Forth Replacement Crossing

Employer's Delivery Team
Construction Vibration Monitoring Report

M9 Junction 1a Contract
(August 2012)

TRANSPORT SCOTLAND

An agency of The Scottish Government

FORTH REPLACEMENT CROSSING

FORTH REPLACEMENT CROSSING

EMPLOYER'S DELIVERY TEAM
CONSTRUCTION VIBRATION MONITORING REPORT

M9 JUNCTION 1A CONTRACT
(AUGUST 2012)

Revision Status

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FORTH REPLACEMENT CROSSING

EMPLOYER'S DELIVERY TEAM
CONSTRUCTION VIBRATION MONITORING REPORT

CONTENTS

1. INTRODUCTION

1.1 This report sets out the results of the construction vibration monitoring undertaken on the M9 Junction 1a Contract in August 2012 as part of the Forth Replacement Crossing project.

2. M9 J1A CONTRACT VIBRATION MONITORING

VIBRATION MONITORING LOCATIONS

2.1 Continuous vibration monitoring was carried out at fixed monitor locations in August 2012 as outlined in Table 2.1 below. The main construction activities carried out adjacent to the monitor locations are also listed.

Monitoring Location	Monitoring Period	Main Construction Activities
93/95 King Edwards Way (CNV02)	August 2012	• Erection of noise barrier • Fencing works • ITS works along M9 eastbound • Pavement works near Gateside
15-17 Buie Rigg (CNV07)	August 2012	• Continued concrete invert works inside new Swineburn culvert • Piling at G11 near Buie Rigg • Newmains Bridge North Abutment • ITS works on eastbound merge • Drainage completed near Buie Rigg • Pavement works on eastbound diverge
8 Kirklands Park Grove (CNV16)	August 2012	• Piling at Gantry 12 • Newmains Bridge North Abutment • Noise barrier erected • Drainage works ongoing on A90 southbound

Table 2.1 Long Term Monitoring Locations - August

VIBRATION MONITORING RESULTS

2.2 The results of the M9 J1a Contract construction vibration monitoring are provided in chart format in Appendix A of this report.

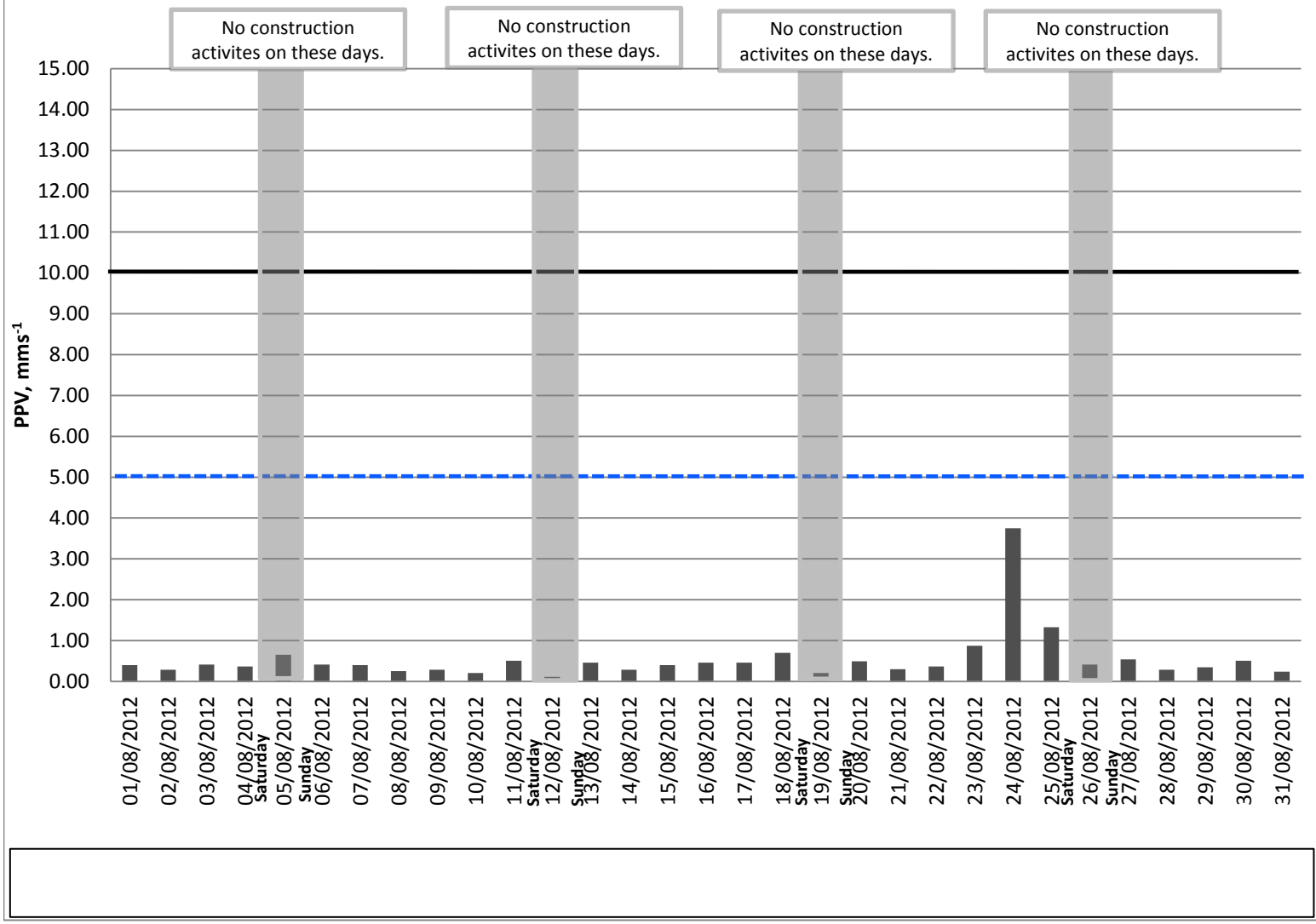
2.3 The charts show the Vibration Dose Values (VDV) and Peak Particle Velocities (PPV) recorded at receptors. VDV levels are recorded in order to monitor the potential for disturbance to the occupants of buildings (as discussed in BS 6472) and PPV values are recorded in order to monitor the potential for damage to buildings (as discussed in BS 7385).

2.4 The charts indicate that all construction activities in the period were carried out in accordance with the vibration thresholds set out in the project Code of Construction Practice.

2.5 Only one exceedance of the VDV threshold was recorded at King Edwards Way on 24/08/12. However, after investigation this exceedance was attributed to domestic building works being carried out in the vicinity of the vicinity of the receptor.

