# PORTSIDE / BLUNDELL ROAD IMPROVEMENTS PROJECT

# STORMWATER POLLUTION PREVENTION PLAN

**Issue date: June 30, 2022**

**Revision 0**

**DOCUMENT NUMBER: ID020X-LEDC-MEM-DR-0001-STM WTR PLT PREV PL-0**

June 30, 2022

Vancouver Fraser Port Authority
100 The Pointe, 999 Canada Place
Vancouver, BC V6C 3T4

Attention: Roxana Mousavi,
Acting Manager, Infrastructure Delivery

Dear Ms. Mousavi:

**PORTSIDE / BLUNDELL ROAD IMPROVEMENTS PROJECT – STORMWATER POLLUTION PREVENTION PLAN REV 0**

Please be advised that we have prepared the Stormwater Pollution Prevention Plan, Revision 0 dated June 30, 2022, for the above project.

We trust you will find our Plan acceptable. Please contact us if you have any questions.

Sincerely,
Ledcor CMI Ltd.

Sat Oberoi
Design-Build Manager
Sat.Oberoi@ledcor.com | 778-886-9706

Erhard Behrens
Senior Project Manager
Erhard.Behrens@ledcor.com | 604-803-1743

# REVISION HISTORY

| Rev. | Date of Changes | Nature of Change | Prepared by: | Approved by: |
|---|---|---|---|---|
| 0 | June 30, 2022 | First issue | McElhanney:<br>• Michael Thiessen<br>• Gary Lin<br>Ledcor:<br>• Erhard Behrens | Sat Oberoi<br>Erhard Behrens |
| | | | | |
| | | | | |

# TABLE OF CONTENTS

# 1.0 INTRODUCTION

The Vancouver Fraser Port Authority (VFPA) has retained Ledcor Group of Companies with their subconsultants (the Ledcor team) to provide design and construction services for the Portside/Blundell Road Improvements Project (the project). One requirement is a Stormwater Pollution Prevention Plan (SPPP).

This SPPP is based on site-specific information and customized for the project which is limited to road improvements and has very limited operational activities. Therefore, most of this plan will be focused on construction activities which have the greatest potential for pollutants to enter the natural system.

# 2.0 SITE INVENTORY OVERVIEW

The project is located in the south-east portion of Richmond within an industrial area that is bordered by the Fraser River to the south and mostly agricultural area on the north, west, and east sides. The area is accessed by No. 8 Road from the north which crosses Blundell Road and a CN Rail yard (both of which run approximately east-west across the area) with controlled at-grade intersections.

Blundell Road is currently two lanes and runs east-west through the middle of the area on the north side of the rail yard. This project will widen Blundell Road to four lanes and construct an overpass across the rail yard to connect Blundell Road to Portside Road on the south side of the rail yard. The overall project is shown in **APPENDIX A**. The existing stormwater infrastructure along with an overview of the hydrology are included in **APPENDIX B:** Draft Preliminary Drainage Report (McElhanney, 2022).

Construction activities anticipated during construction include:

- Excavation of existing material to be replaced by the proposed design
- Granular material stockpiling, handling, placing, and compacting
- Concrete curb pouring
- Pavement cutting
- Equipment refueling and maintaining
- Paving
- Line painting
- Pipe and drainage infrastructure installation

These activities are anticipated to include the following materials:

- Granular fill
- Native spoils
- Fully cured concrete and asphalt to be removed
- Fresh concrete and asphalt being placed and cured
- Tack coat during paving
- Fuel for equipment
- Lubricants for equipment
- Excavation water
- General construction waste

Post construction, activities will be limited to driving on the new road surface. This will result in small deposits of tire particles, oil drips, and sediment that will be washed by rainfall into the storm sewer system.

# 3.0 ISSUES IDENTIFICATION AND RISK ANALYSIS

## 3.1 Standards, Acts, Regulations

Stormwater generated from the project area would either infiltrate through unpaved ground or flows into drainage ditches/sewer. Eventually, the stormwater would reach the estuary section of the South Arm of Fraser River.

The Fraser River is under federal jurisdiction. Under the Fisheries Act, Fisheries and Oceans Canada (DFO) has a mandate of protecting fish and fish habitat. Any project near water will require a project review or authorization to avoid

- Causing the death of fish
- Harmful alteration, disruption, or destruction of fish habitat.

