, and location standards of this Section 19.9.13. In nonresidential districts,

driveways approaching an intersection shall comply with Section 19.10.1. In residential districts, all driveways shall be at least six feet from the point of curvature of any intersection, per Standard Drawing Nos. 222 and 222A, unless this requirement is waived by the public works director. Private driveways and drive aisles shall comply with the fire code when the fire chief determines that they are necessary for fire apparatus access.

Commentary: This provision does not exempt developments from compliance with any fire code adopted by the city.

7. Direct Access to Collector and Larger Streets Restricted. Unless otherwise approved by the public works director, no direct vehicular access onto any minor or industrial collector, secondary arterial or primary arterial or larger street shall be permitted from any lot zoned RS-1A, RS-2, RS-4, RS-6, RM-8 or RM-10. Access to lots zoned RS-1A, RS-2, RS-4, RS-6, RM-8 or RM-10 shall be by minor local or interior subdivision streets or alleys only. Unless otherwise approved by the public works director, each RS-1A and RS-2 lot existing prior to adoption of this Development Code that fronts on and directly accesses a street shown on the master streets and highways plan shall provide a circular drive to access that street.

C. Street Jogs. Streets shall not have centerline offsets of less than one hundred twenty-five feet unless approved by the public works director.

D. Reverse or Compound Curves. The minimum tangent on reverse or compound curves on all streets, except local streets, shall be one hundred feet.

E. Cul-de-Sacs. In addition to the right-of-way and pavement width standards of this section, cul-de-sac streets shall comply with the following standards.
1. Length. The maximum length of a cul-de-sac shall be six hundred feet, measured from the center of the intersection to the center of the turnaround. Cul-de-sac lengths in excess of six hundred feet shall require approval of the fire chief.
2. Number of Lots. No more than twenty lots may be located on a cul-de-sac street. Cul-de-sacs that serve more than twenty lots shall require approval of the fire chief.

F. Block Length.
1. Blocks shall not exceed one thousand two hundred feet in length between intersections except where topography, traffic or other conditions require longer blocks.
2. Neighborhood roadways shall be designed with elements to reduce cut-through traffic and speeding. The neighborhood shall be designed to discourage long blocks. Design elements such as cul-de-sacs, curved streets, traffic circles and short-segmented streets shall be used.

G. Intersections.
1. Minimum tangent distances between right-of-way lines shall be as shown in the standard drawings.
2. At intersections of major streets or a major and minor street, sight visibility zones shall be provided in accordance with Standard Drawing No. 201.2.
3. Any median opening providing access to a public or private street may be closed or channelized with a median in order to restrict the public or private street to right-turn-only movements as determined by the director of public works to reduce the risk of any potential traffic hazards.

H. Drainage.
1. Drainage System
a. The subdivider shall provide the necessary means to assure complete drainage in and adjacent to the subject property by making use of state or city stormwater systems, natural watercourses or constructed channels. The subdivider shall submit to the public works

director sufficient information in the form of maps and profiles prepared by a surveyor or engineer to indicate the proper drainage of the runoff to natural drainage courses or into city or state drain systems. If surface runoff drainage is proposed across lands intended to be used as private lots, rights-of-way and easements shall be indicated on the proposed plat. The location and width of easements shall be indicated on the plat to be recorded and marked “public drainage easements with the minimum width being twenty feet.” If deemed necessary by the Public Works Director, temporary or permanent improvements shall be provided. The design of the improvements shall be determined by an engineer in accordance with the latest edition of the “Clark County Regional Flood Control District Hydrologic Criteria and Drainage Design Manual.” The construction of all improvements shall be in accordance with the latest edition of the Uniform Standard Drawings and specifications for the Clark County Area, Nevada.

b. No discharge of any pollutant, as defined in the Federal Water Pollution Control Act (33 U.S.C. 1251 et seq.) shall be made into the stormwater system or waters of the state of Nevada within the city of Henderson without first obtaining the appropriate NPDES permit from the state of Nevada or the U.S. Environmental Protection Agency.

2. Valley Gutters and Under-Drains. Valley gutters with a minimum width of eight feet or under-drains are required across intersections. The construction of valley gutters or under-drains shall comply with the Uniform Standard Drawings and Specifications for the Clark County Area, Nevada. Valley gutters will not be allowed to cross eighty-foot-wide or larger streets. Drainage will be placed in appropriately sized pipes at those points and discharged to existing stormwater systems or drained to daylight.

3. Drainage Pipe. No public storm water drainage pipe shall be less than eighteen inches in diameter. All public storm water drainage pipe shall be corrosive-resistant and have a design life of at least fifty years.

4. Curb and Gutter. Curbs and gutters shall conform to the Uniform Standard Drawings and Specifications for the Clark County Area, Nevada.

a. Rolled Curbs and Gutters—Private Streets. A thirty-inch rolled curb and gutter may be used on privately owned and maintained streets, provided that all sidewalks abutting the rolled curb and gutter are constructed with a minimum thickness of five inches of Class B concrete, and all meter covers in the sidewalk area are the traffic-bearing type.

I. Alleys.

1. Alleys not less than twenty feet wide may be provided in commercial and industrial districts except where other definite and assured provision is made for service access, such as off-street loading, unloading, and parking that is adequate for the proposed uses.

2. If alleys are provided in residential developments, they shall be at least twenty-four feet wide except in the ELO district where they may be allowed as per Section 19.6.5(j)(7).

J. Street Names.

1. All street names and addresses shall conform to the Henderson standard for street naming and addressing, as adopted by the city council.

2. The subdivider shall purchase and install street signs in accordance with city standards.

K. Access Streets. All access streets shall be constructed in compliance with the standard drawings and Standard Specifications, as approved by the public works director and fire chief.

L. Gating and Restricting Access to Streets, Driveways and Alleys. The following restrictions apply to all residential, commercial, and industrial development except for a single-family home with its own separately gated driveway.

1. No street, driveway or alley, whether publicly or privately owned or maintained, shall be gated or otherwise restricted with regard to vehicular or pedestrian (traffic) access without specific permission from the city council. As used in this section, the term, gate, shall refer to any electronically operated barrier or similar device that would allow access or passage to a certain person, group of people or type of traffic and not to the general public or to transient traffic.

2. Permission to restrict access from public streets to private streets or to gate or otherwise restrict access to private streets, driveways, and alleys may be granted through the planned unit development (PUD) process (Section 19.2.7) at the time the subdivision and road are first designed and approved. If such design does not result in a restriction of access to any existing street, the citizen's traffic advisory board need not review the plans. If, however, the restriction of access on a proposed street would result in restricting access to an existing street, the applicant shall first follow the procedures described below for gating an existing street.
3. Public streets or alleys shall not be gated.
4. In the event that one or more property owners wish to restrict access on an existing public street or to gate or otherwise restrict access on an existing private street or alley, said property owners shall initiate an application through the city clerk, and the city clerk shall forward the application to the city council for acceptance or rejection. The application shall be signed by every property owner whose lot or condominium directly abuts the street and every owner of properties on cul-de-sacs or loop streets that are primarily accessed by the street. The fee for such application shall be the same as for an application for vacation of street right-of-way. If rejected, the application shall be void, the fee shall be refunded, and no reapplication shall be accepted by the city clerk for the same or substantially the same proposal for a period of one hundred eighty days. If accepted, the city council shall remand the application to the citizen's traffic advisory board and planning commission for their reviews. The applicants shall cause a traffic study to be performed in accordance with the specifications of the city's traffic engineer, and the results of the study, along with any police and fire department requirements, shall be included in a plan presented to the citizen's traffic advisory board. The citizen's traffic advisory board shall forward the results of their review to the planning commission, which shall then make a recommendation to the city council. Upon receipt of the planning commission's recommendation, the city council shall conduct a public hearing and make its final determination on the application. If denied, no reapplication shall be accepted by the city clerk for the same or substantially the same proposal for a period of one hundred eighty days.
5. Access to either public or private streets, driveways, and alleys may be restricted using a permanent barrier if approved by the city council. Such restriction shall be for all vehicles with the exception of emergency vehicles that may require passage as an option. The city council's decision to allow restricted access to a street shall be based on the restriction enhancing the health, safety, and welfare of the general public, and not solely to help isolate or segregate a segment of the population or an organization.
6. It is the intent of this subsection that no street, driveway or alley access restriction shall be authorized until all traffic and emergency access studies and all functional and aesthetic designs are completed, reviewed by the planning commission, and approved by the city council. Furthermore, the citizen's traffic advisory board shall also review all such proposals for streets already in existence at the time of the application.
(Ord. 2573 § 5, 2007; Ord. 2567 § 7 (part), 2007; Ord. 2263 § 4, 2004; Ord. 2254 § 9 (part), 2004: Ord. 2061 § 9 (part), 2001)

Title 14 PUBLIC SERVICES
Chapter 14.17 WASTEWATER COLLECTION AND TREATMENT

LVMC 14.17.025 Definitions

(66) “Storm drain” means a conveyance structure for carrying storm and surface waters and drainage water excluding wastewater.

(67) “Stormwater” means uncontaminated water resulting from precipitation; irrigation with drinking water; or clean groundwater.

Stormwater Discharges are discussed in Paragraphs D and E.

14.17.120 Discharge of certain materials expressly prohibited.

(A) It is unlawful for any user to discharge or cause to be discharged into the system any of the following materials in concentrations sufficient to cause pass through or interference, or in concentrations that violate any regulation promulgated in accordance with Section 307(b), (c) or (d) of the Act;

(1) Gasoline, mercury, total identifiable chlorinated hydrocarbons, kerosene, naphtha, benzene, toluene, xylene, ethers, alcohols, ketones, aldehydes, peroxides, chlorates, perchlorates, bromates, carbides, hydrides, solvents, pesticides or jet fuel;

(2) Acids, caustics, sulfides, concentrated chloride and fluoride compounds and substances which will react with water to form acidic products;

(3) Liquids, solids or gases which, by reason of their nature or quantity, are flammable, reactive, explosive, corrosive or radioactive or by interaction with other materials could result in a fire, explosion or injury;

(4) Wastewater from industrial facilities that contain floatable fats, wax, grease or oils;

(5) Non-biodegradable cutting oils, commonly called soluble oil, which form persistent water emulsions;

(6) Floatable material which is readily removable;

(7) Any waste with a closed-cup flashpoint of less than one hundred forty degrees Fahrenheit (sixty degrees Celsius) using the test methods specified in 40 CFR 261.21.

(B) Except as expressly allowed in a wastewater contribution permit, it is unlawful for any user to discharge or cause to be discharged into the system any of the following materials:

(1) Solid or viscous material which could cause an obstruction to the flow or cause an interference to the operation of the system or the City's storm drain system, including without

limitation grease, garbage with particles that are greater than one-half of an inch in any dimension, animal guts or tissues, paunch manure, bones, hair, hides or fleshing, entrails, feathers, ashes, cinders, sand, spent lime, stone marble dust, metal, glass, straw, shavings, grass clippings, rags, spent grains, spent hops, waste paper, wood, plastics, gas tar, asphalt residues, residues from the refining or processing of fuel, lubricating oil, mud, glass grinding or polishing wastes, any wastewater that has a pH of less than 5.0 or more than 11.0 or any wastewater that has any other corrosive property that is capable of causing damage or hazard to the structures, equipment, or personnel of the City;

(2) Toxic pollutants in a sufficient quantity to injure or interfere with any wastewater treatment process, constitute a hazard or cause injury to human, animal or plant life or cause to be exceeded any limitation that is set forth in this Chapter;

(3) Noxious or malodorous liquids, gases or solids in a sufficient quantity, either alone or by interaction with other materials, to create a nuisance or which result in toxic gases, vapors or fumes within the system in a quantity that may cause acute worker health and safety problems;

(4) Any material in a sufficient quantity to interfere with any wastewater treatment process, render any product thereof unsuitable for reclamation and reuse or cause the City to be in non-compliance with the sludge use or disposal criteria, guidelines or regulations in connection with Section 405 of the Act, the Solid Waste Disposal Act, the Clean Air Act, the Toxic Substances Control Act or other Federal or State criteria that are applicable to the sludge management method that is being used;

(5) Material which will cause the City to be in violation of its NPDES permit or any applicable Federal and State statute, rule or regulation;

(6) Wastewater that contains pigment which is not removed in the ordinary wastewater treatment process and which creates a visual contrast with the material appearance of the City's discharge when it is observed at the point of the discharge;

(7) Wax, grease or oil concentration of mineral or petroleum origin (nonliving sources) of more than one hundred milligrams per liter, whether emulsified or not, or which contain substances which may solidify or become viscous at temperatures between thirty-two degrees Fahrenheit and one hundred fifty degrees Fahrenheit (zero degree Celsius and sixty-five degrees Celsius) at the point of its discharge into the system;

(8) Total fat, wax, grease or oil concentration of animal or vegetable origin (biodegradable living sources) of more than two hundred fifty milligrams per liter, whether emulsified or not, or which contain substances which may solidify or become viscous at temperatures between forty degrees Fahrenheit and one hundred degrees Fahrenheit (four degrees Celsius and thirty-seven degrees Celsius) at the point of its discharge into the system.

(9) Waste containing substances that may precipitate, solidify or become viscous at temperatures between forty degrees Fahrenheit and one hundred degrees Fahrenheit (four degrees Celsius and thirty-seven degrees Celsius) at the point of its discharge into the system;

(10) Wastewater that has a heat content in such a quantity that the temperature of the wastewater at the introduction into the wastewater treatment plant exceeds one hundred four degrees Fahrenheit (forty degrees Celsius);

(11) Pollutants, including without limitation oxygen-demanding pollutants, that are released at a flow rate or a pollutant concentration which will cause or contribute to an interference with the wastewater treatment process;

(12) Single pass cooling water; provided, however, that the blowdown or bleedoff from cooling towers or other evaporative coolers may be accepted into the system as long as it does not exceed one-third of the makeup of the water and is expressly authorized in the user's wastewater contribution permit;

(13) Wastewater which constitutes a hazard or causes injury to human, animal or plant life or creates a public nuisance;

(14) Recognizable portions of the human or animal anatomy;

(15) Wastewater which constitutes a hazard or causes injury to human, animal or plant life or creates a nuisance;

(16) Water that is added for the purpose of diluting wastes which would otherwise exceed the applicable maximum concentration limitations;

(17) Excessive amounts of organic phosphorous type compounds;

(18) Excessive amounts of deionized water, steam condensate or distilled water;

(19) Rainwater, stormwater, groundwater, street drainage, surface drainage, roof drainage, yard drainage, water from yard fountains, ponds, lawn sprays or any other uncontaminated water;

(20) Industrial waste which does not comply with the applicable Federal pretreatment standards, as the same are set forth in Section 307(b) and (c) of the Act and any applicable regulation thereunder, including without limitation those that are promulgated in 40 CFR Chapter I, Subpart N, Parts 401 to 471. The most stringent standards will apply whenever Federal, State and local standards overlap.

(C) In no case shall LVMC 14.17.120(B) be interpreted to allow a discharge that is not in compliance with any regulation promulgated in accordance with Section 307(b), (c) or (d) of the Act.

(D) It is unlawful for any person to discharge wastewater in any form, other than stormwater, into the storm drains of the City of Las Vegas.

(E) It is unlawful for any person to discharge any pollutant, as defined in the Act, into surface waters within the City of Las Vegas without first obtaining an NPDES permit from the State of Nevada or the U.S. Environmental Protection Agency.

(F) At no time shall two successive readings on an explosion hazard meter, at the point of discharge into the system, or at any point in the system, exceed five percent, nor shall any single reading exceed ten percent of the lower explosive limit of the meter.
(Ord. 3713 § 14, 1993: Ord. 3447 § 102, 1989)

Title 13 PUBLIC SERVICES
Chapter 13.28 WASTEWATER COLLECTION AND TREATMENT

Stormwater Discharges are discussed in Paragraphs D and E.

13.28.120 Discharge of certain materials expressly prohibited.

A. It is unlawful for any user to discharge or cause to be discharged into the system any of the following materials in concentrations sufficient to cause pass through or interference, or in concentrations that violate any regulation promulgated in accordance with Section 307(b), (c) or (d) of the Clean Water Act:

1. Gasoline, mercury, total identifiable chlorinated hydrocarbons, kerosene, naphtha, benzene, toluene, xylene, ethers, alcohols, ketones, aldehydes, peroxides, chlorates, perchlorates, bromates, carbides, hydrides, solvents, pesticides or jet fuel;

2. Acids, caustics, sulfides, concentrated chloride and fluoride compounds and substances which will react with water to form acidic products;

3. Liquids, solids or gases which, by reason of their nature or quantity, are flammable, reactive, explosive, corrosive, or radioactive or by interaction with other materials could result in a fire, explosion or injury;

4. Wastewater from industrial facilities that contain floatable fats, wax, grease or oils;

5. Nonbiodegradable cutting oils, commonly called soluble oil, which form persistent water emulsions;

6. Floatable material which is readily removable;

7. Any waste with a closed-cup flashpoint of less than 140 degrees Fahrenheit (60 degrees Celsius) using the test methods specified in 40 CFR 261.21.

B. Except as expressly allowed in a wastewater contribution permit, it is unlawful for any user to discharge or cause to be discharged into the system any of the following materials:

1. Solid or viscous material which could cause an obstruction to the flow or cause an interference to the operation of the system or the city's storm drain system, including without limitation grease, garbage with particles that are greater than one-half of an inch in any dimension, animal guts or tissues, paunch manure, bones, hair, hides or fleshing, entrails, feathers, ashes, cinders, sand, spent lime, stone marble dust, metal, glass, straw, shavings, grass clippings, rags, spent grains, spent hops, waste paper, wood, plastics, gas tar, asphalt residues, residues from the refining or processing of fuel, lubricating oil, mud, glass grinding or polishing wastes, any wastewater that has a pH of less than 5.0 or more than 11.0 or any wastewater that has any other corrosive property that is capable of causing damage or hazard to the structures, equipment, or personnel of the city;

2. Toxic pollutants in a sufficient quantity to injure or interfere with any wastewater treatment process, constitute a hazard or cause injury to human, animal or plant life, or cause any limitation that is set forth in this chapter to be exceeded;

3. Noxious or malodorous liquids, gases or solids in a sufficient quantity, either alone or by interaction with other materials, to create a nuisance or which result in toxic gases, vapors or fumes within the system in a quantity that may cause acute worker health and safety problems;

4. Any material in a sufficient quantity to interfere with any wastewater treatment process, render any product thereof unsuitable for reclamation and reuse or cause the city of Las Vegas or Clark County sanitation district to be in noncompliance with the sludge use or disposal criteria, guidelines, or regulations in connection with Section 405 of the Act, the Solid Waste Disposal Act, the Clean Air Act, the Toxic Substances Control Act, or other federal or state criteria that are applicable to the sludge management method that is being used;

5. Material which will cause the city of Las Vegas or Clark County sanitation district to be in violation of its NPDES permit or any applicable federal and state statute, rule or regulation;

6. Wastewater that contains pigment which is not removed in the ordinary wastewater treatment process and which creates a visual contrast with the material appearance of the city's discharge when it is observed at the point of the discharge;

7. Wax, grease or oil concentration of mineral or petroleum origin (non-living sources) of more than 100 milligrams per liter, whether emulsified or not, or which contain substances which may solidify or become viscous at temperatures between 32 degrees Fahrenheit and 150 degrees Fahrenheit (0 degree Celsius and 65 degrees Celsius) at the point of its discharge into the system;

8. Total fat, wax, grease, or oil concentration of animal or vegetable origin (biodegradable living sources) of more than 250 milligrams per liter, whether emulsified or not, or which contain substances which may solidify or become viscous at temperatures between 40 degrees Fahrenheit and 100 degrees Fahrenheit (4 degrees Celsius and 37 degrees Celsius) at the point of its discharge into the system;

9. Waste containing substances that may precipitate, solidify or become viscous at temperatures between 40 degrees Fahrenheit and 100 degrees Fahrenheit (4 degrees Celsius and 37 degrees Celsius) at the point of its discharge into the system;

10. Wastewater that has a heat content in such a quantity that the temperature of the wastewater at the introduction into the wastewater treatment plant exceeds 104 degrees Fahrenheit (40 degrees Celsius);

11. Pollutants, including without limitation oxygen demanding pollutants, that are released at a flow rate or a pollutant concentration which will cause or contribute to an interference with the wastewater treatment process;

12. Single pass cooling water; provided, however, that the blow down or bleed off from cooling towers or other evaporative coolers may be accepted into the system as long as it does not exceed one-third of the makeup of the water and is expressly authorized in the user's wastewater contribution permit;

13. Wastewater which constitutes a hazard or causes injury to human, animal, or plant life or creates a public nuisance;

14. Recognizable portions of the human or animal anatomy;

15. Wastewater which constitutes a hazard or causes injury to human, animal, or plant life or creates a nuisance;

16. Water that is added for the purpose of diluting wastes which would otherwise exceed the applicable maximum concentration limitations;

17. Excessive amounts of organic phosphorous type compounds;

18. Excessive amounts of deionized water, steam condensate or distilled water;

19. Rainwater, stormwater, groundwater, street drainage, surface drainage, roof drainage, yard drainage, water from yard fountains, ponds, lawn sprays or any other uncontaminated water;

20. Industrial waste which does not comply with the applicable federal pretreatment standards, as the same are set forth in Section 307 (b) and (c) of the Act and any applicable regulations thereunder, including without limitation those that are promulgated in 40 CFR Chapter I, Subpart N, Parts 401 to 471. The most stringent standards will apply whenever federal, state and local standards overlap.

C. In no case shall Section 13.28.120B be interpreted to allow a discharge that is not in compliance with any regulation promulgated in accordance with Section 307(b), (c) or (d) of the Act.

D. It is unlawful for any person to discharge any waste water in any form, other than stormwater, into the storm drains of the city.

E. It is unlawful for any person to discharge any pollutant, as defined in the Act, into surface waters within the city without first obtaining an NPDES permit from the state of Nevada or the U. S. Environmental Protection Agency.

F. At no time shall two successive readings on an explosion hazard meter, at the point of discharge into the system or at any point in the system, exceed five percent, nor shall any single reading exceed ten (10) percent of the lower explosive limit of the meter. (Ord. 1098 § 2 (part), 1993: prior code § 4.14.120)

Appendix E

APPENDIX E

STORMWATER MONITORING PROGRAM - DRY WEATHER DATA FOR MS4 PROGRAM HISTORY

DRY WEATHER MONITORING DATA 1991-2007

Location	Date	Q (cfs)	Temp (Deg C)	Oil & Grease (mg/L)	TSS (mg/L)	TDS (mg/L)	pH *	MBAS (mg/L)	Ortho-Phosphate (mg/L)	Total Phosphate-Phosphorous (mg/L)	NO3-N (mg/L)	NO2-N (mg/L)	NH3-N (mg/L)	TKN (mg/L)	Total Nitrogen (mg/L)	Copper (mg/L)	Chromium (mg/L)	Lead (mg/L)	Mercury (mg/L)	Cadmium (mg/L)	Zinc (mg/L)	Silver (mg/L)	Nickel (mg/L)
Western Tributary at Cheyenne	08/27/91	0.7	25.9	< 3	4	930	8.5	0.07	0.46	0.20	0.72		< 0.05	1.1	1.8	< 0.01	< 0.01	< 0.002	< 0.0002	< 0.005	0.022	< 0.01	< 0.04
	04/06/92	1.0				1,350	8.6				2.50					< 0.01							
	09/13/92	1.7	26.2	< 3	6	3,420	8.3	< 0.05	< 0.05	< 0.05	1.80		< 0.05	< 1.0	1.8-2.8	< 0.01	< 0.01	< 0.002	< 0.0002	< 0.005	< 0.020	< 0.01	< 0.04
	03/07/93	4.4	29.1			1,370	8.6				2.70					< 0.01							
	08/23/93	0.9	29.0	< 3	21	1,085	8.4	0.25	< 0.05	< 0.05	0.38		0.13	< 1.0	1.4	< 0.01	< 0.01	< 0.002	< 0.0002	< 0.005	0.049	< 0.01	< 0.02
	04/03/94	1.6	8.6			1,260	8.6				1.3					< 0.01							
	08/28/94	6.0	22.4	< 3	18	735	8.3	0.06	< 0.05	< 0.05	0.50		< 0.05	1.5	2.1	< 0.01	< 0.01	< 0.002	< 0.0002	< 0.005	0.113	< 0.01	< 0.01
	03/26/95	5.7	10.1			1,340	8.3				2.40					< 0.01							
	08/28/95	2.0	21.9	< 3	4	1,225	7.8	0.07	< 0.05	< 0.05	< 0.40		< 0.05	1.0	1.4	< 0.01	< 0.01	< 0.002	< 0.0002	< 0.005	< 0.020	< 0.01	< 0.01
	09/10/96	0.9	27.3	< 3	22	1,515	8.4	< 0.05	< 0.05	< 0.05	1.10		< 0.05	< 1.0	2.1	< 0.01		< 0.001			< 0.020		
	09/24/97	1.5	20.3	< 3	9	1,195	8.5	0.13	0.01	< 0.01	2.60		< 0.05	1.2	3.8	< 0.01		< 0.1			< 0.020		
			No Sample Taken for 1998, 1999, or 2000 Dry Weather Monitoring Program										No Sample Taken for 1998, 1999, or 2000 Dry Weather Monitoring Program								No Sample Taken for 1998, 1999, or 2000 Dry Weather Monitoring Program		
	Median	**1.6**	**24.1**	**< 3**	**9**	**1,260**	**8.4**	**0.07**	**< 0.05**	**< 0.05**	**1.30**		**< 0.05**	**1.0**	**1.9**	**< 0.01**	**< 0.01**	**< 0.002**	**< 0.0002**	**< 0.005**	**< 0.020**	**< 0.01**	**< 0.02**
	Average	**2.4**	**22.1**	**< 2**	**12**	**1,402**	**8.4**	**0.09**	**0.09**	**0.05**	**1.47**		**< 0.05**	**< 1.0**	**2.1**	**< 0.01**	**< 0.01**	**< 0.002**	**< 0.0002**	**< 0.005**	**0.032**	**< 0.01**	**< 0.02**
Flamingo at Swenson	06/24/91	0.7	23.5		4	2,500	7.4	< 0.05	< 0.05		9.20		< 0.05	9.4	18.5	< 0.01	< 0.01		< 0.0002	< 0.005	0.025	< 0.01	< 0.04
	07/14/91	0.8	25.6	< 3	9	2,700	7.8	0.07	0.05	0.08	10.00		< 0.05	5.0	14.7	0.01	< 0.01	< 0.002	< 0.0002	< 0.005	< 0.020	< 0.01	< 0.04
	08/26/91	0.7	25.5	< 3	8	2,575	7.8	< 0.05	< 0.05	< 0.05	8.50		< 0.05	< 1.0	9.0	< 0.01	0.014	< 0.002	< 0.0002	< 0.005	0.033	< 0.01	< 0.04
	09/13/92	3.6	26.2	< 3	5	2,730	8.3	0.11	< 0.05	< 0.05	6.65		< 0.05	< 1.0	6.7-7.7	< 0.01	< 0.01	< 0.01	< 0.0002	< 0.005	< 0.020	< 0.01	< 0.04
	08/23/93	1.5	26.2	< 3	12	2,540	8.1	0.07	< 0.05	< 0.05	4.35		0.12	< 1.0	5.4	< 0.01	< 0.01	< 0.002	< 0.0002	< 0.005	< 0.020	< 0.01	< 0.02
	04/03/94	2.6				2,705	8.0				8.20					< 0.01							
	08/28/94	4.0	28.6	< 3	40	2,645	8.1	0.07	0.05	< 0.05	8.90		< 0.05	1.0	10.4	< 0.01	< 0.01	0.015	< 0.0002	< 0.005	0.015	< 0.01	< 0.01
	03/26/95	3.7	21.0			2,800	8.1				8.90					< 0.01							
	08/28/95	2.0	27.7	< 3	7	2,635	8.3	0.06	< 0.05	< 0.05	6.80		< 0.05	< 1.0	7.8	< 0.01	< 0.01	< 0.002	< 0.0002	< 0.005	< 0.020	< 0.01	< 0.01
	09/10/96	2.6	30.4	< 3	12	2,470	8.4	0.08	0.07	0.09	2.90		0.08	1.3	4.2	< 0.01		< 0.001			< 0.020		
	09/24/97	9.4	27.2	< 3	16	1,835	8.4	0.13	< 0.01	0.01	4.30		< 0.05	0.5	< 5.3	< 0.01		< 0.1			0.021		
			No Sample Taken for 1998, 1999, or 2000 Dry Weather Monitoring Program										No Sample Taken for 1998, 1999, or 2000 Dry Weather Monitoring Program								No Sample Taken for 1998, 1999, or 2000 Dry Weather Monitoring Program		
	Median	**2.6**	**26.2**	**< 3**	**9**	**2,635**	**8.1**	**0.07**	**< 0.05**	**< 0.05**	**8.20**		**< 0.05**	**< 1.0**	**7.8**	**< 0.01**	**< 0.01**	**< 0.002**	**< 0.0002**	**< 0.005**	**< 0.020**	**< 0.01**	**< 0.04**
	Average	**2.9**	**26.5**	**< 2**	**13**	**2,558**	**8.1**	**0.07**	**< 0.03**	**< 0.04**	**7.15**		**< 0.04**	**2.1**	**9.1**	**< 0.01**	**< 0.01**	**< 0.009**	**< 0.0001**	**< 0.003**	**< 0.016**	**< 0.005**	**< 0.014**
Flamingo at Nellis	06/24/91	3.7	22.4	< 3	3	3,400	8.1	< 0.05	< 0.05		3.90		< 0.05			< 0.01	< 0.01		< 0.0002	< 0.005	0.022	< 0.01	< 0.04
	07/14/91	3.9	23.3	< 3	13	3,400	8.2	0.10	< 0.05	< 0.05	3.60		< 0.05	< 1.0	4.3	< 0.01	< 0.01	< 0.002	< 0.0002	< 0.005	< 0.020	< 0.01	< 0.04
	08/26/91	6.2	25.4	< 3	15	3,225	8.3	< 0.05	< 0.05	< 0.05	4.10		< 0.05	< 1.0	4.5	< 0.01	< 0.01	< 0.002	< 0.0002	< 0.005	0.025	< 0.01	< 0.04
	04/07/92	9.6				3,310	7.8				4.10					< 0.01							
	09/13/92	12.5	24.0	< 3	13	3,450	8.2	< 0.05	< 0.05	< 0.05	1.40		< 0.05	< 1.0	1.4-2.4	< 0.01	< 0.01	< 0.01	< 0.0002	< 0.005	0.025	< 0.01	< 0.04
	03/07/93	8.3	21.2			3,640	8.7				4.60					< 0.01							
	08/23/93	5.4	29.6	< 3	18	3,270	8.3	0.06	< 0.05	< 0.05	4.10		0.08	< 1.0	5.1	< 0.01	< 0.01	< 0.002	< 0.0002	< 0.005	0.088	< 0.01	< 0.02
	04/03/94	5.0	14.5			3,710	8.2				4.45					< 0.01							
	08/28/94	27.0	25.6	< 3	21	3,300	8.4	< 0.05	< 0.05	< 0.05	3.95		< 0.05	< 1.0	5.0	< 0.01	0.01	< 0.002	< 0.0002	< 0.005	< 0.020	< 0.01	< 0.01
	03/26/95	25.0	20.5			3,780	8.4				5.20					0.01							
	08/28/95	18.0	27.0	< 3	8	3,290	8.5	0.07	< 0.05	< 0.05	3.30		< 0.05	< 1.0	4.3	< 0.01	< 0.01	< 0.002	< 0.0002	< 0.005	< 0.020	< 0.01	< 0.01
	09/10/96	7.6	31.0	< 3	25	3,490	8.6	< 0.05	< 0.05	< 0.05	3.00		< 0.05	< 1.0	3.5	< 0.01		< 0.001			< 0.020		
	09/24/97	15.3	20.5	< 3	19	1,840	8.3	0.09	0.07	0.05	2.90		< 0.05	1.2	4.1	0.016		< 0.1			< 0.025		
			No Sample Taken for 1998, 1999, or 2000 Dry Weather Monitoring Program										No Sample Taken for 1998, 1999, or 2000 Dry Weather Monitoring Program								No Sample Taken for 1998, 1999, or 2000 Dry Weather Monitoring Program		
	1/18/01*		9.0			3,470	8.4		0.02	0.02	6.1	< 0.08	< 0.08	0.1	6.2	0.008	0.005				0.017		0.016
	4/25/01*	0.4	24.5			3,010	8.4			0.01	3.9	< 0.08	< 0.08	0.1	4.0	0.014	0.002				0.015		0.014
	7/30/01*	0.3	26.8			3,250	8.6			0.01	3.6	< 0.08	< 0.08		3.6	0.012	0.002				0.011		0.015
	10/24/01*	7.1	14.9			3,400	9.2		0.02	0.02	4.4	< 0.08	< 0.08		4.4	0.009					0.011		0.008
	1/23/02*	6.0																					
	4/24/02*	6.2																					
	7/24/02*	5.6	29.2		31	3,060	8.4		0.007	0.218	2.9	< 0.08	< 0.08	1.3	2.9	0.003	0.003				0.001		0.016
	10/23/02*	6.0	15.0			3,200	8.2		0.024	0.084	4.3	< 0.08	0.17	0.05	4.4	0.005	0.003	0.0006			0.011		0.015
	1/22/03*		10.4			3,200	8.1		0.031	0.055	4.4	< 0.08	< 0.08		4.4	0.009	0.002				0.012		0.010
	4/23/03*		16.4			2,910	8.3		0.023		4.2	< 0.08	< 0.08		4.2	0.013	0.001				0.015		0.007
	7/23/03*		26.1			3,140	7.9		0.006	0.030	3.5		0.04	0.7	4.2	0.013	0.069	< 0.002			0.010		0.009
	10/22/03*		17.3			3,210	6.1		0.008	< 0.050	4.9	< 0.08	< 0.05	0.5	5.4	0.005	0.056	< 0.002			< 0.020		0.019
	1/21/04*		8.9			3,240	8.2		0.011	< 0.050	5.1	< 0.08	< 0.05	0.4	5.5	< 0.010	0.032	< 0.002			< 0.020		< 0.010
	4/21/04*		14.9			3,100	8.1		0.008	< 0.050	4.1	< 0.08	< 0.05	0.4	4.5	< 0.010	0.031	< 0.002			< 0.020		< 0.010
	7/21/04*		22.9			2,980	8.0		0.008	< 0.010	4.0	NA	< 0.08		5.3	0.003	0.001	0.0005			0.016		0.013
	10/27/04*		14.7			3,070	8.2		NA	NA	4.9	NA	NA	NA		0.150	< 0.001	< 0.0005			0.038		< 0.005
	1/26/05*		14.6			2,310	8.2		0.036	0.110	4.6	< 0.08	0.13	1.1		< 0.010	< 0.001	0.0033			0.074		< 0.005
	4/19/05*		13.1			3,090	8.2		0.009	< 0.010	5.9	< 0.08	< 0.08	0.7		0.005	0.002	0.0014			0.082		0.014
	7/20/2005*		25.3			2,910	8.1		0.005	< 0.050	3.8	< 0.08	< 0.08	0.5		< 0.010	< 0.001	< 0.0005			< 0.020		< 0.010
	10/26/2005*		15.0			1,260	8.1		0.056	0.050	< 0.1	< 0.08	0.12	0.7		0.007	0.003	0.0007			0.012		0.006
	1/19/2006*		No Sample Taken for 01/19/06 Dry Weather Monitoring Program													No Sample Taken for 01/19/06 Dry Weather Monitoring Program					No Sample Taken for 01/19/06 Dry Weather Monitoring Program		
	4/18/2003*		12.5			2,900	8.5		0.004		4.8	< 0.08				0.002	0.001	< 0.0005			0.007		0.019
	7/27/2006*		25.5			2,900	8.1		< 0.050	0.022	4.7	0.17	< 0.08	0.5	0.2	0.003	0.001	< 0.002			0.009		0.002
	10/25/2006*		15.9			3,700	8.2		NA	0.046	4.7	< 0.08	< 0.08	0.3	0.3	0.002	0.005	0.0003			0.009		0.01
	1/23/2007*		9.4			2,800	8.3		< 0.002	< 0.001	5.9	< 0.08	< 0.08	< 1.0	< 0.2	0.001	0.002	< 0.002			0.004		0.001
	4/18/2007*		14.0			3,100	8.2		0.006	< 0.001	4.3	0.10	< 0.10	0.8	0.8	0.002	0.001	0.0002			0.001		0.002
	Median	**6.2**	**20.5**	**< 3.0**	**17**	**3,205**	**8.2**	**< 0.05**	**< 0.02**	**< 0.05**	**4.17**	**< 0.08**	**< 0.08**	**< 0.77**	**4.30**	**< 0.010**	**< 0.003**	**< 0.002**	**< 0.0002**	**< 0.005**	**0.019**	**< 0.010**	**< 0.010**
	Average	**9.0**	**19.5**	**< 1.5**	**17**	**3,120**	**8.2**	**< 0.05**	**< 0.03**	**0.05**	**4.11**	**< 0.09**	**< 0.07**	**< 0.72**	**3.80**	**0.012**	**0.010**	**0.006**	**< 0.0002**	**0.003**	**0.022**	**0.005**	**0.015**

Location	Date	Selenium (mg/L)	Arsenic (mg/L)	Boron (mg/L)	Cyanide (mg/L)	Copper Dissolved (mg/L)	Lead Dissolved (mg/L)	Zinc Dissolved (mg/L)	BOD (mg/L)	COD (mg/L)	Apparent Color (ACU)	Turbidity (NTU)	Phenol (mg/L)	Total Petroleum Hydrocarbons (mg/L)	Total Chlorine (mg/L)	Conductance (mmhos)	Fecal Coliform (MPN/100 mL)	Fecal Streptococcus (MPN/100 mL)	Total Coliform (MPN/100 mL)	Salmonella (MPN/100 mL)	VOC's (# detects)
Western Tributary at Cheyenne	08/27/91		< 0.005	0.46	0.006				< 6	16	20	1.2	< 0.01		0.05	1.500	12,500	< 16			
	04/06/92			0.54	< 0.005								< 0.01		0.20		30		500		
	09/13/92		0.024	0.41	< 0.005				< 6	14	18	0.8	< 0.01		0.10	1.230	700	1,050			
	03/07/93			0.54	< 0.005								0.20		< 0.10	15.680	70		1,100		
	08/23/93	< 0.005	< 0.005	0.44	< 0.005				< 6	16	25	9.7	0.20		0.10	1.920	950,024	5,700			
	04/03/94			0.44	0.01								< 0.01		< 0.10	19.860	55		4,650		
	08/28/94	< 0.005	< 0.005	0.25	< 0.005				< 6	22	23	6.0	< 0.01		< 0.01	1.120	2,650	8,100		7	
	03/26/95			0.51	0.006								< 0.01		< 0.10	1.805	1,300	170	9,000		
	08/28/95	< 0.005	< 0.005	0.59	< 0.005				< 6	23	20	0.9	< 0.01		0.28	1.783	1,700	2,550		3.6	
	09/10/96			0.45	< 0.005				< 6	< 10	16	6.1	< 0.01	< 1.0	0.10	1.720	1,750	305		< 2.2	
	09/24/97			0.67	< 0.005				< 6	< 10	20	4.3	< 0.01	< 1.0	0.26	0.032	1,950	1,400		3.7	
		No Sample Taken for 1998, 1999, or 2000 Dry Weather Monitoring Program (cont.)										No Sample Taken for 1998, 1999, or 2000 Dry Weather Monitoring Program									
	Median	**< 0.005**	**< 0.005**	**0.46**	**< 0.005**				**< 6**	**16**	**20**	**4.3**	**< 0.01**	**< 1.0**	**0.10**	**1.75**	**1,700**	**1,225**	**2,875**	**3.7**	
	Average	**< 0.003**	**0.007**	**0.48**	**< 0.004**				**< 3.0**	**14**	**20**	**4.1**	**0.04**	**< 0.5**	**0.11**	**4.67**	**88,430**	**2,410**	**3,813**	**3.9**	
Flamingo at Swenson	06/24/91			0.60	< 0.005						10	0.7	< 0.005		0.03	2.700	< 16	< 16			
	07/14/91		< 0.005	0.61	0.006				< 6	15	13	1.2	0.03		0.09	3.500	< 16	< 16			
	08/26/91		0.006	0.70	< 0.005				< 6	11	10	0.9	< 0.01		0.08	3.200	9,000	< 16			
	09/13/92		< 0.005	0.80	< 0.005				< 6	13	10	0.4	< 0.01		0.10	3.420	500	200			
	08/23/93	< 0.015	0.004	0.70	< 0.005				< 6	16	18	3.6	0.10		< 0.10	1.900	300,250	1,875	500		
	04/03/94			0.64	0.005								< 0.01		< 0.10	14.590	190		9,500		
	08/28/94	0.01	< 0.01	0.76	< 0.005				< 6	23	13	12.6	< 0.01		< 0.01	3.190	2,690	1,300		< 2	
	03/26/95			0.76	< 0.005								< 0.01		< 0.10	2.910	500	350	5,000		
	08/28/95	0.0075	< 0.005	0.75	0.006				< 6	13.5	12.5	0.6	< 0.01		0.03	2.920	2,900	1,250		< 2.2	
	09/10/96			0.58	< 0.005				< 6	10	18	2.7	< 0.01	< 1.0	0.05	2.650	4,700	335		2	
	09/24/97			0.68	< 0.005				< 6	< 10	7.5	1.7	< 0.01	< 1.0	0.25	0.058	900	230		< 2.2	
		No Sample Taken for 1998, 1999, or 2000 Dry Weather Monitoring Program (cont.)										No Sample Taken for 1998, 1999, or 2000 Dry Weather Monitoring Program									
	Median	**0.010**	**< 0.005**	**0.70**	**< 0.005**				**< 6**	**13**	**13**	**1.2**	**< 0.01**	**< 1.0**	**0.09**	**2.920**	**900**	**283**	**5,000**	**2.10**	
	Average	**0.008**	**< 0.004**	**0.69**	**< 0.003**				**< 3.000**	**13**	**12**	**2.7**	**0.02**	**< 0.50**	**0.07**	**3.731**	**29,241**	**556**	**5,000**	**< 1.30**	
Flamingo at Nellis	06/24/91			1.20	< 0.005						5	0.8	< 0.005		0.04	3.900	< 16	< 16			
	07/14/91		< 0.005	1.20	< 0.005				< 6	10	15	5.2	< 0.005		0.08	3.700	< 16	< 16			
	08/26/91		< 0.005	1.20	< 0.005				< 6	< 10	13	5.8	< 0.01		0.05	3.900	1,600	< 16			
	04/07/92			1.20	< 0.005								< 0.01		0.04		2,400		8,000		
	09/13/92		0.008	0.09	< 0.005				< 6	13	10	2.0	< 0.01		0.10	3.400	550	190			
	03/07/93			1.20	< 0.005								0.10		< 0.10	1.310	14		300		
	08/23/93	< 0.02	0.006	1.15	< 0.005				< 6	11	15	6.3	< 0.01		< 0.10	5.650	12,100	85			
	04/03/94			1.25	< 0.005								< 0.01		< 0.10	10.650	1,220		3,150		
	08/28/94	0.02	< 0.025	1.10	< 0.005				< 6	16	15	1.2	< 0.01		< 0.01	3.875	11,115	1,800		10	
	03/26/95			1.30	< 0.005								< 0.01		< 0.10	4.210	30	50	1,600		
	08/28/95	0.0135	< 0.005	1.25	< 0.005				< 6	19	18	0.4	< 0.01		0.23	3.760	650	100		2.1	
	09/10/96			1.10	< 0.005				< 6	< 10	13	1.0	< 0.01	< 1.0	0.23	6.750	1,900	150		< 2.2	
	09/24/97			0.75	< 0.005				< 6	11.5	15	5.7	< 0.01	< 1.0	0.26	0.063	6,150	2,615		< 2.2	
		No Sample Taken for 1998, 1999, or 2000 Dry Weather Monitoring Program (cont.)										No Sample Taken for 1998, 1999, or 2000 Dry Weather Monitoring Program									
	1/18/01*		0.006									1.8				4.0	17				
	4/25/01*		0.008									2.0				3.5	60				
	7/30/01*		0.006									1.1				3.8	250				
	10/24/01*		0.009									2.6				3.8	617				
	1/23/02*																				
	4/24/02*																				
	7/24/02*	0.016	0.009									2.2				3.5	300				
	10/23/02*	0.014	0.007									2.2				3.7	670				
	1/22/03*	0.015	0.005									1.1				3.6	110				
	4/23/03*	0.015	0.005									3.2				3.5	< 400				
	7/23/03*	< 0.005	0.006									1.4				3.7	4,800				
	10/22/03*	< 0.005	0.005									0.7				3.8	430				
	1/21/04*	< 0.005	0.007									1.3				3.8	< 200				
	4/21/04*	< 0.005	0.005									1.2				3.6	450				
	7/21/04*	0.014	0.005									9.0				3.6	16,600				
	10/27/04*	< 0.001	0.007									9.7				3.6	593				
	1/26/05*	0.0134	< 0.001									10.0				2.9	4,000				
	4/19/05*	0.0162	0.007									14.0				3.6	< 200				
	7/20/2005*	0.0132	0.009																		4
	10/26/2005*	0.0063	0.004																		
	1/19/2006*	No Sample Taken for 01/19/06 Dry Weather Monitoring Program (cont.)										No Sample Taken for 01/19/06 Dry Weather Monitoring Program									
	4/18/2003*	0.020	0.005																		
	7/27/2006*	0.132	0.006									3.4					4,200				0
	10/25/2006*	0.014	0.006									5.6					4,600				3
	1/23/2007*	0.016	0.004									0.6					< 100				3
	4/18/2007*	0.015	0.005									1.7					4,200				4
	Median	**0.014**	**0.006**	**1.20**	**< 0.005**				**< 6**	**11**	**15**	**1.960**	**< 0.010**	**< 1.0**	**0.10**	**3.735**	**593**	**92.5**	**2,375**	**2**	**3**
	Average	**0.018**	**0.007**	**1.08**	**0.003**				**3**	**11**	**13**	**3.552**	**0.01**	**0.5**	**0.10**	**3.895**	**2441**	**501**	**3,263**	**4**	**3**

Notes:
(1) In cases where measured constituant concentrations were less than detection limits, 1/2 of the detection limit was used to compute the average concentration.
When this approach resulted in a computed average value which was less than the detection limit, the average value was reported as "<DL".
(2) Discharge values for Flamingo at Nellis taken from USGS streamgage records, average daily flow, for 8/27/91 - 8/28/95
* Sample was taken by SNWA

DRY WEATHER MONITORING DATA 1991-2006
(continued)

Location	Date	Q (cfs)	Temp (Deg C)	Oil & Grease (mg/L)	TSS (mg/L)	TDS (mg/L)	pH *	MBAS (mg/L)	Ortho Phosphate (mg/L)	Total Phosphate-Phosphorous (mg/L)	NO3-N (mg/L)	NO2-N (mg/L)	NH3-N (mg/L)	TKN (mg/L)	Total Nitrogen (mg/L)	Copper (mg/L)	Chromium (mg/L)	Lead (mg/L)	Mercury (mg/L)	Cadmium (mg/L)	Zinc (mg/L)	Silver (mg/L)	Nickel (mg/L)	Selenium (mg/L)	Arsenic (mg/L)	Boron (mg/L)	Cyanide (mg/L)	Copper Dissolved (mg/L)	Lead Dissolved (mg/L)	Zinc Dissolved (mg/L)	BOD (mg/L)	COD (mg/L)	Apparent Color (ACU)	Turbidity (NTU)	Phenol (mg/L)	Total Petroleum Hydrocarbons (mg/L)	Total Chlorine (mg/L)	Conductance (mmhos)	Fecal Coliform (MPN/100 mL)	Fecal Streptococcus (MPN/100 mL)	Total Coliform (MPN/100 mL)	Salmonella (MPN/100 mL)	VOC's (# detects)
Duck Creek	06/23/91	0.8	22.0	< 3	20	6,700	8.2	< 0.05	< 0.05	< 0.01	4.20		< 0.05	< 1.0	5.2	< 0.01	< 0.01	< 0.002	< 0.0002	< 0.005	0.030	< 0.01	< 0.04		0.044	3.40	< 0.005				< 6	24	13	3.9	< 0.005		0.04	7.600	< 16	< 16			
at Russell	08/26/91																																						1,400				
or Patrick	09/13/92	9.8	24.7	< 3	7	3,370	8.3	< 0.05	< 0.05	< 0.05	1.70		< 0.05	< 1.0	1.7-2.7	< 0.01	< 0.01	< 0.01	< 0.0002	< 0.005	< 0.020	< 0.01	< 0.04		0.026	1.70	< 0.005				< 6	17	15	1.2	< 0.01		< 0.10	7.100	800	3,300			
or Sunset	08/23/93	3.3	24.2	< 3	15	5,710	8.2	0.06	< 0.05	< 0.05	3.20		< 0.05	< 1.0	4.2	< 0.01	< 0.01	< 0.002	< 0.0002	< 0.005	0.026	< 0.01	< 0.02	0.021	0.051	3.00	< 0.005				< 6	16	13	1.8	0.15		< 0.10		235	2,600			
	04/03/94	4.4				5,865	8.2				3.90					< 0.01										2.70	0.0065								< 0.01		< 0.10		125		1,500		
	08/28/94	2.0	22.3	< 3	31	5,375	8.0	< 0.05	< 0.05	< 0.05	8.90		< 0.05	1.0	9.9	< 0.01	0.013	< 0.002	< 0.0002	< 0.005	< 0.020	0.011	0.01	0.046	0.041	2.90	0.008				< 6	23	15	0.9	< 0.01		0.01	6.900	550	1,300		5	
	03/26/95	3.4	19.1			6,210	7.9				11.00					< 0.01										3.00	< 0.005								< 0.01		< 0.10	6.300	2,400	1,700	5,000		
	08/28/95	3.0	23.1	< 3	15	5,815	8.2	< 0.05	0.055	< 0.05	9.70		< 0.05	< 1.0	10.7	< 0.01	< 0.01	< 0.002	< 0.0002	< 0.005	0.024	< 0.01	< 0.01	0.0455	0.03	3.20	0.005				< 6	14	5	0.7	< 0.01		0.16	6.320	260	950		7	
	09/10/96	2.2	27.9	< 3	14	4,490	8.1	< 0.05	< 0.05	< 0.05	8.70		< 0.05	< 1.0	9.2	< 0.01		< 0.001			< 0.020					3.00	< 0.005				< 6	11	13	2.3	< 0.01	< 1.0	0.08	6.295	650	1,250		< 2.2	
	09/24/97	4.1	24.4	< 3	27	4,185	8.1	0.09	0.01	0.05	8.90		< 0.05	1.3	10.2	< 0.01		< 0.1			< 0.020					2.70	< 0.005				< 6	18.5	7.5	2.8	< 0.01	< 1.0	0.24	0.048	665	1,350		< 2.2	
	09/24/98	6.6		< 3	17	3,510				< 0.02	7.80	< 0.10	< 0.05	0.7	8.5	0.01		< 0.1			< 0.020					2.60		0.018	< 0.10	< 0.02									210	1,000		< 2.2	0
	11/04/99	5.1		< 3	11	3,540				< 0.02	6.41	< 0.20	< 0.05	< 0.2	6.4	< 0.01		< 0.1			< 0.020					2.50		< 0.01	< 0.10	< 0.02									50	240			0
	11/05/99	5.1		< 3	26	2,620				< 0.02	6.26	< 0.20	< 0.05	0.4	6.7	< 0.01		< 0.1			< 0.020					2.50		< 0.01	< 0.10	< 0.02									110	80			0
	10/03/00	3.3		4.5	< 10	4,920				0.02	9.20	< 2.00	< 0.05	1.7	10.90	< 0.01		< 0.1			< 0.020					2.80		0.01	0.10	0.02									50	210			0
	10/04/00	3.3		< 3	13	4,920				0.02	8.52	< 2.00	0.083	< 0.2	8.52	< 0.01		< 0.1			< 0.020					2.80		< 0.01	< 0.10	< 0.02									500	5,000			0
	10/17/00*																																						280	300			
	12/18/00*	2.5		< 3	< 10	4,780				7.70	10.30	< 0.50	< 0.05	0.7	10.95	< 0.01		< 0.1			< 0.020					2.50		< 0.01	< 0.10	< 0.02									50	300			1
	1/18/01*		9.0			5,060	8.2		0.013	0.12	6.10	< 0.08	< 0.08	0.3	6.10	0.013	0.0026	0.0006			0.022		0.028		0.051									13.8				6.120	93				
	4/25/01*		21.0			5,140	8.3			0.02	4.69	< 0.08	< 0.08	0.2	4.69	0.017	0.002				0.019		0.022		0.052									2.4				6.020	0				
	7/30/01*	5.3	25.9			5,160	8.1			0.02	4.24	< 0.08	< 0.08		4.24	0.014	0.0018				0.013		0.022		0.054									1.4				6.070	233				
	10/24/01*	6.6	18.7			5,050	8.5		0.030	0.02	5.43	< 0.08	< 0.08		5.43	0.012									0.041									0.5				6.010	337,503				
	1/23/02*	6.5																																									
	4/24/02*	5.1																																									
	7/24/02*	5.5	26.8			5,020	8.1		0.02		3.89	< 0.08	< 0.08	0.9	3.9								0.03	0.0236	0.043									1.3				5.820	1,440				
	10/23/02*	6.2	20.9			5,140	8.2		0.02	0.03	5.39	< 0.08	0.26	0.7	5.7	0.0034	0.0028				0.006	< 0.01	0.021	0.0233	0.055									1.0				6.080	2,850				
	1/22/03*		10.4			5,150	7.9	0.06	0.04	0.05	5.77	< 0.08	< 0.08		5.8	0.0067	0.0018				0.008		0.014	0.0230	0.05									5.7				5.790	80				
	4/23/03*		4.6		29	5,000	7.9		0.02		5.28	< 0.08	< 0.08		5.3	0.0081	0.0012				0.006	< 0.01	0.011	0.0224	0.046									12.7				6.130					
	7/23/03*		25.7			5,220	7.9		0.01		4.90		< 0.05	0.8	5.7	0.0028	0.0011	< 0.002			< 0.020		0.013	< 0.005	0.051									1.8				6.000	5,100				
	10/22/03*																																										
	1/21/04*		10.0			NA	NS		NA	NA	NA	NA	NA	NA		NA	NA	NA			NA		NA	NA	NA									NS				NS	NS				
	4/21/04*		15.0			NA	NS		NA	NA	NA	NA	NA	NA		NA	NA	NA			NA		NA	NA	NA									10.2				5.860	NS				
	Median	**4.4**	**22.0**	**< 3**	**15**	**5,055**	**8.1**	**< 0.05**	**< 0.03**	**< 0.03**	**5.9**	**< 0.08**	**< 0.05**	**< 0.9**	**5.9**	**< 0.010**	**< 0.0027**	**< 0.010**	**< 0.0002**	**< 0.005**	**< 0.020**	**< 0.01**	**< 0.02**	**0.023**	**0.048**	**2.80**	**< 0.005**	**0.010**	**< 0.10**	**< 0.020**	**< 6**	**17**	**13**	**2**	**< 0.01**	**< 1.0**	**< 0.10**	**6.080**	**260**	**1,000**	**3,250**	**2**	**0**
	Average	**4.5**	**19.8**	**< 2**	**18**	**4,915**	**8.1**	**< 0.04**	**< 0.02**	**0.45**	**6.3**	**0.20**	**0.04**	**0.6**	**7.1**	**0.007**	**0.004**	**0.022**	**0.0001**	**0.003**	**0.013**	**0.006**	**0.017**	**0.026**	**0.045**	**2.75**	**0.004**	**0.008**	**0.058**	**0.012**	**3**	**18**	**11**	**4**	**0.021**	**0.500**	**0.081**	**5.910**	**14,226**	**1,384**	**3,250**	**3**	**0**
Duck Creek	06/23/91	1.3	17.7	< 3	19	5,800	8.3	< 0.05	< 0.05	< 0.25	0.90		< 0.05	< 1.0	1.9	< 0.01	< 0.01	< 0.002	< 0.0002	< 0.005	0.026	< 0.01	< 0.04		0.047	2.70	< 0.005				< 6	9	8	2.6	0.005		0.03	6.600	< 16	< 16			
at Callahan	08/26/91																																						2,300				
or Broadbent	04/06/92	5.5				6,450	8.0				2.80					< 0.01										2.80	< 0.005								< 0.01		0.20		500		1,700		
	09/13/92	1.6	25.6	< 3	84	6,030	8.0	< 0.05	< 0.05	0.07	6.80		0.07	< 1.0	6.8-7.8	< 0.01	< 0.01	< 0.01	< 0.0002	< 0.005	0.030	< 0.01	< 0.04		0.062	3.00	< 0.005				< 6	19	13	38.0	< 0.01		< 0.10	7.400	760	1,050			
	03/07/93	0.7	22.2			5,760	7.6				17.00					< 0.01										3.00	< 0.005								< 0.01		< 0.10	5.900	4		500		
	08/23/93	1.4	22.2	< 3	26	5,570	8.0	< 0.05	< 0.05	< 0.05	9.90		< 0.05	< 1.0	10.9	< 0.01	< 0.01	< 0.002	< 0.0002	< 0.005	0.038	< 0.01	< 0.02	0.07	0.05	3.10	< 0.005				< 6	20	10	3.2	0.10		< 0.10		150	20,500			
	04/03/94	2.2	15.8			4,255	7.9				9.90					< 0.01										3.05	< 0.005								0.10		< 0.10	5.900	110		6,650		
	08/28/94	3.0	23.5	< 3	31	5,255	8.1	< 0.05	< 0.05	< 0.05	4.00		< 0.05	< 1.0	5.0	< 0.01	< 0.01	< 0.002	< 0.0002	< 0.005	< 0.020	< 0.01	< 0.01	< 0.025	0.045	2.80	0.005				< 6	22	15	2.4	< 0.01		< 0.01	6.800	650	5,500		< 2	
	03/26/95	7.0	18.9			6,760	7.9				4.00					0.017										2.60	0.005								< 0.01		< 0.10	6.820	500	500	16,000		
	08/28/95	5.0	24.8	< 3	7	5,335	8.2	< 0.05	< 0.05	< 0.05	3.80		< 0.05	< 1.0	4.8	< 0.01	< 0.01	< 0.002	< 0.0002	< 0.005	< 0.020	< 0.01	< 0.01	0.019	0.035	2.90	0.0065				< 6	17.5	10	0.4	< 0.01		0.08	6.210	950	1,800		3	
	09/10/96		27.4	< 3	16	5,470	8.3	< 0.05	< 0.05	< 0.05	4.10		< 0.05	< 1.0	4.6	< 0.01		< 0.001			< 0.020					2.85	< 0.005				< 6	< 10	13	2.5	< 0.01	< 1.0	0.08	6.055	1,100	327		< 2.2	
	09/24/97	13.2	25.2	< 3	28	4,235	8.2	0.10	0.01	0.05	4.90		< 0.05	1.2	6.6	< 0.01		< 0.1			< 0.020					2.40	< 0.005				< 6	15.5	10	2.4	< 0.01	< 1.0	0.35	0.055	500	650		< 2.2	
	09/24/98	7.5		< 3	47	3,750				< 0.02	4.70	< 0.10	< 0.05	1.0	5.6	< 0.01		0.11			< 0.020					2.20		< 0.01	0.1	< 0.02									370	600		< 2.2	0
	11/04/99	11.1		< 3	10	3,240				< 0.02	9.60	< 0.20	< 0.05	< 0.2	9.6	< 0.01		< 0.1			< 0.020					2.70		< 0.01	< 0.1	< 0.02									300	240			0
	11/05/99	11.1		< 3	27	2,400				< 0.02	9.90	< 0.20	< 0.05	0.4	10.3	< 0.01		< 0.1			< 0.020					2.50		< 0.01	< 0.1	< 0.02									700	110			0
	10/03/00	20.0		< 3	< 10	4,930				< 0.02	5.94	< 2.00	< 0.05	0.3	6.3	< 0.01		< 0.1			< 0.020					2.50		< 0.01	< 0.1	< 0.02									500	500			0
	10/17/00			< 3	12	5,020				< 0.02	5.86	< 1.00	0.073	1.0	6.9	< 0.01		< 0.1			< 0.020					2.50		< 0.01	< 0.1	< 0.02									300	24,000			0
	12/18/00	18.1		< 3	< 10	5,070				4.90	6.58	< 0.50	< 0.05	0.7	7.3	< 0.01		< 0.1			< 0.020					2.40		< 0.01	< 0.1	< 0.02									80	500			0
	7/21/04*	26.8	26.8			4,830	8.2		NA	NA	6.00	NA	0.17	0.9		0.0029	0.0014	< 0.0005			0.0095		0.02	0.0259	0.042									1.8				6.000	2,800				
	10/27/04*	15.0	15.0			6,100	7.7		NA	NA	4.10	< 0.08	NA	NA		< 0.002	< 0.001	< 0.0005			< 0.005		0.027	NA	0.058									NS				7.020	< 200				
	1/26/05*	15.7	15.7			NA	NS		NS	NS	NS	NS	NS	NS		NS	NS	NS			NS		NS	NS	NS									NS				NS	NS				
	4/19/05*	13.7	13.7			NA	8.3		0.01	< 0.01	< 0.08	< 0.08	< 0.08	0.4		< 0.002	0.025	< 0.0005			< 0.005		0.02	0.0216	0.053									0.7				6.030	< 200				
	7/20/2005*		26.7			4,880	8.1		0.01	0.04	6.00	< 0.08	< 0.08	0.6		< 0.01	< 0.001	< 0.0005			< 0.005		< 0.01	0.021	0.054									16.7				5.980	2,300				2
	10/26/2005*		16.4			4,150	8.2		0.02	< 0.02	< 0.08	< 0.08	0.17	0.5		< 0.01	< 0.001	< 0.0005			< 0.005		< 0.01	0.0221	0.043									2.2				5.380	1,917				0
	1/19/2006*		9.6			5,200	8.2		0.02		6.60	< 0.08				1.0	1.3	0.2			0.0022		0.019	0.0168	0.057									19.5				5.730	210				0
	4/18/2006*		17.9			5,200	8.2		0.02		7.50	< 0.08				0.8	1.1	< 0.0005			0.02		0.023	0.027	0.049									1.2				5.680	< 200				0
	7/27/2006*		27.2			4,500	7.7		0.00	0.00	5.42	< 0.08	< 0.08	< 0.2		0.0012	0.0008	< 0.0005			0.10		0.003	0.0184	0.059									1.3				5.950	1,800				1
	10/25/2006*		19.2			5,800	8.4		< 0.01	0.02	6.77	< 0.08	< 0.08	0.3		0.0011	0.001	< 0.0005			0.0038		0.014	0.0192	0.054									1.6				5.590	1,400				5
	1/23/2007*		16.6			5,000	7.8		0.00	< 0.01	6.55	< 0.08	< 0.08	0.4		0.001	0.001	< 0.0005			< 0.005		0.002	0.023	0.049									0.5				5.975	< 10				3
	4/18/2007*		20.3			5,100	7.9		0.01	< 0.01	7.23	< 0.10	< 0.10	0.8		< 0.001	0.001	< 0.0005			< 0.005		0.001	0.022	0.049									0.9				3.840	210				4
	Median	**7.5**	**19.8**	**< 3**	**19**	**5,100**	**8.1**	**< 0.05**	**< 0.02**	**< 0.02**	**5.97**	**< 0.08**	**< 0.05**	**< 0.8**	**6.6**	**< 0.01**	**< 0.01**	**< 0.002**	**< 0.0002**	**< 0.005**	**< 0.020**	**< 0.01**	**< 0.02**	**0.022**	**0.050**	**2.70**	**< 0.005**	**< 0.01**	**< 0.10**	**< 0.02**	**< 6**	**18**	**10**	**2.2**	**< 0.01**	**< 1.0**	**< 0.10**	**5.978**	**500**	**550**	**4,175**	**< 2.2**	**0**
	Average	**9.5**	**20.4**	**< 2**	**24**	**5,040**	**8.1**	**< 0.04**	**< 0.02**	**0.27**	**5.96**	**< 0.15**	**< 0.05**	**< 0.6**	**6.6**	**< 0.07**	**< 0.15**	**< 0.026**	**< 0.0001**	**< 0.003**	**< 0.014**	**< 0.01**	**< 0.01**	**0.025**	**0.050**	**2.71**	**< 0.003**	**< 0.01**	**< 0.06**	**< 0.01**	**< 3**	**15**	**11**	**5.8**	**< 0.02**	**< 0.5**	**< 0.09**	**5.746**	**715**	**4,020**	**6,213**	**< 1.5**	**1**
Las Vegas Creek	07/14/91	1.1	27.0	3	10	1,450	8.7	0.08	0.46	0.36	0.85		< 0.05	1.7	2.5	< 0.01	< 0.01	0.005	< 0.0002	< 0.005	0.023	< 0.01	< 0.04		< 0.005	0.61	< 0.005				6	35	35	2.3	< 0.005		0.07	2.100	< 16	< 16			
	08/27/91	0.8	23.3	< 3	4	1,420	8.7	0.13	0.13	0.15	1.30		< 0.05	< 1.0	1.5	< 0.01	< 0.01	0.002	< 0.0002	< 0.005	0.029	< 0.01	< 0.04		< 0.005	0.65	0.005				< 6	19	30	0.7	< 0.01		0.11	2.100	800	< 16			
	04/06/92	0.8				2,110	8.3				4.80					< 0.01										0.76	< 0.005								< 0.01		0.25		1,300		13,000		
	09/13/92	2.1	28.1	< 3	8	1,640	8.5	0.05	0.11	0.08	2.10		0.51	< 1.0	2.1-3.1	0.01	< 0.01	< 0.01	< 0.0002	< 0.005	0.022	< 0.01	< 0.04		< 0.005	0.91	< 0.005				< 6	22	23	2.7	< 0.01		< 0.10	3.180	4,650	1,650			
	03/07/93	14.8	23.4			1,660	8.5				3.80					< 0.01										0.58	< 0.005								0.10		0.10	7.160	70		1,300		
	08/23/93	3.2	26.1	< 3	13	1,275	8.6	0.22	< 0.05	0.06	1.50		0.07	< 1.0	2.5	< 0.01	< 0.01	< 0.002	< 0.0002	< 0.005	0.093	< 0.01	< 0.02	< 0.015	< 0.005	0.46	< 0.005				< 6	22	25	2.1	0.10		< 0.10		6,650	1,550			
	04/03/94	1.1	15.8			2,030	8.1				1.80					< 0.01										0.61	< 0.005								< 0.01		< 0.10	9.320	425		10,500		
	08/28/94	1.0	23.9	< 3	61	1,540	8.3	0.07	0.13	0.10	< 0.50		0.49	3.0	3.5	< 0.01	< 0.01	0.003	< 0.0002	< 0.005	0.035	< 0.01	< 0.01	< 0.005	< 0.005	0.53	< 0.005				< 6	41	28	12.4	< 0.01		< 0.01	2.160	2,300	3,150		5	
	03/26/95	0.9	16.2			1,790	8.4				3.00					< 0.01										0.65	< 0.005								< 0.01		0.10	0.682	230	170	5,000		
	08/28/95	3.0	25.4	< 3	< 4	1,435	8.5	0.08	0.07	0.09	0.75		< 0.05	1.1	1.9	< 0.01	< 0.01	< 0.002	< 0.0002	< 0.005	0.024	< 0.01	< 0.01	< 0.005	< 0.005	0.59	< 0.005				< 6	29	25	1.3	< 0.01		0.08	1.970	1,550	3,150		4.1	
	09/10/96	2.9	27.4	< 3	9	1,565	8.7	0.07	0.06	0.09	1.00		< 0.05	< 1.0	1.5	< 0.01		< 0.001			0.027					0.41	< 0.005				< 6	17	21	4.4	< 0.01	< 1.1	0.08	1.924	6,650	1,500		< 2.2	
	09/24/97	1.4	25.2	< 3	27	1,385	8.2	0.13	0.1	0.08	1.30		0.1	1.8	3.1	0.016		< 0.1			0.030					0.53	< 0.005				< 6	14	20	7.1	< 0.01	< 1.0	0.15	0.051	155,500	27,500		3.7	
	09/24/98	8.0		< 3	179	1,430				0.06	1.90	< 0.10	< 0.05	0.5	2.4	< 0.01		< 0.1			0.049					0.40		0.01	< 0.1	< 0.02									3,200	1,800		< 2.2	1
	11/04/99	2.0		< 3	6	1,100				0.04	1.86	< 0.20	< 0.05	< 0.2	1.9	< 0.01		< 0.1			< 0.020					0.46		< 0.01	< 0.1	< 0.02									110	2,300			0
	11/05/99	4.3		< 3	12	660				0.08	1.54	< 0.20	< 0.05	0.28	1.8	< 0.01		< 0.1			0.021					0.39		< 0.01	< 0.1	< 0.02									170	1,700			1
	10/03/00	2.2		< 3	< 10	1,870				0.16	3.65	< 2.00	< 0.05	0.49	4.1	< 0.01		< 0.1			0.024					0.62		< 0.01	< 0.1	0.024									3,000	3,000			0
	10/04/00	2.2		< 3	66	1,960				0.15	2.91	< 2.00	< 0.05	0.43	3.3	0.016		< 0.1			0.027					0.65		< 0.01	< 0.1	< 0.02									300	9,000			0
	10/17/00*																																						2,400	5,000			
	12/18/00*	1.1		< 3	< 10	2,070				0.04	3.58	< 0.50	< 0.05	0.51	4.1	< 0.01		< 0.1			< 0.020					0.63		< 0.01	< 0.1	< 0.02									28	900			0
	1/18/01*		10.5			3,210	8.4		0.023	0.03	4.71	< 0.08	< 0.08	0.40	4.7	0.01	0.0032	0.0007			0.019		0.013		0.0044									7.9				3.810	507				
	4/25/01*		23.7			3,200	8.4			0.01	3.64	0.12	< 0.08	0.50	3.8	0.014	0.0025				0.021		0.01		0.0067									2.3				9.740	107				
	7/30/01*	2.2	29.0			3,200	8.6			0.03	1.97	0.18	< 0.08		2.2	0.01	0.0019				0.013		0.011		0.0062									5.0				9.780	2,700				
	10/24/01*	3.1	18.1			3,230	9.2		0.03	0.06	2.26	< 0.08	< 0.08		2.3	0.012	0.002	0.0011			0.026		0.008		0.0072									1.3				2.280	1,667				
	1/23/02*	2.9																																									
	4/24/02*	3.4																																									
	7/24/02*	3.3	29.2			2,800	8.7	0.06	0.018	0.02	2.46	< 0.08	< 0.08	2.60	2.5	0.0038	0.0024	0.0006			0.012		0.011	0.0104										1.8				3.310	2,180				
	10/23/02*	2.7	13.9			3,130	8.3	0.05	0.021	0.03	3.45	< 0.08	0.17	1.20	3.6	0.003	0.0027	0.0007			0.012		0.011	0.016	0.0057									2.1				3.740	1,200				
	1/22/03*		10.7			2,990	8.4		0.032	0.05	3.29	< 0.08	< 0.08		3.3	0.0054	0.0018				0.013		0.007	0.011	0.0047									2.4				3.400	260				
	4/23/03*		19.0			3,210	8.6		0.013	0.01	3.17	< 0.08	< 0.08		3.2	0.0044	0.0011				0.006		0.006	0.0114	0.0046									1.6				3.880	240				
	7/23/03*		26.7			2,940	8.1		0.007	0.09	1.90		0.038	0.92	2.8		0.013	0.001			0.023		0.007	< 0.005	0.0062									2.7				3.590	83,000				
	10/22/03*		16.4			2,930	8.0		0.008	0.03	3.30	< 0.08	< 0.05	0.74	4.0		0.004	0.0011			0.015		0.014	< 0.005	0.0065									12.0				3.500	94,000				
	1/21/04*		7.2			3,050	8.3		0.015	< 0.02	4.20	< 0.08	< 0.05	0.59	4.8		< 0.002	< 0.001			< 0.020		< 0.01	< 0.005	0.0069									2.2				3.580	< 200				
	4/21/04*		15.5			3,490	8.1		0.01	0.01	3.30	< 0.08	< 0.05	0.48	3.8		< 0.002	< 0.001			< 0.020		< 0.01	< 0.005	0.0075									1.1				3.980	547				
	Median	**2.2**	**23.4**	**< 3**	**10**	**1,995**	**8.4**	**0.07**	**0.03**	**0.06**	**2.36**	**< 0.08**	**0.05**	**< 0.83**	**3.1**	**< 0.01**	**< 0.0030**	**< 0.002**	**< 0.0002**	**< 0.005**	**0.022**	**< 0.01**	**< 0.01**	**< 0.005**	**< 0.005**	**0.60**	**< 0.005**	**< 0.01**	**< 0.10**	**< 0.02**	**< 6**	**22**	**25**	**2.3**	**< 0.01**	**< 1.1**	**0.10**	**3.450**	**1,200**	**1,750**	**7,750**	**3.7**	**0**
	Average	**2.8**	**20.9**	**< 1.5**	**38**	**2,192**	**8.4**	**0.09**	**0.07**	**0.07**	**2.53**	**< 0.19**	**0.08**	**0.88**	**3.0**	**0.01**	**0.0037**	**0.017**	**0.0001**	**0.003**	**0.023**	**0.01**	**0.01**	**0.006**	**0.005**	**0.56**	**< 0.003**	**0.006**	**0.050**	**0.012**	**< 3**	**25**	**26**	**3.8**	**0.021**	**0.525**	**0.079**	**3.762**	**12,128**	**3,899**	**7,450**	**3.0**	**0**

Notes:
(1) In cases where measured constituant concentrations were less than detection limits, 1/2 of the detection limit was used to compute the average concentration.
When this approach resulted in a computed average value which was less than the detection limit, the average value was reported as "<DL".
(2) Discharge values for Flamingo at Nellis taken from USGS streamgage records, average daily flow, for 8/27/91 - 8/28/95
* Sample was taken by SNWA

DRY WEATHER MONITORING DATA 1991-2006
(continued)

Location	Date	Q (cfs)	Temp (Deg C)	Oil & Grease (mg/L)	TSS (mg/L)	TDS (mg/L)	pH *	MBAS (mg/L)	Ortho Phosphate (mg/L)	Total Phosphate-Phosphorous (mg/L)	NO3-N (mg/L)	NO2-N (mg/L)	NH3-N (mg/L)	TKN (mg/L)	Total Nitrogen (mg/L)	Copper (mg/L)	Chromium (mg/L)	Lead (mg/L)	Mercury (mg/L)	Cadmium (mg/L)	Zinc (mg/L)	Silver (mg/L)	Nickel (mg/L)	Selenium (mg/L)	Arsenic (mg/L)
Las Vegas Wash at Desert Rose	09/24/97	42.5	25.2	< 3	16	2,395	8.4	0.07	< 0.01	0.01	4.00		< 0.05	1.1	5.1	< 0.01		< 0.1			0.023				
	09/23/98	54.1		< 3	55	2,280				0.02	5.70	< 0.10	< 0.05	1.7	7.3	< 0.01		< 0.1			0.026				
	11/04/99	10.0		< 3	26	1,880				0.04	4.47	< 0.20	< 0.05	< 0.2	4.5	< 0.01		< 0.1			0.030				
	11/05/99	10.0		< 3	39	1,340				< 0.02	4.65	< 0.20	< 0.05	0.6	5.3	< 0.01		< 0.1			0.025				
	10/03/00	18.4		< 3	< 10	3,700				< 0.02	5.45	< 2.00	< 0.05	0.3	5.7	< 0.01		< 0.1			< 0.020				
	10/04/00	18.4		< 3	< 10	3,600				< 0.02	4.42	< 2.00	< 0.05	0.4	4.9	< 0.01		< 0.1			< 0.020				
	12/18/00	31.6		< 3	< 10	3,570				< 0.02	5.31	< 0.50	< 0.05	0.4	5.7	< 0.01		< 0.1			< 0.020				
	7/21/04*		23.8			3,200	8.2		0.01	0.11	2.40	NA	0.05	1.10		< 0.002	0.001	0.0005			0.011		0.01	0.0093	0.0061
	10/27/04*		13.4			3,560	8.4		NA	NA	4.30	NA	NA	NA		< 0.002	< 0.001	< 0.0005			0.034		< 0.005	NA	0.0074
	1/26/05*		14.1			1,730	8.2		0.04	0.39	2.60	< 0.08	0.38	2.70		< 0.002	< 0.001	0.011			0.130		< 0.005	0.0064	4.4
	4/19/05*		15.2			3,470	8.5		0.01	0.02	4.30	< 0.08	< 0.08	0.96		0.0033	0.0023	< 0.0005			0.008		0.01	0.0114	< 0.001
	7/20/2005*		26.7			3,200	8.0		0.01	< 0.02	2.00	< 0.08	0.13	0.68		< 0.002	< 0.001	< 0.0005			0.055		< 0.005	0.0061	< 0.001
	10/26/2005*		15.2			500	7.7		0.06	0.05	< 0.08	< 0.08	0.16	0.73		0.0088	< 0.001	< 0.0005			0.019		< 0.005	0.0062	0.034
	1/19/2006*		9.6			3,300	8.3		0.01		4.40	< 0.08				0.0034	0.0008	< 0.0005			0.010		0.007	0.0079	< 0.001
	4/18/2006*		13.6			2,600	8.3		0.01		2.60	< 0.08				0.0021	0.0001	0.0005			0.029		0.009	0.0074	0.057
	7/27/2006*		26.8			3,200	8.6		< 0.01	0.06	2.71	0.20	< 0.08	0.92		2.4	0.0005	0.0002			0.005		0.002	0.0092	0.008
	10/25/2006*		15.4			3,900	8.1		NA	0.08	4.06	0.11	< 0.08	0.89		2.8	0.001	0.0003			0.009		< 0.005	0.0093	0.0065
	1/23/2007*		8.0			3,300	8.4		0.01	0.03	4.97	0.08	< 0.08	0.64		2.9	0.0009	0.0003			0.006		0.001	0.013	0.0064
	4/18/2007*		15.6			3,100	8.0		0.02	0.03	3.16	0.10	< 0.08	1.40		3.1	0.0006	< 0.0002			0.008		0.002	0.0096	0.0069
	Median	**18.4**	**15.2**	**< 3**	**16**	**3,200**	**8.3**	**0.07**	**< 0.01**	**0.03**	**4.30**	**< 0.10**	**< 0.07**	**0.8**	**5.3**	**< 0.01**	**0.001**	**< 0.0005**			**0.020**		**0.005**	**0.0092**	**0.007**
	Average	**26.4**	**17.1**	**< 2**	**22**	**2,833**	**8.2**	**0.07**	**< 0.02**	**< 0.06**	**4.00**	**< 0.23**	**< 0.07**	**0.9**	**5.6**	**< 0.00**	**0.002**	**< 0.0259**			**< 0.027**		**< 0.005**	**0.0078**	**0.557**
Sloan Channel	09/23/98	1.0		< 3	23	1,220				0.04	1.10	< 0.10	< 0.05	2.2	3.3	0.01		< 0.1			0.020				
						No Sample Taken for 1999 Dry Weather Monitoring Program					No Sample Taken for 1999 Dry Weather Monitoring Program								No Sample Taken for 1999 Dry Weather Monitoring Program						
	10/03/00	0.01		< 3	13	760				0.15	< 1.00	< 1	< 0.05	1.2	1.2	< 0.01		< 0.1			< 0.020				
	10/04/00	0.01		< 3	12	750				0.12	< 0.50	< 10	< 0.05	1.3	1.3	< 0.01		< 0.1			0.028				
	10/17/00*	0.01																							
	1/18/01*		7.0			1,880	8.1		0.09	0.08	2.97	< 0.08	0.96	1.6	3.9	0.004	0.0035				0.006		0.009		0.032
	4/25/01*		18.2			1,970	8.1			0.01	2.45	< 0.08	0.16	0.9	2.6	0.0083	0.0034				0.012		0.006		0.034
	7/30/01*	0.15	22.9			2,150	8.0			0.03	1.33	0.21	0.11		1.5	0.0066	0.0028				0.008		0.006		0.033
	10/24/01*	0.20	15.0			1,770	8.5				2.96	< 0.08	< 0.08		3.0	0.0066	0.0054	0.0006			0.012				0.018
	1/23/02*	0.25																							
	4/24/02*	0.25																							
	7/24/02*	0.25	29.3			1,660	9.0	0.10	0.009	0.03	1.12	< 0.08	< 0.08	20.4	1.1	0.0056	0.0049	0.0006			0.011		0.001	0.00638	0.014
	10/23/02*	0.20	17.5			1,750	8.9	0.05	0.01	0.03	2.85	< 0.08	0.17	0.8	3.0	0.0027	0.0063						0.003	0.00747	0.014
	1/22/03*		7.5			1,810	8.4		0.028	0.05	3.72	< 0.08	< 0.08		3.7		0.0049						0.004	0.00776	0.019
	4/23/03*		11.9			1,710	8.0		0.041	0.02	2.35	0.09	0.19		2.5	0.0039	0.0024				0.005		0.003	0.00595	0.024
	7/23/03*		31.0			1,750	9.3		0.007	0.01	1.40		< 0.05	1.0	2.4	0.0069	0.0034	< 0.001			0.007		< 0.01	< 0.005	0.011
	10/22/03*		21.7			1,900	8.9		0.018	0.02	3.90	< 0.08	< 0.05	0.7	4.6	< 0.010	0.0058	< 0.001			< 0.020		< 0.01	< 0.005	0.019
	1/21/04*		8.6			1,990	9.3		0.024	< 0.02	4.40	< 0.08	< 0.05	0.8	5.2	< 0.010	0.0042	< 0.001			< 0.020		< 0.01	< 0.005	0.02
	4/21/04*		15.9			2,000	8.7		0.018	< 0.02	4.50	< 0.08	0.055	0.8	4.9	< 0.010	< 0.001	< 0.001			< 0.020		< 0.01	0.001	0.016
	7/21/04*		33.3			1,950	9.6		0.008	< 0.01	4.00	NA	< 0.08	0.5		0.004	0.0039	< 0.0005			0.010		< 0.005	0.0087	0.013
	10/27/04*		NS			NA	NS		NA	NA	4.90	NA	NA	NA		NS	NS	NS			NS		< 0.005	NS	NS
	1/26/05*		NS			NA	NS		0.036	0.11	4.60	< 0.08	0.13			NS	NS	NS			NS		NS	NS	NS
	4/19/05*		11.4			2,210	8.4		0.009	< 0.01	5.30	< 0.08	< 0.08	0.7		0.003	0.0054	< 0.0005			< 0.005		NS	0.0099	0.017
	7/20/2005*		23.0			1,320	8.2		0.01	0.03	1.70	< 0.08	0.13	1.7		< 0.010	< 0.001	< 0.0005			0.066		< 0.005	0.0046	0.0084
	10/26/2005*					NA			NS	NS	NS	NS	NS	NS		NS	NS	NS			NS		NS	NS	NS
	1/19/2006*		NS			NA	NS		NS	NS	NS	NS	NS	NS		NS	NS	NS			NS		NS	NS	NS
	4/18/2006*		17.1			1,400	9.2		0.0043		1.40					0.002	1.5	0.022			0.019		0.006	0.0064	0.0076
	7/27/2006*		31.1			2,900	9.4		0.003	0.05	3.16	< 0.08	0.52	25.0		0.018	0.0034	0.0011			0.024		0.002	0.0108	0.012
	10/25/2006*		13.1			2,900	8.4		NA	0.02	5.65	< 0.08	< 0.08	< 0.2		0.002	0.0036	< 0.0005			0.008		0.002	0.0103	0.015
	1/23/2007*		6.4			2,400	8.5		0.014	< 0.01	5.65	< 0.08	< 0.08	< 0.2		0.001	0.0036	< 0.0005			0.006		< 0.005	0.012	0.014
	4/18/2007*		9.1			2,500	8.4		0.008	0.01	6.32	< 0.08	< 0.10	< 0.1		0.002	0.0038	< 0.0002			< 0.005		< 0.001	0.012	0.017
	Median	**0.20**	**16.5**	**< 3.0**	**13**	**1,880**	**8.5**	**0.08**	**0.010**	**0.02**	**2.97**	**0.08**	**< 0.08**	**0.85**	**2.96**	**< 0.01**	**0.0037**	**< 0.001**			**0.012**		**0.005**	**0.007**	**0.017**
	Average	**0.23**	**17.6**	**< 1.5**	**16**	**1,854**	**8.7**	**0.08**	**0.020**	**0.04**	**3.15**	**0.32**	**0.13**	**3.30**	**2.96**	**0.01**	**0.0786**	**< 0.010**			**0.014**		**0.004**	**# 0.007**	**0.018**
Meadows Detention Basin	10/25/00*		14.2			1380	8.2		0.100	0.13	1.28	< 0.08	0.16	0.60	1.88	0.005	< 0.0020	0.001			0.021		0.007	0.005	< 0.005
	1/18/01*		1.0			1870	8.4		0.030	0.03	4.38	< 0.08		0.50	4.88	0.005	0.0029	< 0.001			0.011		0.008	< 0.005	0.002
	4/25/01*		15.0			1280	8.3			0.05	1.37	0.18	0.30	1.30	2.67	0.007	0.0024	0.001			0.029		0.006	< 0.005	0.004
	7/30/01*		24.0			1220	9.0			0.23	0.70	< 0.08	< 0.08		0.70	0.008	0.0018	0.002			0.024		0.007	< 0.005	0.004
	10/24/01*		20.1			1640	8.3		0.020	0.02	4.40	< 0.08	< 0.08		4.40	0.010	< 0.0020	0.002			0.029		0.006	< 0.005	0.005
	1/23/02*		5.5			1730	9.0		0.010	0.01	4.30	< 0.08	< 0.08		4.30	0.006	0.0029	0.001			0.021		0.009	0.007	< 0.005
	4/24/02*		17.5			650	8.3		0.280	0.55	< 0.08	< 0.08	1.24	4.40	4.40	0.008	0.0021	0.001			0.019		0.005	0.002	0.006
	7/24/02*		29.6			930	9.3		0.090	0.22	< 0.08	< 0.08	< 0.08	2.90	2.90	0.007	0.0023	0.001			0.023		0.006	0.003	0.003
	10/23/02*		22.8			1450	9.3		0.050	0.08	2.38	< 0.08	0.18	1.20	3.58	0.004	0.0025	< 0.001			0.012		0.007	0.005	0.004
	1/22/03*		8.8			1770	8.4		0.030	0.06	3.94	< 0.08	< 0.08		3.94	0.006	0.0013	< 0.001			0.015		0.006	0.006	0.003
	4/23/03*		15.5			1620	8.3		0.040		2.90	< 0.08	< 0.08		2.90	0.010	< 0.0020	0.001			0.013		< 0.001	0.055	0.003
	7/23/03*		28.0			1280	7.9		0.008	0.08	1.70		0.03	1.50	3.20	0.024	0.0034	0.0015			0.023		0.006		0.003
	10/22/03*		17.3			1290	8.1		0.115	0.31	3.40	< 0.08	< 0.08	0.82	4.22	0.089	0.0011	0.001			0.041		0.007		0.003
	1/21/04*		7.5			1920	8.3		0.007	0.05	5.00	< 0.08	< 0.08	1.20	6.20	0.004	< 0.0020	0.001			0.330		0.007		0.005
	4/21/04*		14.2			1960	7.5		0.007	0.03	5.10	< 0.08	< 0.08	1.20	6.30	< 0.002	< 0.0020	< 0.001			< 0.020		< 0.01		< 0.005
	7/21/04*		26.1			1350	8.5		NS	NS	NS	NS	NS	NS		0.012	0.0010	< 0.0005			0.028		0.006	0.007	0.003
	10/27/04*		16.6			1490	8.1		NS	NS	3.40	< 0.08	NS	NS		< 0.002	< 0.0010	< 0.0005			0.037		< 0.005	NA	< 0.001
	1/26/05*		14.7			820	7.6		0.080	0.56	3.70	0.53	1.10	6.30		0.043	0.0071	0.011			0.210		< 0.005	0.003	< 0.001
	4/19/05*		15.1			2040	8.1		0.004	< 0.01	6.20	< 0.08	< 0.08	0.71		0.003	0.0031	< 0.0005			0.012		0.009	0.009	0.003
	7/20/2005*		6.6			1540	8.8		0.005	0.05	2.00	< 0.08	< 0.08	1.50		0.010	< 0.0010	< 0.0005			0.055		< 0.005	0.006	< 0.001
	10/26/2005*		10.4			1630	8.2		0.610	0.05	< 0.08	< 0.08	0.03	2.00		0.005	< 0.0010	< 0.0005			0.019		< 0.005	0.006	0.034
	1/19/2006*		6.4			2000	8.3		< 0.010		24.00	0.14				0.003	0.0000	< 0.0005			0.010		0.007	0.008	< 0.001
	4/18/2006*		22.9			1700	8.8		0.005		6.00	< 0.08				0.009	1.0000	0.0005			0.029		0.009	0.007	0.057
	7/27/2006*		25.1			1300	8.4		0.036	0.09	1.11	1.20	0.15	1.10		0.006	0.0005	0.0003			0.012		0.001	0.004	0.004
	10/25/2006*		25.5			500	8.1		NA	0.05	0.90	0.91	< 0.08	< 0.20		0.001	0.0007	< 0.0005			0.045		0.002	0.001	0.005
	1/23/2007*		0.4			2000	8.3		0.003	< 0.01	5.19	5.20	< 0.08	1.00		0.002	0.0006	< 0.0005			0.005		0.001	0.008	0.008
	4/18/2007*		8.4			1600	8.2		0.044	0.06	2.94	2.90	< 0.10	1.50		0.005	0.0007	0.0003			0.020		0.001	0.006	0.003
	Median		**15.1**			**1,540**	**8.3**		**0.03**	**0.06**	**3.17**	**< 0.08**	**< 0.08**	**1.20**	**3.94**	**0.006**	**< 0.002**	**0.001**			**0.021**		**0.006**	**0.006**	**0.003**
	Average		**15.5**			**1,480**	**8.4**		**0.05**	**0.15**	**3.92**	**< 0.07**	**0.19**	**2.39**	**3.76**	**0.012**	**0.080**	**0.001**			**0.045**		**0.006**	**0.008**	**0.005**
Monson Channel	10/25/00*		21.3			3920	8.5		0.040	0.04	1.11	< 0.08	< 0.08	0.80	1.91	0.009	< 0.0020	0.001			0.022		0.016	0.023	0.009
	1/18/01*		12.1			4660	8.6		0.010	0.01	5.05	< 0.08	< 0.08	0.60	5.65	0.010	0.0026	< 0.001			0.011		0.018	< 0.005	0.012
	4/25/01*		21.0			4590	8.4			0.01	3.77	0.14	< 0.08	1.20	4.05	0.017	< 0.0020	< 0.001			0.017		0.018	< 0.005	0.016
	7/30/01*		27.8			4580	8.1			0.02	3.57	0.11	< 0.08		3.68	0.015	0.0022	0.001			0.016		0.017	< 0.005	0.015
	10/24/01*		23.3			4540	8.6		0.010	0.01	4.16	< 0.08	< 0.08		4.16	0.013	0.0019	0.002			0.019		0.012	< 0.005	0.012
	1/23/02*		6.3			5250	8.3		0.010	0.01	8.12	0.09	< 0.08		8.21	< 0.002	< 0.0020	< 0.001					< 0.01	0.023	0.026
	4/24/02*		21.3			4300	8.1		0.020	0.01	5.46	0.14	0.13	1.00	6.46	< 0.002	< 0.0020	< 0.001					< 0.01	0.020	0.030
	7/24/02*		27.6			4230	8.3		0.010	0.03	2.81	< 0.08	< 0.08	1.20	3.01	0.003	0.0027	0.001			0.008		0.019	0.022	0.013
	10/23/02*		23.5			4360	8.5		< 0.010	0.03	4.20	< 0.08	0.17	0.20	4.40	0.004	0.0027	< 0.001			0.006		0.018	0.023	0.020
	1/22/03*		10.8			4570	8.2		0.030	0.05	4.80	< 0.08	< 0.08		4.80	0.005	0.0017	0.001			0.009		0.014	0.023	0.018
	4/23/03*		20.2			4560	8.5		0.020		4.53	< 0.08	< 0.08		4.53	0.004	< 0.0020	< 0.001					0.008	0.024	0.014
	7/23/03*		26.8			4550	7.8		0.007		3.10		0.08	0.58	3.68	0.005	< 0.0020	< 0.001			0.008		0.011	< 0.005	0.019
	10/22/03*		19.7			4630	8.2		0.015	< 0.08	5.20	< 0.08	< 0.08	0.54	5.74	< 0.002	< 0.0020	< 0.001			< 0.020		0.025	< 0.005	0.017
	1/21/04*		10.0			4610	8.1		0.017	< 0.08	5.40	< 0.08	< 0.08	0.42	5.82	< 0.002	< 0.0020	< 0.001			< 0.020		< 0.01	< 0.005	0.020
	4/21/04*		15.0			4710	8.1		0.013	0.03	4.80	< 0.08	< 0.08	0.32	5.12	< 0.002	< 0.0020	< 0.001			< 0.020		< 0.01	< 0.005	0.021
	7/21/04*		22.1			4530	7.9		0.016	< 0.01	4.30	< 0.08	< 0.08	3.70		0.002	< 0.001	< 0.0005			0.012		0.016	0.021	0.017
	10/27/04*		16.6			4520	8.2		NA	NA	5.00	< 0.08	NA	NA		< 0.002	< 0.001	< 0.0005			< 0.005		< 0.005	< 0.001	0.019
	1/26/05*		14.7			4310	8.2		0.026	0.02	4.90	< 0.08	< 0.08	0.46		< 0.002	< 0.001	< 0.0005			0.040		< 0.005	0.021	0.021
	4/19/05*		15.1			2210	8.2		NS	NS	NS	NS	NS	NS		NS	NS	NS			NS		NS	NS	NS
	7/20/2005*		25.3			4520	8.0		0.011	< 0.01	4.30	< 0.08	0.09	0.74		< 0.002	< 0.0020	< 0.0005			< 0.005		< 0.005	0.021	0.019
	10/26/2005*		19.6			4340	8.0		0.020	< 0.01	< 0.08	< 0.08	0.35	0.44		< 0.002	0.0004	< 0.0005			< 0.005		0.001	0.022	0.014
	1/19/2006*		12.4			4600	8.2		0.007		6.40	< 0.08				0.008	0.0007	< 0.0005			0.002		0.015	0.023	0.012
	4/18/2006*		18.0			5000	8.5		0.005		2.98	0.12				0.006	0.0009	< 0.0005			< 0.005		0.019	0.029	0.012
	7/27/2006*		28.1			4400	8.2		0.006	0.04	4.52	0.21	0.11	0.69		0.003	0.0009	0.0011			0.001		0.002	0.022	0.016
	10/25/2006*		17.0			5200	8.2		NA	0.01	5.65	< 0.08	< 0.08	0.36		0.002	0.0008	0.0002			0.007		0.013	0.022	0.016
	1/23/2007*		9.8			4400	8.2		< 0.002	< 0.01	5.42	< 0.08	< 0.08	1.00		0.002	0.0007	< 0.0005			0.003		< 0.010	0.025	0.013
	4/18/2007*		15.9			4400	8.3		0.003	< 0.01	5.42	< 0.10	< 0.10	0.31		0.002	0.0007	< 0.0002			< 0.005		< 0.001	0.025	0.014
	Median		**19.6**			**4,540**	**8.2**		**0.01**	**# 0.01**	**# 4.67**	**< 0.08**	**< 0.08**	**0.59**	**4.53**	**0.002**	**< 0.002**	**# 0.001**			**0.008**		**0.012**	**0.021**	**0.016**
	Average		**18.6**			**4,463**	**8.2**		**0.01**	**# 0.03**	**4.39**	**< 0.09**	**0.10**	**0.81**	**4.75**	**0.005**	**0.002**	**0.001**			**0.012**		**0.012**	**0.017**	**0.017**
Burns Street Channel	7/27/2006*		26.6			4500	8.4		0.004	0.02	6.55	< 0.08	< 0.08	0.26		0.001	0.0300	< 0.0005			0.003		0.002	0.013	0.050
	10/25/2006*		22.0			5400	8.6		< 0.010	0.03	0.08	< 0.08	< 0.08	0.46		0.001	0.0160	< 0.0005			0.003		0.010	0.010	0.043
	1/23/2007*		18.2			3800	8.4		0.003	< 0.01	6.55	< 0.08	< 0.08	0.41		< 0.002	0.0130	< 0.0005			0.002		< 0.005	0.011	0.038
	4/18/2007*		21.7			3700	8.2		0.017	0.02	8.35	< 0.01	< 0.01	< 0.10		< 0.001	0.0078	< 0.0002			< 0.005		< 0.001	0.010	0.033
	Median		**21.9**			**4150**	**8.4**		**0.007**	**0.02**	**6.55**	**< 0.08**	**< 0.08**	**0.34**		**0.001**	**0.0145**	**< 0.0005**			**0.003**		**0.003**	**# 0.010**	**# 0.041**
	Average		**22.1**			**4350**	**8.4**		**0.007**	**0.02**	**5.38**	**< 0.03**	**< 0.03**	**0.30**	**4.75**	**0.001**	**0.0167**	**< 0.0002**			**0.0027**		**0.004**	**0.011**	**0.041**
	1991-2007 Median (All Sites)	**3.4**	**20.3**	**< 3.0**	**13.0**	**3,100**	**8.3**	**0.06**	**0.020**	**0.04**	**4.10**	**< 0.08**	**< 0.08**	**0.90**	**4.30**	**< 0.010**	**< 0.0024**	**< 0.0010**	**< 0.0002**	**< 0.005**	**< 0.020**	**< 0.010**	**0.010**	**0.010**	**< 0.009**
	2006-2007 Median (All Sites)		**16.8**			**3,500**	**8.2**		**0.008**	**0.017**	**5.31**	**< 0.08**	**0.08**	**0.48**		**< 0.002**	**0.0010**	**< 0.001**			**< 0.005**		**0.002**	**0.012**	**0.014**

