

City of Newport Beach

Final Report



State Water Resources Control Board Agreement No. 01-079-550-4

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Cover Photo: Newport Boulevard Water Quality (Bioswale) Treatment Project taken after a rain event



ACKNOWLEDGEMENTS

The City of Newport Beach would like to give special recognition to the State Water Resources Control Board (SWRCB) and their Clean Beaches Initiative (CBI) Program making the funding available for the successful implementation of these projects.

In addition, these projects are the result of successful partnerships, collaboration, support and cooperation of the following agencies and organizations

The City of Newport Beach City Council and Staff

State Water Resources Control Board (SWRCB)

Santa Ana Regional Water Quality Control Board

Orange County Health Care Agency

County of Orange

County of Orange Water Quality Lab

Newport Dunes Waterfront Resort & Marina

Dr. Dave Campbell

West Technology Systems Inc.

Everest International Consultants Inc.

Geomatrix

CRG Labs

Orange County Sanitation District



EXECUTIVE SUMMARY

Under funding from Proposition 13, administered by the State Water Resources Control Board's (SWRCB) Clean Beaches Initiative (CBI), the City of Newport Beach (City) program to reduce AB411 posting of beaches has primarily focused on removal of bacteria from dry-weather runoff by:

- Installing storm drain diversions,
- Installing catch basin filters and screens, and
- Constructing a filtration bioswale.

These actions compliment the City's NPDES program that involves community education, inspection and enforcement of specific measures that reduce the source of bacteria to dry weather runoff.

The City believes that the projects undertaken on the CBI grant have borne fruit and have contributed to reducing the number of beach postings in the past three years (refer to Appendix C: AB411 Data). The City intends to continue its program to reduce bacterial loads into the Bay through source control programs, public education, and innovative approaches for removing bacteria from dry-weather flows.

Water Quality Postings:

- AB411 postings were reduced from 56 postings in 2000 to 30 postings in 2006
- Calendar year postings were reduced from 75 postings in 2000 to 38 postings in 2006

One of the greatest successes of this program was the removal of a long term/permanent (advisory) posting for poor water quality at 43rd St beach in Newport Bay. The posting had been in place since 1999 and was removed in November 2005.

Specific Projects Completed:

1. **Newport Dunes Storm Drain Diversions** – Four small storm drains discharging onto Newport Dunes Beach (the most popular swimming beach in Newport Bay) were plugged and the runoff diverted and used for irrigation. As a result algal blooms and AB 411 violations have decreased.
2. **Catch Basin Screens/Filters** – Catch Basin Screens/Filters were installed in catch basins near problematic beaches in 2001-2002. The screens are installed during the dry-weather season to keep trash, debris, sediment and other materials from entering the storm drain system and ultimately the waters of Newport Bay. The screens are keeping an estimated 125 cu ft of material out of the bay annually. The catch basin filters were installed as a pilot project using the latest technology (at the time) with the hopes of reducing bacteria inputs to



the bay. Unfortunately, testing results have indicated this Best Management Practice (bmp) [meaning the catch basin filters, not the catch basin screens] is not very effective, and the City and SWRCB have opted not to continue with this project. On the other hand, the City of Newport Beach has expanded the catch basin screen bmp program, and currently (using City funds) has installed screens in more than 375 catch basins. To summarize, the catch basin *filter* project has proven to be an ineffective bmp, however the catch basin *screen* project has proven to be a very effective bmp.

3. **Newport Island Circulation Test** – Pilot testing of two circulation/aeration devices, with the Oloid Unit offering very promising results. A formal report was submitted to the SWRCB documenting our findings. The City is currently working to address a couple of challenges before implementing a full scale project, such as, addressing residents concerns of noise, lighting and aesthetic issues.
4. **Newport Boulevard Water Quality (Bioswale) Treatment Project** – Design and construction of a bioswale to treat an estimated 30,000 gallons per day (gpd) of urban runoff (400 acre watershed) before entering Newport Bay. Preliminary results indicate a 75% removal of fecal indicator bacteria. Monitoring will begin in earnest after the plantings have established and removal of the temporary irrigation.
5. **Storm Drain Flow and Water Quality Monitoring Project** - The purpose of this study was to evaluate the relative impact of the five candidate storm drains to Lower Newport Bay, and to assist the City to select the most appropriate storm drain(s) for a dry weather storm drain flow diversion program. Flow data and water quality samples were collected for five storm drains selected by the City of Newport Beach. Flow data were collected continuously for the two-week period, while water quality samples were collected three times a day. In addition, water samples were also collected at the outfall locations for three of the five storm drains. The collected data were analyzed to estimate the indicator bacteria loading from each storm drain to Lower Newport Bay. The pollutant loadings were then used as input to a numerical model for the evaluation of the relative impact of each storm drain to Lower Newport Bay. The outcome of this study provided the City with a matrix listing how a particular storm drain impacts a particular beach—a very effective tool for helping City staff to prioritize any future storm drain to sewer diversions.

