

# Appendix 12-2

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Road Safety Audit



## **Stage 1 Road Safety Audit**

**Mixed Use Development, Crown Square, Galway City**

**On behalf of Crown Square Developments Ltd**

Prepared By:

**CST Group** Chartered Consulting Engineers  
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**October 2018**

**Civil**  
**Structural**  
**Traffic**

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## Document History

<b>Revision</b>	RO	RO							
<b>Purpose of Issue:</b> P=Preliminary PG=Progress C=Comment I=Information PL=Planning T=Tender CN=Construction	P	PL							
<b>Date:</b>	16 10 18	19 10 18							
<b>Originator:</b>	SS	SS							
<b>Checked By:</b>	PB	PB							
<b>Approved By:</b>	SS	SS							

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## 1. Introduction

- 1.1 This report describes a Stage 1 Road Safety Audit carried out on proposed public road alterations on the R336 Tuam Road, R339 Monivea Road and Joyce's Road that connects these two. Additionally, there are two site access junctions to the proposed development included within the audit scope. The audit has been undertaken on behalf of Crown Square Developments Ltd. The audit was carried out between 12<sup>th</sup> – 15<sup>th</sup> October 2018.
- 1.2 The audit team were as follows:
- Team Leader:*
- Stuart Summerfield, HNC (Civil) MCIHT FSoRSA, Partner  
Certificate of Competency in Road Safety Audits (SoRSA, Jul 2015)  
TII Auditor Ref. SS73290
- Team Member*
- Philip Bayfield, Chartered Engineer, BE MSc CEng MIEI, Senior Engineer  
TII Auditor Ref. PB106343.
- 1.3 The audit comprised an examination of the drawings relating to the scheme supplied by the design office. A site visit was carried out by both audit team members together on 14<sup>th</sup> October 2018 between the hours of 12:00-13:30. Weather conditions during the inspection were dry and sunny and the road surface was dry. Photographs were taken during the inspection.
- 1.4 This Stage 1 audit has been carried out in accordance with the relevant sections of the Transport Infrastructure Ireland (TII) Publication (Standard) GE-STY-01024 (Dec 2017) 'Road Safety Audit'. The audit team has examined only those issues within the design relating to the road safety implications of the scheme and has therefore not examined or verified the compliance of the design to any other criteria.
- 1.5 Limited information has been provided for consideration in this audit. It is suggested that the scheme is offered for a Stage 2 Audit upon completion of detailed design.
- 1.5 Appendix A describes the documents examined by the audit team.
- 1.6 All of the problems described in this report are considered by the audit team to require action in order to improve the safety of the scheme and minimise accident occurrence.

## 2. Items Resulting from This Stage 1 Audit

### 2.1 Collision Data

Collision data has not been supplied with this scheme.

Road Collision Data available on the Road Safety Authority Database, within the period 2005 to 2014, recorded a total of 5 collision at the Monivea Road junction and a single collision at the Tuam Road junction. All collisions are recorded as Minor collisions.

### 2.2 General Problems / Problems at Multiple Locations

#### 2.2.1 Road Cross Section

**Problem:** The proposed road cross section does not show any change in levels between the carriageway – cycleway – footpath.

**Hazard:** Vehicles may stray into vulnerable users' space.

**Recommendation:** Provide vertical segregation between the various users.

#### 2.2.2 Street Lighting

**Problem:** The existing street lights in the area are approximately 6m high with what is believed to be high pressure sodium lanterns.

**Hazard:** The proposed widened carriageway may not be adequately illuminated by the existing street lights.

**Recommendation:** Ensure adequate street lighting is provided.

#### 2.2.3 Road Markings

**Problem:** Incorrect line markings used throughout.

**Hazard:** Users may misunderstand their intended route through the network and impact with other users.

**Recommendation:** All road markings should be in compliance with the Traffic Signs Manual.

#### 2.2.4 Formation of Bus Lanes

**Problem:** The proposals indicate provision of ghost islands in advance of the bus lane to force traffic to the near side of the carriageway prior to shifting all bus busses to the right.

**Hazard:** Cyclists are at risk of being 'squeezed' by other road users as they are forced to the near side of the carriageway. Additionally, the provision of the ghost islands prohibits access to other properties for right turning vehicles.

**Recommendation:** Omit the ghost island. Form the bus lane as typically provided elsewhere in the city.

#### 2.2.5 Exits from Development

**Problem:** Dual lanes exits are provided from the development.

**Hazard:** Adjacent exiting vehicles may restrict visibility to the public road for each other. Errant entry into the path of oncoming traffic may result.

**Recommendation:** Provide a single exit lane only.

#### 2.2.6 Signalised Junctions

**Problem:** The location of the signals is incorrect in relation to the stop line. Also, secondary signals are not shown.

**Hazard:** Drivers who proceed to the stop line will not have sight of any signal heads.

**Recommendation:** Provide a 'standardised' signal arrangement.

#### 2.2.7 Junction Radii

**Problem:** The Junction Radii throughout the proposals seem large.

**Hazard:** Large radii will increase the pedestrian crossing distance of the junction.

**Recommendation:** Reduce the junction radii in compliance with the desires of the Design Manual for Urban Roads and Streets.

## 2.3 Problems at Specific Locations

### 2.3.1 Tuam Road Northern Kerb/footpath

**Problem:** The existing kerb is laid to a low level and is damaged by over-running of vehicles. This is assumed to be as a result of right turning traffic being under-passed by straight ahead traffic.

**Hazard:** Impact with pedestrians on the footpath may result.

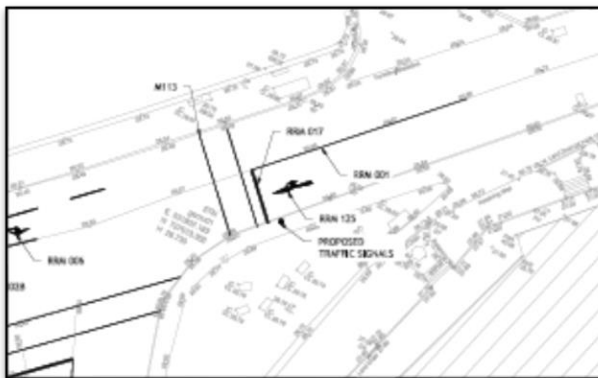
**Recommendation:** Move the existing road centre-line to the south in order to provide wider eastbound lanes on Tuam Road into this junction.

### 2.3.2 Tuam Road – Westbound Approach

**Problem:** Road Marking Arrow RM 125 indicates a right turn is permitted.

**Hazard:** Users in dark conditions may believe an entry to the hotel is provided at this location and impact with the northern kerb.

