



Technical Memorandum

Date: November 29, 2006

To: Stormwater Quality Standards Task Force

From: CDM

Subject: Recreational Use Survey Data Report– Greenville Banning Channel

Introduction

To support Santa Ana River Basin Plan triennial review efforts, an evaluation of the appropriateness of REC-1 beneficial use designations and associated bacteria water quality objectives in the Santa Ana River Watershed is being performed by the Santa Ana Stormwater Quality Standards Task Force. The Task Force consists of representatives from a variety of stakeholder interests, including the Santa Ana Watershed Project Authority; the counties of Orange, Riverside, and San Bernardino; special districts; the Santa Ana Regional Water Quality Control Board; EPA Region 9; and local environmental groups, with assistance from CDM and Risk Sciences, Inc. As part of study efforts, recreational use surveys were performed upon select waterbodies to obtain information regarding current levels of recreational use. This technical memorandum summarizes results from a recreational use survey conducted at two locations on Greenville Banning Channel, located within the City of Costa Mesa. The Greenville Banning Channel is tributary to the Santa Ana River. The confluence is approximately 1.5 miles upstream of where the Santa Ana River discharges to the Pacific Ocean.

Study Location

Two locations were surveyed on the Greenville Banning Channel, including:

- Greenville Banning Channel at Pedestrian Bridge
- Greenville Banning Channel at Adams Avenue Bridge

The pedestrian bridge camera was stolen at the end of its third week of operation. A replacement camera was subsequently installed at a more upstream point near the Adams Avenue Bridge crossing, and the survey at the pedestrian bridge location was abandoned. The Adams Avenue Bridge location was selected because it was more secure and had the same general physical channel characteristics as the pedestrian bridge location. Figure 1

Recreational Use Survey - Greenville Banning Channel
November 29, 2006

shows the two survey locations and depicts the general physical characteristics of the channel and surrounding land use.

Recreational Use Survey - Greenville Banning Channel
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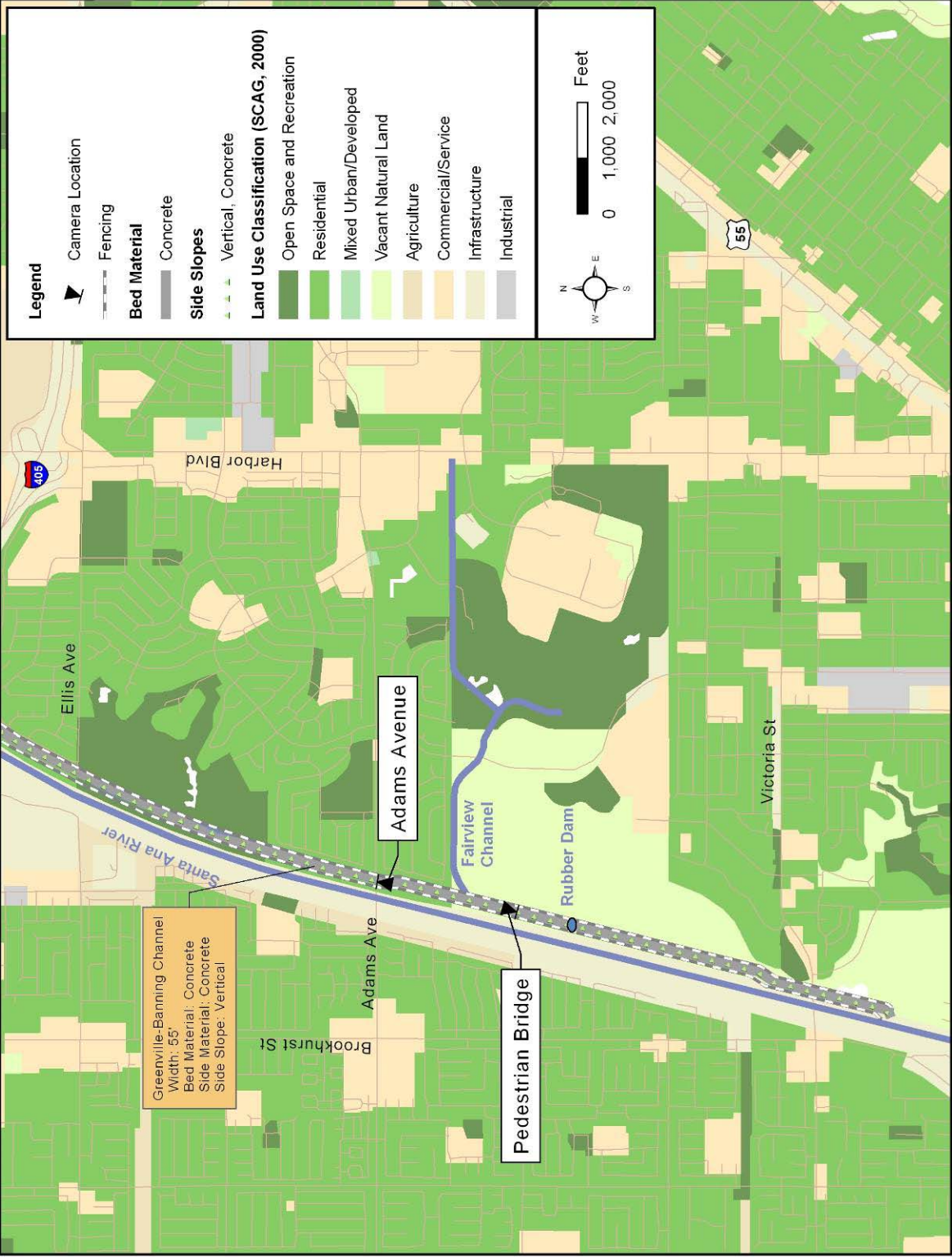