APPENDIX A - M9 J1A CONTRACT CONSTRUCTION VIBRATION CHARTS

Measured highest daytime Peak Particle Velocity (PPV), 93/95 King Edwards Way (CNV02) Measurement period 1st August 2012 to 31st August 2012



Construction PPV Thresholds

Daily PPV threshold for intermittent construction

Daily PPV threshold for continuous construction

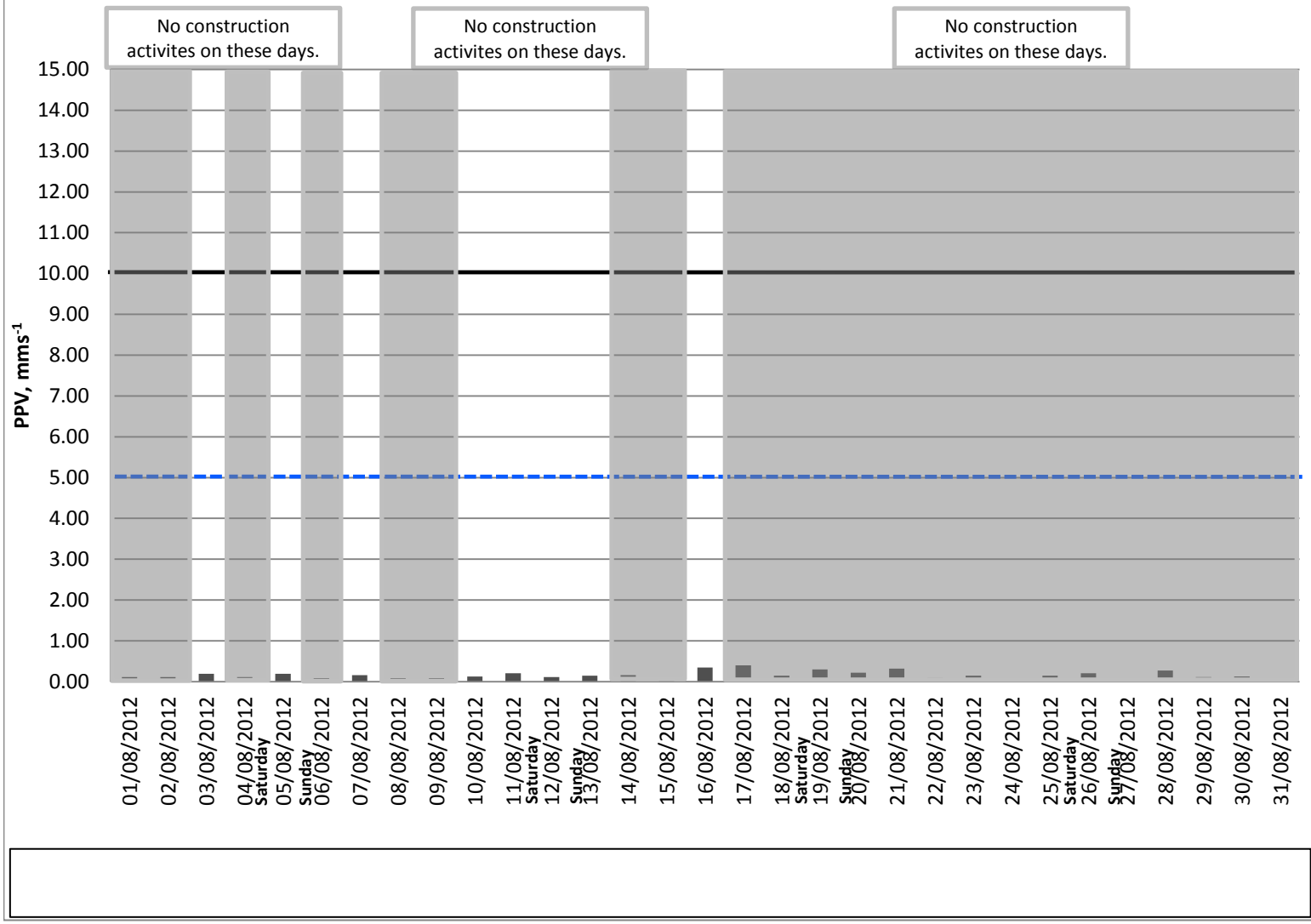
Measured VDV

Daily highest PPV (z-axis)

(n) = Investigation Report Number

Note: The horizontal axes often show high vibration levels caused by spurious 'localised' events which are not attributable to construction works, whilst the vertical axis appears much less affected. Therefore the results from only the vertical dataset are presented, as a more reliable indicator of the prevailing vibration climate at this location.

Measured highest night-time Peak Particle Velocity (PPV), 93/95 King Edwards Way (CNV02) Measurement period 1st August 2012 to 31st August 2012