**Recommendation:** Amend this arrow to point to the left.



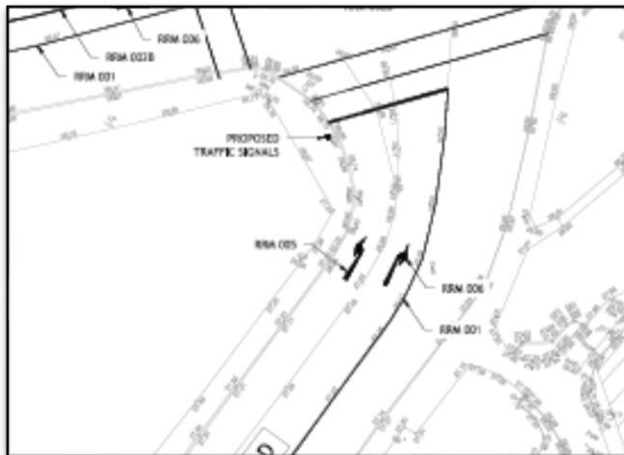
### 2.3.3 Joyce's Road Signals at Tuam Road Junction

**Problem:** Northbound traffic on Joyce's Road will not have adequate forward visibility of the signal head.

**Hazard:** Overshoot into the junction may result

**Recommendation:** Redesign the junction to provide adequate forward visibility, ensuring inter-visibility between junction arms remains.



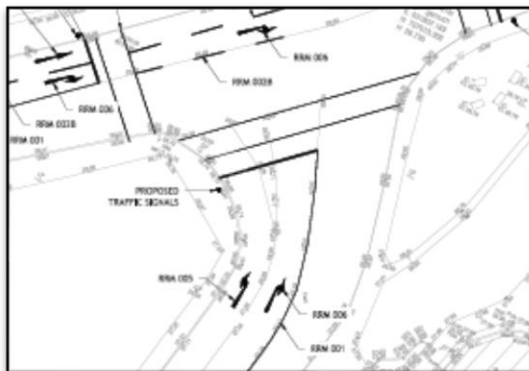


### 2.3.4 Tuam Road Junction – Pedestrian crossing of Joyce’s Road

**Problem:** Pedestrians have a long road crossing to negotiate on the Joyce’s Road arm of the crossing.

**Hazard:** Frail or infirm users may have difficulty in completing the crossing in the ‘green man’ phase of the crossing. These users are at risk of vehicle impact.

**Recommendation:** Undertake vehicle swept path analysis in attempt to tighten up this arm.



### 2.3.5 Tuam Road Junction – Pedestrian Crossing of Joyce’s Road

**Problem:** Pedestrians crossing southwest to northeast will have limited visibility of approaching traffic.

**Hazard:** Pedestrians who ignore the Red Man and enter the crossing are at risk if being struck by Joyce’s Road traffic who are shown a green light. This is considered a particular problem during off peak dark hours when pedestrians wrongly believe no traffic is approaching the junction.

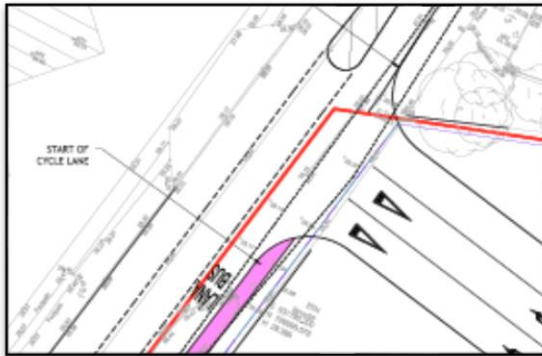
**Recommendation:** Provide visibility for pedestrians.

### 2.3.6 Formation of Cycle Lane at Northern Development Junction

**Problem:** Cyclists on Joyce's Road will aim for the start of the cycle lane. Vehicles exiting the development may believe their correct location to yield on exit is at the edge of the bus lane.

**Hazard:** Impact with cyclists may result.

**Recommendation:** Extend the cycle lane through the junction.



### 2.3.7 Drop-off point on Joyce's Road

**Problem:** The drop off point on Joyce's Road is wide with shallow tapers.

**Hazard:** Multiple vehicles may stack in the drop off bay and queue out into the cycle lane and/or multiple vehicles may attempt to exit the bay at the same time. Impact with cyclists may result.

**Recommendation:** Provide suitable road markings to provide guidance in use to patrons.

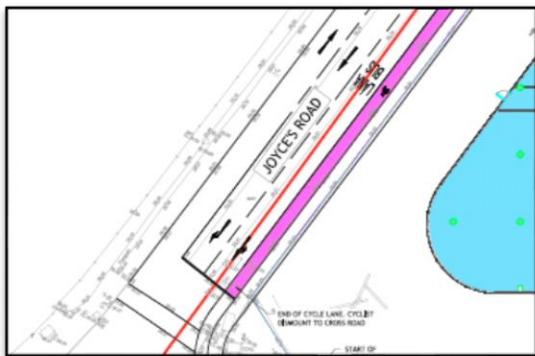


### 2.3.8 Joyce's Road Bus Lane on Approach to Monivea Road Junction

**Problem:** The bus lane continues up to the signalised junction.

**Hazard:** Some left turning and straight non-bus traffic may believe entry into this lane is prohibited and remain in the offside lane. Side on impact with nearside lane traffic may result when these users attempt to turn left.

**Recommendation:** Terminate the bus lane in advance of the junction.

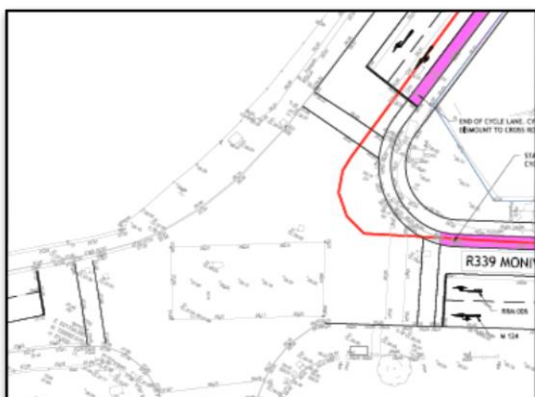


### 2.3.9 Cyclist provision on Joyce's Road approach to Monivea Road Junction

**Problem:** Cyclists wishing to turn right at this junction without dismounting are not catered for.

**Hazard:** Cyclists may stay on the cycle lane up to the junction and turn right across left turning traffic. Impact may result.

**Recommendation:** Provide suitable facilities to enable on-road cyclists to turn right safely at this junction. The design team should note Galway City Council have provided 'Box turns' elsewhere as detailed in the National Cycle Manual.

