Andrew Martin
Planning

Maldon District Local Development Plan (LDP) 2014-2029

Draft Plan for Consultation

28th August 2013 – 14th October 2013

Representations

on behalf of

the Landowners

Land to the East of Broad Street Green Road and North of Lofts Farm Drive | Heybridge

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October 2013

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Appendices

1.0 Summary of Representations

1.1 Objection is raised to the Maldon Local District Plan, on the basis that it is unsound as currently drafted, for the following reasons:

- **The absence of an appropriate, comprehensive and up-to-date evidence base.**

  In particular a key document entitled, 'Draft Heybridge and Maldon Surface Water Plan' (SWMP), prepared by Essex County Council and dated 2013, has not been made available for public consultation. In response to an email dated 3/9/2013 requesting this document, the Council has confirmed that it has not yet been finalised and consequently is not available. The Council estimate that it will be completed later in the year, and by the time the plan is submitted to the Secretary of State.

  The SWMP forms a key part of the evidence base. It was the subject of an update to members ahead of a Special Meeting of the Full Council on 8 August 2013. At this meeting the Draft Plan and preferred strategy for growth in Maldon were agreed by members. An email exchange between officers from Maldon District Council and Essex County Council set out in the 'update', referred to the SWMP as justification for Policy S4, 'Maldon and Heybridge Strategic Growth'.

  It is submitted that this technical document would deprive interested persons of the opportunity to comment upon it and how it has impacted upon the revised, preferred spatial growth strategy. On this basis the Plan is unsound in that it fails to assess the impact of key infrastructure proposals that are fundamental to achievement of the growth strategy set out in the Local District Plan;

- **The emerging plan does not propose to meet its full objectively assessed needs as advised in the National Planning Policy Framework (NPPF).**

  The submitted evidence base, in the form of the Strategic Housing Market Assessment Update (SHMA) of 2012 identifies a market sector shortfall in housing supply of 825 units per annum over the 15 year plan period including around 580 market dwellings and 245 affordable dwellings per annum. The Draft Local Development Plan suggests that the total housing need for the district is 294 dwellings per annum. This is a significant departure from the SHMA figure.

  Advice set out in the NPPF (paragraphs 158 and 159) confirms that Local Planning Authorities should have a clear understanding of housing needs in their area and that they should prepare a SHMA to assess their full housing needs. This should identify the scale, mix and range of tenures needed over the plan period, which meets household and population projections, taking account of migration and demographic change.

  MDC has taken legal advice from several sources on how best to identify 'objectively assessed need'. These are broadly united in advising that the Sub National Population Projections (SNPP) figures should be regarded as a minimum, alongside the conclusions of the SHMA. MDC have based its housing target on the SNPP on the basis that the level of need outlined in the SHMA cannot be realistically accommodated.

- **The absence of an adequate sustainability assessment. There has been a failure to comply with the EU Directive 2001/42/EC, and Regulations made to implement it. The Sustainability Appraisal Report does not contain all that it should.**

  The SAR fails to describe and evaluate the likely significant effects on the environment of implementing the plan and reasonable alternatives.

  It is submitted that the SA should be part of an iterative process that is carried out during the preparation of the plan. Guidance on the implementation of the Directive issued by the European Commission, confirms that the likely significant effects of the plan and the alternatives should be identified, described and evaluated in a comparable way. The public should be presented with an accurate picture of what reasonable alternatives there were to the chosen strategy, and why they have been rejected.

  It is submitted that the identification of a preferred growth strategy and proposed masterplan areas, was the result of political influence and not a process informed by the SA or evidence based documents. The final SAR has been prepared retrospectively to justify a decision made by the Council on 11 July 2013 and informed by, but in variance/departure from the resolution of the Planning and Licensing Committee who met two days before.

  The Directive states that consultation is an inseparable part of the assessment. Furthermore, the results of the consultation have to be taken into account when the decision is being made. If either element is missing, there is by definition, no Environmental Assessment in conformity with the Directive. This underlines the importance that is attached to consultation in the assessment. As the officer report to the Planning and Licensing Committee and Full Council confirms, *"Following the selection of the preferred spatial growth scenario for inclusion within the Draft LDP as strategic site allocations, full independent Sustainability Appraisal of the plan will be undertaken…."*(our underlining)

  The SA is required to inform the plan. The SAR is where the consideration and assessment of the main alternatives should be found. In the circumstances set out above the SAR dated July 2013 had no role to play in the final choice of a spatial strategy for growth in the district, taken by Council Members in July 2013.

1.2 Land East of Broad Street Green Road and north of the drive to Lofts Farm, (identified on the illustrative masterplan attached at Appendix 1) has been promoted for development since 2007, when it was put forward in response to a 'call for sites' by the Council upon commencing its Strategic Housing Land Availability Assessment (SHLAA). Since then the land has been recognised by the Council as a reasonable option for growth, by virtue of inclusion of the promoters at LDP workshops and an invitation to present the proposals to Members alongside all the main alternatives, as late as May 2013. The land represents a sustainable development opportunity and its rejection without the benefit of evaluation, on the same basis and to the same level as the options promoted in the plan, represents a breach in the requirement of the Regulations. Furthermore, reasons are required to be given for the rejection of alternatives. It should be clear from the SAR accompanying the plan what those reasons are.

1.3 There is a strong case to argue that the housing target for the district should be increased in the context of the Government's desire to 'boost significantly the supply of housing' (NPPF paragraph 47) and to reflect the much higher figures in the SHMA update 2012 for market and affordable housing. Additional sites will need to be found to meet this increase in demand. To achieve a sustainable pattern of growth we support a strategy that directs the majority of growth to the existing

key settlements, with the maximum potential capacity being in Maldon and Heybridge as the highest order and most sustainable settlements in the district. In particular, when critical infrastructure constraints of sewerage and flood risk are taken into consideration, this points towards a spatial solution to growth that focuses upon the north of the District at Heybridge.

1.4 A strategy for growth at Heybridge is required to contribute significantly towards meeting housing demand in the district and deliver key items of much needed infrastructure. This will necessitate the comprehensive development of three parcels of land (shown on the masterplan at appendix 1) that all have important contributions to make to sustainable development. Significant benefits are also to be had for new and existing communities via such economies of scale. Section 5.0 of these representations demonstrates how the development of land on both sides of Broad Street Green Road can deliver a comprehensive and sustainable solution for growth which includes improved transport provision in the form of a new link road, a solution to flooding in the district and sewerage capacity problems. Technical work on the critical issues of flood risk and sewerage capacity have informed these representations and are attached in full as appendices. The inclusion of additional land to link these parcels to the existing built-up area offers further benefits in the form of connectivity and access to community facilities and services via sustainable modes of transport. A landscape-led masterplan indicates how land to the east of Broad Street Green Road could be integrated with adjoining sites to meet the housing and infrastructure needs of the district and deliver a number of benefits to the existing community.

1.5 The overall spatial strategy for growth has been selected in the absence of technical information on flood risk and sewerage capacity. Furthermore the evidence base on key infrastructure is incomplete. The failure of an up-to-date evidence base is so central to the LDP's overall strategy that the emerging plan, as it stands, cannot be found sound. A substantive revisiting of the overall plan strategy is required, to include the preparation of a thorough and effective SA that takes into account a proper testing of the alternatives and reconsideration of the District's capacity to accommodate new housing in the light of the SHMA results. All of the above would require being subject to further public consultation and objective consideration by the Council.

1.6 For the reasons set out above it is submitted that the Council should withdraw the LDP, carry out the work as specified, and republish the Plan for consultation, together with a full evidence base, as it is obliged to do.

2.0 Introduction/Background to Representations

2.1 Land to the east of Broad Street Green Road has been promoted for development via the Local Development Framework for Maldon since 2007. It was put forward in response to a 'call for sites' by Maldon District Council (MDC), upon commencing a Strategic Housing Land Availability Assessment (SHLAA). This assessment commenced in 2007 and concluded in 2010.

2.2 This work was updated in May/June 2012 by consultants URS. Land to the east and west of Broad Street Green Road is identified as site reference 8038. This joint area amounts to 186.7 hectares of agricultural land, woodland and lakes, adjoining the existing settlement. Its estimated net developable area is 93.35 hectares and it is found to be suitable, available and with high viability. It is seen as deliverable, subject to policy and capable of being developed at 40 dwellings per hectare. This would result in an estimated capacity of 3734 dwellings capable of delivery within phases 0-5 and 6-10 years of the local plan period. Justification and remarks on this site state that this land could provide a major urban extension to Maldon Urban Area and would be appropriate to be released as discrete parcels of land over time. Although it is close to existing services and facilities, major development would need to provide more. Major infrastructure upgrade relating to transport and sewerage will be required if the site is to be developed as a strategic allocation. In addition development will be required to take into account the existing Broad Street Green Settlement. It is assumed that 50% of the site is developable due to parts being within flood zone 3, ponds and the existing settlement. At the time of assessment it was below the viability threshold but above the alternative land value. If the site were to be developed a number of mitigation measures would need to be addressed, for example, surface water flooding and flood storage; highway improvements and traffic measures; nature conservation and ecology; landscaping; heritage assets; and archaeology. Land North of Holloway Road (reference 2029a) was discounted due to its location in flood zone 3.

2.3 The SHLAA formed one of several technical reports and background documents to underpin the emerging Maldon District Local Development Plan. At that time MDC was proposing to provide some 3000 dwellings over the plan period from 2014 – 2029. Sites were identified for some 20,242 dwellings.

2.4 In the interim period the Council had been preparing a Core Strategy (CS) to guide development and growth in the District. In accordance with the east of England Plan this sought to provide 2,400 dwellings with the towns being the main focus for this, i.e. Maldon, Heybridge and Burnham-on-Crouch. The rural areas were viewed as unsuitable for significant residential growth and only capable of absorbing limited residential infill. The CS was abandoned at the pre-submission stage. However the latest SA is said to draw upon the early work undertaken in relation to the CS. Following this the East of England Plan was abolished in January 2013, by which time the NPPF had been published (March 2012) to guide the developing Local Development Plan (LDP).

2.5 In June 2012 a SAR was submitted for consultation alongside the Local Plan – Preferred Options. Following consultation on these documents it was determined that housing provision was not sufficient to meet the full objectively assessed housing needs – a requirement of the NPPF. The preferred options plan had proposed a housing target of 3,000 new dwellings over the 15 year plan period (200 new dwellings a year). The strategic growth was to be distributed as follows: 1,250 to the south of Maldon; 900 to the north of Heybridge; 450 new dwellings to Burnham-on-Crouch, and 300 new dwellings to North Fambridge. Reliance was placed on 'windfall' development and some additional growth in the villages.

2.6 In the light of the need for the LDP to identify its own locally derived housing target, the Council, together with neighbouring authorities, engaged consultants Roger Tym and Partners to respond to emerging national policy and identify a range of potential housing growth scenarios for the Maldon local authority areas. The work was informed by up to date demographic projections produced by Edge Analytics and the Council's existing evidence base including the SHLAA and SHMA. At the same time the Council (this is only confirmed recently) began assessment on where growth should be distributed. Sites and broad areas for assessment were said to have been identified. This included land to the north of Heybridge (SH01) and Heybridge Swifts (SH02) as well as land to the south of Maldon at Limebrook Way (SH05), Wycke Hill (SH04) and South of Park Drive (SH06). Sites at Southminster, Burnham on Crouch, Langford, Great Totham, North Fambridge, Wickham Bishops and Little Braxted were also included.

2.7 All the assessment work appears to have been undertaken by Council Members on the Planning Policy Panel. A methodology for assessing sites was taken to the Planning and Licensing Committee in November 2012 but the thinking of members on preferred sites was not made public. Advice of ECC-Highways, Anglian Water on sewerage capacity and Essex and Suffolk water on water supply was said to have been sought. Similarly it was reported that advice had been sought from statutory bodies on education, health and telecommunications.

2.8 A report entitled "Preferred Growth Strategy" and dated June 2012 is an evidence base document that outlines the historic process of deciding the preferred spatial strategy. Crucially this confirms that *"Although the assessment of potential growth areas suggested that some areas may be considered to have 'critical constraints' for some of the criteria, the assessments were undertaken on an individual site by site basis. As a result, the assessments have not considered the potential for development over a wider area (on multiple sites) to provide the critical mass and funding required to unlock development constraints, which may exist. This potential for wider and coherent development strategies to unlock 'critical' constraints which may exist on individual sites has largely been identified through the strategic discussions with infrastructure providers undertaken to inform the Infrastructure Development Plan."* The evidence base as a whole has been said to have informed the development of coherent scenarios for growth distribution.

2.9 Following member seminars a housing target of 200 units per annum was selected and a distribution that continued to concentrate growth around Maldon, Heybridge and Burnham. Compared to previous proposals to distribute growth to these centres it was proposed that the scale of growth at Heybridge be reduced and that to the south of Maldon and Fambridge increased " to take into account the constraints and opportunities identified through the evidence base". The 'Preferred Growth Strategy' document although dated June 2012 has only been made public more recently.

2.10 Neither the identification of the preferred growth areas nor the reasoning behind the selection was made known to the public or the promoters of individual sites. As late as September 2012 the Council commenced a series of LDF Workshops (the first took place on 6 September 2012) to which the promoters of land East of Broad Street Green Road were invited. At this time and continuing through to workshops on drainage and highways and education in December 2012, the Council gave no indication of its emerging spatial strategy for growth.

2.11 It was not until the publication of papers for Committee in May 2013 that the Council's position on the preferred direction for growth was made known. A report prepared for the Planning and Licensing Committee on 21 May and full Council on 22 May, sought member endorsement to the emerging LDP draft including a housing target and potential options to increase the housing provision within the plan. The report confirms that the emerging draft LDP has been developed in consultation with members at the Planning Policy Panel. This is said to have been informed by

consultation responses received a year before in June/July 2012. Whilst policy S2 continues to reflect the preferred spatial option in terms of directing growth to Maldon, Heybridge and Burnham there were some changes to increase growth at Heybridge to reflect the Heybridge Swifts site and reduce growth at North Fambridge. At this point the concept of rural allocations across the district was introduced.

2.12 The key components were identified as:

- **Strategic Allocations (2,700 dwellings):**
  - South Maldon – 1,250 dwellings;
  - North Heybridge – 1,000 dwellings;
  - West Burnham-on-Crouch – 450 dwellings.
- **Rural allocations (300 dwellings)** (to be allocated through a Rural Allocations Development plan Document)
  - North Fambridge – 75 dwellings;
  - Other rural locations – 225 dwellings.
- **Residual land supply (397 dwellings**)
  - Sites with extant planning permission – 300 dwellings;
  - Policy compliant Strategic Housing Land Availability sites – 97 dwellings
- **Windfall allowance (330 dwellings).**

2.13 Crucially the officer report in May 2013 confirms that the emerging draft policies are "currently subject to 'internal' consultation to obtain feedback from relevant Maldon District Council and Essex county Council officers." In addition the proposed revisions were said to be "subject to Sustainability Appraisal, Viability Assessment and further consideration by Members prior to further public consultation". We submit that in reaching this position there had been no iterative SA to guide and influence the changes, nor on-going engagement with the public. The most up to date SAR at that point had been published in support of the Preferred Options Plan. Since then there had been considerable change in terms of national planning policy guidance and the need 'to boost significantly' the supply of housing. In addition the previous SAR had itself been out of date, based as it was on the Core Strategy of 2009.

2.14 Appendix 1 to the officer's report confirmed that due to significant change, the strategic policies had been largely re-written and re-structured.

2.15 The officer report in May 2013 also recommended that the objectively assessed need for the district be revised upward to 294 dwellings per annum in accordance with Sub National Population Projections, the latest report by Edge Analytics and the emerging SHMA. Further interpretation of the findings from the draft SHMA in relation to the identification of objectively assessed needs for housing was to be provided to Members. A decision on the overall housing target was therefore made without the benefit of the up to date SHMA.

2.16 To meet the increased need for growth from 200 dwellings per annum to 294, members were asked to consider the need to identify and plan for a minimum of 700 additional dwellings in the plan period. In selecting potential additional options to increase housing provision members were asked to

consider the deliverability and viability of sites to ensure an adequate five-year supply in accordance with the NPPF. The following options were presented:

- Southminster
- Heybridge
- Maldon
- Burnham-on-Crouch
- Increased Rural Allocations
- Intensification of existing Strategic Sites

2.17 Appendix 5 to the officer's report confirmed those sites that had been selected as the 'proposed masterplan areas', at these broad locations. It also identified sites and broad areas to be the subject of further testing for growth to meet the increased housing target of 700 dwellings. Land to the west of Broad Street Green Road was identified as the proposed masterplan area at Heybridge, to accommodate 900 dwellings. Land to the east was identified, amongst others, for growth capacity testing to accommodate an extra 700 dwellings.

2.18 It was noted in the officer's report that prior to any formal decisions being taken by members in relation to the draft strategic allocations, further testing and assessment of the options was required, including sustainability appraisal. Reference was made to member workshops planned in May/June 2013, the purpose of which was to allow developers and agents representing "key relevant sites potentially associated with the LDP strategic allocations at Maldon, Heybridge and Burnham-on-Crouch with an opportunity to present to members on emerging plans and work currently being undertaken". A presentation was subsequently made to members in respect of land to the east of Broad Street Green Road on 24 May 2013.

2.19 Member endorsement of the emerging Local Development Plan revised spatial growth strategy (policy S2) and strategic site allocations was sought at the Planning and Licensing Committee on 11 July and two days later at the full Council meeting, which was intended to endorse the recommendations of the former. As will be described below in paragraph 2.24, the Council did not accept the recommendation and instead approved fundamental changes without adequate reasoning or evidence.

2.20 The overall housing target was endorsed together with the broad allocations for growth. Reference was made to growth capacity testing and efforts to seek information from partners and infrastructure providers such as ECC, Anglian Water, the Environment Agency, the National Health Services and Royal Haskoning (Sustainability Appraisal consultants). Evidence obtained to support the preferred options plan in 2012 was referred as relevant, despite considerable change in the interim and need to significantly re-structure and re-write the strategic policies of the plan as referred to in the May report referred to above.

2.21 The officer's report in July identifies that responses from the partners and infrastructure providers have been provided at officer level and do not represent organizational views. Furthermore, and key to the soundness of this plan the officer reported that:

> *"the majority of responses were not received by the requested date, and as a consequence officers have not had time to complete a detailed review and analysis of the responses received in relation to the spatial growth scenarios. In addition, the respondents have not always been able to provide the degree of clarification requested, or respond to all of the questions raised by officers" (*paragraphs 2.2.6-2.2.8)

2.22 In addressing the specific issue of sustainability appraisal, paragraph 2.3.2 confirms that an SA was undertaken in 2012 in respect of the Preferred Options Plan. In addition Royal Haskoning has provided an initial SA assessment of the growth capacity testing exercise, attached as appendix 2 to the report of the Head of Planning Services. This takes the form of tables to consider broad areas for growth e.g. north Heybridge, or south Maldon, etc. against SA objectives. A final table assesses the individual sites such as land east and west of Broad Street Green Road and scores them using a +,-, and 0 rating, against SA objectives. The only detail relating to land east of Broad Street Green Road consists of two sentences that state if developed alone it has the potential to create an isolated settlement and it is close to water bodies and impacts to these features would need to be managed. It is submitted that nowhere is there any real testing of the proposed masterplan areas selected or the alternative in the form of growth capacity testing areas and sites. Indeed paragraph 2.3.2 goes on to add that:

> *"Following the selection of the preferred spatial growth scenario for inclusion within the Draft LDP as strategic site allocations, full independent Sustainability Appraisal of the Plan will be undertaken"* and *"This will be published alongside the Draft LDP for public consultation later this summer".* (our underlining)

2.23 Paragraph 2.4.4 confirmed viability testing work associated with the potential LDP strategic sites to be at a "relatively early stage" and that *"it will be further refined following the confirmation of the strategic allocations to be included within the draft LDP".* Members were warned that: *"On-going discussions with infrastructure providers and delivery partners through the LDP Developer Forum in relation to the strategic allocations and future infrastructure requirements will be key to ensure that the Council can demonstrate that the LDP will be both viable and deliverable. Otherwise there is a significant risk that the LDP will not be found to be 'sound' at the Examination-in-Public."*

2.24 Eight spatial growth scenarios were set out for member consideration. Each of these was described as "potentially robust and 'deliverable' taking into account the information and evidence available at the present time…." Members were advised that they must take into account the responses received when selecting the preferred spatial growth scenario (even though these had just been described by the officer as incomplete) and that Sustainability Appraisal must ultimately be key to inform the site selection process (even though the latest SAR had been prepared over a year ago and related to an out-dated housing target and had been superseded by key planning policy change at national and regional level). Furthermore, all that had been prepared to advise on the latest selection of sites was a table comparing broad growth options to SA objectives and this had not been informed by technical background studies. No guidance was given on the likely environmental impact of the eight scenarios for growth. During the evening of 9 July some members queried the early stage of the viability study in terms of testing the sites to be considered. It was pointed out that members had no real idea of infrastructure costs and that these should be known to ensure that various scenarios were viable. It was said to be foolish to consider some of the scenarios without knowing whether they were deliverable. The officer replied that they had got as much information as was possible. The problem had been that most statutory bodies would not give information until the Council firmed up on draft plan allocations.

2.25 The meeting on 9 July was dominated by a single Councillor and concluded with elements of two of the eight scenarios being combined into a single solution that saw additional land being directed to north Heybridge - exclusively on land to the west of Broad Street Green Road. The potential for land to the east to be considered as a reserve site, as had been mooted during the evening in a list of sites highlighted on a screen, was not debated any further. Two days later, on 11 July the Special Meeting of the Full Council completely overturned the decision of the Planning and Licensing

Committee. Additional growth to meet the figure of 700 homes was directed elsewhere in the district. The allocation for land to the west of Broad Street Green Road remained at 900 dwellings.

2.26 Upon viewing the papers for the meetings on 9 and 11 July, Andrew Martin-Planning (Julie Cross) contacted the Strategic Planning Policy Manager at MDC (David Coleman) to discuss the contents and this was followed up in a letter dated 3 July 2013. This letter is attached at appendix 2. A telephone conversation earlier that day was referred to and a discussion of the various scenarios for growth and in particular growth capacity testing to identify land to accommodate a minimum of 700 additional dwellings. The conversation and letter sought to explore the reasons behind the options selected for growth and specifically why land to the east of Broad Street Green Road had been rejected. It was acknowledged that land to the west had some merits as a strategic location to accommodate a link road, but that in considering additional growth in Heybridge there are compelling arguments in favour of development of land to the east. Concern was expressed by AM-P that in considering growth capacity testing a dialogue had been held with statutory bodies such as ECC Highways, Education and Health, however none had taken place with Anglian Water on what the Council had itself described as the 'critical' issue of sewerage capacity. In this regard land to the east of Broad Street Green Road had been identified by AW in its viability appraisal of the whole district, as the best value/least cost solution. Furthermore, land to the east has the potential to offer a foul drainage solution that can relieve the existing network and provide a joint solution to meeting the development needs of land to the west. Various committee reports were quoted as describing the evidence base to the plan as 'the best available at this time', 'may be subject to revision' and 'subject to review and change as further information becomes available'. It was argued by AM-P that to remove land east of Broad Street Green Road as a potential development site for members to consider on 9 and 11 July was an unreasonable distortion of the options available to meet the overall target for growth. At the very least there should be continued debate over land to the east and west of Broad Street Green Road. Reference was made to a comment by the Strategic Planning Policy Manager that "there is nothing fundamentally flawed with the Lofts Farm site" (commonly known name for land east of Broad Street Green Road). The officer had said that there was still scope for things to change and it was pointed out in the AM-P letter that unless land to the east of the road remained as part of one of the eight options to be presented to the committees then members would not be able to lend support to development at this location. Reference was made to the lack of an SA to inform the decision making process and facilitate the evaluation of alternatives.

2.27 Finally, at a meeting of the full Council on 8 August 2013 the draft plan, including a preferred strategy for growth in Maldon, was agreed by members. An 'update' to the Committee papers included an email exchange between officers of the District Council and Essex County Council, in seeking to justify further amendment to policy S4 "Maldon and Heybridge Strategic Growth". Proposed amendment to this policy was to reflect changes recommended to the North Heybridge Masterplan area, that had been recommended by the Planning and Licensing Committee two days before i.e. 6 August 2013. This amendment relied upon the Surface Water Management Plan – a key part of the evidence base that has not been made public. Failure to publish this technical document has deprived interested parties of the opportunity to comment upon it and understand how it has influenced the revised spatial strategy for growth. On this basis we submit that the plan is unsound in that it fails to assess the impact of key infrastructure proposals that are fundamental to achievement of the growth strategy set out in the LDP.

3.0 Representations to the Draft Local Development Plan and Key Evidence Base Documents

3.1 The introduction and context to the draft LDP confirm that it sets out the revised preferred policies, following the 'Preferred Options' consultation in June 2012. The Council is now seeking views on the revised preferred spatial growth strategy (policy S2) and new strategic policies S4 (Maldon and Heybridge Strategic Growth), S6 (Burnham on Crouch Strategic Growth), and S7 (Prosperous Rural Communities).

3.2 This section of our representations examines and comments upon those key policies outlined above, notwithstanding our overriding submission that the plan as a whole is not based upon an appropriate or up-to-date evidence base; has not been prepared to meet the objectives of sustainable development; nor come close to meeting housing need and demand within the district. Whilst we support the key objective of policy S1 Sustainable Development and its underlying proposals to direct growth to the towns of Maldon, Heybridge and Burnham, we submit that the identification of detailed masterplan areas within those settlements is the result of political influence at a late stage in the plan process and not a proper objective and informed consideration and assessment of the alternatives under the EU Directive and Regulations for Sustainability Appraisal. Crucially, decisions on the scale and location of growth have been made without recourse to the need for transparency and public consultation.

3.3 Policy S2 Strategic Growth proposes to meet objectively assessed housing need for the district by providing for a minimum of 4410 dwellings between 2014 and 2029 (294 per annum) including provision for market housing, affordable housing, housing for an ageing population and other types of specialist needs. This policy then specifies in a table the source of the supply and projected phasing.

<u>The Objectively Assessed Housing Needs.</u>

3.4 National planning policy is clear in advising local planning authorities that to comply with one of four 'soundness tests' the plan should demonstrate that it has been 'positively prepared'. This requires the plan to be based on a strategy which seeks to meet objectively assessed development and infrastructure requirements, including unmet requirements from neighbouring authorities where it is reasonable to do so and consistent with achieving sustainable development (NPPF paragraph 182).

3.5 It is a requirement of the NPPF (paragraph 159) that local planning authorities should have a clear understanding of housing needs in their area. An up-to-date objective assessment of full housing need is also required by paragraph 47 of the NPPF. This advises that such an assessment should be properly undertaken in the context of a Strategic Housing Market Assessment (SHMA). Paragraphs 2.21 and 2.22 of the draft plan confirm that the housing target is based on the Sub National Population Projections (SNPP). The SHMA is recognized as "another key source of evidence" in identifying the Council's objectively assessed housing need. The explanatory text to Policy S2 confirms the latest SHMA estimate of total demand for market housing to be around 687 units and 242 affordable units per annum. This figure is much higher than the demographic based projection but is dismissed on the basis that "the majority of housing needs and demand identified in the report should be met by turnover of existing stock, and local authorities are not expected to simply translate housing demand into actual housing targets".

3.6 It is submitted that there are an increasing number of local plans being withdrawn on the advice of inspectors at PINS, where an up to date SHMA has not been taken into consideration. Waverley in Surrey and North West Leicestershire DC are two authorities that have announced an intention to withdraw in the last few days. In a draft LDP Technical Paper prepared by MDC, the background to

an assessment of OAN is examined. This paper forms part of the evidence base to the Plan. It confirms that, in the absence of Government guidance on identifying and planning for objectively assessed need the Council has received advice from a number of other sources. Andrew Wright, manager of the Planning Officers Society Enterprises confirms that the Local Plan should seek to meet SNPP figures as a minimum, alongside the conclusions of the SHMA. Steve Carnaby of PINS said that OAN should be based on a range of issues including waiting lists, affordable housing, population projections, migration etc. and that the conclusions of the SHMA are very important in outlining this information. In respect of affordable housing need he confirmed that the SHMA can provide large and unrealistic targets. These same points were not addressed in respect of the market housing assessment. Finally, advice from Counsel – Paul Shadarevian – confirmed that a range of growth options, particularly based on the recommendations of the SHMA, population projections and results of capacity analysis of the district should be assessed. Counsel agreed that the Council could reasonably propose that the SNPP population projections provide the district's OAN for housing if the level of need outlined in the SHMA could not be realistically accommodated.

3.7 It is submitted that the key is to test whether the full need for market and affordable housing can be met in the district. We do not consider that this has been fully assessed. The latest SHLAA still confirms the suitability and availability of additional land in Heybridge that could meet this need. On that basis there is no reason for the Council to artificially restrict growth to the SNPP figure and ignore the results of the SHMA. This must all be seen in the context of the NPPF that seeks to 'boost significantly' the supply of housing.

3.8 Recent advice given to MDC by a Senior Planning Inspector – Keith Holland - confirmed that the Council 'will struggle' if it wants to rely on highways constraints and/or landscape value to justify a lower housing target. He stated that compelling evidence is required to justify a lower housing target. The only example he could quote for justifying figures below OAN was in Chichester where local sewerage constraints could not be resolved. Significant landscape designations or serious flood risk may also be considered as 'critical' constraints that cannot be overcome. It is significant to note that whilst sewerage capacity and flood risk are real constraints in Maldon District, there are alternative sites such as land east of Broad Street Green Road that have been rejected without reason when they can make a significant contribution to resolving such constraints in the district.

Garden Suburbs, Strategic Allocations and Rural Allocations. (Policies S4, S6, and S7)

3.9 Objection is raised to proposals for a new garden suburb on land south of Maldon to provide 1710 new dwellings in the plan period. This additional growth (i.e. an increase from 1250 as previously promoted) was the result of a political decision in July 2013 that did not have the benefit of technical assessment on infrastructure nor an SA to identify and justify the most appropriate sites for development. Similarly the decision to provide 450 dwellings at Burnham and 420 in rural allocations has lacked proper assessment of the alternatives. Reasons for objection are highlighted in the text that follows and are made clear in the context of our submissions relating to the spatial strategy for growth generally.

3.10 In the absence of such assessment, work has been commissioned from consultants Intermodal Transportation Ltd on Spatial Sustainable Transport Considerations and WSP on the importance of a review of sewerage and flood risk in considering the strategic allocation of new development in the district. These reports are attached in full at appendix 3 and 4 respectively and their conclusions summarised below.

i. Spatial Sustainable Transport Considerations

3.11 There has been no quantitative modelling of the preferred spatial strategy in so far as understanding travel patterns and behaviour in Maldon district, either as part of the SA or other evidence base documents. The testing of some spatial scenarios that has been carried out are subjectively based and rated as to whether they are broadly negative, neutral or positive. Essex Highways has undertaken reviews in relation to road capacity but do not include any holistic travel pattern/travel destination studies or analysis.

3.12 Intermodal Transportation Ltd has therefore undertaken its own studies to adjudge the spatial strategy currently being promoted in the draft plan. These suggest that additional housing to the north of Heybridge would offer better compliance with policy than the chosen strategy. The study work indicates the following key findings:

- Although the settlements of Southminster, Burnham, Althorne and North Fambridge have railways stations, the opportunity to change radically the modal split in favour of this form of travel would be limited. The indications from a selective study between Burnham and Maldon suggest that the predominant form of travel is by car and would remain as such, and that the difference in daily car trip lengths would proportionately increase the further people live from Maldon Town and the main road corridors. This would suggest that any settlements situated in an arc from north east to south east Maldon (particularly those without a station) would entail higher car mileage and greater dependency on the car. On this basis, as much new development as possible should be concentrated in Maldon and Heybridge to reduce trip lengths. Train ridership would have to increase to unprecedented levels to, for example, make Burnham as sustainable as Maldon and Heybridge.

- Car travel to work has the biggest impact on the highway network.

- In accessibility terms, taking account of the day to day facilities that people would expect and rely on, the difference between locating housing to the north of Maldon/Heybridge or the south of Maldon, appears to be marginal.

- However, access to the most convenient mainline stations at Witham and Hatfield Peveral by car and bus respectively, would be easier from development to the north of Heybridge.

- Furthermore, the A414 is an extremely busy road corridor, as highlighted by Essex Highways. Housing development in the south, in particular, would increase traffic levels on this already congested route. In general distribution terms there is evidence to show that development to the north of Maldon would involve the greater use of roads with spare capacity, thus reducing the 'traffic burden.'

- In commenting upon accessibility, it is assumed that the new link road between Broad Street Green Road and Maypole Road/Langford Road is constructed.

- Overall a more sustainable spatial strategy would be to reduce the number of dwellings in Burnham and redirect the 345 dwellings assigned to the rural areas, to Maldon and Heybridge.

- On the basis of the above a 50/50 split of housing north and south will afford a better sustainability balance. Because south Maldon has been promoted in the draft plan to take a greater share of the growth the re-designation of some 730 – 930 units from Burnham and the rural areas referred to above should now be focused on Heybridge.

- It is demonstrated that Heybridge could accommodate between 730-930 additional units on top of the 1000 allocated, before road capacity becomes an issue.

- The economies of scale in bringing forward greater development in a single location can justify additional services and facilities, including a main food store, in a centralised area. In this way, new development, providing there is a critical mass to support new services and facilities, could be self sufficient to a large degree. Most trips could readily be undertaken via a safe and pleasant walk or cycle route. Moreover, new employment could be provided. Land east of Broad Street Green Road in particular has the ability to provide high quality and extensive open space provision that links to existing public rights of way.

- Based on the work of Intermodal Transportation Ltd, it is essential that the Council undertake the necessary work to ascertain the transport implications of the spatial strategy options in relation to greenhouse gas emissions alone and test the plan's soundness in meeting national and local policy objectives.

ii. Drainage and Flood Risk Issues

3.13 WSP have prepared representations to the draft LDP and technical note on matters of drainage and flood risk. The key conclusions of the specialist consultant are summarised below.

- When reviewing the strategic allocation of new development in Maldon and Heybridge the review of sewerage and flood risk is an important consideration.

- The most recent revision to Policy S4 was made on 8th August 2013 when the draft plan was approved for public consultation. An 'update' to members on the night sought to justify a change to the geographical extent of the proposed masterplan area at Heybridge to enable a full relief road scheme and associated Sustainable Urban Drainage Systems (SUDs) and attenuation ponds constructed on the northern side. The 'update' referred to consultation with Essex County Council and the Environment Agency on the implications of the Maldon and Heybridge Surface Water Management Plan (SWMP) on the proposed changes. Although referred to in the draft plan the SWMP is not publically available and reliance on its content in terms of emerging policy and spatial allocation, cannot be validated. Appendices to the 'update' from ECC and the EA, confirm that they cannot support or object to the potential site allocations.

- The importance of the yet to be published SWMP is confirmed in the Infrastructure Delivery Plan: Schedule update June 2013. This states that *"Essex County Council has identified the need to assess the risk of flooding in Maldon and Heybridge. The Maldon and Heybridge Surface Water Management Plan will include an action plan to assist in reducing the flood risk within Maldon and Heybridge and providing guidance on its implementation. The findings of the SWMP will directly inform the masterplan process for the proposed garden suburbs*".

- References to the SWMP in the draft LDP should be removed until it becomes available. It is submitted that this should recognise the greater benefit of flow transfer to avoid existing developed areas ahead of upstream attenuation that still requires flows to pass through existing urban areas in any risk hierarchy. The Mid-Essex SFRA should be included as a key evidence base document.

- Maldon and Heybridge are prone to flood risk as described in the Mid-Essex SFRA and the Essex Local Flood Risk Management Strategy.

- Figures 5A and 5B of the draft LDP do not show the full extent of Flood Zone 3 as this relates to the proposed masterplan areas in Heybridge and Maldon respectively.

- On figure 5A the extent of Flood Zone 3 is not shown in the southern corner of the site allocation for Heybridge Garden Suburb, as detailed in the mid-Essex SFRA. The presence of the flood plain should be noted because it will impact on capacity, master planning and design of the relief road.

- Figure 5B does not show the extent of Flood Zone 3 in the south eastern corner of the site allocation for Maldon Garden Suburb, as detailed in the Mid-Essex SFRA. The presence of the flood zone should form part of the site assessment.

- The ability of the proposed south Maldon site allocation to contribute to flood mitigation is questioned as it is a small catchment, separate and mainly to the south of Lime Brook. Surface water run-off does not flow through the town.

- The draft LDP discusses Waste Water Treatment and how the two proposed strategic allocations can connect to the Maldon Treatment Works (paragraph 2.53, explanatory text to Policy S4). By stating that a new connection must be made by the north but that the south will require appropriate mitigation, means that the two sites are not being treated equally and the greater severity of the sewerage problems to the south are not recognised. The text should be reworded to state that sewerage solutions should ensure that existing sewer flooding and CSO operation should not be made worse and that mitigation should be provided where practicable and viable.

- The following representations relate to more detailed policies that feed into Policy S4, as well as the SAR, Infrastructure Delivery Plan, SHLAA, Maldon Scoping Water Cycle Study, and the Viability Study. These are made notwithstanding our key submission that the plan is unsound on the basis that the evidence base required to inform it is incomplete.

- Policy D2 should be expanded under (6) to include reference to the Water Framework Directive and specifically the Anglian River Basin Management Plan objectives for the district catchments. This will support the D5 policy requirement for SUDs. The evidence base should be expanded to include the Anglian RBMP and Mid-Essex SFRA.

- Policy D5 is supported in policy terms but its application within the Council's own evidence base is questioned as there is no consistency between the inclusion of flood risk zones as a constraint within various evidence base documents such as the Viability Study and SHLAA.

- With regard to the call for SUDs, the draft policy and supporting text does not reference the ECC SUDs Guide, which is recommended. It should be noted that the geology north of Heybridge is more conducive to infiltration SUDs than that south of Maldon, and the inherent benefits that arise in terms of volumes of water to attenuate, and water quality improvement.

- Sustainability Appraisal Report. Objective No. 9 in Table 5.1 is supported when it says "No new development in Flood Zones 2 and 3". This is stronger than Policy D5 wording but should be maintained for all strategic residential allocations as there is sufficient land in Flood Zone 1 to deliver the required housing numbers and there is no Sequential Test proving the need for residential development in Flood Zones 2 and 3.

- Infrastructure Delivery Plan. Update 1.7c on the Surface Water Management Plan is questioned as the evidence base is not published. A simple review of catchment topography shows that land to the south of Maldon can provide no, or very limited flood mitigation. For land north of Heybridge there would be greater benefit if surface water flows intercepted by the Relief Road were routed to the east so that they bypassed Heybridge entirely.

- Mid Essex SFRA. The maps for Maldon and Heybridge are not consistent between Figures D3-1 and D3-2. Due to the tidal breach model boundary limit Figure D3-2 does not show the actual predicted extent of Flood Zone 3 in the south-eastern corner of the South Maldon strategic allocation. This should be shown and included in assessment.

- SHLAA. Assessment of site 4329a omits the presence of Flood Zone 3, which will limit capacity as noted on site 1855a. The Flood Zone 3 existence should be added as a constraint. Assessment of site 8038 pools a large area and introduces a variety of constraints. Land east of Broad Street Green is not within Flood Zone 3 and the existing lakes represent an asset and are not a constraint.

- Maldon Scoping Water Cycle Study. The findings of the Maldon Scoping Water Cycle Study on sewerage are supported in that it finds sewerage a major constraint in Maldon and Southminster. It further highlights the significance of the sewage constraint to land South of Maldon. It should be highlighted that any strategic development South of Maldon which does not provide relief to the town centre will exacerbate operation of the Combined Sewer Overflows, whereas development of land East of Broad Street Green Road would provide relief and a pathway for development west of Broad Street Green Road without impact on the CSO's. Figures 6.3 and 6.5, and Table 6.3 confirm North Heybridge as a more favourable location for growth with regards to sewerage capacity.

- Viability Study. Table 7.3 Strategic Sites Infrastructure Requirements is supported on sewerage where the magnitude of costs clearly show the significance of constraints for South Maldon and Southminster in comparison to North Heybridge. Para 8.8 is supported in stating that development of North Heybridge should be the first strategic development to come forward in terms of phasing. Para 8.16 is supported but there is a need for abnormal costs for development in Flood Zones 2 and 3a to be consistently and correctly applied.

- The Viability Study Appendix includes pages for each site tested that summarise constraints. The phrase "Area prone to surface water flooding, significant SUDs work required" needs to be consistently and factually applied. If the word 'area' means the locale around the site assessed then the phrase should be applied to all villages and towns that regularly experience surface water flooding including Burnham, Maldon and Southminster and not only Heybridge. If the phrase is specific to the site then the H1 extension and BS2 should not be included. Furthermore, the presence of fluvial (river) flood zones on M1 and H1 should be explicitly stated as a constraint. It is matter of local policy that significant SUDs are to be provided on the strategic allocations. It is not a constraint and it is a cost equally to be applied to all strategic sites. Indeed the testing of land to the east of Broad Street Green Road (referred to as BS1 and BS2) should highlight that because of the lower density, easy access to receiving watercourses and lakes, and the underlying geology that the cost of SUDs is likely to be lower.

- Generally, the Viability Study has not clearly shown the benefit of increased development North of Heybridge. Infrastructure costs and therefore viability will improve as fixed costs on highways and sewerage are shared amongst a larger strategic allocation of units at North Heybridge.

Currently the infrastructure burden to North Heybridge has been applied in full to all assessments, which is not correct and should be rectified.

- The Technical Note at Appendix 4 demonstrates that there are significant benefits of an expanded allocation at Heybridge, combining land to the west and east of Broad Street Green Road.

- In terms of both flooding and sewerage, it is clear that strategic development on both sides of the road will present the opportunity to overcome known, critical constraints', in a way that delivers tangible benefits to the existing community. These benefits go beyond the provision of a relief road alone.

3.14 An evidence base document entitled "Maldon and Heybridge Visioning Workshop," provides a review of a workshop event held for members, officers and stakeholders on 7th May 2013 to consider potential strategic housing allocations. This report and its findings which conclude with masterplan layouts for land south of Maldon and at Heybridge, demonstrate how a preference for the site allocations in the current draft plan were forming as a result of political influence and without the benefit of technical guidance in the form of an evidence base or sustainability appraisal of the realistic options for growth. In particular the masterplans that emerge from this process show a complete lack of understanding of matters of flood risk and sewerage capacity as identified above and fail even to consider the benefits that developing a wider area at Heybridge could bring about.

3.15 We refer back at this point to the evidence base document entitled "Preferred Growth Strategy" prepared in June 2012. This recognised that despite the potential 'critical constraints' of some growth areas, the assessments at that time had not considered the potential for development over a wider area (on multiple sites) in order to provide the critical mass and funding required to present a solution. Such potential was said to have been raised in discussion with infrastructure providers.

3.16 Finally in commenting on the proposed level and distribution of growth in Policy S2 and as proposed to be delivered in Policies S4, 6 and 7. We have the remaining comments to add. The sustainability of rural allocations has not been tested. Aside from the comments above, and in the appendices to these representations, on transport and accessibility and flood risk and drainage, there has been no sustainability appraisal of the proposed allocation of some 420 dwellings to North Fambridge (75) and other villages (345). The concept of including an allocation within the rural area was introduced as late as May 2013 when revised population projections forced the Council to revise its overall housing target upwards. The proposed capacity growth testing to find sites for an additional 700 homes saw the introduction of development in the rural areas generally as a solution. This has not been part of an iterative process of assessment, informed by a technical evidence base.

3.17 Some 730 dwellings proposed in the table to Policy S2 comprise windfall allowance (330) and "Existing commitments across the District (including suitable sites identified in the SHLAA)" (400). The latter figure is said to be subject to change. The precise source of these figures is not clear and there is potentially some double counting between the two categories. We object in particular to some 410 units from these two sources being proposed to be phased early the plan period and crucially seen as a key part of the district's five year housing land supply (i.e. some 22% of the five year requirement for land).

4.0 The Sustainability Appraisal Process

4.1 Under Section 19(5) of the 2004 Act, a Local Planning Authority is required to carry out an appraisal of the sustainability of the proposals in each of its development plans and prepare a report of the findings of that appraisal. This is known as a Sustainability Appraisal (SA).

4.2 The Maldon LDP is required to be subject to a Strategic Environmental Assessment by virtue of Directive 2001/42/EC. This requires an SA to identify, describe and evaluate the likely significant effects on the environment of implementing the plan and reasonable alternatives, taking into account the objectives and geographical scope of the plan. The objective of the Directive is to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans with a view to promoting sustainable development.

4.3 We submit that the SAR undertaken by Royal Haskoning DHV and published in late July 2013, fails to describe properly and evaluate the likely significant effects on the environment of implementing the plan and reasonable alternatives as required under Regulation 12. It does not, as the Regulations require, provide an outline of the reasons for selecting the alternatives dealt with, or a description of how the assessment was undertaken. It confines itself to the testing of individual policies against key sustainability objectives rather than consideration and assessment of the main alternatives. As case law * demonstrates, the SA should be clear how and why the final strategy has been selected from the options originally presented.

4.4 The Maldon SA process commenced in 2012 with the publication of a scoping report. This was said to update previous SA work carried out in relation to the CS preparation in 2006. The scoping report of 2012 was circulated to statutory consultees in March/April 2012. The first the public saw of this was in June 2012 when an SAR was submitted for consultation alongside the Preferred Options Plan. Following this, national and regional planning policy change resulted in an update which was published in August 2012.

4.5 Whilst the findings of earlier assessments can be used in a final SAR, case law confirms that all relevant information should be brought together and it should not be necessary to embark on a paper-chase to understand environmental effects.

4.6 The SAR for Maldon claims to draw upon earlier assessments undertaken in 2009 (for the Core Strategy – later abandoned) and 2012 (Preferred Options Plan). In both cases the SA focuses on the testing of general policies against broad sustainability objectives. There has been no examination of preferred options for growth or alternatives. It was not until the SAR dated July 2013, published on 28 August together with the latest Draft Plan, that new policies were introduced confirming preferred options for growth relating to Garden Suburbs in Maldon, Heybridge and Burnham on Crouch, in respect of which specific masterplan areas were defined. In the case of Heybridge this directed growth predominantly to land to the west of Broad Street Green Road, and excluded land to the east.

4.6 It is submitted that the SA should be part of an iterative process that is carried out during the preparation of the plan. In the case of the Maldon LDP it is not clear what role the SA played in informing the content of the plan. Guidance on the implementation of the Directive confirms that the likely significant effects of the Plan and the alternatives should be identified, described and evaluated

* Source: - Cogent Land LLP v Rochford District Council. 2012 EWHC 2542
- Save Historic Newmarket Ltd v Secretary of State & Forest Heath District Council (2011) EWHC 606
- Heard v Broadland District Council, South Norfolk DC, Norwich CC 2012 EWHC 344

in a comparable way. The public should be presented with an accurate picture of what reasonable alternatives there are and why they are not considered to be the best option.

4.7 Environmental reports are required to be of sufficient quality to meet the requirements of the Directive and quality is said to involve ensuring that a report is based on proper information and expertise and covers all the potential effects of the plan. In this regard the evidence base to the plan is incomplete in that a key technical document in the form of the SWMP has not been made publically available.

4.8 It is submitted that the identification of a preferred growth strategy and proposed masterplan areas was the result of political influence and not informed by the SA or evidence base documents. The final SAR has sought to justify retrospectively a decision made by the Council on 11 July 2013. At Council meetings on 9 and 11 July members were asked to consider eight spatial growth scenarios, as well as various 'reserve' sites, to accommodate 700 additional dwellings. These were required to meet an increased housing target for the district. In dealing with the need for SA to inform the plan and specifically these changes, the Head of Planning in a report to members, referred to the SA appraisal of 2012 together with very brief interim analysis. The Head of Planning further clarified that *"Following the selection of the preferred spatial growth scenario for inclusion within the draft LDP as strategic site allocations, full independent Sustainability Appraisal of the Plan will be undertaken…."* Despite the lack of SA the 8 scenarios were presented as "*potentially robust and deliverable taking into account the information and evidence available at the present time".* This, by officers' own admission was inadequate and incomplete.

4.9 Article 2(b) of the Directive states that *"consultation involved is an inseparable part of the assessment. Further, the results of the consultation have to be taken into account when the decision is being made. If either element is missing, there is by definition, no Environmental Assessment in conformity with the Directive. This underlines the importance that is attached to consultation in the assessment".* As the officer report to the July Committees confirms, following member decision to agree a spatial strategy for growth a Sustainability Appraisal **will** be undertaken. Neither the Members involved in decision-making, nor interested members of the public had the benefit of such an environmental report.

4.10 The SAR fails to meet a key objective of the Directive to provide environmental assessment to protect the environment and integrate environmental considerations into the adoption of plans with a view to promoting sustainable development (Article 1). It fails to demonstrate adequately why the chosen strategic allocations in the draft LDP for Maldon are environmentally sound nor how they came to represent the final strategy, from those options originally presented. The Directive requires that the alternatives to the option being promoted should be evaluated on the same basis and to the same level as the option promoted in the plan. It follows that since the chosen strategy itself has not been comprehensively assessed, there is no such benchmark for the testing of the alternatives in this case. Consequently it is not possible to know from the SAR accompanying the plan what the reasons are for the rejection of alternative sites such as land to the east of Broad Street Green Road.

4.11 Under the terms of the Directive the public have not been given an effective and early opportunity, within appropriate timeframes to express their opinion on the plan and accompanying SAR.

4.12 There is overwhelming evidence to conclude that the SAR accompanying the draft Maldon LDP is flawed because it fails on numerous grounds to comply with the requirements of the Directive.

5.0 Land to the East of Broad Street Green Road – An Alternative Sustainable Development Proposal

5.1 The basis of our representations as set out above is that the draft LDP for Maldon is unsound and on this basis we argue that the plan should be withdrawn on three main grounds:

- the absence of an appropriate, comprehensive and up-to-date evidence base;
- failure of the plan to meet its objectively assessed needs as advised in the NPPF; and
- absence of an adequate sustainability assessment.

5.2 It is submitted that the Council should then carry out work to complete its evidence base, particularly with regard to flood risk and sewerage capacity. In the light of the Government's desire to boost significantly the supply of housing the Council should increase its housing target for the district to reflect the much higher figures in its SHMA. This in turn will require the identification of more sites to meet in full the objectively assessed housing needs of the district. A substantive revisiting of the plan strategy is then required, to include the preparation of a thorough and effective SA that takes into account a proper testing of the alternatives for growth and development.