ACRONYMNS

AB411	Assembly Bill 411
BMD	Beach Mile Days
BMP	Best Management Practice
CBI	Clean Beaches Initiative
CEQA	California Environmental Quality Act
GPM	Gallons per Minute
GPD	Gallons per Day
MGD	Million Gallons per Day
O&M	Operation & Maintenance
OC	Orange County
OCHCA	Orange County Health Care Agency
OCSA	Orange County Sanitation District
QAPP	Quality Assurance Project Plan

SELECT TECHNICAL TERMS

AB411 – Assembly Bill which added section to the California Health & Safety Code to create bacteriological ocean water quality standards

Filter media – A bed of granular material which retains the solid particles by having a large surface area where the particles can be trapped

Turbidity – Cloudiness or haziness of water caused by individual particles that are generally invisible to the naked eye



TABLE OF CONTENTS

ACKNOWLEDGEMENTS i

EXECUTIVE SUMMARY ii

ACRONYMS & SELECT TECHNICAL TERMS iii

1 INTRODUCTION 1

 1.1 Background and Goals 1

 1.2 Scope of Work 2

2 SPECIFIC WORK TASKS 2

3 SPECIFIC PROJECTS 8

 3.1 Newport Dunes Storm Drain Diversions 8

 3.2 Catch Basin Screens / Filters 9

 3.3 Newport Island Circulation Pilot Test 10

 3.4 Newport Boulevard Water Quality Treatment Project 11

 3.5 Storm Drain Flow and WQ Monitoring Project 13

4 CONCLUSIONS 15

 4.1 Newport Dunes Storm Drain Diversions 15

 4.2 Catch Basin Screens / Filters 16

 4.3 Newport Island Circulation Pilot Test 17

 4.4 Newport Boulevard Water Quality Treatment Project 17

 4.5 Storm Drain Flow and WQ Monitoring Project 17

 4.6 **A** Look to the Future 18

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LIST OF TABLES

Table 2.1 Task Products and Schedule of Completion 7

Table 4.1 AB411 Violations Newport Dunes Swimming Area 16

LIST OF APPENDICES

- Appendix A Oloid Circulation Report
- Appendix B Storm Drain Diversion Study
- Appendix C AB 411 Data
- Appendix D Annual Summaries
- Appendix E Catch Basin Filters



1 INTRODUCTION

1.1 Background and Goals

Newport Bay is a water quality limited water body that is listed on the federal Clean Water Act's Section 303(d) List for sediment, nutrients, fecal indicator bacteria, and toxic pollutants. As a result of weekly testing (AB 411) done by the Orange County Health Care Agency at 35 different sites in Newport Bay and at twelve ocean sites (testing done by the Orange County Sanitation Agency), Newport Beach and Newport Bay had 28 beach postings, for a total of 38 days (8.1 Beach Mile Days) in 2005. Two swimming areas in the Bay accounted for a majority of the postings, meaning that high bacteria levels in the waters impaired the public's ability to swim in and enjoy these areas.

The Clean Beaches Initiative Grant Program began with the Budget Act of 2001. The Budget appropriated \$32.298 million from Proposition 13 to implement 38 different projects. The projects address postings and closures at California public beaches caused by bacterial contamination.

The intent of the projects and assessment performed under this grant is to reduce bacteria inputs from onshore sources and to increase die-off rates of on-water sources of bacteria so as to meet REC-1 standards in the Bay and along the shoreline. Based on the innovative studies and projects attempted by the City, the results have been very satisfactory, not only based on the significant reduction in beach mile day postings, but also in the City's understanding of what types of BMPs show promise for future improvements. Projects and assessments accomplished under this grant include:

Phase 1

- Part 1. Installing up to 65 devices in catch basin inlets that combine a screen with a filter ("catch basin combos") in the storm drain network draining into Newport Island's channels
- Part 2. Plugging four remaining storm drains at Newport Dunes and diverting these flows ("Dunes Diversions");
- Part 3. Studying, and if appropriate, installing devices on a pilot basis to increase circulation and aeration in Newport Dunes and Newport Island, with the potential of permanently installing selected devices in a later phase, if shown to be effective.

Phase 2:

- A. Designing and implementing a storm drain flow and water quality monitoring project.



- B. Designing and constructing a water quality treatment project at Arches Interchange (Old Newport Boulevard storm drain).

The Project will combine the resources of the State Water Resources Control Board (SWRCB) Clean Beaches Initiative (CBI) with the resources of the City of Newport Beach (municipality with jurisdiction), the County of Orange's Health Care Agency (water testing), and the County of Orange's Resources and Development Management Department (RDMD).