Construction PPV Thresholds

Daily PPV threshold for intermittent construction

Daily PPV threshold for continuous construction

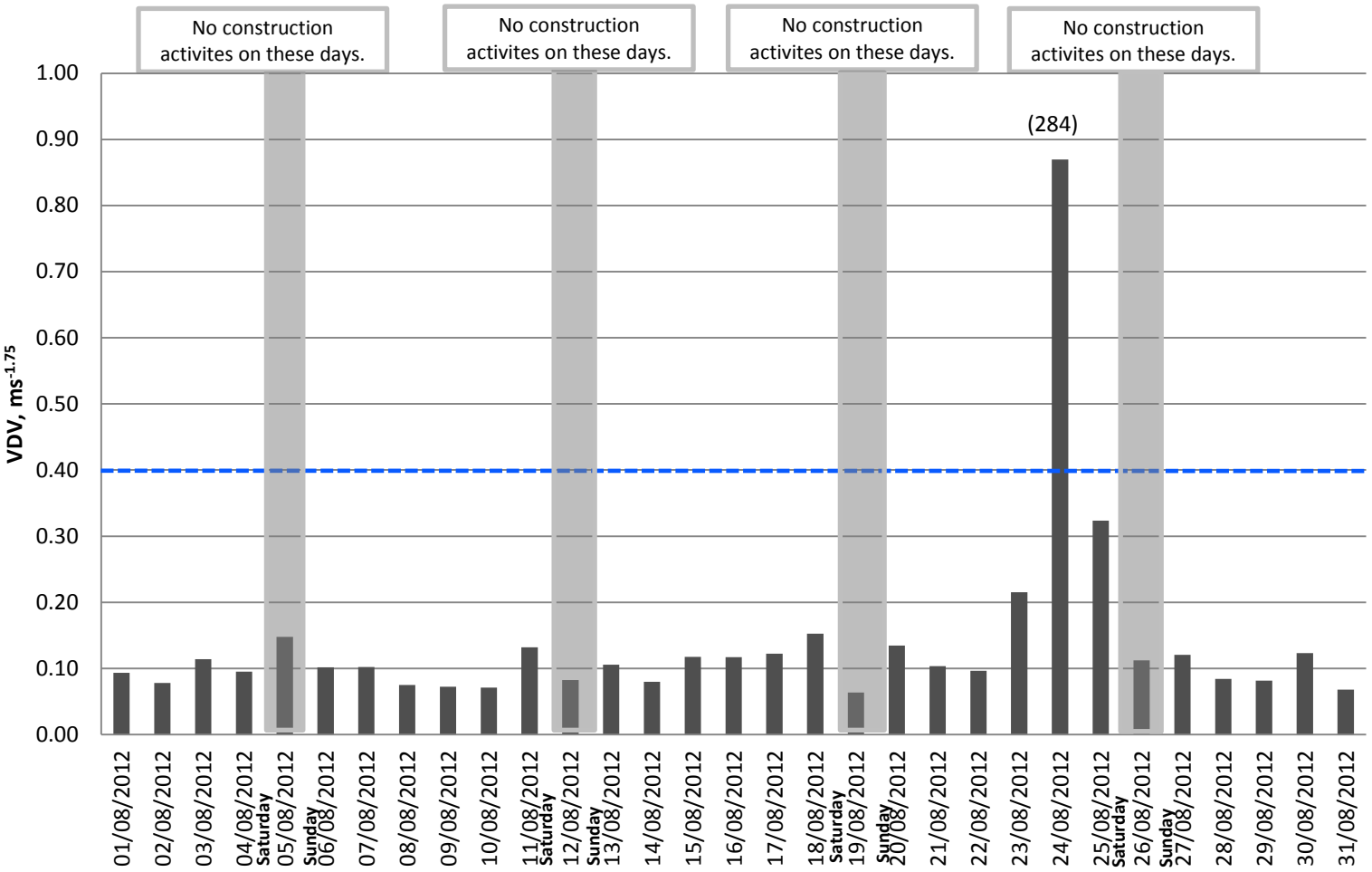
Measured VDV

Daily highest PPV (z-axis)

(n) = Investigation Report Number

Note: The horizontal axes often show high vibration levels caused by spurious 'localised' events which are not attributable to construction works, whilst the vertical axis appears much less affected. Therefore the results from only the vertical dataset are presented, as a more reliable indicator of the prevailing vibration climate at this location.

Measured daytime (07:00-23:00) Vibration Dose Values (VDV), 93/95 King Edwards Way (CNV02) Measurement period 1st August 2012 to 31st August 2012



Construction VDV Threshold

Daily daytime VDV threshold for residential dwellings

Measured VDV

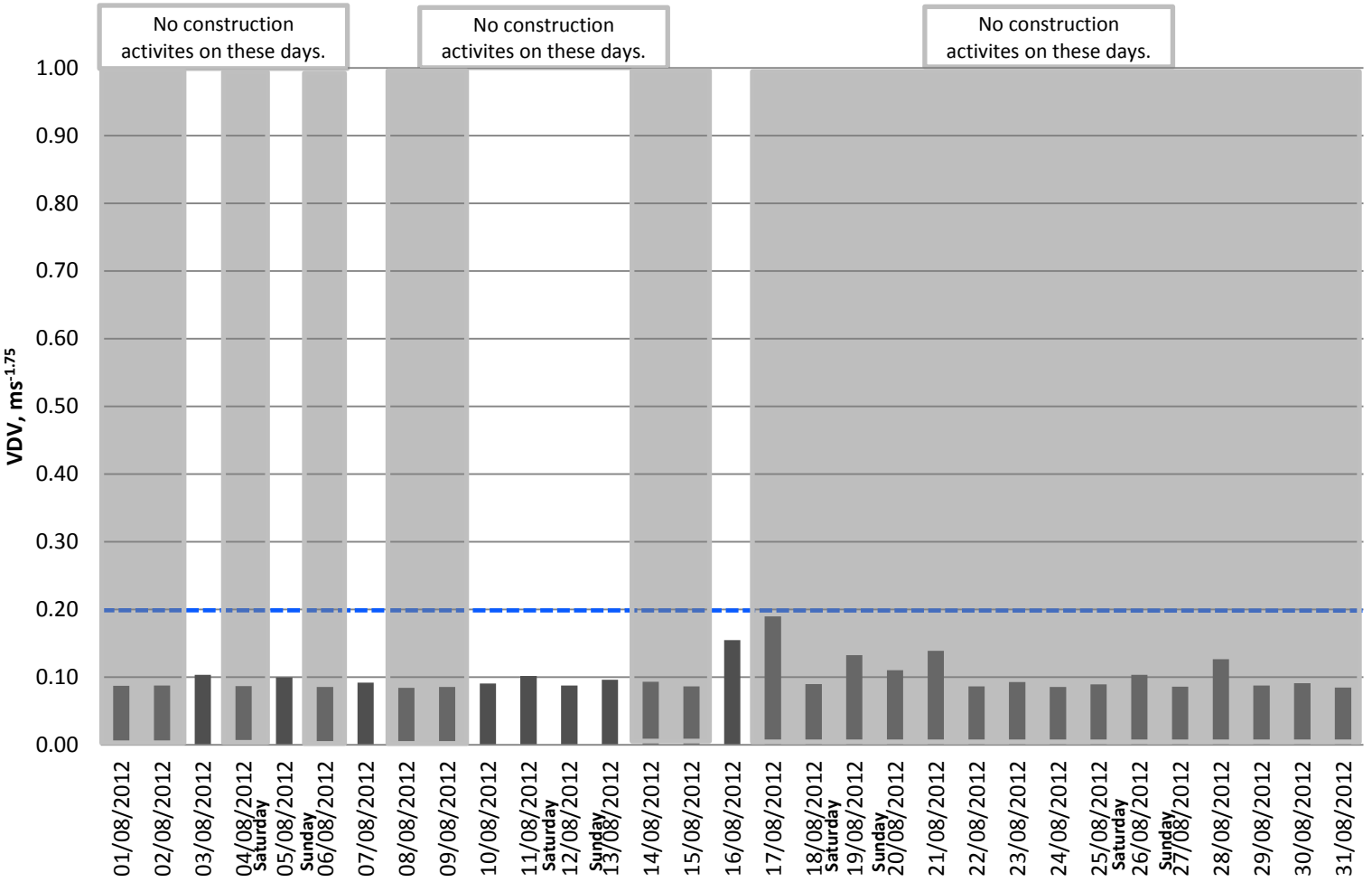
Daily daytime VDV (z-axis)

(n) = Investigation Report Number

Note: The horizontal axes often show high vibration levels caused by spurious 'localised' events which are not attributable to construction works, whilst the vertical axis appears much less affected. Therefore the results from only the vertical dataset are presented, as a more reliable indicator of the prevailing vibration climate at this location.