Location	Date	Boron (mg/L)	Cyanide (mg/L)	Copper Dissolved (mg/L)	Lead Dissolved (mg/L)	Zinc Dissolved (mg/L)	BOD (mg/L)	COD (mg/L)	Apparent Color (ACU)	Turbidity (NTU)	Phenol (mg/L)	Total Petroleum Hydrocarbons (mg/L)	Total Chlorine (mg/L)	Conductance (mmhos)	Fecal Coliform (MPN/100 mL)	Fecal Streptococcus (MPN/100 mL)	Total Coliform (MPN/100 mL)	Salmonella (MPN/100 mL)	VOC's (# detects)
Las Vegas Wash at Desert Rose	09/24/97	0.96	< 0.005				< 6	< 10	10	2.5	< 0.01	< 1.0	0.25	0.067	500	850		< 2.2	
	09/23/98	1.00		< 0.01	< 0.1	< 0.02									900	1,050		< 2.2	0
	11/04/99	0.91		< 0.01	< 0.1	< 0.02									1,300	1,300			3
	11/05/99	0.94		< 0.01	< 0.1	< 0.02									700	240			3
	10/03/00	1.30		< 0.01	< 0.1	< 0.02									900	3,000			0
	10/04/00	1.30		< 0.01	< 0.1	< 0.02									900	2,400			0
	12/18/00	1.20		< 0.01	< 0.1	< 0.02									700	2,400			0
	7/21/04*									2.9				3.850	9,100				
	10/27/04*									3.1				4.060	1,683				
	1/26/05*									132.0				2.560	3,600				
	4/19/05*									1.5				4.040	< 200				
	7/20/2005*									1.8				3.750	4,600				3
	10/26/2005*									140.0				1.740	16,800				1
	1/19/2006*									3.1				3.720	450				
	4/18/2006*									1.3				3.090	< 200				
	7/27/2006*									3.0				3.940	3,400				2
	10/25/2006*									2.7				3.660	17,200				5
	1/23/2007*									1.2				3.951	< 100				5
	4/18/2007*									1.8				3.493	3,600				5
	Median	**1.00**	**< 0.005**	**< 0.01**	**< 0.1**	**< 0.02**	**< 6**	**< 10**	**10**	**2.7**	**< 0.01**	**< 1.0**	**0.25**	**3.720**	**900**	**1,300**		**<**	**3**
	Average	**0.96**	**< 0.005**	**< 0.01**	**< 0.1**	**< 0.01**	**< 5**	**< 9.6**	**10**	**22.8**	**< 0.01**	**< 0.5**	**0.25**	**3.225**	**2,666**	**1,606**		**< 1.1**	**2.25**
Sloan Channel	09/23/98	0.60		0.01	< 0.1	< 0.02									162	225		< 2.2	0
												No Sample Taken for 1999 Dry Weather Monitoring Program							
	10/03/00	0.30		< 0.01	< 0.1	< 0.02									1,600	9,000			1
	10/04/00	0.24		< 0.01	< 0.1	< 0.02									1,700	9,000			1
	10/17/00*														300	2,200			
	1/18/01*									1.4				2.530	257				
	4/25/01*									3.3				2.550	680				
	7/30/01*									3.2				2.710	260				
	10/24/01*									2.6				3.950	1,103				
	1/23/02*																		
	4/24/02*																		
	7/24/02*									3.1				2.150	5,800				
	10/23/02*									1.3				2.290	5,000				
	1/22/03*									0.1				2.300	1,390				
	4/23/03*									2.3				2.320	300				
	7/23/03*									1.3				2.510	36,000				
	10/22/03*									1.8				2.440	2,400				
	1/21/04*									2.2				2.560	< 200				
	4/21/04*									0.5				2.550	633				
	7/21/04*									2.2				2.370	NA				
	10/27/04*									NS				NS	NS				
	1/26/05*									NS				NS	NS				
	4/19/05*									7.8				2.770	553				
	7/20/2005*									1.7				1.802	24,000				10
	10/26/2005*																		0
	1/19/2006*									NS				NS	NS				0
	4/18/2006*									3.5				1.888	< 200				3
	7/27/2006*									2.9				3.550	3,600				3
	10/25/2006*									0.7				2.950	6,667				5
	1/23/2007*									1.1				2.990	< 2,000				5
	4/18/2007*									0.4				3.057	330				4
	Median	**0.300**		**< 0.01**	**< 0.10**	**< 0.02**				**1.98**				**2.54**	**1103**	**5,600**			**3**
	Average	**0.380**		**0.01**	**0.05**	**0.01**				**2.16**				**2.61**	**3,426**	**5,106**			**3**
Meadows Detention Basin	10/25/00*									1.52				1.93					
	1/18/01*									0.50				2.49	95				
	4/25/01*									3.45				1.85	1,490				
	7/30/01*									8.02				1.53	1,300				
	10/24/01*									8.35				2.20	665				
	1/23/02*									3.53				2.33	50				
	4/24/02*									7.30				1.04	190				
	7/24/02*									4.05				1.37	16,500				
	10/23/02*									2.08				1.63	5,300				
	1/22/03*									0.75				2.37	10				
	4/23/03*									0.83				2.18	< 400				
	7/23/03*									2.62				1.85	64,000				
	10/22/03*									1.69				1.83	2,200				
	1/21/04*									1.13				2.51	387				
	4/21/04*									0.77				2.58	600				
	7/21/04*									2.15				1.77	18,100				
	10/27/04*									2.40				2.14	NA				
	1/26/05*									68.50				0.57	413				
	4/19/05*									0.90				2.70	< 200				
	7/20/2005*									3.22				2.07	1,580				5
	10/26/2005*									9.51				2.26	5,400				4
	1/19/2006*									0.83				2.61	< 200				0
	4/18/2006*									12.40				2.29	1,360				2
	7/27/2006*									2.66				1.81	80,000				0
	10/25/2006*									3.41				3.64	4,200				3
	1/23/2007*									0.74				2.61	< 667				4
	4/18/2007*									1.66				2.36	1,360				4
	Median									**2.40**				**2.18**	**1,300**				**4**
	Average									**5.74**				**2.09**	**8,237**				**3**
Monson Channel	10/25/00*									0.13				4.42					
	1/18/01*									0.37				5.18	20				
	4/25/01*									1.20				5.03	545				
	7/30/01*									2.26				5.01	20				
	10/24/01*									2.27				5.01	230				
	1/23/02*									2.95				5.80	20				
	4/24/02*									0.96				5.65	660				
	7/24/02*									3.10				4.74	15				
	10/23/02*									1.20				3.96	2,220				
	1/22/03*									4.56				4.97	185				
	4/23/03*									0.72				1.27	260				
	7/23/03*									0.42				4.92	8,600				
	10/22/03*									1.15				5.00	2,300				
	1/21/04*									0.29				4.97	<200				
	4/21/04*									0.40				5.14	740				
	7/21/04*									1.49				5.06	< 400				
	10/27/04*									0.90				4.91	700				
	1/26/05*									17.90				4.72	< 200				
	4/19/05*									0.37				5.11	< 200				
	7/20/2005*									0.85				5.01	13,100				3
	10/26/2005*									1.02				4.88	9,200				0
	1/19/2006*									0.77				5.09	< 200				0
	4/18/2006*									0.77				5.03	< 200				0
	7/27/2006*									13.90				4.98	6,400				2
	10/25/2006*									1.35				5.01	7,800				3
	1/23/2007*									0.63				4.93	< 400				4
	4/18/2007*									0.44				4.98	< 100				4
	Median									**0.96**				**5.00**	**400**				**3**
	Average									**2.31**				**4.84**	**2189**				**2**
Burns Street Channel	7/27/2006*									1.14				5.72	880				1
	10/25/2006*									0.66				5.49	420				4
	1/23/2007*									1.02				5.18	< 200				3
	4/18/2007*									0.33				4.98	< 100				3
	Median									**0.84**				**5.34**	**310**				**3**
	Average									**0.79**				**5.34**	**363**				**3**
	1991-2007 Median (All Sites)	**0.960**	**< 0.005**	**< 0.010**	**< 0.100**	**< 0.020**	**< 6**	**16**	**15**	**1.90**	**< 0.010**	**< 1.000**	**< 0.100**	**3.70**	**650**	**1,025**	**4,650**	**< 2.20**	**1**
	2006-2007 Median (All Sites)									**1.25**				**3.95**	**1,600**				**4**

Notes:
(1) In cases where measured constituant concentrations were less than detection limits, 1/2 of the detection limit was used to compute the average concentration.
When this approach resulted in a computed average value which was less than the detection limit, the average value was reported as "<DL".
* Sample was taken by SNWA

Appendix F

APPENDIX F

STORMWATER MONITORING PROGRAM – WET WEATHER

- **Wet Weather Data for MS4 Program History**
- **Summary of Detention Basin Monitoring for Pollutant Removal Effectiveness – July 2005 through May 2006**

Wet Weather Monitoring Data, 1992-2007

Location	Date	Q (cfs)	Temp (Deg. C)	Oil & Grease (mg/L)	TSS (mg/L)	TDS (mg/L)	Specific Conductance (umho/cm)	Lab pH (units)	MBAS (mg/L)	Ortho-Phosphate (mg/L)	Total Phosphate-Phosphorous (mg/L)
Western Tributary at Civic Center	08/30/92		26.3	3.5	92	1,110		7.2	2.67	< 0.05	0.29
	10/24/92		17.3	3	66	760		7.3	1.02	0.18	0.50
	02/08/93		12.0	3	950	300		7.9	0.24	0.26	0.55
	05/14/93	839	26.4	3.5	110	600		7.2	1.64	0.19	0.51
	08/04/93	211	26.0	3	840	980		7.6	1.13	0.06	0.88
	02/04/94	181	8.2	5.7	3,720	400	465	7.5	0.44	2.34	2.10
	03/25/94	353	12.9	10	2,800	520	2,530		0.73	0.75	1.40
	07/19/94		23.6	< 3	81	400	535	7.8	1.49	0.11	0.23
	08/09/94	4	29.5	< 3	5,550	370	525	7.9	0.35	0.18	0.87
	01/24/95	624	9.7	< 3	880	5,210	187	8	0.24	0.06	
	05/24/95		19.7	5.5	125	300	488	7.5	1.35	0.08	0.32
	08/12/95	583	27.5	3.7	450	690	633	7.2	1.50	0.09	0.83
	03/13/96			4	510	780		7.5		0.45	0.97
	11/21/96	163	15.6	< 3	2,500	290	498	7.8	< 0.05	0.59	2.80
	07/28/97		25.7	6.1	890	380	588	7.7	1.84	0.11	0.30
	09/01/97			4.2	290	580		7.5	1.75	< 0.01	0.33
	Median	**282**	**21.7**	**3.5**	**675**	**550**	**525**	**7.5**	**1.13**	**0.15**	**0.55**
	Average	**370**	**20**	**3.8**	**1241**	**854**	**717**	**7.6**	**1.09**	**0.34**	**0.86**
Las Vegas Creek at Pecos or Lena	08/30/92	75	27.1	4	550	830		7.2	3.10	0.06	1.10
	10/24/92	204	17.5	3.9	500	530		7.3	1.89	0.55	< 0.05
	10/28/92	76	18.1	< 3	460	440		7.4	1.12	0.18	0.51
	02/08/93	454	11.1	64	300	190		7.8	0.17	0.25	0.55
	05/14/93	138	26.9	7.2	220	490		7.1	1.34	0.36	1.00
	08/04/93	34	30.7	< 3	560	1,070		7.1	1.41	0.12	0.96
	02/04/94	114	8.2	4.8	1,050	320	984	7.6	0.83	0.87	1.50
	09/19/94		22.0	5.4	230	880	950	7.3	1.00	0.78	1.50
	03/11/95	23	13.4	4.1	93	150	1,150	7.6	0.25	0.21	0.36
	05/24/95	24	26.5	12	330	270	680	7.5	0.87	0.21	1.15
	08/20/95	4	26.7	3.9	42	520	883	7.3	1.55	0.20	0.55
	05/24/96		17.8	15	490	500	500	7	4.74	6.50	7.00
	07/15/96	148	27.0	23	480	470		7.4		0.68	0.94
	02/24/98		12.0	< 3	200	100		8	< 0.50	0.20	0.46
	03/26/98		15.2	< 3	1,390	200	570	8.2	0.73	0.54	0.85
	09/22/99			3.5	950	100					0.61
	02/12/03			< 3	110	130	200	7.4	0.36		
	07/25/03				880	580					
	08/16/03				1,570	580				0.29	2.40
	08/16/04			< 5	3,020	340	401	7.6	0.22	0.15	1.70
	01/03/05			5	51	120	177	7.7	0.41	0.10	0.20
	Median	**76**	**18**	**4**	**480**	**440**	**625**	**7.4**	**0.87**	**0.23**	**0.94**
	Average	**118**	**20**	**9**	**642**	**420**	**650**	**7.5**	**1.19**	**0.68**	**1.23**
Duck Creek at Boulder Highway	08/30/92	30	27.1	< 3	120	4,590		7.8	0.64	< 0.05	0.12
	10/24/92	73	17.7	< 3	130	4,670		7.6	0.62	0.06	0.16
	02/08/93	43	11.5	< 3	23	4,700		8.1	< 0.10	< 0.05	0.06
	08/04/93	15	27.5	< 3	150	5,150		7.3	0.54	< 0.05	0.13
	02/04/94	22	9.0	< 3	4,430	3,360	7,380	7.5	0.15	2.26	1.30
	03/25/94	22	17.3	< 3	240	3,990	17,480	7.7	0.23	0.11	0.20
	07/19/94	38	23.0	< 3	280	3,350	4,930	7.3	2.25	0.07	0.37
	01/24/95	21	9.4	3	360	230	2,520	8	0.30	0.11	
	02/20/96			4	2,170	2,910		7.4		0.33	1.00
	07/14/96	177	29.1	3	1,270	2,450	2,900	7.1		0.65	5.60
	04/02/97		12.3	< 3	170	1,660	2,050	7.2	0.77	< 0.05	0.38
	07/22/97		24.8	375	6,540	2,960	389	7.5		0.04	0.41
	02/03/98		12.0	< 3	2,020	2,290	290	7.5	< 0.50	0.09	1.34
	09/08/98	171		< 3	5,720	1,520					1.20
	06/02/99	10		< 3	50	1,100					0.58
	09/22/99			< 3	210	870					0.44
	02/16/00			< 3	1,920	1,240					2.29
	08/30/00	108		< 3	4,360	1,300					3.60
	07/06/01	242		< 3	8,420	1,610					7.50
	02/12/03	489		< 3	2,580	1,270	1,580	7.4	0.23	0.08	2.70
	07/24/03				1,080	3,290					
	08/16/04			5	3,960	1,920	2,320	7.2	0.28	0.09	1.70
	09/09/04			< 5	26,300	2,040	2,080	7.7	0.22	0.04	2.40
	Median	**41**	**18**	**< 3**	**1,270**	**2,290**	**2,320**	**7.5**	**0.30**	**0.08**	**1.00**
	Average	**104**	**18**	**19**	**3,152**	**2,542**	**3,993**	**7.5**	**0.50**	**0.25**	**1.59**
Flamingo Wash at Nellis	10/24/92	115	18.0	< 3	1,710	1,270		7.4	1.51	0.18	1.20
	02/08/93	160	12.3	< 3	1,130	130		8.2	< 0.05	0.46	0.66
	06/05/93	41	17.7	3.9	1,420	1,520		7.5	1.84	0.44	0.82
	08/05/93	57	26.1	< 3	5,910	2,290		7.6	1.18	0.06	1.20
	02/04/94	45	9.0	5.3	620	1,180	2,300	7.4	0.69	0.61	0.68
	03/25/94	79	17.4	6.5	3,860	1,140	7,570	7.4	0.78	0.84	1.80
	07/19/94		24.4	7	6,710	1,200	1,501	7.4	3.49	0.19	2.10
	08/19/94	37	26.0	3.8	4,750	1,060	2,080	7.7	0.05	< 0.05	1.00
	01/24/95	125	9.3	4.5	1,960	600	389	7.9	0.22	0.08	
	05/24/95	30	18.3	< 3	255	1,160	1,302	7.5	0.71	0.06	0.32
	08/12/95	335	26.4	7.2	1,050	1,010	1,003	7.2	1.70	0.14	1.50
	01/31/96			18	560	1,920		7	1.99	0.44	1.30
	11/21/96	184	17.3	< 3	2,620	440	3,830	7.8	< 0.05	0.15	1.50
	09/25/97		19.7	< 3	324	580	710	7.3	1.75	0.57	0.66
	02/04/98		11.2	5.2	1,800	680	240	7.6	0.92	0.22	2.94
	02/24/98		12.0	< 3	660	380		7.8	< 0.50	0.08	0.88
	02/12/03	538		< 3	1,900	260	415	7.6	0.33	0.15	1.05
	04/14/03	411			3,410	505	650	7.4	< 0.05		
	07/24/03	120			2,230	790					
	08/16/03	366			19,200	810				0.34	1.00
	08/13/04			< 5	18,800	940	1,020	7.2	0.06	0.11	5.00
	08/16/04			< 5	5,760	1,040	1,210	7.3	0.59	0.09	3.20
	Median	**120**	**17.7**	**3.9**	**1,930**	**975**	**1,115**	**7.5**	**0.70**	**0.17**	**1.20**
	Average	**181**	**18**	**4.1**	**3,938**	**950**	**1,730**	**7.5**	**0.91**	**0.26**	**1.52**

Location	Date	NO3-N (mg/L)	NO-2 (mg/L)	NH3-N (mg/L)	TKN (mg/L)	Total Nitrogen (mg/L)	Copper (mg/L)	Dissolved Copper (mg/L)	Chromium (mg/L)	Lead (mg/L)	Dissolved Lead (mg/L)
Western Tributary at Civic Center	08/30/92	3.9		0.66	9.8	13.68	0.024		< 0.01	< 0.010	
	10/24/92	2.9		0.73	6.2	9.1	0.017		< 0.01	< 0.010	
	02/08/93	1.1		0.3	1.1	2.2	0.018		0.024	0.018	
	05/14/93	2.4		1.3	5.5	7.9	0.015		< 0.01	0.009	
	08/04/93	2.1		1.4	6.6	8.7	0.033		0.027	0.022	
	02/04/94	1.1		1.1	16	17.1	0.092		0.05	0.150	
	03/25/94	1.2		1.1	6.7	7.9	0.058		0.033	0.076	
	07/19/94	1.4		0.47	< 1	2.4	0.016		< 0.01	0.006	
	08/09/94	1.4		0.47	2.7	4.1	0.052		0.035	0.140	
	01/24/95	4.5		< 0.05	< 1	5.5	0.012		< 0.01	< 0.100	
	05/24/95	1.2		0.6	4.9	6.1	0.023		< 0.01	0.020	
	08/12/95	0.9		0.6	7.2	8.1	0.042		0.013	0.025	
	03/13/96	1.7		0.9	6.2	2.6	0.041				
	11/21/96	1.7		0.8	11	12.7	0.038			< 0.100	
	07/28/97	1.6		1.2	4.8	6.4	0.100			0.170	
	09/01/97	1		0.9	7.2	8.2	0.044			< 0.100	
	Median	**1.5**		**0.8**	**6.2**	**7.9**	**0.036**	**N/A**	**0.012**	**0.025**	
	Average	**1.9**		**0.8**	**6.1**	**7.7**	**0.039**	**N/A**	**0.018**	**0.053**	
Las Vegas Creek at Pecos or Lena	08/30/92	1.8		0.42	9.5	11.3	0.010		0.019	0.072	
	10/24/92	1.8		1.2	8.8	10.6	0.190		0.057	0.280	
	10/28/92	1.4		0.33	3.7	5.1	0.055		0.019	0.071	
	02/08/93	0.7		0.22	1.1	1.8	0.019		< 0.01	0.036	
	05/14/93	0.1		2.3	6.5	6.6	0.027		< 0.01	0.026	
	08/04/93	1.5		2.4	10	11.5	0.078		0.021	0.078	
	02/04/94	1.3		0.92	5.3	6.6	0.047		0.018	0.057	
	09/19/94	4.3		1.7	13	17.3	0.057		0.015	0.053	
	03/11/95	0.4		0.2	1.6	2	< 0.010		< 0.01	0.017	
	05/24/95	1.4		0.7	7.2	8.6	0.098		0.023	0.140	
	08/20/95	1.1		0.3	5	6.1	0.024		< 0.01	0.008	
	05/24/96	3.4		1.9	10	11.9	0.070				
	07/15/96			1.2	8.5	8.7	0.091			< 0.100	
	02/24/98	0.58		0.3	< 1	0.6	0.013			< 0.100	
	03/26/98	0.56		0.23	3.2	3.8	0.012			< 0.100	
	09/22/99	0.68		0.322	2.9	3.58	0.049	< 0.010		< 0.100	< 0.100
	02/12/03	0.71	< 0.1		1.9	2.61	0.020	< 0.010	0.0044	0.008	< 0.100
	07/25/03	2.7	0.23		18	20.93	0.066	< 0.010		0.043	< 0.100
	08/16/03	1.4	0.13		10	11.53	0.220	< 0.010		0.120	< 0.100
	08/16/04	2.4	< 0.5		8.9	11.3	0.170	< 0.010	0.0041	0.099	< 0.020
	01/03/05	0.5	< 0.1		0.97	1.47	0.020	< 0.010	0.0036	0.006	< 0.020
	Median	**1.35**	**0.13**	**0.56**	**6.50**	**6.60**	**0.049**	**< 0.010**	**0.013**	**0.072**	**< 0.100**
	Average	**1.44**	**0.14**	**0.92**	**6.48**	**7.81**	**0.064**	**0.005**	**0.015**	**0.066**	**0.037**
Duck Creek at Boulder Highway	08/30/92	3.5		0.06	2.6	4.5	< 0.010		< 0.01	< 5.000	
	10/24/92	3.8		0.42	3.7	7.5	< 0.010		< 0.01	< 0.010	
	02/08/93	4.6		< 0.1	< 1	5.6	< 0.010		< 0.01	< 0.004	
	08/04/93	4.1		0.68	3.1	7.2	< 0.010		< 0.01	< 0.004	
	02/04/94	4.5		0.69	4.3	8.8	0.044		0.045	0.031	
	03/25/94	< 2		0.4	3.4	5.4	0.016		0.01	0.006	
	07/19/94	4.1		2.3	5.5	9.6	0.025		0.01	0.007	
	01/24/95	1		0.2	1.5	2.5	0.022		< 0.01	< 0.100	
	02/20/96	3.6		1	8.1	9.1	0.062				
	07/14/96	2.3		1.2	11	13.3	0.046			< 0.100	
	04/02/97	3.2		1	5.2	8.4	0.016			< 0.100	
	07/22/97	< 1		0.6	6.8	7.8	0.140			< 0.100	
	02/03/98	3.8		0.6	5.2	9	< 0.010			0.120	
	09/08/98	2.2		0.44	13	2.33	0.240	0.023		0.220	< 0.100
	06/02/99	2.38		0.79	4.73	7.11	0.040	< 0.010		< 0.100	< 0.100
	09/22/99	1.86		0.401	2.45	4.31	< 0.010	< 0.010		< 0.100	< 0.100
	02/16/00	3.04		0.885	6.9	9.94	0.150	< 0.010		< 0.100	< 0.100
	08/30/00	1.78		0.261	4.9	6.68	0.240	< 0.010		< 0.100	< 0.100
	07/06/01	2		< 0.05	11	13	0.240	< 0.010		0.150	< 0.100
	02/12/03	1.3	< 0.5		9.7	11	0.094	< 0.010	0.0091	0.040	< 0.100
	07/24/03	2.8	1.8		6.2	10.8	< 0.200	< 0.020		0.019	< 0.200
	08/16/04	3.6	2.6		11	17.2	0.280	0.530	0.045	0.046	< 0.020
	09/09/04	2.4	< 0.4		8.9	11.3	0.094	< 0.010	0.067	0.077	0.020
	Median	**2.8**	**1.2**	**0.6**	**5.2**	**8.4**	**0.044**	**0.010**	**< 0.010**	**0.100**	**< 0.100**
	Average	**2.8**	**1.21**	**0.63**	**6.1**	**8.4**	**0.082**	**0.060**	**0.019**	**0.165**	**< 0.048**
Flamingo Wash at Nellis	10/24/92	2.3		1.4	7.6	9.9	0.100		0.038	0.079	
	02/08/93	0.4		0.13	< 1	1.4	0.020		0.031	0.019	
	06/05/93	3.2		1.1	4.9	8.1	0.059		0.031	0.051	
	08/05/93	4.3		1.9	6.6	10.9	0.067		0.04	0.086	
	02/04/94	2.6		1	3.7	6.3	0.046		0.011	0.014	
	03/25/94	< 0.5		0.8	7.1	7.6	0.094		0.048	0.100	
	07/19/94	3		2.5	6.1	9.1	0.130		0.05	0.130	
	08/19/94	2		0.82	9.1	11.1	0.094		0.043	0.125	
	01/24/95	1.3		0.3	2.6	3.9	0.061		0.028	< 0.100	
	05/24/95	2.1		0.4	3.1	5.2	0.027		< 0.01	0.018	
	08/12/95	< 0.3		1	9.3	9.6	0.069		0.017	0.049	
	01/31/96	5.1		2.5	13	18.1	0.070			0.130	
	11/21/96	1		0.6	3.8	4.8	0.057			< 0.100	
	09/25/97	0.5		0.3	2.7	3.2	0.026			< 0.100	
	02/04/98	1.7		0.8	19	20.7	0.065			0.120	
	02/24/98	0.98		0.3	2.2	3.2	0.020			< 0.100	
	02/12/03	0.97	< 0.1		3.2	4.17	0.039	< 0.010	0.0063	0.030	< 0.100
	04/14/03	1.23	0.13		7.6	8.96	0.100	< 0.010	34	0.047	< 0.100
	07/24/03	1.8	< 0.5		6.6	8.4	0.170	< 0.010		0.074	< 0.100
	08/16/03	2	< 0.2		5.4	7.4	0.320	< 0.010		0.120	< 0.100
	08/13/04	2.2	< 0.2		16	2.2	0.270	< 0.020	< 0.1	0.410	< 0.020
	08/16/04	2.6	0.092		11	14.53	0.220	< 0.010	0.066	0.220	< 0.020
	Median	**1.9**	**0.17**	**0.8**	**6.4**	**7.85**	**0.068**	**0.010**	**0.038**	**0.100**	**0.100**
	Average	**1.89**	**0.12**	**0.99**	**6.9**	**8.13**	**0.097**	**0.006**	**2.298**	**0.092**	**0.037**

Location	Date	Mercury (mg/L)	Cadmium (mg/L)	Zinc (mg/L)	Dissolved Zinc (mg/L)	Silver (mg/L)	Nickel (mg/L)	Selenium (mg/L)	Arsenic (mg/L)	Boron (mg/L)	Cyanide (mg/L)	BOD (mg/L)	COD (mg/L)	Color (ACU)
Western Tributary at Civic Center	08/30/92	< 0.0002	< 0.005	0.055		< 0.01	< 0.04		< 0.025	0.42	0.029	85	559	313
	10/24/92	< 0.0002	< 0.005	0.074		< 0.01	< 0.04		< 0.025	0.25	0.009	31	210	90
	02/08/93	< 0.0002	< 0.005	0.270		< 0.01	< 0.04	< 0.005	0.01	0.14	< 0.005	25	98	25
	05/14/93	< 0.0002	< 0.005	0.078		< 0.01	< 0.04	< 0.005	0.005	0.27	0.01	63	220	200
	08/04/93	< 0.0002	< 0.005	0.180		< 0.01	0.021	< 0.005	0.011	0.05	0.008	83	390	400
	02/04/94	0.0008	< 0.005	0.440		< 0.01	0.023	< 0.02	0.027	0.23	< 0.005	57	475	750
	03/25/94	< 0.0002	< 0.005	0.320		< 0.01	0.02	< 0.005	0.016	0.17	< 0.005	59	310	1,000
	07/19/94	< 0.0002	< 0.005	0.050		< 0.01	0.011	< 0.005	< 0.005	0.16	0.009	110	215	150
	08/09/94	< 0.0002	< 0.005	0.240		< 0.01	0.025	< 0.005	0.05	0.19	< 0.005	19	300	75
	01/24/95	< 0.0002	< 0.005	0.057		< 0.01	< 0.01	< 0.005		2.40	0.007	< 6	23	10
	05/24/95	< 0.0002	< 0.005	0.094		< 0.01	0.011	< 0.005	< 0.005	0.18	0.01	35	215	40
	08/12/95	< 0.0002	< 0.005	0.200		< 0.01	0.02	< 0.005	0.007	0.28	0.03	77	345	250
	03/13/96			0.120						0.27	0.009	52	250	100
	11/21/96			0.240						0.19	< 0.005	45	400	80
	07/28/97			0.630						0.21	< 0.005	36	930	110
	09/01/97			0.160						0.25	0.052	38	160	128
	Median	**< 0.0002**	**< 0.005**	**0.170**		**< 0.01**	**0.022**	**< 0.005**	**0.011**	**0.22**	**0.009**	**49**	**275**	**119**
	Average	**< DL**	**< DL**	**0.201**		**< DL**	**0.018**	**< DL**	**0.014**	**0.35**	**0.012**	**51**	**316**	**233**
Las Vegas Creek at Pecos or Lena	08/30/92	< 0.0002	< 0.005	0.320		< 0.01	< 0.04		< 0.025	0.43	0.032	80	760	300
	10/24/92	0.006	< 0.005	0.960		< 0.01	< 0.04		< 0.025	0.26	0.024	69	500	120
	10/28/92	< 0.0002	< 0.005	0.280		< 0.01	< 0.04		< 0.025	0.22	0.015	35	195	5
	02/08/93	< 0.0002	< 0.005	0.290		< 0.01	< 0.04	< 0.005	< 0.005	0.08	< 0.005	27	230	15
	05/14/93	< 0.0002	< 0.005	0.150		< 0.01	< 0.02	< 0.005	< 0.005	0.27	0.011	86	400	320
	08/04/93	< 0.0002	< 0.005	0.380		< 0.01	0.02	0.017	0.015	0.30	0.011	115	690	560
	02/04/94	0.0003	< 0.005	0.230		< 0.01	< 0.02	< 0.01	0.008	0.15	0.006	57	360	100
	09/19/94	< 0.0002	< 0.005	0.300		< 0.01	0.026	< 0.005	0.008	0.40	0.016	99	720	500
	03/11/95	< 0.0002	< 0.005	0.075		< 0.01	< 0.01	< 0.005	< 0.005	0.10	< 0.005	10	85	50
	05/24/95	< 0.0002	< 0.005	0.590		< 0.01	0.016	< 0.005	0.007	0.13	0.005	34	295	30
	08/20/95	< 0.0002	< 0.005	0.120		< 0.01	0.011	< 0.005	0.007	0.19	< 0.005	29	245	200
	05/24/96			0.430						0.30	0.01	265	550	175
	07/15/96			0.350						0.19	< 0.005	58	380	300
	02/24/98			0.073						0.06	< 0.005	17	100	15
	03/26/98			0.110						0.08	< 0.005	27	130	30
	09/22/99			0.288	< 0.200					0.06				
	02/12/03	< 0.0002	0.0011	0.090	< 0.200	< 0.0005	< 0.005	< 0.005	< 0.002	< 0.05				
	07/25/03			0.450	0.042					0.22				
	08/16/03			1.000	0.020					0.15				
	08/16/04	0.00021	< 0.0025	0.850	0.021	< 0.0025	0.036	< 0.025	0.015	0.14				
	01/03/05	< 0.0002	< 0.0005	0.070	< 0.020	< 0.0005	< 0.005	< 0.010	< 0.002	0.06				
	Median	**< 0.0002**	**< 0.005**	**0.290**	**< 0.032**	**< 0.010**	**0.020**	**< 0.005**	**0.008**	**0.15**	**0.006**	**57**	**360**	**120**
	Average	**0.0005**	**0.002**	**0.353**	**0.049**	**0.004**	**0.016**	**0.005**	**0.008**	**0.18**	**0.010**	**67**	**375**	**181**
Duck Creek at Boulder Highway	08/30/92	< 0.0002	< 0.005	0.053		< 0.01	< 0.04		0.06	2.70	0.013	19	99	100
	10/24/92	< 0.0002	< 0.005	0.038		< 0.01	< 0.04		0.038	2.50	0.007	21	125	225
	02/08/93	< 0.0002	< 0.005	0.097		< 0.01	< 0.04	< 0.025	0.042	2.30	< 0.005	< 6	30	25
	08/04/93	< 0.0002	< 0.005	0.035		< 0.01	< 0.02		0.037	3.00	< 0.005	77	230	200
	02/04/94	0.0002	< 0.005	0.200		< 0.01	0.027	< 0.02	0.1	1.50	< 0.005	28	175	225
	03/25/94	< 0.0002	< 0.005	0.053		< 0.01	< 0.01	0.019	0.046	1.80	< 0.005	15	89	60
	07/19/94	< 0.0002	< 0.005	0.073		< 0.01	0.01	< 0.01	0.034	1.60	0.011	67	445	60
	01/24/95	0.0002	< 0.005	0.110		< 0.01	< 0.01	< 0.005		0.08	0.009	12	90	30
	02/20/96			0.160						1.20	0.03	50	245	30
	07/14/96			0.210						1.60	< 0.005	110	780	200
	04/02/97			0.083						0.79	0.006	40	280	150
	07/22/97			0.190						1.60	0.022	20	170	150
	02/03/98			0.340						1.20	< 0.005	48	190	75
	09/08/98			0.730	< 0.020					0.72				
	06/02/99			0.130	< 0.020					0.77				
	09/22/99			0.079	< 0.020					0.46				
	02/16/00			0.500	< 0.020					0.77				
	08/30/00			0.910	< 0.020					0.56				
	07/06/01			0.850	0.029					0.79				
	02/12/03	< 0.0002	0.0011	0.270	< 0.020	< 0.0005	0.031	< 0.05	0.089	0.33				
	07/24/03			0.140	< 0.040					1.30				
	08/16/04	< 0.0002	0.003	0.530	0.025	< 0.0025	0.05	< 0.025	0.063	0.70				
	09/09/04	< 0.0002	0.0016	0.480	< 0.020	0.0130	0.12	< 0.025	0.19	0.84				
	Median	**< 0.0002**	**< 0.005**	**0.160**	**< 0.020**	**< 0.01**	**0.03**	**0.02**	**0.05**	**1.20**	**0.006**	**28**	**175**	**100**
	Average	**< 0.0001**	**< 0.002**	**0.289**	**< 0.014**	**0.005**	**0.029**	**0.012**	**0.070**	**1.266**	**0.009**	**39**	**227**	**118**
Flamingo Wash at Nellis	10/24/92	0.0002	< 0.005	0.430		< 0.01	< 0.04		< 0.025	0.49	0.008	54	555	175
	02/08/93	< 0.2	< 0.005	0.180		< 0.01	< 0.04	< 0.025	0.015	0.09	< 0.005	< 6	57	15
	06/05/93	0.0002	< 0.005	0.260		< 0.01	< 0.02	< 0.015	0.016	0.58	< 0.005	56	375	320
	08/05/93	< 0.0002	< 0.005	0.270		< 0.01	0.03		0.027	0.97	0.008	85	415	320
	02/04/94	< 0.0002	< 0.005	0.088		< 0.01	< 0.02	< 0.01	0.008	0.41	< 0.005	37	185	100
	03/25/94	0.0004	< 0.005	0.370		< 0.01	0.032	< 0.015	0.031	0.37	0.008	55	395	1,000
	07/19/94	0.0004	< 0.005	0.550		< 0.01	0.054	< 0.01	0.032	0.44	0.013	22	630	150
	08/19/94	0.0002	< 0.005	0.440		< 0.01	0.026	< 0.005	0.031	0.35	< 0.005	40	465	150
	01/24/95	< 0.0002	< 0.005	0.260		< 0.01	0.016	< 0.005		0.18	< 0.005	33	155	25
	05/24/95	< 0.0002	< 0.005	0.094		< 0.01	0.011	0.007	< 0.005	0.50	0.007	19	115	35
	08/12/95	< 0.0002	< 0.005	0.370		< 0.01	0.027	< 0.005	0.009	0.34	< 0.005	78	450	250
	01/31/96			0.860						0.71	0.03	116	660	230
	11/21/96			0.280						0.12	< 0.005	18	220	30
	09/25/97			0.130						0.30	< 0.005	42	160	60
	02/04/98			0.360						0.22	< 0.005	63	570	75
	02/24/98			0.150						0.13	< 0.005	13	98	15
	02/12/03	< 0.0002	0.00073	0.170	0.100	< 0.0500	0.015	< 0.05	0.012	< 0.05				
	04/14/03	< 0.0002	< 0.00250	0.450	< 0.020	0.0057	0.038	< 0.04	0.014	0.18				
	07/24/03			1.100	0.023					0.24				
	08/16/03			1.500	< 0.020					0.27				
	08/13/04	0.00031	< 0.05000	< 0.010	1.900	< 0.0050	0.5	< 0.025	< 0.012	0.56				
	08/16/04	0.0026	0.00300	1.100	0.026	< 0.0025	0.062	< 0.025	0.027	0.28				
	Median	**< 0.0002**	**< 0.005**	**0.320**	**0.025**	**< 0.010**	**0.030**	**< 0.015**	**0.016**	**0.32**	**0.005**	**41**	**385**	**125**
	Average	**< 0.0070**	**< 0.0038**	**0.428**	**0.345**	**0.006**	**0.058**	**0.009**	**0.017**	**0.352**	**0.006**	**46**	**344**	**184**

Location	Date	Turbidity (NTU)	Phenol (mg/L)	Petroleum Hydrocarbons	TPH (diesel) (MPN/100 mL)	TPH (gasoline) (MPN/100 mL)	Total Chlorine (mg/L)	Fecal Coliform (MPN/100 mL)	Fecal* Coliform (MPN/100 mL)	Fecal** Coliform (MPN/100 mL)
Western Tributary at Civic Center	08/30/92	60	0.09				< 0.10	< 160,000		
	10/24/92	45	0.04				< 0.10	130,000		
	02/08/93	750	0.1				< 0.10	30,000	5,000	
	05/14/93	70	0.1				< 0.10	5,000,000	240,000	13,000
	08/04/93	130	0.2				< 0.10	30,000	110,000	500,000
	02/04/94	950	0.1				< 0.10	3,000	500	
	03/25/94	1,200	0.04				< 0.10	< 2	8,000	8,000
	07/19/94	44	0.08				0.10		> 160,000	1,600,000
	08/09/94	6.5	< 0.01				0.10		80,000	2,300
	01/24/95	100	0.10		< 1.1	< 1.1	< 0.01			5,000
	05/24/95	68	0.02	< 1			< 0.01			> 160,000
	08/12/95	11	< 0.10		< 2.3	< 2.3	< 0.01			
	03/13/96	32					0.05	5,000		
	11/21/96	5,600	< 0.01	< 1			< 0.01	40,000		
	07/28/97	600	< 0.01	< 1			< 0.10	160,000		
	09/01/97	160	0.019					160,000		
	Median	**85**	**0.08**	**< 1**	**1.7**	**1.7**	**< 0.10**	**40,000**	**80,000**	**13,000**
	Average	**614**	**0.06**	**< DL**	**< DL**	**< DL**	**< DL**	**512,546**	**86,214**	**326,900**
Las Vegas Creek at Pecos or Lena	08/30/92	275	0.10				< 0.10	160,000		
	10/24/92	340	0.10				< 0.10	700,000		
	10/28/92	300	0.03				< 0.10	80,000		
	02/08/93	180	0.10				< 0.10	17,000	8,000	13,000
	05/14/93	90	0.20				< 0.10	5,000,000	1,700,000	300,000
	08/04/93	65	0.10				< 0.10	5,000,000	300,000	1,300,000
	02/04/94	350	0.10				< 0.10	2,200	2,400	
	09/19/94	20	0.06				< 0.01			900,000
	03/11/95	62	< 0.10		< 1	< 1	< 0.01			24,000
	05/24/95	270	0.02	< 1			< 0.01			160,000
	08/20/95		0.10		< 1	< 1	0.20			28,000
	05/24/96	8	0.09					11,000		
	07/15/96	190	< 0.01				< 0.01	3,000,000		
	02/24/98	132	< 0.01	< 1			0.10	5,000		
	03/26/98	720	< 0.01	< 1			< 0.10	160,000		
	09/22/99							8,000		
	02/12/03							5,000		
	07/25/03							900,000		
	08/16/03							1,600,000		
	08/16/04							> 1,600,000		
	01/03/05							1,300		
	Median	**185**	**0.10**	**< 1**	**< 1**	**< 1**	**< 0.10**	**160,000**	**154,000**	**160,000**
	Average	**214**	**0.07**	**0.50**	**0.50**	**0.50**	**0.051**	**1,073,500**	**502,600**	**389,286**
Duck Creek at Boulder Highway	08/30/92	55	0.02				< 0.10	50,000		
	10/24/92	55	0.5				< 0.10	50,000		
	02/08/93	14	0.1				< 0.10	400	800	
	08/04/93	34	0.02				< 0.10	1,700,000	1,400,000	1,300,000
	02/04/94	650	0.1				< 0.10	1,100	2,300	220
	03/25/94	70	< 0.01				< 0.10	3,000		3,000
	07/19/94	45					< 0.10	900,000	300,000	500,000
	01/24/95	120	< 0.10		< 1	< 1	< 0.01			5,000
	02/20/96	14	< 0.01	< 1				3,000		
	07/14/96	3,800	< 0.01				< 0.01	5,000,000		
	04/02/97	72	< 0.01	< 1			0.00	7,000		
	07/22/97	2,300	< 0.01	< 1			0.40	22,000		
	02/03/98	370	< 0.01	< 1			< 0.10	1,100		
	09/08/98							17,000		
	06/02/99							7,900		
	09/22/99							160,000		
	02/16/00							8,000		
	08/30/00							110,000		
	07/06/01							900,000		
	02/12/03							30,000		
	07/24/03							1,600,000		
	08/16/04							900		
	09/09/04							900,000		
	Median	**70**	**0.02**	**< 1**	**< 1**	**< 1**	**< 0.10**	**26,000**	**151,150**	**5,000**
	Average	**585**	**0.07**	**< 1**	**< 1**	**< 1**	**< 0.07**	**521,427**	**425,775**	**361,644**
Flamingo Wash at Nellis	10/24/92	750	0.02				< 0.10	80,000		
	02/08/93	700	0.1				< 0.10	1,700	3,000	
	06/05/93	390	< 0.01				< 0.10	8,000	28,000	5,000
	08/05/93	200	0.02				< 0.10	300,000	500,000	50,000
	02/04/94	190	0.1				< 0.10	1,300	500	2,300
	03/25/94	1,400	0.01				< 0.10	24,000	30,000	30,000
	07/19/94	0.2	0.13				< 0.10		1,600,000	500,000
	08/19/94	950	< 0.10				< 0.10	170,000	80,000	140,000
	01/24/95	510	0.10		< 1.1	< 1.1	< 0.01			3,000
	05/24/95	180	0.01	< 1			< 0.01			160,000
	08/12/95	8	< 0.10		< 1	< 1	< 0.01			> 160,000
	01/31/96	520	0.02	< 1				13,000		
	11/21/96	3,300	< 0.01	< 1			< 0.01	240		
	09/25/97	280	< 0.01	1.5				90,000		
	02/04/98	2,200	< 0.01	< 1			0.10	5,000		
	02/24/98	740	< 0.01	< 1			0.20	13,000		
	02/12/03							7,000		
	04/14/03							130,000		
	07/24/03							1,600,000		
	08/16/03							300,000		
	08/13/04							> 1,600,000		
	08/16/04							> 1,600,000		
	Median	**515**	**0.02**	**< 1**	**< 1**	**< 1**	**< 0.10**	**52,000**	**30,000**	**50,000**
	Average	**770**	**0.04**	**< 0.7**	**< 0.5**	**< 0.5**	**< 0.1**	**330,180**	**320,214**	**116,700**

Location	Date	Fecal Strep. (MPN/100 mL)	Fecal* Strep. (MPN/100 mL)	Fecal** Strep. (MPN/100 mL)	Salmonella (MPN/100 mL)	VOC (# of detects)	Pesticides (# of detects)	SOC (# of detects)	Herbicides (# of detects)
Western Tributary at Civic Center	08/30/92	> 16							
	10/24/92	300,000							
	02/08/93	22,000	30,000						
	05/14/93	1,700,000	160,000	50,000					
	08/04/93	160,000	500,000	700,000					
	02/04/94	90,000	28,000						
	03/25/94	50,000	230,000	90,000	< 2.0				
	07/19/94		50,000	140,000	8.0				
	08/09/94		130,000	50,000	< 2.0				
	01/24/95			22,000	< 2.0				
	05/24/95			> 160,000	2.0				
	08/12/95			> 1,600	6.0				
	03/13/96	11,000			< 2.2				
	11/21/96	50,000			< 2.2		0		1 (2,4-D)
	07/28/97	90,000			5.1		0		1
	09/01/97	90,000			< 2.2		0		1
	Median	**90,000**	**130,000**	**70,000**	**2.2**		**0**		**1**
	Average	**233,001**	**161,143**	**151,700**	**2.7**		**0**		**1**
Las Vegas Creek at Pecos or Lena	08/30/92	> 16							
	10/24/92	500,000							
	10/28/92	500,000							
	02/08/93	160,000	30,000	5,000					
	05/14/93	6,000,000	1,300,000	3,000,000					
	08/04/93	160,000	1,700,000	3,000,000					
	02/04/94	35,000	1,300						
	09/19/94			160,000	< 2.0				
	03/11/95			160,000	22.0				
	05/24/95			> 160,000	< 2.0				
	08/20/95			90,000	7.0				
	05/24/96	> 16,000			160.0		1		
	07/15/96	80,000			9.2		0		0
	02/24/98	13,000			< 2.2		0		1
	03/26/98	90,000			< 2.2		1		4
	09/22/99	170,000				1e			0
	02/12/03	90,000				1a	0	4 g,k,n,x	0
	07/25/03	500,000				1k	4	7	2
	08/16/03	240,000				2k,l	0	7	0
	08/16/04	220,000				1a	0	5 ii,jj,kk,vv	3 y,uu,xx
	01/03/05	11,000				0.0	0	8 ii,jj,pp,vv.zz,1,3	3 hh,uu.xx
	Median	**160,000**	**665,000**	**160,000**	**4.6**	**1.0**	**0**	**7**	**1**
	Average	**516,766**	**757,825**	**939,286**	**25**	**1**	**1**	**6**	**1**
Duck Creek at Boulder Highway	08/30/92	> 16							
	10/24/92	30,000							
	02/08/93	3,000	13,000						
	08/04/93	160,000	160,000	3,000,000					
	02/04/94	8,000	2,300	230					
	03/25/94	13,000		30,000	< 2.0				
	07/19/94	240,000	240,000	240,000	2.0				
	01/24/95			17,000	< 2.0				
	02/20/96	13,000			5.0				
	07/14/96	500,000			2.2		0		0
	04/02/97	90,000			4.0		0		3
	07/22/97	17,000			9.2		0		1
	02/03/98	50,000			< 2.2		0		1
	09/08/98	24,000			< 2.2	0	0		0
	06/02/99	130,000				1 (acetone)	0		0
	09/22/99	35,000				1a	0		0
	02/16/00	80,000				1a	0		0
	08/30/00	90,000				0	0		0
	07/06/01	300,000				2a,b	0		2 f
	02/12/03	160,000				1a	0	3 g,m,x	0
	07/24/03	80,000				1.0	0	7	0
	08/16/04	70,000				1a	0	2 ii,kk	0 y,hh
	09/09/04	> 160,000				1a	0	2 kk,pp	1 uu
	Median	**75,000**	**86,500**	**30,000**	**2.2**	**1**	**0**	**3**	**0**
	Average	**102,410**	**103,825**	**657,446**	**3.0**	**0**	**0**	**4**	**1**
Flamingo Wash at Nellis	10/24/92	80,000							
	02/08/93	90,000	30,000						
	06/05/93	50,000	160,000	90,000					
	08/05/93	90,000	160,000	90,000					
	02/04/94	22,000	1,300	500					
	03/25/94	160,000	160,000	90,000	< 2.0				
	07/19/94		500,000	170,000	13.0				
	08/19/94	300,000	130,000	130,000	8.0				
	01/24/95			22,000	8.0				
	05/24/95			90,000	2.0				
	08/12/95			> 1,600	2.0				
	01/31/96	3,000			< 2.0		0		0
	11/21/96	738			< 2.2		0		0
	09/25/97	160,000			< 2.2		0		0
	02/04/98	50,000			< 2.2		2		1
	02/24/98	17,000			< 2.2		1		1
	02/12/03	17,000				1a	0	9 g,h,j,o,q,s,t,u,x	0
	04/14/03	70,000				1d		8 g,h,k,o,x,z,aa,bb	0
	07/24/03	170,000				2	0	3	0
	08/16/03	10,000			0.0	1	0	0	0
	08/13/04	170,000				2k,l	0	2 ii, kk	0
	08/16/04	900,000				1a	0	3 ii,kk,pp	2 y,uu
	Median	**75,000**	**160,000**	**90,000**	**2.2**	**1**	**0**	**3**	**0**
	Average	**131,097**	**163,043**	**76,011**	**3.3**	**1**	**0**	**4**	**0**

Wet Weather Monitoring Data, 1992-2007 (Continued)

Location	Date	Q (cfs)	Temp (Deg. C)	Oil & Grease (mg/L)	TSS (mg/L)	TDS (mg/L)	Specific Conductance (umho/cm)	Lab pH (units)	MBAS (mg/L)	Ortho-Phosphate (mg/L)	Total Phosphate-Phosphorous (mg/L)	NO3-N (mg/L)	NO-2 (mg/L)	NH3-N (mg/L)	TKN (mg/L)	Total Nitrogen (mg/L)
C-1 Channel at Warm Springs	08/30/92	500	24.5	< 3	17,800	230		8	0.26	< 0.05	2.20	1.6		0.07	8.3	9.9
	02/08/93	181	11.1	< 3	3,670	140		8.3	< 0.05	1.50	3.90	0.3		0.11	< 1	1.3
	07/19/94		24.1	3.2	77	290	486	7.5	1.81	0.41	0.42	0.8		0.97	2.8	3.6
	09/19/94		22.7	3	120	930	888	7.6	2.60	1.20	2.70	5.2		1.6	4.1	9.3
	01/24/95	5	9.5	< 3	1,190	210	274	8.2	0.14	0.41		0.8		0.06	< 1	1.8
	11/21/96	30	17.0	< 3	1,980	150	575	8.2	< 0.05	0.52	1.90	0.8		0.3	2.1	2.9
	08/10/97		17.5	< 3	4,800	260		8.5	0.60	0.37	1.48	2		0.2	5.2	7.2
	02/24/98		12.0	< 3	1,460	88		8.4	< 0.50	0.61	6.04	0.59		0.2	1.7	2.3
	02/16/00			< 3	610	62					2.15	0.49		0.362	1.9	2.39
	08/16/00	76		5.2	1,170	380					1.50	4.12		1.13	6.1	10.22
	02/25/03	9		< 3	187	100	139	7.7	0.19			0.44	< 0.1		0.92	1.36
	09/04/03	29			3,850	440					6.80	1.7	< 0.1		10	11.53
	11/12/03	156			110	150				0.26	0.38	0.61	< 0.1		2.4	3.01
	11/07/04			< 5	810	80	93	8.4	0.05	1.40	1.50	0.2	< 0.1		1.4	1.62
	Median	**53**	**17.3**	**< 3**	**1,180**	**180**	**380**	**8.2**	**0.22**	**0.47**	**2.03**	**0.8**	**0.1**	**0.3**	**2.3**	**3.0**
	Average	**123**	**17.3**	**< 2.1**	**2702**	**251**	**409**	**8.1**	**0.66**	**0.63**	**2.48**	**1.40**	**0.05**	**0.50**	**3.42**	**4.89**
Sloan Channel (Range Wash) at Charleston	10/24/92	32	17.8	< 3	280	100		7.9	0.21	0.41	0.43	0.5		0.2	1.1	1.6
	02/08/93	56	10.5	< 3	830	130		8.2	< 0.10	0.64	4.70	0.4		0.14	< 1	1.4
	07/19/94	24	23.4		6,540	430	611	7.3	0.61	0.09	2.10	2.3		1.2	1.7	4
	08/09/94	5	24.1	< 3	16,200	440	598	7.9	0.31	0.09	2.00	1.3		0.14	2.7	4
	08/19/94	2	23.1	< 3	4,010	390	626	8	< 0.05	< 0.05	0.82	2		0.37	3.1	5.1
	01/24/95		10.0	< 3	3,540	230	3	8.1	0.22	0.08		8.7		0.7	2.5	11.2
	08/12/95	5	27.3	3	3,390	510	620	7.4	0.75	0.24	3.10	< 0.2		0.4	8	8.2
	11/21/96	63	16.9	< 3	5,230	240	413	8	< 0.05	0.51	1.70	1.1		0.5	3.7	4.8
	07/22/97		27.0	1,060	230	200	297	8.1		0.44	0.13	0.9		1	2.5	3.4
	08/08/97			3.7	1,500	240		7.9	1.53	0.08	0.47	2		2.5	6.1	8.1
	08/14/98	30		< 3	4,060	330					1.00	2.5		0.66	5.8	8.3
	02/16/00			< 3	1,970	200					1.71	1.74		0.485	3.9	5.64
	02/26/01			< 3	220	110					0.33	0.64		0.278	1.3	1.94
	02/12/03	99		< 3	79	110	172	7.2	0.31	0.18	0.26	0.73	< 0.1		2	2.73
	10/20/04			< 5	270	180	263	7.9	0.56	0.30	0.53	0.9	< 0.1		2.6	3.5
	Median	**30**	**23.1**	**< 3**	**1,970**	**230**	**413**	**7.9**	**0.31**	**0.21**	**0.91**	**1.1**	**0.10**	**0.5**	**2.6**	**4.0**
	Average	**35**	**20.0**	**< 77**	**3,223**	**256**	**400**	**7.8**	**0.42**	**0.26**	**1.38**	**1.7**	**0.05**	**0.7**	**3.2**	**4.9**
Las Vegas Wash	04/02/97		12.6	< 3	480	1,060	1,549	7.1	0.63	0.55	0.91	3.3		1.3	8.5	11.8
	07/28/97		26.6	1,180	400	1,200	1,092	7.6	1.34	0.04	0.52	2.1		0.8	3.9	6
	02/04/98			< 3	2,590	980		7.7	0.60	0.17	1.97	0.63		0.7	7.3	7.9
	02/24/98		12.0		5,580	540		7.9	< 0.50	0.09	1.46	1		0.2	< 1	1
	04/24/99	112		3.8	1,240	1,000					0.93	2.8		0.5	7.45	10.25
	04/30/99	550		< 3	1,870	440					1.83	1.9		0.78	8.73	1.9
	02/21/00			5.1	1,910	100					2.10	0.64		0.179	3.2	3.84
	10/23/00	312		4.55	1,390	2,430					1.20	3.48		0.601	7.4	10.88
	02/26/01	400		< 3	2,940	1,250					1.70	2.64		0.404	4.9	7.54
	11/24/01	75		14.5	630	1,590					0.86	2		1.61	7.8	11.8
	09/11/02	83		< 3	110	1,300	1,570	7.1	2.18		0.49	3.9	< 2.5	1.13	5.4	9.3
	02/12/03	400		5	5,980	1,180	819	7.7	< 0.05	0.13	2.40	1.5	< 0.2		4.7	6.2
	02/25/03	775		8							0.44			0.379	3	3
	07/19/03				500	1,330						0.63	1.2		7.7	9.53
	02/21/04				340	660	274	7.5	0.48		0.42	1.8	< 0.2		2.9	4.7
	11/09/04			< 5		1,500	1,730	6.7	< 0.05		0.77	165	< 0.1		2.5	170
	02/04/05			< 5	1,730	290	428	7.9	< 0.05	0.22	1.20	0.7	< 0.1			2.2
	07/24/05			< 5	1,160	390	535	7.6	0.12	0.04	0.77	1.5	6.5		4.1	10.6
	10/05/06					298	446		0.09	0.19	0.75	1.1	ND		2	
	Median	**356**	**12.6**	**5**	**1,315**	**1,030**	**819**	**7.6**	**0.48**	**0.15**	**0.92**	**1.9**	**0.2**	**0.7**	**4.8**	**7.7**
	Average	**338**	**17.1**	**83**	**1,803**	**974**	**938**	**7.5**	**0.57**	**0.18**	**1.15**	**10.9**	**1.3**	**0.7**	**5.3**	**16.0**
Monson Channel	02/12/03			12	11,600	740	940	7.5	0.79	0.98	2.32	1.3	0.56		8.6	10.46
	07/31/03				800	170						2.9	0.18		7.9	10.98
	11/12/03				210	540				0.36	0.69	4.8	0.25		0.69	5.74
	10/20/04			< 5	460	350	479	0.011	0.95	0.27	0.80	1.3	0.14		4.9	6.35
	Median			**9**	**630**	**445**	**710**	**4**	**0.87**	**0.36**	**0.80**	**2.10**	**0.22**		**6.40**	**8.41**
	Average			**7**	**3,268**	**450**	**710**	**4**	**0.87**	**0.54**	**1.27**	**2.58**	**0.28**		**5.52**	**8.38**
Meadows Detention Basin	02/12/03			7	100	110	153	7.4	0.37	0.19	0.32	0.6	< 0.1		1.6	2.2
	07/25/03				490	310						3.3	< 0.1		7.6	10.9
	12/11/03				94	140	150	7.8	0.29	0.20	0.84	1.8	< 0.2		2.2	2.72
	11/07/04			< 5	73	120	140	7.4	0.69	1.40	0.34	0.6	< 0.1		2.2	2.8
	01/03/05			5	31	47	67	7.7	0.32	0.10	0.18	0.2	< 0.1		0.67	0.87
	Median			**5**	**94**	**120**	**145**	**7.6**	**0.34**	**0.20**	**0.33**	**0.60**	**< 0.10**		**2.20**	**2.72**
	Average			**14**	**158**	**145**	**128**	**7.6**	**0.42**	**0.47**	**0.42**	**1.30**	**0.06**		**2.85**	**3.90**
Lake Las Vegas	02/12/03	560			11,100	1,160	1,650	7.5	< 0.05	3.00	4.30	5.02	0.52		9.6	15.14
	12/28/04			< 5	1,970	1,120	1,560	7.6	0.05	0.49	2.30	4.7	0.49		5.5	10.6
	02/11/05			< 5	1,360	910	1,290	7.6	0.09	0.93	0.67	4.6	< 0.05		2.3	6.9
	10/25/05				2,480	590				0.58	2.40		1.9			
	10/14/06				3,600	1,250	1,720	7.3	ND	0.13	1.30	3.4	0.62		2.3	
	04/16/07				78	1,730	2,460	8.3	ND	0.15	0.15	14	ND		0.97	
	Median	**560**		**5**	**2,225**	**1,140**	**1,650**	**7.6**	**0.05**	**0.53**	**1.80**	**4.70**	**0.51**		**2.3**	**10.6**
	Average	**560**		**5**	**3,431**	**1,127**	**1,736**	**7.6**	**0.06**	**0.88**	**1.85**	**6.34**	**0.71**		**4.1**	**10.9**
Las Vegas Wash at Pabco Rd.	09/11/02	320		< 3	60	1,450	1,950	7.3	< 0.45		0.32	9.9	< 2.5		3.2	13.1
	10/27/02	218		< 3	10	1,490	2,230	8.0			0.29	9.86			1.2	11.06
	Median	**269**		**3**	**35**	**1,470**	**2,090**	**7.7**	**0.451**		**0.31**	**9.9**	**2.50**		**2.2**	**12.1**
	Average	**269**		**1.5**	**35**	**1,470**	**2,090**	**7.7**	**0.226**		**0.31**	**9.9**	**1.25**		**2.2**	**12.1**
2006-2007 Median		**N/A**	**N/A**	**N/A**	**1,839**	**1,250**	**1,720**	**7.8**	**0.09**	**0.15**	**0.75**	**3.4**	**0.62**	**# N/A**	**2.0**	**N/A**
2006-2007 Average		**N/A**	**N/A**	**N/A**	**1,839**	**1,093**	**1,542**	**7.8**	**0.09**	**0.16**	**0.73**	**6.17**	**0.62**	**N/A**	**1.76**	**N/A**
1992-2007 Median		**104**	**18**	**< 3**	**950**	**580**	**633**	**7.6**	**0.50**	**0.19**	**0.96**	**1.76**	**0.20**	**0.60**	**4.90**	**7.20**
1992-2007 Average		**177**	**19**	**26**	**2,375**	**952**	**1,363**	**7.5**	**0.78**	**0.42**	**1.40**	**3.31**	**0.62**	**0.76**	**5.36**	**8.38**

Location	Date	Copper (mg/L)	Dissolved Copper (mg/L)	Chromium (mg/L)	Lead (mg/L)	Dissolved Lead (mg/L)	Mercury (mg/L)	Cadmium (mg/L)	Zinc (mg/L)	Dissolved Zinc (mg/L)	Silver (mg/L)	Nickel (mg/L)	Selenium (mg/L)	Arsenic (mg/L)	Boron (mg/L)	Cyanide (mg/L)	BOD (mg/L)	COD (mg/L)	Color (ACU)	Turbidity (NTU)	Phenol (mg/L)
C-1 Channel at Warm Springs	08/30/92	0.270		0.19	0.220		0.0014	< 0.005	0.890		< 0.01	0.21		0.12	0.27	0.015	13	88	30	8,500	0.02
	02/08/93	0.092		0.063	0.060		< 0.0002	< 0.005	0.370		< 0.01	0.077	< 0.025	0.021	0.09	< 0.005	< 6	81	30	1,900	0.10
	07/19/94	0.021		< 0.01	0.010		< 0.0002	< 0.005	0.083		< 0.01	0.017	< 0.005	< 0.005	0.10	0.006	27	190	200	26	0.08
	09/19/94	0.029		0.014	0.022		< 0.0002	< 0.005	0.200		< 0.01	0.022	< 0.005	0.008	0.23	0.009	105	560	400	18	0.02
	01/24/95	0.035		0.019	< 0.100		0.0002	< 0.005	0.180		< 0.01	0.068	< 0.005		0.06	0.007	7	60	25	380	0.10
	11/21/96	0.033			< 0.100				0.230						0.07	< 0.005	< 6	58	32	840	< 0.01
	08/10/97	0.029			< 0.100				0.200						0.15	< 0.005	8	230	< 3	4,400	< 0.01
	02/24/98	< 0.010			< 0.100				0.170						0.09	< 0.005	13	120	20	850	< 0.01
	02/16/00	0.071	< 0.010		< 0.100	< 0.100			0.320	< 0.200					0.00						
	08/16/00	0.150	0.034		< 0.100	< 0.100			0.490	< 0.020					0.12						
	02/25/03	0.025	< 0.010	0.0089	0.0055	< 0.100	< 0.0002	< 0.0005	0.080	0.100	< 0.0005	0.0071	< 0.005	0.0025	< 0.05						
	09/04/03	< 0.200	< 0.010		0.0900	< 0.100			0.450	< 0.020					0.11						
	11/12/03	0.024	0.038		0.0045	< 0.020			0.080	0.083					< 0.05						
	11/07/04	0.042	< 0.010	0.016	0.0170	< 0.020	< 0.0002	< 0.0005	0.150	< 0.020	< 0.0005	0.0200	< 0.010	0.0055	< 0.05						
	Median	**0.034**	**0.010**	**0.02**	**0.095**	**< 0.100**	**< 0.0002**	**< 0.005**	**0.200**	**< 0.052**	**0.01**	**0.022**	**< 0.005**	**0.007**	**0.09**	**0.006**	**11**	**104**	**30**	**845**	**0.02**
	Average	**0.066**	**0.015**	**0.045**	**0.052**	**< 0.037**	**0.0003**	**< 0.0019**	**0.278**	**< 0.052**	**< 0.004**	**0.060**	**< 0.005**	**0.027**	**0.098**	**0.006**	**22**	**173**	**92**	**2,114**	**0.04**
Sloan Channel (Range Wash) at Charleston	10/24/92	0.028		0.019	0.020		< 0.0002	< 0.005	0.170		< 0.01	< 0.04		< 0.025	0.08	0.005	12	74	10	0	< 0.01
	02/08/93	0.017		0.021	0.018		< 0.0002	< 0.005	0.110		< 0.01	< 0.04	< 0.005	0.01	0.08	< 0.005	< 6	46	15	600	0.2
	07/19/94	0.068		0.057	0.063		< 0.0002	< 0.005	0.310		< 0.01	0.046	< 0.01	0.049	0.24	0.007	28	135	100	3	0.04
	08/09/94	0.049		0.031	0.086		0.0002	< 0.005	0.170		< 0.01	0.028	< 0.005	0.061	0.93	< 0.005	15	295	75	1	< 0.01
	08/19/94	0.040		0.035	0.037		< 0.0002	< 0.005	0.150		< 0.01	0.026	0.027	0.027	0.24	< 0.005	10	115	150	1,350	< 0.01
	01/24/95	0.064		0.058	< 0.100		< 0.0002	< 0.005	0.290		< 0.01	0.044	< 0.005		0.11	0.01	14	97	15	1,100	0.10
	08/12/95	0.056		0.035	0.029		< 0.0002	< 0.005	0.300		< 0.01	0.03	< 0.005	0.018	0.20	< 0.005	59	375	250	63	0.10
	11/21/96	0.033			< 0.100				0.200						0.15	< 0.005	17	140	37	1,600	< 0.01
	07/22/97	0.029			< 0.100				0.260						0.12	< 0.005	26	130	200	240	< 0.01
	08/08/97	0.150			0.210				0.620						0.18	0.33	41	310	150	600	0.012
	08/14/98	0.110	0.011		< 0.100	< 0.100			0.440	< 0.020					0.24						
	02/16/00	0.012	< 0.010		< 0.100	< 0.100			0.054	< 0.020					0.10						
	02/26/01	0.029	< 0.010		0.011	< 0.001			0.120	< 0.020					0.00						
	02/12/03	0.018	< 0.010	0.0043	0.0060	< 0.100	< 0.0002	< 0.0005	0.075	< 0.020	< 0.0005	< 0.0005	< 0.050	0.0026	< 0.05						
	10/20/04	0.028	0.013		0.0095	< 0.020	0.0002	< 0.005			< 0.0005	0.0087	< 0.010	0.0047	0.10						
	Median	**0.033**	**0.010**	**0.033**	**0.063**	**< 0.100**	**< 0.0002**	**< 0.005**	**0.185**	**< 0.020**	**< 0.010**	**0.030**	**< 0.008**	**0.022**	**0.12**	**< 0.005**	**16**	**133**	**88**	**420**	**0.01**
	Average	**0.049**	**0.008**	**0.033**	**0.052**	**< 0.032**	**< 0.0001**	**< 0.0023**	**0.234**	**< 0.010**	**< 0.004**	**0.025**	**0.009**	**0.023**	**0.19**	**0.037**	**23**	**172**	**100**	**556**	**0.05**
Las Vegas Wash	04/02/97	0.024			< 0.100				0.180						0.52	0.015	77	290	150	230	0.01
	07/28/97	0.023			< 0.100				0.150						0.57	0.007	35	240	180	220	< 0.01
	02/04/98	0.065			0.180				0.550						0.37	< 0.005	74	260	25	1,660	0.01
	02/24/98	< 0.010			0.180				0.320						0.21	< 0.005	10	90	10	1,050	< 0.01
	04/24/99	< 0.010	< 0.010		< 0.100	< 0.100			0.280	< 0.020					0.55						
	04/30/99	0.130	< 0.010		< 0.100	< 0.100			0.540	< 0.020					0.36						
	02/21/00	0.012	< 0.010		< 0.100	< 0.100			0.833	< 0.020					0.25						
	10/23/00	0.090	< 0.010		< 0.100	< 0.100			0.540	0.032					0.57						
	02/26/01	0.055	< 0.010		0.029	0.001			0.280	0.039					0.24						
	11/24/01	0.012	< 0.010		< 0.100	< 0.100			0.071	0.035					0.70						
	09/11/02	0.098	0.110	< 0.01	0.010	< 0.100	< 0.0002	0.0069	0.180	0.220	< 0.0005	0.019		0.0055	0.41						
	02/12/03	0.110	< 0.010	0.015	0.096	< 0.100	< 0.0002	0.0028	0.390	< 0.020	< 0.0005	0.045	< 0.05	0.034	< 0.05						
	02/25/03	0.390		0.0094	0.014			0.00055	0.190			0.012		0.0059	0.22						
	07/19/03	0.075	0.020		0.020	< 0.100			0.250	0.052					0.33						
	02/21/04	0.027	< 0.010	< 0.01	0.077	< 0.020	< 0.0002	< 0.00050	0.890	0.400	0.0006	< 0.05	< 0.025	0.0051	0.24						
	11/09/04	0.029		0.018	0.031		< 0.0002	< 0.00061	0.360		< 0.0005	0.024	< 0.05	0.0083	0.11						
	02/04/05	0.019	< 0.010	< 0.0001	0.047	< 0.020	< 0.0002	< 0.00500	2.700	0.004	< 0.0050	< 0.05	< 0.05	< 0.02	0.10						
	07/24/05	0.110	0.022	0.023	0.046	0.046	< 0.0002	0.00077	4.600	0.380	< 0.0050	0.035	< 0.01	0.0099	0.16						
	10/05/06	0.690	0.013	15	0.016	ND	ND	ND	0.730	0.020		0.017		0.006	0.12						
	Median	**0.055**	**0.010**	**0.013**	**0.096**	**< 0.100**	**< 0.0002**	**0.0008**	**0.360**	**0.032**	**0.0006**	**0.030**	**< 0.050**	**0.007**	**0.25**	**0.006**	**55**	**250**	**88**	**640**	**< 0.01**
	Average	**0.071**	**0.016**	**0.011**	**0.060**	**< 0.039**	**< 0.000**	**0.002**	**0.739**	**0.100**	**0.0011**	**0.026**	**0.019**	**0.011**	**0.32**	**0.007**	**49**	**220**	**91**	**790**	**< DL**
Monson Channel	02/12/03	0.053	< 0.050	0.0079	0.034	< 0.500	< 0.0002	0.00090	0.330	< 0.100	< 0.0005	0.015	< 0.02	0.02	0.028						
	07/31/03	0.058	< 0.010		0.120	< 0.100			0.210	< 0.020					0.29						
	11/12/03	0.028	0.035		0.009	< 0.020			0.130	0.180					0.26						
	10/20/04	0.051	< 0.010	8.7	0.019	< 0.020	< 0.0002	0.00055		0.033	< 0.0005	0.011	< 0.02	0.009	0.24						
	Median	**0.052**	**< 0.023**	**4.354**	**0.027**	**< 0.060**	**< 0.0002**	**0.001**	**0.210**	**< 0.067**	**< 0.001**	**0.013**	**< 0.020**	**0.015**	**0.250**						
	Average	**0.048**	**0.018**	**4.354**	**0.046**	**0.080**	**0.0001**	**0.001**	**0.223**	**0.068**	**0.0003**	**0.013**	**0.010**	**0.015**	**0.205**						
Meadows Detention Basin	02/12/03	0.026	< 0.010	0.0053	0.012	< 0.100	< 0.0002	0.00074	0.100	< 0.020	< 0.0005	0.0051	< 0.005	0.0025	< 0.05						
	07/25/03	0.110	< 0.010		0.040	< 0.100			0.510	0.090					0.13						
	12/11/03	0.031	< 0.010	0.00055	0.014	< 0.020	< 0.00021	0.00053	0.150	0.150	< 0.0005		< 0.005	< 0.002	0.05						
	11/07/04	0.024	< 0.010	0.0041	0.011	< 0.020	< 0.0002	< 0.0005	0.140	0.041	< 0.0005	< 0.005	< 0.01	0.0021	0.07						
	01/03/05	0.019	< 0.010	< 0.005	0.006	< 0.020	< 0.0002	< 0.0025	0.070	< 0.020	< 0.0025	< 0.025	< 0.01	< 0.002	< 0.05						
	Median	**0.026**	**< 0.010**	**0.005**	**0.012**	**< 0.020**	**< 0.0002**	**0.0006**	**0.140**	**< 0.041**	**< 0.0005**	**0.0051**	**< 0.008**	**0.0021**	**< 0.052**						
	Average	**0.042**	**0.005**	**0.003**	**0.017**	**0.026**	**0.0001**	**0.0007**	**0.194**	**0.060**	**0.0005**	**0.0067**	**0.0038**	**0.0017**	**0.060**						
Lake Las Vegas	02/12/03	0.082		0.043	0.092		< 0.0002	< 0.0025	0.350		< 0.0025	0.06									
	12/28/04	< 0.010	< 0.010	0.033	0.050	< 0.020	< 0.0002	< 0.0050	0.270	< 0.020	< 0.0005	0.056	< 0.15	0.032	0.51						
	02/11/05	0.041	< 0.010	0.023	0.031	< 0.020	< 0.0002	0.6100	0.170	< 0.020	< 0.0005	0.035	< 0.01	0.017	0.33						
	10/25/05	0.056	0.014	0.057		0.109			0.210	0.109										2,140	
	10/14/06	0.120	0.007	70	0.130	0.001	ND	0.00120	0.450	ND	1.0000	0.094	ND	0.049	0.37						
	04/16/07	0.150	0.011	2.5	0.002	ND	ND	ND	0.087	0.030	ND	0.0093	ND	0.0093	0.70						
	Median	**0.069**	**0.010**	**0.050**	**0.050**	**0.020**	**< 0.0002**	**< 0.0038**	**0.240**	**0.025**	**< 0.0015**	**0.06**	**0.08**	**0.025**	**0.44**						
	Average	**0.076**	**0.008**	**12.109**	**0.061**	**0.032**	**< 0.0001**	**0.1537**	**0.256**	**0.040**	**0.2504**	**0.05**	**0.04**	**0.027**	**0.48**						
Las Vegas Wash at Pabco Rd.	09/11/02	0.015	0.017	0.0045	0.0024	< 0.100	< 0.0002	< 0.0005	0.051	0.058	< 0.0005	0.014		0.0038	0.59						
	10/27/02	0.012	0.0082	0.0031	0.0006	< 0.0005	< 0.0002	< 0.0005	0.065	0.058	< 0.0005	0.0083	< 0.005	0.0086	0.59						
	Median	**0.014**	**0.013**	**0.004**	**0.002**	**0.050**	**< 0.0002**	**< 0.0005**	**0.058**	**0.058**	**< 0.0005**	**0.011**	**0.005**	**0.0062**	**0.59**						
	Average	**0.014**	**0.013**	**0.004**	**0.002**	**0.025**	**0.0001**	**0.0003**	**0.058**	**0.058**	**0.0003**	**0.011**	**0.003**	**0.0062**	**0.59**						
2006-2007 Median		**0.150**	**0.011**	**15.0**	**0.02**	**0.001**	**ND**	**0.0012**	**0.450**	**0.025**	**1.000**	**0.017**	**ND**	**0.009**	**0.37**						
2006-2007 Average		**0.320**	**0.010**	**29.2**	**0.05**	**0.001**	**ND**	**0.0012**	**0.422**	**0.025**	**1.000**	**0.040**	**ND**	**0.021**	**0.40**						
1992-2007 Median		**0.044**	**0.010**	**0.018**	**0.076**	**< 0.100**	**< 0.0002**	**< 0.0050**	**0.230**	**0.022**	**< 0.010**	**0.026**	**< 0.010**	**0.014**	**0.24**	**< 0.005**	**35**	**230**	**100**	**235**	**0**
1992-2007 Average		**0.073**	**0.023**	**1.486**	**0.107**	**< 0.077**	**0.0027**	**< 0.0113**	**0.350**	**0.093**	**< 0.019**	**0.037**	**0.017**	**0.023**	**0.42**	**0.013**	**45**	**283**	**159**	**738**	**0**

Location	Date	Petroleum Hydrocarbons	TPH (diesel) (MPN/100 mL)	TPH (gasoline) (MPN/100 mL)	Total Chlorine (mg/L)	Fecal Coliform (MPN/100 mL)	Fecal* Coliform (MPN/100 mL)	Fecal** Coliform (MPN/100 mL)	Fecal Strep. (MPN/100 mL)	Fecal* Strep. (MPN/100 mL)	Fecal** Strep. (MPN/100 mL)	Salmonella (MPN/100 mL)	VOC (# of detects)	Pesticides (# of detects)	SOC (# of detects)	Herbicides (# of detects)
C-1 Channel at Warm Springs	08/30/92				< 0.10	90,000			> 16							
	02/08/93				< 0.10	3,000			30,000							
	07/19/94				< 0.10		11,000	30,000		80,000	300,000	4.0				
	09/19/94				< 0.01			30,000			90,000	8.0				
	01/24/95		< 1.1	< 1.1	< 0.01			1,700			13,000	< 2.0				
	11/21/96	< 1.1			< 0.01	240			1,230			< 2.2		0		1 (2,4-D)
	08/10/97				< 0.10	3,000			50,000			9.2		0		1
	02/24/98	< 1			0.10	5,000			24,000			< 2.2		0		2
	02/16/00					13,000			30,000				1d	0		0
	08/16/00					30,000			90,000				1a	1 (diazinon)		1 (2, 4-D)
	02/25/03					8,000			2,400				0	0	5 g,h,l,o,x	0
	09/04/03					17,000			30,000				0	0	0	0
	11/12/03					24,000			16,000				4	0	4	0
	11/07/04					5,000			17,000				0	0	1 ii	0
	Median	**< 1.1**	**< 1.1**	**< 1.1**	**< 0.10**	**8,000**	**11,000**	**30,000**	**24,000**	**80,000**	**90,000**	**3.1**	**0**	**0**	**3**	**0**
	Average	**< DL**	**< DL**	**< DL**	**0.04**	**18,022**	**11,000**	**20,567**	**26,422**	**80,000**	**134,333**	**4.1**	**1**	**0**	**3**	**1**
Sloan Channel (Range Wash) at Charleston	10/24/92				< 0.10	5,000			130,000							
	02/08/93				< 0.10	1,300		1,400	24,000		50000					
	07/19/94				< 0.10	28,000	23,000	23,000	22,000	30,000	30,000	12.0				
	08/09/94				< 0.10		170,000	30,000		70,000	23,000	< 2.0				
	08/19/94				< 0.10	30,000	80,000	130,000	23,000	35,000	9,000	170.0				
	01/24/95		< 1.2	< 1.2	< 0.01			3,000			17,000	4.0				
	08/12/95		< 1.4	< 1.4	< 0.01			> 160,000			> 1,600	< 14.0				
	11/21/96	< 1			< 0.01	240			9,300			< 2.2		1 Prometon		1 (2,4-D)
	07/22/97	< 1			< 0.10	90,000			90,000			< 2.2		0		1
	08/08/97					5,000			160,000			< 2.2		0		0
	08/14/98					3,000			160,000			< 2.2	1 (acetone)	0		1 (2,4-D)
	02/16/00					11,000			30,000				1a	0		0
	02/26/01					5,000			50,000				1a	0		0
	02/12/03					5,000			80,000				1a	0	9 g,h,I,j,k,l,u,v,x	
	10/20/04					17,000			30,000				1a	0	4 ii,jj,pp,zz	1 uu
	Median	**< 1**	**1.3**	**1.3**	**< 0.10**	**5,000**	**80,000**	**26,500**	**40,000**	**35,000**	**20,000**	**2.2**		**0**	**7**	**1**
	Average	**< DL**	**< DL**	**< DL**	**< DL**	**16,712**	**91,000**	**57,900**	**67,358**	**45,000**	**21,767**	**25**		**0**	**7**	**1**
Las Vegas Wash	04/02/97	4.3				7,500			90,000			< 2.0		1		4
	07/28/97	< 1			< 0.10	1,600,000			1,600,000			< 2.2				
	02/04/98					8,000			28,000			< 2.2		2		1
	02/24/98	< 1				2,400			8,000			< 2.2		1		1
	04/24/99												1 (acetone)	0		1 (2,4-D)
	04/30/99												2 ***	0		1 (2,4-D)
	02/21/00												1a			0
	10/23/00													0		0
	02/26/01					2,200			220,000				1a	0		0
	11/24/01												1a	0		0
	09/11/02					300,000			500,000							
	02/12/03					500,000			22,000				1a	0	4 g,j,o,x	0
	02/25/03					30,000			30,000				0	0		
	07/19/03												1	0	0	0
	02/21/04					1,600			33,000				1a	0	0	0
	11/09/04					16,000			5,000				0			
	02/04/05					500			28,000				3(qq,ss,tt)	0	2 pp,zz	0
	07/24/05					1,600,000			170,000				2(a,k)	0	0	2 (hh,uu)
	10/05/06					300,000			50,000				14	1 5	0	1
	Median	**< 1**			**< 0.10**	**16,000**			**33,000**			**< 2.2**	**1**	**0**	**0**	**0**
	Average	**2**			**< DL**	**336,015**			**214,154**			**< DL**	**2**	**0**	**1**	**1**
Monson Channel	02/12/03					28,000			28,000				1a	0	4 g,h,o,x	0
	07/31/03					1,600,000			1,600,000				1	1	8	0
	11/12/03					50,000			220,000				1	0	4	0
	10/20/04					50,000			160,000				1a	0	3 ii,kk,pp	3 hh, uu, xx
	Median					**50,000**			**190,000**				**1a**	**0**	**4**	**0**
	Average					**432,000**			**502,000**					**0**	**5**	**1**
Meadows Detention Basin	02/12/03					7,000			30,000				1a	0	5 g,h,k,p,x	0
	07/25/03					160,000			1,600,000				1	0	8	1
	12/11/03					2,200			17,000				0	0	2	0
	11/07/04					9,000			50,000				1a		8 ii,jj,kk,yy,zz,1,2,3,	1 uu
	01/03/05					11,000			9,000				0	0	7 ii,jj.pp,vv.zz,1,3	1 hh
	Median					**9,000**			**30,000**				**1a**	**0**	**7**	**1**
	Average					**37,840**			**341,200**				**1a**	**0**	**6**	**1**
Lake Las Vegas	02/12/03					1,600,000			300,000							
	12/28/04					7,000			17,000				4(ii,kk,qq,tt)	0	2 kk,pp	1 uu
	02/11/05					50,000			50,000				3(a,qq,tt)	1 4	0	0
	10/25/05					220,000			5,000							
	10/14/06					220,000			50,000				12	0	0	1
	04/16/07					23			110				5	0	1	0
	Median					**135,000**			**50,000**				**9**	**1 4**	**1**	**1**
	Average					**349,504**			**84,400**				**6**	**1**	**1**	**1**
Las Vegas Wash at Pabco Rd.	09/11/02					1,600,000			900,000							
	10/27/02												4(d,cc,dd,ee)	0	2 i,j	0
	Median					**1,600,000**			**900,000**					**0**	**2**	**0**
	Average					**1,600,000**			**900,000**				**4**	**0**	**2**	**0**
2006-2007 Median						**220,000**			**50,000**				**12**	**0**	**0**	**1**
2006-2007 Average						**173,341**			**33,370**				**10**	**0**	**0**	**1**
1992-2007 Median		**< 1.00**	**1.10**	**1.10**	**< 0.10**	**24,000**	**55,000**	**30,000**	**50,000**	**105,000**	**90,000**	**< 2**	**1**	**0 5**	**3**	**0**
1992-2007 Average		**< DL**	**< DL**	**< DL**	**< DL**	**425,050**	**263,173**	**223,809**	**207,332**	**228,112**	**323,514**	**10**	**2**	**0 5**	**4**	**1**

Notes:

(1) Insitu pH used for 3/25/94 Western Trib
(2) Phenol values are Lab measurements when both lab and in-situ measurements are available
(3) In computing median values, concentrations below detection limits were assumed to equal the detection limit
(4) Concentrations less than the detection limit were assumed to be 1/2 the detection limit for purposes of computing average values.
(5) Pesticides tested are atrazine, chlorpyrifos (Dursban), metachlor, malathion, prometon, and simazine.
(6) SOC detection limits dropped and the new detection limit is indicated in the "Notes" section, after each name.
* Denotes grab sample taken from bottle X
** Denotes grab sample taken from flow stream while bottle X is filling
*** VOCs detected were carbon disulfide and acetone

(a) VOC detected is Acetone
(b) VOC detected is 2-Butanone
(d) VOC detected is Chloroform
(e) VOC detected is Trichloroflorομethane
(f) Herbicide detected is 2, 4-D and MCCP
(g) SOC detected is Butylbenzylphthalate, 0.5 ug/L
(h) SOC detected is Caffeine, 0.05 ug/L

(i) SOC detected is Di-(2-Ethylhexyl)adipate, 0.6 ug/L.
(j) SOC detected is Di-n-Butylphthalate, 0.5 ug/L
(k) SOC detected is Phenanthrene, 0.02 ug/L
(l) SOC detected is Pyrene, 0.05 ug/L
(m) SOC detected is Simazine, 0.05 ug/L
(n) SOC detected is Dimethylphthalate, 0.5 ug/L
(o) SOC detected is Diethylphthalate, 0.5 ug/L

(p) SOC detected is Alachlor, 0.05 ug/L
(q) SOC detected is Benzopyrene, 0.02 ug/L
(s) SOC detected is Metolalchlor, 0.05 ug/L
(t) SOC detected is Propachlor, 0.05 ug/L
(u) SOC detected is Benzo(g,h,I)Perylene, 0.05 ug/L
(v) SOC detected is Benzo(k)Fluoranthene, 0.02 ug/L
(x) SOC detected is Di(2-Ethylhexyl)phthalate, 0.6 ug/L

(y) Pesticide detected is Diazinon
(z) SOC detected is Heptachlor, 0.04 ug/L
(aa) SOC detected is Lindane, 0.02 ug/L
(bb) SOC detected is Metribuzin, 0.05 ug/L
(cc) VOC detected is chlorodibromomethane
(dd) VOC detected is bromodichloromethane
(ee) VOC detected is Total THM

(hh) Herbicide detected is 2, 4-D
(ii) SOC detected is Di (2-Ethylhexyl) phthalate
(jj) SOC detected is Caffeine
(kk) DOC detected Diethylphthalate
(pp) SOC detected is butylbenzylphthalate
(qq) VOC detected is chloroform
(ss) VOC detected is bromodichloromethane

(tt) VOC detected is total THM
(uu) Herbicide detected is 2, 4-DB
(vv) SOC detected is pyrene
(xx) Pesticide detected is Dicamba
(yy) VOC detected is p-Dichloropropane
(zz) SOC detected is phenanthrene
(1) SOC detected is Di-(2-Ethylhexyl) adipate

(2) SOC detected is Di-n-Butylphthalate
(3) SOC detected is fluoranthene
(4) Pesticide detected is dieldrin

M E M O R A N D U M

MWH

To: **Kevin Eubanks** **Date:** **June 8, 2007**

From: **Chip Paulson** **Reference:** **1700610.01180201**

Subject: **Summary of Detention Basin Monitoring for Pollutant Removal Effectiveness - July 2005 through May 2007**

Introduction

This memorandum summarizes monitoring results from the Detention Basin Pollutant Removal Effectiveness Monitoring Program conducted for the Las Vegas Valley Municipal Separate Storm Sewer (MS4) NPDES program for July 2005 through May 2007. The objective of this program is to determine whether existing regional detention basins in Las Vegas Valley are effective in reducing pollutant concentrations in storm waters tributary to Las Vegas Wash. It is noted that a separate analysis is being performed to evaluate sediment removal benefits provided by existing detention basins. Aspects of the detention basin monitoring program are described in the current Storm Water Management Plan and the 2004-2005 and 2005-2006 Annual Reports for the MS4 NPDES permit.