5.3 In the absence of sustainability assessment and the preparation of a complete evidence base the promoters of land east of Broad Street Green Road have undertaken their own assessment. Work to date includes:

- **Illustrative masterplan** that looks at a comprehensive strategy for growth in Heybridge. Balancing growth over three sites, to the east and west of Broad Street Green Road, this takes advantage of the relatives and opportunities that each can offer – (Ken Philpot Design)

- A **landscape and ecological appraisal**. This analysis supports a landscape-led approach that is rooted in its context and the processes that have shaped this land over time. The assessment focuses on the geographical factors that have shaped the landscape. It considers whether this land has the capacity to change and what form that might take – (Rummey Design).

- **Assessment of drainage and flood risk.** Identified by the Council and key infrastructure providers as 'critical' constraints to development in the district of Maldon, these should have been the subject of full, comprehensive and up-to-date assessment to inform the emerging plan and the selection of a spatial strategy for growth. Work undertaken by a specialist consultant demonstrates that the strategic allocation of new development in Maldon district cannot feasibly be undertaken in the absence of a review of sewerage and flood risk. If this is undertaken the benefits of focusing growth in the north of the district, at Heybridge are conclusive – (WSP).

- A **spatial sustainable transport assessment.** A consideration of this predominantly rural district indicates that the most sustainable pattern of growth is to focus this in and around the key towns of Maldon and Heybridge. By redirecting growth proposed in remote rural area to these locations, there will result a critical mass to justify not only necessary infrastructure in terms of a new link road, but also the provision of services and facilities to serve new and existing communities using a range of transport modes including walking and cycling – (Intermodal Transportation Ltd).

Illustrative Masterplan

5.4 The Illustrative masterplan at appendix 1 focuses upon the provision of housing and mixed use development on land east of Broad Street Green Road, commonly known as and referred to in some

of the attached reports as 'Lofts Farm'. The plan also demonstrates how this land could be developed in association with that to the west (promoted by Countryside Properties) and to the south (promoted by Persimmon Homes) to create a highly sustainable urban extension.

5.5 Together these sites will provide a critical mass of development to justify the provision of key items of infrastructure and the services and facilities to create a balanced, mixed new neighbourhood. Each parcel of land brings with it important benefits and opportunities. Collectively they can make a major contribution to meeting the level of homes required in the district to satisfy its objectively assessed needs. The sites demonstrate a degree of interdependency in order to achieve a sustainable strategic allocation that can also solve the transport, flooding and sewerage problems of Maldon District:

- Land being promoted by Countryside Properties is necessary to accommodate a link road and remove the need for traffic to go through the centre of Heybridge.

- In a largely rural district with few opportunities for development and the need to look to greenfield sites, land to the east of Broad Street Green Road presents the opportunity to develop largely despoiled land (80%) and low grade agricultural land. Following years of mineral extraction it offers a unique natural landscape including extensive water resources. Sewerage is identified as a significant constraint to development in the district. Land to the east of Broad Street Green Road has the lowest cost foul and surface water drainage solutions of all strategic sites in the district. It also poses less risk in environmental and operational terms and ultimately provides the most sustainable solution. Lakes and Brooks on this land provide receptors for on-site SUDs surface water system, removing the need for sewer or off-site connection. The land also presents the opportunity to meet the Council's requirement for a country park, linking into an existing network of public footpaths and major recreation and leisure opportunity and other major sports and recreation facilities.

- Land to the east of the road and south of that referred to above, lies immediately adjacent to the existing built up area of Heybridge and allows for greater connectivity between new and existing communities.

5.6 The illustrative masterplan proposes a mix of uses that could be achieved at this location. At this early stage, this represents but one solution to growth. This can help to inform the further work on the LDP, its evidence base and SA, to be undertaken by the Council, and form the basis of on-going assessment.

Landscape and Ecological Appraisal

5.7 Work undertaken by Rummey Design and attached at appendix 5, demonstrates the opportunity that exists for a landscape-led approach to development. This assessment focuses predominantly on land to the east of Broad Street Green Road and the unique opportunities this will bring to the wider development at Heybridge as a result of its unique landscape character.

5.8 The site is considered by the specialist consultants to have significant development potential by virtue of its geology, topography and hydrology. The extraction of gravel at this location has left behind disturbed landscape in transition. It is a predominantly flat landscape that has its own distinctive quality, even setting it apart from the adjoining parcels of land. It has its own distinctive quality which should be respected and emulated – dominated by water, and creating the opportunity to create a strong landscape framework and enrich biodiversity. The landscape has the capacity to absorb development since there are no highpoints. Its geology creates a strong foundation for a 'wet' landscape that itself will create a distinctive character within which to set new development and

establish a unique identity. Existing streams and brooks on the site will also help create a focus for development and hold the possibility of water reduction for the wider area. The site is well contained by topography and vegetation. There are important landmark views from the site towards the spires of Totham and Maldon churches.

5.9 The assessment by Rummey Design concludes with preliminary ideas on a masterplan layout that build upon layers of distinctive habitats. Moving from south to north these range from eco-diversity/leisure/tourism/education uses associated with the lakes and larger water bodies. Adjoining this lies an opportunity for waterside homes and leisure. This leads into further residential areas with an equine edge and theme. Moving on to plot and crop residential and, finally to the northern edge of the site and a wooded employment area. Distinct residential hamlets are proposed using the existing woodland and water bodies to create the overall structure to the site.

5.10 On going assessment of the site from a landscape and ecological perspective will continue to inform an emerging masterplan. This work will be submitted to the Council for use in establishing a sustainable spatial strategy for growth in the district, and identifying specific sites to meet its growth needs.

Drainage and Flood Risk

5.11 A Technical Note on drainage and flood risk prepared by WSP is attached at appendix 4. This confirms that a review of sewerage and flood risk is prerequisite to considering the strategic allocation of new development in Maldon District. The current draft Local Plan has identified a preferred spatial strategy for growth including detailed masterplan areas, without the benefit of such assessment. A surface water management plan is being prepared by Essex County Council and is cited as a relevant part of the evidence base that has informed the plan. This has not however been published. In addition the evidence base that does exist on the issue of flooding, contains errors, as we have pointed out above, and remains substantially incomplete. A review of these issues has therefore been carried out by WSP to inform the re-assessment work required by the Council. This demonstrates conclusively that an SA, backed by an evidence base, has neither influenced those sites that were selected for growth in the draft plan, nor played any part in justifying rejection of those such as land east of Broad Street Green Road.

5.12 The results of survey and assessment by WSP point conclusively to the location of development at Heybridge in order to solve the problems of flooding and inadequate sewerage capacity. The ability of a proposed allocation for development in South Maldon to contribute to flood mitigation is questioned as it is a small catchment area, separate and mainly south of the Lime Brook. Furthermore surface water run-off does not flow through the town. The Maldon Water Cycle Scoping Study indicates that sewerage is a significant constraint in South Maldon. It confirms that *"…development south of the River Blackwater would currently be unable to go ahead without significant investment in new mains…"* In addition the south east corner of this allocation is constrained by an area prone to flooding (Flood Zone 3).

5.13 In contrast, the assessment by WSP finds that the proposed route of a relief road at Heybridge is capable of intercepting the majority of the catchment for flood mitigation. In addition run-off from the catchments severed by the proposed relief road can be routed though land to the east of Broad Street Green Road, to bypass Heybridge and mitigate the existing urban flooding. Restoration of the Catchpole and Spickets Brooks to their pre-quarry state can also include attenuation of the upper catchment run-off in the wetlands. Land in this part of Heybridge has underlying gravel geology that is conducive to infiltration which maximises the SUDs options available for development. Land to the

east of the road is the nearest large site to Maldon Sewage Treatment Works and can connect to a point on the existing sewerage network downstream of the CSOs with capacity confirmed by AW.

A Spatial Sustainable Transport Assessment

5.14 To meet key objectives of the plan for delivering a sustainable level of housing growth that will limit greenhouse gas emissions, a focus upon the towns of Maldon and Heybridge is essential. Assessment work by Intermodal Transportation Ltd forms appendix 3 to these representations.

5.15 Assessment shows that the difference in locating housing on sites to the north of Heybridge and the south of Maldon is marginal in transport terms. Additional sites will be required to meet increased housing targets and ensure that the objectively assessed needs of the market area are accommodated. In addition there is justification for a redistribution of growth proposed in remote rural areas. In the context of wider benefits to be gained from additional growth at Heybridge, there is sufficient justification in transport terms to increase the size of an allocation at north Heybridge. It is also relevant to point out that extra growth at North Heybridge would balance the larger share already allocated to South Maldon in the emerging draft plan.

5.16 Assuming the provision of the proposed Relief Road, land at North Heybridge can accommodate an extra 730-930 additional dwellings on top of the 1000 allocated units in the draft plan, before capacity of the junction reaches nil detriment, or just over, compared to a 'do nothing' situation. A traffic capacity assessment has been undertaken by Intermodal Transportation Ltd and is attached at appendix 3. It therefore makes for a sustainable growth strategy to take advantage of the economies of scale and provide a greater share of growth at North Heybridge. More growth in a single location will justify additional services and facilities and the urban extension could be largely self sufficient. In this way more trips can be taken via non-car modes of transport including walking and cycling.

5.17 The above assessment work has informed the masterplan for the site. Any further work will be submitted to the Council to inform the emerging plan for the district and to ensure viability and delivery of a new urban extension on land to the east and west of Broad Street Green road, in North Heybridge as part of the overall spatial strategy for growth.

6.0 Summary and Conclusions – Proposed Amendment to the Emerging Local Plan

6.1 It is submitted that the Maldon District LDP is unsound as currently drafted. It is not informed by an appropriate, comprehensive and up-to-date evidence base. Failure to publish a full evidence base alongside the draft plan has deprived interested persons of the opportunity to comment upon them. In the absence of a robust and credible evidence base it is not possible to justify the preferred spatial strategy for growth.

6.2 The local plan is not supported by an adequate sustainability assessment. There has been a failure to comply with the relevant requirements of the EU Directive and Regulations. The SA fails to consider the alternatives for growth in the District and it is not possible to conclude that the best option has been selected. Failure to comply with the Directive and Regulations will bring into question the legality of the plan and risks having at least part of it quashed due to an inadequate SA.

6.3 In the absence of a full evidence base and SA to inform the plan, the emerging strategy for growth instead appears to have been decided on political grounds.

6.4 The matters addressed in these representations and summarised above, are so central to the District Plan's overall strategy that the emerging plan, as it stands, cannot be found sound. A substantive revisiting of the plan is required. This should include the preparation of a thorough and effective SA that takes into account the proper testing of the alternatives for growth. The options should be considered in the context of the objectively assessed needs for housing in the district, that in turn pay due regard not only to current and future demographic trends and profiles including the government's latest published household projections, but also the latest SHMA.

6.5 A revisiting of the plan as recommended above would need to be the subject of full public consultation. Therefore the Council should withdraw the current draft plan, carry out the necessary work as specified above, and republish the plan for consultation together with a full evidence base.

6.6 Not withstanding our principal objection that the plan is unsound and should be withdrawn to allow further work and public consultation, we have demonstrated in these representations that to meet the full housing need of this District in a sustainable way, additional sites would need to be identified.

6.7 We submit that when reviewing the strategic allocation of new development in the District, a review of sewerage and flood risk is an important consideration. Furthermore the Council must undertake the necessary work to ascertain the transport implications of its spatial strategy. Our own assessment of these issues together with consideration of landscape sensitivity, points towards a focus for growth in the north of the district at Heybridge.

6.8 These representations consider the potential for growth at this location and propose a sustainable and balanced approach to extending the existing urban area, that conform with government advice. These proposals are promoted within the context of revisions to the local plan and its evidence base, as called for in these representations.

MASTER PLAN

∞ SPACES ∞

LAND EAST OF BROAD STREET GREEN ROAD HEYBRIDGE

SPACES
WILDLIFE
LEISURE
RECREATION
WALKING
WOODLAND
OPEN SPACE
CYCLING
EDUCATION
WATER
LIVING
WORKING

N

SCRALEY ROAD
WOODLAND EXTENSION AND F.P/CYCLEWAY
SPICKETTS BROOK
S/W MANAGEMENT AND INCREASED AQUATIC BIODIVERSITY
ADJOINING LAKES NATURE RESERVE WILDLIFE
ECODIVERSITY LEISURE EDUCATION
WOODLAND - WATER WILDLIFE CORRIDOR OPEN SPACE LEISURE, WORK RECREATION EDUCATION SPACES
EDUCATION CENTRE
WATERSIDE RECREATION LEISURE
NEW WOODLAND AND BIODIVERSITY. NEW WOODLAND CARRIES BUFFER STRIP TO COUNTRYSIDE AND WILDLIFE CORRIDOR. LINKING LAKES, EXISTING WOODLAND AND ESTUARY WITH OPEN SPACES.
SAINS HALL
VILLAGE GREEN TO VILLAGE 1 - PART OF WILDLIFE CORRIDOR + S/W MANAGEMENT
MILLENIUM WAY — EXISTING TRACK AND NEW F/P AND CYCLEWAY NETWORK
VILLAGE GREEN TO VILLAGE 2 - PART OF WILDLIFE CORRIDOR + S/W MANAGEMENT.
SLOUGH HOUSE FARM
LAKE
EXISTING FOOTPATH
SACKETTS BROOK AND S/W OUTFALL
CATCHPOLE BROOK
WOODLAND EXTENSION - RECREATION LEISURE
MASTER PLAN SITE BOUNDARY
LOFT'S FARM
30 ACRE LAKE
QUARRY SYSTEM NOW NATURALISED LAKES. UTILISING S/W RUN OFF.
B1 BUSINESS & STARTER UNITS
LAKE
SOUTHWOODS
16H SCHOOL
HEYBRIDGE SWIFTS F/C
SCRALEY ROAD
0.55H RETAIL STORE
EXISTING RESIDENTIAL
BROAD STREET GREEN ROAD
BROAD STREET GREEN ROAD
ALLOTMENTS
VILLAGE ROAD NETWORK
SITE ACCESS POINT NORTH
POTLOCK FARM
S/W RUNOFF POSSIBLE CONNECTION TO EXISTING LAKE SYSTEM.
APPROXIMATE LOCATION OF PROPOSED RELIEF ROAD
CLASSIFIED RESIDENTIAL - POSSIBLE ELDERLY LIVING
FOSSILE HIGHWAY CONNECTION BETWEEN SITES
LAND UNDER OPTION AGREEMENT. BY PERMANENT DEVELOPMENT PROFILE IS INDICATIVE.
POWER LINES
TYPICAL INFILL — LOW DENSITY RESIDENTIAL
G.P SURGERY TREATMENT AND COMMUNITY CARE CENTRE POST OFFICE

RESIDENTIAL DEVELOPMENT AREAS

VILLAGE 1

11	residential	35/ha	2.6ha	91 units	
12	residential	30/ha	2.1ha	63 units	---------- 168 units
13	residential	30/ha	0.45ha	14 units	

VILLAGE 2

	School		1.6ha		
1	residential	30/ha	1.0ha	30 units	
2	residential	30/ha	0.86ha	26 units	
3	residential	30/ha	1.9ha	32 units	
4	residential	30/ha	1.0ha	30 units	
5	residential	35/ha	0.3ha	11 units	
6	residential	30/ha	1.95ha	60 units	
7	residential	30/ha	1.1ha	33 units	
8	residential	30/ha	0.3ha	9 units	---------- 377 units
9	residential	30/ha	0.75ha	23 units	
10	residential	30/ha	1.25ha	38 units	
14	residential	30/ha	0.7ha	21 units (poss. elderly)	
15	residential	very low density		say, 30 units	
16	residential	35/ha	0.27ha	10 units	
17	residential	35/ha	0.38ha	13 units	
18	residential	30/ha	0.37ha	11 units	

TOTAL VILLAGES 1 & 2---------- 545 units

INFILL

19	residential	30/ha	0.3ha	9 units
20	residential	30/ha	0.18ha	5 units
21	residential	30/ha	0.15ha	4 units ---------- 28 units
22	residential	30/ha	0.2ha	5 units
23	residential	30/ha	0.16ha	5 units

SAINS HALL

24	residential/business	1.62ha

SCHOOL - 1.6ha

GP SURGERY, TREATMENT & COMMUNITY CARE CENTRE AND POST OFFICE – 0.6ha

SMALL/MEDIUM RETAIL STORE – 0.55ha

B1 BUSINESS AND STARTER UNITS

A	0.3ha
B	0.5ha
C	0.5ha
D	0.3ha
E	0.3ha
F	0.55ha

TOTAL BUSINESS ---------- 2.45ha

0 50 100 150 250

SCALE 1:2500 • OCTOBER 2013 • MP1

KENPHILPOTDESIGN SPACES

Andrew Martin
Planning
Planning Design Development

Our Ref: JC/13021/RS/Coleman 03-07-13

David Coleman
Strategic Planning Policy Manager
Maldon District Council
Princes Road
Maldon
Essex CM9 5DL

3rd July 2013

Dear David

Maldon District Local Development Plan Spatial Growth Scenarios and Strategic Site Allocations

I refer to our telephone conversation earlier today and discussion regarding the proposed growth scenarios to be considered at a special meeting of the Planning and Licensing Committee on 9 July 2013, and thereafter by Full Council on 11 July.

The purpose of my telephone call to you today was to discuss the various scenarios for growth and in particular growth capacity testing to identify land to accommodate a minimum of 700 additional dwellings, in addition to the key components of the revised policy S2. I sought to explore the reasons behind the options selected and in particular the exclusion of land to the east of Broad Street Green Road (BSGR), known as 'Lofts farm'.

I note your argument that the overall level of growth proposed at Heybridge is too high and needed to be whittled down. Furthermore I acknowledge that land being promoted by Countryside Properties to the west of BSGR has some merits as a strategic location in particular to accommodate a link road and remove the need for traffic to go through the centre of Heybridge. Thereafter the additional growth being tested in Heybridge, within Spatial Growth Scenario 1, i.e. some 500 – 600 units, remains to be allocated. At this point there are compelling arguments in favour of development to the east of BSGR, at Lofts Farm.

I refer to Andrew Martin's letter to you of 31 May 2013, following a presentation to members which confirmed that Lofts Farm would be viable and deliverable for between 500-700 homes, with 500 being sufficient to provide a critical mass to secure a range of uses and facilities.

The papers on capacity growth testing to be considered by members next week refer to a dialogue with key statutory bodies such as Essex County Council Highways, Education and Health authorities. However, this crucially fails to include the same debate with Anglian Water on what the Council itself has described the as the 'critical' issue of sewerage capacity. In this regard land to the east of BSGR has been identified by Anglian Water in its viability appraisal of the whole district, as being of best value/least financial cost solution. Furthermore, Lofts Farm has the potential to offer a foul drainage solution that can relieve the existing network and provide a joint solution to meeting the development needs of land to the west of BSGR.

Various reports to committee members make it abundantly clear that baseline evidence to support the growth scenarios is far from complete. This is described variously as 'the best available at this time', 'may be subject to revision' and "subject to review and change as further information becomes available'. On that basis I submit that to remove Lofts Farm as a potential development site, for members to consider next week, is an unreasonable distortion of the options available to meet the overall target for growth. At the very least, growth

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scenario 1 that seeks to test the capacity for further development in Heybridge should allow continued debate over land to the east and west of BSGR, in addition to the 800 units proposed by Countryside Properties.

You confirmed that "there is nothing fundamentally flawed with the Lofts farm site". Furthermore you stated that there is still scope for things to change. However, unless the Lofts Farm site remains as part of at least one of the options under consideration then members who are being asked to select a preferred growth scenario will not be able to lend support to development at this location.

All options, the subject of representation to the Council, should be the subject of an up-to-date sustainability appraisal. It is a requirement of National Policy guidance that the Sustainability Appraisal must be undertaken from the outset and that in doing so it will help to ensure that decisions are made that contribute to achieving sustainable development. The SA is integral to the plan making process and should form an integrated part of the plan preparation process. It should be transparent and open to public participation. Crucially, the SA should inform the decision making process to facilitate the evaluation of alternatives. It should help demonstrate that the plan is the most appropriate given the reasonable alternatives. It is quite possible that following full and thorough testing via an SA that there will be a 'hierarchy of merit' which should inform the final allocations in the draft strategy for submission. It would be perverse if this did not test all the alternatives.

You mentioned that you are meeting with members on Friday 5 July at the Planning Policy Panel meeting to look further at the options. You say that you will draw to their attention the fact that the Lofts Farm site does not feature in any of the 8 growth scenarios. Accordingly I am copying this letter to members and urge all parties to allow land at Lofts farm to remain in the debate to be had next week, and until there is a complete and robust evidence base against which to properly test the relative options.

Finally I draw your attention to the examples of other districts such as South Cambs and Chelmsford, where it can be seen that reliance on a small number of large sites, controlled by a few developers is not necessarily the most efficient or optimum way to achieve delivery. It is safer and less risk adverse to have a variety of sites in sustainable locations controlled by a number of developers/landowners. Not only does this encourage competition but it widens market availability and choice of homes in both the private and affordable sectors.

I would be grateful if you could confirm receipt of this letter.

I look forward to hearing from you.

Yours sincerely

ANDREW MARTIN *MAUD DipTP(Distinction) FRICS FRTPI*
andrew@am-plan.com

cc. Derek Lawrence I Head of Planning Services, Maldon District Council
Maldon District Council Members

Proposed Residential Development Land East of Broad Street Green, Maldon

Spatial Sustainable Transport Considerations

on behalf of

Messrs Hughes and Sandy

October 2013

INTERMODAL TRANSPORTATION
Hunters Court, Debden Road, Saffron Walden, Essex CB11 4AA Tel: 01799 529529 Fax: 01799 529530 e-mail: enquiries@inter-modal.co.uk

IT1296

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APPENDICES

1.0 INTRODUCTION

1.1 Intermodal Transportation Limited (ITL) was commissioned by Messrs Hughes and Sandy to consider the broad transport sustainability of Maldon District Council's draft strategic housing allocation strategy to enable the fundamental test of policy in terms of site selection and establish how the objectors site (Site BH1) could offer better compliance with the basic principles of sustainable development.

1.2 The objector's site is located to the east of the B1022 Broad Street Green on existing agricultural land generally to the north of Heybridge in Maldon, Essex. The site hereon will be referred to as the LEBSG site.

1.3 The appropriate policies which deal with sustainable development are scheduled below and are taken from the Maldon District 'Draft Development Local Plan 2014-2029' consultation document. These can be divided into the overarching core transportation policies and also germane sustainability objectives found within other draft policies.

1.4 Policies T1 (Sustainable Transport) and T2 (Accessibility) are the only two transport related policies but between them they cover the well-established principles to locate development in sustainable and accessible locations to minimise the reliance on car borne travel and reduce greenhouse gas emissions. Alternative means of transport is to be encouraged through locational considerations and also through improved infrastructure provisions.

1.5 A raft of other policies, supplement (in part) the general thrust of the above policies and highlight the key major employment and regeneration areas:

Policy S1, Sustainable Development; Objective 12: Minimise the need to travel and where travel is necessary, prioritise sustainable modes of transport and improve access for all in the community;

Policy S3, Place Shaping; Objectives 7, 8 and 9: Local centres to act as the community focus within the garden suburbs, with a mix of shops and community uses that are well served by public transport and connected to the town centre by safe walking and cycling routes; Providing a network of safe and usable paths and streets for pedestrians, cyclists and vehicles; to integrate with the surrounding communities through shared community uses, and a variety of transport modes including walking, cycling and public transport;

Policy S4, Maldon and Heybridge Strategic Growth; Need identified for a new link road and **e**nhanced public transport provision incorporated within the new Strategic Allocations; enhanced walking and cycling routes to be included internally within the new allocations and externally connected to the wider area especially the Maldon and Heybridge Central Area; to allow development where it can be accommodated within the capacity of the Maldon and Heybridge road network and junctions following appropriate mitigation measures and junction improvements

Policy S5, The Maldon and Heybridge Central Areas; the policy refers to the Causeway Regeneration area to provide better quality employment space and strengthen this area as the prime employment zone within the District; also to improve the riverside facilities for leisure use and to attract more visitors to the area.

Policy D2, Climate Change and Environmental Impact of New Development; Objective 13: Seek to reduce the need to travel, particularly by private vehicle, by encouraging sustainable transport methods, and providing flexibility in the development to enable home working or similar facilities.

Policy E1, Employment: this policy conveniently schedules the size of all employment areas in the district identifying that the Causeway Employment area is by far the largest employment area in the district and alone represents half of all the notable employment areas in the district.

2.0 BASIS OF TESTING POLICY COMPLIANCE

2.1 As far as we are aware, there has been no quantitative modelling of the spatial strategy in so far as understanding travel patterns and behaviour within the Maldon District, as part of the SA and SEA evidence based documentation produced to date. The testing of some spatial strategies and impacts as to whether they are broadly negative, neutral or positive appear to be subjectively based. Essex Highways (EH) have undertaken specific reviews in relation to road and junction capacity across the district, to test specific growth options, but this work does not include any holistic travel pattern/travel distance studies or analysis.

2.2 Clearly many policies refer to the need to reduce greenhouse gas (carbon) emissions and in this regard the primary means of travel to work must carry some notable weight in reviewing housing allocation across the district. Moreover, accessibility in the local context of a site is another important consideration in relation to choice for the everyday needs of the resident population to access workplace, educational, shopping and leisure facilities, and to engender shorter trips and/or reduce the reliance on the car, and foster opportunities for people to walk or cycle to their destinations.

2.3 The evidence based information, which we submit for review by the Council, is selective due to the enormity of undertaking the appropriate level of work to adjudge the current spatial strategy; however, by being selective, we consider enough evidence based information will have been provided to the Council to question the current draft allocations and indeed suggest why additional housing to the north of Heybridge would appear to offer better compliance with policy.

2.4 Hence, the first question to ask is in terms of travel is whether concentration around Maldon Town and Heybridge, as opposed to a spread across the district, represents the best sustainable strategy given car travel would be regarded as the greatest transport contributor to greenhouse gas emissions and, secondly, to review the LEBSG site's accessibility in the local context.

3.0 TRAVEL PATTERNS

3.1 As a demonstration of the current travel behaviour of people who reside in Maldon District, we have chosen a 'demonstration model' that considers the broad travel behaviour of residents who live in the Heybridge east ward against Burnham on Crouch north ward, the latter being a Town that is spatially more isolated from major destinations and primary travel corridors. Heybridge east ward is the nearest ward to the LEBSG site. This comparison would highlight if there are any notable disadvantages to the draft allocated development in more remote (easterly) areas in terms of greenhouse gas emissions.

3.2 As an indicator of modal share for the comparison Towns, and the District as a whole, we have reproduced the 2001 and the 2011 census information for travel to work by mode for both identified wards and Maldon District as a whole. This is reproduced below in Table 1 below.

Table 1: Maldon District, Heybridge East and Burnham on Crouch 2001 & 2011 Travel to Work Census Data

Mode of Travel	Heybridge Ward East		Burnham on Crouch		Maldon District	
	2011	2001	2011	2001	2011	2001
Work mainly at or from Home	5%	9%	6%	10%	7%	12%
Underground, Metro, Light Rail, Tram	0%	0%	0%	0%	0%	0%
Train	5%	5%	13%	11%	8%	7%
Bus, Minibus or Coach	2%	1%	1%	1%	2%	1%
Taxi	0%	0%	0%	0%	0%	0%
Motorcycle, Scooter or Moped	1%	1%	1%	1%	1%	1%
Driving a Car or Van	71%	66%	62%	59%	67%	63%
Passenger in a Car or Van	5%	6%	4%	5%	4%	5%
Bicycle	3%	3%	2%	5%	2%	2%
On Foot	7%	8%	9%	8%	8%	7%
Other Method of Travel to Work	0%	0%	1%	0%	1%	1%

3.3 Prime facie, Burnham on Crouch appears to have better sustainability credential by virtue of the fact that it has a branch railway line connection to Shenfield and London via Wickford. An interesting observation from the comparison of the 2001 and 2011 travel to work census data is that the proportion of people working from home has dropped significantly and that most of the people that worked from home in 2001 have obviously switched back to remote workplaces and, have chosen to use the car for the commute.

3.4 Car travel has ***and will*** remain the predominant mode of travel for work so it is important to understand if development located further away from the main employment, shopping and transport corridors (including conurbations outwith Maldon District), would result in a less favourable carbon footprint on a district wide basis.

3.5 To answer this question we have reviewed the disaggregated data sets from the 2001 census survey (this level of detail was not available from the 2011 census at the time of our assessment) to understand where people were destined in terms of their work place from both Heybridge and from Burnham on Crouch, by car. From the above 2001 census data, the origin of the trip is known and the destination(s) are known; the percentage of work trips is known and the number of car trips to each OD pair is known. Given this information it is then possible to assign traffic to logical commuter routes between each origin and destination (OD) pair. By then aggregating all the respective trip distances between each OD pair it was possible to produce the total vehicle miles travelled to work from both Heybridge and Burnham on Crouch. Finally by dividing this total mileage by the number of households within the Heybridge or Burnham wards in 2001 it is possible to derive an average length of car journey per dwelling.

3.6 Tables 2 & 3, in Appendix A, provides the breakdown of the input data to undertake this detailed assessment. The results of this exercise, not unexpectedly, prove that the average car trip per household from Burnham on Crouch to work is greater at 27.2 miles (round trip) whereas the average distance from Heybridge is 23.5 miles. Hence, despite Burnham having a train patronage (modal share) which is almost 2.5 times greater than that of Heybridge, each household still results in a 16% greater average journey length on each working day by virtue of living in Burnham. This is notable and suggests that whilst some development should be supported in the lower order settlements of the district, to offer more affordable housing, fundamentally as much as possible new housing development should be concentrated to Maldon and Heybridge to reduce trip lengths.

3.7 To test a robust elasticity in terms of the potential to encourage even greater train ridership from Burnham we have considered the amount of modal shift to train that would be required to bring about a similar average car borne trip distance per household as for Heybridge, i.e. bring the average 27.2 miles distance from Burnham down to the 23.5 miles per household from Heybridge level. A reasonable approach would be to say it is more likely that any potential switch from a car trip to a train trip would be from those locations where car commuters are currently going which could be reasonably (conveniently) accessed by train. These locations are: the London area; Brentwood; Southend; Basildon; Rochford and Thurrock. Arguably these locations are the destinations which could be accessed via a moderately convenient train journey involving only one change at Wickford and which would replace some of the longest distances people currently drive to work from Burnham. A proportionate reduction in the drive distance to these destinations was iteratively tested until the average trip distance per household in Burnham equated to the average trip distance per household from Heybridge. By doing this exercise, we were then able to calculate a revised theoretical (lower) number of people who would drive to work from Burnham to calculate the percentage switch from car to rail. The analysis, which is shown in Table 4, at Appendix A, indicates that the train ridership would have to increase by a further 6% which, if added to the 2011 census split of 13%, would give rise to a train modal share figure of 19% from Burnham on Crouch. Such a high ridership in a non-metropolitan area would be unprecedented. Given that many people use a car for business for practical reasons, namely tradesmen and travelling salesmen as prime examples, and the fact that if part of a multi modal commute is more than 1.6km from a station requiring a further bus or taxi trip to their work place, we consider it is unrealistic in the extreme to achieve this level of further modal shift to make Burnham as sustainable as the Maldon/Heybridge Town area.

3.8 In presenting this conclusion the following should be borne in mind:

- Heybridge (east) ward would probably be a reasonable proxy in terms of the travel characteristics of Maldon Town as a whole.
- The above assessment does not include for other car borne trips including for social, leisure, and shopping (both main food and comparison) where it could be reasonably expected the average non-work trip would involve a longer drive distance from Burnham on Crouch, or other remote settlements.
- The least flexible mode of travel is by rail given they are fixed routes with fixed access nodes (stations) which run to timetables and may require bus connections at one or both ends. Bus services are the next least flexible forms of travel particularly where frequency of service is not high. Car, walking and cycling are all very flexible modes of travel and are popular because the time of journey is not fixed and routes are generally more direct with high levels of personal comfort.
- Other remote settlements in Maldon District without ready access to a railway station, or a frequent bus service, would produce a higher percentage of car borne travel compared to Burnham on Crouch or Maldon/Heybridge.
- Car ownership is a very important aspect of social and business integration, at all levels, and has to be respected as the primary means of travel. Many people who use more sustainable modes of travel for some trips still own a car for their other weekly trip needs and requirements, bulk shopping and transporting children being prime examples of this.
- Even taking an unreasonably extreme assumption that a massive 6% of commuter car borne trips would need to be converted to train trips from Burnham (which already has an impressive 13% train modal share compared to the national average of 5%), just to equate to the existing average car borne trip length per household from Heybridge at present, clearly indicates that consolidation of all new housing around Maldon and Heybridge would represent the best sustainability option.

4.0 ACCESSIBILITY

4.1 Logically, new development at a strategic level should be located close to the day to day needs of the new population. Effective ways to minimise travel and make access easy is to provide key facilities close to the new housing. Work, food shopping and educational trips are the main regular trips that are undertaken and where locational considerations can make a substantial difference to the carbon footprint of a new development.

4.2 Policy S4 Maldon and Heybridge Strategic Growth identifies….

The North of Heybridge Garden Suburb and Strategic Allocations will need to deliver the following key infrastructure elements;

• A new 1-form entry primary school;

• Necessary contributions toward the sufficient expansion of Plume School;

• A new relief road to the north of Heybridge between Broad Street Green Road and Langford Road; and a new country park focused to the west of Maypole Road.

4.3 This provision relates to the basic allocation of 1000 units to the north of Maldon (north of Holloway Road and Heybridge Swifts sites). The LEBSG site could comfortably accommodate between 730 and 930 units, on top of the 1000 allocated, before road capacity becomes an issue in Heybridge (see separate Technical Highway Note prepared by Intermodal Transportation and dealing with road capacity issues as part of the same representation). In addition to the above basic provisions the objectors consider that a strategically placed local centre should be provided perhaps to the south of the LEBSG site to provide a centralised area to serve the Countryside Properties (CP) allocated site and also perhaps any development Persimmon promote to the north of Scraley Road.

4.4 A local centre could support the usual small retail, service sector and community facilities providing for the day to day needs of the local populace but it is considered that a main foodstore could be also be a viable proposition to accommodate significant growth to the north of Heybridge and Maldon. In this way most of the new development, with a critical mass to support new facilities, could be self-sufficient to a large degree in terms of basic shopping and service sector needs. Most trips to a well-placed 'centre' from the new development could be readily undertaken via safe and pleasant walk or cycle routes which would integrate both development areas to the west and east side of Broad Street Green. If car trips are undertaken in the local context these would be very short and contained in nature.

4.5 Moreover, further new employment land to the north of the LEBSG site should be provided to offer new employment opportunities on the doorstep of the growth area; additionally the LEBSG site has the ability to provide high quality and extensive open space provision which links to existing public right of way (PROW) routes through to Heybridge Basin; the Masterplan, prepared as part of this representation, shows land set aside for these uses. Importantly the open space strengthens the route of the millennium way which passes across the LEBSG site.

4.6 In the context of the need to travel in the wider context (mainly employment, leisure and comparison shopping requirements), site selection should take account of the existing provisions to understand where 'external' trips would likely be made. The four principal considerations fall to where people work, where people might undertake comparison shopping, accessibility to the public transport nodes/connections and, where people would wish to travel for leisure pursuits. These are discussed under respective separate headings below.

Local Centre Provision

4.7 It is assumed that like development to the north of Maldon, development to the south of Maldon would have the critical mass to support a local centre and as such many short day-to-day trips could be similarly catered for. As such we do not draw any distinction between development south of Maldon and north of Maldon on this basis.

Main Food Shopping

4.8 It is considered that another main retailer would have interest in providing a new outlet to the north of Heybridge if further allocation were to be allowed. This would give a good balance of main food shopping provision across Maldon. The existing Morrisons to the south is well placed to serve new housing to the south and the existing Tesco store off the Fullbridge roundabout is well placed to serve central Maldon/Heybridge. The Bentalls Centre in Heybridge also fulfils a very important local role for the Heybridge area by not only providing other retail and service sector businesses but some bulk food shopping facilities also. A possible location for a foodstore, with good highway access, is shown on the LEBSG Masterplan submitted with this representation.

Employment within Maldon District

4.9 The extent of the employment area situated around the Causeway by comparison to the rest of the District is stark representing 50% of the employment in Maldon. The Oval Park and Langford Waterworks sites together represent just under 17% of the employment zones within Maldon District. The employment areas at West Station Yard and Wycke Hill Business Park together represent 8% of the employment zones within Maldon District. Given that the Causeway employment zone is an area where regeneration and modernisation is to be encouraged, then this employment area is going to be a major attractor to new residents in the District. Hence, a high number of trips to local employment destinations could be envisaged from the new housing stock on the outskirts of Maldon with a diminishing draw radiating away from Maldon Town. Whilst Burnham on Crouch has its own employment areas, it is the case that even Burnham residents travel to Chelmsford and Maldon to work and this is not surprising. It is noted the Council are promoting the need for 5 Ha for employment land at Wycke Hill south and north (principally to the south), and therefore an area of land to the north of the LEBSG site, shown on the Masterplan would be able to offer a similar level of provision.

4.10 People who choose to live in Maldon would consider their options for travel to work and it is unlikely therefore that any new resident living in Maldon would want to travel to smaller settlements in the District (where some employment base exists) but would principally be attracted to travel to Maldon itself and then to higher order conurbations outwith but close to the Town.

Employment Outwith Maldon District

4.11 A proportion of residents living in Maldon would want to travel to higher order centres such as London, Chelmsford, Briantree/Witham and Colchester for work where the commuter trip would be regarded as reasonable.

4.12 The Travel Pattern survey undertaken to derive the average work trip distance by car from Burnham and Heybridge allows for some basic conclusions to be drawn in relation to car travel to work outside the Maldon District. The OD pairing indicates the following basic split of work trips to the key areas within reasonable commuting distance. Table 5 below shows the results.

Table 5: Main Work Destinations by Car from Maldon District

Work Destination	Percentage by Car from Heybridge East Ward	Percentage by Car from Burnham North Ward
Maldon Town/Heybridge	36%	7%
Burnham Town	0%	29%
Rest of Maldon District	9%	12%
Chelmsford	25%	14%
Witham/Braintree	10%	3%
Colchester	3%	1%
Basildon	4%	9%
Brentwood	2%	2%
Southend on Sea	1%	3%
London Area	6%	7%

4.13 The table above shows that both Burnham and Heybridge are able to contain a notable amount of car trips within their local respective towns. In this regard Heybridge is better at containment of 'out commuting' by car than Burnham. The results also show that Chelmsford is a strong pull for employment related trips.

4.14 The Consultants are aware of the relative capacity of the roads to the west and north of Maldon, to access the A12, and most of the roads emanating from Maldon to the north are relatively free flowing during peak hours. It would be easy to access the A12 for destinations north of Witham via Tiptree and Kelvedon. The same ease of access would apply for trips to Colchester Town. When travelling east to Witham and/or Chelmsford the three obvious routes are the Maypole Rd/Witham Rd/Blue Bell Hills route, the B1019 Langford Road to Hatfield Peveral route and the A414 route through Danbury.

4.15 Given that clearly any destinations to the north of Maldon and Heybridge would entail drivers using good roads with spare capacity to access higher order centres, or the A12, then new housing located to the north of the Town clearly provides benefit because drivers would either not be using the more congested A414 route to access the A12 or not be travelling around the Maldon bypass or through central Maldon to access the A12.

4.16 Any trips to Witham/Braintree for work, which has substantial employment areas, would be more readily facilitated on less congested routes via Wickham Bishops or via Langford Road involving shorter trips to this destination from housing located to the north of Maldon.

4.17 Trips to the south and Chelmsford would entail marginally longer trips, unless to the Industrial Springfield end of Chelmsford where they would be shorter. However, because it is well know that the A414 between Maldon and the A12 suffers from a high degree of congestion the times to reach common points on the A12 due east of Chelmsford are unlikely to be radically different. One of the land owners of the LEBGS site undertakes a commute to the A12 and over the years has acquired a very good local knowledge of the alternative routes. Whilst it is acknowledged that the junction of

the B1019 with The Street in Hatfield Peveral can suffer some congestion, this by comparison is nowhere near as bad as the delays caused by the Oaks Corner roundabout on the A414 and the double-mini roundabouts in Danbury, which on some days can be severe. Hence, the balance of flows to accommodate east to west movements from Heybridge, would rest between residents living in the south of Maldon predominantly using the A414 and residents living to the north of Maldon/Heybridge using the B1019 and some using the B1018.

4.18 Whilst there may be a slight disadvantage in terms of residents living to the north of Maldon accessing central Chelmsford and the south on the A12, this has to be viewed against the advantage when travelling to north Chelmsford, Witham/Braintree, Colchester and all destinations north on the A12. The one advantage, however, of the traffic corridors which would be favoured by residents living in the north would be the utilisation of generally more free flowing links and junctions which of itself would result in lower CO2 emissions per mile travelled.

Public Transport - Rail

4.19 Four railway stations exist within Maldon district at Southminster, Burnham, Althorne and North Fambridge located on a provincial line that connects with Wickford and then to the Norwich to Liverpool Street mainline at Shenfield.

4.20 Use of this line therefore requires at least one change of service if destined for stops from Wickford heading south to London. However, if commuters are destined for Chelmsford or destinations north of Chelmsford two train changes are required. Hence, the use of the train for many potential trips to the rail node catchments would be, and would remain supressed due to the inconvenience of changing services particularly to the west and north of Maldon District.

4.21 Because trips by rail to London and its outer surrounds would be reasonable by train from the above mentioned stations, some residents choosing to live in these smaller settlements would ‘out commute’ and would not help to bring about local social and commercial inclusion. With provision of a railway station close to new housing some community detachment is inevitable.

4.22 However, a notable proportion of people from Maldon Town do use the train (equivalent to the national average at 5% ridership) and this ‘out commuting’ would also occur but to a lesser extent. Opportunities to use the train from Maldon rest mainly with the Norwich to Liverpool Street mainline and the closest viable stations to access are Witham, Hatfield Peveral and Chelmsford.

4.23 Chelmsford would represent the most difficult train station to access, for Maldon based residents, due to the delays on the road network in accessing the station and parking difficulties/costs. Witham would be the next favoured station because it is relatively easy to access (within the Town) but parking would still be an issue. Hatfield Peveral would be the preferred station, in our opinion, because it is the easiest station to access and to park at, despite the ‘halt’ frequency being less than Witham and Chelmsford.

4.24 Our assertions above are also supported by Essex Highways who report in their ‘Response from Essex Highways’ June 2013 report to MDC as follows:

" Impact on Possible North-east Chelmsford Rail Station

In earlier correspondence, CCC indicated their concern that traffic from prospective developments in the Maldon district area may not have been accounted for in assessing access to the proposed North-east Chelmsford rail station.

Whilst it is acknowledged that the location of the proposed rail station, the Boreham Interchange on the A12, is often congested under existing conditions, it is unclear how much of any proposed development in Maldon district would impact on the area. Currently, there are two main accesses to the A12 from Heybridge and Maldon, the A414 through Danbury and the B1019 and B1137 via Hatfield Peverel. The former route links up with the Park and Ride facility at Sandon and is further south than Boreham, whilst the latter route has an alternative, nearer rail station at Hatfield Peverel (albeit with potentially fewer services than the North-east Chelmsford facility). Hence, in both cases there are reasonable travel alternatives to a North-east Chelmsford rail station. EH therefore consider it unlikely that significant numbers of trips would be bound for North-east Chelmsford from Heybridge and / or Maldon. "

4.25 Clearly given that Witham and Hatfield Peveral are the most attractive rail stations to use then, if travelling by car, shorter travel distances would be the consequence from housing located to the north of Maldon/Heybridge.

Public Transport - Bus

4.26 Maldon Town is reasonably well served by existing bus routes which offer acceptable and frequent (half hour or less) services to Central Maldon, South Woodham Ferrers, Chelmsford, Witham and Colchester, being the nearest conurbations that people would probably travel to by bus. At all these locations bus passenger can interchange to other bus services radiating from central transport hubs (to respective surrounding settlements) providing accessibility to a wide catchment area.

4.27 Bus services run to Chelmsford, Hatfield Peveral and Witham giving access to train stations and an existing service passes along Broad Street Green Road which runs through Wickham Bishops to Witham railway station (Service 90). Table 6 below shows the service frequency and journey times to these main line stations from south of Maldon and from north of Maldon.

Table 6: Existing Bus Services to Stations

Service	Start Time	Finish Time	Frequency	Journey Time
South Maldon to Chelmsford (Service 31)	07:26	21:58	30mins	33-40mins
South Maldon to Witham (Service 90)	06:19	17:59	30mins	35mins
South Maldon to Hatfield Peveral (Service 73)	09:06	17:58	120mins	33mins
Heybridge to Chelmsford (Service 73)	07:30	18:12	120mins	48mins
Heybridge to Witham (Service 90)	06:27	18:07	30mins	20mins
Heybridge to Hatfield Peveral (Service 73)	07:30	18:12	120mins	20mins

4.28 Service 73 does not pass along Broad Street Green but serves Heybridge via the Square and thence to Langford Road; it is not frequent or flexible enough to currently offer a viable service for the LEBSG site but could be enhanced to serve the northern growth area. However, Service 90 which currently runs along Broad Street Green offers a good frequent option to access Witham station by bus and represents the shortest journey time to a main line railway station (with its high number of stopping services) form the Maldon/Heybridge area.

4.29 Inevitably with large scale development to either the north or the south of Maldon, bus services would need to be reviewed, extended and/or provided and the frequency would need to be such that access by all for most needs over the active day would be provided by bus. Details of these services would be developed when the allocation sites are consolidated within the approved Local Development Plan.

4.30 Also new, extended or diverted bus services would penetrate the core areas of the new development to ensure that most properties are within the preferred maximum 400m walk distance which Essex County Council advocate is a convenient maximum distance to encourage use of this alternative mode of travel.

4.31 Given that such services would need to be developed to serve the currently allocated 1000 units to the north of Maldon, then additional housing to the north can only bolster the viability to introduce new or better services.

Other Destinations of Importance

4.32 The local hospital (St Peter's hospital) and Secondary School (Plume School) would be regarded as important provisions to maintain and strengthen as a result of substantial growth in Maldon.

4.33 Maldon High Street is the core central area of the Town. The reasonably wide 'offer' provided by retailers and businesses in the Town, would mean that new residents may choose to undertake many comparison shopping and service sector trips in Maldon, as opposed to the larger towns of Chelmsford and Colchester which have more shopping choice.

4.34 The principal leisure activity which would generate the greatest activity on a house by house basis would be walking for pleasure, walking pets or cycling for recreation. The LEBSG site offers an expansive and interesting open space provision with natural paths that lead in a broad north westerly to south easterly direction through the Meres and other lakes to Heybridge Basin (part of which is on the Millennium route). This route would be very popular particularly as Heybridge Basin is a pleasant and very popular destination in its own right. This open space would be located to the south and east of new allocations if the LEBSG site were to be promoted. However, this vast open space provision (shown on the masterplan) would also abut the existing northern fringe of Heybridge providing better and convenient open space provision to be enjoyed by a wider catchment to promote and encourage more walking and cycling.

4.35 Residents living close to Maldon would also look to the Marine Parade Park and the Chelmer waterside for extended walking and cycling recreational trips; this waterside recreational area is also a popular local destination with some historic quayside merit. The Maldon Leisure Centre is situated a short distance to the south west of Marine Parade Park off Park Drive Road.

5.0 CONCLUSIONS

5.1 The draft Local Development Plan transportation policies T1 and T2 require that development is located in accessible locations to reduce the reliance on the car and offer alternative forms of travel. Fundamentally, the test of the carbon footprint of new development is a major consideration as to where new housing should be located.

5.2 No substantive evidence, based on detailed assessment work, appears to have been carried out to test the alternative growth strategies from an overall carbon footprint perspective and this would appear to be a shortfall of the published consultation documentation.

5.3 The promoters of the LEBSG site therefore challenge the spatial strategy, as currently drafted, from a number of viewpoints, including transport sustainability and accessibility. For this reason the promoters of the LEBGS site instructed Intermodal Transportation to carry out a high level review to ascertain how the LEBSG site would fare from a transportation perspective, when compared to the current draft strategy.

5.4 The study work would indicate the following:

1) Notwithstanding that Southminster, Burnham on Crouch, Althorne and North Fambridge have railway stations, the opportunity to radically change the modal split in favour of this form of travel would be limited. The indications from a selective study between Burnham and Maldon suggests that the predominant form of travel is by car, and would remain as such, and that the difference in daily car trip lengths would proportionately increase the further people live from Maldon Town and the main road corridors. This would suggest that ***any*** settlements situated in an arc from north east to south east Maldon (particularly those without a station) would entail higher car mileage and greater dependency on the car.

2) Car travel to work is the single most important aspect in terms of impact on the highway network during the morning and evening peak hours. A massive 67% of Maldon's employment provision is located towards the north of Maldon Town (the Causeway Area) and to the north east of the Town (Langford Waterworks and Oval Park). Remote settlements to the east of Maldon town look to Maldon and Chelmsford for some employment opportunities due to the scale of the existing provision.

3) In accessibility terms, taking into account the key day-to-day facilities that people would expect and rely upon, the differences between locating housing to the north of Maldon/Heybridge or the south of Maldon appears to be marginal.

4) Access to the two most convenient mainline railway stations at Witham and Hatfield Peveral would be easier from development to the north of Heybridge; to Hatfield Peveral Station by car and to Witham Station by bus.

4) The A414 is an extremely busy road corridor and this has been highlighted by Essex Highways in their evidence based reports to Maldon District Council. Housing development, particularly in the south, would have the effect of increasing traffic levels on this congested route, or potentially for some trips to be diverted northwards around Maldon (using the bypass) to access Langford Road. In general distribution terms whether locally or, to access the A12 and beyond, development to the north of Maldon would involve the

greater use of a number of roads with more spare capacity thus reducing the 'traffic burden'.

5) In commenting upon accessibility, it is inherently assumed that the new link road between Broad Street Green and Maypole Road/Langford Road is constructed.