Figure 1
 Location of Recreational Use Surveys and Physical Characteristics for the Greenville Banning Channel

The first camera location was installed to capture any recreation use activities occurring in the channel near a tributary channel (Fairview Channel). Access to Fairview Channel is considerably easier than that of Greenville Banning Channel. Figure 2 shows a photo of the general conditions at this point. The camera presented an upstream view of the channel confluence. Figure 3 shows a downstream view of the channel at Adams Avenue Bridge.



Figure 2
Upstream view of Greenville Banning Channel at Confluence with Fairview Channel

Survey Design

Advanced digital cameras and data transfer technology, coupled with weekly on-location physical surveys were used to collect recreational use data at the pedestrian bridge and Adams Avenue Bridge locations. An Observer IV™ camera equipped with cellular data transmission capabilities collected an image every fifteen minutes, and transferred the image to a secure data storage server via a file transfer protocol (FTP) site. Weekly site visits were conducted to record recreational use observations, and monitor and maintain the image collection equipment. This survey design was selected to provide unprecedented levels of data to characterize recreational use.

Figure 4 shows the camera installation at Greenville Banning Channel at the pedestrian bridge. The camera was housed in a robust protective enclosure and installed under the Adams Avenue Bridge. The camera was positioned to record downstream images of Greenville Banning Channel. Figure 5 shows the camera installation at Adams Avenue.

