



## **Supplementary Environmental Information**

### *Able Marine Energy Park Stage 1 Road Safety Audit*

#### *Supplementary Report EX 15.5*

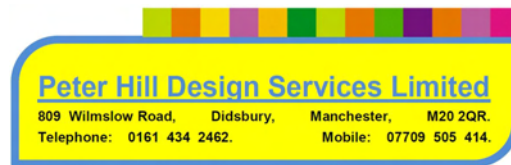
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JMP



# Able Marine Energy Park Stage 1 Road Safety Audit

Report





# Able Marine Energy Park

## Stage 1 Road Safety Audit

Report

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Job No. NEA1114

Report No. 1

Prepared by PH

Verified RF

Approved by DM

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# 1 Introduction

## Purpose of the Report

- 1.1 This report represents the findings of a Stage 1 Road Safety Audit undertaken on the proposed highway mitigation improvement works to three junctions for the proposed Able Marine Energy Park development in Killingholme.
- 1.2 The highway improvement works include:
- the provision of new traffic signals at Rosper Road / Humber Road;
  - the provision of an additional lane on an approach to the roundabout at Humber Road / A160 / A1173; and
  - the provision of an additional lane on two approaches to the roundabout at Kiln Lane / North Moss Lane / A1173.
- 1.3 Where it is considered that a problem exists and where improvements to the design could be implemented to make the layout safer, these are included within Section 2 of this report. Only the scheme details noted above and contained on the drawing received (and listed below) have been considered by the audit.

## Audit Personnel

- 1.4 The audit was carried out by team leader Peter Hill BEng CEng MICE, Director of Peter Hill Design Services Limited and team member Rachel Fogg MA MEng (Cantab) CEng MCIHT MSoRSA, an Associate Director in the JMP Leeds office.

## Scope and Conduct of the Audit

- 1.5 The audit was carried out between 22nd June and 25th June 2012 in the offices of JMP Consultants Limited and Peter Hill Design Services Limited. A site visit was undertaken on the 22nd June 2012, which was attended by both auditors. The weather was overcast, with intermittent rain during the audit. The road surface was wet.
- 1.6 The audit was carried out in accordance with the Department for Transport Standard HD 19/03 on Road Safety Audits and has been based on the standard design principles set out in the various documentation contained within the Design Manual for Roads and Bridges.
- 1.7 This report considers the road safety aspects of the scheme in isolation, on their own merits, without consideration of other factors, such as cost, which might otherwise influence decisions. The essential balancing of all competing interests is a task which must be undertaken by the Project Sponsor and not the Safety Auditor.
- 1.8 The diagram numbers (Dia) where specified in the following report are those numbers referred to in the Traffic Signs Regulations and General Directions 2002.

- 1.9 The drawings contained in **Table 1.1** below were examined during the course of the audit and were available to the auditors prior to the site visit.

**Table 1.1 Drawings Examined during the Audit**

| Drawing Number   | Drawing Title  |
|------------------|--|
| NEA1114/01 Rev A | Junction C Proposals for Humber Road/Rosper Road         |
| NEA1114/02 Rev A | Junction E Proposals for A160/A1173/Humber Road          |
| NEA1114/06 Rev A | Junction H Proposals for A1173/North Moss Lane/Kiln Lane |

- 1.10 Issues raised by this audit are contained within the following section of this report.

## 2 Items raised in Stage 1 Audit

- 2.1 This section describes safety issues that were identified as part of the Stage 1 safety audit. The locations of the problems are shown on the plans included in Appendix A of this report.

### Humber Road / Rosper Road (Traffic Signals)

- 2.2 Problem (Location 1) – Insufficient clearance causing risk of vehicle strikes

The width of all three islands provided within the carriageway to accommodate the new signal poles and signal heads are only 1m in width. Islands of this width will not provide the minimum clearance of 450mm required to the signal heads and this will increase the risk of vehicles striking the signal heads and damaging the signals and the vehicles.

#### Recommendation

The width of the islands should be increased to a minimum of 1350mm for a single signal head and 1850mm for a double signal head (wider islands will be required if yellow backing boards are also proposed) to ensure a minimum clearance of 450mm is provided to the signal heads from the kerb line.

- 2.3 Problem (location 2) – Side swipe collisions on double right turn movement

A double right turn movement is proposed from Rosper Road to Humber Road. However, the carriageway width on the Humber Road exit from the junction is only 6.2m, which may be too narrow to accommodate the swept paths of two large vehicles. This will increase the risk of side swipe collisions between large vehicles and increase the risk of vehicles over running the traffic island and striking the signal equipment.

