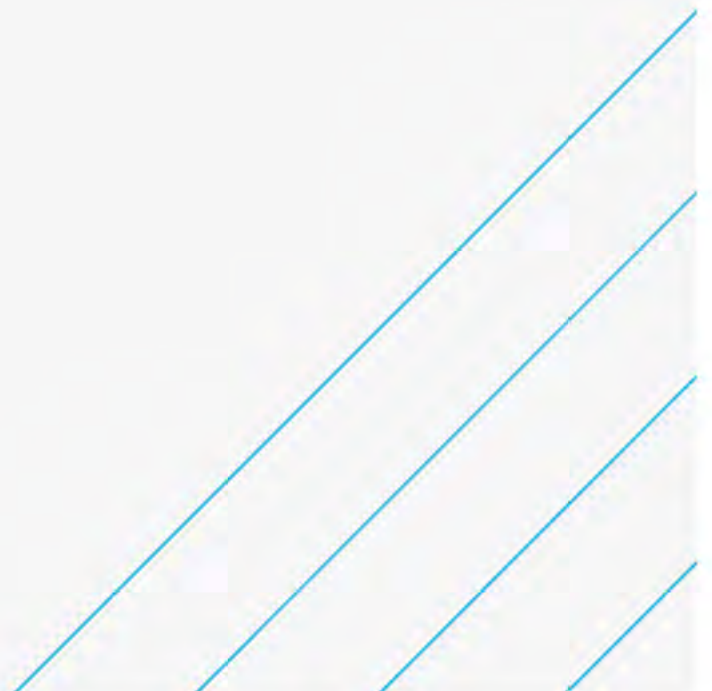


Meadows to George Street - Hanover Street & Market Street

Stage 1 Road Safety Audit

City of Edinburgh Council

September 2022



Notice

This document and its contents have been prepared and are intended solely as information for City of Edinburgh Council and use in relation to active travel improvements at Hanover Street and Market Street as part of the Meadows to George Street scheme.

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This document has 23 pages including the cover.

Document history

Revision	Purpose description	Originated	Checked	Reviewed	Authorised	Date
Rev 1.0	For Issue					12/09/2022

Client signoff

Client	City of Edinburgh Council
RSA team organisation	Atkins
Report title	Meadows to George Street – Hanover Street & Market Street Stage 1 Road Safety Audit
Client Reference	RSA/22/003a
Atkins reference	RSA049_SCO_S1A

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1. Introduction

1.1 Project Details

Report Title	Meadows to George Street – Hanover Street & Market Street Stage 1 Road Safety Audit
Date:	September 2022
Document Reference and Revision:	RSA049_SCO_S1A
Prepared by:	Atkins
Overseeing Organisation:	City of Edinburgh Council

Atkins has been commissioned by City of Edinburgh Council (CEC), to undertake a Stage 1 Road Safety Audit (RSA) on active travel improvements at Hanover Street and Market Street, Edinburgh as part of the Meadows to George Street scheme. This report documents the outcome of the RSA in the form of identified road safety problems and associated recommendations.

To the knowledge of the RSA Team, two previous Stage 1 RSA have been undertaken on the Meadows to George Street scheme. Changes to the design at Hanover Street warrant another Stage 1 audit of this section. The proposals at Market Street have been developed separately, and it therefore has not been included in the previous RSA for the Meadows to George Street scheme.

1.2 Terms of Reference

The RSA has been conducted in accordance with GG 119 Road safety audit, in the Design Manual for Roads and Bridges. The RSA team has examined and reported only on the road safety implications of the highway scheme proposals and has not examined or verified the compliance of the designs to any other criteria. Where there are issues that may be of interest to the Design Organisation, but not necessarily within the scope of the RSA, these have been provided to the Overseeing Organisation separately.

In addition to GG 119, this RSA has been informed by the RSA brief prepared and approved by William Prentice of AECOM.