5.5 Under the 'Transport and Access' chapter of the Draft Local Development Plan the following context statements are made:

7.1 National planning policy requires the consideration of the transport system to be balanced in favour of sustainable transport modes and that developments that generate significant movement should be located where the need to travel will be minimised and the use of sustainable transport modes can be maximised.

7.3 The Southminster Branch Line provides an opportunity to ease the District's reliance on the private car for transport. Railway patronage could be increased by improving train services, and improving connections to rail stations with bus links to nearby settlements.

7.10 National planning policy states that the ability of people to access key services and facilities can make an important contribution to the health and well-being of communities. Therefore local authorities need to ensure residents of new developments are appropriately linked to employment, housing, retail, leisure, and key services and facilities irrespective of their age or physical ability.

5.6 The location of more housing to the north of Heybridge can positively meet these over-arching objectives in a positive way and the promoters of the LEBSG site do not contest, in transportation terms, that a basic split between strategic allocation to the south and the north represents the best opportunity for the plan period, although it is considered the merits of developing the LEBSG should be reviewed in detail by the Council to understand if a different distribution of the housing numbers north and south might offer a better growth option.

5.7 Whilst the Council aim to bring about increased ridership on the Southminster branch railway line, this proclamation needs to be tested given that the Council's current allocation strategy locates only a relatively modest amount of the overall housing need near to the branch line and its stations. Moreover, it would appear that an unachievably high modal shift to this travel mode would be required to reduce the average distance travelled by car per household to be at parity with average travel distance currently travelled from Heybridge. To carry out rail infrastructure improvements and/or increase the frequency of train and bus services would be prohibitively and disproportionally expensive for a potential small gain in ridership and is unlikely to be supported by central government or the train operators. Also, bus operators would need to be assured that services between rural locations and stations are viable. Furthermore, because of the requirement for passengers having to endure one or two rail service interchanges at Wickford and/or Shenfiled to reach all major conurbations served by rail, the branch line would never be able to offer a service that provides direct, convenient travel.

6.0 RECOMMENDATIONS

6.1 It is recommended that a more sustainable strategy would be to reduce the number of dwellings in Burnham on Crouch (currently 450 proposed), and redirect most of the 345 houses assigned to 'other rural settlements' to Maldon/Heybridge on the basis that some of the rural allocations can be met from the anticipated 330 windfall application allowance.

6.2 Given that the draft south Maldon housing allocation has been promoted to absorb more dwellings than previously advocated in recent times by the Planning Authority, then this strategy should be reconsidered to direct some of the additional housing to the north Maldon/Heybridge area. A 50/50 split of housing north to south may prove to give a better sustainability balance, based upon this initial review.

6.3 Hence, we conclude that if an additional 730 to 930 units were to be re-designated to north Heybridge (making circa 1730 to 1930 to the north of the Town), the district wide carbon footprint would be proven to be better than the draft plan distribution strategy. The limit of 730 additional units is regarded as a safe limit to respect a 'nil detriment' impact on the local Heybridge road network compared to a 'do nothing' situation. The limit of an additional 930 units is based upon the supposition that the impact of another 200 houses (above the 730) cannot be regarded as having a ***severe*** traffic impact which NPPF considers is the benchmark where the presumption in favour of development could be questioned.

6.4 By amending the LDF plan in the way outlined above, we consider that there would not be a fundamental step change to the philosophy of expansion to the south and north of Maldon but by capturing most of the 345 units from unspecified rural allocations, by taking a proportion of the allocations at Burnham and, by possibly reassigning some of the south allocation housing to the north of the Town would appear to be a better transportation planning solution to meet the NPPF requirement that judgements should be based upon sound evidence when making strategic decisions.

6.5 Hence, we consider that based upon this limited review, it is essential that the Council undertake the necessary and extensive study work to ascertain the transport implications of the spatial strategy options in relation to greenhouse gas emissions, which should include consideration of LEBSG site, to test the draft Local Development Plan's soundness in meeting the national and local policy objectives in the best way.

APPENDIX A

HEYBRIDGE AND BURNHAM ON CROUCH TRAVEL DISTANCE ASSESSMENTS

Table 2: Travel to Work Vehicle Miles Calculation for Heybridge East Ward

Ward name	Local/Unitary Authority name	Distance to Travel	All	WFH	Underground	Train	Bus	Taxi	Car Driver	Car Pass	P2W	Cycle	Ped	Total Distance per Ward
	Barking and Dagenham	36	8	0	0	0	0	0	8	0	0	0	0	576
	Bexley	45	3	0	0	0	0	0	3	0	0	0	0	270
	Camden	55	9	0	0	3	0	0	6	0	0	0	0	660
	Havering	30	22	0	0	0	0	0	19	3	0	0	0	1140
	Islington	45	9	0	0	6	0	0	3	0	0	0	0	270
	Kingston upon Thames	69	6	0	0	0	0	0	3	0	0	3	0	414
	Lambeth	57	3	0	0	0	0	0	3	0	0	0	0	342
	Newham	47	6	0	0	0	0	0	6	0	0	0	0	564
	Redbridge	37	3	0	0	0	0	0	3	0	0	0	0	222
	Southwark	53	3	0	0	0	0	0	3	0	0	0	0	318
	Tower Hamlets	45	6	0	0	3	0	0	3	0	0	0	0	270
	Southend-on-Sea	24	15	0	0	0	0	0	15	0	0	0	0	720
	Milton Keynes	91	3	0	0	0	0	0	3	0	0	0	0	546
	Cardiff	212	3	0	0	0	0	0	3	0	0	0	0	1272
	South Cambridgeshire	60	3	0	0	0	0	0	3	0	0	0	0	360
	Basildon	21	56	0	0	0	0	0	53	3	0	0	0	2226
	Braintree	14	164	0	0	0	0	3	146	12	3	0	0	4088
	Brentwood	26	34	0	0	3	3	0	28	0	0	0	0	1456
	Castle Point	23	3	0	0	0	0	0	3	0	0	0	0	138
	Chelmsford	12	406	0	0	6	22	0	348	27	3	0	0	8352
	Colchester	18	54	0	0	0	6	0	48	0	0	0	0	1728
	Epping Forest	36	3	0	0	0	0	0	3	0	0	0	0	216
	Harlow	38	6	0	0	0	0	0	6	0	0	0	0	456
Althorne	Maldon	10	19	0	0	0	0	0	16	0	0	3	0	320
Burnham-on-Crouch North		14	6	0	0	0	0	0	3	3	0	0	0	84
Great Totham		2	29	0	0	0	0	0	26	0	0	3	0	104
Heybridge East		1	479	205	0	6	0	0	178	18	0	9	60	356
Heybridge West		1	111	0	0	0	0	0	49	6	0	15	41	98
Maldon East		2.5	8	0	0	0	0	0	8	0	0	0	0	40
Maldon North		2.5	377	0	0	0	10	0	249	27	3	29	59	1245
Maldon South		2.5	7	0	0	0	0	0	7	0	0	0	0	35
Maldon West		2.5	27	0	0	0	0	0	19	5	0	0	3	95
Mayland		11	3	0	0	0	0	0	3	0	0	0	0	66
Purleigh		6	9	0	0	0	0	0	6	3	0	0	0	72
Southminster		13	4	0	0	0	0	0	4	0	0	0	0	104
Tillingham		18	6	0	0	0	0	0	6	0	0	0	0	216
Tollesbury		8.5	4	0	0	0	0	0	4	0	0	0	0	68
Tolleshunt D'Arcy		6.2	18	0	0	0	0	0	15	3	0	0	0	186
Wickham Bishops/Woodham		5.5	38	0	0	0	0	0	35	3	0	0	0	385
	Rochford	22	3	0	0	0	0	0	3	0	0	0	0	132
	Uttlesford	38	22	0	0	0	0	0	22	0	0	0	0	1672
	Broxbourne	48	6	0	0	0	0	0	6	0	0	0	0	576
	Broxbourne	48	3	0	0	0	0	0	3	0	0	0	0	288
	Hertsmere	55	3	0	0	0	0	0	3	0	0	0	0	330
	Welwyn Hatfield	58	3	0	0	0	0	0	3	0	0	0	0	348
	Canterbury	83	3	0	0	0	0	0	3	0	0	0	0	498
	Dartford	42	3	0	0	0	0	0	3	0	0	0	0	252
	Norwich	87	3	0	0	0	0	0	3	0	0	0	0	522
	Babergh	33.4	3	0	0	0	0	0	3	0	0	0	0	200
	Forest Heath	69	3	0	0	0	0	0	3	0	0	0	0	414
	Malvern Hills	197	3	0	0	0	0	0	3	0	0	0	0	1182
Totals		-	-	-	-	-	-	-	**1408**	-	-	-	-	**36492**
Number of Households (2001 Census)														**1552**
Average Car Trip Length Per Household (miles)														**23.51**

Table 3: Travel to Work Vehicle Miles Calculation for Burnham North Ward

Ward name	Local/Unitary Authority name	Distance to Travel	All	WFH	Underground	Train	Bus	Taxi	Car Driver	Car Pass	P2W	Cycle	Ped	Total Distance per Ward
Cripplegate	City of London	40	6	0	0	3	0	0	3	0	0	0	0	240
Abbey	Barking and Dagenham	39	3	0	0	0	0	0	3	0	0	0	0	234
Crayford	Bexley	42	3	0	0	0	0	0	3	0	0	0	0	252
Regent's Park	Camden	54	3	0	0	0	0	0	3	0	0	0	0	324
Greenwich West	Greenwich	48	3	0	0	0	0	0	3	0	0	0	0	288
Woolwich Common	Greenwich	48	3	0	0	0	0	0	3	0	0	0	0	288
Woolwich Riverside	Greenwich	48	3	0	0	0	0	0	3	0	0	0	0	288
Brooklands	Havering	36	3	0	0	0	0	0	3	0	0	0	0	216
Hacton	Havering	36	4	0	0	0	0	0	4	0	0	0	0	288
Heaton	Havering	36	3	0	0	0	0	0	3	0	0	0	0	216
Mawneys	Havering	36	3	0	0	0	0	0	3	0	0	0	0	216
Romford Town	Havering	36	6	0	0	3	0	0	3	0	0	0	0	216
South Hornchurch	Havering	36	5	0	0	0	0	0	5	0	0	0	0	360
Harefield	Hillingdon	80	3	0	0	0	0	0	3	0	0	0	0	480
Canonbury	Islington	48	3	0	0	0	0	0	3	0	0	0	0	288
Rushey Green	Lewisham	50	3	0	0	0	0	0	3	0	0	0	0	300
Trinity	Merton	59	3	0	0	0	0	0	3	0	0	0	0	354
East Ham Central	Newham	44	3	0	0	0	0	0	3	0	0	0	0	264
Clementswood	Redbridge	43	3	0	0	0	0	0	3	0	0	0	0	258
Bethnal Green North	Tower Hamlets	46	3	0	0	0	0	0	3	0	0	0	0	276
High Street	Waltham Forest	50	3	0	0	0	0	0	3	0	0	0	0	300
Higham Hill	Waltham Forest	50	3	0	0	0	0	0	3	0	0	0	0	300
Lea Bridge	Waltham Forest	50	3	0	0	0	0	0	3	0	0	0	0	300
East Putney	Wandsworth	55	3	0	0	0	0	0	3	0	0	0	0	330
New Parks	Leicester	145	3	0	0	0	0	0	3	0	0	0	0	870
Eastwood Park	Southend-on-Sea	25	3	0	0	0	0	0	3	0	0	0	0	150
Leigh	Southend-on-Sea	25	3	0	0	0	0	0	3	0	0	0	0	150
Milton	Southend-on-Sea	25	7	0	0	3	0	0	4	0	0	0	0	200
St Laurence	Southend-on-Sea	25	3	0	0	0	0	0	3	0	0	0	0	150
St. Luke's	Southend-on-Sea	25	7	0	0	3	0	0	4	0	0	0	0	200
Southchurch	Southend-on-Sea	25	3	0	0	0	0	0	3	0	0	0	0	150
Victoria	Southend-on-Sea	25	6	0	0	0	0	0	6	0	0	0	0	300
West Leigh	Southend-on-Sea	25	3	0	0	0	0	0	3	0	0	0	0	150
Corringham and Fobbing	Thurrock	29	3	0	0	0	0	0	3	0	0	0	0	174
Park	Thurrock	29	6	0	0	0	0	0	6	0	0	0	0	348
Stifford	Thurrock	29	5	0	0	0	0	0	5	0	0	0	0	290
Binfield with Warfield	Bracknell Forest	100	3	0	0	0	0	0	3	0	0	0	0	600
Campbell Park	Milton Keynes	98	3	0	0	0	0	0	3	0	0	0	0	588
Billericay West	Basildon	20	3	0	0	0	0	0	3	0	0	0	0	120
Burstead	Basildon	20	3	0	0	0	0	0	3	0	0	0	0	120
Fryerns	Basildon	20	29	0	0	0	0	0	26	0	0	0	0	1040
Laindon Park	Basildon	20	20	0	0	0	0	0	17	0	0	0	0	680
Nethermayne	Basildon	20	6	0	0	0	0	0	6	0	0	0	0	240
Pitsea North West	Basildon	20	13	0	0	0	0	0	13	0	0	0	0	520
St Martin's	Basildon	20	6	0	0	0	0	0	6	0	0	0	0	240
Wickford Castledon	Basildon	20	7	0	0	0	0	0	7	0	0	0	0	280
Wickford North	Basildon	20	20	0	0	0	0	0	17	0	0	0	0	680
Wickford Park	Basildon	20	3	0	0	0	0	0	3	0	0	0	0	120
Bocking South	Braintree	27	3	0	0	0	0	0	3	0	0	0	0	162
Braintree South	Braintree	27	3	0	0	0	0	0	3	0	0	0	0	162
Gosfield and Greenstead Green	Braintree	27	3	0	0	0	0	0	3	0	0	0	0	162
Kelvedon	Braintree	27	3	0	0	0	0	0	3	0	0	0	0	162
Rayne	Braintree	27	3	0	0	0	0	0	3	0	0	0	0	162
Central	Braintree	27	19	0	0	0	3	0	16	0	0	0	0	864
Brentwood South	Brentwood	30	3	0	0	0	0	0	3	0	0	0	0	180
Brentwood West	Brentwood	30	9	0	0	3	0	0	6	0	0	0	0	360
Mountnessing	Brentwood	30	3	0	0	0	0	0	3	0	0	0	0	180
Shenfield	Brentwood	30	3	0	0	0	0	0	3	0	0	0	0	180
Warley	Brentwood	30	8	0	0	0	0	0	8	0	0	0	0	480
Canvey Island Winter Gardens	Castle Point	20	3	0	0	0	0	0	3	0	0	0	0	120
Victoria	Castle Point	20	3	0	0	0	0	0	3	0	0	0	0	120
Hanningfield	Chelmsford	21	7	0	0	0	0	0	7	0	0	0	0	294
Broomfield and The Walthams	Chelmsford	21	9	0	0	0	0	0	9	0	0	0	0	378
Park	Chelmsford	21	9	0	0	0	3	0	6	0	0	0	0	252
Chelmsford Rural West	Chelmsford	21	6	0	0	0	0	0	3	0	0	0	0	126
Galleywood	Chelmsford	21	8	0	0	0	3	0	5	0	0	0	0	210
Great Baddow East	Chelmsford	21	5	0	0	0	0	0	5	0	0	0	0	210
Sandon	Chelmsford	21	10	0	0	0	0	0	10	0	0	0	0	420
Marconi	Chelmsford	21	13	0	0	0	0	0	13	0	0	0	0	546
Moulsham and Central	Chelmsford	21	48	0	0	0	10	0	35	0	0	0	0	1470
Rettendon and Runwell	Chelmsford	21	3	0	0	0	0	0	3	0	0	0	0	126
St Andrews	Chelmsford	21	3	0	0	0	0	0	3	0	0	0	0	126
Margaretting	Chelmsford	21	3	0	0	0	0	0	3	0	0	0	0	126
Collingwood	Chelmsford	21	3	0	0	0	0	0	3	0	0	0	0	126
Woodville	Chelmsford	21	30	0	0	3	0	0	27	0	0	0	0	1134
Trinity	Chelmsford	21	6	0	0	0	0	0	6	0	0	0	0	252
Waterhouse Farm	Chelmsford	21	13	0	0	0	0	0	13	0	0	0	0	546
Highwoods	Colchester	35	3	0	0	0	0	0	3	0	0	0	0	210
Lexden	Colchester	35	3	0	0	0	0	0	3	0	0	0	0	210
Tiptree	Colchester	35	3	0	0	0	0	0	3	0	0	0	0	210
Loughton Broadway	Epping Forest	48	3	0	0	0	0	0	3	0	0	0	0	288
Little Parndon and Hare Street	Harlow	45	3	0	0	0	0	0	3	0	0	0	0	270
Mark Hall	Harlow	45	6	0	0	0	3	0	3	0	0	0	0	270
Toddbrook	Harlow	45	3	0	0	0	0	0	3	0	0	0	0	270
Althorne	Maldon	3.5	36	0	0	0	0	0	29	0	0	0	0	203
Burnham-on-Crouch North	Maldon	1	471	169	0	9	0	3	183	0	0	3	0	366
Burnham-on-Crouch South	Maldon	1	255	0	0	3	0	0	120	0	3	17	0	240
Great Totham	Maldon	16	3	0	0	0	0	0	3	0	0	0	0	96
Heybridge East	Maldon	15	14	0	0	0	0	0	11	0	0	0	0	330
Heybridge West	Maldon	15	9	0	0	0	0	0	9	0	0	0	0	270
Maldon North	Maldon	12	53	0	0	0	3	0	47	0	0	0	0	1128
Maldon South	Maldon	12	6	0	0	0	0	0	3	0	0	0	0	72
Maldon West	Maldon	12	11	0	0	0	3	0	5	0	0	0	0	120
Mayland	Maldon	5	9	0	0	0	0	3	6	0	0	0	0	60
Purleigh	Maldon	10.5	9	0	0	0	0	0	6	0	0	0	0	126
Southminster	Maldon	2.5	55	0	0	3	6	0	35	0	0	0	0	175
Tillingham	Maldon	11	55	0	0	0	0	0	49	0	0	0	0	1078
Woodham	Maldon	18	4	0	0	0	0	0	4	0	0	0	0	144
Ashingdon and Canewdon	Rochford	22	3	0	0	0	0	0	3	0	0	0	0	132
Foulness and Great Wakering	Rochford	22	3	0	0	0	0	0	3	0	0	0	0	132
Hawkwell South	Rochford	22	3	0	0	0	0	0	3	0	0	0	0	132
Hawkwell West	Rochford	22	3	0	0	0	0	0	3	0	0	0	0	132
Wheatley	Rochford	22	5	0	0	0	0	0	5	0	0	0	0	220
Whitehouse	Rochford	22	3	0	0	0	0	0	3	0	0	0	0	132
Ramsey and Parkeston	Tendring	48	6	0	0	0	0	0	3	0	0	0	0	288
Borehamwood Kenilworth	Hertsmere	65	3	0	0	0	0	0	3	0	0	0	0	390
Little Stour	Canterbury	90	3	0	0	0	0	0	3	0	0	0	0	540
Littlebrook	Dartford	38	3	0	0	0	0	0	3	0	0	0	0	228
Riverside	Gravesham	52	3	0	0	0	0	0	3	0	0	0	0	312
North	Maidstone	63	3	0	0	0	0	0	3	0	0	0	0	378
Seal and Weald	Sevenoaks	55	3	0	0	0	0	0	3	0	0	0	0	330
Sevenoaks Kippington	Sevenoaks	55	3	0	0	0	0	0	3	0	0	0	0	330
Vauxhall	Tonbridge and Malling	57	3	0	0	0	0	0	3	0	0	0	0	342
Ambien	Hinckley and Bosworth	170	3	0	0	0	0	0	3	0	0	0	0	1020
Valley	South Shropshire	220	3	0	0	0	0	0	3	0	0	0	0	1320
Clun	South Shropshire	220	3	0	0	0	0	0	3	0	0	0	0	1320
Burton	East Staffordshire	179	3	0	0	0	0	0	3	0	0	0	0	1074
Long Melford	Babergh	48	3	0	0	0	0	0	3	0	0	0	0	288
Bridge	Ipswich	51	3	0	0	0	0	0	3	0	0	0	0	306
Leiston	Suffolk Coastal	75	3	0	0	0	0	0	3	0	0	0	0	450
Northgate	Crawley	73	3	0	0	0	0	0	3	0	0	0	0	438
Pound Hill South and Worth	Crawley	73	3	0	0	0	0	0	3	0	0	0	0	438
West Grinstead	Horsham	83	3	0	0	0	0	0	3	0	0	0	0	498
#N/A	#N/A		6	0	0	0	0	0	3	0	0	0	0	0
Totals		-	-	-	-	-	-	-	**1050**	-	-	-	-	**42178**
Number of Households (2001 Census)														**1552**
Average Car Trip Length Per Household (miles)														**27.18**

Table 4: Travel to Work Vehicle Miles Calculation for Burnham North Ward -Sensitivity Test

Ward name	Local/Unitary Authority name	Distance to Travel	All	WFH	Underground	Train	Bus	Taxi	Car Driver	Car Driver (Extreme Case)	Car Pass	P2W	Cycle	Ped	Total Distance per Ward
Cripplegate	City of London	40	6	0	0	3	0	0	3	1.68	0	0	0	0	134
Abbey	Barking and Dagenham	39	3	0	0	0	0	0	3	1.68	0	0	0	0	131
Crayford	Bexley	42	3	0	0	0	0	0	3	1.68	0	0	0	0	141
Regent's Park	Camden	54	3	0	0	0	0	0	3	1.68	0	0	0	0	181
Greenwich West	Greenwich	48	3	0	0	0	0	0	3	1.68	0	0	0	0	161
Woolwich Common	Greenwich	48	3	0	0	0	0	0	3	1.68	0	0	0	0	161
Woolwich Riverside	Greenwich	48	3	0	0	0	0	0	3	1.68	0	0	0	0	161
Brooklands	Havering	36	3	0	0	0	0	0	3	1.68	0	0	0	0	121
Hacton	Havering	36	4	0	0	0	0	0	4	2.24	0	0	0	0	161
Heaton	Havering	36	3	0	0	0	0	0	3	1.68	0	0	0	0	121
Mawneys	Havering	36	3	0	0	0	0	0	3	1.68	0	0	0	0	121
Romford Town	Havering	36	6	0	0	3	0	0	3	1.68	0	0	0	0	121
South Hornchurch	Havering	36	5	0	0	0	0	0	5	2.8	0	0	0	0	202
Harefield	Hillingdon	80	3	0	0	0	0	0	3	1.68	0	0	0	0	269
Canonbury	Islington	48	3	0	0	0	0	0	3	1.68	0	0	0	0	161
Rushey Green	Lewisham	50	3	0	0	0	0	0	3	3	0	0	0	0	300
Trinity	Merton	59	3	0	0	0	0	0	3	3	0	0	0	0	354
East Ham Central	Newham	44	3	0	0	0	0	0	3	3	0	0	0	0	264
Clementswood	Redbridge	43	3	0	0	0	0	0	3	3	0	0	0	0	258
Bethnal Green North	Tower Hamlets	46	3	0	0	0	0	0	3	3	0	0	0	0	276
High Street	Waltham Forest	50	3	0	0	0	0	0	3	3	0	0	0	0	300
Higham Hill	Waltham Forest	50	3	0	0	0	0	0	3	3	0	0	0	0	300
Lea Bridge	Waltham Forest	50	3	0	0	0	0	0	3	3	0	0	0	0	300
East Putney	Wandsworth	55	3	0	0	0	0	0	3	3	0	0	0	0	330
New Parks	Leicester	145	3	0	0	0	0	0	3	3	0	0	0	0	870
Eastwood Park	Southend-on-Sea	25	3	0	0	0	0	0	3	1.68	0	0	0	0	84
Leigh	Southend-on-Sea	25	3	0	0	0	0	0	3	1.68	0	0	0	0	84
Milton	Southend-on-Sea	25	7	0	0	3	0	0	4	2.24	0	0	0	0	112
St Laurence	Southend-on-Sea	25	3	0	0	0	0	0	3	1.68	0	0	0	0	84
St. Luke's	Southend-on-Sea	25	7	0	0	3	0	0	4	2.24	0	0	0	0	112
Southchurch	Southend-on-Sea	25	3	0	0	0	0	0	3	1.68	0	0	0	0	84
Victoria	Southend-on-Sea	25	6	0	0	0	0	0	6	3.36	0	0	0	0	168
West Leigh	Southend-on-Sea	25	3	0	0	0	0	0	3	1.68	0	0	0	0	84
Corringham and Fobbing	Thurrock	29	3	0	0	0	0	0	3	1.68	0	0	0	0	97
Park	Thurrock	29	6	0	0	0	0	0	6	3.36	0	0	0	0	195
Stifford	Thurrock	29	5	0	0	0	0	0	5	2.8	0	0	0	0	162
Binfield with Warfield	Bracknell Forest	100	3	0	0	0	0	0	3	3	0	0	0	0	600
Campbell Park	Milton Keynes	98	3	0	0	0	0	0	3	3	0	0	0	0	588
Billericay West	Basildon	20	3	0	0	0	0	0	3	1.68	0	0	0	0	67
Burstead	Basildon	20	3	0	0	0	0	0	3	1.68	0	0	0	0	67
Fryerns	Basildon	20	29	0	0	0	0	0	26	14.56	0	0	0	0	582
Laindon Park	Basildon	20	20	0	0	0	0	0	17	9.52	0	0	0	0	381
Nethermayne	Basildon	20	6	0	0	0	0	0	6	3.36	0	0	0	0	134
Pitsea North West	Basildon	20	13	0	0	0	0	0	13	7.28	0	0	0	0	291
St Martin's	Basildon	20	6	0	0	0	0	0	6	3.36	0	0	0	0	134
Wickford Castledon	Basildon	20	7	0	0	0	0	0	7	3.92	0	0	0	0	157
Wickford North	Basildon	20	20	0	0	0	0	0	17	9.52	0	0	0	0	381
Wickford Park	Basildon	20	3	0	0	0	0	0	3	1.68	0	0	0	0	67
Bocking South	Braintree	27	3	0	0	0	0	0	3	3	0	0	0	0	162
Braintree South	Braintree	27	3	0	0	0	0	0	3	3	0	0	0	0	162
Gosfield and Greenstead Green	Braintree	27	3	0	0	0	0	0	3	3	0	0	0	0	162
Kelvedon	Braintree	27	3	0	0	0	0	0	3	3	0	0	0	0	162
Rayne	Braintree	27	3	0	0	0	0	0	3	3	0	0	0	0	162
Central	Braintree	27	19	0	0	0	3	0	16	16	0	0	0	0	864
Brentwood South	Brentwood	30	3	0	0	0	0	0	3	1.68	0	0	0	0	101
Brentwood West	Brentwood	30	9	0	0	3	0	0	6	3.36	0	0	0	0	202
Mountnessing	Brentwood	30	3	0	0	0	0	0	3	1.68	0	0	0	0	101
Shenfield	Brentwood	30	3	0	0	0	0	0	3	1.68	0	0	0	0	101
Warley	Brentwood	30	8	0	0	0	0	0	8	4.48	0	0	0	0	269
Canvey Island Winter Gardens	Castle Point	20	3	0	0	0	0	0	3	1.68	0	0	0	0	67
Victoria	Castle Point	20	3	0	0	0	0	0	3	1.68	0	0	0	0	67
Hanningfield	Chelmsford	21	7	0	0	0	0	0	7	7	0	0	0	0	294
Broomfield and The Walthams	Chelmsford	21	9	0	0	0	0	0	9	9	0	0	0	0	378
Park	Chelmsford	21	9	0	0	0	3	0	6	6	0	0	0	0	252
Chelmsford Rural West	Chelmsford	21	6	0	0	0	0	0	3	3	0	0	0	0	126
Galleywood	Chelmsford	21	8	0	0	0	3	0	5	5	0	0	0	0	210
Great Baddow East	Chelmsford	21	5	0	0	0	0	0	5	5	0	0	0	0	210
Sandon	Chelmsford	21	10	0	0	0	0	0	10	10	0	0	0	0	420
Marconi	Chelmsford	21	13	0	0	0	0	0	13	13	0	0	0	0	546
Moulsham and Central	Chelmsford	21	48	0	0	0	10	0	35	35	0	0	0	0	1470
Rettendon and Runwell	Chelmsford	21	3	0	0	0	0	0	3	3	0	0	0	0	126
St Andrews	Chelmsford	21	3	0	0	0	0	0	3	3	0	0	0	0	126
Margaretting	Chelmsford	21	3	0	0	0	0	0	3	3	0	0	0	0	126
and Collingwood	Chelmsford	21	3	0	0	0	0	0	3	3	0	0	0	0	126
Woodville	Chelmsford	21	30	0	0	3	0	0	27	27	0	0	0	0	1134
Trinity	Chelmsford	21	6	0	0	0	0	0	6	6	0	0	0	0	252
Waterhouse Farm	Chelmsford	21	13	0	0	0	0	0	13	13	0	0	0	0	546
Highwoods	Colchester	35	3	0	0	0	0	0	3	3	0	0	0	0	210
Lexden	Colchester	35	3	0	0	0	0	0	3	3	0	0	0	0	210
Tiptree	Colchester	35	3	0	0	0	0	0	3	3	0	0	0	0	210
Loughton Broadway	Epping Forest	48	3	0	0	0	0	0	3	3	0	0	0	0	288
Little Parndon and Hare Street	Harlow	45	3	0	0	0	0	0	3	3	0	0	0	0	270
Mark Hall	Harlow	45	6	0	0	0	3	0	3	3	0	0	0	0	270
Toddbrook	Harlow	45	3	0	0	0	0	0	3	3	0	0	0	0	270
Althorne	Maldon	3.5	36	0	0	0	0	0	29	29	0	0	0	0	203
Burnham-on-Crouch North	Maldon	1	471	169	0	9	0	3	183	183	0	0	3	0	366
Burnham-on-Crouch South	Maldon	1	255	0	0	3	0	0	120	120	0	3	17	0	240
Great Totham	Maldon	16	3	0	0	0	0	0	3	3	0	0	0	0	96
Heybridge East	Maldon	15	14	0	0	0	0	0	11	11	0	0	0	0	330
Heybridge West	Maldon	15	9	0	0	0	0	0	9	9	0	0	0	0	270
Maldon North	Maldon	12	53	0	0	0	3	0	47	47	0	0	0	0	1128
Maldon South	Maldon	12	6	0	0	0	0	0	3	3	0	0	0	0	72
Maldon West	Maldon	12	11	0	0	0	3	0	5	5	0	0	0	0	120
Mayland	Maldon	5	9	0	0	0	0	3	6	6	0	0	0	0	60
Purleigh	Maldon	10.5	9	0	0	0	0	0	6	6	0	0	0	0	126
Southminster	Maldon	2.5	55	0	0	3	6	0	35	35	0	0	0	0	175
Tillingham	Maldon	11	55	0	0	0	0	0	49	49	0	0	0	0	1078
Woodham	Maldon	18	4	0	0	0	0	0	4	4	0	0	0	0	144
Ashingdon and Canewdon	Rochford	22	3	0	0	0	0	0	3	1.68	0	0	0	0	74
Foulness and Great Wakering	Rochford	22	3	0	0	0	0	0	3	1.68	0	0	0	0	74
Hawkwell South	Rochford	22	3	0	0	0	0	0	3	1.68	0	0	0	0	74
Hawkwell West	Rochford	22	3	0	0	0	0	0	3	1.68	0	0	0	0	74
Wheatley	Rochford	22	5	0	0	0	0	0	5	2.8	0	0	0	0	123
Whitehouse	Rochford	22	3	0	0	0	0	0	3	1.68	0	0	0	0	74
Ramsey and Parkeston	Tendring	48	6	0	0	0	0	0	3	3	0	0	0	0	288
Borehamwood Kenilworth	Hertsmere	65	3	0	0	0	0	0	3	3	0	0	0	0	390
Little Stour	Canterbury	90	3	0	0	0	0	0	3	3	0	0	0	0	540
Littlebrook	Dartford	38	3	0	0	0	0	0	3	3	0	0	0	0	228
Riverside	Gravesham	52	3	0	0	0	0	0	3	3	0	0	0	0	312
North	Maidstone	63	3	0	0	0	0	0	3	3	0	0	0	0	378
Seal and Weald	Sevenoaks	55	3	0	0	0	0	0	3	3	0	0	0	0	330
Sevenoaks Kippington	Sevenoaks	55	3	0	0	0	0	0	3	3	0	0	0	0	330
Vauxhall	Tonbridge and Malling	57	3	0	0	0	0	0	3	3	0	0	0	0	342
Ambien	Hinckley and Bosworth	170	3	0	0	0	0	0	3	3	0	0	0	0	1020
Valley	South Shropshire	220	3	0	0	0	0	0	3	3	0	0	0	0	1320
Clun	South Shropshire	220	3	0	0	0	0	0	3	3	0	0	0	0	1320
Burton	East Staffordshire	179	3	0	0	0	0	0	3	3	0	0	0	0	1074
Long Melford	Babergh	48	3	0	0	0	0	0	3	3	0	0	0	0	288
Bridge	Ipswich	51	3	0	0	0	0	0	3	3	0	0	0	0	306
Leiston	Suffolk Coastal	75	3	0	0	0	0	0	3	3	0	0	0	0	450
Northgate	Crawley	73	3	0	0	0	0	0	3	3	0	0	0	0	438
Pound Hill South and Worth	Crawley	73	3	0	0	0	0	0	3	3	0	0	0	0	438
West Grinstead	Horsham	83	3	0	0	0	0	0	3	3	0	0	0	0	498
#N/A	#N/A		6	0	0	0	0	0	3	0	0	0	0	0	0
Totals		-							**1050**	**941**					**36460**
Number of Households (2001 Census)															**1552**
Car Adjustment Factor to Achieve Parity with Heybridge Average Distance															**0.56**
Average Car Trip Length Per Household (miles)															**23.49**

Proposed Residential Development Land East of Broad Street Green, Maldon

Technical Highway Note

on behalf of

Messrs Hughes and Sandy

October 2013

INTERMODAL TRANSPORTATION
Hunters Court, Debden Road, Saffron Walden, Essex CB11 4AA Tel: 01799 529529 Fax: 01799 529530 e-mail: enquiries@inter-modal.co.uk

IT1296

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DRAWINGS

APPENDICES

1.0 Introduction

1.1 Intermodal Transportation Limited (ITL) was commissioned by Messrs Hughes and Sandy to consider the traffic and transportation impact of potential strategic housing development situated to the east of the B1022 Broad Street Green on existing agricultural land generally to the north of Heybridge in Maldon, Essex. The site hereon will be referred to as the LEBSG site.

1.2 The reason for preparing this Technical Highway Note (THN) is to consider the performance of the local road network in the central part of Heybridge, based upon a detailed review of the work undertaken for Maldon District Council by Essex Highways (EH) and, to build upon that assessment work to provide supplemental evidence based information as to why more housing development can be facilitated to the north of Heybridge without having any material impact upon the existing junctions that EH has hitherto highlighted as constraints to any development above 1000 dwellings to the north of Maldon.

1.3 In reviewing the case for more than 1000 houses to the north of Heybridge, as part of our Clients representations, it is acknowledged that to facilitate additional housing on the LEBSG site, the Countryside Properties land provisionally allocated between Broad Street Green and Maypole Road (north of Holloway Road) would need to come forward to provide the new link road between Broad Street Green and the B1018 Langford Road.

1.4 In producing this note, staff of ITL visited the site during May 2013 in order to observe prevailing conditions on the local road network, particularly during the peak periods. Moreover, two meetings have been held between representatives of the LEBSG promoters and officers of Essex Highways to discuss the LEBSG option. In addition to the meetings a significant amount of telephone discussion and e-mail dialogue has taken place between ITL and EH officers in relation to EH's study work and remit.

2.0 Characteristics of Local Road Network

2.1 The site is located to the north of the built up area of Heybridge and sits east of the B1022 Broad Street Green (BSG) which is a main Distributor Road by definition. This road is the main link between Colchester, Tiptree and Maldon.

2.2 The two key junctions that EH have expressed concerns about are the roundabout junction of the B1022 Colchester Road with Goldhanger Road (Junction 1) and; The Street roundabout junction with The Causeway (A414) and The Square (Holloway Road) to be referred to as Junction 2. Both junctions are small three arm roundabouts.

2.3 The site in its wider and local context is shown on drawing IT1296/THN/01 appended. For ease of reference the above two mentioned junctions are shown ringed on the location plan.

3.0 Background Information

3.1 This Technical Highway Note builds upon the work undertaken by Essex Highways in their reports 'Maldon LDF Core Strategy – Assessment of Impact of Potential Core Strategy Sites on Existing Junctions' dated December 2010 and 'Maldon LDP - Further Study' report dated June 2013.

3.2 The reports from Essex Highways specifically assessed the potential for 731 residential units to the north of Maldon as part of the Maldon LDF study in the December 2010 report. Further assessment in the June 2013 report investigated the impact of 1,000 residential units assuming that all dwellings would be accessed via a proposed relief road linking Broad Street Green Road with Holloway Road / Langford Road as part of the Countryside development. The 2013 appraisal work by EH used the basic information from the 2010 assessment to enable them to give headline recommendations in relation to the LDF allocation sites being considered at the time of the latter assessment.

3.3 Despite holding several meetings with both officers of MDC and EH during the early part of 2013, the promoters of the LEBSG site were surprised to discover that MDC had not instructed EH to consider this viable and deliverable site, although passing mention of the LEBSG site is made in the 'Maldon LDP - Further Study' report. It is for this reason that the promoters have sought professional advice in relation to the assessment work undertaken to date (and in the public domain) placed before the Council by the Highway Authority.

3.4 ITL have reviewed the EH reports and noted that they concluded that with the inclusion of a new proposed relief road (serving the 731 units north of Holloway Road) the road would provide relief to the aforementioned two junctions to deliver a 'nil detriment' impact. However, it should be noted that the results actually show that ***a substantially better than 'nil detriment'*** impact would arise at the two key roundabout junctions cited as being a restraint to further development. As such, it is considered that the opportunity to provide additional housing would be possible before any traffic impact would reach an actual 'nil detriment' traffic impact compared to the 'do nothing' situation in the test year 2026 assuming no link road or LDF housing development.

3.5 Table 1 below shows the results extracted from the Essex Highways report for the two roundabout junctions for the base line situation and also the scenario of adding 731 units (LDF) with a link road to the network in 2026. Note the base line 2026 assessments take on board committed development and background traffic growth.

Table 1: Results from Essex Highways 2010 Report for 2026 Base and with LDF Traffic

Junction/Approach	***2026 Base (No Link Road)***		***2026 Base + LDF (with Link Road)***	
Junction 1 AM	RFC	Queue	RFC	Queue
Goldhanger Rd	1.117	39	0.998	17
Colchester Rd South	0.466	1	0.413	1
Colchester Rd North	1.018	26	0.895	7

Junction 1 PM	RFC	Queue	RFC	Queue
Goldhanger Rd	0.479	1	0.454	1
Colchester Rd South	1.062	62	1.004	29
Colchester Rd North	0.748	3	0.639	2
Junction 2 AM	RFC	Queue	RFC	Queue
Heybridge St	1.194	137	1.138	97
The Causeway	0.748	3	0.669	2
Holloway Rd	0.330	1	0.335	1
Junction 2 PM	RFC	Queue	RFC	Queue
Heybridge St	0.741	3	0.692	2
The Causeway	1.288	200	1.185	123
Holloway Rd	0.576	1	0.567	1

3.6 On this basis, ITL undertook traffic generation analysis utilising the EH's geometric parameters for the two roundabout junctions; also ITL have adopted EH's 2026 base traffic flows, trip rates, housing tenure proportions and traffic distribution based on zonal areas as scheduled in Appendix D of the 'Maldon LDF Core Strategy – Assessment of Impact of Potential Core Strategy Sites on Existing Junctions' report. ITL has then assigned the new development traffic to and from the LEBSG site via the most logical routes i.e. taking the most direct (shortest) route if no alternative is available or, where there are route choices appropriate percentages have been assigned to accord with the relative flow conditions on the alternative network links during the critical peak commuter periods.

4.0 Traffic Attraction / Generation

4.1 In terms of the estimated traffic generation during the critical peak periods, the relevant data was extracted from the Essex Highways report to provide the base situation from which to run additional residential dwelling assessments by superimposing trips on the Essex Highways report network loadings. Table 2 below, shows the TRICS trip rates and housing density proportions utilised in their reports which Intermodal has used for their review.

Table 2: TRICS Residential Trip Rates and Housing Types from Essex Highways Report

Type of Dwelling	No.	%	AM		PM	
			Arrival	Departure	Arrival	Departure
Flats rented	48	7%	0.063	0.125	0.122	0.091
Flats private	164	22%	0.045	0.179	0.149	0.069
Houses rented	117	16%	0.129	0.235	0.270	0.172
Houses private	402	55%	0.157	0.457	0.401	0.235
Total	***731***	***100%***				

5.0 Distribution of Trips

5.1 Essex Highways in their report utilised a zone to zone distribution based upon census data for the AM peak distribution of traffic for the development to the north of Holloway Road, which is reproduced in Appendix THN/1. ITL, like EH, has assumed that the arrivals and departure patterns for the new traffic during the PM peak would be a transposition of the AM peak model.

5.2 The closest zone to the LEBSG site used in the EH appraisal is zone C. Hence within the arrival and departure tables shown in Appendix THN/1, it is the percentages assigned to and from zone C that have been adopted. Whilst it could be suggested that either zone A or B should have been adopted as a proxy for the LEBSG site, it is the case that zone C assigns more traffic down Colchester Road and through the two critical junctions and therefore represents the worst case loadings on these two junctions.

5.3 As the zone to zone methodology adopted in the EH report did not provide specific details as to where the actual traffic was assigned on the more local road system in Maldon (other than giving the actual turning proportions at the key junctions in north Maldon/Heybridge), ITL had to make some reliable assumptions for the LEBSG site using the origin zone and destination zone information provided (see Appendix THN1) and their knowledge of the local roads, based on a number of observations and timed runs. Table 3 below indicates how ITL have distributed the new traffic to the local Heybridge and North Maldon network using the EH zone to zone assignments. The distributions below are based upon the more detailed analysis undertaken by ITL shown in spreadsheet format within Appendix THN/2

Table 3: Local Traffic Distribution based on Essex Highways Zone Distribution

Road	General Direction (to or from)	Distribution (%) AM		Distribution (%) PM	
		Arrival	Departure	Arrival	Departure
Broad St Green	North	23%	15%	15%	23%
Colchester Road	South	28%	31%	31%	28%
Goldhanger Rd	East	26%	15%	15%	26%
The Causeway	South (central)	2%	16%	16%	2%
The Street	South (central)	2%	16%	16%	2%
Proposed Link Road	West	50%	52%	52%	50%
B1018 Langford Road	West	27%	27%	27%	27%
Maldon Bypass	South	23%	25%	25%	23%
The A414	West	13%	17%	17%	13%

Note: the PM distribution model is a transposition of the AM distribution

6.0 Junction Capacity Assessment

6.1 The software program ARCADY was utilised to run the junction capacity assessment. In order to ascertain the likely level of additional housing that could be accommodated at the two key roundabout junctions, an incremental increase in the number of residential dwellings was assessed until a queuing result similar to the 2026 base situation was reached (the 'nil detriment' position). This iterative exercise revealed that 1000 additional units would give rise to the 'nil detriment' situation and the results of the ARCADY assessment are summarised below.

Table 4: ARCADY Roundabout Capacity Assessment Results

Junction/Approach	***2026 Base (No link)***		***1000 Units (with link)***		***1200 Units (with link)***	
Junction 1 AM	RFC	Queue	RFC	Queue	RFC	Queue
Goldhanger Rd	1.117	39	1.115	41	1.122	43
Colchester Rd South	0.466	1	0.417	1	0.419	1
Colchester Rd North	1.018	26	1.025	28	1.052	36
Junction 1 PM	RFC	Queue	RFC	Queue	RFC	Queue
Goldhanger Rd	0.479	1	0.507	1	0.517	1
Colchester Rd South	1.062	62	1.057	58	1.069	65
Colchester Rd North	0.748	3	0.718	3	0.734	3
Junction 2 AM	RFC	Queue	RFC	Queue	RFC	Queue
Heybridge St	1.194	137	1.160	114	1.170	120
The Causeway	0.748	3	0.684	2	0.684	2
Holloway Rd	0.330	1	0.332	1	0.332	1
Junction 2 PM	RFC	Queue	RFC	Queue	RFC	Queue
Heybridge St	0.741	3	0.694	2	0.694	2
The Causeway	1.288	200	1.253	170	1.263	178
Holloway Rd	0.576	1	0.588	1	0.588	1

6.2 The results above, indicate that the roundabout junction of Goldhanger Road with Colchester Road would be the first junction to attain 'nil detriment' during the morning peak hour if an additional 1000 units were to be provided on top of the 731 assumed as part of EH's 2010 work; this would make a total of 1731 units which could be constructed in this geographical area to help meet the LDF's target allocation. Note, that during the evening peak periods both junctions would still be operating better than 'nil detriment'.

6.3 The National Planning Policy Framework (NPPF) states that: -

"…*Development should only be prevented or refused on transport grounds where the residual cumulative impacts of development are severe*."

6.4 Given the status of Maldon District Council's Local Development Plan, weight has to be given to the NPPF in terms of developing and implementing the plan and clearly central government considers that traffic impact is an inevitability of housing growth which, if constrained by an overtly cautious approach to road capacity, would severely frustrate meeting the latent demand for growth in the housing stock. Hence, ITL are of the firm opinion that until the impact of the traffic generated by a development (in capacity and congestion terms) is considered to be ***severe***, then traffic should not be cited as a reason to prevent development as part of the LDF assessment process.

6.5 Central Government appears to be sending a clear message to Local Planning Authorities that some transport impact which is above 'nil detriment' would be acceptable. For this reason, ITL has also run a sensitivity test to consider 1200 additional units added to the 731 dwelling scenario tested by EH in the 2026 test year, making a total provision of 1931 dwellings to the north of Heybridge. The results for this assessment are also shown in Table 4 above and whilst the morning peak performance of the Colchester Road/Goldhanger Road/Heybridge Road roundabout junction would suffer some modest additional queuing on the Colchester Road north arm (modest in the context of the NPPF test), the evening peak hour at this junction still returns a better than 'nil detriment' situation compared to the 2026 base line assessment. Moreover, The Street/The Causeway/Holloway Road roundabout junction still returns a better than 'nil detriment' result in both the morning and evening peak hours.

6.6 The full ARCADY results for the junction capacity appraisals are contained in Appendix THN/3

6.7 The link diagrams and turning movements at the two key junctions for the 2026 base situation (assuming no LDF development or link road) have been taken directly from EH's evidence based 2010 report. In accordance with the percentage distribution of trips to the network shown in Table 3 of this report, for both the morning and evening peak periods, ITL have added the new development traffic to the network to derive the turning proportions at the junctions for the projected number of dwellings tested. Hence, the tuning diagrams for the two cases of 1000 extra dwellings and 1200 extra dwellings have been produced and are contained in Appendix THN/4 for reference purposes.

7.0 Conclusions

7.1 Within ITL's study work it is important to appreciate that our conclusions do not fundamentally contest the extensive appraisal work undertaken by Essex Highways in providing their strategic transportation advice to Maldon District Council. In this regard, ITL has utilised all the basic assumptions adopted in the two EH reports and simply added additional traffic generated by the LEBGS 'contender site' to the network for capacity testing.

7.2 The only contention in relation to the findings of the EH reports is that EH indicate that 'nil detriment' at the two Heybridge junctions would be reached at the 1000 dwelling intervention point for new housing located to the north of Maldon and Heybridge. This is incorrect and by reference to the EH reports there clearly is a much better than 'nil detriment' impact on the two key roundabout junctions (identified by EH as a constraint), assuming the Countryside Properties link road is constructed.

7.3 Hence, the results from ITL's ARCADY assessments has identified the likely level of additional traffic that would produce an ***actual*** 'nil detriment' impact on the two key roundabout junctions, compared to the 2026 base situation (with no link road) as calculated by Essex Highways. ITL's work has shown that a total of between 1730 and 1930 dwellings spread between the LEBSG, Countryside Properties sites, and possibly the Persimmon site (north of Scraley Road), could be facilitated subject to other planning, drainage and environmental considerations.

7.4 Moreover, the Council cannot ignore the significant change in government policy within the NPPF framework regarding highway impact where much less emphasis is placed upon the traffic consequences of development and where it is stated in paragraph 32 of the National Planning Policy Framework (NPPF) (page 10) that:-

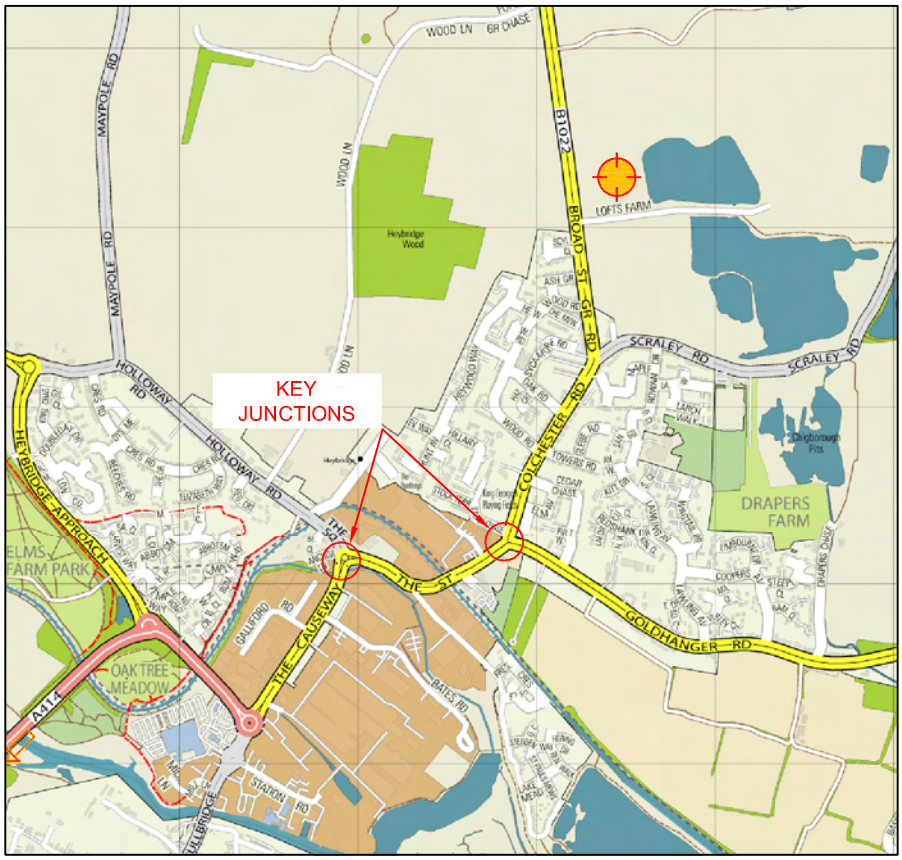
"…*Development should only be prevented or refused on transport grounds where the residual cumulative impacts of development are severe.*"

7.5 It is recognised that any development to the north of Maldon/Heybridge would have impacts on other junctions, but to a lesser degree as demonstrated by EH's work. These more modest impacts can be ameliorated by undertaking some highway capacity improvement works to those junctions. Hence, impacts on the wider network (where the traffic influence progressively dilutes) are not seen as an impediment to major housing development. It is also true to say that irrespective of where development is located in Maldon (fundamentally polarised to the north and/or the south of Maldon Town) these impacts on junctions more remote from the respective sites would be similar so that overall some improvements to some junctions would be an inevitability of developing anywhere around Maldon Town.