VDV threshold for Education establishments, offices and similar is 0.40ms$^{-1.75}$ and Commercial is 0.80ms$^{-1.75}$. Therefore it may be necessary to adjust the threshold displayed on the graph if buildings other than residential dwellings are being assessed.

Measured night time (23:00-07:00) Vibration Dose Values (VDV), 93/95 King Edwards Way (CNV02)
Measurement period 1st August 2012 to 31st August 2012



Construction VDV Threshold

Daily night time VDV threshold for residential dwellings

Measured VDV

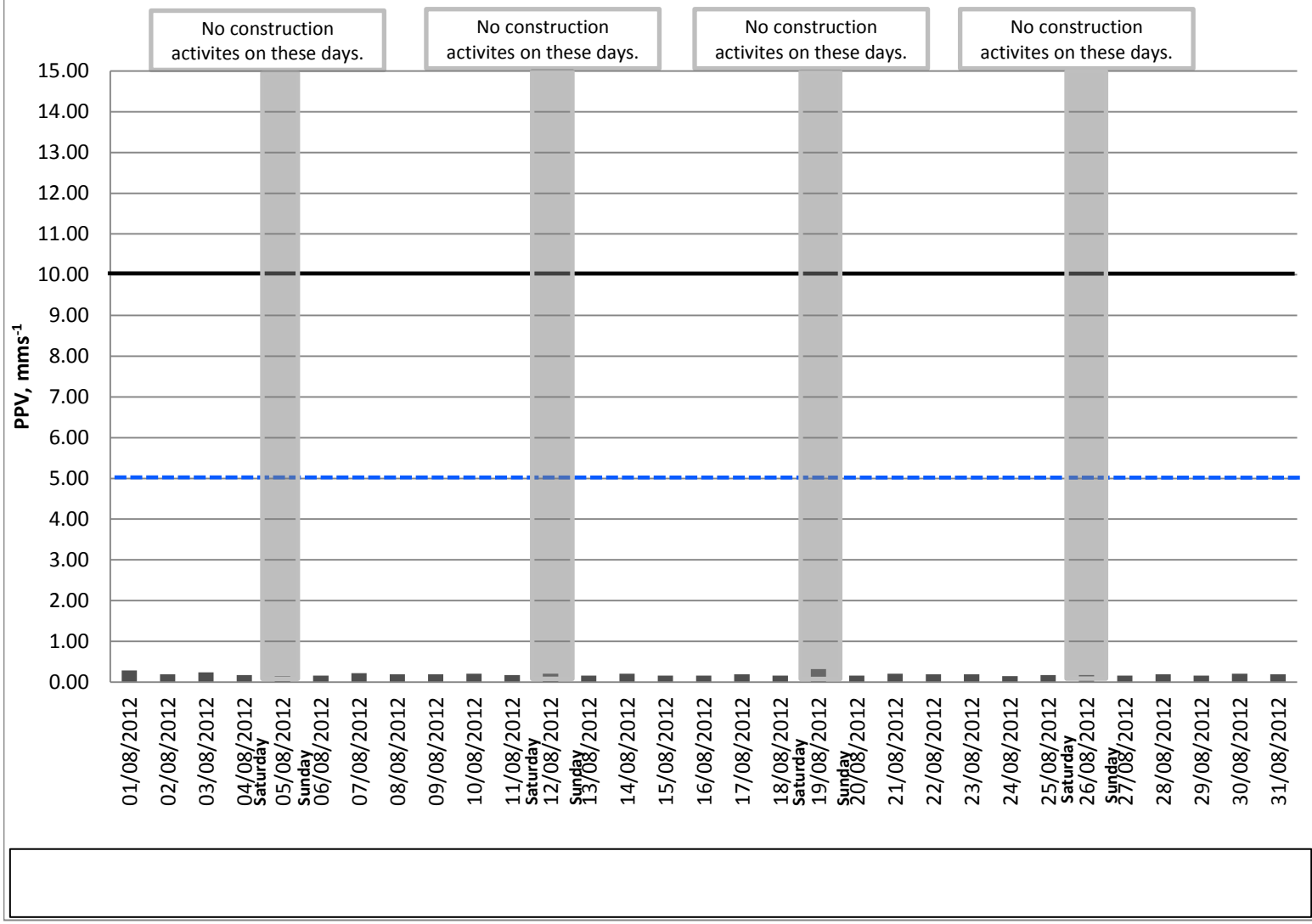
Daily night time VDV (z-axis)

(n) = Investigation Report Number

Note: The horizontal axes often show high vibration levels caused by spurious 'localised' events which are not attributable to construction works, whilst the vertical axis appears much less affected. Therefore the results from only the vertical dataset are presented, as a more reliable indicator of the prevailing vibration climate at this location.

A transfer function equivalent to doubling the night-time VDV measurements has been applied to obtain values representative of an upstairs, mid-floor receptor location. VDV threshold for Education establishments, offices and similar is 0.40ms$^{-1.75}$ and Commercial is 0.80ms$^{-1.75}$. Therefore it may be necessary to adjust the threshold displayed on the graph if buildings other than residential dwellings are being assessed.

Measured highest daytime Peak Particle Velocity (PPV), 15-17 Buie Rigg (CNV07) Measurement period 1st August 2012 to 31st August 2012



Construction PPV Thresholds

Daily PPV threshold for intermittent construction

Daily PPV threshold for continuous construction

Measured VDV

Daily highest PPV (z-axis)