1.3 RSA Team

The RSA team, approved by Stacey Monteith-Skelton of CEC, was as follows:

[Redacted]

[Redacted]

RSA Team Leader, Atkins Transportation
(Certificate of Competency in RSA, 2017)

[Redacted]

[Redacted]

RSA Team Member, Atkins Transportation

1.4 Site Visit

The RSA comprised a desktop review of the information provided, and a site visit was undertaken during daylight hours on 18th August 2022 between 14:00 and 15:00 with all RSA team members in attendance. During the site visit the road surface was dry and the weather was fine. Traffic levels were busy with no congestion evident. Pedestrian levels were high and cycling levels were low.

1.5 Scope

The Meadows to George Street scheme proposes to enhance walking, cycling and public spaces in Edinburgh's City Centre through the delivery of a north-south active travel link.

The scheme is located on Hanover Street; between Princes Street and George Street, and Market Street; between Waverley Bridge and east of Market Street. Both Hanover Street and Market Street are single carriageway roads with posted 20mph speed limits.

Hanover Street is located within the heart of Edinburgh's City Centre, fronted by a number of shops, restaurants and bars. Market Street provides access to hotels, cafes, and notably to Waverley Train Station.

The scheme proposes:

Hanover Street:

- segregated cycle ways;
- reallocation of road space;
- floating bus stops with associated crossing infrastructure;
- designated taxi and loading bays; and
- associated road markings and signage improvements

Market Street:

- a two-way bus and taxi gate;
- zebra crossing installation;
- designated drop-off areas;
- mini roundabout installation; and
- associated road markings and signage improvements

1.6 Report Outline

Section 2 of this report documents any outstanding issues identified from previous Audit Reports and Section 3 documents the findings of the current RSA stage. Section 4 comprises the RSA Team statement.

Details of the information provided about the scheme are included in Appendix A. Problems and recommendation locations for the current RSA stage are shown on the plan included in Appendix B.

1.7 Notes and Clarifications

The recommendations included within this report should not be regarded as being prescriptive design solutions to the problems raised. They are intended only to indicate a proportionate and viable means of eliminating or mitigating the identified problem; alternative methods should be considered by the Design Organisation. GG 119 provides requirements and advice on the process for responding to this RSA report including the production and agreement of a separate RSA response report. The RSA response report provides the full

audit trail of decision making at each stage of the process and captures the changes made as a result of the recommendations made here.

The Audit Team Leader has previously worked on an adjacent scheme on George Street in Edinburgh. This was raised with the Overseeing Organisation and the Audit Team Leader has been approved to undertake this RSA.

2. Items Outstanding from Previous Audits

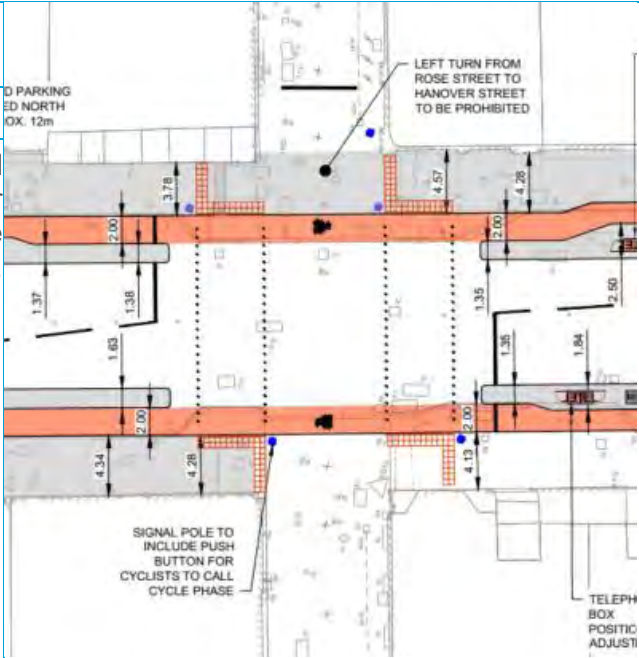
Two previous Stage 1 RSA have been undertaken on the Meadows to George Street scheme. The first in July 2020, and the second in December 2021.

Hanover Street was included in both previous Stage 1 RSA, however due to amendments to the design at this location, warrants another Stage 1 audit. This is the first RSA in which the Market Street proposals have been considered.

No outstanding issues have been identified after examination of the previous Stage 1 RSA at Hanover Street.

3. Items Raised at this Stage 1 RSA

This section details the items raised in this Stage 1 RSA.