Events Sampled to Date

Table 1 summarizes the runoff events sampled as of June 1, 2007. For each runoff event at each detention basin, inflow and outflow samples were collected and analyzed. Table 2 lists the constituents that were analyzed for each sample.

Table 1. Detention Basin Monitoring Events

Location	Date
Meadows Detention Basin	July 29, 2005 October 18, 2005 October 14, 2006
Lower Las Vegas Wash Detention Basin	October 18, 2005 June 7, 2006 October 5, 2006 October 14, 2006 April 16, 2007
Upper Flamingo Wash Detention Basin	October 18, 2005 October 25, 2005 July 18, 2006 October 14, 2006 April 16, 2007

Table 2. Constituents Analyzed in Detention Basin Samples

Category	Constituents
Conventional	Total Dissolved Solids (TDS), Total Suspended Solids (TSS), Turbidity
Nutrients	Total Phosphorus, Orthophosphate, Nitrate
Metals	Copper, Lead, Zinc (Total and Dissolved)
Bacteria	Fecal Coliforms, Fecal Streptococci

Sample Collection and Analysis Procedures

Detention basin inflow and outflow samples were collected using automated sampling equipment. The sampling operation was activated when the stage in the associated channel exceeded a predetermined level. Up to 24 bottles in the carousel of the automated sampler were filled at 7-minute intervals. Composite samples were prepared from the aliquots in the individual sampler bottles by taking equal amounts of water from each sampler bottle from the carousel and combining those aliquots into a larger bottle. Flow meters are not installed at the detention basin sampling sites so it was not possible to prepare flow weighted composite samples. Because inflow will become mixed in the detention basin, this approach was considered adequate for obtaining average inflow and outflow concentrations. The larger bottle was agitated to further mix the samples, and was then used to fill each laboratory-prepared sample collection bottle for the various constituents to be analyzed.

It was necessary to collect grab samples at the Upper Flamingo Wash Detention Basin during the storm of October 25, 2005. At this location there was sufficient flow to sample, but the actuator for the automated sampler was not automatically activated due to the height of the actuator being above the water level in the channel. Grab samples were also taken April 16, 2007 because the sampling equipment was damaged due to vandalism. In both cases multiple grab samples were collected and composited at both the inflow and outflow sampling sites. It was also necessary to collect a grab sample at the Lower Las Vegas Wash Detention Basin during the storm of June 7, 2006. Flow depths were not sufficient to activate the automated samplers, but it was decided to collect grab samples because so few storms had occurred during the permit year.

Conditions at Detention Basins

Meadows Detention Basin – The design of the Meadows Detention Basin inflow and outflow structures directs base flows and small storm flows into a permanent wetland area with two small ponds (see Figure 1). Small storm flows will flush water out of the wetland and ponds, and could potentially mobilize constituents that have accumulated in the ponds during non-storm periods. Under these conditions the basin would be expected to have minimal benefits for downstream water quality. During large flows in which substantial ponding occurs in the basin, effects of poor quality water stored in the existing ponds would be minimized after first-flush conditions have passed and more treatment could be expected.

Upper Flamingo Wash Detention Basin – At the time sampling occurred for the 2005 and 2006 storms, a private sand and gravel operation was actively working in the detention basin storage area (see Figure 2). This created significant disturbed area and piles of mined sand and gravel. Runoff entering the basin could have picked up sediment and related constituents from the mining area, increasing concentrations in the detention basin outflow compared to normal conditions.

Lower Las Vegas Wash Detention Basin – No unusual conditions are known to have existed during sampling at this detention basin. However, the inflow monitoring station was located upstream of a long section of unlined channel entering the detention basin. It is possible that this section of channel could change the pollutant concentrations of the flow that actually enters the detention basin. The possibility of moving the inflow sampling point further downstream will be investigated if the detention basin monitoring program is continued into 2007-2008.

Figure 3. Lower Las Vegas Wash Detention Basin Inflow Sampling Location

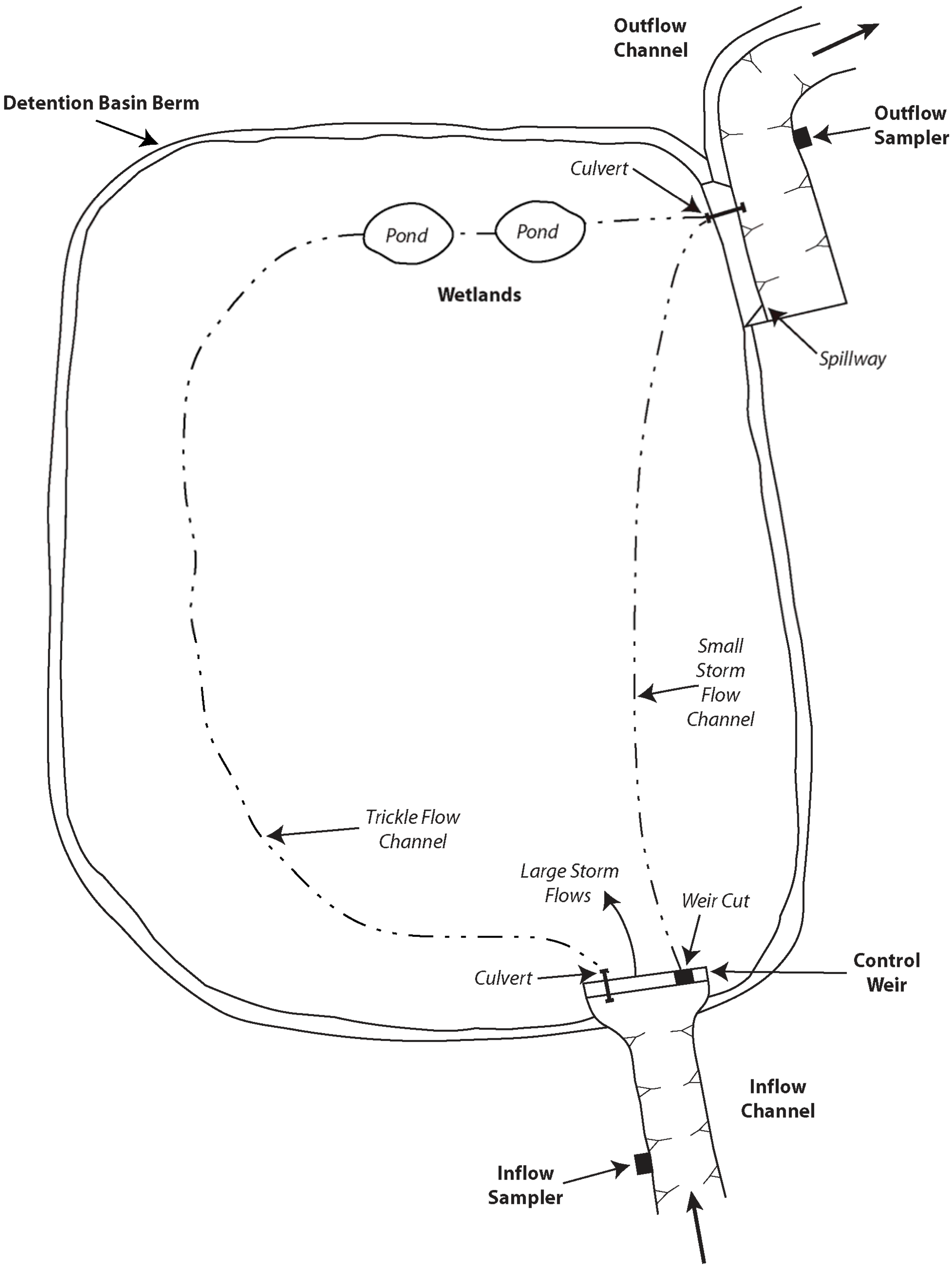


Figure 1. Meadows Detention Basin Conceptual Layout

Figure 2. Upper Flamingo Detention Basin

Data Analysis

Detention basin monitoring data for the two year period suggests that existing regional detention basins provide moderate benefits for reducing certain constituent concentrations. However, the results can vary widely from storm to storm and from site to site.

The data analysis for this report includes:

- Data summary table (Table 5) – organized by location, date, and parameter
- Bar charts, one for each parameter (Figures 4-17) – organized by location and date
- Probability plots, one for each parameter (Figures 18-31) – all locations and dates combined
- Concentration change scatter plots, one for each parameter (Figures 32-45) – inflow concentration versus percent reduction in concentration, all locations and dates combined

Probability plots present the percent of time a measured concentration is less than a given value. When inflow and outflow concentration data are plotted together they can quickly indicate if an inflow dataset has higher or lower concentrations than an outflow dataset. They can also indicate if BMPs are performing better over a certain range of inflow concentration. In these plots, inflow and outflow data from the same sample are not necessarily paired together; the plots show the overall trends in inflow and outflow concentrations. The probability plots suggest the following constituents generally did not show constituent removal through the detention basins: TDS, Dissolved Copper, Orthophosphate, Fecal Coliform, Fecal Streptococci. The probability plots also indicate that for selected constituents the best removal generally occurs under the following conditions:

- Turbidity at concentrations less than 100 NTU
- TSS at concentrations over the full range of measured values up to 6,000 mg/L
- Total Copper at concentrations less than 0.04 mg/L
- Total Lead at concentrations greater than 0.006 mg/L
- Dissolved Lead at concentrations greater than 0.005 mg/L
- Total Zinc at concentrations greater than 0.08 mg/L
- Dissolved Zinc at concentrations greater than 0.006 mg/L
- Nitrate at concentrations greater than 1.4 mg/L
- Total Phosphorus at concentrations greater than 0.3 mg/L

Because the probability plots combine results from all three detention basins, and there are not a large number of samples, the probability plots included in this report do not lead to any definitive conclusions regarding detention basin water quality treatment.

The concentration change scatter plots show the percent reduction in concentration between inflow and outflow for the individual storm events. A positive percent reduction shows removal of the constituent through the detention basin while a negative percent reduction shows an increase of constituent concentration through the detention basin. In general the concentration change scatter plots do not show consistent removal of the constituents through the detention basins, and they reinforce the results for the analysis of the bar charts and probability plots. For the cases in which constituent concentration was reduced as flow passed though the detention basin, the average concentration reduction was about 48 percent.

Although there are still not enough samples at each location to perform meaningful statistical analyses, some overall observations are possible. Table 3 lists the detention basin most effective at reducing concentrations of each constituent. Meadows Detention Basin was found to be the most effective overall of the three basins sampled. In the case of dissolved copper and fecal coliforms, none of the detention basins showed any consistent effectiveness in pollutant removal.

Table 3. Most Effective Detention Basins by Constituent

Constituent	Detention Basin with Most Effective Concentration Reduction Performance
TSS	Meadows
TDS	Lower Las Vegas Wash
Turbidity	Meadows
Total Copper	Meadows
Dissolved Copper	-
Total Lead	Meadows
Dissolved Lead	Meadows, Upper Flamingo Wash
Total Zinc	Meadows
Dissolved Zinc	Lower Las Vegas Wash
Nitrate	Meadows, Lower Las Vegas Wash
Ortho Phosphorus	Upper Flamingo Wash
Total Phosphorus	Upper Flamingo Wash
Fecal Coliform	-
Fecal Strep	Lower Las Vegas Wash, Upper Flamingo Wash

Table 4 summarizes the occurrence of changing constituent concentrations (decrease, increase and no change) between detention basin inflow and outflow samples.

Table 4. Summary of Occurrence of Constituent Concentration Changes Between Detention Basin Inflows and Outflows

Sample Set	Percentage of Occurrences		
	Decreasing Concentration	Increasing Concentration	No Change in Concentration
All Samples (all storms, all sites, all constituents)	47%	42%	11%
Primarily Particulate Constituents (TSS, TP, Total Cu, Total Pb, Total Zn, Turb)	54%	41%	5%
Primarily Dissolved Constituents	41%	42%	17%

(TDS, OP, NO3, Diss Cu, Diss Pb, Diss Zn, Fecal Col, Fecal Strep)			
Metals – Total Fraction	51%	44%	5%
Metals – Dissolved Fraction	33%	33%	33%
Nutrients (TP, OP, NO3)	56%	36%	8%
Sediment Related Constituents (TSS, Turb)	54%	46%	0%
Bacteria (Fecal Col, Fecal Strep)	42%	50%	8%
Meadows Detention Basin Only	50%	43%	7%
Lower Las Vegas Wash DB Only	43%	46%	11%
Upper Flamingo Wash DB Only	49%	37%	14%

The following conclusions can be drawn from the results in Table 4.

- Overall, the three existing detention basins sampled to date are somewhat effective at reducing concentrations of the constituents analyzed.
- As expected, data demonstrates that detention basins are more effective at removing particulate constituents than dissolved constituents. Concentrations of primarily particulate constituents were reduced in 54 percent of the sample events, whereas concentrations of primarily dissolved constituents were reduced in only 41 percent of the sample events.
- Detention basins reduced the total metal concentrations in half of the sample sets while the dissolved metal concentrations were only reduced by 33 percent.
- Of the classes of constituents analyzed, the regional detention basins were most effective at reducing nutrient concentrations.
- Surprisingly, sediment-related constituents (TSS and turbidity) were only reduced in 54 percent of the sample sets. This may be related in part to gravel mining in Upper Flamingo Detention Basin. Based on inspection and maintenance reports, detention basins are effective in removing sediment from inflows. However, the initial sampling data suggests that suspended (fine) sediment and associated particulates are not removed as effectively, possibly due to resuspension of previously deposited material.
- Meadows Detention Basin and Upper Flamingo Wash Detention Basin reduced constituent concentrations in approximately half of the sample sets. However, Meadows Detention Basin had a higher percentage of increasing the constituent concentrations (43 percent) than did Upper Flamingo Wash Detention Basin (37 percent). Storms occurring one week apart were sampled at Upper Flamingo Wash Detention Basin. The basin showed significantly better performance in reducing constituent concentrations during the second storm; 12 constituents showed reduced concentrations or no change in the second storm, compared to 6 constituents showing reduced concentrations or no change in the first storm. This difference in performance may be evidence of the first flush effect during the first storm, or it may be due to differing effects of gravel mining occurring in the basin area.

Summary

Although there is not enough data to perform significant statistical analyses some overall conclusions can be made. Detention basin monitoring data for 2005-2007 suggest that existing regional detention basins provide moderate benefits for reducing certain constituent concentrations. These benefits apply more significantly to constituents occurring primarily in particulate form, and results can vary widely from storm to storm and from site to site.

Of the four categories of constituents analyzed the detention basins were most effective at removing nutrients, primarily Total Phosphorous and Nitrate. The data also suggests that sediment related constituents (TSS and Turbidity) are effectively removed. There was some decrease in the total metal concentrations, whereas dissolved metal and bacteria concentrations were not consistently reduced.

In general, Meadows Detention Basin was the most effective at decreasing the constituent concentrations analyzed, closely followed by the Upper Flamingo Wash Detention Basin. The Lower Las Vegas Wash Detention Basin showed some reduction in constituent concentrations but at a lower percentage of occurrences than the other two basins.

cc: Las Vegas Valley Stormwater Quality Management Committee

Table 5. Data Summary

		TDS (mg/L)		TSS (mg/L)		Turbidity (NTU)		Total Copper (mg/L)		Dissolved Copper (mg/L)		Total Lead (mg/L)		Dissolved Lead (mg/L)		Total Zinc (mg/L)		Dissolved Zinc (mg/L)	
Date	Basin	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow
10/18/05	Lower Las Vegas	180	150	1,090	1,220	1,100	1,070	0.033	0.023	0.022	0.0043	0.014	0.0089	0.013	<0.0005	0.13	0.08	0.094	<0.005
6/7/06	Lower Las Vegas	404	384	257	403	285	420	0.042	0.0051	0.036	0.046	0.0072	0.0088	0.0062	0.0082	0.17	0.14	0.17	0.13
10/5/06	Lower Las Vegas	436	268	191	219	174	173	0.029	0.036	0.0026	0.013	0.0036	0.0046	<0.0005	<0.0005	0.094	0.13	0.011	0.009
10/14/06	Lower Las Vegas	144	246	1,990	2,500	2,140	2,030	0.038	0.041	0.0033	0.0034	0.019	0.031	<0.0005	<0.0005	0.16	0.18	<0.005	<0.005
4/16/07	Lower Las Vegas	256	260	105	165	156	143	0.035	0.036	0.024	0.019	0.0034	0.0035	<0.0005	<0.0005	0.076	0.076	0.026	0.023
7/29/05	Meadows Detention Basin	210	300	300	140	131	100	0.16	0.087	<0.002	0.0048	0.05	0.015	<0.0005	<0.0005	0.45	0.23	0.0059	0.018
10/18/05	Meadows Detention Basin	51	110	110	76	70	43	0.033	0.046	0.038	0.042	0.022	0.0074	0.022	0.0064	0.015	0.11	0.145	0.105
10/14/06	Meadows Detention Basin	72	474	194	44	115	42	0.062	0.017	0.0073	0.005	0.032	0.0036	<0.0005	<0.0005	0.28	0.058	0.011	0.026
10/18/05	Upper Flamingo Wash	82	150	140	170	129	199	0.04	0.026	0.034	0.042	0.0041	0.0036	0.0034	0.003	0.22	0.065	0.215	0.057
10/25/05	Upper Flamingo Wash	150	150	460	350	434	472	0.038	0.021	0.0074	0.0053	0.0063	0.0067	<0.0005	<0.0005	0.061	0.058	<0.005	<0.005
7/18/06	Upper Flamingo Wash	770	354	5,830	27	2,090	26	0.036	0.0088	0.0028	0.0088	0.022	<0.0005	<0.00005	<0.00005	0.18	0.017	<0.005	0.011
10/14/06	Upper Flamingo Wash	174	122	886	960	728	778	0.023	0.043	0.0036	0.0038	0.013	0.013	<0.0005	<0.0005	0.095	0.11	<0.005	<0.005
4/16/07	Upper Flamingo Wash	342	468	210	160	78	127	0.07	0.089	0.017	0.022	0.0056	0.0064	<0.0005	<0.0005	0.210	0.270	0.063	0.096

		Nitrate-N (mg/L)		Ortho-P (mg/L)		Total P (mg/L)		F. Coliform (MPN/100 mL)		F. Strep (MPN/100 mL)	
Date	Basin	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow	Inflow	Outflow
10/18/05	Lower Las Vegas	1.5	1.3	0.156	0.183	0.79	0.72	22,000	30,000	90,000	110,000
6/7/06	Lower Las Vegas	4.6	4.3	0.056	0.37	0.51	0.42	2,400	800	90,000	30,000
10/5/06	Lower Las Vegas	16	1.4	0.36	0.45	0.3	0.34	24,000	3,000	24,000	24,000
10/14/06	Lower Las Vegas	0.9	1.8	0.04	0.03	1.2	1.2	16,000	22,000	110,000	22,000
4/16/07	Lower Las Vegas	1.80	1.80	0.29	0.47	0.4	0.45	50	1,600	24,000	2,400
7/29/05	Meadows Detention Basin	0.15	<0.1	0.015	0.071	0.58	0.55	>1,600,000	>1,600,000	11,000	30,000
10/18/05	Meadows Detention Basin	0.22	0.51	0.072	0.084	0.24	0.38	30,000	>1,600,000	17,000	90,000
10/14/06	Meadows Detention Basin	0.6	0.5	0.22	0.11	0.59	0.28	30,000	50,000	30,000	170,000
10/18/05	Upper Flamingo Wash	0.34	0.61	0.069	0.075	0.29	0.29	500	9,000	28,000	11,000
10/25/05	Upper Flamingo Wash	1.5	1.2	0.102	0.08	0.4	0.3	24,000	2,400	9,000	5,000
7/18/06	Upper Flamingo Wash	2.7	1.2	0.22	0.02	1.7	0.19	2,400	160,000	500	90,000
10/14/06	Upper Flamingo Wash	0.8	0.5	0.26	0.11	1	0.75	17,000	50,000	30,000	5,000
4/16/07	Upper Flamingo Wash	2.2	3.0	0.58	0.41	0.89	0.88	1,600	300	30,000	17,000

Assumptions: concentrations reported as less than the method detection limit were assumed to be equal to the method detection limit for statistical analyses.

