



# **Lime Down**

## Solar Park

# **Transport Response to Appendix C of SLD Deadline 5 Submission [REP5-130]**

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## 1 Introduction

### 1.1 Background

1.1.1 This Technical Note provides a response to Appendix C of Stop Lime Down's **Responses to the ExA's second written questions (ExQ2) [REP5-130]** and sets out the approach used to estimate the probability of two heavy goods vehicles (HGVs) meeting each other during the peak construction hour on the proposed construction routes serving Lime Down Solar Park (hereafter referred to as 'the Scheme').

1.1.2 The assessment considers two routes: Fosse Way and Bradfield Cottages. It first assesses the probability of HGVs meeting across the full route length, refines the assessment by excluding sections where HGVs can pass, and considers the effect of HGVs leaving the site in convoys of two vehicles.

### 1.2 Purpose of the Assessment

1.2.1 The purpose of the assessment is to provide a clear, quantitative indication of how frequently construction HGVs may be expected to meet opposing HGV traffic during the busiest construction hour. This is relevant because parts of the local construction route network are rural in character and may have sections where two HGVs cannot comfortably pass without one vehicle yielding, slowing, or waiting at a suitable passing location.

### 1.3 Assessment Methodology

1.3.1 The calculation is based on the estimated journey time for an HGV to travel along the assessed section of route and the number of HGVs expected to travel in each direction during the peak construction hour. Existing and proposed HGV flows are combined to establish the total opposing HGV demand. The assessment then converts the peak-hour HGV flows into vehicles per second and applies these rates over the period during which a vehicle is travelling on the assessed section. This provides an estimate of the number of occasions in one hour when an HGV could meet another HGV travelling in the opposing direction.

1.3.2 The assessment uses an assumed average HGV speed of 25 mph, equivalent to approximately 40.23 km/h or 11.18 metres per second. This speed is applied consistently to both assessed routes to calculate the time during which a vehicle is exposed to the possibility of meeting an opposing HGV.

## 2 Full Route Assessment

### 2.1 Introduction

2.1.1 The full route assessment considers the complete length of each route, regardless of whether parts of the route include locations where HGVs can pass. This provides a broad, initial assessment of the likelihood of HGV encounters across the full route length.

### 2.2 Fosse Way Construction Route

2.2.1 The Fosse Way calculation assumes a route length of 3,100 metres. On this basis, the journey time through the route is approximately 277 seconds, or 4.62 minutes. Using the combined peak construction hour flows of 6 northbound and 5 southbound HGVs, the calculation indicates approximately 2.31 HGV meeting events in one hour. This equates to a chance of an HGV meeting another HGV on the route of approximately 1 in 5, with a corresponding 79% chance of not meeting another HGV.

**Table 2-1 Fosse Way - Construction Route Assessment**

| Fosse Way - Construction Route Assessment |             |            |
|-------------------------------------------|-------------|------------|
| Journey Time Along Construction Route     |             |            |
| Average Speed                             | 25          | mph        |
| Average Speed                             | 40.2335     | km/h       |
| Average Speed                             | 11.17597222 | m/s        |
| Route Length                              | 3100        | metres     |
| Journey Time                              | 277         | Seconds    |
| Minutes                                   | 4.623013161 | Minutes    |
| HGV Flows during Peak Construction Hour   | Northbound  | Southbound |
| Existing                                  | 2           | 1          |
| Proposed                                  | 4           | 4          |
| Combined                                  | 6           | 5          |
| Vehicles per Period                       | Northbound  | Southbound |
| Vehicles per Second                       | 0.00167     | 0.00139    |
| Vehicles per Period (i.e. 277s)           | 0.46230     | 0.38525    |
| HGV Chance of Meeting                     |             |            |
| Number of HGVs meeting another in 1 hour  |             | 2.31       |

| <b>Fosse Way - Construction Route Assessment</b>  |        |
|---------------------------------------------------|--------|
| Chance of HGV meeting another along the route     | 1 in 5 |
| Chance of HGV not meeting another along the route | 79%    |

## 2.3 Bradfield Cottages Construction Route

2.3.1 The Bradfield Cottages calculation uses a route length of 980 metres. On this basis, the journey time through the route is approximately 88 seconds, or 1.46 minutes. Using the combined peak construction hour flows of 10 northbound and 7 southbound HGVs, the calculation indicates approximately 1.71 HGV meeting events in one hour. This equates to a chance of an HGV meeting another HGV on the route of approximately 1 in 10, with a corresponding 90% chance of not meeting another HGV.