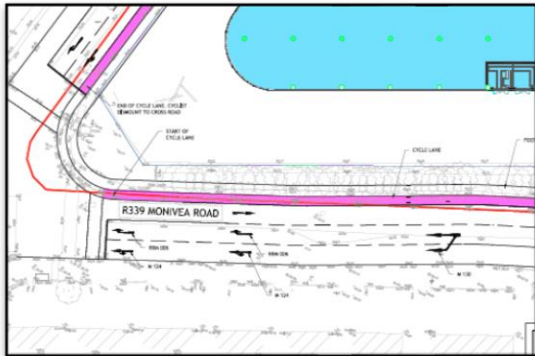


### 2.3.10 Westbound Monivea Road Approach to Signalised Junction

**Problem:** Some 'straight ahead' traffic may arrive at the junction in the offside lane, with others obeying the road markings and occupying the near side lane.

**Hazard:** Side impact may occur as both vehicles attempt to exit the junction into the single lane.

**Recommendation:** Widen the exit of the junction to permit dual lane exit.



### 2.3.11 Monivea Road Cycle Lane

**Problem:** The cycle lane will be to an uphill gradient. The cross section indicates a 0.75m wide provision for cyclists. Differential speeds between cyclists is likely due to the uphill gradient.

**Hazard:** Cyclists overtaking slower cyclists are at risk of impact from main carriageway traffic.

**Recommendation:** Widen the cycleway.

### 2.3.12 Monivea Road Bus Stop

**Problem:** The existing bus stop is approximately 80m east of Joyce's Road junction. Cyclists will need to depart the cycle lane in order to pass this bus.

**Hazard:** Cyclists may be struck by motorised traffic.

**Recommendation:** Extinguish this bus stop.

### 2.3.13 Drop-off Point on Monivea Road

**Problem:** The drop off point on Monivea Road is wide with shallow tapers.

**Hazard:** Multiple vehicles may stack in the drop off bay and queue out into the cycle lane and/or multiple vehicles may attempt to exit the bay at the same time. Impact with cyclists may result.

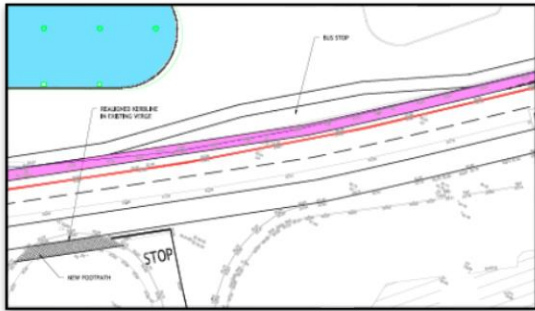
**Recommendation:** Provide suitable road markings to provide guidance in use to patrons.

### 2.3.14 Proposed New Bus Bay on Monivea Road

**Problem:** The bus bay appears narrow.

**Hazard:** The bus may partially occupy the cycle lane thus forcing cyclists into the vehicular carriageway.

**Recommendation:** Ensure the bus bay has adequate width.

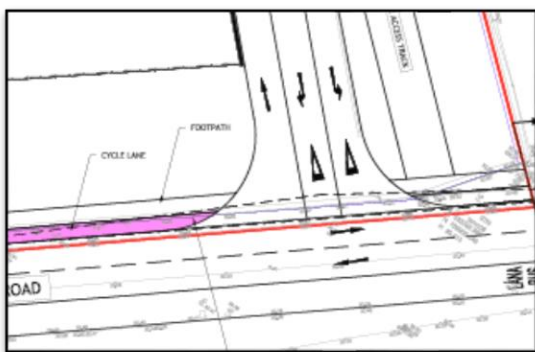


### 2.3.15 Termination of Cycle Lane at Development Junction

**Problem:** Cyclists departing the cycle lane will be close to the nearside road edge.

**Hazard:** Vehicles exiting the development may proceed to the edge of the main carriageway prior to yielding. Impact with cyclists may result.

**Recommendation:** Extend the cycle lane to the far side of the development junction.

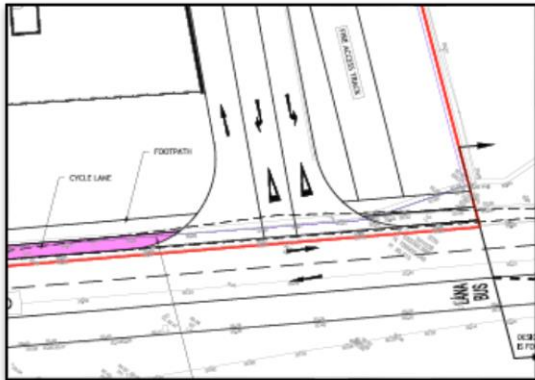


### 2.3.16 Fire Tender Access of Monivea Road

**Problem:** No details of the interface of the fire tender access with the public road have been shown.

**Hazard:** Errant public access to the lane may result.

**Recommendation:** The design team should ensure only the fire tender can access this lane.



### 2.3.17 Development Access off Monivea Road – Right Turning.

**Problem:** Vehicles waiting to turn right into the development will hinder the passage of straight-ahead traffic. Waiting users may suddenly switch lane into the adjacent bus lane to undertake these vehicles.

**Hazard:** Side impact with bus lane traffic may result.

**Recommendation:** Commence the bus lane to the south-west of the development junction.

### 2.3.18 Greenway Development to South of Monivea Road

**Problem:** No details are given for road junctions to the ongoing Greenway Development to the opposite side of Monivea Road.

**Hazard:** Conflicting traffic movements may result.

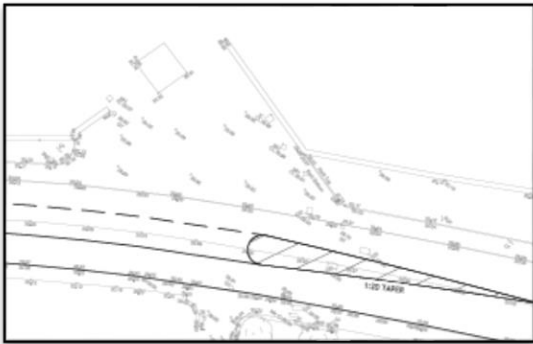
**Recommendation:** The Design Team should ensure these proposals do not interfere with the Greenway Development.

### 2.3.19 Access to Eir Offices

**Problem:** The proposed road markings for Monivea Road effectively prohibits right turning into the adjacent Eir offices.

