Odyssey Markides

LAND AT WEST HORNDON, BRENTWOOD

Representation about Dunton Garden Suburb Consultation

Report No. 13-158-08B
February 2015

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1.0 INTRODUCTION

Background

1.1 Odyssey Markides (OM) have been appointed by Countryside to provide transport advice relating to a site at West Horndon in Essex. This report is therefore written by OM on behalf of Countryside.

1.2 Brentwood Borough Council (BrBC) are currently in the process of preparing their Local Plan, and have recently published the "Strategic Growth Options Consultations" document. The consultation period opened on 6 January 2015 and will close on 17 February 2015.

1.3 BrBC and Basildon Borough Council (BaBC) have identified the potential for a joint opportunity for a "Garden Suburb" at Dunton. Whilst this is not directly part of the Local Plan consultation, the Councils have jointly produced the "Dunton Garden Suburb Consultation" document which is open for comments and representations during the LP consultation period.

1.4 The purpose of this report is to represent the views of Countryside on the suitability of the Dunton Garden Suburb site with regards to transport.

Approach

1.5 **Section 2.0** of this report summarises the potential development of the site as set out in the "Dunton Garden Suburb Consultation" document.

1.6 **Section 3.0** sets out the existing conditions on the local highway network.

1.7 **Section 4.0** provides comments on the proposed development mix, layout and timescales.

1.8 **Section 5.0** sets out the anticipated trip generation and travel demand of the potential development.

1.9 **Section 6.0** discusses the implication of the potential development on the local highway network whilst **Section 7.0** discusses the impact on the public transport network.

1.10 **Section 8.0** contains a summary and conclusions.

2.0 DUNTON GARDEN SUBURB PROPOSALS

2.1 BrBC and BaBC have jointly produced the "Dunton Garden Suburb Consultation" document which seeks to explore the potential for cross boundary development of a site at Dunton in Essex.

2.2 The site is located between Laindon in Basildon Borough and West Horndon in Brentwood Borough. Approximately two thirds of the site are located in Brentwood Borough whilst the remainder is located within Basildon Borough.

2.3 The site is bounded to the north by the A127, to the west by the A128 and to the east by Lower Dunton Road. The London to Shoeburyness railway line runs adjacent to the southern site boundary. The site location is shown in **Figure 1**.

2.4 The current use of the site is mainly farmland as well as the Dunton Hills Family Golf Centre. The site also accommodates a small number of buildings, some of which are listed.

2.5 The consultation document suggest that the site could accommodate or provide:

- 4,000-6,000 houses
- Employment
- Gypsy and traveller pitches
- Community facilities
- Green space
- Integrated transport improvements
- New railway station along the southern boundary of the site
- Highway improvements

2.6 The consultation document acknowledges that commencement of development of the site is likely to take some eight years or more from any approval. It is therefore anticipated that first occupations will be no earlier than the mid 2020's.

3.0 EXISTING HIGHWAY NETWORK

3.1 The A127 runs roughly in an east-west alignment from Southend-on-Sea in the east to London in the west. Although not part of the trunk road network anymore, the A127 is a major route from the east coast of England towards London and therefore experiences high traffic flows throughout the day. In 2012 it carried in the order of 73,000[1] vehicles per day on some sections. In the vicinity of the site it carried around 62,600 vehicles a day.

3.2 The site is located between two major grade separated roundabout junctions on the A127, namely the Halfway House roundabout to the west and the Dunton roundabout to the east. Current access to the site is taken from the southwestern arm of the Dunton roundabout. Both the Halfway House and Dunton roundabouts have been identified as accident hotspots.[1]

3.3 The highway network in the vicinity of the site is shown in **Figure 2**.

3.4 OM commissioned Automatic Traffic Counts (ATCs) to be carried out at three locations in January 2015. They revealed that two-way flows along West Mayne, south of the junction with Lower Dunton Road, are around 1850 vehicles between 0700-0800 and around 2,000 vehicles between 1700-1800.

3.5 Two-way flows along West Mayne, east of the junction with the B1036, are around 930 vehicles in the morning and 920 vehicles in the evening whilst flows along the B1036 are around 1,040 vehicles in the morning and 1,350 vehicles in the evening. The observed traffic flows are shown in **Figure 3**.

[1] A127 – Corridor for Growth, An Economic Plan, March 2014

4.0 PROPOSED DEVELOPMENT MIX, LAYOUT AND TIMESCALES

4.1 The Dunton Garden Suburb consultation document sets out the potential development mix; however, it does not provide much detail. Nevertheless, it is considered that a development of the proposed size at Dunton will be required to provide a comprehensive mix of facilities in addition to the main residential element, such as:

- Reasonable amount and mix of employment uses
- Primary schools
- Secondary school
- Retail
- Sports pitches or other open green space
- Leisure facilities (e.g. pub / restaurant)
- New bus route or diversion of existing route
- Pedestrian infrastructure throughout the site and linking to existing infrastructure
- Highway improvements to mitigate development impact

4.2 As stated above, the consultation document suggests that development of the site would not take place until the mid 2020's. BrBC's Strategic Housing Market Assessment (SHMA) concluded at paragraph 1.3.5 that "*the dwellings projection figure for Brentwood is 362 per annum over the Plan period 2015 to 2030*."

4.3 However, Countryside's Strategic Growth Options representations, produced by Andrew Martin Planning, suggest that the SHMA considerably underestimates the future housing need in Brentwood Borough.

4.4 It is clear that in the order of 3,500 dwellings will be required within Brentwood Borough prior to the potential implementation of any development at Dunton based on the housing target set out in the SHMA. In reality the housing need is likely to be even higher as demonstrated in Countryside's representations. This could be provided by sites such as the Countryside site at West Horndon early on in the plan period.

5.0 TRIP GENERATION

5.1 The potential development of the site is likely to be residentially led with some, to date unquantified, employment and community facilities provided. Therefore the main element of the trip generation will be between 4,000 and 6,000 dwellings.

5.2 Given the potential for employment uses within the site there may be a small element of internalisation of trips, however it can be expected that a development of the size considered will generate in the order of one external car trip per two dwellings, i.e. a trip rate of approximately 0.5 trips/dwelling, during the peak hours. It is therefore anticipated that a development of 6,000 houses will generate around 3,000 peak hour car trips (external), in addition to any trips associated with the employment or community elements. Including any employment provision or community facilities the total trip generation could be considerably higher, depending on the quantum provided.

5.3 Of the residential peak hour trips, a large proportion is for commuting purposes. The 2011 Census data (Table ID QS703EW - Method of Travel to Work) suggests that, for the West Horndon and Laindon Park wards combined, 62% of residents drive to work. The Census data further suggests that 21% of residents use public transport to get to work. A small proportion walk or cycle. Combining the Census data with the estimated car trip generation of the site, the number of trips by other modes (ballpark figures) have been estimated, as shown in **Table 5.1**.

Table 5.1 Potential trip generation for Dunton Garden Suburb (ballpark figures)

Mode	Mode share	Trip Generation (6,000 dwellings)
Train	18%	865
Bus	3%	136
Motorcycle	1%	37
Car driver	62%	3,000
Car Passenger	6%	276
Bicycle	2%	92
Walk	7%	340
Other	3%	127
Total	**100%**	**4,873**

5.4 It is acknowledged that this methodology is not entirely accurate as different journey purposes will have different modal splits but for the purpose of this report it is considered an acceptable methodology.

5.5 The impact resulting from the trip generation of the proposed development on the local highway network and the public transport network will be discussed in the following chapters.

6.0 IMPACT ON THE LOCAL HIGHWAY NETWORK

Trip Distribution and Assignment

6.1 The consultation document suggests that the Dunton Garden Suburb development could potentially have three accesses onto the existing highway network; two onto the B148 West Mayne and one onto the B1036 Mandeville Way, as shown in **Figure 2**.

6.2 The A148 West Mayne connects directly to the A127 to the north of the site whilst the B1036 connects to the A13 to the south. Both, the A148 and the B1036, also provide access to Basildon to the east.

6.3 The latest available journey to work (J2W) data suggests that 46% of workers who live in Laindon Park and West Horndon wards work in Basildon Borough. Specifically, the majority work in Laindon Park and Fryerns wards. The distribution of journey to work trips is shown in **Figure 4**.