Also, in BC, ambient water quality guidelines are benchmarks for fresh and marine water quality which are used to assess and manage the health and sustainability of B.C.'s aquatic resources. As such, it is important to ensure that the quality of any stormwater generated from the project area meet the Canadian Environmental Quality Guidelines and BC Water Quality Guidelines for aquatic life prior to discharging into Fraser River.

## 3.2 Potential Sources and Pathway

As mentioned in Section 2.0 above, potential sources of stormwater pollution include concrete, asphalt granular fill, native spoils, fuel, engine oil, lubricant, rain/groundwater from excavation, tire particles, oil drips, and dirt from tires.

These potential pollutants would be carries by the rainwater/snowmelt into the storm drains and eventually reach the Fraser River.

## 3.3 Potential Receptors

Potential aquatic receptors of the potential stormwater pollutants would include:

- Fish (marine and estuary)
- Amphibians
- Reptiles

## 3.4 Risk Analysis

Any sediment laden stormwater would have the potential of altering aquatic habitat or even cause the death of fish and other aquatic life.

# 4.0 STORMWATER POLLUTION PREVENTION PLAN

The following sections provide general guidelines of stormwater pollution prevention during and after the construction work.

## 4.1 During Construction

The pollution prevention plan during the construction phase would include prevention of pollution generation, pollution containment/reduction, and end-of-pipe treatment. General pollution prevention measures are outlined in the following and subject to changes based on site-specific conditions through different construction stages:

- Prevent pollution generation
    - Avoid bringing contaminants to site
    - Sediment control measures appropriate for the Site and in a manner that ensures discharge water meets water quality guidelines for aquatic life before being permitted to enter any watercourse
    - Equipment maintenance conducted in a manner to mitigate pollution potential. (i.e., use of spill trays etc.)
    - Construction materials including overburden and general fill will be stored and disposed of in such a manner as to prevent mobilization of sediment into watercourses. Stockpiles will be located away from the top of bank of watercourses and material will be bermed, sloped, seeded, or tarped where there is risk of sediment mobilization near environmental sensitivities
    - Cover or back fill excavation slopes
    - Ensure that all personnel use best efforts to ensure that no Work activity results in the deposition of a deleterious substance to any water body Create a culture to make it everyone's responsibility to say something
    - Properly document, store, and protect pollutants (eg. fuel)
    - Non-erodible work pads
    - Implement opportunities for improvement procedures as part of the environmental monitoring process

- Containment/reduction
    - Training
    - Spill response kits
    - CB filter socks or doughnuts
    - Measures will be in place to minimize mud tracking by construction vehicles (e.g., sweeping/cleaning). Where mud, dirt, and debris are tracked along local roads and areas outside of the immediate work area, contractors will ensure timely clean-up of tracked materials;
    - Wheel wash
    - Designated areas for laydown, stockpile, parking, truck access, etc
    - Concrete washout and waste concrete bin, and proper disposal processes
    - Straw waddles or silt fences
    - Record keeping

- Treatment
    - Stormwater treatment on-site as required

## 4.2 Post-Construction

As discussed, post construction activities will be limited to driving which does result in small amount of contaminants entering the storm system. To mitigate this, each catch basin will be designed with a sump and oil/grease trapping hood as per City of Richmond standard detail ST-5-SD (see Figure # below). The detail notes that the "trapping hoods are temporary [during] construction and are to be removed by the contractor upon contract completion" but they can be left in at the request of VFPA.

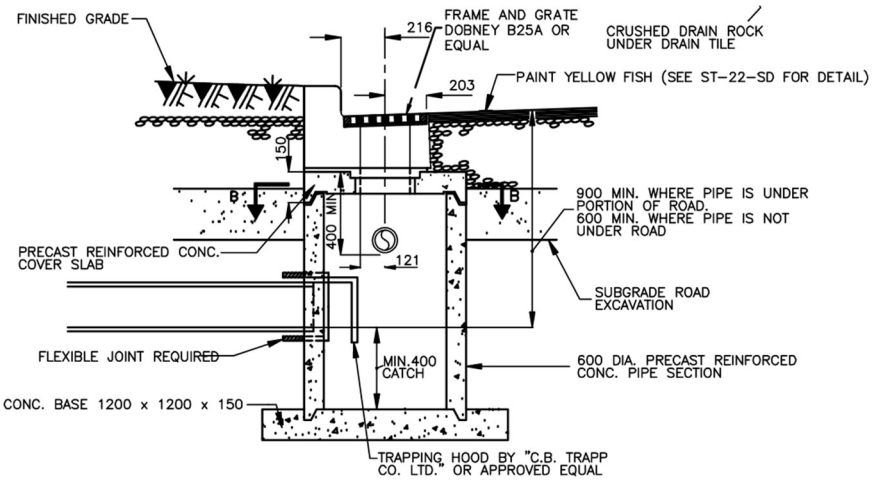



*Figure 1: Excerpt from City of Richmond standard detail ST-5-SD showing the sump and oil/grease trapping hood*