1.2 Scope of Work

The purpose of this Contract was to plan, design, and implement the Newport Beach CBI Bay/Beach Improvement Project. The Project includes these major components:

Design, install and operate:

- Stormdrain Diversions. The Project will design, construct, and implement up to four storm drain diversions in the following locations:
 - Newport Dunes (four small plug-and-pump diversions)
- Catch Basin Combos (combinations of a screen outside a catch basin inlet and filters behind the screen). Includes installing at least 65 catch basin combos at catch basin inlets.
- Circulation Pilot Test. Analyze, via field-testing and modeling (using the existing *RMA* model of Newport Bay), the reduction in bacteria (if any) when devices that aerate and circulate bay water are installed in Newport Dunes Swimming Lagoon and in the Newport Island Channel.
- Water Quality Treatment Project. The Project will design and construct a water quality treatment project in the Arches Interchange (Old Newport Boulevard storm drain).
- Storm drain flow and water quality monitoring project. The project includes a component to assess how effectively a diversion will improve water quality and reduce beach postings.

2 SPECIFIC WORK TASKS

Task 1: Project Management and Administration



1.1 Provide all technical and administrative services as needed for contract completion; monitor, supervise and review all work performed; and coordinate budgeting and scheduling to assure that the contract is completed within budget, on schedule, and in accordance with approved procedures, applicable laws, and regulations.

1.2 Ensure that the contract requirements are met through completion of quarterly status reports submitted to the Contract Manager by the 10th of the month following the end of the calendar quarter (March, June, September, and December) and through regular communication with the Contract Manager. The progress reports shall describe activities undertaken and accomplishments of each task during the quarter, milestones achieved, and any problems encountered in the performance of the work under this contract. The description of activities and accomplishments of each task during the quarter shall be in sufficient detail to provide a basis for payment of invoices and shall be translated into percent of task work completed for the purpose of calculating invoice amounts.

1.3 Disclosure Requirements - Include the following disclosure statement in any document, written report, or brochure prepared in whole or in part pursuant to this contract:

“Funding for this project has been provided in full or in part through a contract with the State Water Resources Control Board (SWRCB) pursuant to the Costa-Machado Water Act of 2000 (Proposition 13) and any amendments thereto for the implementation of California’s Clean Beaches Initiative. The contents of this document do not necessarily reflect the views and policies of the SWRCB, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.”

The Contractor shall include in each of its subcontracts for work under this contract a provision that incorporates the requirements stated within this subtask.

1.4 The Contractor and any of its subcontractors shall notify the Contract Manager at least ten (10) working days prior to any public or media event publicizing the accomplishments and/or results of this contract and provide the opportunity for attendance and participation by SWRCB representatives.

1.5 Complete a one-page contract summary form (form to be provided by the SWRCB) within three months of the contract execution.

1.6 Award subcontract(s) to appropriate organization(s) to perform tasks as outlined in this agreement. Document steps taken in soliciting and awarding the subcontract and submit them to the Contract Manager for review. Document all subcontractor activities in quarterly reports.



1.7 Every six months during the life of this contract, the Contractor shall develop and submit to their assigned SWRCB Program Analyst expenditure/invoice projections to enable funding to be available for payment of invoices.

1.8 At the completion of this project and prior to final payment, the Project Director shall fill out and provide a project survey form to the Contract Manager.

Task 2: Preliminary Design

2.1 Preliminary Newport Dunes Diversions Design. The Project Director shall oversee the preliminary design of the proposed diversions.

2.2 Preliminary Catch Basin Combo Designs. The Project Director shall oversee the preliminary plans to place at least 65 catch basin combos in areas impacted by high bacteria counts, including the West Newport storm drain network and the small watersheds that enter the Bay near Channel Place Park.

2.3 Circulation Improvement Studies and Pilot Project Plan. The Project Director shall oversee a consultant's design of the Circulation Improvement Studies and Pilot Project Plan that would show the types of devices proposed to be installed, the monitoring program post-installation, any water quality modeling, and that would estimate effectiveness measures of the tested devices.

2.4 Preliminary Water Quality Treatment project. The Project Director shall oversee the preliminary design of the water quality treatment project. In an effort to streamline design for this project, preliminary and final design will be rolled into one task and the budget for final design will include preliminary design. Also, the storm drain monitoring project (Task 2.5) includes some preliminary design work for this project.

2.5 Storm Drain Monitoring – The Project Director shall oversee the selection of a consultant, to implement a storm drain monitoring program designed to characterize candidate storm drains within the Newport Bay watershed. Only a portion of this work applies to this contract.

Task 3: Permits and CEQA Documents

3.1. The Project Director will prepare applicable California Environmental Quality Act (CEQA) document associated with the Project (found to be exempt under one or more categorical exemptions) and record with the Orange County Clerk-Recorder's office.