Problem:	3.1
Location(s):	Hanover Street at Rose Street
Drawing(s):	60579473-RSA-C-0001
Summary:	Risk of pedestrians and cyclists being injured or struck by vehicles at the signalised crossing facilities. 

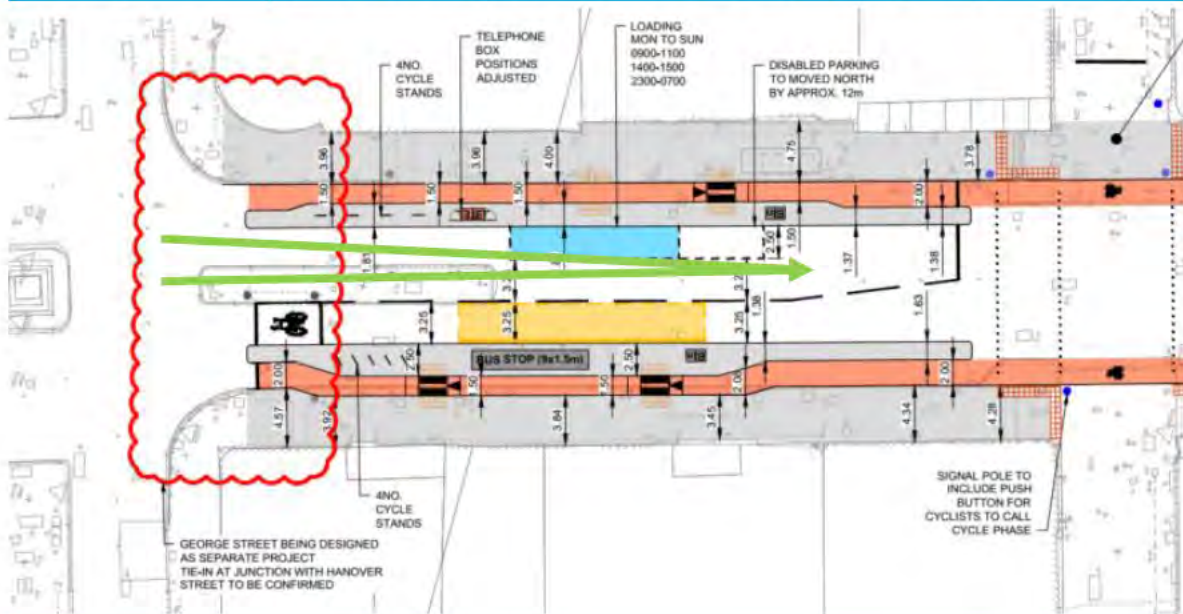
Description:

The proposals include the installation of a second signalised crossing facility on Hanover Street at its junction with Rose Street. Due to the width of the combined crossing facilities, there is a risk that during times of congestion or whilst vehicles are queuing behind loading/unloading buses, that vehicles are within the crossing area during green phases for pedestrians and cyclists. This may give rise to road users conflicts, and with vehicles unable to see the traffic signals, increasing the risk of collisions with pedestrians and cyclists.

Recommendation:

It is recommended that yellow box markings or a similar measure are installed to prevent vehicles from stopping across and between the crossing facilities.

Problem:	3.2
Location(s):	Hanover Street at George Street
Drawing(s):	60579473-RSA-C-0001
Summary:	Risk of side swipe collisions resulting from carriageway narrowing.



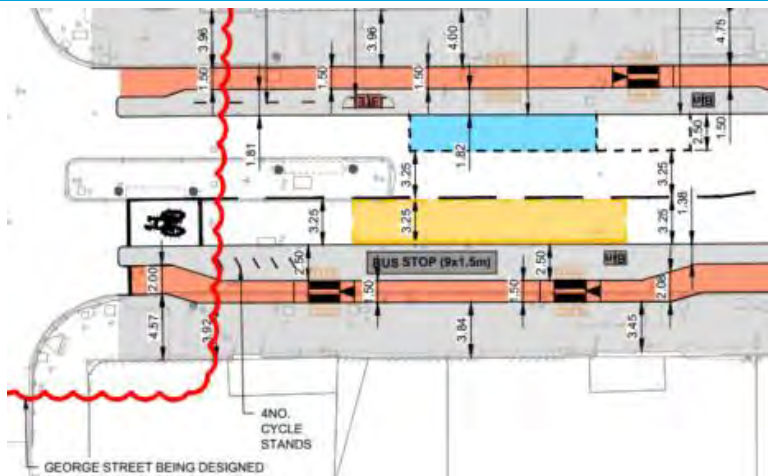
Description:

