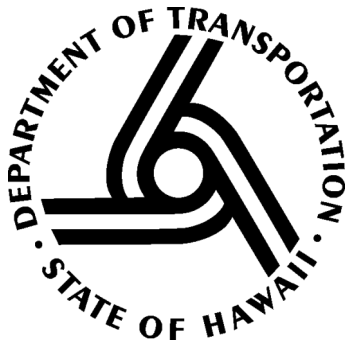




Action Plan to Address Erosional Outfalls



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STATE OF HAWAII DEPARTMENT OF TRANSPORTATION

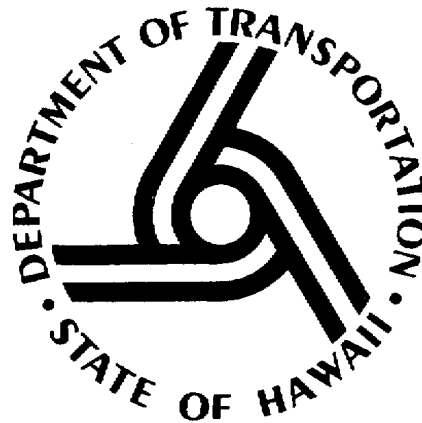
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Hawaii State Department of Transportation
Highways Division, Oahu District
Storm Water Management Program
NPDES Permit No. HI S000001
April 2015

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Action Plan to Address Erosional Outfalls

**State of Hawaii Department of Transportation
Highways Division, Oahu District**



April 2015
Version: Final

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Record of Revision

Revision No.	Revision Date	Description	Sections Affected
Original Document	October 2014	Original	N/A
1	February 2015	Formatting	All
2	April 2015	Draft Finalized. Date changed	All

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ACRONYMS AND ABBREVIATIONS

BMP	Best Management Practice
CDF	Control Density Fill
CMP	Corrugated Metal Pipe
CRM	Concrete Rubble Masonry
DOH	State of Hawaii Department of Health
DOT-HWYS	State of Hawaii Department of Transportation, Highways Division, Oahu District
MP	Mile Post
MS4	Municipal Separate Storm Sewer System
MS4 Permit	DOT-HWYS' NPDES Permit No. HI S000001
NPDES	National Pollutant Discharge Elimination System
PID	Point Identification Number
ROW	Right-of-Way
TMDL	Total Maximum Daily Load

1. INTRODUCTION

As required by Part D.1.f.(3).(iv) of the State of Hawaii Department of Transportation Highways Division, Oahu District's (DOT-HWYS') National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. HI S000001, (hereinafter referred to as "MS4 Permit"), DOT-HWYS has developed the following Action Plan to Address Erosion at its Storm Drain System Outlets (Erosional Outfalls). The MS4 Permit requirements are as follows:

Permit Requirements - Erosion Control D.1.f.(3).(iv)

"Provide the DOH with an Action Plan to address erosion at its storm drain system outlets with significant potential for water quality impacts to be completed within one (1) year of the effective date of this permit, which shall identify outfalls to be addressed, explanation on the basis for their selection and an implementation schedule. The implementation schedule shall cover a five (5) year period. A status report on implementation of the plan shall be included in the Annual Report. The Permittee shall install velocity dissipators or other BMPs to reduce erosion at locations identified by the Islandwide Retrofit Study or through its periodic required inspections. The Action Plan may include, but not be limited to projects in compliance with any TMDL I&M Plan."

2. SELECTION OF EROSIONAL OUTFALL REPAIR SITES

The purpose of the Action Plan to address Erosional Outfalls is to reduce erosion at DOT-HWYS' MS4 outfalls on the island of Oahu that have the significant potential for water quality impacts by implementing appropriate and cost-effective outfall repairs. Potential erosional outfall repair sites were selected through the review of previous MS4 studies and from data collected during routine MS4 monitoring and maintenance activities. The following criteria were used to determine final site selections for the action plan's five year implementation schedule:

1. Confirmed as an outfall from DOT-HWYS' MS4;
2. Classified as having significant potential for water quality impacts:
 - Erosion issues caused by discharge at outfall,
 - Evidence of sediment transport to downstream receiving waters,
 - Inadequate natural or man-made storm water treatment in flow path to receiving water.
3. Located within DOT-HWYS' ROW, or known to have an access easement, and have readily available construction and maintenance access.