**Table 2-2 Bradfield Cottages - Construction Route Assessment**

| <b>Bradfield Cottages - Construction Route Assessment</b> |                   |                   |
|-----------------------------------------------------------|-------------------|-------------------|
| <b>Journey Time Along Construction Route</b>              |                   |                   |
| Average Speed                                             | 25                | mph               |
| Average Speed                                             | 40.2335           | km/h              |
| Average Speed                                             | 11.17597222       | m/s               |
| Route Length                                              | 980               | metres            |
| Journey Time                                              | 88                | Seconds           |
| Minutes                                                   | 1.461468677       | Minutes           |
| <b>HGV Flows during Peak Construction Hour</b>            | <b>Northbound</b> | <b>Southbound</b> |
| Existing                                                  | 7                 | 4                 |
| Proposed                                                  | 3                 | 3                 |
| Combined                                                  | 10                | 7                 |
| <b>Vehicles per Period</b>                                | <b>Northbound</b> | <b>Southbound</b> |
| Vehicles per Second                                       | 0.00278           | 0.00194           |
| Vehicles per Period (i.e. 88s)                            | 0.24358           | 0.17050           |
| <b>HGV Chance of Meeting</b>                              |                   |                   |
| Number of HGVs meeting another in 1 hour                  | 1.71              |                   |
| Chance of HGV meeting another along the route             | 1 in 10           |                   |
| Chance of HGV not meeting another along the route         | 90%               |                   |

### 3 Narrow Section Assessment Excluding Passing Areas

#### 3.1 Introduction

3.1.1 The second stage of the assessment refines the probability calculation by removing sections of each route where HGVs are able to pass. This focuses the assessment on the narrower sections of the routes where an HGV meeting another HGV would be more operationally relevant. By reducing the assessed route length to the constrained sections only, the calculated exposure time is reduced and the probability of an encounter is correspondingly adjusted.

#### 3.2 Probability of two HGVs meeting in peak construction hour

##### Fosse Way Construction Route

3.2.1 For Fosse Way, the route length is reduced from 3,100 metres to 2,062 metres after removing passing sections. This reduces the journey time on the constrained section to approximately 185 seconds, or 3.07 minutes. On this basis, the calculation indicates approximately 1.54 HGV meeting events in one hour. This equates to a chance of an HGV meeting another HGV on the narrower section of approximately 1 in 7, with an 86% chance of not meeting another HGV.

**Table 3-1 Fosse Way - Probability of two HGVs meeting in peak construction hour**

| Fosse Way - Probability of two HGVs meeting in peak construction hour |             |            |
|-----------------------------------------------------------------------|-------------|------------|
| Journey Time Along Construction Route                                 |             |            |
| Average Speed                                                         | 25          | mph        |
| Average Speed                                                         | 40.2335     | km/h       |
| Average Speed                                                         | 11.17597222 | m/s        |
| Route Length                                                          | 3100        | metres     |
| Route Length minus Passing Sections                                   | 2062        | metres     |
| Journey Time                                                          | 185         | Seconds    |
| Minutes                                                               | 3.075049399 | Minutes    |
| HGV Flows during Peak Construction Hour                               | Northbound  | Southbound |
| Existing                                                              | 2           | 1          |
| Proposed                                                              | 4           | 4          |

| <b>Fosse Way - Probability of two HGVs meeting in peak construction hour</b> |                   |                   |
|------------------------------------------------------------------------------|-------------------|-------------------|
| Combined                                                                     | 6                 | 5                 |
| <b>Vehicles per Period</b>                                                   | <b>Northbound</b> | <b>Southbound</b> |
| Vehicles per Second                                                          | 0.00167           | 0.00139           |
| Vehicles per Period (i.e. 185s)                                              | 0.30750           | 0.25625           |
| <b>Chance of HGVs meeting</b>                                                |                   |                   |
| Number of HGVs meeting another in 1 hour                                     |                   | 1.54              |
| Chance of HGV meeting another along the route                                |                   | 1 in 7            |
| Chance of HGV not meeting another along the route                            |                   | 86%               |

### Bradfield Cottages Construction Route

- 3.2.2 For Bradfield Cottages, the route length is reduced from 980 metres to 660 metres after removing passing sections. This reduces the journey time on the constrained section to approximately 59 seconds, or 0.98 minutes. On this basis, the calculation indicates approximately 1.15 HGV meeting events in one hour. This equates to a chance of an HGV meeting another HGV on the narrower section of approximately 1 in 15, with a 93% chance of not meeting another HGV.