(n) = Investigation Report Number

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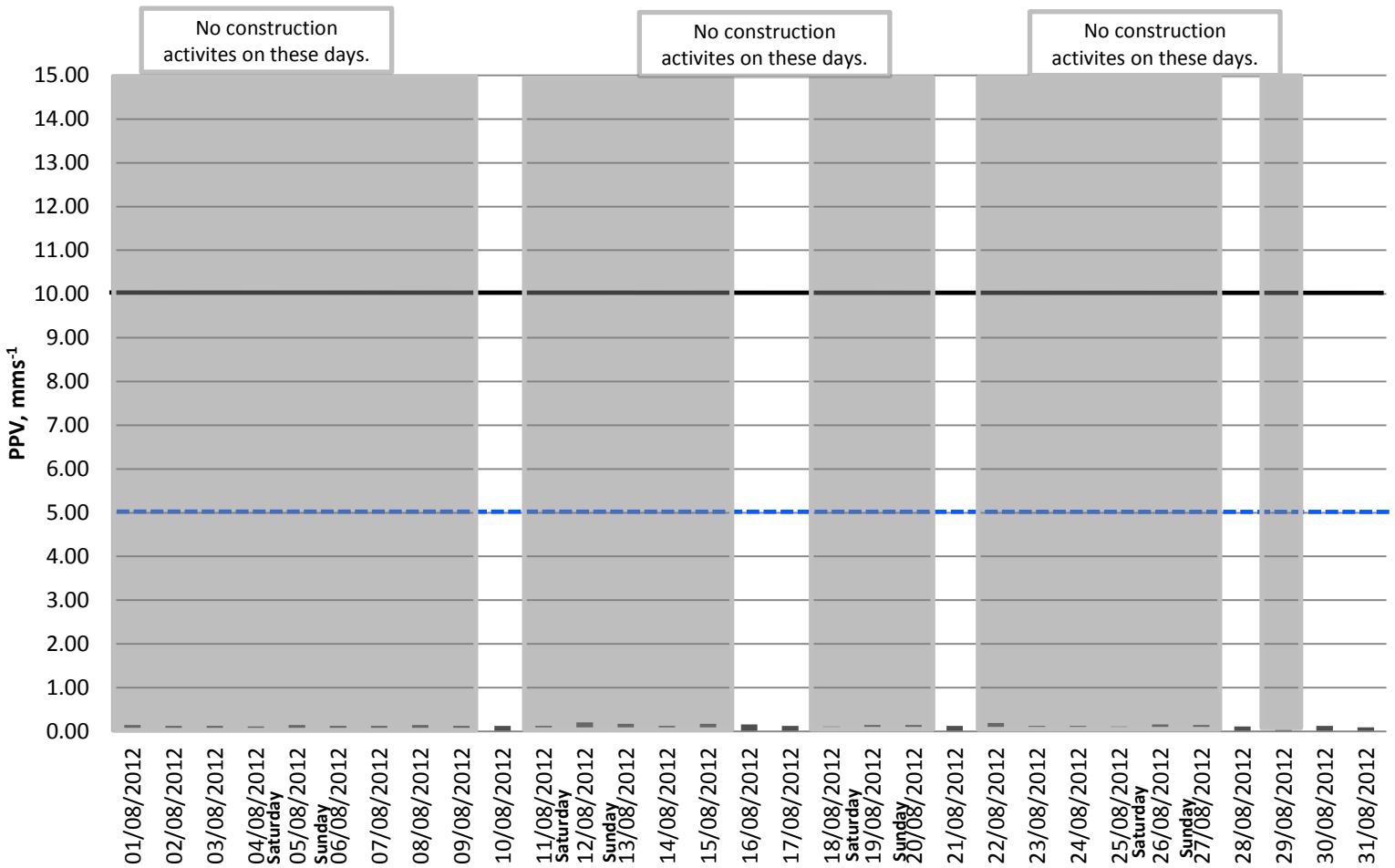

Construction PPV Thresholds

Daily PPV threshold for intermittent construction

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Measured VDV

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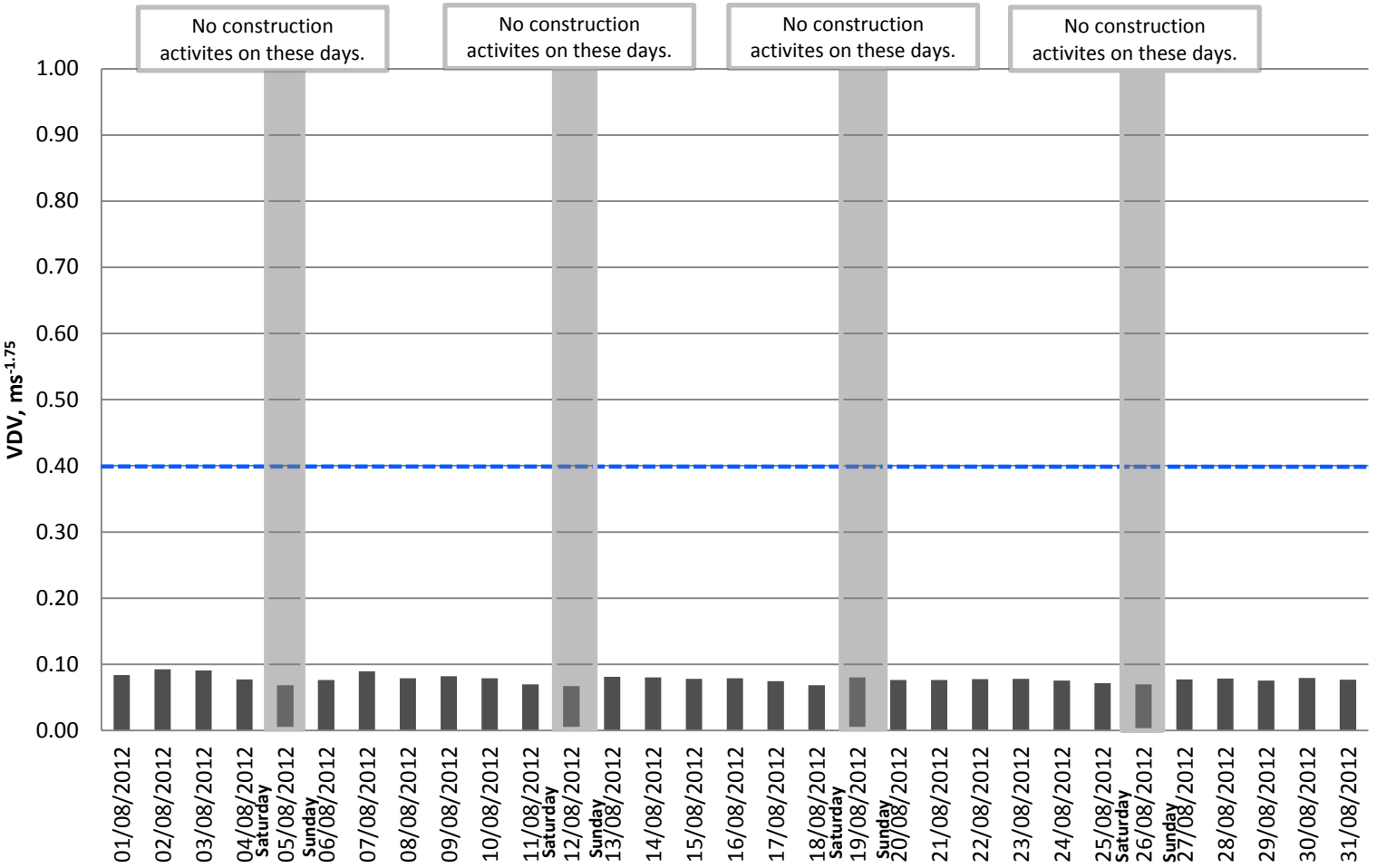