6.4 In numerical terms, based on the residential element of the proposals alone, it is estimated that around 1,250 cars will use the A127 towards London whilst around 1,000 will travel towards Basildon on the A127 during peak hours. The remainder is likely to use the B1036 towards the A13 or West Mayne towards Basildon. The provision of employment on site in addition to the residential development could result in significantly higher development flows than those assessed in this report.

6.5 The development traffic flows in the vicinity of the site along with traffic flows collected in January 2015 are shown in **Figures 5 and 6**.

6.6 ***The proposals for the Dunton Garden Suburb include three accesses, all of which load the development traffic onto the highway network along the eastern site boundary. It is estimated that the proposed development would generate at least in the order of 3,000 peak hour vehicle trips. The majority of peak hour vehicle trips will use the A127 towards London (1,250 vehicles per hour) or Basildon (1,000 vehicles per hour) while a small number will use***

local roads towards Basildon (500 vehicles per hour) or the A13 (250 vehicles per hour).

Highway impact

6.7 A development of the size of that proposed at Dunton Garden Suburb will have a significant impact on the local highway network, which can be broken down into:

- Impact on the access junctions and West Mayne
- Impact on Dunton roundabout and A127 slip roads
- Impact on the local highway network within Basildon

6.8 Following the assessment of the impact based on the access strategy set out in the consultation document, two alternative access options have been explored:

- Access onto the A128
- New access junction onto the A127

Impact on Access Junctions and West Mayne

Northern Access Junction

6.9 The northern access onto West Mayne appears to use the existing signal controlled junction of Lower Dunton Road with West Mayne. This junction is located along the dualled section of the B148 West Mayne and allows left and right turn inbound movement but only allows left turn outbound movements.

6.10 Based on the latest J2W data it is anticipated that there could be around 2,250 additional peak hour movements along the B148 West Mayne between the northern access and the Dunton roundabout, which are likely to be subject to strong tidality, i.e. the majority of vehicles will travel away from the site in the morning and towards the site during the evening peak hour.

6.11 Given the restricted movements and the location of the north site access junction it is likely that the majority of vehicles travelling via the A127 will use the northern site access, thereby adding potentially 2,250 vehicle movements per peak hour, or 38 vehicles per minute to the junction. The addition of such a significant amount of traffic will result in severe delays at the signalised junction.

Other Site Accesses

6.12 The second access off West Mayne is likely to be located along the single carriageway section between Lower Dunton Road and the B1036. The access onto the B1036 appears to be in the location of the existing three arm priority junction with Laindon Way.

6.13 It is anticipated that the two southern accesses will be mainly used by traffic travelling towards Thurrock Borough, Laindon or central Basildon via local roads. For the purpose of this report it has been assumed that around 500 vehicles will use the southern access onto West Mayne and 250 vehicles will use the access onto the B1036.

6.14 ***The vehicular access strategy for the Dunton Garden Suburb results in all development traffic using the B148 West Mayne or the B1036 Mandeville Way. The junction capacity at the site access junctions will be exceeded. It is therefore concluded that the access strategy set out in the consultation document is not suitable to serve a residentially-led mixed use development of up to 6,000 homes.***

Link Capacity of West Mayne

6.15 In accordance with TA79/99 West Mayne south of the Dunton roundabout is classified as an UAP1 road and a link capacity of around 3,350 vehicles per peak hour and direction. Given the observed northbound traffic flows of around 1,000 vehicles during the morning peak hour at this section of road, the addition of 2,250 vehicles in the peak hours in the future will result in traffic flows exceeding the theoretical link capacity.

6.16 ***In total, it is anticipated that around 2,250 vehicles will travel along the B148 West Mayne and through the Dunton roundabout, resulting in traffic flows along West Mayne in excess of the theoretical link capacity.***

Impact on Dunton Roundabout

6.17 The Dunton roundabout is a large five arm roundabout which connects the A127 with the B148 West Mayne. It also provides direct access to the Dunton Technical Centre.

6.18 The impact on the junction resulting from a large development such as the Dunton Garden Suburb is two-fold. Firstly, the addition of around 2,250 vehicle movements per peak hour, or 38 vehicles per minute, will result in long queues at the roundabout itself.

6.19 ATC data collected in January 2015 revealed that during the network peak hour of 0800-0900 around 1,000 vehicles travel northbound on the B148 towards the junction. The peak traffic period on that approach is 0700-0800 at around 1,300 vehicles.

6.20 The vast majority of development would travel northbound in the morning, thereby potentially trebling the current traffic flows towards the roundabout during the morning peak hour. It is expected that this will cause long delays at the junction.

6.21 In addition to the capacity at the roundabout itself, the slip road configuration is also dependent on level of traffic flows. The existing slip roads are of the simplest configuration, i.e. simple taper merges and diverges.

6.22 Based on traffic data collected in January 2015, it is estimated that the mainline traffic flow during the peak hour is currently between 2,000 and 3,000 vehicles in each direction.

6.23 TD22/06 sets out different slip road configurations for varying levels of mainline and merging or diverging traffic flows.

6.24 Based on mainline flows of between 2,000 and 3,000 vehicles and merging flows of around the same order (existing plus development flows), the required slip road configuration would be "Lane Gain with Ghost Island Merge" and "Lane Gain with Ghost Island Diverge" in accordance with Figures 2/3AP and 2/5AP of TD22/06. In other words, the slip roads would need to be widened to two lanes and the A12 would be required to be widened to three lanes in each direction in the vicinity of the junction.

6.25 Further assessments would be required to establish geometric requirements, land availability, and associated costs, however it is unlikely that the impact on the Dunton roundabout of the potential development flows could be fully mitigated without major changes to or even rebuilding of the Dunton roundabout.

6.26 ***The impact of the proposed Dunton Garden Suburb on the Dunton roundabout is two-fold. Firstly, the addition of the development traffic to the junction will cause long delays on the approaches to the Dunton roundabout. Secondly, the development will add significant volumes of traffic to the on-slips onto the A127, which the existing slip road configurations will not be able to cater for. It is unlikely that the necessary mitigation measures could be delivered within the existing structure of the junction and therefore major changes to or even rebuilding of the Dunton roundabout would be required.***

Impact on Local Highway Network

6.27 The addition of around 3,000 vehicle movements during peak hours will impact on the local highway network, in particular in the vicinity of the main employment areas within Basildon. Journey to work data suggest that the majority of people living in West Horndon or Laindon Park wards work in Laindon Park or Fryerns wards of Basildon. These can be reached via the A127 or the B148 West Mayne, St Nicholas Road and the A1235 to the east of the site.

6.28 The evidence base for the emerging Basildon Local Plan includes a Highway Impact Assessment which suggests that some junctions along the A1235 are already over capacity or will be in the future. It is acknowledged that the evidence base document takes account of a small amount of development traffic however the full Dunton Garden Suburb proposals are not included. Therefore,

the addition of the full Dunton Garden Suburb proposals will exacerbate the existing and future delays along the B148 and A1235 corridor and other local roads.

6.29 ***The proposed development would add in the order of 3,000 cars to the highway network in the peak hours, resulting in congestion along local roads, in particular through Basildon, along the B148 and A1235 corridor.***

Potential Access onto A128

6.30 As concluded previously the proposed access strategy for the Dunton Garden Suburb is not suitable for a development of that size. It is therefore anticipated that an alternative access strategy may be explored, which could include an access onto the A128 to the west of the Dunton Garden Suburb site.

6.31 The consultation document suggests that the built up area of the Dunton Garden Suburb is located in the eastern part of the site with the western part of the site being open space, recreational or green areas. An open water course runs through the western part of the site and some parts of the site are located within Flood Zone 3.

6.32 Due to the flooding risk, the western part of the site is clearly not suitable for built up development such as housing or employment. Providing an access road through flood zones 2 or 3 is costly both in terms of construction and maintenance, and hence it does not usually provide a viable access strategy.

6.33 Additionally, even if an access road was to be provided through the flood zone, this would most likely be a long straight road through recreational space, thereby impacting on users of the recreational space as well as wildlife. The road would be conducive to speeding thereby not creating a safe means of access.

6.34 ***The potential for an access off the A128 has been explored. However, it has been concluded that this is not a viable option due to the cost associated with the construction of the road through a flood zone as well as due to the impact on the recreational area located in the western part of the Dunton Garden Suburb site.***

Potential for New Junction on the A127

6.35 As set out above, the addition of the potential development traffic to the existing Dunton roundabout would result in long queues and the need for new slip roads whilst an access road onto the A128 is not a viable option due to the cost of construction through a flood zone.