**Hazard:** Eir traffic may undertake 'u' turns in the development junctions and impact with other development users.

**Recommendation:** Ensure access to the Eir offices is not prohibited.



### 3. Audit Team Statement

We certify that we have examined the drawings and other information listed in Appendix A. This examination has been carried out with the sole purpose of identifying any features of the design that could be removed or modified to improve the safety of the scheme. The problems that we have identified have been noted in the report, together with suggestions for improvement which we recommend should be studied for implementation. No one in the audit team has been involved with the scheme design as shown in Appendix A.

Signed  .....  
Stuart Summerfield  
TII Approved Audit Team Member

Date *15<sup>th</sup> October 2018* .....

Signed  .....  
Philip Bayfield  
TII Approved Audit Team Member

Date *15<sup>th</sup> October 2018* .....



## **Appendix A      List of Documents Examined**

PUNCH Consulting Engineers drawings:

183106-SK010 PR2 – Proposed Road Re-alignment - Sheet 1 of 5

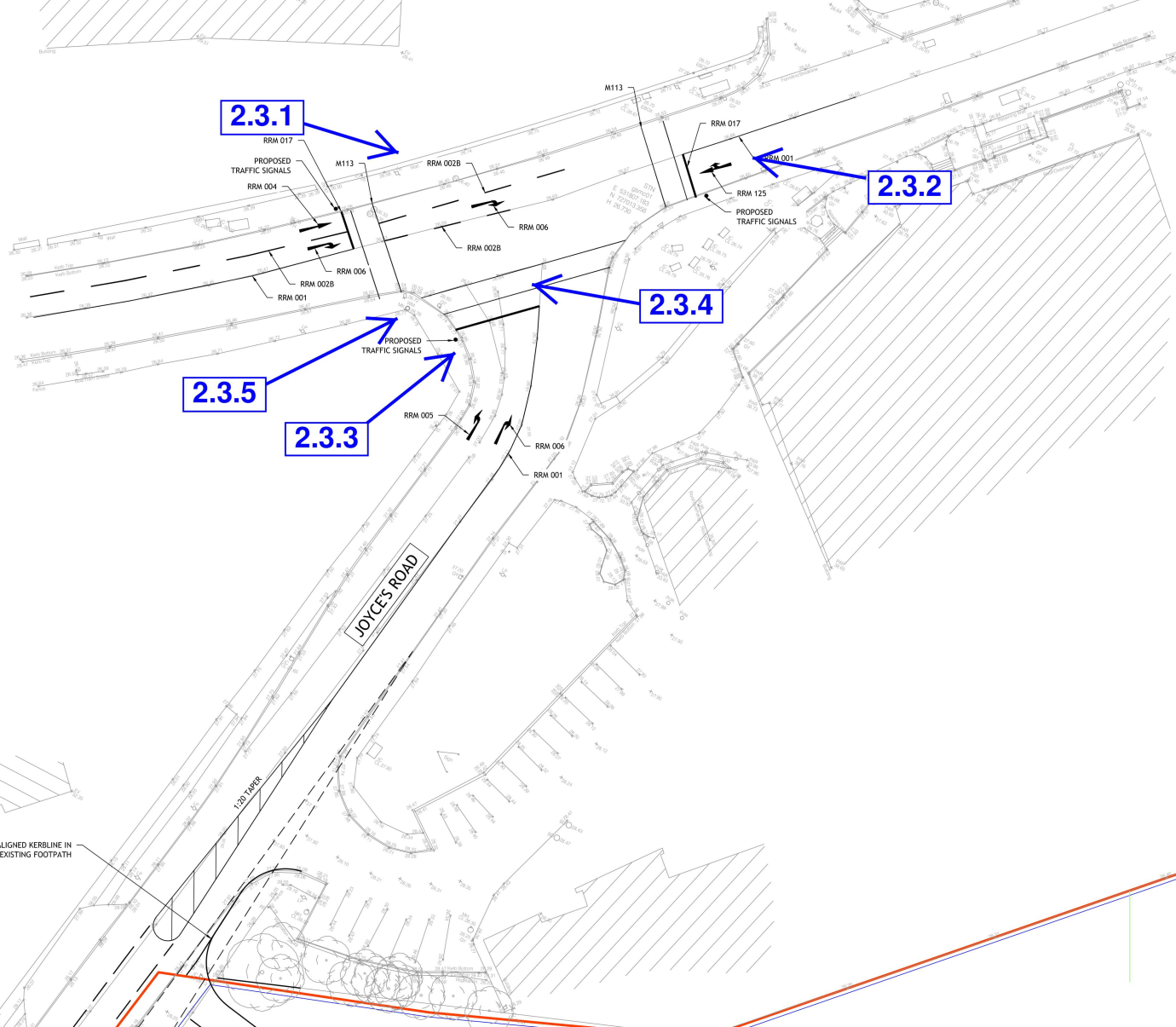
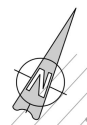
183106-SK011 PR2 – Proposed Road Re-alignment - Sheet 2 of 5

183106-SK012 PR2 – Proposed Road Re-alignment - Sheet 3 of 5

183106-SK013 PR2 – Proposed Road Re-alignment - Sheet 4 of 5

183106-SK014 PR2 – Proposed Road Re-alignment - Sheet 5 of 5

## **Appendix B      Problem Location Plan**



**LEGEND:**

VISIBILITY SPLAY & ENVELOPE OF VISIBILITY

PROPOSED EXTENT OF DEVELOPMENT

LAND WITHIN DEVELOPERS OWNERSHIP

**NOTES:**

1. ALL ROAD MARKINGS TO BE IN ACCORDANCE WITH CHAPTER 7 OF THE DEPARTMENT OF TRANSPORT TRAFFIC SIGNS MANUAL.
2. ROAD MARKINGS SHOWN ARE TO ILLUSTRATE DESIGN INTENT FOR PLANNING APPLICATION PURPOSES AND ARE SUBJECT TO GALWAY CITY COUNCIL APPROVAL.