## 5.0 IMPLEMENTATION AND MONITORING

During the construction period, the prime contractor is responsible for the implementation of the SPPP, which would include the installation of erosion and sediment control measures, routine monitoring of downstream storm sewer by a Qualified Environmental Monitor.

Typically, the monitoring frequency is no less than once every week and whenever there is a significant rainfall event (i.e. greater than or equal to 25mm rainfall in a 24-hour period). Water from storm sewer should be collected and field tested for pH, turbidity, and temperature. If necessary, the water samples should be submitted to a CALA certified laboratory for the analysis of total suspended solids and any hydrocarbon contaminant of concern.

For post-construction monitoring, the catch basin sediment traps should be checked regulatory to ensure it is functioning as intended.

## 6.0 ADAPTIVE MANAGEMENT MEASURES

The SPPP is a work-in-progress plan that should be re-evaluated regulatory and revised as needed to meet the site-specific requirements.

# APPENDIX A – PROJECT OVERVIEW FIGURE

PROPOSED WIDENING OF BLUNDELL ROAD

INTERSECTION IMPROVEMENTS TO ELIMINATE SOUTH ACCESS ACROSS RAIL

PROPOSED OVERPASS CONNECTING BLUNDELL ROAD AND PORTSIDE ROAD

CN RAIL INTERMODAL YARD

2400mm STORM SEWER OUTFALL. NO FLAP GATE OR LIFT STATION

1200mm

1500mm

1800mm

750mm

LS

Blundell Rd

York Rd

Portside Rd

Zylmans Way

Savage Rd

Dyke Rd

No 8 Rd

No 9 Rd

Nelson Rd

McCartney Way

Hinston Rd

River Rd

FRASER RIVER

N

ISSUED FOR DISCUSSION ONLY

McElhanney

Projection: NAD 1983 UTM Zone 10N

City of Delta, VFPA, Earthstar Geographics, Esri Canada, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, NRCan, Parks Canada, Esri, CGIAR, USGS

## TITLE

**Figure 1. Project Overview**

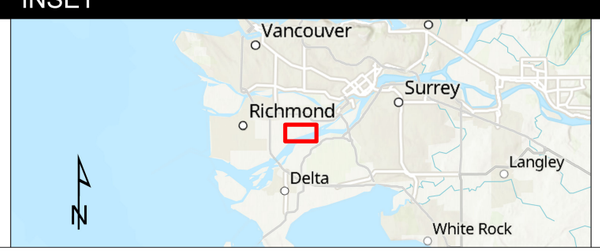
**Project: Portside-Blundell Road Improvements**

Location: Richmond, BC

Scale 1:10,000

0 500 Meters

## INSET




## LEGEND

- LS Lift Station
- Outfall
- Existing Storm Sewer
- Proposed Road Design
- Flow Direction
  - Open Ditch
  - Storm Sewer

Original Paper Size: 11" x 17"

Author: HSHIN

X:\2111\1.00 - DB Projects\2111-40118-00 Ledcor - Portside-Blundell Rd Imp\7.0 SURVEY & MAPPING\7.1 Figure\Ledcor - Portside-Blundell Rd Imp - SPPP.aprx

# APPENDIX B – DRAFT PRELIMINARY DRAINAGE REPORT

Our File: 2111-40118-00

# TECHNICAL MEMO

| To | From |
|---|---|
| Rick Berg, P.Eng.<br>Ledcor / Design Build Lead | Mike Thiessen, P.Eng.<br>McElhanney / Drainage Lead |
| **Re** | **Date** |
| Portside/Blundell Road Improvements Project<br>Draft Preliminary Drainage Report | May 31, 2022 |

## REVISION HISTORY

| Rev. | Date of Changes | Nature of Change | Prepared by: | Approved by: |
|---|---|---|---|---|
| A | May 31, 2022 | First Draft | Robin Jory, EIT | Mike Thiessen, P.Eng |
| | | | | |
| | | | | |

# 1. Introduction

McElhanney Ltd. (McElhanney) is teamed with Ledcor Group of Companies (Ledcor) to provide engineering services for a proposed overpass and roadworks upgrades project on Blundell Road in Richmond, BC (the project). As part of the project, McElhanney has completed the following stormwater analysis to assess the impacts of climate change on the existing drainage infrastructure and support the design of drainage infrastructure. The project extents and overall drainage patterns are shown in **Figure 1**.

