



Road and Bridge Rehabilitation Loubiere to Bagatelle Road Project Phase 1: Loubiere to Grand Bay

EWMP - Extreme Weather Management Plan

February 2022

Mott MacDonald
Mott MacDonald House
8-10 Sydenham Road
Croydon CR0 2EE
United Kingdom

T +44 (0)20 8774 2000
mottmac.com

Road and Bridge Rehabilitation Loubiere to Bagatelle Road Project Phase 1: Loubiere to Grand Bay

EWMP - Extreme Weather Management Plan

February 2022

Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
A	03/10/2018	P Keane	C Probert C Williams	P.Phipps	First Issue
B	16/12/2021	T Hickson	C Probert	A Burton	Second issue (updated to reflect Variation 004)
C	16/02/2022	T Hickson	C Probert	A Burton	Third issue (client comments)

Document reference: 100376135 | 023 | C | 100376135-RPT-023-C

Information class: Standard

This document is issued for the party which commissioned it and for specific purposes connected with the above-captioned project only. It should not be relied upon by any other party or used for any other purpose.

We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

This document contains confidential information and proprietary intellectual property. It should not be shown to other parties without consent from us and from the party which commissioned it.

Contents

1	Introduction	1
1.1	Purpose	1
1.1	Project Background	1
1.2	EWMP Aim	2
2	Extreme Weather Management Plan	3
2.1	Overview	3
2.2	Pre-construction Planning	3
2.2.1	Extreme Weather Identification	3
2.2.2	Risk Identification and Mitigation	4
2.2.3	Rectification and Recovery	5
3	References	6

1 Introduction

1.1 Purpose

The island of Dominica is situated in the volcanically active Lesser Antilles chain, located on the eastern margin of the Caribbean Sea. Owing to its geological setting and its tropical maritime climate, it is vulnerable to volcanic eruptions, earthquakes, hurricanes, high rainfall, tsunamis, landslides, and river scour. The island is the youngest in the Lesser Antilles and is still being formed by geothermal-volcanic activity. There are currently several centres of volcanic activity recognised on the island, with a significant concentration of these in the south of the island close to the Loubiere to Bagatelle Road (LBR). Furthermore, Dominica is the wettest island in the Eastern Caribbean (Government of the Commonwealth of Dominica Environmental Coordinating Unit [ECU], 2014) with precipitation is concentrated in the rainy season from June to November.

The LBR is the main southern highway and an important infrastructural asset connecting the east and west of the island. It suffered from damage sustained during Tropical Storm Erika in August 2015, subsequently in Hurricane Maria in 2017 and in addition is vulnerable to extreme climatic events and natural hazards. On completion, the LBR Rehabilitation Project will reduce the vulnerability to such extreme climatic events and natural hazards through climate resilient design.

An Environmental and Social Impact Assessment (ESIA) was undertaken to ascertain the impacts of the proposed design on the surrounding environment. Subsequently, an Environmental and Social Management Plan (ESMP) has been prepared which provides management actions to guide the construction phase of the proposed works. The ESMP should be read in conjunction with the Extreme Weather Management Plan (EWMP). EWMPs are site-specific documents to minimise the impact of extreme conditions on works under construction. Adherence to an effective EWMP will provide a reduction in occupational risk, construction damage, environmental damage through pollution incidents and a consistent response to hazards throughout the construction works.

1.1 Project Background

Tropical Storm Erika struck the island of Dominica in August 2015 and led to 30 deaths, making it the deadliest natural disaster in Dominica since Hurricane David in 1979. The storm generated floods and mudslides which damaged key national infrastructure. The LBR suffered upslope and downslope failure, causing landslides and undermining the road respectively. In addition, severe flash flooding resulted in significant damage to the road whereas the foundations of bridge abutments and piers within river channels failed. Inadequate culverts were blocked by debris causing additional flooding. In September 2017 Hurricane Maria (a Category 5 hurricane) made landfall on the island on the 18th of September 2017 and brought catastrophic devastation to the island with a death toll of 65 and destroying housing stock (leaving 50,000 residents displaced), damaging infrastructure, and practically eradicating the vegetation across the island.

Following the storm, the Government of the Commonwealth of Dominica (GoCD) have received financing from the Caribbean Development Bank (CDB) to fund the development of a gender-responsive climate resilient transport network. To that extent the GoCD, through MoPWP have engaged Mott MacDonald Ltd to assist in the preparation of the Rehabilitation of the Loubiere to Bagatelle Road project.

Phase 1 of the project starts in the village of Loubiere, and the road extends for approximately 10.4km, through the communities of Bellevue Chopin, Pichelin and ending in Grand Bay.

1.2 EWMP Aim

The aim of this document is to provide management actions to guide the construction phase of the proposed works if extreme weather conditions are experienced. It is the aim of an EWMP to reduce the temporal and financial impact on a project subsequent to extreme weather. The EWMP should be read in conjunction with the ESMP.

2 Extreme Weather Management Plan

2.1 Overview

As the client, the Climate Resilience Execution Agency of Dominica (CREAD) is responsible for managing the overall project, but may delegate their responsibility to an appropriately qualified specialist to act on their behalf during the construction period.

The Contractor is responsible for preparation and implementation of the EWMP prior to and during construction works respectively. Site-specific EWMPs are to be issued on Transport and Main Road construction projects so that extreme weather impacts are minimised.