6.36 It is anticipated that a potential developer may explore the option of providing a new junction for the proposed development onto the A127. For the purpose of this report, OM have done an initial assessment of this option which is presented in the following paragraphs.

6.37 Any potential site access directly onto the A127 would have to be between the existing junction of Halfway House and Dunton roundabouts. Both roundabouts are grade separated all movement junctions, i.e. they allow vehicles to access and leave the A127 in both directions whilst allowing the mainline traffic to flow freely.

6.38 The distance between the slip roads of the two roundabouts (weaving length) is currently approximately 1.5km.

6.39 The speed limit along the A127 between the two roundabouts is derestricted. In accordance with TA46/97 (Traffic Flow Ranges For Use In The Assessment Of New Rural Roads) and TD22/06 (Layout of Grade Separated Junctions), the A127 is therefore a rural all-purpose road.

6.40 In accordance with Table 4 of TD9/93 (Highway Link Design) the A127 near the site falls into road category 7A, which requires full grade separation of junctions. Therefore, TD22/02 Layout of Grade Separated Junctions applies.

6.41 The minimum distance between grade separated junctions in accordance with TD22/06 is largely governed by the length and type of merges and diverges (on and off slips) as well as the weaving lengths between the slip roads.

6.42 The length of any slip road is governed by the following factors:

- The type of slip road required in accordance with TD22/06
- The size of grade separated junction / width of mainline carriageway
- The level difference

6.43 The weaving length is measured between the merge and diverge tapers. It ensures that vehicles who merge with the mainline traffic flows can do so safely without interference from vehicles wishing to diverge, and vice versa.

6.44 At paragraph 4.36, TD22/06 states that the desirable minimum weaving length on rural all-purpose roads must be 1km. The current weaving length is 1.5km as mentioned previously and therefore satisfies the minimum weaving length requirement.

6.45 It is anticipated that any new grade separated access junction would be similar in size to the existing junctions. The slip roads at the existing junctions are simple taper merges and diverges (i.e. the simplest and shortest form of slip road) and in the order of 400-500m in length. The Dunton roundabout, the smaller of the two existing adjacent junctions is approximately 900m wide including the slip roads.

6.46 Therefore it is considered that a new junction of similar dimensions as the Dunton roundabout would result in weaving lengths of around 300m, i.e. (existing weaving length (1.5km) minus width of new junction (0.9km)) divided by 2), which is well below the desirable minimum weaving length of 1km.

6.47 ***The potential for a new access junction onto the A127 has been explored and it has been concluded that it is not possible to provide safe access to the Dunton Garden Suburb via a new grade separated junction onto the A127 due to junction spacing constraints.***

6.48 Following the assessment set out above it is concluded that the access strategy set out in the consultation document is not suitable for a development of the size of that proposed. Furthermore, the alternative access options explored present their own challenges and constraints. The challenges and constraints identified within the report are shown in **Figure 5**.

6.49 ***It is concluded that the access strategy presented in the consultation document is not suitable for a residentially-led development of 6,000 dwellings. An alternative access onto the A128 would be costly due to construction in the flood zone whilst an alternative access directly onto the A127 cannot be achieved safely due to junction spacing constraints.***

7.0 IMPACT ON PUBLIC TRANSPORT NETWORK AND SUSTAINABILITY

Bus Network

7.1 It is anticipated that a development of the size of that proposed at Dunton would provide a bus service from the site to the nearest town or employment centres as well as a railway station in order to encourage sustainable modes of travel to destinations beyond walking and cycling distance. In this case this is likely to be Basildon town and rail station.

7.2 There are currently a number of buses running through Laindon in the vicinity of the Dunton Garden Suburb although the peak hour spare capacity and slack in the timetable of these are not known. Furthermore it is not known whether the existing buses are subject to frequent delays due to large volumes of traffic. The existing bus routes are shown in **Figure 2**.

7.3 All new residential dwellings should be located within 400m of a bus stop, which, in this case, would result in a much longer bus route if any of the existing buses were to be diverted through the site.

7.4 The proposed development would generate in the order to 140 peak hour bus users, not including persons travelling by bus to a rail station.

7.5 It is therefore considered that any development at Dunton Garden Suburb would be required to provide a bus service, either as an extension to an existing route or a new route. The service should be in operation at first occupation of the site in order to establish sustainable travel patterns from “Day 1”. The details of the bus service should be discussed with local bus operators prior to the submission of a planning application.

7.6 ***It is anticipated that the proposed development at the Dunton Garden Suburb would provide a bus service between the site and Basildon.***

Rail Network

7.7 The consultation document includes the potential for a new railway station within the site boundary, located between West Horndon and Laindon railway stations, as shown in **Figure 2**.

7.8 OM have carried out a feasibility study for a new railway station in this location. The report concluded that it would be difficult to construct and operate a railway station at Dunton Garden Suburb. The full report is included in **Appendix A** while the reasons for the conclusions are summarised below:

- the railway embankment at the site is unsuitable;
- the gradient is too steep; and
- the railway is already so fully utilised that an additional station stop could not be incorporated into the timetable while retaining its safety and reliability.

7.9 Following OM's assessment it is therefore anticipated that residents at Dunton Garden Suburb would have to travel to one of the existing railway stations, such as West Horndon or Laindon.

7.10 **Table 5.1** suggests that there would be around 865 residents travelling by train, most of which would travel during peak hours. Given the location of the site in relation to the railway stations it is likely that at least 75% of those would drive to the station whilst the remainder might take the bus (if provided). Therefore the total number of car drivers generated by the development would increase from around 3,000 to approximately 3,600, adding to the already congested highway network.

7.11 ***A feasibility study about the potential for a new railway station within the Dunton Garden Suburb concluded that the construction and operation of a railway station would be difficult due to an unsuitable embankment, a steep gradient and a lack of slack in the timetable. Therefore, the proposed Dunton Garden Suburb residents would be required to travel to one of the existing railway stations. This will add around 600 cars to the already congested local highway network.***

8.0 CONCLUSIONS

8.1 The conclusion is that this proposal would face the following transport-related challenges:

Access

8.2 The site access strategy presented in the consultation document is deemed unsuitable for a development of the size of that proposed, due to the amount of traffic loaded onto the Dunton roundabout and the B148 link. We expect that there will also be capacity issues with each of the access junctions that have been proposed.

8.3 Two options for alternative access have been explored; onto the A128 to the west of via a new junction onto the A127.

8.4 Whilst it may be possible to provide an access junction onto the A128, the construction of the access road would be costly due to it being partly located in Flood Zone 3. Furthermore it would likely be a long straight road through open or green space without direct access, leading to safety concerns due to potential speeding.

8.5 It was concluded that it is not possible to provide a safe access junction onto the A127 due to junction spacing constraints.

Traffic Impact

8.6 A development of 6,000 dwellings, employment and associated infrastructure would result in a trip generation of at least 3,000 vehicle movements in the peak periods, based on the residential element alone, leading to congestion on the local highway network.

8.7 In particular, the Dunton roundabout and the A127 slip roads would be adversely affected, as well as local roads in Basildon, such as the A1235 corridor.

8.8 It is anticipated that the necessary mitigation measures at the Dunton roundabout cannot be delivered within the existing junction structure and that major changes or even rebuilding of the roundabout would be required to accommodate the traffic resulting from the Dunton Garden Suburb.