NO. 8 ROAD GRANVILLE AVENUE DRAINAGE LIFT STATION

NO. 7 ROAD SOUTH DRAINAGE LIFT STATION

NELSON ROAD SOUTH DRAINAGE LIFT STATION

FLOW SPLIT MANHOLE. EAST INVERT IS HIGHER TO ACT AS AN OVERFLOW.

PROPOSED OVERPASS

CN RAIL INTERMODAL YARD

2400mm STORM SEWER OUTFALL. NO FLAP GATE OR LIFT STATION

C1 12.8ha
C2 6.9ha
C3 1.4ha
C4 14.4ha
C5 10.5ha
C6 0.8ha
C7 0.4ha
C8 10.9ha
C9 6.1ha
C10 1.4ha
C11 29.4ha
C12 1.8ha
C13 19.0ha
C14 4.0ha
C15 0.9ha

750mm
1200mm
1500mm
1800mm

No 8 Rd
No 9 Rd
Blundell Rd
York Rd
Nelson Rd
McCartney Way
Dyke Rd
Zylmans Way
Savage Rd
Portside Rd
Hinston Rd
River Rd

RIVER
FRASER

LS

ISSUED FOR DISCUSSION ONLY

McElhanney

Projection: NAD 1983 UTM Zone 10N

City of Delta, VFPA, Earthstar Geographics, Esri Canada, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, NRCan, Parks Canada, Esri, CGIAR, USGS

## TITLE

**Figure 1. Project Overview**

**Project: Portside-Blundell Road Improvements**

Location: Richmond, BC

Scale 1:10,000

0 500 Meters

## INSET


## LEGEND

- Catchments
- Lift Station
- Outfall
- Existing Storm Sewer
- Proposed Road Design

Flow Direction
- Open Ditch
- Storm Sewer
- Overland Flow

Original Paper Size: 11" x 17"

Author: HSHIN

X:\211111.00 - DB Projects\2111-40118-00 Ledcor - Portside-Blundell Rd Imp\7.0 SURVEY & MAPPING\7.1 Figure\Ledcor - Portside-Blundell Rd Imp.aprx

# 2. Background

The project is located in the south-east portion of Richmond within an industrial area that is bordered by the Fraser River to the south and mostly agricultural area on the north, west, and east sides. The area is accessed by No. 8 Road from the north which crosses Blundell Road and a CN Rail yard (both of which run approximately east-west across the area) with controlled at-grade intersections.

Blundell Road is currently two lanes and runs east-west through the middle of the area on the north side of the rail yard. This project will widen Blundell Road to four lanes and construct an overpass across the rail yard to connect Blundell Road to Portside Road on the south side of the rail yard.

Richmond is generally below sea level and is protected by dikes on all sides. The industrial area has been filled to approximately match the City of Richmond's dike design target elevation of 4.7m. The industrial area is drained by a storm sewer along the Blundell Road ROW that outfalls to the Fraser River. Due to the height of the area, the outfall does not need to be pumped or protected by a flap gate.

The surrounding agricultural area is drained by a network of ditches that are pumped to the Fraser River by the Nelson Road South Pump Station and the No. 7 Road South Pump Station.

The drainage catchments were developed based on a site visit by the drainage team on May 26, 2022, record information provided by the City of Richmond, and previous drainage analysis by RF Binnie and Associates (Concept Drainage Design Strategy Report, March 2021) and Urban Systems Ltd (Storm Control Plan, December 2001).