Sites that are located in a TMDL, Consent Decree or CWA Section 303(d) watershed were given priority; however, this was not a required criterion.

3. SUMMARY OF EROSIONAL OUTFALL REPAIR SITES

Five erosional outfalls were identified for proposed remediation and/or reconstruction within the required five year implementation period. The selected outfalls include three corrugated metal pipes (CMPs), ranging from 24 to 42 inches in diameter, a concrete rubble masonry (CRM) spillway, and an open channel concrete spillway. **Table 1** provides a summary of proposed outfall repair sites along with their five-year implementation schedule. The implementation year is the year in which the proposed outfall repair is scheduled to be completed; however, this schedule is subject to change due to funding availability, permitting delays, or other unforeseen circumstances. Changes to the implementation schedule will be provided in the Annual Report. A detailed description of each proposed erosional outfall repair site is provided in **Appendix A**.

Table 1. Proposed Erosional Outfall Repair Sites and Implementation Schedule

Erosional Outfall Site	Outfall PID	Outfall Type	Receiving Waterbody	Watershed	Implementation Year
1	300350	36" CMP	Kawainui Stream	Kawainui	2014
2	302311	42" CMP	Aiea Stream	Aiea	2015
3	302481	CRM Spillway	Halawa Stream	Halawa	2016
4	301161	24" CMP	Kalaepulu Stream	Kawainui	2017
5	301782	Concrete Open Channel	Waimalu Stream	Waimalu	2018

Action Plan to Address Erosional Outfalls

APPENDIX A: PROPOSED EROSIONAL OUTFALL REPAIR SITES

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Erosional Outfall Site 1

Associated PID: 300350

Receiving Water Body: Kawainui Stream

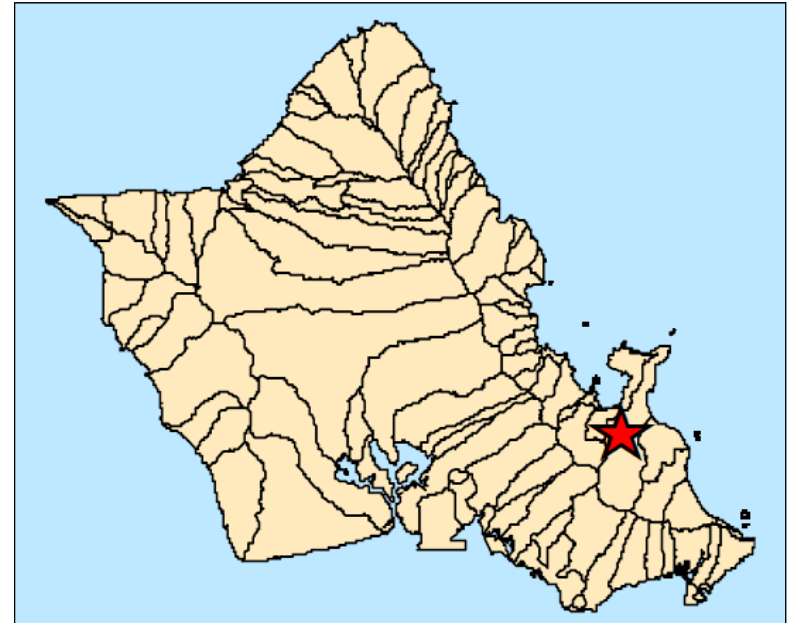
Outfall Type: 36" CMP (Corrugated Metal Pipe)

Outfall Description:

PID 300350 is an outfall for several catch basins that collect storm water along the H-3 Freeway near Kaneohe. The existing CRM headwall and apron is severely undercut and there are significant signs of erosion and sediment transport downstream of the outfall location.

Proposed Remediation/Repair:

New concrete headwall and riprap apron.