Buses

8.9 The development of Dunton Garden Suburb would require the provision of a bus service through the site.

Railways

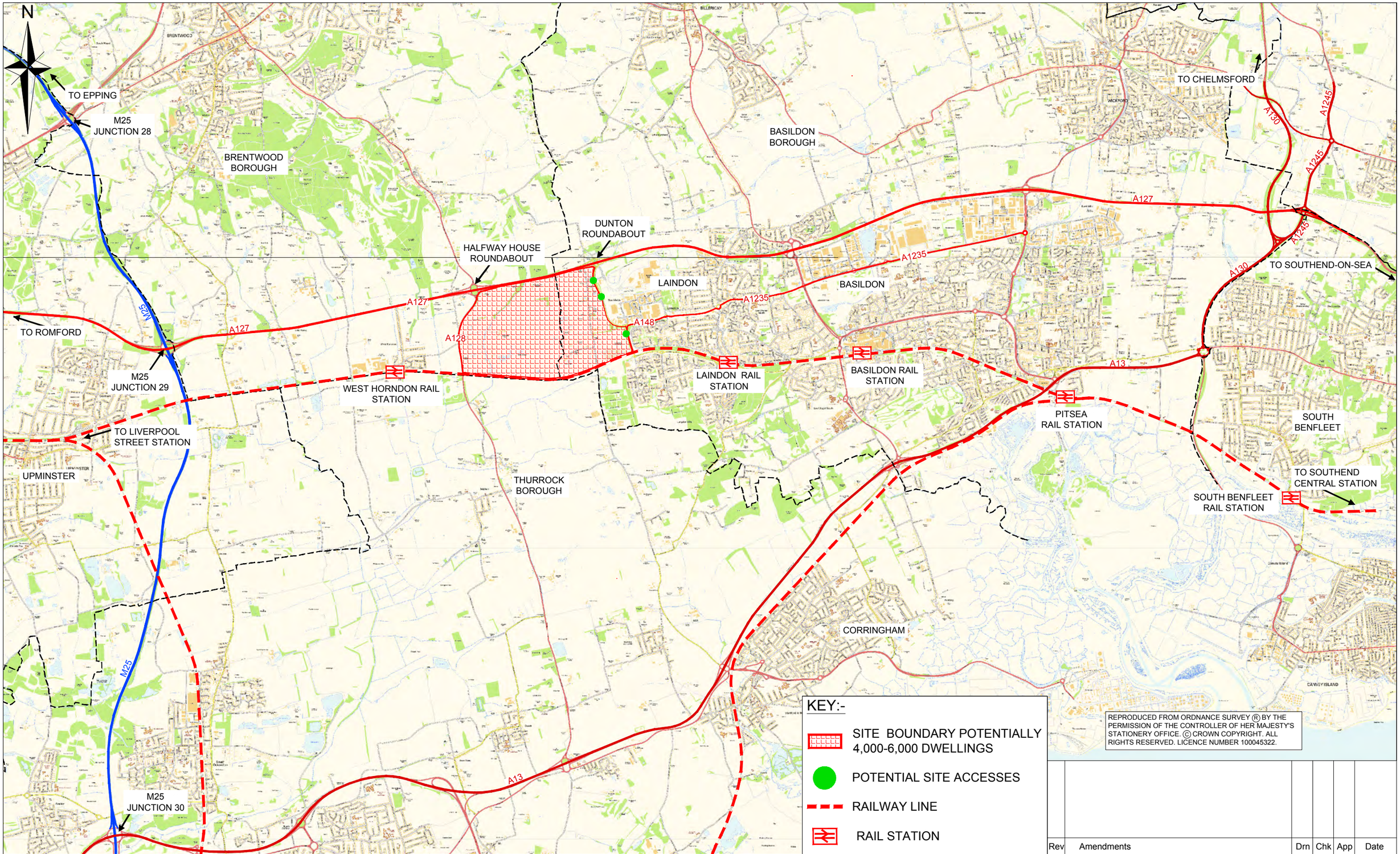
8.10 The consultation document suggests the construction of a new railway station within the site boundary. However, a feasibility study carried out by OM concluded that this would be very difficult to deliver due to unsuitable embankments, steep gradients and lack of slack in the timetable.

8.11 Instead, the residents of Dunton Garden Suburb would be expected to use the existing station of West Horndon or Laindon, adding around 400 additional cars to the already congested highway network.

Overall Conclusion

8.12 ***There are many uncertainties about the proposal and significant transport consequences are likely which (even if they are solvable) are likely to cost significant amounts of money.***

FIGURES



KEY:-

- SITE BOUNDARY POTENTIALLY 4,000-6,000 DWELLINGS
- POTENTIAL SITE ACCESSES
- RAILWAY LINE
- RAIL STATION

Rev	Amendments	Drn	Chk	App	Date

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Job Title: WEST HORNDON

Drawing Title: SITE LOCATION AND STRATEGIC HIGHWAY & RAIL NETWORK

Client: COUNTRYSIDE

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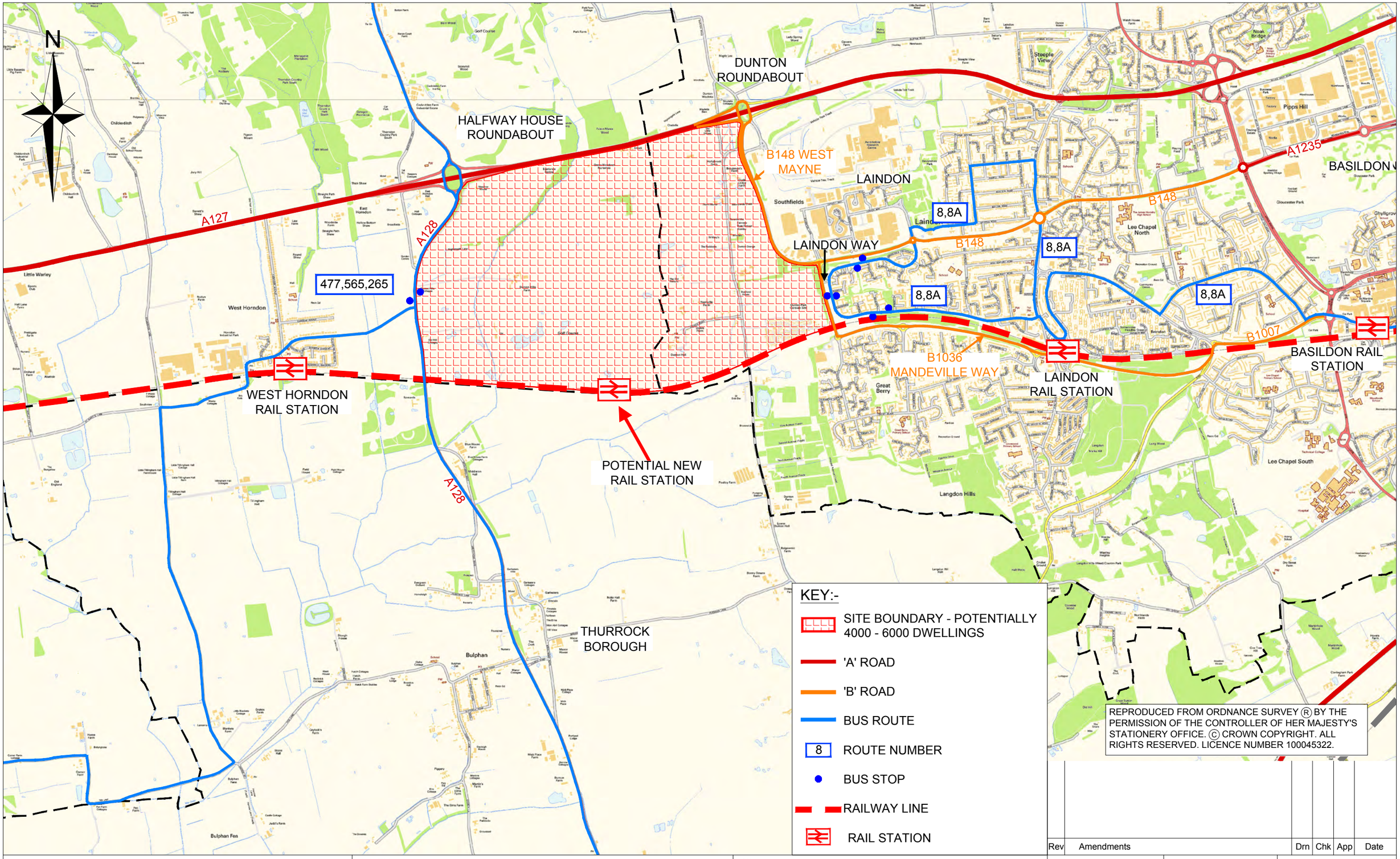