3.2. The Project Director will secure all required permits for project work. No work that is subject to permitting shall proceed under this contract until documents that satisfy the permitting process(es) are received by the Contract Manager. Permits may include (if deemed to be applicable by permitting agencies):



- a. US Army Corps of Engineers Section 404 Permit. Where any part of the Project would require dredging and filling of wetlands/waters of the United States, the contractor will secure a Corps Section 404 Permit.
- b. US Fish and Wildlife Section 7 Permit. If any part of the Project would result in an impact to any federally listed species, the contractor will prepare a request for consultation under Section 7 of the Endangered Species Act with the US Fish and Wildlife Service (US F&WS).
- c. California Regional Water Quality Control Board, Santa Ana Region, Section 401 Permit. If determined by Board staff to be applicable, the contractor will prepare and submit a request for a waiver under Section 401 of the Clean Water Act. Also, if applicable, prepare and submit a Notice of Construction Activity (NOCA) to conduct work under the City's

NPDES General stormwater permit. Prepare and submit any applicable stormwater pollution prevention plan associated with the latter permit.

- d. California Department of Fish and Game Streambed Alteration Agreement. *If found to be applicable, prepare and submit a Streambed Alteration Agreement.*
- e. California Coastal Commission Coastal Development Permit. If found to be applicable, after receiving an "approval in concept" (AIC) from the City of Newport Beach, prepare and submit application for a Coastal Development Permit.
- f. City of Newport Beach Approval in Concept (AIC) and Encroachment Permit. If found to be applicable, prepare and submit a request for an AIC (see above) and an Encroachment Permit from the City of Newport Beach for any construction activity on publicly-owned land or right-of-way.
- g. Caltrans Encroachment Permit & Maintenance Agreement. Construction of the water quality treatment project will likely require an Encroachment Permit and a Maintenance Agreement from Caltrans.

- 3.3 The Project Director will provide liaison with the above-listed agencies to answer questions, coordinate field visits, secure permits, and incorporate any mitigation measures as outlined in the permit conditions.

Task 4: Final Project Engineering

- 4.1 Prepare final documents for Newport Dunes Diversions.



- 4.2 Prepare a final list of all locations to install the catch basin “combos”, and include vendor documentation.
- 4.3 Implement the Circulation Improvement Study and the Pilot Project Plan.
- 4.4 Final Design: Contractor or consultant(s) will review the existing preliminary design work for the Water Quality Treatment Project, and prepare construction documents.
- 4.5 Implement the Storm Drain Monitoring Program in accordance with the RFP (Task 2.5), and City of Newport Beach Project Execution Guidelines.
- 4.6 Preparation of Contract Documents/Authorize Contract to be Let for Bid. Prepare contract documents (construction plans, specifications, and final cost estimate) for the Project(s) (Circulation Improvement Study, the Water Quality Treatment Project, and the Storm Drain Monitoring Project) in accordance with City of Newport Beach standards. Let the Contract for bid per the City’s standards.
- 4.7 Assistance with Bidding/Recommendation to City Council. Provide assistance to the City during the bidding period to answer questions, preparing any addenda to the Contract, and preparing a staff report with recommendation to the City Council on the award of the Project. Council reports will be prepared for the projects identified in Task 4.6.

Task 5: Project Construction/Project Implementation

- 5.1 Construct the Newport Dunes Diversion diversions in accordance with the final documents prepared in Task 4.1. Deliverables will include photo documentation.
- 5.2 Catch Basin “Combos” Installation – City staff will install the debris screens on the front face of the catch basin. The filter manufacturer will install the filter(s) in the catch basin. Deliverables will include photo documentation.
- 5.3 Circulation Improvement Studies and Pilot Project Plan – Prepare final report based on the approved preliminary design.
- 5.4 Water Quality Treatment Project Construction – Construct Water Quality Treatment Project in accordance with the Final Construction documents prepared in Task 4.4. Submit photo documentation of completed project.
Storm Drain Monitoring Program – Prepare final report based on the approved preliminary design.

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Table 2.1 below outlines the Tasks and Schedule of Completion for this Project