#### Recommendation

The layout should be amended to ensure adequate width is provided on the exit from the junction for two large vehicles to undertake the right turn movement simultaneously.

- 2.4 Problem (location 3) – Head on collisions and kerb over running

#### Recommendation

The swept path of large vehicles should be checked to ensure they can safely undertake the left turns at the junction and the introduction of exit tapers should be provided to assist in this movement.

2.5 Problem (location 4) – Side swipe due to confusion over lane destinations

The lane destination arrows are located too close to the stop lines and the first vehicle stopped at the junction will block them from view. This will increase the risk of side swipe collisions if following vehicles need to make late lane changes at the junction or are positioned in the incorrect lane.

Recommendation

The lane destination arrows should be shown a minimum of 20m from the stop lines.

2.6 Problem (location 5) – Collisions due to unsighted signal heads

The signal heads are only offset from the stop lines by 1m, which will make it difficult for the first vehicle to see the signal aspect and may result in confusion over when it is safe to proceed through the junction. This will increase the risk of collisions occurring at the junction.

Recommendation

The distance between the stop line and the primary signal head should be increased to 2.5m minimum at all of the stop lines at the junction.

2.7 Problem (location 6) – Increased risk of vehicle strikes with street furniture

The layout of the junction shows that a new traffic island is proposed between the ahead lane and the right turning lane on the eastern side of the junction. However, the staging indicates there is no need to provide this traffic island as the ahead movement and right turn run together in the same stage and the right turn is never separately signalled. The provision of unnecessary traffic islands and street furniture within the carriageway introduces an additional hazard that is at risk of being struck by vehicles.

Recommendation

The traffic island between the right turn lane and the ahead lane should be removed.

2.8 Problem (Location 7) – Vehicle strikes to islands and loss of control

The lane widths past the traffic islands on the eastern side of the junction are only 3m wide, with the ahead lane potentially even narrower than 3m – scaling approximately 2.9m from the drawing. The junction is heavily used by large HGVs, and the narrow lane widths will increase the risk of vehicles striking the islands, or signal equipment, and causing loss of control type conflicts.

Recommendation

The lane widths through the junction should be increased to 3.5m to provide additional space for large vehicles that are using this route.

## 2.9 Problem (Location 8) – Kerb strike and loss of control collisions

The alignment of the kerb line at the western extent of the works, where it ties back into the existing kerb line has a kink on the southern side as it moves over abruptly northwards to tie into the existing kerbs. This sharp change of direction into the carriageway will increase the risk of vehicles striking the kerb line at this location and the driver losing control of the vehicle.

### Recommendation

The alignment of the kerb line should be smoothed out so there are no sharp changes in the kerb line as it re-joins the existing alignment at the tie-in point.

## 2.10 Problem (Location 9) – Additional delay / frustration

The location of the traffic islands appear to be set back from the junction by some distance with the space across the junction being almost 40m in length. This will increase the length of the intergreens required at the junction and reduce the capacity of the junction, which may cause drivers additional delay and frustration, and potentially leading to drivers proceeding into the junction at the start of the red phase and thus increasing the risk of collisions with vehicles from the opposing phase.

### Recommendation

The layout of the junction should be made as compact as possible, by moving the islands in towards the junction, to reduce this delay/frustration and potential subsequent dangerous behaviour.

## A160 / A1173 / Humber Road (Roundabout)

### 2.11 Problem (Location 10) – Risk due to unnecessary construction works

The proposed introduction of an additional lane on the north eastern arm of the roundabout to provide a two lane entry 8m wide is considered unnecessary following the site visit. The existing single lane entry is currently 8m wide and vehicles, including HGV traffic, were observed using the entry as a two lane entry even though lane markings are not currently present on site. Undertaking construction work on the highway, which is potentially not necessary, will increase the risk (to vehicles and construction personnel) of collisions as a result of the works and traffic management necessary to undertake these.

#### Recommendation

The existing carriageway should be cleared of debris that has built up in the outside of the offside lane and the existing single lane entry should be remarked as a two lane entry with 4m wide lanes.

