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Project No: 133904

San Diego County Hydromodification Management Plan (HMP)

Subject: Rainfall Station Selection Criteria
Date: April 30, 2009
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San Diego NPDES Copermittees
Hydromodification Technical Advisory Committee (TAC)
From: Eric Mosolgo – Brown and Caldwell
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This Technical Memorandum outlines standards for the selection of rainfall station data associated with Interim Hydromodification Criteria (IHC) set forth by the County of San Diego and its NPDES Copermittees. The IHC was prepared as mandated by Regional Water Quality Control Board Order R9-2007-0001 Provision D.1.g, which requires that IHC apply until the final Hydromodification Management Plan (HMP) is implemented. The purpose of the IHC is to prevent development-related changes in storm water runoff from causing, or further accelerating, stream channel erosion or other adverse impacts to beneficial stream uses.

Brown and Caldwell is currently working with the County of San Diego in the preparation of long-term hourly precipitation gauge data for multiple rainfall stations throughout San Diego County. For a given project location, the following factors should be considered in the selection of the appropriate rainfall data set.

- In most cases, the rainfall data set in closest proximity to the project site will be the appropriate choice. A rainfall station map has been posted to the *Project Clean Water* web site for public use.
- In some cases, the rainfall data set in closest proximity to the project site may not be the most applicable data set. Such a scenario could involve a data set with an elevation significantly different from the project site. In addition to a simple elevation comparison, the project proponent may also consult with the County of San Diego's average annual precipitation isopluvial map, which is provided in the San Diego County Hydrology Manual. Review of this map could provide an initial estimate as to whether the project site is in a similar rainfall zone as compared to the rainfall stations. Generally, precipitation totals in San Diego County increase with increasing elevation.
- Where possible, rainfall data sets should be chosen so that the data set and the project location

Limitations:

This document was prepared solely for the County of San Diego in accordance with professional standards at the time the services were performed and in accordance with the contract between the County of San Diego and Brown and Caldwell. This document is governed by the specific scope of work authorized by County of San Diego; it is not intended to be relied upon by any other party except for regulatory authorities contemplated by the scope of work.

are both located in the same topographic zone (coastal, foothill, mountain) and major watershed unit (Upper San Luis Rey, Lower San Luis Rey, Upper San Diego River, Lower San Diego River, etc.).

Upon preliminary review of all available San Diego County rainfall records, Brown and Caldwell has identified 20 precipitation rain gauges for input to continuous simulation hydrologic models. The gauge locations were selected to provide adequate geographic coverage of the County. Specifically, gauges were distributed among major watersheds to provide coverage in coastal, inland valley, foothill and mountain areas of the County.

Gauge selection was further governed by minimum continuous simulation modeling requirements including the following:

- The selected precipitation gauge data set should be located near the project site to ensure that long-term rainfall records are similar to the anticipated rainfall patterns for the site. Thus, gauges were selected in proximity to areas planned for future development and redevelopment.
- Recording frequency for the gauge data set should be hourly (or more frequent).
- The gauge rainfall record should extend for the entire length of the record. Where the gauge record length is less than 35 years, then adjacent gauge records were used to extend the rainfall record to at least 35 years.
- Use of the most applicable long-term rainfall gauge data, as opposed to the scaling of rainfall patterns from Lindbergh Field, is required to account for the diverse rainfall patterns across San Diego County.

Precipitation gauges identified by Brown and Caldwell, summarized in the Table 1 below, all have recording frequencies of one hour and recording data ranges of at least 35 years.

TABLE 1 – Rainfall Station Summary

Station	Elevation	Watershed
Bonita	120	Sweetwater River
Encinitas	242	Between San Elijo Creek and San Marcos Creek ocean outfalls
Escondido	645	Escondido Creek
Fallbrook	675	San Luis Rey River (near ridge with Santa Margarita River watershed)
Fashion Valley	20	Lower San Diego River
Flinn Springs	880	San Diego River
Kearny Mesa	425	San Diego River (near ridge with San Clemente Canyon watershed)
La Mesa	420	San Diego River (near ridge with Chollas Creek watershed)
Lake Cuyamaca	4,590	Upper San Diego River
Lake Heneshaw	2,990	Upper San Luis Rey River
Lake Wohlford	1,490	Upper Escondido Creek
Lindbergh Field	Near Sea Level	Coastal – San Diego Bay
Lower Otay Reservoir	491	Otay River
Morena Dam	3,075	Upper Tijuana River
Oceanside	30	San Luis Rey River
Poway	440	Los Penasquitos Canyon

Ramona	1,450	Upper San Dieguito River
San Onofre	162	North County Coastal – Pacific Ocean
San Vicente Reservoir	663	San Diego River
Santee	300	San Diego River

Sources for data used in the preparation of rainfall gauges include the following:

- ALERT rainfall gauge information from the County of San Diego
- Historical (pre-1982) rainfall station information from the County of San Diego
- NOAA / National Climatic Data Center
- Western Regional Climate Center
- California Irrigation Management Information System
- California Data Exchange Center
- California Department of Forestry

Prior to the commencement of hydromodification flow control modeling to meet Interim Hydromodification Criteria for a project site, the project proponent should take the following steps to ensure use of the appropriate precipitation gauge data.

- For projects in the unincorporated areas of San Diego County, the project proponent should contact the appropriate Department of Public Works (DPW) Project Manager
- For projects located in other jurisdictions within San Diego County, the project proponent should contact the jurisdiction’s NPDES coordinator.

Brown and Caldwell has provided rainfall gauge information in a WDM format compatible with the HSPF hydrologic model. Upon request, the rainfall data may also be provided in formats compatible with HEC-HMS. This prepared rainfall station information is available on the *Project Clean Water* web site.

Upon completion of the Hydromodification Management Plan and implementation of final hydromodification criteria, the hydromodification flow control sizing calculator being developed by Brown and Caldwell will automate the rainfall gauge selection process. The information in this Technical Memorandum is subject to revision pending final review by the County of San Diego, NPDES Copermittees, and the Technical Advisory Committee.