Table 2.1: Task Products and Schedule of Completion

Task	Subtask	Deliverable	Completion Date
1	Project Management and Administration		
	1.2	Quarterly Progress Reports	March 2002/quarterly
	1.5	Contract Summary Form	March, 2002
	1.6	Subcontractor Documentation	June 2005
	1.7	Expenditure / Invoice Projections	July 2002/semi-annually thereafter
	1.8	Project Survey Form	March 2007
2	Preliminary Design		
	2.1	Preliminary Dunes Diversion Design	Feb 2002
	2.2	Preliminary Catch Basin Combo Designs	May, 2002
	2.3	Circulation Improvement Studies and Pilot Project Plan	March 2003
	2.5	Storm Drain Monitoring RFP	Apr 2004
3	Permits and CEQA Documents		
	3.1	CEQA Documentation	March 2006
	3.2	Applicable Permits	Mar 2006
4	Final Project Engineering		
	4.1	Final Documents – Newport Dunes Diversions	May 2002
	4.2	Final Catch Basin “Combos” Locations & Literature	Dec 2003
	4.4	Final Construction Documents – Water Quality Treatment Project	Aug 2005
	4.6	Contract Document(s)	Aug 2005
	4.7	Council Staff Reports	Aug 2005
5	Project Construction/Project		
	5.1	Photo Documentation – Newport Dunes Diversions	Aug 2002
	5.2	Photo Documentation – Catch Basin Project	Dec 2003
	5.3	Final Report – Circulation Improvement Project	Aug 2003
	5.4	As-built drawings of Water Quality Treatment Project and photo documentation	Sept 2006
	5.5	Final Report – Storm Drain Monitoring Program	Oct 2004
6	Quality Assurance Project Plan		
	6.1	Approved Revised QAPP	Mar 2006
7	Monitoring and Reporting Plan and Draft and Final Reports		
	7.1	Approved Revised Monitoring and Reporting Plan	Mar 2006
	7.2	Draft Final Report	Feb 2007
	7.3	Final Report	Mar 2007



3 SPECIFIC PROJECTS

3.1 Newport Dunes Storm Drain Diversions

Project Name: Newport Dunes Storm Drain Diversions



Newport Dunes Public Swimming Area

Project Description:

- Storm drain Diversions – Four storm drain diversions are in place diverting contaminated urban runoff flows from entering the public swimming area within Newport Dunes. These four storm drains carry storm flows, urban runoff and contaminants from a watershed area that includes the Newport Dunes Resort, the Marina and adjacent parking lots to outfalls located directly into the Newport Dunes swimming area. These diversions are unique as they incorporate cost effectiveness and water conservation (recycling) into their design. A rather simple but effective solution consisting of four inflatable plugs inserted into the four storm drains, inflated (stopping the urban runoff from reaching the swimming lagoon), and a sump pump is added to each catch basin and the diverted flows are pumped out and used for irrigation (water conservation benefit). The plugs are deflated if there is a chance of rain (to avoid a potential flooding hazard) and removed during the winter rainy season.

Project Cost: \$5,000

CBI Proposition 13 Funding: \$5,000



3.2 Catch Basin Screens / Filters

Project Name: Catch Basin Screens / Filters (Combos)



Catch Basin Screens



Catch Basin Filters

Project Description: This Project combines CBI funds along with matching funds and resources of the City of Newport Beach to install catch basin inlet screens and filters (catch basin combos) – The City has installed catch basin combos in approximately 175 catch basins. The screens are installed during dry-weather season to keep trash, debris, sediment and other materials from entering the storm drain system and ultimately the waters of Newport Bay. In addition, catch basin filters are installed to filter urban runoff thereby helping to prevent organics, hydrocarbons, and bacteria from entering the storm drain system, refer to Appendix C for AB411 data.

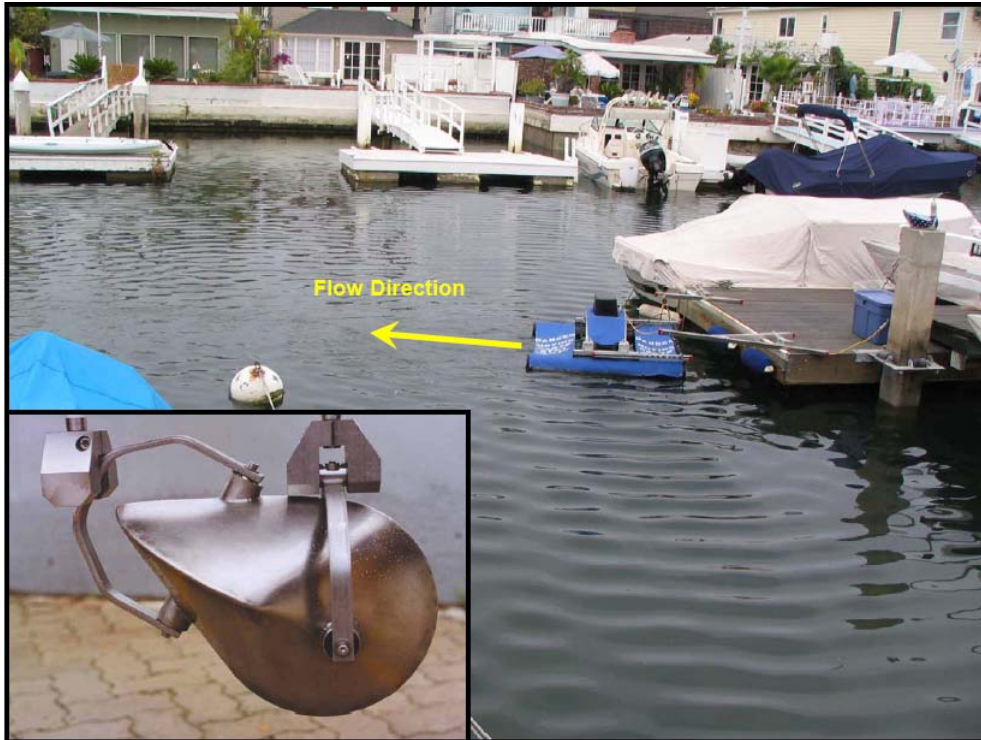
Project Cost: \$175,000 **CBI Proposition 13 Funding:** \$145,000