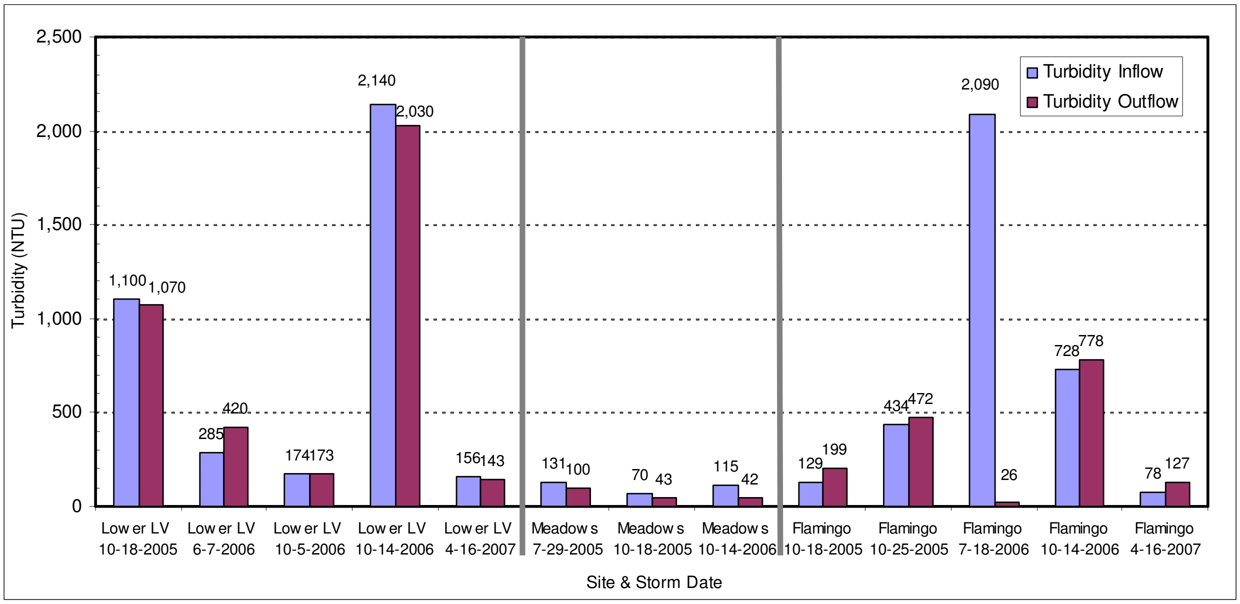


Figure 4. Turbidity Bar Chart

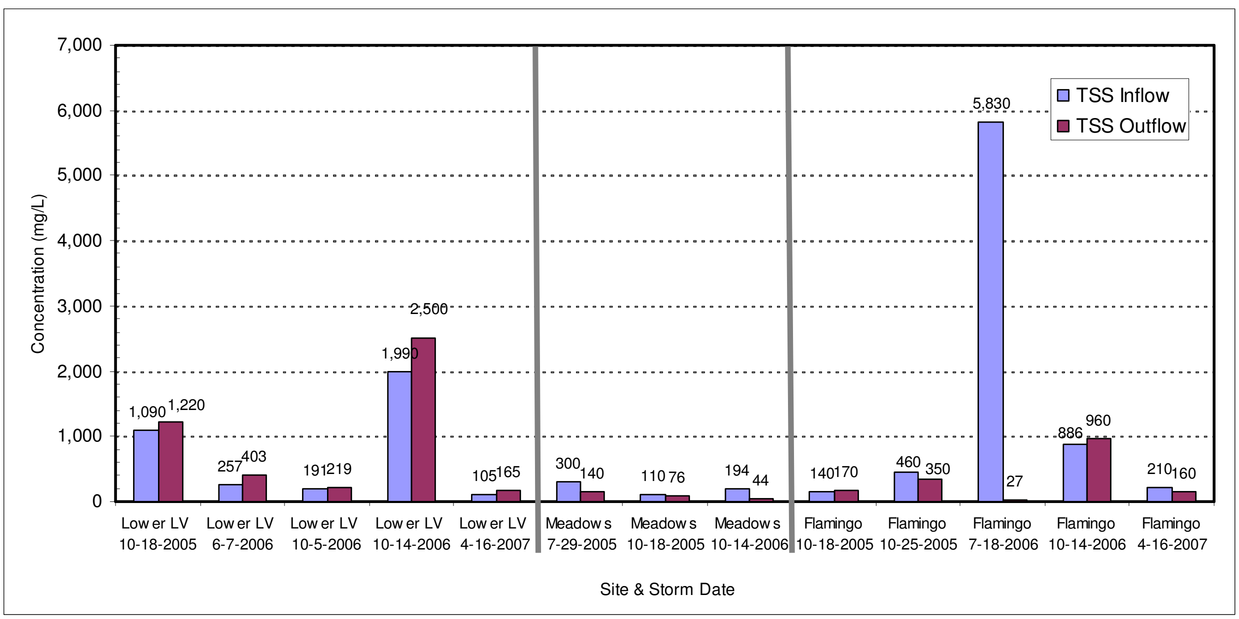


Figure 5. TSS Bar Chart

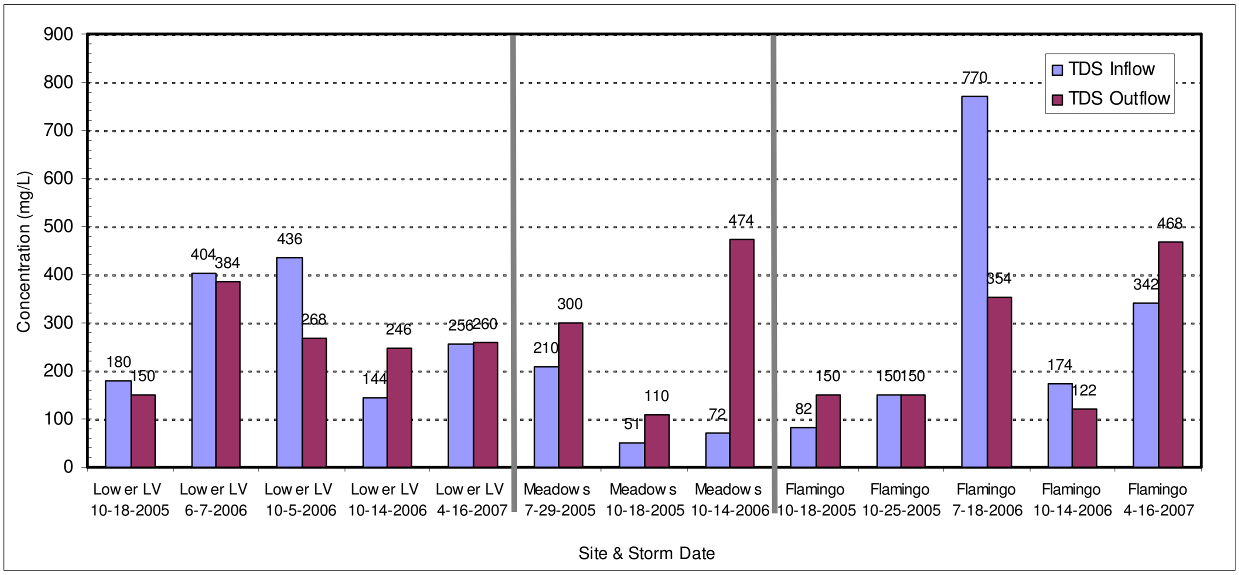


Figure 6. TDS Bar Chart

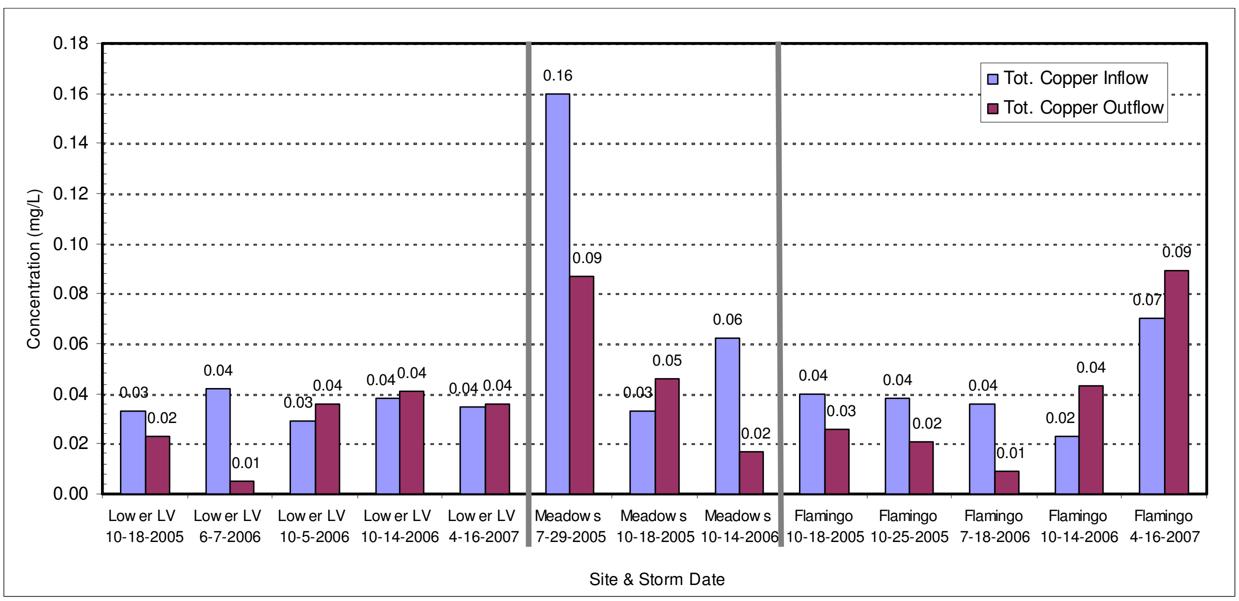


Figure 7. Total Copper Bar Chart

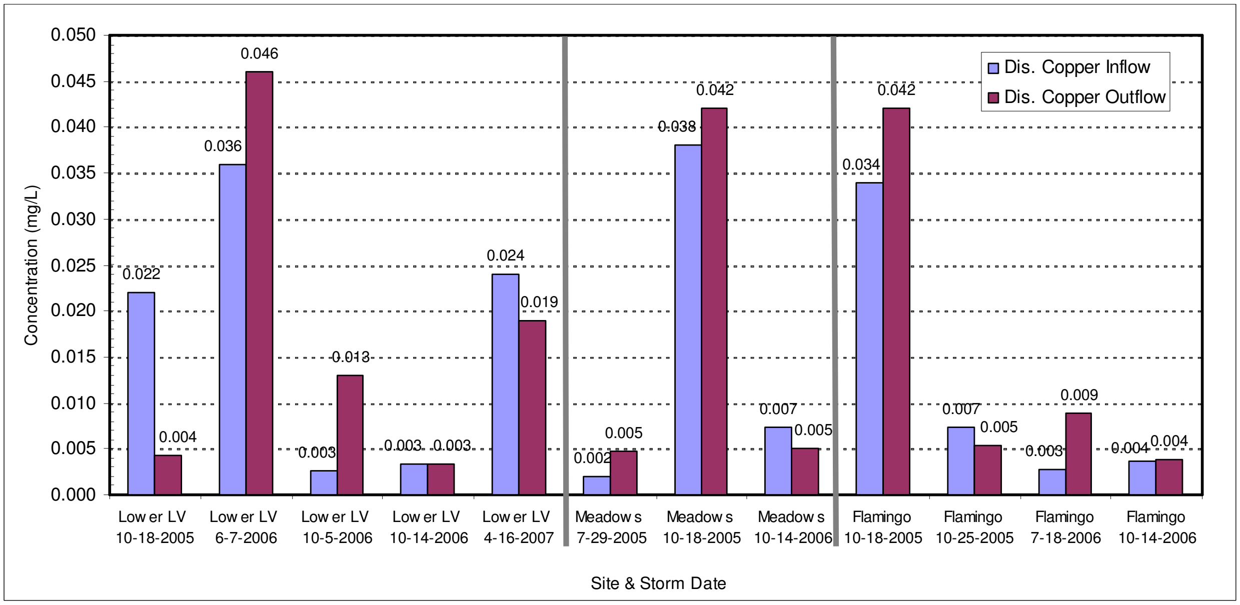


Figure 8. Dissolved Copper Bar Chart

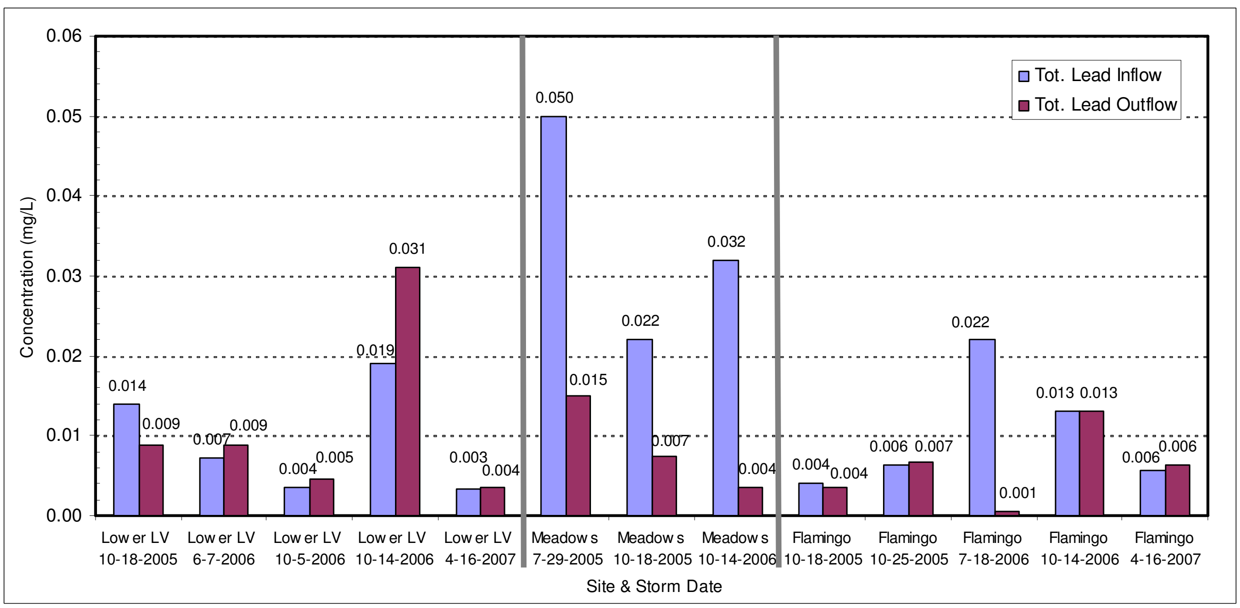


Figure 9. Total Lead Bar Chart

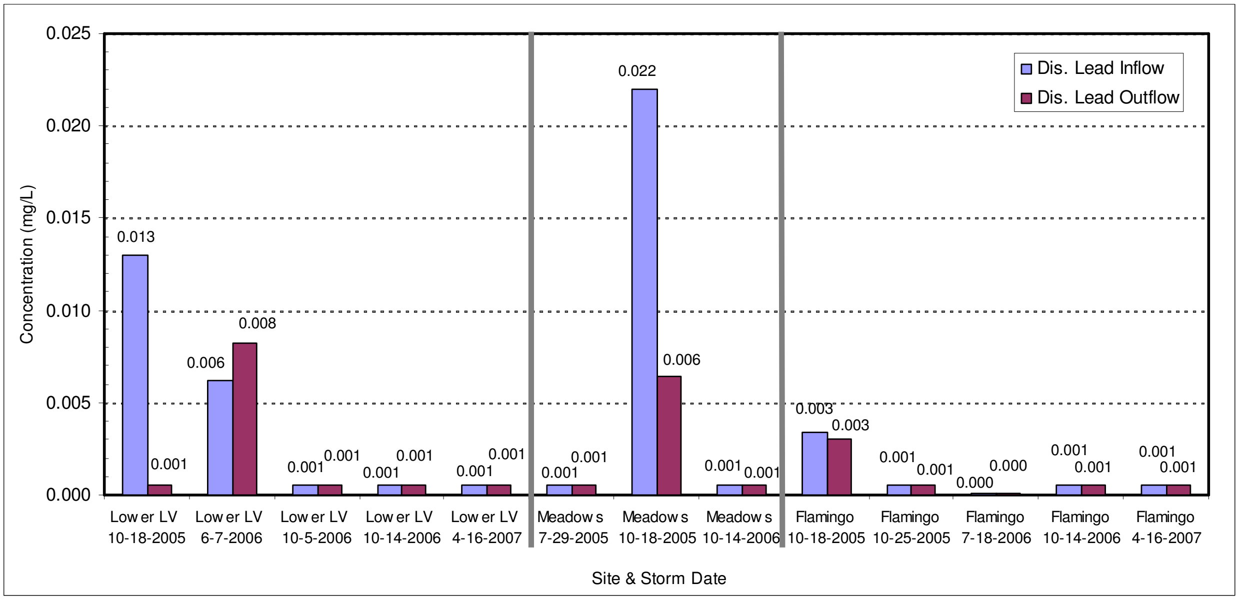


Figure 10. Dissolved Lead Bar Chart

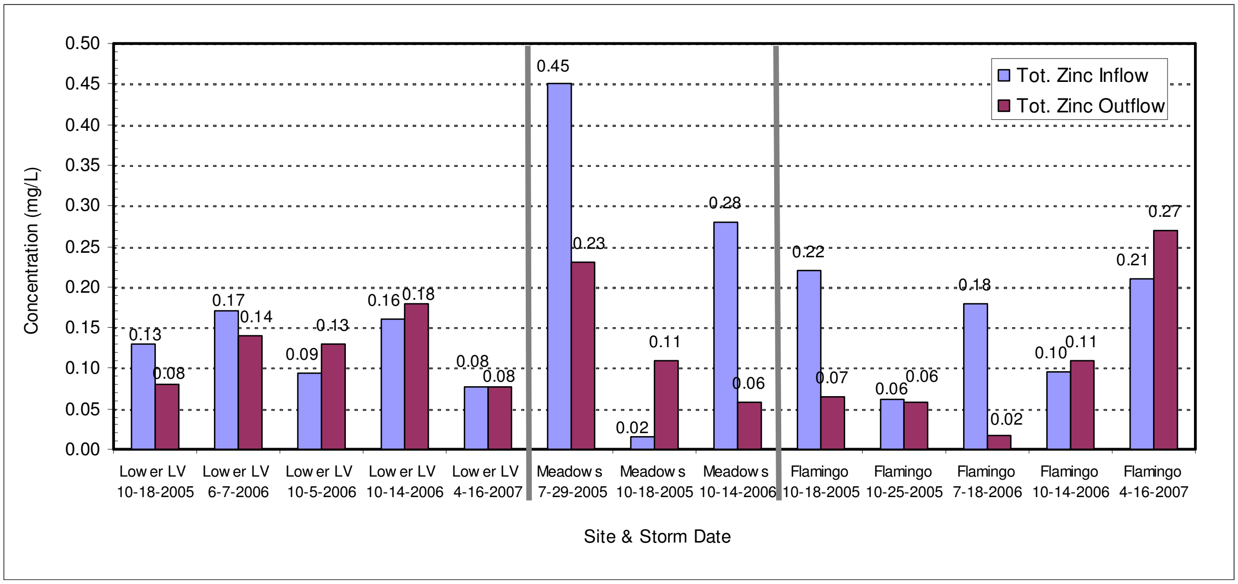


Figure 31. Total Zinc Bar Chart

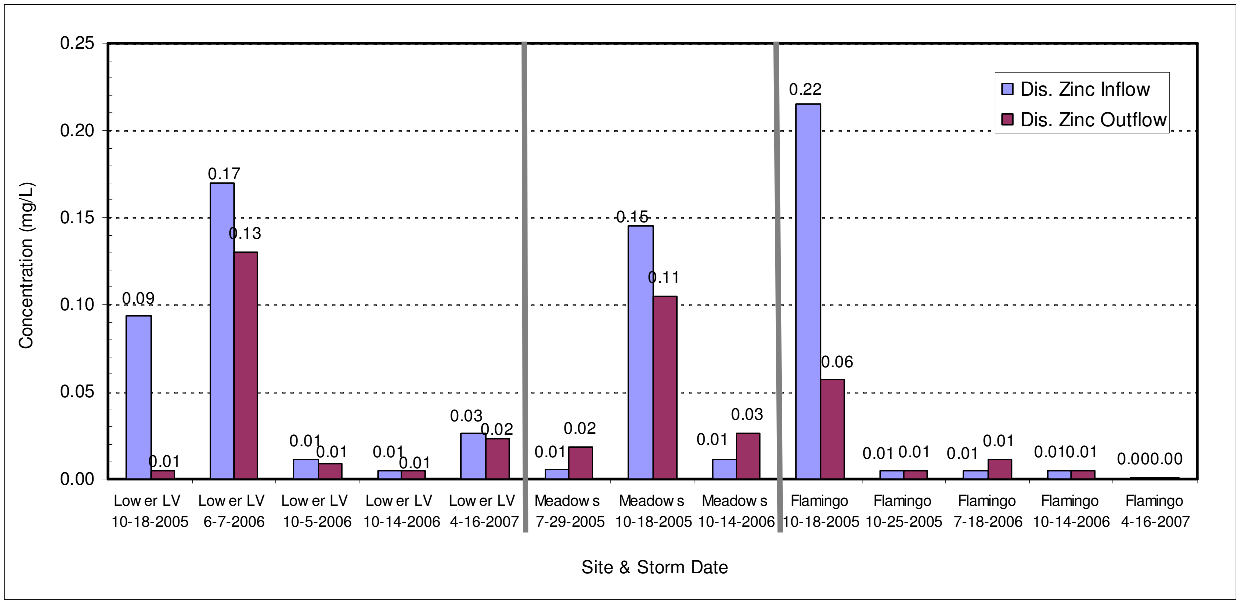


Figure 42. Dissolved Zinc Bar Chart

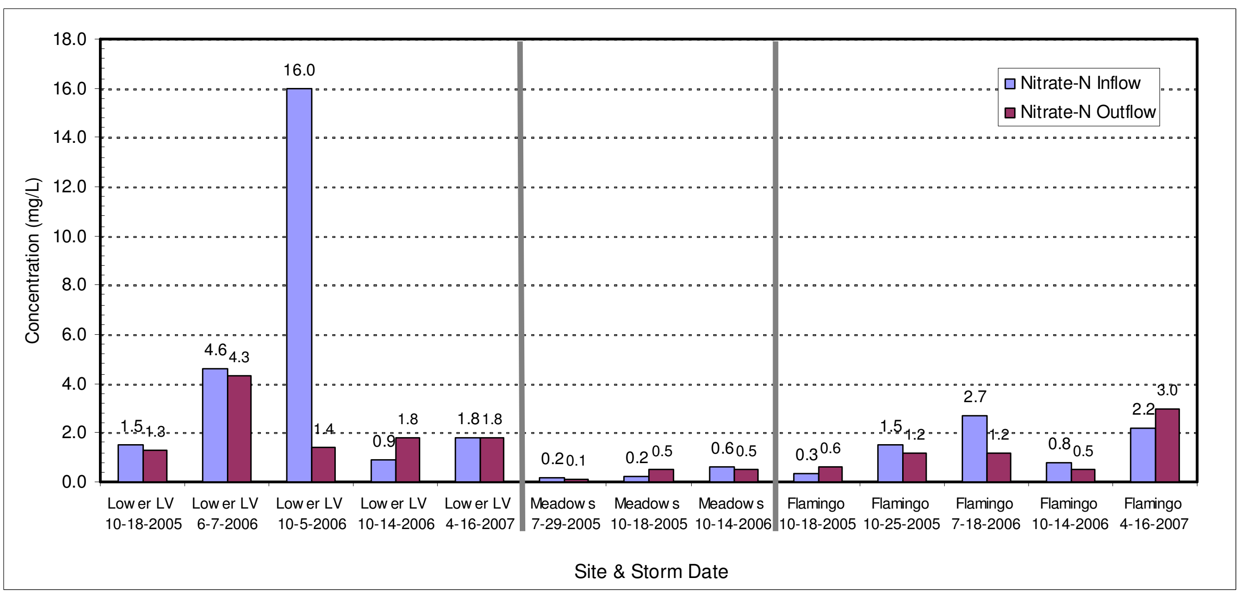


Figure 53. Nitrate-N Bar Chart

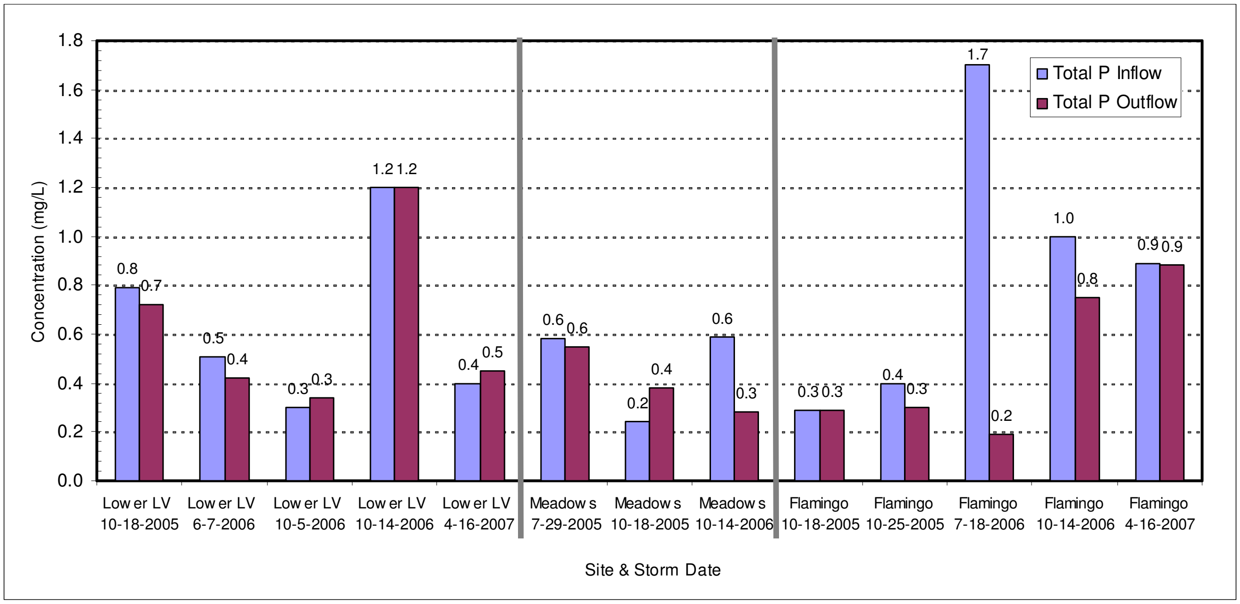


Figure 64. Total Phosphorus Bar Chart

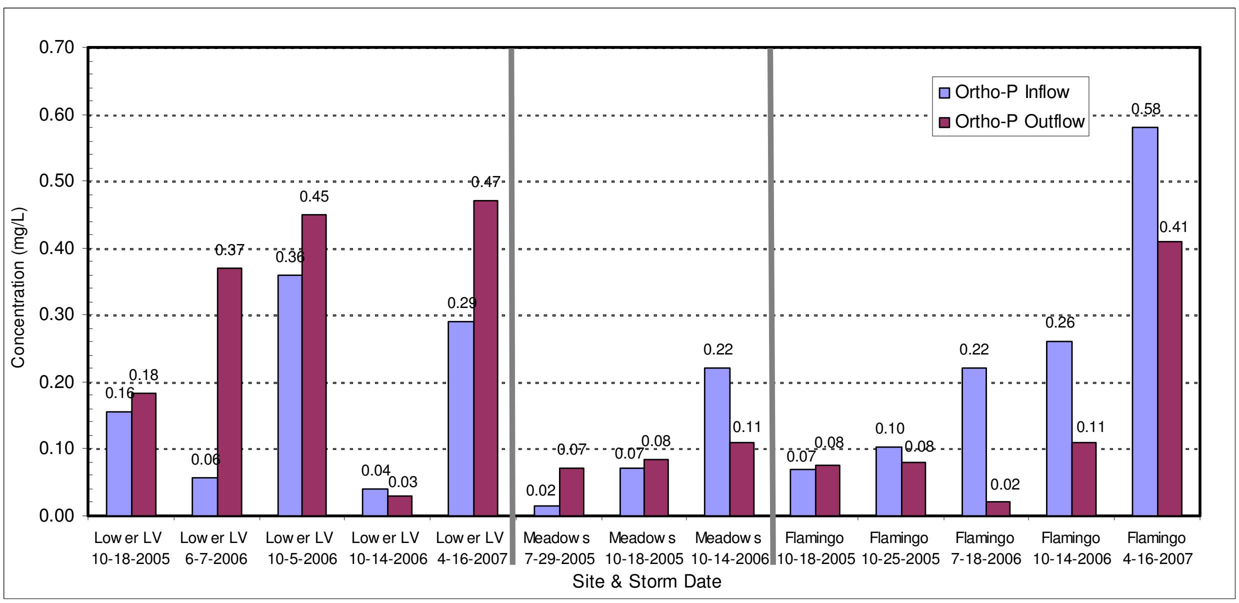


Figure 75. Orthophosphorus-P Bar Chart

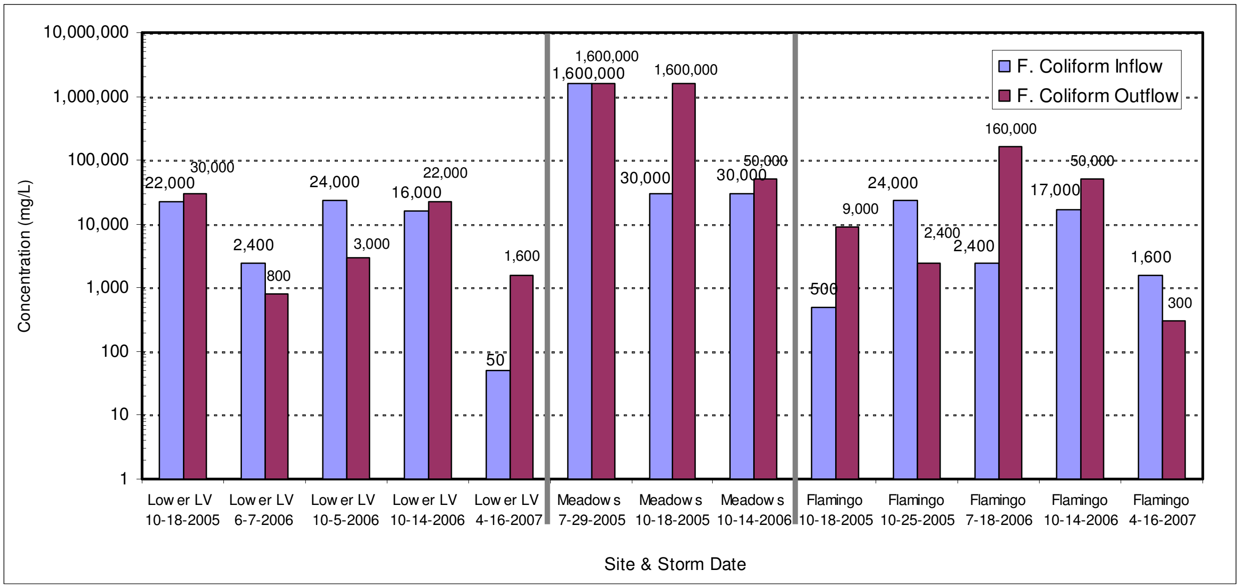


Figure 86. Fecal Coliform Bar Chart

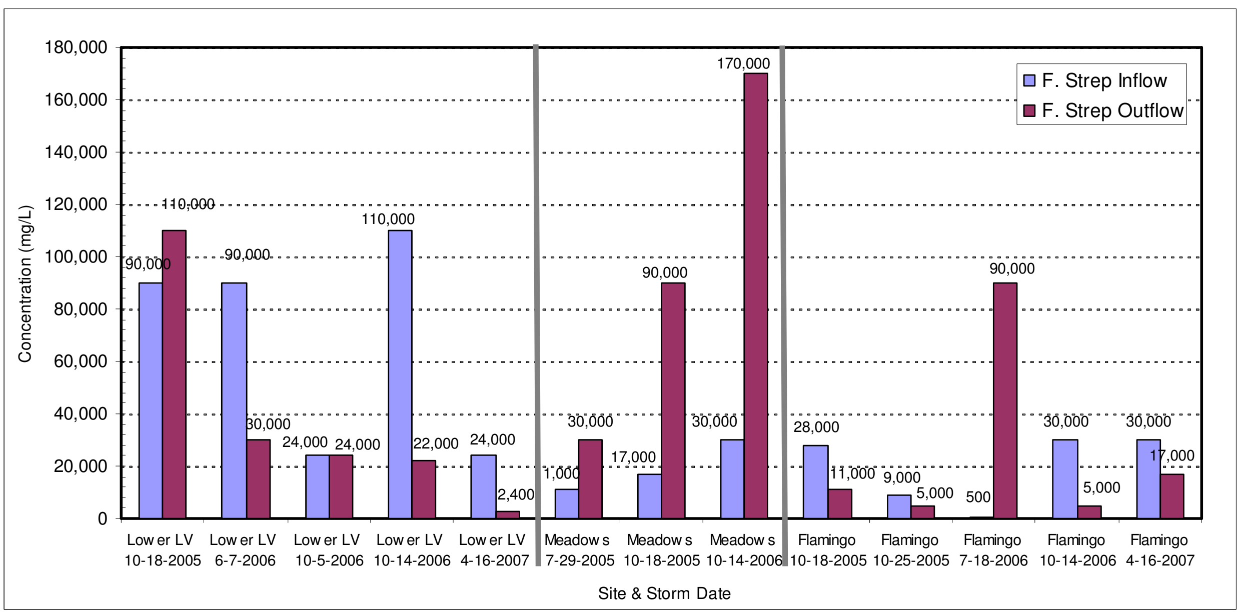


Figure 97. Fecal Streptococcus Bar Chart

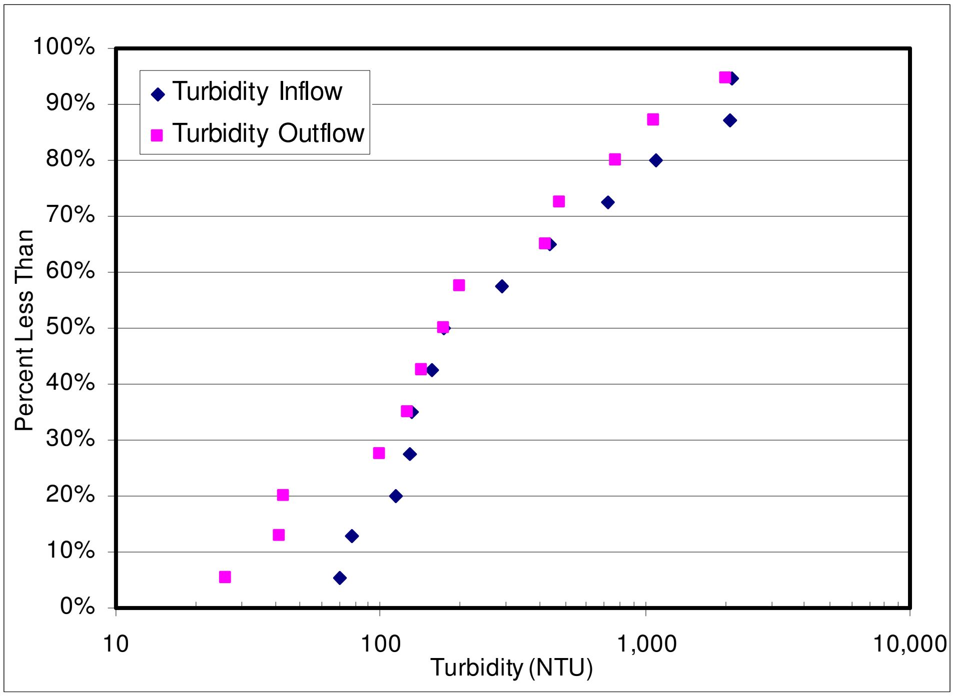


Figure 108. Turbidity Probability Plot

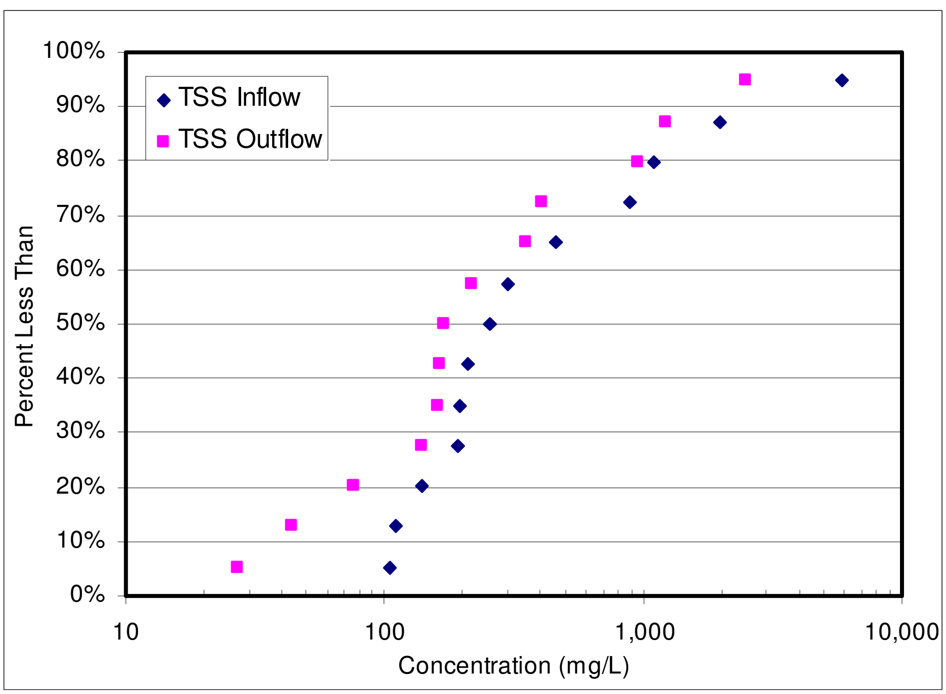


Figure 119. TSS Probability Plot

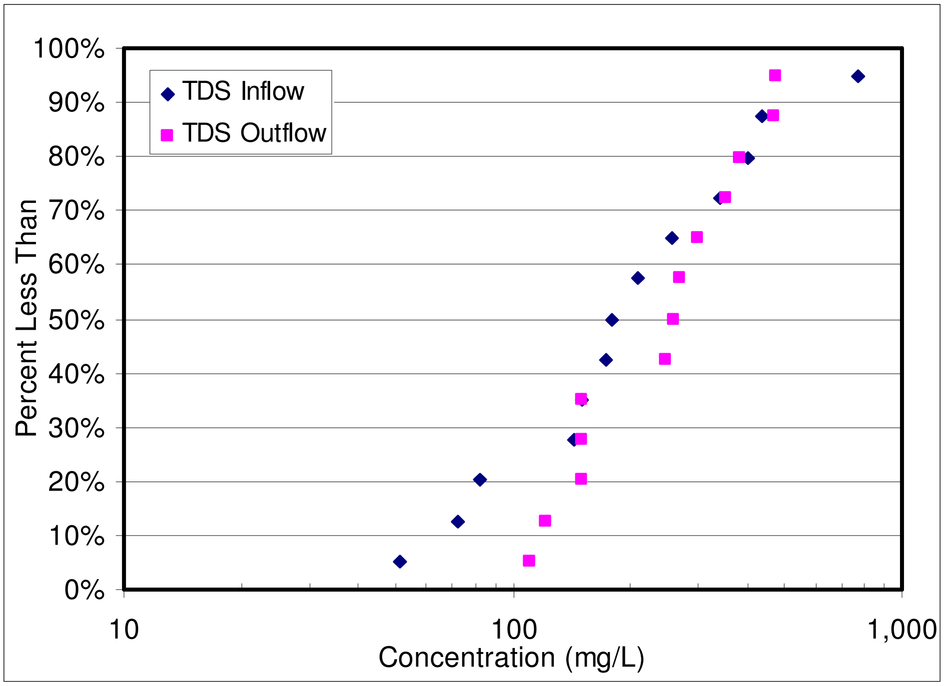


Figure 20. TDS Probability Plot

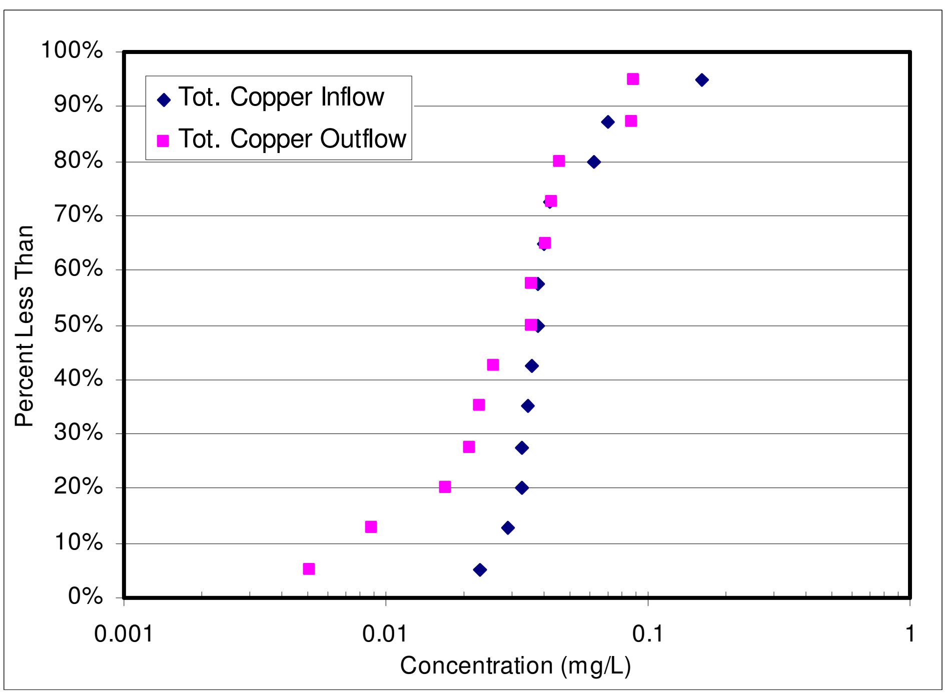


Figure 121. Total Copper Probability Plot

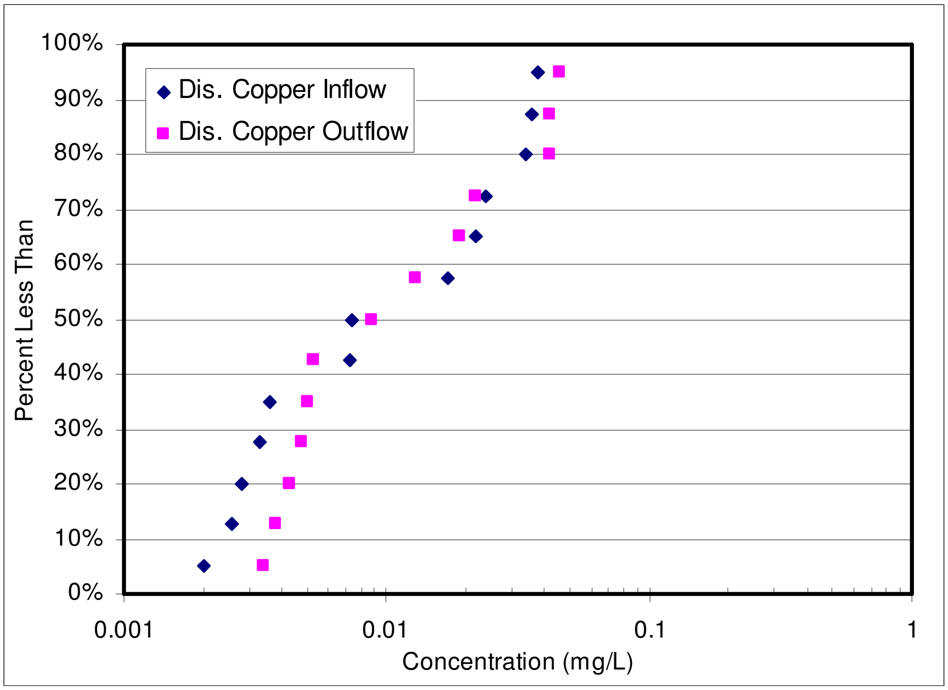


Figure 132. Dissolved Copper Probability Plot

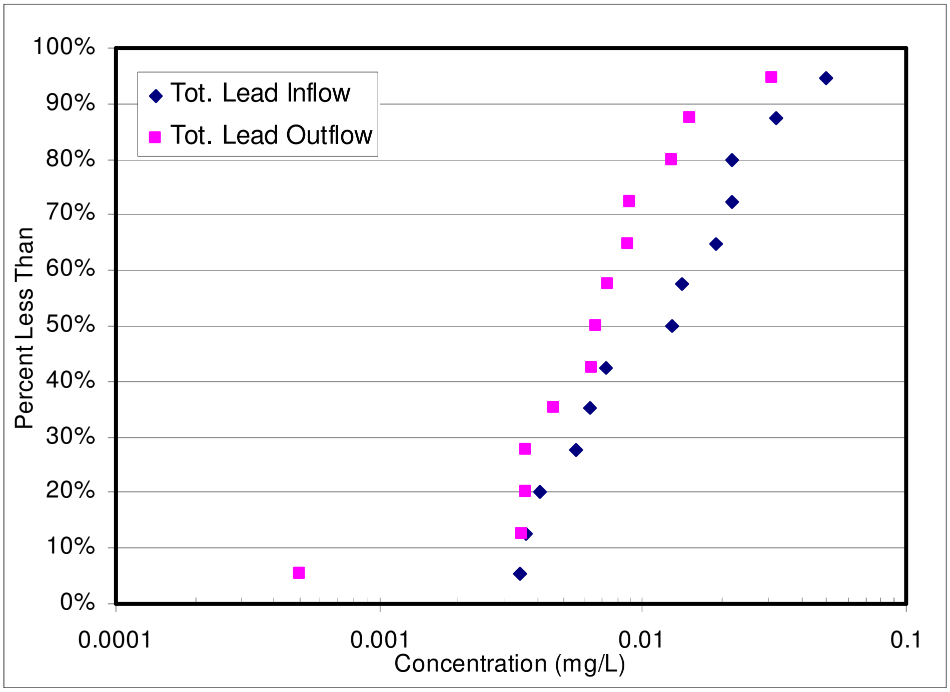


Figure 143. Total Lead Probability Plot

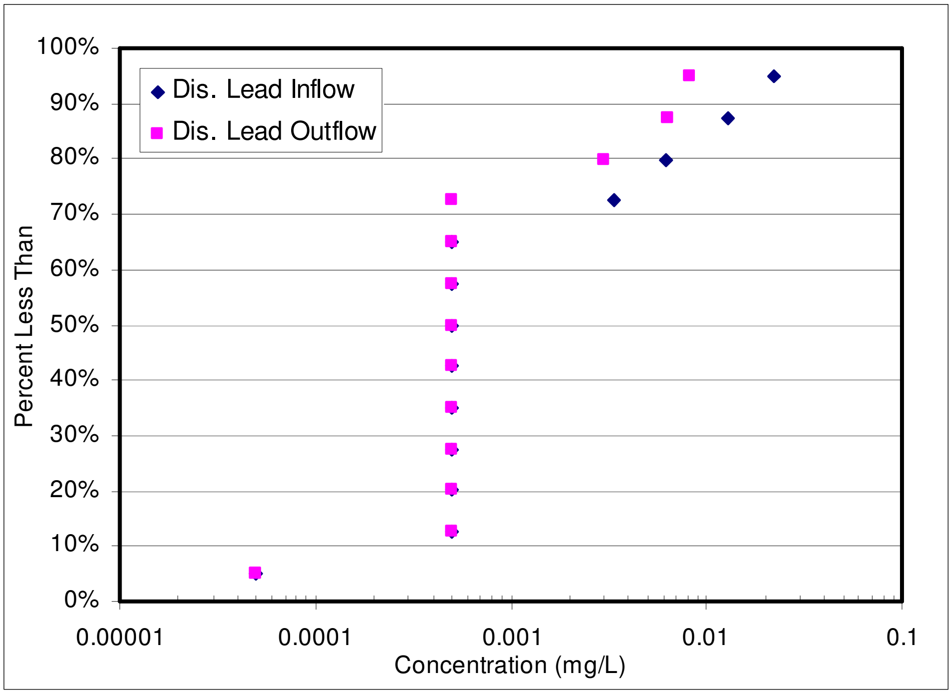


Figure 154. Dissolved Lead Probability Plot

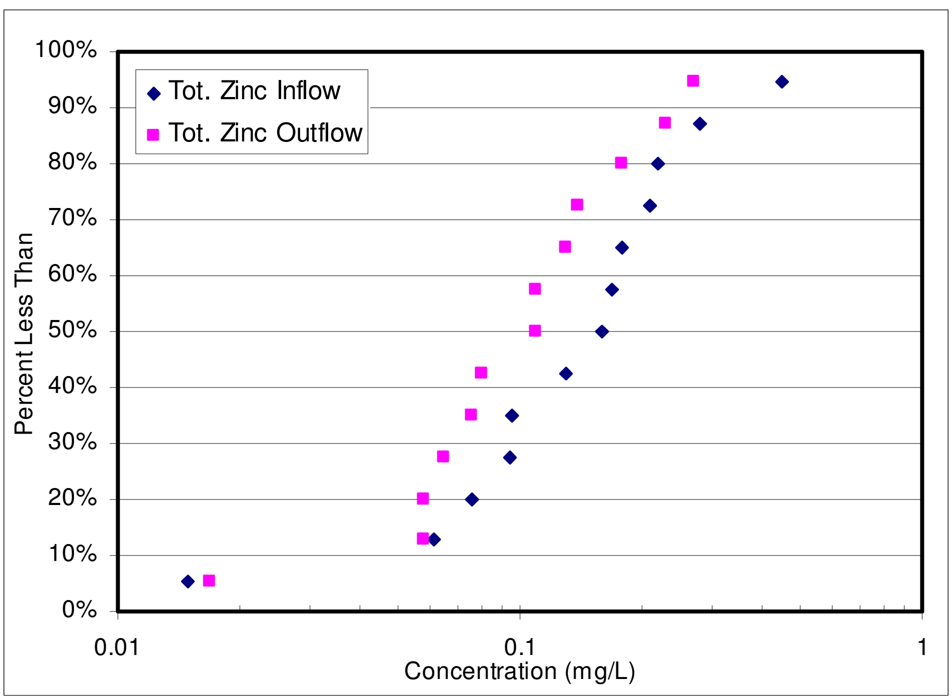


Figure 165. Total Zinc Probability Plot

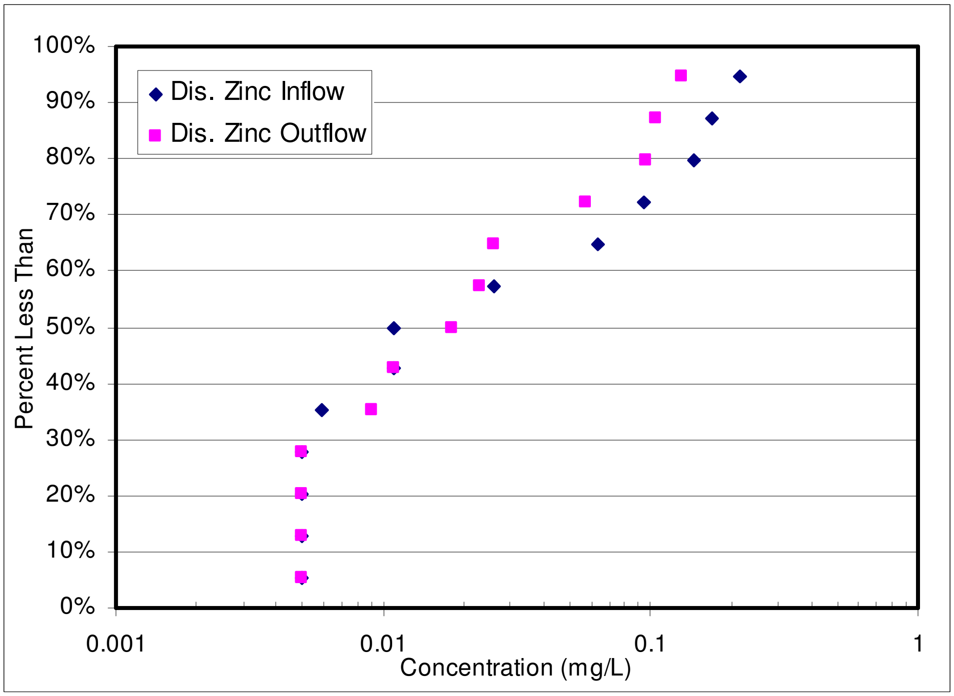


Figure 176. Dissolved Zinc Probability Plot

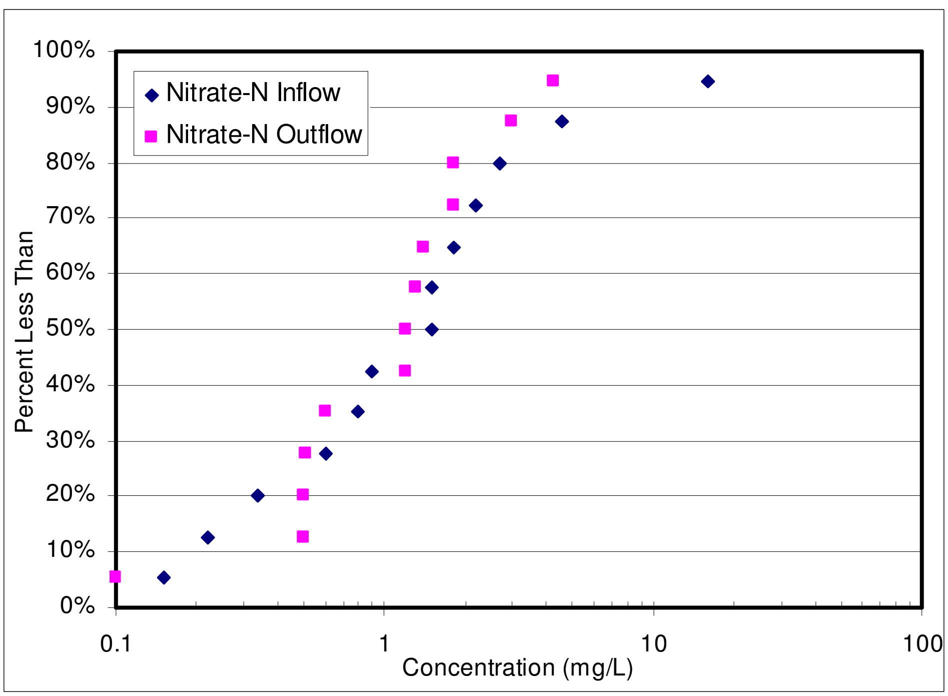


Figure 187. Nitrate-N Probability Plot

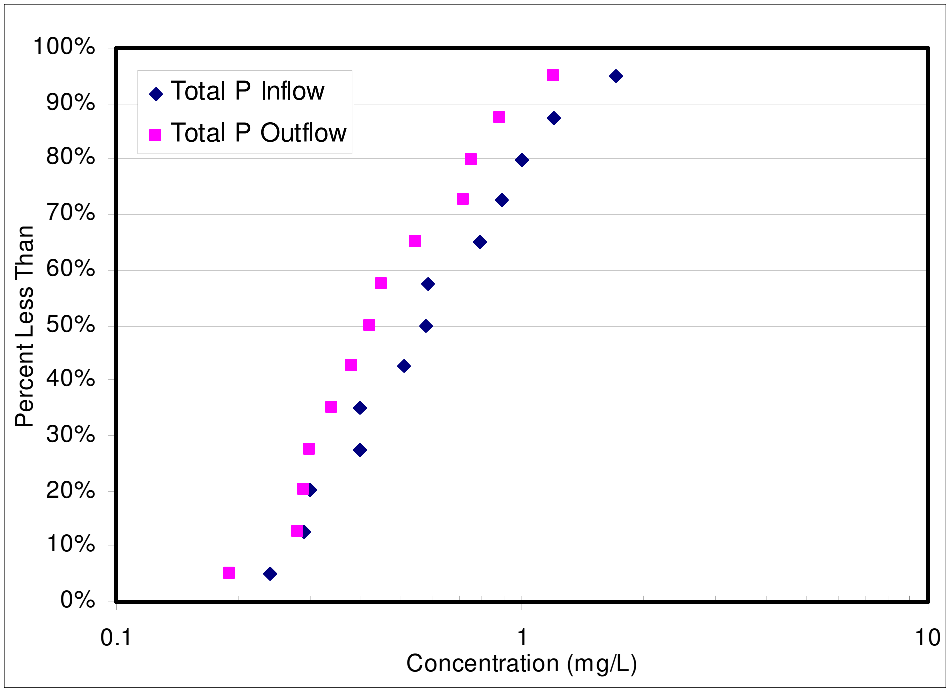


Figure 198. Total Phosphorus Probability Plot

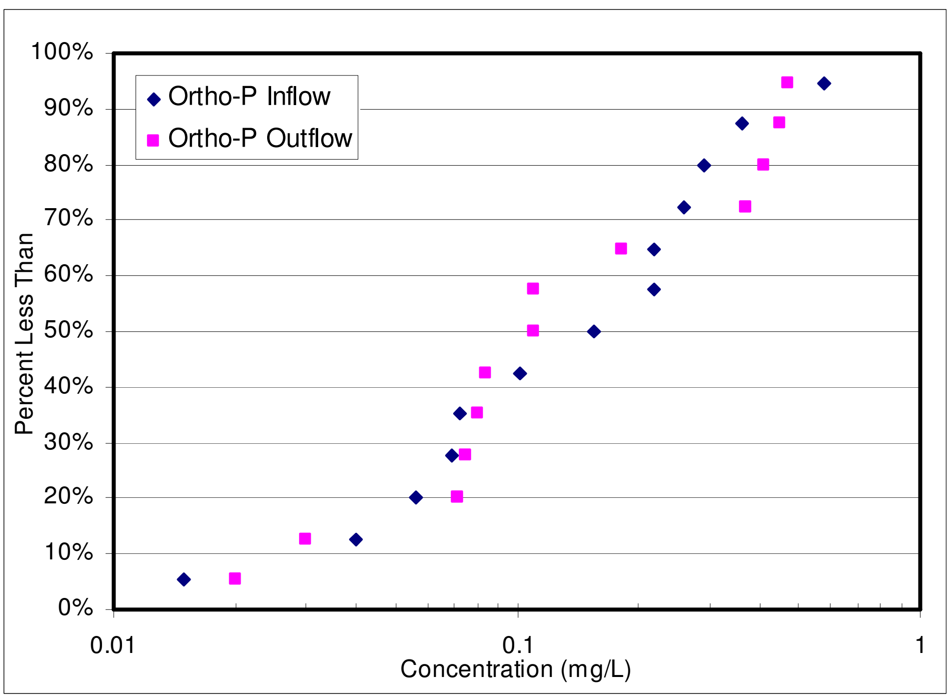


Figure 209. Orthophosphorus-P Probability Plot

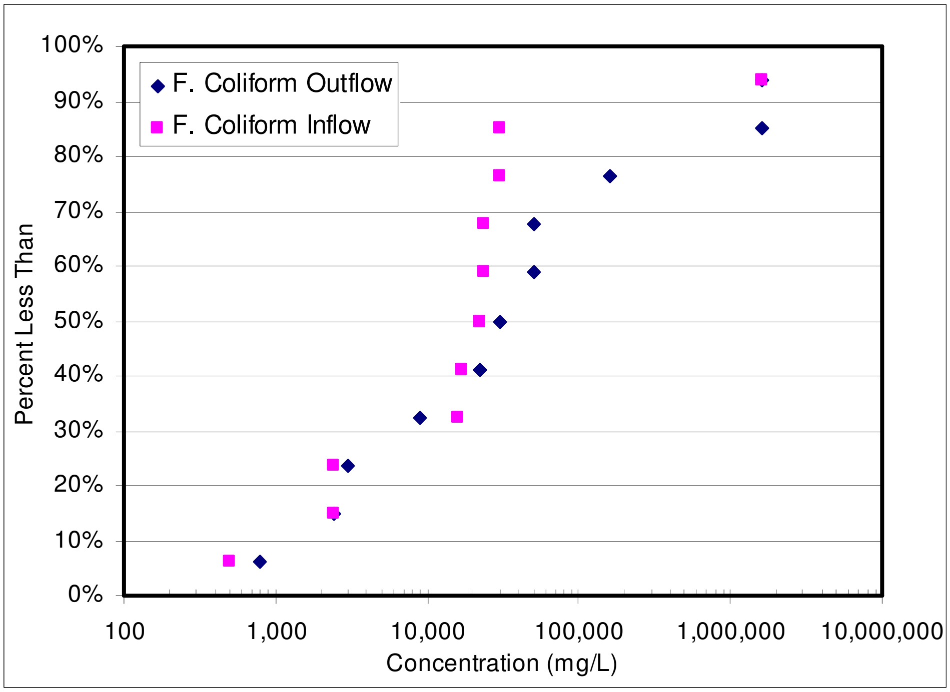


Figure 30. Fecal Coliform Probability Plot

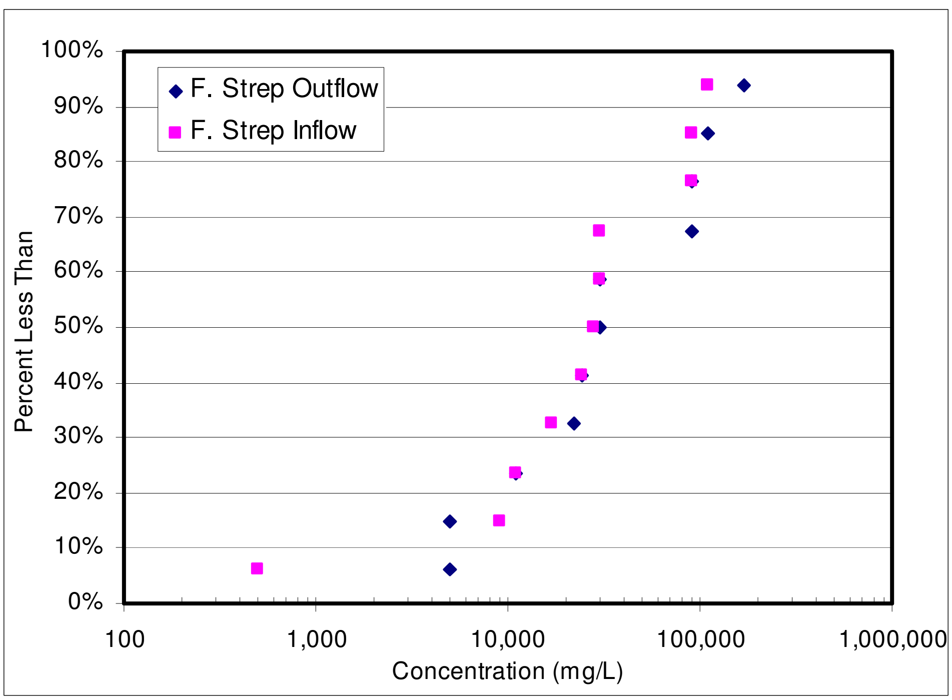


Figure 211. Fecal Streptococcus Probability Plot

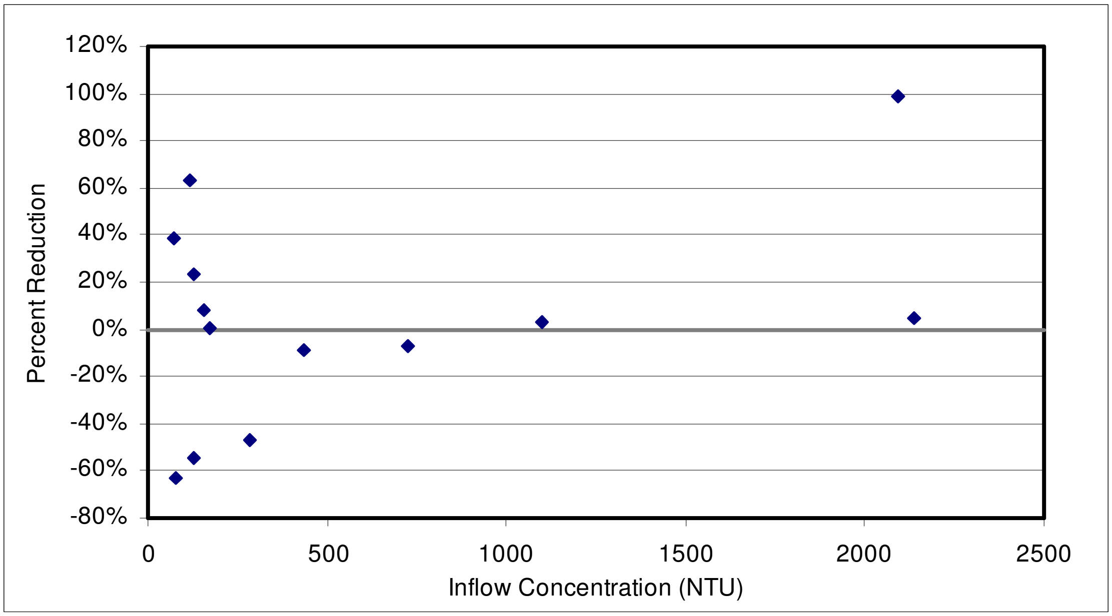


Figure 32. Turbidity Change Scatter Plot

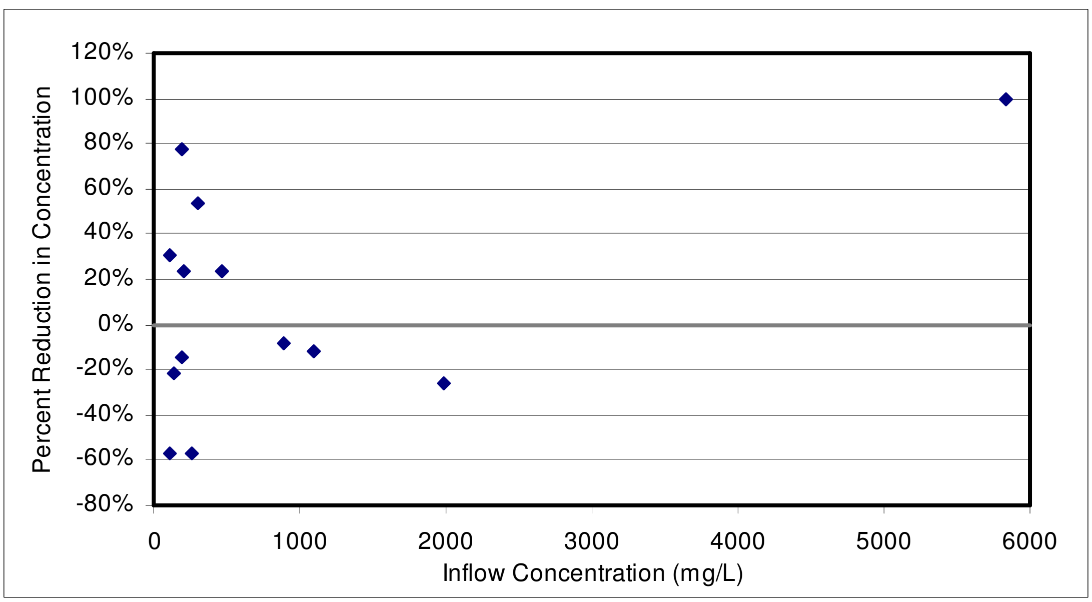


Figure 33. TSS Concentration Change Scatter Plot

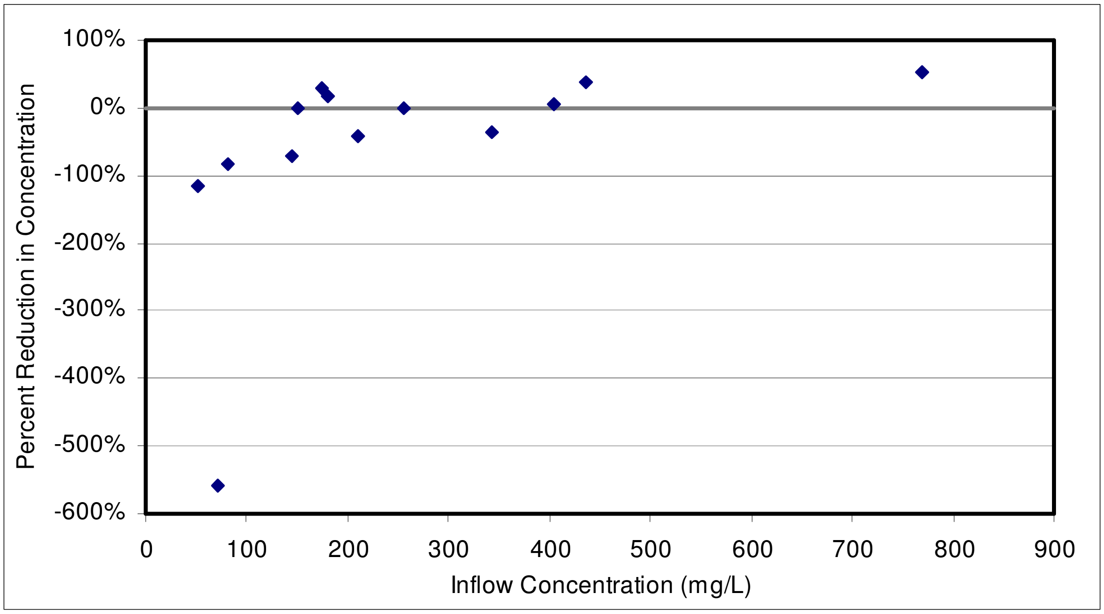


Figure 34. TDS Concentration Change Scatter Plot

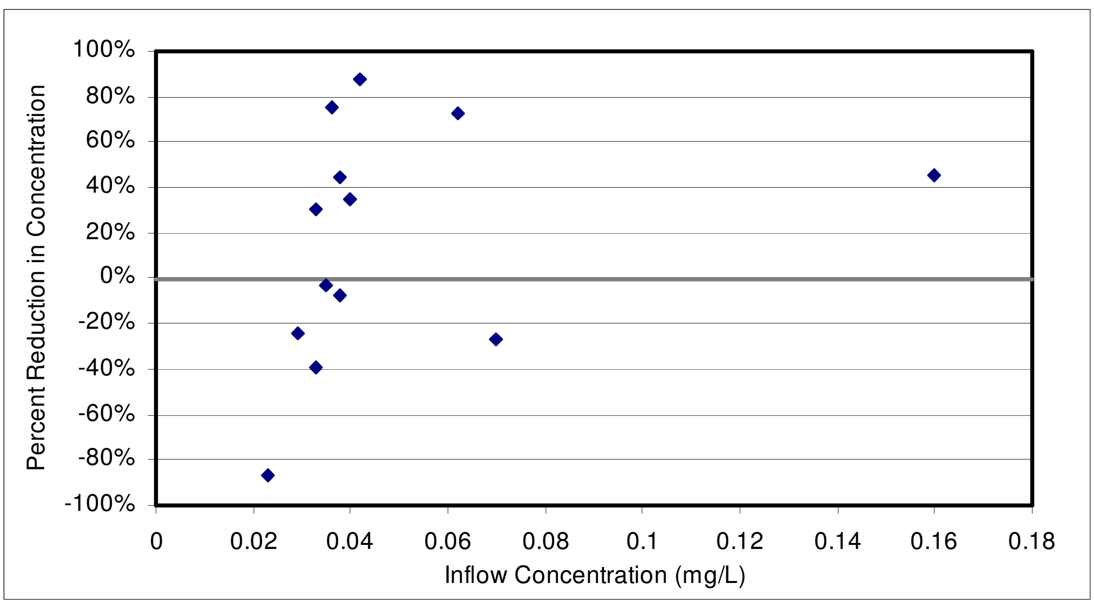


Figure 35. Total Copper Concentration Change Scatter Plot

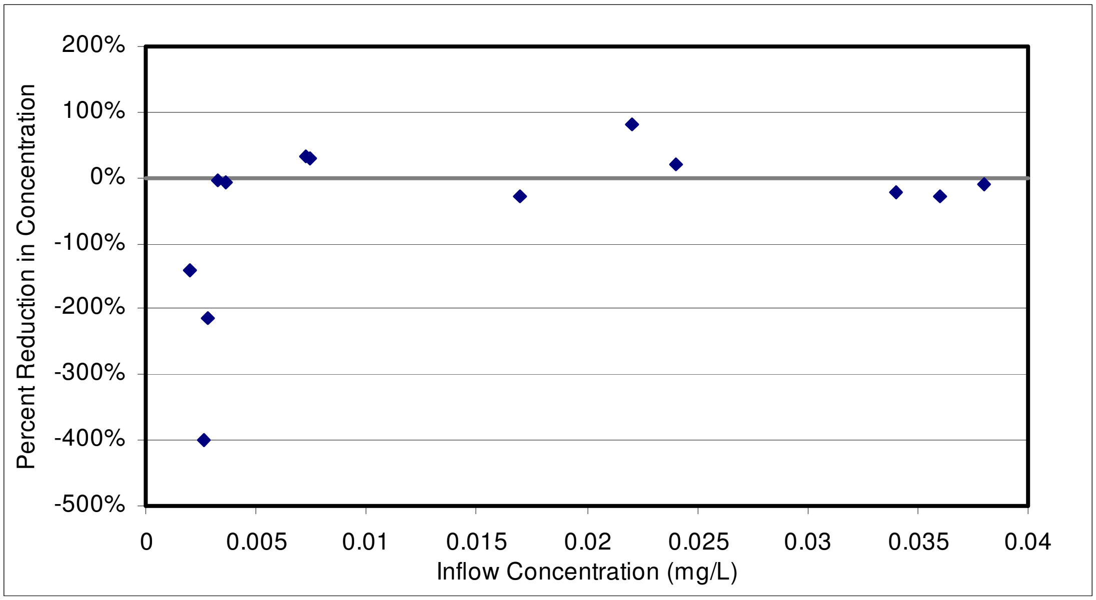


Figure 36. Dissolved Copper Concentration Change Scatter Plot

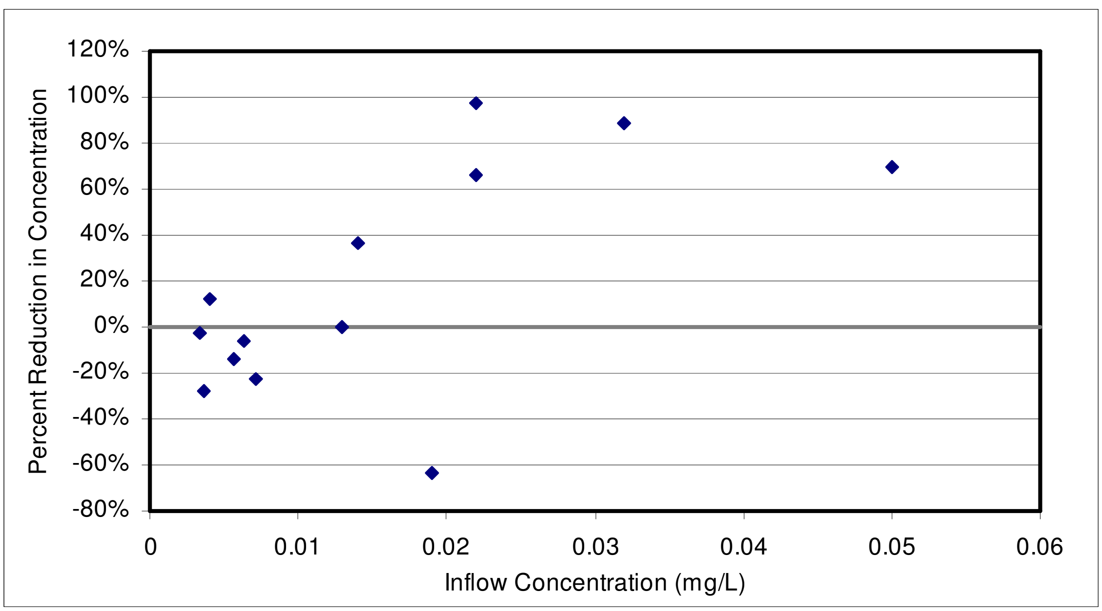


Figure 37. Total Lead Concentration Change Scatter Plot

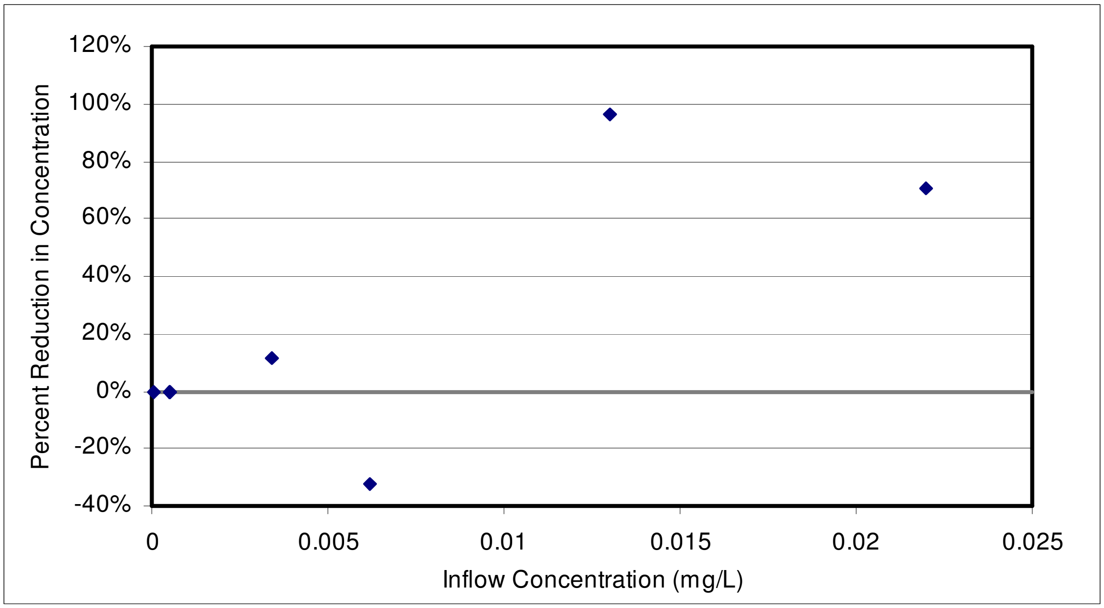


Figure 38. Dissolved Lead Concentration Change Scatter Plot

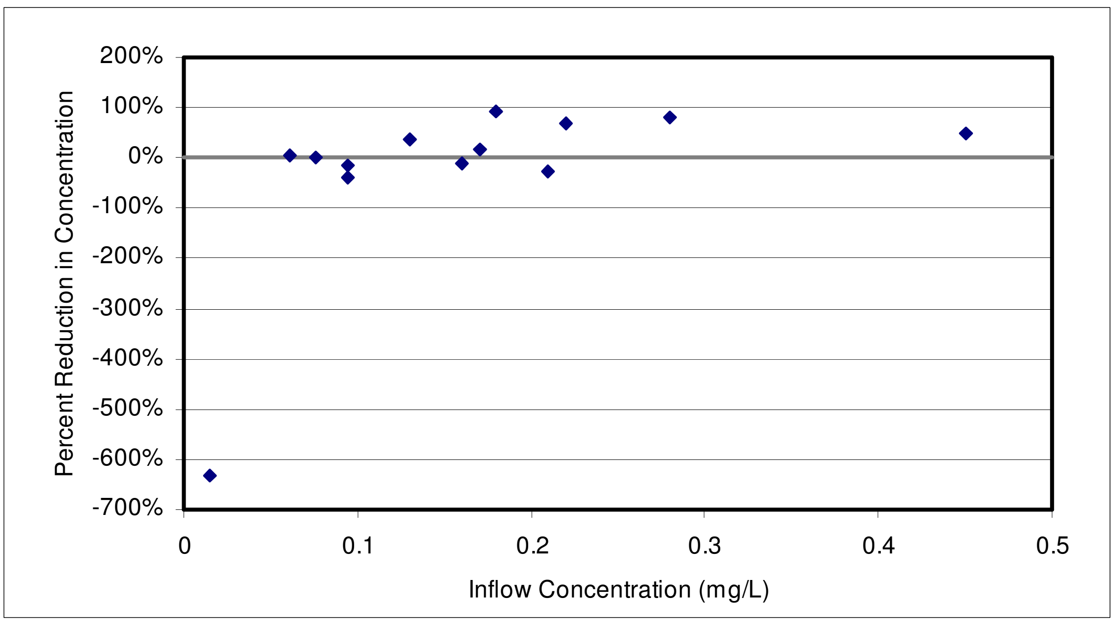


Figure 39. Total Zinc Concentration Change Scatter Plot

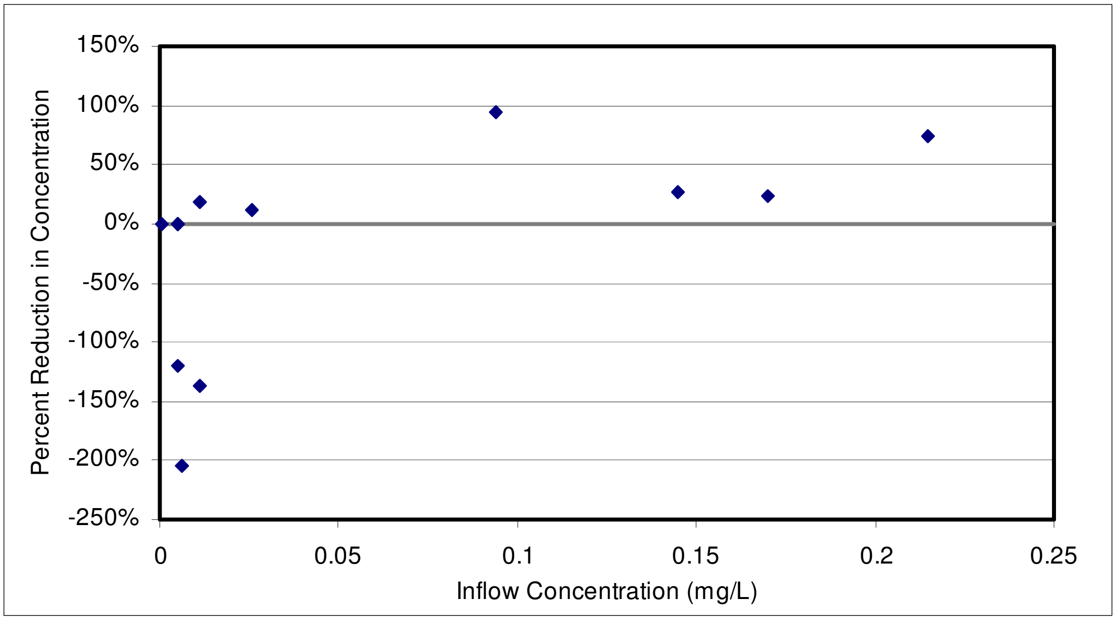


Figure 40. Dissolved Zinc Concentration Change Scatter Plot

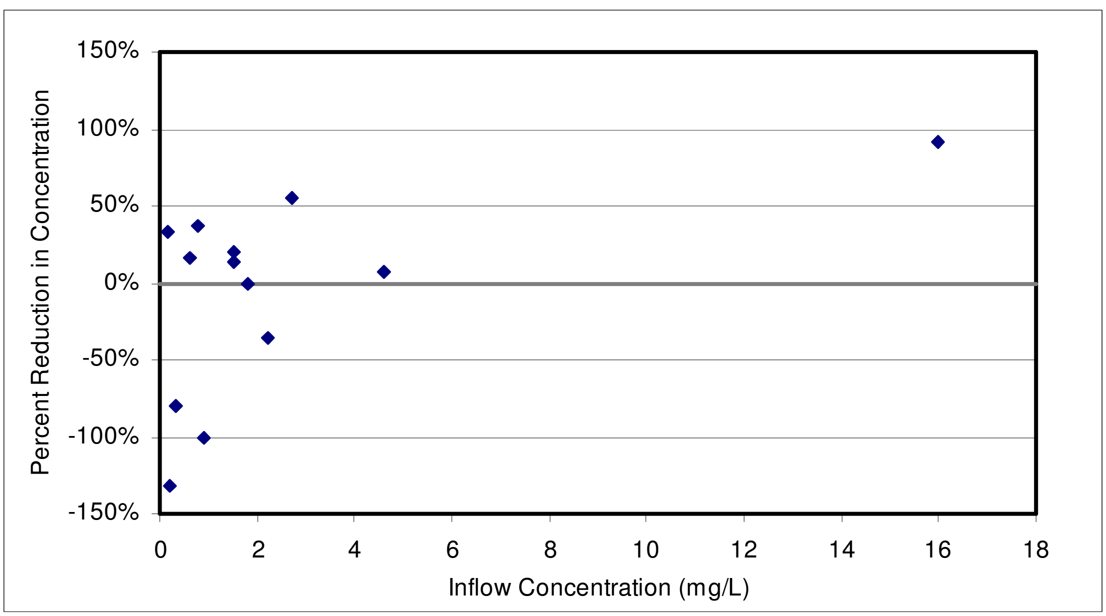


Figure 41. Nitrate-N Concentration Change Scatter Plot

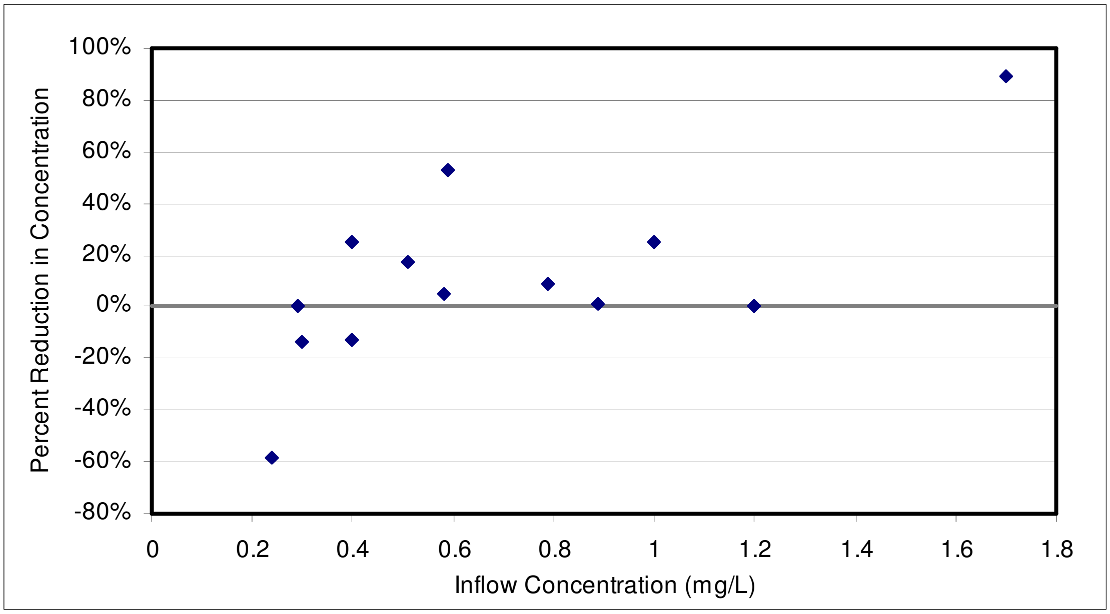


Figure 42. Total Phosphorus Concentration Change Scatter Plot

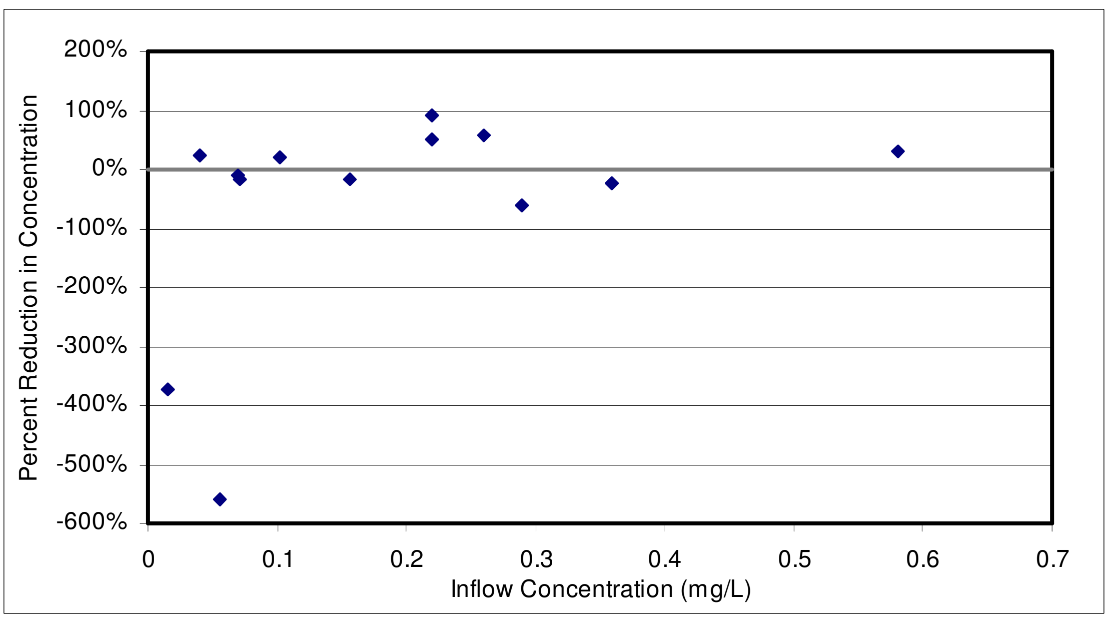


Figure 43. Orthophosphorus-P Concentration Change Scatter Plot

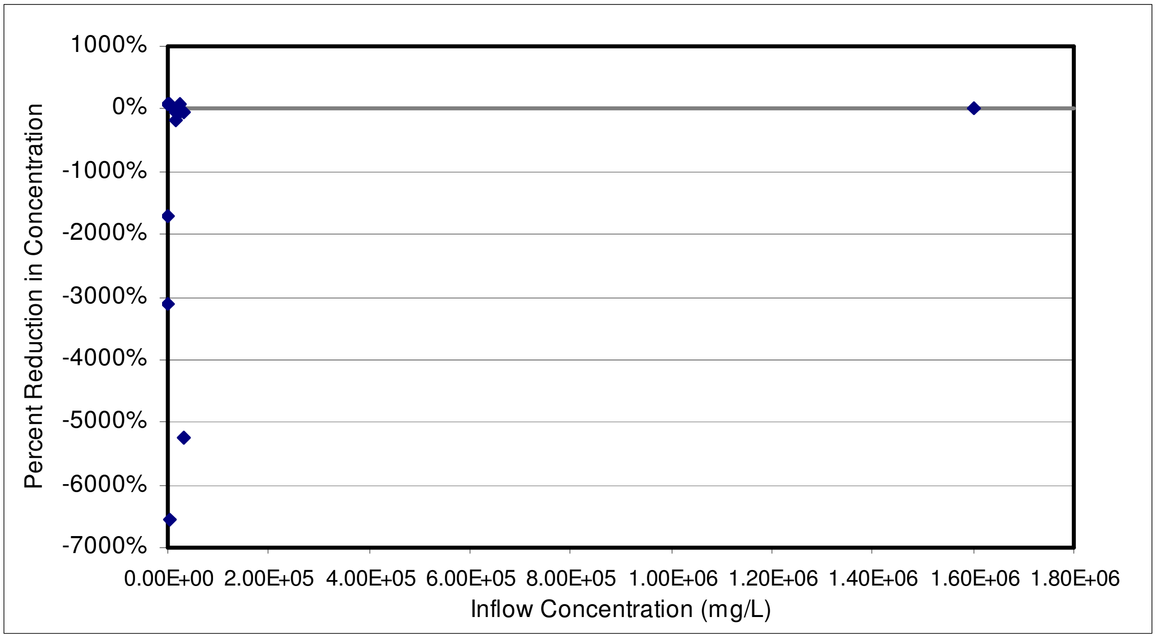


Figure 44. Fecal Coliform Concentration Change Scatter Plot

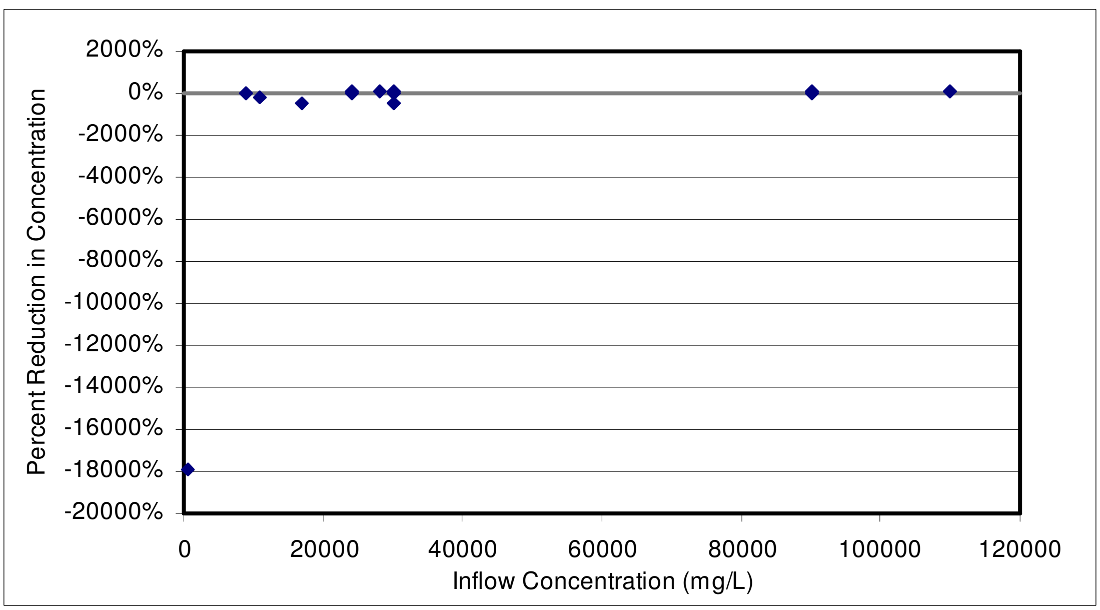


Figure 45. Fecal Streptococcus Concentration Change Scatter Plot

Appendix G

APPENDIX G

PUBLIC OUTREACH AND EDUCATION PROGRAM

Survey Purpose

An important component of the Clark County Regional Flood Control District's Public Information Program is evaluation. In October 1999 the District conducted its first flood awareness study to measure citizen awareness of the dangers of flash flooding in Clark County. The survey has been replicated during the month of October every year since 1999.

The 2006 survey was administered to 790 randomly selected residents of Clark County by UNLV's Cannon Survey Center. The margin of error for the study is + / - 3.49%. The core of the study remained the same and longitudinal comparisons have been conducted. Ten percent of the surveys were conducted in Spanish. There were some additional topical areas added this year (urban runoff drains into Lake Mead and a more in depth evaluation of behavior changes and willingness to change a behavior as a result of knowing this. The survey collected data on the following topics:

- Awareness of flash flooding in the Las Vegas Valley.
- General knowledge of various subjects related to flash flooding.
- Sources of flash flooding education and information.
- Behavior and tendencies when encountering a flooded street or road in the Las Vegas Valley
- Knowledge of availability and other flood insurance issues
- Demographic profile of respondents who have watched The Flood Channel
- Knowledge of urban runoff and assessment of behavior changes.
- Opinion of how well flood control is being handled in the Las Vegas Valley.

REGIONAL FLOOD CONTROL DISTRICT

CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT

2006 FLOOD AWARENESS SURVEY SUMMARY SHEET

Characteristics of the Sample

As in previous administrations of the survey, five demographic variables were used to create the sub-sets for data analysis. They are "area of Clark County respondent resides in," "length of time in Clark County," "age," "level of education" and "gender." According to the Nevada State Demographer the total population of Clark County is in excess of 1.8 million.

LENGTH OF TIME LIVING IN CLARK COUNTY

3% Less than 6 months
4% 6 months to less than 1 year
10% 1 year to less than 3 years
15% 3 years to less than 6 years
17% 6 years to less than 10 years
51% More than 10 years

AGE OF RESPONDENT

7% 18 – 24 years old
31% 25 – 44 years old
36% 45 – 64 years old
26% 65+ years old

GENDER

48% Male
52% Female

EDUCATION

8% Less than high school
30% High school graduate
17% Some college no degree
15% Two year college degree
17% Four year college degree
3% Some post graduate work
10% Graduate/professional degree

Knowledge of Various Subjects Relating to Flash Flooding

Flood Related Issue	% Agree 2006	% Agree 2005
I know about the dangers of flash flooding	95%	95%
I know about the time of year flash flooding is most likely to occur in the area	81%	81%
I know about safety precautions relating to flash flooding	87%	83%
I know about the resources available to learn more about flash flooding	56%	56%
I know ways in which flooding is being controlled in the area	73%	69%
I know about the availability of flood insurance	74%	75%

FUTURE STEPS

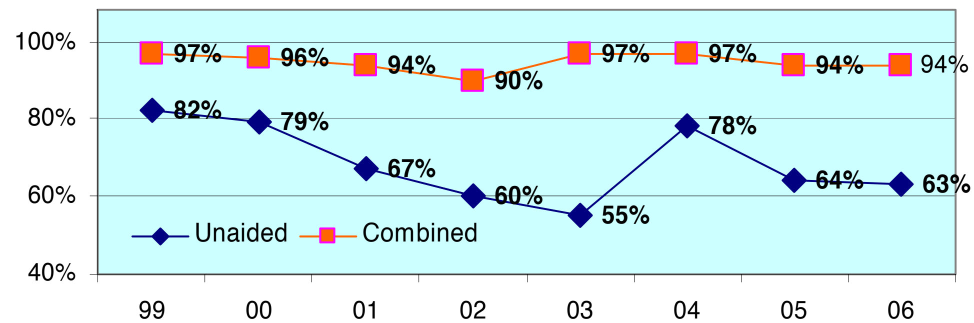
- One constant has been the significant importance of television in conveying flood safety information. Rain in the desert brings strong news coverage. Continued outreach and education efforts using the news medium are warranted and based on survey trends since 1999.
- The data continues to indicate that there is a high level of awareness (when combing unaided and aided results) among residents of Clark County regarding the dangers of flash flooding; overall, 94% of respondents were aware that flash flooding can occur in Clark County. Moreover, 2006 data shows that 98% of respondents who have lived in Clark County longer than 10 years are aware of the dangers. The data suggests that District's educational message regarding flash flooding does increase awareness; this is substantiated by the high percentage of respondents who are aware of flash flooding.
- The Hispanic population in the Las Vegas Valley grows twice as fast as the total population and is expected to be nearly 600,000 by the year 2010.[1] This will represent 28% of the population of Clark County. With such rapid growth of this segment of the population it is important to continue providing public information to the Hispanic population. In doing so the Hispanic population is best reached via television. The survey shows that 89% of the respondents that we spoke to learned about flash flooding from television.

1 Source: Nevada State Demographer

AWARENESS OF FLOODING IN CLARK COUNTY

When looking at the total number of respondents in both the unaided/unprompted ("What types of weather related natural dangers are you aware of that occur in Clark County?"), and prompted/aided questions ("Are you aware that flash flooding can occur here in Clark County?"), 94% of the sample was aware of flooding as a weather related natural danger. The chart below displays the data collected from 1999 to 2005 relating to flood awareness among Clark County residents.

FLOOD AWARENESS YEARLY COMPARISION 1999-2005 AMONG CLARK COUNTY RESIDENTS



PROGRAM RECALL OF RESPONSDENTS WHO HAVE WATCHED THE FLOOD CHANNEL

According to Cox Communications, approximately 74% of the total households in the Las Vegas Valley have access to cable television. Seventy-four percent (74%) of respondents in the sample reported to have access to cable television. Of this number, 43% reported to have watched the Flood Channel. The chart below shows the items most frequently mentioned when asked, "What do you remember the most from watching the flood channel?"

Rank		% 2006
1	Dangers of flash flooding	40%
2	Safety precautions	29%
2	Unable to specify	29%
4	Ways floods are controlled	14%
5	Other	9%
6	Where to learn more about flooding	4%
7	Time of year flooding occurs	3%
8	Availability of flood insurance	2%

Other: includes such responses as "cars floating," "rescues," and "devastation."

Issue	% Correct
Flood insurance is available to everyone	60%
Flood insurance will only cover structural damage	26%
Flood insurance is only available to those living in a flood zone	53%
Flood insurance is only available to cover damage to the contents of a residence	58%
Flood insurance costs the same regardless of whether or not the residence is in a flood zone	52%
Where to learn more about flooding	39%

FUTURE STEPS

- The Flood Channel should continue to include information and education about flash flooding, awareness of when the flood season is, flood insurance issues, and precautions to take when encountering a flooded street or road. In addition, the data shows that emphasis should be placed on "where to learn more about flooding." The data collected on stormwater and urban runoff indicates that emphasis should also be put on ways that individuals can help protect the environment and Lake Mead. Ninety percent (90%) of those who have not already made a behavior change to help improve water quality would do so if they knew what to do. Younger respondents (18 – 24) and females (92%) were the most likely to indicate that they would make a behavior change to improve water quality.
- When looking at the knowledge of flood insurance that the respondents have, considerable confusion on the topic remains. This was the one topical area of the survey where there was not an increase in awareness. Continued emphasis should be placed in this area.
- Clark County continues to be among the fastest growing areas in the United States. Issues related to population growth should continue to be given consideration when planning ongoing public education. Awareness levels in excess of 90% are extremely difficult to achieve in marketing brank awareness, and the District has achieved such. The efforts and programs in place should continue with some modifications aimed at Spanish speaking residents. Emphasis should also be put on reaching the newcomers to the area and residents between the ages of 18 and 24.

BEHAVIOR WHEN ENCOUNTERING A FLOODED STREET

Of those respondents who had encountered a flooded street in Clark County 68% made a good or appropriate choice; they either "turned back and took an alternate route" or "waited for the water to go down and then drove through it." This percentage is similar to the 67% who made an appropriate choice in 2005.

Sources Of Flash Flooding Education And Information

Survey respondents were asked to answer "yes" or "no" to a list that was read to them of possible sources for obtaining information about floods. The following table represents the responses in order. Television continues as the top source of information about flash flooding.

Rank	Source	% 2006	% 2005	% 2004
1	Television	87%	87%	93%
2	Newspaper	60%	58%	64%
3	Friends / Relatives	59%	48%	52%
4	Radio	56%	47%	57%
5	Billboards	46%	39%	53%
6	Brochure	24%	26%	26%
7	CCRFCD Website	19%	5%	13%
8	Welcome Home Magazine	8%	5%	5%

Knowledge Of Issues Regarding Flood Insurance

All respondents were asked a series of questions on issues regarding flood insurance. The table below shows the percentage of respondents who answered the question correctly.

Issue	% Correct
Flood insurance is available to everyone	60%
Flood insurance will only cover structural damage	26%
Flood insurance is only available to those living in a flood zone	53%
Flood insurance available to cover damage to the contents of a residence	58%
Flood insurance costs the same regardless of whether of not the residence is in a flood zone	52%
If you live in a flood zone you must buy flood insurance	39%

AREA OF CLARK COUNTY RESPONDENTS RESIDE IN

Southeast – 35%
Northeast – 17%
Southwest – 15%
Northwest – 29%
Outlying – 2%

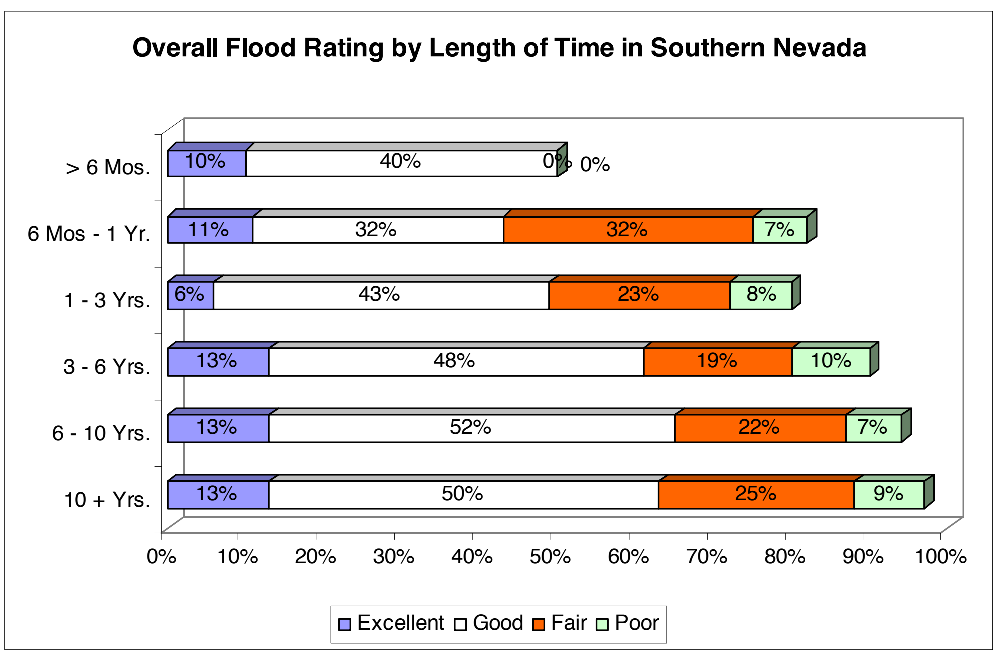
Includes Mesquite, Boulder City and Logandale.

Knowledge Of Stormwater And Urban Runoff

As a new data point this year, all respondents were asked whether they think that "All" or "Some" of the urban runoff that travels through the flood control system drains into Lake Mead? Thirty-eight percent (38%) of respondents correctly responded "all," 40% thought that "some" of the urban runoff that travels through the flood control system drains into Lake Mead, and 22% did not know how to respond to the question. Respondents were also asked whether they thought that "the urban runoff and rainwater that travels through the flood control system is "treated" or "untreated." Forty-four percent (44%) correctly answered the question and they were asked if they had made a behavior change as a result of having this knowledge. Fifty-five percent (55%) said that they had, an increase of 34 percentage points over last year. The following table shows the behavior change in order.

Rank	*Behavior Change*	*Percent 2006*	*Percent 2005*
1	Proper disposal of general waste	46%	38%
2	Proper disposal of chemicals	41%	19%
3	Use a commercial carwash	24%	10%
4	Proper disposal of oil	33%	10%
5	Proper clean/up disposal of pet waste	22%	3%
6	Use of organic fertilizers	19%	3%
7	Other	16%	29%

Overall 61% of respondents rated the way that flood control is being controlled in Southern Nevada positively. This is up 4 percentage points from the 57% who rated flood control overall positive last year. Overall rating by length of time in the area is shown below.



REGIONAL FLOOD CONTROL DISTRICT

Dear Educator:

Thank you for requesting a presentation for your students about the importance of flood safety awareness. The Clark County Regional Flood Control District believes that public outreach, especially with our youth, is essential to keeping people away from flash flooding.

We are always striving to improve our classroom presentations. What follows is a brief survey designed to give us some feedback so adjustments can be made where necessary to ensure our presentations are effective as possible.

Thank you for your assistance.

School Name____
Number of students in your class ____________**Grade level you teach**_________________
Teacher's Name:

Please rank the following on a scale of 1 (least effective) to 5 (most effective).

1. Was the flood safety awareness presentation understood by your students? 1 2 3 4 5

2. How would you rate the presentation style and the ability of the presenter to keep the students' interest? 1 2 3 4 5

3. Did the presentation cover the topics you anticipated? 1 2 3 4 5

4. Do you believe, as a result of the presentation, that your students will be deterred from playing in floodwaters and/or flood control facilities? Yes No

5. Do you believe, as a result of the presentation, that your students understand the negative effects of chemicals and pollution in rainwater runoff? Yes No

6. Do you believe, as a result of the presentation, that your students know what they and their families can do to better protect the environment and Lake Mead? Yes No

7. Do you believe your students spoke with family members about the dangers of driving through flooded areas and cautioned them to make good decisions? Yes No

8. As an instructor, did you find the presentation informative? Yes No

9. Have you or your family watched *The Flood Channel* program on cable channel 4? Yes No

10. Are there any other topics you would like included in this presentation? Yes No
    If yes, please explain. ____

    Comments ____

Please return this survey to: CC Regional Flood Control District
Betty Hollister, Public Information Manager
600 S. Grand Central Parkway, Suite 300
Las Vegas, NV 89106

School Survey Report

10/2006 - 4/2007

1. Was the flood safty awareness presentation understood by your students?

Value 1 -	0.00%	Value 2 -	0.00%	Value 3 -	1.10%	value 4 -	24.18%	value 5 -	73.63%

2. How would you rate the presentation style and the ability of the presenter to keep the students intrest?

Value 1 -	0.00%	Value 2 -	0.00%	Value 3 -	0.00%	value 4 -	28.57%	value 5 -	68.13%

3. Did the presentation cover the topics you anticipated?

Value 1 -	0.00%	Value 2 -	0.00%	Value 3 -	3.30%	value 4 -	7.69%	value 5 -	89.01%

4. Did you believe, as a result of the presentation, that your students would be deterred from playing in floodwater and/or flood control facilities?

Yes - 100.00%   No - 0.00%

5. Did you believe, as a result of the presentation, that your students understand the negative effects of chemicals and pollution in rainwater runoff?

Yes - 96.70%   No - 3.30%

6. Did you believe, as a result of the presentation, that your students whow what they and their families can do to better protect the environment and Lake Mead?

Yes - 85.71%   No - 14.29%

7. Do you delieve you students spoke with their familiy members about the dangers of driving though flooded areas and cautioned them to make good decisions?

Yes - 80.22%   No - 19.78%

8. As an instructor, did you find the presentation informative?

Yes - 98.90%   No - 1.10%

9. Have you or your family watched The Flood Channel program on cable channel 4?

Yes - 32.97%   No - 67.03%

10. Are there any other topics you would like included in this presentation?

Yes - 10.99%   No - 89.01%

Comments

Nicely done & thanks for the magazine, crayons and flood stickers.

Well done! Few individuals, including adults, realize how very dangerous flood waters are.

Be award of local floods and flood control. She needs to be award of our flood control plan and issues. Couldn't answer questions from students if it wasn't covered in presentation.

Thank you my class enjoyed it.

Great! Good pace, clean concepts, repetition, reinforcement, mind set for listening.

The props that you had were great! Thanks for coming!

I thought it was good. The class seemed to enjoy it! Thanks!

Safety with strangers / Avoid being abductive.

Thank You!

Very good presenter!

Great information! Thanks.

I liked the video - it helped them understand the term Flash Flood - being about to see it!

The video was terrific. It contains scenes shown on the news that the students seldom watch.

The presenter was good. The students really liked the question/answers for pencils!!

Thanks for your time and information for our students. We appreciate your time.

Nicely Done!

Good Presentation - Thank you!

Nice job!

Great visuals with water and bowl.

You did a great job keeping the students' attention.

Get hands on explanations.

The kids were really into the presentation. Thank you!

Great job! The kids love it!

Thank you so much!

Excellent!

Great interaction with students.

Wonderful presentation! Right at the students' level.

Good recap of information. Video is effective to restate facts and great visuals.

Thanks - great presentation!

Thank you very much for coming out to talk to our kids!

More direct information about #6.

Good presentation!

Great presentation!

Great job!

The video was very powerful! Thank you for sharing your information with our students.

Thank you! It was a great, informative presentation

Thanks for coming and talking to our students

Great Job!

Something about the dangers of electricity near water.

Very nice, well paced and informative.

Protecting the environment wasn't a major theme of this presentation - it was more inferred. It should be a more important part.

Thank you! It was great talking about dirty and dangerous flood water!

The presentation was very informative and kid friendly. She was great!!

Thank you so much for your information and time!

Thank you so much for realizing the importance of teaching the students when they are young and impressionable!

Very nice job!

Nice Job!

Thanks for coming out each year!

Great Job!

I am happy that you come to our schools. Students are reminded with activity books on safety of floods and can tell people at home what they learned from your video.

Much better DVD/Video. Thank you.

The new video is much more kid oriented. Great job!

What to to if they see someone in the flood channels.
The new video was super! I gave my kids a little quiz on the topics they learned and they did great!

I enjoyed the presentation

I would recomment using Yes versus Yeah. Otherwise presntation was awesome. Also more realitivity to the terms. A greater number of our students are english as a second language learners.

Please try to speak slowly, we have many students, who are second language learners.

The students attention was kept most of the time, but don't be afraid to enforce rules like raising hands and quieting down.

Great presentation! Very informative!

Maybe actual talks on people caught in flood waters (I once raced water coming down to the east 5 years ago.)

It was an important topic. Thank you!

Mrs. M did an encellent job! Thank you!

Students were totally engaged! Great job. Thanks for the goodies, too!

It was very good. She worked very well with the kids. Thanks.

Great job! Thanks for coming out this year.

The presenter did a great job and was really professional.

I think students need more visuals. Understanding of the amount of water in the jar. They don't quite see the concept that the amount of rain is spread out over the year and it has to rain a lot to get to the rainfall amount.

Appendix H

APPENDIX H

BMP REPORTS FROM CO-PERMITTEES
STORM CHANNEL INSPECTION REPORTS

Department of Public Works

500 S Grand Central Pky • Box 554000 • Las Vegas NV 89155-4000
(702) 455-6000 • Fax (702) 455-6040

Denis Cederburg, P.E., Director • E-Mail: dlc@co.clark.nv.us

August 9, 2007

Mr. Chip Paulson
Montgomery Watson Harza
1801 California Street, 29th Floor
Denver, Colorado 80202-1244

2006-2007 ANNUAL REPORT INFORMATION

LAS VEGAS VALLEY NPDES MUNICIPAL STORMWATER DISCHARGE PERMIT

Dear Mr. Paulson:

I am writing in response to your request for information for the 2006-2007 Annual Report for the Las Vegas Valley Municipal Stormwater Discharge NPDES Permit. The following information is provided for the period July 1, 2006 thru June 30, 2007.

Structural and Source Control Measures:

Storm Drain Inlet and Catch Basin Cleaning Activities:

The County maintains a total of 5509 drain inlets and catch basins within the permit area.
The number of drain inlets and catch basins inspected during the permit year was 14,617.
The number of drain inlets and catch basins cleaned out during the permit year was 14,617.
The volume or weight of material removed from inlets and catch basins is not recorded. The County is currently reviewing its operational practices and database management systems and is implementing new software to capture this information in the future.

The County believes that the goals of the drain inlet cleaning BMP to Inspect/clean 20 percent of drop inlets a minimum of once per year were met for the 2006-07 permit year.

Street Sweeping Activities:

The County maintains a total of 2330 curb miles in the sweeping program within the permit area.
The number of curb miles swept during the permit year was 64,444 miles.
The volume or weight of material collected by street sweepers was 25,594 cu yds.

The County believes that the goals of the street sweeping BMP to sweep curbed-and-paved public streets in urban areas once every 30 days were met for the 2006-07 permit year.

Detention Basins Inspected and Cleaned:

Clark County currently maintains fourteen detention basins in the Las Vegas Valley during the permit period.
All basins were inspected a minimum of two times during the permit period.

The detention basins list includes:

Upper Blue Diamond Detention Basin
Desert Inn Detention Basin
Lower Duck Creek Detention Basin
Upper Duck Creek Detention Basin
F-1 Debris Basin
F-2 Debris Basin
Upper Flamingo Wash Detention Basin
Lakes Detention Basin
Las Vegas Range Confluence Detention Basin
R-4 Detention Basin
Red Rock Detention Basin
Tropicana Wash Detention Basin
Van Buskirk A Detention Basin
Van Buskirk C Detention Basin

The Tropicana Detention Basin had 74 cubic yards of sediment and debris from storms removed.

The F2 Detention Basin had 20 cubic yards of debris removed.

The Upper Blue Diamond Detention Basin had 48,549 cubic yards of sediment removed.

The Red Rock Detention Basin had 67,466 cu yds of sediment removed.

The Upper Duck Creek Basin had 5,600 cu yds removed.

The Lower Duck Creek Basin had 58 cu yds of debris removed.

The Upper Flamingo Wash Detention Basin remains under contract with the United States Army Corps of Engineers (USACOE), which is increasing the storage capacity of the facility.

Other departments provide additional report information. Should you have any questions or concerns, or wish to discuss any of these items further, please call me at (702) 455-7540. The office hours are Monday through Friday, 6:30 a.m. to 3:00 p.m.

Sincerely,

GIL SUCKOW
Senior Construction Management Inspector
Maintenance Management Division

GS:sdd

cc: Rob Mrowka
Les Henley, Construction Management
L. Cameron Harper, Maintenance Management Division

CITY OF HENDERSON
240 Water Street
P. O. Box 95050
Henderson, NV 89009

September 17, 2007

Mr. Chip Paulson, P.E.
Montgomery Watson Harza
1801 California Street, 29th Floor
Denver, CO 80202-1244

RE: Revised NPDES Stormwater Discharge Permit Annual Report

This is to provide you with information from the City of Henderson for the NPDES Stormwater Discharge Permit Annual report for the period July 2006 to June 2007.

Drop Inlet and Storm Drain Maintenance

The objective outlined in the 2004 - 2005 Annual Report is to determine the total number of drop inlets in the system, then inspect and maintain 20-percent of the total every year. During the 2005 - 2006 reporting period, the City hired additional maintenance staff and equipment to meet the drop inlet maintenance objectives. The material collected during the drop inlet and street sweeping duties are delivered to the same drop off point. The goals of the drop inlet cleaning program were met for the 2006 – 2007 reporting period.

Total Estimated Drop Inlets in System = 3000
Drop Inlets Maintained = 814

Street Sweeping

The objective outlined in the 2004 – 2005 Annual Report is to sweep the curbed and paved public streets once every 30 days. The City has seven street sweepers in operation, the same as in past years, and is currently sweeping the public streets once every 25 days on average. However, there were two months where the where the 30 day goal wasn't met in Area 4 and Area 5 of the City. This was due to mechanical problems with the sweepers that required parts to be ordered. The City has purchased new sweepers as part of the normal replacement program and anticipates that all goals will be met for the next year. On average, the goals of the street sweeping program were met for the 2006 – 2007 reporting period.

Total Curbing in System = 1576 miles
Sweeper Centerline Miles = 37,070 miles
Material Removed = 2814 cubic yards

Flood Control Facilities Inspection and Maintenance

The objective outlined in the 2004 – 2005 Annual Report is to visually inspect the channels and detention basins within the City boundaries semi-annually as part of the Illicit Discharge and Detection Program. The semi-annual inspections take place during the Fall and Spring of each reporting period. Please see the semi-annual wash reports included in a separate section of the Annual Report for the results of the inspections. The City also inspects and maintains the regional flood control facilities on a regular basis under a maintenance agreement with the Clark County Regional Flood Control District. Sediment, debris, and trash found during the semi-annual and regularly scheduled inspections are logged in the inspection reports and maintenance is scheduled. Sediment and other material removed from storm drains, drop inlets, and lined channels are deposited at our Warm Springs maintenance yard. From there it is transferred to the landfill at Apex. Uncontaminated sediment removed from unlined channels is placed on the side of the channel. Attached is a spreadsheet identifying the channels and detention basins that were inspected and the volume of material removed from those that underwent maintenance activity, and the total volume of material removed as part of the 2006 – 2007 flood control inspection and maintenance program.

Construction Site Inspection Program

The objectives outlined in the 2004 – 2005 Annual Report is to develop and maintain an construction site inspection program as required by the Las Vegas Valley MS4 NPDES permit. The Public Works Department – Quality Control Division currently inspects active construction sites for compliance with local ordinances concerning the discharge of pollutants. Of the inspections completed 1062 (83%) sites inspected revealed no potential to violate code and general compliance with State and local construction site requirements; 54 (4%) revealed potential to violate code or actually had violations to the code, and 155 (13%) of the inspections were closed out with no further inspection required or cancelled. The problems identified in the inspections were corrected at each site. A training session for the current and new inspectors was provided on February 6, 2007. Copies of the sign-in sheet and training presentation are included with this report.

The City has improved the inspection process to reduce the turn-around times for re-inspections and ensure that the notification letters reach the correct address. Further modifications to be implemented in the next fiscal year is to incorporate the Building Department inspectors as part of the program, use feedback from the inspectors to update the training based on experiences from the last year, and update ordinances and other regulatory mechanisms to require erosion and sediment controls. The City will continue to meet with staff and the co-permittees to implement program improvements in the coming year. Please find a summary of the Construction Site Monitoring Program included with this report.

Industrial Facility Monitoring and Control Program

The objectives outlined in the 2004 – 2005 Annual Report is to develop and maintain an industrial facility monitoring and control program as required by the Las Vegas Valley MS4 NPDES permit. The Utility Services Department - Pretreatment Division currently inspects at least annually the sites identified on the SARA Section 313 list as well as those identified with a potential to discharge. The City's storm water quality staff is currently working with the Building and Fire Safety Department to incorporate the fire safety inspectors into the industrial facility inspection program. The inspectors will identify and inspect facilities identified by the City as potential substantial contributors of pollutants to the MS4. The identification of facilities, inspection procedures, and enforcement of the industrial inspection program will be based on the hazardous materials requirements in the 2006 International Fire Code. The City plans to make the changes inspection program, finalize and implement a training program for the inspectors, and set up a reporting and tracking system for the inspection process in the next fiscal year.

Local Ordinances

Local ordinances relating to NPDES activities were revised during the reporting period due to an overhaul of the Utility Services Code. The ordinance was also rewritten to be similar to the language used by the City of Las Vegas and the City of North Las Vegas based on comments from the EPA Audit. When reviewing the ordinance, the City Attorneys Office determined that it should be placed in both the Utility Services and Development Code. The ordinance is now located in Chapter 14.09.040 – Wastewater Discharge Regulation, Section D and Chapter 19.9.13 – Streets, Section H – Drainage, Subsection 1b. Copies of the pertinent sections of the ordinance are included with this report.

BMP Implementation

The City of Henderson responsibility for the Year 3 measurable goals are outlined below:
- Implement street sweeping program developed in Year 1.
- Implement drop inlet and storm drain system cleaning program developed in Year 1.
- Conduct semi-annual field inspections of channels and detention basins.

Enforcement Actions

We received 6 citizen reports of NPDES violations during the report period. Following is a short description of the complaint and the action taken:

<u>Complaint 1</u>
Citizen observed a neighbor dumping bags of animal waste in drop inlet next to house. A field crew was sent to inspect and clean the drop inlet and the violator informed of the ordinances against such dumping.

<u>Complaint 2</u>
Public Works informed of a homeowner dumping household garbage into storm drain drop inlet. The homeowner has early stage Alzheimer's and does not know it is a problem. Public Works crews cleaned out the inlet and monitored on a regular basis. The family has been notified of the problem.

Complaint 3
Citizen reported a sewer smell and liquid running in Arroyo Grande Boulevard to the Public Works Department. Streets Maintenance staff confirmed the report and found that the storm drain was clogged. Street Maintenance cleaned the storm drain system.

Complaint 4
Public Works received a report of a 55 gallon drum in trash enclosure leaking oil into the parking lot at 9955 S. Eastern Avenue. The oil covered the floor of the enclosure, a portion of the parking lot, and entered the onsite storm drain system. H2O Environmental was called to secure the drum and clean the site. The oil did not enter the adjacent regional channel.

Complaint 5
Citizen reported that a carpet cleaning company was cleaning their truck and dumping carpet cleaning liquid and chemicals into the storm drain system. An investigation indicated that the truck was not in use anymore and the carpet cleaning business closed. Code Enforcement was dispatched to post the truck as illegally parked. On a follow up inspection the truck was gone.

Complaint 6
Business was allowing ice used to store fish to melt and drain to the sump in the loading area. The water and fish parts were being pumped from the sump into the nearby storm drain system. The complaint was turned over to the Business License Division, which informed the owner that this practice violated the municipal code. The owner has stopped the practice.

Public Outreach

The City of Henderson attended a booth at the Whole Foods Earth Day event on April 22, 2007. Curt Chandler made a presentation that included discussion on Project GREEN, Stormwater Quality, and floodplain Management. Outreach materials were handed out from the booth.

Partially Completed Storm Drains

The City of Henderson has a number of partially completed storm drains; however, none of them are designed specifically to cause the water to infiltrate. In some cases, the discharge is to the natural ground where it evaporates, percolates, or supports vegetation.

Drinking Water Discharges

A report on drinking water discharges was submitted separately to the EPA.

Please let me know if you require any additional information or detail for the completion of your report.

Sincerely,

Albert J. Jankowiak, P.E., CFM
Project Engineer II
City of Henderson

cc: Kevin Eubanks, CCRFCD
Curt Chandler, City of Henderson

FLOOD CONTROL FACILITIES INSPECTION AND MAINTENANCE PROGRAM

Sweeper Report Fiscal 2007

not swept

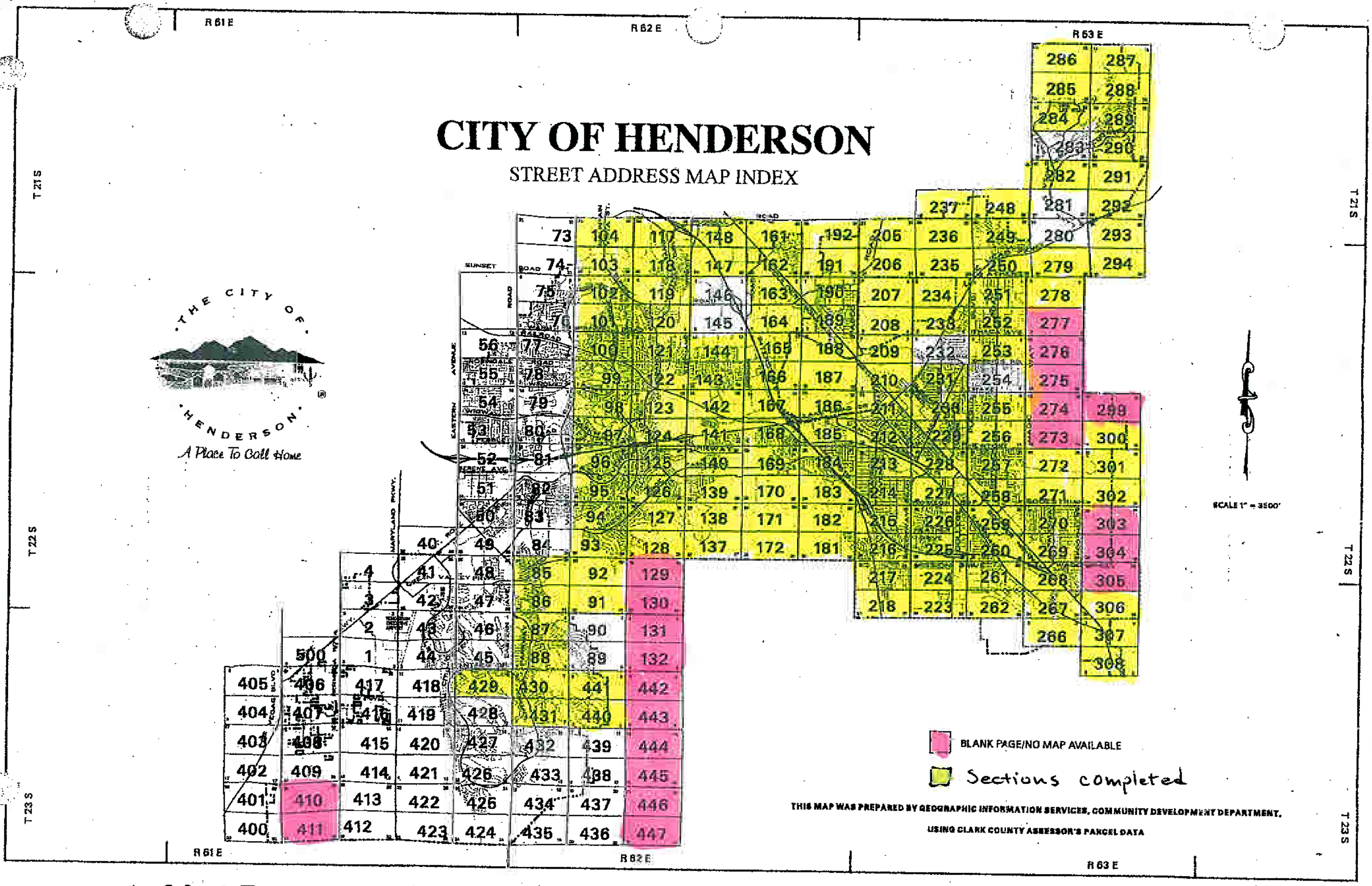
Date	Sweeper Miles traveled	Hours	Cubic yards		
July 06	5974	452	208		
Aug 06	9660	525	210		
Sept 06	5385	474	240		
Oct 06	6016	421	264		
Nov 06	6059	445	380		
Dec 06	5465	390	302		
Jan 07	6841	478	236		
Feb 07	5808	421	184		
March 07	5781	399	228		
April 07	6248	452	182		
May 07	5322	388	148		
June 07	5579	389	232		
total	74,138	5,234	2,814		
ave/month	6,178	436	234.5		

Sweeper Report 4-1-07 → 6-30-07

Areas 1 & 6	Current	Previous	Since 1-26-04
Working Day Ave.	13.5	13.75	10.3
Calender Day Ave.	23.5	25.25	18.2
Area 2			
Working Day Ave.	12.2	14	12.82
Calender Day Ave	21.5	25	23.26
Area 3			
Working Day Ave	11.8	11	9.6
Calendar Day Ave	20.4	21	16.9
Area 4			
Working Day Ave	16	16	14.77
Calender Day Ave	28.6	30.6	25.1
Area 5			
Working Day Ave	20	18	15.4
Calender Day Ave	35	33	27.17
Night Shift			
Working Day Ave	12.5	10.8	13
Calender Day Ave	21.75	19.1	22.8
Over All ave			
Working Day	14.3	13.9	12.5
Calender Day	25.1	25.6	22.3

2nd quarter Sweeper Dump

36 Loads 562 yds



6-30-07 D.I's cleaned and inspected Fiscal 2007 814

D.I's cleaned and inspected since June 2005 1,480

Drop Inlet Inspections Completed

Date		Date		Date	
June 05	36	Dec 06	74		
July 05	11	2006	939		
Aug 05	none				
Sept 05	4	Jan 2007	42		
Oct 05	49	Feb 2007	55		
Nov 05	72	March 2007	66		
Dec 05	135	April 2007	27		
		May 2007	93		
Jan 06	13	June 2007	51		
Feb 06	24	total Since June 05	1,480		
March 06	148	Fiscal 2007	814		
April 06	73				
May 06	101				
June 06	100				
July 06	40				
Aug 06	116				
Sept. 06	124				
Oct 06	50				
Nov 06	76				

CHANNEL NAME	MASTER PLAN FACILITY ID	COH MAINTENANCE		
		MWP FACILITY NUMBER	MAINTENANCE EXPENDITURE ($)	MATERIAL REMOVED (CY)
C-1 CHANNEL	CICH 0000-0674	HEN 01	$ 61,109.45	4568
GREENWAY CHANNEL	C1GW 0000-0081	HEN 02	$ -	
VAN WAGENEN CHANNEL	PTVW 0000-0184	HEN 03	$ 2,173.70	
GIBSON CHANNEL	PTGB 0000-0249	HEN 04	$ 13,555.86	82
LOWER PITTMAN CHANNEL	PTDC 0013-0237	HEN 05	$ 45,371.86	114
UPPER PITTMAN CHANNEL	PTWA 0000-0476	HEN 06	$ 57,779.36	182
UPRR CHANNEL	PTRW 0000-0131	HEN 07	$ 25,939.12	64
SANDWEDGE CHANNEL	PTSW 0000-0129	HEN 08	$ 25,640.38	494
WHITNEY RANCH CHANNEL	WWDC 0000-0069	HEN 09	$ 6,171.56	18
DUCK CREEK CHANNEL	DCWA 0646-0669	HEN 10	$ 37,901.68	2143
MISSION HILLS DETENTION	C1CH 0674-0882	HEN 11	$ 2,465.91	20
RAILROAD EAST CHANNEL	PTRE 0000-0157	HEN 12	$ 4,618.72	134
McDONALD RANCH CHANNEL	PTMR 0000-0479	HEN 13	$ 8,828.15	18
DRAKE CHANNEL	C1DC 0000-0101	HEN 14	$ -	
I-515 CHANNEL	PTIS 0000-0198	HEN 15	$ -	
EASTERN CHANNEL	PTEA 0000-0209	HEN 16	$ 275.53	
WESTERN INTERCEPTOR	C1CH 0871-0972	HEN 17	$ 1,401.69	12
EQUESTRIAN DETENTION BASIN	C1EQ 0152-0297	HEN 18	$ 3,281.06	100
SUNRIDGE CHANNEL	PTPW 0060-0262	HEN 19	$ 17,845.74	126
PITTMAN WASH RAILROAD	PTRR 0000-0116	HEN 20	$ 2,500.26	
PITTMAN PARK DETENTION BASIN	PTWA 0055	HEN 21	$ 8,309.40	15
PITTMAN WASH BURNS CHANNEL	PTBR 0029-0160	HEN 22	$ 12,438.37	400
PITTMAN WASH BLACK MOUNTAIN	PTBM 0000-0045	HEN 23	$ -	
PITTMAN PECOS CHANNEL	PTPE 0000-0166	HEN 24	$ 5,012.95	50
BLACK MOUNTAIN DETENTION BASIN	C1CH 1012-1138	HEN 25	$ 1,557.41	6
EAST C-1 DETENTION BASIN	C1DC 0226-0303	HEN 26	$ 5,932.14	120
McCULLOUGH HILL DETENTION BASIN	PTPW 0307-0309	HEN 27	$ -	
PIONEER DETENTION BASIN	PTVW 0185	HEN 28	$ 19,116.74	937
PITTMAN EAST DETENTION BASIN	PTEA 0291-0495	HEN 29	$ 1,099.84	
SAGUARO PARK/DOWNS CHANNEL	C1EQ 0000-0151	HEN 30	$ -	

FACILITY NAME	MASTER PLAN FACILITY ID	COH MAINTENANCE MWP FACILITY NUMBER	MAINTENANCE EXPENDITURE ($)	MATERIAL REMOVED (CY)
C-1 CHANNEL - US 95	C1US 0000-0078	HEN 31	$ -	
C-1 CHANNEL BOULDER HIGHWAY	C1BH 0000-0302	HEN 32	$ 1,790.19	12
UPPER PITTMAN WASH SOUTH	PTWA 0982	HEN 33	$ -	
PITTMAN STEPHANIE	PTST 0000-0170	HEN 34	$ -	
PITTMAN DESERT WILLOW	PTDW 0000-0069	HEN 35	$ 14,995.00	
PITTMAN FOOTHILLS DRIVE	PTFD 0000-0111	HEN 36	$ 3,164.15	6
PITTMAN LAKE MEAD	PTLM 0000-0078	HEN 37	$ 3,116.44	8
PITTMAN VALLE VERDE	PTVV 0000-0005	HEN 38	$ -	
PITTMAN GAS LINE	PTGL 0000	HEN 39	$ 1,147.01	
PITTMAN PIONEER DETENTION	PTPD 0000-0063	HEN 40	$ -	
PITTMAN WEST HORIZON	PTWH 0000-0011	HEN 41	$ -	
PITTMAN/ANTHEM PARKWAY	PTAP 0000-0191	HEN 42	$ -	
PITTMAN HORIZON RIDGE	PTHR 0043-0067	HEN 43	$ -	
PITTMAN HORIZON RIDGE RCB	PTHR 0139	HEN 44	$ -	
PITTMAN ANTHEM CHANNEL & DET. B	PTAN 0000-0280	HEN 45	$ -	
PITTMAN REUNION DRIVE	PTRD 0000-0055	HEN 46	$ -	
PITTMAN GREEN VALLEY	PTGV 0028-0073	HEN 47	$ -	
PITTMAN SEVEN HILLS	PTSH 0000-0084	HEN 48	$ -	
C-1 CHANNEL US 95 TRIB 1	C1U1 0000-0062	HEN 49	$ -	
C-1 CHANNEL FOUR KIDS	C1FK 0000-0039	HEN 50	$ -	
C-1 CHANNEL FOUR KIDS CULVERT	C1FK 0073	HEN 51	$ -	
LAKE LAS VEGAS MAGIC WAY CULVER	LLMW 0129	HEN 52	$ -	
LAKE LAS VEGAS MAGIC WAY CHANNE	LLMW 0203	HEN 53	$ -	
PITTMAN HAMPTON ROAD	PTHD 0000-0020	HEN 54	$ -	
PITTMAN ANTHEM DRIVE	PTAD 0055	HEN 55	$ -	
PITTMAN WASH SOUTHEAST	PTSE 0135	HEN 56	$ -	
PITTMAN WASH WILDERNESS STUDY	PTWS 0000	HEN 57	$ -	
TOTALS			$ 394,539.67	9629

ENFORCEMENT ACTIONS

Name	Address	Phone Number
Katrina Tambouras	2351 Schaeffer Hills Drive	702-270-1949

Address of complaint	Subdivision	Lot	Block	SAM Map	APN #
2351 Schaeffer Hills Drive	SC Anthem Unit 19 P	196	8	426	19113410124

FEMA Panel	Major Cross Streets	Type of Complaint (See Note Below)
	Schaeffer Hills & Anthem Parkway	NPDES

Problem
Citizen observed person dumping bags of animal waste in drop inlet next to their house.

Proposed Solution

Action Taken
Called Alan Forbragd to send drop inlet crew to clean drop inlet. Also asked him to inspect other drop inlets in area and clean as necessary.

Flood Date	Received By	Date Received	Number
	Al Jankowiak	11/8/2006	970

Additional Comments
Will contact Neighborhood Services to see about sending HOA letter asking them to place information about pet waste in monthly newsletter.

Note: Any complaints involving pollution must contain "NPDES" in the complaint type

Any complaints regarding maintenance should contain "Maintenance" in the type

Name			Address				Phone Number
Brown, Nellie M.			1531 Fieldbrook				
Address of complaint			Subdivision	Lot	Block	SAM Map	APN #
1531 Fieldbrook			Sun City Anthem #3	312	9	88	19006410114

FEMA Panel	Major Cross Streets	Type of Complaint (See Note Below)
		NPDES

Problem
Ms. Brown has been dumping household garbage into the storm drain inlet. PW crews have cleaned it numerous times. She has alzheimers, and does not know what she is doing.
Proposed Solution
Monitor the inlet and work with Ms. Brown to resolve the problem.
Action Taken
Code enforcement is working with Ms. Roberts and her family to help her dispose of her garbage properly.

Flood Date	Received By	Date Received	Number
	Alan Forgragd	1/18/2007	973

Additional Comments

Note: Any complaints involving pollution must contain "NPDES" in the complaint type

Any complaints regarding maintenance should contain "Maintenance" in the type

Name			Address			Phone Number
Galen Schutt			171 Alterra Drive			702-498-0845

Address of complaint	Subdivision	Lot	Block	SAM Map	APN #
171 Alterra Drive	Terracina	102	2	123	17816212043

FEMA Panel	Major Cross Streets	Type of Complaint (See Note Below)
	Arroyo Grande/Wigwam	NPDES

Problem
Sewer smell and liquid of some kind running north bound on west side of Arroyo Grande at the intersection of Hillpoint. Storm drain outlet may be clogged
Proposed Solution
Alan Forbragd spoke with the Galen about the problem.
Action Taken
A vactor is being scheduled to clean out the storm drain.

Flood Date	Received By	Date Received	Number
	Al Jankowiak	3/14/2007	982

Additional Comments

Note: Any complaints involving pollution must contain "NPDES" in the complaint type

Any complaints regarding maintenance should contain "Maintenance" in the type

Name	Address	Phone Number
Les Ratliff		610-5594

Address of complaint	Subdivision	Lot	Block	SAM Map	APN #
9955 S. Eastern Avenue	Southfork Pointe	1		50	17725217011

FEMA Panel	Major Cross Streets	Type of Complaint (See Note Below)
	Easern and St Rose	NPDES

Problem
55 Gallon drum of used oil tipped and spilled contents. Oil covered trash enclosure, portion of parking lot, and entered onsite storm drain system.

Proposed Solution

Action Taken
Informed Bob Osip in COH Risk Mangement of situation. Called H2O Environmental to clean up spill and vactor storm drain. Inspected adjacent channel to ensure that oil didn't enter RFCD system.

Flood Date	Received By	Date Received	Number
	Al Jankowiak	3/28/2007	983

Additional Comments

Note: Any complaints involving pollution must contain "NPDES" in the complaint type

Any complaints regarding maintenance should contain "Maintenance" in the type

Name	Address	Phone Number
Scott, Bill	1915 Coralino Drive	896-2561

Address of complaint	Subdivision	Lot	Block	SAM Map	APN #
296 Kershner	Sandcastle Estates U	104	2	99	17808711032

FEMA Panel	Major Cross Streets	Type of Complaint (See Note Below)
	Valle Verde/Silver Springs	NPDES

Problem
Person at 296 Kershner parks his carpet cleaning truck on street and dumps carpet cleaning chemicals into the storm drain.

Proposed Solution

Action Taken
Investigation showed that the truck has not been used for many months and that the carpet cleanning business is gone. Therefore, no additional discharges are expected.

Flood Date	Received By	Date Received	Number
	Chandler	6/10/2007	986

Additional Comments
Mr. Scott's cell is 283-2523 and fax is 896-2561. email is bscott3000@aol.com. Property owner is Priscilla Weeks.

Note: Any complaints involving pollution must contain "NPDES" in the complaint type

Any complaints regarding maintenance should contain "Maintenance" in the type

Name			Address			Phone Number
Rice, Mike			440 Parkson #B			566-1411X227
Address of complaint			**Subdivision**	**Lot**	**Block**	**SAM Map**	**APN #**
441 Eastgate			Warm Springs Busine	1	1	164	17802410010

FEMA Panel	Major Cross Streets	Type of Complaint (See Note Below)
	Cape Horn/Eastgate	NPDES

Problem

Business in adjacent building shares loading dock. Fish packed in ice arrives, and ice is allowed to melt in sump of dock. Gets pumped out and flows to storm drain with fish pieces in it.

Proposed Solution

Warn the business that this illegal and is causing a nuisance.

Action Taken

Turned complaint over to Business license 6/14/07. Ken Lowery of Business License investigated and talked to the owner of the fish business. We have Pretreatment and Code Enforcement looking into this. The owner agreed to stop the practice.

Flood Date	Received By	Date Received	Number
	Chandler	6/13/2007	987

Additional Comments

Business is Showa Marine, 668 S, Alameda St. LA, CA 90021. Owner: Goro Ikeda, Manager: Russell Uehara.