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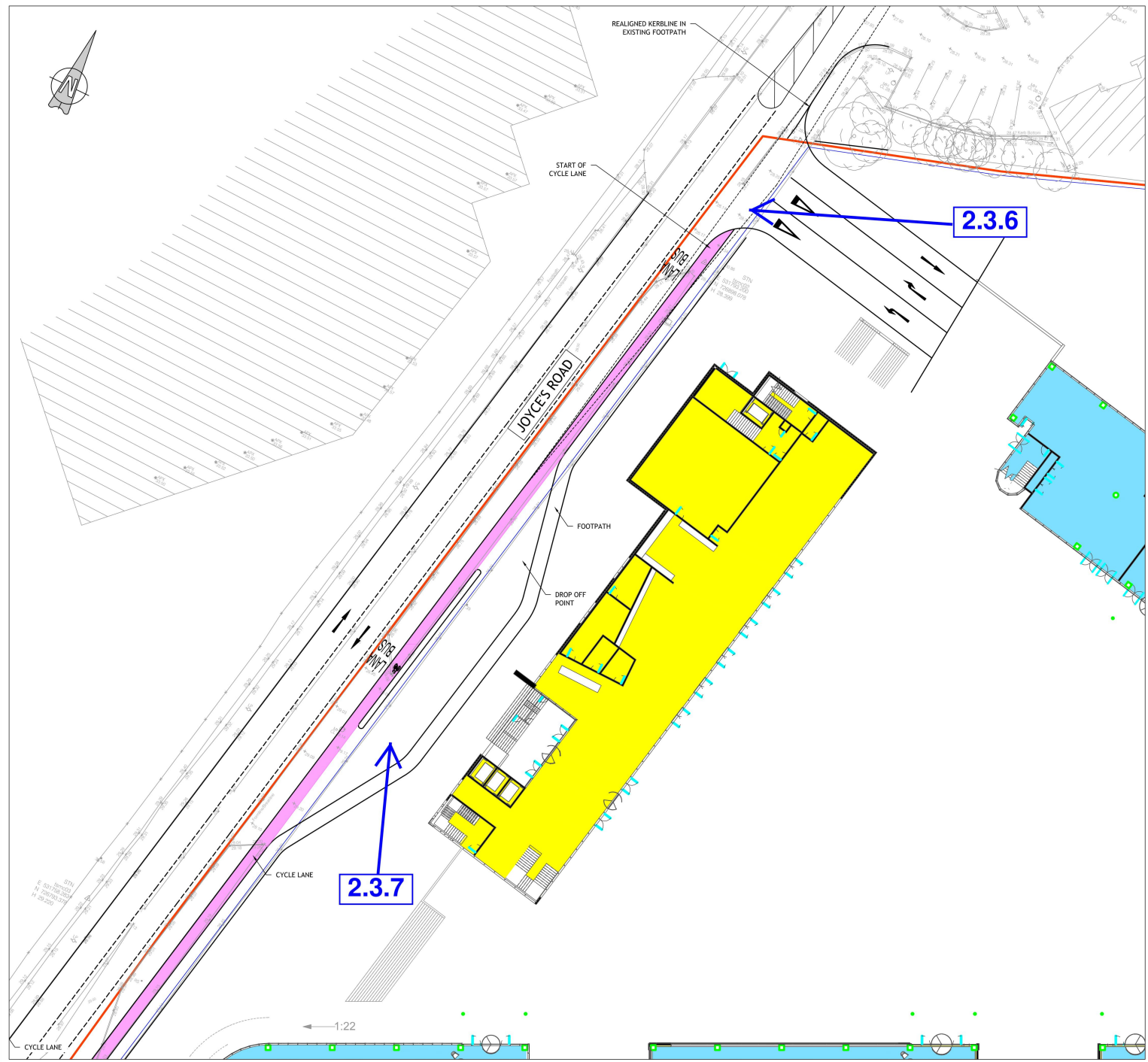


Rev	Amendment	By	Date
PR1	PRELIMINARY ISSUE	JB	10/10/2018
PR2	PRELIMINARY ISSUE	JB	11/10/2018

Client:

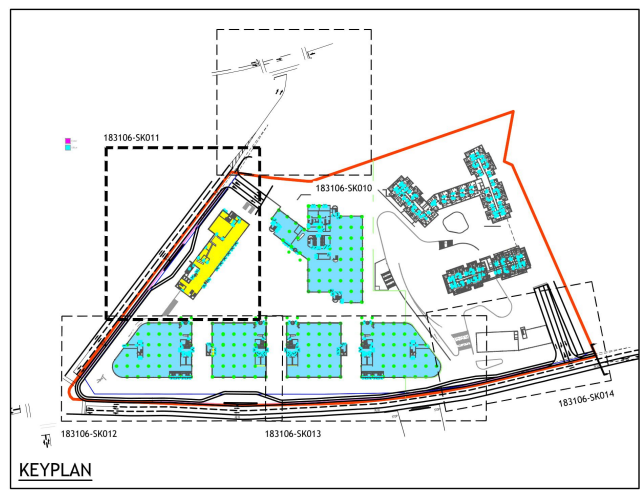
Job: CROWN SQUARE, GALWAY  
 Title: PROPOSED ROAD RE-ALIGNMENT - SHEET 1 OF 5  
  
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 Carnegie House, Library Road, Dun Laoghaire, Co. Dublin, A96 C7W7  
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Stage: PRELIMINARY  
 Scale: A1: 1:250  
 Technician Check: IBS  
 Engineer Check: RB  
 Approved:  
 Drawing No: 183106-SK010\_PR2



- LEGEND:**
- VISIBILITY SPLAY & ENVELOPE OF VISIBILITY
  - PROPOSED EXTENT OF DEVELOPMENT
  - LAND WITHIN DEVELOPERS OWNERSHIP

- NOTES:**
1. ALL ROAD MARKINGS TO BE IN ACCORDANCE WITH CHAPTER 7 OF THE DEPARTMENT OF TRANSPORT TRAFFIC SIGNS MANUAL.
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PR2	PRELIMINARY ISSUE	JS	11/10/2018

Client:

Job: CROWN SQUARE, GALWAY  
 Title: PROPOSED ROAD RE-ALIGNMENT - SHEET 2 OF 5  
  
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Stage: PRELIMINARY  
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 Technician Check: IBS  
 Engineer Check: IBS  
 Approved:  
 Drawing No: 183106-SK011 PR2