# 3. Analysis Criteria and Methodology

## 3.1. CRITERIA

The documents listed below were reviewed and design criteria were established based on the following order of precedence:

1) Appendix 3 – Vancouver Fraser Port Authority (June 2021)
2) City of Richmond Engineering Design Specifications (November 2019)
3) Study of the Impacts of Climate Change on Precipitation and Stormwater Management (GHD, August 2018)
4) Metro Vancouver Stormwater Design Guidelines (May 2012)
5) Applicable MMCD standards (2009)
6) Any other applicable resource documents

The criteria for the project as determined from the documents are summarized in **Table 1.**

*Table 1: Stormwater Analysis Criteria*

| Parameter | Criteria |
|---|---|
| **Minor System** | 10-year 2-hour and 10-year 24-hour storms with climate change shall be conveyed in the minor system without flooding to the surface |
| **Major System** | Larger storms are permitted to flood to the surface |
| **Downstream Boundary Condition** | 50-year winter flood event in the Fraser River with 1.0m sea level rise |
| **Precipitation increase due to climate change** | 17% based on Pacific Climate Impacts Consortium Plan2Adapt tool; 2100 time horizon with 90% confidence level |
| **Catchbasin spacing** | Based on 700 sq.m of catchment area as per City of Richmond design criteria for roads with less than 1% slope |

## 3.2. DESIGN STORMS

The design storms for the analysis were created using the City of Richmond's 10-year 2-hour and 10-year 24-hour storms and scaling them by a climate change precipitation factor. The factor was obtained from the Pacific Climate Impacts Consortium (PCIC) Plan2Adapt tool for Greater Vancouver for the years 2070-2099, as this was the closest available time horizon to 2100. During winter conditions, the maximum projected precipitation increase is 17% in this region. **Table 2** and **Table 3** show the design storms adjusted for a 17% precipitation increase.

*Table 2: Climate Change Design Storm – 10-year 2-hour*

| Time (min) | Rainfall Intensity (mm/hr) |
|---|---|
| 5 | 10.81 |
| 10 | 10.81 |
| 15 | 21.48 |
| 20 | 21.48 |
| 25 | 12.07 |
| 30 | 12.07 |
| 35 | 12.07 |
| 40 | 12.07 |
| 45 | 14.74 |
| 50 | 14.74 |
| 55 | 15.44 |
| 60 | 15.44 |
| 65 | 28.22 |
| 70 | 28.22 |
| 75 | 2.67 |
| 80 | 2.67 |
| 85 | 5.34 |
| 90 | 5.34 |
| 95 | 8.14 |
| 100 | 8.14 |
| 105 | 2.67 |
| 110 | 2.67 |

| | |
|---|---|
| 115 | 0.00 |
| 120 | 0.00 |

*Table 3: Climate Change Design Storm – 10-year 24-hour*

| Time (hr) | Rainfall Intensity (mm/hr) |
|---|---|
| 1 | 2.12 |
| 2 | 2.21 |
| 3 | 2.33 |
| 4 | 2.47 |
| 5 | 2.63 |
| 6 | 2.84 |
| 7 | 3.12 |
| 8 | 3.52 |
| 9 | 4.14 |
| 10 | 7.84 |
| 11 | 7.84 |
| 12 | 7.84 |
| 13 | 7.84 |
| 14 | 3.79 |
| 15 | 3.30 |
| 16 | 2.97 |
| 17 | 2.74 |
| 18 | 2.55 |
| 19 | 2.40 |
| 20 | 2.27 |
| 21 | 2.16 |
| 22 | 2.07 |
| 23 | 2.04 |
| 24 | 1.99 |

## 3.3. SEA LEVEL RISE AND DOWNSTREAM BOUNDARY CONDITION

A sea level rise (SLR) of 1m was used for the stormwater analysis. This value was obtained from the RF Binnie and Associates report titled Concept Drainage Design Strategy Report (March 2021). This value is commonly used across the lower mainland and is a reasonable design input for this project.

The projected water level of the Fraser River at the drainage outlet location with SLR was determined from the BC Ministry of Forests, Lands, and Natural Resource Operations report titled Simulating the Effects of Sea Level Rise and Climate Change on Fraser River Flood Scenarios. In this report, a maximum water level of 3.63m is anticipated at the drainage outlet for a 1 in 50-year storm during the winter season with a SLR of 1m. This water level was used in the model as the downstream boundary condition.

## 3.4. DRAINAGE MODEL

Single Event computational modelling was undertaken to evaluate the drainage system under the discussed 2100 climate change conditions. A preliminary hydrologic / hydraulic model was developed in PCSWMM 7.2, an adaptation and enhancement of the well-known and widely used United States Environmental Protection Agency's (EPA) Stormwater Management Model (SWMM) version 5.1 developed by Computational Hydraulics International (CHI). PCSWMM requires input parameters to simulate the rainfall-to-runoff and routing processes. Key model parameters used are presented in **Table 4**.