Note: Any complaints involving pollution must contain "NPDES" in the complaint type

Any complaints regarding maintenance should contain "Maintenance" in the type

FACILITY	HEN NUMBER	INSPECTION DATE	WATER/WATER FLOW	VEGETATION	SEDIMENT/ DEBRIS	TRASH	ILLEGAL CONNECTIONS	ILLICIT DISCHARGES	MISCELLANEOUS	ACTIONS TAKEN AND RECOMMENDED FOLLOW UP ACTIVITIES
C-1 Channel	1	9/20/2006	None	Vegetation build-up between river miles 0000-0125	Sediment and debris build-up between river miles 0000-0125 and 0284-0502	Minor trash build-up between river miles 0284-0502	None	None	N/A	Remove build-up of trash, sediment and debris, and vegetation.
Greenway Channel	2	9/20/2006	None	None	None	None	None	None	N/A	N/A
Van Wagenen Channel	3									
Gibson Channel	4	9/20/2006	None	None	None	None	None	None	N/A	N/A
Lower Pittman Channel	5	10/11/2006	River Mile 95 – Groundwater discharging from 18" pipe River Mile 0097 – Groundwater discharging from Whitney Ranch Channel River Mile 0197 – Groundwater discharging from 12" pipe River mile 0237 - Groundwater from Upper Pittman Wash	Vegetation build-up between river miles 0118 - 0237		Trash between river miles 0118 - 0237				
Upper Pittman Channel	6	10/11/2006	River mile 0000-0017 – Groundwater discharging to channel from pipes at irregular intervals River 0106 – Groundwater discharging from under UPRR bridge	River Mile 0000-0047 – Minor vegetation build-up to be removed with normal maintenance activities						
UPRR Channel	7	10/11/2006	None	None	None	None	None	None	N/A	N/A
Sandwedge Channel	8	10/11/2006	None	Minor vegetation to be removed with normal maintenance	None	None	None	None	N/A	

FACILITY	HEN NUMBER	INSPECTION DATE	WATER/WATER FLOW	VEGETATION	SEDIMENT/ DEBRIS	TRASH	ILLEGAL CONNECTIONS	ILLICIT DISCHARGES	MISCELLANEOUS	ACTIONS TAKEN AND RECOMMENDED FOLLOW UP ACTIVITIES
Whitney Ranch Channel	**9**	10/11/2006	River Mile 0055 – Groundwater surfacing at entrance to channel and conveyed to Lower Pittman Wash	None	None	None	None	None	N/A	
Duck Creek Channel	**10**	10/11/2006	None	None	None	None	None	None	N/A	N/A
Mission Hills Detention Basin	**11**	9/20/2006	None	None	None	River Mile 0686-0854 – Minor trash in Detention Basin and at outlets	None	None	N/A	Maintenance completed 9/25/2006 – Trash and debris removed from detention basin and outlets
Railroad East Channel	**12**	10/11/2006	None	None	River Mile 0087-0098 – Sediment and debris in channel to be removed	None	None	None	N/A	
MacDonald Ranch Channel	**13**	10/11/2006	None	None	River Mile 0082 – Sediment and debris plugging low flow discharge pipe. Standing water at energy dissipater	None	None	None	N/A	
Drake Channel	**14**	9/20/2006	None	None	None	None	None	None	N/A	N/A
I-515 Channel	**15**	9/20/2006	None	None	None	None	None	None	N/A	N/A
Eastern Channel	**16**	11/29/2006	None	None	None	None	None	None	N/A	N/A
Western Interceptor	**17**	9/20/2006	None	None	None	River Mile 0871-0930 – Trash and debris at various inlets along facility	None	None	N/A	
Equestrian Detention Basin	**18**	9/20/2006	None	None	None	River Mile 0297 – Remove minor trash and debris in detention basin	None	None	N/A	Maintenance completed 9/25/2006 – Trash and debris removed from detention basin

FACILITY	HEN NUMBER	INSPECTION DATE	WATER/WATER FLOW	VEGETATION	SEDIMENT/ DEBRIS	TRASH	ILLEGAL CONNECTIONS	ILLICIT DISCHARGES	MISCELLANEOUS	ACTIONS TAKEN AND RECOMMENDED FOLLOW UP ACTIVITIES
Sunridge Channel	**19**	11/29/2006	None	None	None	None	None	None	River Mile 0216-0262 – Trim overhanging vegetation to top of property walls	
Pittman Wash Railroad Channel	**20**	9/20/2006	None	None	None	None	None	None	N/A	N/A
C-1 Channel/Boulder Highway	**21**	10/11/2006	River Mile 0050 – Groundwater conveyed in low flow channel	None	None	None	None	None	N/A	N/A
Pittman Wash Burns Channel	**22**	9/20/2060	River Mile 0090 – Nuisance flow discharging from RECP into channel River Mile 0091-0140 – Groundwater flow conveyed in channel	None	None	None	None	None	N/A	N/A
Pittman Wash Black Mountain	**23**	9/20/2006	None	None	None	None	None	None	N/A	N/A
Pittman Pecos Channel	**24**	10/11/2006	None	River Mile 0096-0097 – Vegetation build-up at entrance and exit of culvert	None	None	None	None	N/A	
Black Mountain Detention Basin	**25**	9/20/2006	None	None	River Mile 1095 – Minor sediment build-up at outlet of basin	River Mile 1095 – Minor trash build-up at outlet of basin	None	None	N/A	
East C-1 Detention Basin	**26**	9/20/2006	None	None	River Mile 0303 – Trash and debris in detention basin and in spillway	None	None	None	Concrete Apron at entrance of spillway has been damaged	Maintenance Completed 9/26/2006 – Trash and debris removed
McCullough Hills Detention Basin	**27**	11/29/2006	None	None	None	None	None	None	N/A	N/A

FACILITY	HEN NUMBER	INSPECTION DATE	WATER/WATER FLOW	VEGETATION	SEDIMENT/ DEBRIS	TRASH	ILLEGAL CONNECTIONS	ILLICIT DISCHARGES	MISCELLANEOUS	ACTIONS TAKEN AND RECOMMENDED FOLLOW UP ACTIVITIES
Pioneer Detention Basin	28	10/11/2006	None	None	River Mile 0185 – Sediment and debris build-up in low flow channel, trap, and at outlet of detention basin	None	None	None	N/A	
Pittman East Detention Basin	29	11/29/2006	None	None	River Mile 0439 – Sediment and debris build-up on rack at discharge pipe	None	None	None	N/A	
Saguaro Park/Downs Channel	30	9/20/2006	None	None	None	None	None	None	N/A	N/A
C1 Channel US 95	31	9/20/2006	None	None	None	None	None	None	N/A	N/A
C1 Channel Boulder Highway	32	9/20/2006	None	None	None	None	None	None	N/A	N/A
Upper Pittman Wash South	33	11/29/2006	None	None	None	None	None	None	N/A	N/A
Pittman Stephanie	34	10/11/2006	None	None	River Mile 0000-0016 – Construction debris and sediment in flow path between culvert under I215 and PTRE Channel	None	None	None	N/A	
Pittman Desert Willow	35	10/11/2006	None	None	None	None	None	None	N/A	N/A
Pittman Foothills Drive	36	10/11/2006	None	None	None	None	None	None	N/A	N/A
Pittman Lake Mead	37	10/11/2006	None	None	None	None	None	None	N/A	N/A
Pittman Valle Verde	38									
Pittman Gas Line	39	9/20/2006	None	None	None	None	None	None	N/A	N/A
Pittman Pioneer Detention Basin	40	10/11/2006	None	None	None	None	None	None	N/A	N/A
Pittman West Horizon	41	9/20/2006	None	None	None	None	None	None	N/A	N/A
Pittman/Anthem Parkway	42	11/29/2006	None	None	None	None	None	None	N/A	N/A

FACILITY	HEN NUMBER	INSPECTION DATE	WATER/WATER FLOW	VEGETATION	SEDIMENT/ DEBRIS	TRASH	ILLEGAL CONNECTIONS	ILLICIT DISCHARGES	MISCELLANEOUS	ACTIONS TAKEN AND RECOMMENDED FOLLOW UP ACTIVITIES
Pittman Horizon Ridge	**43**									
Pittman Horizon Ridge RCB	**44**	9/20/2006	None	None	None	None	None	None	N/A	N/A
Pittman Anthem Channel and Detention Basin	**45**	11/29/2006	None	None	None	None	None	None	N/A	N/A
Pittman Reunion Drive	**46**	11/29/2006	None	None	None	None	None	None	N/A	N/A
Pittman Green Valley	**47**	9/20/2006	River Mile 0028 – Nuisance flow discharging from RCP into channel	None	None	None	None	None	N/A	N/A
Pittman Seven Hills	**48**	11/29/2006	None	None	None	None	None	None	N/A	N/A
C1 Channel US95 Trib	**49**	9/20/2006	None	None	None	None	None	None	N/A	N/A
C1 Channel Four Kids	**50**	9/20/2006	None	None	None	None	None	None	N/A	N/A
C1 Channel Four Kids Culvert	**51**	9/20/2006	None	None	None	None	None	None	N/A	N/A
Lake Las Vegas Magic Way Culvert	**52**	9/20/2006	None	None	None	None	None	None	N/A	N/A
Lake Las Vegas Magic Way Channel	**53**	9/20/2006	None	None	None	None	None	None	N/A	N/A
Pittman Hampton Road	**54**									
Pittman Anthem Drive	**55**	11/29/2006	None	None	None	None	None	None	N/A	N/A
Pittman Wash Southeast	**56**	11/29/2006	None	None	None	None	None	None	N/A	N/A
Pittman Wash Wilderness Study	**57**									

City of Las Vegas MS 4 Annual Report

City of Las Vegas Structural and Source Control Measures Program

Street Sweeping. The City of Las Vegas is separated into districts. Sediment and debris from each unit was dumped into a central refuse pile at either the west or east yards. The Field Operations Department, which details the number of street mile swept and the number of inlets cleaned, produced monthly reports.

CLV sweeps most urban public streets on a 14-day schedule. The CLV swept 220,500 miles of street in the 2006-2007 permit year.

Drop Inlet Cleaning. City maintenance staff currently keeps logs for drain inlet and drainage easement cleaning. Sediment and debris from each unit were dumped into a central refuse pile at either the west or east city yards. The 2005 -2006 permit year, approximately 57,000 drop inlets and walk through drains were cleaned.

Detention basin Maintenance. Detention basins were inspected twice a year as part of the Wash Walk program, and were also inspected after each major storm event. This satisfies the goal for this BMP. The basins were cleaned after each inspection by the CLV maintenance contractor. The CLV maintenance contractor removed about 6,453 cubic yards of sediment and debris from the Angel Park Detention Basin during the 2006-2007 permit year.

In the 2006-2007 permit year, the total volume of trash hauled from the east and west City yards to Apex Landfill from all maintenance activities was 45,800 cubic yard.

City of Las Vegas Illicit Discharge Detection program

Municipal Maintenance Staff Training. CLV conducted the Municipal Maintenance Staff Training on 7/25/07 with the Field Operations Department. The sign in sheet is attached. The training is focused on recognizing the field identification Illicit Discharge and the proper contact information for the CLV to address the Illicit Discharge.

City of Las Vegas Construction Site Inspection Program

Follow up of DAQEM inspection. CLV conducted the follow up inspection and enforcement to address the DAQEM’s referrals. The attached spreadsheet contains the resolution of the DAQEM’s referrals.

CITY OF
NORTH LAS VEGAS

Your Community of Choice

Public Works Department - Majed A. Al-Ghafry, Director
Development & Flood Control
2266 Civic Center Drive • North Las Vegas, Nevada 89030
Telephone: (702) 633-1200 • Fax: (702) 649-4696 • TDD: (800) 326-6868
www.cityofnorthlasvegas.com

August 13, 2007

Chip Paulson
Montgomery Watson Harza
1800 California Street, Suite 2900
Denver, Co 80202

Re: **NPDES Quarterly Report**
Street, Drop Inlet and Detention Basin Cleaning

Dear Mr. Paulson:

This letter is to serve as the City of North Las Vegas' quarterly report on street, drop inlet and detention basin cleaning activities. The following is a summary of the work that was completed during the period of April 2007 to June 2007.

Street Cleaning:	25,009 street miles were swept and 5,889 cubic yards of waste was removed.
Drop Inlet Cleaning:	52 drop inlets were cleaned and 316 cubic feet of waste was removed.
Detention Basins:	2 detention basins were cleaned and 452 cubic yards of waste was removed.

Additionally, there were 278 Industrial Stormwater Inspections performed and 6 Illicit Discharge Report responses.

Please let me know if you should have any questions regarding this information at (702) 633-1223.

Sincerely,

Jennifer E. Doody, PE CFM
Manager
Development and Flood Control Division

	04-05	05-06	06-07
Total number of Drop Inlets in the System	1,250	1,367	2,634
Total number of Drop Inlets inspected	37	39	228
% of Drop Inlets Inspected/Cleaned	3%	2.85%	9%
Total Street Miles in the City			1,230
Total Street Miles Swept	36,801	49,272	87,168
Were the streets swept once/30 days?	yes	yes	yes
Total Debris Removed from System	7,260	10,446	22,750
Total Illicit Discharge Report Responses		28	41
Total Industrial Inspections		179	1,444

Quarter	Number of Drop Inlets Cleaned	Amount of Debris Removed (cu ft)	Street Miles Swept	Amount of Debris Removed (cu yds)	Number of Detention Basins Cleaned	Amount of Debris Removed (cu yds)	Illicit Discharge Report Responses	Industrial Stormwater Inspections Performed
06/04 to 09/04	8	0	7,862	1,586	0	0		
10/04 to 12/04	7	32	9,027	1,843	0	0		
01/05 to 03/05	20	245	8,792	1,707	0	0		
04/05 to 06/05	2	180	11,120	1,667	0	0		
07/05 to 09/05	13	174	11,847	2,374	2	50		
10/05 to 12/05	2	5	12,385	2,157	3	169		
01/06 to 03/06	0	0	13,274	2,225	4	391		
04/06 to 06/06	24	190	11,766	2,410	2	302	28	179
07/06 to 09/06	23	356	16,233	3,131	0	0	21	335
10/06 to 12/06	19	135	19,926	4,166	2	0	0	376
01/07 to 03/07	134	1,163	26,000	6,123	5	1,019	14	455
04/07 to 06/07	52	316	25,009	5,889	2	452	6	278

Department of Public Works

500 S Grand Central Pky • PO Box 554000 • Las Vegas NV 89155-4000
(702) 455-6000 • Fax (702) 455-6040

Denis Cederburg, P.E., Director • E-Mail: dlc@co.clark.nv.us

December 5, 2006

Chip Paulson
Montgomery Watson Harza
1801 California Street, 29th Floor
Denver, Colorado 80202

NPDES FALL 2006 SEMI-ANNUAL INSPECTION REPORT

Dear Mr. Paulson:

Provided for your use is the Fall 2006 Semi-annual NPDES Stormwater Discharge Inspection Report.

Should you have any additional questions or concerns, please call me at 702-455-7540. The office hours are Monday through Friday, 6:30 a.m. to 3:00 p.m.

DENIS CEDERBURG
DIRECTOR OF PUBLIC WORKS

BY: ______________________
GIL SUCKOW
Senior Construction Management Inspector
Maintenance Management Division

GS:slh

Attachments

cc: Les Henley
Cameron Harper

Clark County

Storm Channel Inspection Report
Fall 2006

CLARK COUNTY
PUBLIC WORKS

FIRST IN ACCREDITATION
LEADERS IN SERVICE

LAS VEGAS VALLEY MS4 NPDES PERMIT

LAS VEGAS VALLEY MS4 NPDES PERMIT

PART I – INSPECTION SUMMARY

During the period November 8, 2006, through November 21, 2006, Gil Suckow, Clark County Public Works, inspected open channels and detention basins located within the Las Vegas Valley under the jurisdiction of Clark County.

The purpose of the inspections was to inspect the channels and basins looking for illicit discharges or illegal connections along the facilities that contain dry weather flow.

Inspections are required to be conducted semi-annually by the Las Vegas NPDES Municipal Stormwater Permit. Co-permittees to this permit include the Clark County Regional Flood Control District, City of North Las Vegas, City of Las Vegas, City of Henderson, Clark County, and the Nevada Division of Transportation.

Weather during the period was generally clear to partly cloudy. Temperatures ranged from the upper seventies to mid forties.

The report identifies the channels and detention basins that were inspected and observations made. The report has been distributed throughout the Public Works Department to make them aware of the findings. Each division, as necessary, will determine follow-up actions.

Part II of the report identifies the channels and detention basins that were inspected (in alphabetical order). Part III of the report details the inspection findings. The attached map shows all of the storm conveyances that affect the County. Part IV identifies potential problems observed, actions taken and recommended follow-up activities.

LAS VEGAS VALLEY MS4 NPDES PERMIT

PART II – CHANNELS/BASINS INSPECTED

Duck Creek Channel

Lower Duck Creek Detention Basin to the Wetlands boundary at Broadbent Blvd.

Flamingo Wash

Red Rock Detention Basin to the confluence of the Las Vegas Wash.

Las Vegas Wash

Lake Mead Boulevard to Owens Avenue; and,

Charleston Boulevard to Flamingo Rd

Las Vegas Range Wash

Lamb Boulevard to the confluence of the Las Vegas Wash.

PART III – INSPECTION FINDINGS

Duck Creek Channel

Lower Duck Creek Detention Basin to the Wetlands boundary at Broadbent Blvd.

The Lower Duck Creek Detention Basin was dry. There was intermittent minor dry weather flow. The channel had groundwater discharge downstream of Tomiyasu Lane from a groundwater pump.

Flamingo Wash

Red Rock Detention Basin to the confluence of the Las Vegas Wash.

The Red Rock Detention basin was dry. Minor dry weather flow was observed along the Red Rock Channel to the Upper Flamingo Wash Detention Basin. Minor dry weather flow was observed along the Flamingo Wash channel to the Imperial Palace. The Flamingo Wash channel has dry weather flow from several casino groundwater-pumping facilities, which continued with minor inflows to the confluence of the Las Vegas Wash.

Several portions of the Flamingo Wash were under construction including those portions from Swenson St to Cambridge and Topaz Ave to Pecos-Mcleod.

Las Vegas Wash

Lake Mead Boulevard to Owens Ave.

There was minor dry weather flow from the Lake Mead structure.

Charleston Boulevard to Flamingo Rd.

There was dry weather flow along the wash. The Las Vegas Wash from Desert Inn Rd to Flamingo Rd was under construction.

Las Vegas Range Wash

Lamb Boulevard to the confluence of the Las Vegas Wash.

There was intermittent dry weather flow. The Confluence Detention Basin was dry. The Southern Nevada Water Authority (SNWA) Sloan Pumping Station was discharging a low volume of flow from their facility.

LAS VEGAS VALLEY MS4 NPDES PERMIT

PART IV – POTENTIAL PROBLEMS OBSERVED, ACTIONS TAKEN AND RECOMMENDED FOLLOW-UP ACTIVITIES

Flamingo Wash

Construction activity was taking place along the Flamingo Wash between Topaz and Pecos-Mcleod. No apparent BMP's were in place along the wash and was referred to the Nevada Department of Environmental Protection (NDEP).

A potential illegal discharge was noted in the vicinity of Maryland Parkway and was referred to the Clark County Public Response Office.

Flamingo Wash North Fork

A potential illegal discharge was noted in the vicinity of Jones Blvd and Harmon Ave. The discharge was reported to Risk Management and a sample of the water was taken and tested. No illegal discharge was noted. A copy of the report is attached.

Duck Creek Channel

Construction activity was taking place along the Duck Creek Channel in the vicinity of Nellis Blvd. No apparent BMP's were noted and was referred to NDEP. Additionally, construction activity was taking place along Duck Creek Channel in the vicinity of Hollywood Blvd. Some BMP's were noted, but was referred to NDEP for follow-up.

Las Vegas Range Wash

A potential illegal discharge was noted in the vicinity of Alexander Rd and Lamb Blvd and was referred to the Clark County Public Response Office.

Ninyo & Moore
Geotechnical and Environmental Sciences Consultants

November 20, 2006
Project No. 302201001

Mr. Richard Reinard
Clark County Risk Management
4121 Stephanie Street
Las Vegas, Nevada 89122

Subject: Storm Water Wash Sampling
Lindell Road and Harmon Avenue
Las Vegas, Nevada

Dear Mr. Reinard:

At your request, on November 9, 2006, Ninyo & Moore visited the storm water wash at Lindell Road and Harmon to assess the presence of algae/slime. The wash contained water varying from less than 1 inch to 6 inches deep and was moving very slowly toward the south. A small area of algae was noticed just north of the bridge over the wash that divides the Autumn Ridge apartments. It seemed curious that water would exist in the wash given that there had been no rain for several days; therefore, a source of the water was sought. The wash was followed to the northwest until it became a tunnel under the neighboring school's playing field. The tunnel ended at the northwest corner of the school property and the open wash continued west behind an apartment complex. Near the west end of the apartment complex, two underground culverts were observed slowly seeping water into the wash. No further tracing of the source was attempted. Upon returning to the bridge at the Autumn Ridge apartments, a 1-liter sample of the water was collected just north of the bridge.

The water sample was delivered to the Silver State Analytical Laboratory at 5070 Arville, Las Vegas, Nevada, where the sample was analyzed for nitrates, biological oxygen demand (BOD) and chemical oxygen demand (COD).

These tests were selected, as they are general water quality parameters that are commonly used to determine both the drinking quality of water or in instances where the levels are higher, whether to treat water before it is released back into the environment. The nitrate levels are indicative of the presence of fertilizers or ammonia products in the water. The BOD is a measure of the amount of oxidizable organic matter in the water that is degradable by microorganisms, while the COD is a more rigorous measure of all oxidizable organic matter. The amount of organic matter in water is often the measurement used to determine the degree of pollution in water.

The accompanying test results show the nitrates to be 0.56 milligrams/liter (mg/L), the BOD was 7.74 mg/L, and the COD was 39.7 mg/L.

The nitrate levels are lower than the maximum contaminant levels set by EPA for drinking water. The BOD levels are higher than the drinking water standards but are lower than levels that can be permitted to be released from wastewater treatment plants. The COD levels are not mandated by either of these regulations, but their levels are normally higher than the BOD results. A COD of 50 to 100 times the BOD level would be indicative of an organic chemical or petroleum spill. While a lower ratio is indicative of decay of dead organisms and plants.

The received results are representative of water with some decaying matter, which would promote algae growth. The water is not safe to drink, but could be permitted to be discharged from a wastewater plant.

It is Ninyo & Moore's conclusion that the water is probably excess runoff from landscape watering and that normal influx of runoff water should clear the algae. At this time, it does not appear that the County needs to take any action on the site, however, if the algae persists for several more weeks, some additional sampling may be appropriate.

Sincerely,
NINYO & MOORE

Robert G. Williams
Senior Engineer, P.E., CIH, CEM

RGW/ltk

Distribution: (2) Addressee

Enclosures: Laboratory Report
Chain-of-Custody

LABORATORY REPORT

DATE: November 16, 2006

REPORT NUMBER: 06-3477

CLIENT: Ninyo & Moore
6700 Paradise Road, Suite E
Las Vegas, NV 89119

PAGE: 1 of 1

CLIENT PROJECT:

CLIENT PO #:

Sampled By: Client
Date Sampled: 11/09/06
Time Sampled: 1500

Submitted by: R. Williams
Date Received: 11/09/06
Time Received: 1500

Report Attention: R. Williams

Sample ID	Parameter	Result	Unit	Reporting Limit	Method	Date Analyzed	Analyst
Storm Water Wash	Nitrate	0.56	mg/L	0.5	EPA 300.1	11/10/06	RA
	COD	39.7	mg/L	25	EPA 410.4	11/13/06	JS
	BOD	7.74	mg/L	2.0	EPA 405.1	11/10-15/06	DW

ND: non-detect
EPA Flag: none

REVIEWED BY:

Ronald W. Winter
Laboratory Director

5070 South Arville Street, Suite 6 • Las Vegas, NV 89118 • Tel: 702-873-4478 • Fax: 702-873-7967
4600 Kietzke Lane, Suite D-130 • Reno, NV 89502 • Tel: 775-825-1127 • Fax: 775-825-1167
www.ssalabs.com

SilverState Analytical Laboratories

5070 South Arville, Suite 6, Las Vegas, Nevada 89118
Phone: (702) 873-4478 Fax: (702) 873-7967

CHAIN-OF-CUSTODY RECORD

Page ____ of ____

Project/Job #: | Payment Method/PO #:

SEND INVOICE TO:
Name:
Company:
Mailing Address:
City, State, Zip:

REPORT RESULTS TO:
Name: NINYO & MOORE
Company:
Mailing Address:
City, State, Zip:
Phone: Fax:

Sampled By:

Report Attention:

On-Site pH/Temperature:

Turnaround Time (Specify Below with an X):
Standard 10 Business Days [X]
Rush: 24h | 48h | 72h | Other
NOTE: A surcharge is applied for rush samples

Other Pertinent Info:

ANALYSES REQUESTED

Date Sampled	Time Sampled	Sample Location/ Sample ID	Silver State Lab ID	Comp/ Grab	Matrix*	Preservative	Number/Type of Containers**	NITRATE	COD	BOD
11/9/06	1500	STORM WATER WASH	3477-1					X	X	X

Circle Applicable Program: SDWA CWA RCRA Other

Reporting requirements: RL MDL PQL

Report Level: I II III IV

NOTE: Surcharges apply to Level III and IV reports

*Metals:

Tampering with sample name, date, time, and location may constitute fraud

Relinquished by Signature/Print: Robert G Williams Time/Date: 1500 11/9/06
Relinquished by Signature/Print: Time/Date:
Relinquished by: Signature/Print: Time/Date:

Relinquished by Signature/Print: Time/Date: 1500 11/9/06
Relinquished by Signature/Print: Time/Date:
Relinquished by: Signature/Print Time/Date:

Authorized by: Robert G Williams Date: 11/9/06
Authorization is required to process samples. This obligates your organization for fees pertaining to services rendered. If collections or legal services are required to recover said fees, your organization will be responsible for all fees and cost in addition to service fees.

Method of Delivery: Receiving Laboratory:

Special Instructions:

Note: Samples are discarded 30 days after results are reported. Samples deemed hazardous are returned to the client upon completion of analysis.

* Key: AQ - Aqueous S - Soil W - Waste OT - Other White - Lab Yellow - Client Pink - Client On-Site ** Key: P - Plastic G - Glass V - VOA Vial OT - Other

Department of Public Works

500 S Grand Central Pky • Box 554000 • Las Vegas NV 89155-4000
(702) 455-6000 • Fax (702) 455-6040

Denis Cederburg, P.E., Director • E-Mail: dlc@co.clark.nv.us

May 24, 2007

Chip Paulson
Montgomery Watson Harza
1801 California Street, 29th Floor
Denver, Colorado 80202

NPDES SPRING 2007 SEMI-ANNUAL INSPECTION REPORT

Dear Mr. Paulson:

Provided for your use is the Spring 2007 Semi-annual NPDES Stormwater Discharge Inspection Report.

Should you have any additional questions or concerns, please call me at 702-455-7540. The office hours are Monday through Friday, 6:30 a.m. to 3:00 p.m.

Sincerely,

Gil Suckow
Senior Construction Management Inspector
Maintenance Management Division

GS:slh

Attachments

cc: Les Henley
Cameron Harper

Clark County

Storm Channel Inspection Report
Spring 2007

CLARK COUNTY
PUBLIC WORKS

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LEADERS IN SERVICE

LAS VEGAS VALLEY MS4 NPDES PERMIT

LAS VEGAS VALLEY MS4 NPDES PERMIT

PART I – INSPECTION SUMMARY

During the period April 9, 2007, through May 4, 2007, Gil Suckow, Clark County Public Works, inspected open channels and detention basins located within the Las Vegas Valley under the jurisdiction of Clark County.

The purpose of the inspections was to inspect the channels and basins looking for illicit discharges or illegal connections along the facilities that contain dry weather flow.

Inspections are required to be conducted semi-annually by the Las Vegas NPDES Municipal Stormwater Permit. Co-permittees to this permit include the Clark County Regional Flood Control District, City of North Las Vegas, City of Las Vegas, City of Henderson, Clark County, and the Nevada Division of Transportation.

Weather during the period was generally clear to partly cloudy. Temperatures ranged from the upper seventies to mid forties.

The report identifies the channels and detention basins that were inspected and observations made. The report has been distributed throughout the Public Works Department to make them aware of the findings. Each division, as necessary, will determine follow-up actions.

Part II of the report identifies the channels and detention basins that were inspected (in alphabetical order). Part III of the report details the inspection findings. The attached map shows all of the storm conveyances that affect the County. Part IV identifies potential problems observed, actions taken and recommended follow-up activities.

LAS VEGAS VALLEY MS4 NPDES PERMIT

PART II – CHANNELS/BASINS INSPECTED

Duck Creek Channel

Interstate-15 to the Wetlands boundary at Broadbent Blvd.

Flamingo Wash

Red Rock Detention Basin to the confluence of the Las Vegas Wash.

Las Vegas Wash

Lake Mead Boulevard to Owens Avenue; and,

Charleston Boulevard to Flamingo Rd.

Las Vegas Range Wash

Lamb Boulevard to the confluence of the Las Vegas Wash.

Tropicana Wash

Blue Diamond Turning Basin to the Confluence of the Flamingo Wash

PART III – INSPECTION FINDINGS

Duck Creek Channel

Las Vegas Blvd to the Wetlands boundary at Broadbent Blvd.

There was intermittent minor dry weather flow along the Duck Creek channel. The Lower Duck Creek Detention Basin was dry. The channel had groundwater discharge downstream of Tomiyasu Lane from a groundwater pump.

Flamingo Wash

Red Rock Detention Basin to the confluence of the Las Vegas Wash.

The Red Rock Detention basin was dry. Minor dry weather flow was observed along the Red Rock Channel to the Upper Flamingo Wash Detention Basin. Minor dry weather flow was observed along the Flamingo Wash channel to the Imperial Palace. The Flamingo Wash channel has dry weather flow from several casino groundwater-pumping facilities, which continued with minor inflows to the confluence of the Las Vegas Wash.

Several portions of the Flamingo Wash were under construction including those portions from Swenson St to Cambridge and Topaz Ave to Pecos-Mcleod.

Las Vegas Wash

Lake Mead Boulevard to Owens Ave.

There was minor dry weather flow from the Lake Mead structure.

Charleston Boulevard to Flamingo Rd.

There was dry weather flow along the wash.

Las Vegas Range Wash

Lamb Boulevard to the confluence of the Las Vegas Wash.

There was intermittent dry weather flow. The Confluence Detention Basin was dry. The Southern Nevada Water Authority (SNWA) Sloan Pumping Station was discharging a low volume of flow from their facility.

Tropicana Wash

Blue Diamond Turning Basin to the Confluence of the Flamingo Wash.

There was intermittent dry weather flow.

PART IV – POTENTIAL PROBLEMS OBSERVED, ACTIONS TAKEN AND RECOMMENDED FOLLOW-UP ACTIVITIES

Flamingo Wash

Construction activity was taking place along and in the vicinity of West Russell Rd. No apparent BMP's were in place and were referred to the Nevada Department of Environmental Protection (NDEP).

- NE Corner Tenaya Way and Mesa Vista Ave - PCL # 163-27-701-008.
- NE Corner Jones Blvd and Dewey Ave - PCL# 163-25-401-013.
- NW Corner Tropicana Ave & Bermuda Rd - PCL # 162-21-810-003 & 007
- Russell Rd between Durango Rd and I-215 NW of F4 Channel: PCL 163-29-810-001
- Russell Rd, SE of Ft Apache Rd - PCL 163-32-101-014
- NW Corner Russell Rd and Grand Canyon Dr - PCL 163-30-418-004 and 163-30-418-005

Duck Creek Channel

Construction activity was taking place along several sections of the Duck Creek Channel. No apparent BMP's were noted and all were referred to NDEP.

- Las Vegas Blvd & Serene Ave - NE Corner - PCL 177-21-220-000
- Las Vegas Blvd & Jo Rae Ave - NW Corner - PCL 177-29-605-012
- Richmar Ave & Gilespie St - SW Corner - PCL 177-21-417-006
- Windmill Rd & Bermuda Ave - Amigo N side - PCL 177-10-401-027
- Green Valley Pky & Patrick Ave - SW Corner - PCL 161-31-702-022
- Oquendo Rd & Annie Oakley Dr - SE Corner - PCL 161-31-601-015
- Russell Rd & Gateway Ave - SW Corner - PCL 161-31-502-004
- Russell Rd & Palm Ave - SE Corner - PCL 161-32-102-001

A Place To Call Home

CITY OF HENDERSON
240 Water Street
P. O. Box 95050
Henderson, NV 89009

December 28, 2006

Mr. Chip Paulson, P.E.
MWH
1801 California Street, Suite 2900
Denver, CO 80202

Subject: NPDES FALL 2006 CHANNEL INSPECTION REPORT

Dear Mr. Paulson:

During the period of time between July 1 and November 30, 2006, the NPDES Fall channel inspections where conducted. The following is a summary of our observations:

C-1 CHANNEL SYSTEM:

The inspections found sediment and trash at various locations in the system:

1. Sediment, vegetation, and debris at various locations needs to be removed (C1CH 0000 to 0125).
2. Minor trash and debris at various locations needs to be removed (River Mile C1CH 0284 to 0502).

LOWER PITTMAN WASH CHANNEL:

The inspections found sediment and trash at various locations in the system:

1. Trash and vegetation in section of channel between Galleria and US 95 (River Mile PTDC 0118 to 0237).

The inspections found a steady flow of water at various locations in the system:

1. 36" RCP at Warm Springs Road, nuisance flow from Warm Springs Road.
2. 18" RCP west bank at Warm Springs Road, nuisance flow.
3. Sunset Road Bridge, west side 14-inch PVC with flap gate. Heavy flow of ground water.
4. 8-inch weep holes at the Whitney Channel interconnect with a constant ground water flow.
5. Constant ground water flow from Whitney Channel into the Lower Pittman Wash Channel.
6. Lower Pittman at Stephanie, north side 10-inch PVC with a flap gate. Heavy flow of ground water.

UPPER PITTMAN CHANNEL:

The inspections found minor vegetative growth at various locations in the system:

1. Vegetation in section of channel at Arroyo Grande Park. Can be removed during normal maintenance schedule (River Mile PTWA 0000 to 0047).

The inspections found a steady flow of water at various locations in the system:
1. Groundwater discharging from under the UPRR Bridge (River Mile PTWA 0106).
2. Groundwater discharging from 18-inch pipe at Arroyo Grande Park (River Mile PTWA 047).

RAILROAD EAST CHANNEL:

The inspections found sediment, trash, and construction debris at various locations in the system:
1. Remove trash and sediment in section of channel east of Stephanie (PTRE 0087 to 0098)

PITTMAN MACDONALD RANCH CHANNEL:

The inspections found standing water at the outlet of the channel:
1. Unplug discharge pipe at outlet of channel. (River Mile PTMR 0132).

WESTERN INTERCEPTOR:

The inspections found minor vegetative growth and trash build-up at various locations in the system:
1. Remove trash and vegetation at inlets to Western Interceptor (River Mile C1CH 0871 to 0930).

SUNRIDGE CHANNEL:

The inspections found overhanging vegetation at various locations in the system:
1. Trim overhanging vegetation to the top of property walls (River Mile PTPW 0216 to 0262).

PITTMAN PECOS CHANNEL:

The inspections found vegetative build-up at the discharge point of the system:
1. Remove vegetation at entrance and exit of culvert (River Mile PTPE 0096 to 0097).

PITTMAN STEPHANIE CHANNEL:

The inspections found construction debris at various locations of the system:
1. Remove build-up of construction debris in section of channel between I-215 and UPRR (River Mile PTST 0000).

DUCK CREEK CHANNEL:

The unlined portion of channel was cleaned and debris removed in the 3rd Quarter of 2005 - 2006. There was no debris or substantial growth of vegetation evident during the inspection.

The inspections found a steady flow of water at various locations in the system:
1. Constant water flow in channel is due to groundwater.

BLACK MOUNTAIN DETENTION BASIN

The inspections found trash at various locations in the detention basin:
1. Minor trash and sediment located at the outlet of the detention basin.

There was no water stored in the detention basin at this time.

PIONEER DETENTION BASIN

The inspections found trash and sediment at various locations in the detention basin:
1. Minor trash and sediment located at the outlet of the detention basin.
2. Clean out sediment in low flow channel and debris trap

There was no water stored in the detention basin at this time.

PITTMAN EAST DETENTION BASIN

The inspections found sediment and trash at various locations in the detention basin:
1. Remove sediment and trash at the outlet rack.

There was no water stored in the detention basin at this time.

ARROYO GRANDE PARK DETENTION BASIN

The inspections found no vegetation, sediment, or debris build-up in the detention basin.

There was no water stored in the detention basin at this time. However, the low flow channel conveys a steady flow of water to the Lower Pittman Channel System.

The remaining channels and detention basins in the system were inspected and found to be clean and dry with no maintenance required by City outside of the regularly scheduled inspections.

If you have any questions with the above information, please give me a call at 267-3024.

Respectfully submitted,

Albert J. Jankowiak, P.E., CFM
Project Engineer II
Public Works-Land Development

cc: Robert Murnane, Director Public Works
Curt Chandler, Land Development Manager

CITY OF HENDERSON
240 Water Street
P. O. Box 95050
Henderson, NV 89009

July 23, 2007

Mr. Chip Paulson, P.E.
MWH
1801 California Street, Suite 2900
Denver, CO 80202

RE: NPDES SPRING 2007 CHANNEL INSPECTION REPORT

Dear Mr. Paulson:

During the period of time between January 1 and June 30, 2007, the NPDES Spring channel inspections where conducted. The following is a summary of our observations:

LOWER PITTMAN WASH CHANNEL:

The inspections found a steady flow of water at various locations in the system:

1. 36" RCP at Warm Springs Road, nuisance flow from Warm Springs Road.
2. 18" RCP west bank at Warm Springs Road, nuisance flow.
3. Sunset Road Bridge, west side 14-inch PVC with flap gate. Heavy flow of ground water.
4. 8-inch weep holes at the Whitney Channel interconnect with a constant ground water flow.
5. Constant ground water flow from Whitney Channel into the Lower Pittman Wash Channel.
6. Lower Pittman at Stephanie, north side 10-inch PVC with a flap gate. Heavy flow of ground water.

UPPER PITTMAN CHANNEL:

The inspections found a steady flow of water at various locations in the system:

1. Groundwater discharging from under the UPRR Bridge (River Mile PTWA 0106).
2. Groundwater discharging from 18-inch pipe at Arroyo Grande Park (River Mile PTWA 047).

DRAKE CHANNEL:

The inspections found vegetation at various locations in the system:

1. Remove vegetation immediately upstream of confluence with C-1 Channel (Rive Mile C1DC 0000 to 0045).

I-515 CHANNEL:

The inspections found trash in the channel:

1. Remove minor trash during regular maintenance (River Mile PTIS 0102)

PITTMAN PECOS CHANNEL:

The inspections found openings in the fence along the channel:
1. Repair fence along channel (River Mile PTPE 0097).

EASTERN CHANNEL:

The inspections found trash and debris, and openings in the fence, at various locations of the system:
1. Remove trash and debris in channel (River Mile PTEA 0125).
2. Repair fence at various locations (River Mile PTEA 0125).

MISSION HILLS DETENTION BASIN

The inspections found trash and debris at various locations in the detention basin:
1. Remove trash and debris located at the spillway apron of the detention basin (River Mile C1CH 0854).

There was no water stored in the detention basin at this time.

EAST C-1 DETENTION BASIN

The inspections found damage to the spillway of the detention basin:
1. Repair damaged concrete at the spillway (C1DC 0303).

There was no water stored in the detention basin at this time.

PIONEER DETENTION BASIN

The inspections found trash and sediment, and damage to the fence, at various locations in the detention basin:
1. Minor trash and sediment located at the outlet and low flow channel of the detention basin (River Mile PTVW 0185).
2. Repair access gate (PTVW 0185).

There was no water stored in the detention basin at this time.

ARROYO GRANDE PARK DETENTION BASIN

The inspections found no vegetation, sediment, or debris build-up in the detention basin.

There was no water stored in the detention basin at this time. However, the low flow channel conveys a steady flow of water to the Lower Pittman Channel System.

The remaining channels and detention basins in the system were inspected and found to be clean and dry with no maintenance required by City outside of the regularly scheduled inspections.

If you have any questions with the above information, please give me a call at 267-3024.

Respectfully submitted,

Albert J. Jankowiak, P.E., CFM
Project Engineer II
Public Works-Land Development

cc: Robert Murnane, Director Public Works
Curt Chandler, Land Development Manager

City of Las Vegas

Storm Channel Inspection Report
Fall 2006

NPDES Municipal Separate Storm Sewer System Permit

PART I: INSPECTION SUMMARY

On October 4, October 5 and October 31, 2006, John Solvie and Cheng Shih of the City of Las Vegas Department of Public Works visually inspected exposed storm channels and detention basins located within the City of Las Vegas, primarily focusing on those where dry weather flow persisted. Robert Welch of the City of Las Vegas Department of Public Works participated in inspections performed on October 4, 2006.

The inspections were performed by visually observing open channel sections and looking for evidence of non-stormwater discharges. Emphasis was placed on those areas that had a reasonable potential of containing illicit discharges, exfiltration from the sanitary sewer system or other sources of non-stormwater. Also looked for were heavy sediment loads that may be associated with construction site runoff.

Weather conditions all days included partly cloudy skies and light breezes. The high temperature was 89º F on October 5, 78º F on October 5 and 74º F on October 31. There was no measurable rainfall the days prior to the inspections. Inspections were halted on October 5, 2006 when it began to rain and were concluded on October 31, 2006.

The report identifies the channels and detention basins that were inspected and the observations that were made. The Upper Las Vegas Wash Detention Basin, while located within the corporate boundaries of the City of Las Vegas, is not included in the inspections, as the City of North Las Vegas is responsible for both inspecting and maintaining this basin. The channel formerly identified as Las Vegas Creek Lateral and been redesignated in this report and in future reports as Langtry Channel

The report has been internally distributed to the City Engineer Division and the Streets & Sanitation Division to make them aware of the findings. Follow-up actions by these Divisions will be determined and executed at their discretion.

Parts II and III of the report identifies the channels and detention basins that were inspected (in alphabetical order) and the dates they were inspected. Parts IV and V of the report details the inspection findings for each channel and detention basin including which ones contained exposed dry weather flow. Part VI of the report details potential problems observed, actions taken and recommended follow-up activities. The attached map shows the majority of major above-ground and below-ground storm conveyances that affect the City of Las Vegas.

Storm channel inspections are conducted semi-annually as specified in the Las Vegas Valley Storm Water Management Plan for Municipal Separate Storm Sewer System. Current co-permittees of the Clark County NPDES Municipal Separate Storm Sewer System Permit, which became effective on June 19, 2003, include the Clark County Regional Flood Control District, City of Las Vegas, City of North Las Vegas, City of Henderson and Clark County.

PART II: CHANNELS INSPECTED

CHANNEL (*Date Inspected*)	PORTION INSPECTED
Angel Park / Summerlin Channel (*10/5/06*)	1) East/west channel located on the north side of Alta Dr, from the 215 Beltway to Town Center Dr 2) North/south channel located on the west side of Anasazi Dr, from Banburry Cross Dr to Summerlin Pkwy 3) East/west channel located on the south side of Summerlin Pkwy, from Anasazi Dr to Town Center Dr 4) Box culvert outlet located on the east side of Rampart Blvd, between Canyon Run Dr & Summerlin Pkwy (adjacent to the 2nd hole on the Angel Park Par 3 "Cloud Nine" Golf Course)
Beltway Channel (*10/4/06*)	North/south channel located next to the of the 215 Beltway, from Charleston Blvd to US-95
Buffalo Channel (*10/4/06*)	North/south channel located between Buffalo Dr & Tenaya Way, from Washington Ave to the Gowan South Detention Basin
Capella Storm Drain (*10/31/06*)	Bubble up outlet on the north side of Capella Ave, located between Valley View Blvd & Procyon St (surface street flow continues eastward to the Freeway Channel at Sirius Ave)
Cedar Creek (*10/31/06*)	East/west channel located between Bonanza Rd & Stewart Ave, from Pecos Rd to Las Vegas Wash
Cheyenne Channel (*10/4/06*)	East/west channel located on the south side of Cheyenne Ave, from approximately 400' west of Spring Shadow Rd to the Gowan South Detention Basin
Freeway Channel (*10/31/06*)	North/south channel located on the west side of I-15, from the Desert Inn Arterial to Kings Way
Gilmore Channel (*10/4/06*)	1) East/west channel located along the south side of Gilmore Ave, extending one block east of Cliff Shadows Pkwy 2) East/west channel along the Gilmore Ave right-of-way, from the 215 Beltway to Lone Mountain Detention Basin
Gowan North Channel (*10/4/06*)	East/west channel located just south of Alexander Rd, from Durango Dr to Buffalo Dr

CHANNEL (*Date Inspected*)	PORTION INSPECTED
Las Vegas Creek (*10/31/06*)	1) East/west channel located on the south side of Alta Dr, from Bedford Rd to Valley View Blvd 2) East/west channel, turning into a north/south channel located east of Valley View Blvd, from Alta Dr to Meadows Detention Basin (inside the LVVWD property) 3) Large opening located on the southeast side of the US-95 / I-15 interchange 4) Opening located on the southeast side of US-95 and F St 5) Opening located on the southwest side of US-95 and the railroad tracks 6) North/south channel located on the east side of Veterans Memorial Dr, just north of Bonanza Way 7) Confluence of Las Vegas Creek and Las Vegas Wash
Las Vegas Wash (*10/31/06*)	North/south channel located between Pecos Rd and Nellis Blvd, from Owens Ave (just east of Stevens St) to Charleston Blvd (just west of Nellis Blvd)
Langtry Channel (*10/31/06*)	North/south channel located between Langtry Dr & Starks Dr, from Bonanza Rd to Washington Ave
Red Rock / Hualapai Collector (*10/5/06*)	North/south channel located on the east side of Hualapai Way and east/west channel located on the north side of Desert Inn Rd, extending one block northward and one block eastward of the Hualapai / Desert Inn intersection
US-95 Channels (*10/4/06*)	North/south channels located alongside US-95, from Kyle Canyon Rd to Vegas Dr
Miscellaneous channels (*10/4,5 & 31/06*)	Confirmed dry or underground miscellaneous channels throughout the City of Las Vegas

PART III: BASINS INSPECTED

BASIN (*Date Inspected*)	PORTION INSPECTED
Angel Park Detention Basins (*10/5/06*)	1) South side of Vegas Dr, just east of Rampart Blvd 2) West side of Durango Dr, at Westcliff Dr
Box Canyon Detention Basin (*10/4/06*)	West of Lone Mountain – Beltway Detention Basin
Cam 10 Detention Basin (*10/4/06*)	West of 215 Beltway, north of Ann Rd
Elkhorn Springs Detention Basin (*10/4/06*)	West side of Buffalo Dr, between Sunny Springs Ln and Golden Talon Ave
Fort Apache Detention Basin (*10/4/06*)	Southwest side of Bath Dr and Fort Apache Rd
Gowan Detention Basins (*10/4/06*)	1) East side of Tenaya Way, from Cheyenne Ave to Peak Dr 2) East side of Tenaya Way, from Buckskin Ave to Gowan Rd 3) East side of Tenaya Way, from Gowan Rd to Alexander Rd
Lone Mountain Detention Basin (*10/4/06*)	North side of Gowan Rd, between Hualapai Way & Jensen St
Lone Mountain – Beltway Detention Basin (*10/4/06*)	Northwest, southwest and southeast sides of Lone Mountain Rd and the 215 Beltway
Meadows Detention Basin (*10/31/06*)	Southeast of US-95 and Valley View Blvd, inside the LVVWD property.
Mojave / US-95 Detention Basin (*10/31/06*)	North side of US-95, from Mojave Rd to 30th St
Oakey Detention Basin (*10/5/06*)	West side of Torrey Pines Dr, from Oakey Blvd to O'Bannon Dr
Rainbow Detention Basin (*10/5/06*)	East and west side of Rainbow Blvd, just south of US-95
Rancho Alta Mira Detention Basin (*10/4/06*)	South side of Brookmere Dr & Blue Royal Dr

BASIN (*Date Inspected*)	PORTION INSPECTED
Rancho Detention Basin (*10/4/06*)	West side of Centennial Center Blvd, just south of Tropical Pkwy
Summerlin 5 Detention Basin (*10/4/06*)	West of Desert Foothills Dr, between Far Hills Ave & Alta Dr
Summerlin Village 7 Detention Basin (*10/5/06*)	North side of Village Center Cir and Trails Center Dr (Trails Park)
Village 26 Detention Basin (*10/4/06*)	West side of the 215 Beltway, south of Cheyenne Ave

PART IV: CHANNEL INSPECTION FINDINGS

ANGEL PARK / SUMMERLIN CHANNEL

- The exposed portions of the channel west of Town Center Dr are lined with concrete (to the 215 Beltway). The exposed channel east of Town Center Dr is an earthen wash to the Angel Park Detention Basin.
- There was minor flow in the exposed portions of the channel 1) along Alta Dr, and 2) where the channel becomes exposed on Anasazi Dr to Town Center Dr where it percolates into the ground. The water appeared clean.
- There was minor nuisance flow in the channel along Alta Dr. The water appeared clean. Moderate vegetation was noted in the channel joints. There was significant graffiti in the channel just east of the 215 Beltway.
- There channel was dry at Town Center Dr with graffiti on the side of the overpass. Minor vegetation was noted.
- The box culvert outlet located adjacent to the 2nd hole on the Angel Park Par 3 "Cloud Nine" Golf Course had a low to medium flow, which entered a sediment trap. The water appeared clean. No odor was noted.
- The channel contained no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris.

BELTWAY CHANNEL

- The channel was dry. Minor nuisance water was periodically noted.
- Significant tumbleweeds were noted in the channel west of Fort Apache Detention Basin.
- Minor graffiti was noted in various areas of the channel.
- The channel contained no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris.

BUFFALO CHANNEL

- The channel contained low intermittent flow between Peak Drive and Gowan South Detention Basin and in isolated sections upstream to Summerlin Parkway. Water was ponding at the Gowan South Detention Basin. The water appeared clean.

- The enclosed box channel that enters the west side Buffalo Channel just north of Lake Mead Boulevard contained garbage and had a strong urine odor.

- There was minor graffiti at various locations in the channel.

- The channel contained no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris.

CAPELLA STORM DRAIN

- The bubble up outlet located on the north side of Capella Ave, between Valley View Blvd & Procyon St, was dry.

- There was intermittent nuisance flow in the gutters. The water appeared clean.

- The channel contained no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris.

CEDAR CREEK

- The flow was low and constant throughout the channel. The water appeared clean.

- The channel contained minor algae on the bottom of the channel. No vegetation was noted.

- The channel contained minor graffiti.

- The channel contained no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris.

CHEYENNE CHANNEL

- A new entrance gate has been installed at the top of the channel.

- The access gates near Fort Apache Rd and El Capitan Way were open. CLV crews were in the channel clearing a storm drain blockage in an inlet pipe, which they described as construction debris that had likely been in the pipe since it was originally installed many years ago.

- There was minor undermining on the outer portion of the north side of the channel at locations where there were inlet grates on the south side of the channel. The water enters the channel and flows over the north side of the channel onto the dirt.

- A gap in the channel joint was noted approximately 50' east of Grand Canyon Dr.

- Trickle flow entered the channel at Grand Canyon Dr, which quickly dissipated. Minor flow entered the channel underneath Rampart Blvd and Soft Breezes Dr, which flowed continuously to the Gowan South Detention Basin. There was minor ponding where the water entered the basin. The water appeared clean.

- There was graffiti underneath the underpasses.

- The section of soil noted during the last inspection that was washed out on the north side of the channel, a few hundred feet east of Grand Canyon Blvd, has deepened further. Photos were taken and forwarded to CLV Flood Control.

- Sediment that was noted during the previous inspection where the channel entered Gowan South Detention Basin has been removed.

- A large inlet pipe on the south side of the channel at Gowan South Detention Basin that was noted as collapsed during the previous inspection has been repaired.

- The channel contained no visible evidence of illegal connections, illicit discharges or excessive sediment.

<u>FREEWAY CHANNEL</u>

- The water in the channel was very slow moving from Desert Inn Rd to Sirius Ave. The water appeared clean. Moderate sediment, minor algae and minor algae were noted in the channel. The remainder of the channel was dry.

- The channel contained no visible evidence of illegal connections, illicit discharges or excessive sediment.

<u>GILMORE CHANNEL</u>

- The channel on the west side of the 215 Beltway had minor flow and contained minor debris.

- The channel on the east side of the 215 Beltway was dry and clean.

- The channel contained no visible evidence of illegal connections, illicit discharges or excessive debris.

<u>GOWAN NORTH CHANNEL</u>

- There was a minor nuisance flow entering the channel at Durango Dr with additional flow entering at Cimarron Rd. The water appeared clean. The channel was dry from Durango Dr to Lone Mountain Rd.

- Sediment and garbage was noted in the channel tunnel underneath Durango Dr and Alexander Rd. Minor landscaping waste was sitting in the north side of the channel between Cimarron Rd and Buffalo Dr.

- The channel contained minor graffiti.

- The channel contained no visible evidence of illegal connections, illicit discharges or excessive debris.

LAS VEGAS CREEK

- The flow was low and continuous throughout the creek with minor algae. The water appeared clean.

- Minor graffiti and minor vegetation were noted in the creek along Alta Dr, west of Valley View Blvd.

- Construction activity continues inside Meadows Detention Basin and inside the Las Vegas Valley Water District property on the south side of US-95. The channel is enclosed between Meadows Detention Basin and US-95. The LVVWD property and the Meadows Detention Basin is becoming a public park.

- The portion of the creek alongside US-95 is being covered as part of the freeway widening project.

- There was moderate vegetation noted inside the channel at the opening on the southeast side of the US-95 / I-15 interchange. The water appeared clean. Algae was visible on the bottom of the channel.

- There was no vegetation noted inside the channel at the opening on the southeast side of US-95 and F St. The water appeared clean.

- There was no vegetation noted inside the channel at the opening next to the railroad tracks. The water appeared clean.

- The channel opening at Veterans Memorial Pkwy contained no vegetation. Algae was visible on the bottom of the channel. The water appeared clean.

- The creek contained no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris.

LAS VEGAS WASH

- The flow was moderate & constant throughout the wash. The wash contained moderate algae and minor to heavy vegetation at some locations. The water appeared clean.

- Wire stripping debris and motor oil had been thrown over the back wall of the apartment complex located on the south side of the wash (outside of the wash), just west of Lamb Blvd.

- Moderate to heavy sediment was noted in the wash just south of Washington Ave. It could not be ascertained whether the sediment was construction related. There were no construction sites noted upstream to Owens Ave, where CLV's corporate boundaries end.

- There was graffiti underneath the underpasses. Heavy graffiti was noted at the confluence to Las Vegas Creek, south of Owens Ave.

- The channel contained no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris.

LANGTRY CHANNEL

- The flow was low and continuous. Minor floating algae was noted. The water appeared clean.

- The channel joints showed signs of separation.

- The channel contained minor garbage and debris.

- The channel contained no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris.

MISCELLANEOUS CHANNELS

- A recently burned white Dodge Magnum Hemi was discovered in the desert south of Village 26 Detention Basin. The Las Vegas Metropolitan Police Department was dispatched to the scene.

- A recently burned 4-door sedan was discovered in the desert west of Summerlin 5 Detention Basin. The Las Vegas Metropolitan Police Department was dispatched to the scene.

RED ROCK / HUALAPAI COLLECTOR

- There was a minor trickle on the east end of the channel originating from the neighborhood to the north. The water appeared clean.

- The channel contained no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris.

US-95 CHANNELS

- The channels were clean.

- The channels contained no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris.

PART V: BASIN INSPECTION FINDINGS

ANGEL PARK DETENTION BASINS

Angel Park North Basin

- The basin contained moderate vegetation. Two small piles of concrete construction debris were noted on the far northwest corner of the basin. Landscaping debris, carpet scraps and furniture were noted in the northern end of the basin.

- The grate located on the northeast side of the basin was dry. A tailgate and bumpers were sitting adjacent to it.

- Vehicle and ATV tracks were noted inside the basin.

- The basin was dry and contained no visible evidence of illegal connections, excessive sediment or excessive debris.

Angel Park South Basin

- The basin contained moderate vegetation. Two burned scooters were sitting in the basin.

- The grate located on the southeast side of the basin contained minor nuisance flow, minor debris, moderate vegetation and minor graffiti. The water appeared clean.

- The small outlet structure on the east side of the basin was covered with debris.

- Vehicle and ATV tracks were noted inside the basin.

- The basin was dry and contained no visible evidence of illegal connections, excessive sediment or excessive debris.

BOX CANYON DETENTION BASIN

- Not yet under construction. There is currently a quarry in the area, which will eventually become the detention basin.

CAM 10 DETENTION BASIN

- The basin was dry and clean. The outlet grate was clean.

- A number of chains between the concrete bollards surrounding the basin have been forcibly removed and thrown into the basin.

- The basin was dry and contained no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris.

ELKHORN SPRINGS DETENTION BASIN (Sunny Springs Park)

- The inlet grates located on the north, southeast and the east sides of the basin and the outlet grate located on the east side of the basin contained standing water. The water appeared clean. A water level sensor is located inside the outlet grate.

- Minor rocks and sediment were noted inside the southeast inlet grate.

- Minor vegetation was noted inside the inlet grate on the east side of the basin.

- A bolt was missing and a bar has been removed from the outlet trash rack on the east side of the basin.

- There was erosion in the basin adjacent to the grate caused by runoff from Betsy Rhodes Elementary School, which is located next to the basin.

- The basin was dry and contained no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris.

FORT APACHE DETENTION BASIN

- There was noticeable erosion on the inlet ramp. Moderate rocks and sediment and discarded pallets were noted at the bottom of the ramp.

- There was moderate debris on the outlet grate. Garbage was noted inside the grate.

- The entrance chain was removed on the south side and west side of the basin.

- A truck liner was sitting in the bottom of the basin.

- One of the cubicle concrete barriers was pushed half way down the inside of the basin on the west side.

- The basin was dry and contained no visible evidence of illegal connections, illicit discharges or excessive sediment.

GOWAN DETENTION BASINS

Gowan North Upper Detention Basin

  - The dog park located inside the basin is complete.

- Moderate to heavy vegetation was growing inside the basin, especially near the inlet grate located at the northwest corner of the basin.

- The inlet grate located at the northwest corner of the basin was clean and contained minor flow. The water appeared clean.

- The outlet grate located on the south side of the basin was clean. Hay bales that used to be wrapped around the grate are now sitting adjacent to the grate. There was standing water inside the grate, which appeared clean.

- Some of the chains have been removed between the bollards surrounding the basin and some of the bollards have been undermined from erosion and are tilting into the basin.

- The basin contained no visible evidence of illegal connections, illicit discharges or excessive sediment.

Gowan North Lower Detention Basin

- The basin continues to be used as a soccer field.

- Moderate to heavy vegetation was noted in the low flow channel.

- The inlet grate located on the southeast corner of the basin contained moderate garbage and debris. There was standing water and moderate flow in the inlet pipe. The water appeared clean. Standing water was noted outside of the grate, which appeared to be caused by irrigation overspray. The fence located on the side of the grate was broken.

- The inlet grate located on the southwest corner of the basin was dry and contained minor sediment. A large chunk of concrete has broken off of the structure itself.

- The outlet grate located on the north side of the basin was clean. There was standing water underneath the grate. The water appeared clean.

- The basin contained no visible evidence of illegal connections, illicit discharges or excessive sediment.

Gowan South Detention Basin

- There was minor nuisance flow entering the basin at Cheyenne Channel and Buffalo Channel. The water appeared clean.

- The water inside the exit grate appeared clean. Significant ponding was noted outside of the grate. No garbage or debris was noted.

- There was minor vegetation growing inside the basin.

- The channel contained no visible evidence of illegal connections, illicit discharges or excessive sediment.

LONE MOUNTAIN DETENTION BASIN

- Construction is underway on the south and west side of the basin. Construction fencing is located inside the basin.

- The basin contained little to no vegetation.

- The Gilmore Channel inlet ramp on the west side contained minor nuisance flow, which ran down the low-flow channel on the north side of the channel. The water appeared clean.

- The inlet ramp on the south side of the basin was clean and dry.

- The inlet pipe on the southeast corner of the lower basin was clean and dry.

- The concrete outflow grate located on the northeast side of the basin was clean and dry.

- The concrete inlet structure located on the west side of the basin contained minor sediment and minor graffiti.

- The basin contained no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris.

LONE MOUNTAIN – BELTWAY DETENTION BASIN

- The basin is very large and was still under construction at the time of the inspection.

- The large basin located on the west side of the 215 beltway is still used as a gravel pit.

- The basin was dry.

- The basin contained no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris.

MEADOWS DETENTION BASIN

- Work continues on converting the basin into a park by the LVVWD. The basin contains ponds, trees and vegetation, which has grown significantly since the last inspection.

- The inlet structure contained moderate sediment. The outlet structure was clean.

- The basin contained no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris.

MOJAVE / US-95 DETENTION BASIN

- The basin was dry.
- The inlet & outlet were clean.
- A large pile of decorative rock has been placed in the southeast end of the basin.
- The basin contained moderate to heavy vegetation.
- The entrance gate has been bent further subsequent to what was noted during the last inspection.
- The basin contained no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris.

OAKEY DETENTION BASIN

- The basin contained little to no vegetation.
- The entrance grate located on the northwest side of the basin was clean and dry.
- The exit grate located on the northeast side of the basin contained minor standing water. The water appeared clean.
- The entrance grate located on the southwest side of the basin was clean and dry and contained graffiti. The water appeared clean.
- The basin contained no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris.

RAINBOW DETENTION BASINS

Rainbow East Detention Basin

- The basin contained no vegetation.
- The inlet structure on the northwest side of the basin contained minor flow, minor rocks and minor sediment. The water appeared clean.
- The two inlet structures on the south side of the basin were clean and contained minor nuisance flow. The water appeared clean.

- The outlet structure located on the east side of the basin was dry and clean.

- The basin contained no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris.

Rainbow West Detention Basin

- The basin was unable to be safely accessed due to adjacent construction activities.

- The basin contained no vegetation.

- The basin contained no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris.

RANCHO ALTA MIRA DETENTION BASIN

- The basin is a small park.

- Adjacent landscaping rocks were collecting inside the outlet grate.

- The basin contained no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris.

RANCHO DETENTION BASIN

- The inlet & outlet were clean.

- The basin contained minor vegetation.

- The inlet ramp located at the southwest corner of the basin began contained significant flow. The water appeared clean. The source of the flow turned out to be Las Vegas Valley Water District well purging at Cimarron Rd and El Campo Grande Ave. The area in front of the inlet ramp still shows signs of significant erosion.

- The inlet located on the northwest side of the basin also contained significant flow, which was also determined to be from Las Vegas Valley Water District well purging. The water appeared clean. Moderate vegetation was noted in front of the inlet structure.

- One of the two inlet pipes located on the northeast side of the basin contained minor flow. The water appeared clean.

- The outlet grate located on the southeast side of the basin was dry and contained minor sediment.

- The basin contained no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris.

SUMMERLIN 5 DETENTION BASIN

- Approximately nine acres of the inside of the basin is still a plant nursery / staging area for Howard Hughes Corporation. Four water tanks are located inside the basin. The temporary structure is still inside the basin. The basin was not entered because of the "no trespassing private property" signs posted around the outside of the basin.

- Apart from the plant nursery, the basin was dry.

- The basin contained no visible evidence of illegal connections, illicit discharges or excessive sediment.

SUMMERLIN VILLAGE 7 DETENTION BASIN

- The basin is a park with baseball fields.

- The outlet pipe contained rocks.

- The basin contained no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris.

VILLAGE 26 DETENTION BASIN

- The basin was dry.

- The basin contained minor vegetation.

- One of the horizontal bars was missing from the exit grate located on the north side of the channel. The inside of the grate contained minor rocks and graffiti.

- The basin contained no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris.

- There was evidence of bonfires in front the outlet grate.

- A quarry has been put into service just west side of the basin.

PART VI: ACTIONS TAKEN AND RECOMMENDED FOLLOW-UP ACTIVITIES

The report has been internally distributed to the City Engineer Division and the Streets & Sanitation Division to make them aware of the findings. Follow-up actions by these Divisions will be determined and executed at their discretion.

Meeting Minutes
Southern Delivery System Environmental Impact Statement
Progress Conference Call
5 December 2006, 1:00 p.m. to 3:00 p.m.

MWH

Attendees: *Reclamation:* B. Boaz, R. Tisdale-Hein
Colorado Springs Utilities: K. Riley, C. Baker
ERO/MWH: B. Van Derveer, S. Petrunich, R. Trenholme, C. Paulson

Notes Compiled By: S. Petrunich **Notes Approved by:** R. Tisdale-Hein

Distribution: *Reclamation:* B. Boaz, R. Burton, D. Fritz, T. Gomoll, J. Gould, K. Lamb, J. Lyons, T. Musgrove, L. Smith, R. Thomasson, R. Tisdale-Hein, W. Tully, L. Vehmas
Colorado Springs Utilities: C. Baker, R. Bartels, S. Berry, G. Bostrom, K. Bricker, D. Padgett, K. Riley, M. Shea
EIS Consultant Team: S. Canton, D. Conklin, L. Fardal, D. Jeavons, T. Lennon, C. Paulson, S. Petrunich, R. Trenholme, B. Van Derveer

Distribution Date: January 9,2007

Project Management

A. Previous Action Items

1. None.

B. New Business

1. **Action Item: Bill Van Derveer will send a summary of major EIS milestones that reflects forthcoming alternatives changes to Reclamation and Utilities by 6 December.**

Agency Coordination and Public Communication

A. Previous Action Items

1. **Springs Utilities to update comments on the Cultural PA.**
   (a) In Progress. Keep as an Action Item. This is a priority and will be completed as soon as the final No Action Alternative is established.
2. **Reclamation will look into any issues concerning the FWS for the 2007 fiscal year and update them accordingly.**
   (a) On hold until the final No Action Alternative is established. Keep as an Action Item.
3. **Bill Van Derveer to organize a meeting with DOW to discuss hydrology and aquatic resources effects.**
   (a) On hold until the final No Action is established. Keep as an Action Item.
4. **When the No Action Alternative is established, a SDS EIS Newsletter regarding project status will be developed and distributed.**
   (a) On hold until the final No Action is established. Keep as an Action Item.
5. **Beth Boaz is to update Fremont County and other cooperating agencies of the project status, once the schedule update has been completed.**
   (a) On hold until the final No Action is established. Keep as an Action Item.

6. Beth Boaz to send meeting agenda to Keith Riley regarding the November 29th meeting for NAA.
   (a) Complete.

B. New Business

1. Development of a cooperating agency agreement between Reclamation and EPA is continuing.
2. Renewal of the USGS agreement with Reclamation is nearly complete.
3. Utilities staff recently met with the Fremont County Commissioners to provide information on the SDS project. Utilities committed to quarterly updates to this body.

EIS Chapters and Sections

A. Previous Action Items

1. None.

B. New Business

1. No Action Alternative.
   (a) Utilities is continuing to develop a final No Action Alternative. It was determined that the alternative concept presented to Reclamation last week likely requires some changes to provide adequate yield. Utilities will present a final No Action Alternative concept to Reclamation after a further evaluation of options.
2. Content Guidelines for EIS Chapters and Sections.
   (a) Draft guidelines for the content of EIS chapters and sections were discussed (copy attached). The final document will define general expectations for EIS chapters and sections that are shared by Reclamation, Utilities, and EIS consulting team. Utilities reviewed the draft and had no comments. Reclamation's Great Plains Regional Office suggested some additions. The following additions will be made:
      (i) A statement that key issues to be analyzed have already been identified through scoping will be added.
      (ii) Descriptions of any critical assumptions that are being made will be added.
      (iii) A statement that EIS sections are not intended to "stand-alone" – that cross-referencing other sections is desired – will be added.
      (iv) A statement that acronyms will be defined only at first use and that a list of acronyms will be included in the EIS will be added.
   (b) **Action Item: Beth Boaz will check with Eastern Colorado Area Office staff for additional comments and forward them to Bill Van Derveer.**
   (c) **Action Item: Bill Van Derveer will incorporate the comments from this discussion and any others from the Eastern Colorado Area Office and provide final draft guidelines to Beth Boaz for approval.**
3. Reviews of EIS Deliverables.
   (a) Opportunities to make deliverables reviews easier for reviewers and to receive more focused comments were discussed.
      (i) A draft table of contents for the EIS will be provided to reviewers of EIS chapters and sections.
      (ii) Draft deliverables for review will be combined into packages by topic, when practicable. For example, the Draft Wetland and Riparian Resources Technical Report (describing existing conditions) and the

Draft Wetlands and Riparian Areas section of the Draft EIS would be provided to reviewers at the same time.

(iii) **Action Item: Chip Paulson will evaluate how a simple diagram/chart that shows changes in hydrology for each alternative could be developed.**

4. Mitigation Planning.
   (a) **Action Item: Reclamation will research if any uniformity to mitigation plans have been done in the past for other EIS's and ROD's.**
   (b) **Action Item: Richard Trenholme is to distribute a conceptual mitigation plan to the Progress team that was developed for a road project that ERO completed.**
   (c) **Action Item: Reclamation and Utilities will create guidelines for a conceptual mitigation plan for the EIS team.**
   (d) **Action Item: Bill Van Derveer will talk with WCRM regarding whether a mitigation conceptual plan is needed.**
5. Proposed Upper Williams Creek Reservoir Site Facilities Layout.
   (a) Information on proposed facilities layouts at the Upper Williams Creek Reservoir site are needed for EIS analyses. CH2MHill has completed the geotechnical drilling at this site and a report should be completed in a few weeks. Facilities layouts will follow. **Action Item: Bill Van Derveer will check with CH2MHILL on the timeline for completing proposed facilities layouts at the Upper Williams Creek Reservoir site.**

Major Permits/Approvals

[404 Permit Application/404(b)(1) Analysis; Fish & Wildlife Coordination Act Report; Endangered Species Act Biological Assessment/Opinion; Pueblo County 1041 Application]

A. Previous Action Items

1. None.

B. New Business

1. None.

Contracting

A. Previous Action Items

1. **Beth Boaz will inform Springs Utilities the time frame for reviewing the CH2MHILL's computational fluid dynamics analysis of the Joint Use Manifold by September 11, 2006.**
   (a) In Progress. Keep as an Action Item. Additional information was requested and received by Reclamation. This analysis is being reviewed by Reclamation.

B. New Business

1. **Action Item: Beth Boaz is to get a draft revision of the MOU between Reclamation and Utilities to Keith Riley with changes made regarding Pueblo West.**

Other

A. Previous Action Items

1. None.

B. New Business

1. The next progress update will be a conference call on December 19th at 11am.

City of Las Vegas

Storm Channel Inspection Report
Spring 2007

NPDES Municipal Separate Storm Sewer System Permit

PART I: INSPECTION SUMMARY

On April 9, April 25 and May 3, 2007, John Solvie and Cheng Shih of the City of Las Vegas Department of Public Works visually inspected exposed storm channels and detention basins located within the City of Las Vegas, primarily focusing on those where dry weather flow persisted.

The inspections were performed by visually observing open channel sections and looking for evidence of non-stormwater discharges. Emphasis was placed on those areas that had a reasonable potential of containing illicit discharges, exfiltration from the sanitary sewer system or other sources of non-stormwater. Also looked for were heavy sediment loads that may be associated with construction site runoff.

Weather conditions all days included sunny skies and light breezes. The high temperature was 87º F on April 9, 88º F on April 25 and 77º F on May 3. There was no measurable rainfall immediately prior to the inspection days.

The report identifies the channels and detention basins that were inspected and the observations that were made. The Upper Las Vegas Wash Detention Basin, while located within the corporate boundaries of the City of Las Vegas, is not included in the inspections, as the City of North Las Vegas is responsible for both inspecting and maintaining this basin.

The report has been internally distributed to the City Engineer Division and the Streets & Sanitation Division to make them aware of the findings. Follow-up actions by these Divisions will be determined and executed at their discretion.

Parts II and III of the report identifies the channels and detention basins that were inspected (in alphabetical order) and the dates they were inspected. Parts IV and V of the report details the inspection findings for each channel and detention basin including which ones contained exposed dry weather flow. Part VI of the report details actions taken and recommended follow-up activities. The attached map shows the majority of major above-ground and below-ground storm conveyances within the City of Las Vegas.

Storm channel inspections are conducted semi-annually as specified in the Las Vegas Valley Storm Water Management Plan for Municipal Separate Storm Sewer System. Current co-permittees of the Clark County NPDES Municipal Separate Storm Sewer System Permit, which became effective on June 19, 2003, include the Clark County Regional Flood Control District, City of Las Vegas, City of North Las Vegas, City of Henderson and Clark County.

PART II: CHANNELS INSPECTED

CHANNEL (*Date Inspected*)	PORTION INSPECTED
Angel Park / Summerlin Channel (*4/25/07*)	1) East/west channel located on the north side of Alta Dr, from the 215 Beltway to Town Center Dr 2) North/south channel located on the west side of Anasazi Dr, from Banburry Cross Dr to Summerlin Pkwy 3) East/west channel located on the south side of Summerlin Pkwy, from Anasazi Dr to Town Center Dr 4) Box culvert outlet located on the east side of Rampart Blvd, between Canyon Run Dr & Summerlin Pkwy (adjacent to the 2nd hole on the Angel Park Par 3 "Cloud Nine" Golf Course)
Beltway Channel (*4/9/07*)	North/south channel located next to the of the 215 Beltway, from Charleston Blvd to US-95
Buffalo Channel (*4/9/07*)	North/south channel located between Buffalo Dr & Tenaya Way, from Washington Ave to the Gowan South Detention Basin
Capella Storm Drain (*4/25/07*)	Bubble up outlet on the north side of Capella Ave, located between Valley View Blvd & Procyon St (surface street flow continues eastward to the Freeway Channel at Sirius Ave)
Cedar Creek (*5/3/07*	East/west channel located between Bonanza Rd & Stewart Ave, from Pecos Rd to Las Vegas Wash
Cheyenne Channel (*4/9/07*)	East/west channel located on the south side of Cheyenne Ave, from approximately 400' west of Spring Shadow Rd to the Gowan South Detention Basin
Freeway Channel (*4/25/07*)	North/south channel located on the west side of I-15, from the Desert Inn Arterial to Kings Way
Gilmore Channel (*4/25/07*)	1) East/west channel located along the south side of Gilmore Ave, extending one block east of Cliff Shadows Pkwy 2) East/west channel along the Gilmore Ave right-of-way, from the 215 Beltway to Lone Mountain Detention Basin
Gowan North Channel (*4/9/07*)	East/west channel located just south of Lone Mountain Rd, extending southward to the intersection of Alexander Rd and Durango Dr, the extending eastward to Buffalo Dr

CHANNEL (*Date Inspected*)	PORTION INSPECTED
Las Vegas Creek (*5/3/07*)	1) East/west channel located on the south side of Alta Dr, from Bedford Rd to Valley View Blvd 2) East/west channel, turning into a north/south channel located east of Valley View Blvd, from Alta Dr to Meadows Detention Basin (inside the LVVWD property) 3) Large opening located on the southeast side of the US-95 / I-15 interchange 4) Opening located on the southeast side of US-95 and F St 5) Opening located on the southwest side of US-95 and the railroad tracks 6) North/south channel located on the east side of Veterans Memorial Dr, just north of Bonanza Way 7) Confluence of Las Vegas Creek and Las Vegas Wash
Las Vegas Wash (*5/3/07*)	North/south channel located between Pecos Rd and Nellis Blvd, from Owens Ave (just east of Stevens St) to Charleston Blvd (just west of Nellis Blvd)
Langtry Channel (*5/3/07*)	North/south channel located between Langtry Dr & Starks Dr, from Bonanza Rd to Washington Ave
Red Rock / Hualapai Collector (*4/25/07*)	North/south channel located on the east side of Hualapai Way and east/west channel located on the north side of Desert Inn Rd, extending one block northward and one block eastward of the Hualapai / Desert Inn intersection
US-95 Channels (*4/25/07*)	North/south channels located alongside US-95, from Kyle Canyon Rd to Vegas Dr
Miscellaneous channels (*4/9/07, 4/25/07 & 5/3/07*)	Confirmed dry or underground miscellaneous channels throughout the City of Las Vegas

PART III: BASINS INSPECTED

BASIN (*Date Inspected*)	PORTION INSPECTED
Angel Park Detention Basins (*4/25/07*)	1) South side of Vegas Dr, just east of Rampart Blvd 2) West side of Durango Dr, at Westcliff Dr
Box Canyon Detention Basin (*4/25/07*)	West of Lone Mountain – Beltway Detention Basin
Cam 10 Detention Basin (*4/25/07*)	West of 215 Beltway, north of Ann Rd
Elkhorn Springs Detention Basin (*10/4/06*)	West side of Buffalo Dr, between Sunny Springs Ln and Golden Talon Ave
Fort Apache Detention Basin (*4/25/07*)	Southwest side of Bath Dr and Fort Apache Rd
Gowan Detention Basins (*4/9/07 & 4/25/07*)	1) East side of Tenaya Way, from Cheyenne Ave to Peak Dr 2) East side of Tenaya Way, from Buckskin Ave to Gowan Rd 3) East side of Tenaya Way, from Gowan Rd to Alexander Rd
Lone Mountain Detention Basin (*4/25/07*)	North side of Gowan Rd, between Hualapai Way & Jensen St
Lone Mountain – Beltway Detention Basin (*4/25/07*)	Northwest, southwest and southeast sides of Lone Mountain Rd and the 215 Beltway
Meadows Detention Basin (*5/3/07*)	Southeast of US-95 and Valley View Blvd, inside the LVVWD property.
Mojave / US-95 Detention Basin (*5/3/07*)	North side of US-95, from Mojave Rd to 30th St
Oakey Detention Basin (*4/25/07*)	West side of Torrey Pines Dr, from Oakey Blvd to O'Bannon Dr
Rainbow Detention Basin (*4/25/07*)	East and west side of Rainbow Blvd, just south of US-95
Rancho Alta Mira Detention Basin (*4/25/07*)	South side of Brookmere Dr & Blue Royal Dr

BASIN (***Date Inspected***)	**PORTION INSPECTED**
Rancho Detention Basin (*4/25/07*)	West side of Centennial Center Blvd, just south of Tropical Pkwy
Summerlin 5 Detention Basin (*4/25/07*)	West of Desert Foothills Dr, between Far Hills Ave & Alta Dr
Summerlin Village 7 Detention Basin (*4/25/07*)	North side of Village Center Cir and Trails Center Dr (Trails Park)
Village 26 Detention Basin (*4/25/07*)	West side of the 215 Beltway, south of Cheyenne Ave

PART IV: CHANNEL INSPECTION FINDINGS

ANGEL PARK / SUMMERLIN CHANNEL

- The exposed portions of the channel west of Town Center Dr are lined with concrete (to the 215 Beltway). The exposed channel east of Town Center Dr is an earthen wash to the Angel Park Detention Basin.

- There was minor flow in the exposed portions of the channel 1) along Alta Dr, and 2) where the channel becomes exposed on Anasazi Dr to Town Center Dr where it percolates into the ground. The water appeared clean.

- There was minor nuisance flow in the channel along Alta Dr.

- There channel was dry at Town Center Dr with minor graffiti on the side of the overpass. Minor sediment was collecting on the west side of the underpass.

- The box culvert outlet located adjacent to the 2nd hole on the Angel Park Par 3 "Cloud Nine" Golf Course had a minor flow, which entered a sediment trap. The water appeared clean. No odor was noted.

- The channel contained no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris.

BELTWAY CHANNEL

- Minor nuisance water was periodically noted. A steady flow of water was flowing into the channel near Hualapai Way, which as ponding inside the Fort Apache Detention Basin. We discovered the source of the water to be a broken Las Vegas Valley Water District water line underneath Egan Crest Dr, just south of Elkhorn Rd. The leak was reported to LVVWD.

- There was excessive construction sediment in the channel emanating from a 330 acre Pulte Home development located adjacent to Village 26 Detention Basin. See Part VI of the report for follow-up activities.

- There was a large amount of wire stripping debris located underneath Cheyenne Ave. See Part VI of the report for follow-up activities.

- There was a couch inside the channel near Cheyenne Ave.

- Excessive trash and debris were noted inside the channel between Cheyenne Ave and Gilmore Channel.

- Excessive trash and debris were noted inside the channel north of Gilmore Channel.

- Significant tumbleweeds and debris were noted inside the channel underneath Hualapai Way.

- There is a lateral that was recently connected into the channel from a housing complex under construction on the north side of the channel, west of Durango Dr. It has not been backfilled.

- Minor graffiti was noted in various areas of the channel.

- The channel contained no visible evidence of illegal connections, illicit discharges, or excessive debris.

<u>BUFFALO CHANNEL</u>

- The channel contained low intermittent flow between Peak Drive and Gowan South Detention Basin and in isolated sections upstream to Summerlin Parkway. The water appeared clean and dissipated before reaching Gowan South Detention Basin.

- The enclosed box channel that enters the west side Buffalo Channel just north of Lake Mead Boulevard contained significant garbage inside of it.

- The enclosed box channel that extends south underneath Summerlin Parkway contained significant garbage inside of it.

- There were minor rocks and minor graffiti at various locations in the channel.

- The channel contained no visible evidence of illegal connections, illicit discharges or excessive sediment.

<u>CAPELLA STORM DRAIN</u>

- The bubble up outlet located on the north side of Capella Ave, between Valley View Blvd & Procyon St, was dry.

- The channel contained no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris.

<u>CEDAR CREEK</u>

- The flow was low and constant throughout the channel. The water appeared clean.

- The channel contained minor algae on the bottom of the channel. No vegetation was noted.

- The channel contained very minor graffiti at various locations.

- The channel contained no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris.

<u>CHEYENNE CHANNEL</u>

- Since the Fall 2006 inspection, curbing has been installed on the north side of the channel at locations where there were inlet grates on the south side of the channel.

- Trickle flow entered the channel at Soaring Gulls Dr. Minor flow also entered the channel underneath Rampart Blvd, which flowed continuously to the Gowan South Detention Basin. No sediment was noted at the entrance to the basin. The water appeared clean.

- There was graffiti underneath the underpasses from Soft Breezes drive eastward.

- The channel contained no visible evidence of illegal connections, illicit discharges or excessive sediment.

<u>FREEWAY CHANNEL</u>

- The water in the channel was very slow moving from Desert Inn Rd to Sirius Ave. The water appeared clean. Moderate sediment, trash and debris were noted in the channel. The remainder of the channel was dry.

- The channel contained no visible evidence of illegal connections, illicit discharges or excessive sediment.

<u>GILMORE CHANNEL</u>

- The channel on the west side of the 215 Beltway contained trickle flow. The water appeared clean.

- The channel on the east side of the 215 Beltway was dry and clean.

- One of the bollards inside the channel on the east side of the 215 Beltway has been pulled out of the ground.

- The channel contained no visible evidence of illegal connections, illicit discharges or excessive debris.

<u>GOWAN NORTH CHANNEL</u>

- There was a minor nuisance flow entering the channel at Durango Dr with additional nuisance flow entering at Cimarron Rd. The water appeared clean. The channel was dry from Durango Dr to Lone Mountain Rd.

- Minor sediment and garbage were noted in the channel tunnel underneath Durango Dr Alexander Rd. Moderate garbage was noted inside the channel just south of Lone Mountain Rd.

- The channel contained minor graffiti.

- The channel contained no visible evidence of illegal connections, illicit discharges or excessive debris.

LANGTRY CHANNEL

- The flow was low and continuous. The water appeared clean.

- The channel joints showed signs of significant separation.

- The channel contained minor vegetation, garbage, debris and graffiti.

- The channel contained no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris.

LAS VEGAS CREEK

- The flow was low and continuous throughout the creek with minor algae. The water appeared clean.

- Minor graffiti and minor vegetation were noted in the creek along Alta Dr, west of Valley View Blvd.

- Construction activity continues inside Meadows Detention Basin and inside the Las Vegas Valley Water District property on the south side of US-95. The channel is enclosed between Meadows Detention Basin and US-95. The LVVWD property and the Meadows Detention Basin is becoming a public park.

- The portion of the creek alongside US-95 has now been covered as part of the freeway widening project.

- Moderate vegetation, minor algae, minor sediment and minor debris were noted inside the channel at the opening on the southeast side of the US-95 / I-15 interchange. A duck with eleven chicks were swimming in the channel. The water appeared clean.

- Minor vegetation, minor sediment and minor algae were noted inside the channel at the opening on the southeast side of US-95 and F St. The water appeared clean.

- Minor vegetation, minor sediment and minor algae were noted inside the channel at the opening next to the railroad tracks. The water appeared clean.

- Minor vegetation was noted inside channel opening at Veterans Memorial Pkwy. The water appeared clean.

- The creek contained no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris.

LAS VEGAS WASH

- The flow was moderate & constant throughout the wash. The wash contained moderate algae and minor to heavy vegetation at some locations. The water appeared clean.

- Wire stripping debris was noted on the south side of the wash, just west of Washington Ave.

- There was graffiti underneath the underpasses.

- The channel contained moderate to heavy vegetation.

- The channel contained no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris.

MISCELLANEOUS CHANNELS

- No problems noted.

RED ROCK / HUALAPAI COLLECTOR

- There was a minor trickle on the east end of the channel originating from the neighborhood to the north. The water appeared clean.

- The channel contained no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris.

US-95 CHANNELS

- The channels were clean.

- The channels contained no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris.

PART V: BASIN INSPECTION FINDINGS

ANGEL PARK DETENTION BASINS

Angel Park North Basin

- The basin contained little to no vegetation.
- The grate located on the northeast side of the basin was dry.
- The basin was dry and contained no visible evidence of illegal connections, excessive sediment or excessive debris.

Angel Park South Basin

- The basin contained minor vegetation.
- The grate located on the southeast side of the basin contained minor nuisance flow, minor debris, minor vegetation and minor graffiti. The water appeared clean.
- The small outlet structure on the east side of the basin was clean.
- The basin was dry and contained no visible evidence of illegal connections, excessive sediment or excessive debris.

BOX CANYON DETENTION BASIN

- Not yet under construction. There is currently a quarry in the area, which will eventually become the detention basin.

CAM 10 DETENTION BASIN

- The basin was dry and clean. The outlet grate was clean.
- More of the chains between the concrete bollards surrounding the basin have been forcibly removed. The eye hooks have been broken off the bollards.
- The basin was dry and contained no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris.

ELKHORN SPRINGS DETENTION BASIN (Sunny Springs Park)

- The inlet grates located on the north, southeast and the east sides of the basin and the outlet grate located on the east side of the basin contained standing water. The water appeared clean. A water level sensor is located inside the outlet grate.

- Very minor sediment was noted inside the inlet grate on the east side of the basin.

- A bolt was broken off from the outlet trash rack on the east side of the basin. The bar than was noted as removed during the Fall 2006 inspection has been replaced.

- There was erosion in the basin adjacent to the north grate caused by runoff from Betsy Rhodes Elementary School, which is located next to the basin.

- The basin was dry and contained no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris.

<u>FORT APACHE DETENTION BASIN</u>

- There was erosion on the inlet ramp. Minor debris and sediment and noted on the inlet ramp.

- A steady flow of water was flowing into the basin and in the bottom of the basin. We discovered the source of the water to be a broken Las Vegas Valley Water District water line underneath Egan Crest Dr, just south of Elkhorn Rd. The leak was reported to LVVWD.

- The basin contained no visible evidence of illegal connections, illicit discharges or excessive sediment.

<u>GOWAN DETENTION BASINS</u>

Gowan North Upper Detention Basin

- No vegetation was noted inside the basin.

- The inlet grate located at the northwest corner of the basin was clean and contained minor flow. All of the water was flowing into the low flow diversion grate. The grate contained sediment and debris. The water appeared clean.

- The outlet grate located on the south side of the basin was clean. The low flow exit pipe contained minor flow. A large amount of water was ponding outside the exit grate, which appeared to be from precipitation.

- Some of the chains have been removed between the bollards surrounding the basin and some of the bollards have been undermined from erosion and are tilting into the basin.

- The basin contained no visible evidence of illegal connections, illicit discharges or excessive sediment.

Gowan North Lower Detention Basin

- The basin continues to be used as a soccer field.
- There was no vegetation noted in the low flow channel.
- The inlet grate located on the southeast corner of the basin contained moderate garbage and debris. There was standing water and moderate flow in the inlet pipe. The water appeared clean. The fence located on the side of the grate was broken.
- The inlet grate located on the southwest corner of the basin was dry and clean. A large chunk of concrete is broken off of the structure itself.
- The outlet grate located on the north side of the basin was clean and dry.
- The basin contained no visible evidence of illegal connections, illicit discharges or excessive sediment.

Gowan South Detention Basin

- There was minor nuisance flow entering the basin at Cheyenne Channel. The water appeared clean.
- There was minor nuisance flow inside the exit grate. The water appeared clean. No garbage or debris was noted.
- There was little to no vegetation growing inside the basin.
- There was minor graffiti at Buffalo Channel.
- The channel contained no visible evidence of illegal connections, illicit discharges or excessive sediment.

LONE MOUNTAIN DETENTION BASIN

- Construction is still underway on the south and west side of the basin. Construction fencing is still located inside the basin.
- The basin contained little to no vegetation.
- Ball fields are under construction in the south side of the basin. Dirt and rock piles are being stockpiled inside the basin. A temporary plant nursery is also located inside the basin.
- Large landscaping rocks have been installed on the outside of the basin.

- The Gilmore Channel inlet ramp on the west side contained minor nuisance flow, which ran down the low-flow channel on the north side of the channel and was significantly ponding at the bottom. The water appeared clean. The bottom of the ramp contained minor sediment and debris.

- The inlet ramp on the south side of the basin was clean and dry.

- The inlet pipe on the southeast corner of the lower basin was clean and dry.

- The concrete outflow grate located on the northeast side of the basin was clean and dry.

- The concrete inlet structure located on the west side of the basin contained moderate sediment and minor graffiti. Residue of a recent fire is also evident.

- The basin contained no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris.

<u>LONE MOUNTAIN – BELTWAY DETENTION BASIN</u>

- The basin is very large and was still under construction at the time of the inspection.

- The large basin located on the west side of the 215 beltway is still used as a gravel pit.

- The basin was dry.

- The basin contained no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris.

<u>MEADOWS DETENTION BASIN</u>

- Work continues on converting the basin into a park by the LVVWD. The basin contains ponds, trees and vegetation, which has grown significantly since the last inspection.

- The inlet structure was clean. The outlet structure was clean.

- The basin contained no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris.

<u>MOJAVE / US-95 DETENTION BASIN</u>

- The basin was dry.

- The low flow channel was full of sediment and debris but did not appear to be construction related.

- A large pile of decorative rock is being stockpiled in the southeast end of the basin.

- The basin contained very heavy vegetation where nuisance water enters at the southwest corner.

- The entrance gate is significantly bent.

- The basin contained no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris.

OAKEY DETENTION BASIN

- The basin contained little to no vegetation.

- The entrance grate located on the northwest side of the basin contained minor nuisance flow and graffiti. The water appeared clean.

- The exit grate located on the northeast side of the basin contained minor nuisance flow. The water appeared clean.

- The entrance grate located on the southwest side of the basin contained standing water and ponding water in front of the grate. The water appeared clean.

- The basin contained no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris.

RAINBOW DETENTION BASINS

Rainbow East Detention Basin

- The basin contained very minor vegetation.

- A truck bed liner was sitting in the bottom of the basin.

- The inlet structure on the northwest side of the basin was dry and contained minor rocks and minor sediment.

- The two inlet structures on the south side of the basin were clean and contained minor nuisance flow and minor graffiti. The water appeared clean.

- The outlet structure located on the east side of the basin contained minor nuisance flow. The water appeared clean.

- The basin contained no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris.

Rainbow West Detention Basin

- The basin was unable to be safely accessed due to adjacent construction activities.
- The basin contained no vegetation.
- The basin contained no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris.

RANCHO ALTA MIRA DETENTION BASIN

- The basin is a small park.
- Large landscaping rocks were collecting on the outlet grate.
- The basin contained no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris.

RANCHO DETENTION BASIN

- The inlet & outlet were clean.
- The basin contained minor vegetation.
- The inlet ramp located at the southwest corner of the basin was clean and dry.
- The inlet located on the northwest side of the basin contained very minor flow and minor graffiti. The water appeared clean. Minor vegetation was noted in front of the inlet structure.
- One of the two inlet pipes located on the northeast side of the basin contained very minor flow. The water appeared clean.
- The outlet grate located on the southeast side of the basin was dry and contained minor sediment on and around the grate.
- The basin contained no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris.