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Job Title: WEST HORNDON

Drawing Title: LOCAL HIGHWAY NETWORK & PUBLIC TRANSPORT

Client: COUNTRYSIDE

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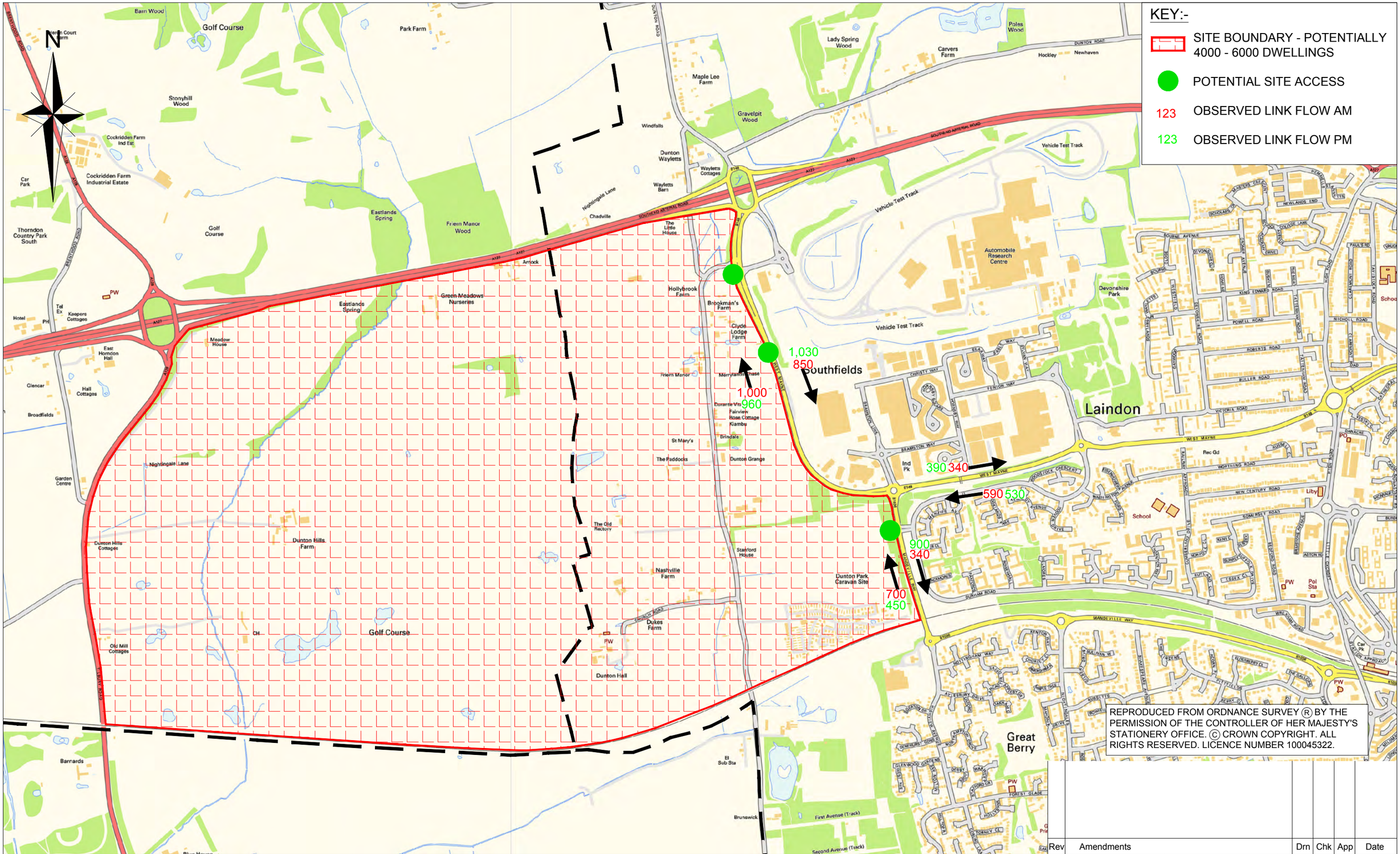

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Job No: 13-158	Drawing No: FIGURE 3		Rev:

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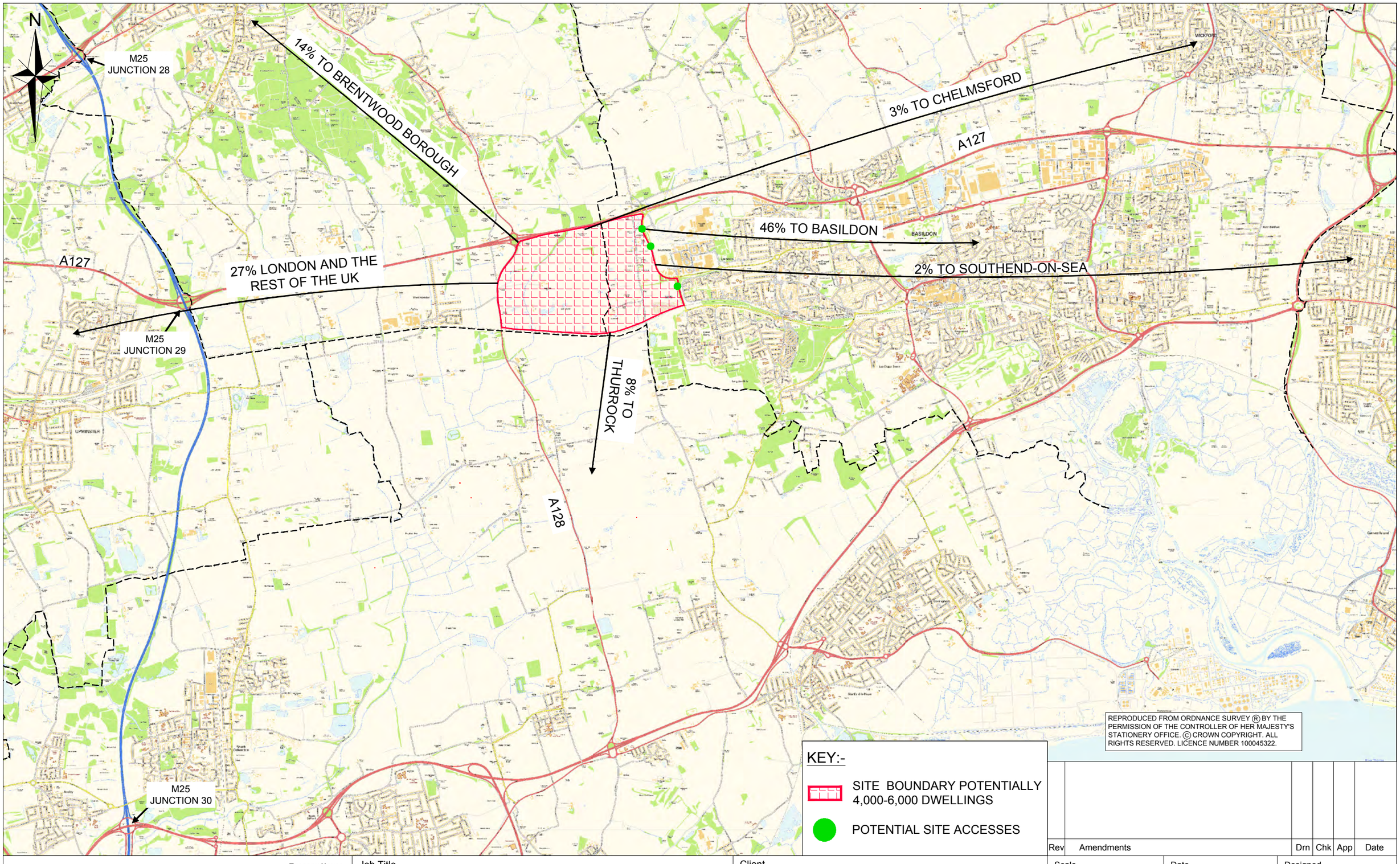

KEY:-

SITE BOUNDARY POTENTIALLY 4,000-6,000 DWELLINGS

POTENTIAL SITE ACCESSES

Rev	Amendments	Drn	Chk	App	Date

P:\13-158 - West Horndon\Tech\Acad\DuntonGreen report\13-158 Fig 4 Site Location & Trip Distribution.dwg