The southbound carriageway width at Hanover Street, extending from the junction with George Street is 5.75m, before narrowing on the approach to the signalised crossing facilities at the Rose Street junction. It is anticipated that two vehicles may enter Hanover Street side by side, unaware of the lane narrowing, and need to merge ahead. This presents a risk of sudden braking and side swipe collisions.

Recommendation:

It is recommended that the southbound carriageway is reduced to one running lane upon entering Hanover Street to remove the need for vehicles to merge.

Problem:	3.3
Location(s):	Hanover Street – northbound approach to George Street
Drawing(s):	60579473-RSA-C-0001
Summary:	Risk of traffic signals being obscured.



Description:

A Response Report was submitted in response to the previous Stage 1 RSA, specifically in relation to the problem raised (Problem 4.2.2) regarding a stationary bus obscuring forward visibility of the traffic signals. Concerns remain regarding the potential for a waiting/loading bus to obstruct forward visibility to the traffic signals and junction ahead.

Insufficient forward visibility may result in vehicles inadvertently overtaking a stationary bus and being unable to proceed and/or re-join their lane due to queuing vehicles or a red traffic signal. This increases the likelihood of vehicles being stranded in the opposing running lane, which may give rise to head on collisions.

Recommendation:

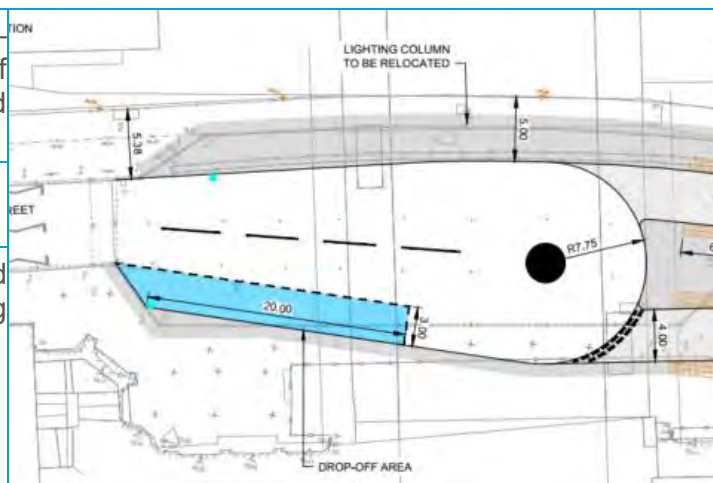
It is recommended that the bus stop is relocated and/or sufficient forward visibility is provided for road users.

Problem: 3.4

Location(s): Market Street turning circle west of the proposed bus and taxi gate.

Drawing(s): 60579473-RSA-C-0002

Summary: Risk of parked vehicles obstructing the bus and taxi gate



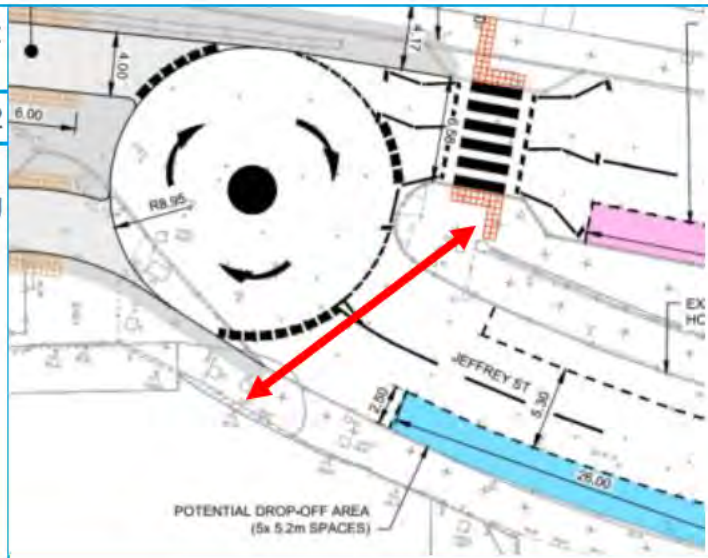
Description:

A drop-off area is proposed southwest of the turning circle, east of Waverley Train Station. It is anticipated that during peak periods if the drop-off area is at capacity, that vehicles will undertake loading/unloading activities around the extents of the turning circle. This increases the likelihood of road user conflicts, including pedestrians, should stationary vehicles obstruct the bus and taxi gate and presents a collision risk between parked vehicles situated outside of the designated drop-off area and those attempting to utilise the turning circle.

Recommendation:

It is recommended that parking restrictions are installed around the extents of the turning circle.

Problem:	3.5
Location(s):	Jeffery Street at Market Street
Drawing(s):	60579473-RSA-C-0002
Summary:	Risk of pedestrians being struck by passing vehicles.



Description:

The proposals do not indicate the provision of pedestrian crossing infrastructure at the junction of Jeffery Street at East Market Street. As this presents a direct route to/from the taxi rank and Jeffery Street, it is anticipated that there will be demand to cross this junction, as observed during the site visit.

Due to the geometry of the Jeffery Street and East Market Street junction, pedestrian visibility of oncoming vehicles is restricted. Visibility is impacted further by the railings that extend between the two streets and the on street parking on Jeffery Street. Insufficient visibility of other road users increases the likelihood of pedestrians being struck by vehicles when attempting to cross the carriageway.

There is a secondary risk that without crossing infrastructure in place, pedestrians may trip and fall over full height kerbs at this location.

Recommendation:

It is recommended that a controlled pedestrian crossing facility is provided on Jeffery Street.

Problem:	3.6	
Location(s):	Jeffery Street	
Drawing(s):	60579473-RSA-C-0002	
Summary:	Risk of vehicles at Jeffery Street failing to give way due to restricted visibility and high vehicle speeds	

Description:

There is limited visibility from Jeffery Street towards East Market Street due to the area's topography, railings (which during the site visit were covered in adverts) and stationary vehicles in the taxi rank on East Market Street. Traffic emerging from Jeffery Street must give-way to traffic from East Market Street but as a result of visibility limitations there is a risk that drivers inadvertently emerge from Jeffery Street and collide with oncoming vehicles.

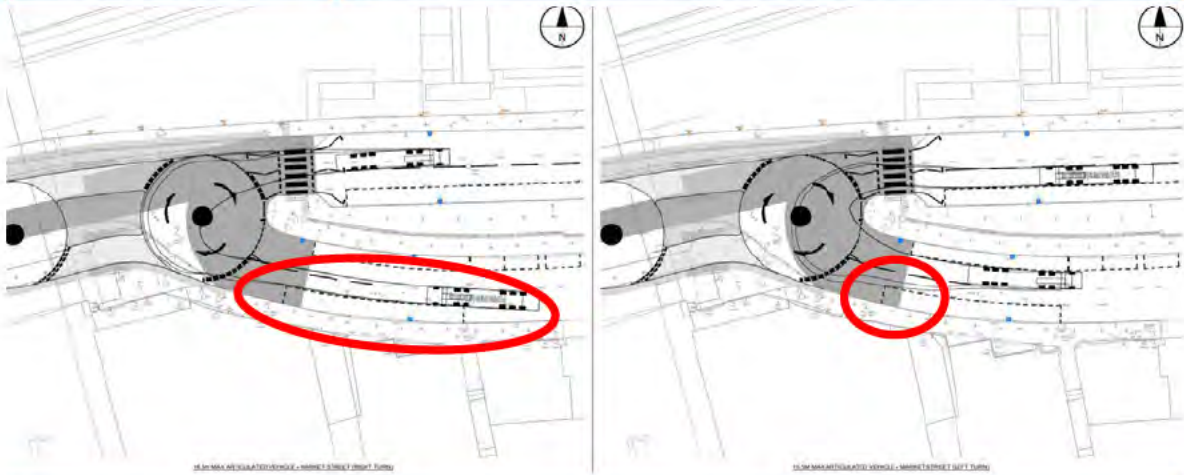
This risk is exacerbated by the carriageway width and downhill gradient at Jeffery Street which may result in drivers approaching the mini roundabout at an inappropriate speed. This increases the likelihood of sudden braking leading to rear end shunt collisions and/or vehicles overshooting the roundabout.