SUMMERLIN 5 DETENTION BASIN

- Approximately nine acres of the inside of the basin is still a plant nursery / staging area for Howard Hughes Corporation. Four water tanks are located inside the basin. The temporary structure is still inside the basin. The basin was not entered because of the "no trespassing private property" signs posted around the outside of the basin.

- Apart from the plant nursery, the basin was dry.

- There was evidence of numerous bonfires in the channel west of the basin. There were also numerous propane canisters in the channel that were being explosively destroyed in bonfires. See Part VI of the report for follow-up activities.

- The basin contained no visible evidence of illegal connections, illicit discharges or excessive sediment.

SUMMERLIN VILLAGE 7 DETENTION BASIN

- The basin is a park with baseball fields.

- The outlet pipe on the east side of the basin contained rocks.

- The basin contained no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris.

VILLAGE 26 DETENTION BASIN

- The basin was dry.

- The basin contained little to no vegetation, except for a grove of replanted Yucca plants from the adjacent Pulte Homes development that is under construction. See Part VI of the report for follow-up activities.

- The basin contained landscaping, block walls and paving as a demonstration project for the adjacent Pulte Homes development that is under construction. See Part VI of the report for follow-up activities.

- One of the horizontal bars was missing from the exit grate located on the north side of the channel. The inside of the grate contained minor rocks and trash.

- The basin contained no visible evidence of illegal connections, illicit discharges, excessive sediment or excessive debris.

PART VI: ACTIONS TAKEN AND RECOMMENDED FOLLOW-UP ACTIVITIES

Pulte Homes was contacted about the sediment entering the Beltway Channel from the 330 acre development located adjacent to Village 26 Detention Basin. The inlet is being redesigned to protect sediment from entering the channel.

Pulte Homes was also contacted about their replanted Yucca plants, landscaping, block walls and paving demonstration project located inside Village 26 Detention Basin. They did not have permission to construct inside the basin and are being required to remove it.

The large amount of wire stripping debris found in the Beltway Channel underneath Cheyenne Ave has been referred to the wire stripping detachment of the Las Vegas Metropolitan Police Department.

H2O Environmental has been contacted to remove the unexploded propane canisters located in the channel west of Summerlin 5 Detention Basin.

A Letter of Violation was sent to the homeowner at 7805 Quill Gordon Ave to address the used paint that had been poured over the back wall.

The report has been internally distributed to the City Engineer Division and the Streets & Sanitation Division to make them aware of the findings. Follow-up actions by these Divisions will be determined and executed at their discretion.

CITY OF
NORTH LAS VEGAS
Your Community of Choice

City of North Las Vegas

Storm Channel Inspection Report
Fall 2006

Clark County NPDES Muncipal Separate Storm Sewer System Permit

Permit Number NV0021911

PART I: INSPECTION SUMMARY

On November 14th and 15th, 2006 Doug Robinson, Heavy Equipment Operator for the City of North Las Vegas performed the semi-annual inspection of the Las Vegas Wash channels, tributaries, and detention basins in the Central Region under jurisdiction of the City of North Las Vegas. Visual inspections were performed on the exposed storm water channel sections and the detention basins. The main purpose for the inspection was to look for illegal discharges to the storm water collection system.

This report has been internally distributed to the Roadway Operations Division and the Operations Division of the Utilities Department and Development and Flood Control Division of Public Works. The responsible sections will perform follow-up actions to remediate noted comments.

Storm channel inspections are conducted semi-annually as specified in the Las Vegas Valley Storm Water Management Plans for Municipal Separate Storm Sewer System (September 2003). Co-permittees of the Clark County NPDES Municipal Separate Sewer System permit, which became effective on June 19, 2003, including the Clark County Regional Flood Control District, Clark County, Henderson, City of Las Vegas, City of North Las Vegas and the Nevada Department of Transportation.

There were no illegal discharges detected during this inspection.

PART II: CHANNELS / BASINS INSPECTED

CHANNEL / BASIN (Date Inspected)	PORTION INSPECTED
Las Vegas Wash - Middle LVMD November 14, 2006	North/South channel between Lake Mead Boulevard and Decatur Boulevard
Lower Las Vegas Wash Detention Basin LVMD 2050 November 15, 2006	Detention Basin located between Camino Al Norte and Clayton Street
Cheyenne Peaking Basin LVMD 1645 November 14,2006	Detention Basin located between Cheyenne Avenue and Gowan Road.
Las Vegas Wash - N Channel LVNC November 14,2006	North/south channel between just south of Cheyenne Avenue and I-15
King Charles - N Channel LVKC November 14, 2006	East/west channel between Alexander Road and the King Charles Channel.
Las Vegas - King Charles Channel LVKC November 14, 2006	North/south channel between Gowan Road/I-15 and Craig Road
Upper Las Vegas Wash LVUP November 14, 2006	North/south channel between Craig Road and La Madre Street
Range Wash - West Tributary RWWE November 15, 2006	North/south channel between Craig Road and Vandenberg Detention Basin
Vandenberg Detention Basin RWWE 0170 November 14, 2006	Detention Basin located between Donovan Way and I-15
Range Wash - Railroad Channel RWRR November 14,2006	North/south channel between Vandenberg Detention Basin and northside of the Union Pacific Railroad tracks
Tributary to Western Tributary at Alexander Road November 14, 2006	West/east channel between North 5th Street and Las Vegas Wash - Middle

CHANNEL / BASIN (Date Inspected)	PORTION INSPECTED
Tributary to Western Tributary at Craig Road November 14, 2006	West/east channel between Alexander Road and Las Vegas Wash - Middle
Gowan Outfall Facilities GOOF November 14, 2006	West/east channel between Ferrell Street and Las Vegas Wash - Middle
Las Vegas - Brooks LVBR November 14, 2006	West/east channel between North 5th Street and west side of the Union Pacific Railroad tracks
Freeway Channel LV15 November 14, 2006	South/north channel between Lake Mead Boulevard and Gowan Road.
Las Vegas Wash - Smoke Ranch LVSR November 15, 2006	West/east channel between Losee Road and Freeway Channel
Las Vegas Wash - Colton LVCL November 15, 2006	West/east channel from the westside of Losee Road and Freeway channel
Carey - Lake Mead Detention Basin LVLM 0223 November 15,2006	Detention Basin located Between Carey Avenue and Lake Mead Boulevard
North Las Vegas Detention Basin LVUP 0405 November 15, 2006	Detention Basin located between 215 & Elkhorn Road
Range Wash - Las Vegas Wash Divers Levee LVRW 0293 November 15, 2006	East/west levee Nellis Air Base property and the North Las Vegas Detention Basin
Upper Las Vegas Wash Detention Basin LVUP 0910 November 15, 2006	Detention Basin located between Jones Boulevard and Decatur Boulevard
Kyle Canyon Detention Basin LVMD 3315 November 15, 2006	Detention Basin located between Nickelson Street and Mainwal Boulevard

PART III: INSPECTION RESULTS

LAS VEGAS WASH - MIDDLE CHANNEL

- ❑ At intersection of Lake Mead Boulevard and Pecos Road:
  Good condition; Moderate (not excessive) flow from the City of Las Vegas.

- ❑ Halfway between Lake Mead Boulevard and Carey Avenue:
  Good condition; Moderate (not excessive) flow from the City of Las Vegas. Two three (3) inch pipes show signs of illegal discharges from residential properties on the east side of the wash. Environmental Services Section will investigate the illegal discharges to the storm water collection system.

- ❑ At intersection of Carey Avenue:
  Great condition; shopping carts removed since last inpection. Moderate flow. Construction of new bridge has been completed.

- ❑ Halfway between Carey Avenue and Las Vegas Boulevard:
  Fair condition; minor ponding is occurring due to silt and debris. Remove silt and debris from channel. Minor bank/access road erosion on both sides of channel. Section of chain link fence missing.

- ❑ At intersection of Las Vegas Boulevard North:
  Great condition. Moderate (not excessive) flow from the City of Las Vegas. Construction of new bridge on the north side of Las Vegas Boulevard North completed.

- ❑ Cartier Drain/Channel south of intersection of Las Vegas Boulevard North:
  Fair condition; minimal flow. Channel drains to "A" Channel east of Belmont Street.

- ❑ Cartier Drain/Channel at Belmont Street:
  Good condition; no flow. Shopping carts removed since last inspection. Trash/debris needs to be removed from the east and west sides.

- ❑ Halfway between Las Vegas Boulevard North and Cheyenne Avenue:
  Good condition; Vegetation, silt and debris removed since last inspection to eliminate minor ponding. Eroded area graded to cover exposed water infrastructure. Utilities Department's sewer air vac piping exposed due to erosion on the west side of the channel, has been covered since last inspection. Moderate (not) excessive flow from the City of Las Vegas.

- ❑ At intersection of Cheyenne Avenue:
  Great condition; construction of new bridge complete at Cheyenne Avenue. Moderate (not excessive) flow from the City of Las Vegas. Shopping carts and debris removed since last inspection.

- ❑ At intersection of Civic Center Drive:
  Great condition; channel recently cleaned. Moderate (not excessive) flow from the City of Las Vegas. Shopping carts and debris removed from channel since last inspection.

- ❑ <u>At intersection of Interstate 15 overpass:</u>
  Great condition; channel recently cleaned. Moderate (not excessive) flow emanating from channel paralleling I-15 south from the City of Las Vegas. Channel paralleling I-15 to the north has no flow. Safety chains at channel drop have been removed. Gate entrance at the north end of Bullock need to be replaced.

- ❑ <u>Losee Road:</u>
  Great condition; Slight nuisance flow from businesses irrigation runoff.

- ❑ <u>At Alexander Road:</u>
  Great condition; Slight nuisance flow from businesses irrigation runoff. Three sections of chain link fencing needs to be repaired

- ❑ <u>At intersection of Craig Road:</u>
  Great condition; Slight nuisance flow from businesses and residential irrigation runoff.

- ❑ <u>At Commerce Street:</u>
  Great condition; slight nuisance flow.

- ❑ <u>At intersection of Camino Al Norte:</u>
  Great condition; slight nuisance flow from businesses and residential irrigation runoff along Camino Al Norte. Shopping cart removed from channel since last inspection.

LOWER LAS VEGAS WASH DETENTION

- ❑ Basin dry.
- ❑ No signs of illegal discharge.
- ❑ No excessive build-up of sediment. Minor trash/debris at basin outflow grates
- ❑ Chain between ballard posts at east end of Hammer missing.
- ❑ On-going construction in basin for park/soccer field.

CHEYENNE PEAKING BASIN

- ❑ Basin dry.
- ❑ No signs of illegal discharge.
- ❑ Moderate (not excessive) flows in channel.
- ❑ No excessive build-up of sediment.
- ❑ Safety handrail cable fencing need to be repaired due to vandalism.

LAS VEGAS WASH – N CHANNEL

- ❑ Good condition, channel dry.
- ❑ No signs of illegal discharge.
- ❑ Heavy vegetation between Cheyenne Avenue and Gowan Road

KING CHARLES – N CHANNEL

- ❑ Great condition, channel dry.
- ❑ No signs of illegal discharge.

LAS VEGAS – KING CHARLES CHANNEL

- ❑ Great condition, channel dry.
- ❑ No signs of illegal discharge.

UPPER LAS VEGAS WASH

- ❑ Good condition, channel dry.
- ❑ No signs of illegal discharge.

RANGE WASH – WEST TRIBUTARY

- ❑ Good condition, channel dry.
- ❑ No signs of illegal discharge.

VANDENBERG DETENTION BASIN

- ❑ Basin dry.
- ❑ No signs of illegal discharge.
- ❑ Remove minor dirt buildup at both in-flow sections.
- ❑ Remove minor sediment buildup at low-flow lined section.
- ❑ Remove trash/debris buildup on out-flow grate and repair several holes cut in chain link fencing.

RANGE WASH – RAILROAD CHANNEL

- ❑ Channel dry.
- ❑ No signs of illegal discharge.

TRIBUTARY TO WESTERN TRIBUTARY AT ALEXANDER ROAD

- ❑ Channel dry.
- ❑ No signs of illegal discharge.

TRIBUTARY TO WESTERN TRIBUTARY AT CRAIG ROAD

- ❑ Channel dry.
- ❑ No signs of illegal discharge.

GOWAN OUTFALL CHANNEL

- ❑ At intersection of Camino Al Norte:
  Good condition; Minimal flow from residential irrigation.
- ❑ At intersection of Clayton Avenue:
  Good condition; Minimal flow from residential irrigation.
- ❑ At intersection of Simmons Street:
  Good condition; Minimal flow from residential irrigation.
- ❑ At intersection of Ferrell Street:
  Good condition; Minimal flow from residential irrigation being discharge from the Gowan outfall underground boxes.

LAS VEGAS – BROOKS

- ❑ Good condition; Minor flow from irrigation from businesses along Losee Road.
- ❑ No signs of illegal discharge

FREEWAY CHANNEL

- ❑ Channel has moderate flows.
- ❑ No illegal discharge.
- ❑ This channel is maintained by NDOT south of Cheyenne Avenue to Lake Mead Boulevard

LAS VEGAS WASH – SMOKE RANCH

- ❑ Channel has moderate flows.
- ❑ No illegal discharge.
- ❑ Heavy vegetation recently removed

LAS VEGAS WASH – COLTON

- ❑ Fair condition; Slight nuisance flows from commercial irrigation along Losee Road and Colton Avenue. Vegetation needs to be removed between Losee Road and the railroad.
- ❑ No signs of illegal discharge

CAREY – LAKE MEAD DETENTION BASIN

- ❑ Basin dry.
- ❑ No excessive build-up of sediment.
- ❑ Culverts recently cleaned at in-flow to basin at the northwest corner.
- ❑ Trash/debris recently removed from out-flow grate.
- ❑ No signs of illegal discharge

NORTH LAS VEGAS DETENTION BASIN

- ❑ Basin dry.
- ❑ No excessive buil-up of sediment Basin in the process of being cleaned.
- ❑ No signs of illegal discharge.

RANGE WASH – LAS VEGAS WASH DIVERSION LEVEE

- ❑ Basin dry.
- ❑ Trash/debris in diversion channel.
- ❑ No excessive build-up of sediment
- ❑ No signs of illegal discharge

UPPER LAS VEGAS WASH DETENTION BASIN

- ❑ Basin dry.
- ❑ Trees/vegetation growing in lower section of basin
- ❑ No excessive build-up of sediment.
- ❑ No signs of illegal discharge

KYLE CANYON DETENTION BASIN

- ❑ Basin dry.
- ❑ Abandoned trailer house at northwest corner of basin needs to be removed.
- ❑ No excessive build-up of sediment
- ❑ No signs of illegal discharge

PART IV: ACTIONS TAKEN AND RECOMMENDED FOLLOW-UP ACTIVITIES

As noted in Part I, this report has been internally distributed to the Roadway Operations Division and the City Operations Division of the Utilities Department and the Development and Flood Control Division of Public Works. The responsible divisions will perform follow-up actions to remediate noted comments.

Starting October of 2006, Roadway Operations Division has taken responsibility for performing the semi-annual inspections of the Las Vegas Wash channels, tributaries, and detention basins in the Central Region under the jurisdiction of the City of North Las Vegas.

The City will perform the next semi-annual inspection of the Las Vegas Wash channels, tributaries, and detention basins in the Central Region under jurisdiction of the City of North Las Vegas in May 2007.

If you have any questions, please call me at (702) 633-1328

Respectfully,

Phillip Davis
Roadway Operations Supervisor

CC: Dennis Scott, Roadway Operations Assistant Manager
Bryant Hill, Roadway Operations Supervisor
Jennifer Doody P.E., Flood Control Division Manager
Kirk Medina, Utilities Manager
Thomas Rura, Pretreatment Supervisor

CITY OF
NORTH LAS VEGAS
Your Community of Choice

City of North Las Vegas

Storm Channel Inspection Report
Spring 2007

Clark County NPDES Muncipal Separate Storm Sewer System Permit

Permit Number NV0021911

PART I: INSPECTION SUMMARY

On April 19th and 30th and May 3rd , 2007 Doug Robinson, Heavy Equipment Operator for the City of North Las Vegas performed the semi-annual inspection of the Las Vegas Wash channels, tributaries, and detention basins in the Central Region under jurisdiction of the City of North Las Vegas. Visual inspections were performed on the exposed storm water channel sections and the detention basins. The main purpose for the inspection was to look for illegal discharges to the storm water collection system. Matt Ball and Henry C. Hicks, City of North Las Vegas Maintenance Workers assisted Doug Robinson on April 19th and 30th respectively.

This report has been internally distributed to the Roadway Operations Division and the Operations Division of the Utilities Department and Development and Flood Control Division of Public Works. The responsible sections will perform follow-up actions to remediate noted comments.

Storm channel inspections are conducted semi-annually as specified in the Las Vegas Valley Storm Water Management Plans for Municipal Separate Storm Sewer System (September 2003). Co-permittees of the Clark County NPDES Municipal Separate Sewer System permit, which became effective on June 19, 2003, including the Clark County Regional Flood Control District, Clark County, Henderson, City of Las Vegas, City of North Las Vegas and the Nevada Department of Transportation.

There were no illegal discharges detected during these inspections.

PART II: CHANNELS / BASINS INSPECTED

CHANNEL / BASIN (Date Inspected)	PORTION INSPECTED
Las Vegas Wash - Middle LVMD April 30, 2007	North/South channel between Lake Mead Boulevard and Decatur Boulevard
Lower Las Vegas Wash Detention Basin LVMD 2050 April 30, 2007	Detention Basin located between Camino Al Norte and Clayton Street
Cheyenne Peaking Basin LVMD 1645 April 19,2007	Detention Basin located between Cheyenne Avenue and Gowan Road.
Las Vegas Wash - N Channel LVNC April 19,2007	North/south channel between just south of Cheyenne Avenue and I-15
King Charles - N Channel LVKC April 19, 2007	East/west channel between Alexander Road and the King Charles Channel.
Las Vegas - King Charles Channel LVKC April 19, 2007	North/south channel between Gowan Road/I-15 and Craig Road
Upper Las Vegas Wash LVUP May 3, 2007	North/south channel between Craig Road and La Madre Street
Range Wash - West Tributary RWWE April 19, 2007	North/south channel between Craig Road and Vandenberg Detention Basin
Vandenberg Detention Basin RWWE 0170 April 19, 2007	Detention Basin located between Donovan Way and I-15
Range Wash - Railroad Channel RWRR April 19,2007	North/south channel between Vandenberg Detention Basin and northside of the Union Pacific Railroad tracks
Tributary to Western Tributary at Alexander Road April 30, 2007	West/east channel between North 5th Street and Las Vegas Wash - Middle

CHANNEL / BASIN (Date Inspected)	PORTION INSPECTED
Tributary to Western Tributary at Craig Road April 30, 2007	West/east channel between Alexander Road and Las Vegas Wash - Middle
Gowan Outfall Facilities GOOF April 30, 2007	West/east channel between Ferrell Street and Las Vegas Wash - Middle
Las Vegas - Brooks LVBR April 30, 2007	West/east channel between North 5th Street and west side of the Union Pacific Railroad tracks
Freeway Channel LV15 April 30, 2007	South/north channel between Lake Mead Boulevard and Gowan Road.
Las Vegas Wash - Smoke Ranch LVSR April 30, 2007	West/east channel between Losee Road and Freeway Channel
Las Vegas Wash - Colton LVCL April 30, 2007	West/east channel from the westside of Losee Road and Freeway channel
Carey - Lake Mead Detention Basin LVLM 0223 April 30,2007	Detention Basin located Between Carey Avenue and Lake Mead Boulevard
North Las Vegas Detention Basin LVUP 0405 April 30, 2007	Detention Basin located between 215 & Elkhorn Road
Range Wash - Las Vegas Wash Diversion Levee LVRW 0293 May 3, 2007	East/west levee Nellis Air Base property and the North Las Vegas Detention Basin
Upper Las Vegas Wash Detention Basin LVUP 0910 May 3, 2007	Detention Basin located between Jones Boulevard and Decatur Boulevard
Kyle Canyon Detention Basin LVMD 3315 May 3, 2007	Detention Basin located between Nickelson Street and Mainwal Boulevard

PART III: INSPECTION RESULTS

LAS VEGAS WASH - MIDDLE CHANNEL

- ❑ At intersection of Lake Mead Boulevard and Pecos Road:
  Great condition; Minimal flow from the City of Las Vegas.

- ❑ Halfway between Lake Mead Boulevard and Carey Avenue:
  Great condition; Minimal flow from the City of Las Vegas. Two three (3) inch pipes show no signs of illegal discharges from residential properties on the east side of the wash. Environmental Services Section contacted residences to cease illegal discharges to the storm water collection system.

- ❑ At intersection of Carey Avenue:
  Great condition; Minimal flow from the City of Las Vegas.

- ❑ Halfway between Carey Avenue and Las Vegas Boulevard:
  Fair condition; Minimal flow from the City of Las Vegas. Minor ponding due to silt and debris build-up. Remove vegetation, silt and debris from channel. Minor bank/access road erosion on both sides of channel. Section of chain link fence repaired since fall inspection

- ❑ At intersection of Las Vegas Boulevard North:
  Great condition; Minimal flow from the City of Las Vegas.

- ❑ Cartier Drain/Channel south of intersection of Las Vegas Boulevard North:
  Fair condition; Minimal flow. Minor ponding due to vegetation/debris build-up. Remove vegetation/debris. Channel drains to "A" Channel east of Belmont Street.

- ❑ Cartier Drain/Channel at Belmont Street:
  Good condition; no flow. Trash/debris needs to be removed from the east and west sides of channel.

- ❑ Halfway between Las Vegas Boulevard North and Cheyenne Avenue:
  Good condition; Minimal flow from the City of Las Vegas.

- ❑ At intersection of Cheyenne Avenue:
  Great condition; construction of new bridge complete at Cheyenne Avenue. Moderate (not excessive) flow from the City of Las Vegas. Shopping carts and debris removed since last inspection.

- ❑ At intersection of Civic Center Drive:
  Great condition; channel recently cleaned. Moderate (not excessive) flow from the City of Las Vegas. Shopping carts and debris removed from channel since last inspection.

- ❑ At intersection of Interstate 15 overpass:
  Great condition; channel recently cleaned. Moderate (not excessive) flow emanating from channel paralleling I-15 south from the City of Las Vegas. Channel paralleling I-15 to the north has no flow. Safety chains at channel drop have been removed. Gate entrance at the north end of Bullock need to be replaced.

- ❑ Losee Road:
  Great condition; Slight nuisance flow from businesses irrigation runoff.

- ❑ At Alexander Road:
  Great condition; Slight nuisance flow from businesses irrigation runoff. Three sections of chain link fencing needs to be repaired

- ❑ At intersection of Craig Road:
  Great condition; Slight nuisance flow from businesses and residential irrigation runoff.

- ❑ At Commerce Street:
  Great condition; slight nuisance flow.

- ❑ At intersection of Camino Al Norte:
  Great condition; slight nuisance flow from businesses and residential irrigation runoff along Camino Al Norte. Shopping cart removed from channel since last inspection.

LOWER LAS VEGAS WASH DETENTION

- ❑ Basin dry.
- ❑ No signs of illegal discharge.
- ❑ Sediment build-up and minor trash/debris at basin outflow grates.
- ❑ Chain between ballard posts at east end of Hammer missing.
- ❑ Construction in basin for park/soccer field to be completed in June.

CHEYENNE PEAKING BASIN

- ❑ Basin dry.
- ❑ No signs of illegal discharge.
- ❑ Moderate nuisance water flow in channel.
- ❑ No excessive build-up of sediment.
- ❑ Safety handrail cable fencing repaired since fall 2006 inspection.
- ❑ Trash/debris in southwest corner removed since fall 2006 inspection

LAS VEGAS WASH – N CHANNEL

- ❑ Good condition, channel dry.
- ❑ No signs of illegal discharge.
- ❑ Channel has been graded and vegetation removed.

KING CHARLES – N CHANNEL

- ❑ Great condition, channel dry.
- ❑ No signs of illegal discharge.

LAS VEGAS – KING CHARLES CHANNEL

- ❑ Great condition, channel dry.
- ❑ No signs of illegal discharge.

UPPER LAS VEGAS WASH

- ❑ Good condition, channel dry.
- ❑ No signs of illegal discharge.

RANGE WASH – WEST TRIBUTARY

- ❑ Good condition, channel dry.
- ❑ No signs of illegal discharge.

VANDENBERG DETENTION BASIN

- ❑ Basin dry.
- ❑ No signs of illegal discharge.
- ❑ Dirt buildup at both in-flow sections removed.
- ❑ Minor sediment buildup at low-flow lined section removed.
- ❑ Trash/debris buildup on out-flow grate removed; several holes cut in chain link fencing repaired.

RANGE WASH – RAILROAD CHANNEL

- ❑ Channel dry.
- ❑ No signs of illegal discharge.

TRIBUTARY TO WESTERN TRIBUTARY AT ALEXANDER ROAD

- ❑ Channel dry.
- ❑ No signs of illegal discharge.

TRIBUTARY TO WESTERN TRIBUTARY AT CRAIG ROAD

- ❑ Channel dry.
- ❑ No signs of illegal discharge.

GOWAN OUTFALL CHANNEL

- ❑ At intersection of Camino Al Norte:
  Great condition; Channel dry.
- ❑ At intersection of Clayton Avenue:
  Great condition; Channel dry.
- ❑ At intersection of Simmons Street:
  Great condition; Channel dry.
- ❑ At intersection of Ferrell Street:
  Great condition; Channel dry.

LAS VEGAS – BROOKS

- ❑ Great condition; Channel dry.
- ❑ No signs of illegal discharge

FREEWAY CHANNEL

- ❑ Channel has moderate flows from the City of Las Vegas.
- ❑ No illegal discharge.
- ❑ This channel is maintained by NDOT south of Cheyenne Avenue to Lake Mead Boulevard

LAS VEGAS WASH – SMOKE RANCH

- ❑ Channel has moderate flows.
- ❑ No illegal discharge.
- ❑ Vegetation that was recently removed has grown back.

LAS VEGAS WASH – COLTON

- ❑ Fair condition; Slight nuisance flows from commercial irrigation along Losee Road and Colton Avenue. Remove trees/vegetation between Losee Road and the railroad.
- ❑ No signs of illegal discharge

CAREY – LAKE MEAD DETENTION BASIN

- ❑ Basin dry.
- ❑ No excessive build-up of sediment.
- ❑ Trees/weeds growing at inlet to basin from airport.
- ❑ No signs of illegal discharge

NORTH LAS VEGAS DETENTION BASIN

- ❑ Basin dry.
- ❑ No excessive build-up; Fence cut on westside north of 215 by downstream overflow..
- ❑ No signs of illegal discharge.

RANGE WASH – LAS VEGAS WASH DIVERSION LEVEE

- ❑ Basin dry.
- ❑ Trash/debris in diversion channel.
- ❑ No excessive build-up of sediment
- ❑ No signs of illegal discharge

UPPER LAS VEGAS WASH DETENTION BASIN

- ❑ Basin dry.
- ❑ Trees/vegetation growing in lower section of basin recently removed
- ❑ No excessive build-up of sediment.
- ❑ No signs of illegal discharge

KYLE CANYON DETENTION BASIN

- ❑ Basin dry.
- ❑ No excessive build-up of sediment
- ❑ No signs of illegal discharge

PART IV: ACTIONS TAKEN AND RECOMMENDED FOLLOW-UP ACTIVITIES

As noted in Part I, this report has been internally distributed to the Roadway Operations Division and the City Operations Division of the Utilities Department and the Development and Flood Control Division of Public Works. The responsible divisions will perform follow-up actions to remediate noted comments.

Since October of 2006, Roadway Operations Division has taken responsibility for performing the semi-annual inspections of the Las Vegas Wash channels, tributaries, and detention basins in the Central Region under the jurisdiction of the City of North Las Vegas.

The City will perform the next semi-annual inspection of the Las Vegas Wash channels, tributaries, and detention basins in the Central Region under jurisdiction of the City of North Las Vegas in October 2007.

If you have any questions, please call me at (702) 208-6705

Respectfully,

Phillip Davis
Roadway Operations Supervisor

CC: Dennis Scott, Roadway Operations Assistant Manager
Bryant Hill, Roadway Operations Supervisor
Jennifer Doody P.E., Flood Control Division Manager
Kirk Medina, Utilities Manager
Thomas Rura, Pretreatment Supervisor

M E M O R A N D U M

MWH

To:	**Las Vegas Valley Storm Water Quality Management Committee**	**Date:**	**April 23, 2007**
From:	**Chip Paulson, Tracy Wilcox**	**Reference:**	**1700610.01180201**
Subject:	**Example Approaches for Post-Construction Stormwater Management for New Development and Redevelopment in the Arid West**		

1. Executive Summary

Municipalities in the arid west vary in their approaches to controlling stormwater quality from development and redevelopment. Some stormwater quality programs are highly evolved and provide developers with extensive guidance on managing stormwater quality, while others have very basic requirements. Typically, city codes give authority to either the engineering or development services departments of cities to set stormwater policy and those departments provide guidance to developers during the design process.

Some of the more evolved stormwater quality programs provide developers with detailed guidance documents to help them design sites with the least environmental impact. These publications may discuss low impact development (LID) techniques and provide comparisons of different structural and non-structural best-management practices. The guidance documents may also describe how to calculate design flows and volumes for water quality treatment.

The requirements of most municipalities are based on treatment of the runoff generated by a specified design storm, such as the 10-year storm. Usually a city's development services department will not issue the necessary building and occupancy permits until the engineering department has certified that the site plans are adequate to meet water quality requirements. Examples of local requirements in the arid west are summarized below.

For both the Truckee Meadows region of Nevada and the Denver Metropolitan area, which includes several cities and unincorporated areas, regional agencies set stormwater quality guidelines. It is up to local governments to require developers to follow the guidelines set by the regional agency. Both regional agencies have developed extensive materials to assist developers with stormwater quality planning. The City of Reno is in the process of developing ordinances that require developers to follow the Truckee Meadows Structural Controls Design Manual and LID Handbook (Svetich 2007). Several cities within the Denver Metropolitan area require developers to adhere to the guidelines set by the Denver Urban Drainage and Flood Control District (Urban Drainage). For instance, the City of Denver's municipal code states that the City of Denver's Storm Drainage and Design and Technical Criteria (Criteria) are the source of city policy on stormwater drainage. The Criteria contains extensive references to the requirements of the Urban Drainage Design Manual. The Urban Drainage Design Manual requires the treatment of a "water quality capture volume" that is calculated based on surface area, rainfall, and runoff coefficient.

The cities of Phoenix and Tempe employ similar approaches to stormwater quality. The City of Phoenix, in their Storm Water Policies and Standards manual, requires all new developments to retain the 100 year, 2 hour storm. The City of Tempe requires new construction to retain the runoff generated by the 100-year storm event directly in their municipal code.

The City of Boise's Storm Water Management Design Manual (Design Manual) requires a specific rate of removal of TSS from stormwater. The rate of TSS removal is based on the percentage of impervious area on a site. Tables of design TSS removal rates for different best management practice (BMP) types are included in the Design Manual. All BMPs are designed for the 0.34 inch design storm.

The City of Albuquerque's stormwater requirements are focused on the removal of pollutants and floatable trash for most land use types. This allows developers to implement pass-through type BMPs, such as vortex separators, rather than retention-type of BMPs. Albuquerque's stormwater quality requirements are described in the city's Development Process Manual.

Although the requirements for stormwater quality treatment for new development and redevelopment vary from city to city in the arid west, most major cities do have requirements that developers must adhere to in order to complete the development review process. There are extensive resources available, particularly from California, Denver, and Truckee Meadows, that can be useful models for new stormwater quality programs for new development and redevelopment.

Table 1. Summary of Municipal Stormwater Programs for New Development and Redevelopment

Municipality	Ordinance	Required BMPs	Design Guidance Manual
Truckee Meadows, NV	In development	Yes	Yes
Denver, CO	Yes	Yes	Yes
Phoenix, AZ	Yes	Yes	Yes
Tempe, AZ	Yes	Yes	No
Boise, ID	Yes	Yes	Yes
Albuquerque, NM	Yes	Yes	Yes

2. Introduction

The Environmental Protection Agency (EPA) has requested that the Las Vegas Valley Municipal Separate Storm Sewer (MS4) permittees develop and implement a program to control the quality of runoff from new development and redevelopment. The permittees have requested information on program elements and BMPs recommended or commonly applied to developed and developing areas in similar communities. This document focuses on the land use planning and structural controls categories of watershed management that can be implemented at development and redevelopment projects as permanent measures or practices to improve stormwater quality.

This memorandum discusses stormwater quality planning principles for new development and then provides examples of how some western municipalities have incorporated stormwater quality planning into their new development and redevelopment processes. Issues associated with applying the principles and practices in Las Vegas Valley are discussed.

2.1. Stormwater Quality Planning Principles

There are many examples of communities in the southwest United States where development and redevelopment projects are required to implement the following three planning principles to improve water quality and/or reduce pollutant loading to surface waters (CSQA 2003):

(1) Reduce the amount of runoff leaving the site (see Section 3 – Low Impact Development Principles);

(2) Control pollutant sources; (see Section 4 – Source Control)

(3) Treat the stormwater runoff that will eventually leave the site (see Section 5 – Permanent Structural Controls).

When municipalities require developers to submit stormwater quality plans and meet water quality requirements, it makes economic sense for developers to consider the stormwater quality impacts of their sites in the design process. It encourages designing to minimize runoff and planning stormwater quality management from the beginning of the site layout. Proper planning to reduce runoff can decrease the capital and maintenance costs of structural water treatment facilities.

The three planning principles are discussed in more detail in Sections 2 through 4 of this report. The first principle, reduce the amount of runoff leaving the site, is mainly addressed via a discussion of low impact design (LID) principles.

2.2. Examples

Several well developed stormwater programs involving land use planning and structural controls already exist in the arid west. Other cities are just beginning to require that developers consider stormwater quality. There is a wealth of published information covering most facets of land use planning and structural controls. With all of the available information, it is not necessary for municipalities looking to add stormwater quality requirements to their development process to "reinvent the wheel". Much of the available information can be readily tailored to local climatic and cultural conditions. Basic elements that are part of most municipal stormwater quality programs are described in Section 6. The stormwater quality programs of several western municipalities are described in Section 7.

3. Low Impact Design (LID) Principles

Employing LID techniques in design can help developers and municipalities meet stormwater goals. LID is a broad topic, but generally can be summarized as techniques to reduce the footprint of development and maintain the natural function of the watershed as much as possible.

EPA (2000) states that, "LID is a site design strategy with a goal of maintaining or replicating the pre-development hydrologic regime through the use of design techniques to create a functionally equivalent hydrologic landscape." The functionally equivalent hydrologic landscape is obtained by incorporating storage and infiltration features, reducing impervious surfaces, lengthening flow paths and runoff time, and protecting sensitive features such as stream buffers and mature trees. So, unlike regional stormwater control facilities that may have water quality benefits, but still result in a modified hydrograph, LID techniques result in hydrologic conditions closer to the natural state of the watershed (EPA 2000).

LID techniques are divided into the following three categories for discussion:

- Site design
- Street and parking lot design
- Protection of natural areas

Note that much of the research and application of LID techniques, and review of the available examples, have occurred in the East and Midwest where hydrologic conditions and native vegetation are very different than in the arid West. Modification of these approaches may be necessary for application in Las Vegas Valley.

3.1. Site Design

Reducing the amount of runoff that a site generates and improving water quality can be accomplished by minimizing directly connected impervious areas. Directly connected impervious areas are those impervious areas draining directly to a storm drain system without any buffer of vegetation, soil, or gravel that could slow the runoff and also allow infiltration. Reducing the amount of runoff can also be effective in reducing the size and cost of eventual treatment controls that are required. Frequently there is a tradeoff between the amount of space that can be dedicated to pervious area on a site to reduce runoff amounts and designs with higher imperviousness that must use more costly treatment mechanisms (CSQA 2003).

The following LID techniques for site design are modified from the Center for Watershed Protection (CWP) (2006) and Prince George's County (1999).

(1) Advocate open space development (also known as cluster development, see Figure 1) incorporating smaller lot sizes to minimize total impervious area, reduce total construction costs, conserve natural areas, provide community recreational space, and promote watershed protection.

(2) Clearly specify how community open space will be managed and designate a sustainable legal entity responsible for managing both natural and recreational open space.

(3) Relax side yard setbacks and allow narrower frontages to reduce total road length in the community and overall site imperviousness. Relax front setback requirements to minimize driveway lengths and reduce overall lot imperviousness.

(4) Reduce overall lot imperviousness by promoting alternative driveway surfaces and shared driveways that connect two or more homes together.

(5) Direct rooftop runoff to pervious areas such as yards, open channels, or vegetated areas and avoid routing rooftop runoff directly to the roadway and the stormwater conveyance (see Figure 2).

(6) Limit areas of clearing, grading, and development to those parts of the lot that have less value in terms of hydrologic function. For instance, barren, clayey soil areas should be developed rather than vegetated, sandy soil areas (see Figure 3).

Figure 1. Comparison of Conventional Site Plan and LID Site Plan on the Same Site

Source: Truckee Meadows (2005)

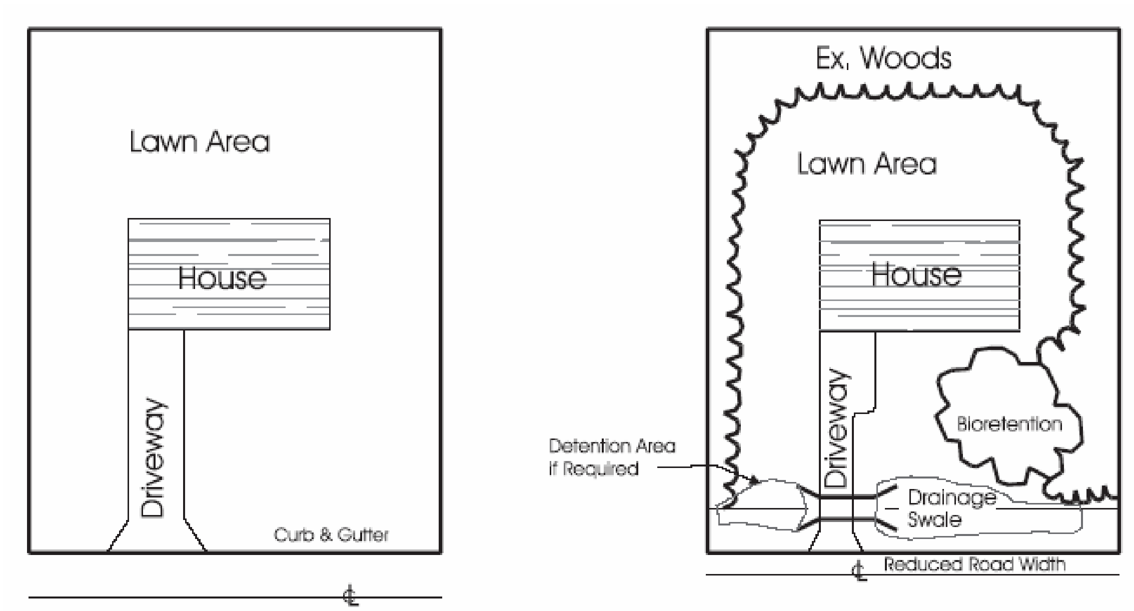


Figure 2. Conventional 1-Acre Lot and Typical LID 1-Acre Lot (not to scale)

Source: Prince George's County (1999)

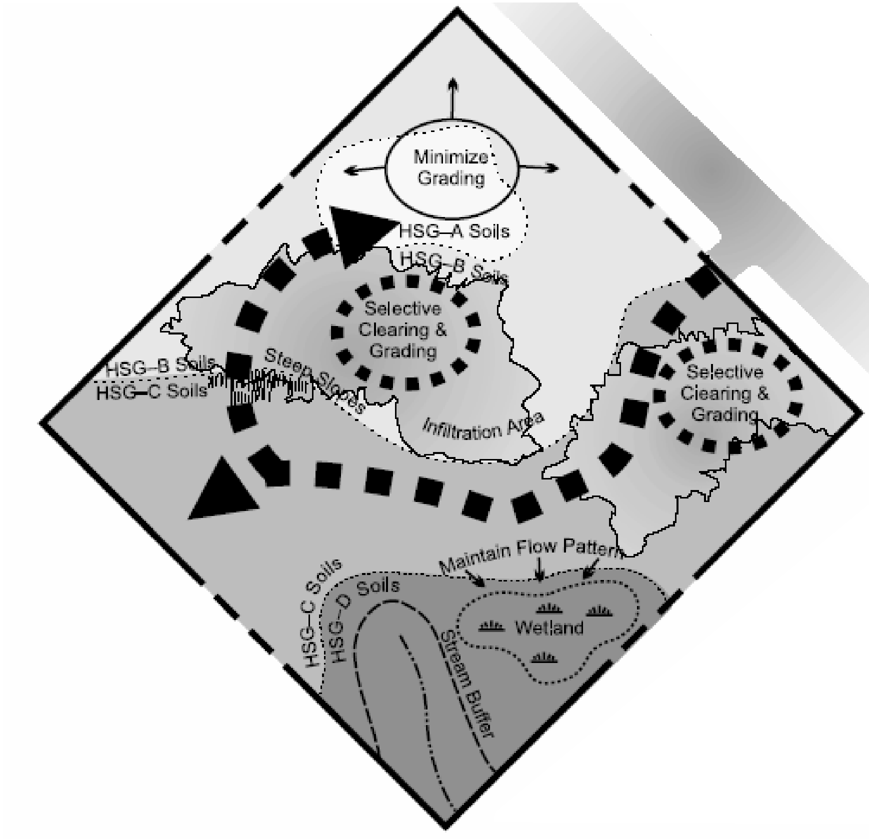


Figure 3. Hydrologically Functional Landscape

Source: Prince George's County (1999)

3.2. Street and Parking Lot Design

According to CSQA (2003), street and other transportation-related structures typically can comprise between 60 and 70 percent of the total impervious coverage in urban areas, and they are almost always directly connected to the storm drain system. Therefore, street design can have a great impact on stormwater quality. Street standards that encourage the use of narrow interconnected access streets in residential areas can reduce imperviousness and still meet the needs of emergency access.

The following LID ideas for street design are modified from CWP (2006) and Prince George's County (1999):

(1) Design residential streets for the minimum required pavement width needed to support traffic volume, emergency, maintenance, and service vehicle access. Consider installing sidewalks on only one side of the street. Where feasible, limit parking to only one side of the street.

(2) Reduce the total length of residential streets by examining alternative street layouts to determine the best option for increasing the number of homes per unit length. Reduce the radii of cul-de-sacs or add landscape islands to reduce the amount of impervious area in cul-de-sacs.

(3) Where density, topography, soils, and slope permit, vegetated open channels should be used in the street right-of-way to convey and treat stormwater runoff rather than underground storm drains.

Figure 4 compares options for residential street cross sections. There are several options available to reduce the amount of impervious area contributed by streets. Street standards that are similar to the rural street standard result in much less impervious area.

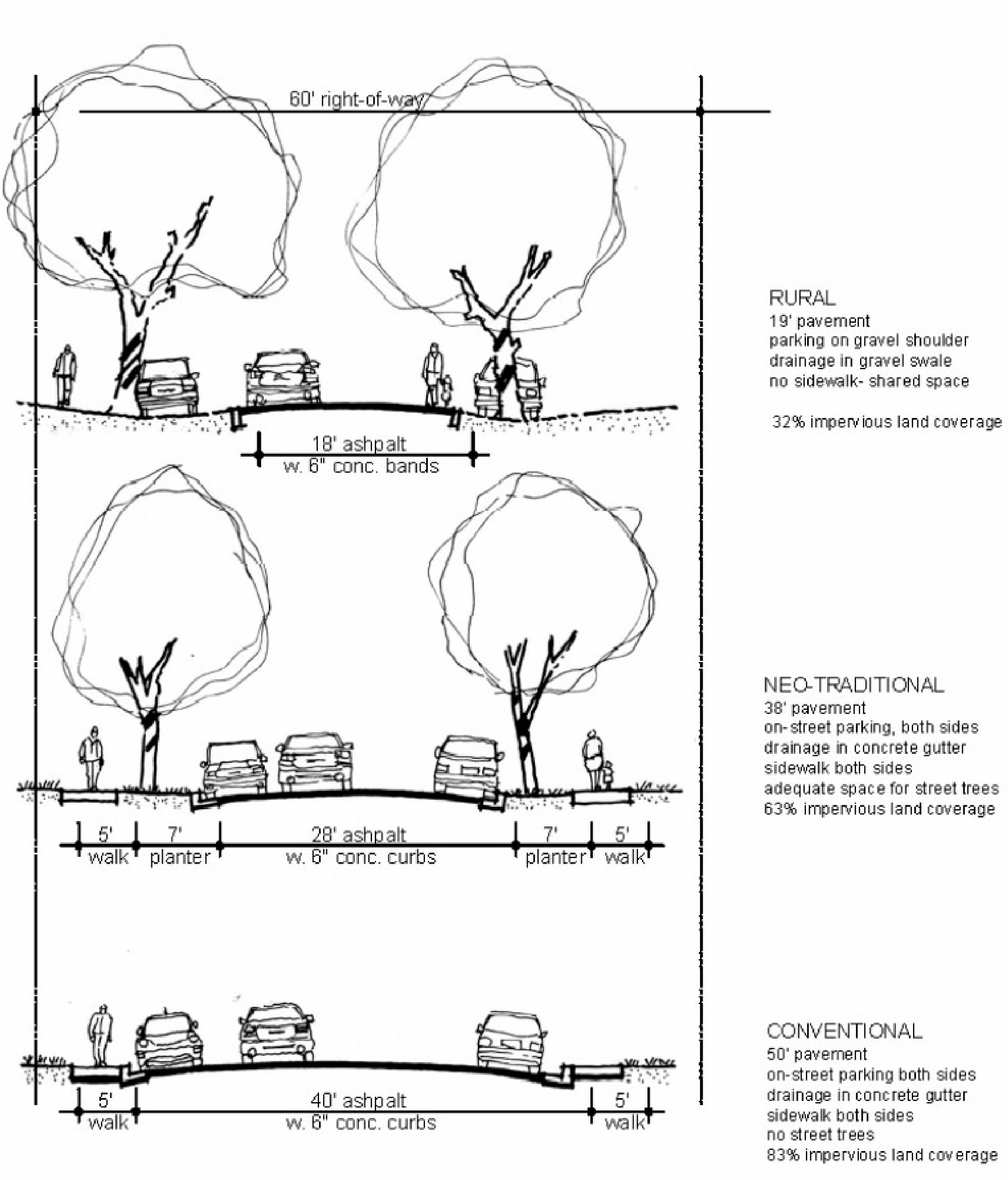


Figure 4. Comparison of Residential Street Cross Sections

Source: CSQA (2003)

The following LID ideas for parking lots are modified from CWP (2006):

(1) The required number of parking spaces governing a particular land use should be enforced as both a maximum and a minimum in order to curb excess parking space construction. Existing parking requirements should be reviewed for conformance taking into account local and national experience and the availability of mass transit to see if lower requirements are warranted and feasible.

(2) Reduce the overall imperviousness associated with parking lots by providing compact car spaces, minimizing stall dimensions, incorporating efficient parking lanes, and using pervious materials in spillover parking areas where possible.

(3) Encourage structured and shared parking.

(4) Wherever possible, provide stormwater treatment for parking lot runoff using bioretention areas, filter strips, and/or other practices that can be integrated into required landscaping areas and traffic islands

Figure 5 compares a typical big-box store parking lot and one designed with pervious pavement and other LID techniques.

Figure 5. Comparison of Typical Parking Lot and LID Parking Lot

Source: LIDC (2006)

3.3. Protection of Natural Areas

The following LID ideas for protection of natural areas are modified from CWP (2006):

(1) Create a variable width, naturally vegetated buffer system along streams that also encompasses critical environmental features such as the 100-year floodplain, steep slopes and wetlands.

(2) The riparian stream buffer should be preserved or restored with native vegetation. The buffer system should be maintained through the plan review delineation, construction, and post-development stages.

(3) Clearing and grading of native vegetation at a site should be limited to the minimum amount needed to build lots, allow access, and provide fire protection. A fixed portion of any community open space should be protected and managed in a consolidated manner.

(4) Conserve trees and other vegetation at each site by planting additional vegetation, clustering tree areas, and promoting the use of native plants. Wherever practical, manage community open space, street rights-of-way, parking lot islands, and other landscaped areas.

3.4. Incorporating LID Principles Into Policy and Reality

In order to implement LID principles in Las Vegas Valley, it may be necessary to counteract misconceptions regarding some of the LID principles, change local ordinances (street standards and zoning rules) to allow LID, and provide incentives for developers to utilize LID.

Some aspects of LID principles may be perceived as unfavorable. For example, narrower streets may be perceived as a safety hazard, smaller lot size may be seen as a turnoff to homebuyers, and some LID techniques may be perceived as more expensive. However, many of these perceptions are untrue, particularly if developments are well designed.

The Better Site Design Handbook (CWP 1998) provides facts to counter some of the negative perceptions about LID principles. The handbook points to studies that show that narrower streets are safer and that many families prefer smaller lot sizes to reduce yard work. Also, LID designs can actually reduce development costs by:

- Reducing the area of constructed surfaces such as roadways, curb, and gutters;
- Decreasing the use of storm drain pipe and inlet structures;
- Eliminating or decreasing the size of large stormwater ponds;
- Greater lot yield can increase profits for developers (Prince George’s County 1999).

Zoning ordinances typically specify land uses, describe lot layout requirements, road layout requirements, and sometimes drainage requirements. More environmentally friendly zoning ordinances may need to be adopted to facilitate and even encourage LID.

Smart Growth for Clean Water (NALGEP et al. 2003) recommends providing economic incentives to developers who adopt LID principles in their designs. They suggest creating incentives for:

- Dedication of open space to preservation;
- Cluster/conservation zoning or density bonuses;
- Overlay zones to protect water resources;
- Minimum tree planting requirements;
- Incentives for stormwater runoff reduction techniques.

Incentives for implementing LID techniques can also include property tax reduction and stormwater credits.

LID techniques rely heavily on the assumption that typical residential development and landscaping generate more runoff in terms of quantity and pollutant load than an undisturbed watershed. In the arid West, this assumption is not as clear cut. Undeveloped watersheds in arid areas commonly contribute higher sediment loads than developed watersheds due to lack of vegetation cover. Because sediment is a key pollutant, preserving undisturbed areas may not be beneficial for sediment management.

In addition, the push for use of more desert landscaping as a water conservation measure may change the dynamic between developed area landscaping and water quality concerns. Desert landscaping requires less pesticide/herbicide use and generates less outdoor irrigation return flows than conventional landscaping. Research may be required to assess the adverse or positive effects of desert landscaping on water quality and the hydrologic cycle.

In general, it may be that LID techniques developed in more humid areas of the US would be less effective in the watershed conditions common in the Las Vegas Valley.

Implementing LID practices in Las Vegas Valley may require changes to development standards at the county and city level, as well as changes to the way community associations and homeowners associations treat landscaping policies.

Because of the importance of the development community in Las Vegas Valley, a strong outreach and education effort to this group would have to be a part of any LID program implementation on a broad basis.

4. Source Control

There is a long list of varied source controls that are best practices for reducing runoff and protecting the quality of runoff. Source controls that could specifically be applied in areas of new development or redevelopment include:

- Efficient irrigation systems which limit erosion and limit the transport of pollutants offsite,
- Storm drain labeling to educate the public and reduce dumping of wastes into storm drains,
- Waste management including practices for material delivery, handling, storage, and disposal that reduce the likelihood of materials coming into contact with stormwater,
- Street sweeping to remove sediment and debris from streets before they can enter waterways,
- Fertilizer and pesticide management including the judicious use of these chemical and proper storage of the materials so that they do not contact stormwater

More information on source controls applicable to the Las Vegas Region is included in Appendix G of the Las Vegas Valley NPDES Municipal Stormwater Discharge Permit Annual Report for 2003-2004.

5. Permanent Structural Controls – Post-Construction BMPs

After LID techniques and source control have been implemented, runoff that still leaves the site could be treated via structural controls, or post-construction best management practices (BMPs). BMPs can either be designed and constructed specifically for each site or, in some cases, proprietary manufactured products can be used to meet stormwater quality requirements.

Many municipalities require the installation of post-construction BMPs in new developments to treat the majority of runoff that will leave the site. Usually, municipalities allow the use of both regional and on-site BMPs as long as the water quality requirements for each individual development are met by the combination. Combining regional and on-site BMPs requires a partnership between the planning agency (e.g., CCRFCD and the municipal planning departments) and the development community to define the approach to satisfying the permit requirements and choosing between regional and onsite BMPs (CSQA 2003).

Some commonly implemented post-construction BMPs in the arid West are described below. Much more detailed design information, performance data, benefits and limitations for each type of BMP is available.

5.1. Vegetated Swale

Vegetated swales force stormwater to be conveyed slowly and shallowly allowing for sedimentation and minimizing erosion. Vegetated swales have been proven successful even in dry areas. Caltrans found that in areas with as little rainfall as 10 inches per year, the vegetation in the swale survived without any supplemental irrigation (CSQA 2003).

The Denver Urban Drainage Manual (Urban Drainage 2005) states, "A grass swale can be located to collect overland flows from areas such as parking lots, buildings, residential yards, roadways and grass buffer strips (GBs). They can be made a part of the plans to minimize a directly connected impervious area by using them as an alternative to a curb-and-gutter system."

Figure 6 depicts a grassed swale and a xeriscape-vegetated swale. The xeriscaped swale would be more applicable to Las Vegas Valley, particularly given the push for outdoor watering conservation. Xeriscaped swales may be less effective than grass swales for pollutant removal, but would still provide substantial benefits compared to curb and gutter or storm drains.

Figure 6. Vegetated Swale and Xeriscape Swale

Sources: Urban Drainage (2005) and Truckee Meadows (2005)

5.2. Extended Detention Basin

Extended detention basins are a modification of detention basins typically used for flood control. The outlet is modified to drain in a certain number of hours, usually between 24 and 72 hours, after filling, and the basins may contain a permanent pool of water.

Extended detention basins are well suited for drainage areas greater than 10 acres in dry climates. Maintenance is relatively low, a constant water source is not needed, and the water quality of the outflow usually is improved (CSQA 2003).

Figure 7 is a photo of an extended detention basin in the Denver area. Figure 8 is an example profile design of an extended detention basin. Design plans similar to what is shown in Figure 8 are available for most of the post-construction BMPs.

Figure 7. Extended Detention Basin Example

Source: Urban Drainage (2005)

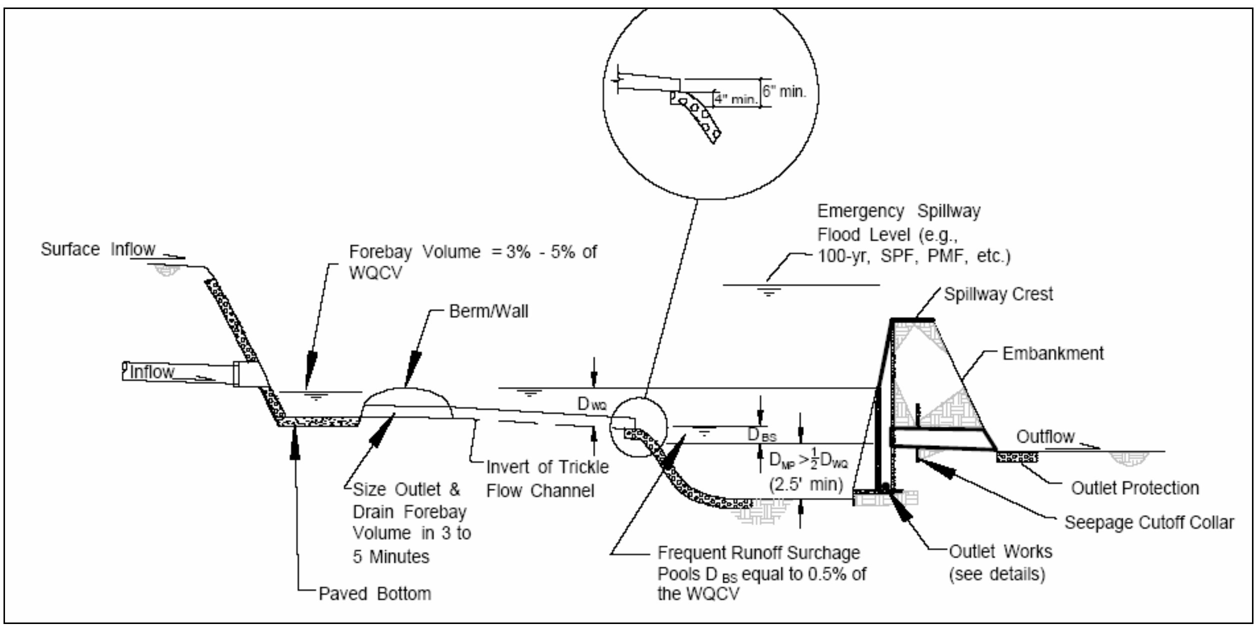


Figure 8. Extended Detention Basin Profile (not to scale)

Source: Urban Drainage (2005)

In the Las Vegas Valley there are opportunities to retrofit existing regional and local detention basins to improve their performance at removing pollutants for the frequent storm events that are less than the detention basin design event. This would normally involve modifying the outlet structure to reduce the outflow and increase retention time for frequent (e.g., 2-year) storm events.

5.3. Porous Pavement

Porous pavement allows water to infiltrate in parking areas reducing the amount of runoff and the associated pollutants. It can be installed with and without underdrains. There are several design considerations such as the amount of load that a particular type of porous pavement can support and the soil type on which the porous pavement can be installed. Figure 9 shows several different types of porous pavement.

Figure 9. Porous Pavement Examples

Source: Urban Drainage (2005)

5.4. Porous Landscape Detention

Porous landscape detention consists of a low lying vegetated (or xeriscaped) area underlain with porous planting media and a drainage system. In humid climates, this type of BMP allows for planting of bluegrass and other types of vegetation, which usually cannot survive in the wetter conditions of an extended detention basin. In arid climates it allows for planting of vegetation for landscaping that may need slightly more water than more traditional xeriscape planting. Figure 10 shows two examples of this BMP, one is a parking lot island at Canyonlands National Park and one with a putting green.


Figure 10. Porous Landscape Detention Examples

Sources: Denver (2004) and Urban Drainage (2005)

6. Typical Stormwater Quality Management Approaches for New Development and Redevelopment

This section describes typical elements of municipal stormwater quality programs with requirements for new development.

6.1. Stormwater Quality Plans

Municipal stormwater programs in large communities in the Western U.S. typically require developers to submit stormwater quality plans for approval. Very small developments are typically excepted from the process, but development and redevelopment meeting any of the following criteria do need to submit plan (CSQA 2003):

- Residential sites with at least 10 units
- Commercial sites at least 1 acre in size
- Parking lots and road projects greater than 5,000 square feet
- Retail gasoline outlets
- New and redevelopment projects with greater than 1 acre of impervious area

Stormwater quality plans must be approved prior to issuance of construction permits. Several municipalities in the arid West provide manuals or sections of their drainage manuals dedicated to stormwater quality and the development of stormwater quality plans. They provide BMP fact sheets and design guidelines to help developers select the best BMPs for their site conditions and design those BMPs for their site. Stormwater quality plans can be integrated with drainage plans and generally must contain documentation of the following topics:

Topic	Description
Site conditions	Description of pre- and post-development conditions Description of how site fits into overall watershed and existing drainage system
Hydrologic conditions	Understanding of how the runoff hydrograph after construction differs from the pre-construction runoff hydrograph. Calculation of peak flow rate and other hydrologic characteristics to help describe the hydrologic effects of the site.
Pollutants of concern	Determine pollutants of concern for the site based on receiving water quality, planned land use and pollutants associated with such land use, expected changes to site hydrology and how that may affect water quality, and other considerations
Identify candidate BMPs	Based on pollutant of concern, treatment efficiency, cost, space available
Determine BMP size	Based on local hydrology, site drainage, local permit sizing requirements such as a specified water quality capture volume
BMP maintenance plan	Maintenance plans are required before stormwater permits are granted to ensure ongoing maintenance of structures

To implement this approach in Las Vegas Valley, each of the entities would have to amend its development approval process to require submittal of a stormwater quality plan along with the drainage plan. Templates for stormwater quality plans could be prepared at the regional level (e.g. by CCRFCD) to assure consistency among all the entities.

Pollutants of concern at a site can generally be identified from site conditions and proposed land uses as well as receiving water conditions. If a receiving water is on the 303(d) list, has existing total maximum daily loads (TMDLs), or is sensitive to loading of any particular pollutant, the stormwater management at the site should be geared toward these concerns. Certain land uses are generally expected to produce certain pollutants in runoff. Table 2 is a summary of potential pollutants of concern by land use. It is noted that this data is based on nationwide runoff monitoring and may or may not be applicable to Las Vegas Valley.

Table 2. Potential Pollutants By Land Use

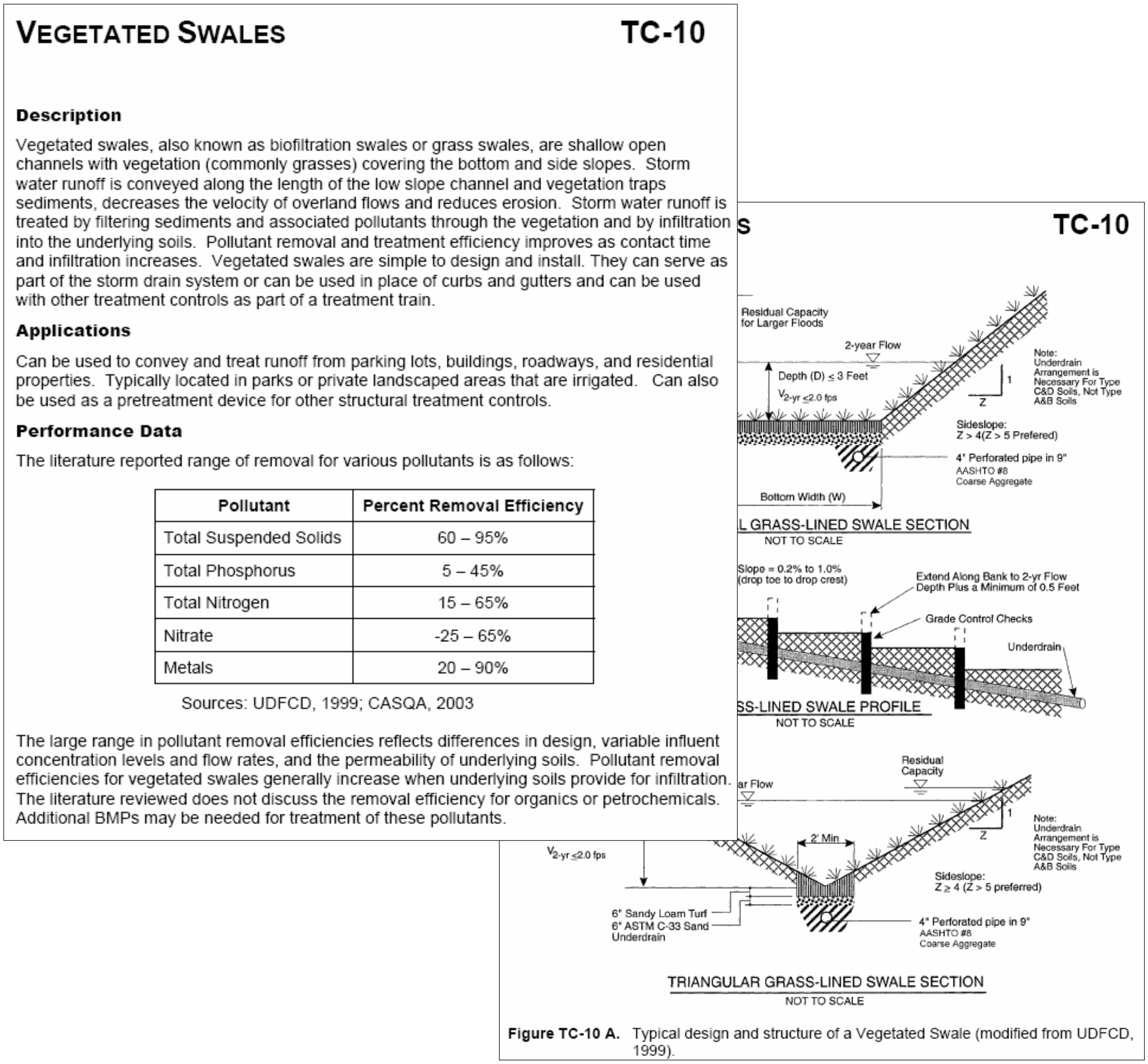
Project Categories	General Pollutant Categories								
	Pathogens	Heavy Metals	Nutrients	Pesticides	Organic Compounds	Sediments	Trash & Debris	Oxygen Demanding Substances	Oil & Grease
Detached Residential Development	X		X	X		X	X	X	X
Attached Residential Development	P		X	X		X	X	P(1)	P(2)
Commercial/Industrial Development > 100,000 ft^2	P(3)		P(1)		P(2)	P(1)	X	P(5)	X
Automotive Repair Shops		X			X(4)(5)		X		X
Restaurants	X						X	X	X
Hillside Development			X	X		X	X	X	X
Parking Lots		X	P(1)	P(2)		P(1)	X	P	X
Streets & Highways		X	P(1)		X(4)	X	X	P(5)	X

X = anticipated, P=Potential (1) a potential pollutant if landscaping exists on-site, (2) a potential pollutant if the project includes uncovered parking areas, (3) a potential pollutant if land use involves food or animal waste products, (4) including petroleum hydrocarbons, (5) including solvents

Source: CSQA (2003)

6.2. BMP Fact Sheets or Manuals

BMP fact sheets or manuals including a description of the BMP, a list of suitable applications, and design considerations are useful to developers completing stormwater management plans. BMP fact sheets are available from many sources, although not all BMPs may be appropriate for a given climate or location. The appropriate list of BMPs for a given municipality can be selected by the municipality's stormwater managers. Appendix G of the Las Vegas Valley NPDES Municipal Stormwater Discharge Permit Annual Report for 2003-2004 includes brief fact sheets for construction, post-construction, and source control BMPs that are appropriate for the Las Vegas region. Examples from a detailed BMP fact sheet for the Truckee Meadows region are shown in Figure 11.



VEGETATED SWALES **TC-10**

Description

Vegetated swales, also known as biofiltration swales or grass swales, are shallow open channels with vegetation (commonly grasses) covering the bottom and side slopes. Storm water runoff is conveyed along the length of the low slope channel and vegetation traps sediments, decreases the velocity of overland flows and reduces erosion. Storm water runoff is treated by filtering sediments and associated pollutants through the vegetation and by infiltration into the underlying soils. Pollutant removal and treatment efficiency improves as contact time and infiltration increases. Vegetated swales are simple to design and install. They can serve as part of the storm drain system or can be used in place of curbs and gutters and can be used with other treatment controls as part of a treatment train.

Applications

Can be used to convey and treat runoff from parking lots, buildings, roadways, and residential properties. Typically located in parks or private landscaped areas that are irrigated. Can also be used as a pretreatment device for other structural treatment controls.

Performance Data

The literature reported range of removal for various pollutants is as follows:

Pollutant	Percent Removal Efficiency
Total Suspended Solids	60 – 95%
Total Phosphorus	5 – 45%
Total Nitrogen	15 – 65%
Nitrate	-25 – 65%
Metals	20 – 90%

Sources: UDFCD, 1999; CASQA, 2003

The large range in pollutant removal efficiencies reflects differences in design, variable influent concentration levels and flow rates, and the permeability of underlying soils. Pollutant removal efficiencies for vegetated swales generally increase when underlying soils provide for infiltration. The literature reviewed does not discuss the removal efficiency for organics or petrochemicals. Additional BMPs may be needed for treatment of these pollutants.

Figure TC-10 A. Typical design and structure of a Vegetated Swale (modified from UDFCD, 1999).

Figure 11. Example BMP Fact Sheets

Source: Truckee Meadows (2004)

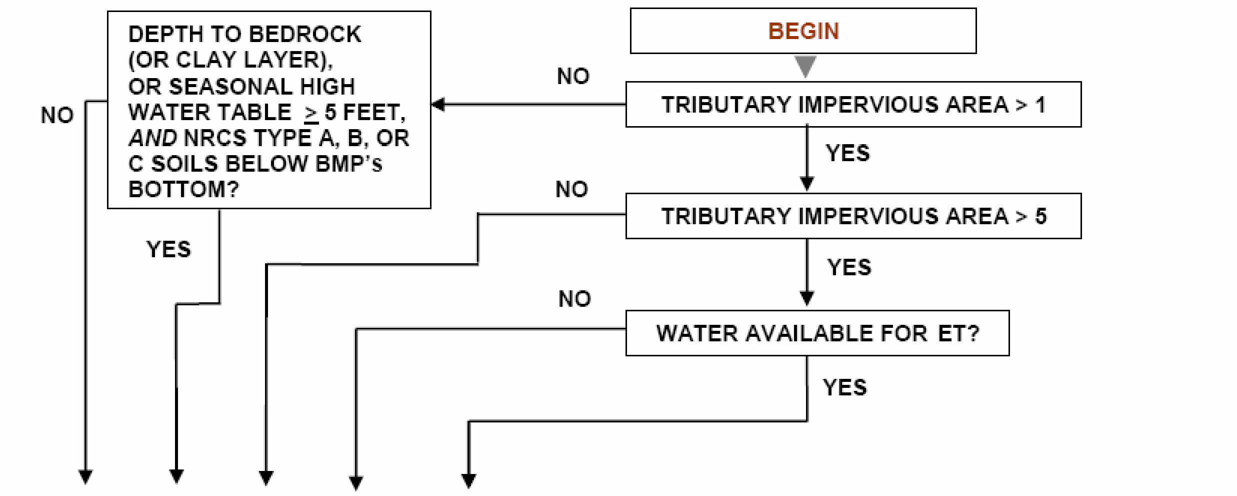
Typical topics of discussion for BMP fact sheets are:

- Description
- Advantages
- Limitations
- Design and sizing guidelines
- Performance
- Siting criteria
- Design guidelines
- Maintenance
- Cost
- References and sources of additional information

Municipalities can also provide guidance to developers regarding the best BMPs to treat stormwater at their site. Some information regarding typical applications of a given BMP can be included on the fact sheets, but decision trees, such as the one shown in Figure 12, or other matrices can be useful.

The current BMP manual for Las Vegas Valley is incorporated in the CCRFCD Hydrologic Criteria and Drainage Design Manual (HCDDM), and is provided for guidance to the engineering community only. The additional BMP information included in Appendix G of the 2003-2004 Annual Report has not been adopted in any widely distributed guidance documents. Incorporating structural BMPs in engineering design documents would be most easily accomplished by updating the HCDDM to include specific requirements for BMPs. Guidance similar to Figure 12 would have to be developed to assist engineers and develops in selecting BMPs appropriate for Las Vegas Valley conditions.

If local ordinances in Las Vegas Valley are modified to require implementation of post-construction BMPs, BMP fact sheets for Las Vegas Valley will have to be formalized and adopted by all permittees, either individually through the CCRFCD HCDDM.



■	■				GREEN ROOF WITH IRRIGATION
■	■				GRASS BUFFER (GB)
■	■	■	■	■	GRASS SWALE (GS)
	■				POROUS PAVEMENT (PP) WITH INFILTRATION
■					POROUS PAVEMENT (PP) WITH UNDERDRAINS
	◆				POROUS PAVEMENT DETENTION (PPD) WITH INFILTRATION
◆					POROUS PAVEMENT DETENTION (PPD) WITH UNDERDRAINS
	◆				POROUS LANDSCAPE DETENTION (PLD) WITH INFILTRATION
◆					POROUS LANDSCAPE DETENTION (PLD) WITH UNDERDRAINS
		●	●	●	EXTENDED DETENTION BASIN (EDB) ***
◆	◆	◆	◆	◆	SAND FILTER DETENTION BASIN (EDB)
				●	CONSTRUCTED WETLAND BASIN (CWB)
				●	RETENTION POND (RP)
■	■	■	■	■	CONSTRUCTED WETLAND CHANNEL (CWC)

Legend: ■ Provides for reductions in runoff volume, along with some reduction in pollutant EMCs

◆ Provides for reductions in runoff volume and the recommended *WQCV*

● Provides recommended *WQCV*

*** EDBs are not very suitable for catchments with less than 5 acres of impervious tributary area. The International BMP Database reports EDBs provide as much as 30% reductions in annual runoff volume.

Figure 12. Decision Tree for Potential BMPs Based on Site Characteristics

Source: Urban Drainage (2005)

6.3. Sizing Standards for Structural BMPs

Once the appropriate BMP for a site has been chosen, the size of the BMP, whether based on a flowrate or a volume must be selected.

Typically, the size of a BMP is determined through a combination of site characteristics and the municipality's requirements. Treatment BMPs are most cost efficient when sized to treat smaller, more frequent storms that over time result in the majority of runoff. Typically, municipality BMP sizing requirements are set according to the point where the depth of storm events increases more rapidly than the number of storm events. This is shown as the "knee of the curve" in Figure 13. The knee of the curve occurs when, beyond that point rapidly diminishing returns are realized for capturing larger stormwater volumes (ASCE 1998).

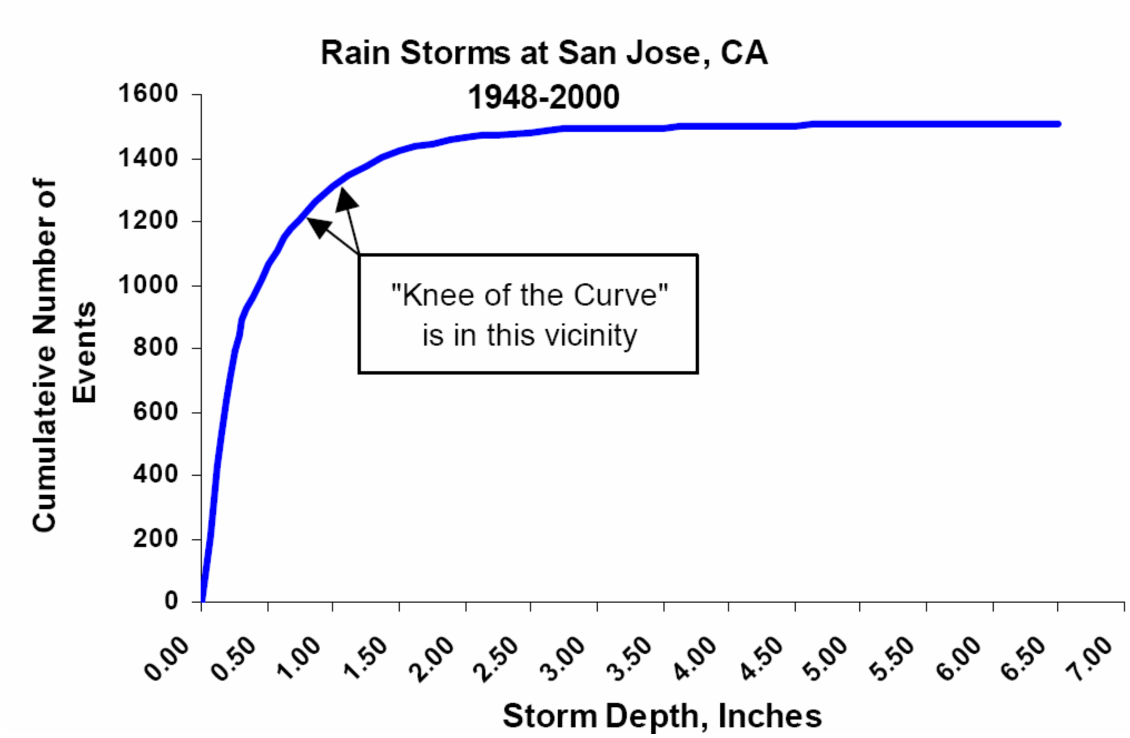


Figure 13. Storm Events in San Jose, California

Source: CSQA (2003)

Volume-based BMPs are often sized to capture and infiltrate or treat a volume that corresponds to the 75th to 85th percentile of annual average runoff volume. CSQA (2003) found that the 75th to 85th percentile corresponded to the knee of the curve at most sites where the composite runoff coefficient (a measure of imperviousness) is between 0.5 and 0.95.

The volume-based water quality BMP sizing method used by most municipalities is as follows:

1. Determine size of area draining to a BMP
2. Determine the composite runoff coefficient of the area (based on imperviousness of the various surfaces draining to the BMP)
3. Determine the unit area capture volume required to be treated by the BMP. Such a volume could be based on the desired percentage of runoff to be captured by the BMP, such as 75 percent. Figure 14 shows two examples of curves used to size the unit capture volume.
4. Multiply the drainage area by the unit area capture volume.

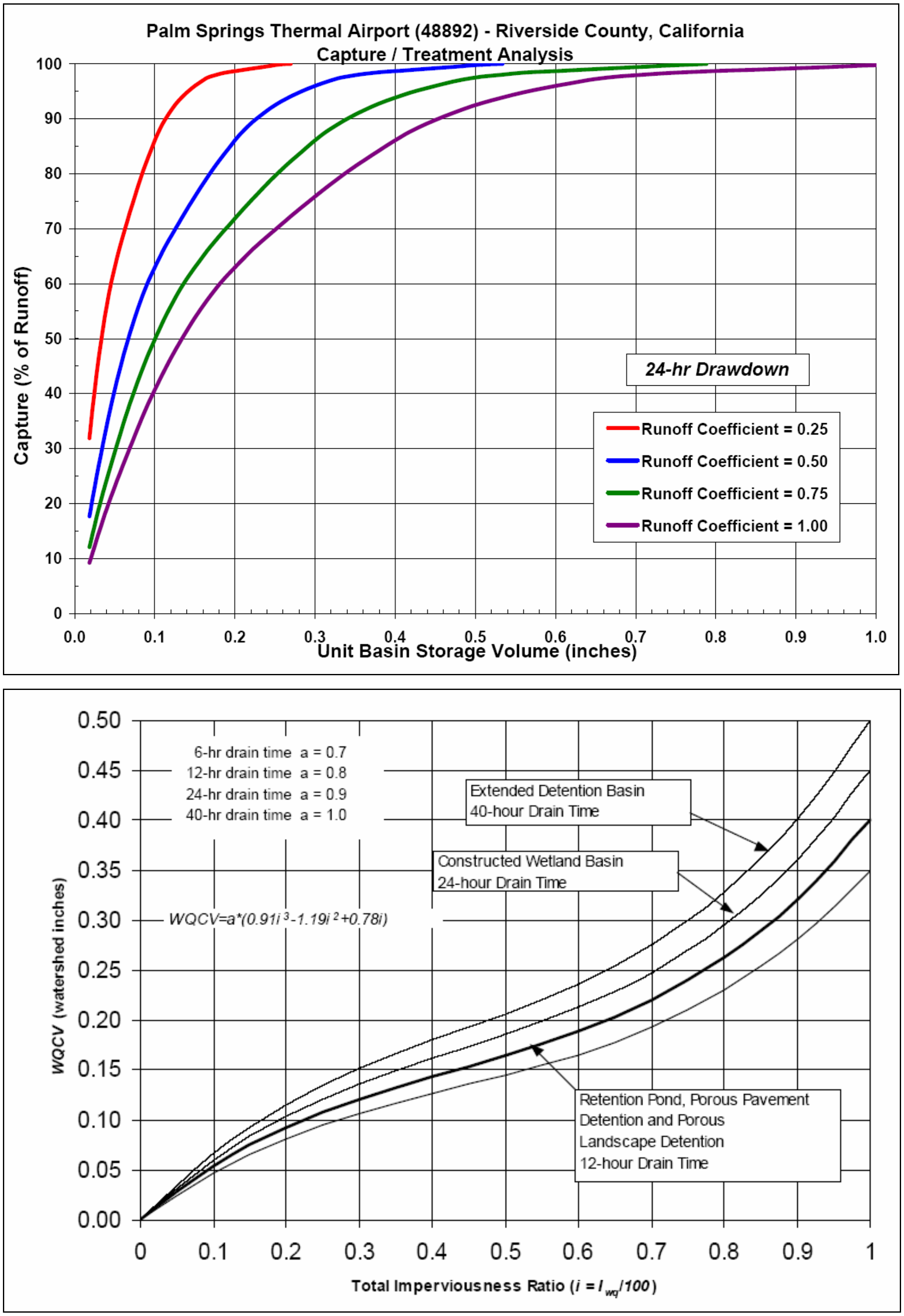


Figure 14. Example Curves Used to Estimate Unit Water Quality Capture Volume

Source: CSQA (2003), Urban Drainage (2005)

There are other methods that can be employed at larger or more complicated sites, such as modeling of runoff. Again, municipalities may require these more intensive methods on projects of a certain size.

Some BMPs are sized according to flowrate rather than volume. Flowrate sizing is often based on treating an amount that corresponds to a particular rainfall intensity. The following approaches are listed in the California Stormwater BMP Handbook (CSQA 2003):

- 10% of the 50-yr peak flow rate (Factored Flood Flow Approach)
- The flow of runoff produced by a rain event equal to at least two times the 85th percentile hourly rainfall intensity for the applicable area, based on historical records of hourly rainfall depths (California Stormwater BMP Handbook Approach)
- The flow of runoff resulting from a rain event equal to at least 0.2 in/hr intensity (Uniform Intensity Approach)

The Rational Formula ($Q = CiA$) can be applied to calculate the flowrates listed in the examples above.

If structural BMPs are incorporated into the HCDDM or similar documents and are mandated for use in Las Vegas Valley developments, specific sizing criteria and parameters will have to be developed as appropriate for the Las Vegas climate.

7. Examples of New Development (Post-Construction) BMP Programs

Communities with established programs include Reno/Sparks, Denver, Boise, Albuquerque, Salt Lake City, Phoenix, Tempe, and all major cities in Southern California. The stormwater quality requirements for development and redevelopment in some of these locations are summarized below.

7.1. Truckee Meadows, Nevada

Truckee Meadows includes the communities of Reno, Sparks, and Washoe County in Nevada. The Truckee Meadows Regional Stormwater Quality Management Program has created several documents that are utilized by the municipalities in their stormwater programs. The LID Handbook (Truckee Meadows 2005) is to be used by developers during the initial planning process. The Structural Controls Design Manual (Truckee Meadows 2004) is to be used in conjunction with the municipalities' drainage manual in the engineering design of the site. Then, the Construction Site BMP Handbook is to be used for selection of construction-phase BMPs.

It is up to the municipalities to modify their existing ordinances and policies to require the use of water quality controls such as those suggested in the handbooks and manual. The City of Reno is currently developing modified ordinances to require stormwater treatment for new development using suggested requirements in the LID Handbook as a starting point (Svetich 2007). The Draft LID Handbook details LID principles and also suggests water quality treatment requirements for developments of different types. The tiered requirements in the LID handbook are as follows:

- Tier 1 – projects that will disturb one acre or more of land: reduce runoff peaks and volumes to pre-development levels and incorporate design features and practices that will address water quality.
- Tier 2 – projects that will include constructed open channels and local or regional detention basins for flood management: incorporate permanent erosion control BMPs such as riprap and revegetation. Local and regional detention basins must incorporate water quality outlet structures.
- Tier 3 – projects that will include industrial, commercial, or civic facilities: employ source control measures for outdoor storage and other activities. Do not allow infiltration if spills could occur at the site or if stormwater quality could impact ground water quality.
- Tier 4 – Projects located within or directly adjacent to environmentally sensitive areas: projects less than 1 acre that are adjacent to areas such as the Truckee River, stream buffer zones, or any

defined as significant hydrologic resources may be required to incorporate the same BMPs as for Tiers 1 through 3 (Truckee Meadows 2005).

The Truckee Meadows Structural Controls Design Manual (Truckee Meadows Manual) was finalized in 2004. Water quality design criteria for Sacramento, California, Boise, Idaho, Denver, Colorado, and Austin, Texas as well as the California Stormwater BMP Handbook (CSQA 2003) were reviewed and used as models for the Truckee Meadows Structural Controls Design Manual (Truckee Meadows 2004). The manual includes both flow-based and volume-based water quality sizing requirements for post-construction BMPs. Local precipitation data, such as the frequency analysis shown in Figure 15, were used in the development of BMP sizing criteria. The volume-based requirement is based on the 90th percentile precipitation depth, or 0.60 inches.

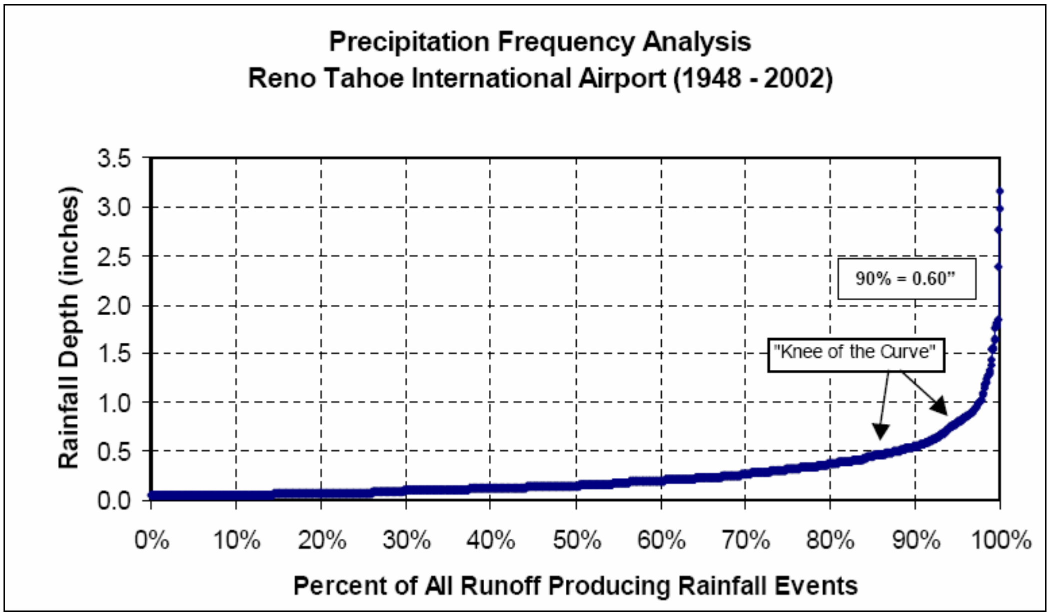


Figure 15. Knee of the Curve Analysis – Truckee Meadows

Source: Truckee Meadows (2004)

In addition to site-specific pollutants of concern, the manual encourages developers to consider that the Truckee River is on the 303(d) list for pollutants including temperature, phosphorus, and turbidity. In addition, TMDLs have been established for nitrogen, phosphorus, and total dissolved solids in parts of the river. The Truckee Meadows Manual also includes the table of expected pollutants based on land use shown as Table 2.

The Truckee Meadows Manual includes a matrix of structural control BMPs to help developers choose the most appropriate treatment control for their site. It also includes examples of design worksheets for structural controls that provide guidance to developers needing to apply for stormwater permits (see Figure 16).