Construction VDV Threshold

Daily daytime VDV threshold for residential dwellings

Measured VDV

Daily daytime VDV (z-axis)

(n) = Investigation Report Number

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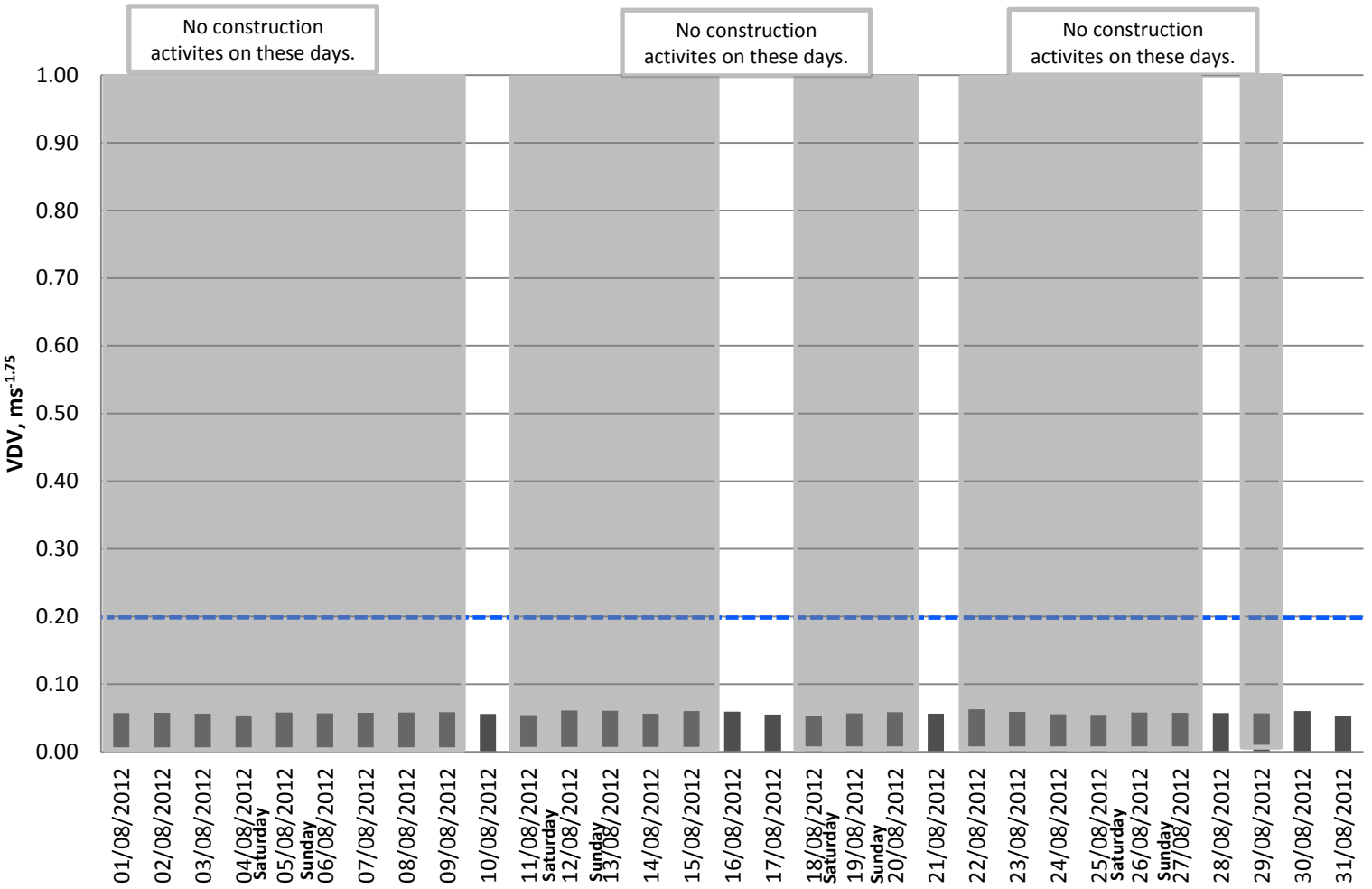

Construction VDV Threshold

Daily night time VDV threshold for residential dwellings

Measured VDV

Daily night time VDV (z-axis)

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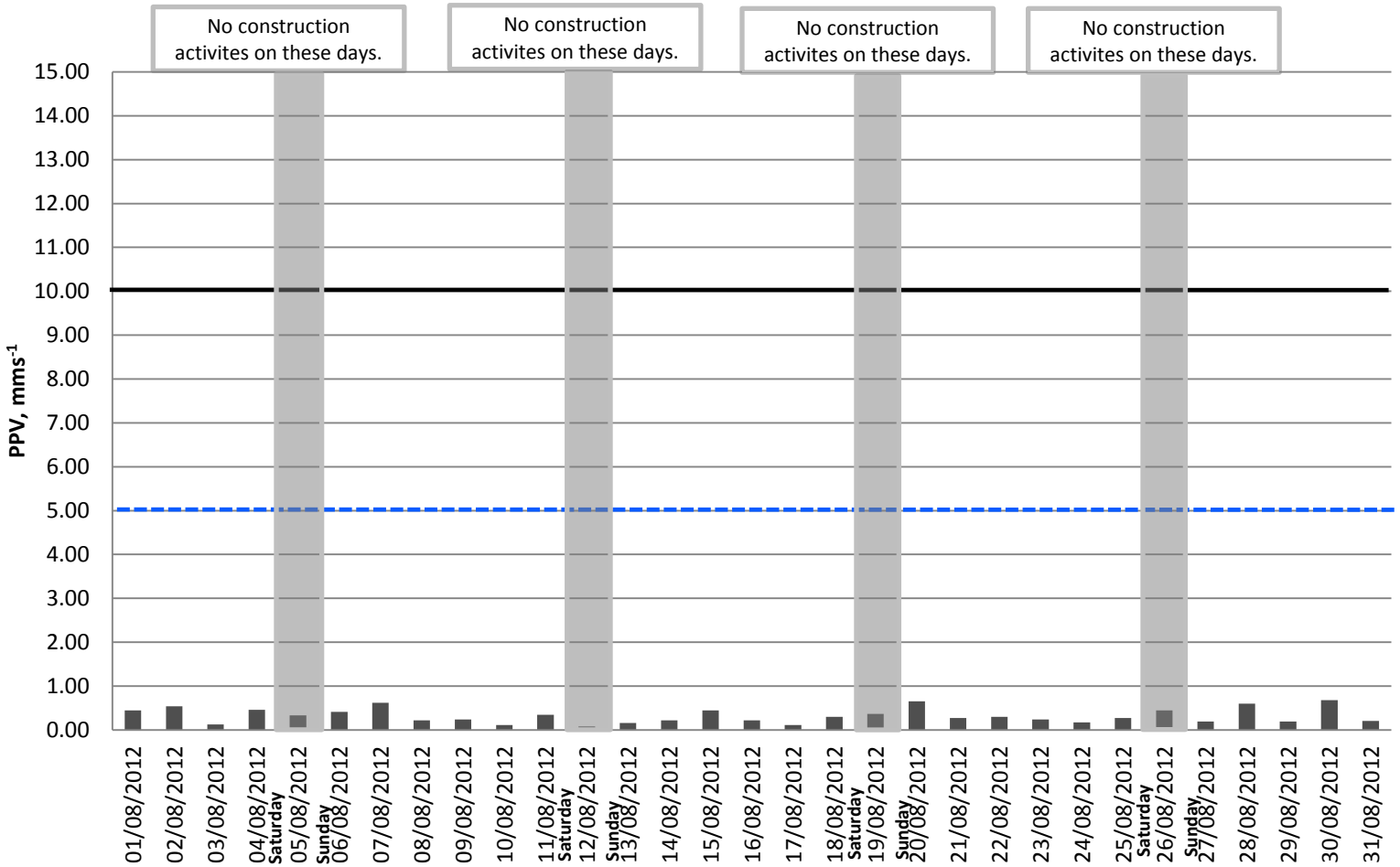
Measured highest daytime Peak Particle Velocity (PPV), 8 Kirklands Park Grove (CNV16) Measurement period 1st August 2012 to 31st August 2012