### 2.12 Problem (Location 11) – Inconsistent pedestrian facilities

The proposed realignment of the existing kerbing of the north eastern splitter island to provide a two lane entry will require a new flush dropped kerbs to be provided and associated tactile paving to meet with current safety standards for a pedestrian crossing. This will then introduce an inconsistency at the junction as this would be the only dropped crossing that meets current safety standards. Pedestrians may then expect to find tactile paving at all the pedestrian crossings around the junction to warn them where the edge of the carriageway is and inadvertently walk into the carriageway, thus increasing the risk of collision with passing vehicles.

#### Recommendation

Flush dropped kerbs and tactile paving should be provided at all pedestrian crossings at the junction to meet with current safety standards.

## A1173 / North Moss Lane / Kiln Lane (Roundabout)

### 2.13 Problem (Location 12) – Side swipe collisions on approaches

The proposed lane widths on both the eastern and western arms of the junction are only 3.0 wide around the entry radii, which will result in large HGVs either over running the inside kerb line or encroaching into the offside lane increasing the risk of side swipe collisions with other vehicles.

#### Recommendation

The lane widths should be increased to ensure that the swept path of a large HGV can be accommodated within each entry lane.

### 2.14 Problem (Location 13) – Overshoot collisions on circulatory carriageway

The increased width of the eastern and western entry arms to the roundabout will enable vehicles to enter the roundabout at a greater speed, thus increasing the risk of vehicles overshooting the giveway road markings and colliding with vehicles on the circulating carriageway.

#### Recommendation

The entry path deflection should be checked on each entry that is to be widened to ensure that it meets with the design standards and vehicles cannot enter the roundabout on a vehicle path that is greater than a 100m radius.

### 2.15 Problem (Location 14) – Kerb strike and loss of control of vehicle

The kerb alignment of the eastern approach has a kink at the tie-in point with the roundabout. This kink will increase the risk of vehicles striking the kerb line and losing control of the vehicle at this point.

#### Recommendation

The kink should be removed from the layout and a smooth kerb alignment should be provided on the approach to the roundabout and at the tie-in with the existing kerb alignment.

### 2.16 Problem (Location 15) – Side swipe on circulatory carriageway

The central road markings on the western arm direct vehicles in the nearside lane into the offside lane at the entry point to the roundabout. This will increase the risk of side swipe collisions on the circulatory carriageway at this location.

#### Recommendation

The central road markings should be amended at the end of the approach to direct vehicles further to the left (on entry to the roundabout) to provide sufficient space for vehicles in the offside lane to continue around them once on the circulatory carriageway.



## 2.17 Problem (Location 16) – Side swipe collisions on circulatory carriageway and exits

The circulatory carriageway is only 6m wide on the western side and 7m wide on the northern side which is insufficient width for two lanes of traffic to safely negotiate the roundabout side by side. Also, all the roundabout exits are only a single lane exit. The provision of two lane entries on the eastern and western entries will increase the risk of side swipe collisions occurring at the exits and on the circulatory carriageway in these locations.

### Recommendation

Additional lane destination arrows and lane markings should be provided on both of the two lane approaches. On the eastern approach (Kiln Lane), the nearside lane should be marked for the A1173 west and the offside lane marked for the A1173 north. Ahead only arrows should be used on this approach to prevent vehicles turning right onto the circulatory carriageway after the splitter island. On the western approach, the nearside lane should have left only arrows and marked for the A1173 north and the offside lane should have ahead only arrows and marked for Kiln Lane. Circulatory lane markings should also be provided on the southern and north western sides of the roundabout to help vehicles remain in the correct lanes.

### 3 Audit Team Statement

I certify that this audit has been carried out in accordance with HD 19/03.

AUDIT TEAM LEADER:

Peter Hill BEng CEng MICE

Director

Peter Hill Design Services Limited

809 Wilmslow Road

Didsbury

Manchester

M20 2QR

[REDACTED]

[REDACTED]

Signed.. [REDACTED] ..