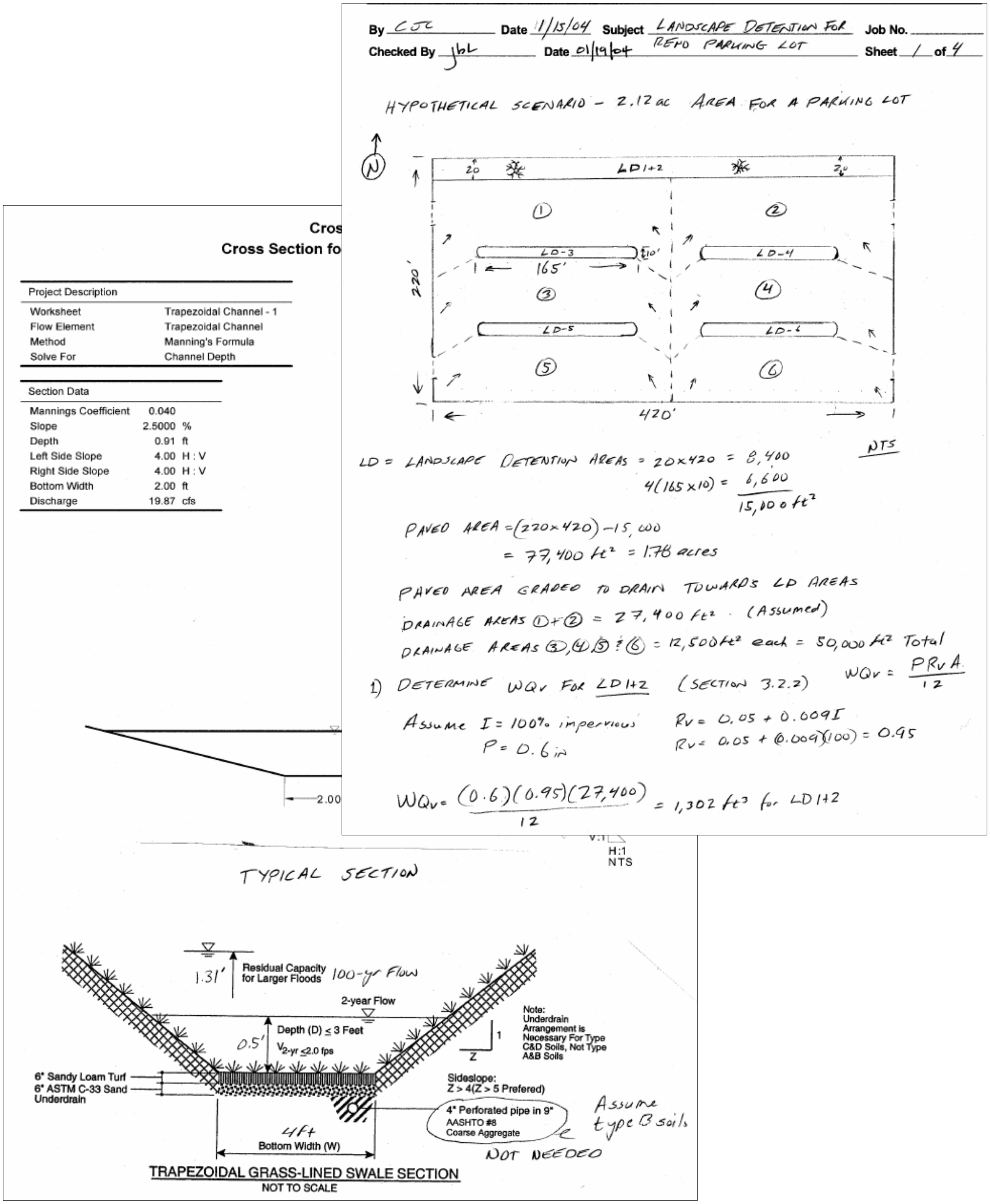


Figure 16. Example Structural Design Worksheets

Source: Truckee Meadows (2004)

7.2. Denver, Colorado

Urban Drainage assists local governments in the vicinity of Denver, Colorado with drainage projects. The Urban Storm Drainage Criteria Manual (Urban Drainage Manual) is referenced by many of the local governments, including the City and County of Denver and City of Aurora, in their storm drainage design manuals. The Urban Drainage Manual contains extensive information regarding the selection and design of appropriate stormwater quality BMPs and BMPs that function for both flood control and water quality purposes (Urban Drainage 2005).

The City of Denver requires permanent stormwater quality BMPs for developments larger than 1 acre and for those less than 1 acre with flood control detention at-grade. Furthermore, the City of Denver requires that all facilities with stormwater detention provide water quality enhancement through timed release water quality outlet structures (Denver 2006). The water quality capture volume and structure design are to conform with the Urban Drainage Manual. Developments have required submittals including Stormwater Quality Control Plans (SQCPs) that must be approved by the City and County of Denver Wastewater Management Divisions prior to construction. Instructions to developers for completing SQCPs are published in an Information Guide (Denver 2000).

The Urban Drainage Manual recommends that water quality facilities in the Front Range of Colorado capture the 80th percentile runoff event (Urban Drainage 2005). The City and County of Denver requires the use of BMP design forms included in the Urban Drainage Manual. Design form examples can be downloaded from the Urban Drainage website in either document or spreadsheet format. The spreadsheets include equations for appropriate sizing and design (see Figure 17).

DRAINAGE CRITERIA MANUAL (V. 3) DESIGN FORMS

Sand Filter Basin (SFB)

Design Procedure Form: Sand Filter Basin (SFB)

Designer:
Company:
Date:
Project:
Location:

1. Basin Storage Volume	
A) Tributary Area's Imperviousness Ratio ($I = I_a / 100$)	I_a = 98.00 % I = 0.98
B) Contributing Watershed Area (Area)	Area = 0.3000 acres
C) Water Quality Capture Volume (WQCV) (WQCV = 1.0 * (0.91 * I^3 - 1.19 * I^2 + 0.78 * I))	WQCV = 0.48 watershed inches
D) Design Volume: Vol = (WQCV / 12) * Area	Vol = 0.0120 acre-feet
2. Minimum Filter Surface Area: A_s = (Vol / 3) * 43,560	A_s = 174 square feet, Minimum
Actual Filter Surface Area Used (Should not be less than minimum):	A_s = 175 square feet,
Filter Surface Elevation	1100.00 feet
Average Side Slope of the Filter Basin (4:1 or flatter, zero for vertical walls)	Z = 0.0 Using Vertical Walls
3. Estimate of Basin Depth (D), based on filter area A_s	D = 3.0 feet
4. Outlet Works	
A) Sand (ASTM C-33) Layer Thickness (18" min.)	____ inches
B) Non-Woven Geotextile Fabric Between Sand & Gravel - meeting ASTM D4751 - AOS U.S. Std. Seive #50 to #70. Min. Grab Strength of 100 lbs., min. permitivity of 1.8 / sec.	____ Non-Woven Geotextile Per USDCM Figure SFB-1 ____ Other:
C) Gravel (AASHTO or CDOT Section 703; #4, #57, or #67) Thickness (8" min.)	____ inches, No. ____
D) Overflow Elevation At Top of Design Volume (Filter Surface Elev. + Estimate of Basin Depth (D))	1103.00 feet
4. Basin Inlet	
A) Inlet Pipe with Impact Basin; OR Inlet Channel with Grouted Sloping Boulder Drop; OR Inlet Channel with Concrete Baffle Chute Drop	☐ Inlet Pipe with Impact Basin; OR ☐ Inlet Channel with GSB Drop; OR ☐ Inlet Channel with Baffle Chute Drop
B) Riprap Outlet Protection For Pipe or Channel Over Non-Woven Geotextile Fabric Wrapped to the Top of the Sand Layer	____ Riprap Outlet Protection ____ Other:
5. Draining of Sand Filter Basin (Check A, or B, or C, answer D) Based on answers to 5A through 5D, check the appropriate method	____ Infiltration to Subgrade with Permeable Membrane: 5(C) checked and 5(D) = no
A) Check box if subgrade is heavy or expansive clay ☐ B) Check box if subgrade is silty or clayey sands ☐ C) Check box if subgrade is well-draining soils ☐	____ Underdrain with Impermeable Membrane: 5(A) checked or 5(D) = yes
D) Does tributary catchment contain land uses that may have petroleum products, greases, or other chemicals present, such as gas station, hardware store, restaurant, etc.? yes ☐ no ☐	____ Underdrain with Non-Woven Geotextile Fabric: 5(B) checked and 5(D) = no ____ Other:
6. Describe Provisions for Maintenance	

Notes:

10-2005 DF-11
Urban Drainage and Flood Control District

Figure 17. Example Urban Drainage Design Form

Denver also has a Water Quality Management Plan (2004) which, among other topics, discusses additional implementation guidelines for BMPs. The guidelines include better ways to integrate BMPs into designs and ways to integrate substantial runoff reduction techniques in designs. The Water Quality Management Plan emphasizes that BMPs should be functional, maintainable, and attractive and it includes more photos and design examples than many of the other available stormwater quality publications (see Figure 18).

DOWNSPOUTS IN BOULDER

Rooftop runoff from an industrial facility splashes into rain gardens set in buried concrete pipe adjacent to the building, and then flows on a concrete pan out of the basin.

TREES IN GRASS BUFFER IN DENVER

Trees in this grass buffer serve to both screen and shade the adjacent parking.

FOREBAY AT STAPLETON IN DENVER

This forebay to a detention basin allows the energy in runoff to dissipate and drop out suspended particles and solids. Designed to the standards described in Volume 3, vehicles can access this area for periodic cleanout.

Figure 18. Examples in Denver's Water Quality Management Plan

7.3. Phoenix, Arizona

The City of Phoenix Storm Water Policies and Standards (Phoenix 2004) requires all new developments to retain the 100-year, 2-hour storm. The depth of this design storm ranges from approximately 2 to 3 inches depending on the location. The retention requirement may be waived for isolated developments smaller than ½ acre in size. The City of Phoenix encourages developers to infiltrate the retained water if at all possible (Loffa 2006). Dry wells are frequently used in Phoenix to infiltrate stormwater.

The City of Phoenix also has specific requirements for stormwater sediment analysis and control. All developments must evaluate sediment transport either qualitatively, for small peak discharges, or quantitatively, for larger peak discharges. Sedimentation basins and structures are required to hold at least 2 years of watershed sediment based on a specified erosion rate (Phoenix 2004).

The City of Phoenix Development Services Department manages the site plan review process that evaluates whether stormwater quality requirements have been met (Phoenix 2004). A stormwater quality protection ordinance gives the City of Phoenix the right to manage the quality of stormwater in the city's storm drainage system and issue permits to dischargers. The stormwater ordinance is currently being revised to provide more authority to the city to require water quality BMPs in addition to retention structures for certain developments where there is concern for additional stormwater pollution (Loffa 2006).

7.4. Tempe, Arizona

According to Tempe's Stormwater Management Plan (Tempe 2003), Tempe is a city with low growth and construction potential and a large amount of industrial land use. Therefore, stormwater quality management in Tempe is focused on industrial controls. However, Tempe does have an on-site retention ordinance (Tempe 2006), which requires new construction to retain the runoff generated by the 100-year storm event. In a one square mile area in downtown Tempe, known as the "Alternative Retention Criteria Area" (ARCA), space limitations and other considerations make retaining runoff from the 100-year storm difficult. In the ARCA area, developers are required to retain runoff from the 2-year storm unless other water quality BMPs have been approved by the City Engineer. Tempe's Development Services Department will not issue grading or building permits until the City Engineer has approved the drainage plan with the required on-site retention (Tempe 2003).

7.5. Boise, Idaho

The City of Boise's stormwater program is defined in the City of Boise Design Manual. The policies apply to development projects that qualify as industrial, commercial, institutional, multi-family residential, subdivisions, and projects with greater than 500 square feet of impervious surface. Boise Municipal Code (Chapter 8-15) gives authority to the City to regulate stormwater quality and requires the submittal of stormwater management plans, drainage plans, and operation and maintenance plans.

Stormwater management plans are required for new development projects as part of the application for a building permit. BMPs are required on all impervious and disturbed areas. They must be designed to remove the average annual load of total suspended solids (TSS) for post-development conditions. Table 3 lists the required removal rate of TSS that must be met by the weighted average of all BMPs installed. Table 4 shows design TSS removal rates for different BMPs. Boise requires that BMPs be designed for a 0.34 inch design storm. Certain types of industrial and commercial land use developments must also install BMPs to treat pollutants expected at the site in addition to TSS. The appendices of the Design Manual describe the process of calculating required volumes and sizing of BMPs.

Table 3. Sliding Scale for Required TSS Removal Efficiency

% of parcel area that is impervious	% TSS removal efficiency required
0	40
5	40
10	40
15	40
20	40
25	40
30	40
35	47
40	53
45	59
50	62
55	66
60	68
65	70
70	72
75	74
80	75
85	77
90	78
95	79
100	80

Table 4. TSS Removal Rates for BMPs

BMP	Design Removal Rate	Comments
Dry Detention Ponds	15%	Quantity control pond
Wet Detention Ponds	60%	Quantity control pond
Dry Extended Detention Pond	45%	Sediment forebay included
Wet Extended Detention Pond	80%	Sediment forebay included
Evaporation Pond	100%	Designed to evaporate or retain
Biofiltration Swale	70%	
Sand Filter	80%	Pretreatment, includes Austin, underground, pocket, and Delaware designs
Organic Filter	80%	Pretreatment, includes compost and peat/sand
Catch Basin insert	25%	Off-line only
Sediment Trap	25%	
Grass Buffer Strip	85%	Minimum width of 10'
Oil/Water Separator	15%*	

* rate may increase when sized specifically for sediment removal

7.6. Albuquerque, New Mexico

The City of Albuquerque requires post-construction BMPs on all new developments according to the criteria shown in Table 5. The requirements are described in Albuquerque's Development Process Manual (Albuquerque 2006). BMPs are required to treat the runoff from 0.6 inches of precipitation within a six-hour period. The water quality volume is based approximately on the 80th percentile rainfall event.

Table 5. New Development Water Quality Requirements for Albuquerque

Priority Projects	Control of Liquids from Dumpster Areas[(1)]	Control of Gross Pollutants and Floatable Trash	Control of Oil from Vehicle Parking Areas
Residential developments with more than 10 residential units		x	
Automotive repair facilities		x	x
Gas stations/ fueling facilities		x	x
Restaurants	x	x	
Retail and office developments larger than 0.5 acres	x	x	
Dumpster and compactor pads[(1)]	x	x	

(1) Discharged to the sanitary sewer

Source: Albuquerque (2006)

7.7. Summary of Municipal Post-Construction Programs

Table 6 indicates whether the communities surveyed for this evaluation have ordinances or policies governing control of runoff from new development or redevelopment, whether specific types of permanent BMPs are required during development, and whether design guidelines are provided to the development community for BMP design.

Table 6. Summary of Municipal Stormwater Programs for New Development and Redevelopment

Municipality	Ordinance	Required BMPs	Design Guidance Manual
Truckee Meadows, NV	In development	Yes	Yes
Denver, CO	Yes	Yes	Yes
Phoenix, AZ	Yes	Yes	Yes
Tempe, AZ	Yes	Yes	Unknown
Boise, ID	Yes	Yes	Yes
Albuquerque, NM	Yes	Yes	Yes

8. Other BMP Program Considerations

Other BMP program considerations are inspection of BMPs, maintenance of BMPs and fees to cover expenses of the program.

8.1. Inspection of Development BMPs During and After Construction

The programs reviewed for this memorandum generally all included an inspection of sites during construction for several development issues including stormwater. However, none of the programs discussed inspection of BMPs by the local government entity years after construction.

8.2. Maintenance

In most cases, local drainage requirements specify that property owners are responsible for maintenance of drainage and water quality facilities. Some examples are described below.

8.2.1. City of Los Angeles

Los Angeles municipal code required a covenant and agreement signed by the property owner and recorded with Los Angeles County Recorder, declaring that the BMPs necessary to control stormwater pollution shall be installed and/or constructed and maintained in proper working condition at all times. Figure 19 shows part of the blank agreement.

Recording requested by and mail to:

Name: ______________________________

Address: ______________________________

____

____

** Space above this line for Recorder's use **

MASTER COVENANT AND AGREEMENT
REGARDING ON-SITE STORMWATER TREATMENT DEVICES MAINTENANCE

The undersigned hereby certifies I am (we are) the owner(s) of the hereinafter legally described real property located in the City of Los Angeles, County of Los Angeles, State of California (please give the legal description):

____

Site Address ____

And in consideration of the City of Los Angeles allowing ____ on said property, we do hereby covenant and agree to and with said City to maintain according to the Operation & Maintenance Plan (Attachment 1), all on-site structural stormwater pollution removal devices including but not limited to: Detention/Sedimentation System, Filtration Systems, Infiltration Systems, Oil and Water Separators, Water Quality Inlets and Dry Wells. The specific structural Stormwater Treatment Devices are listed as follows:

____

____

This covenant and agreement shall run with the land and shall be binding upon any future owners, encumbrance, their successors, heirs or assigns including any Home Owner Associations (HOAs) and shall continue in effect until the Bureau of Sanitation of the City of Los Angeles approves its termination.

______________________________ (Print Name of Property Owner) ______________________________ (Print Name of Property Owner)

______________________________ (Signature of Property Owner) ______________________________ (Signature of Property Owner)

Dated this ________ day of ___________ 20____.

** Space Below This Line For Notary's Use **

ALL-PURPOSE ACKNOWLEDGMENT

STATE OF CALIFORNIA, COUNTY OF LOS ANGELES

On ________________________ before me, __________________________________ (name of title officer), a Notary Public personally appeared __________________________, personally known to me (or proved to me on the basis of satisfactory evidence) to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

WITNESS my hand and official seal.

_________________________________ (SEAL)
Notary Public Signature

** Space below this line for Bureau use **

Permit No. ______________________________
Attachment 1 – O&M Plan included? Y____ N____

Approved for recording by ____ Date: ______________________
(Watershed Protection Division)

Figure 19. Example of Los Angeles Covenant/Agreement to Maintain BMPs

8.2.2. City of Boise

Boise requires that an operation and maintenance plan be included in the Stormwater Management Plan for all development projects. The City of Boise has a stand-alone Operation and Maintenance Resource Guide document which includes the following:

- Recommendations for frequency of inspection: after installation, twice per year, and after any storm event producing more than 0.5 inches of rainfall.
- Common maintenance problems with different types of BMPs and recommendations for dealing with the problem.
- Example inspection and maintenance forms.
- Example operation and maintenance plans.

8.2.3. City of Denver

The City of Denver's Drainage Manual references maintenance guidelines that are provided in the Urban Drainage Manual and the Denver's Water Quality Management Plan. The City's Drainage Manual also specifically states that for all stormwater management facilities, the following are required:

- Facilities must be designed to be readily maintainable with clearly specified long-term maintenance requirements.
- Long-term maintenance of the BMP must by provided by the facility owner.

Drainage Plans for new development must have a section dedicated to maintenance. In addition, the Urban Drainage manual, which is referenced by the City of Denver, includes maintenance recommendations for each type of BMP. Table 7 is an example of the maintenance recommendations for sand filter basins.

Required Action	Maintenance Objectives	Frequency
Debris and litter removal	Remove debris and litter from detention area to minimize clogging of the sand media.	Routine – Depending on aesthetic requirements.
Landscaping removal and replacement	If the sand filter is covered with rock mulch, bluegrass, or other landscaping covers, the cover must be removed to allow access to the sand media. Replace landscaping cover after maintenance of sand media is complete.	Every 2 to 5 years.
Scarify filter surface	Scarify top 3 to 5 inches by raking the filter's surface.	Once per year or when needed to promote drainage.
Sand filter removal	Remove the top 3 inches of sand from the sand filter. After a third removal, backfill with 9 inches of new sand to return the sand depth to 18 inches. Minimum sand depth is 12 inches.	If no construction activities take place in the tributary watershed, every 2 to 5 years depending on observed drain times, namely when it takes more than 24 hours to empty 3-foot deep pool. Otherwise more often. Expect to clean out forebay every 1 to 5 years.
Inspections	Inspect detention area to determine if the sand media is allowing acceptable infiltration.	Routine – Bi-annual inspection of hydraulic performance, one after a significant rainfall.

Table 7. Sand Filter Basin Maintenance Recommendations

Source: Urban Drainage (2005)

In cases of some large flood control projects (similar to CCRFCD regional projects) Urban Drainage will assist in maintaining facilities if projects meet a long list of requirements:

- The design of the facility must be in accordance with the Urban Drainage Criteria Manual. The design and construction must be approved by Urban Drainage.
- Satisfactory maintenance access and easements or rights-of-way must be provided.
- The facility must be designed by or approved for construction by the local government body in charge of approving such designs (e.g., City of Denver). Facilities are constructed to control runoff from tributary basins exceeding 130 acres.
- The application for maintenance assistance by Denver Urban Drainage must come from the local governing body (e.g. City of Denver) and coordination with Urban Drainage early in the design process is recommended.

Key operating policies for the Urban Drainage Maintenance Program include the following:

- The expenditure of District maintenance funds is prioritized first toward Urban Drainage-owned facilities and Urban Drainage-funded projects, then to projects funded by others, and finally to unimproved urban and unimproved rural drainageways;
- Local governments are not required to match Urban Drainage maintenance funds, but may participate in order to accelerate completion of a large project; and
- Urban Drainage is a small agency generally in charge of management of project funds; supervision of all work done by consulting engineers and contractors, and coordination with local governments. All design and construction work is contracted to the private sector.

An annual maintenance work program is developed for each county based on the funds available for that county and on a prioritized list of maintenance requests from each local government. The work is divided into three types of activities: routine, restoration and rehabilitation. Routine maintenance consists of mowing native vegetation, trash and debris cleanup, including trash rack cleaning, weed control, and minor revegetation efforts. Private contractors perform the routine maintenance activities on a unit price basis. Restoration work is site-specific construction work to repair isolated drainageway problems. Types of restoration projects include detention pond mucking, tree thinning, local erosion repair, and local channel grading, shaping and stabilization. Rehabilitation projects are major design and construction efforts which are intended to rebuild and reestablish existing drainage facilities which have been damaged or neglected such that structural problems have developed.

8.2.4. City of Phoenix

The City Phoenix's Stormwater Policies and Standards include the following maintenance requirements:

- All drainage facilities that are to be maintained by the City of Phoenix shall be encompassed within a designated City owned property or right-of-way and clearly shown on the recorded plat. To eliminate ambiguity and term confusion, drainage easements are not accepted as a means to describe public or private ownership.
- Homeowner's Associations that own and/or operate drainage facilities shall include statements in its covenants, conditions, and restrictions clearly identifying that the Homeowners Association is responsible for operation, maintenance and repair of the drainage facilities.

8.3. Fees and Program Financing

Research into the funding of stormwater programs showed that programs are generally funded through annual stormwater fees and plan check fees. Examples are described below. More research into stormwater fees charged annually or at the development permit stage can be performed if requested.

8.3.1. Los Angeles

The City of Los Angeles Municipal code includes the following plan check fee information:

- Single-family hillside residential developments less than 1 acre have a fee of $200 per project.
- Other types of development have a fee of $600 per project.
- At the discretion of the Bureau of Sanitation, a large scale project may be categorized as a Special Project and billed on actual cost incurred by the City.

8.3.2. City of Denver

A Denver ordinance authorized a storm drainage service charge to be collected from the owners of all improved parcels of land. The annual charge to a property owner is based on the relative impact the property will have on the storm drainage system. The charge is based on the ratio of impervious surface area to total parcel area. Based upon that ratio, a rate is applied to the impervious area to calculate the annual charge. The higher the ratio, the greater the rate. Denver estimates impervious surface area from aerial photography. The 2006 cost per 100 square feet of impervious area is as shown in Table 8. For a 10,000 square foot property that is 55 percent impervious, the annual fee would be $162.

Table 8. City of Denver Annual Stormwater Fees

Impervious Ratio	Fee per 100 square feet of impervious area	Impervious Ratio	Fee per 100 square feet of impervious area
0 to .10	$1.44	.51 to .60	$2.95
.11 to .20	$1.81	.61 to .70	$3.34
.21 to .30	$2.18	.71 to .80	$3.72
.31 to .40	$2.58	.81 to .90	$4.09
.41 to .50	$2.95	.91 to 1.00	$4.48

The City of Denver also charges several plan review fees.

Denver Urban Drainage was established by the Colorado legislature in 1969 and is funded through four different property tax mill levies. The mill levies are earmarked for specific programs including Master Planning, Design and Construction, Maintenance, Floodplain Management, Information Services and Flood Warning, and South Platte River. Urban Drainage operates a $22 million annual program.

For the Maintenance Program Urban Drainage is authorized to levy up to four tenths (0.4) mill for maintenance of drainage and flood control facilities. The total maintenance budget for 2007 is about $6 million. Urban drainage allocates maintenance service between the seven counties in the district based on the amount of tax revenue generated by that particular county.

8.3.3. City of Phoenix

The City of Phoenix charges Grading and Drainage Plan review fees as authorized by ordinance.

8.3.4. Salt Lake City

The Salt Lake City Department of Public Utilities collects an annual stormwater fee. The published stormwater fee statistics for fiscal year 2004-2005 on their website show that the average annual residential stormwater fee was $36.

9. Resources

The following is a list of particularly useful resources for stormwater quality:

California Stormwater Quality Association: http://www.cabmphandbooks.com/Development.asp

Urban Drainage and Flood Control District: http://www.udfcd.org/downloads/down_critmanual.htm

Caltrans: http://www.dot.ca.gov/hq/env/stormwater/

Truckee Meadows Regional Stormwater Quality Management Program:
http://www.cityofreno.com/gov/pub_works/stormwater/

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Appendix I

APPENDIX I

ILLICIT DISCHARGE DETECTION AND ELIMINATION PROGRAM, SPILL RESPONSE STRATEGY

Las Vegas Valley Municipal Separate Storm Sewer System NPDES Discharge Permit

Illicit Discharge Detection and Elimination Program

Spill Response Strategy

July 2006

1.0 INTRODUCTION

This report presents the Spill Response Strategy adopted by the Las Vegas Valley Municipal Separate Storm Sewer System (MS4) NPDES Discharge Permit permittees. A Spill Response Strategy is part of the Illicit Discharge Detection and Elimination Program (IDDEP) required by the MS4 stormwater permit (paragraph 4.7.1.4) and the Las Vegas Valley Storm Water Management Plan (SWMP) (section 7.5).

The Spill Response Strategy addresses spills, intentional discharges, dumping, and other releases of hazardous materials and other non-stormwater liquids or solids to the drainage system in Las Vegas Valley. These problems are addressed by existing hazardous materials emergency response plans and standard operating procedures for spill response. Sanitary sewer overflows (SSOs) and adopted response procedures are addressed under the wastewater discharge permits held separately by each Las Vegas Valley municipality and issued by the Nevada Division of Environmental Protection (NDEP).

Emergency response organizations and local public works departments have existing spill response authority and established policies and procedures for responding to spills and discharges of various kinds, including those affecting the MS4 system. Therefore, these existing policies and procedures are relied upon for the IDDEP. As a result, this Spill Response Strategy does not develop or promote new plans or organizations to deal with illicit discharges to the MS4. Rather, the pertinent existing plans and programs are cited and briefly summarized. These include:

- State of Nevada Hazardous Materials Emergency Response Plan
- Clark County Hazardous Materials Emergency Response Plan
- Local Standard Operating Procedures

These plans and programs are updated regularly, and the most current versions are adopted for the MS4 program.

The emphases of the Spill Response Strategy for the IDDEP are: (1) to coordinate the activities among the various permittees and other affected agencies to assure a coordinated and integrated response to spills and other illegal discharges to the stormwater system; and (2) to raise awareness among first responders of stormwater and environmental issues related to spill incidents.

All of the Las Vegas Valley municipalities contract with H2O Environmental for cleanup of substantial hazardous material spills. Their role is briefly described later in this document.

2.0 STATE OF NEVADA HAZARDOUS MATERIALS EMERGENCY RESPONSE PLAN

The State of Nevada Hazardous Materials Emergency Response Plan (State Plan) (Nevada Division of Environmental Protection, May 25, 2005) establishes common guidelines for responding to hazardous materials incidents anywhere in the State of Nevada, with the objective of protecting life, property and the environment from risks associated with the discharge, release or misuse of hazardous materials. It serves as an appendix to the State Comprehensive Emergency Management Plan. The authority for the State Plan is derived from federal and state law.

The State Plan, developed and maintained by Nevada Division of Environmental Protection in cooperation with a State Hazardous Materials Emergency Response Plan Committee, defines state agency responsibilities for hazardous material spill training and response. It provides the framework for development of local hazardous materials emergency response plans by Local Emergency Planning Committees in districts throughout the state (see Section 3.0).

The State Plan provides the following information:

- Training and certification requirements for State personnel present at a hazardous materials incident;
- Requirements for notifying NDEP, local fire departments, State Office of Emergency Management, Nevada Highway Patrol and EPA in the event of a hazardous material spill;
- Response actions including roles and responsibilities of local, state and federal officials;
- A Nevada Hazmat Emergency Contact list.

The State Plan provides the foundation for the MS4 Spill Response Strategy, particularly with regard to notification requirements. The entire plan is available to emergency managers and the public on the internet at:
http://ndep.nv.gov/bca/response

3.0 CLARK COUNTY HAZARDOUS MATERIALS EMERGENCY RESPONSE PLAN

A regional hazardous material response plan has been adopted by all of the Las Vegas Valley municipalities. This is referred to as the Clark County Hazardous Materials Emergency Response Plan (County Plan), and is developed by the Clark County Local

Emergency Planning Committee (LEPC). The County Plan provides the framework for responding to any illegal discharges or spills of hazardous chemicals to the storm sewer system. Each of the permittees has its own spill response procedures that are consistent with the regional plan, but the key local guidance document for hazardous spill response is the County Plan. This document summarizes the key elements of the County Plan, and references guidance documents published separately.

3.1 Relationship to Other Plans

The County Plan is authorized under and subject to conformity with the State Plan. It is part of the Clark County Emergency Operations Plan. The Comprehensive Emergency Management Plans for the cities of Las Vegas, North Las Vegas and Henderson refer to the LEPC County Plan for hazardous materials incident response.

3.2 County Plan Summary

The County Plan is Clark County's proactive approach to managing possible releases of hazardous substances to the environment. It is developed and maintained by the Local Emergency Planning Committee, a group serving the Clark County Local Emergency Planning District with broad representation including each of the MS4 permittees. The County Plan fulfills a federal requirement of the Superfund Amendments and Reauthorization Act of 1986 (SARA) under Title III, "Emergency Planning and Community Right-To-Know."

The current County Plan was finalized and published in January 2005. The LEPC meets regularly and performs annual updates of the County Plan to reflect current roles and responsibilities of each agency, best management practices, and other new information. The entire plan is available to emergency managers and the public on the internet at: http://www.co.clark.nv.us/administrative_services/oem/Plans.htm.

The County Plan provides guidance for hazardous materials emergency response preparedness, response, and prevention. It reflects the combined experience of local government officials, industry representatives, emergency managers, environmental managers, and members of the public actively engaged in hazardous materials preparedness, response and prevention. The guiding principle of the County Plan can be summarized as follows: The individuals in custody of hazardous material have primary responsibility of the material, but in the event those individuals lose control of the materials, the local government must take action to limit the effects on life, property, and the environment. The County Plan states that private industry is required to report releases of hazardous materials to the entities listed in the County Plan's telephone directory.

The County Plan includes the following sections:

- The Planning Standards section references pertinent state and federal guidance and local agreements related to hazardous materials spills, and provides an inventory of likely hazards in Clark County including facilities, pipelines, railroads, etc. Locations of fixed facilities with extremely hazardous substances and the quantities of those substances are tabulated. The County Plan states that each facility is required to establish emergency response procedures that are submitted to local fire departments and other agencies. This section also more generally describes the quantities of materials transported on the various transportation corridors in Clark County.

- The Agency Duties section outlines responder roles and responsibilities including a description of the Incident Commander who is a designated fire department officer at the scene. The Incident Commander reports to a local Emergency Operations Center, if activated. The Clark County and City of Las Vegas fire departments have specially trained and equipped Hazardous Materials Response Teams to respond to chemical emergencies.

- The Telephone Directory section lists agency telephone numbers and contact personnel, emergency operations centers, hospitals, and reporting phone numbers for both emergency and non-emergency spills.

The Response section describes the organization of responders, methods for determining releases and the population affected. This section also describes the required notification of response agencies, hazardous materials incident classification levels, and scene management for response personnel including establishment of evacuation, decontamination, and hazard zones. Finally, this section also describes training on proper response to hazardous materials incidents. Clark County's hazardous materials response training is summarized in Section 3.4.

- The Warning Methods and Evacuation sections describe guidelines for notifying and evacuating citizens in an affected geographic area.

- The Resource Management section describes resources and available equipment for cleanup and disposal of materials.

- The Follow-Up section describes the proper documentation necessary after an incident to record information on the incident and its response.

The Table of Contents of the January 2005 Clark County Hazardous Materials Emergency Response Plan is included in Appendix A.

3.3 Responsible Local Agencies

The County Plan designates various responsible agencies when responding to hazardous material spills within each jurisdiction. These are defined as:

Incident Commander: designated representative of the local fire department

Unified Incident Command:	fire department having jurisdiction, and law enforcement agency having jurisdiction
Lead Agency:	Unincorporated Areas of Clark County - Clark County Fire Department Local Cities – respective city fire departments State Roads and Highways – Nevada Highway Patrol State Lands – state agency with jurisdiction Federal Lands – federal agency with jurisdiction

3.4 Training Within Clark County

First responders to hazardous material spills are normally members of local fire departments. Each fire department has training requirements for potential first responders that meet or exceed the minimum standards promulgated by the National Fire Protection Association (NFPA) and the Occupational Safety and Health Administration (OSHA). As noted above, the Clark County and City of Las Vegas fire departments have specially trained Hazardous Materials Response Teams that have received the necessary Hazardous Waste Operations and Emergency Response Standard (HAZWOPER) training.

The County Plan adopts minimum training standards that are consistent with NFPA and OSHA standards, and places the burden for training on local fire departments and other responding agencies. Exercises to test the Hazardous Materials Emergency Response Plan are conducted annually within Clark County jurisdictions. Exercises range from tabletop, to functional, to full-scale exercises. Multi-jurisdictional full-scale exercises may also be performed on an annual basis.

Hazardous materials training is an on-going activity within all of the Clark County jurisdictions. The training areas include awareness, operations, incident command, responder safety, decontamination, radiological monitoring, and emergency medical services. Courses are taught by both in-house personnel and by outside contractors. Courses are updated regularly.

Field staff of the Clark County Department of Public Works, City of Las Vegas Environmental Division and City of North Las Vegas Utilities Department/ Environmental Division who may respond to hazardous materials incidents receive HAZWOPER training and required annual refresher courses. City of Henderson is in the process of implementing a HAZWOPER training program for its field crews.

Training for hazardous materials spill response focuses on issues related to public safety and the safety of emergency personnel. Additional awareness of stormwater and water quality issues on the part of first responders could be beneficial to protecting the environment. Although public safety must remain paramount, implementing spill response practices that prevent illicit discharges from entering drainage systems could minimize impacts to the MS4. To address this situation, the permittees will implement a Spill Responders Stormwater Awareness Program consisting of the following elements:

- Prepare educational materials for typical first responders
- Distribute material at professional meetings, conferences, and meetings with key emergency management agency staff.

Implementation of this program will begin during the 2006-2007 MS4 permit year.

4.0 LOCAL PUBLIC WORKS STANDARD OPERATING PROCEDURES

4.1 Response

Staffs of Public Works Departments and associated divisions within local government are called to respond to spill incidents involving non-hazardous materials and small quantities (e.g., less than 25 gallons or 3 cubic yards) of hazardous materials. Local governments have adopted Standard Operating Procedures (SOPs) to guide first responders and clean-up crews in these cases. In most cases the SOPs are documented and published in guidance manuals and training procedures. In some cases SOPs represent best practices used by field staff in accordance with applicable policies and regulations. Where SOPs are not currently documented in writing, the MS4 permittees will encourage local agencies to develop SOP guidance documents for proper response and notification for spills of non-hazardous materials.

4.2 Training

Local public works field crews receive spill response training primarily through internal training activities conducted by experienced employees. As noted above, most field crews also receive basic HAZWOPER training as well. As with hazardous materials spill responders, public works crews would benefit from additional awareness of stormwater quality issues. Therefore, the Spill Responders Stormwater Awareness Program will be extended to these workers as well.

5.0 H2O ENVIRONMENTAL

H2O Environmental is a private contractor used by all of the entities in Las Vegas Valley to respond to and clean up hazardous material spills of all kinds. It guarantees response to spills anywhere in Las Vegas Valley within 45 minutes. H2O Environmental may be contacted by one of the MS4 permittees when available internal resources are insufficient or not properly trained to handle hazardous material spills. H2O Environmental is generally contacted for spills exceeding 25 gallons. All entities have standing agreements with H2O Environmental, which allow them to mobilize immediately in response to notification of a spill. Although other private contractors could be used, all entities currently rely on H2O Environmental for their spill cleanup needs.

H2O Environmental has 35 employees and an extensive inventory of equipment located in Las Vegas. Responsibilities include site cleanup and material disposal in accordance with all applicable environmental regulations and health and safety standards.

6.0 NOTIFICATION

Notification of parties that could be potentially affected by a hazardous materials spill is conducted in accordance with the guidelines adopted in the County Plan and local emergency response plans. Notification lists are updated at least annually. At the present time the County Plan does not recognize Clark County Regional Flood Control District (CCRFCD) as an entity to be informed when hazardous materials are spilled to the environment. As Lead Agency for the MS4 stormwater permit, CCRFCD should be notified in these cases. The LEPC will be informed of this suggested change to the County Plan.

7.0 SUMMARY OF LOCAL AGENCY RESPONSIBILITY FOR THE SPILL RESPONSE STRATEGY

Each local agency has specific responsibilities and procedures in place to implement the Spill Response Strategy, depending on its own administrative structure. The following table summarizes the primary municipal departments and agencies that could be involved in implementing various portions of the Spill Response Strategy for the MS4 IDDEP if illicit discharges are reported within their jurisdiction.

The large number of agencies and departments that could become involved in a significant illicit discharge incident in Las Vegas Valley points to the importance of coordination among these various organizations. An important element of the MS4 Spill Response Strategy is to promote improved coordination among spill response agencies. This will be accomplished through cross-entity communication at regular monthly Stormwater Quality Management Committee meetings, and through internal communications within entities initiated by MS4 permit coordinators for each permittee.

Summary of Primary Spill Response Strategy Responsibilities Within Each Permittee Jurisdiction

Spill Response Function	Clark County	City of Las Vegas	City of North Las Vegas	City of Henderson
Receive Spill Complaint	• SN Health District • CC Public Response Office • CC Public Works • CC Water Reclamation District • CC Police Department	• SN Health District • CC Public Response Office • CLV Field Operations • CLV Environmental Division • CLV Police Department	• SN Health District • CC Public Response Office • CNLV Utilities • CNLV Public Works • CNLV Code Enforcement • CNLV Police Department	• SN Health District • CC Public Response Office • CH Utilities • CH Public Works • CH Police Department
First Responder	• SN Health District • Fire Departments • CC Water Reclamation District • CC Risk Management • CC Public Works	• SN Health District • Fire Departments • CLV Field Operations • CLV Environmental Division	• SN Health District • Fire Departments • CNLV Utilities/ Environmental • CNLV Public Works/Streets	• SN Health District • Fire Departments • CH Utilities
Clean-Up	• H20 Environmental • Fire Departments • CC Risk Management • CC Public Works	• H20 Environmental • Fire Departments • CLV Field Operations	• H20 Environmental • Private Contractor • CNLV Public Works/Streets	• H20 Environmental • Fire Departments • CH Utilities • CH Public Works
Notifications	• Spill Owner • CC Water Reclamation District • Fire Departments • CC Risk Management	• Spill Owner • CLV Environmental Division • Fire Departments	• Spill Owner • CNLV Utilities/ Environmental • CNLV Public Works/Streets • Fire Departments	• Spill Owner • CH Utilities • Fire Departments

Notes:
1. CC = Clark County; SN = Southern Nevada; CLV = City of Las Vegas; CNLV = City of North Las Vegas; CH = City of Henderson
2. Fire Departments could respond to emergencies in neighboring jurisdictions, so are listed generally for each municipality
3. Only primary responsible agencies are listed; there can be overlap among agencies, and others may become involved in special cases.

APPENDIX A

CLARK COUNTY HAZARDOUS MATERIALS EMERGENCY RESPONSE PLAN

January 2005

TABLE OF CONTENTS

CLARK COUNTY
LOCAL EMERGENCY PLANNING COMMITTEE

HAZARDOUS MATERIALS EMERGENCY RESPONSE PLAN

MESQUITE
HENDERSON
LAS VEGAS
BOULDER CITY
CLARK COUNTY
NORTH LAS VEGAS

This Plan is a Clark County Local Emergency Planning Committee project coordinated by the Office of Emergency Management in cooperation with the participating agencies listed in the Agencies section of the plan.

January 2005

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AGENCY DUTIES

TELEPHONE DIRECTORY - HAZARDOUS MATERIALS EMERGENCY ASSISTANCE

Appendix J

APPENDIX J

INDUSTRIAL INSPECTION REPORTS
INDUSTRIAL FACILITY INSPECTOR
TRAINING ATTENDANCE LIST

INDUSTRIAL FACILITY MONITORING AND CONTROL PROGRAM

Industrial User Inspection Form

City of Henderson

Department of Utility Services - Pretreatment
P.O. Box. 95050 - 2400 Moser Dr. (MSC 814)
Henderson, NV 89050
Phone: 702-267-2650 Fax: 702-267-2651

A Place To Call Home

General Information

Facility Name: BMI Tenant: Chemical Lime Company

Are there alternate names for the business? yes [x] no [ ]

If yes, indicate the alternate name(s): CHEM-LIME, Chem Star, & BMI Complex

Waste Discharge Authorization Permit No.: COH - 0201 Expiration Date: 30-Jun-07

Facility ID No.: 5

Permit Classification (check all that apply): IU [ ] SIU [x] CIU [ ] Zero Discharge [ ]

Physical Address: 8000 West Lake Mead Drive

City: Henderson State: NV Zip: 89015

Mailing Address: PO Box 127

City: Henderson State: NV Zip: 89015

Telephone: 702-565-8991 Fax:

E-mail address: NA

Name of Responsible Official: Aaron Jones Title: Plant Manager

Additional contact person(s) (if applicable): Colen Watts (BMI)

Inspection Date: 6-Jun-07 Inspection Start Time: 830 Inspection Finish Time: 900

Purpose of the inspection (check all that apply): Annual [x] Enforcement Action [ ] New Facility [ ]
Slug or Accidental Discharge [ ] Requested by the Facility [ ] Unannounced [ ] Scheduled [x]
Other [ ]

Those present for the inspection: City Representative(s): RMT, JLM

IU Representative(s): Aaron Jones, Plant Manager

Last action by the city (date & purpose): Inspection: see attached facility review

Sampling: see attached facility review

Indicate any violation(s) and resulting enforcement actions that have occur during the past 12 months.

see attached facility review

Environmental Information

Does the facility hold any additional environmental permits? yes [ ] no [ ] NA [x]

If yes, indicate the type of permit(s), the permit number(s) and the effective/expiration date(s):

North American Industry Classification System (NAICS) or Standard Industrial Classification (SIC) number(s):

3274

Operational Information

Provide a brief description of all the activities, which may be performed at this facility.

Process dolomitic quicklime into dolomitic type-s hydrated lime. Vehicle and other equipment maintenance.

Hours of Operation: Sun. 24 hrs Mon. 24 hrs Tues. 24 hrs

Wed. 24 hrs Thur. 24 hrs Fri. 24 hrs Sat. 24 hrs

Avg. number of employees per shift: 1st 20 2nd 8 3rd 3

Is process water discharged, to the POTW, continuously or on a batch basis?

Continuous [ ] Batch [x] lab waste

If continuous discharge, indicate the maximum flow rate in GPM and GPD.

GPM ______ GPD ______

If batch discharge(s), indicate the maximum flow rate in GPM and GPD along with the frequency of the batch discharge(s)

Frequency daily GPM <5 GPD <50

Are there scheduled shut downs or periods of no discharge? yes [ ] no [x]

If yes, indicate the shutdown period(s)

Is operation seasonal? yes [ ] no [x]

If yes, indicate the month(s), which operation may occur.

J [ ] F [ ] M [ ] A [ ] M [ ] J [ ] J [ ] A [ ] S [ ] O [ ] N [ ] D [ ]

Has an accurate schematic of the facility's process plumbing, sewer lines, process equipment, and other appurtenances been provided?

yes [ ] no [x]

Are there any recent or proposed changes in the facility's operation? yes [ ] no [x]

If yes, describe the changes.

Chemical Storage Area(s)

Does the facility store chemicals? yes [x] no [ ]

If yes, has a copy of the facility's SPCC Plan been provided? yes [ ] no [x]

If no, please explain. There are no drains in the facilities chemical storage area that flow to the POTW

If yes, has a copy of the corresponding MSDS sheets been provided? yes [x] no [ ]

If no, please explain.

If yes, are there floor drains in this area that discharge to the POTW? yes [ ] no [x]

If yes, indicate the quantity.

If yes, provide a description of the overall condition of the respective area(s).

Facility is very old and in fair condition. There is very little possibility for water to enter the POTW from any chemical storage areas. The facility has been designed to divert stormwater runoff away from s.s. lines

If yes, indicate any required action(s) and the timeframe specified for their completion. None

Processing Area(s)

Description of the overall condition of the respective area(s).

Facility is very old and in fair condition. The only discharge to the POTW comes from a small lab. The lab has demonstrated excellent Operating Procedures and should not cause the POTW any problems. There is very little possibility for water to enter the POTW from any other processing areas. The facility has been designed to divert stormwater runoff away from s.s. lines

Are there floor drains in this area that discharge to the POTW? yes [x] no [ ]

If yes, indicate the quantity. lab area only

Indicate any required action(s) and the timeframe specified form their completion. None

Waste Storage and Disposal

Does the facility generate, store, or dispose of any type of waste(s)? yes [x] no [ ]

If yes, are there floor drains in this area that discharge to the POTW? yes [ ] no [x]

If yes, indicate the quantity.

If yes, provide a description of the overall condition of the respective area(s).

Facility is very old and in fair condition. There is very little possibility for water to enter the POTW from any waste storage and disposal areas. The facility has been designed to divert stormwater runoff away from s.s. lin

If yes, does the facility generate, store, or dispose of any hazardous waste(s), as defined by the RCRA Regs?

yes [x] no [ ]

If yes, were copies of the corresponding hazardous waste manifest(s) made available for review?

yes [x] no [ ]

If yes, indicate any required action(s) and the timeframe specified for their completion. None

Pretreatment Measures

Does the facility utilize any pretreatment measures, equipment, technology, or other waste reduction process(es)?

yes [x] no [ ]

If yes, provide a description of the pretreatment measures utilized.

The entire plant is designed to collect and treat it own process wastewater. Only domestic waste and a small amount of lab waste is sent to the POTW.

If yes, provide a description of the overall condition of the respective area(s).

Facility is very old and in fair condition. There is very little possibility for water to enter the POTW from any pretreatment areas. The facility has been designed to divert stormwater runoff away from s.s. lines

If yes, indicate any required action(s) and the timeframe specified for their completion. None

Inspection Results

Did the facility comply with their Waste Discharge Authorization Permit, Henderson Municipal Code 13.16 & 13.10, and all applicable federal, state, and local regulations?

yes [x] no [ ]

If no, explain the corrective actions that need to be completed to bring the IU into compliance.

List any comments made by IU representative(s). None

R. Matt Thomas & John Massicotte
(Print) Name of person filling out this inspection form

Pretreatment Inspector
Title

Signature

Wednesday, June 06, 2007
Date

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Industrial User Inspection Form

City of Henderson

Department of Utility Services - Pretreatment
P.O. Box. 95050 - 2400 Moser Dr. (MSC 814)
Henderson, NV 89050
Phone: 702-267-2650 Fax: 702-267-2651

A Place To Call Home

General Information

Facility Name: BMI Tenant: Saguaro Power Company

Are there alternate names for the business? yes [x] no [ ]

If yes, indicate the alternate name(s): BMI Complex

Waste Discharge Authorization Permit No.: COH - 0201 Expiration Date: 30-Jun-07

Facility ID No.: 5

Permit Classification (check all that apply): IU [ ] SIU [x] CIU [ ] Zero Discharge [ ]

Physical Address: 8000 West Lake Mead Drive

City: Henderson State: NV Zip: 89015

Mailing Address: PO Box 90849

City: Henderson State: NV Zip: 89009-0849

Telephone: 702-558-1100 Fax:

E-mail address: NA

Name of Responsible Official: Kenneth Adams Title: Plant Manager

Additional contact person(s) (if applicable): Don Fritz, Larry Flashberg, & Jeff Cheney (Saguaro), Colen Watts (BMI)

Inspection Date: 6-Jun-07 Inspection Start Time: 900 Inspection Finish Time: 930

Purpose of the inspection (check all that apply): Annual [x] Enforcement Action [ ] New Facility [ ]
Slug or Accidental Discharge [ ] Requested by the Facility [ ] Unannounced [ ] Scheduled [x]
Other [ ]

Those present for the inspection: City Representative(s): RMT/JLM
IU Representative(s): Larry Flashberg

Last action by the city (date & purpose): Inspection: see attached facility review
Sampling: see attached facility review

Indicate any violation(s) and resulting enforcement actions that have occur during the past 12 months.

see attached facility review

Environmental Information

Does the facility hold any additional environmental permits? yes ☐ no ☐ NA ☒

If yes, indicate the type of permit(s), the permit number(s) and the effective/expiration date(s):

North American Industry Classification System (NAICS) or Standard Industrial Classification (SIC) number(s):

4931

Operational Information

Provide a brief description of all the activities, which may be performed at this facility.

Cogeneration of electric power and steam, both for export. Vehicle and other equipment maintenance.

Hours of Operation: Sun. 24 hrs Mon. 24 hrs Tues. 24 hrs

Wed. 24 hrs Thur. 24 hrs Fri. 24 hrs Sat. 24 hrs

Avg. number of employees per shift: 1st 20 2nd 2 3rd 2

Is process water discharged, to the POTW, continuously or on a batch basis? No process water is discharged to the POTW. Continuous ☐ Batch ☐

If continuous discharge, indicate the maximum flow rate in GPM and GPD. NA

GPM ______ GPD ______

If batch discharge(s), indicate the maximum flow rate in GPM and GPD along with the frequency of the batch discharge(s)

Frequency ______ GPM ______ GPD ______

Are there scheduled shut downs or periods of no discharge? yes ☐ no ☒

If yes, indicate the shutdown period(s) ______

Is operation seasonal? yes ☐ no ☒

If yes, indicate the month(s), which operation may occur.

J ☐ F ☐ M ☐ A ☐ M ☐ J ☐ J ☐ A ☐ S ☐ O ☐ N ☐ D ☐

Has an accurate schematic of the facility's process plumbing, sewer lines, process equipment, and other appurtenances been provided?

yes ☐ no ☒

Are there any recent or proposed changes in the facility's operation? yes ☐ no ☒

If yes, describe the changes. ______

Chemical Storage Area(s)

Does the facility store chemicals? yes [x] no [ ]

If yes, has a copy of the facility's SPCC Plan been provided? yes [ ] no [x]

If no, please explain. not required since there are no drains that discharge to the POTW

If yes, has a copy of the corresponding MSDS sheets been provided? yes [x] no [ ]

If no, please explain.

If yes, are there floor drains in this area that discharge to the POTW? yes [ ] no [x]

If yes, indicate the quantity.

If yes, provide a description of the overall condition of the respective area(s).

Facility is in fair condition. There is very little possibility for water to enter the POTW from any chemical storage areas. The facility has been designed to divert stormwater runoff away from s.s. lines

If yes, indicate any required action(s) and the timeframe specified for their completion. None

Processing Area(s)

Description of the overall condition of the respective area(s).

Facility is in fair condition. There is very little possibility for water to enter the POTW from any processing areas. The facility has been designed to divert stormwater runoff away from s.s. lines

Are there floor drains in this area that discharge to the POTW? yes [ ] no [x]

If yes, indicate the quantity.

Indicate any required action(s) and the timeframe specified form their completion. None

Waste Storage and Disposal

Does the facility generate, store, or dispose of any type of waste(s)? yes [x] no [ ]

If yes, are there floor drains in this area that discharge to the POTW? yes [ ] no [x]

If yes, indicate the quantity.

If yes, provide a description of the overall condition of the respective area(s).

Facility is in fair condition. There is very little possibility for water to enter the POTW from any waste storage and disposal areas. The facility has been designed to divert stormwater runoff away from s.s. lin

If yes, does the facility generate, store, or dispose of any hazardous waste(s), as defined by the RCRA Regs?

yes [ ] no [ ] NA [x]

If yes, were copies of the corresponding hazardous waste manifest(s) made available for review?

yes [ ] no [x]

If yes, indicate any required action(s) and the timeframe specified for their completion. None

Pretreatment Measures

Does the facility utilize any pretreatment measures, equipment, technology, or other waste reduction process(es)?

yes [x] no [ ]

If yes, provide a description of the pretreatment measures utilized.

The entire plant is designed to collect and treat it own process wastewater. Only domestic waste is sent to the POTW.

If yes, provide a description of the overall condition of the respective area(s).

Facility is in fair condition. There is very little possibility for water to enter the POTW from any pretreatment areas. The facility has been designed to divert stormwater runoff away from s.s. lines

If yes, indicate any required action(s) and the timeframe specified for their completion. None

Inspection Results

Did the facility comply with their Waste Discharge Authorization Permit, Henderson Municipal Code 13.16 & 13.10, and all applicable federal, state, and local regulations?

yes [x] no [ ]

If no, explain the corrective actions that need to be completed to bring the IU into compliance.

List any comments made by IU representative(s).

Again, Larry inquired about the possibility of discharging cooling tower water (TDS levels of 5,000mg/l) to the POTW. PT explained that a request must be submitted in writing and that the request would need to be approved by both BMI and the COH. Discussion ensued about the pros/cons.

R. Matt Thomas & John Massicotte
(Print) Name of person filling out this inspection form

Pretreatment Inspector
Title

Signature

Wednesday, June 06, 2007
Date

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Industrial User Inspection Form

City of Henderson

Department of Utility Services - Pretreatment
2400Moser Drive - P.O. Box 95050
Henderson NV, 89009-5050
Phone: 702-267-2650 Fax: 702-267-2651

A Place To Call Home

General Information

Facility Name: Pioneer Amerigas LLC

Are there alternate names for the business? yes [X] no [ ]

If yes, indicate the alternate name(s): Pioneer Chemical & BMI Complex

Waste Discharge Authorization Permit No.: COH - 0201 Expiration Date: 30-Jun-07

Facility ID No.: 5

Permit Classification (check all that apply): IU [ ] SIU [X] CIU [ ] Zero Discharge [ ]

Physical Address: 8000 West Lake Mead Drive

City: Henderson State: NV Zip: 89015

Mailing Address: PO Box 86

City: Henderson State: NV Zip: 89009-0849

Telephone: 702-565-8781 Fax: 702-564-0340

E-mail address: chris.sylvia@piona.com

Name of Responsible Official: Gary Sulik Title: Plant Manager

Additional contact person(s) (if applicable): Chris Sylvia (Pioneer Chemical), Colen Watts (BMI)

Inspection Date: 7-Jun-07 Inspection Start Time: 830 Inspection Finish Time: 930

Purpose of the inspection (check all that apply): Annual [X] Enforcement Action [ ] New Facility [ ]

Slug or Accidental Discharge [ ] Requested by the Facility [ ] Unannounced [ ] Scheduled [X]

Other [ ]

Those present for the inspection: City Representative(s): RMT, JLM

IU Representative(s): Chris Sylvia

Last action by the city (date & purpose): Inspection: See attached facility review

Sampling: See attached facility review

Indicate any violation(s) and resulting enforcement actions that have occur during the past 12 months.

See attached facility review

Environmental Information

Does the facility hold any additional environmental permits? yes [X] no [ ]

If yes, indicate the type of permit(s), the permit number(s) and the effective/expiration date(s):

NPDES Permit No. NV0020923

North American Industry Classification System (NAICS) or Standard Industrial Classification (SIC) number(s):

2812

Operational Information

Provide a brief description of all the activities, which may be performed at this facility.

Manufacture chlorine , sodium Hypochlorite (bleach), sodium hydroxide, sulfuric acid, and hydrochloric acid from raw material (mostly salt). Vehicle and other equipment maintenance.

Hours of Operation:					
Sun.	24 hrs	Mon.	24 hrs	Tues.	24 hrs
Wed.	24 hrs	Thur.	24 hrs	Fri.	24 hrs
Sat.	24 hrs				

Avg. number of employees per shift: 1st 80 2nd 13 3rd ____

Is process water discharged, to the POTW, continuously or on a batch basis?

No process water is discharged to the POTW.

If continuous discharge, indicate the maximum flow rate in GPM and GPD. NA

GPM ____ GPD ____

If batch discharge(s), indicate the maximum flow rate in GPM and GPD along with the frequency of the batch discharge(s)

Frequency ____ GPM ____ GPD ____

Are there scheduled shut downs or periods of no discharge? yes [ ] no [X]

If yes, indicate the shutdown period(s) ____

Is operation seasonal? yes [ ] no [X]

If yes, indicate the month(s), which operation may occur.

J [ ] F [ ] M [ ] A [ ] M [ ] J [ ] J [ ] A [ ] S [ ] O [ ] N [ ] D [ ]

Has an accurate schematic of the facility's process plumbing, sewer lines, process equipment, and other appurtenances been provided?

yes [ ] no [X]

Are there any recent or proposed changes in the facility's operation? yes [ ] no [X]

If yes, describe the changes.

Possiblu bring over the transportation crew, which would add approximately 15 more people, but would not change their process wastestream quantity and/or quality.

Chemical Storage Area(s)

Does the facility store chemicals? yes [X] no [ ]

If yes, has a copy of the facility's SPCC Plan been provided? yes [X] no [ ]

If no, please explain.

If yes, has a copy of the corresponding MSDS sheets been provided? yes [X] no [ ]

If no, please explain.

If yes, are there floor drains in this area that discharge to the POTW? yes [ ] no [X]

If yes, indicate the quantity.

If yes, provide a description of the overall condition of the respective area(s).

Facility is very old and in fair condition. There is very little possibility for water to enter the POTW from any chemical storage areas. The facility has been designed to divert stormwater runoff away from s.s. lines

If yes, indicate any required action(s) and the timeframe specified for their completion. None

Processing Area(s)

Description of the overall condition of the respective area(s).

Facility is very old and in fair condition. There is very little possibility for water to enter the POTW from any chemical storage areas. The facility has been designed to divert stormwater runoff away from s.s. lines

Are there floor drains in this area that discharge to the POTW? yes [ ] no [X]

If yes, indicate the quantity.

Indicate any required action(s) and the timeframe specified form their completion. None

Waste Storage and Disposal

Does the facility generate, store, or dispose of any type of waste(s)? yes [X] no [ ]

If yes, are there floor drains in this area that discharge to the POTW? yes [ ] no [X]

If yes, indicate the quantity.

If yes, provide a description of the overall condition of the respective area(s).

Facility is very old and in fair condition. There is very little possibility for water to enter the POTW from any chemical storage areas. The facility has been designed to divert stormwater runoff away from s.s. lines

If yes, does the facility generate, store, or dispose of any hazardous waste(s), as defined by the RCRA Regs?

yes [X] no [ ]

If yes, were copies of the corresponding hazardous waste manifest(s) made available for review?

yes [X] no [ ]

If yes, indicate any required action(s) and the timeframe specified for their completion. None

Pretreatment Measures

Does the facility utilize any pretreatment measures, equipment, technology, or other waste reduction process(es)?

yes [X] no [ ]

If yes, provide a description of the pretreatment measures utilized.

The entire plant is designed to collect and treat it own process wastewater. Only domestic waste is sent to the POTW.

If yes, provide a description of the overall condition of the respective area(s).

Facility is very old and in fair condition. There is very little possibility for water to enter the POTW from any chemical storage areas. The facility has been designed to divert stormwater runoff away from s.s. lines

If yes, indicate any required action(s) and the timeframe specified for their completion. None

Inspection Results

Did the facility comply with their Waste Discharge Authorization Permit, Henderson Municipal Code 13.16 & 13.10, and all applicable federal, state, and local regulations?

yes [X] no [ ]

If no, explain the corrective actions that need to be completed to bring the IU into compliance.

List any comments made by IU representative(s). None

R. Matt Thomas & John Massicotte	Pretreatment Inspector
(Print) Name of person filling out this inspection form	Title
	Thursday, June 07, 2007
Signature	Date

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Industrial User Inspection Form

City of Henderson

Department of Utility Services - Pretreatment
2400 Moser Dr. - P.O. Box 95050
Henderson, NV 89050
Phone: 702-267-2650 Fax: 702-267-2651

A Place To Call Home

General Information

Facility Name:	Titanium Metals Corporation
Are there alternate names for the business?	yes [x] no [ ]
If yes, indicate the alternate name(s):	TIMET & BMI Complex
Waste Discharge Authorization Permit No.:	COH - 0201
Expiration Date:	30-Jun-07
Facility ID No.:	5
Permit Classification (check all that apply):	IU [ ] SIU [x] CIU [ ] Zero Discharge [ ]
Physical Address:	8000 West Lake Mead Drive
City:	Henderson
State:	NV
Zip:	89015
Mailing Address:	PO Box 2128
City:	Henderson
State:	NV
Zip:	89009-0849
Telephone:	702-564-2544
Fax:	
E-mail address:	NA
Name of Responsible Official:	John Sanderson
Title:	Plant Manager
Additional contact person(s) (if applicable):	Craig Wilkenson & Amy Lahav (TIMET), Colen Watts (BMI)
Inspection Date:	12-Jun-07
Inspection Start Time:	830
Inspection Finish Time:	930
Purpose of the inspection (check all that apply):	Annual [x] Enforcement Action [ ] New Facility [ ] Slug or Accidental Discharge [ ] Requested by the Facility [ ] Unannounced [x] Scheduled [ ] Other [ ]
Those present for the inspection: City Representative(s):	JLM
IU Representative(s):	Amy Lahav
Last action by the city (date & purpose): Inspection:	see attached facility review
Sampling:	see attached facility review

Indicate any violation(s) and resulting enforcement actions that have occur during the past 12 months.

see attached facility review

Environmental Information

Does the facility hold any additional environmental permits? yes [x] no [ ]

If yes, indicate the type of permit(s), the permit number(s) and the effective/expiration date(s):

NPDES Permit No. NV2000510 effective date 7/02 / expiration date 6/07.

Also have recently obtained a new NPDES permit for their new treatment plant that will be online in the near future. We did not get the number or the expiration date.

North American Industry Classification System (NAICS) or Standard Industrial Classification (SIC) number(s):

3339

Operational Information

Provide a brief description of all the activities, which may be performed at this facility.

Manufacture of titanium metal from raw materials. Vehicle and other equipment maintenance.

Hours of Operation: Sun. 24 hrs Mon. 24 hrs Tues. 24 hrs

Wed. 24 hrs Thur. 24 hrs Fri. 24 hrs Sat. 24 hrs

Avg. number of employees per shift: 1st 235 2nd 120 3rd 120

Is process water discharged, to the POTW, continuously or on a batch basis?

No process water is discharged to the POTW

If continuous discharge, indicate the maximum flow rate in GPM and GPD.

GPM ______ GPD ______

If batch discharge(s), indicate the maximum flow rate in GPM and GPD along with the frequency of the batch discharge(s)

Frequency ______ GPM ______ GPD ______

Are there scheduled shut downs or periods of no discharge? yes [ ] no [x]

If yes, indicate the shutdown period(s) ______

Is operation seasonal? yes [ ] no [x]

If yes, indicate the month(s), which operation may occur.

J [ ] F [ ] M [ ] A [ ] M [ ] J [ ] J [ ] A [ ] S [ ] O [ ] N [ ] D [ ]

Has an accurate schematic of the facility's process plumbing, sewer lines, process equipment, and other appurtenances been provided?

yes [ ] no [x]

Are there any recent or proposed changes in the facility's operation? yes [x] no [ ]

If yes, describe the changes.

process water reclamation plant is now online, vac purification process is under construction to expand process by adding several new furnace units.

Chemical Storage Area(s)

Does the facility store chemicals? yes [x] no [ ]

If yes, has a copy of the facility's SPCC Plan been provided? yes [x] no [ ]

If no, please explain. not required at this time

If yes, has a copy of the corresponding MSDS sheets been provided? yes [x] no [ ]

If no, please explain.

If yes, are there floor drains in this area that discharge to the POTW? yes [ ] no [x]

If yes, indicate the quantity.

If yes, provide a description of the overall condition of the respective area(s).

Facility is very old and in fair condition. There is very little possibility for water to enter the POTW from any chemical storage areas. The facility has been designed to divert stormwater runoff away from s.s. lines

If yes, indicate any required action(s) and the timeframe specified for their completion. None

Processing Area(s)

Description of the overall condition of the respective area(s).

Facility is very old and in fair condition. There is very little possibility for water to enter the POTW from any processing areas. The facility has been designed to divert stormwater runoff away from s.s. lines

Are there floor drains in this area that discharge to the POTW? yes [ ] no [x]

If yes, indicate the quantity.

Indicate any required action(s) and the timeframe specified form their completion. None

Waste Storage and Disposal

Does the facility generate, store, or dispose of any type of waste(s)? yes [x] no [ ]

If yes, are there floor drains in this area that discharge to the POTW? yes [ ] no [x]

If yes, indicate the quantity.

If yes, provide a description of the overall condition of the respective area(s).

Facility is very old and in fair condition. There is very little possibility for water to enter the POTW from any waste storage and disposal areas. The facility has been designed to divert stormwater runoff away from s.s. lin

If yes, does the facility generate, store, or dispose of any hazardous waste(s), as defined by the RCRA Regs?

yes [x] no [ ]

If yes, were copies of the corresponding hazardous waste manifest(s) made available for review?

yes [x] no [ ]

If yes, indicate any required action(s) and the timeframe specified for their completion. None

Pretreatment Measures

Does the facility utilize any pretreatment measures, equipment, technology, or other waste reduction process(es)?

yes [x] no [ ]

If yes, provide a description of the pretreatment measures utilized.

The entire plant is designed to collect and treat it own process wastewater. Only domestic waste is sent to the POTW. The facility has installed a new treatment plant that will be online soon.

If yes, provide a description of the overall condition of the respective area(s).

Facility is very old and in fair condition. There is very little possibility for water to enter the POTW from any pretreatment areas. The facility has been designed to divert stormwater runoff away from s.s. lines

If yes, indicate any required action(s) and the timeframe specified for their completion. None

Inspection Results

Did the facility comply with their Waste Discharge Authorization Permit, Henderson Municipal Code 13.16 & 13.10, and all applicable federal, state, and local regulations?

yes [x] no [ ]

If no, explain the corrective actions that need to be completed to bring the IU into compliance.

List any comments made by IU representative(s). None

John Massicotte	Pretreatment Inspector
(Print) Name of person filling out this inspection form	Title
	12-Jun-07
Signature	Date

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Industrial User Inspection Form

City of Henderson

Department of Utility Services - Pretreatment
2400Moser Drive - P.O. Box 95050
Henderson NV, 89009-5050
Phone: 702-267-2650 Fax: 702-267-2651

A Place To Call Home

General Information

Facility Name: Tronox (Formerly Kerr McGee)

Are there alternate names for the business? yes [X] no [ ]

If yes, indicate the alternate name(s): BMI Complex

Waste Discharge Authorization Permit No.: COH - 0201 Expiration Date: 30-Jun-07

Facility ID No.: 5

Permit Classification (check all that apply): IU [ ] SIU [X] CIU [ ] Zero Discharge [ ]

Physical Address: 8000 West Lake Mead Drive

City: Henderson State: NV Zip: 89015

Mailing Address: PO Box 55

City: Henderson State: NV Zip: 89015

Telephone: 702-651-2200 Fax:

E-mail address: NA

Name of Responsible Official: Rick Stater Title: Plant Manager

Additional contact person(s) (if applicable): Susan Crowley (Kerr McGee), Colen Watts (BMI)

Inspection Date: 13-Jun-07 Inspection Start Time: 830 Inspection Finish Time: 930

Purpose of the inspection (check all that apply): Annual [X] Enforcement Action [ ] New Facility [ ]

Slug or Accidental Discharge [ ] Requested by the Facility [ ] Unannounced [ ] Scheduled [X]

Other [ ]

Those present for the inspection: City Representative(s): RMT, JLM

IU Representative(s): Rick Stater

Last action by the city (date & purpose): Inspection: see attached facility review

Sampling: see attached facility review

Indicate any violation(s) and resulting enforcement actions that have occur during the past 12 months.

see attached facility review

Environmental Information

Does the facility hold any additional environmental permits? yes [X] no [ ]

If yes, indicate the type of permit(s), the permit number(s) and the effective/expiration date(s):

NPDES Permit No. NV0000078 effective/expiration dates unknown

NPDES Permit No. NV0023060 effective/expiration dates unknown

North American Industry Classification System (NAICS) or Standard Industrial Classification (SIC) number(s):

2819, 819

Operational Information

Provide a brief description of all the activities, which may be performed at this facility.

Manufacture of manganese dioxide, boron, and boron trichloride. Vehicle and other equipment maintenance.

Hours of Operation: Sun. 24 hrs Mon. 24 hrs Tues. 24 hrs

Wed. 24 hrs Thur. 24 hrs Fri. 24 hrs Sat. 24 hrs

Avg. number of employees per shift: 1st 104 2nd 18 3rd 18

Is process water discharged, to the POTW, continuously or on a batch basis?

No process water is discharged to the POTW. Continuous [ ] Batch [ ]

If continuous discharge, indicate the maximum flow rate in GPM and GPD. NA

GPM ____ GPD ____

If batch discharge(s), indicate the maximum flow rate in GPM and GPD along with the frequency of the batch discharge(s)

Frequency ____ GPM ____ GPD ____

Are there scheduled shut downs or periods of no discharge? yes [ ] no [X]

If yes, indicate the shutdown period(s) ____

Is operation seasonal? yes [ ] no [X]

If yes, indicate the month(s), which operation may occur.

J [ ] F [ ] M [ ] A [ ] M [ ] J [ ] J [ ] A [ ] S [ ] O [ ] N [ ] D [ ]

Has an accurate schematic of the facility's process plumbing, sewer lines, process equipment, and other appurtenances been provided?

yes [X] no [ ]

Are there any recent or proposed changes in the facility's operation? yes [ ] no [X]

If yes, describe the changes. ____

Chemical Storage Area(s)

Does the facility store chemicals? yes [X] no [ ]

If yes, has a copy of the facility's SPCC Plan been provided? yes [X] no [ ]

If no, please explain.

If yes, has a copy of the corresponding MSDS sheets been provided? yes [X] no [ ]

If no, please explain.

If yes, are there floor drains in this area that discharge to the POTW? yes [ ] no [X]

If yes, indicate the quantity.

If yes, provide a description of the overall condition of the respective area(s).

Facility is very old and in fair condition. There is very little possibility for water to enter the POTW from any chemical storage areas. The facility has been designed to divert stormwater runoff away from s.s. lines

If yes, indicate any required action(s) and the timeframe specified for their completion. None

Processing Area(s)

Description of the overall condition of the respective area(s).

Facility is very old and in fair condition. There is very little possibility for water to enter the POTW from any processing areas. The facility has been designed to divert stormwater runoff away from s.s. lines

Are there floor drains in this area that discharge to the POTW? yes [ ] no [X]

If yes, indicate the quantity.

Indicate any required action(s) and the timeframe specified form their completion. None

Waste Storage and Disposal

Does the facility generate, store, or dispose of any type of waste(s)? yes [X] no [ ]

If yes, are there floor drains in this area that discharge to the POTW? yes [ ] no [X]

If yes, indicate the quantity.

If yes, provide a description of the overall condition of the respective area(s).

Facility is very old and in fair condition. There is very little possibility for water to enter the POTW from any waste storage and disposal areas. The facility has been designed to divert stormwater runoff away from s.s. lin

If yes, does the facility generate, store, or dispose of any hazardous waste(s), as defined by the RCRA Regs?

yes [X] no [ ]

If yes, were copies of the corresponding hazardous waste manifest(s) made available for review?

yes [X] no [ ]

If yes, indicate any required action(s) and the timeframe specified for their completion. None

Pretreatment Measures

Does the facility utilize any pretreatment measures, equipment, technology, or other waste reduction process(es)?

yes [X] no [ ]

If yes, provide a description of the pretreatment measures utilized.

The entire plant is designed to collect and treat it own process wastewater. Only domestic waste is sent to the POTW.

If yes, provide a description of the overall condition of the respective area(s).

Facility is very old and in fair condition. There is very little possibility for water to enter the POTW from any pretreatment areas. The facility has been designed to divert stormwater runoff away from s.s. lines

If yes, indicate any required action(s) and the timeframe specified for their completion. None

Inspection Results

Did the facility comply with their Waste Discharge Authorization Permit, Henderson Municipal Code 13.16 & 13.10, and all applicable federal, state, and local regulations?

yes [X] no [ ]

If no, explain the corrective actions that need to be completed to bring the IU into compliance.

List any comments made by IU representative(s). None

R. Matt Thomas & John Massicotte
(Print) Name of person filling out this inspection form

Pretreatment Inspector
Title

Signature

13-Jun-07
Date

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CITY OF LAS VEGAS STORMWATER PROGRAM
INDUSTRIAL FACILITY MONITORING AND CONTROL
FY 06/07 INDUSTRIAL STORMWATER SUMMARY

Section 4.8 of the Clark County MS4 Permit requires monitoring and control of pollutants in stormwater discharges from these facilities:

1. Municipal landfills

2. Hazardous waste treatment, disposal and recovery facilities

3. Industrial facilities subject to Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986

4. Industrial facilities that contribute a substantial pollutant loading to the MS4

Facilities Meeting Section 4.8 criteria during FY 06/07 and Inspection Activity

<u>Municipal landfills</u>

None

<u>Hazardous waste treatment, disposal and recovery facilities</u>

None

<u>Industrial facilities subject to Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986</u> (Identified via EPA's online Toxic Release Inventory)

1. Anderson Dairy
   801 Searles Ave
   Las Vegas, NV 89101
   <u>Inspected 12/29/06</u> – No stormwater violations noted.
   <u>Inspected 6/15/07</u> – No stormwater violations noted.

2. Las Vegas Finishing LLC
   3261 Builders Ave
   Las Vegas, NV 89101
   Inspected 12/21/06 – No stormwater violations noted.
   Inspected 6/5/07 – No stormwater violations noted.

3. Nevada Ready Mix
   601 W Bonanza Rd
   Las Vegas, NV 89106
   Inspected 6/15/07 – No stormwater violations noted.

4. Southern Nevada Paving Beltway
   I-215 & Summerlin Pkwy
   Las Vegas, NV 89145
   Inspected 6/15/07 – No stormwater violations noted.

5. Sparkletts Water System Aqua Vend
   3140 Polaris Ave
   Las Vegas, NV 89102
   Out of business – Inspection not possible

Industrial facilities that contribute a substantial pollutant loading to the MS4

None

Other Industrial Stormwater Inspection Activity during FY 06/07

The following is a summary of inspections pertaining to stormwater-related provisions in Chapter 14.17 of the Las Vegas Municipal Code during routine inspections at industrial and commercial facilities that the Industrial Waste Section normally inspects for compliance with non-domestic discharges to the sanitary sewer. The following also summarizes stormwater-related complaint calls associated with industrial (or residential) activity, when applicable under LVMC 14.17

Class I Wastewater Contribution Permittees

16 stormwater inspections were performed at Class I permitted facilities during the course of routine Industrial Waste Section wastewater inspections. All stormwater issues that were discovered have been satisfactorily resolved.

Class II Wastewater Contribution Permittees

178 stormwater inspections were performed at Class II permitted facilities during the course of routine Industrial Waste Section wastewater inspections. All stormwater issues that were discovered have been satisfactorily resolved.

Complaint Calls

42 stormwater-related complaint calls were responded to by the Industrial Waste Section. All stormwater issues that were discovered have been satisfactorily resolved.

	04-05	05-06	06-07
Total number of Drop Inlets in the System	1,250	1,367	2,634
Total number of Drop Inlets inspected	37	39	228
% of Drop Inlets Inspected/Cleaned	3%	2.85%	9%
Total Street Miles in the City			1,230
Total Street Miles Swept	36,801	49,272	87,168
Were the streets swept once/30 days?	yes	yes	yes
Total Debris Removed from System	7,260	10,446	22,750
Total Illicit Discharge Report Responses		28	41
Total Industrial Inspections		179	1,444

Quarter	Number of Drop Inlets Cleaned	Amount of Debris Removed (cu ft)	Street Miles Swept	Amount of Debris Removed (cu yds)	Number of Detention Basins Cleaned	Amount of Debris Removed (cu yds)	Illicit Discharge Report Responses	Industrial Stormwater Inspections Performed
06/04 to 09/04	8	0	7,862	1,586	0	0		
10/04 to 12/04	7	32	9,027	1,843	0	0		
01/05 to 03/05	20	245	8,792	1,707	0	0		
04/05 to 06/05	2	180	11,120	1,667	0	0		
07/05 to 09/05	13	174	11,847	2,374	2	50		
10/05 to 12/05	2	5	12,385	2,157	3	169		
01/06 to 03/06	0	0	13,274	2,225	4	391		
04/06 to 06/06	24	190	11,766	2,410	2	302	28	179
07/06 to 09/06	23	356	16,233	3,131	0	0	21	335
10/06 to 12/06	19	135	19,926	4,166	2	0	0	376
01/07 to 03/07	134	1,163	26,000	6,123	5	1,019	14	455
04/07 to 06/07	52	316	25,009	5,889	2	452	6	278

APPENDIX K

CONSTRUCTION SITE INSPECTION REPORTS
CONTRACTOR STORMWATER TRAINING CLASS LIST

EO	January				February				March				April				May				June			
	Refd	NIC	OK	Ttl	Refd	NIC	OK	Ttl	Refd	NIC	OK	Ttl	Refd	NIC	OK	Ttl	Refd	NIC	OK	Ttl	Refd	NIC	OK	Ttl
Bingham				0		7	4	11				0				0				0				0
Gutierrez		2	66	68			28	28			50	50				0				0			18	18
Gutierrez Sanders				0		1	1	2				0				0				0				0
Howell				0				0				0				0				0				0
Knight		1	34	35		1	50	51			53	53			21	21			26	26			36	36
MacKinnon			2	2			1	1		1	9	10		1		1				0			4	4
Melo		5	35	40			28	28			34	34		1	28	29		6	30	36			10	10
Petersen		6	17	23		7	52	59		9	42	51		1	20	21		8	37	45	1	5	24	30
Restori			23	23			11	11		1	10	11		2	23	25		2	15	17			8	8
Rhu			27	27			5	5			38	38				0			22	22			4	4
Richards		5	37	42		3	29	32		1	48	49			37	37		1	40	41		1	34	35
Turner			31	31			~~41~~	27			23	23			32	32			46	46			53	53
Whitfield			1	1		2	1	3			1	1		3	10	13			1	1				0
Yimer			43	43			47	47			49	49			29	29		1	45	46			63	63
Richter		1		1		1		1				0		1		1				0				0
Adoor			23	23			9	9			12	12			16	16				0			15	15
Avram				0				0				0				0			2	2				0
Dean			74	74			22	22			74	74		1	39	40			62	62			51	51
Fogarty	1	4	5	10	1	1		2		4	6	10	1	4	4	9		1		1		7	2	9
Francis			8	8			5	5			4	4				0			3	3			2	2
Hyder		5	30	35		4	29	33		3	22	25		10	11	21		3	30	33		3	27	30
Nielsen		14	24	38		14	21	35		17	18	35		19	8	27		11	11	22				0
Rainey		3	23	26		1	12	13		3	15	18		2	9	11		2	12	14		1	27	28
Vega		1	3	4			1	1	2	1		3				0				0				0
				0				0				0				0				0				0
TOTALS	1	47	506	554	1	42	383	426	2	40	508	550	1	45	287	333	0	35	382	417	1	17	378	396

EO	July				August				September				October				November				December			
	Refd	NIC	OK	Ttl	Refd	NIC	OK	Ttl	Refd	NIC	OK	Ttl	Refd	NIC	OK	Ttl	Refd	NIC	OK	Ttl	Refd	NIC	OK	Ttl
Bingham				0				0				0				0				0				0
Gutierrez				0				0				0				0				0				0
Gutierrez Sanders				0				0				0				0				0				0
Howell				0				0				0				0				0				0
Knight				0				0				0				0				0				0
MacKinnon				0				0				0				0				0				0
Melo				0				0				0				0				0				0
Petersen				0				0				0				0				0				0
Restori				0				0				0				0				0				0
Rhu				0				0				0				0				0				0
Richards				0				0				0				0				0				0
Turner				0				0				0				0				0				0
Whitfield				0				0				0				0				0				0
Yimer				0				0				0				0				0				0
Richter				0				0				0				0				0				0
Adoor				0				0				0				0				0				0
Avram				0				0				0				0				0				0
Dean				0				0				0				0				0				0
Fogarty				0				0				0				0				0				0
Francis				0				0				0				0				0				0
Hyder				0				0				0				0				0				0
Nielsen				0				0				0				0				0				0
Rainey				0				0				0				0				0				0
Vega				0				0				0				0				0				0
				0				0				0				0				0				0
TOTALS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Year Total: 2676

Index: Refd = Not in compliance and form E-Mailed to CCRFCD
NIC = Not in compliance and form NOT E-Mailed
OK = Site in compliance

January 1, 2007 – June 30, 2007
Total = 2,676

July 1, 2006 to June 30, 2007
Total = 4,468

EO	January Refd	January NIC	January OK	January Ttl	February Refd	February NIC	February OK	February Ttl	March Refd	March NIC	March OK	March Ttl	April Refd	April NIC	April OK	April Ttl
Bingham		2	6	8		6	2	8			4	4			6	6
Englehart			3	3		7	37	44			18	18			4	4
Gutierrez Sanders			4	4	1	1	13	15				0				0
Howell				0			2	2				0				0
Knight	1		7	8		2	21	23			8	8		1	20	21
MacKinnon	2		4	6	5		10	15		1	6	7				0
Melo			1	1		6	31	37		7	35	42		1	16	17
Petersen		1	7	8	2	6	19	27		5	11	16			7	7
Rhu				0		5	17	22			10	10		1	5	6
Richards		6	30	36		2	27	29			45	45		4	33	37
Richter				0		1	1	2				0		1		1
Turner		-	27	27			35	35			56	56			13	13
Whitfield			1	1			10	10		3	24	27		1	8	9
Yimer			26	26			30	30			32	32			17	17
Adoor		6	4	10		11	14	25		9	5	14		5	15	20
Dean		1	18	19		1	52	53		3	28	31			51	51
Fogarty		10	1	11	2	4	11	17	2	5	2	9	1	5	3	9
Francis		2		2			4	4			2	2	1			0
Gutierrez				0			55	55	2		22	24			1	1
Hyder		11	2	13		12	16	28	1	21	3	25		21	14	35
Nielsen		4	3	7		7	7	14	1	3	9	13		9	3	12
Rainey	1	5	7	13		7	19	26		20	16	36		8	15	23
Avram				0				0				0				0
Vega				0				0				0				0
Restori				0				0				0				0
				0				0				0				0
TOTALS	4	48	151	203	10	78	433	521	6	77	336	419	2	57	231	289

EO	May Refd	May NIC	May OK	May Ttl	June Refd	June NIC	June OK	June Ttl	July Refd	July NIC	July OK	July Ttl	August Refd	August NIC	August OK	August Ttl
Bingham			8	8				0				0		1	2	3
Englehart		1	4	5			2	2			5	5			2	2
Gutierrez Sanders				0				0				0				0
Howell				0				0				0				0
Knight			12	12		2	17	19		1	11	12			15	15
MacKinnon		1		1		1	2	3				0			1	1
Melo		1	18	19		2	15	17		1	32	33	1	2	22	25
Petersen			18	18		1	9	10	2	2		4	1	4	1	6
Rhu		2	2	4		2	4	6	1	7	14	22	2	3	15	20
Richards		1	36	37				0		1	21	22		3	11	14
Richter				0		1		1				0		1	2	3
Turner			59	59			45	45			48	48			56	56
Whitfield		6	22	28		3	11	14		2	1	3				0
Yimer				0				0				0				0
Adoor		2	10	12		1	15	16		1	5	6		1	20	21
Dean			34	34			64	64			88	88			50	50
Fogarty	1	6	1	8	1	2	1	4		2		2	1		1	2
Francis		2	4	6		2	7	9		3	13	16			6	6
Gutierrez			4	4	1		22	23			47	47			79	79
Hyder		9	11	20	1	1	10	12	1	9	9	19		2	19	21
Nielsen		9	29	38		4	5	9	1	2		3		11	10	21
Rainey		1		1				0				0		1	3	4
Avram				0				0				0				0
Vega				0				0				0				0
Restori				0				0				0				0
				0				0				0				0
TOTALS	1	41	272	314	3	22	229	254	5	31	294	330	5	29	315	349

EO	September Refd	September NIC	September OK	September Ttl	October Refd	October NIC	October OK	October Ttl	November Refd	November NIC	November OK	November Ttl	December Refd	December NIC	December OK	December Ttl
Bingham				0				0				0				0
Englehart				0			2	2				0				0
Gutierrez Sanders				0			0	0			4	4			5	5
Howell				0				0				0				0
Knight		1	30	31			25	25		1	60	61			31	31
MacKinnon	1	2	8	11		2	8	10			2	2				0
Melo			11	11	2	1	11	14			14	14			1	1
Petersen	1	6	12	19			21	21		1	15	16			2	2
Rhu				0				0				0			8	8
Richards				0		1	15	16		3	11	14				0
Richter				0				0				0				0
Turner			47	47			24	24			19	19			18	18
Whitfield			3	3			1	1		1	2	3		1		1
Yimer				0			11	11			28	28			22	22
Adoor			7	7			38	38			13	13			7	7
Dean			29	29			49	49			24	24		1	62	63
Fogarty		5	4	9	1	3	2	6			3	3		1	3	4
Francis	1	1	2	4		5	6	11		2	13	15			4	4
Gutierrez	1		56	57			51	51			17	17			15	15
Hyder		3	12	15		3	20	23		2	25	27		3	28	31
Nielsen		10	3	13		9	10	19		8	6	14		9	9	18
Rainey				0				0				0		3	9	12
Avram				0				0				0			5	5
Vega				0				0				0				0
Restori				0				0				0			15	15
				0				0				0				0
TOTALS	4	28	224	256	3	24	294	321	0	18	256	274	0	18	244	262

Year Total: 3792

Index: Refd = Not in compliance and form E-Mailed to CCRFCD
NIC = Not in compliance and form NOT E-Mailed
OK = Site in compliance

July 1, 2006 – Dec. 31, 2006

Total = 1,792

Stormwater Quality Construction Inspection Log

Record Number	Project Name	Date of DAQEM Inspection	Permittee	APN/Property Address	Phone Number	Point of Contact	DAQEM Inspector	Description of Problem (DAQEM)	Description of Action Taken (DAQEM)	Date of CLV Inspection	CLV Inspector	Description of Problem (CLV)	Description of Action Taken (CLV)	Problem Resolved (Y/N)	Comments
1	6108 Golden Saddle St LV, NV 89130	6/29/2005	Ronald Corbett	6108 Golden Saddle St LV, NV 89130	N/A	Ronald Corbett	Dean Knight	Broken concrete within the private street	Noted problem and forwarded to entity	7/21/2005	Lori Wohletz	No evidence of sediment discharge or broken concrete	None	Y	
2	Summerlin Village 20	7/20/2005	Angela Henderson	Charleston/Vista Run	791-4588	Angela Henderson	Troy Hildreth	Sediment track out onto public street	Noted problem and forwarded to entity	7/27/2005	Lori Wohletz	No visible sediment was entering stormwater system	None	Y	
3	NWC of Azure Dr. and Bradley Rd.	11/3/2006	Bradley 14 LLC	NWC of Azure Dr. and Bradley Rd	340-4555	Carlos Escapa	Cris Melo	silt and mud entering Beehive grate inlet	Noted problem and forwarded to entity	11/3/2006	Cheng Shih	Sand bags placed. Will be placing a concrete curbing and drop inlet	indicate one week reinspection	N	Follow up on record #5. problem resolved
4	World Market II	11/9/2006	World Market II	Bonneville and Grand Central Parkway				Kevin Eubanks forwarded the Carrie Stower's complanits		11/9/2006	Cheng Shih	World Market II is not connected to MS-4 yet. We have nothing.	None	Y	
5	NWC of Azure Dr. and Bradley Rd.	11/3/2006	Bradley 14 LLC	NWC of Azure Dr. and Bradley Rd	340-4555	Carlos Escapa	Cris Melo	silt and mud entering Beehive grate inlet	Noted problem and forwarded to entity	11/17 and 11/20/06	Cheng Shih	No activity on 11/17. Called owner and indicated possible NOV	Reinspect on 11/20/06. sand bags around the storm drain bubbler	Y	
6	SWC of Alta and Rampart	11/28/2006	ne Queensridge Pla	SWC of Alta and Rampart	254-2579	Brendan Weingartner				11/27/2006	Cheng Shih	sediment along Alta	requested action to stop sediment go into storm drain	N	Follow up to reinspect in a few days
7	SWC of Alta and Rampart	11/30/2006	ne Queensridge Pla	SWC of Alta and Rampart	254-2579	Brendan Weingartner				11/30/2006	Cheng Shih	Straw Bale blocking storm drain	p the sediment getting into the gutter and remove the straw bale fror	N	Follow up with a re-inspection in a few days
8	SWC of Alta and Rampart		One Queensridge Pla	SWC of Alta and Rampart	254-2579	Brendan Weingartner				12/13/2006	Cheng Shih	torm drain is unblocked. The debris goes into the gutter has been mini	None	Y	
9	Residential Pool construction			936 Loma Bonita	898-5255	Nicole				12/13/2006	Cheng Shih	Complaint of pool constructor dumping debris.	ated community - no jurisdition. Still talked to the contractor to stop t	Y	
10	Shadow Mountain Marketplace	5/1/2007	orefield Construction	ecatur and 215 at Costco Shopping Cent	630-7888	Kevin	Joshua Restori	Misplacement of BMP.	Noted problem and forwarded to entity	5/24/2007	Cheng Shih	The Straw bale has been placed properly now.	None	Y	
11	Horizon Crest Family Apartments	7/19/2007	Salvation Army	11 W. Owens	739-3345	Carlos Espinoza	Allan Gutierrez	Sediment runoff from the entrance of the site	nducted re-inspection on 7/20/07. Noted t	7/23/2007	Cheng Shih/Keith Letus	onstruction entrance has BMP installed - rock gravels after DAQEM ins	The facility installed BMP of the entrance to the construction site	Y	spent 1 hour on this inspection
12															
13															
14															
15															
16															

CONSTRUCTION SITE INSPECTION PROGRAM

The City of Henderson
Storm Water Pollution Prevention
Construction Site Monitoring Summary
Run Date (01-JUL-06 to 30-JUN-07)

KIVAPROD

Total # of Inspections:	**1277**
Total # Passing:	**1062**
Total # Failing:	**54**
Total # Finaled:	**155**
Total # Cancelled:	**5**

Total Insp. Time Spent:	**22305**
% Passing:	**83.16**
% Failing:	**4.23**
% Finaled:	**12.14**
% Cancelled:	**.39**

Top Ten Permits with Failing Inspections

Type	Permit Number	Permit Name	# of Failing Insp.
PCVL	2005870183	LLV PRIMA PHASE 3	3
PCVL	2004870207	CANYON VIEW	3
PCVL	2006870032	HOLIDAY INN HOTEL	2
PCVL	2005870021	PALM ELEVEN ESTATES	2
PCVL	2005870062	GENEVA & KIEL	2
PCVL	2005870209	FOURSQUARE GOSPEL INTERNATIONAL CHURCH	2
PCVL	2005870098	EASTERN SILVERADO CENTRE PHASE 2	1
PCVL	2005870007	LLV THE FALLS PARCELS 5 & 10 PHASE 2	1
PCVL	2005870134	WAGON WHEEL APARTMENTS	1
PCVL	2005870203	LONDON/NAPLES ESTATES	1

Construction Site Stormwater Training

May 9 & 10, 2007

Two sessions repeated each day:

9:30 a.m. to 11:30 a.m.
1:30 p.m. to 3:30 p.m.