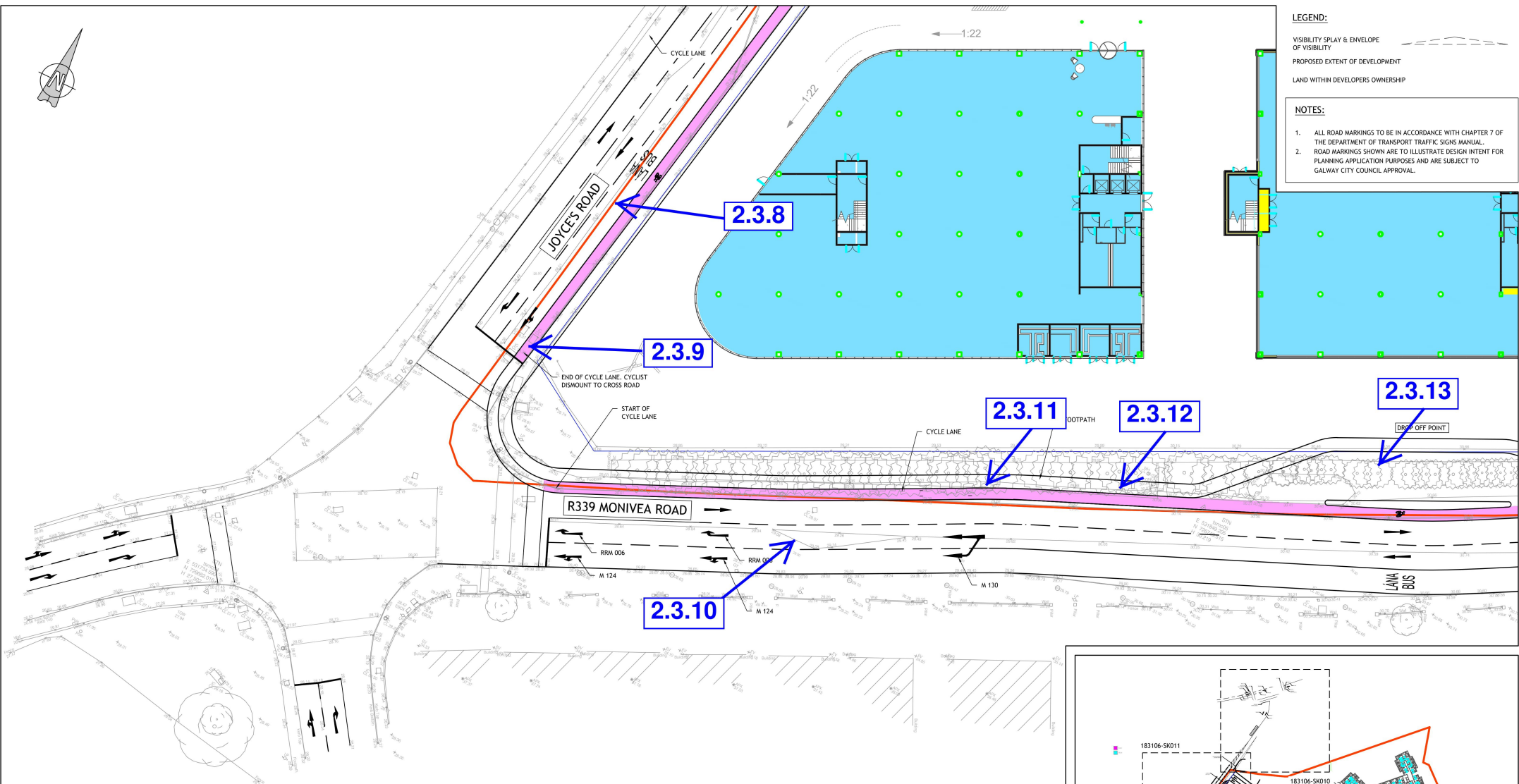


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Client:

Job: CROWN SQUARE, GALWAY

Title: PROPOSED ROAD RE-ALIGNMENT - SHEET 3 OF 5

Scale: @ A1: 1:250

Engineer Check: IBS

Approval:

Client: **PUNCH** consulting engineers Dublin Limerick Cork Galway Glasgow

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Stage: PRELIMINARY

Rev: 183106-SK012 PR2

**LEGEND:**

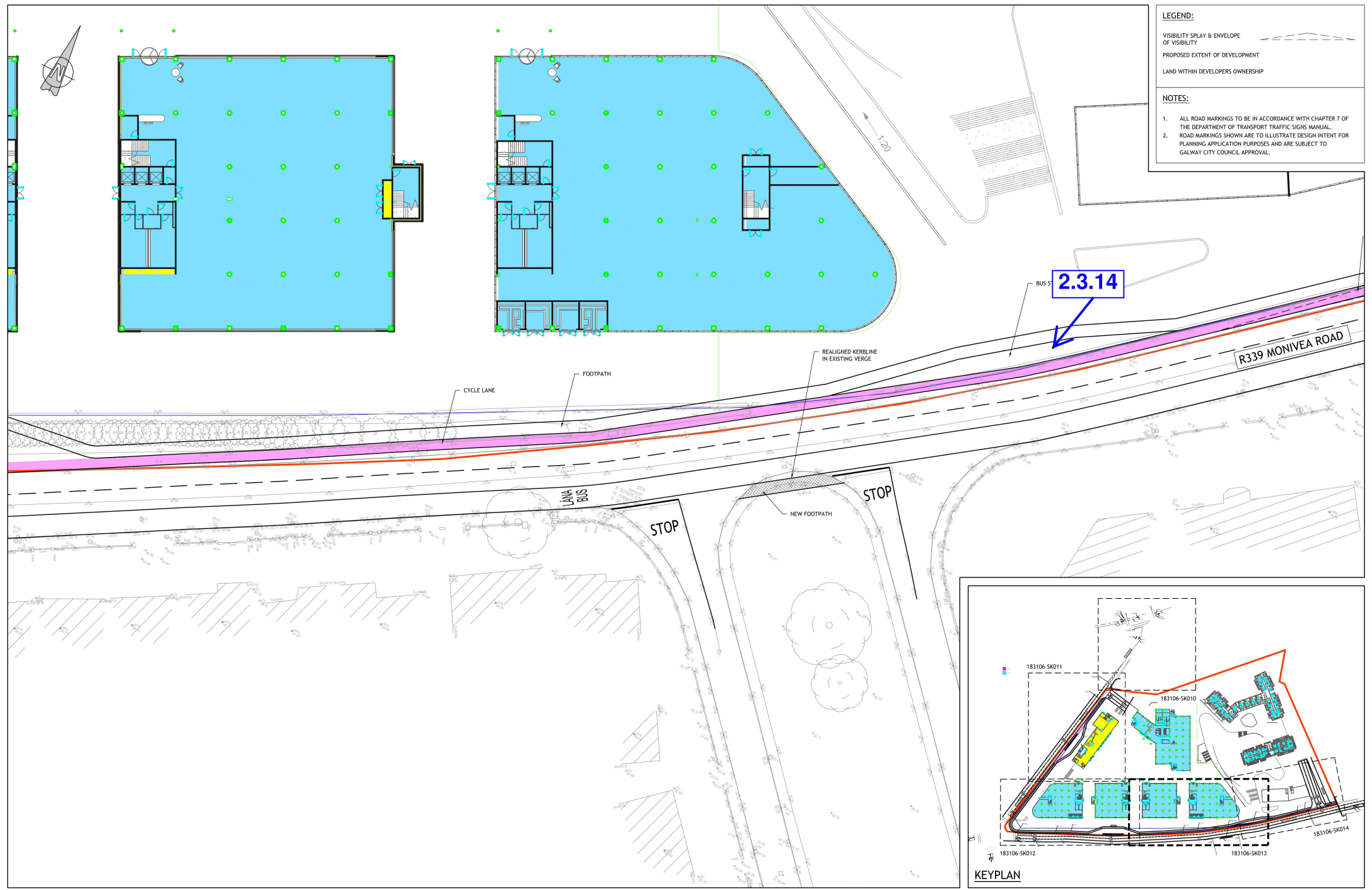
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PROPOSED EXTENT OF DEVELOPMENT