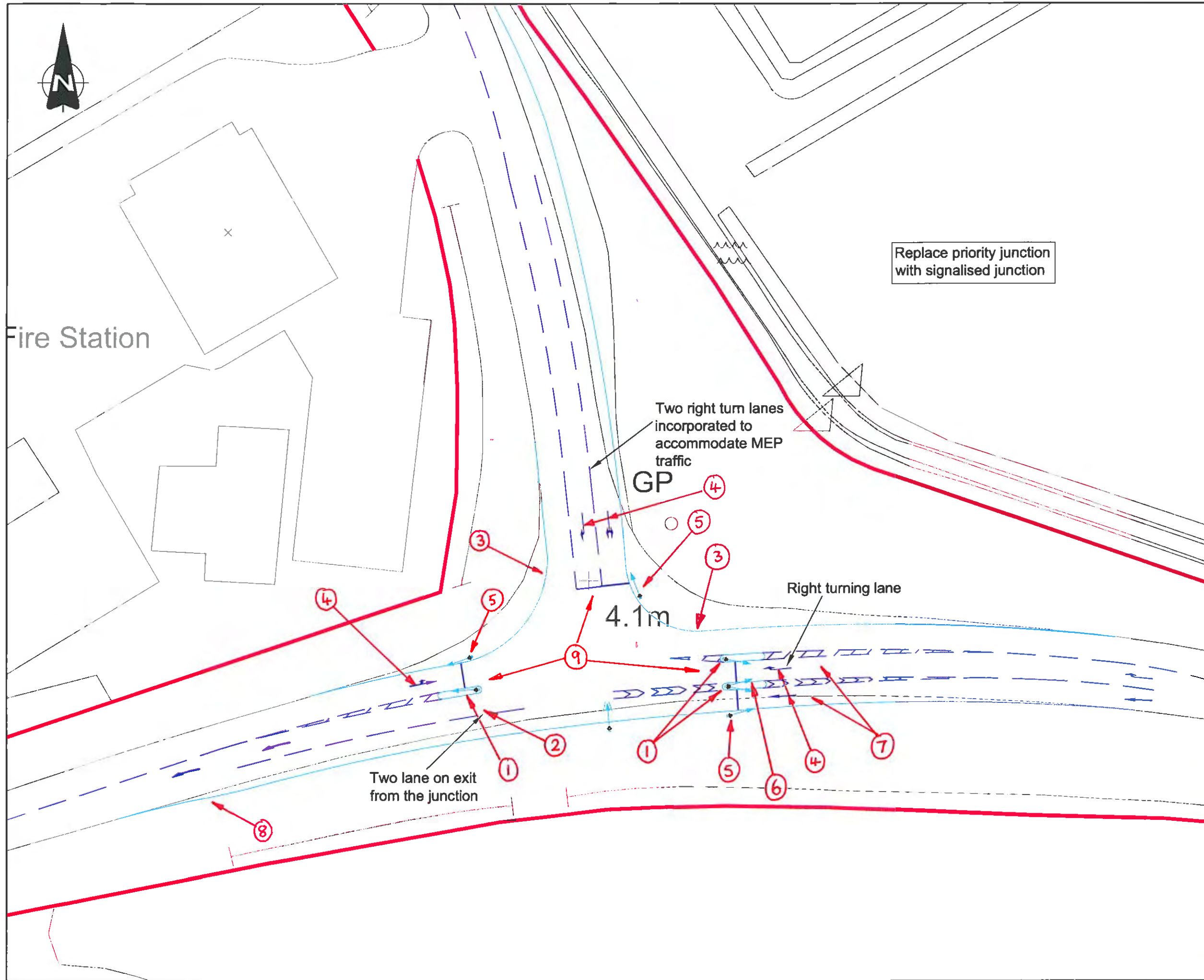
Date: 26/06/2012



## Appendix A

### Plans Showing Location of Safety Problems

| Job No  | Report No | Issue no | Report Name                                       | Page |
|---------|-----------|----------|---|------|
| NEA1114 | 1         | 2        | Able Marine Energy Park Stage 1 Road Safety Audit | A1   |



# Key

- Road markings
- Proposed kerb line
- Approximate highway boundary

|   |          |                         |     |    |
|---|----------|-------------------------|-----|----|
| A | 11/07/11 | Delete left turn filter | RAB | DM |
|---|----------|-------------------------|-----|----|

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Able UK

Marina Energy Park

Junction C  
Proposal for Humber Road / Rosper Road

|       |            |       |
|-------|------------|-------|
| RAB   | DM         |       |
| A3    | Mar 2011   | 1:500 |
| DRAFT | NEA1114/01 | A     |



Unit 1

5.6m

A 160

Introduce additional lane

A 160

### Key

-  Road markings
-  Proposed kerb line
-  Approximate highway boundary

|   |          |                           |     |    |
|---|----------|---------------------------|-----|----|
| A | 11/07/11 | Amend mitigation proposal | RAB | DM |
|---|----------|---------------------------|-----|----|

