
6.0 TRANSPORTATION

- 6.1.1 The REP development has been the subject of a detailed transportation assessment culminating in the production of a Transport Statement. This has considered the highways and traffic issues associated with the development of a new Renewable Energy Plant at Boston Road, Sleaford and represents an update to the original August 2007 report to incorporate technical work submitted to LCC post this date. The full Transportation Statement forms Appendix 6.1 to the ES and the conclusions of the document have been set out below.
- 6.1.2 The proposal would involve the development of an electricity generating facility with an installed capacity of 40MW. Electricity will be generated via a steam turbine which would be driven through the combustion of biomass material (primarily straw) supplied via contracts from farms within a local catchment. The site is proposed to operate with an operating capacity of 240,000 tonnes per annum (tpa) of delivered biomass material, with the energy generating process resulting in approximately 25,000 tpa (by weight) of ash waste material.

6.2 Existing Network Conditions

- 6.2.1 The proposal site is currently utilised for agricultural land use, with existing vehicular access limited to field access points from the southern boundary route of Boston Road. No formal hard surfaced access is currently available. Boston Road provides local distributor road standard access to the town of Sleaford to the west and connections to the A17 at the Kirkby La Thorpe interchange to the east. The section of route to the frontage of the proposal site is currently the subject of a general weight restriction relating to larger goods vehicles over 7.5t (except for access to frontage fields / properties). This weight restriction is associated with the low railway bridge located to the west, the operational impact of which is to effectively limit movements to / from Sleaford town centre on this route to cars, light vans, pedal cycles and motorcycles.

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- 6.2.2 To the east of the proposal site Boston Road connects to the A17 Sleaford Bypass at a local grade separated all movements junction at the village of Kirkby La Thorpe. The A17 is of dual carriageway nature at this location, although the route narrows to a single carriageway layout approximately 400m to the east of the main slip road connections to Boston Road. The Boston Road connections to the A17 mainline route are of a limited layout standard, with the merge / diverge provision currently being of a simple give way arrangement, with no acceleration lane. This level of provision reflects the existing low level of demand for side road traffic.
- 6.2.3 Review of 2006 traffic flow data for the A17 route demonstrates a generally low level of hourly demand, with typical daytime flow being less than 1400 vehicles per hour during main daytime hours (two way). Maximum directional demand on the A17 has been noted to be less than 900 vehicles per hour in either direction, with typical weekday daytime demand being 550-750 vehicles per hour. Such flows are well within the 1600 vehicles per lane broad capacity criteria identified for a single running lane on a dual carriageway grade separated route as set out in DfT standards and suggests significant spare background operating capacity at this location.
- 6.2.4 An audit of recorded Personal Injury Accident data for the local network to the Sleaford REP has been carried out. This review identified that just five accidents have been recorded within the vicinity of the Kirkby La Thorpe interchange, only two of which were related to access routes which will be utilised by regular Sleaford REP operational traffic demand. In addition, six further incidents were recorded on the section of Boston Road between the proposal site frontage and the A17 junction. The majority of these Boston Rd incidents were not 'vehicle to vehicle' accidents and appear to relate to loss of control factors or driver error. Overall it is considered that the review of accident trends does not identify any existing major road safety concerns across the study area. Accident rates at or near the Kirkby la Thorpe junction are low and there is no evidence to suggest that the existing junction layout suffers from any inherent safety issues for traffic movements entering or leaving the A17.