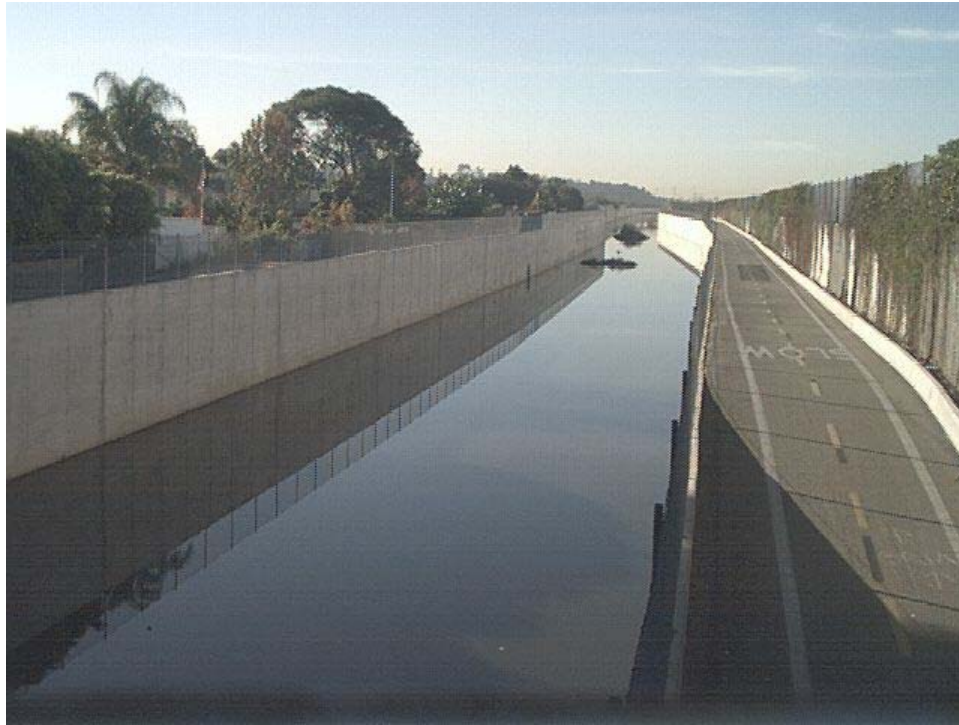


Figure 3
Downstream View of Greenville Banning Channel from Adams Avenue Bridge



Figure 4
View of Camera Location Installed at Pedestrian Bridge and Channel Wall



Figure 5
Camera Installation at Adams
Avenue Bridge

The duration of survey and number of images collected on the Greenville Banning Channel is shown in Table 1. An image was collected every fifteen minutes throughout the study duration unless signal strength fluctuations or equipment failures precluded collection and transmission. Images were not collected at night due to darkness.

Table 1			
Recreational Use Survey Duration			
Survey Location	Start Date	End Date	Number of Images
Pedestrian Bridge	7/7/05	7/27/05	424
Adams Avenue Bridge	11/17/05	1/3/06	2,552

The first survey camera installed under the pedestrian bridge operated for three weeks before being stolen. The second camera at the Adams Avenue Bridge was installed in a fortified enclosure to prevent vandalism while providing a clear view of the channel. The second camera experienced a major malfunction on January 3, 2006. Until that date, over 2,600 images had been recorded.

Between the start and end dates, the image collection equipment worked reliably, but due to signal strength fluctuation issues and other equipment functionality issues, periodic, short-

term gaps in image collection occurred. These gaps ranged from relatively minor single, fifteen-minute interval image gaps, which occurred on numerous days, to gaps in image collection spanning several days. Table 2 summarizes the more significant data gaps.

Location	Data Gap Period	Cause
Adams Avenue Bridge	November 26 – November 27	Battery Failure
Adams Avenue Bridge	December 3 – December 4	Battery Failure

Images were stored and individually reviewed for any activity at the channel location. A use/activity categorization protocol was established for logging and categorizing observed activity from both image review and physical surveys. Within the protocol, information was collected for water contact recreation, non-water contact recreation, and maintenance activity in the following categories:

- Date / Time
- Number of People
- Type of Contact
 - Incidental Contact
 - Contact Below Ankle
 - Contact Between Ankle and Waist
 - Contact Between Waist and Neck
 - Contact Above Neck
 - Non-Recreation Contact
- Non-Contact Activity

Images containing individuals within channel fencing or boundaries (and on-site surveys where individuals were observed) were considered “events.”

An event could include one or more persons. For each event, each person’s activity (type), and its duration and magnitude were logged per the established protocol. If an activity was captured within one image, an activity duration was reported as <30 minutes. Likewise, if an activity was observed within two consecutive fifteen-minute interval images, the duration was reported as <45 minutes.

Survey Results

For camera locations at Greenville Banning Channel at the pedestrian bridge and the Adams Avenue Bridge, no water contact recreation, non-water contact recreation, or maintenance activities were observed.

Summary of Findings

Over 400 recreational use data points (images) were collected over a 20-day duration from Greenville Banning Channel at the pedestrian bridge. Additionally, approximately 2,600 images were collected over a 47-day duration from the Adams Avenue Bridge. Survey results indicate no water contact recreation, non-water contact recreation, nor maintenance activities during the survey periods from July 7, 2005 to July 27, 2005, and November 17, 2005 to January 2, 2006.