Project Funding Sources: State Water Resources Control Board (SWRCB), City of Newport Beach



3.3 Newport Island and Newport Dunes Circulation Pilot Tests

Project Name: Newport Island and Newport Dunes Circulation Pilot Tests



**Pilot Testing the “Oloid” Circulation Device
Newport Island Channels**

Project Description: Hydrodynamic and water quality modeling was conducted to evaluate the relative performance of using 10, 15, 20 and 25 Oloid units to improve water circulation and water quality at Newport Island Channels. Most of the evaluation was based on the original Oloid design with an estimated flow rate of 1.5 MGD. The model results showed that the use of adequate number of Oloid units can substantially improve water circulation at Newport Island Channels compared to existing condition. Furthermore, the results indicate that the optimum number of Oloid units for the study area will be between 10 and 15. The use of more than 15 Oloid units will only produce minor additional improvement. In addition to evaluate the optimal number of units to be used at Newport Island Channels, limited tests were conducted to evaluate the orientation and spatial distribution of the Oloid units. The results show that it is more



effective to deploy the Oloid units in a way to generate a counter-clockwise flow within Newport Island Channels. In addition, it was found that for the same number of Oloid units, it was more effective to deploy most of the units towards the back end of the Newport Island Channels instead of distributed the units uniformly throughout the channels. Finally, additional evaluations were performed for the use of 10 and 15 modified Oloid units (higher flow rate) for the Newport Island Channels. The modified Oloid unit with a higher flow rate was found to be very effective in improving water circulation in Newport Island Channels.

City staff has recommended installation of the circulation units at Newport Islands Channels. However, a few residents have concerns about noise, lighting, impact on property values and impact on navigation. Staff thinks these concerns can be addressed adequately, however, as the channels appear to be clear of fecal indicator bacteria at this time, installation of the circulation units has been delayed.

Project Cost: \$50,000 **CBI Proposition 13 Funding:** \$25,000

Project Funding Sources: State Water Resources Control Board (SWRCB), City of Newport Beach

3.4 Newport Boulevard Water Quality Treatment Project

Project Name: Arches Bioswale Project



Arches Bioswale (pre-construction)



Arches Bioswale (post-construction)



Project Description: The third project for implementation with our CBI grant is the bioswale construction along Newport Boulevard. The V-Ditch receives an estimated 30,000 gpd of urban runoff and the functioning bioswale filters urban runoff before entering Newport Bay. Based on flow and water quality monitoring at this location, it was determined that the high measured bacterial loads could be contributing to beach advisory posting at the Turning Basin as well as within the Newport Island Channels. While source control within the tributary watershed is the ultimate goal, the City saw an opportunity to redesign and reconstruct a flood conveyance channel ideal for treatment for bacteria filtration in dry weather flows. Therefore, a filtration bioswale was designed to replace a 300-foot V-ditch along Newport Boulevard. The City worked with the site owner, Caltrans, to design the bioswale such that the flood conveyance function of the channel would be maintained. The graded channel includes a bed composed of layered sand, gravel and river rock. Each layer is separated by geo-textile fabric to increase the efficiency and stability of the engineered filter. The finished bioswale was then planted with native plants and hydro-seeded with a native seed mix.

Project Cost: \$350,000 **CBI Proposition 13 Funding:** \$300,000

Project Funding Sources: State Water Resources Control Board, City of Newport Beach



3.5 Storm Drain Flow and WQ Monitoring Project

Project Name: Storm Drain Flow and WQ Monitoring Project



Newport Bay Diagram listing Candidate Storm Drains and AB 411 Testing Sites

Project Description: From August 12 to August 25, 2004, flow data and water quality samples were collected for five storm drains selected by the City of Newport Beach. Flow data were collected continuously for the two-week period, while water quality samples were collected three times a day at around 7:30 am, noon, and 2:30 pm. In addition, water samples were also collected at the outfall locations for three of the five storm drains. The collected data were analyzed to estimate the indicator bacteria loading from each storm drain to Lower Newport Bay. The pollutant loadings were then used as input to a numerical model for the evaluation of the relative impact of each storm drain to Lower Newport Bay. Major findings for this Study are summarized here, and recommendations are provided in the next section.