6.3 Development Scheme

- 6.3.1 The scheme proposals envisage the construction of a Biomass REP to generate electricity via the combustion of biomass material (primarily straw) supplied from within a local catchment. The site is proposed to process of the order of 240,0000 tonnes per annum (tpa) and would generate a 40MW supply. Physical waste arisings from the Sleaford REP facility would effectively be limited to ash from the burn process which would be quenched (wetted) and sold as an agricultural soil conditioner. Anticipated quantities of derived ash waste would equate to approximately 5.8% of biomass input by weight.
- 6.3.2 Vehicular access to the proposal site would be taken from Boston Road via a new industrial standard access junction located to the south eastern corner of the proposal site. Predicted development site related traffic demand levels are not anticipated to exceed the 300 vehicle per day threshold level for the provision of ghost island access arrangements, even including for 'absolute worst case' operating scenarios of the REP site operating at maximum theoretical input capacity. Furthermore, review of the PICADY junction capacity calculations for this site access design identifies that the proposed layout will provide substantial spare operating capacity even for 2022 future year design conditions with 'worst case' development traffic - with negligible delays for through traffic movements on Boston Road.
- 6.3.3 At the request of LCC highways officers, the simple T-junction arrangement has been modified to discourage large goods vehicle movements associated with the Sleaford REP facility from utilising Boston Road to the west of the site.
- 6.3.4 All input vehicles to the site would be operated under an appropriate transport logistics contract working to routeing agreements, with materials transported using large HGV vehicles specifically modified in order to maximise straw loads. Such an approach ensures high input tonnages per vehicle and would maximise the delivery performance of the site, therefore reducing overall vehicle demand movements to / from the site. Incoming straw loads to the site would be unloaded on-site by two grab cranes – which operate with a typical crane unloading time of the order of 30 minutes per vehicle.

6.4 Site Operating Parameters

- 6.4.1 The site will operate for 50 weeks of the year (allowing for a 2 week shutdown / maintenance period during the summer) requiring an hourly throughput of the order of 30 tonnes per hour of straw to the Sleaford REP facility. The on-site storage barns will cater for the storage of up to 3 days straw input - allowing for both uninterrupted operation of the boiler over weekend periods (when product input movements will be restricted) and some site operational flexibility.
- 6.4.2 It is proposed that the combustion process at the Sleaford REP facility would operate on a 24 hour basis, 7 days a week basis. Deliveries of straw / exports of ash waste, however, would be restricted to Monday – Friday, over a 12 hour delivery window (07:00-19:00) and a six hour delivery period on a Saturday (08:00-14:00). No deliveries will take place on Sundays or public holidays.
- 6.4.3 Operational HGV movements to / from the site will be subject to a routing agreement, restricting traffic to agreed route corridors. All HGV delivery movements will access the site from Boston Road to the east, with operational movements utilising the Kirkby La Thorpe interchange to access the A17. Exit movements to the A17(E) will be required to utilise the A17 west facing entry slip road only and undertake a safe U-turn at the grade separated A17 / A153 'Sleaford North' Interchange.

6.5 Anticipated Development Trip Demand

- 6.5.1 Anticipated demand estimates for trip movements to / from the proposed Sleaford REP facility have been calculated via a 'first principles' approach, based on main site operating assumptions such as anticipated site processing capacity, site operating / delivery hours and anticipated input / export vehicle tonnages.
- 6.5.2 On the basis of a 50 week operational year, it can be anticipated that site operating capacity will be of the order of 4800t per week of input material. Assuming a typical 5.5 day weekly delivery / export window, it can be anticipated that maximum site input demand will be of the order of 867 tonnes

per full working day of straw input and 92 tonnes per day ash waste production for export (inc char and moisture content).

6.5.3 Assuming no back-loading of operational vehicles, day to day operation of the Sleaford REP facility can therefore be anticipated to generate the following total number of daily vehicle movements (in + out):

- HGV operational movements: 100 trips per day;
- Staff (private car) movements: 36 trips per day

6.5.4 In order to provide comfort to LCC officers re: traffic impact levels for the Sleaford REP scheme, a sensitivity test has been carried out assuming for 'absolute worst case' theoretical maximum site input capacity. This sensitivity assessment has been based on the vehicle unloading capacity of the four grab crane facilities (30 minutes per vehicle). Such operation would result in a theoretical maximum site input HGV demand of 96 vehicles per day (assuming 12hr operation at 8 vehicles per hour) or 192 movements (in + out). Such operating levels are considered highly unlikely to occur in practice, as the Sleaford REP facility is designed to allow for on-site storage of straw input materials to provide up to four days operating supply – resulting in little need for such intensive delivery operation.