The risk is increased as drivers from East Market Street are likely to be looking towards Market Street and less aware of vehicles emerging from Jeffery Street.

Recommendation:

It is recommended that a sufficient visibility splay is provided between East Market Street and Jeffery Street and that measures are installed, such as advanced warning signage and/or traffic calming, to encourage drivers to moderate their speed on the Jeffery Street approach to the roundabout. Additionally, it is recommended that the proposed zebra crossing facility at East Market Street is located on a raised table to slow users entering the roundabout from this arm.

Problem:	3.7
Location(s):	Jeffery Street
Drawing(s):	60579473-RSA-C-2603
Summary:	Risk of head-on vehicle collisions resulting from large vehicles crossing into the opposing lane to complete turning manoeuvres.



Description:

From the vehicle swept path plans provided, the turning manoeuvre of a 16.5m articulated vehicle involves crossing the centreline of both Jeffery Street and East Market Street when negotiating the junction. This increases the risk of head-on collision between vehicles which is exacerbated by the lack of intervisibility between Jeffery Street and East Market Street (see problem 3.7).

In addition, the swept path indicates that vehicles will encroach into the drop-off area proposed on Jeffery Street.

Recommendation:

It is acknowledged that the geometry of the road layout is challenging, however, it is recommended that:

- Opposing traffic movements are subject to control to manage access to the junction space; and
- The drop-off area is relocated eastwards so that an articulated vehicle can manoeuvre into and out of Jeffery Street without encroaching into it.

Problem:	3.8	
Location(s):	Jeffery Street at East Market Street	
Drawing(s):	60579473-RSA-C-0002	
Summary:	Risk of vehicles mounting the pavement whilst turning left into Jeffery Street	

Description:

During the site visit, the RSA Team observed severe footway defects at the corner of Jeffery Street and East Market Street. The damaged footway is likely to result from vehicles mounting the footway whilst attempting to turn left onto Jeffery Street. This presents a risk to pedestrians who may be struck by turning vehicles inadvertently mounting the footway. The footway defects present a secondary risk to pedestrians who may trip and fall over the cracked and uneven slabs.

Recommendation:

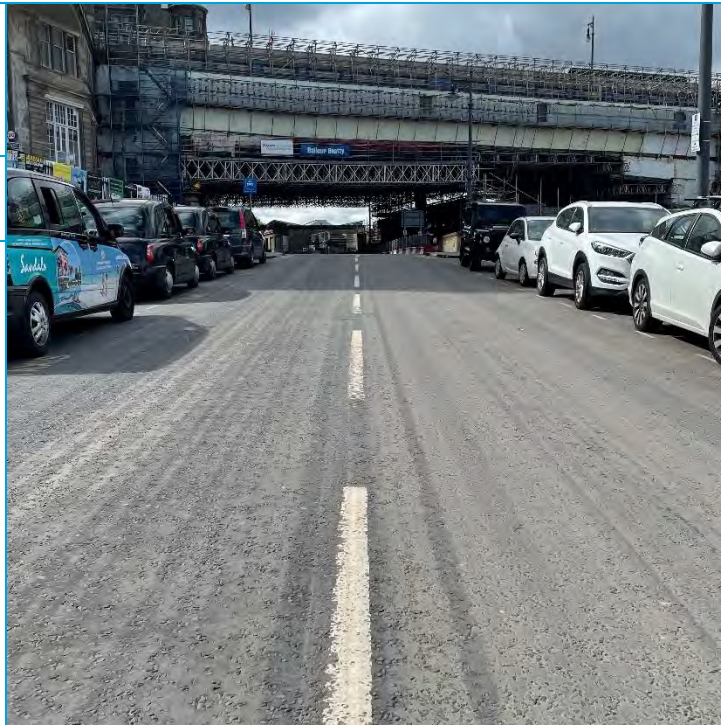
It is recommended that the junction layout is revised to ensure vehicles can turn into Jeffery Street without mounting the footway. Furthermore, it is recommended that the footway is resurfaced to remove any potential trip hazards.