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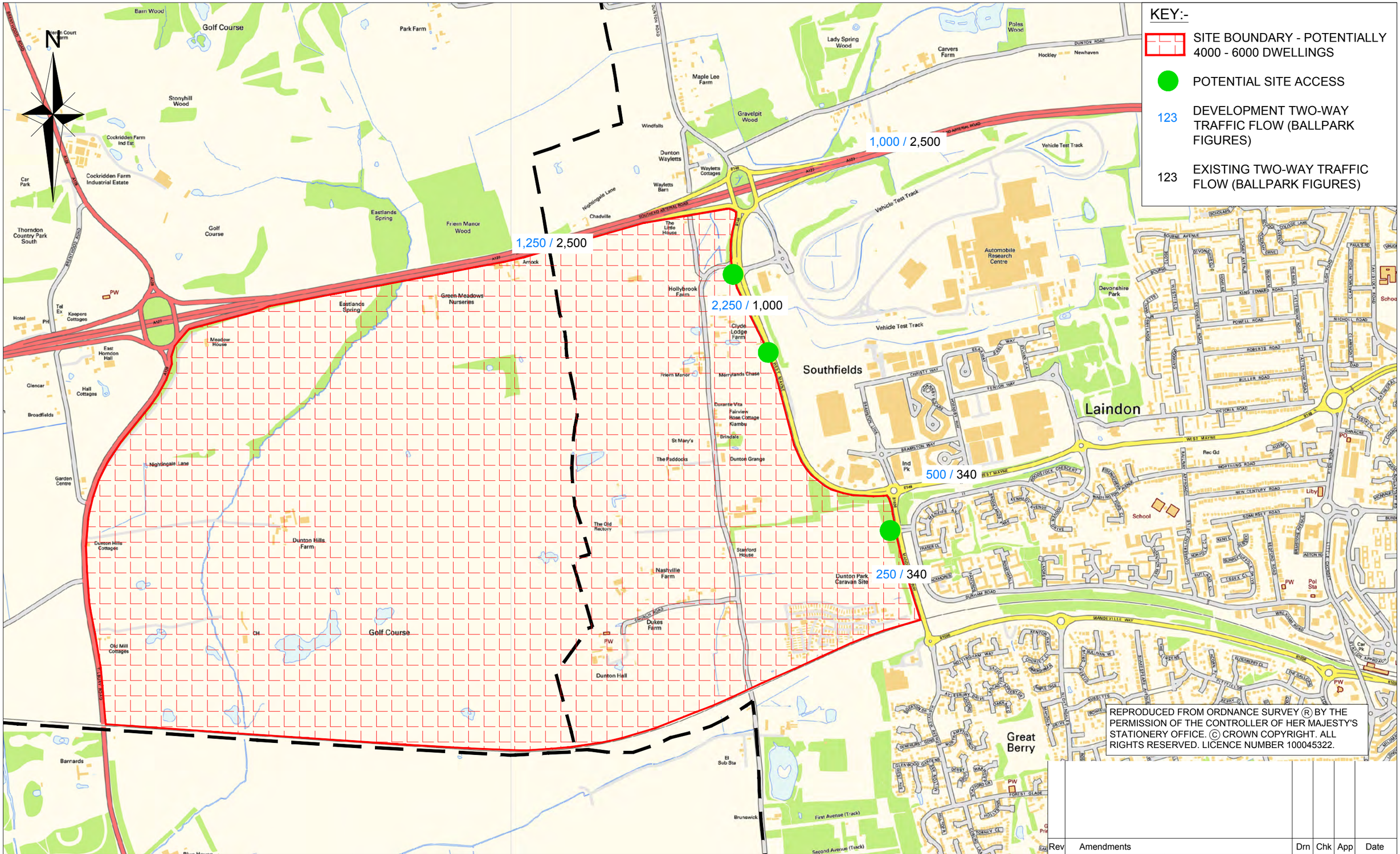
Drawing Title: DISTRIBUTION OF DEVELOPMENT TRIPS

Client: COUNTRYSIDE

Scale	Date	Designed
N.T.S	JAN 15	AB
Drawn	Checked	Approved
AB	MS	
Job No	Drawing No	Rev
13-158	FIGURE 4	



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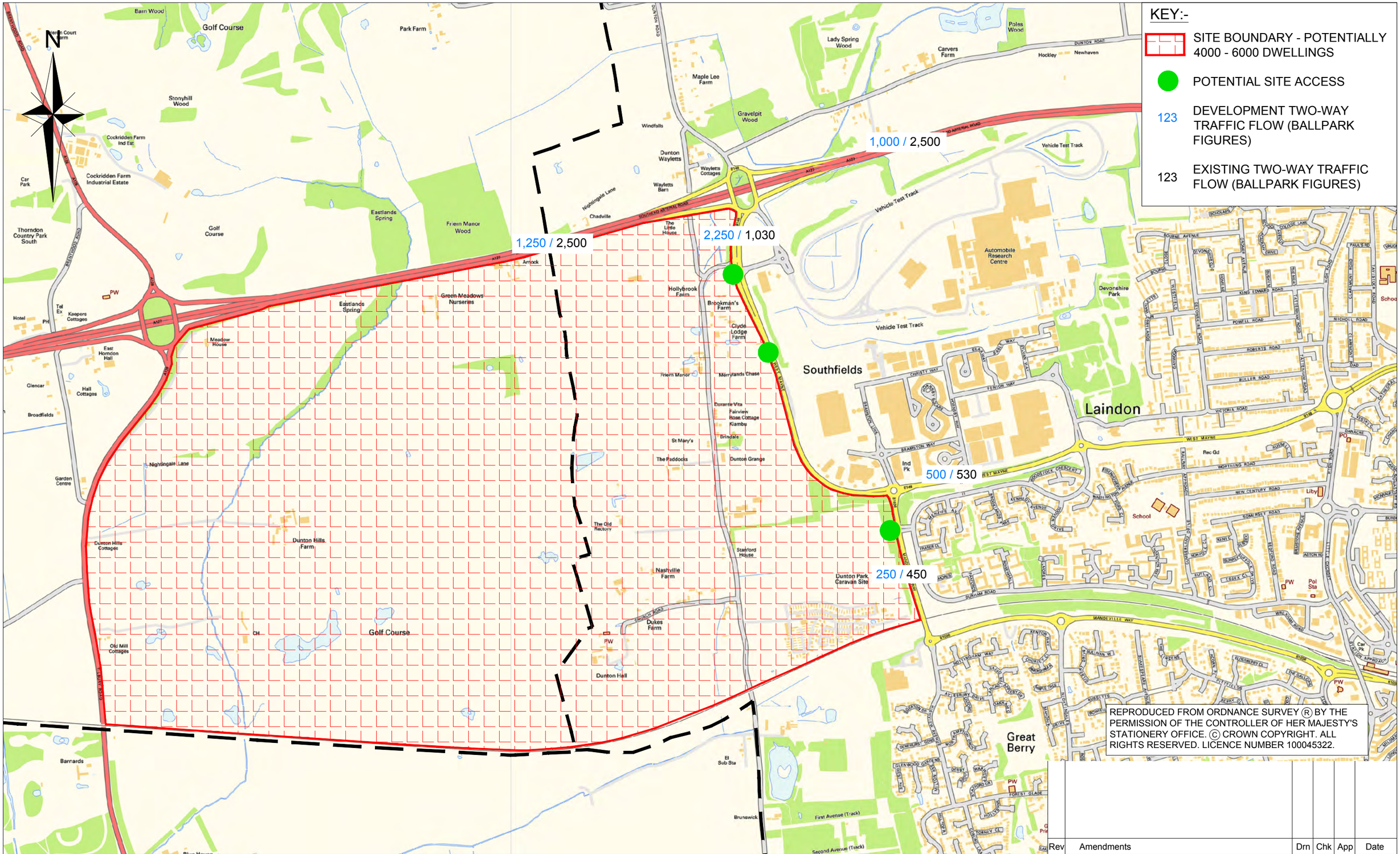
Job Title: WEST HORNDON		Client: COUNTRYSIDE	
Drawing Title: DUNTON GARDEN SUBURB AM PEAK HOUR OUTBOUND DEVELOPMENT FLOWS			
Scale: 1:12,500@A3	Date: JAN 15	Designed: AB	
Drawn: AB	Checked: MS	Approved:	
Job No: 13-158	Drawing No: FIGURE 5		Rev:

P:\13-158 - West Horndon\Tech\Acad\DuntonGreen report\13-158 Fig 5 am Peak hour Traffic Flows.dwg



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Drawing Title: DUNTON GARDEN SUBURB PM PEAK HOUR INBOUND DEVELOPMENT FLOWS