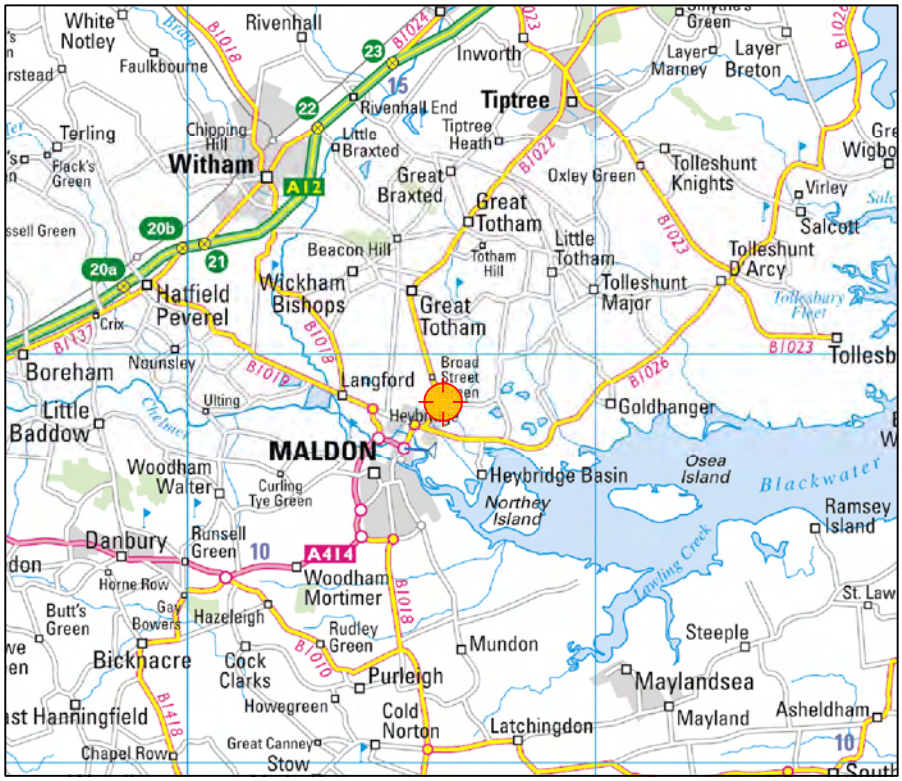
7.6 It is therefore concluded that further development to the north of Heybridge (up to 1930 residential units) can be facilitated to meet both National and emerging LDF framework policies which, based upon the EH's assessment work to date, would stand the test of rigorous scrutiny.

DRAWINGS

LOCAL CONTEXT



WIDER CONTEXT



SITE LOCATION

Rev	Description	Date

IT Project:
LAND EAST OF BROAD STREET
GREEN ROAD, HEYBRIDGE

Rev:
-

Drawing Title:
SITE LOCATION
IN THE LOCAL AND
WIDER CONTEXT

Sheet 1 of 1

Client:
MESSRS HUGHES AND SANDY

Drawn By:
AM

Approved By:
CG

Drawing No:
IT1296/THN/01

CAD File:
IT1296_01.dwg

A4

Notes:
Dimensions should not be scaled from this drawing. The contents of this drawing are confidential, should you receive this drawing in error please return it to Intermodal Transportation at the address printed.

Date:
OCTOBER 2013

Scale:
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e: enquiries@inter-modal.co.uk

APPENDIX THN/1

ESSEX HIGHWAYS APPENDIX 'D' CENSUS DISTRIBUTION

Appendix D – Traffic Distribution

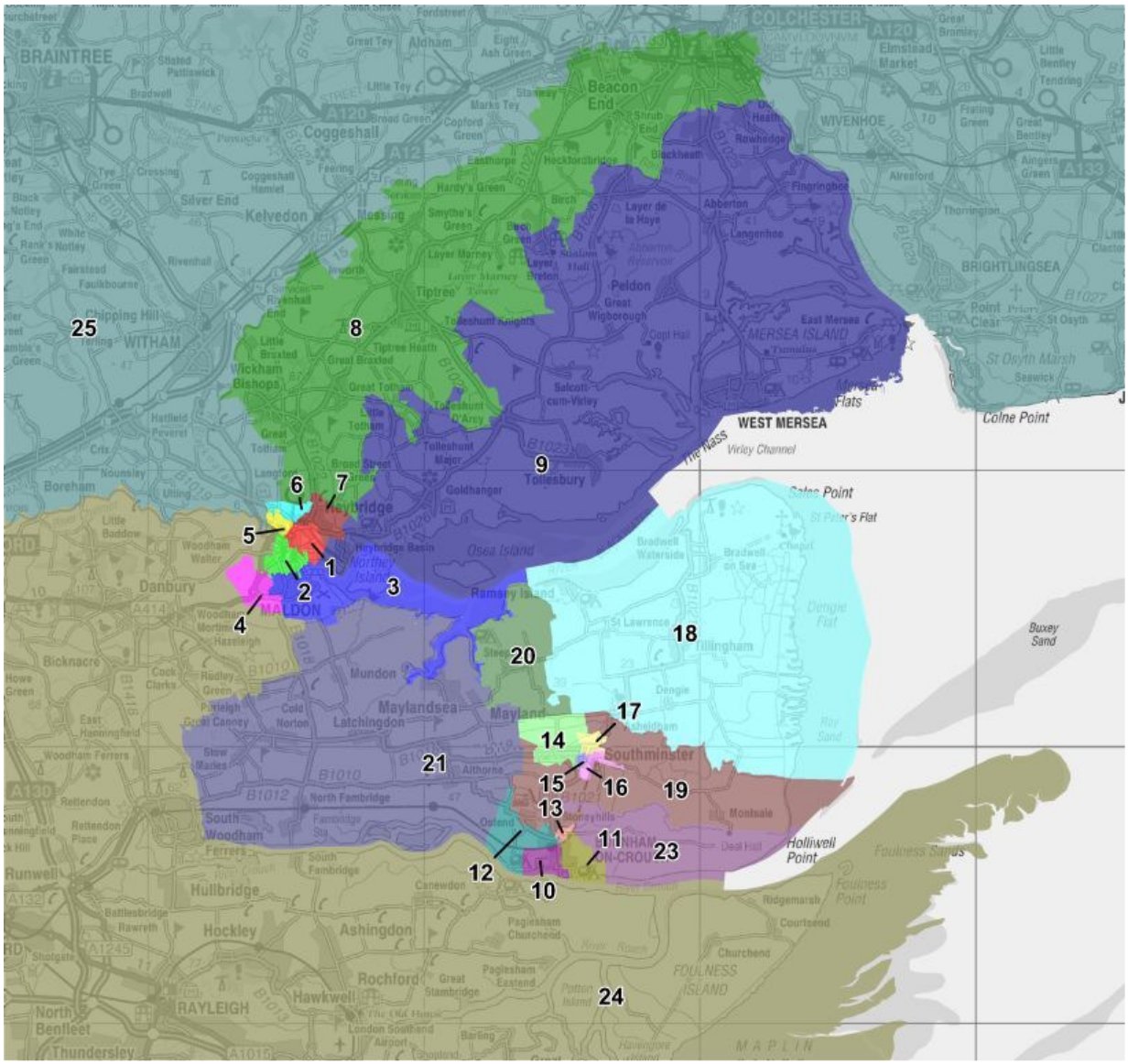

Figure D1: Maldon LDF Study 2001 Census JTW Zoning System

Maldon / Heybridge

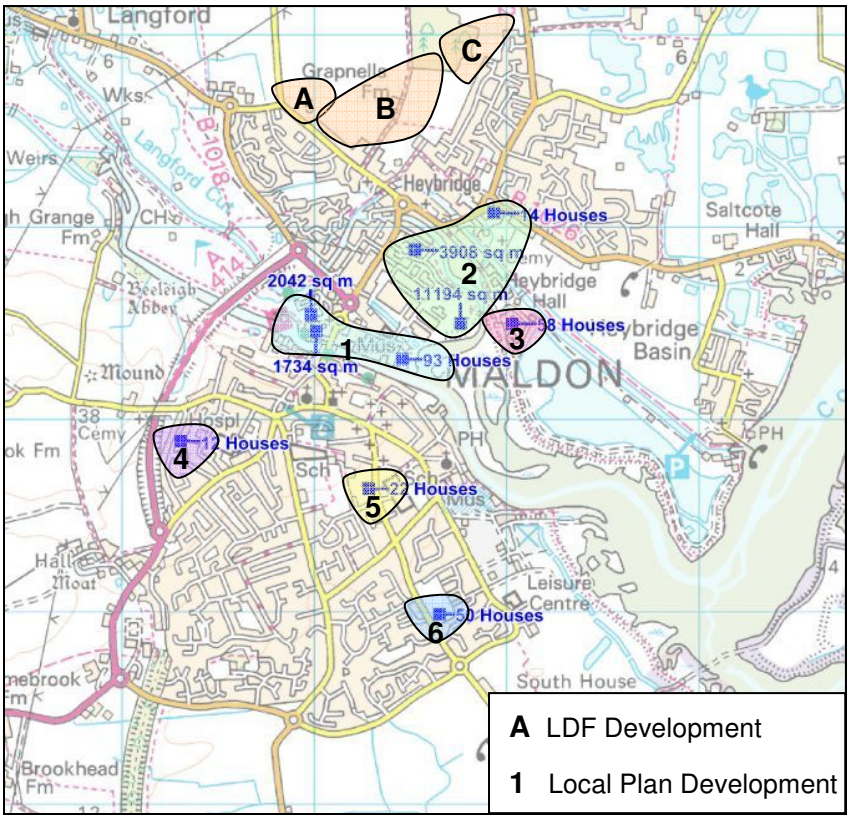

Figure D2: Development Groups in Maldon / Heybridge

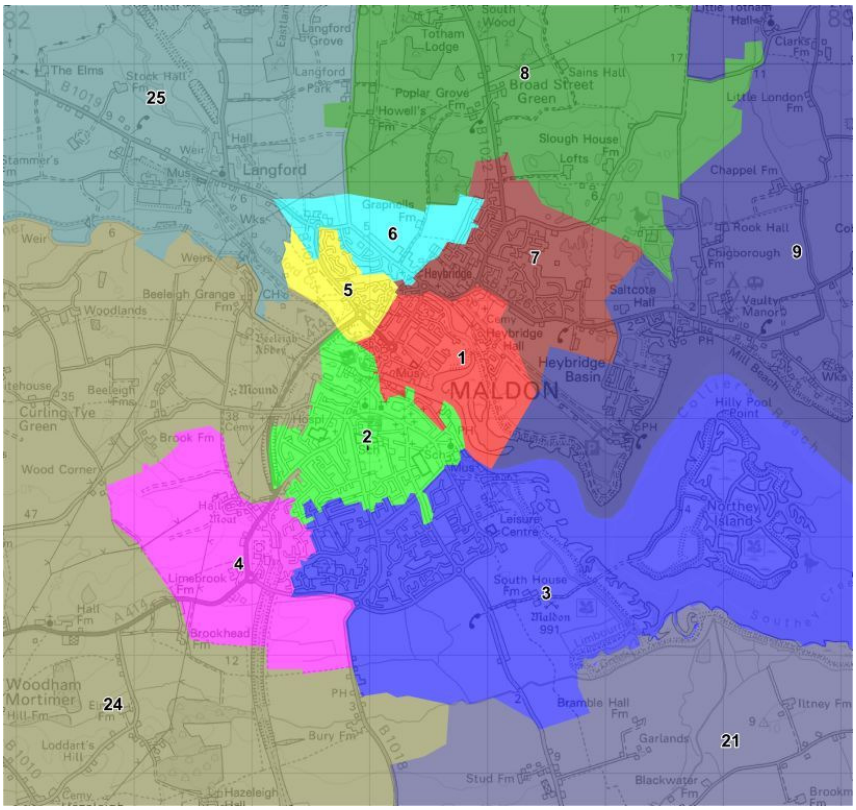

Figure D3: Maldon / Heybridge 2001 Census JTW Zones

Table D1 – Maldon / Heybridge Development AM Arrival Distribution

Zone		Group								
		A	B	C	1	2	3	4	5	6
Within Maldon / Heybridge	1	2%*	2%*	0%	2%*	2%*	2%*	1%	1%	0%
	2	5%	5%	3%	5%	5%	5%	11%*	11%*	4%
	3	10%	10%	5%	10%	10%	10%	9%	9%	58%*
	4	2%	2%	0%	2%	2%	2%	2%	2%	1%
	5	1%	1%	1%	1%	1%	1%	2%	2%	1%
	6	2%	2%	1%	2%	2%	2%	2%	2%	1%
	7	9%	9%	18%*	9%	9%	9%	6%	6%	2%
Total		**31%**	**31%**	**27%**	**31%**	**31%**	**31%**	**31%**	**31%**	**67%**
External to Maldon / Heybridge	8	13%	13%	10%	13%	13%	13%	9%	9%	1%
	9	6%	6%	8%	6%	6%	6%	6%	6%	5%
	10	0%	0%	0%	0%	0%	0%	1%	1%	0%
	11	0%	0%	0%	0%	0%	0%	1%	1%	1%
	12	0%	0%	1%	0%	0%	0%	0%	0%	1%
	13	0%	0%	0%	0%	0%	0%	0%	0%	0%
	14	1%	1%	0%	1%	1%	1%	1%	1%	1%
	15	0%	0%	0%	0%	0%	0%	0%	0%	1%
	16	0%	0%	0%	0%	0%	0%	0%	0%	0%
	17	0%	0%	0%	0%	0%	0%	0%	0%	0%
	18	1%	1%	0%	1%	1%	1%	3%	3%	1%
	19	0%	0%	0%	0%	0%	0%	1%	1%	0%
	20	0%	0%	0%	0%	0%	0%	0%	0%	0%
	21	6%	6%	2%	6%	6%	6%	6%	6%	5%
	23	0%	0%	0%	0%	0%	0%	0%	0%	0%
	24	22%	22%	26%	22%	22%	22%	22%	22%	8%
	25	20%	20%	25%	20%	20%	20%	17%	17%	7%
Total		**69%**	**69%**	**73%**	**69%**	**69%**	**69%**	**69%**	**69%**	**33%**

* internal trips which are not distributed on the strategic road network

Based on Zone 1 Distribution
Based on Zone 2 Distribution
Based on Zone 3 Distribution
Based on Zone 7 Distribution

Table D2 – Maldon / Heybridge Development AM Departure Distribution

Group	Zone																									
	Within Maldon / Heybridge							Total	External to Maldon / Heybridge																	Total
	1	2	3	4	5	6	7		8	9	10	11	12	13	14	15	16	17	18	19	20	21	23	24	25	
A	18 %*	13 %	0%	0%	0%	0%	2%	**33 %**	3%	0%	0%	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	40 %	22 %	**67 %**
B	18 %*	13 %	0%	0%	0%	0%	2%	**33 %**	3%	0%	0%	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	40 %	22 %	**67 %**
C	11 %	9%	1%	1%	0%	0%	14 %*	**36 %**	5%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	34 %	20 %	**64 %**
1	18 %*	13 %	0%	0%	0%	0%	2%	**33 %**	3%	0%	0%	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	40 %	22 %	**67 %**
2	18 %*	13 %	0%	0%	0%	0%	2%	**33 %**	3%	0%	0%	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	40 %	22 %	**67 %**
3	18 %*	13 %	0%	0%	0%	0%	2%	**33 %**	3%	0%	0%	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	40 %	22 %	**67 %**
4	7%	20 %*	1%	1%	0%	0%	2%	**32 %**	3%	2%	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	0%	1%	0%	45 %	16 %	**68 %**
5	7%	20 %*	1%	1%	0%	0%	2%	**32 %**	3%	2%	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	0%	1%	0%	45 %	16 %	**68 %**
6	8%	9%	10 %*	2%	0%	0%	2%	**31 %**	4%	1%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	2%	0%	48 %	12 %	**69 %**

* internal trips which are not distributed on the strategic road network

Based on Zone 1 Distribution
Based on Zone 2 Distribution
Based on Zone 3 Distribution
Based on Zone 7 Distribution

APPENDIX THN/2

LEBSG TRIP DISTRIBUTION TABLE

Distribution of Arrivals to Zone C (Table contents abstracted from EH 2010 Appendix D tables)

From Zone	Via The Street	Via Causeway	Via Colchester Rd	Via Goldhanger	Via A414	Via Bypass	Via B1019	Via New Link	North
1									
2						3		3	
3	2	2	2			3		3	
4									
5						1		1	
6							1	1	
7			18	18					
8									10
9			8	8					
10									
11									
12						1		1	
13									
14									
15									
16									
17									
18									
19									
20									
21						2		2	
22									
23									
24					13	13	13	26	
25							13	13	13
Total %	**2**	**2**	**28**	**26**	**13**	**23**	**27**	**50**	**23**

Distribution of Departures from Zone C (Table contents abstracted from EH 2010 Appendix D tables)

To Zone	Via The Street	Via Causeway	Via Colchester Rd	Via Goldhanger	Via A414	Via Bypass	Via B1018	Via New Link	North
1	11	11	11						
2	5	5	5			4		4	
3						1		1	
4						1		1	
5									
6									
7			14	14					
8									5
9			1	1					
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21						2		2	
22									
23									
24					17	17	17	34	
25							10	10	10
Total %	**16**	**16**	**31**	**15**	**17**	**25**	**27**	**52**	**15**

APPENDIX THN/3

ARCADY PRINTOUTS

TRL LIMITED

CAPACITIES, QUEUES AND DELAYS AT ROUNDABOUTS

ARCADY 5.0 ANALYSIS PROGRAM
RELEASE 1.1 (MAY 2001)

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TRL SOFTWARE BUREAU
TEL: CROWTHORNE (01344) 770758, FAX: 770864
EMAIL: SoftwareBureau@trl.co.uk

Run with file:-
"p:\IT 1290-1299\IT 1296 Land East of Broad Street Green, Maldon\Calcs & Drawings\03.09.13 revised ARCADY\
IT1296 Causeway RB 2026 LDF + 1000 Dev LINK AM - Mouchel.vai"
(drive-on-the-left) at 14:55:29 on Tuesday, 3 September 2013

.ROUNDABOUT CAPACITY AND DELAY
****

.RUN TITLE
****
IT1296 Causeway RB 2026 LDF + 1000 Dev LINK AM - Mouchel

.INPUT DATA
****
ARM A - Heybridge Street
ARM B - The Causeway
ARM C - Holloway Rd

.GEOMETRIC DATA

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	3.50	8.00	9.50	150.00	28.00	45.0	0.634	24.050 *
ARM B	4.75	7.00	20.00	200.00	27.00	22.0	0.761	22.263 *
ARM C	3.50	7.00	12.00	150.00	25.00	33.0	0.664	27.675

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

WARNING One or more intercept values (flagged * in the table)
have been adjusted
according to local values input from a previous run and listed below -

	ADJUSTMENT TO INTERCEPT (PCU/MIN)
ARM A	-2.400
ARM B	-12.400

.TRAFFIC DEMAND DATA

.TIME PERIOD BEGINS 07.45 AND ENDS 09.15
.LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS	NUMBER OF MINUTES FROM START WHEN TOP OF PEAK IS REACHED	NUMBER OF MINUTES FROM START WHEN FLOW STOPS IFALLING TO RISE	RATE OF FLOW (VEH/MIN) BEFORE PEAK	RATE OF FLOW (VEH/MIN) AT TOP OF PEAK	RATE OF FLOW (VEH/MIN) AFTER PEAK
ARM A	15.00	45.00	75.00	16.85	25.28	16.85
ARM B	15.00	45.00	75.00	9.18	13.76	9.18
ARM C	15.00	45.00	75.00	4.57	6.86	4.57

TIME	FROM/TO	ARM A	ARM B	ARM C
07.45 - 09.15				
	ARM A	0.000	0.835	0.165
		0.0	1126.0	222.0
		(0.1)	(0.0)	(0.0)
	ARM B	0.828	0.018	0.154
		608.0	13.0	113.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.372	0.628	0.000
		136.0	230.0	0.0
		(0.0)	(0.0)	(0.0)

TURNING PROPORTIONS
TURNING COUNTS (VEH/HR)
(PERCENTAGE OF H.V.S)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

. QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

TIME	ARM	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.45-08.00									
	ARM A	16.85	22.13	0.761		0.0	3.0	41.1	
	ARM B	9.18	20.18	0.455		0.0	0.8	11.9	
	ARM C	4.57	22.55	0.203		0.0	0.3	3.7	
08.00-08.15									
	ARM A	20.12	21.75	0.925		3.0	8.9	107.1	
	ARM B	10.96	19.79	0.554		0.8	1.2	17.7	
	ARM C	5.46	21.54	0.254		0.3	0.3	5.0	
08.15-08.30									
	ARM A	24.64	21.24	1.160		8.9	62.1	540.0	
	ARM B	13.42	19.62	0.684		1.2	2.1	29.6	
	ARM C	6.69	20.17	0.332		0.3	0.5	7.2	
08.30-08.45									
	ARM A	24.64	21.24	1.160		62.1	113.5	1317.0	
	ARM B	13.42	19.60	0.684		2.1	2.1	31.8	
	ARM C	6.69	20.14	0.332		0.5	0.5	7.4	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.45-09.00								
ARM A	20.12	21.75	0.925		113.5	91.9	1540.4	
ARM B	10.96	19.56	0.560		2.1	1.3	20.3	
ARM C	5.46	21.49	0.254		0.5	0.3	5.2	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
09.00-09.15								
ARM A	16.85	22.12	0.762		91.9	16.4	812.4	
ARM B	9.18	19.52	0.470		1.3	0.9	13.9	
ARM C	4.57	22.51	0.203		0.3	0.3	3.9	

.QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	3.0	***
08.15	8.9	*********
08.30	62.1	**********
08.45	113.5	**********
09.00	91.9	**********
09.15	16.4	**********

.QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.8	*
08.15	1.2	*
08.30	2.1	**
08.45	2.1	**
09.00	1.3	*
09.15	0.9	*

.QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.3
08.15	0.3
08.30	0.5
08.45	0.5
09.00	0.3
09.15	0.3

. QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

ARM	TOTAL DEMAND	* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	1848.4	1232.3	4358.1	2.36	4364.2	2.36
B	1006.5	671.0	125.1	0.12	125.2	0.12
C	501.9	334.6	32.5	0.06	32.5	0.06
ALL	3356.7	2237.8	4515.8	1.35	4521.9	1.35

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.

* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

****** ARCADY 5 run completed.

TRL LIMITED

CAPACITIES, QUEUES AND DELAYS AT ROUNDABOUTS

ARCADY 5.0 ANALYSIS PROGRAM
RELEASE 1.1 (MAY 2001)

FOR SALES AND DISTRIBUTION INFORMATION,
PROGRAM ADVICE AND MAINTENANCE CONTACT:
TRL SOFTWARE BUREAU
TEL: CROWTHORNE (01344) 770758, FAX: 770864
EMAIL: SoftwareBureau@trl.co.uk

Run with file:-
"p:\IT 1290-1299\IT 1296 Land East of Broad Street Green, Maldon\Calcs & Drawings\03.09.13 revised ARCADY\
IT1296 Causeway RB 2026 LDF + 1000 Dev LINK PM - Mouchel.vai"
(drive-on-the-left) at 09:16:03 on Thursday, 5 September 2013

.ROUNDABOUT CAPACITY AND DELAY

.RUN TITLE

IT1296 Causeway RB 2026 LDF + 1200 Dev LINK PM - Mouchel

.INPUT DATA

ARM A - Heybridge Street
ARM B - The Causeway
ARM C - Holloway Rd

.GEOMETRIC DATA

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	3.50	8.00	9.50	150.00	28.00	45.0	0.634	23.650 *
ARM B	4.75	7.00	20.00	200.00	27.00	22.0	0.761	21.563 *
ARM C	3.50	7.00	12.00	150.00	25.00	33.0	0.664	24.375 *

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

WARNING One or more intercept values (flagged * in the table)
have been adjusted
according to local values input from a previous run and listed below -

ARM	ADJUSTMENT TO INTERCEPT (PCU/MIN)
ARM A	-2.800
ARM B	-13.100
ARM C	-3.300

.TRAFFIC DEMAND DATA

.TIME PERIOD BEGINS 16.45 AND ENDS 18.15
.LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	NUMBER OF MINUTES FROM START WHEN TOP OF PEAK IS REACHED	NUMBER OF MINUTES FROM START WHEN FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	RATE OF FLOW (VEH/MIN) AT TOP OF PEAK	RATE OF FLOW (VEH/MIN) AFTER PEAK
ARM A	15.00	45.00	75.00	10.54	15.81	10.54
ARM B	15.00	45.00	75.00	16.89	25.33	16.89
ARM C	15.00	45.00	75.00	5.24	7.86	5.24

TURNING PROPORTIONS
TURNING COUNTS (VEH/HR)
(PERCENTAGE OF H.V.S)

TIME	FROM/TO	ARM A	ARM B	ARM C
16.45 - 18.15	ARM A	0.000	0.829	0.171
		0.0	699.0	144.0
		(0.1)	(0.0)	(0.0)
	ARM B	0.867	0.008	0.125
		1171.0	11.0	169.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.726	0.274	0.000
		304.0	115.0	0.0
		(0.0)	(0.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

. QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

TIME	ARM	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
16.45-17.00									
	ARM A	10.54	22.66	0.465		0.0	0.9	12.5	
	ARM B	16.89	20.20	0.836		0.0	4.6	58.8	
	ARM C	5.24	14.75	0.355		0.0	0.5	7.9	
17.00-17.15									
	ARM A	12.58	22.47	0.560		0.9	1.3	18.2	
	ARM B	20.17	19.93	1.012		4.6	19.5	199.3	
	ARM C	6.25	13.24	0.472		0.5	0.9	12.7	
17.15-17.30									
	ARM A	15.41	22.22	0.693		1.3	2.2	31.1	
	ARM B	24.70	19.57	1.262		19.5	97.0	876.1	
	ARM C	7.66	13.03	0.588		0.9	1.4	19.7	
17.30-17.45									
	ARM A	15.41	22.22	0.694		2.2	2.2	33.2	
	ARM B	24.70	19.56	1.263		97.0	174.2	2034.0	
	ARM C	7.66	13.02	0.588		1.4	1.4	21.0	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
17.45-18.00								
ARM A	12.58	22.45	0.560		2.2	1.3	20.2	
ARM B	20.17	19.92	1.012		174.2	178.2	2643.1	
ARM C	6.25	12.82	0.488		1.4	1.0	15.2	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
18.00-18.15								
ARM A	10.54	22.63	0.466		1.3	0.9	13.6	
ARM B	16.89	20.19	0.836		178.2	130.4	2314.8	
ARM C	5.24	12.71	0.412		1.0	0.7	11.0	

.QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.9	*
17.15	1.3	*
17.30	2.2	**
17.45	2.2	**
18.00	1.3	*
18.15	0.9	*

.QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	4.6	*****
17.15	19.5	********************
17.30	97.0	

****

17.45	174.2	

****

18.00	178.2	

****

18.15	130.4	

****

.QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.5	*
17.15	0.9	*
17.30	1.4	*
17.45	1.4	*
18.00	1.0	*
18.15	0.7	*

. QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	1155.9	770.6	128.8	0.11	128.8	0.11
B	1852.5	1235.0	8126.2	4.39	8547.3	4.61
C	574.5	383.0	87.5	0.15	87.5	0.15
ALL	3583.0	2388.7	8342.4	2.33	8763.5	2.45

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

****** ARCADY 5 run completed.

TRL LIMITED

CAPACITIES, QUEUES AND DELAYS AT ROUNDABOUTS

ARCADY 5.0 ANALYSIS PROGRAM
RELEASE 1.1 (MAY 2001)

FOR SALES AND DISTRIBUTION INFORMATION,
PROGRAM ADVICE AND MAINTENANCE CONTACT:
TRL SOFTWARE BUREAU
TEL: CROWTHORNE (01344) 770758, FAX: 770864
EMAIL: SoftwareBureau@trl.co.uk

Run with file:-
"p:\IT 1290-1299\IT 1296 Land East of Broad Street Green, Maldon\Calcs & Drawings\03.09.13 revised ARCADY\
IT1296 Causeway RB 2026 LDF + 1200 Dev LINK AM - Mouchel.vai"
(drive-on-the-left) at 09:15:01 on Thursday, 5 September 2013

.ROUNDABOUT CAPACITY AND DELAY
****

.RUN TITLE
****
IT1296 Causeway RB 2026 LDF + 1200 Dev LINK AM - Mouchel

.INPUT DATA
****
ARM A - Heybridge Street
ARM B - The Causeway
ARM C - Holloway Rd

.GEOMETRIC DATA

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	3.50	8.00	9.50	150.00	28.00	45.0	0.634	24.050 *
ARM B	4.75	7.00	20.00	200.00	27.00	22.0	0.761	22.263 *
ARM C	3.50	7.00	12.00	150.00	25.00	33.0	0.664	27.675

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

WARNING One or more intercept values (flagged * in the table)
have been adjusted
according to local values input from a previous run and listed below -

ARM	ADJUSTMENT TO INTERCEPT (PCU/MIN)
ARM A	-2.400
ARM B	-12.400

.TRAFFIC DEMAND DATA

.TIME PERIOD BEGINS 07.45 AND ENDS 09.15
.LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	NUMBER OF MINUTES FROM START WHEN TOP OF PEAK IS REACHED	NUMBER OF MINUTES FROM START WHEN FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	RATE OF FLOW (VEH/MIN) AT TOP OF PEAK	RATE OF FLOW (VEH/MIN) AFTER PEAK
ARM A	15.00	45.00	75.00	16.99	25.48	16.99
ARM B	15.00	45.00	75.00	9.19	13.78	9.19
ARM C	15.00	45.00	75.00	4.57	6.86	4.57

TIME	FROM/TO	ARM A	ARM B	ARM C
07.45 - 09.15		TURNING PROPORTIONS (TURNING COUNTS (VEH/HR) (PERCENTAGE OF H.V.S))		
	ARM A	0.000	0.837	0.163
		0.0	1137.0	222.0
		(0.1)	(0.0)	(0.0)
	ARM B	0.829	0.018	0.154
		609.0	13.0	113.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.372	0.628	0.000
		136.0	230.0	0.0
		(0.0)	(0.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

. QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

TIME	ARM	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.45-08.00									
	ARM A	16.99	22.13	0.768		0.0	3.1	42.4	
	ARM B	9.19	20.18	0.455		0.0	0.8	11.9	
	ARM C	4.57	22.54	0.203		0.0	0.3	3.7	
08.00-08.15									
	ARM A	20.28	21.75	0.932		3.1	9.5	113.0	
	ARM B	10.97	19.80	0.554		0.8	1.2	17.7	
	ARM C	5.46	21.53	0.254		0.3	0.3	5.0	
08.15-08.30									
	ARM A	24.84	21.24	1.170		9.5	65.5	569.2	
	ARM B	13.44	19.64	0.684		1.2	2.1	29.7	
	ARM C	6.69	20.16	0.332		0.3	0.5	7.2	
08.30-08.45									
	ARM A	24.84	21.24	1.170		65.5	119.8	1390.2	
	ARM B	13.44	19.63	0.685		2.1	2.1	31.8	
	ARM C	6.69	20.13	0.332		0.5	0.5	7.4	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.45-09.00								
ARM A	20.28	21.75	0.933		119.8	100.6	1653.3	
ARM B	10.97	19.58	0.560		2.1	1.3	20.3	
ARM C	5.46	21.48	0.254		0.5	0.3	5.2	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
09.00-09.15								
ARM A	16.99	22.12	0.768		100.6	26.8	955.8	
ARM B	9.19	19.54	0.470		1.3	0.9	13.9	
ARM C	4.57	22.50	0.203		0.3	0.3	3.9	

.QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	3.1	***
08.15	9.5	**********
08.30	65.5	**********
08.45	119.8	**********
09.00	100.6	**********
09.15	26.8	**********

.QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.8	*
08.15	1.2	*
08.30	2.1	**
08.45	2.1	**
09.00	1.3	*
09.15	0.9	*

.QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.3
08.15	0.3
08.30	0.5
08.45	0.5
09.00	0.3
09.15	0.3

. QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

ARM	TOTAL DEMAND	* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH) (VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	1863.5 1242.3	4723.8	2.53	4740.1	2.54
B	1007.8 671.9	125.3	0.12	125.3	0.12
C	501.9 334.6	32.5	0.06	32.5	0.06
ALL	3373.2 2248.8	4881.7	1.45	4898.0	1.45

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.

* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

****** ARCADY 5 run completed.

TRL LIMITED

CAPACITIES, QUEUES AND DELAYS AT ROUNDABOUTS

ARCADY 5.0 ANALYSIS PROGRAM
RELEASE 1.1 (MAY 2001)

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TEL: CROWTHORNE (01344) 770758, FAX: 770864
EMAIL: SoftwareBureau@trl.co.uk

Run with file:-
"p:\IT 1290-1299\IT 1296 Land East of Broad Street Green, Maldon\Calcs & Drawings\03.09.13 revised ARCADY\
IT1296 Causeway RB 2026 LDF + 1200 Dev LINK PM - Mouchel.vai"
(drive-on-the-left) at 09:16:14 on Thursday, 5 September 2013

.ROUNDABOUT CAPACITY AND DELAY

.RUN TITLE

IT1296 Causeway RB 2026 LDF + 1200 Dev LINK PM - Mouchel

.INPUT DATA

ARM A - Heybridge Street
ARM B - The Causeway
ARM C - Holloway Rd

.GEOMETRIC DATA

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	3.50	8.00	9.50	150.00	28.00	45.0	0.634	23.650 *
ARM B	4.75	7.00	20.00	200.00	27.00	22.0	0.761	21.563 *
ARM C	3.50	7.00	12.00	150.00	25.00	33.0	0.664	24.375 *

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

WARNING One or more intercept values (flagged * in the table)
have been adjusted
according to local values input from a previous run and listed below -

ARM	ADJUSTMENT TO INTERCEPT (PCU/MIN)
ARM A	-2.800
ARM B	-13.100
ARM C	-3.300

.TRAFFIC DEMAND DATA

.TIME PERIOD BEGINS 16.45 AND ENDS 18.15
.LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK
ARM A	15.00	45.00	75.00	10.54	15.81	10.54
ARM B	15.00	45.00	75.00	16.89	25.33	16.89
ARM C	15.00	45.00	75.00	5.24	7.86	5.24

TURNING PROPORTIONS
TURNING COUNTS (VEH/HR)
(PERCENTAGE OF H.V.S)

TIME	FROM/TO	ARM A	ARM B	ARM C
16.45 - 18.15	ARM A	0.000	0.829	0.171
		0.0	699.0	144.0
		(0.1)I	(0.0)I	(0.0)I
	ARM B	0.867	0.008	0.125
		1171.0	11.0	169.0
		(0.0)I	(0.0)I	(0.0)I
	ARM C	0.726	0.274	0.000
		304.0	115.0	0.0
		(0.0)I	(0.0)I	(0.0)I

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

. QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
16.45-17.00								
ARM A	10.54	22.66	0.465		0.0	0.9	12.5	
ARM B	16.89	20.20	0.836		0.0	4.6	58.8	
ARM C	5.24	14.75	0.355		0.0	0.5	7.9	
17.00-17.15								
ARM A	12.58	22.47	0.560		0.9	1.3	18.2	
ARM B	20.17	19.93	1.012		4.6	19.5	199.3	
ARM C	6.25	13.24	0.472		0.5	0.9	12.7	
17.15-17.30								
ARM A	15.41	22.22	0.693		1.3	2.2	31.1	
ARM B	24.70	19.57	1.262		19.5	97.0	876.1	
ARM C	7.66	13.03	0.588		0.9	1.4	19.7	
17.30-17.45								
ARM A	15.41	22.22	0.694		2.2	2.2	33.2	
ARM B	24.70	19.56	1.263		97.0	174.2	2034.0	
ARM C	7.66	13.02	0.588		1.4	1.4	21.0	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
17.45-18.00								
ARM A	12.58	22.45	0.560		2.2	1.3	20.2	
ARM B	20.17	19.92	1.012		174.2	178.2	2643.1	
ARM C	6.25	12.82	0.488		1.4	1.0	15.2	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
18.00-18.15								
ARM A	10.54	22.63	0.466		1.3	0.9	13.6	
ARM B	16.89	20.19	0.836		178.2	130.4	2314.8	
ARM C	5.24	12.71	0.412		1.0	0.7	11.0	

.QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.9	*
17.15	1.3	*
17.30	2.2	**
17.45	2.2	**
18.00	1.3	*
18.15	0.9	*

.QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	4.6	*****
17.15	19.5	********************
17.30	97.0	

****

17.45	174.2	

****

18.00	178.2	

****

18.15	130.4	

****

.QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.5	*
17.15	0.9	*
17.30	1.4	*
17.45	1.4	*
18.00	1.0	*
18.15	0.7	*

. QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	1155.9	770.6	128.8	0.11	128.8	0.11
B	1852.5	1235.0	8126.2	4.39	8547.3	4.61
C	574.5	383.0	87.5	0.15	87.5	0.15
ALL	3583.0	2388.7	8342.4	2.33	8763.5	2.45

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

****** ARCADY 5 run completed.

TRL LIMITED

CAPACITIES, QUEUES AND DELAYS AT ROUNDABOUTS

ARCADY 5.0 ANALYSIS PROGRAM
RELEASE 1.1 (MAY 2001)

FOR SALES AND DISTRIBUTION INFORMATION,
PROGRAM ADVICE AND MAINTENANCE CONTACT:
TRL SOFTWARE BUREAU
TEL: CROWTHORNE (01344) 770758, FAX: 770864
EMAIL: SoftwareBureau@trl.co.uk

Run with file:-
"p:\IT 1290-1299\IT 1296 Land East of Broad Street Green, Maldon\Calcs & Drawings\03.09.13 revised ARCADY\
IT1296 Goldhanger Rd 2026 LDF + 1000 Dev LINK AM - Mouchel.vai"
(drive-on-the-left) at 14:56:41 on Tuesday, 3 September 2013

.ROUNDABOUT CAPACITY AND DELAY
****

.RUN TITLE
****
IT1296 Goldhanger RB 2026 LDF + 1000 Dev LINK AM - Mouchel

.INPUT DATA
****
ARM A - Goldhanger Rd
ARM B - Colchester Rd South
ARM C - Colchester Rd North

.GEOMETRIC DATA

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	3.25	6.50	11.00	200.00	18.00	21.0	0.669	18.818 *
ARM B	3.25	6.00	20.00	200.00	22.00	40.0	0.641	26.299
ARM C	3.00	7.00	5.00	22.50	22.00	35.0	0.564	17.576 *

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

WARNING One or more intercept values (flagged * in the table)
have been adjusted
according to local values input from a previous run and listed below -

ARM	ADJUSTMENT TO INTERCEPT (PCU/MIN)
ARM A	-7.900
ARM C	-3.000

.TRAFFIC DEMAND DATA

.TIME PERIOD BEGINS 07.45 AND ENDS 09.15
.LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	NUMBER OF MINUTES FROM START WHEN TOP OF PEAK IS REACHED	NUMBER OF MINUTES FROM START WHEN FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	RATE OF FLOW (VEH/MIN) AT TOP OF PEAK	RATE OF FLOW (VEH/MIN) AFTER PEAK
ARM A	15.00	45.00	75.00	7.69	11.53	7.69
ARM B	15.00	45.00	75.00	7.29	10.93	7.29
ARM C	15.00	45.00	75.00	10.38	15.56	10.38

TURNING PROPORTIONS
TURNING COUNTS (VEH/HR)
(PERCENTAGE OF H.V.S)

TIME	FROM/TO	ARM A	ARM B	ARM C
07.45 - 09.15	ARM A	0.000	0.885	0.115
		0.0	544.0	71.0
		(0.1)	(0.0)	(0.0)
	ARM B	0.463	0.000	0.537
		270.0	0.0	313.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.102	0.898	0.000
		85.0	745.0	0.0
		(0.0)	(0.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

. QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

TIME	ARM	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.45-08.00									
	ARM A	7.69	12.67	0.607		0.0	1.5	20.7	
	ARM B	7.29	25.74	0.283		0.0	0.4	5.8	
	ARM C	10.38	15.68	0.662		0.0	1.9	26.0	
08.00-08.15									
	ARM A	9.18	11.46	0.801		1.5	3.6	46.5	
	ARM B	8.70	25.63	0.340		0.4	0.5	7.5	
	ARM C	12.39	15.31	0.809		1.9	3.8	51.1	
08.15-08.30									
	ARM A	11.24	10.29	1.092		3.6	22.4	206.6	
	ARM B	10.66	25.56	0.417		0.5	0.7	10.4	
	ARM C	15.17	14.80	1.025		3.8	18.4	182.9	
08.30-08.45									
	ARM A	11.24	10.09	1.115		22.4	40.7	474.4	
	ARM B	10.66	25.56	0.417		0.7	0.7	10.7	
	ARM C	15.17	14.79	1.026		18.4	27.8	348.4	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.45-09.00								
ARM A	9.18	10.47	0.877		40.7	25.1	493.4	
ARM B	8.70	25.54	0.341		0.7	0.5	7.9	
ARM C	12.39	15.30	0.810		27.8	5.0	186.3	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
09.00-09.15								
ARM A	7.69	12.47	0.616		25.1	1.7	90.1	
ARM B	7.29	25.61	0.285		0.5	0.4	6.1	
ARM C	10.38	15.67	0.662		5.0	2.0	33.7	

.QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	1.5	*
08.15	3.6	****
08.30	22.4	**********
08.45	40.7	**********
09.00	25.1	**********
09.15	1.7	**

.QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.4	
08.15	0.5	*
08.30	0.7	*
08.45	0.7	*
09.00	0.5	*
09.15	0.4	

.QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	1.9	**
08.15	3.8	****
08.30	18.4	**********
08.45	27.8	**********
09.00	5.0	*****
09.15	2.0	**

. QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

ARM	TOTAL DEMAND	* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH) (VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	843.3 562.2	1331.7	1.58	1331.8	1.58
B	799.4 532.9	48.4	0.06	48.4	0.06
C	1138.1 758.7	828.5	0.73	828.7	0.73
ALL	2780.8 1853.9	2208.7	0.79	2208.9	0.79

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.

* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

****** ARCADY 5 run completed.

TRL LIMITED

CAPACITIES, QUEUES AND DELAYS AT ROUNDABOUTS

ARCADY 5.0 ANALYSIS PROGRAM
RELEASE 1.1 (MAY 2001)

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EMAIL: SoftwareBureau@trl.co.uk

Run with file:-
"p:\IT 1290-1299\IT 1296 Land East of Broad Street Green, Maldon\Calcs & Drawings\03.09.13 revised ARCADY\
IT1296 Goldhanger Rd 2026 LDF + 1000 Dev LINK PM - Mouchel.vai"
(drive-on-the-left) at 14:57:38 on Tuesday, 3 September 2013

.ROUNDABOUT CAPACITY AND DELAY
****

.RUN TITLE
****
IT1296 Goldhanger RB 2026 LDF + 1000 Dev LINK PM - Mouchel

.INPUT DATA
****
ARM A - Goldhanger Rd
ARM B - Colchester Rd South
ARM C - Colchester Rd North

.GEOMETRIC DATA

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	3.25	6.50	11.00	200.00	18.00	21.0	0.669	20.618 *
ARM B	3.25	6.00	20.00	200.00	22.00	40.0	0.641	26.299
ARM C	3.00	7.00	5.00	22.50	22.00	35.0	0.564	19.976 *

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

WARNING One or more intercept values (flagged * in the table)
have been adjusted
according to local values input from a previous run and listed below -

ARM	ADJUSTMENT TO INTERCEPT (PCU/MIN)
ARM A	-6.100
ARM C	-0.600

.TRAFFIC DEMAND DATA

.TIME PERIOD BEGINS 16.45 AND ENDS 18.15
.LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	NUMBER OF MINUTES FROM START WHEN TOP OF PEAK IS REACHED	NUMBER OF MINUTES FROM START WHEN FLOW STOPS IFALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	RATE OF FLOW (VEH/MIN) AT TOP OF PEAK	RATE OF FLOW (VEH/MIN) AFTER PEAK
ARM A	15.00	45.00	75.00	5.57	8.36	5.57
ARM B	15.00	45.00	75.00	18.13	27.19	18.13
ARM C	15.00	45.00	75.00	6.22	9.34	6.22

TURNING PROPORTIONS
TURNING COUNTS (VEH/HR)
(PERCENTAGE OF H.V.S)

TIME	FROM/TO	ARM A	ARM B	ARM C
16.45 - 18.15	ARM A	0.000	0.767	0.233
		0.0	342.0	104.0
		(0.1)	(0.0)	(0.0)
	ARM B	0.526	0.000	0.474
		763.0	0.0	687.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.255	0.745	0.000
		127.0	371.0	0.0
		(0.0)	(0.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

. QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
16.45-17.00								
ARM A	5.57	17.54	0.318		0.0	0.5	6.7	
ARM B	18.13	25.47	0.712		0.0	2.4	33.3	
ARM C	6.22	14.65	0.425		0.0	0.7	10.5	
17.00-17.15								
ARM A	6.66	16.93	0.393		0.5	0.6	9.4	
ARM B	21.64	25.31	0.855		2.4	5.3	70.3	
ARM C	7.43	13.61	0.546		0.7	1.2	16.8	
17.15-17.30								
ARM A	8.15	16.13	0.506		0.6	1.0	14.5	
ARM B	26.51	25.08	1.057		5.3	34.2	315.7	
ARM C	9.10	12.68	0.718		1.2	2.4	32.8	
17.30-17.45								
ARM A	8.15	16.09	0.507		1.0	1.0	15.2	
ARM B	26.51	25.08	1.057		34.2	57.5	689.1	
ARM C	9.10	12.57	0.724		2.4	2.5	37.2	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
17.45-18.00								
ARM A	6.66	16.88	0.394		1.0	0.7	10.2	
ARM B	21.64	25.30	0.855		57.5	9.1	498.8	
ARM C	7.43	12.60	0.590		2.5	1.5	23.7	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
18.00-18.15								
ARM A	5.57	17.49	0.319		0.7	0.5	7.2	
ARM B	18.13	25.46	0.712		9.1	2.5	44.6	
ARM C	6.22	14.47	0.430		1.5	0.8	12.0	

.QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.5	
17.15	0.6	*
17.30	1.0	*
17.45	1.0	*
18.00	0.7	*
18.15	0.5	

.QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	2.4	**
17.15	5.3	*****
17.30	34.2	**********
17.45	57.5	**********
18.00	9.1	*********
18.15	2.5	***

.QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.7	*
17.15	1.2	*
17.30	2.4	**
17.45	2.5	***
18.00	1.5	*
18.15	0.8	*

. QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

ARM	TOTAL DEMAND	* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN) (MIN/VEH)	(MIN)	(MIN/VEH)
A	611.6	407.7	63.3 0.10	63.3	0.10
B	1988.3	1325.5	1651.9 0.83	1652.1	0.83
C	682.9	455.2	132.9 0.19	132.9	0.19
ALL	3282.7	2188.5	1848.1 0.56	1848.2	0.56

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.

* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

****** ARCADY 5 run completed.

TRL LIMITED

CAPACITIES, QUEUES AND DELAYS AT ROUNDABOUTS

ARCADY 5.0 ANALYSIS PROGRAM
RELEASE 1.1 (MAY 2001)

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TRL SOFTWARE BUREAU
TEL: CROWTHORNE (01344) 770758, FAX: 770864
EMAIL: SoftwareBureau@trl.co.uk

Run with file:-
"p:\IT 1290-1299\IT 1296 Land East of Broad Street Green, Maldon\Calcs & Drawings\03.09.13 revised ARCADY\
IT1296 Goldhanger Rd 2026 LDF + 1200 Dev LINK AM - Mouchel.vai"
(drive-on-the-left) at 09:17:10 on Thursday, 5 September 2013

.ROUNDABOUT CAPACITY AND DELAY
****

.RUN TITLE
****
IT1296 Goldhanger RB 2026 LDF + 1200 Dev LINK AM - Mouchel

.INPUT DATA
****
ARM A - Goldhanger Rd
ARM B - Colchester Rd South
ARM C - Colchester Rd North

.GEOMETRIC DATA

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	3.25	6.50	11.00	200.00	18.00	21.0	0.669	18.818 *
ARM B	3.25	6.00	20.00	200.00	22.00	40.0	0.641	26.299
ARM C	3.00	7.00	5.00	22.50	22.00	35.0	0.564	17.576 *

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

WARNING One or more intercept values (flagged * in the table)
have been adjusted
according to local values input from a previous run and listed below -

ARM	ADJUSTMENT TO INTERCEPT (PCU/MIN)
ARM A	-7.900
ARM C	-3.000

.TRAFFIC DEMAND DATA

.TIME PERIOD BEGINS 07.45 AND ENDS 09.15
.LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	NUMBER OF MINUTES FROM START WHEN TOP OF PEAK IS REACHED	NUMBER OF MINUTES FROM START WHEN FLOW STOPS IFALLING	RATE OF FLOW (VEH/MIN) AT TOP OF PEAK	RATE OF FLOW (VEH/MIN) BEFORE PEAK	RATE OF FLOW (VEH/MIN) AFTER PEAK
ARM A	15.00	45.00	75.00	7.76	11.64	7.76
ARM B	15.00	45.00	75.00	7.30	10.95	7.30
ARM C	15.00	45.00	75.00	10.64	15.96	10.64

TIME	FROM/TO	ARM A	ARM B	ARM C
07.45 - 09.15		TURNING PROPORTIONS (PERCENTAGE OF H.V.S)		
		TURNING COUNTS (VEH/HR)		
	ARM A	0.000	0.876	0.124
		0.0	544.0	77.0
		(0.1)	(0.0)	(0.0)
	ARM B	0.462	0.000	0.538
		270.0	0.0	314.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.112	0.888	0.000
		95.0	756.0	0.0
		(0.0)	(0.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

. QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

TIME	ARM	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.45-08.00									
	ARM A	7.76	12.58	0.617		0.0	1.6	21.5	
	ARM B	7.30	25.69	0.284		0.0	0.4	5.8	
	ARM C	10.64	15.68	0.678		0.0	2.0	27.8	
08.00-08.15									
	ARM A	9.27	11.36	0.816		1.6	3.9	49.8	
	ARM B	8.72	25.58	0.341		0.4	0.5	7.6	
	ARM C	12.70	15.31	0.830		2.0	4.3	56.7	
08.15-08.30									
	ARM A	11.35	10.30	1.102		3.9	23.8	218.6	
	ARM B	10.68	25.50	0.419		0.5	0.7	10.5	
	ARM C	15.56	14.80	1.051		4.3	22.5	216.2	
08.30-08.45									
	ARM A	11.35	10.12	1.122		23.8	43.2	503.6	
	ARM B	10.68	25.50	0.419		0.7	0.7	10.7	
	ARM C	15.56	14.79	1.052		22.5	36.2	442.4	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.45-09.00								
ARM A	9.27	10.10	0.918		43.2	34.1	579.9	
ARM B	8.72	25.51	0.342		0.7	0.5	8.0	
ARM C	12.70	15.30	0.830		36.2	6.6	299.6	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
09.00-09.15								
ARM A	7.76	12.32	0.630		34.1	1.8	152.4	
ARM B	7.30	25.51	0.286		0.5	0.4	6.1	
ARM C	10.64	15.67	0.679		6.6	2.2	38.1	

.QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	1.6	**
08.15	3.9	****
08.30	23.8	************************
08.45	43.2	**
09.00	34.1	**********************************
09.15	1.8	**

.QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.4	
08.15	0.5	*
08.30	0.7	*
08.45	0.7	*
09.00	0.5	*
09.15	0.4	

.QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	2.0	**
08.15	4.3	****
08.30	22.5	**********************
08.45	36.2	************************************
09.00	6.6	*******
09.15	2.2	**

. QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

ARM	TOTAL DEMAND (VEH)	TOTAL DEMAND (VEH/H)	* QUEUEING * DELAY * (MIN)	* QUEUEING * DELAY * (MIN/VEH)	* INCLUSIVE QUEUEING * DELAY * (MIN)	* INCLUSIVE QUEUEING * DELAY * (MIN/VEH)
A	851.5	567.7	1525.7	1.79	1525.8	1.79
B	800.8	533.9	48.7	0.06	48.7	0.06
C	1166.9	777.9	1080.9	0.93	1081.0	0.93
ALL	2819.2	1879.5	2655.3	0.94	2655.6	0.94

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.

* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

****** ARCADY 5 run completed.

TRL LIMITED

CAPACITIES, QUEUES AND DELAYS AT ROUNDABOUTS

ARCADY 5.0 ANALYSIS PROGRAM
RELEASE 1.1 (MAY 2001)

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EMAIL: SoftwareBureau@trl.co.uk

Run with file:-
"p:\IT 1290-1299\IT 1296 Land East of Broad Street Green, Maldon\Calcs & Drawings\03.09.13 revised ARCADY\
IT1296 Goldhanger Rd 2026 LDF + 1200 Dev LINK PM - Mouchel.vai"
(drive-on-the-left) at 09:18:20 on Thursday, 5 September 2013

.ROUNDABOUT CAPACITY AND DELAY
****

.RUN TITLE
****
IT1296 Goldhanger RB 2026 LDF + 1200 Dev LINK PM - Mouchel

.INPUT DATA
****
ARM A - Goldhanger Rd
ARM B - Colchester Rd South
ARM C - Colchester Rd North

.GEOMETRIC DATA

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	3.25	6.50	11.00	200.00	18.00	21.0	0.669	20.618 *
ARM B	3.25	6.00	20.00	200.00	22.00	40.0	0.641	26.299
ARM C	3.00	7.00	5.00	22.50	22.00	35.0	0.564	19.976 *

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

WARNING One or more intercept values (flagged * in the table)
have been adjusted
according to local values input from a previous run and listed below -

ARM	ADJUSTMENT TO INTERCEPT (PCU/MIN)
ARM A	-6.100
ARM C	-0.600

.TRAFFIC DEMAND DATA

.TIME PERIOD BEGINS 16.45 AND ENDS 18.15
.LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	NUMBER OF MINUTES FROM START WHEN TOP OF PEAK IS REACHED	NUMBER OF MINUTES FROM START WHEN FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	RATE OF FLOW (VEH/MIN) AT TOP OF PEAK	RATE OF FLOW (VEH/MIN) AFTER PEAK
ARM A	15.00	45.00	75.00	5.69	8.53	5.69
ARM B	15.00	45.00	75.00	18.25	27.38	18.25
ARM C	15.00	45.00	75.00	6.35	9.52	6.35

TIME	FROM/TO	ARM A	ARM B	ARM C
16.45 - 18.15	TURNING PROPORTIONS			
	TURNING COUNTS (VEH/HR)			
	(PERCENTAGE OF H.V.S)			
	ARM A	0.000	0.752	0.248
		0.0	342.0	113.0
		(0.1)	(0.0)	(0.0)
	ARM B	0.523	0.000	0.477
		763.0	0.0	697.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.270	0.730	0.000
		137.0	371.0	0.0
		(0.0)	(0.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

. QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

TIME	ARM	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
16.45-17.00									
	ARM A	5.69	17.54	0.324		0.0	0.5	6.9	
	ARM B	18.25	25.40	0.719		0.0	2.5	34.4	
	ARM C	6.35	14.65	0.434		0.0	0.8	10.8	
17.00-17.15									
	ARM A	6.79	16.93	0.401		0.5	0.7	9.7	
	ARM B	21.79	25.22	0.864		2.5	5.7	74.2	
	ARM C	7.58	13.62	0.557		0.8	1.2	17.5	
17.15-17.30									
	ARM A	8.32	16.13	0.516		0.7	1.0	15.1	
	ARM B	26.69	24.98	1.069		5.7	37.8	343.8	
	ARM C	9.29	12.74	0.729		1.2	2.5	34.4	
17.30-17.45									
	ARM A	8.32	16.09	0.517		1.0	1.1	15.8	
	ARM B	26.69	24.97	1.069		37.8	64.9	771.9	
	ARM C	9.29	12.65	0.734		2.5	2.7	39.1	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
17.45-18.00								
ARM A	6.79	16.88	0.402		1.1	0.7	10.5	
ARM B	21.79	25.21	0.864		64.9	19.4	632.2	
ARM C	7.58	12.66	0.599		2.7	1.5	24.6	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
18.00-18.15								
ARM A	5.69	17.49	0.325		0.7	0.5	7.5	
ARM B	18.25	25.39	0.719		19.4	2.7	65.5	
ARM C	6.35	14.27	0.445		1.5	0.8	12.7	

.QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.5	
17.15	0.7	*
17.30	1.0	*
17.45	1.1	*
18.00	0.7	*
18.15	0.5	

.QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	2.5	**
17.15	5.7	******
17.30	37.8	************************************
17.45	64.9	**
18.00	19.4	*******************
18.15	2.7	***

.QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.8	*
17.15	1.2	*
17.30	2.5	***
17.45	2.7	***
18.00	1.5	**
18.15	0.8	*

. QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

ARM	TOTAL DEMAND	* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH) (VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	623.9 415.9	65.5	0.11	65.5	0.11
B	2002.0 1334.6	1921.8	0.96	1921.9	0.96
C	696.6 464.4	139.2	0.20	139.2	0.20
ALL	3322.4 2215.0	2126.5	0.64	2126.6	0.64

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
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* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

****** ARCADY 5 run completed.

APPENDIX THN/4

NETWORK TRAFFIC DIAGRAMS

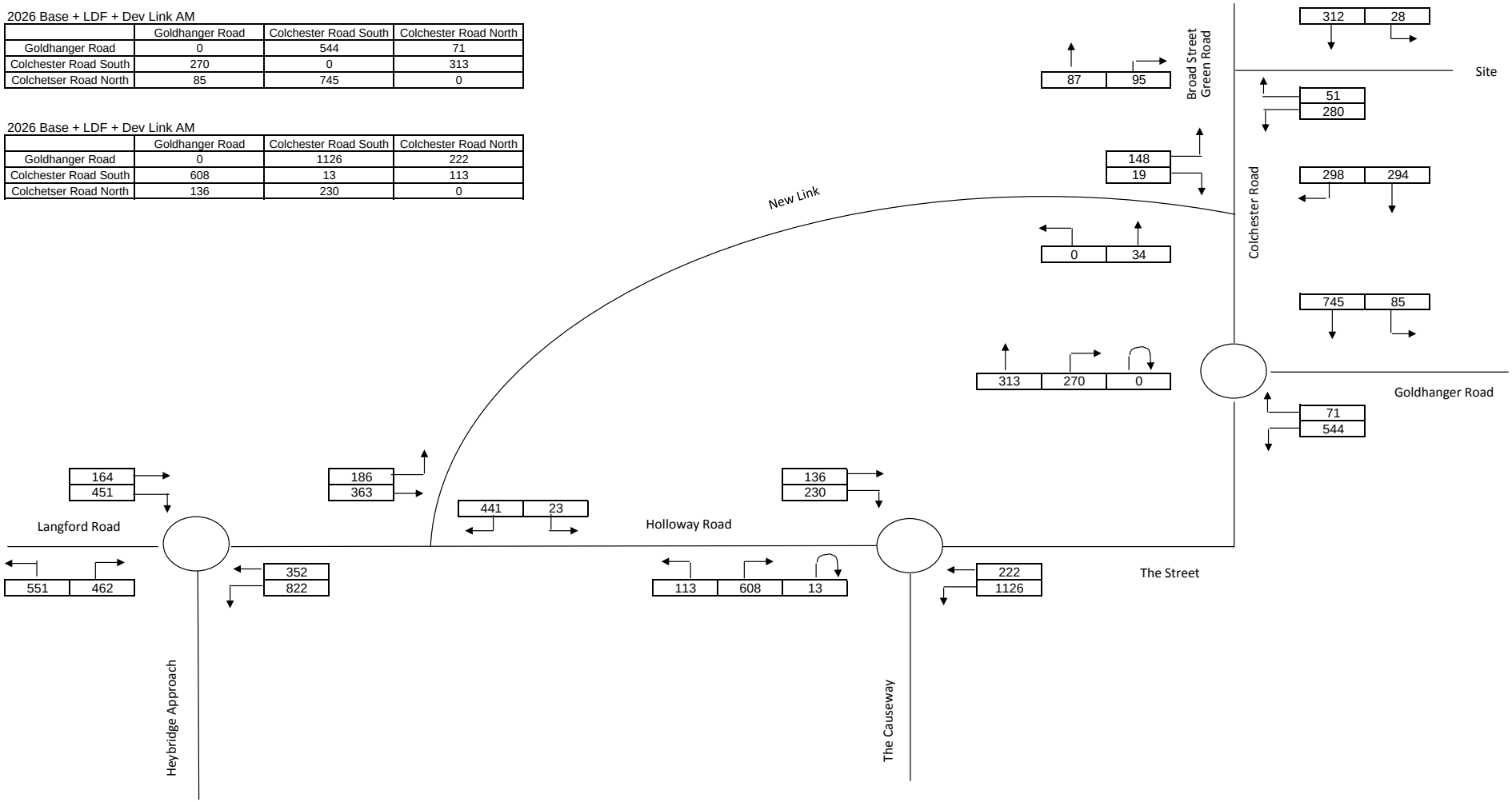
2026 Base + LDF + 1000 Additional Units: AM Peak

2026 Base + LDF + Dev Link AM

	Goldhanger Road	Colchester Road South	Colchester Road North
Goldhanger Road	0	544	71
Colchester Road South	270	0	313
Colchetser Road North	85	745	0

2026 Base + LDF + Dev Link AM

	Goldhanger Road	Colchester Road South	Colchester Road North
Goldhanger Road	0	1126	222
Colchester Road South	608	13	113
Colchetser Road North	136	230	0



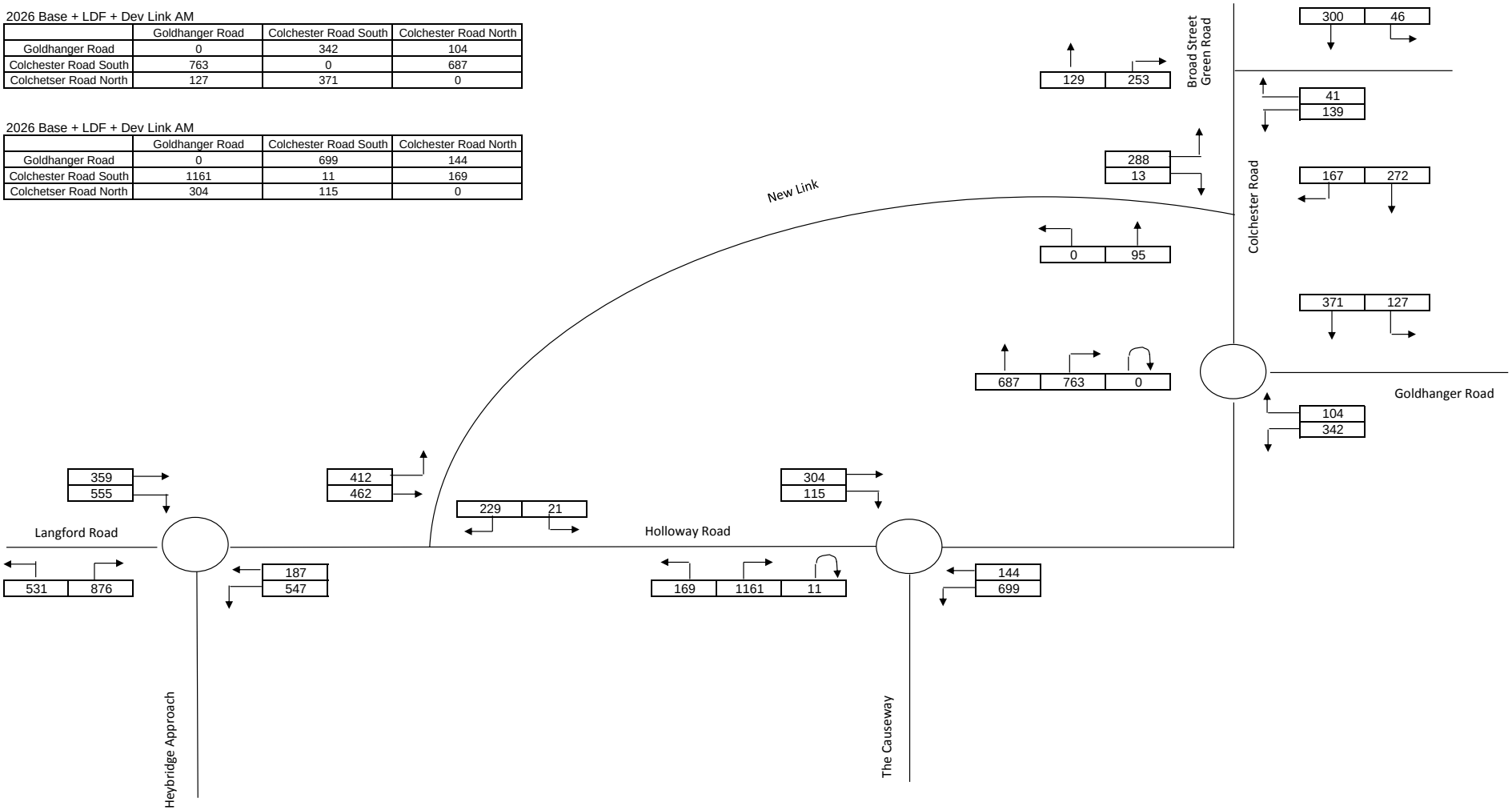
2026 Base + LDF + 1000 Additional Units: PM Peak

2026 Base + LDF + Dev Link AM

	Goldhanger Road	Colchester Road South	Colchester Road North
Goldhanger Road	0	342	104
Colchester Road South	763	0	687
Colchetser Road North	127	371	0

2026 Base + LDF + Dev Link AM

	Goldhanger Road	Colchester Road South	Colchester Road North
Goldhanger Road	0	699	144
Colchester Road South	1161	11	169
Colchetser Road North	304	115	0



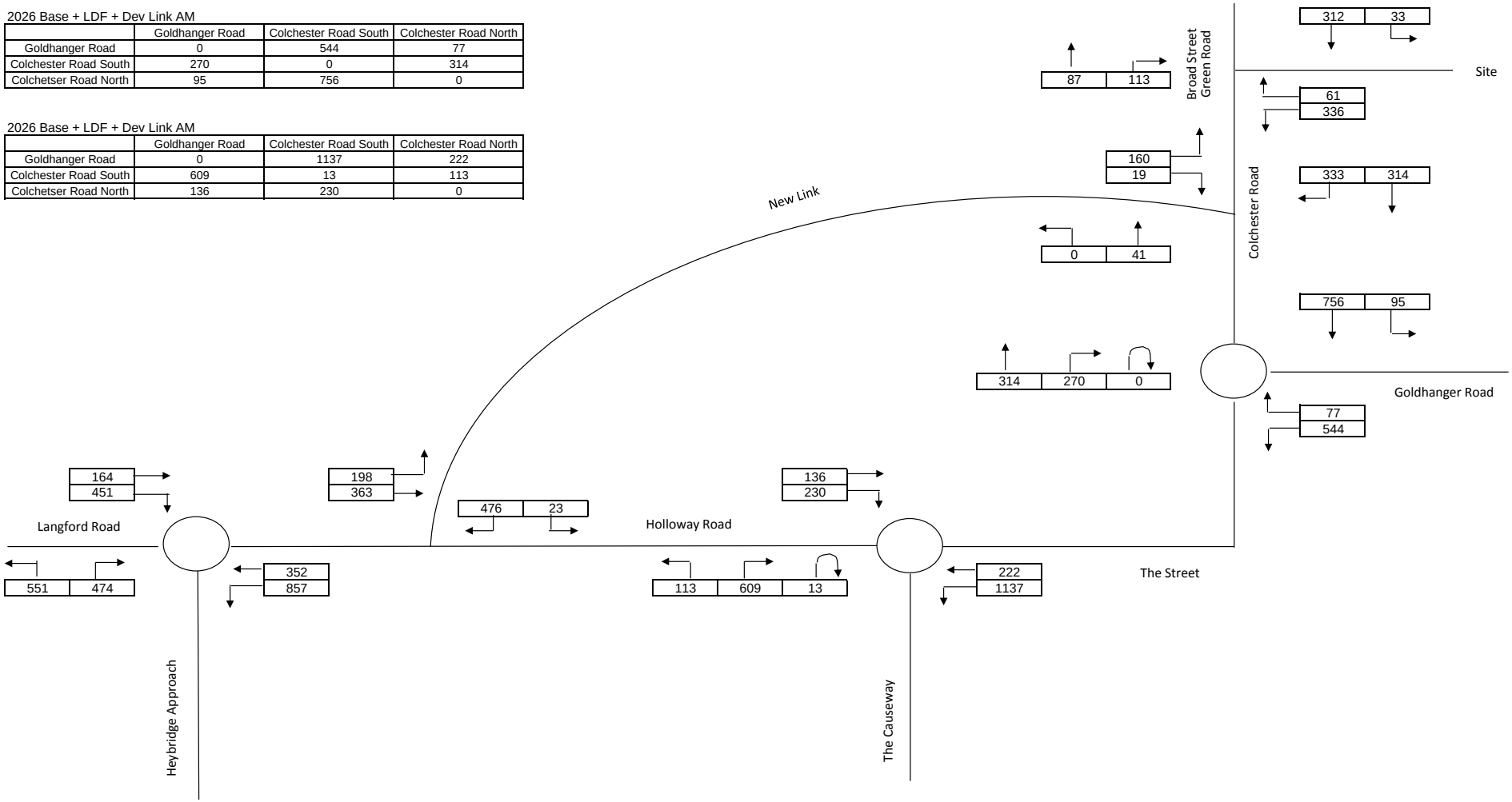
2026 Base + LDF + 1200 Additional Units: AM Peak

2026 Base + LDF + Dev Link AM

	Goldhanger Road	Colchester Road South	Colchester Road North
Goldhanger Road	0	544	77
Colchester Road South	270	0	314
Colchetser Road North	95	756	0

2026 Base + LDF + Dev Link AM

	Goldhanger Road	Colchester Road South	Colchester Road North
Goldhanger Road	0	1137	222
Colchester Road South	609	13	113
Colchetser Road North	136	230	0



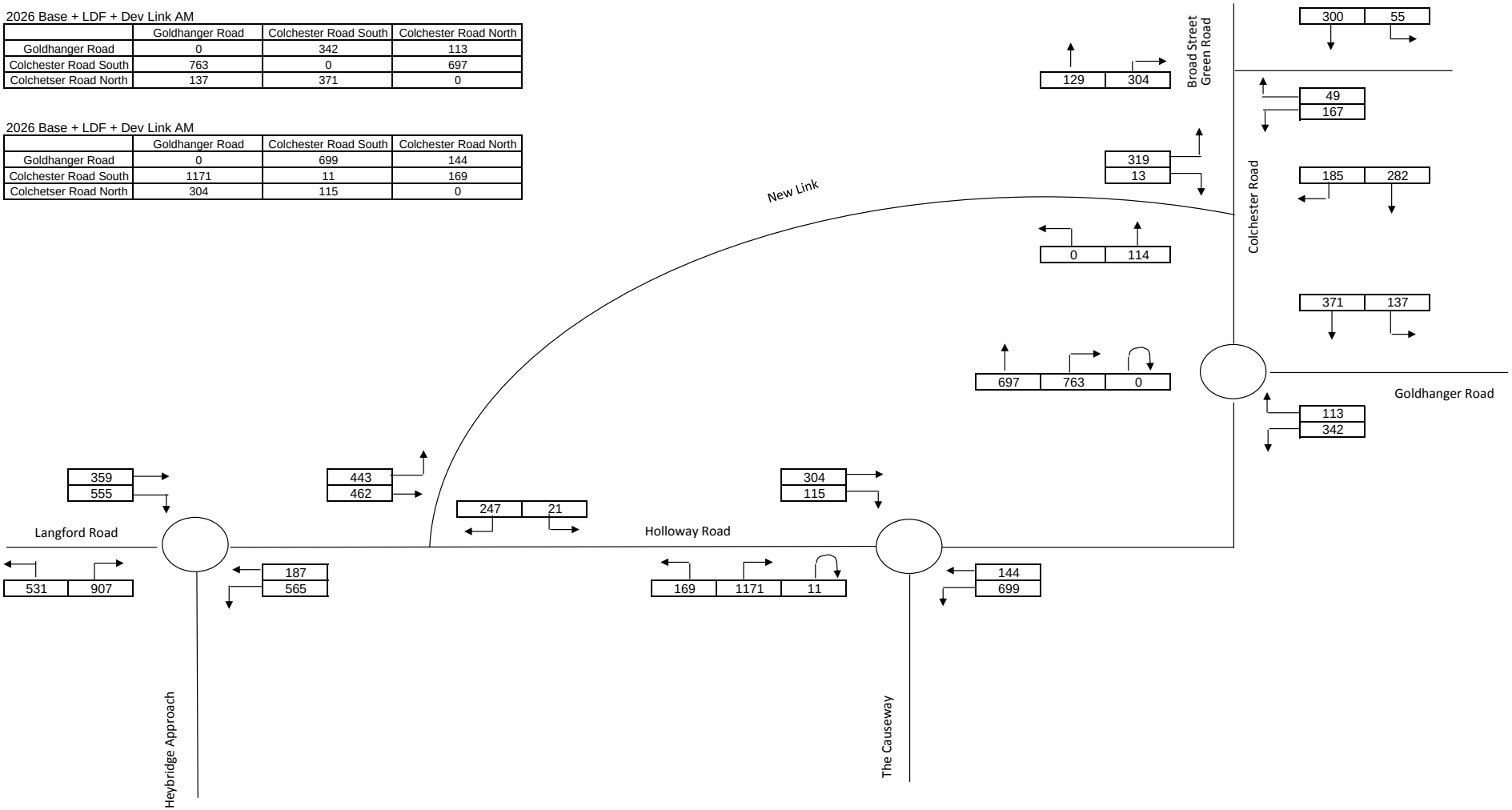
2026 Base + LDF + 1200 Additional Units: PM Peak

2026 Base + LDF + Dev Link AM

	Goldhanger Road	Colchester Road South	Colchester Road North
Goldhanger Road	0	342	113
Colchester Road South	763	0	697
Colchetser Road North	137	371	0

2026 Base + LDF + Dev Link AM

	Goldhanger Road	Colchester Road South	Colchester Road North
Goldhanger Road	0	699	144
Colchester Road South	1171	11	169
Colchetser Road North	304	115	0



UNITED BY OUR DIFFERENCE

WSP

LAND EAST OF BROAD STREET GREEN ROAD, HEYBRIDGE

Drainage and Flood Risk Technical Note

07/10/2013

Confidentiality: Public

Quality Management

Issue/revision	Issue 1	Revision 1	Revision 2	Revision 3
Remarks	Draft	Draft		
Date	02 October 2013	07 October 2013		
Prepared by	C J Mead	C J Mead		
Signature				
Checked by	G Guma	G Guma		
Signature				
Authorised by	C J Mead	C J Mead		
Signature				
Project number	50600603	50600603		
Report number				
File reference	s:\50600603 - lofts farm, heybridge\c documents\reports\drainage and flood risk technical note.docx	s:\50600603 - lofts farm, heybridge\c documents\reports\drainage and flood risk technical note.docx		

Land East of Broad Street Green Road, Heybridge

Drainage and Flood Risk Technical Note

07/10/2013

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Table of Contents

Appendices

Figures

1 Introduction

1.1 Introduction

1.1.1 When considering the strategic allocation of new development in Maldon and Heybridge the review of sewerage and flood risk is an important assessment.

1.1.2 The recent revision of Policy S4 to include a Relief Road with flood mitigation to deliver part of the Maldon and Heybridge Surface Water Management Plan requires further investigation as this document is not publicly available.

1.1.3 Although Anglian Water have confirmed that adequate capacity exists at the Maldon Sewage Treatment Works (STW) the existing, upstream sewerage network is at capacity and there is a real risk of increased operation of the four Combined Sewer Outflows (CSO's) which would create sewage discharge pollution to the River Blackwater contravening legislation. The issue of how strategic allocations can connect to the STW is therefore a significant matter for consideration of the merits of potential sites.

2 Background

2.1 Baseline and MDC LDP Evidence Base

2.1.1 The topography of the land surrounding Maldon and Heybridge is critical because:

- It describes areas vulnerable to tidal flooding with any land below ~5.5m AD being at risk of climate change flooding in the event of a tidal defence failure. This applies to parts of both South Maldon and North Heybridge, the Council's proposed allocations as shown on Figure D3.1 of the Mid-Essex SFRA attached.
- It describes the sub-catchment to the River Blackwater for the Lime Brook, Langford Ditch, Holloway Road Ditch, Heybridge Hall Ditch, Spicketts Brook and Catchpole Ditch as shown on Figure 1.
- It shows the elevation of the proposed Heybridge Relief Road, as shown on Figure 2.

2.1.2 Maldon and Heybridge is prone to flood risk as described in the Mid-Essex SFRA and Essex Local Flood Risk Management Strategy.

2.1.3 Sewerage is identified as a significant constraint in the Maldon Water Cycle Scoping Study as follows:

- South Maldon , *"….development south of the River Blackwater would currently be unable to go ahead without significant investment in new mains".*
- North Heybridge. *"Development to the north of the river….. would also require investment, but to a smaller degree as the treatment works is located closer to these areas"*.

2.1.4 The implications of these statements requires further analysis as the approach taken to resolving the sewerage constraint will directly influence costs for viability and the sustainability of any solution.

3 Analysis

3.1 Basis of Assessment

3.1.1 A simple analysis of Maldon DC LDP evidence base data and publically available documents including the Flood Estimation Handbook, LIDAR ariel mapping and British Geological Society maps has been used for analysis of the potential strategic allocation sites in Maldon and Heybridge.

3.2 Findings

3.2.1 The following findings apply to Development at South of Maldon:

- The allocation has a small upstream catchment of 2.23km²
- The allocation is south of the existing development with an outfall via the Lime Brook. There is therefore very limited or no potential relief to the existing development in Maldon with only 1.45km^2 of the catchment being upstream of existing development.
- There is an area of Flood Zone 3 which constrains development in the south-east corner.
- The underlying clay geology is not conducive to infiltration which limits the SUDS options available for development.
- The WWTW lies some 4km to the north across the river and currently there is a networked pumping system that passes through Maldon town centre.
- Any approach to store foul effluent at South Maldon and pump during lower flow periods although technically achievable is not a sustainable solution because:
  - It provides no relief to the existing town centre sewers which already flood.
  - Operation of the CSO's will become more frequent as sewers will operate more fully, more often so whenever there is a coincidental fluvial or pluvial flood event discharge to the river will occur.
  - Greater frequency of operation of the CSO's will be subject to environmental enforcement action and monitory fine.
- If upgrades to the Maldon town centre sewers is made this will cause significant disruptions.
- If a new crossing of the river is made this will need to be the subject of a full environmental impact assessment and would incur a significant cost.

3.2.2 The following findings apply to development north of Heybridge:

- The allocation has a large upstream catchment of 4.63km².
- The proposed route of the Relief Road follows the 8m contour and is capable of intercepting the majority of the catchment for flood mitigation.
- All surface water run-off intercepted between Langford and Broad Street Green roads can flow either to the east or west.
  - If water flows to the west then it will need to discharge to the Holloway Road and Heybridge Hall ditches which suffer regular flooding.
  - If water flows to the east then it can discharge to Spicketts Brook and bypass the existing areas of Heybridge that flood.
- There is an area of Flood Zone 3 which constrains development in the south of the site.

- The underlying gravel geology is conducive to infiltration which maximises the SUDS options available for development.
- The WWTW lies some 3.5km to the east and the strategic trunk sewers in roads have limited capacity. The quantum of development would require upgrade works through Heybridge unless a new sewer is pumped to the north. Any upgrade through Heybridge will cause significant disruption and a likely increase in operation of some of the CSO's.

3.2.3 The following findings apply to development on land east of Broad Street Green Road:

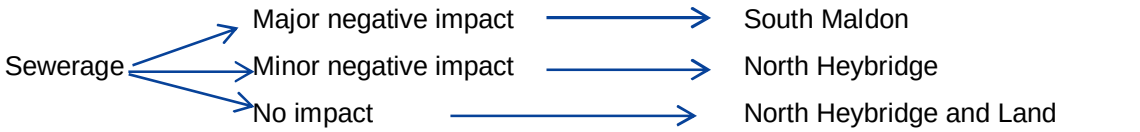
- The site has a large upstream catchment of 6.3 km^2.
- Restoration of the catchpole and Spickett's Brooks to their pre-quarry state can include attenuation of the upper catchment run-off in Wetlands.
- Run-off from the catchments severed by the proposed Relief Road can be routed through the site to bypass Heybridge and mitigate the existing urban flooding.
- There is no flood zone 3 constraining development.
- The undisturbed underlying gravel geology is conducive to infiltration which maximises the SUDS options available for development in areas where quarrying has not taken place.
- The site is the nearest large site to Maldon Sewage Treatment Works and can connect to a point on the existing sewerage network downstream of the CSO's with capacity as confirmed by AW.
- The route of a new sewer to Goldhanger Road is remote from the urban area and would have limited disruption.
- The site sewerage system can receive sewerage from land north of Heybridge and Broad Street Green to ensure no impact on the distressed town network and CSO's.

4 Conclusions

4.1 Conclusions

4.1.1 The benefits of an expanded allocation north of Heybridge combining land on either side of Broad Street Green Road is clear because:

- It provides flood relief to Heybridge by re-directing flows away from the town rather than through the town where blockage or an extreme flood would still cause flooding.
- In EIA / Sustainability Appraisal terms the choices on Sewerage and Flooding are to choose schemes which have:



- It provides an economic sewerage solution which does not lead to increased operation of the town centre CSO's; has a cost significantly less than Land South of Maldon based on distance; has less environmental and operational risk; and is inherently more sustainable.

4.1.2 Therefore, in terms of Flooding and Sewerage, it is clear that strategic development North of Heybridge on both sides of Broad Street Green Road presents opportunities to overcome known, significant sewerage constraints in a way which delivers tangible flood mitigation benefits to the existing community beyond the Relief Road alone.

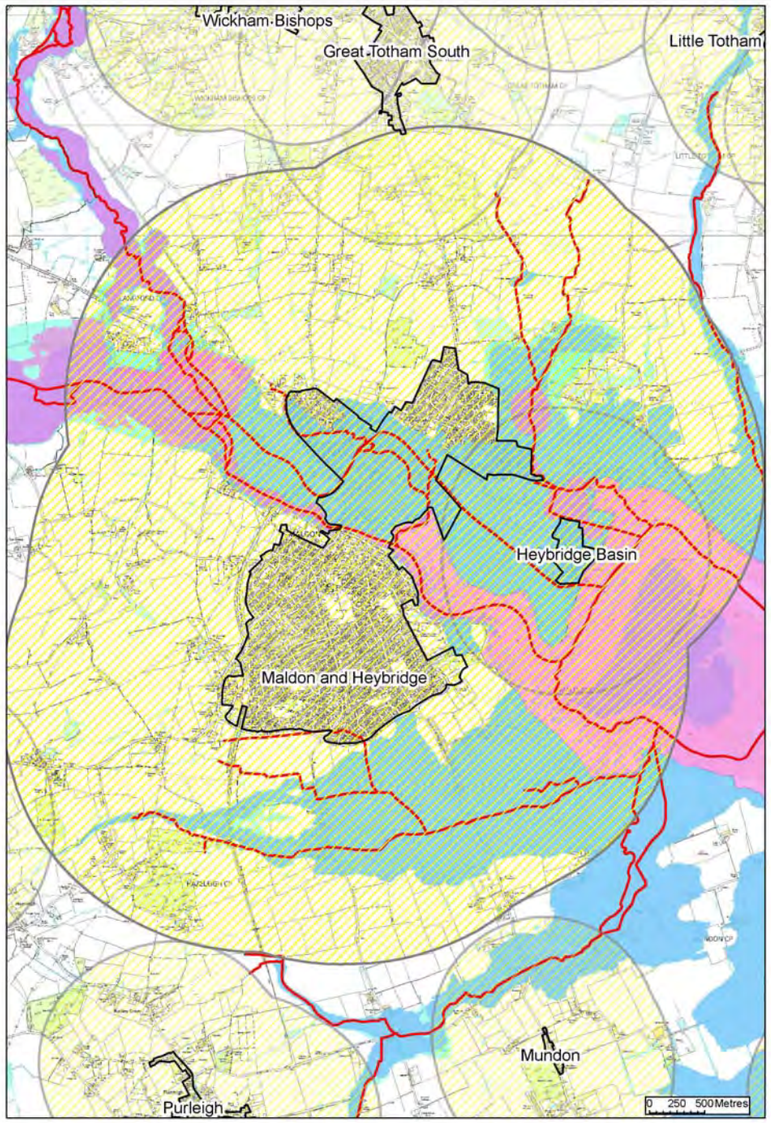
Appendices

3Maldon District Council LDF: Level 1 SFRA

Maldon and Heybridge and Heybridge Basin

PPS25 Flood Zones 2007

Figure D3-1



Legend

- District Boundary
- Settlement Areas with surrounding potential area of development
- Main River
- Environment Agency and Modelled Functional Floodplain
- Environment Agency Flood Zone 3
- Environment Agency Flood Zone 2

Preliminary Core Strategy Assessment

Flood Zone	**1, 2 & 3 (including functional floodplain)**
Potential Housing Allocation	Limited information is available at this stage. There is potential to locate dwellings as an extension of the existing settlement and around the Heybridge Causeway area.
Potential Employment Allocation	Limited information is available at this stage. Employment/mixed use designations may potentially to be proposed as an extension of the existing settlement.
Main River	The settlements are surrounded my tidally influenced Main Rivers, including the River Chlemer, Woodham Mortimer Brook and Catchpole Brook.
Problem drainage areas	No data available
Flood Risk Assessment	The principles of the sequential test should guide the master planning of any potential development sites in these areas. According to PPS25, residential development would not be permitted within the functional floodplain areas. Development of residential units should, where possible, be steered into areas of lower Flood Risk, i.e. Flood Zone 1. The Sequential Test should be used to ensure that where possible, development is located in Flood Zone 1. The Functional Floodplain (Flood Zone 3b, as defined by PPS25) is unsuitable for commercial development. There are areas of Flood Zone 1 within the potential development regions where development could be located, thus reducing the need to develop in Flood Zones 2 and 3. Landscaping and recreational areas can be located within the functional floodplain areas. It is therefore advised to locate any such areas within the bounds of the functional floodplain in this region. If however permanent development is proposed within this area resulting in a loss of floodplain, compensation storage calculations should be included in the FRA. Annex E of PPS25 outlines the requirements of a FRA. This should be referred to in order to ensure any site specific FRA incorporates all the necessary information when assessing flood risk to a development. For example, a site specific FRA should consider floor levels, flood levels, safe access/egress and surface water for any development proposed on this site. This should demonstrate that surface water runoff rates are no greater than those prior to development, where possible, increasing infiltration and storage onsite to minimise the potential impacts of overland flow. This can be achieved by utilising site specific Sustainable Drainage Systems (SuDS). The above are only examples of the content of a FRA. As each development site is unique, Annex E of PPS25 should be referred to in order to determine the specific requirement of an FRA for a particular site.

Settlement Level Assessment

	Size of settlement	Area in Zone 3	Area in Zone 2
Area (ha) Maldon & Heybridge	4021.8	1192.7	1276.9
% of Area		29.7	31.7
Area (ha) Heybridge Basin	496.4	307.2	308.3
% of Area		61.9	62.1

Date Modified: 20/09/2013

Drawn By: ukcxc032

Key

- Indicative New Link Road
- Allocation/Site Boundary
- FEH Catchments
- Main Watercourses

6.30km^2

1.98km^2

1.62km^2

0.59km^2

0.28km^2

0.16km^2

1.45km^2

0.46km^2

0.32km^2

0 0.25 0.5 1 1.5 2 Kilometres

WSP

TITLE:

LAND EAST OF BROAD STREET GREEN ROAD, HEYBRIDGE FEH (FLOOD ESTIMATION HANDBOOK) CATCHMENTS

FIGURE No:

FIGURE 1

File: Q:\WSP_UK\WSP_D\Basing\50600603 - Lofts Farm, Heybridge\Analysis\ArcGIS\MapDocuments\Catchments.mxd

Date Modified: 25/09/2013

Drawn By: ukrdt001

Key

- Indicative New Link Road
- Site Boundary
- Main Watercourses
- Contours

Great Park

Langford Park

White Lodge

Ravens

Furzelands Farm

Middle Wood

Howell's Farm

Poplar Grove Farm

Broad Street Green

Heybridge

Heybridge Basin

Grapnell's Farm

Springfield Cottages

Elms Farm

Mitchell's Barn

Old Rectory

Langford Place

The Bentalls Complex

Playing Fields

Heybridge Primary School

Jacob's Farm

Cemetery

Industrial Estates

Factory

Depot

Warehouse

Dock

Sch

School

Vic

Liby

Car Park

Recn Gd

PW

PO

MAYPOLE ROAD

HOLLOWAY ROAD

LANGFORD ROAD

B1018

B1022

A414

BROAD STREET GREEN ROAD

GALLEYFORD ROAD

BATES ROAD

HIGH STREET

STATION ROAD

MILL LANE

WOOD LANE

ANCHORAGE HILL

River Blackwater

River Chelmer

Heybridge Creek

Blackwater Navigation

Contains Ordnance Survey data © Crown copyright and database right 2012.

0 0.05 0.1 0.2 0.3 0.4 Kilometres

WSP

TITLE:

LAND EAST OF BROAD STREET GREEN ROAD, HEYBRIDGE CONTOURS

FIGURE No:

FIGURE 2

File: Q:\WSP_UK\WSP_D\Basing\50600603 - Lofts Farm, Heybridge\Analysis\ArcGIS\MapDocuments\Catchments and contours.mxd

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Loft's Farm, Heybridge

an opportunity for a landscape-led settlement

Landscape + ecology

Baseline analysis to support representation

27th September 2013

Rummey design


The site
Broad
Street
Green
Maldon
Rummey design

‘landscape-led’ masterplanning for sustainable growth…

… to create a new community

Rummey design

cover page - view north over lake on site

contents

purpose of this document

This presentation supports and complements the representations submitted to Maldon District Council in May 2013. The work, which includes input from the overall consultant team including Ken Philpott Masterplanning, Andrew Martin Planning, WSP and Inter-modal, advises and advances the evidence base relating to the promotion and suitability of Loft's Farm as a viable and deliverable new settlement it will contribute to meeting the future housing and community needs of Maldon District Council.

This document, produced by Rummey Design, an international environment-focused landscape masterplanning and urban design practice, sets out an approach to contribute to a masterplan which is rooted in its context and the processes which have shaped the land over time.

- this document sets out an approach to create a landscape-led masterplan which is rooted in its context and the processes which have shaped it over time.
- this document starts the process of developing a sustainable landscape led masterplan by setting out a technical evidence base.
- It relates specifically to the question of landscape, heritage, visual impact and presents a sound evidence baseline for 'responsible' development.
- the site has significant development potential.
- our assessment suggests that any necessary mitigation can be provided,leading to major environmental, social and economic benefits.

Loft's Farm; a variety of water and landscapes anchored by historic buildings. . . .
a landscape as 'structure' as the basis of a rich residential environment ...

our approach

"'Settlement' is where people gather; attracted by a resource, a particular habitat, climate, geology or aspect. Patterns and the form, or morphology of settlement can be directly traced to the underlying geology and the way that it has interacted with the changing climate."

Elizabeth Staveley, Director Rummey Design

Rummey Design has been commissioned to undertake an environment based evidence assessment, considering the geographical factors that have shaped the landscape (including cultural factors) around Lofts Farm. A team of environmental and urban designers have undertaken a field and desk based assessment of the cultural and physical factors that make up the site. From this objective and analytical process, conclusions can be drawn to consider:

1. whether a particular site has the CAPACITY for change
2. what FORM might that change take? i.e. size and nature of change or development

These strong analytical foundations allow us to create sustainable developments, rooted in their environmental, rather than political context.

the changing 'landscape'

Historically people were drawn to where water and food is available and plentiful, the building materials are readily attainable, where there is fuel for heat and where access is good for the trading of skills, stories and goods. As climate, technology and market forces have changed, these attractions have lost and gained power and settlements have shrunk or grown in response.

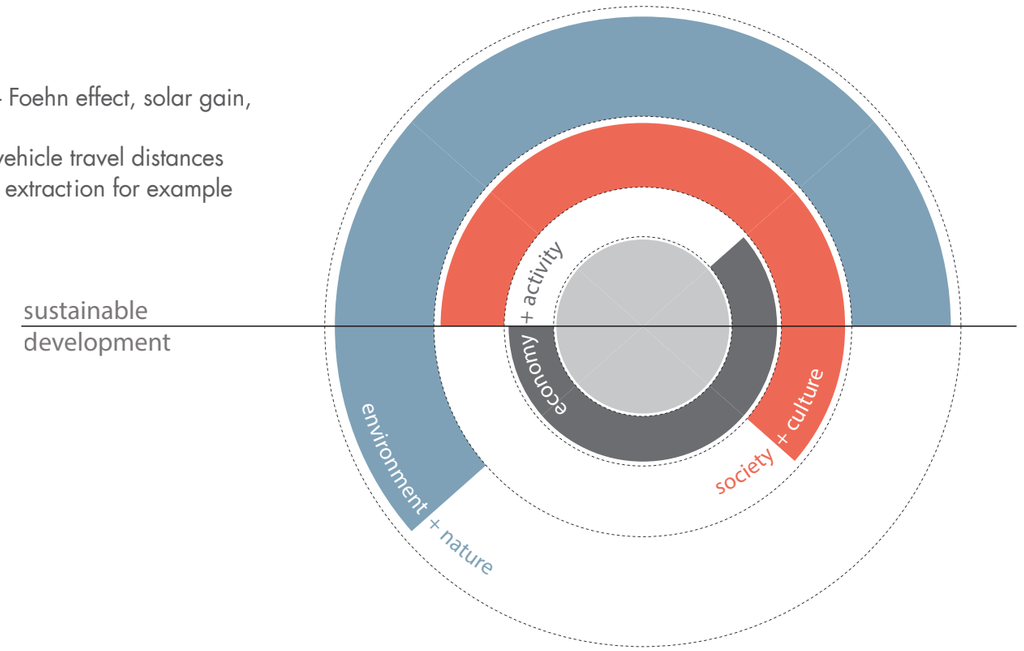
In analysing the settlements and cultural patterns at and around Lofts Farm the analysis identifies a number of influencing social factors, such as advances in technology and farming, political change and affluence.

There are a range of factors that determine the location and form of a settlement to produce;

- hydrophilic settlements
- hydrophobic settlements
- defensive settlements
- settlements with a preferable aspect – Foehn effect, solar gain, wind and rain shelter
- trading points, marking walking and vehicle travel distances
- resource focused settlements - mineral extraction for example

Over time, these settlements have been shaped by changes in social and economic behaviour. Places, settlements and landscape have become distinctive where the physical and human geography intertwine, creating unique identities that continue to attract investment and create the 'brand' of a place.

Settlements that strike a balance between the natural environment and between the social and economic factors become truly sustainable.

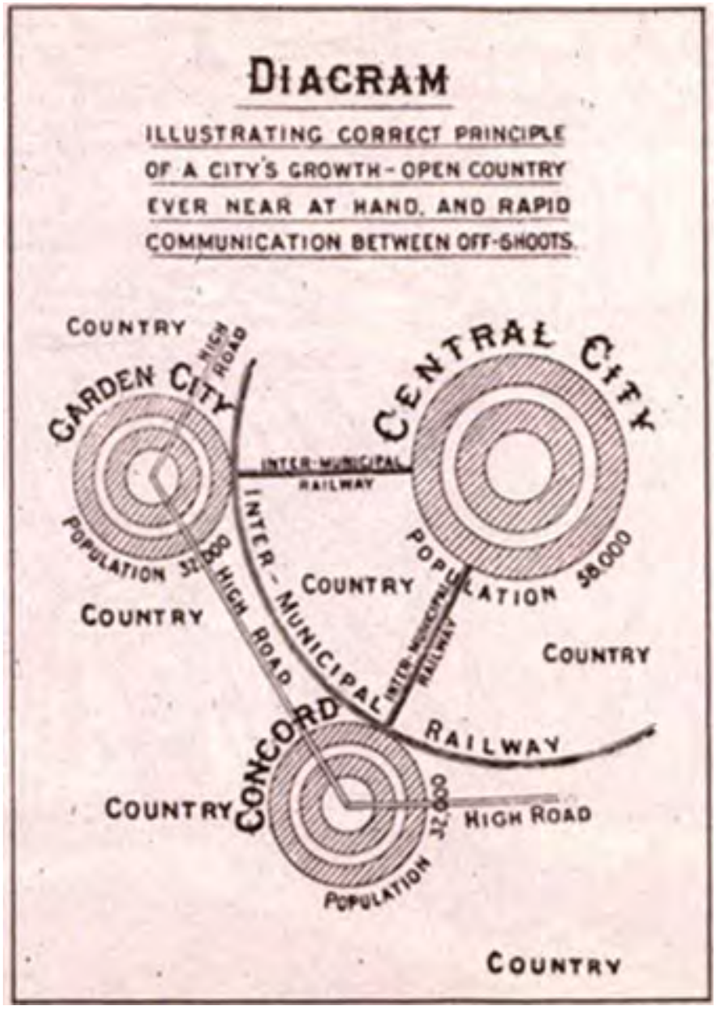


a landscape-led approach

The garden city movement was born of Ebenezer Howard's concern with the state of cities at the end of the nineteenth century, and with the belief that working people deserved better conditions. Embodied in the concept of the garden city are philanthropic but rather rigid ideas relating to the planning of the settlements. When the first garden cities were built in the early twentieth century, the architects Unwin and Parker planned the town in the centre of the Letchworth Estate with Howard's large agricultural greenbelt surrounding the town. But the architects ignored Howard's symmetrical design favouring a more "organic" approach. Inherent in the principles of garden cities is the notion of fresh air, " space to breathe", access to the countryside, but not, in themselves, suburbs: they were self contained.

A landscape led approach is a fundamentally different approach, taking its cure for development from the land itself, but there is inevitably an overlap. Principles such as ecological design, housing in harmony with its setting, the treatment of water, and the integration of landscape and development influencing the form of development, as opposed to academic constraints or solid engineering will produce a different responce. Garden Cities were fundamentally a response to the excesses of industrialization in the nineteenth century. Nowadays we have different, more environmentally based concerns, and a landscape led approach to residential development in the countryside is an appropriate response.

"As our analysis and appendices will show, the site has capacity for development, can be services, is available, and can add significantly to the social and environmental capital of Maldon"



Ebenezer Howard theortecial view of development in the countyside, as a reaction othe overcrowding and poor conditions of the cities.

the 'landscape' we live in …

Some of Ebenezer Howard's principles still apply (room to breathe, contact with nature etc) but much has changed in more than a century. There is concern with impacts on the environment and we now know that a more contextual approach is needed).