*Table 4: Key Model Parameters*

| Parameters | Value |
|---|---|
| Slope (%) | 0.05 |
| Percent Impervious (%) | 95 |
| Manning's n Impervious | 0.015 |
| Manning's n Pervious | 0.1 |
| Depression Storage Impervious (mm) | 2 |
| Depression Storage Pervious (mm) | 7 |
| Saturated Hydraulic Conductivity* (mm/hr) | 0.6 |
| Suction Head* (mm) | 316.3 |
| Initial Moisture Deficit* | 0.079 |

The results of the preliminary model indicate that the existing drainage infrastructure has capacity to manage the increased flows and sea level rise resulting from climate change. Although several storm mains in the model surcharge as a result of the downstream boundary condition, no flooding occurs. The Hydraulic Grade Line (HGL) is parallel to or converging with the pipe at all times. The HGL dips below the pipe obvert near the Blundell Road and No. 8 Road intersection.

The 10-year 2-hour storm was determined to be the critical storm as it produced the higher HGL levels. The model will continue to be refined based on further surveys, site visits, and geotechnical reports. Additional details about the model and results will be provided in the next submission.

# 4. Closing

We trust the above meets the requirements of the project at this time. Please contact the undersigned should you have any questions or require any clarification.

Sincerely,
The McElhanney Team

Prepared by:

*DRAFT*

Robin Jory, EIT
Design Engineer
RLJory@mcelhanney.com

Reviewed by:

*DRAFT*

Michael Thiessen, P.Eng
Drainage Lead
MThiessen@mcelhanney.com

# APPENDIX A

Statement of Limitations

# Statement of Limitations

***Use of this Report.*** This report was prepared by McElhanney Ltd. ("**McElhanney**") for the particular site, design objective, development and purpose (the "**Project**") described in this report and for the exclusive use of the client identified in this report (the "**Client**"). The data, interpretations and recommendations pertain to the Project and are not applicable to any other project or site location and this report may not be reproduced, used or relied upon, in whole or in part, by a party other than the Client, without the prior written consent of McElhanney. The Client may provide copies of this report to its affiliates, contractors, subcontractors and regulatory authorities for use in relation to and in connection with the Project provided that any reliance, unauthorized use, and/or decisions made based on the information contained within this report are at the sole risk of such parties. McElhanney will not be responsible for the use of this report on projects other than the Project, where this report or the contents hereof have been modified without McElhanney's consent, to the extent that the content is in the nature of an opinion, and if the report is preliminary or draft. This is a technical report and is not a legal representation or interpretation of laws, rules, regulations, or policies of governmental agencies.

***Standard of Care and Disclaimer of Warranties.*** This report was prepared with the degree of care, skill, and diligence as would reasonably be expected from a qualified member of the same profession, providing a similar report for similar projects, and under similar circumstances, and in accordance with generally accepted engineering and scientific judgments, principles and practices. McElhanney expressly disclaims any and all warranties in connection with this report.

***Information from Client and Third Parties.*** McElhanney has relied in good faith on information provided by the Client and third parties noted in this report and has assumed such information to be accurate, complete, reliable, non-fringing, and fit for the intended purpose without independent verification. McElhanney accepts no responsibility for any deficiency, misstatements or inaccuracy contained in this report as a result of omissions or errors in information provided by third parties or for omissions, misstatements or fraudulent acts of persons interviewed.

***Effect of Changes.*** All evaluations and conclusions stated in this report are based on facts, observations, site-specific details, legislation and regulations as they existed at the time of the report preparation. Some conditions are subject to change over time and the Client recognizes that the passage of time, natural occurrences, and direct or indirect human intervention at or near the site may substantially alter such evaluations and conclusions. Construction activities can significantly alter soil, rock and other geologic conditions on the site. McElhanney should be requested to re-evaluate the conclusions of this report and to provide amendments as required prior to any reliance upon the information presented herein upon any of the following events: a) any changes (or possible changes) as to the site, purpose, or development plans upon which this report was based, b) any changes to applicable laws subsequent to the issuance of the report, c) new information is discovered in the future during site excavations, construction, building demolition or other activities, or d) additional subsurface assessments or testing conducted by others.

***Independent Judgments.*** McElhanney will not be responsible for the independent conclusions, interpretations, interpolations and/or decisions of the Client, or others, who may come into possession of this report, or any part thereof. This restriction of liability includes decisions made to purchase, finance or sell land or with respect to public offerings for the sale of securities.