Location Map



Photo 1: Undercut headwall and apron



Photo 2: Outfall erosion

Erosional Outfall Site 2

Associated PID: 302311

Receiving Water Body: Aiea Stream

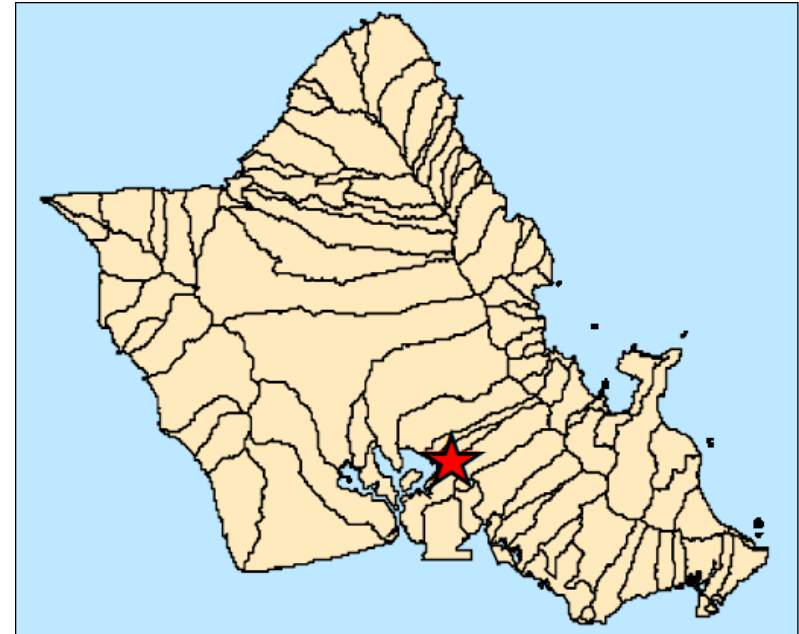
Outfall Type: 42" CMP

Outfall Description:

PID 302311 is an outfall that drains a network of several catch basins that collect storm water from the H-1 Freeway in Aiea. The CMP is corroded and there is significant erosion below the outfall, which is located directly on the bank of Aiea Stream.

Proposed Remediation/Repair:

CMP pipe repair and new riprap apron.



Location Map



Photo 1: Corroded CMP outfall



Photo 2: Outfall stream bank erosion

Erosional Outfall Site 3

Associated PID: 302481

Receiving Water Body: Halawa Stream

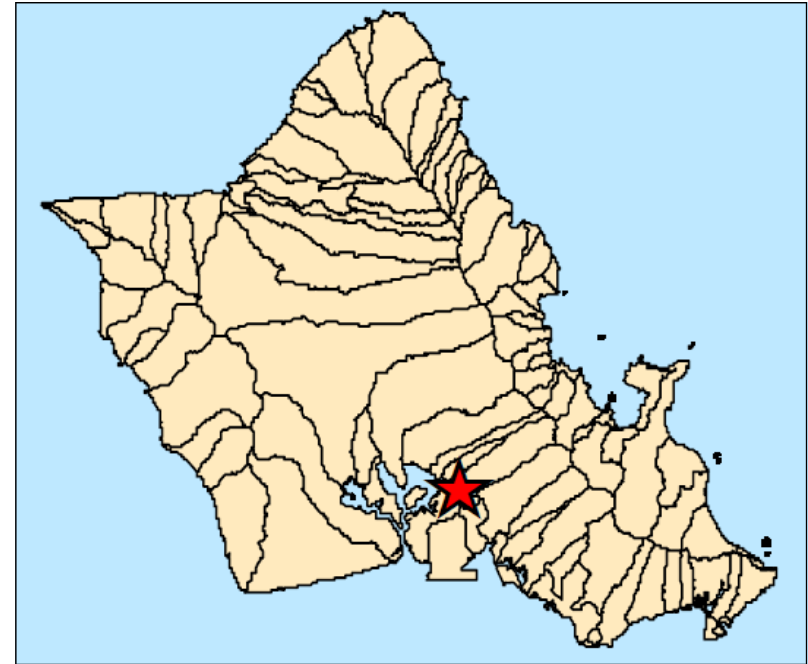
Outfall Type: Concrete Rubble Masonry (CRM) Spillway

Outfall Description:

PID 302481 is a CRM spillway outfall that drains the shoulder of the H-1 Freeway directly onto the concrete lined stream bank of Halawa Stream. A gap has formed between the end of the spillway and the stream bank allowing storm water to erode sediment from the area behind the concrete stream channel liner.

Proposed Remediation/Repair:

Control Density Fill (CDF) or epoxy behind eroded concrete lined stream bank and re-connect outfall apron to concrete stream bank.