Client: COUNTRYSIDE

Scale	Date	Designed
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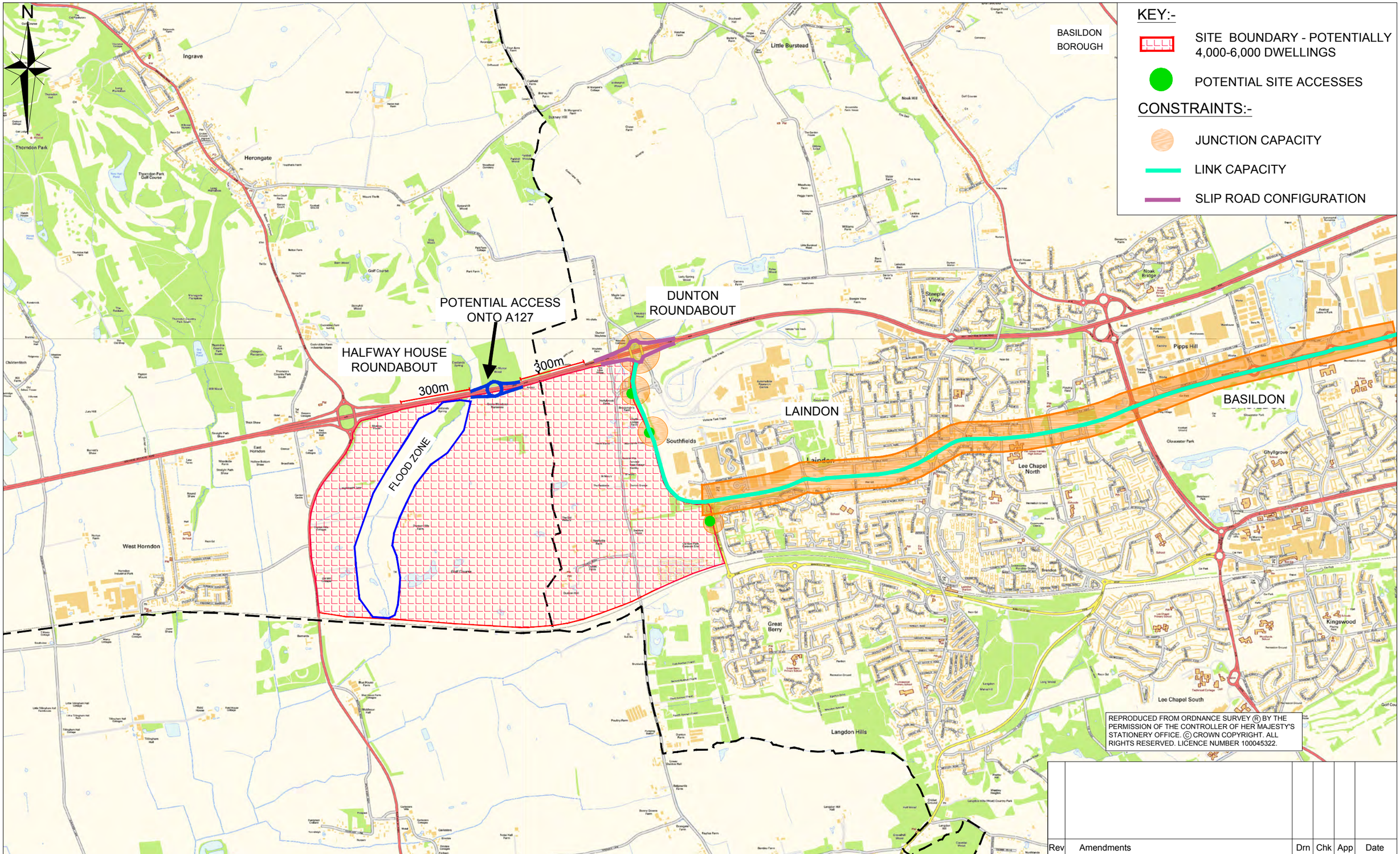
Drawn	**Checked**	**Approved**
AB	MS	
Job No	**Drawing No**	**Rev**
13-158	FIGURE 6	

P:\13-158 - West Horndon\Tech\Acad\DuntonGreen report\13-158 Fig 6 pm Peak hour Traffic Flows.dwg



Rev	Amendments	Drn	Chk	App	Date

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Job Title: WEST HORNDON

Drawing Title: HIGHWAY CONSTRAINTS

Client: COUNTRYSIDE

Scale	Date	Designed
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Drawn	**Checked**	**Approved**
AB	MS	
Job No	**Drawing No**	**Rev**
13-158	FIGURE 7	

P:\13-158 - West Horndon\Tech\Acad\DuntonGreen report\13-158 Fig 7 Highway Constraints.dwg

APPENDIX A

Feasibility of a Railway Station – 13-158-07

Odyssey Markides

LAND AT WEST HORDON, BRENTWOOD

Feasibility of a Rail Station at Dunton Garden Suburb

Report No. 13-158-07A
February 2015

LAND AT WEST HORDON, BRENTWOOD

Feasibility of a Rail Station at Dunton Garden Suburb

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Project No. 13-158
February 2015

DOCUMENT CONTROL SHEET

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A	Final	RN	ACM	ACM	ACM	Feb '15

CONTENTS **Page**

1.0 INTRODUCTION

1.1 This is a brief note which considers the feasibility of constructing a new railway station on the London Tilbury and Southend (LT&S) railway line, between West Horndon and Laindon stations, to serve a possible new housing development at Dunton Garden Suburb.

1.2 The main considerations regarding the feasibility of a new railway station are:

- the construction of the line;
- its gradient;
- the timetabling of trains on the line; and
- the delays caused by trains calling at a new station.

1.3 Furthermore, disabled access, car parking and train capacity have been considered.

2.0 LINE CONSTRUCTION

2.1 The relevant section of the LT&S railway line was built in 1885 to provide a more direct route between Barking and Pitsea than the original route, which is via Tilbury. Today the original route is known as the Tilbury Loop while the newer section, on which a station to serve a Dunton Garden Suburb would lie, is now regarded as the main line.

2.2 West Horndon station lies at about 10m above sea level and the land to the east remains level for a further 2km. Laindon station, about 5.5km from West Horndon, is some 50m above sea level. However, to avoid making a gradient too steep for trains to climb, the line was constructed on a gradually rising embankment which starts just east of the platforms at West Horndon. This means that at a point on the railway near the centre of the southern edge of the proposed Dunton Garden Suburb development, the railway line is significantly above the level of the surrounding land.

2.3 The embankment itself was made from the cheapest material available at the time, which was ash from numerous steam locomotives' fireboxes, accumulated over a long period. It was not sufficiently consolidated and due to weathering, some has been absorbed into adjacent fields, discolouring the soil. When the line was electrified in 1958, using overhead wires, a special design of gantry was required because of the risk of slippage[1].

2.4 The nature of the embankment therefore makes it most unsuitable for the construction of a station with its heavy platforms and buildings.

[1] Laindon and District Community Archive

3.0 GRADIENT

3.1 As mentioned in para 2.2, the line rises approximately 40m over a length of 5.5km, which gives an average gradient of 1 in 140. The Rail Safety and Standards Board (RSSB) in its most recent guidance on the design of stations (GI/GN7616, Section 5.2) suggests that, although the convention that no new stations should be built on a gradient steeper than 1 in 500 is unduly restrictive, it may not be desirable to construct one on a gradient as steep as the one in this case.

3.2 In the early days of railways, several stations were built on gradients of 1 in 100 or even steeper, but since 1892 the Board of Trade's requirement was that no new station should be built on a line steeper than 1 in 260. This was increased to 1 in 500 around 1950. However, the current organisation responsible for setting such standards, the Rail Safety and Standards Board (RSSB) in its most recent guidance on the design of stations (GI/GN7616, section 4.2) suggests that the convention that no new stations should be built on a gradient steeper than 1 in 500 is now unduly restrictive.

3.3 Before agreeing to the construction of a station at Dunton Garden Suburb, a number of considerations would need to be taken into account, including:

- the braking capability of the trains using it;
- provision of mitigating circumstances in the case of a train running away; this could take the form of catch points and the construction of separate sidings on the downhill side of the station, on both tracks, with sand traps. These would obviously be very costly.

3.4 In conclusion, there is no doubt that Network Rail would wish to look very carefully indeed at the safety considerations of a new station in this location.