Flow

The two-week flow monitoring results showed that the Bayside Drive storm drain had the highest flow (about 500,000 gpd), followed by El Paseo Drive (about 80,000 gpd), while Dover Drive has the least flow (about 10,000 gpd). All the storm drains with the exception of Polaris Drive had high peak flows in early morning between 1 a.m. and 6 a.m. Flow from the Polaris Drive storm drain in general was relatively uniform with sporadic high peaks. The regular occurring high flows in the morning at most of the storm drains may be associated with automatic sprinkler systems that have been set to turn on at a specific time.

Indicator Bacteria

Indicative bacteria concentrations for Dover Drive, Polaris Drive, and El Paseo Drive storm drains were similar and higher than those for Arches V-Ditch and Bayside Drive storm drains. At the outfall locations, indicator bacteria concentrations were one to two orders of magnitude lower than at their corresponding storm drains. With the exception of Dover Drive, the morning samples for all the storm drains have higher indicator bacteria concentrations compared to the noon and afternoon samples.

Relative Impact

The numerical model results showed that among the five storm drains, bacteria discharges from the Dover and Bayside Drive storm drains will have the least relative impact to Lower Newport Bay. The Arches V-Ditch had the most impact to Newport Island Channels, the Polaris Drive storm drain had the greatest impact to Newport Dunes, and the El Paseo Drive storm drain had the most bay-wide impacts.

Recommendations

The purpose of this study was to evaluate the relative impact of the five candidate storm drains to Lower Newport Bay, and to assist the City to select the most appropriate storm drain(s) for a dry weather storm drain flow diversion program. The storm drain evaluation showed that among the five candidate storm drains, the Dover Drive and Bayside Drive storm drains have the least impact to Lower Newport Bay, thus are not recommended for further consideration. The storm drain evaluation did not show that a single storm drain has the greatest impact to the entire bay. Instead, the results showed that the Arches V-Ditch has the greatest impact to Newport Island Channels; the Polaris Drive storm drain has the greatest impact to Newport Dunes and the center portion of the bay; and the El Paseo Drive storm drain has the greatest impact to the eastern portion of the bay around Balboa Island and the harbor entrance. Final selection would require considering the:

- Relative importance of the different impacted areas,
- Cost of installing a low flow diversion system,
- Capacity of nearby sewer lines to handle the diverted flow, and



- Limitations imposed by the Orange County Sanitation District to accept the diverted flow.

In addition to considering a storm drain flow diversion program, it was recommended that the City identify the sources for the early morning high peak flows that occur at four of the five monitored storm drains. Reducing these early morning peak flows could be a more cost effective solution for reducing bacteria loading to Lower Newport Bay compared to installing a low flow diversion system.

Based on what was learned from the two-week monitoring program, it was also recommended that for a future monitoring program, the flow monitoring program should start about a week prior to the water quality sampling program so that the water quality sampling schedule can be better designed to match with the flow characteristics such as collecting water samples during peak flow. The monitoring results also indicate that storm drains with highest concentration may not have the highest flow or indicator bacteria loading, hence, any future storm drain monitoring should collect both flow and water quality data to provide the necessary bacteria loading information.

Lastly, the numerical model grid used for this study is based on a grid developed for prior studies for the City and does not include the Upper Newport Bay. The numerical modeling results indicate that not including Upper Newport Bay may have impacted the model results for Polaris Drive. Future use of numerical modeling for similar studies in portions north of the Pacific Coast Highway Bridge should include Upper Newport Bay in the model.

Project Cost: \$85,000 **CBI Proposition 13 Funding:** \$25,000

Project Funding Sources: State Water Resources Control Board, City of Newport Beach

4 CONCLUSIONS AND RESULTS

4.1 Newport Dunes Storm Drain Diversions

The Newport Dunes storm drain diversions were a big factor in reducing algal blooms and beach postings within the public swimming area of Newport Dunes. Postings in the bay were reduced from 56 in 2000 to 30 in 2006 (AB411 Period), refer Appendix C for more details.

Also, please refer to **Table 4.1** showing AB411 violations by year specifically for the four monitoring locations with [in \(?\)](#) the Newport Dunes swimming area.



Table 4.1: AB411 Violations Newport Dunes Swimming Area

Year	# of AB411 Violations (Postings)
2000	27
2001	24
2002	7
2003	13
2004	7
2005	6
2006	13

Please add beach mile days to the table if you can deduce from the data

As noted in the above table, the # of AB411 violations decreased significantly starting in 2002 (the year the four diversions were implemented).

Also as noted above in section 3.1, these ‘diversions’ are very cost effective and include a water conservation (recycling) component.