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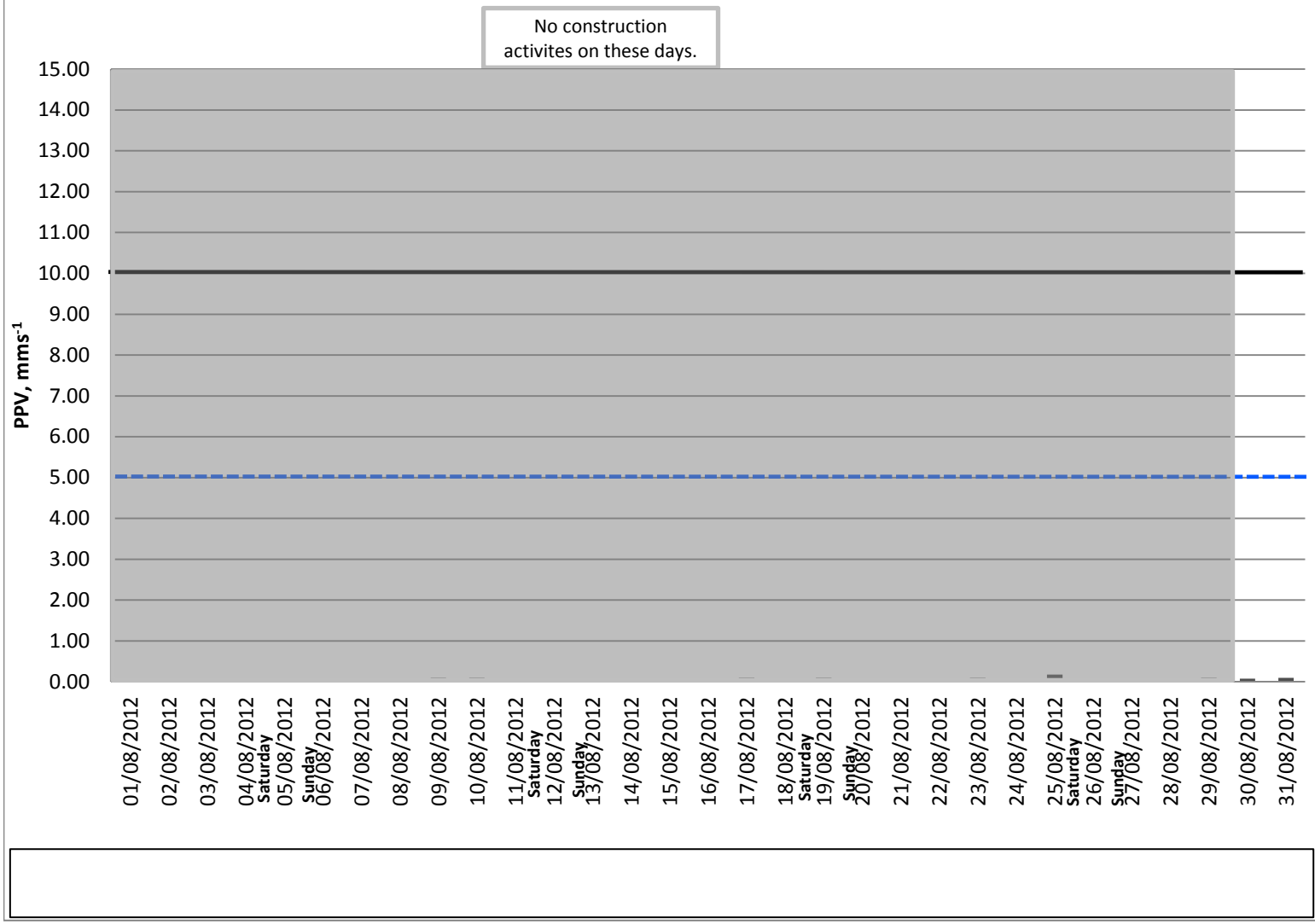