Problem: 3.9

Location(s): East Market Street – westbound approach to the proposed bus and taxi gate

Drawing(s): 60579473-RSA-C-0002

Summary: Risk of loss of control collisions at the bus and taxi gate.



Description:

The East Market Street approach to the proposed mini roundabout is on an incline. Due to this gradient there is a risk that taxis and buses intending to travel ahead onto Market Street, do not have adequate forward visibility of the road layout ahead (see above image).

Drivers may be unaware of the give way or the change in alignment due to the roundabout. This increases the likelihood of vehicles approaching the roundabout at inappropriate speeds and / or failing to give way, subsequently losing control and colliding with other road users and/or the bus and taxi gate infrastructure.

This risk is exacerbated by the see-through effect observed for westbound traffic on East Market Street which is due to the incline, parked vehicles and the perception of a straight road alignment. These factors may also reduce driver visibility of pedestrians approaching/intending to use the proposed zebra crossing facility. This increases the likelihood of pedestrians being struck by vehicles failing to give way.

Recommendation:

It is recommended that advanced warning of the roundabout and zebra crossing is provided and that measures are installed to slow vehicles approaching from East Market Street, such as raising the zebra crossing facility (see Problem 3.6).

4. RSA Team Statement

We certify that this Road Safety Audit has been carried out in accordance with GG 119.

AUDIT TEAM LEADER:

Name: _____

Position: Principal Engineer

Organisation: Atkins

Signed: _____

Date: 12/09/22

AUDIT TEAM MEMBER:

Name: _____

Position: Engineer

Organisation: Atkins

Signed: _____

Date: 12/09/22

Appendices

Appendix A. Drawings and Documents

A.1. Drawings

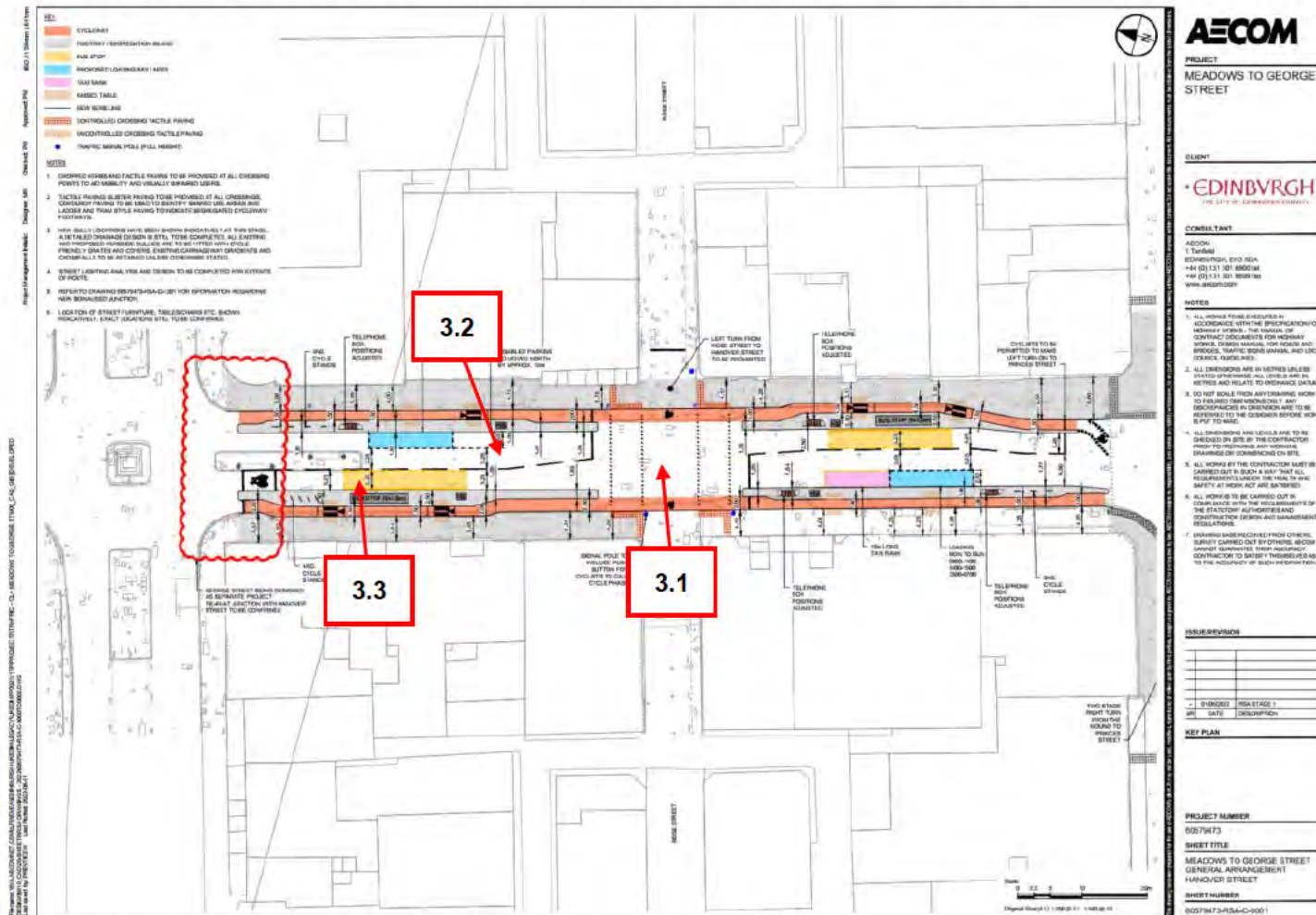
Reference	Description	Revision	Date
60579473-RSA-C-0000	Overview	-	01/06/22
60579473-RSA-C-0001	Hanover Street General Arrangement	-	01/06/22
60579473-RSA-C-0002	Market Street General Arrangement	-	01/06/22
60579473-RSA-C-0901	Pavement Construction Details	-	01/06/22
60579473-RSA-C-1201	Hanover Street / Rose Street Traffic Signals Layout	-	01/06/22
60579473-RSA-C-2601	Hanover Street / Rose Street Vehicle Swept Paths Sheet 1 of 4	-	01/06/22
60579473-RSA-C-2602	Hanover Street / Rose Street Vehicle Swept Paths Sheet 2 of 4	-	01/06/22
60579473-RSA-C-2603	Hanover Street / Rose Street Vehicle Swept Paths Sheet 3 of 4	-	01/06/22
60579473-RSA-C-2604	Hanover Street / Rose Street Vehicle Swept Paths Sheet 4 of 4	-	01/06/22
60579473_MGS_TrafficOps_v3.1	Proposed Traffic Operations	-	-
60579473_MGS_Collision_Analysis	Collision data and analysis for Meadows to George Street main route corridor project extents	-	-
Middle Meadow Walk to George Street Acc Plot	Collision data within Meadows to George Street main route corridor project extents	-	-
60579473_PfE MGS - Market St_Collision_Analysis_v0.0	Collision data and analysis for Market Street	-	-
60579473_MarketSt_CollisionAnalysis_Type	Collision data for Market Street plotted by type	-	-
60579473_MarketSt_CollisionAnalysis_Severity	Collision data for Market Street plotted by severity	-	-

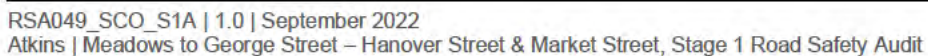
A.2. Documents

Type	Reference	Revision	Date
RSA brief	RSA/22/003a	-	-
Meadows _George St Eburgh RSA1	Stage 1 Road Safety Audit of main route corridor – Wyllie Lodge Ltd		Dec - 21
Meadows to George Street RSA1	Stage 1 Road Safety Audit of main route corridor – Aecom	-	Oct - 20

Appendix B. Location of Problems

Note: Locations of problems, and associated recommendations, are approximate only.





Atkins Limited
2 Atlantic Square
York Street
Glasgow
G2 8JQ
Tel: +44 (0)141 220 2000
@atkinsglobal.com

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