4.2 Catch Basin Screens / Filters

The catch basin screens and filters capture (and prevent) an estimated 125 cu. ft. of debris from entering the waters of Newport Bay annually. However, the City’s General Services Department has found that maintaining the catch basin filters was time consuming and overly difficult. If filters are not kept clear of leaves and other materials, the runoff does not run through the filters but washes over the filter top directly into the catch basin. Further, the filters are only effective for trash and hydrocarbons; they are not effective for filtering or deactivating bacteria. In addition, the City experienced multiple filter failures, and the filters were removed from the catch basins as documented in the below photos and site inspection with SWRCB staff on June 28, 2005. Refer to “Appendix E: Catch Basin Filters” for details.





Failed AbTech Catch Basin Filters

Following the site inspection and review of the monitoring data, the City of Newport Beach and SWRCB staff agreed not to replace the failed filters and further relieve the City of any responsibility to maintain and/or replace these filters in the future.

The catch basin screens on the other hand are a very effective BMP for removing trash and debris and are highly recommended by City staff. The City has greatly expanded this program and to date has installed over 375 catch basin screens (using City funds).

4.3 Newport Island Circulation Pilot Test

Numerical tests show that increased circulation will significantly reduce residence times in the Newport Island Channels and Newport Dunes Lagoon which in turn would reduce pollutant concentration. Per modeling of mechanical mixing by the Oloid circulation device, residence times in the southwest sector of the Newport Dunes Lagoon decreased from 30 days to 10 days for a greater than 50 percent reduction in pollutant concentrations. However, implementation of a circulation device has met its challenges from the residents who are concerned with potential noise and aesthetics issues. The next step for City staff is to conduct more community outreach and address these issues. The City is still hopeful to implement a circulation project in the future.

4.4 Newport Boulevard Water Quality Treatment Project (Bioswale)

Preliminary testing indicates that the bioswale removes 75 percent of fecal indicator bacteria. Once the plantings have taken root, the temporary irrigation system will be dismantled and a more rigorous monitoring program in accordance with the project QAPP will occur to test the effectiveness of the bioswale. Water Quality monitoring data findings and results will be interpreted and forwarded to the SWRCB once obtained.

4.5 Storm Drain Flow and WQ Monitoring Project

The purpose of this study was to evaluate the relative impact of the five candidate storm drains to Lower Newport Bay, and to assist the City to select the most appropriate storm drain(s) for a dry weather storm drain flow diversion program. The storm drain evaluation showed that among the five candidate storm drains, the Dover Drive and Bayside Drive storm drains have the least impact to Lower Newport Bay, thus are not recommended for further consideration. The storm drain evaluation did not show that a single storm drain has the greatest impact to the entire bay. Instead, the results showed that the Arches V-Ditch has the greatest impact to Newport Island Channels; the Polaris Drive storm drain has the greatest impact to Newport Dunes and the center portion of the bay;



and the El Paseo Drive storm drain has the greatest impact to the eastern portion of the bay around Balboa Island and the harbor entrance. Final selection would require considering the:

- Relative importance of the different impacted areas,
- Cost of installing a low flow diversion system,
- Capacity of nearby sewer lines to handle the diverted flow, and
- Limitations imposed by the Orange County Sanitation District to accept the diverted flow.

The outcome of this study provided the City with a matrix listing how a particular storm drain impacts a particular beach—a very effective tool for helping City staff to prioritize any future storm drain to sewer diversion.

If you have the data and can interpret, please add a AB411 Summary table of annual postings: include year, postings, days & BMD's for Newport bay, Beach, and slough – just like table 4.1 with BMD's

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4.6 A Look to the Future

Next Step's for the City of Newport Beach and our stakeholders/partners will include the following:

1. Continue to look for new BMPs and expand on the successes of our current BMPs to further reduce AB411 postings within Newport Bay, Newport Slough and Newport Beach. For example, the City is already expanding our catch basin screen program as this BMPs has proven very effective. Other City on-going water quality improvement related projects include:
 - Installation of Special Water Quality Enforcement/Informational Signs explaining to the public the consequences of illegal discharges and water quality violations.
 - Additional street sweeping, including implementation of a new alley sweeping program.
 - Improved fertilizer and pest management practices in City Parks.
 - Upgrading and retrofitting City irrigation systems, including the installation of ET irrigation controllers, and
 - More dog bag dispensers.
2. Previously, four areas of the City had long term postings (warning signs) in place alerting the public of possible elevated bacteria levels associated with impacts from urban runoff. Thanks largely to the projects implemented as part of this grant project (and other City sponsored projects), two of the long term postings have been removed. The City Council and City staff will be working hard to implement projects with the goal of removing these last long term postings.



Long Term Urban Runoff Warning Signs

These warning signs are still in place at two locations within the City; 33rd St Channel and Harbor Marina. As mentioned above, these signs have been removed from 38th St Beach and 43rd Street Beach. [Tab over](#)

3. Another goal for the City of Newport Beach is to work with the SWRCB to ensure proper controls are in place to protect the two ASBS's within our City; the Newport Beach Marine Life Refuge and the Irvine Coast Marine Life Refuge.