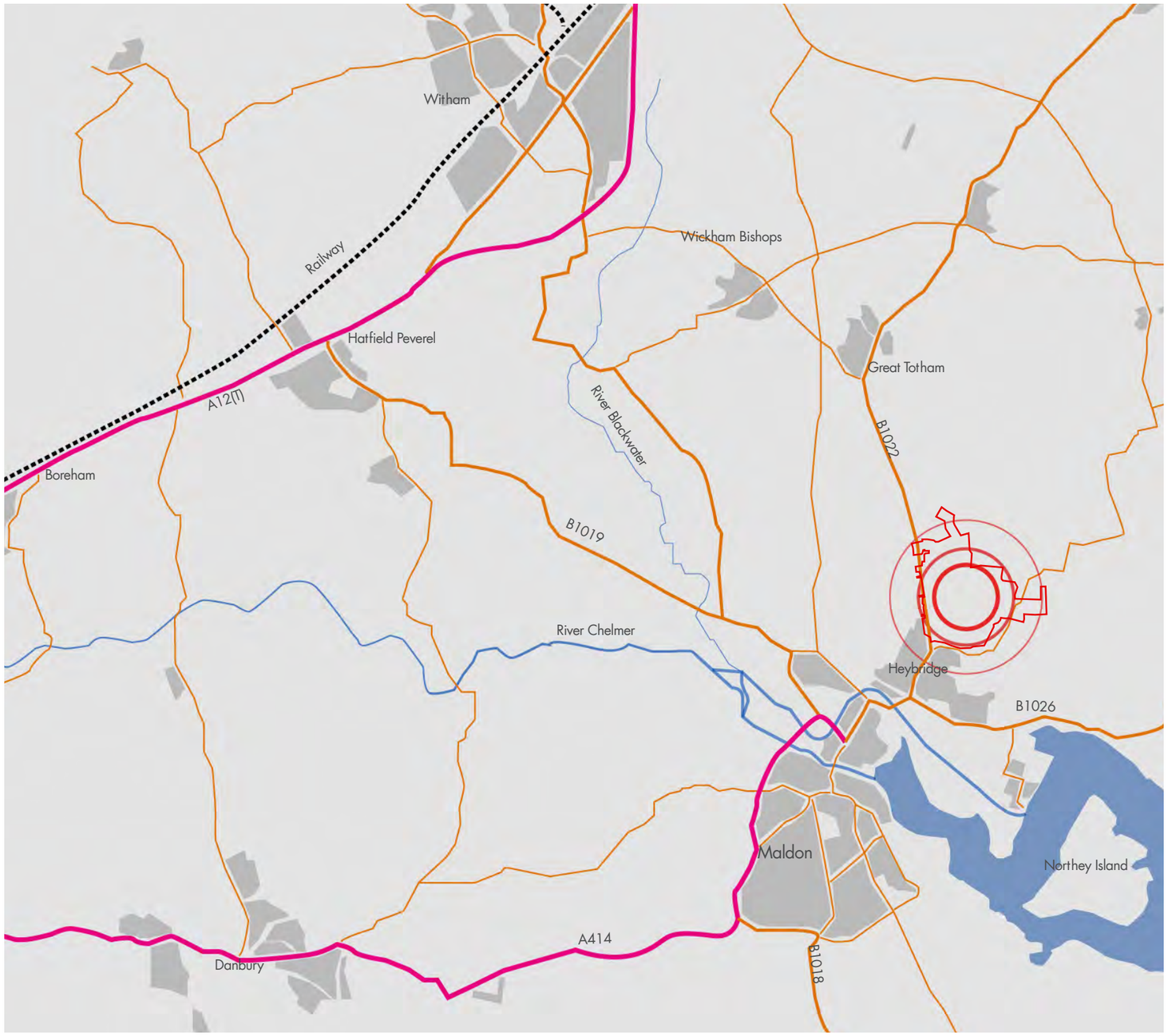
site location and information

site description

Lofts Farm covers approximately 150 acres (60ha) of gently sloping, low lying, arable farmland and grassland. The site lies at approximately 10m AOD with a gentle rise to around 18m AOD in the north-west corner. It is underlain by London clay which was overlain by marine gravels and good quality agricultural soils. Much of the farm was quarried for gravels during the 1970s and 1980s before being restored to farmland. However the loss of the natural drainage, resulting from removal of the gravels, and reduction in topsoil quality has meant that the agricultural potential of the land is diminished. It is now used for a mix of hay production and arable.
The extracted areas still lie below the original level of the land and there are a number of water bodies remaining on the farm from the gravel extraction. These areas now attract numerous waterfowl. There are also silt lagoons remaining in the south-east of the site, left from the working of the site, which are considered to be dangerous. These may need further restoration.

The original Lofts Farm farmhouse and associated barns lie in the middle of the site and are reached from the B1022 (Broad Street roman road) via the farm track which forms a causeway, as it is still at the original level of the land and above the surrounding levels where extraction took place. Slough House farm lies to the east and is used for poultry production so has a number of poultry sheds. Sains Hall lies towards the north of the property and is also a historic farm cluster.

The site is bounded by a linear development of houses to the west, which form ribbon development along the B1022, by the urban edge of Heybridge to the south-west and south, by sand and gravel pits (now nature conservation areas) to the south–east and farmland to the east. To the north lies South Wood which is a small, mixed, ancient woodland which encloses the site to the north. Due to the relatively flat nature of the topography and enclosing vegetation the site is not visible from any great distance.
There is a series of water bodies to the south-east which effectively provide continuity of habitat with the estuary of the Blackwater.
The field boundaries on the site are mainly demarcated by hedgerows, which often have gaps, but which contain a variety of species. Those in the undisturbed areas of the site to the north also contain mature hedgerow trees. These help to compartmentalise the site

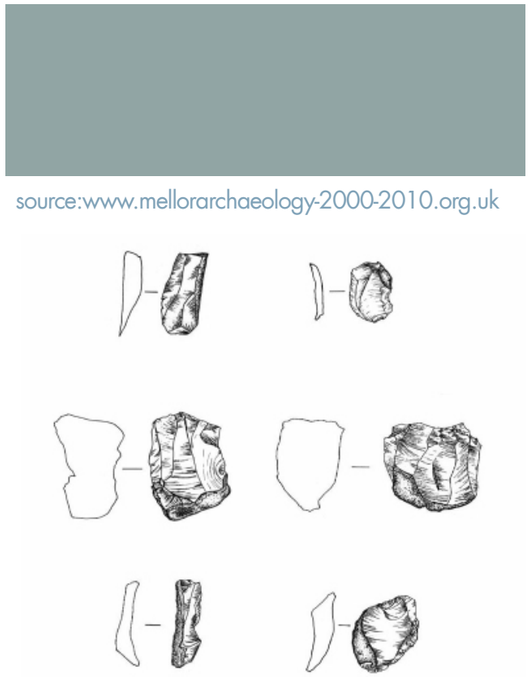


Site location plan (NTS)

lofts farm boundary


Tollehunt Major
South Wood
Sains Hall
Slough House Farm
Lofts Farm
Goldhanger
Heybridge
Maldon

historical overview . timeline



source:www.mellorarchaeology-2000-2010.org.uk

Mesolithic period

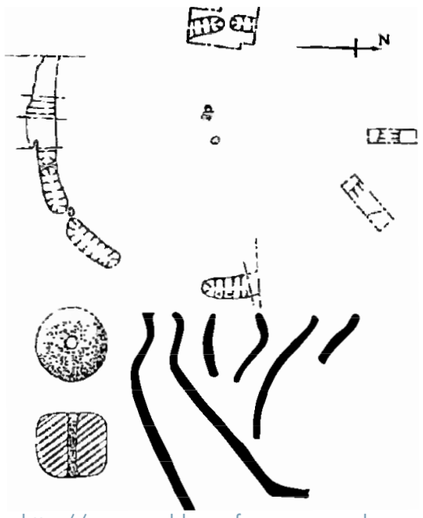
Maldon's strategic position must have been exploited by the very earliest settlers

there is evidence for prehistoric settlement along the Blackwater Estuary (occasional finds of stone tools such as handaxes.)

rural settlements have been excavated at Slough House Farm, Chigborough Farm and Lofts Farm, located to the north of the Backwater Etuary.

environmental data suggests a still largely wooded environment.

Neolithic period



source:http://www.maldonsx.freeserve.co.uk

source: http://www.flickr.com uplandswolf

Bronze Age

first organised occupation of Maldon Hill probably began around 700 - 400 bc

agricultural economy was established and the number of houses (mostly round but some rectangular) and settlement sites increases significantly

A concentration of sites identified at Slough House and Lofts Farms, Rook Hall and Chigborough, near the Blackwater Estuary prove an increasingly settled and populated landscape

sites and finds are numerous within the district (750bc- 43ad)

at the top of the hill (Maldon) a settlement defended by a timber palisade, was established.

Iron Age

source:maldon district historic environment characterisation project
reconstruction of Lofts Farm by Roger Massey-Byrne

source:maldon district historic environment characterisation project
3d reconstruction of salt working and the creation

late Iron Age

(close to the coast of the creeks and estuaries) are the remains of a salt making industry - began in the Late Iron Age and proliferated in the Roman period.

"the line of Red Hills marks the edge of the coastal marsh at that date..."

..."large amounts of red/brown briquetage or fired clay from the salt pans not only give the red hills their name but also mark the location of these sites."

south-east of England (including what is now maldondistrict) had well established links with Roman Gaul (before the roman invasion of 43 ad)

the laying of metalled roads and large expanses of gravelled surfaces characterised the transition to the roman period

the estuaries and surrounding marshes were at the centre of the salt making industry (from iron age through saxon times)

Roman period

source:www. wikipedia.com

lofts farm boundary
blackwater and chelmer river

source:maldon district historic environment characterisation project
Pewitt Island Fish Trap (photo Kevin Bruce)

Saxon period

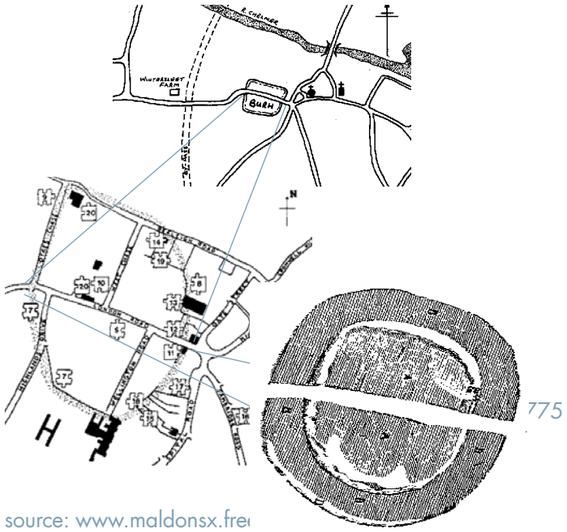
the topography of the confluence of the Chelmer and Bckwater rivers gave Maldon it's saxon name - "Mael-dun" - meaning hill market by a cross

" In the Blackwater Estuary itself massive amounts of timber were used to build large fish-traps radiocarbon dated to the middle saxon period . examples are known off the nass, sales point"

King Edward the elder ordered a burgh to be built at Maldon - as part of his campaign to recover England from Danish control.

(the antiquarians Joshep Strutt and Nathaniel Salmon identified the Maldon burgh in the 18th century)

916



775

source: www.maldonsx.fre

historical overview . timeline

source: http://faculty.washington.edu

source:http://www.bbc.co.uk

991

" the Maldon battle" between Saxons and Danish vikings is the most significant event to take place in Maldon and the oldest recorded battlefield in Britain.

The battle ended in an Anglo-Saxon defeat and the death of Earl Byrhtnoth as the leader of the Anglo-Saxon forces

the town had a mint (until at least 1100) was an important port and a charter (1171) confirmed the town's status as a borough

the appearance of the fieldscape, distribution of woodlands and settlements was essentially medieval in origin

three emblematic churchs were building at the Hythe:
all Saints' (13th century),
St. Peters (today Thomas Plume's library founded in 1704)
St Mary's (12th century)
(historical and architectural important structures - grade 1 - nowadays in the Maldon's skyline)

Medieval period

source:maldon district historic environment characterisation project
reconstruction of late medieval Maldon (by dave

source: http://gallery.nen.gov.uk/
all saints' church

source:http://www.geograph.org.uk
st peter's church tower

source: http://www.mjb-images.co.uk/
saint mary church

source: Maldon district historic environment characterisation project salt-making complex at Stow Maries

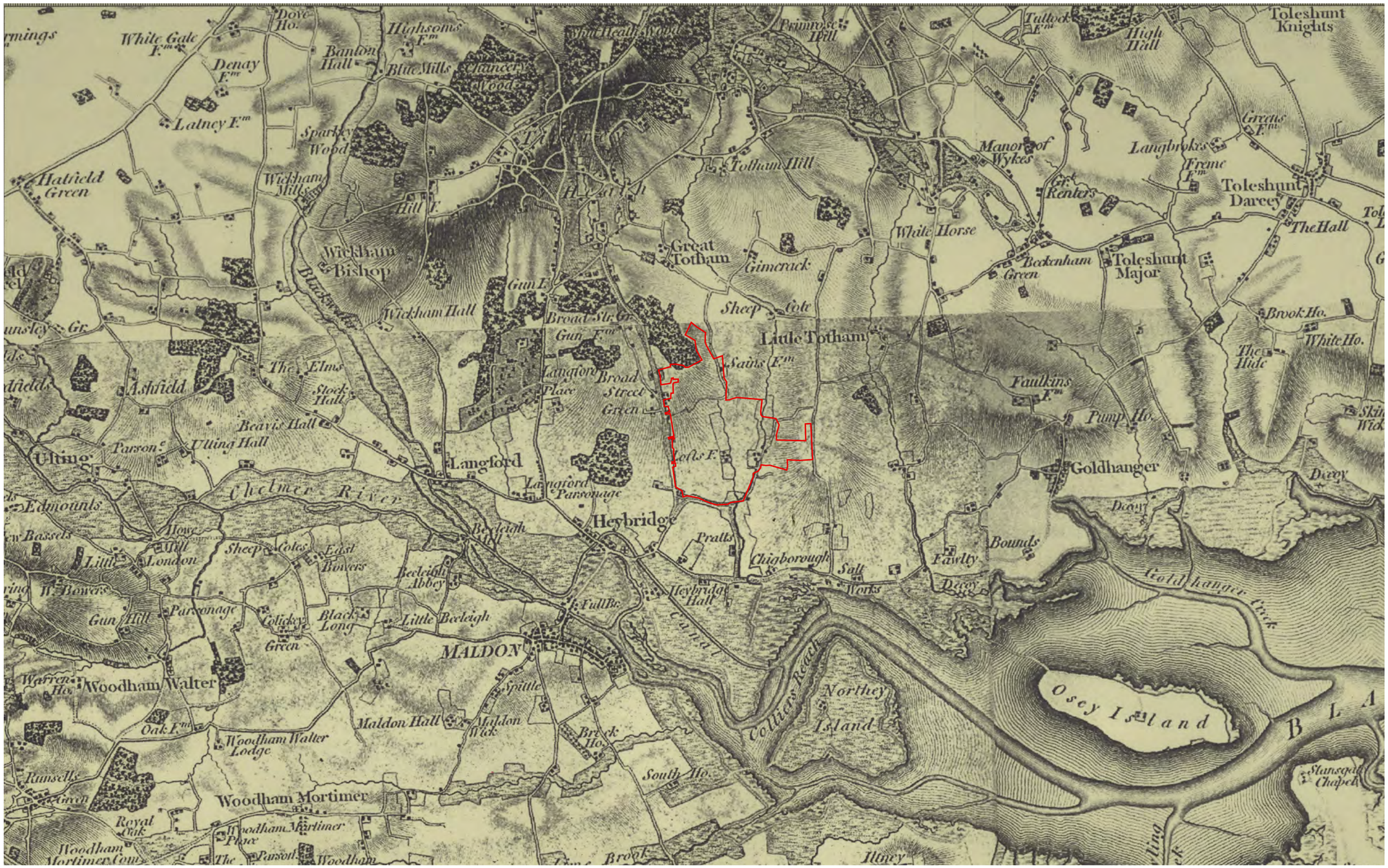
source: Maldon district historic environment characterisation project
aerial view of decoy pond at Goldhanger under snow

post Medieval period

Maldon itself continued to grow and progress as a port (due to their resources and communication opportunities offered by the river) developing conections between the town and London.

continuing in importance from the Medieval period were the developing oyster fisheries and continued sea-salt production

introduction of a number of duck decoy ponds which were used to commercially trap the wildfowl
(still abound on the estuary today)



1805 area map of Loft's Farm (Reference: © cown copyright 2012 all rights reserved license no. 100020449) (courtesy of the client)

historical overview . timeline

completion of the Chelmer and Blackwater Navigation Canal (end of 18th century)

Maldon district was further improved with the railway (mid 19th century)

Modern period

source: http://www.flickr.com (maldon archive)
maldon's railway 1969's

source: http://www.francisfrith.com
blackwater river 1895

source: http://en.wikipedia.org
barge blocks blackwater river

source: http://www.flickr.com (maldon archive)
manufactured by Bentall's

source: http://www.maldonsalt.co.uk
cyril osborne feeding the coal furnaces at the downs salt works prior to the installation of gas

source: http://www.filmola.com
aquaculture industry

Industrial heritage

Maldon salt – the salt draws together three important aspects of the town's heritage – its early (roman) history; the story of the river Blackwater and the origins of Maldon's industry (the "Maldon Crystal Salt Company" start in 1882)

the Blackwater Estuary was central to the development of shipping trade, fisheries - oyster and otherwise - boat building yard of John Howard (19th century) and Cooks Boatyard (until the late 1980s) down at the Hythe and the associated trades, like sail-making by taylor's

important industries for iron-founding and the manufacturing of agricultural equipment, were founded in the Maldon and Heybridge - Bentall's Ironworks and Maldon Ironworks at Fullbridge (19th century)

the timber and builders' merchants of John Sadd & Sons (18th century) a leading firm in Maldon (second biggest employer in the area). barges were key to their business

opportunities for the masterplan

- an historic precedent of settlement associated with the water
- there is a distinctive road infrastructure relating to trade routes
- mineral extraction has shaped land form and use
- there is a cultural legacy that shapes the distinctiveness of the place
- In the twentieth century the land was used for gravel extraction from the river beds associated with the Blackwater. This has produced a characteristic landscape following field boundaries which has great potential for education, biodiversity, and integrated development

Blackwater river and estuary were prominent elements in developing maritime trade

100 ships left Maldon annually for other British ports (18th century)

the industrial revolution brought new types of craft to Maldon estuary – the Thames sailing barges - used to lighter cargo from ships to the wharves along the banks of the rivers. Preserved barges still sail the Blackwater

the decline of commercial shipping raised a leisure use in and around the Blackwater Estuary (early 20th century)

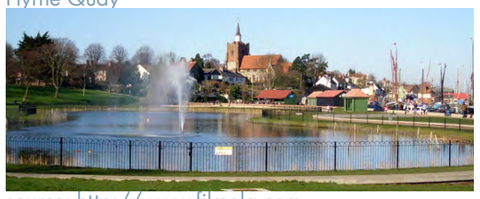
the Hythe, St. Mary spire (served as a beacon for sailors returning home), the Marine Promenade (1895), the former Marine Lake (1905), the Battlefield Walk (2.5 miles on footpaths across grassland and arable fields) and the Maldon Mud Race keep alive this maritime heritage.

maritime heritage

source:http://gallery.nen.gov.uk
Thames sailing barges

source:http://www.panoramio.com
Hythe Quay

source: http://www.filmola.com
Marine Lake 1961



source: http://www.filmola.com
Promenade Park

source:http://www.battlefieldstrust.com
Battlefield Walk . looking east along the lane to Northey Island

Battlefield Walk . causeway to Northey Island at low tide

Battlefield Walk . battlefield from the north west

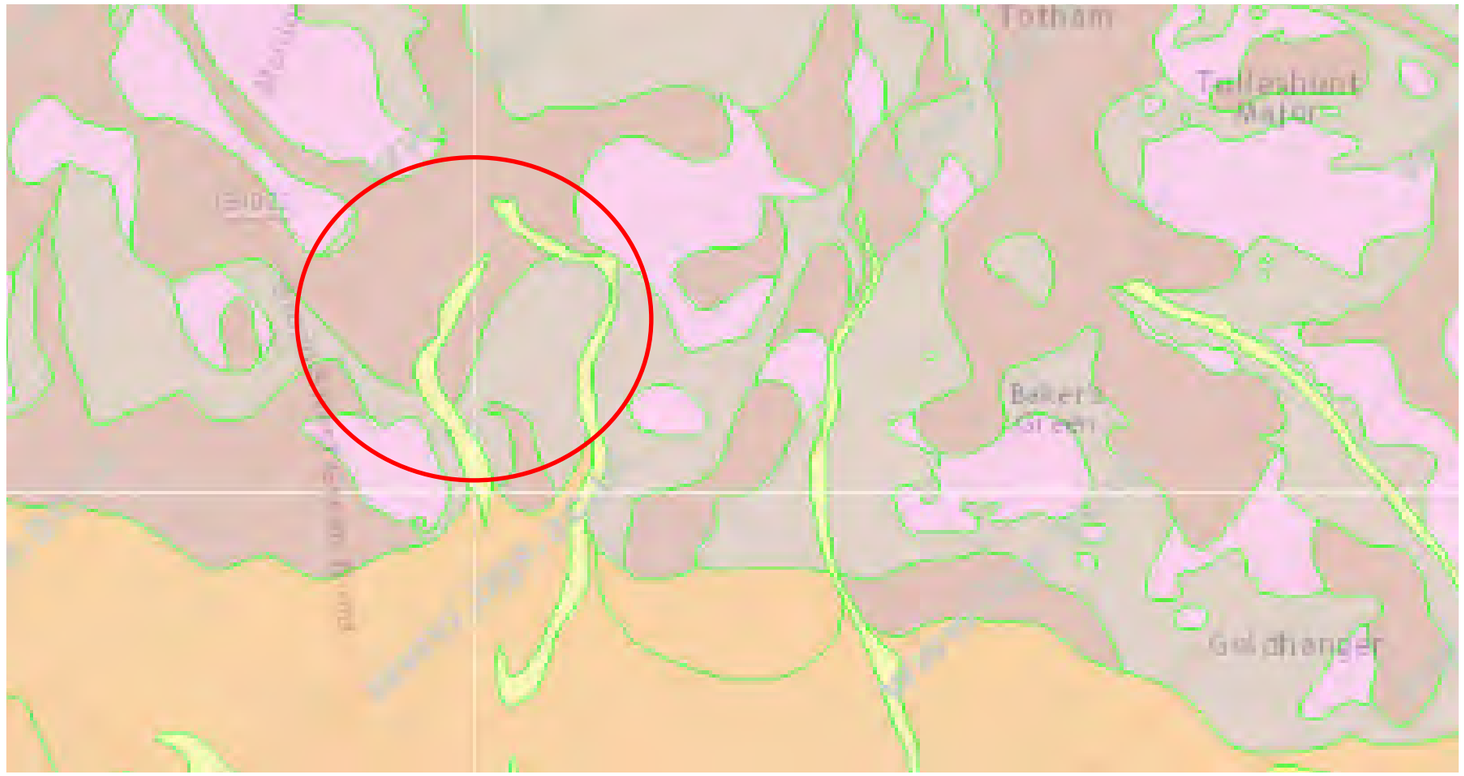
source:http://www.guardian.co.uk/
Maldon Mud Race

source:http://www.panoramio.com
Chelmer and Blackwater Navigation Canal

geology and topography

geology and its interface with a changing climate = 'landscape' in the broadest sense of the word and this influences the settlement within it

the Loft's Farm site is predominately formed by layers of 'river terrace deposits' and sub-alluvial resources; valuable for extraction and cultivation. The site is included on the Mineral resources plan produced by the ODPM and the British Geological Society.



Much of the site has been excavated , lowering the land by around 6m. These Blackwater terrace gravels' were home to a number of archaeological finds, from the last ice age, resulting in the designation of a geological SSSI on the island in the old pit/new lake. However most of the site has now been excavated, leaving an island of educational interest on the farm.

conclusion for site justification

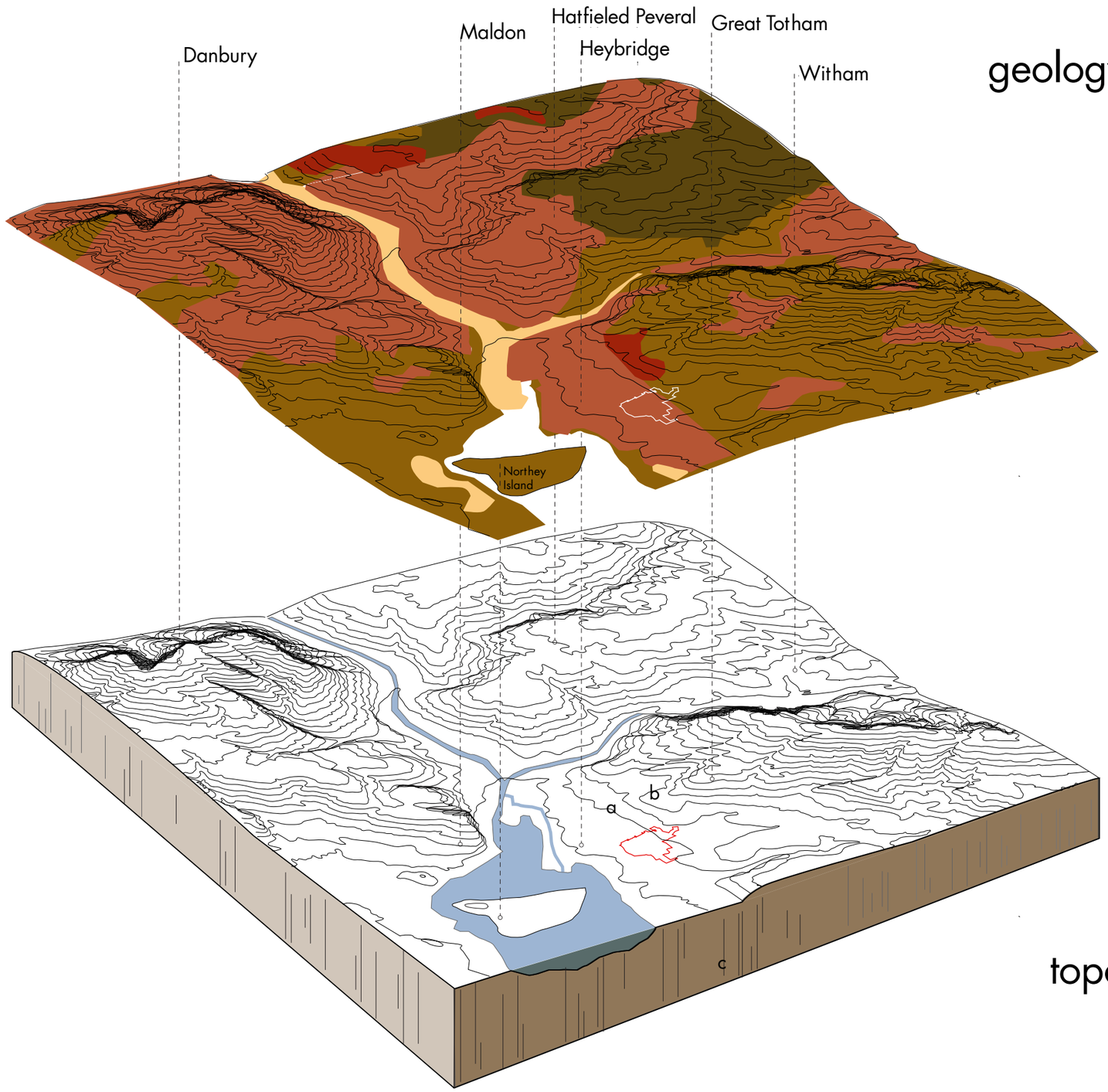
- the gravel extraction has left a disturbed landscape in transition.
- this is a site which could be considered to have 'priviously used land' status

"scale bedrock geology description: London Clay Formation - Clay, Silt And Sand. Sedimentary Bedrock formed approximately 34 to 55 million years ago in the Palaeogene Period. Local environment previously dominated by deep seas.

Setting: deep seas. These rocks were formed in deep seas from infrequent slurries of shallow water sediments which were then redeposited as graded beds."

opportunities for the masterplan

- The flat landscape has is own distinctive quality which should be respected and emulated - water, aquatic vegetation, etc
- This landscape has capacity to absorb development since there are no high points; a strong landscape framework is needed
- The impervious soils and subsoils create a strong foundation for a 'wet' landscape creating a distinctive character and identity for new development



geology

key

lofts farm boundary

alluvium deposits
sands and gravels
brickearths and loams
london clay
glacial tills

geology analysis diagram

a lofts farm boundary
b river chelmer
c river blackwater
blackwater estuary

0 - 5m	northey island
3 - 10m	heybridge
5 - 10m	lofts farm
5 - 30m	maldon
15 - 35m	whitam
35 - 45m	hatfield peveral
40 - 60m	great totham
65 - 105m	danbury

topography

topography analysis diagram

hydrology overview

water shaping the landscape

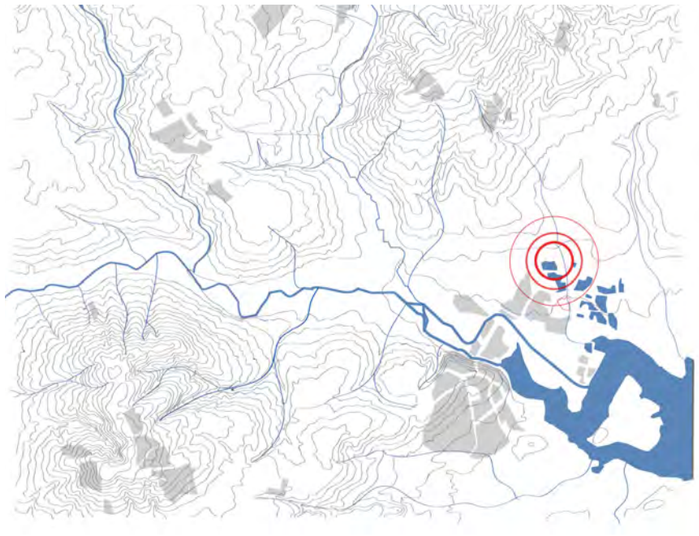
A combination of natural drainage pattern and man-made excavations have shaped the character of the site.

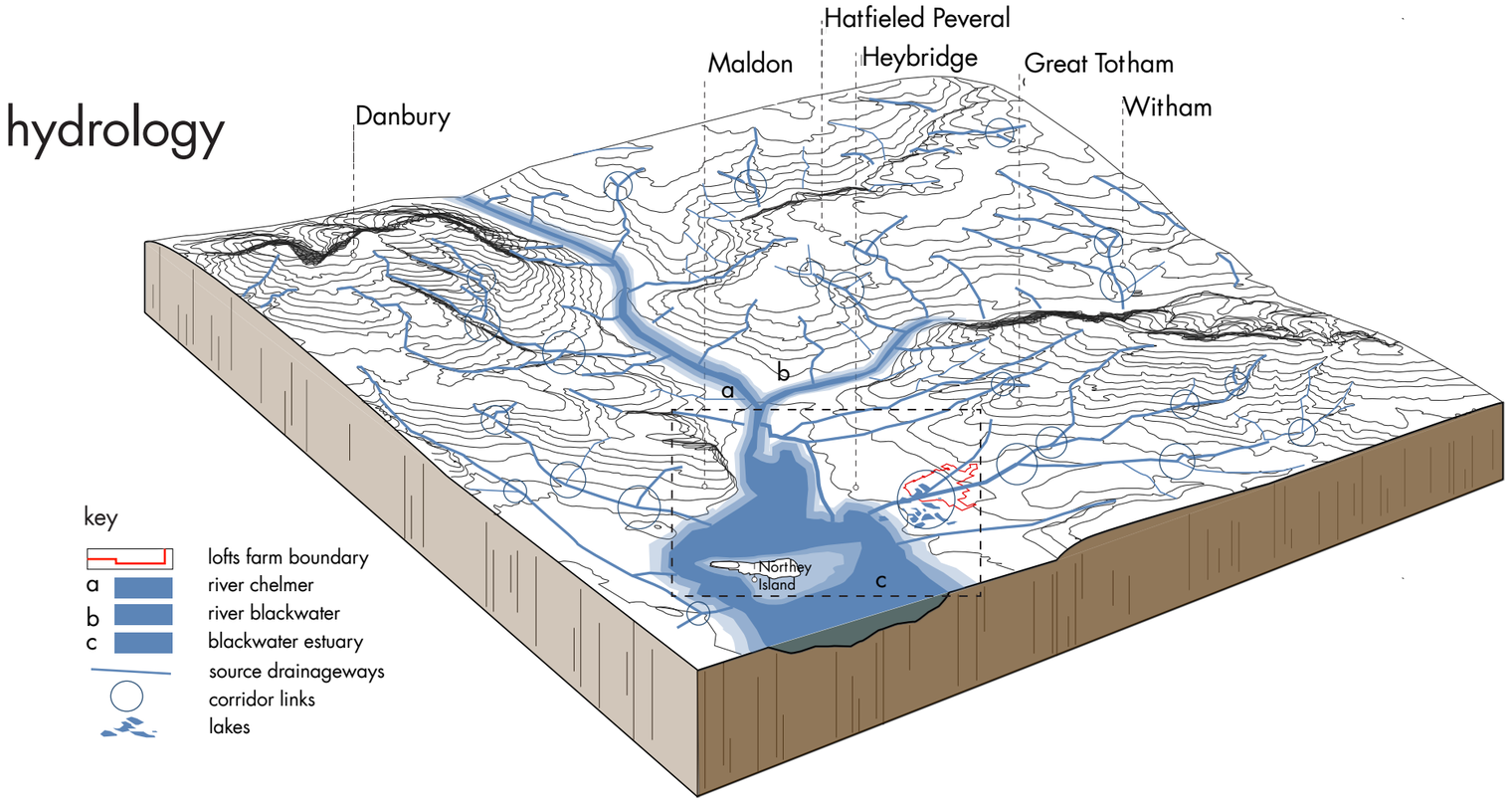
climate change

As rainfall patterns fluctuate, water management is a primary focus for development. Climate change figures for the area indicate that while summers will be significantly warmer with a 60% reduction in rainfall, winter months will see a 30% increase in rainfall with heavier and more concentrated storms, causing flooding and erosion where water cannot be managed appropriately.

conclusion for site justification

Disturbed land well drained enclosed by landform.





hydrology analysis diagram (NTS)

opportunities for the masterplan

- natural drainage, the associated landform and vegetation have created a distinctive and valuable landscape framework and character
- the combination of moving and held water provides a range of habitat and amenity values
- the existing streams on the site create a focus for settlement
- the site holds the possiblity of water reduction for a wider area

Loft's Farm

key

— loft's farm boundary
--- spickets brook
--- catchpole brook

1 "loft's farm lake"
2 may lake
3 pochard lake
4 gadwall lake
5 heybridge mere
6 chigborough mere
7 chigborough lakes
8 may lake
9 home water

a chelmer river
b blackwater river

water bodies analysis diagram (NTS); the site forms part of a larger water system which with appropriate connection, could be a valuable resource

landscape designations

landscape context

national designations

The national planning policy framework (NPPF, 2012) sets out the government's planning policies for England and how these are expected to be applied. NPPF places sustainability as the golden thread running through the plan-making and decision-taking process with a presumption in favour of sustainable development. One of the core principles is that planning should:

"take account of the different roles and characters of different areas, promoting the vitality of our main urban areas, protecting the Green Belts around them, recognising the intrinsic beauty of the countryside and supporting thriving rural communities within it."

In section 11, 'conserving and enhancing the natural environment', the NPPF requires that valued landscapes are protected and enhanced with great weight placed on the conservation of landscape and scenic beauty in national parks and areas of outstanding natural Beauty (AONBs), which have the highest status of protection in relation to landscape and scenic beauty.

local policy and designations

The northern part of the site lies within the Special Landscape Area (SLN) – Chelmer Blackwater Ridges.
policy cc7 of the replacement local plan (2005) states that :

"within special landscape areas permission will not be given for development unless its location, siting, design, materials and landscaping conserve or restore the character of the area in which the development is proposed".

South wood is ancient woodland. It lies adjacent to the north boundary of the site and within the special landscape area.

The southern parts of the site lie within the coastal zone (saved policy CC11):
"Within the defined coastal zone, development will only be permitted if:
1. It requires a coastal location or is associated with an existing use within the coastal zone;
2. the location, siting, design, materials and landscaping would not adversely affect the open and rural character of the area, its historic features and wildlife;
3. It has minimal impact on views into and out of the area;
4. It meets an essential overriding local need which cannot be met within the settlement development boundaries; and
5. every reasonable effort is made to use previously developed land and/or buildings in preference to undeveloped land".

Lofts Farm pit including the lake just north of the causeway is a geological SSSI and other lakes to the south-east of the site are local wildlife sites (part of LWS M8 Chigborough Lakes TL 877086).

conclusion for site justification

The site does not lie within or close to an AONB.

A landscape and visual assessment was undertaken of areas on the periphery of Maldon (see LVIA report 2010) where there was expected to be pressure for greenfield land to be developed for housing. The study included a small part of the SW field known as Area M1. The report concluded that this area falls within the Lower Chelmer river valley LCA (sub unit A7a) and has medium to high landscape sensitivity. It also concluded that development of this area would result in visual impacts for a small number of properties on the northern edge of Heybridge and one PRoW, although it acknowledges that this could be mitigated by planting and creation of open space adjacent to the housing

opportunities for the masterplan

- a context of habitats provides a resource into which the new development can enhance and expand
- existing landscape features and markers provide a structure for the development of a place
- the enclosed land has an established structure while the open spaces are presentaly farmed
- the landscape strategy helps to define and interpret the place, referencing culture, history and ecology through sensitive design

existing vegetation and settlements

woodland

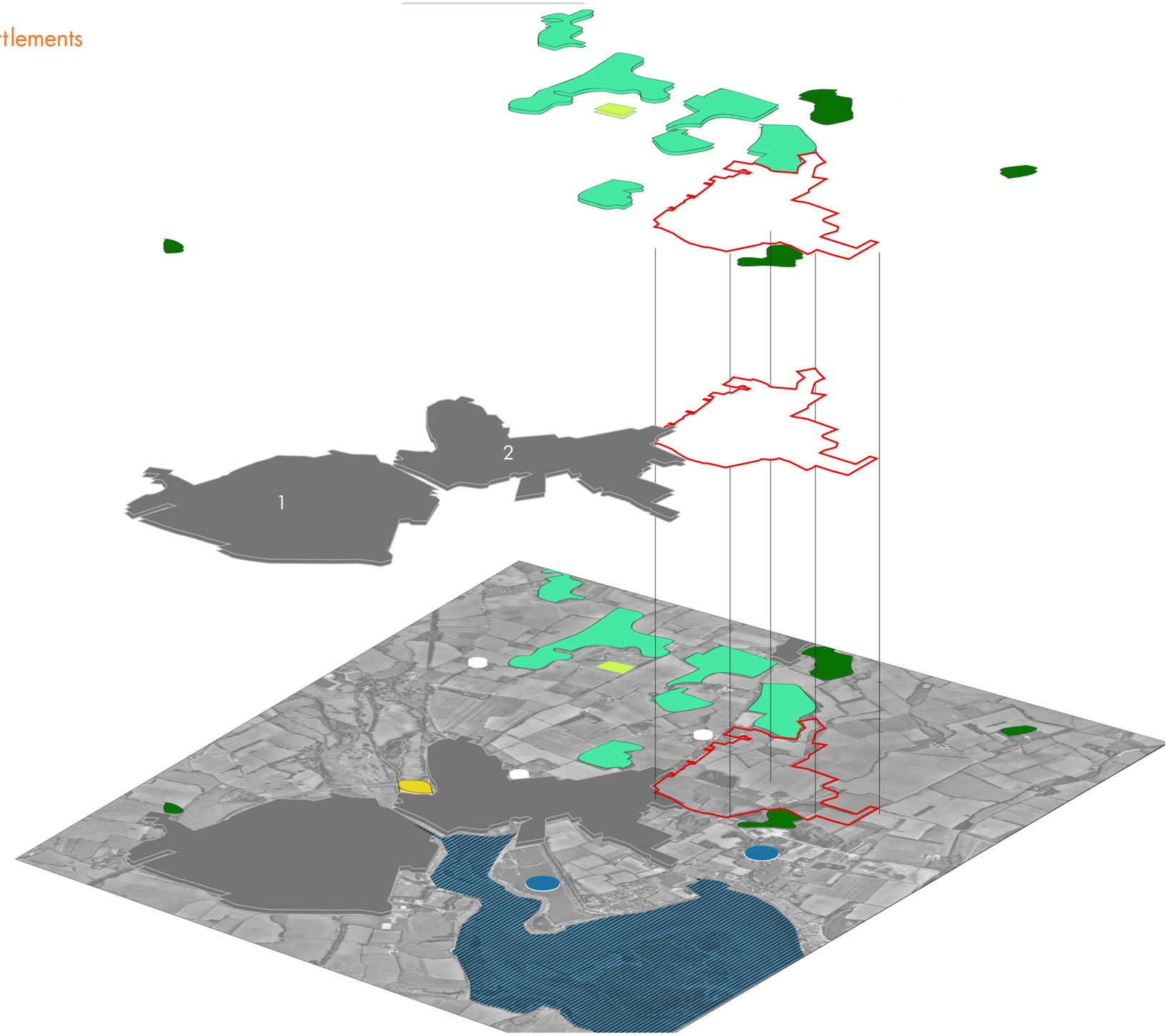
ancient replanted
ancient and semi-natural
woodpasture and parkland B

settlements boundaries

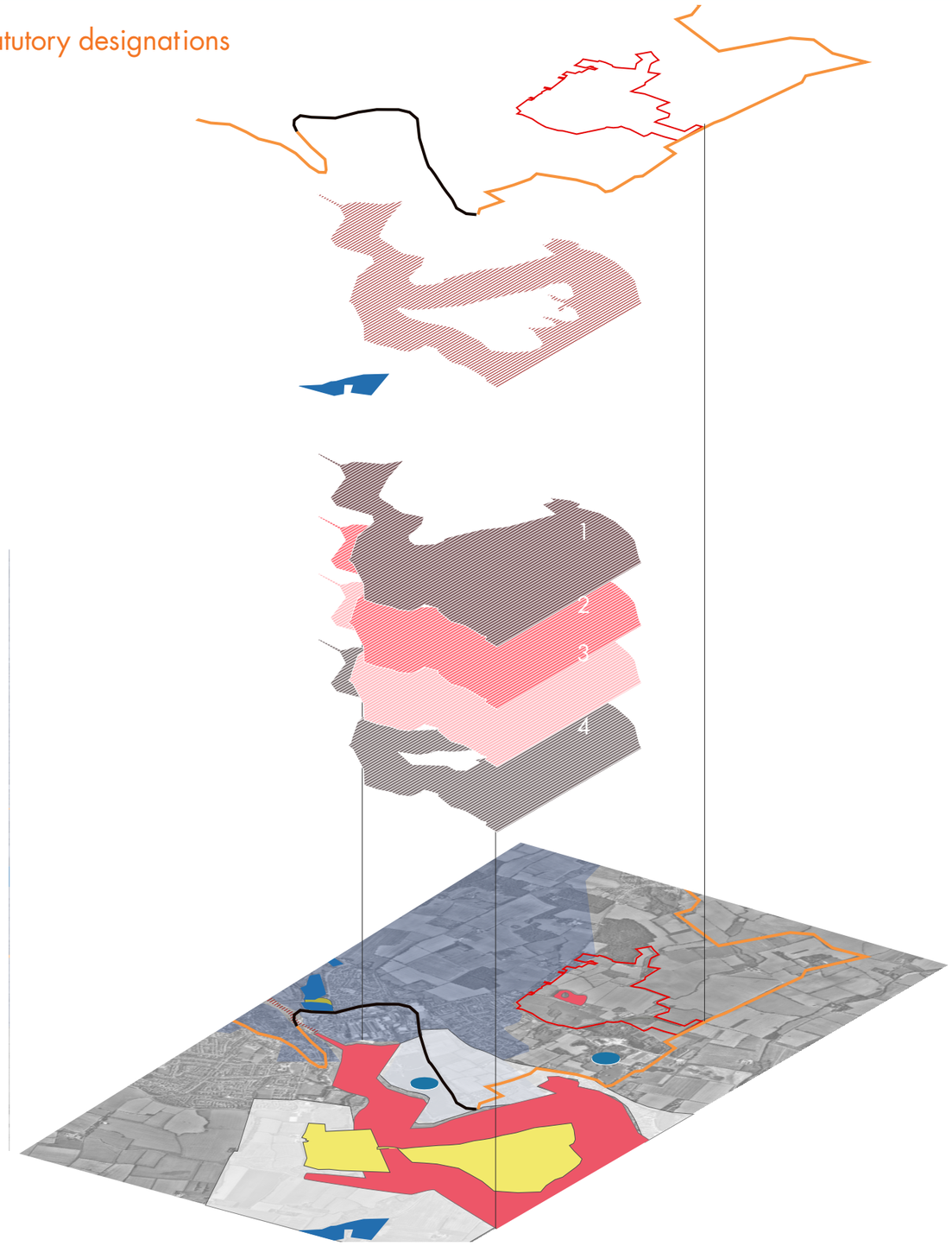
1 Malden
2 Heybridge

traditional orchard.

loft's farm boundary
important bird areas
seabird nesting counts
oak tree meadow - doorstep



habitats and statutory designations



national cycle network
- national route - traffic free
- national route - on road
- regional route - on road

marine and coastal habitat

- mudflat BAP priority habitat
- marsh BAP priority habitat

designations

1 MMO marine paln area

2 RAMSAR

3 SPA

4 SAC

- loft's farm boundary
- SSSI
- national trust properties
- catchment sensitive farming non statutory
- environbmentally sensitive areas - statutory
- SLA - chelmer blackwater ridges
- local wildlife sites

landscape character

District character

landscape character areas

"Landscape character is what makes an area unique. It is defined as "a distinct, recognisable and consistent pattern of elements, be it natural (soil, landform) and/ or human (for example settlement and development) in the landscape that makes one landscape different from another, rather than better or worse".

Policy CC6 of the Replacement Local Plan states that:

'The natural beauty, tranquillity, amenity and traditional quality of the District's landscape will be protected, conserved and enhanced. Proposals for development in the countryside will only be permitted provided that:

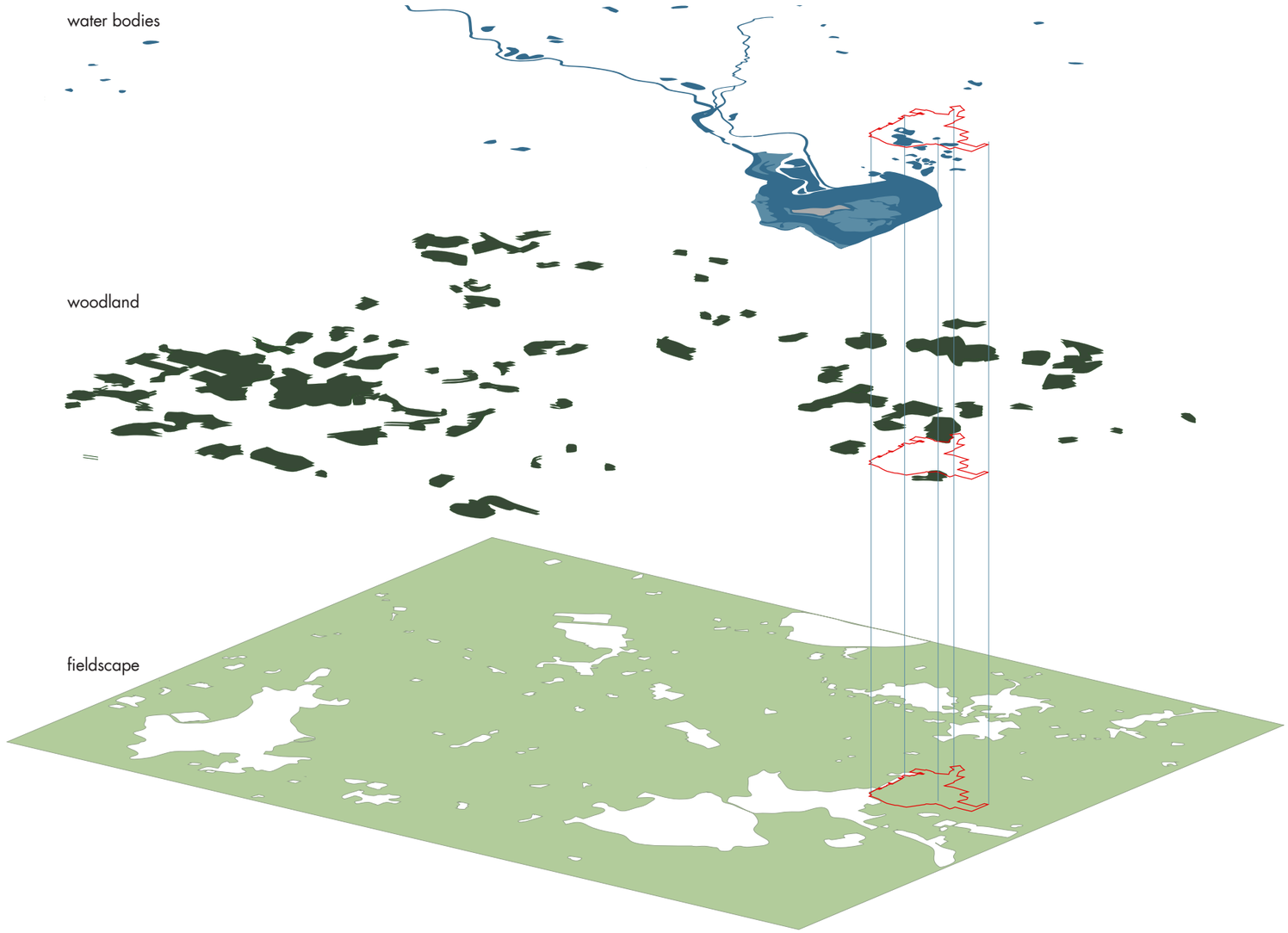
- no harm is caused to the landscape character in the locality, and
- the location, siting, design and materials are appropriate for the landscape in which the development is proposed, and
- the development is landscaped to protect and enhance the local distinctiveness and diversity of the landscape character of the area in which it is proposed'.