6.6 Development Traffic Distribution & Assignment

6.6.1 The distribution and assignment of traffic over the immediate local highway network to the development site has been predicted via reference to both proposed local routing agreements for Boston Road & A17 and details of the catchment of commercial straw supply contracts. Given the identified distribution of commercial straw supply contract catchment, it is anticipated that the majority of straw delivery vehicles would approach the proposed Sleaford REP facility via the A17 from the west of the Kirkby La Thorpe interchange. In order to ensure a wide ranging appraisal of development traffic demand at the A17 / Boston Road junction, however, two assignment scenarios have been considered:

- All approach traffic (including staff vehicles) via A17(W) – Base Scenario;

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- 80% of approach traffic via A17(W), 20% via A17(E) – Sensitivity Scenario.

6.6.2 Assessment of development traffic operational and environmental impact

6.6.3 The assessment of development traffic impact has been carried out through Impact assessment has been carried out through the consideration of key junction capacity assessments and link / flow assessment for the key distributor road link of the A17 connector roads at the A17 Kirkby la Thorpe Interchange (which will effectively accommodate all Sleaford REP operational movements).

6.7 Junction Capacity.

6.7.1 Junction capacity assessment work has been undertaken at two main locations on the immediate local highway network:

- Site access junction to Boston Road;
- Operation at the internal junctions to the Bone Mills Interchange (Sleaford North).

6.7.2 Review of the PICADY model results demonstrates that the proposed site access junction would operate with substantial levels of spare capacity at the future design year. All key turning movement RFC's would be at well below critical 0.85 values and with negligible queuing or delay impact on through movements along Boston Road. There is sufficient spare capacity within these assessment results to suggest that the junction could accommodate a significant rise in background traffic movements on Boston Road without any material impact in operation.

6.7.3 It is therefore concluded that the proposed site access junction represents an entirely suitable layout which would deliver appropriate levels of operational capacity and safety. Site traffic demand, even for absolute worst case site maximum levels, would be below daily side road traffic thresholds identified in DfT standards TD42/95 and there is no evidence to suggest that the operation of the junction would result in a material impact on the safe operation of through traffic movements on Boston Road.

6.7.4 Traffic demand at the Bone Mills Interchange associated with the Sleaford REP proposal scheme is anticipated to be minimal, with the majority of trips remaining on the A17 mainline from origins from the west. Development traffic utilising the main interchange internal junctions would be limited to:

- Eastbound 'U' turn traffic which has been routed away from the Kirkby La Thorpe interchange;
- Trips from north-east origins likely to be served by the A153.

6.7.5 Even taking into account 'worst case' traffic generation assumptions, maximum two way traffic associated with the Sleaford REP site would only be of the order of 57 HGV trips per day.

6.7.6 Junction capacity assessments at Bone Mills interchange demonstrate that the development of the Sleaford REP facility would not result in a material change in operational or environmental capacity conditions at the Bone Mills interchange. There is therefore no requirement for any highway improvement works at this location to support the development of the Sleaford REP proposal scheme.

6.8 Link Flow Assessment

6.8.1 Link flow operational assessments have been concentrated on the immediate sections of the A17 close to Kirkby La Thorpe interchange, through reference to the background link flow data collected in 2006 and connector road data from 2007.