EACH SESSION LIMITED TO 75 PARTICIPANTS
PLEASE REGISTER FOR ONE SESSION ABOVE BY CALLING 455-3139
Mention Stormwater Training

Brought to you by:

Nevada Division of Environmental Protection
And
The Las Vegas Valley Stormwater Quality Management Committee
Clark County, Las Vegas, North Las Vegas and Henderson

Location:

Las Vegas Valley Water District
1001 S. Valley View Blvd.
Mead Room
(Inside Main Customer Entrance)
At Valley View Blvd. and Charleston Blvd.

Who Should Attend:

Owners, Developers, Contractors, and Operators of construction activity that will disturb one or more acres of land, or are part of a larger common plan of development or sale whose land disturbing activities total one or more acres.

Topics:

These sessions will include an extensive overview of the regulations and permit compliance requirements. Some topics that will be discussed: Notice of Intent, (NOI), Stormwater Pollution Prevention Plan (SWPPP), permit conditions and requirements, Best Management Practices (BMPs), documentation requirements, inspection requirements, 14-day rule, and Notice of Termination (NOT). This is valuable training to ensure that your facility is complying with the existing stormwater regulations as they apply to the construction industry.

If Questions Contact:

Kevin Eubanks, keubanks@ccrfcd.org, 455-3139

Construction Site Storm Water Training
November 15, 2006
2:00 p.m. – 4:00 p.m.

NAME	FIRM	ADDRESS	TELEPHONE	E-MAIL	SIGN-IN
1. Alexander Mackovski	N/A	7745 Maggie Bell Court LV, NV 89123	334-5161	AMackovski@hotmail.com	
2. Donald Sardano	Roma Homes	10120 S. Eastern Ave #238 Henderson,, NV 89052	492-7766	Don@romahomes.com	
3. George Boyton	Roma Homes	10120 S. Eastern Ave #238 Henderson,, NV 89052	492-7766	Don@romahomes.com	
4. Berry Eckart	CSW	6280 S. Valley View Blvd #232 LV, NV 89118	641-8002	Lindsay@cswdev.com	
5. Julio Moreno	CSW	6280 S. Valley View Blvd #232 LV, NV 89118	641-8002	Lindsay@cswdev.com	Julio C. Moreno
6. Leroy ~~Ball~~ Bass Jr	CSW	6280 S. Valley View Blvd #232 LV, NV 89118	641-8002	Lindsay@cswdev.com	Leroy Bass
7. Jerry Wilson	Inspiration Homes	2942 Brighton Creek Court LV, NV 89135	655-9887	Inspirellc@cox.net	Jerry Wilson
8. Jim ~~Chalfant~~ Chatfant	Inspiration Homes	2942 Brighton Creek Court LV, NV 89135	655-9887	Inspirellc@cox.net	[illegible]
9. Bryan Yakubik	Standard Pacific Homes	2500 N. Buffalo, Suite #105 LV, NV 89128	568-2100	dbenites@stanpac.com	
10. Jason Shields	Standard Pacific Homes	2500 N. Buffalo, Suite #105 LV, NV 89128	568-2100	dbenites@stanpac.com	
11. Alec Gonzeles	H20	4035 Flossmoor St. LV, NV 89115	396-4148	Alecgonzeles@cox.net	

Construction Site Storm Water Training
November 15, 2006
2:00 p.m. – 4:00 p.m.

NAME	FIRM	ADDRESS	TELEPHONE	E-MAIL	SIGN-IN
12. Dennis Webb	CG&B	221 Funpac Ave Henderson, NV 89011	565-6564	mmccomb@concertegradingbuilding.com	
13. William Vance	CG&B	221 Funpac Ave Henderson, NV 89011	565-6564	mmccomb@concertegradingbuilding.com	
14. Jared Crockett	CG&B	221 Funpac Ave Henderson, NV 89011	565-6564	mmccomb@concertegradingbuilding.com	
15. Carol Roth	CG&B	221 Funpac Ave Henderson, NV 89011	565-6564	mmccomb@concertegradingbuilding.com	
16. Crystal Majors	CG&B	221 Funpac Ave Henderson, NV 89011	565-6564	mmccomb@concertegradingbuilding.com	
17. Dennis Merrett	CG&B	221 Funpac Ave Henderson, NV 89011	565-6564	mmccomb@concertegradingbuilding.com	
18. Jill Dale	Tetra Tech	1214 Wigwam Pkwy Suite 100 Henderson, NV 89074	564-2802	Jill.dale@ttemi.com	
19. Rich Pasco	Pasco Demolition	4980 S. Rogers LV, NV 89118	876-6418	Pascodemo@aol.com	
20. Todd Rawlinson	Layton Construction	9090 S. Sandy Pkwy Sandy, UT 84070	232-9819	TRawlinson@layton-const.com	
21. Eric Reinschiissel	American Asphalt and Grading	4725 Cartier Avenue LV, NV 89115	507-1855	kjones@aagmail.com eric@aagmail.com	
22. Mike Childress	American Asphalt and Grading	4725 Cartier Avenue LV, NV 89115	507-1855	kjones@aagmail.com	
23. Michelle Almaraz	American Asphalt and Grading	4725 Cartier Avenue LV, NV 89115	507-1855	kjones@aagmail.com	
24. Angelo Silvester	American Asphalt and Grading	4725 Cartier Avenue LV, NV 89115	507-1855	kjones@aagmail.com	
25. Sebastian Holgin	American Asphalt and Grading	4725 Cartier Avenue LV, NV 89115	507-1855	kjones@aagmail.com	
26. Kenneth Prevest	American Asphalt and Grading	4725 Cartier Avenue LV, NV 89115	507-1855	kjones@aagmail.com	

Construction Site Storm Water Training
November 15, 2006
2:00 p.m. – 4:00 p.m.

NAME	FIRM	ADDRESS	TELEPHONE	E-MAIL	SIGN-IN
27. Gaylord Sernea	American Asphalt and Grading	4725 Cartier Avenue LV, NV 89115	507-1855	kjones@aagmail.com	
28. Louise Hernandez	American Asphalt and Grading	4725 Cartier Avenue LV, NV 89115	507-1855	kjones@aagmail.com	
29. Bruce Ford	American Asphalt and Grading	4725 Cartier Avenue LV, NV 89115	507-1855	kjones@aagmail.com	Bruce Ford
30. Robert Phillips	Tradewinds Construction	323 Orville Wright Court LV, NV 89119	310-6088	rphillips@tradewindsconstruction.com	
31. Greg Bradshaw	Investment Equity Development	4560 S. Decatur, Ste 200 LV, NV 89103	871-4545	rclark@investmentequity.com	
32. Troy Nipstad	Dustdown Water Trucks	406 Federal Street Henderson, NV 89015	400-9298		
33. Debbie Moore	American Asphalt and Grading	4725 Cartier Avenue LV, NV 89115	507-1855	kjones@aagmail.com	
34. Chris Hart	Investment Equity Development	4560 S. Decatur Avenue, #200 LV, NV 89103	871-4545	rclark@investmentequity.com	
35. Gene Empey	Best Water Truck Svc	4705 Copper Sage St LV, NV 89115	651-1501	gempey@bestwatertrucks.com	
36. Carol Delossantos	Converse Consultants	731 Pilot Road, Ste H LV, NV 89119	263-7600		
37. Janese Doyle	US Occupational Services	7065 W. Ann Road Las Vegas, NV 89130	258-5771	usoss@cox.net	Janese Doyle
38. Carmen Rosa	US Occupational Services	7065 W. Ann Road Las Vegas, NV 89130	258-5771	usoss@cox.net	Carmen Rosa
39. David Ortega	Converse Consultants	731 Pilot Road LV, NV 89119	269-8336	dortega@converseconsultants.com	David Ortega
40. Ernest Mancuso	Converse Consultants	731 Pilot Road LV, NV 89119	269-8336	dortega@converseconsultants.com	E. Mancuso
41. Shomri James	Converse Consultants	731 Pilot Road	269-8336	dortega@converseconsultants.com	Shomri James

Construction Site Storm Water Training
November 15, 2006
2:00 p.m. – 4:00 p.m.

NAME	FIRM	ADDRESS	TELEPHONE	E-MAIL	SIGN-IN
		LV, NV 89119			
42. Shaun Shoup	Las Vegas Paving	4425 Decatur LV, NV 89103	510-1278	thildreth@lasvegaspaving.com	
43. Christian Prohaska	Las Vegas Paving	4425 Decatur LV, NV 89103	510-1278	thildreth@lasvegaspaving.com	
44. Tom Burk	R & O Construction	2121 E Warmsprings #1011 LV, NV 89119	361-7794	tommyhburk@hotmail.com	
47.Bart Utter	Gothic Landscape	4565 W. Nebso Drive Las Vegas, NV 89103	252-7017	blutter@gothiclandscape.com	
45. Robert Griggo	Gothic Landscape	4565 W. Nebso Drive Las Vegas, NV 89103	252-7017	blutter@gothiclandscape.com	
46. Lee Gallier	~~Party~~ Homes PARDEE	650 White Drive LV, NV 89119	491-8078	Lee.gallier@~~partyhomes~~.com Pardeehomes.com	Lee Gallier
47. Diana Perez	~~Party~~ Homes PARDEE	650 White Drive LV, NV 89119	491-8078	~~Lee.gallier~~@~~partyhomes~~.com Diana.Perez@Pardeehomes.com	
48.	Carson Taylor Construction				
49. Todd Gilreach	Paradigm Engineering	1489 W. Warmsprings Suite #110 Henderson, NV 89014	876-6013	toddg@carsontaylor.com	
50. Nathan Foster	Paradigm Engineering	5032 Golfridge Drive LV, NV 89130	845-0899	Nathan.dofster@paradigm-engineering.com	
51. Tony Brighi	Paradigm Engineering	5032 Golfridge Drive LV, NV 89130	845-0899	Tony.brighi@paradigmengineering.com	Tony Brighi
52. Michael Payne	Minegar Environmental Systems	5032 Golfridge Drive Las Vegas, NV 89130	553-9260	Michael.payne@paradigmengineering.com	Michael Payne
53. Paul McCaughey	Minegar Environmental	27705 Commerce Center Drive	951-232-0153	paul@minegar.com	

Construction Site Storm Water Training
November 15, 2006
2:00 p.m. – 4:00 p.m.

NAME	FIRM	ADDRESS	TELEPHONE	E-MAIL	SIGN-IN
	Systems	Temecula, CA 92593			
54. Paul McCaughey CARI OLSON	Old Mill Meadows ENVIR WASHOUT	27705 Commerce Center Drive Temecula, CA 92593	~~951-232-0153~~ 7026049584	paul@minegar.com	
55. Noelle Geraci	Sebastian Construction Services	4181 Franciscan Court Las Vegas, NV 89121	451-1554	oldmillmeadows@aol.com	Noelle [signature]
56. Brad Fast		1609 Onclave Court Las Vegas, NV 89134	419-4804	brad@sebastianandassociates.com	Brad Fast
57. Rhonda Bailey	Converse Consultants	731 Pilot Road, Ste H Las Vegas, NV 89119	249-6922	rhondabailey@converseconsultants.com	[signature]
58. Phyllis Weaver	Weaver Construction	2590 N. Nellis Blvd. LV, NV 89115	644-1088	Weaverconst1@earthlink.net	[signature]
59. Chuck Forsythe	US Airforce	NAFB NV	6524287	WEBFORSYTHE@YAHOO.COM	[signature]
60. DJ Haarklu	US Airforce		6526115		
61. Adam Clutts	RWBOGBEE		388 9133		
62. Tom Buchanan	Standard Pacific	250 N Buffalo 89128 Suite #105 Las Vegas	564-210.		Thomas A. Buchanan
63. Mike Williams	Korte Homes Const		556-8629		
64. Mike Wyle	Korte Const				
65. Jason Gannan	KORTE		858-8742		[signature]
66. RICH PASCO	PASCO DEMOLITION	4980 Rogers 89118	876-6418		[signature]
67. Danielle Frieda	Lennar	6750 Via Austi Pkwy	245 0654		Danielle Frieda
68. Courtney Breen	Lennar	"	883-3829		[signature]
69. Kelli Simmons	Lennar	" "	450-4929	Kelli.Simmons@lennar.com	[signature]
70. JONATHAN ORTIZ	KORTE		702-592 2827		[signature]
71. Dana L Murphy	I.E.D.	4560 S. DECATUR	702-296-9551	DMACTATtoo@aol.Com.	[signature]
72.					
73.					
74.					
75.					

Construction Site Storm Water Training
November 15, 2006
9:00 a.m. – 11:00 a.m.

NAME	FIRM	ADDRESS	TELEPHONE	E-MAIL	SIGN-IN
1. Rick Herman	MBA Associates	3068 E Sunset Rd #7 LV, NV	355-1334	Rick@mbaassocaiteslv.com	
2. Azam Hakim	MBA Associates	3068 E Sunset Rd #7 LV, NV	355-1334	Rick@mbaassocaiteslv.com	
3. Christine Distasio	Story Book Homes	2580 Montessouri St #107 LV, NV 89117	877-7040	CDistasio@storybookhomes.us	
4. Mike Peek	American Trucking & Materials	3172 N. Rainbow #183 LV, NV 89108	219-1413	Peekpaze@aol.com	
5. Jeff Benson	American Trucking & Materials	3172 N. Rainbow #183 LV, NV 89108	219-1413	Peekpaze@aol.com	
6. Terry Cupp	T-Cupp & Associates	3172 N. Rainbow # 183 LV, NV 89108	219-1413	Peekpaze@aol.com	Terry Cupp
7. Al Haas	T-Cupp Associates	3172 N. Rainbow #183 LV, NV 89108	219-1413	Peekpaze@aol.com	
8. Darrel Dovali	El Camino Construction	3172 N. Rainbow #183 LV, NV 89108	219-1413	Peekpaze@aol.com	
9. Clyde Elliott	Richmond American Homes	2490 Pecos Verde Pkwy Henderson, NV 89074	289-7815	Clydeelliott@ndch.com	C Elliott
10. J.C. Grant	Richmond American Home	2490 Pecos Verde Pkwy Henderson, NV 89074	289-7815	JCGrant@ndch.com	
11. Fred Comas	OakView Construction	376 E. Warmsprings Rd #160 LV, NV 89119	873-6399	Jkeller@oakviewconst.com	
12. Angel McCutchen	T-Cupp	3172 N. Rainbow #183 LV, NV 89108	219-1413	PeekPaze@aol.com	
13. Robert Leidig, III	OakView Construction	376 E. Warmsprings Rd #160 LV, NV 89119	873-6399	Jkeller@oakviewconst.com	
14. Fred Kuglin	OakView Construction	376 E. Warmsprings Rd #160 LV, NV 89119	873-6399	Jkeller@oakviewconst.com	

Construction Site Storm Water Training
November 15, 2006
9:00 a.m. – 11:00 a.m.

NAME	FIRM	ADDRESS	TELEPHONE	E-MAIL	SIGN-IN
15. Art ~~Wills~~ Willms	OakView Construction	376 E. Warmsprings Rd #160 LV, NV 89119	873-6399	Jkeller@oakviewconst.com	
16. Dan Kruger	OakView Construction	376 E. Warmsprings Rd #160 LV, NV 89119	873-6399	Jkeller@oakviewconst.com	
17. Garry Cookingham	OakView Construction	376 E Warmsprings Rd. #160 LV, NV 89119	873-6399	Jkeller@oakviewconst.com	
18. Byron Weicht	Reyburn Lawn & Land	91 Corporate Park Dr. #120 Henderson, NV 89074	564-3955	Byron@reyburnlandscape.com	
19. Steve McGovern	Reyburn Lawn & Land	91 Corporate Park Dr. #120 Henderson, NV 89074	564-3955	Byron@reyburnlandscape.com	
20. Jose Salguero	Reyburn Lawn & Land	91 Corporate Park Dr. #120 Henderson, NV 89074	564-3955	Byron@reyburnlandscape.com	
21. Helene Yanez	WestMark Homes	4350 S. Arville #29-B LV, NV 89103	525-4238	Helene@westmarklv.com	
22. Greg Martin Randy Fields	WestMark Homes	4350 S. Arville #29-B LV, NV 89103	525-4238	Helene@westmarklv.com	
23. Veronica Vinocur	Ryland Homes	8925 W .Russell Rd. #200 Las Vegas, NV 89148	306-5553	vvinocur@ryland.com	
24. Raffie Yerenian	Ryland Homes	8925 W Russell Rd. #200 Las Vegas, NV 89148	306-5553	vvinocur@ryland.com	
25. Bill Grennan	Ryland Homes	8925 W .Russell Rd #200 Las Vegas, NV 89148	306-5553	vvinocur@ryland.com	
26. Adam Clutts	Bugbee & Assoc.	1005 S. Cimarron Road LV, NV 89145	388-9133	sgbugbee@earthlink.net	
27. Monte Bledsoe	Brimont Construction	PO Box 1142 Overton, NV 89040	397-8854	Brimont@mvdsl.com	
28. Scott Densmore	Southwest Homes	245 E. Warmsprings Rd	597-3233	nwade@southwesthomesinc.com	

Construction Site Storm Water Training
November 15, 2006
9:00 a.m. – 11:00 a.m.

NAME	FIRM	ADDRESS	TELEPHONE	E-MAIL	SIGN-IN
		#108 LV, NV 89119			
29. Cory Rigby	Southwest Homes	245 E. Warmsprings Rd #108 LV, NV 89119	597-3233	nwade@southwesthomesinc.com	
30. Rick Frizzell	Southwest Homes	245 E. Warmsprings Rd #108 LV, NV 89119	597-3233	nwade@southwesthomesinc.com	
31. John McCormack	Southwest Homes	245 E. Warmsprings Rd #108 LV, NV 89119	597-3233	nwade@southwesthomesinc.com	
32. Chris Marino	Southwest Homes	245 E. Warmsprings Rd #108 LV, NV 89119	597-3233	nwade@southwesthomesinc.com	
33. Pat Whipple	Astoria Homes	10655 Park Run Dr. #200 LV, NV 89144	853-6328	pwhipple@astoriahomes.com	Pat Whipple
34. Kevin Herrmann	Astoria Homes	10655 Park Run Dr. #200 LV, NV 89144	853-6328	pwhipple@astoriahomes.com	Kevin
35. Kyle Pate	Astoria Homes	10655 Park Run Dr. #200 LV, NV 89144	853-6328	pwhipple@astoriahomes.com	[illegible]
36. Fred Fields	Astoria Homes	10655 Park Run Dr. #200 LV, NV 89144	853-6328	pwhipple@astoriahomes.com	Fred Fields
37. Mark Hedges	CRM	1857 Helm Drive Las Vegas, NV 89119	851-0621	mhedges@laughlinbaymarina.com	
38. Steve Roberts	CRM	1857 Helm Drive LV, NV 89119	851-0621	sroberts@laughlinbaymarina.com	
39. Jeff Wade	Standard Pacific Homes	2500 N. Buffalo, Suite 105 LV, NV 89128	568-2100	dbenites@stanpac.com	[illegible]
40. Deanna Benites	Standard Pacific Homes	2500 N. Buffalo, Suite 105 LV, NV 8912	568-2100	dbenites@stanpac.com	Deanna [illegible]

Construction Site Storm Water Training
November 15, 2006
9:00 a.m. – 11:00 a.m.

NAME	FIRM	ADDRESS	TELEPHONE	E-MAIL	SIGN-IN
41. Pat Owens	Standard Pacific Homes	2500 N. Buffalo, Suite 105 LV, NV 89128	568-2100	dbenites@stanpac.com	Pat Owens
42. Terry Sharp	Korte Construction	9225 W. Flamingo #100 LV, NV 89147	531-9716	Mike.williams@korteco.com	[illegible]
43. Jerry Maran	Korte Construction	9225 W. Flamingo #100 LV, NV 89147	531-9716	Mike.williams@korteco.com	Jerry Maran
44. Paul Jensen	Korte Construction	9225 W. Flamingo #100 LV, NV 89147	531-9716	Mike.williams@korteco.com	[illegible]
45. John Tracy	Korte Construction	9225 W. Flamingo #100 LV, NV 89147	531-9716	Mike.williams@korteco.com	[illegible]
46. Randy Fields	Westmark Homes	4350 S. Arville Bldg. D Suite #29B LV, NV 89103	525-4238	helene@westmarklv.com	[illegible]
47. John Price	Magnum Opes	3170 E. Sunset Rd #A LV, NV 89120	383-8811	dlancaster@magnumopes.com	
48. Joe Wixom	Burnett Haase	100 Corporate Park Dr Henderson, NV 89074	547-9000	Jwixom@burnetthaase.com	[illegible]
49. Troy Fish	Burnett Haase	100 Corporate Park Dr Henderson, NV 89074	547-9000	Jwixom@burnetthaase.com	[illegible]
50. William Armstrong	Nevada Pacific Construction	10624 S Eastern Avenue #A646 LV, NV 89052	360-815-2893		[illegible]
51. John Prince	Magnum Opes	3170 E. Sunset Suite A LV, NV 89120	838-8811	jprincemc@aol.com	
52. Anita Gutierrez Sanders	CC Dept of Air Quality	500 S. Grand Central Pkwy LV, NV 89155	455-1638	sanders@co.clark.nv.us	Anita Gutierrez Sanders
53. Chris Melo	CC Dept of Air Quality	500 S. Grand Central Pkwy LV, NV 89155	455-1638	sanders@co.clark.nv.us	[illegible]
54. Whitney Francis	CC Dept of Air Quality	500 S. Grand Central Pkwy LV, NV 89155	455-1640	francisw@co.clark.nv.us	[illegible]

Construction Site Storm Water Training
November 15, 2006
9:00 a.m. – 11:00 a.m.

NAME	FIRM	ADDRESS	TELEPHONE	E-MAIL	SIGN-IN
55. Mark Yedlicka	Land Development	9727 W. Ann Rd LV, NV 89149	994-0285	MYedlicka@landdevelopment.net	
56. Aaron Romero	Penta Building Group	181 Warmspring Rd. Las Vegas, NV 89119	614-1678	aromero@pentabldggroup.com	
57. Eric Duchaine	Penta Building Group	181 Warmspring Rd. LV, NV 89119	614-1678	aromero@pentabldggroup.com	
58. Ryan Averland	Penta Building Group	181 Warmspring Rd. LV, NV 89119	614-1678	aromero@pentabldggroup.com	
59. Mike Hintze	Penta Building Group	181 Warm Springs Road LV, NV 89119	614-1678	aromero@pentabldggroup.com	
60. Steve Sparti	ZMH Development	490 Hagens Alley Mesquite, NV 89027	206-0088	Steve.sparti@gmail.com	Steve Sparti
61. Randy McKee	Engle Homes	7872 W. Sahara LV, NV 89117	208-6836	rmckee@englehomes.com	
62. Ed Lozano	Kitchell Construction	4760 Jim Rote LV, NV 89119	774-8715	elozano@kitchell.com	Ed Lozano
63. Seth Maurer	Core Construction	2410 Fire Mesa Street LV, NV 89128	794-0550	sethmaurer@coreconstructnv.com	
64. Al Banks	Breslin Builders	5525 Polaris Avenue LV, NV 89118	798-3977	abanks@breslinbuilders.com	
65. Tracy Eagan	Breslin Builders	5525 Polaris Avenue LV, NV 89118	798-3977	abanks@breslinbuilders.com	
66. David Koerber	Breslin Builders	5525 Polaris Avenue LV, NV 89118	798-3977	abanks@breslinbuilders.com	
67. Sergio Oregel	National Home	4485 S. Buffalo, LV, NV 89147	871-3322	shellyj@nationalhomesinc.com	
68. John Barnes	Investment Equity Dev	4560 S. Decatur, Ste 200 LV, NV 89103	871-4545	jbarnes@investmentequity.com	
69. Vicki Helms	Dustdown Water Trucks	406 Federal Street Henderson, NV 89015	400-9298		Vicki Helm

Construction Site Storm Water Training
November 15, 2006
9:00 a.m. – 11:00 a.m.

NAME	FIRM	ADDRESS	TELEPHONE	E-MAIL	SIGN-IN
70. Robert Newhard	Desert Palms Investment Group	2287 Crestline Loop Suite #C and /3D LV, NV 89030	839-2052	Nancy@desertpalmslv.com	
71. Nancy Painter	Desert Palms Investment Group	2287 Crestline Loop Suite #C and /3D LV, NV 89030	839-2052	Nancy@desertpalmslv.com	
72. Nakia Jones	US Occupational Safety Services	7065 W. Ann Road Las Vegas, NV 89130	258-9771	usoss@cox.net	Nakia Jones
73. Ed O'Neill	O'Neill Construction Services, Inc.	129 S. Water Street Henderson, NV 89015	220-9333	ocs_swppps@msn.com	[illegible]
74. Sonya Miller	O'Neill Construction Services, Inc.	129 S. Water Street Henderson, NV 89015	220-9333	ocs_swppps@msn.com	Sonya Miller
75. Alfonso Mundez	Sun City Landscape	4270 W. Patrick Lane Las Vegas, NV 89118	249-4697	alfonsom@suncitylas.com	[illegible]
76. Gerald Gillilith	OAKVIEW Const				G Gillilath
77 Rober Rhu	CCDAQEM	900 Rancho	2493544	Rhu@co.clark.nv.us	[illegible]
78 George Burt	Roma Homes				[illegible]
79 James Cunningham	Rome Home		544-2739		

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Construction Site Storm Water Training
November 16, 2006
9:00 a.m. – 11:00 a.m.

NAME	FIRM	ADDRESS	TELEPHONE	E-MAIL	SIGN-IN
1. Lori Nichols	Spiess Construction Co.	3305 Spring Mtn Rd #68 LV, NV 89102	269-8066	Speissnevada@earthlink.net	Lori K. Nichols
2. Jerry Gollobith	Oak View Construction	376 E. Warmsprings Rd. #160 LV, NV 89119	873-6399	Jkeller@oakviewconst.com	
3. Don Highsmith	Oak View Construction	376 E. Warmsprings Rd. #160 LV, NV 89119	873-6399	Jkeller@oakviewconst.com	
4. Lou Foster	Oak View Construction	376 E. Warmsprings Rd. #160 LV, NV 89119	873-6399	Jkeller@oakviewconst.com	
5. Elliott Miller	Oak View Construction	376 E. Warmsprings Rd. #160 LV, NV 89119	873-6399	Jkeller@oakviewconst.com	
6. Osmond U,	Oak View Construction	376 E. Warmsprings Rd. #160 LV, NV 89119	873-6399	Jkeller@oakviewconst.com	
7. Ehrich, Walter	Alper Construction	3920 West Badura LV, NV 89118	210-1342	Wehrich103@aol.com	Walter E
8. Ron Woodward	Marnell Corrao Associates	222 Via Way Marnell LV, NV 89119	739-2000* 2404	Rwoodward@marnellcorrao.com	R. Woodward
9. Roland Flores	Beazer Homes	4670 S. Fort Apache #200 LV, NV 89147	837-2100	rflores@beazer.com	
10. Jerry Oakley	Triple Five Nevada Development	9440 W. Sahara #240 LV, NV 89117	528-8377	Jerry.oakley@triplefive.com	Jerry Oakley
11. James Grimdstaff	Triple Five Nevada Development	9440 W. Sahara #240 LV, NV 89117	528-8377	James.grimdstaff@triplefive.com	
12. Mike Williams	Korte Construction	9225 W. Flamingo #100 LV, NV 89147	531-9716	Mike.williams@korteco.com	
13. Mike Wylie	Korte Construction	9225 W. Flamingo #100 LV, NV 89147	531-9716	Mike.williams@korteco.com	

Construction Site Storm Water Training
November 16, 2006
9:00 a.m. – 11:00 a.m.

NAME	FIRM	ADDRESS	TELEPHONE	E-MAIL	SIGN-IN
14. Joe Andera	David Boland Inc.	Construction Trailer NW of Hanger 1000 Creech AFB Indian Springs, NV 89018	449-2104	karenb@dboland.com	
15. Monte Fillingim	David Boland Inc.	Construction Trailer NW of Hanger 1000 Creech AFB Indian Springs, NV 89018	449-2104	karenb@dboland.com	
16. Mike Stillwell	David Boland Inc.	Construction Trailer NW of Hanger 1000 Creech AFB Indian Springs, NV 89018	449-2104	karenb@dboland.com	
17. Paul Mares	Korte Construction	9225 W. Flamingo #100 LV, NV 89147	531-9716	Mike.williams@korteco.com	
18. Guy Laing	Korte Construction	9225 W. Flamingo #100 LV, NV 89147	531-9716	Mike.williams@korteco.com	
19. Ken Voss	Magnum Opes	3170 E. Sunset Rd #A LV, NV 89120	383-8811	dlancaster@magnumopes.com	
20. Mike Ramsey	Ready Mix Inc.	3430 E. Flamingo #100 LV, NV 89121	493-6459	Mramsey@readymixinc.com	
21. Brett Armstrong	Nevada Pacific Construction	10624 S Eastern Avenue #A646 LV, NV 89052	360-815-2893		
22. Jen Bryant	Broadbent & Associates	8 West Pacific Avenue Henderson, NV 89015	563-0600	jbryant@broadbentinc.com	
23. Mickey Regan	Broadbent & Associates	8 West Pacific Avenue Henderson, NV 89015	563-0600	jbryant@broadbentinc.com	
24. Dave Adams	Korte Construction	9225 W. Flamingo #100 Las Vegas, NV 89147	531-9716		
25. Cancelled					

Construction Site Storm Water Training
November 16, 2006
9:00 a.m. – 11:00 a.m.

NAME	FIRM	ADDRESS	TELEPHONE	E-MAIL	SIGN-IN
26. Joel Wells	Bramble Homes	1290 S Jones Suite 250 LV, NV 89146	242-8608	Jwells@bramblegroup.com	
27. Gene Frederick	Bramble Homes	1290 S Jones Suite 250 LV, NV 89146	242-8608	Jwells@bramblegroup.com	
28. Paul Minto	Wood Rodgers	9900 Covington Cross Dr. LV, NV 89144	434-4639	pminto@woodrodgers.com	
29. Patty Crawford	Premier Construction	1333 N. Buffalo Las Vegas, NV 89128	501-9564	pattyc@pageantryco.com	
30. Ron Barker	Premier Construction	1333 N. Buffalo LV, NV 89128	501-9564	pattyc@pageantryco.com	
31. Pryor Bonner	Korte Construction	9225 W. Flamingo #100 LV, NV 89147	531-9716	Mike.williams@korteco.com	[signature]
32. Wally Sampson	Concorda Homes	980American Pacific Drive Ste #100 Henderson, 89014	434-5200*39		
33. Efrain Villicana	Concorda Homes	980American Pacific Drive Ste #100 Henderson, 89014	434-5200*39		[signature]
34. Dave Theodore	Concorda Homes	980 American Pacific Drive Ste #100 Henderson, 89014	434-5200*39		[signature]
35. Richard Nielson	CC Air Quality	240 Water Street Henderson NV	455-1637	Nielson@co.clark.nv.us	
36. Huston Robinson	Hand Construction	295 E. Warm Springs Road, Suite 101 LV, NV 89119	739-3345	mcontreras@nevadahand.org	
37. Chris Tensley	Hand Construction	295 E. Warm Springs Road, Suite 101 LV, NV 89119	739-3345	mcontreras@nevadahand.org	[signature]

Construction Site Storm Water Training
November 16, 2006
9:00 a.m. – 11:00 a.m.

NAME	FIRM	ADDRESS	TELEPHONE	E-MAIL	SIGN-IN
38. Dillon Sexton	Hand Construction	295 E. Warm Springs Road, Suite 101 LV, NV 89119	739-3345	mcontreras@nevadahand.org	Dillon Sexton
39. Merida Contreras	Hand Construction	295 E. Warm Springs Road, Suite 101 LV, NV 89119	739-3345	mcontreras@nevadahand.org	Merida Contreras
40. Gary Nalley	Investment Equity Dev	4560 S. Decatur, Ste 200 LV, NV 89103	871-4545	rclark@investmentequity.com	
41. Jim Oberndorfer	Investment Equity Development	4560 S. Decatur, Ste 200 LV, NV 89103	871-4545	rclark@investmentequity.com	
42. Vickki Seelig	Industrial Support	POB 91329 Henderson, NV 89009	565-5949	istccd@aol.com	Vikki Seelig
43. Skip Lowe	Industrial Support	POB 91329 Henderson, NV 89009	565-5949	sloweist@cox.net	[illegible]
44. Len Elliott	Best Water Truck Svc	4705 Copper Sage Street Las Vegas, NV 89115	651-1501	lelliott@bestwatertrucks.com	[illegible]
45. Doug Cox	Best Water Truck Svc	4705 Copper Sage Street Las Vegas, NV 89115	651-1501	dcox@bestwatertrucks.com	[illegible]
46. Eric Morris	Crown Development	375 E. Warm springs Rd #102 LV, NV 89119	794-2588		[illegible]
47. Rich Reif	Crown Development	375 E. Warm springs Rd #102 LV, NV 89119	794-2588		[illegible]
48. Dave Starr	Crown Development	375 E. Warm springs Rd #102 LV, NV 89119	794-2588		D Starr
49. Kaylie Brice	US Occupational Services	7065 W. Ann Road Las Vegas, NV 89130	258-5771	usoss@cox.net	Kaylie Brice
50. Sidney Brown	US Occupational Services	7065 W. Ann Road Las Vegas, NV 89130	258-5771	usoss@cox.net	Sidney Brown
51. Gil Bradmond	US Occupational Services	7065 W. Ann Road Las Vegas, NV 89130	258-5771	usoss@cox.net	Gilbert Redmond

Construction Site Storm Water Training
November 16, 2006
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NAME	FIRM	ADDRESS	TELEPHONE	E-MAIL	SIGN-IN
52. Evon Kanagin	Panacea Services	2805 Synergy Street North Las Vegas, NV 89030	655-2915	panaceaservices@aol.com	
53. Todd Bell	Panacea Services	2805 Synergy Street North Las Vegas, NV 89030	655-2915	panaceaservices@aol.com	
54. Nick Kanagin	Panacea Services	2805 Synergy Street North Las Vegas, NV 89030	655-2915	panaceaservices@aol.com	
55. Angela Henderson	Howard Hughes Corp.	10000 W. Charleston #200 LV, NV 89135	279-4636	panaceaservices@aol.com	Angela Henderson
56. Rich Shelso	Panacea Services	2805 Synergy Street NLV, NV 89030	655-2915	panaceaservices@aol.com	
57. Ray Ramicon	Panacea Services	2805 Synergy Street NLV, NV 89030	655-2915	panaceaservices@aol.com	
58. Bryan McCoy	Martin-Harris Construction	3030 S. Highland Dr. Las Vegas, NV 89109	474-8277	jsieiro@martinharris.com	
59. Chad Tichenor	Martin-Harris Construction	3030 S. Highland Dr. Las Vegas, NV 89109	474-8277	jsieiro@martinharris.com	
60. Dan Condreay	Martin-Harris Construction	3030 S. Highland Dr. Las Vegas, NV 89109	474-8277	jsieiro@martinharris.com	
61. James Wilson	Martin-Harris Construction	3030 S. Highland Dr. Las Vegas, NV 89109	474-8277	jsieiro@martinharris.com	
62. Joe Grissette	Martin-Harris Construction	3030 S. Highland Dr. Las Vegas, NV 89109	474-8277	jsieiro@martinharris.com	
63. John Coutts	Martin-Harris Construction	3030 S. Highland Dr. Las Vegas, NV 89109	474-8277	jsieiro@martinharris.com	
64. Kenneth Coates	Martin-Harris Construction	3030 S. Highland Dr. Las Vegas, NV 89109	474-8277	jsieiro@martinharris.com	
65. Mike Stark	Martin-Harris Construction	3030 S. Highland Dr. Las Vegas, NV 89109	474-8277	jsieiro@martinharris.com	
66. Randy Gardner	Martin-Harris Construction	3030 S. Highland Dr. Las Vegas, NV 89109	474-8277	jsieiro@martinharris.com	

Construction Site Storm Water Training
November 16, 2006
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NAME	FIRM	ADDRESS	TELEPHONE	E-MAIL	SIGN-IN
67. Robert Longsden	Martin-Harris Construction	3030 S. Highland Dr. LV, NV 89109	474-8277	jsieiro@martinharris.com	
68. Robert Murphy	Martin-Harris Construction	3030 S. Highland Dr. LV, NV 89109	474-8277	jsieiro@martinharris.com	
69. Scott Dunham	Martin-Harris Construction	3030 S. Highland Dr. LV, NV 89109	474-8277	jsieiro@martinharris.com	
70. Tim Hightower	Martin-Harris Construction	3030 S. Highland Dr. LV, NV 89109	474-8277	jsieiro@martinharris.com	
71. Tom Noe	Martin-Harris Construction	3030 S. Highland Dr. LV, NV 89109	474-8277	jsieiro@martinharris.com	
72. Christina Areana	Panacea Services	2805 Synergy NLV, NV 89030	655-2915	cmapanaceaservices@aol.com	C Areana
73. Tony Hall	Southern Highlands Development	11411 Southern Highlands Parkway Suite #300 LV, NV 89141	616-3800	rnarciso@olympiacompanies.com	Tony Hall
74. Reggie Narciso	Southern Highlands Development	11411 Southern Highlands Parkway Suite #300 LV, NV 89141	616-3800	rnarciso@olympiacompanies.com	
75. Gene Coder	Ahern Rentals	1611 W. Bonanza LV, NV 89106	631-4250	GeneC@ahern.com	
LARRY MAHATHY	TISHMAN CONST		228-323-3551	JMAHATHY@TISHMAN	
Pat Hanley	Echelon Construction	2920 Howard Hughes	625 6255	Pat.Hanley@EchelonResorts.com	
William Grennan	Southwest Gas	4900 W. Tropicana	(702) 365-2173	William.grennan@swgas.com	
Rusty Ewell	" "	" "	365-2002		Rusty Ewell
DALE E KENNEDY	PERINI		443-7665	DKENNEDY@PERINIWEST	
TIMOTHY P. O'MALLEY	PERINI BUILDING COMPANY		3665231	TO'MALLEY@PERINIWEST.COM	
DANIEL SCOTT	KORTE CONSTRUCTION	9225 W FLAMINGO	531-9716		
JACK BINGHAM	DAQEM		249-4316		

Construction Site Storm Water Training
November 16, 2006
2:00 p.m. – 4:00 p.m.

NAME	FIRM	ADDRESS	TELEPHONE	E-MAIL	SIGN-IN
1. Sally Comeau	Signature Homes	801 S. Rancho, Ste E4 LV, NV 89106	671-6019	sallycomeau@signaturehomes.com	
2. Mike Thomas	Signature Homes	801 S. Rancho, Ste E4 LV, NV 89106	496-0475	mikethomas@signaturehomes.com	
3. Dan Scott	Korte Construction	9225 W. Flamingo #100 LV, NV 89147	531-9716	mike.williams@korteco.com	Dan Scott
4. Scott Robertson	Korte Construction	9225 W. Flamingo #100 LV, NV 89147	531-9716	mike.williams@korteco.com	
5. Isaac Steed Scott Bullock	Legacy	340 Falcon Ridge Pkwy #700B Mesquite, NV 89027	378-3666	Isaac@golffalcon.com	Isaac Steed
6. Vernon Hardy Cresent Hardy	"	340 Falcon Ridge Pkwy #700B Mesquite, NV 89027	378-3666	~~Isaac@golffalcon.com~~ VERNON12@CASCADEMEADOWS.COM	Vernon Hardy
7. Donald Juergensmeyer	Korte Construction	9225 W. Flamingo #100 LV, NV 89147	531-9716	Mike.williams@korteco.com	D. Juergensmeyer
8. A. J. Tipton	Bramble Homes	1290 S Jones Suite 250 LV, NV 89146	242-8608	Jwells@bramblegroup.com	
9. Bruce Reynolds	Bramble Homes	1290 S Jones Suite 250 LV, NV 89146	242-8608	Jwells@bramblegroup.com	
10. Sebastian Jurado	Bramble Homes	1290 S Jones Suite 250 LV, NV 89146	242-8608	Jwells@bramblegroup.com	
11. James Turner	DAQEM	500 S. Grand Central Pkwy, LV, NV 89155	379-5197		James Turner
12. Larry McCall	CG&B	221 Funpac Ave Henderson, NV 89011	565-6564	mmccomb@concertegradingbuilding.com	Larry McCall
13. Pueo Ross	CG&B	221 Funpac Ave Henderson, NV 89011	565-6564	mmccomb@concertegradingbuilding.com	
14. Michael Jurgensen	CG&B	221 Funpac Ave Henderson, NV 89011	565-6564	mmccomb@concertegradingbuilding.com	

Julie Orozco / Perini Julie

JEAN VON WINCKELMANN / PERINI 810-7484 JVONWINCKELMANN@PERINIWEST.COM

Scott Bullock Legacy

Construction Site Storm Water Training
November 16, 2006
2:00 p.m. – 4:00 p.m.

NAME	FIRM	ADDRESS	TELEPHONE	E-MAIL	SIGN-IN
15. Ron Fried	Echelon Resorts	3930 Howard Hughes Pkwy. 5th Floor LV, NV 89109	888-8114		
16. Bob Marra	Echelon Resorts	3930 Howard Hughes Pkwy. 5th Floor LV, NV 89109	888-8114		
17. Larry MaHathy	Echelon Resorts	3930 Howard Hughes Pkwy 5th Floor LV, NV 89109	888-8114		
18. Eric Provenzano	Echelon Resorts	3930 Howard Hughes Pkwy. 5th Floor LV, NV 89109	888-8114		
19. Bob Seagle	Echelon Resorts	3930 Howard Hughes Pkwy. 5th Floor LV, NV 89109	888-8114		
20. Mike Sincavage	Echelon Resorts	3930 Howard Hughes Pkwy. 5th Floor LV, NV 89109	888-8114	MSINCAVAGE@TISHMAN.COM	
21. Jill Tucker	A Track-Out Solutions	3430 E Russell LV, NV 89109	419-7708	Tjill590@aol.com	
22. Chris Darling	A Track-Out Solutions	3430 E Russell LV, NV 89109	419-7708	Tjill590@aol.com	
23. Shawn Gustafson	A Track-Out Solutions	3430 E Russell LV, NV 89109	419-7708	Tjill590@aol.com	
24. Mike Peek	A Track-Out Solutions	3430 E Russell LV, NV 89109	419-7708	Tjill590@aol.com	
25. Erin Coughlin	DL Denman	4880 Donovan way N. Las Vegas, NV 89081	399-5939	Wstinner@DLdenman.com	
26. Don Denman	DL Denman	4880 Donovan way N. Las Vegas, NV 89081	399-5939	Wstinner@DLdenman.com	

JASON Thornton Converse consultants

BARRY ECKART C.S.W. DEV & CONST 6280 So. VALLEY VIEW - 641-8002

Construction Site Storm Water Training
November 16, 2006
2:00 p.m. – 4:00 p.m.

NAME	FIRM	ADDRESS	TELEPHONE	E-MAIL	SIGN-IN
27. Jonathon Orzal	Korte Construction	9225 W. Flamingo #100 LV, NV 89147	531-9716	mike.williams@korteco.com	
28. Jason Gannon	Korte Construction	9225 W. Flamingo #100 LV, NV 89147	531-9716	mike.williams@korteco.com	
29. Dave Goff	C and S	2809 Cynerty Ave LV, NV 89030	384-1177		
30. J.B Cox	C and S	2809 Cynerty Ave LV, NV 89030	384-1177		
31. Brooks Cox	C and S	2809 Cynerty Ave LV, NV 89030	384-1177		
32. Chris Marino	Desert Wind Homes	4535 W. Russell Rd, Ste 1 LV, NV 89118	882-5599	cm@desertwindhomes.com	Chris Marino
33. Matt Bishop	Amstar Homes	6620 S. Teneya Way Suite #200 LV, NV 89113	650-2923	Debell4kids@hotmail.com	[illegible]
34. Matt Bishop Jr.	Amstar Homes	6620 S. Teneya Way Suite #200 LV, NV 89113	650-2923	Debell4kids@hotmail.com	
35. Sam Lybarger	Safety Sam & Assoc	1306 W. Craig Road North Las Vegas, 89032	499-8819	Safetysam1@cox.net	Sam Lybarger
36. Mike Elerader	Crown Development	375 E. Warm springs Rd #102 LV, NV 89119	794-2588		Michael Elerader
37. Jodi Christensen	E.C.A. Environmental Compliance Assoc.	~~1124 Phillip Island Street Henderson, NV 89052~~	400-0363	address 2930 W. Green Vly Pkwy #321 Henderson, NV 89014 jodi@eca-llc.com	Jodi Christensen
38. Ann Smith	E.C.A.	~~1124 Phillip Island Street Henderson, NV 89052~~	400-0363		Ann Smith
39. Dan Russell	SWPP Compliance and	Box 34567 LV, NV 89133	658-9360	sjdplv@yahoo.com	D Russell
Todd Gilreath	CarsonTaylor		334 1010	Toddg@CarsonTaylor.com	Todd Gilreath
L. M Banks	ATC Ass. Inc	6000 S. Eastern #12A	798-5750	lawrence.banks@atcassociates.com	L. Banks

Construction Site Storm Water Training
November 16, 2006
2:00 p.m. – 4:00 p.m.

NAME	FIRM	ADDRESS	TELEPHONE	E-MAIL	SIGN-IN
	Monitors				
40. Orlando Marino	Sun City Landscape	4270 W Patrick Lane LV, NV 89118	260-6309 373-3126		
41. Bob Brown	US Occupational	Safety Services			
42. Doug Abell	American Nevada	901 N. Green Valley Pkwy Suite #200 Henderson, NV 89074	990-2144		
43. Michelle Baltz	Marnell	222 Via Marnell Way Las Vegas NV 89119	739-2000	mbaltz@marnellcorrao.com	
44. Scott Stellmon	Wilson Scott Inc.	2975 W. Executive Pkwy #153 Leihi, UT 84043	801-407-8390	Emalia@wilsonscottinc.com	
45. Doug Stellmon	Wilson Scott Inc.	2975 W. Executive Pkwy #153 Leihi, UT 84043	801-407-8390	Emalia@wilsonscottinc.com	
46. Paul Wilson	Wilson Scott Inc.	2975 W. Executive Pkwy #153 Leihi, UT 84043	801-407-8390	Emalia@wilsonscottinc.com	
47. Tim Rawlings	Stormwater Programs	HC 62 Box 362 Nelson, NV 89046	291-0204	trawlings@stormwaterprograms.com	
48. Regina Bates	Woodside Homes	5888 W. Sunset Road Suite #200 LV, NV 89118	889-7808	reginab@woodsidegroupinc.com	Regina Bates
49. ~~Eddie Duenas~~ Dan Sloan	Woodside Homes	5888 W. Sunset Road Suite #200 LV, NV 89118	889-7808	reginab@woodsidegroupinc.com	For Eddie.
50. Jessica Turoccy	Woodside Homes	5888 W. Sunset Road Suite #200 LV, NV 89118	889-7808	reginab@woodsidegroupinc.com	
Charles Stanton	Tishman Nevada	3960 Howard Hughes Pkwy L.V. NV 89109	888-8151	cstanton@tishman.com	

Construction Site Storm Water Training
November 16, 2006
2:00 p.m. – 4:00 p.m.

NAME	FIRM	ADDRESS	TELEPHONE	E-MAIL	SIGN-IN
51. Matt Gniadek		647 Cape Horn Drive Henderson, NV 89015	429-1314	Ils647@yahoo.com	
52. Vince Fleischman	ENJ Corp	2400 Del Paso Rd Suite #200 Sacramento CA 95834	916-285-0008	Rkosmata@emjcorp.com	
53. Rick Kosmata	ENJ Corp	2400 Del Paso Rd Ste 200 Sacramento CA 95834	916-285-0008	Rkosmata@emjcorp.com	
54. Pete Cesari	Commerce Construction	3333 Blue Diamond Rd LV, NV 89139	914-8549	Pcesari@commercelp.com	
55. Michelle Mann	Commerce Construction	3333 Blue Diamond Rd LV, NV 89139	914-8549	Dbober@commercelp.com	
56. Lee McNutt	Top Notch Services	9062 El Camino Las Vegas, NV 89139	348-6963	lmcnutt@iovino-masonry.com	
57. Kevin ~~Avis~~ AIVAZ	Top Notch Services	9062 El Camino LV, NV 89139	348-6963	lmcnutt@iovino-masonry.com	
58. Carmen Iovino	Top Notch Services	9062 El Camino Las Vegas, NV 89139	348-6963	lmcnutt@iovino-masonry.com	
59. Patrick Johnson	JNJ Engineering	1240 W. Uzone Ave Hildale, UT 84784	602-799-9908		
60. Terrel Dutson	JNJ Engineering	1240 W. Uzone Ave Hildale, UT 84784	602-799-9908		
61. Leslie Jessop	JNJ Engineering	1240 W. Uzone Ave Hildale, UT 84784	602-799-9908		
62. Jacob Jessop Jr.	JNJ Engineering	1240 W. Uzone Ave Hildale, UT 84784	602-799-9908		
63. Jemery Christisen	Black Well	181 N. Gibson Henderson, NV 89014	889-1007	blackwellnv@yahoo.com	
64. Brad Kelley	Black Well	181 N. Gibson Henderson, NV 89014	889-1007		
65. Jason McKee	Black Well	181 N. Gibson	889-1007		

Construction Site Storm Water Training
November 16, 2006
2:00 p.m. – 4:00 p.m.

NAME	FIRM	ADDRESS	TELEPHONE	E-MAIL	SIGN-IN
		Henderson, NV 89014			
66. Justin Franks	Black Well	181 N. Gibson Henderson, NV 89014	889-1007		
67. Mark Quinn	APCO	3432 N. Fifth Street N. Las Vegas, NV 89032	279-8221	mquinn@apcoconstruction.com	[signature]
68. Nick ~~Saiens~~ Saines	TT ~~IEM~~ EMI	1587 Figueroa Dr. 89123	896-4049	greatunc@aol.com	[signature]
69. Leroy Bass	CSW	6280 S. Valley View Blvd Suite # 232 LV, NV 89118	379-1514		
70. Berry Eckerson	CSW	6280 S. Valley View Blvd Suite # 232 LV, NV 89118	379-1514		
71. Ali Yimer	~~EAQE~~ DAQEM	333 N. Rancho Athrium Bldg. Suite #850 LV, NV 89	455-164~~6~~3	Yimer@co.clark.nv.us	[signature]
72. Sarah Hoffman	Ninyo & Moore	6700 Paradise Road Suite #E LV, NV 89119	433-0330	shoffman@ninyoandmoore.com	[signature]
73. Bill Jamieson	Ninyo & Moore	6700 Paradise Road Suite #E LV, NV 89119	433-0330	shoffman@ninyoandmoore.com	
74. John Prince	Magumn	3170 E Sunset Ste A Las Vegas NV	370-4018	jprincemc@aol.com	
75. Currie Stowers	Stowers Compliance	1779 Olympic Dr. 89123	897 8420	cstowers@stormwaterpollution.net	[signature]
Phyllis Weaver	Weaver Const	2510 N. Nellis Blvd LV NV 89115	644-1088		Phyllis Weaver
Brenda Whitfield	DAQEM	500 S Grand Central Pkwy	455-5142	Whitfield@co.clark.nv.us	[signature]
Paul Hatt	KONE				

7-25-07

TRAINING

by Cheng Shih "STORMWATER QUALITY MANAGEMENT" FOR THE LAS VEGAS VALLEY

1. TRACEE SCOTT
2. STEFAN CRISTO
3. RICHARD GAGAN
4. GREG NAITO
5. Travis Black
6. CASSandra Smith
7. STEPHEN SHAFFER
8. JAMES VEDRAL
9. Fraude Glasper
10. Bill Smirk
11. Leroy Williams
12. Ray Casaell
13. Rodney Jordan
14. Billie Jenkins
15. John Murphy
16. Mark Hooper
17. Damian Boyd
18. GUY MONROE
19. LEWIS RINKER
20. JOEY BORVELOSA
21. Chris Finbury
22. JORGE GAMBOA
23. KAWIKA A. STAFFORD
24. Antonio Guevara
25. William Hinkle
24 WILLIAM MORRIS
25 James Wheaton
26 William H. Federson

27 Jacques Lice
28. JIM GARVIN
29. Hector M. Esqueda
30 TROY CROSLAND
31 Hayley Taylor
32 JAMES LORD
33. LARRY JUDD
34. JAMES A. MCKENZIE Streets + Sanitation
35. Clyde Cassoutt
36. RAYMOND S. MILLER
37. Macon Jackson MACON JACKSON
38. Steven Combs
39. LARRY PABST
40. Skyler Winquist
41. Tony Esposito
42 Chris J. Christenson
43. Tony Morello
44. LEONARD E HOWARD
45 ERNEST OMURDOCK
46 David Bailey
47. Michael Dunn
43 IVA SMITH
44. MICHAEL GASTON
45. DANNY PARCH
46. Stacy Ross
47. Jim Leckus
48 CHARLES HENDERSON
49 Anthony Yrrong
50. Robert D. Bell

51. CHRIS PUMPHREY

52. Jose L. Limon

53 SEAN MAHAN

54. Steven R. Golden

55. Michael Hall

56 DAVID BESKE

57. Ozyvano Matthews

58. Jerry Taylor

59. William Logan Jr

60. Jay Perry

61. RODNEY WILLIAMS

62. Elvin Jones

63 DARREN GIBB

64. CALVIN CLARK

65 Rick Wilson

66 DANNY FOWLER

67 David L. MOORE

68 Grant Strong

69. JAMEY BAILEY

70. Bret Lee

71. Nick Demes

72 Dan Johnson

73 BEN CABILES

74 Emory Nitipal

75 Elliott Holmes

SWPPPs

and

CONSTRUCTION SITE STORMWATER POLLUTION PREVENTION IN THE LAS VEGAS VALLEY

Why should I care and

what are my responsibilities?

Why are Las Vegas Valley construction sites inspected for stormwater pollution compliance?

- **US Congress** – passed Federal Clean Water Act (CWA) in 1978
- **US EPA** required by CWA to protect US waters from stormwater pollution
- **State of NV** is authorized by EPA to control its own stormwater discharges
- **Nevada Division of Environmental Protection (NDEP):**

  Issues 1 combined State permit to 5 local government entities in LV Valley:

  - **Clark County, Clark County Regional Flood Control District, City of Henderson, City of Las Vegas, and City of North Las Vegas**

- <u>NDEP stormwater permit requires</u> these local entities to conduct <u>construction site inspections in LV Valley</u>
- **Each construction site** disturbing 1-acre or more of land is also required to be covered under the NDEP stormwater permit and to have a **SWPPP**

Why is stormwater pollution prevention needed in the Las Vegas Valley?

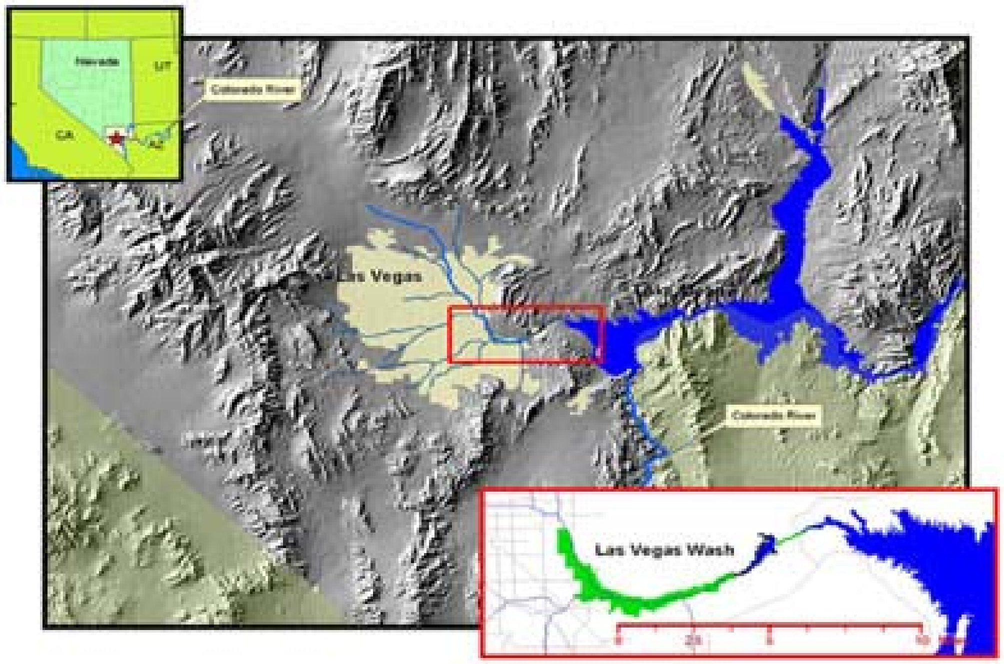
Sanitary sewer

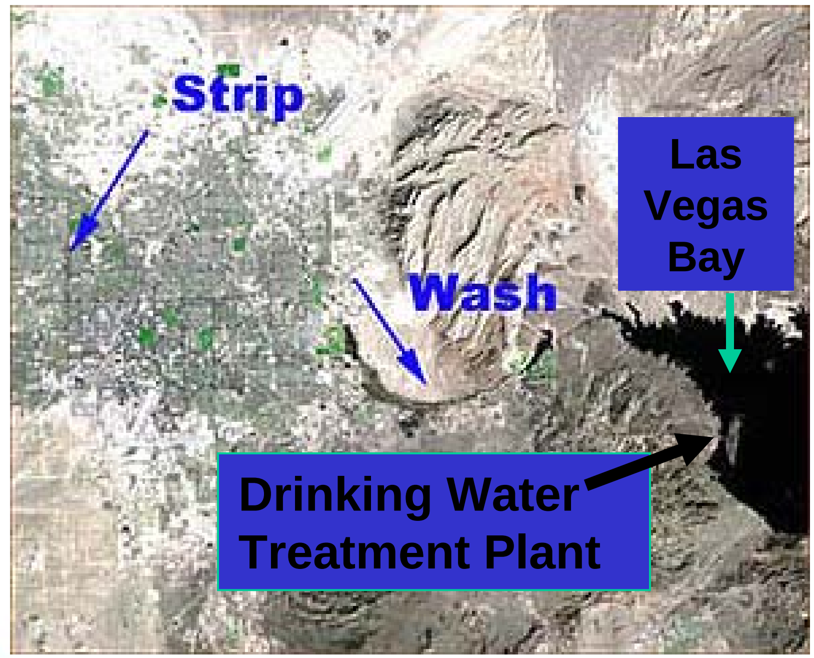
Storm sewer

The Las Vegas Valley has
<u>two</u> different sewer systems

***All* Las Vegas Valley storm sewer discharges drain *untreated* to Lake Mead**

Las Vegas Valley drainages flow to Lake Mead…





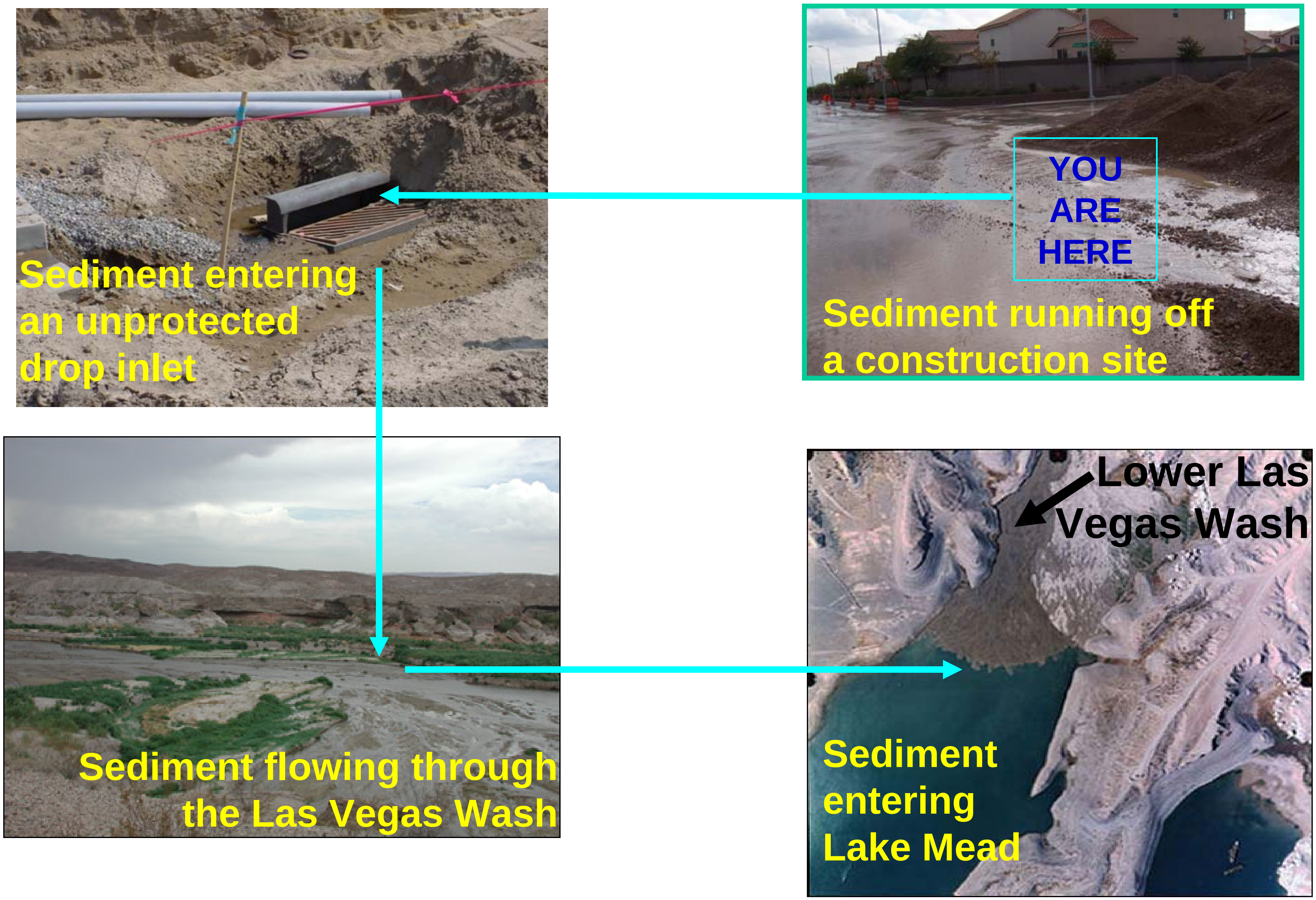
…where most of our drinking water comes from!

How does <u>untreated</u> stormwater get channeled to Lake Mead?

From curbside…to drop inlet…to storm sewer channel...

…to the Las Vegas Wash… **…to Lake Mead**

Why is construction site stormwater management necessary?



What construction site practices may cause stormwater pollution?

- **Discharging sediment off site to storm sewer**
- **Improper storage or discharge of hazardous substances from a site: paints, oils, solvents, thinners, glues, etc.**
- **Discharging waste stucco or concrete**
- **Allowing garbage or debris to leave the site**
- **On-site fuel spills that could be washed off site**
- **Sewage (from porta-potties) that leak and drain off site**
- **Purposely washing these pollutants onto streets or into storm drains**
- **Poorly designed, installed, or maintained BMPs**

What are BMPs?

(BMP = Best Management Practice)

BMPs are methods to prevent pollutants from occurring and/or from leaving a construction site in a rainstorm

Examples:

- **Street sweeping**
- **Trackout prevention**
- **Concrete washout areas**
- **Silt fence**
- **Straw wattles**
- **Covered trash bin**
- **Tarp-covered material stockpiles**
- **Hazardous materials containment**
- **Porta-potty management**
- **Gravel bags**

Trackout and Street Sweeping

Gravel pads, tire wash areas minimize trackout

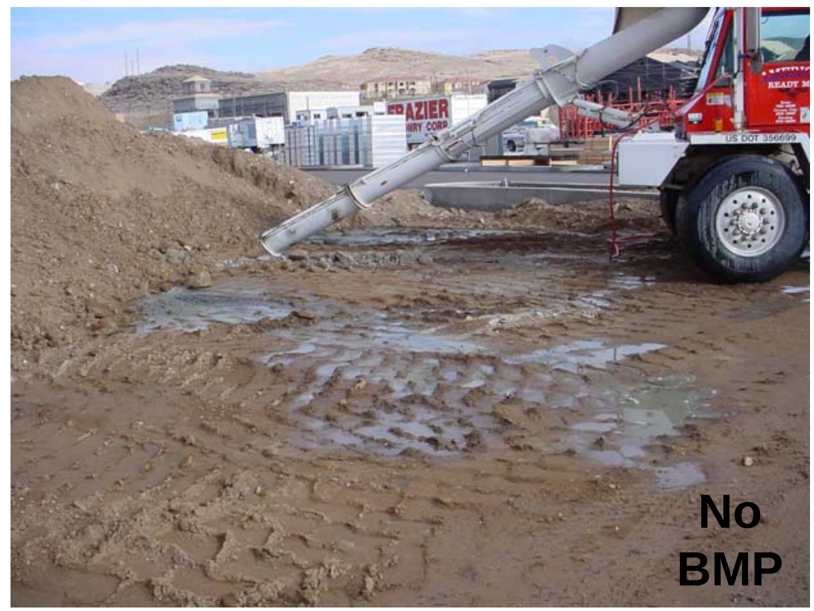
Streets swept clean and well maintained

Sediment-filled street caused by trackout, by hosing down sidewalks, and by stormwater runoff

Concrete Washout

<u>Designated</u> concrete washout areas

Concrete residue that will leave the site in a rainstorm



Silt Fencing

Properly installed fence

Poorly maintained fence

Effective, but fence installed backwards

Forgotten fence

Straw Wattles

Effectively placed
and properly staked

Poorly installed and
improperly used

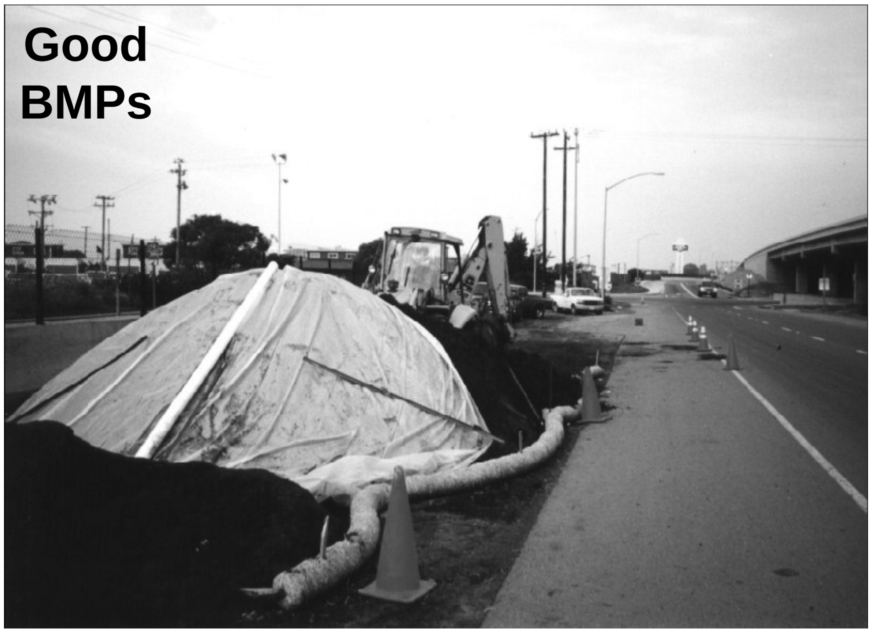
Construction Waste Management

Well-maintained, covered dumpster

Improperly discarded construction waste

Uncontrolled debris pile

Stockpile Management



Tarp-covered stockpile with straw wattle

Poor housekeeping and improper storage of stockpiled materials

Hazardous Materials Management

Effective containment of potential chemical spills

Spillage from uncontained diesel tank will flow off site

Porta-potty Placement

Units at concrete washout area--one BMP with two uses

Unit in gutter is subject to leakage and tipping

Unit out of gutter and behind a BMP

Unit in gutter and leaking

Gravel Bags at Storm Drain Inlets Good BMPs

Effective drain inlet BMPs

Effective use of gravel bag BMP

Poorly maintained storm drain inlet BMPs

Don't just set them and forget them!

Are there allowable construction site discharges?

- **Stormwater and approved *applied dust suppressant* can be discharged provided they do not carry pollutants or if they flow through filtering BMPs.**
- **However, BMPs are <u>not to be place off-site</u> in a public right-of-way <u>*except*</u> temporarily during street cleaning operations**

Remember, clogged inlets can also cause street flooding!

But, do not sweep trapped debris down the drain!

Who inspects construction sites for stormwater permit compliance?

- **DAQEM Air Quality Enforcement Officers** inspect Las Vegas Valley construction sites for stormwater compliance in:
  - **North Las Vegas**
  - **Las Vegas**
  - **Unincorporated Clark County**

- **Henderson performs its own inspections**

- **NDEP can also inspect at <u>any</u> construction site in Nevada**

Stormwater enforcement and violations

Enforcement and violations handled <u>separately</u> by each jurisdiction

- **City of Las Vegas**
- **City of North Las Vegas**
- **City of Henderson**
- **Clark County (unincorporated LV Valley areas)**
- **NDEP – all sites in LV Valley**

State of Nevada civil penalties – fines can be up to $25,000 for each day of the violation. (NRS 445A.700)

FAQs Handout

- **How to file for coverage under the State construction stormwater permit**
- **How to prepare a SWPPP**
- **Websites for more information**
- **Contacts for support and to get answers**

What happens in Vegas
stays in Vegas!

It's everyone's responsibility

to prevent stormwater pollution

in our valley

Stormwater Discharge Program

Activities that take place at industrial facilities and construction projects are often exposed to stormwater, and in turn discharge pollutants into nearby storm sewer systems and water bodies. To limit these discharges the NPDES Phase I Stormwater Program contains an industrial stormwater permitting component. Operators of industrial facilities included in one of the 11 categories of "stormwater discharges associated with industrial activity" (40 CFR 122.26 (b)(14)(I)-(vi) to a municipal separate storm sewer system (MS4) or directly to waters of the United States require authorization under a NPDES industrial stormwater permit or construction permit.

Stormwater Channel
Las Vegas, Nevada

N
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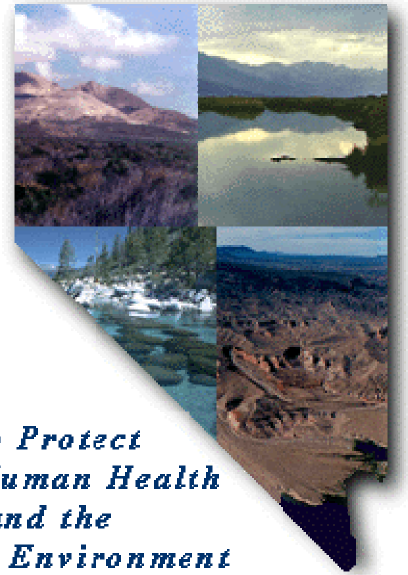


To Protect Human Health and the Environment

Cliff Lawson @ (775)-687-9429

clawson@ndep.nv.gov

Larry Rountree @ (775)-687-9440

lrountree@ndep.nv.gov

David Lloyd @ (702) 486-2872

dlloyd@ndep.nv.gov

Clark County, Las Vegas, North Las Vegas, Henderson, and the Clark County Regional Flood Control District

In coordination with

NEVADA DIVISION OF ENVIRONMENTAL PROTECTION

NEVADA DIVISION OF ENVIRONMENTAL PROTECTION

**333 West Nye Lane,
Room 129
Carson City, NV 89706**

STORMWATER TRAINING

CONSTRUCTION

February 8 & 9

WHO SHOULD ATTEND?

** Facility operators that fall into one or more of the 11 categories of "stormwater associated with industrial activity" as defined by either the facilities Standard Industrial Code (SIC) or a description of facility activities.

** Owners, Developers, Contractors, and Operators of construction activity that will disturb one or more acres of land, or are part of a larger common plan of development or sale whose total land disturbing activities total one or more acres of disturbance.

Straw waddles used for flow dissipation and erosion control. (Reno, Nevada)

CONSTRUCTION SESSION

Two sessions will be provided each day to allow operators to send as many staff as possible, including contractors, sub-contractors, and employees. These session will include an extensive overview of the regulations and permit compliance requirements. Some topics that will be discussed: Notice of Intent (NOI), Storm Water Pollution Prevention Plan (SWPPP), permit conditions and requirements, Best Management Practices (BMPs), documentation requirements, inspection requirements, 14-day rule, and Notice of Termination (NOT). This is valuable training to ensure that your facility is complying with the existing stormwater regulations as they apply to the construction industry.

Erosion Control Fiber Matting (Carson City, Nevada)

Location:
East Las Vegas Community Center
250 North Eastern Avenue

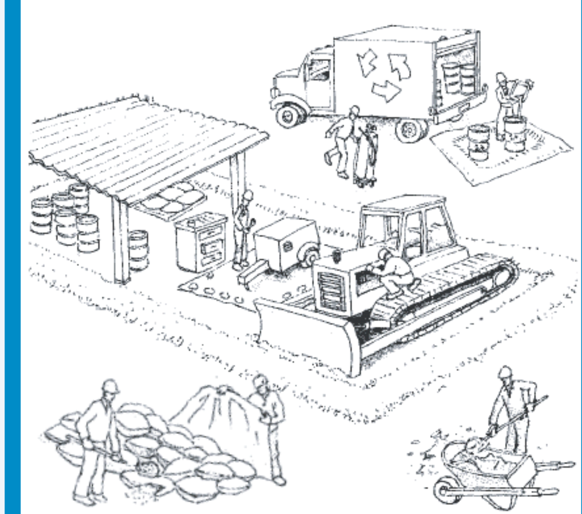
Cost: Free

When:
Construction Sessions: Daily
8:30 a.m.-10:30 a.m.
2:00 p.m.-4:00 p.m.

StormWater Pollution

What you should know for...

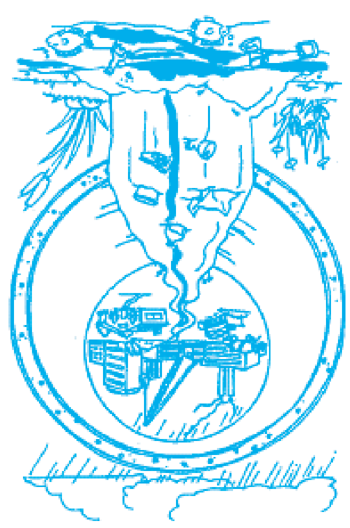
GENERAL CONSTRUCTION & SITE SUPERVISION



Best Management Practices (BMPs) for:

- Developers
- General Contractors
- Home Builders
- Construction Inspectors
- Anyone in the construction business

StormWater Pollution . . . What You Should Know

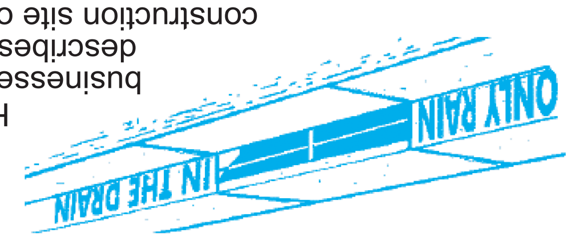


Clark County has two underground pipe systems - sewers and storm drains. The storm drain system was designed to reduce flooding by carrying excess rainwater away from streets and developed areas. Since the storm drain system does not provide for water treatment, it also serves the *unintended* function of transporting pollutants directly to our local waterways.

Unlike sanitary sewers, storm drains are not connected to a wastewater treatment plant - they flow directly to our local streams, washes and lakes.

Stormwater runoff is part of the natural hydrological process. However, land development and construction activities can significantly alter natural drainage processes and introduce pollutants into stormwater runoff. Polluted stormwater runoff from construction sites has been identified as a major source of water pollution in Nevada and all developing areas. It jeopardizes the quality of our local waterways and can pose a serious threat to the health of our aquatic ecosystems.

The Las Vegas Valley Municipal Separate Storm Sewer Protection Program



Because preventing pollution is much easier and less costly than cleaning up "after the fact," the Cities of Las Vegas, North Las Vegas and Henderson and Clark County inform residents and businesses on pollution prevention activities. This pamphlet describes various Best Management Practices (BMPs) that construction site operators can use to prevent stormwater pollution.

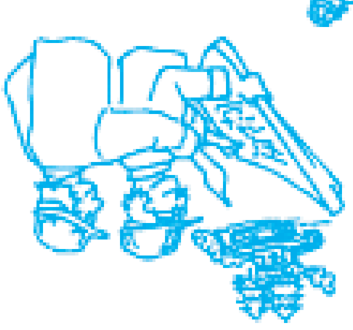
In accordance with applicable federal and state law, the Las Vegas Valley municipalities have adopted ordinances for stormwater management and discharge control that **prohibit** the discharge of pollutants into the storm drain system or local surface water. This includes discharges from construction sites containing sediment, concrete, mortar, paint, solvents, lubricants, vehicle fluids, fuel, pesticides, and construction debris.

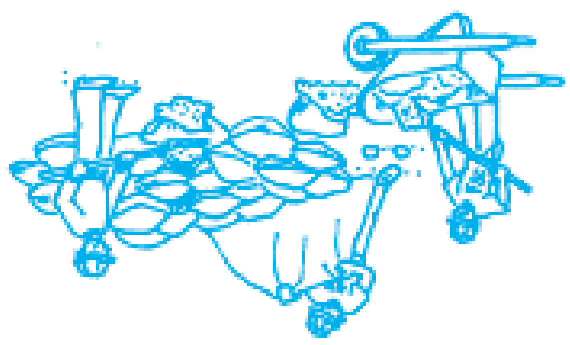
PLEASE NOTE: The Federal, State and local regulations strictly prohibit the discharge of sediment and pollutants into the streets, the storm drain system or waterways. As an owner, operator or supervisor of a construction site, you may be held financially responsible for any environmental damage caused by your subcontractors or employees.

Stormwater Pollution from Construction Activities

The two most common sources of stormwater pollution problems associated with construction activities are ***erosion*** and ***sedimentation***. Failure to maintain adequate erosion and sediment controls at construction sites often results in sediment discharges into the storm drain system, creating multiple problems once it enters local waterways.

Construction vehicles and heavy equipment can also track significant amounts of mud and sediment onto adjacent streets. Additionally, wind may transport construction materials and wastes into streets, storm drains, or directly into our local waterways.





To report illegal dumping, call:

Clark County Health District
702-383-1027

To order additional brochures or to obtain information on other pollution prevention activities, please call 702-455-3139 or visit the Las Vegas Valley Stormwater Quality Management Committee stormwater pollution prevention website at:

www.lvstormwater.com

The Las Vegas Valley Stormwater Quality Management Committee gratefully acknowledges the following agencies for providing information for this brochure:

- Santa Clara Valley Nonpoint Pollution Control Program
- Alameda Countywide CleanWater Program
- City of Los Angeles Stormwater Management Division
- County of Riverside StormWater/ CleanWater Protection Program

STORM DRAINS CARRY UNTREATED WATER TO LAKE MEAD
KEEP 'EM Clean
Stormwater Quality Management Committee

Resources

To obtain Notice of Intent/Termination Forms and General SWPPP and NPDES information, contact:

Stormwater Coordinator - Bureau of Water Pollution Control - Nevada Division of Environmental Protection
775-687-9429
www.ndep.nv.gov

Las Vegas Valley Permittees:

Clark County Regional Flood Control District
702-455-3139

Clark County Department of Air Quality and Environmental Management
702-455-5942

City of Las Vegas
702-229-6541

City of North Las Vegas
702-633-1200

City of Henderson
702-267-3000

What Should You Do?
Advance Planning to Prevent Pollution

- ❑ Remove existing vegetation only as needed.
- ❑ Schedule excavation, grading, and paving operations for dry weather periods, if possible.
- ❑ Designate a specific area of the construction site, well away from storm drain inlets or watercourses, for material storage and equipment maintenance.
- ❑ Develop and implement an effective combination of erosion and sediment controls for the construction site.
- ❑ Practice source reduction by ordering only the amount of materials that are needed to finish the project.
- ❑ Educate your employees and subcontractors about stormwater management requirements and their pollution prevention responsibilities.
- ❑ Control the amount of surface runoff at the construction site by impeding internally generated flows and using berms or drainage ditches to direct incoming offsite flows to go around the site. ***NOTE:*** *Consult local drainage policies for more information.*

Best Management Practices

The following Best Management Practices (BMPs) can significantly reduce pollutant discharges from your construction site. Compliance with stormwater regulations can be as simple as minimizing stormwater contact with potential pollutants by providing covers and secondary containment for construction materials, designating areas away from storm drain systems for storing equipment and materials and implementing good housekeeping practices at the construction site.

- ❑ Protect all storm drain inlets and streams located near the construction site to prevent sediment-laden water from entering the storm drain system.
- ❑ Limit access to and from the site. Stabilize construction entrances/exits to minimize the track out of dirt and mud onto adjacent streets. Conduct frequent street sweeping.
- ❑ Protect stockpiles and construction materials from winds and rain by storing them under a roof, secured impermeable tarp or plastic sheeting.
- ❑ Avoid storing or stockpiling materials near storm drain inlets, gullies or streams.
- ❑ Phase grading operations to limit disturbed areas and duration of exposure.
- ❑ Perform major maintenance and repairs of vehicles and equipment offsite.
- ❑ Wash out concrete mixers only in designated washout areas at the construction site.
- ❑ Set-up and operate small concrete mixers on tarps or heavy plastic drop cloths.
- ❑ Keep construction sites clean by removing trash, debris, wastes, etc. on a regular basis.
- ❑ Clean up spills immediately using dry clean up methods (e.g., absorbent materials such as cat litter, sand or rags for liquid spills; sweeping for dry spills such as cement, mortar or fertilizer) and by removing the contaminated soil from spills on dirt areas.
- ❑ Prevent erosion by implementing any or a combination of soil stabilization practices such as mulching, surface roughening, permanent or temporary seeding.
- ❑ Maintain all vehicles and equipment in good working condition. Inspect frequently for leaks, and repair promptly.
- ❑ Practice proper waste disposal. Many construction materials and wastes, including solvents, water-based paint, vehicle fluids, broken asphalt and concrete, wood, and cleared vegetation can be recycled. Materials that cannot be recycled must be taken to an appropriate landfill or disposed of as hazardous waste.
- ❑ Cover open dumpsters with secured tarps or plastic sheeting. Never clean out a dumpster by washing it down on the construction site.
- ❑ Arrange for an adequate debris disposal schedule to insure that dumpsters do not overflow.

General Construction Activities Stormwater Permit

The Nevada Division of Environmental Protection (NDEP) adopted the General Permit for Stormwater Discharges Associated with Construction Activity (NVR100000), superseding the now expired General Permit GNV0022241. This permit is administered and enforced by the NDEP, with cooperation from local municipalities that have their own ordinances controlling discharges to the drainage system. The General Permit for Construction Activity establishes a number of stormwater management requirements for construction site owners and operators.

Frequently Asked Questions:

Does my construction site require coverage under the General Permit for Construction Activity?
Yes, if construction activity results in the disturbance of one or more acres of total land area or is part of a common plan of development that results in the disturbance of one or more acres.

How do I obtain coverage under the General Permit for Construction Activity?
Obtain the permit package and submit the completed Notice of Intent (NOI) form to the NDEP prior to grading or disturbing soil at the construction site. For ongoing construction activity involving a change of ownership, the new owner must submit a new NOI within 30 days of the date of change of ownership. The completed NOI along with the required fee should be mailed to the NDEP.

What must I do to comply with the requirements of the General Permit for Construction Activity?

- Implement BMPs for non-stormwater discharges year-round.
- Prepare and implement a Stormwater Pollution Prevention Plan (SWPPP) prior to commencing construction activities.
- Keep a copy of the SWPPP at the construction site for the entire duration of the project.
- Calculate the anticipated stormwater run-off.
- Implement an effective combination of erosion and sediment control on all soil disturbed areas.
- Conduct site inspections prior to anticipated storm events, every 24 hours during extended storm events, and after actual storm events.
- Perform repair and maintenance of BMPs as soon as possible after storm events depending upon worker safety.
- Update the SWPPP, as needed, to manage pollutants or reflect changes in site conditions.
- Include description of post-construction BMPs at the construction site, including parties responsible for long-term maintenance.

NOTE: *Please refer to the General Permit for Stormwater Discharges Associated with Construction Activity for detailed information*. You may contact the *NDEP or visit the website at* **www.ndep.nv.gov/bwpc** *to obtain more information.*

How long is this General Permit for Construction Activity in effect?
The Permit coverage stays in effect until you submit a Notice of Termination (NOT) to the NDEP. For the purpose of submitting a NOT, all soil disturbing activities have to be completed and one of the three following criteria has to be met.

1. Change of ownership;
2. A uniform vegetative cover with 70 percent coverage has been established; or,
3. Equivalent stabilization measures such as the use of reinforced channel liners, soil cement, fiber matrices, geotextiles, etc., have been employed.

SEPTEMBER 2007

Las Vegas Valley NPDES Municipal Stormwater Discharge Permit

APPENDICES 2006-2007

Storm Drains Carry Untreated Water To Lake Mead

Clark County Regional Flood Control District

MWH