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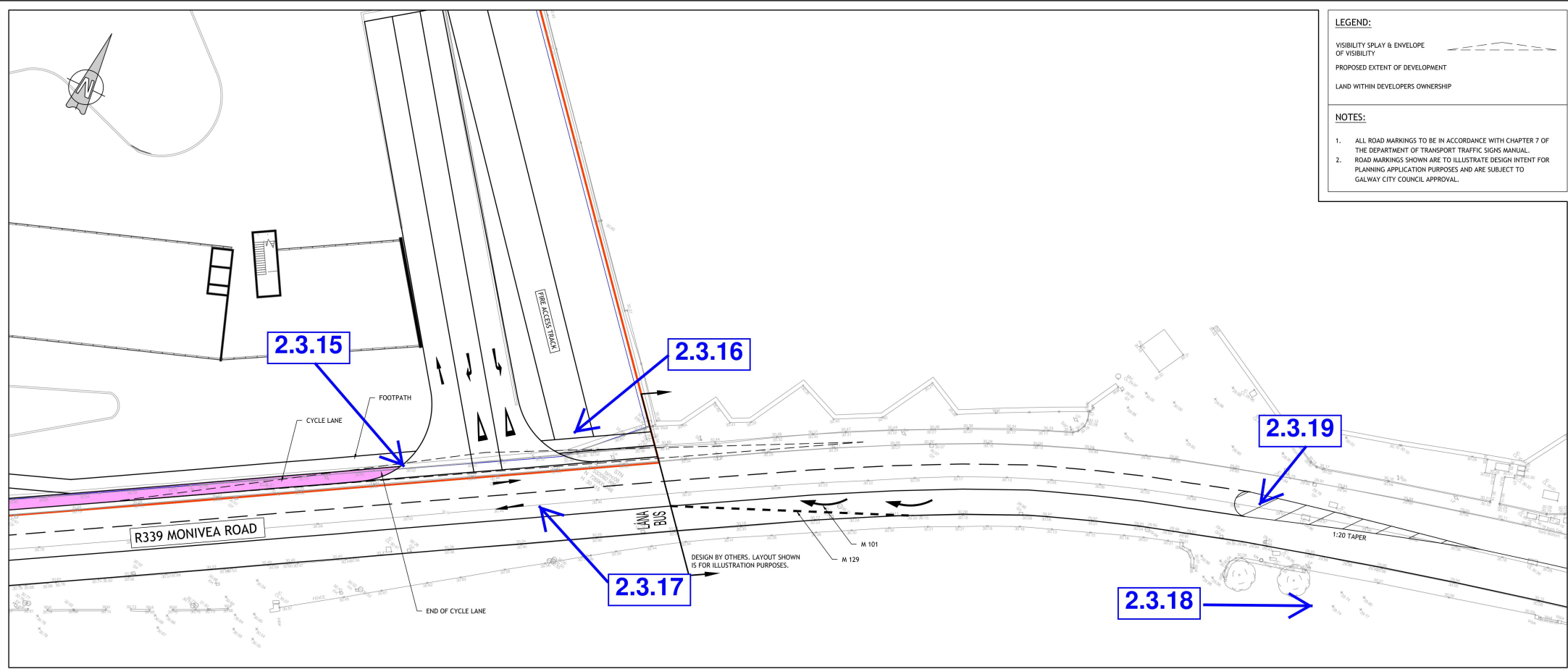


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PR1	PRELIMINARY ISSUE	JS	10/10/2018
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Client: **Rhatigan**  
 Rhatigan  
 Rhatigan Group

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 Scale: A1: 1:250  
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 Engineer Check: IBS  
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 Drawing No: 183106-SK013 PR2  
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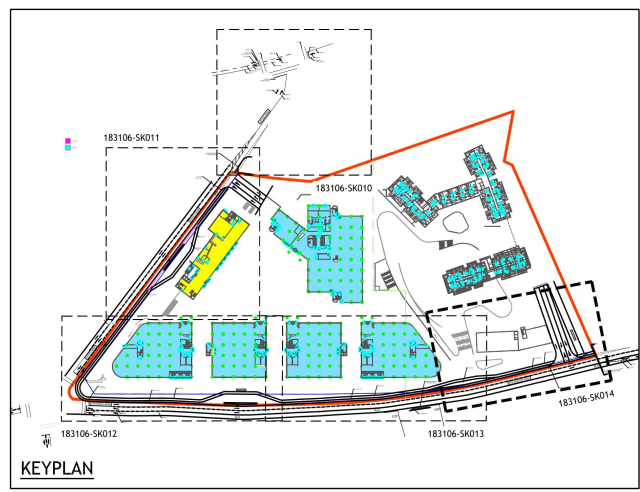
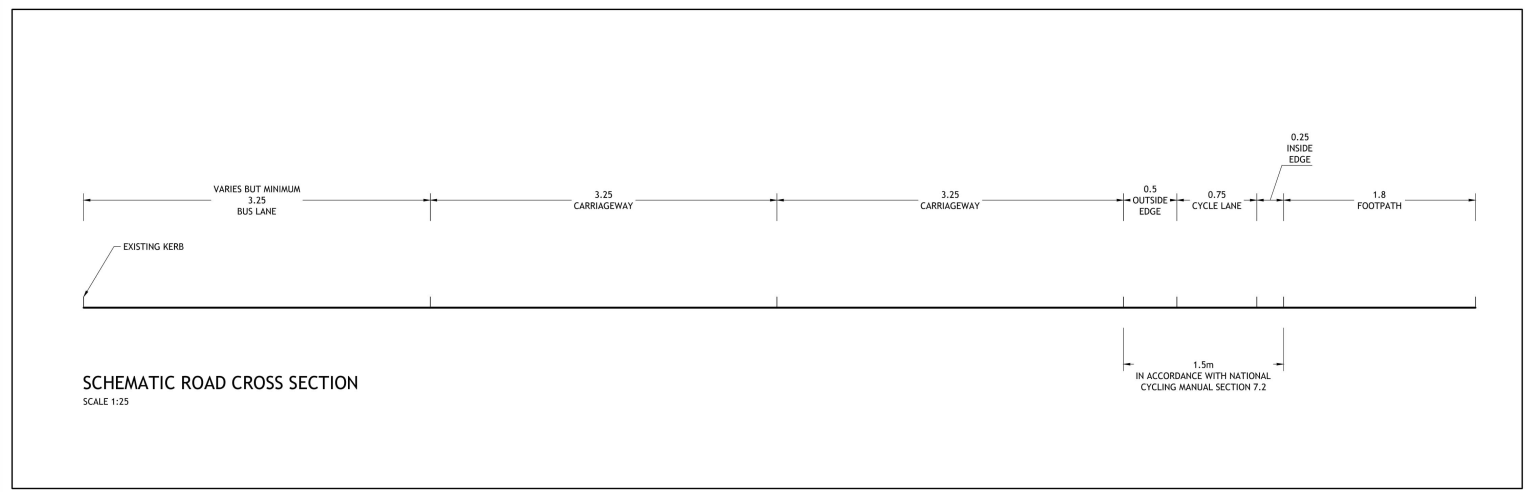
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Rev	Amendment	By	Date
PR1	PRELIMINARY ISSUE	JB	10/10/2018
PR2	PRELIMINARY ISSUE	JB	11/10/2018