Location Map



Photo 1: CRM spillway to concrete lined channel



Photo 2: Eroded area behind concrete liner

Erosional Outfall Site 4

Associated PID: 301161

Receiving Water Body: Kalaepulu Stream

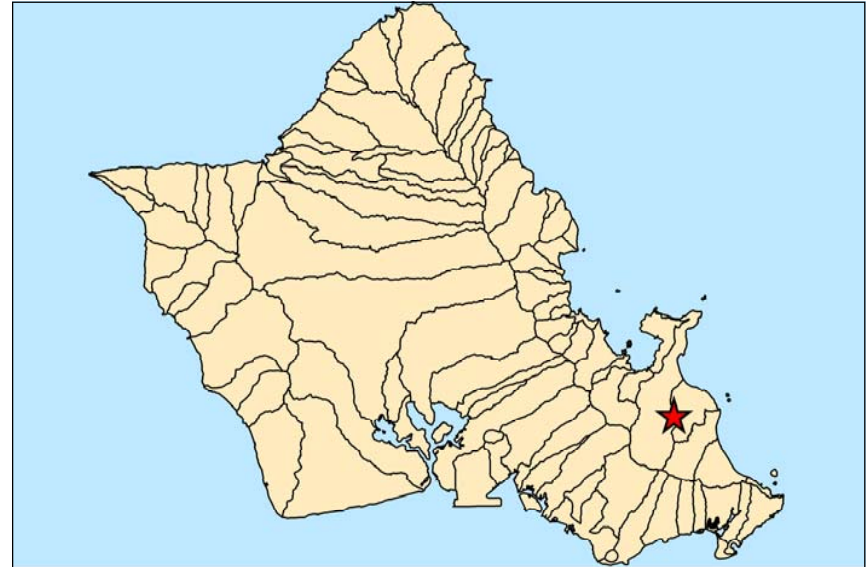
Outfall Type: 24" CMP

Outfall Description:

PID 301161 is a 24" CMP outfall that receives storm water flow from open channels and catch basins located along Kalanianaʻole Highway near Kailua. The CMP is severely undermined and collapsing and there is significant erosion downstream of the outfall.

Proposed Remediation/Repair:

New concrete headwall and riprap apron.



Location Map



Photo 1: Pipe undermined due to erosion



Photo 2: Outfall erosion

Erosional Outfall Site 5

Associated PID: 301782

Receiving Water Body: Waimalu Stream

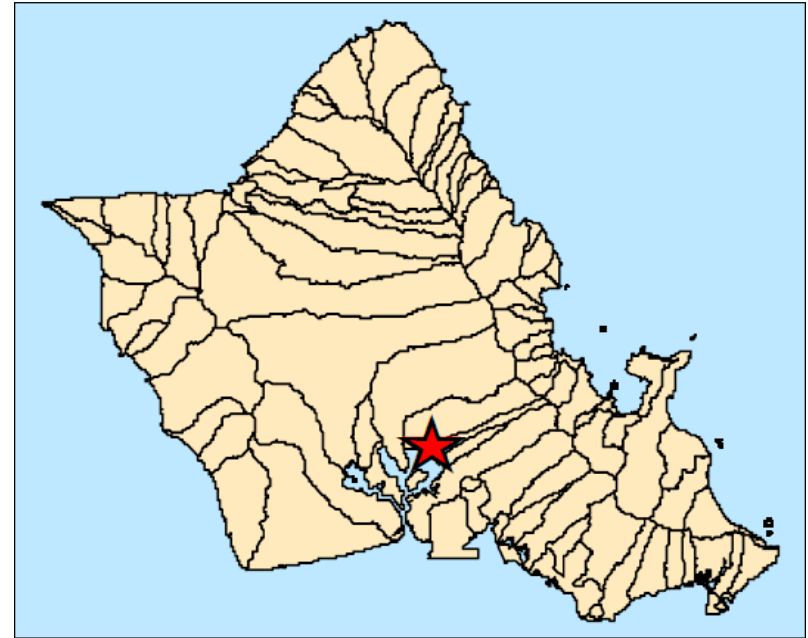
Outfall Type: Concrete Open Channel

Outfall Description:

PID 301782 is a concrete open channel outfall that receives storm water runoff from catch basins and open channels located along the H-1 Freeway near Moanalua Road. The concrete channel is breaking apart in several locations and there is significant erosion at the outfall with sedimentation downstream of the outfall.

Proposed Remediation/Repair:

Repair of concrete channel and outfall stabilization.



Location Map



Photo 1: Failing concrete liner at outfall



Photo 2: Erosion at outfall