6.8.2 Typical day-to-day development traffic movements on the mainline A17 are unlikely to be in excess of 18 vehicles per hour (8 HGV's and 10 staff movements) and that 12 hour link flow impact is anticipated to be less than 1% at the site opening year 2012, Even when 'absolute worst case' sensitivity scenario demand conditions are considered (based on theoretical maximum site input levels) 12 hour development link flow impact is not anticipated to exceed 1.5% of background demand flows. Such impact levels are well below traditional IHT guideline thresholds and it is therefore concluded that development of the Sleaford REP facility is unlikely to result in a material change in operating conditions on the A17 mainline route

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- 6.8.3 Typically development link flow impact on Boston Road is not anticipated to be substantial. Peak hour percentage change values identify that development traffic demand associated with typical day-to-day operation of the Sleaford REP will be less than 10% of background traffic demand at the 2012 opening year even taking into account the low background demand / spare capacity nature of this route (see para 2.2.16). It is not anticipated that such demand will result in a material traffic impact on this link, particularly given the substantial existing spare operating capacity identified on this link.
- 6.8.4 Link flow percentage impact has also been considered for the A17 Kirkby La Thorpe connector road flows. This exercise indicates that development traffic impact on the east facing connector road links to the A17 will be strictly limited. Development demand for both typical day-to-day operation and the 'worst case' sensitivity demand scenario are not anticipated to exceed 3.5% of 2012 opening year hourly background demand levels and 12 hour demand less than 2.0%. Such small percentage change represents the strictly limited development traffic demand predicted to utilise these links.
- 6.8.5 Percentage change levels on the west facing connector road links to the Kirkby La Thorpe interchange are predicted to be much higher than for those on the east-facing links. This is considered to be more a reflection of the low levels of background traffic experienced on these links than substantial development demand movements. Peak hour 2012 opening year background flows on these links are predicted to be less than 80 vehicles per hour or in the order of just 1 existing vehicle movement per minute. Any additional development trips are therefore likely to result in a large percentage change. Typical day-to-day hourly demand (including all staff trips) on the west facing connector road links is anticipated to be less than 14 movements per hour during peak hours and of the order of only 4 movements per hour (operational HGV's) during other weekday daytime hours. Such levels of additional demand represent less than 1 vehicle every 4 minutes (peak hours) or 1 vehicle every 15 minute off peak - such demand will not represent a material change in operating conditions on these links and could be successfully accommodated by the existing layout.

6.9 Environmental effects of traffic demand

- 6.9.1 In order to ensure the most robust appraisal of environmental impact, additional tests have been undertaken to review changes in HGV link flow demand on the A17 following development of the Sleaford REP facility. Review of predicted additional development HGV levels on the key A17 mainline corridor demonstrates that impact will be substantially less than minimum IEA 30% guideline thresholds for material environmental impact. Indeed, typical HGV increases are anticipated to only reach levels of the order of 5% of 2012 background demand. Sensitivity assessments assuming for 'absolute worst case' development traffic demand demonstrate that even for this extreme theoretical operating scenario, HGV increases will still only be in the order of 10% of background HGV traffic demand.
- 6.9.2 Current HGV levels on Boston Road between the A17 junction at Kirkby La Thorpe and Sleaford are negligible (less than 1% of background movements recorded during the February 2008 surveys), due to the impact of the height restriction at the railway bridge which deters HGV movements to / from Sleaford Town Centre. The Sleaford REP proposals will result in an increase in HGV numbers on this section, however, it is not anticipated that this will lead to any material operational issues as the route is generally free flowing and is of a standard suitable to accommodate such traffic. The additional HGV movements are also not anticipated to result in any material environmental impact, as there are no direct frontage properties along this section of route.
- 6.9.3 Given the above review of anticipated future operational highway conditions and reference to appropriate guideline standards, it can be concluded that the development of the Sleaford REP facility will not result in a material change in operational or environmental capacity conditions over the local highway network. Development traffic flow increases will generally be low and it is considered that there is no requirement for significant development related off-site highway improvement works to support the scheme.
- 6.9.4 Notwithstanding the conclusions of paragraph 6.9.3 above, at the request of the LHA, the Developer has investigated improvement options to the westbound merge layout at the junction of Boston Road and the A17 which would meet appropriate highway design standard as set out in DMRB

guidance TD42/95. This preferred layout option is described in Appendix 6.1. The Developer of the Sleaford REP scheme would be prepared to fund and implement these proposals if requested to do so by the planning authority as a condition of planning consent.