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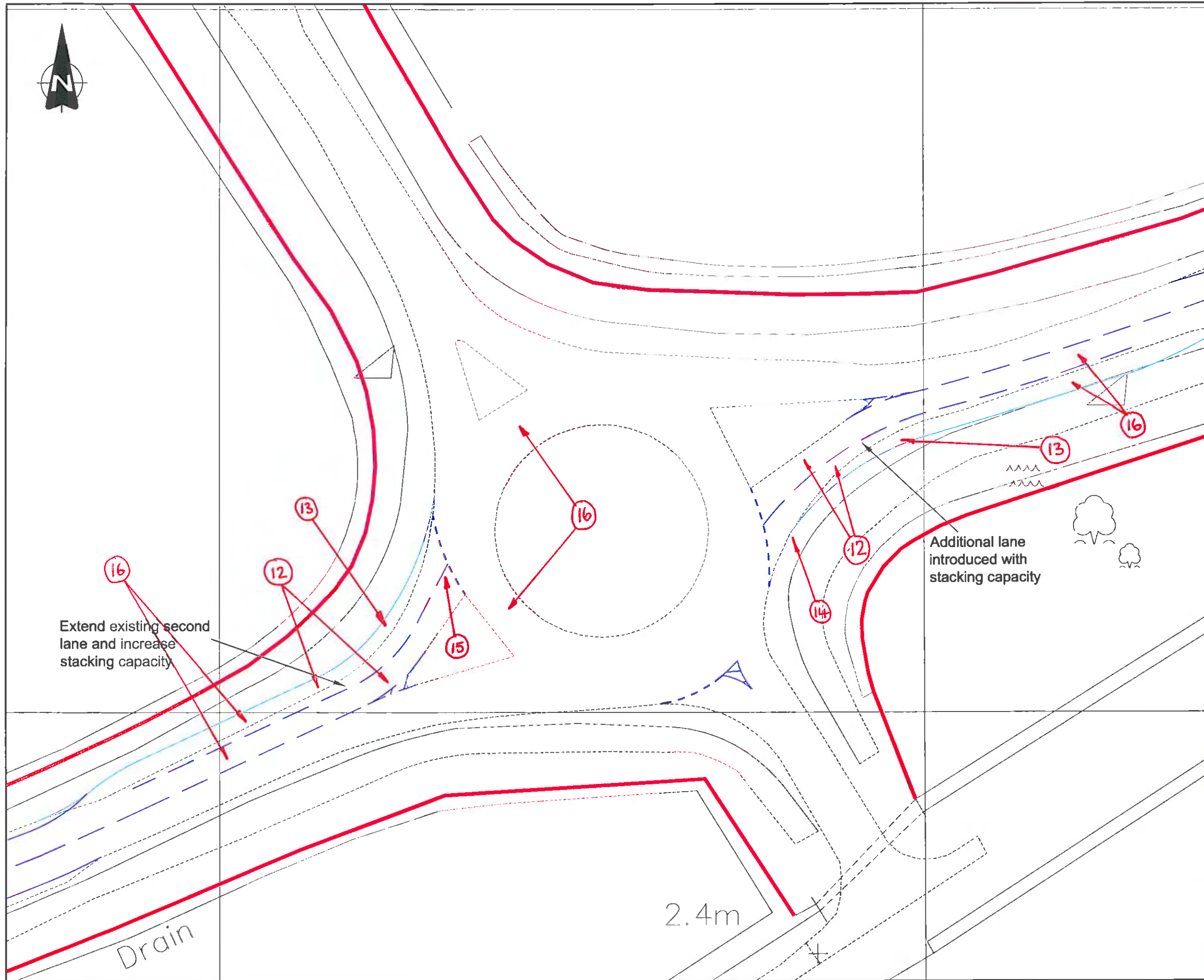


Able UK

Marine Energy Park

Junction E  
Proposal for A160 / A1173 / Humber Road

|       |            |       |
|-------|------------|-------|
| RAB   | DM         |       |
| A3    | Apr 2011   | 1:500 |
| DRAFT | NEA1114/02 | A     |



# Key

- Road markings
- Proposed kerb line
- Approximate highway boundary

|   |          |                                  |     |    |
|---|----------|----------------------------------|-----|----|
| A | 11/07/11 | Delete mitigation on A1173 north | RAB | DM |
|---|----------|----------------------------------|-----|----|

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Able UK

Marine Energy Park

Junction H  
Proposal for A1173 / North Moss Lane / Kiln Lane

|       |            |       |
|-------|------------|-------|
| RAB   | DM         |       |
| A3    | Mar 2011   | 1:500 |
| DRAFT | NEA1114/06 | A     |