**Table 3-2 Bradfield Cottages - Probability of two HGVs meeting in peak construction hour**

| <b>Bradfield Cottages - Probability of two HGVs meeting in peak construction hour</b> |                   |                   |
|---------------------------------------------------------------------------------------|-------------------|-------------------|
| <b>Journey Time Along Construction Route</b>                                          |                   |                   |
| Average Speed                                                                         | 25                | mph               |
| Average Speed                                                                         | 40.2335           | km/h              |
| Average Speed                                                                         | 11.17597222       | m/s               |
| Route Length                                                                          | 980               | metres            |
| Route Length minus Passing Sections                                                   | 660               | metres            |
| Journey Time                                                                          | 59                | Seconds           |
| Minutes                                                                               | 0.984254415       | Minutes           |
| <b>HGV Flows during Peak Construction Hour</b>                                        | <b>Northbound</b> | <b>Southbound</b> |
| Existing                                                                              | 7                 | 4                 |

| <b>Bradfield Cottages - Probability of two HGVs meeting in peak construction hour</b> |                   |                   |
|---------------------------------------------------------------------------------------|-------------------|-------------------|
| Proposed                                                                              | 3                 | 3                 |
| Combined                                                                              | 10                | 7                 |
| <b>Vehicles per Period</b>                                                            | <b>Northbound</b> | <b>Southbound</b> |
| Vehicles per Second                                                                   | 0.00278           | 0.00194           |
| Vehicles per Period (i.e. 59s)                                                        | 0.16404           | 0.11483           |
| <b>Chance of HGVs meeting</b>                                                         |                   |                   |
| Number of HGVs meeting another in 1 hour                                              | 1.15              |                   |
| Chance of HGV meeting another along the route                                         | 1 in 15           |                   |
| Chance of HGV not meeting another along the route                                     | 93%               |                   |

## 4 Convoy Scenario Assessment

### 4.1 Introduction

4.1.1 The third stage of the assessment considers the effect of construction HGVs departing the site in convoys of two vehicles. This scenario reduces the number of separate departure events because two HGVs are released together rather than independently. The calculation therefore adjusts the directional HGV flow assumptions to reflect fewer individual opposing movements during the peak hour. This is relevant because convoy working can reduce the probability of single HGVs encountering opposing HGVs on constrained sections, provided it is managed through an appropriate delivery booking and site dispatch process.

### 4.2 Probability of two HGVs meeting in peak construction hour in a convoy of two

#### Fosse Way Construction Route

4.2.1 For Fosse Way, the convoy scenario is assessed on the narrower 2,062 m section. With HGVs assumed to depart in convoys of two, the combined peak-hour flows are adjusted to 6 northbound and 3 southbound movements. The calculation indicates approximately 0.92 HGV meeting events in one hour. To convert that into a simpler probability, the 0.92 expected meeting events are divided across the 9 HGV movements in that hour, which gives approximately 0.10 meeting events per HGV movement. That is why the assessment describes the likelihood as approximately 1 in 10, or 10%, of an individual HGV meeting another HGV on the constrained section during the peak construction hour. The corresponding 90% figure is therefore also on a per-HGV-movement basis during the peak construction hour — i.e. for any individual HGV movement, there is an approximate 90% chance it would not meet another HGV on that section during that hour.

**Table 4-1 Fosse Way - Probability of two HGVs meeting in peak construction hour in a convoy of two**

| Fosse Way - Probability of two HGVs meeting in peak construction hour in a convoy of two |             |        |
|------------------------------------------------------------------------------------------|-------------|--------|
| Journey Time Along Construction Route                                                    |             |        |
| Average Speed                                                                            | 25          | mph    |
| Average Speed                                                                            | 40.2335     | km/h   |
| Average Speed                                                                            | 11.17597222 | m/s    |
| Route Length                                                                             | 2062        | metres |