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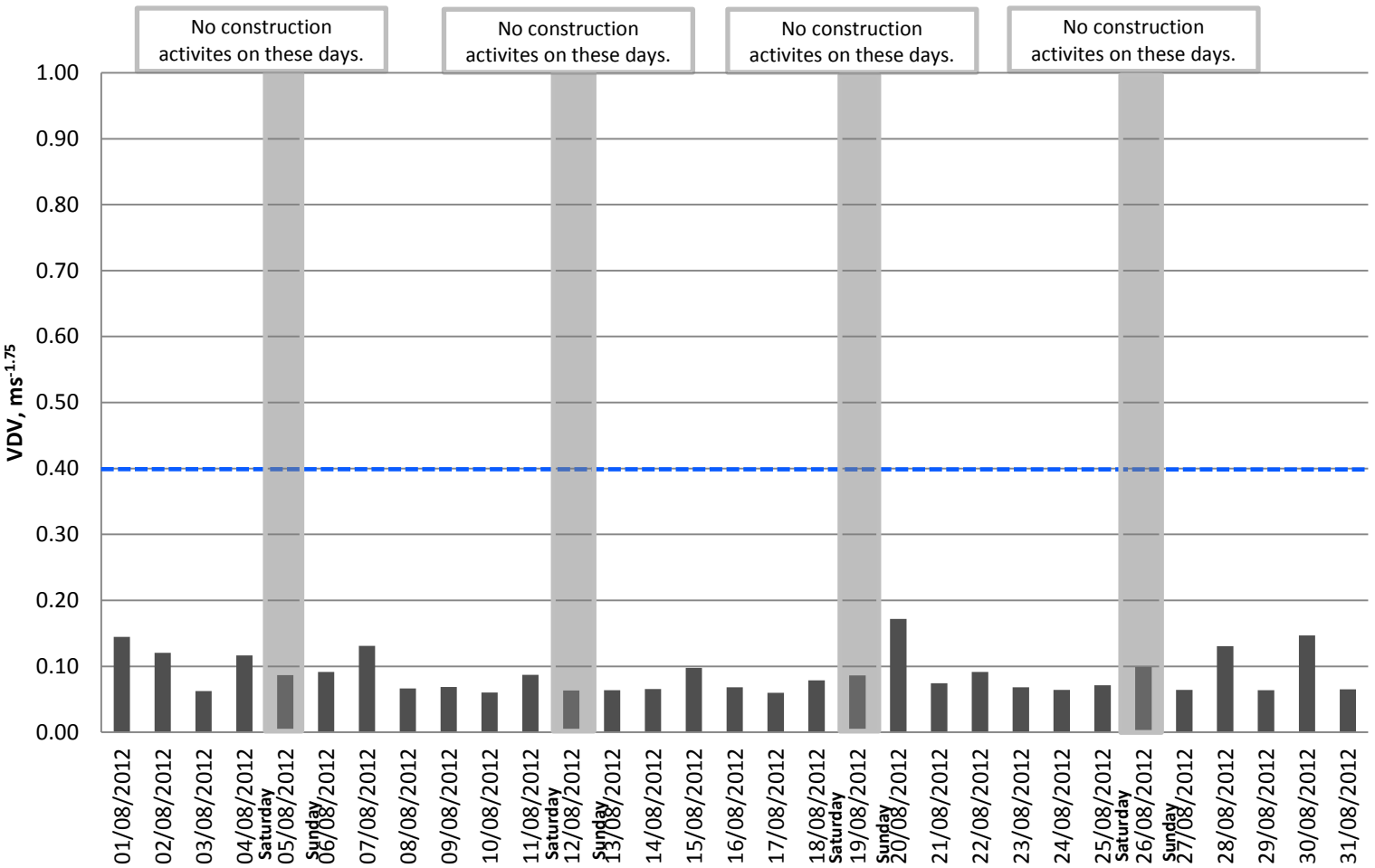

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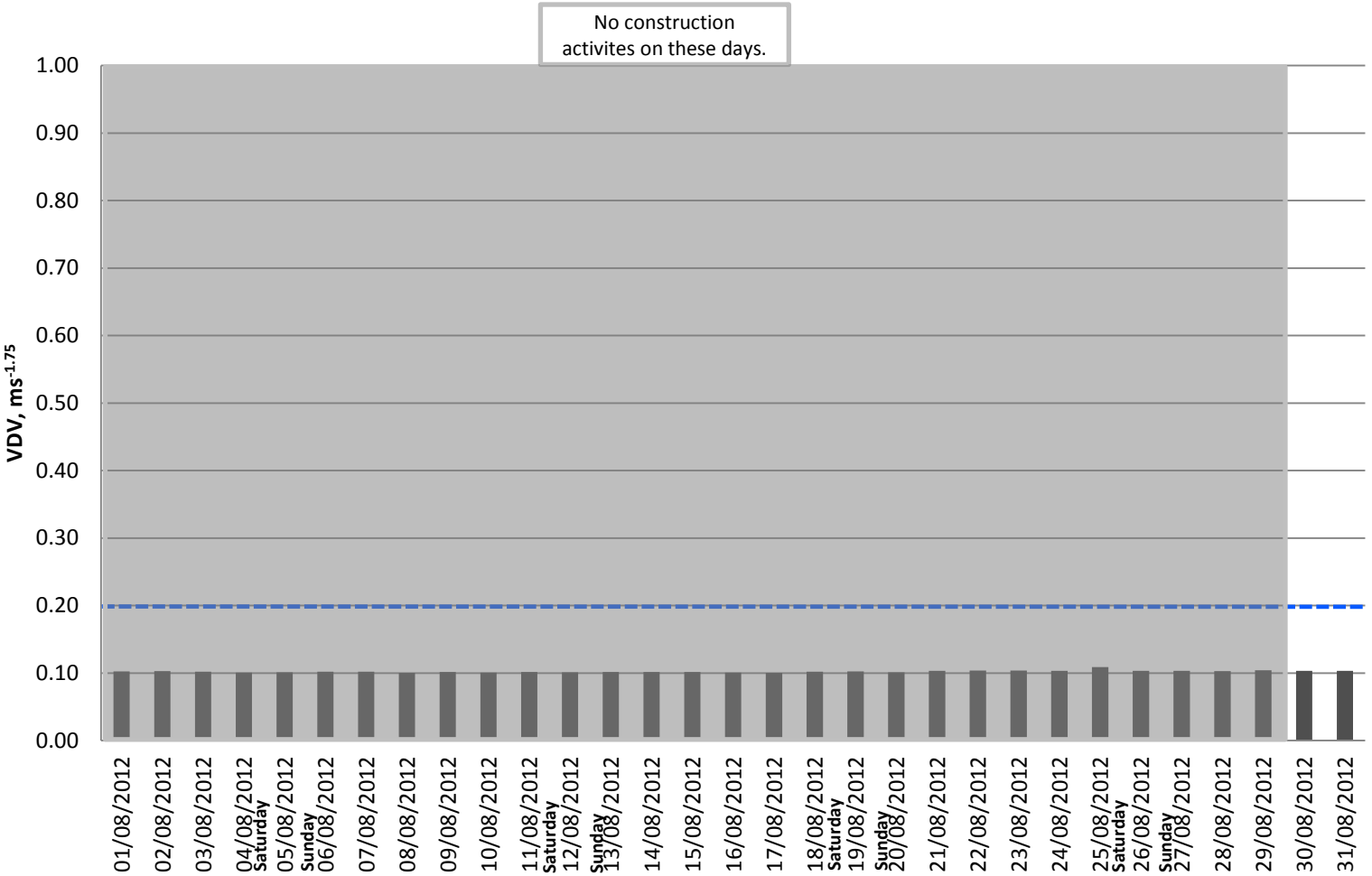

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