Client: **Rhatigan**  
Rhatigan  
Engineering & Construction

Job: CROWN SQUARE, GALWAY  
Title: PROPOSED ROAD RE-ALIGNMENT - SHEET 5 OF 5  
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Engineer Check: IBS  
Approved:  
Drawing No: 183106-SK014 PR2  
Rev:

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## Appendix C      RSA Feedback Form



# ROAD SAFETY AUDIT FEEDBACK FORM

Scheme: Mixed Use Development, Crown Square, Galway City – Crown Square Developments Ltd

Audit Stage: 1 Date Audit Completed: 16/10/18 Route No. R339 Our Ref : 118241

TO BE COMPLETED BY DESIGNER				TO BE COMPLETED BY AUDIT TEAM LEADER
Paragraph No. in Safety Audit Report	Problem accepted (Yes/No)	Recommended measure accepted (Yes/No)	Describe alternative measure(s). Give reasons for not accepting recommended measure. Only complete if recommended measure is not accepted.	Alternative measures or reasons accepted by Auditors (Yes/No)
2.2.1	Yes	Yes		
2.2.2	No	Yes	Public lighting is outside the scope of the works and is the responsibility of Galway City Council. There are no proposals to change existing public lighting.	Yes
2.2.3	Yes	Yes		
2.2.4	Yes	Yes		
2.2.5	No	No	Dual lane exits were permitted as part of the previous consented development and are necessary for the volume of queuing traffic to exit onto a low speed urban road.	Yes
2.2.6	Yes	Yes		
2.2.7	No	No	Autotrack analysis has been undertaken and the radii are appropriate to prevent turning traffic particularly HGVs encroaching into oncoming traffic.	Yes
2.3.1	No	Yes	Existing defective kerblines are the responsibility of Galway City Council. Alternative road markings are proposed at this location to facilitate turning movements.	Yes
2.3.2	Yes	Yes		
2.3.3	Yes	Yes	Provide additional warning signs of junction ahead to prevent overshooting. A second primary head will be provided to the east of junction.	Yes
2.3.4	Yes	No	Autotrack analysis has been undertaken and the radii and stop	Yes

# ROAD SAFETY AUDIT FEEDBACK FORM

TO BE COMPLETED BY DESIGNER				TO BE COMPLETED BY AUDIT TEAM LEADER
Paragraph No. in Safety Audit Report	Problem accepted (Yes/No)	Recommended measure accepted (Yes/No)	Describe alternative measure(s). Give reasons for not accepting recommended measure. Only complete if recommended measure is not accepted.	Alternative measures or reasons accepted by Auditors (Yes/No)
			lines are in appropriate locations to preclude vehicles entering oncoming traffic lanes.	
2.3.5	Yes	Yes	Provide additional warning signs for pedestrians to reinforce vigilance of oncoming traffic. The client will attempt obtaining the permission of the landowner to remove the vegetation inside the boundary fence to provide visibility.	Yes
2.3.6	Yes	Yes		
2.3.7	Yes	Yes		
2.3.8	No	Yes	Drawings already updated	
2.3.9	Yes	Yes	Drawings already updated.	
2.3.10	No	No	Provide additional signs and or road markings to reinforce to drivers the need to be in the correct lane.	Yes
2.3.11	No	No	The cycleway is 1.5m wide overall this is in accordance with the National Cycle Manual. This can be reviewed if cycle useage along Monivea Road warrants it. Lands will be reserved for future cycle lane widening if necessary.	Yes
2.3.12	Yes	Yes	Bus Stop extinguishment subject to GCC approval	Yes
2.3.13	Yes	Yes		
2.3.14	No	Yes	The bus bay is standard width and if it were made wider then it may encourage pedestrians to cross directly rather than follow the designated footpath.	Yes
2.3.15	Yes	Yes		
2.3.16	Yes	Yes		
2.3.17	Yes	Yes		

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2.3.18	Yes	Yes	This is outside the scope of the subject works and is a matter for Galway City Council. Road markings for this area have been removed from the scheme works. As part of the detailed design, road markings constructed as part of the development will not interfere with the Greenaway Development.	
2.3.19	No	No	This is outside the scope of the subject works and is a matter for Galway City Council. Road markings for this area have been removed from the scheme works in this location.	Yes

Signed:  Designer Date: 19/10/18  
 Ray Owen  
 PUNCH Consulting Engineers

Signed: \_\_\_\_\_ Audit Team Leader Date: \_\_\_\_\_  
 Stuart Summerfield  
 CST Group Chartered Consulting Engineers

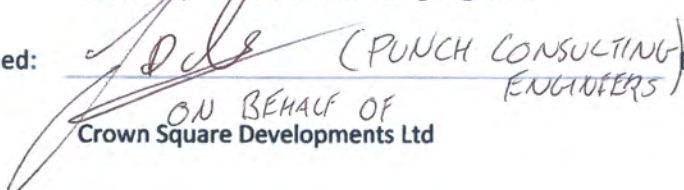
Signed: \_\_\_\_\_ Employer Date: \_\_\_\_\_  
 Crown Square Developments Ltd

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 Ray Owen  
 PUNCH Consulting Engineers

Signed:  Audit Team Leader Date: 19/10/2018  
 Stuart Summerfield  
 CST Group Chartered Consulting Engineers

Signed:  (PUNCH CONSULTING ENGINEERS) Employer Date: 19/10/2018  
 ON BEHALF OF  
 Crown Square Developments Ltd