| <b>Fosse Way - Probability of two HGVs meeting in peak construction hour in a convoy of two</b> |                   |                   |
|-------------------------------------------------------------------------------------------------|-------------------|-------------------|
| Journey Time                                                                                    | 185               | Seconds           |
| Minutes                                                                                         | 3.075049399       | Minutes           |
| <b>HGV Flows during Peak Construction Hour</b>                                                  | <b>Northbound</b> | <b>Southbound</b> |
| Existing                                                                                        | 2                 | 1                 |
| Proposed                                                                                        | 4                 | 2                 |
| Combined                                                                                        | 6                 | 3                 |
| <b>Vehicles per Period</b>                                                                      | <b>Northbound</b> | <b>Southbound</b> |
| Vehicles per Second                                                                             | 0.00167           | 0.00083           |
| Vehicles per Period (i.e. 185s)                                                                 | 0.30750           | 0.15375           |
| <b>Chance of HGVs meeting</b>                                                                   |                   |                   |
| Number of HGVs meeting another in 1 hour                                                        |                   | 0.92              |
| Chance of HGV meeting another along the route                                                   |                   | 1 in 10           |
| Chance of HGV not meeting another along the route                                               |                   | 90%               |

### **Bradfield Cottages Construction Route**

- 4.2.2 For Bradfield Cottages, the convoy scenario is assessed on the narrower 660 metre section. With HGVs assumed to depart in convoys of two, the combined peak-hour flows are adjusted to 10 northbound and 6 southbound movements. The calculation indicates approximately 0.90 HGV meeting events in one hour. To convert that into a simpler probability, the 0.90 expected meeting events are divided across the 16 HGV movements in that hour, which gives approximately 0.06 meeting events per HGV movement. That is why the assessment describes the likelihood as approximately 1 in 17, or 6%, of an individual HGV meeting another HGV on the constrained section during the peak construction hour. The corresponding 94% figure is therefore also on a per-HGV-movement basis during the peak construction hour — i.e. for any individual HGV movement, there is an approximate 94% chance it would not meet another HGV on that section during that hour.

**Table 4-2 Bradfield Cottages - Probability of two HGVs meeting in peak construction hour in a convoy of two**

| <b>Bradfield Cottages - Probability of two HGVs meeting in peak construction hour in a convoy of two</b> |                   |                   |
|----------------------------------------------------------------------------------------------------------|-------------------|-------------------|
| <b>Journey Time Along Construction Route</b>                                                             |                   |                   |
| Average Speed                                                                                            | 25                | mph               |
| Average Speed                                                                                            | 40.2335           | km/h              |
| Average Speed                                                                                            | 11.17597222       | m/s               |
| Route Length                                                                                             | 660               | metres            |
| Journey Time                                                                                             | 59                | Seconds           |
| Minutes                                                                                                  | 0.984254415       | Minutes           |
| <b>HGV Flows during Peak Construction Hour</b>                                                           | <b>Northbound</b> | <b>Southbound</b> |
| Existing                                                                                                 | 7                 | 4                 |
| Proposed                                                                                                 | 3                 | 2                 |
| Combined                                                                                                 | 10                | 6                 |
| <b>Vehicles per Period</b>                                                                               | <b>Northbound</b> | <b>Southbound</b> |
| Vehicles per Second                                                                                      | 0.00278           | 0.00153           |
| Vehicles per Period (i.e. 59s)                                                                           | 0.16404           | 0.09022           |
| <b>Chance of HGVs meeting</b>                                                                            |                   |                   |
| Number of HGVs meeting another in 1 hour                                                                 | 0.90              |                   |
| Chance of HGV meeting another along the route                                                            | 1 in 17           |                   |
| Chance of HGV not meeting another along the route                                                        | 94%               |                   |

## **5 Summary and Conclusion**

- 5.1.1 The calculations demonstrate that the probability of HGVs meeting during the peak construction hour reduces when the assessment is focused on the constrained sections of route only, because sections where HGVs can pass are removed from the exposure length. The analysis also demonstrates that controlled convoy departures can further reduce the probability of HGV encounter events on the narrower sections, because the number of independent HGV movements is reduced.
- 5.1.2 For Fosse Way, the full-route assessment indicates a probability equivalent to approximately 1 in 5. When passing sections are excluded, this reduces to approximately 1 in 7, and under the convoy scenario it reduces further to approximately 1 in 10. For Bradfield Cottages, the full-route assessment indicates a probability equivalent to approximately 1 in 10. When passing sections are excluded, this reduces to approximately 1 in 15, and under the convoy scenario it reduces further to approximately 1 in 17.
- 5.1.3 Overall, the assessment indicates that although HGV encounters may occur during the peak construction hour, the probability of such encounters on the narrower constrained sections is materially lower than the full-route calculation. The use of managed convoy departures has the potential to further reduce the likelihood of HGVs meeting on constrained sections in peak times and can be managed by the booking system set out in the Construction Traffic Management Plan.