National Character Area

Lofts Farm lies on the border between the Northern Thames Basin National Character Area (NCA 111) and Greater Thames Estuary (NCA81).

District Landscape Character Areas/Types

Maldon District Council Landscape Assessment, 2006 identifies a number of Landscape Character Types and Character Areas. The southern two thirds of the site, except the south-west corner, lies within Character Type D - Drained Estuarine Marshes and lies within the District Character Area D2 – Maldon Drained Estuarine Marsh. The south-west corner of the site, that lies closest to Heybridge, lies within Character Type River Valley Landscape and LCA A7 – Lower Chelmer Valley. The northern, less disturbed, parts of the site lie within E1 – Tolleshunt Coastal Farmland which is part of the Landscape Character Type Coastal Farmland Landscapes.



opportunities for the masterplan

- the remnant landscape, both on and off the site, if connected, would give a strong framework for development .
- The presence of water gives opportunities for aquatic landscapes to provide masterplan opportunities for development and improved biodiversity.
- a large scale landscape gives opportunities for a variety of identities whit in the site, framing views and creating a matrix of landscape and habitat

key

loft's farm boundary

landscape characters

e1 tolleshunt coastal farmland

d2 maldon drained estuarine mars

a7 lower chelmer valley

water bodies

salt marshes

woodland

fieldscape

e1

d2

a7

Heybridge

Maldon

Danbury

Rum

landscape character analysis diagram
(NTS)

biodiversity

habitats

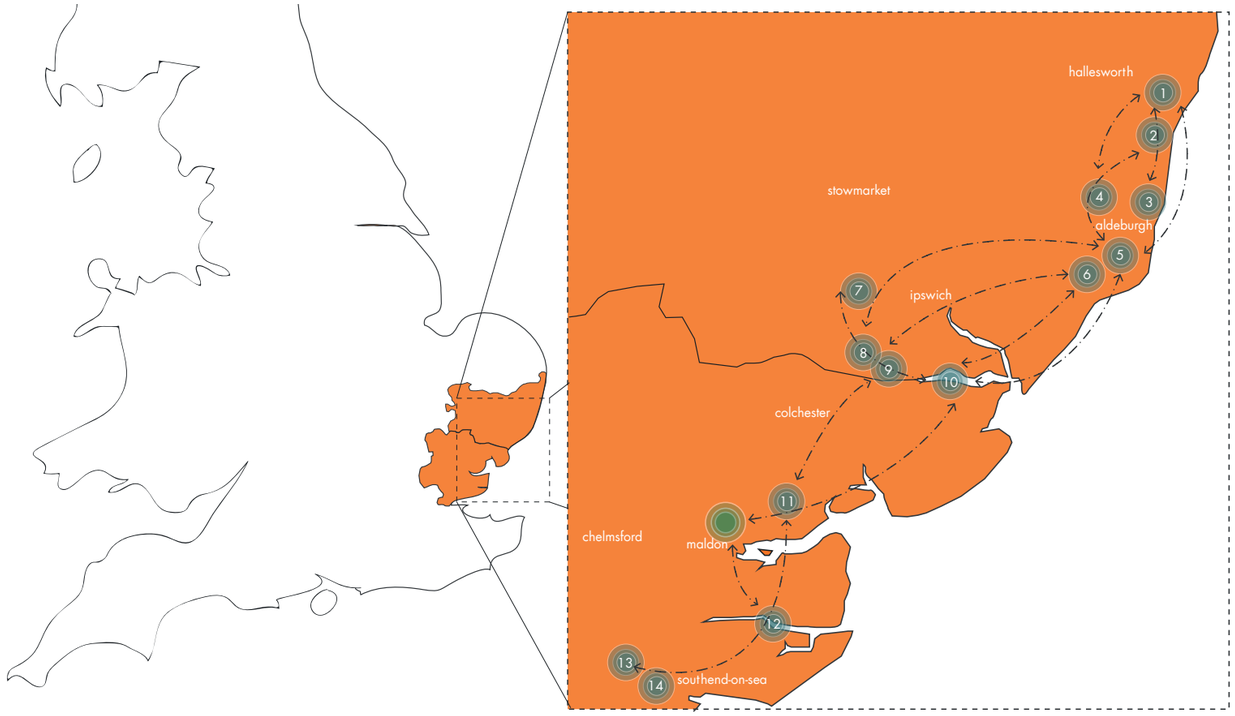
The former gravel pits and perimeter habitats such as the semi-improved grassland along the shore of the northern pit, the vegetated shingle around the southern pit and the scrubby islands are habitats of primary importance on the site. These are relatively uncommon habitats both locally and at a wider geographical scale and are considered to be of County importance. The southern pit and surrounding terrestrial habitats form part of the Chigborough Lakes Local Wildlife Site which is a County designation.

Other grassland and arable crops on the site are of low ecological value with a low species diversity in the swards and evidence that they are agriculturally intensively managed. However, they do provide good feeding areas for waterfowl and also for farmland birds such as linnet, skylark and yellow wagtail.

The network of ditches and hedgerows through the site is generally in a poor condition. Many of the ditches were dry at the time of survey presumably due to land drainage. Many of the hedgerows have large gaps as there is generally no longer an incentive to manage them as stock-proof. Most fields no longer contain livestock; even the one that contained livestock at the time of survey used electric fencing to enclose horses. Given the size of some fields it is likely that some hedgerows have been removed during the last 70 years, as has occurred across much of lowland UK. However, there remains a good network of linear habitats across the proposed development site that is likely to provide foraging and nesting sites for birds, invertebrates, reptiles and small mammals, and movement corridors for many species including reptiles, amphibians, bats and dormice. This network of ditches and hedgerows has potential to be ecologically enhanced which could have beneficial effects throughout the site and beyond.

It is recommended that all habitat types on the site are considered from a biodiversity prospective :

- the waterbodies in the southern section of the site and their marginal wetland habitats, particularly the southernmost waterbody (southern pit), the silt lagoon and Lofts Farm Pit (northern pit) which have the additional constraints of possible breeding Schedule 1 bird species;
- the semi-improved grasslands and vegetated shingle habitats to the south and east of the southern waterbody and around Lofts Farm Pit;
- continuous hedgerows and linear scrub and woodland habitats throughout the site which are likely to provide habitat for commuting and foraging bats, breeding birds and possibly dormice;
- the stream along the eastern boundary;
- many of the buildings on the site with bat roosting potential, as detailed above, and mature trees scattered throughout the site.



key

potentcial bird area

wildlife corridors

RSPB reserves

1 dingle marshes
2 minsmere
3 north warren
4 snape
5 havergate island
6 boyton and hollesley marshes
7 wolves wood
8 flatford wildlife garden
9 cattawade marshes
10 stour estuary
11 old hall marshes
12 wallasea island wild coast project
13 vange marsh and south essex marshes visitor centre
14 west canvey marsh

conclusion for site justification

- within the site there is a range of habitat types which could be potentially a richer resource.
- the site is part of a network of ornithological interest
- connections within the site would enhance biodiversity

opportunities for the masterplan

- potential to extend existing designated county wildlife corridors to and from the site
- significant opportunity to enhance the site's biodiversity, in line with County wide policy and objectives to create new priority habitat of County level importance.
- opportunity to create a sub-regionally important wildlife site

key

- nature reserve - inland
- nature reserve - waterland
- potencial bird area
- loft's farm boundary
- water bodies
- salt marshes
- woodland

Lofts Farm as connected biodiversity resource

visibility

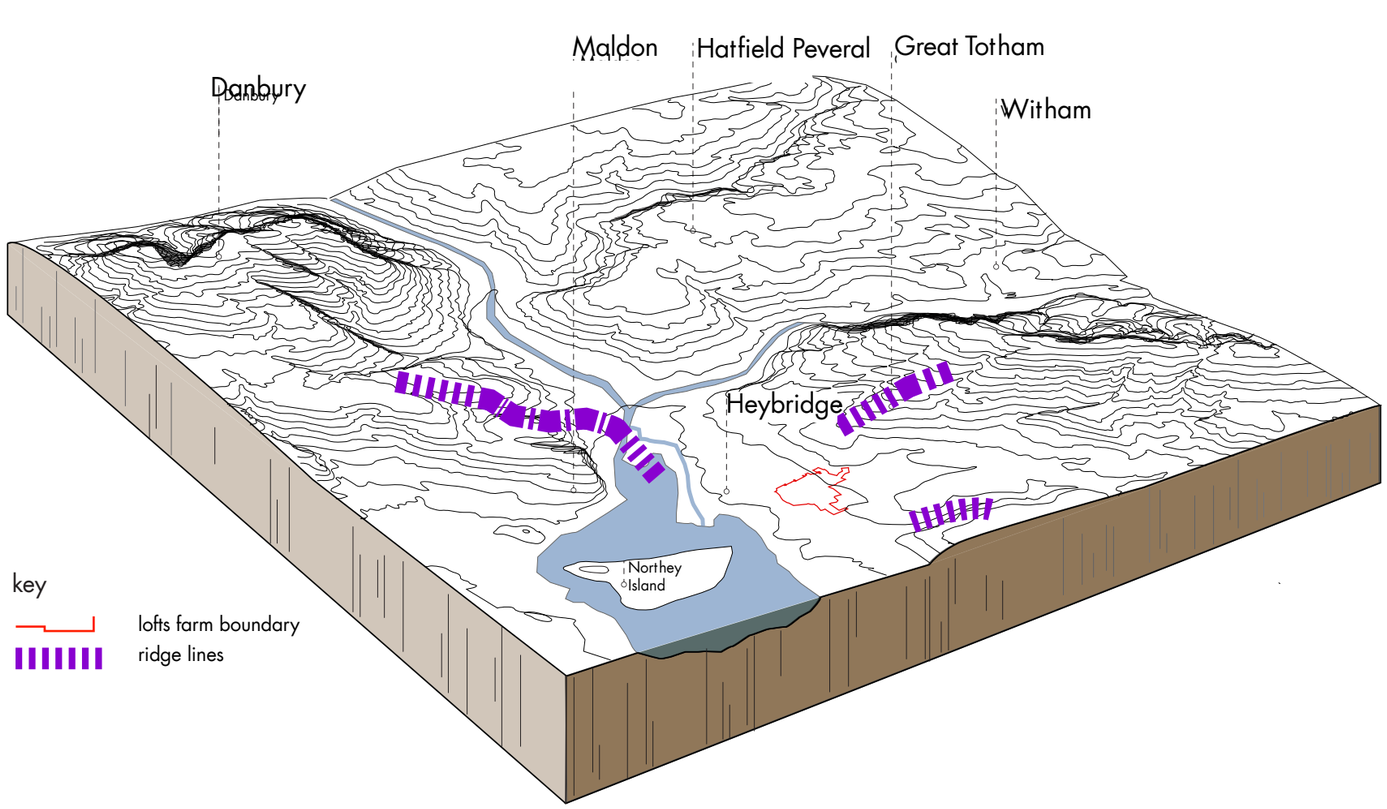
visual context

The site is relatively well enclosed, due to the generally flat nature of the surrounding landscape together with enclosing vegetation. South wood, to the north, preventing any views in from Great Totham, although the land rises to the north of great totham, reaching a height of around 83mAOD. Vegetation and houses along Broad Street Green road largely screen any views into the site from the road and areas to the west. Some of the properties which lie to the east of broad street have views into the site, whilst others have complete or partial screening due to vegetation between the properties and the site. The most visually exposed part of the site lies in the south-west corner where some properties on the edge of Heybridge (mainly single storey) have views to this part of the site. this area is currently grassland. there is a good tree screen along parts of the boundary so not all houses obtain views.

Lofts Farm and Slough House Farm lie within the site as does Sains Hall. it may be possible to obtain views on to parts of the site from sheepcoates farm to the north-east but otherwise no other residential receptors were identified.
the higher parts of Maldon are visible in some views from the site towards the south-west with the church spire being distinguishable. These views are at a distance in excess of 1.5kms.
there are public footpaths crossing the site:

- from Lofts Farm entrance at B1022 running west-east to Scraley Road
- from Broad Street Green west-east to Scraley Road
- from the northern footpath running north past Sains Farm and along the Catchpole Brook to Church Road.

The main lakes on the site are fished by recreational anglers.



conclusion for site justification

There are important landmark views from the site towards the spires of Totham and Maldon churches. These have significance as "placemaking" reference points. Within the site itself the land is compartmented into distinct spaces by the hedgerow structure which will be retained wherever possible. This hedgerow structure will connect with existing woodlands (and perhaps new ones) to divide the site into a series of development parcels where visibility from one parcel to the next is limited, except where deliberate long distances views are planned.

opportunities for the masterplan

- the flat landscape is contained by topography and vegetation
- the existing linear development along broad street green road contains the western edge of the development
- exisitng views into the site to be protected by retaining large areas of open space

key

- Loft's Farm boundary
- woodland
- SLA - special ladscape area
- local wildlife sites

- roads
- pathways
- hedgerows
- access points

- view to spires
- ecological links

- Sains farmhouse (grade II listed building)
- Lofts Farm farmhouse (grade II listed building)

- St Peter church (Great Totham)

source: http://www.geograph.org.uk

- All Saint's church (Maldon)

source: http://gallery.nen.gov.uk/

visibility analysis diagram (NTS)

visibility

visual context - viewpoints

A number of viewpoints were selected to help understand the visual context of the site:

viewpoint 1: from the north-west corner of site towards Northlands farm.
Views into the site are limited by vegetation on the immediate field boundaries. south wood forms the northern boundary of the site.
viewpoint 2: houses along Broad Street Green road
Houses adjacent to broad street vary in their exposure to the site. Some have garden vegetation which effectively screens the site. others have views from upper storey windows on to the immediately adjacent fields. A few houses have uninterrupted views on to the site, to the nearest field boundaries which usually have hedgerows. The photograph shows views back to these properties from the site, from adjacent fields.


viewpoint 1


viewpoint 2

viewpoint 3: north-eastern edge of Heybridge
The houses along the north-east edge of Heybridge along Ccraley Road are often single storey. There is a tree screen to the north of ScraleyRoad which contains semi mature trees and tall shrubs. this is also the northern gateway to maldon and heybridge. The south west field is therefore visually sensitive to residential receptors along scraley road where it abuts the site, and to road users approaching heybridge from the north along the B1022.
viewpoint 4: Sains Hall
Sains Hall lies in the north-east of the site close to south wood. It is well enclosed by vegetation but is exposed to views from the north.
At present it is surrounded by arable land with South Wood being a strong enclosing element to the west. the hall and barns are grade II listed. Any development around the Hall will need to respect its setting.

viewpoint 5: Loft's Farm
Loft's Farm, of which the farmhouse and old barn are grade II listed, lies centrally to the site on ground slightly raised above adjoining areas on account of the former extraction of gravels. It has views in all directions to the site. The photograph shows views from the east towards the farmhouse and northwards.
viewpoint 6: Slough House Farm
Slough House farm consists of poultry sheds, large agricultural buildings and a farmhouse. It is understood that these will be demolished. The pond to the east of the farm (as shown on photographs) would be an interesting focal point to the proposed development in this part of the site which is visually separate from the majority of lofts farm.
viewpoint 7 from footpath running north towards sains hall
Field boundary hedgerows and south wood limit views beyond the immediate fields.
Public Rights of Way
A number of Pupblic Rights of Way cross the site, notably along the driveway which runs east west from Broad Street. Users of these Rights of Way will be
significantly affected by development proposals although there are opportunities to incorporate them into the open space network and enhance linkages.

Loft's Farm boundary

viewpoints

viewpoint 3


viewpoint 4


viewpoint 5


viewpoint 6


viewpoint 7

conclusions from the analysis

geology and topography

- Land lowered by mineral exctraction lowers visual impact of potential development.
- Archaeological designations are potential educational features that can be interpreted through development.
- Pit excavation has resulted in an attractive water infrustructure and attenuation and natural drainage scheme.
- The relatively flat, and lowered topography reduces the built horizon to 6m (TBC) lower than the existing buildings and around the site.

hydrology

- the site has been reclaimed from the river Blackwater marshes over time and the existing natural drainage system frames the site to the east .
- part of the southern area of the site is liable to flooding, creating opportunities to encourage and manage the wetland areas for biodiversity,educational and recreational purposes.
- the northen part of the site is relativeley free draining due to the gravel strata

landscape designations

- the site area falls within the 'Lower Chelmer Landscape Character Area' and has a medium to high sensitivity to change.
- The northern part of the site, not excavated for minerals, lies within the Chelmer Blackwater Ridges, Special Landscape Area which influences the farm, siting, character, ecology and landscape context of any proposed development.
- The site is not Greenbelt nor within the AONB Natural Park, although we recognise the potential of the site to become part of a regional countryside leisure and educational attraction, linking with lakes to the south east and ultimately through to the shore of the river.
- South Wood lies adjacent to the northern boundary outside the site, within the Special Landscape Area. This local asset provides a habitat and amenity resource,that can be protected and extended into the site.

landscape character

- Loft's Farm lies on the border between the Northern Thames Basin National Character Area (NCA III) and the Greater Thames Estuary (NCA81).

- At a more detailed scale, three district character areas meet on the site, resulting in the district characters of 'drained estuarine marshes'; 'river valley landscape' and 'coastal Farmland' across the site. This provides a strong driver for the landscape infrastructure and character areas of the development.

- Common to all of these character types is the flat, low nature of the land, well enclosed by existing field boundary vegetation and raised landform to the west.

biodiversity

The ecological value of the site could be improved through the provision of a strong green connecting infrastructure. Many of the existing linear habitat features, such as hedgerows and ditches, should be retained and enhanced, but new opportunities for linear features could be created to form continuous habitat corridors through the site. It would be particularly valuable to link South Wood to the north and Chigborough Lakes to the south.

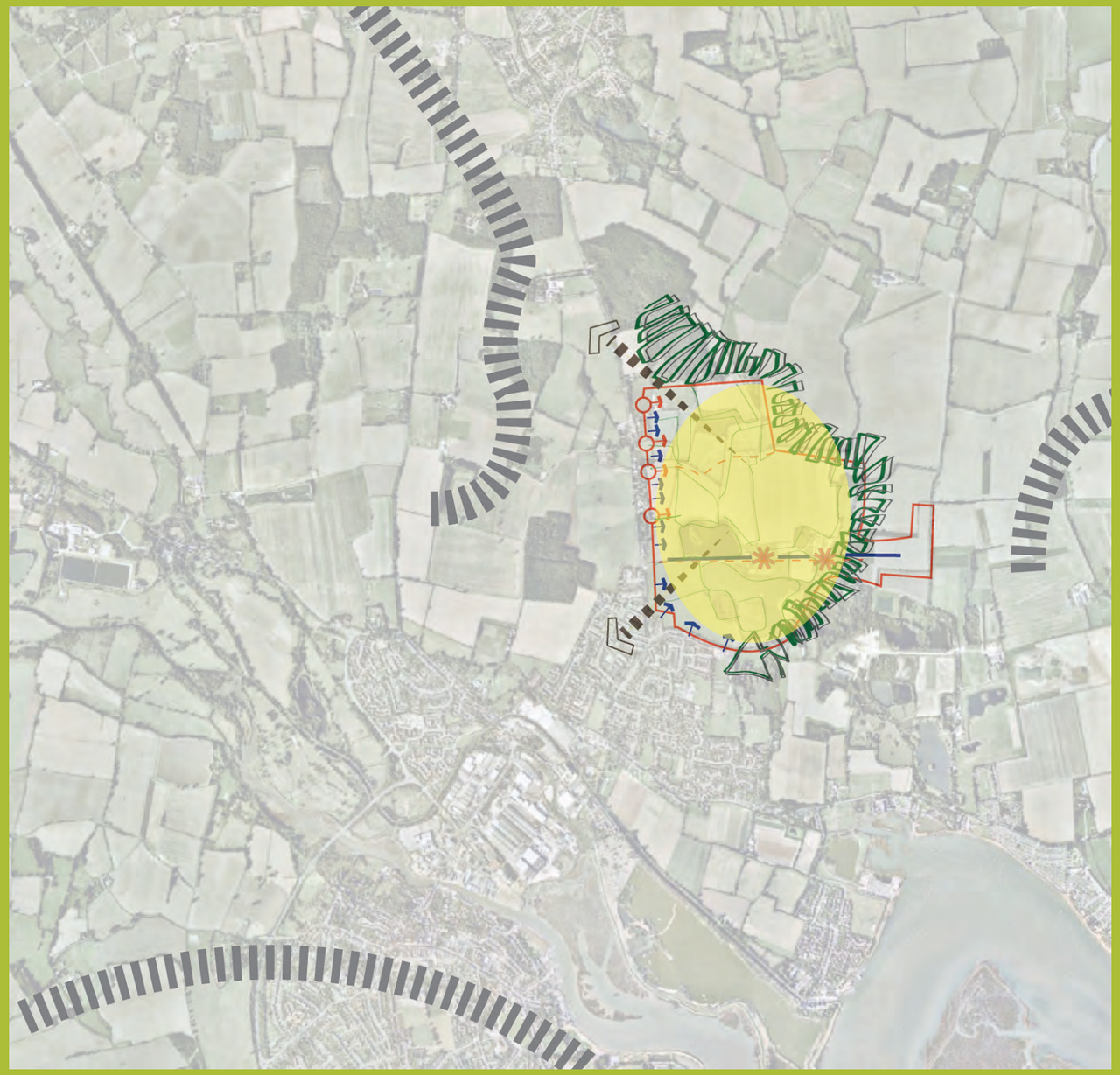
The southern waterbody and adjacent silt lagoon should be managed to increase their biodiversity value, creating some disturbance free areas through access restrictions, but also encouraging informal recreational use in other areas, which will help to alleviate recreational disturbance of nearby protected wildlife sites. Enhancement of this area should focus on increasing the area of wetland habitat along the lake margins and creating further small lagoons to the south and east. The silt lagoon should be retained and made safe by minor re-excavation to deal with the current health and safety risk posed by the soft substrates but note the detailed comments in Extended Phae 1 Habitat Survey Report. A possible model on which to base the ecological enhancement and management of this area, and rehabilitation of dangerous soft substrates, can be found at the Chigborough Lakes Reserve to the southeast which comprise habitats with a similar history of gravel extraction and where former silt lagoons have been re-excavated and public access is allowed across a large area of ecologically rich habitats.

visibility

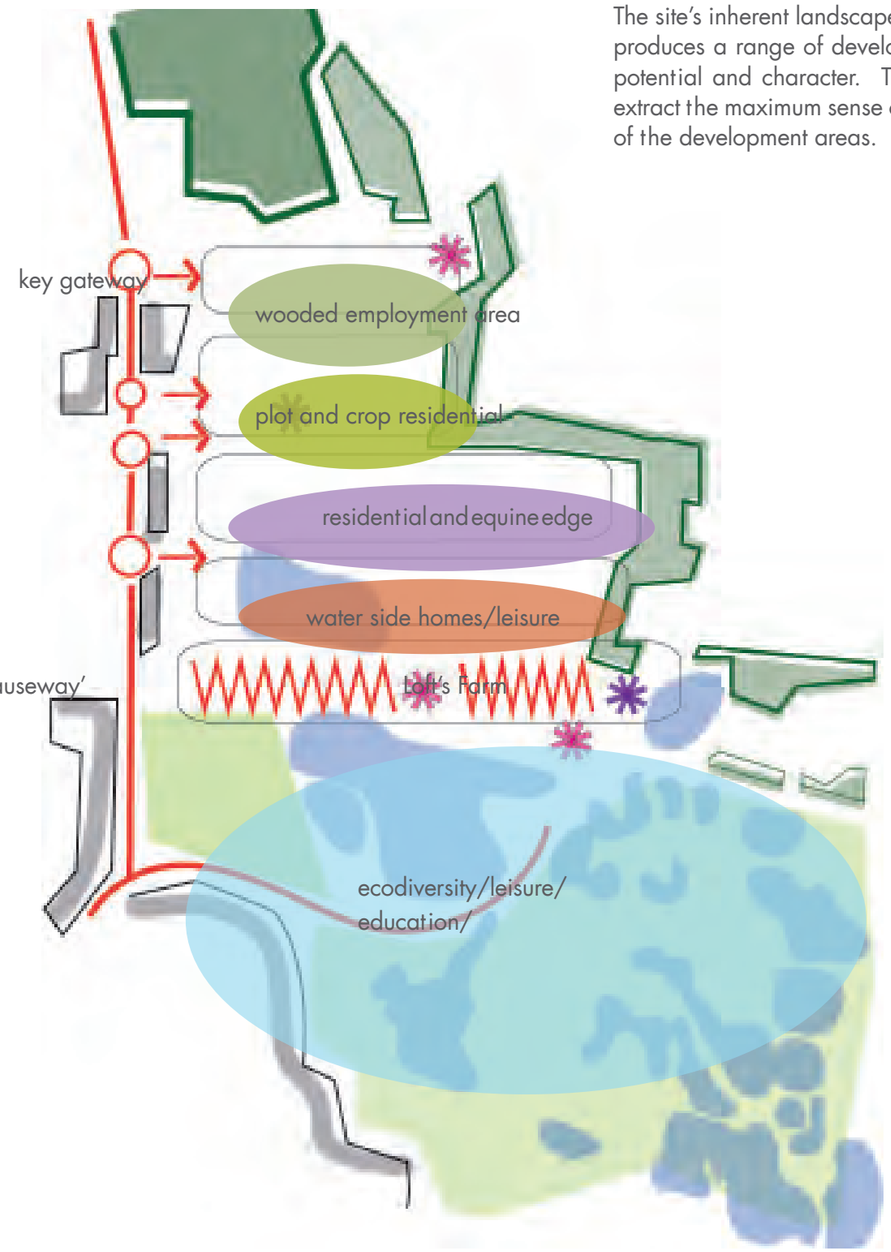
The site is relatively well enclosed, due to the generally flat or gently sloping nature of the surrounding landscape together with enclosing vegetation and the general reduction in site levels. South Wood, to the north, prevents any views in from Great Totham, although the land rises to the north of Great Totham, reaching a height of around 83mAOD. Vegetation and houses along Broad Street Green Road largely screen any views into the site from the road and areas to the west. Some of the properties which lie to the east of Broad Street have views into the site, whilst others have complete or partial screening due to vegetation between the properties and the site. The most visually exposed part of the site lies in the south-west corner where some properties on the edge of Heybridge (mainly single storey) have views to this part of the site. This area is currently grassland. There is a good tree screen along parts of the boundary so not all houses obtain views. Lofts Farm and Slough House Farm lie within the site as does Sains Hall. It may be possible to obtain views on to parts of the site from Sheepcoates Farm to the north-east but otherwise no other residential receptors were identified.

The higher parts of Maldon are visible in some views from the site towards the south-west with the church spire being distinguishable. These views are at a distance in excess of 1.5kms.

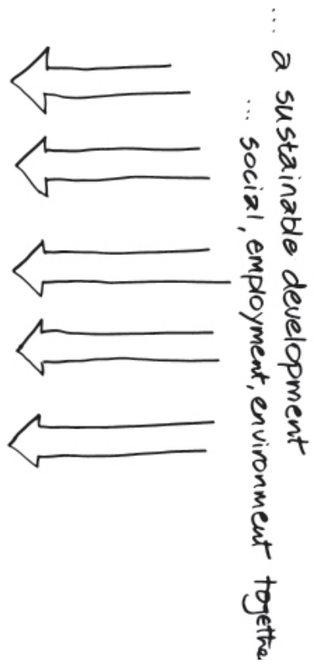
landscape strategy



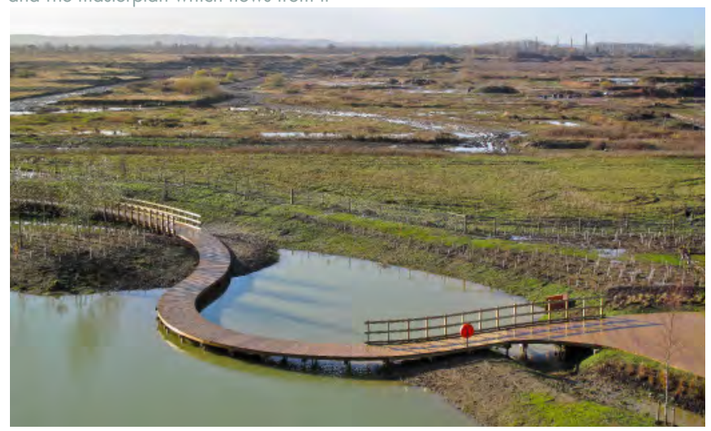
... a strategic plan using existing and new woodland for enclosure, emphasising the causeway to Lofts Farm and displaying the views to the two churches. The site is enclosed by the ridge lines of surrounding landform ...

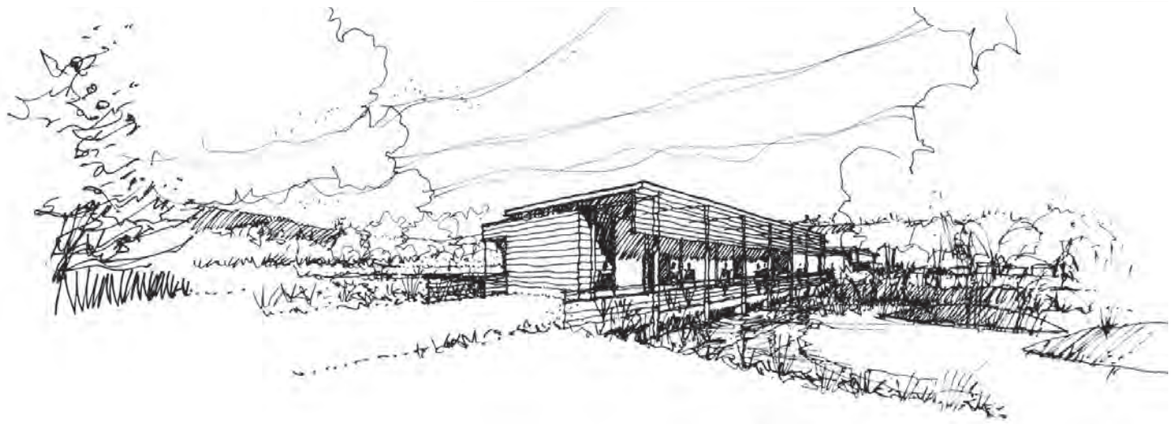


The site's inherent landscape character and differentiation of habitats produces a range of development opportunities, each with different potential and character. The masterplan must use this potential to extract the maximum sense of place to provide distinctiveness to each of the development areas.

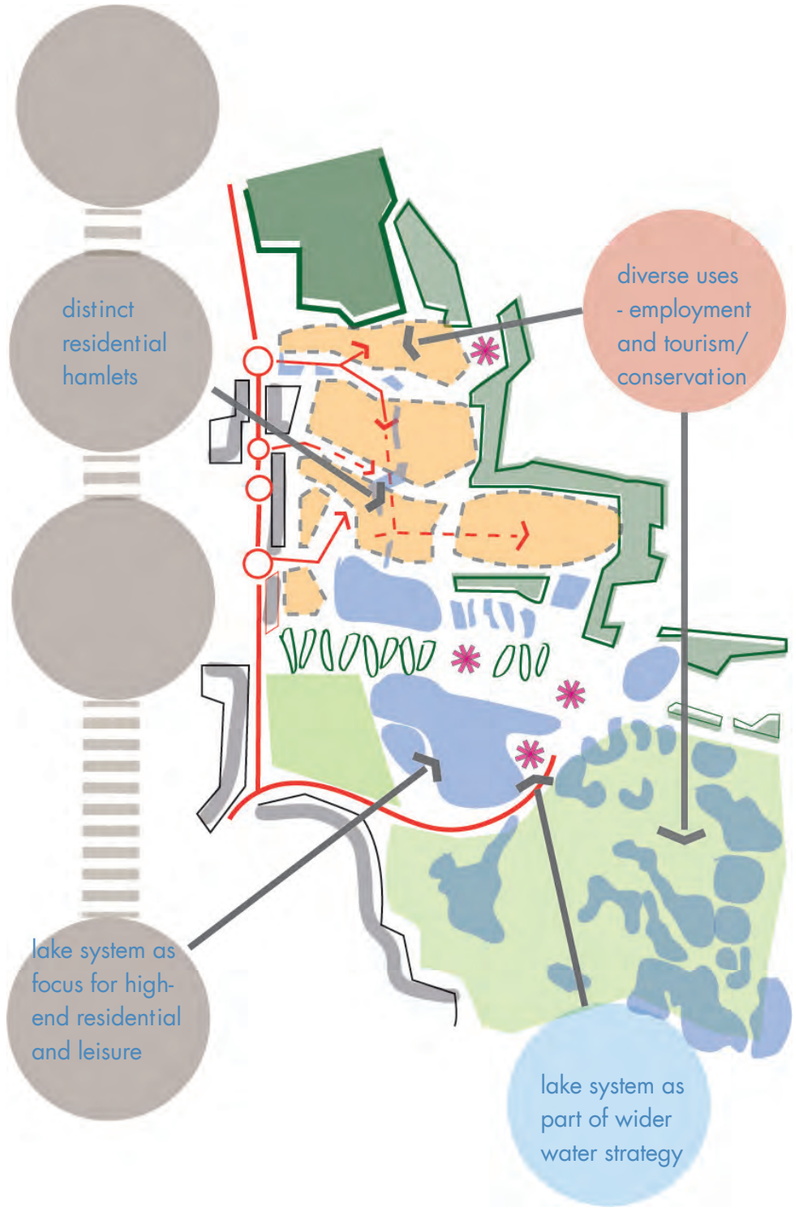


water, in all its forms and uses will play an important part in the landscape strategy and the masterplan which flows from it





Plan concept diagram (NTS)



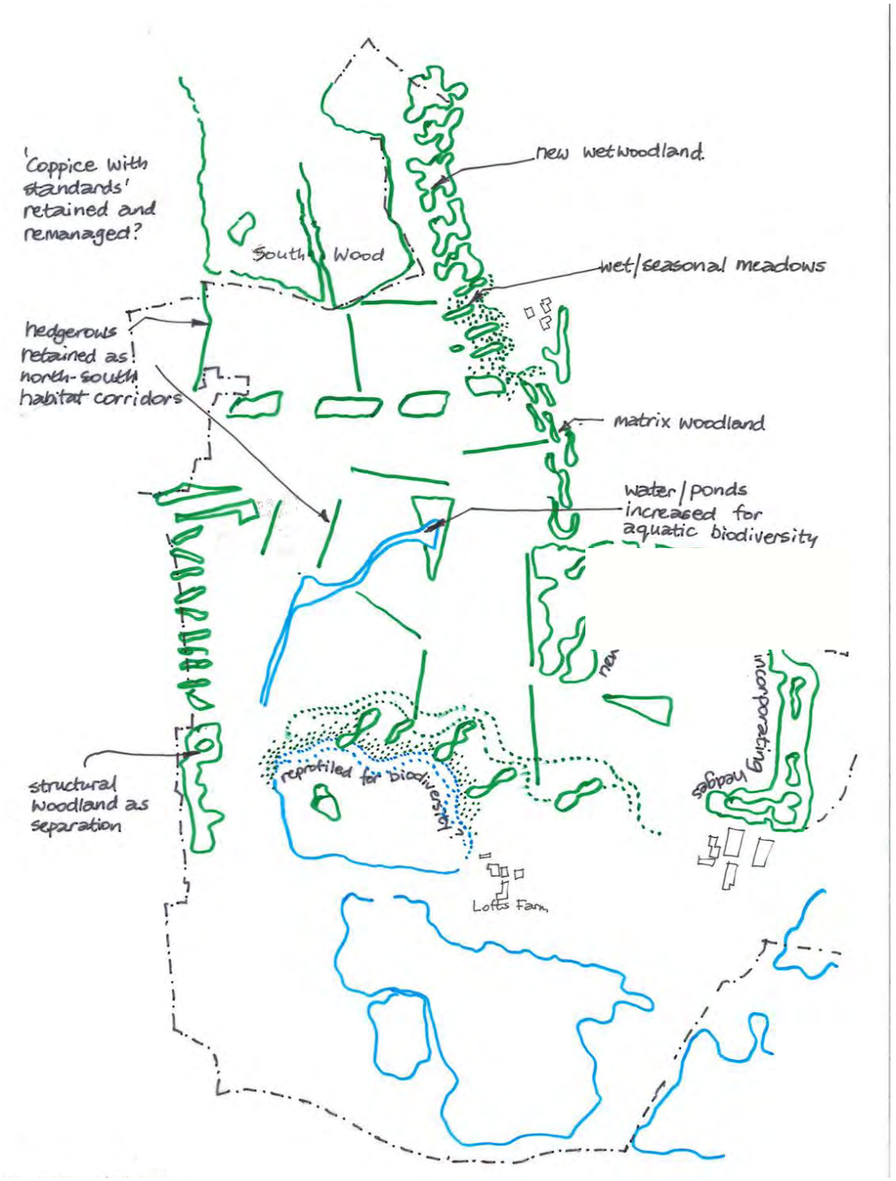
The landscape design should be used positively to use the views of the two church spires visible from the site, to create enclosure so that the visual impact of the project will be negligible, and to create specific places within the land area. We envisage a range of landscape type including new woodlands, complementing the existing, wet woodlands to provide a habitat type currently absent from the site, grassland meadows, and aquatic environments.

This strategy will produce significant habitat corridors using the existing woodland structure off site, and the water bodies on and around the site and in the wider area. See pages 27 and 29.

This development will result in a strong 'connected' landscape increasing the richness of the site and its biodiversity value. This will create development opportunities but also the potential for education, leisure and even sporting resources.

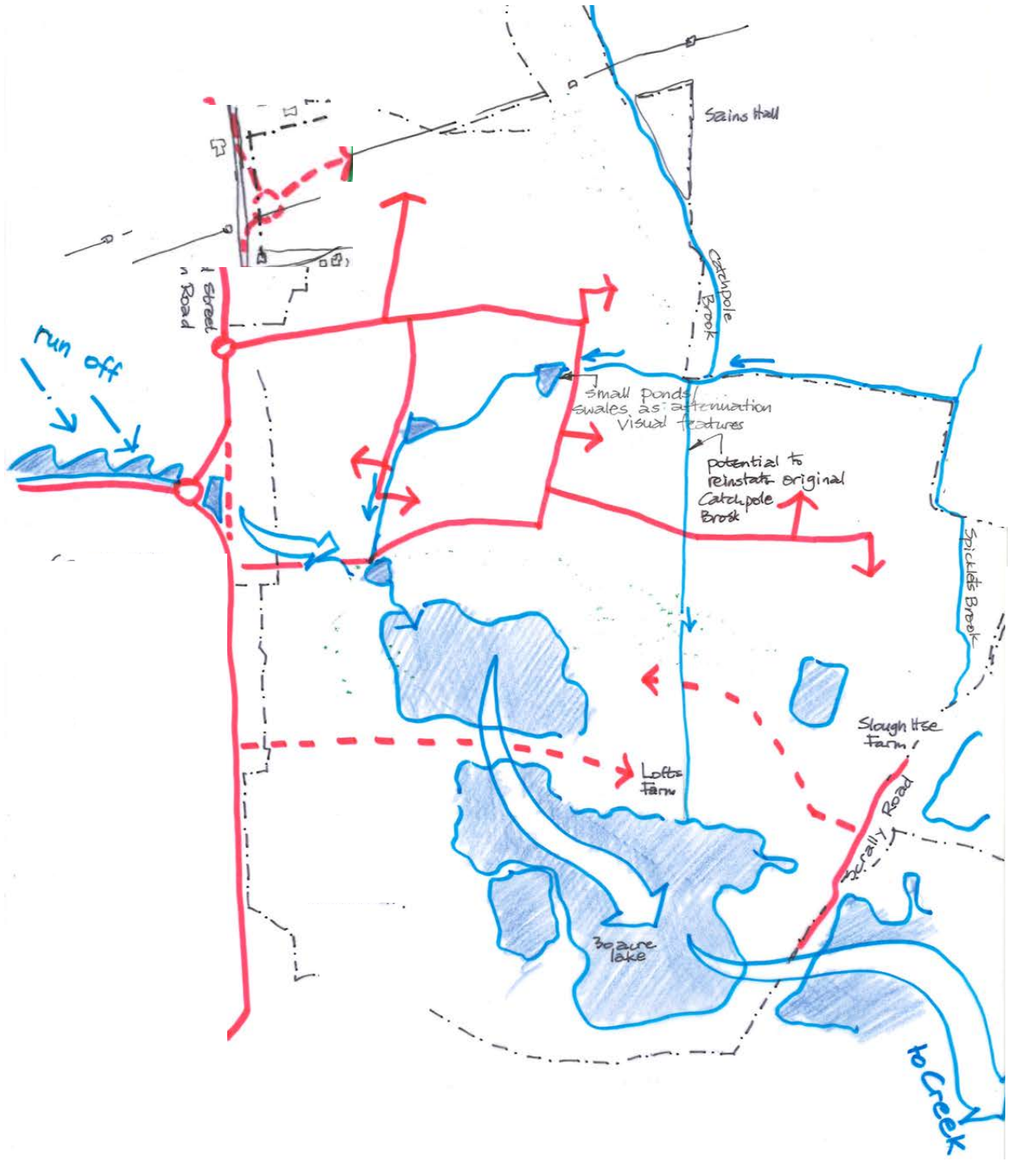
Management of the landscape will play and important part in creating this resource for the long term. South Wood contains 'coppice and standards' trees which provide an example of sustainable management over a long period of time.

Landscape and Biodiversity Strategy



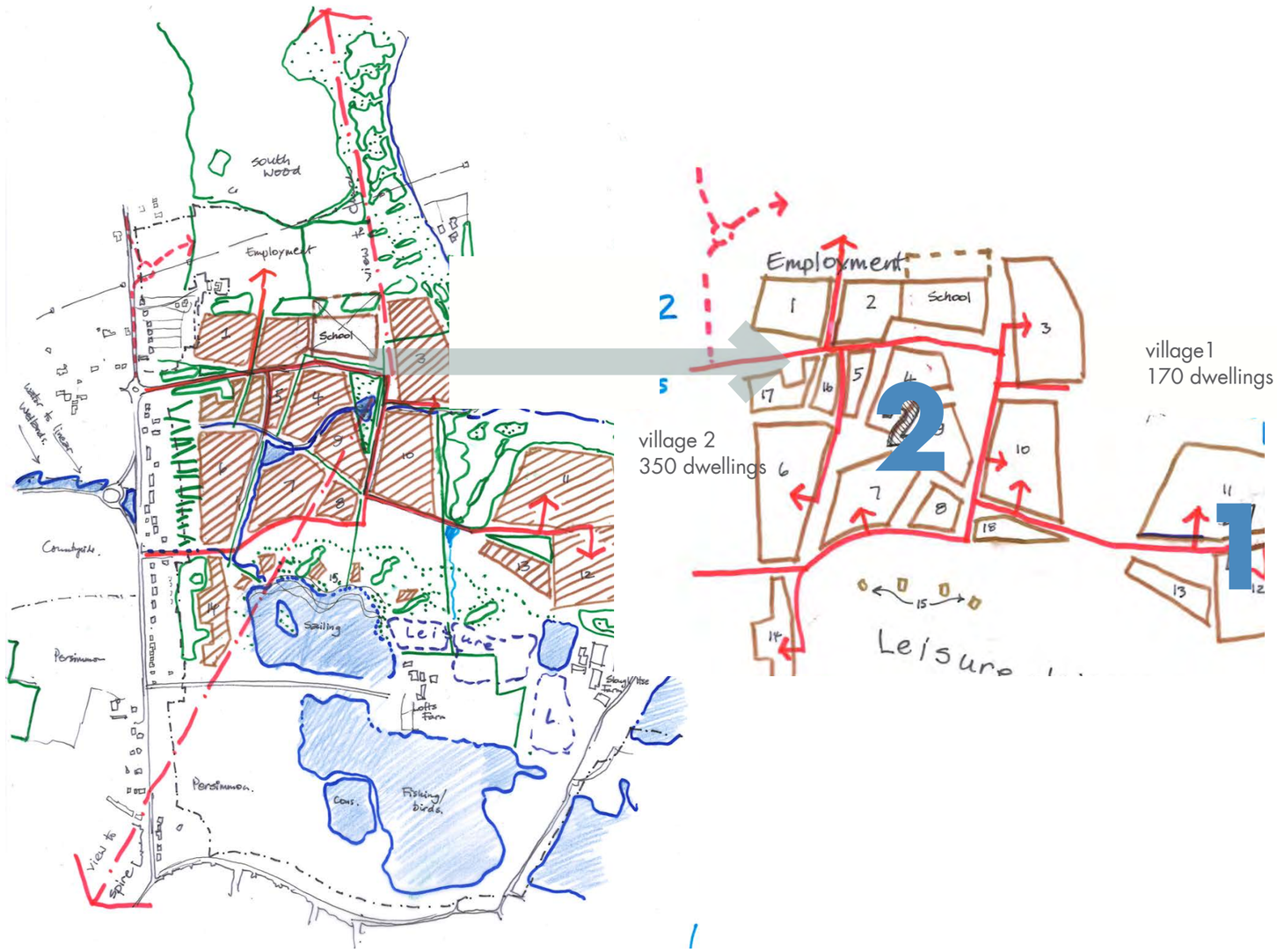
The emerging strategy combining landscape characterisation, land uses and biodiversity resource.

Water and Highways Strategy



The attenuation and flows of water through the site is a key determinant of the masterplan. It can be used to create specific 'places', to inform the engineering solutions to attenuate a wider area of land improving the current draining regime in the existing settlements and its correct use will hugely benefit the biodiversity, educational and scenic value of the site

Residential Development Areas



The landscape strategy evidenced here produces a number of discrete development area for employment (to the north of the site) residential (villages 1 and 2 above), small scale and low density residential to the south near the lakes, and leisure/conservation uses in the southern portion of the site. Approximately 520 units plus a school and ancillary uses on 19.08 ha/47.15 acres of land, plus structural landscape, open space, leisure and water

The diagram shows the two major development areas, as distinct entities with their own characters, with the conceptual landscape types illustrated on page 35 overlain. Landscape character and potenital will inform the development and its masterplan.

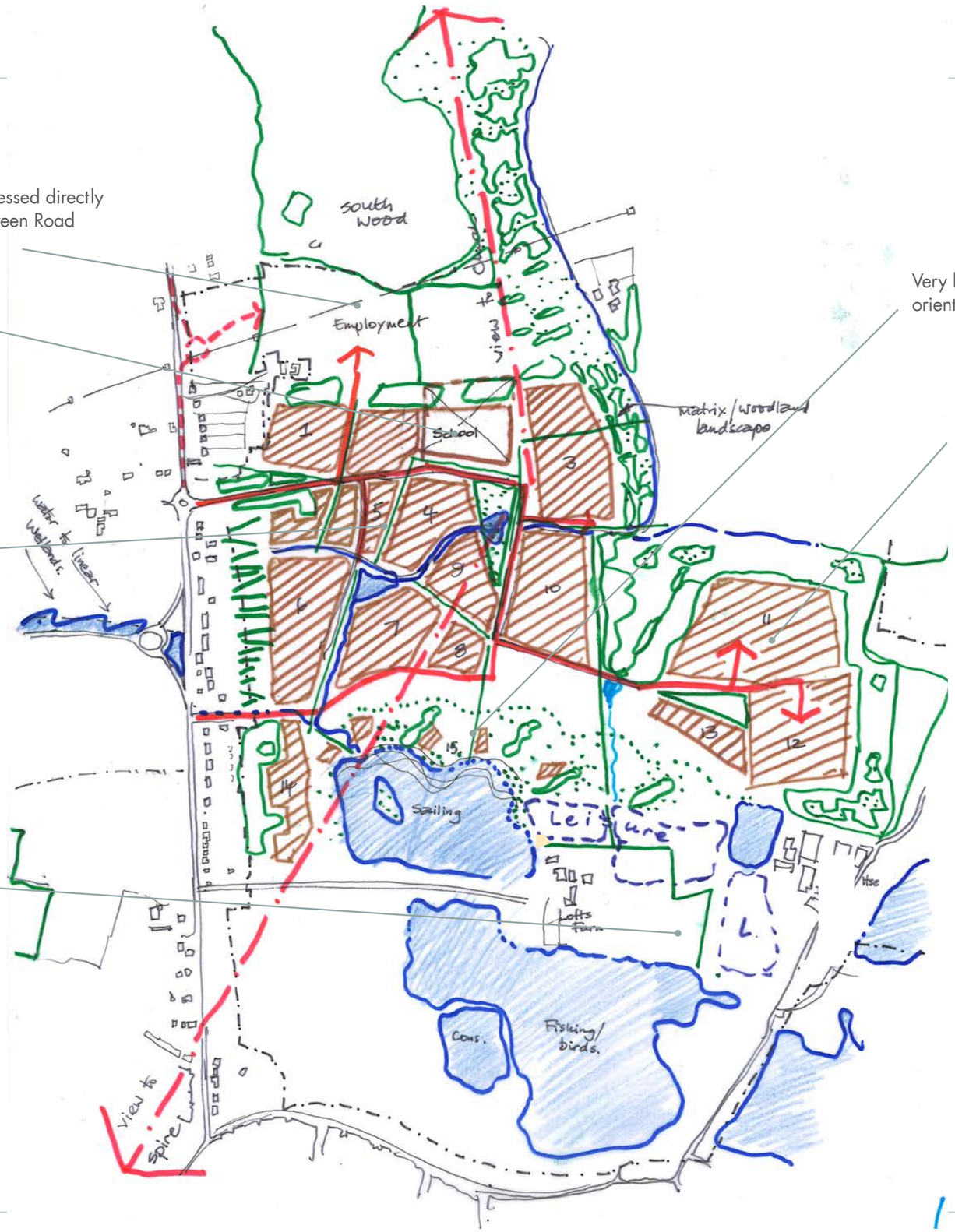
Residential Development Areas

Employment site accessed directly from Broad Street Green Road

1.6 ha school site

Residential village 2. 350 houses is focussed on a triangular space including water attenuation and a school site of 1.6 ha. the flow of water through the site will create distinct neighborhoods with the village.

Leisure, conservation, open space and educational resource to the southern part of the site separating it from further development.



Very low density water oriented houses.