4.0 LINE CAPACITY

4.1 The LT&S is a typical suburban railway, whose main purpose is to carry people to work in central London in the morning and return them home in the evening. The line is two track throughout, which means that trains cannot overtake each other. However it is also quite lengthy, 63km from Shoeburyness to Fenchurch Street, with many intermediate stations. A train which calls at every one of these stations takes about 68 minutes for the journey, but more importantly, would tend to become full long before reaching London on its inward journey. In order to minimize passengers' journey times and to optimise the use of train capacity, a system of skip-stopping is in use during peak periods.

4.2 At these times, most trains from Shoeburyness run non-stop from Pitsea, Basildon or Laindon to London, usually also calling at either Upminster or Barking, but not both. Passengers starting their journeys at Laindon or West Horndon are catered for by a series of trains at roughly 15 minute intervals which start from Laindon; a separate platform has been constructed there for them to wait out of the way of through trains in either direction before starting their journey. During the critical peak periods it would only be these Laindon starters which would call at a new station to serve Dunton Garden Suburb, so as not to delay or overcrowd the through trains.

4.3 Track capacity on the LT&S is very intensively used. The timings of all peak period trains are very critical, because of the need to pass as many trains as possible in safety over each section of track, whilst being able to operate a reliable timetable every day. The Timetable Planning Rules issued by Network Rail state that headways between trains should not be less than 2.5 minutes, except between Barking and Fenchurch Street, where it is 2 minutes.

4.4 **Table 1** shows a small section of the morning peak **working** timetable (the public timetable never shows half minutes, but the railway is routinely timed to this accuracy).

Table 1: Laindon to Fenchurch Street (Partial) Working Rail Timetable

Train no.		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Laindon	Start		0737					0750			
	Call			0742½					0756½		
	Pass	0734½				0747					
W. Horndon			0742					0755½			
Barking	Call		0755	0758			0806	0809½	0812½	0817	
	Pass	0749			0802½	0804½					0821
Fenchurch Street	Arrive	0803	0810	0813	0815	0817	0823	0825	0829	0832	0835

4.5 The train numbers shown in the top row of this table are for the purpose of this report and are not carried by the actual trains. Train numbers 1 and 5 are through from Shoeburyness to London Fenchurch Street and do not call at either Laindon or Barking. Trains 3 and 8 are also through from Shoeburyness to London, calling at Laindon and Barking but not West Horndon. Numbers 2 and 7 start from Laindon and call at West Horndon and Barking on their way to London. Trains 4, 6, 9 and 10 travel via the Tilbury Loop, i.e. do not pass through Laindon or West Horndon. They join the main line at either Upminster (trains 4 and 9) or Barking (trains 6 and 10).

4.6 It can be seen that the scheduled gap (headway) between train 1 passing through Laindon at 0734½ and train 2 starting there at 0737 is 2.5 minutes, i.e. the minimum allowed by the signaling. Similarly, the headway at Laindon between trains 5 (passing at 0747) and 7 (starting at 0750) is 3 minutes. At Barking the gap between train 2, which has called at West Horndon, arriving at 0755 and the following train (no. 3, arriving 0758) is also 3 minutes. The same applies to the gap between trains 7 (0809½) and 8 (0812½). Again, these gaps are the minimum allowed.

4.7 Turning now to the travel time between stations, Train 2 takes 18 minutes to travel from Laindon to Barking, and train 7 takes 19½ minutes, both including stops at West Horndon and Upminster, whereas train 3 takes only 15½ and train 8

takes 16 minutes, both travelling non-stop. Those two stops together cost 2½ - 3½ minutes, or about 1½ minutes each. This is caused by the need to slow down, stop, open doors, allow passengers to board, close doors and accelerate away again. Adding another station stop at a new Dunton Garden Suburb station would cause a similar delay.

4.8 So if this additional station stop were to be inserted into the schedule of trains 2 and 7 they would arrive at Barking 1½ minutes later than at present. This would mean that trains 3 and 8 would also be delayed by 1½ minutes and this would in turn mean that trains 4, 5, 9 and 10 would also be delayed.

4.9 If instead of making trains 2 and 7 arrive later, it was attempted to make them start earlier from Laindon, they would not have the minimum of 2.5 minutes headway behind the preceding fast trains (1 and 5).

4.10 Looking at the morning peak period as a whole, between 0720 and 0830 five trains start from Laindon and each one would have the extra 1½ minutes inserted into their schedule to allow for the call at Dunton Garden Suburb, a total of 7-8 minutes cumulative delay. The timetable does not have enough allowance to accommodate this reliably. Similar comments apply to the evening peak period.

4.11 In other words, there is simply not enough slack in the timetable to allow trains to make an extra stop at a new station at Dunton Garden Suburb in the peak periods. This does not apply during the middle of the day, but it would hardly be appropriate to open a new station which could only be used outside the peak periods.

5.0 CONSIDERATIONS AT EXISTING STATIONS

Introduction

5.1 The following paragraphs go on to consider if it would be possible to provide increased capacity on the existing railway line – instead of building a completely new station at Dunton Garden Suburb.

5.2 Some simple analysis is undertaken, considering in particular the feasibility of providing improvements to:

- Disabled Access
- Parking Provision
- Train Capacity

Disabled Access

5.3 The normal way to achieve disabled access to all platforms at a station is to install lifts at the footbridge, these being located on the opposite side of the bridge from the stairways. If the existing bridge is not suitable then a new one has to be built. Network Rail are currently implementing a programme of improvements of this type under the title 'Access for All'. The current programme covers some 200 stations, costing £370m, even though it does not include West Horndon. The average cost per station, including those where a new footbridge is required, is thus about £1.8m.

5.4 The existing footbridge at West Horndon does appear suitable for lifts to be added, which would probably cost of the order of £1m.

Car Parking

5.5 The car parks at Laindon and West Horndon stations are nearly full at midday on a weekday; this would be confirmed by the annual census carried out by the station operator (C2C).

5.6 It might be possible to expand both car parks, either by making them multi-storey, or more economically by purchasing additional land for surface parking. There would appear to be space on the south side of the tracks at West Horndon which could be used for this purpose. This would definitely be a much cheaper option than building a new station at Dunton Garden Suburb.

Train Capacity

5.7 The Department of Transport publishes annual figures showing the number of passengers arriving at each London terminus in the morning peak period, the capacity of the trains and the numbers who are 'overcrowded'. For this purpose, it is assumed that each train can carry 35% more passengers than the number of seats, before it is overcrowded, so long as none of them has to stand for more than 20 minutes. Even on this somewhat generous definition (from the train operator's point of view), C2C scored badly in the most recently available figures, with 23 out of 47 trains (49%) arriving at Fenchurch Street between 7am and 10am being overcrowded, rising to 74% in the peak hour 8-9. This makes it the second worst route into London, beaten only by Blackfriars. Things are no better in the evening peak.

5.8 Something could be done about this, if the train operator would run longer trains. All the stations on the line are capable of accommodating 12-car trains, but at present only a few of the trains are actually 12 coaches long, the remainder being only of 8 cars. To make them all 12 cars long would require at least 18 additional 4-car units to be built.

5.9 Interestingly, when this route was first electrified in 1962, it had 92 4-car units operating on it. These were replaced in 1999 by only 74 similar sized units, although the latter had sliding doors rather than the slam doors on the 1962 trains; the DTP's convention is that sliding door trains can carry many more standing passengers than slam door trains, hence the number of trains could be reduced. However, the growth in passenger numbers since 1999 would certainly now merit a fleet of the same size as that in 1962, and clearly if more houses are to be built in the West Horndon/Dunton area, this will become even more necessary.

5.10 It is concluded that it would be possible to provide improvements in disabled access and parking provision of the two existing stations of West Horndon and Laindon. Increased capacity to the train service would also be easily achievable. This would question the justification and viability of the idea for a new station at Dunton Garden Suburb.

6.0 CONCLUSIONS

6.1 The conclusion is that it would be very difficult to construct and operate a new station at Dunton Garden Suburb because:

- the railway embankment at the site is unsuitable;
- the gradient is too steep; and
- the railway is already so fully utilised that an additional station stop could not be incorporated into the timetable while retaining its safety and reliability.

6.2 Furthermore, disabled access, car parking and train capacity at West Horndon have been explored. It was concluded that any existing issues can be resolved and that improvements would be possible in disabled access and parking provision. This too would raise serious questions about the justification and viability for a new station at Dunton Garden Suburb.