The construction Contractors will also employ an environmental health and safety (EHS) professional to oversee the implementation of the EWMP. The primary purpose of the EWMP shall be the safety of individuals nonetheless, reducing asset damage will also be an important consideration.

As a minimum, the EWMP shall document the appropriate mitigation measures to minimise the extent of damage to the most common work activities affected by extreme weather. These include but are not limited to:

- Earthwork excavations;
- Environmental protection structures (e.g. cut off drainage channels);
- Permanent and temporary drainage;
- Haul roads;
- Culverts; and
- Pavements.

2.2 Pre-construction Planning

The contractor will aim to ensure all practicable measures are taken to reduce the impact of extreme weather on the construction site. This includes but is not limited to:

- Scheduling of work whereby construction may be undertaken outside high risk periods, such as the rainy season, to the maximum extent possible. In Dominica, the rainy season typically lasts from June to November;
- Reviewing the tender validity period, as a prolonged period of works (90 to 180 days) can have adverse effects on the contractor's ability to schedule works;
- Incorporating an appropriate temporary works design to reduce construction risk (e.g. reinforced concrete pipes in gullies that are at risk to flash flooding); and
- Designing temporary construction works to enable a shorter period of construction in high risk areas. In general, lower risk designs incorporate a greater inclusion of precast materials as opposed to materials cast *in-situ*.

2.2.1 Extreme Weather Identification

The EWMP will identify extreme weather conditions that may impact the project site. Notable conditions in Dominica include, hurricanes, intense and high volumes of rainfall, landslides and river scour. For each extreme weather event identified the contractor must ensure an appropriate strategy is documented in response and mitigates the impact on the construction site.

2.2.2 Risk Identification and Mitigation

The EWMP will also recognise weather related risks and mitigation measures. Such weather-related risks include damage resulting from high winds, flooding, and damage to works susceptible to heavy or prolonged precipitation. Works susceptible to prolonged precipitation include, but are not limited to, pavement and earthworks.

In addition, Tropical Storm Erika and Hurricane Maria have reduced many previously vegetated areas to bare soils and immature woodland. These are particularly prone to increased sediment transport and flash flooding in response to prolonged precipitation.

Risk mitigation measures shall be divided into three temporal categories- short term, medium term, and long term. Moreover, the Contractors EWMP shall include mitigation measures for all works that are overseen by the contractor.

2.2.2.1 Short Term Mitigation (≤ 7 days)

Mitigation measures under the responsibility of the Contractor include (but are not limited to):

- Monitoring the National Hurricane Centre website (<https://www.nhc.noaa.gov/>);
- Monitoring the Government of the Commonwealth of Dominica website, or other official platforms (TV & Radio), for extreme weather alerts, including spatial and temporal variations;
- Compacting any exposed earthworks daily when construction works cease;
- Excavating temporary hydrological channels in the verge to enable sufficient drainage;
- Removing pavement rills to prevent ponding within boxed pavements;
- Filling depressions to prevent ponding in pavements;
- Reducing the site speed limit during an extreme event to reduce the risk of vehicle damage and the probability of accidents;
- Site-specific easing of specification time periods during periods of forthcoming extreme weather (e.g. enabling sealing to be carried out to weatherproof the works before rainfall);
- Clearing hydrologic pathways of debris to allow efficient flow;
- Carrying out repairs where possible to protect works from further damage;
- Moving equipment to high ground;
- Protecting earthworks against erosion;
- Protecting head walls (including sand bagging);
- Pumping to ensure that excavations are not waterlogged;
- Installing a “cut off drain” at the top of cuttings to prevent water running down the face;
- Hurricane-proofing structures; and
- Maintenance crews may work through the event to ensure all measures are operating and carrying out repair works where safe to do so.

2.2.2.2 Medium Term Mitigation (≤ 2 months)

Mitigation measures under the responsibility of the Contractor include (but are not limited to):

- Installing and monitoring temporary and permanent protection measures;
- Stabilising pavement with cement to the working platform when extreme weather is expected;
- Increased use of separate routes in preference to working under traffic flow;
- Scheduling of non-critical activities outside rainy seasons where possible;
- Designing earthworks to allow sufficient hydrological drainage during construction; and

- Establishing protection measures for flood events.

2.2.2.3 Long Term Mitigation (> 2 months)

Mitigation measures under the responsibility of the Contractor include (but are not limited to):

- Scheduling weather susceptible tasks outside periods of high risk, such as the rainy season, and minimising critical activities scheduled in the rainy season;
- Training staff to undertake safe site management practices through toolbox talks which will also reduce rectification work;
- Allocating temporary material storage sites or laydown areas; and
- Locating temporary site buildings and assets above low-lying land to prevent inundation whilst ensuring there is adequate site access during a flood event.

2.2.3 Rectification and Recovery

In response to a severe weather event the Contractor shall take detailed records, including photographic evidence of any damage to the project site. In addition, the measures that the contractor should take include:

- Ceasing of construction until the project site is deemed safe;
- Written record and photographs to include damage costs;
- Notify the project insurance company and client of damages; and
- Review procedures to prevent future recurrence.

3 References

- ECU, 2014, Disaster Vulnerability Reduction Project (DVRP): Environmental Assessment (EA) and Environmental Management Framework (EMF), March 2014, Accessed from: http://ecu.gov.dm/images/documents/dom_EMF-EA_FINAL.pdf (7th September 2018)