Residential village 1. A discrete hamlet of 170 houses designed around a characteristic triangular space, backing onto and enclosed by new woodland. The southern edge of the hamlet is oriented to the open space and wetlands to the south.

appendices

Proposed Development at Lofts Farm, Maldon, Essex

Landscape and Visual Appraisal

Rev and Date	Document Ref:	Author/ Reviewer
130628	RD1474_lofts farm draft LVA	S Singleton/R Rummey

Rummey Environmental
South Park Studios
Sevenoaks
Kent
TN13 1AN

Rummey environmental

Contents

Figures

1.0 Introduction

1.1 This report presents a preliminary overview of the landscape and visual environment at Lofts Farm, Maldon, Essex where a conceptual masterplan is being prepared for the development of the Site. Lofts Farm is located to the east of the B1022 between Heybridge and Great Totham in Essex. This report describes the baseline conditions of the Site and its surroundings, and identifies likely landscape and visual receptors. It also discusses the implications for development and has been used to inform the conceptual masterplan for the site, to ensure that proposals take account of the landscape character of the area and the visibility of the site. In this way any significant impacts on landscape character or the visual environment can be avoided and beneficial impacts optimised.

1.2 The appraisal follows the guidance provided in 'Guidelines for Landscape and Visual Assessment' 3rd edition, 2013. The definition of 'landscape', in particular, has been revised to take account of the European Landscape Convention (ELC), 2000. The ELC definition of landscape supports the need to regard landscape as a resource in its own right:

> *'Landscape is an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors.'*

2.0 Landscape Context

2.1 *National Designations*

The National Planning Policy Framework (NPPF, 2012) sets out the Government's planning policies for England and how these are expected to be applied. NPPF places sustainability as the golden thread running through the plan-making and decision-taking process with a presumption in favour of sustainable development. One of the Core Principles is that planning should:

> '*take account of the different roles and characters of different areas, promoting the vitality of our main urban areas, protecting the Green Belts around them, recognising the intrinsic beauty of the countryside and supporting thriving rural communities within it.*'

In Section 11, 'Conserving and Enhancing the Natural Environment', the NPPF requires that valued landscapes are protected and enhanced with great weight placed on the conservation of landscape and scenic beauty in National Parks and Areas of Outstanding Natural Beauty (AONBs), which have the highest status of protection in relation to landscape and scenic beauty.

The site does not lie within or close to an AONB.

2.2 *Local Policy and Designations*

The northern part of the site lies within the Special Landscape Area – Chelmer Blackwater Ridges.

Policy CC7 of the Replacement Local Plan (2005) states that*:*

'Within Special Landscape Areas permission will not be given for development unless its location, siting, design, materials and landscaping conserve or restore the character of the area in which the development is proposed'.

South Wood is Ancient Woodland. It lies adjacent to the north boundary of the site and within the Special Landscape Area.

The southern parts of the site lie within the Coastal Zone (saved policy CC11):

'Within the defined coastal zone, development will only be permitted if:

1. *It requires a coastal location or is associated with an existing use within the coastal zone;*
2. *The location, siting, design, materials and landscaping would not adversely affect the open and rural character of the area, its historic features and wildlife;*
3. *It has minimal impact on views into and out of the area;*
4. *It meets an essential overriding local need which cannot be met within the settlement development boundaries; and*
5. *Every reasonable effort is made to use previously developed land and/or buildings in preference to undeveloped land'.*

Lofts Farm Pit including the lake just north of the causeway is a geological SSSI and other lakes in the south-east of the site are Local Wildlife Sites (part of LWS M8 Chigborough Lakes TL 877086).

A Landscape and Visual Assessment was undertaken of areas on the periphery of Maldon (see LVIA report 2010) where there was expected to be pressure for greenfield land to be developed for housing. The study included a small part of the SW field known as Area M1. The report concluded that this area falls within the Lower Chelmer River Valley LCA (sub unit A7a) and has Medium to High landscape sensitivity. It also concluded that development of this area would result in adverse visual impacts for a small number of properties on the northern edge of Heybridge and one PRoW, although it acknowledges that this could be mitigated by planting and creation of open space adjacent to the housing.

2.3 *Landscape Character Areas*

'Landscape character is what makes an area unique. It is defined as "a distinct, recognisable and consistent pattern of elements, be it natural (soil, landform) and/or human (for example settlement and development) in the landscape that makes one landscape different from another, rather than better or worse".

Policy CC6 of the Replacement Local Plan states that:

'The natural beauty, tranquillity, amenity and traditional quality of the District's landscape will be protected, conserved and enhanced. Proposals for development in the countryside will only be permitted provided that:

- *No harm is caused to the landscape character in the locality, and*
- *The location, siting, design and materials are appropriate for the landscape in which the development is proposed, and*
- *The development is landscaped to protect and enhance the local distinctiveness and diversity of the landscape character of the area in which it is proposed'.*

National Character Area

Lofts Farm lies on the border between the Northern Thames Basin National Character Area (NCA 111) and Greater Thames Estuary (NCA81).

District Landscape Character Areas/Types

Maldon District Council Landscape Assessment, 2006 identifies a number of Landscape Character Types and Character Areas. The southern two thirds of the site, except the south-west corner, lies within Character Type D - Drained Estuarine Marshes and lies within the District Character Area D2 – Maldon Drained Estuarine Marsh. The south-west corner of the site, that lies closest to Heybridge, lies within Character Type River Valley Landscape and LCA A7 – Lower Chelmer Valley. The northern, less disturbed, parts of the site lie within E1 – Tolleshunt Coastal Farmland which is part of the Landscape Character Type Coastal Farmland Landscapes.

Key characteristics of the landscape character types

A - River Valley Landscapes

- V-shaped or u-shaped landform which dissects Boulder Clay/Chalky Till plateau
- Main river valley served by several tributaries
- Flat or gently undulating valley floor
- Intimate character in places
- Wooded character in places

D - Drained Estuarine Marsh Landscapes

- Areas of flat, artificially drained former saltmarsh currently grassland and cultivated fields
- Visible sea walls separate drained former marshland and current saltmarsh/mudflats
- Lack of large areas of trees or woodland
- Network of visible drainage ditches

E - Coastal Farmland Landscapes

- Predominantly flat, low-lying landscape, sloping gradually upwards to the north
- Views of river estuaries and coastline from several locations
- Arable farmland on underlying heavy clay soils
- Lack of large patches/areas of woodland
- Relatively sparse settlement pattern

Within the generic Landscape Character Types, Landscape Character Areas have been identified at 1:25,000 scale. The Landscape Character Areas reflect distinctive variations in local character within each Landscape Character Type based on visual analysis of how different combinations of physical features and perceptual qualities such as scale, pattern, tranquillity, cultural associations, etc. create areas of distinctive landscape character.

D2 MALDON DRAINED ESTUARINE MARSH

This LCA includes the majority of the southern and central parts of the site, with the exception of the extreme south-west corner closest to Heybridge.

Key Characteristics

- *Drained coastal marsh landscape, now isolated from tidal influences*
- *Scrubby, often gappy hedgerows or random copses, mainly near farmsteads*
- *Absence of woodland*
- *Flat arable farmland behind the coastal marshland*
- *Dispersed isolated farmsteads*
- *Urban/suburban influence of Maldon on eastern edges of the character area.*

Proposed Landscape Strategy Objectives

- *Conserve - seek to protect and enhance positive features that are essential in contributing to local distinctiveness and sense of place through effective planning and positive land management measures*
- *Restore - seek to reinforce and/or reinstate historic landscape patterns and features that contribute to sense of place and time depth, by repairing distinctive elements that have been lost or degraded*

Suggested Landscape Planning Guidelines

- *Ensure that any new development responds to historic settlement pattern and scale, and uses materials that are appropriate to the local landscape character. Such development should be well integrated into the surrounding landscape*
- *Ensure that sites no longer used for gravel extraction are sensitively restored to reflect the local landscape character and are well integrated into the surrounding landscape*
- *Conserve the mostly rural character of the area*

- *Ensure that new farm buildings are sensitively designed and located within the landscape to accord with existing character*
- *Conserve panoramic long distance views to adjacent character areas of drained and open estuarine marsh*

E1 TOLLESHUNT COASTAL FARMLAND

This LCA includes the northern parts of the site which have been undisturbed by gravel extraction.

Key Characteristics

- *Absence of woodland.*
- *Semi regular pattern of tall hedgerows, small copses and shelterbelts, although many hedgerows removed.*
- *Gently undulating arable farmland behind the coastal marshland.*
- *Small-scale settlements situated in close proximity.*

Proposed Landscape Strategy Objectives

- *Conserve - seek to protect and enhance positive features that are essential in contributing to local distinctiveness and sense of place through effective planning and positive land management measures.*
- *Restore - seek to reinforce and/or reinstate historic landscape patterns and features that contribute to sense of place and time depth, by repairing distinctive elements that have been lost or degraded.*

Suggested Landscape Planning Guidelines

- *Ensure that any new development responds to historic settlement pattern and scale, and uses materials that are appropriate to the local landscape character Such development should be well integrated into the surrounding landscape.*
- *Conserve the mostly rural character of the area.*
- *Ensure that new farm buildings are sensitively designed and located within the landscape to accord with existing character.*
- *Conserve panoramic long distance views to adjacent character areas of drained and open estuarine marsh to the south.*

Historic Character

The site and adjacent areas has been well studied and excavated prior to the mineral extraction in the 1970s, which unearthed remains that demonstrated the importance of the area to early settlers. Lofts Farm with sites such as Chigborough Hall Farm, Slough House Farm and Rook Hall, to the east of Heybridge, have been excavated, and revealed that settlement began in the Neolithic period and lasted through to the Iron Age and beyond. Broad Street runs along the line of a Roman Road and Maldon and Heybridge were both early Roman settlements.

Listed Buildings on the site

Lofts Farm farmhouse and granary and Sains Farmhouse and associated barns are Grade II listed.

Site Description

Lofts Farm covers approximately 81 hectares of gently sloping, low lying, arable farmland and grassland. The site lies at approximately 10m AOD with a gentle rise to around 18m AOD in the north-west corner. It is underlain by London Clay which was overlain by marine gravels and good quality agricultural soils. Much of the farm was quarried for gravels during the 1970s and 1980s before being restored to farmland. However the loss of the natural drainage, resulting from removal of the gravels, and reduction in topsoil quality has meant that the agricultural potential of the land is diminished. It is

now used for a mix of hay production and arable. The extracted areas still lie below the original level of the land and there are a number of water bodies remaining on the farm from the gravel extraction. These areas now attract numerous waterfowl. There are also silt lagoons remaining in the south-east of the site, left from the working of the site, which are considered to be dangerous. These may need further restoration.

The original Lofts Farm farmhouse and associated barns lie in the middle of the site and are reached from the B1022 (Broad Street Roman Road) via the farm track which forms a causeway, as it is at the original level of the land and above the surrounding levels where extraction took place. Slough House Farm lies to the east and is used for poultry production so has a number of poultry sheds. Sains Hall lies towards the north of the property and is also a historic farm cluster.

The site is bounded by a linear development of houses to the west, which form ribbon development along the B1022, by the urban edge of Heybridge to the south-west and south, by sand and gravel pits (now forming Chigborough Lakes Nature Reserve) to the south–east and farmland to the east. To the north lies South Wood which is a small, mixed, Ancient woodland which encloses the site to the north. Due to the relatively flat nature of the topography and enclosing vegetation the site is not visible from any great distance.

Chigborough Lakes to the south-east is a 46 acre nature reserve and has a wide variety of habitats including willow carr, open water, small ponds, marshland, grazed grassland and scrub. This effectively provides continuity of habitat between the site's water bodies and the estuary of the Blackwater.

The field boundaries on the site are mainly demarcated by hedgerows, which often have gaps, which contain a variety of species. Those in the undisturbed areas of the site to the north also contain mature hedgerow trees. These help to compartmentalise the site.

A pylon line crosses the northern parts of the site close to South Wood in an east-west direction. This is a significant visual detractor on this part of the site.

3.0 Visual Context

3.1 Visual Receptors

The site is relatively well enclosed, due to the generally flat or gently sloping nature of the surrounding landscape together with enclosing vegetation. South Wood, to the north, prevents any views in from Great Totham, although the land rises to the north of Great Totham, reaching a height of around 83mAOD. Vegetation and houses along Broad Street Green Road largely screen any views into the site from the road and areas to the west. Some of the properties which lie to the east of Broad Street have views into the site, whilst others have complete or partial screening due to vegetation between the properties and the site. The most visually exposed part of the site lies in the south-west corner where some properties on the edge of Heybridge (mainly single storey) have views to this part of the site. This area is currently grassland. There is a good tree screen along parts of the boundary so not all houses obtain views. Lofts Farm and Slough House Farm lie within the site as does Sains Hall. It may be possible to obtain views on to parts of the site from Sheepcoates Farm to the north-east but otherwise no other residential receptors were identified.

The higher parts of Maldon are visible in some views from the site towards the south-west with the church spire being distinguishable. These views are at a distance in excess of 1.5kms.

There are public footpaths crossing the site:

- from Lofts Farm entrance at B1022 running west-east to Scraley Road
- from Broad Street Green west-east to Scraley Road
- from the northern footpath running north past Sains Farm and along the Catchpole Brook to Church Road.

The main lakes on the site are fished by recreational anglers.

A number of viewpoints were selected to help understand the visual context of the Site:

Viewpoint 1: from the north-west corner of site towards Northlands Farm.
Views into the site are limited by vegetation on the immediate field boundaries. South Wood forms the northern boundary of the site. The pylon line that crosses this part of the site is a significant visual detractor in views within the Special Landscape Area south of the Wood and, together with the farm buildings, also detract from the rural character.

Viewpoint 2: houses along Broad Street Green Road
Houses adjacent to Broad Street vary in their exposure to the site. Some have garden vegetation which effectively screens the site. Others have views from upper storey windows on to the immediately adjacent fields. A few houses have uninterrupted views on to the site, to the nearest field boundaries which usually have hedgerows. The photograph shows views back to these properties from the Site, from adjacent fields.

Viewpoint 3: north-eastern edge of Heybridge
The houses along the north-east edge of Heybridge along Scraley Road are often single storey. There is a tree screen to the north of Scraley Road which contains semi mature trees and tall shrubs. This is also the northern gateway to Maldon and Heybridge. The south west field is therefore visually sensitive to residential receptors along Scraley Road where it abuts the site, and to road users approaching Heybridge from the north along the B1022.

Viewpoint 4: Sains Hall
Sains Hall lies in the north-east of the site close to South Wood. It is well enclosed by vegetation but is exposed to views from the north. At present it is surrounded by arable land with South Wood being a strong enclosing element to the west. The Hall and barns are Grade II listed. Any development around the Hall will need to respect its setting.

Viewpoint 5: Lofts Farm
Lofts Farm, of which the farmhouse and old barn are Grade II listed, lies centrally to the site on ground slightly raised above adjoining areas on account of the former extraction of gravels. It has views in all directions to the site. The photograph shows views from the east towards the farmhouse and northwards.

Viewpoint 6: Slough House Farm
Slough House Farm consists of poultry sheds, large agricultural buildings and a farmhouse. It is understood that these will be demolished. The pond to the east of the farm (as shown on photographs) would be an interesting focal point to the proposed development in this part of the site which is visually separate from the majority of Lofts Farm.

Public Rights of Way
A number of PRoW cross the site, notably along the driveway which runs east west from Broad Street. Users of these Rights of Way will be significantly affected by development proposals although there are opportunities to incorporate them into the open space network and enhance linkages.

Viewpoint 7 from footpath running north towards Sains Hall.
Field boundary hedgerows and South Wood limit views beyond the immediate fields.

4.0 Key Implications for Development

4.1 Much of the site has been previously worked for gravel extraction which has altered the character of the land, despite much of it having been returned to agriculture. The legacy of the mineral extraction is a number of man-made water bodies, occupying large areas in the southern half of the site, the farmhouse and causeway lying proud of adjacent levels and some steeper slopes adjacent to the farm buildings. The landscape structure of the site, including the water bodies, hedgerows and mature trees towards the north of the site, and the setting of the 3 farmhouses provide interesting focal features and compartmentalisation of the landscape which can be used as a basis for site planning.

4.2 The northern part of the site lies within a Special Landscape Area (SLA) where policy indicates that development will not be permitted unless it enhances landscape character etc. The SLA lies adjacent to South Wood, which is Ancient Woodland and a Site of Interest for Nature Conservation (SINC). The SLA, including the area immediately to the east of South Wood, should be considered for low key uses which can allow landscape enhancement and buffering of development in keeping with the policies associated with the SLA. Any proposals will need to show enhancement of landscape character.

4.3 The local planning guidelines for the local Landscape Character Area D2 (Maldon Drained Estuarine Marsh), which covers much of the southern parts of the site, emphasise the need to:

- *Ensure that any new development responds to historic settlement pattern and scale, and uses materials that are appropriate to the local landscape character. Such development should be well integrated into the surrounding landscape.*
- *Ensure that sites no longer used for gravel extraction are sensitively restored to reflect the local landscape character and are well integrated into the surrounding landscape.*
- *Conserve the mostly rural character of the area.*

These are important considerations for how the landscape should be used to structure development such as retention and restoration of hedgerows, planting of small woodlands to reflect the local landscape character and retention of water bodies to link to the landscape character of the land to the south-east.

LCA E1, which includes the northern parts of the Site, has similar aspirations and emphasises the need to:

- *Ensure that any new development responds to historic settlement pattern and scale, and uses materials that are appropriate to the local landscape character Such development should be well integrated into the surrounding landscape.*
- *Conserve the mostly rural character of the area.*

4.4 The pond to the north of the driveway to Lofts Farm is a geological SSSI and so should be retained. The ponds to the south of the driveway and at Slough House Farm are also important landscape features as well as Local Wildlife Sites (LWS) and should be retained as part of the landscape structure. The restoration of silt lagoons should be carefully re-considered so that ecological value is balanced with safety issues.

4.5 The southwest field lies adjacent to the edge of Heybridge (see viewpoint 3). Although there is a relatively mature tree screen to the north of Scraley Road, there are views into the site from some properties. To avoid impacts on the visual amenity of these properties a buffer should be planted between Scraley Road and the site and the uses of the SW field carefully considered. There is potential for this area to provide shared community uses to bring the existing and proposed communities together.

4.6 Houses along Broad Street Green Road: in order to mitigate the visual effects of any development proposals a buffer zone should be considered between the existing houses and proposed development which could link to the northern buffer and enhance habitat continuity between South Wood and Heybridge Wood to the south-west.

4.7 The area to the south-east of the site also consists of former gravel workings which are now a series of wetlands and ponds (Chigborough Lakes Nature Reserve) which link the site's wetlands to the Blackwater Estuary habitats. These are designated SINCs and the Blackwater is designated as Ramsar, SAC and SPA (within 1.2km). This is invaluable in terms of nature conservation and the retention and strengthening of the ecological connectivity should be a key driver in site planning.

4.8 Public Rights of Way cross the site in a number of locations. These should be retained within the proposals and incorporated into the open space network where possible. Whilst requiring special orders to re-route a PRoW there may be a case for doing this or to link up footpaths so that the network is improved.

4.9 Approaches to Heybridge from the north – the site will be on an important approach to Heybridge and Maldon and how it relates to the ribbon development along the B1022 and edge of Heybridge is important. A buffer of planting/open space between the ribbon development and any development on site should be considered to mitigate visual impacts from the residential properties.

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Denny Ecology

Ecological Consultants

Lofts Farm, Heybridge, Essex

Extended Phase 1 Habitat Survey Report

June 2013

CONTENTS

1 INTRODUCTION

1.1 Site description

The site is located northeast of Heybridge near Maldon in Essex, centred on OS grid reference TL 86669 09066. The survey area can be broadly divided into two:

- the northern half comprising predominantly arable farmland divided by hedgerows, many of which are now defunct, with a large semi-natural planted ancient woodland (South Wood) lying to the north;
- the southern half comprising five waterbodies, at least three of which are former gravel pits and one is a silt lagoon. These waterbodies have associated marginal wetlands and vegetated shingle habitats, surrounded by improved and semi-improved grassland used for hay production, except the field north of Lofts Farm Pit which is grazed by horses. There are linear areas of scrub and broad-leaved woodland to the south and east. Chigborough Lakes Nature Reserve (managed by Essex Wildlife Trust) lies immediately to the southeast and the Blackwater Estuary SPA/SAC/Ramsar/SSSI is just over 1km to the southeast at its closest.

1.2 Proposed works

There is a proposal to build residential properties with associated greenspace including nature conservation areas. There are currently no detailed plans.

1.3 Aims of study

Denny Ecology was commissioned to undertake an extended Phase 1 Habitat survey of a proposed development site in 2013. This report details the methods and results of this survey and assesses these results.

2 SURVEY METHODOLOGY

2.1 Desk study

There is no Biodiversity Records Centre or similar repository for ecological records in Essex. Therefore, no formal collation of records for the site and surrounding area was possible.

The desk study was composed of two parts: a data search for existing records of protected, UK Biodiversity Action Plan (BAP) and other notable species, habitats and designated sites, and an analysis of aerial photo imagery.

Google Earth (Google Inc 2011) was used for aerial photo imagery. This detailed imagery was examined to determine the possible habitats present on, and adjacent to the site and their context in the surrounding landscape.

The government's Multi-Agency Geographic information for the Countryside (MAGIC) website (www.magic.gov.uk) was interrogated for statutory sites of nature conservation interest within five km of the site. Non-statutory designated Local Wildlife Sites within 5km were searched for using the Essex Wildlife Trust website (www.essexwt.org.uk/protecting-wildlife/local-wildlife-sites). The following websites were interrogated for all records of protected and UK BAP species and Red-listed and other notable bird species within five km of the site and beyond where appropriate: NBN Gateway website (www.searchnbn.net), Nature on the Map (www.natureonthemap.naturalengland.org.uk), Bird Conservation Targeting Project (www.rspb.org.uk/ourwork/conservation/projects/targeting/index.aspx), Birdguides (www.birdguides.com).

2.2 Extended Phase 1 habitat survey

The survey was undertaken by Dr Matthew Denny MCIEEM (who is an experienced ecological surveyor) in June 2013 which is an optimal time of year when the greatest range of animal species are active and plants and habitats are most easily identified and assessed. The weather conditions during the survey were optimal with a moderate southwesterly wind, partial sun and a mild temperature (c.17oC). All areas of the site were accessible enough to facilitate this level of survey.

All areas of the site were walked with habitats assessed, assigned and mapped according to standard survey methodology (JNCC 2003). In addition, evidence of, and potential for habitats to support protected species and other species of importance, was recorded, and general potential ecological constraints and opportunities for the proposed development were assessed.

3 RESULTS

3.1 Desk study

The site lies within the London Basin Natural Area. Aerial photographs show the site is predominantly farmland (mixed) and waterbodies created from the former gravel workings. There are similar farmland habitats to the north and west of the site, and wetlands to the south and east. The site lies adjacent to South Wood (lying to the north) and there are other similar woods nearby and scattered across the agricultural landscape to the north and west.

3.1.1 Statutory Designated Sites

There is a SSSI within the site called Lofts Farm Pit. This is the northwesternmost waterbody on the site and has been designated for its geological interest and therefore is not pertinent to this report. Ecological SSSIs within 5km of the site are the Blackwater Estuary, which is designated primarily for its intertidal habitats and associated breeding and wintering waterfowl interest, and Tiptree Heath which is designated for its heathland habitats. The Blackwater Estuary is also a Special Protection Area (SPA) (European bird designation), Ramsar site (international wetland designation) and is part of the Essex Estuaries Special Area of Conservation (SAC) (European habitats designation). Three further internationally important designated sites lie within 15km of the site. All these sites and their primary reasons for designation are listed in Table 1 below.

Table 1. Statutory designated sites (SSSIs within 5km; international sites within 15km)

Site name	Distance and direction	Designation	Primary reasons for designation
Essex Estuaries	1.5km S/SE	SAC	Six Annex 1 habitats (all intertidal)
Blackwater Estuary	1.5km S/SE	SSSI	Intertidal habitats and overwintering waterfowl
		SPA, Ramsar	Supports the following Annex 1 species: breeding little tern; nationally important overwintering populations of avocet, golden plover, hen harrier and ruff. Supports internationally important populations of passage ringed plovers and overwintering black-tailed godwit, dark-bellied brent geese, dunlin, grey plover, redshank, ringed plover and shelduck. Supports approximately 110,000 individual waterfowl.
Tiptree Heath	4.5km N/NE	SSSI	Heathland habitats with rare plants
Abberton Reservoir	10km S	SSSI, SPA, Ramsar	Supports internationally important populations of overwintering dark-bellied brent geese,
Crouch and Roach Estuaries	11km S	SSSI	Intertidal habitats and overwintering waterfowl
		SPA, Ramsar	Supports internationally important populations of overwintering dark-bellied brent geese,
Dengie	13km S/SE	SSSI	Intertidal habitats and overwintering waterfowl
		SPA, Ramsar	Supports the following Annex 1 species: nationally important overwintering populations of bar-tailed godwit and hen harrier. Supports internationally important populations of overwintering grey plover and knot.
			Supports approximately 31,000 individual waterfowl.

3.1.2 Non-statutory designated sites

There are five non-statutory designated or Local Wildlife Sites within 5km, one of which (Chigborough Lakes) lies partially within the proposed development site encompassing the southern Lofts Farm pit, silt lagoon and surrounding habitats. All these sites and their primary reasons for designation are listed in Table 2 below.

Table 2. Non-statutory designated sites within 5km

Site name	Distance and direction	Primary reasons for designation
Chigborough Lakes Part of this site is an Essex Wildlife Trust (EWT reserve)	On site and to E/SE	Former gravel pits and associated habitats (including UK BAP priority habitats: reedbeds and wet woodlands) with Essex Red-listed and Nationally Scarce plants and a Nationally Scarce solitary wasp. Breeding, passage and wintering bird species including little egret, grey heron, kingfisher and Cetti's warbler.
Heybridge Gravel Pit	1.5km S	Flooded gravel pit with associated habitats (including UK BAP priority habitats: reedbeds). Notable saltmarsh plants and Nationally Scarce dittander present. Breeding Cetti's warbler, water rail and common tern.
South Wood	Adjacent to site N/NE	Planted ancient woodland (including UK BAP priority habitats: lowland mixed deciduous woodland).
Heybridge Wood	1km W	Planted ancient woodland (including UK BAP priority habitats: lowland mixed deciduous woodland).
Bog Grove	3km N	Planted ancient woodland (including UK BAP priority habitats: lowland mixed deciduous woodland). Essex Red-listed scaly male fern present.

3.1.3 Notable bird records

A search of all bird records for Chigborough Lakes on the Birdguides website (back to 13th November 2000) gave returns for records on the EWT reserve, Lofts Farm Gravel Pits and Slough House Farm. A summary of these records are presented in Table 3. As similar habitats exist across the Lofts Farm GPs/Chigborough EWT reserve area, similar bird species are likely to occur across this recording area and all these records are considered relevant to the proposed development site.

Table 3. Summary of existing bird records

Species	Date	Location	Comments	Status
Ring-necked duck	25-30/04/13	Middle Lake, EWT reserve	Female of this rare American vagrant	Nationally rare vagrant
Osprey	29/10/12 30/08/09	Not specified	One flying over south	Scarce migrant
Garganey	04-05/05/12	Bean Mere, EWT reserve	Male	Scarce breeder and migrant
	20/04/07	Not specified	Pair	
Cattle egret	06-15/04/13	Lofts Farm north pit, Slough House Farm pit and EWT reserve	Moved around general area	Rare vagrant
Glossy ibis	10/03-	Lofts Farm GPs	Moved around	Rare vagrant

	06/04/13	and EWT reserve	general area	
Black-necked grebe	13-14/03/13	Lofts Farm southern pit	One	Scarce winter visitor/migrant and nationally rare breeder
	13/04/13			
	06/04/10			
	11-13/03/10			
	27/03/09			
	11/03/12	Not specified		
	03/08/06			
	16/07/06		Three	
	08/03-06/04/04		One	
	22-29/03/03	Lofts Farm southern pit	Three	
	15-16/03/03		One	
Smew	22/02/12	Not specified	Seven	Scarce winter visitor
	03/01/11	Not specified	Female	
	08/03/08	Pochard Lake, EWT reserve	Two	
	29/01/07	Pochard Lake, EWT reserve	1 male	
		Gadwall Lake, EWT reserve	3 male, 2 female	
	01-04/01/07	Pochard Lake, EWT reserve	1 male, 2 female	
	22/11/05-12/03/06		1 male, 2 female maximum	
	02/01-27/02/05	Not specified	1 male, 2 female maximum	
	29/12/04	Pochard Lake, EWT reserve	4 female	
	21/12/03-08/03/04	Pochard Lake, EWT reserve	8 female maximum	
	26/01/03	Lofts Farm GPs	1 female	
	01-08/12/02	Lofts Farm GPs	2 females	
Bewick's swan	03/01/11	Lofts Farm GPs	Eight	Uncommon winter visitor/migrant
Red kite	18/10/11	Not specified	One over north	Scarce migrant and breeder
	06/04/04			
Little gull	05-06/05/11	Lofts Farm GPs	Adult	Uncommon winter visitor/migrant
	06/04/10		Two	
Bittern	09/12/10	Slough House Farm GP		Scarce winter visitor/migrant and nationally rare breeder
Baikal teal	02/10/10	EWT reserve	1st winter male	Rare vagrant
Red-rumped swallow	03/05/10	Fishing lakes south of EWT reserve		Rare vagrant
Great white egret	20/06/09	Not specified		Scarce vagrant
	22/07-06/09/06	Lofts Farm GPs	Long-staying individual roamed	

			across site	
Red-crested pochard	08/03/08	Not specified	One	Scarce vagrant/feral
Whooper swan	02/03/08	Fishing Lake	One	Uncommon winter visitor/migrant
	19/02-17/04/03	Not specified		
Tundra bean goose	29/12/07	Not specified	One with greylag geese	Uncommon winter visitor
Black tern	01/05/07	Lofts Farm GPs	Six	Uncommon migrant
Little egret	30/09/06	Lofts Farm GPs	148 roosting	Uncommon breeding resident
	15/12/02		38	
	01/12/02		51 roosting	
	17/11/02		44 roosting	
Turtle dove	06/08/06	Not specified		Declining breeder and migrant
Ferruginous duck	15-16/01/05	Pochard Lake, EWT reserve	Male	Rare winter visitor
Scaup	29/12/04-20/01/05	Not specified	Up to seven	Uncommon winter visitor
Green sandpiper	14/01/05 08-29/03/04 29/02/04	Not specified		Regular winter visitor
Chiffchaff	02/01/05	Gadwall Lake, EWT reserve		Regular winter visitor
Sand martin	21/03/04	Not specified	20	Common migrant and breeder
White stork	25/04/03	Lofts Farm GPs	Circled over	
Greenshank	09/03/04	Not specified	Seven	Regular migrant and scarce winter visitor
	26/01/04	Not specified		
	04/01/03	Lofts Farm GPs	Five	
	08/12/02	Lofts Farm GPs	Nine	
Slavonian grebe	10/03/03	Not specified		Scarce winter visitor and migrant
Mute swan	19-21/02/03	Kale field c1km north of EWT reserve	118 maximum	Common winter visitor and breeder
White-fronted goose	19/02/03-05/03/03	Not specified	Three maximum	Uncommon winter visitor
Red-necked grebe	15/12/02-05/01/03	Lofts Farm GPs		Scarce winter visitor and migrant

A search of other web resources shows that the following Red-listed and UK BAP species occur in the vicinity of the site: lapwing, yellow wagtail, turtle dove and corn bunting.

3.1.4 Other protected species records

Whilst there are no existing records for specially protected species from the proposed development site itself, a number have been recorded from the vicinity. A summary of these records within 5km of the site, or the closest record if recorded within the 5-10km band from the site, is given in Table 4.

Table 4. Summary of existing non-avian protected species records within 10km of the site

Species	Date	1km-square	Distance & direction	Comments
White-clawed crayfish	2001	TL8516	5km N	Braxsted Mill
	1996	TL8114	5km N/NW	Guitharon, R. Brain
Great crested newt	1984	TL9002	5km S/SE	Closest of several in this direction on the Dengie peninsula
	1964	TL9816	9km NE	
Slow worm	1975	TL7804	6km SW	Danbury Common
Grass snake	1960	TL7805	6km SW	
Adder	1960	TL7805	6km SW	
Common lizard	1978	TL7806	5km W/SW	
Otter	2000	TL8408	2km W/SW	Confluence of Balckwater and Chelmer Rivers. General scattering between 5-10km, particularly to the N & W
Badger	1956	TL8814	4km NE	
Dormouse	1976	TL8513	3km N	Some subsequent records
Daubenton's bat	1987	TL8515	5km N	
Natterer's bat	TL8611	1992	1km N	
	TL8408	1992	1km W	
Brown long-eared bat	TQ7899	2003	10km SW	
Common pipistrelle	TL7803	2008	9km SW	
Soprano pipistrelle	TL7803	2008	9km SW	
Pipistrelle species	TL8511	1985	1km N/NW	Not identified to species

3.2 Habitat survey

Key habitats of ecological interest on the site are the former gravel pits and silt lagoon, particularly the southernmost pit which supports an important assemblage of breeding birds and interesting plants on the vegetated shingle substrate on the eastern banks. All the waterbodies have existing ecological interest and potential for ecological enhancement.

Other important habitats on the site are the scrub and hedgerows, including a few mature trees, which support Red-listed breeding birds and have some potential to support protected species such as bats and dormice. Some hedgerows may be protected under the Hedgerow Regulations 1997. Grassland to the south and east of the southern waterbody are semi-improved and unimproved and support plants and invertebrates of interest. Other grassland on the site is improved and considered to be of low ecological value.

Arable areas were sown with cereal at the time of survey and were considered to be of low ecological value, although a single singing skylark was recorded and there were other Red-listed farmland birds such as linnet recorded which probably use the arable crops for feeding.

Many of the buildings on the site have potential to support roosting bats, particularly at Lofts Farm and Sains Farm, with the farmhouse and brick barns at Slough House Farm also having potential. There is anecdotal evidence that there is a bat roost in the roof void of the farmhouse at Lofts Farm: the farmer who lives there said that evidence of bats was found by a contractor when insulating the roof void approximately four years ago. There are several mature trees throughout the site which have potential to support roosting bats. A dedicated survey to assess bat roosting potential is recommended.

The waterbodies are likely to provide good foraging habitat for bats and hedgerows

connecting these and potential roosting features are likely to provide important bat commuting routes.

The site is located in an area known to support great crested newts (see protected species section below). However, all waterbodies on site are considered to be of low quality habitat such that any population on site are likely to be small and remnant. Therefore great crested newts are considered unlikely to be a significant constraint to development, but dedicated surveys are recommended to confirm this.

Immediately north of the site lies South Wood which is a Local Wildlife Site and a Planted Ancient Woodland. Whilst there are few details available of the habitats, plants and other species present in this woodland (see Table 2 above), it is likely to support important habitats and species and measures should be taken to protect and, where possible, enhance ecological features of this woodland in relation to the proposed development.

3.3 Birds recorded

A range of wetland, scrub and farmland species were recorded across the site. The greatest concentration of notable species was associated with the gravel pits and surrounding habitats. The presence of a black-necked grebe on the southern pit is indicative of possible breeding given the time of year and habitat present. There are nesting black-headed gulls colonies on both the northern and southern Lofts Farm Pits. Notable waterfowl species on the southern pit included pochard, shelduck, great crested grebe (nesting), little grebe, tufted duck, mute swan and oystercatcher, all of which may breed. Two Mediterranean gulls were recorded amongst black-headed gulls on the southern pit before flying off to the south.

Notable species holding territories around the pits were reed warbler, reed bunting, lesser whitethroat and linnet. A hobby was recorded feeding over the southern pit and little egrets and grey herons which nest in the heronry in the EWT reserve immediately to the southeast were recorded flying over the site. Whilst large numbers of greylag and Canada geese and small numbers of Egyptian geese breed on the pits and feed on surrounding habitats, they are all of feral origin and are considered not to be of ecological value.

Notable birds recorded on the farmland on the site were several pairs of linnets, particularly around the Lofts Farmhouse area, a singing skylark over the large arable field in the centre of the site, a yellow wagtail using horse-grazed pasture to the northwest of the northern pit with a range of common and widespread species using hedgerows throughout the site.

3.4 Non-avian protected species

No protected species, or evidence of, were recorded during the survey although many of the habitats have potential to support them (see assessment section below). However, there were trees and buildings on site which have medium and high potential to support roosting bats. The trees with bat roost potential are distributed across the site and will require a dedicated survey to assess them for their level of potential.

Buildings with or without potential to support bats were scoped to focus future survey effort. All buildings at Sains Farm (farmhouse and two barns) are of high bat roosting potential. At Lofts Farm the farmhouse has high potential for roosting bats, particularly in the roof voids which, according to the farmer, has supported bats. The two oldest wooden barns to the north of the house both have medium-high potential for roosting bats, whilst the brick single-storey barn with tiled roof to the west has low-medium potential. All other buildings at Lofts Farm have negligible or no potential for roosting bats and do not require further survey. At Slough House Farm the farmhouse has medium-high potential to support roosting bats, whilst the L-shaped single-storey brick barn with pantile roof to the north (on the north and east side of the swimming pool) has medium potential. All other buildings within the Slough House Farm complex, including all the

chicken-rearing sheds, have negligible or no potential for roosting bats and do not require further survey.

Although not a protected species, hare is listed on the Essex BAP. Two hares were recorded during the survey on the arable section of the site.

3.5 Survey limitations

Whilst an extensive web-based data search was undertaken, without a central biological records centre for Essex some existing records are likely to have been overlooked. In addition, as always with existing records, a lack of records may be a result of low recorder effort and does not necessarily indicate an absence of a species.

There are considered to be no limitations to the field survey.

4 ASSESSMENT AND RECOMMENDATIONS

4.1 Protected sites

The presence of the Blackwater Estuary internationally designated site 1.5km away is of significance. Whilst none of the habitats or that are special features of interest are likely to occur on the proposed development site, certain bird species mentioned on the citation of the SPA and SSSI occur on Lofts Farm GPs in small numbers. Assuming these pits are protected or enhanced for these species there should be no direct significant adverse effects. The other potential issue is that of indirect impacts through increased disturbance of the SPA due to an increased in the local resident human population as a result of the development. However, there is likely to be scope to provide large areas of semi-natural greenspace for recreational purposes on the proposed development site which would fully off-set any potential adverse effects on the SPA.

The Local Wildlife Sites at Lofts Farm and adjacent Chigborough Lakes and South Wood should be protected from negative impacts, particularly increased disturbance, from the proposed development.

With these issues in mind, the proposed development should be mindful of the following three key issues:

- To protect and enhance existing ecologically important habitats on the site, particularly the gravel pits and surrounding terrestrial habitats;
- To provide green infrastructure links through the site connecting all ecologically important sites adjacent to the proposed development site;
- To provide significant areas of greenspace for recreational use (particularly dog-walking), and to landscape this such that it has a semi-natural resonance.

4.2 Habitats

The former gravel pits and perimeter habitats such as the semi-improved grassland along the shore of the northern pit, the vegetated shingle around the southern pit and the scrubby islands are the habitats of primary importance on the site. There are relatively uncommon habitats both locally and at a wider geographical scale and are considered to be of County importance. The southern pit and surrounding terrestrial habitats form part of the Chigborough Lakes Local Wildlife Site which is a County designation.

Other grassland and arable crops on the site are of low ecological value with a low species diversity in the swards and evidence that they are agriculturally intensively managed. However, they do provide good feeding areas for waterfowl and also for farmland birds such as linnet, skylark and yellow wagtail.

The network of ditches and hedgerows through the site are generally in a poor condition. Many of the ditches were dry at the time of survey presumably due to land drainage. Many of the hedgerows have large gaps and there is generally no longer an incentive to manage them as stock-proof as most fields don't have livestock, and even the one that did have horses at the time of survey was fenced with electric fencing rendering perimeter hedges unnecessary. Given the size of some fields it is likely that some hedgerows have been removed during the last 70 years, as has occurred across much of lowland UK. However, there remains a good network of linear habitats across the proposed development site that is likely to provide foraging and nesting sites for birds, invertebrates, reptiles and small mammals, and movement corridors for many species including reptiles, amphibians, bats and dormice. This network of ditches and hedgerows has potential to be ecologically enhanced which could have beneficial effects throughout the site and beyond.

4.3 Birds

The presence of black-necked grebes on the southern pit at Lofts Farm in the spring or summer in many years since 2002, including on this survey, suggests that they may

breed at the site. They are rare breeding birds in the UK with an average national breeding population of 51 pairs in 2006-10 (Holling et al. 2012). The black-necked grebe was first proved to breed in Essex in 1999 and single pairs bred between 1999 and 2002 at a different site each year (Wood 2007) but there appear to have been no subsequent reported breeding attempts (Holling et al. 2007, 2008 & 2012; EBR 2008 & 2009). It is also a Schedule 1 protected species giving it full protection from disturbance during breeding. Were the species proved to breed regularly at the site it would be of National (UK) importance. It is recommended that further surveys and desk-top study be undertaken to determine whether the species currently breeds or has bred at the site.

The black-headed gull colony on Lofts Farm GPs is one of several similar small colonies in this part of Essex. In 2004 65 breeding pairs were counted at Lofts Farm (Wood 2007). Whilst this is only a small percentage of the Essex breeding population, these are concentrated to a few localities. The species is an amber-listed bird of conservation Concern (BoCC) (Eaton et al. 2009) and the presence of this colony is considered to be of County importance.

Cetti's warbler is a scarce breeding species in the UK and a Schedule 1 protected species. It was not recorded during the survey but its presence at the adjacent Chigborough Lakes and the presence of suitable breeding habitat at Lofts Farm GPs (wet scrub) indicate that it is likely to breed.

Other birds holding territory or possibly breeding at Lofts Farm GPs, including oystercatcher, pochard and shelduck, support the assertion that the site is of County importance for breeding birds. It is considered to be of County importance for wintering birds due to the presence of regular smew and other waterfowl during the winter and a large post-breeding flock of little egrets.

4.4 Non-avian protected species

As detailed elsewhere in this report, there is potential for the site to support protected species. Given the proximity to the site of existing records, and the habitats on the site, the following protected species may occur:

- White-clawed crayfish
- Reptiles
- Great crested newt
- Bats
- Dormice
- Otter
- Water vole
- Badger
- Invertebrates

4.5 Planning constraints

Some habitats on the site are considered to be of ecological importance and it is recommended that they are retained and enhanced in the development plans. These areas are as follows:

- all waterbodies in the southern section of the site and their marginal wetland habitats, particularly the southernmost waterbody (southern pit), the silt lagoon and Lofts Farm Pit (northern pit) which have the additional constraints of possible breeding Schedule 1 bird species;
- the semi-improved grasslands and vegetated shingle habitats to the south and east of the southern waterbody and around Lofts Farm Pit;
- continuous hedgerows and linear scrub and woodland habitats throughout the site which are likely to provide habitat for commuting and foraging bats, breeding birds and possibly dormice;
- the stream along the eastern boundary;
- many of the buildings on the site with bat roosting potential, as detailed above,

and
- mature trees scattered throughout the site.

4.6 Planning opportunities

The ecological value of the site could be improved through the provision of a strong green infrastructure. It is recommended that as many of the existing linear habitat features, such as hedgerows and ditches, are retained and enhanced for this purpose, but that opportunities for new linear features are created to form continuous habitat corridors through the site, particularly forming strong linkages with South Wood to the north and Chigborough Lakes to the south.

It is recommended that the southern waterbody and adjacent silt lagoon are managed to increase their biodiversity value, creating some disturbance free areas through access restrictions, but also encouraging informal recreational use in other areas, which will help to alleviate recreational disturbance of nearby protected wildlife sites. Enhancement of this area should focus on increasing the area of wetland habitat along the lake margins and creating further small lagoons to the south and east. The silt lagoon should be retained and made safe by minor re-excavation to deal with the current health and safety risk posed by the soft substrates. Whilst the landowner is currently attempting to fulfil the planning requirements of the mineral extraction permission by filling-in the silt lagoon and the southwestern areas of the southern waterbody, we strongly recommend that an alternative strategy be sought with the agreement of the appropriate planning authority to prevent loss of these wetland habitats. A possible model on which to base the ecological enhancement and management of this area, and rehabilitation of dangerous soft substrates, can be found at the Chigborough Lakes Reserve to the southeast which comprise habitats with a similar history of gravel extraction and where former silt lagoons have been re-excavated and public access is allowed across a large area of ecologically rich habitats.

4.7 Recommended further surveys

A number of detailed ecology surveys are recommended. These are (with optimal survey period in parenthesis):

- Buildings – potential bat roosting features (any time)
- Trees – potential bat roosting features (Oct-Apr)
- Bat activity (Apr-Oct)
- Breeding birds (Apr-July)
- Wintering birds (Oct-Mar)
- Migrating birds (July-Oct & Apr)
- Reptiles (Apr-Oct)
- Great crested newts (Apr-May)
- Dormice (May-Sept)
- Otter (Oct-Apr)
- Water vole (Oct-May)
- Badger (Oct-May)
- Phase 2 botanical (May-Sept)
- Hedgerows (Apr-Sept)
- Invertebrates (Apr-Oct)

5 REFERENCES

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6 APPENDIX 1. PHASE 1 HABITAT PLAN

7 APPENDIX 2. TARGET NOTES

1. Shallow waterbody within woodland. Heavily shaded with little associated vegetation but permanent water with no sign of fish presence. Low great crested newt potential
2. East/northeast boundary of site with stream flanked by intact hedge with mature trees in some sections. In this section also a 6m wide semi-improved neutral grassland strip. Forms strong continuous semi-natural habitat feature along site boundary from South Wood to Chigborough Lakes. Likely to be important for dispersal of species.
3. Sains Farm: three buildings (two c.19th century barns and c.16th century farmhouse) all with medium-high potential to support roosting bats.
4. Small pond dominated by ornamental variegated sedges. Dry at time of survey with significant shading. Low-medium potential for great crested newts.
5. Neglected farm pond, heavily shaded with little associated vegetation. Low potential for great crested newts.
6. Neglected waterbodies throughout woodland strip. Only visible where vegetation kept clear for overhead power lines. Poor water quality and little associated aquatic vegetation. Low potential for great crested newts.
7. South-facing exposed earth bank on side of ditch with evidence of nesting burrowing insects.
8. Dead oak tree with woodpecker holes: medium bat roosting potential.
9. Mature willow tree with potential bat roosting features: medium potential.
10. Large flooded former gravel pit with significant areas of marginal aquatic vegetation dominated by greater reedmace *Typha latifolia* and yellow flag *Iris pseudacorus* with associated singing reed warblers and reed bunting. Many waterfowl use the open water habitats.
11. Island comprising a mosaic of open grassland and willow *Salix* sp. scrub with a black-headed gull nesting colony.
12. Semi-improved neutral grassland around the banks, including some bare ground, managed by a varied cutting regime. Sward includes common bird's-foot trefoil *Lotus corniculatus*, an important food source for invertebrates.
13. Lofts Farm: farmhouse and several outbuildings of varying ages an design The farmhouse is brick built and considered to be between 100 and 200 years old. The farmer who lives in the house confirmed that there is a large roof void and when it was fitted with insulation material approximately four years ago the contractors reported seeing bat droppings. There are two old wooden barns with clay tiled roofs with potential bat roosting features. These three buildings have a high potential to support roosting bats. A further single-storey brick outbuilding at the northwest corner of the complex was inaccessible but considered to have medium bat roosting potential. The other outbuildings, including the corrugated metal and asbestos barns and open brick barn, are considered have low potential to support roosting bats.
14. Former silt lagoon for the gravel extraction workings which is now vegetated with willow scrub (which is appears to be recently dead – from flooding?) and common reed *Phragmites australis*, with associated singing reed warblers and nesting coots. The farmer has indicated that this area is to be reclaimed from wetland to agricultural land to comply with the original mineral extraction permission and to eradicate the health and safety risk of the soft subsrates. However, ecologically this area is considered to be important with the BAP habitats of wet woodland and reedbed present which is likely to support interesting plant, bird and invertebrate species. It is recommended that the area is not reclaimed but managed sympathetically for its ecological interest whilst ameliorating health and safety issues.
15. Low island with wide margins of inundated willow scrub. Supports nesting waterfowl and a black-headed gull colony.
16. Low single island used by nesting and loafing waterfowl, terns and gulls
17. Large flooded former gravel pit with significant areas of marginal aquatic

vegetation and scrub. A large number and diversity of birds use the open water habitats and marginal vegetation.

18. Areas of bare and vegetated shingle used by a pair of oystercatchers (nesting suspected but not proved) and likely to support notable plant species.
19. Mature oak tree with high bat roosting potential: two woodpecker holes 6m above ground level, facing north, on the north-west limb.
20. Large area of semi-improved neutral grassland with thin soils and areas of bare ground with a good diversity of flowering plants.
21. Strip of semi-improved neutral grassland along the north shore of the gravel pit supporting a variety of dragonfly, damselfly and butterfly species including brown argus.
22. Group of trees with high bat roosting potential including a mature oak with a barn owl box and pollarded ash trees with numerous holes where little owls are suspected to nest.
23. Slough House Farm: farmhouse and a series of outbuildings. The farmhouse and single-storey brick barn to the north (surrounding the swimming pool courtyard) have medium-high bat roosting potential with features such as holes in the pantile and slate tile roofs and a probable roof void in the farmhouse. All other farm buildings in this complex have low or no bat roosting potential.
24. Oak tree with medium bat roosting potential.
25. Flooded former gravel pit heavily disturbed by fisherman but with good marginal vegetation. Supports reed warblers, great crested grebes and other common waterfowl.
26. Line of mature trees in field boundary with potential to support roosting bats.
27. Chigborough Lakes Nature Reserve managed by the Essex Wildlife Trust: a series of former gravel pits variously reclaimed as grassland, colonised by woodland and scrub and forming open water habitats. Heronry with nesting grey herons and little egrets present. An American mink (introduced species) was noted during this survey visit. A high diversity of willow and other plant species recorded along with reptile populations and a large number of existing bird records.
28. Large field of grassland managed for silage/hay which is agriculturally improved but retains a diversity of plant species including Yorkshire fog *Holcus lanatus*, false oat-grass *Arrhenatherum elatius*, annual meadow grass *Poa annua*, meadow buttercup *Ranunculus acris* and hogweed *Heracleum sphondylium*.

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