WOKINGHAM STRATEGIC GROWTH LOCATIONS

Growth Scenarios Report - Grazeley, Twyford/Ruscombe and Barkham Square

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June 2018

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EXECUTIVE SUMMARY

Wokingham Borough Council is preparing a Local Plan Update (LPU) for the period to 2036. To better understand the suitability, capacity and deliverability of three potential strategic growth locations being promoted at Grazeley, Barkham Square and Twyford/Ruscombe, the Council has commissioned masterplanning and supporting technical services, as well as an Integrated Transport Study and Infrastructure Plan for the wider Borough. West Berkshire District Council are joint commissioners of work related to Grazeley, as the site straddles the local authority boundary. The outputs of the masterplanning exercise will be used to inform the LPU process. It is not the role of the masterplanning study to recommend whether any of the potential locations should be allocated, but to provide evidence to inform the Councils' decision making in that regard.

All three locations are greenfield sites. The site at Twyford/Ruscombe lies within the Metropolitan Green Belt surrounding London and comprises high quality agricultural land. National policy stipulates that alterations to the Green Belt can only be made in exceptional circumstances. All other reasonable options to meet development needs must be reviewed before deciding whether exceptional circumstances exist. The masterplanning study does not include consideration of whether exceptional circumstances exist or whether the potential loss of high quality agricultural land is justified.

The Brief for the commission requires a range of scenarios to be tested in each potential growth location:

- Grazeley: 15,000, 10,000 and 5,000 homes
- Barkham Square: 1,000, 750 and 500 homes
- Twyford/Ruscombe: 3,500, 2,250 and 1,000 homes

In addition to information gained through site visits, desk-top studies and local document/policy review to understand environmental factors, current infrastructure provision and broad site capacity, a number of workshops were held to engage with technical and community stakeholders so that local knowledge and views could be taken into account. Technical stakeholder discussions related to utilities, transport and highways, environmental health, community wellbeing (including education, health, housing and heritage) and 'green and blue' infrastructure (including drainage and flooding, green infrastructure and ecology).

Baseline viability assessments were undertaken to understand prevailing market conditions in relation to commercial and residential development within the area. Reference to current strategic scale development within WBC provided up to date market information on housing costs. Subsequently, high-level viability assessments were prepared for each Growth Scenario once the individual infrastructure requirements were established.

The Growth Scenarios for each location are set out in Sections 4,5 and 6 of the main report. In broad terms, the findings indicate the following.

- Grazeley: Land within the Grazeley area of search is relatively unconstrained in environmental terms; key site features include the Foudry Brook and its corresponding floodplain and the historic village of Grazeley. The site sits between two movement corridors: the A33 trunk road (affording access to junction 11 of the M4) and the Reading to Basingstoke railway line. It is well related to existing employment opportunities in central Reading, Green Park and the Thames Valley. There appears to be strong potential for a new railway station within the site as well as an extension to the Reading Mass Rapid Transit, both of which point to an opportunity to pursue public transport orientated development. To achieve this, a bold vision has emerged of a new settlement which relates residential densities to public transport accessibility, is enhanced by generous opportunities for walking and cycling, affords easy access to extensive green and blue infrastructure to enhance wellbeing and placemaking, and locates jobs, local services and community uses in very close proximity to homes. In addition, AWE Burghfield Detailed Emergency Planning Zone, which overlaps the area of search and has the effect of reducing the developable area by approximately 25%, indicates a need to use land very efficiently in order to achieve 15,000 homes. The viability assessment indicates that the proposition is viable over the longer term. However, extensive infrastructure requirements in the early phases to facilitate housing delivery reveal that the scheme would not be viable without external funding. Housing Infrastructure Funding (HIF) may be made available and WBC, WBC and Reading Borough Council have made a joint application for HIF, which has progressed to the second round.

The 10,000 and 5,000 Growth Scenarios essentially decouple the elements of the 15,000 scenario which fall within each authority area. Achieving the stipulated housing numbers is dependent on similarly high densities, but these lower levels of growth would reduce the affordability of transport infrastructure in particular, and the probability of securing HIF will also diminish. The viability of 10,000 homes therefore becomes more marginal, whilst the viability of the 5,000 scenario is reduced considerably even when major transport infrastructure including a new station are omitted.

- The Barkham Square site lies within attractive countryside immediately north of the Arborfield SDL. The site is bisected by a tributary of the Barkham Brook, and the listed Barkham Square Farm sits to the north-east of the site. The area is accessed by a rural road network which is constrained in places and congested at peak hour due to commuter traffic. Recent and planned road schemes including the Arborfield By-pass, as well as extensions to Greenways, are intended improve travel towards Reading and the M4, but further investment in highways is likely to be necessary if development comes forward at Barkham Square.

  There are opportunities to link development at Barkham Square to Arborfield SDL so that residents can access the Bohunt School and planned district centre. The location would demand a strong landscape framework with generous tree planting to mitigate the visual impact of development on the wider setting. A Growth Scenario for 1,000 can only be accommodated if SANG is provided off-site. Infrastructure requirements would include a new primary school and road connection between Barkham Ride and Langley Common Road. The cost may affect the financial viability of the scheme only if a very cautious view about land value is taken. Schemes for 750 and 500 homes would not require a school, although the former would require the aforementioned road connection. Both scenarios are considered viable.

- The potential for growth at Twyford and Ruscombe has been examined with regard to the existing village and the challenges it currently faces. Of particular importance is the pending arrival of the Crossrail service to Twyford Station (on the Western mainline, which cuts through the area of search), the constrained station access, limited station parking, the congested village crossroads and associated Air Quality Management Area and the Ruscombe conservation area. Development at a strategic scale presents the opportunity to redress some of these issues, particularly through the provision of additional road access to reduce pressure on the village crossroads.

  Community consultation indicated strong resistance to Green Belt release and a preference for limited housing growth only to address local affordability. In light of this view, a scenario for 500 homes replaced the 1,000 scenario, with homes achieved in part through brownfield development and only limited Green Belt release north-east of the village. Scenarios for 2,250 and 3,500 would necessitate development on land currently within the Green Belt and would impact on high quality agricultural land. A new Green Belt edge could be established by the creation of a new peripheral road to the east to contain strategic scale growth for 2,250 homes to the north of the railway line, and in the case of 3,500 homes, to the south also. A new junction with the A4 would be created. Substantial woodland planting beyond the road would manage views from the wider countryside.

  Both growth scenarios would deliver a package of transport improvements including an improved rail crossing in the form of an underbridge to facilitate access and through-movement, relieve the village crossroads and permit better access to Twyford Station, including by bus. In addition, the master plans put forward ideas for a new 1,000 space station car park on a part of Twyford recreation ground and a station interchange. New primary schools, a secondary school annex and local facilities are included within the master plans.

  All growth scenarios at Twyford are considered viable and deliverable. This is attributable to a large degree to high land values.

  To achieve this level of growth, the Integrated Transport Strategy takes a broader perspective on movement across the area, taking account of current and planned transport schemes. It recognises the ambitions embedded in the Local Transport Plan 3 in relation to sustainable travel and the need for investment in the local and strategic networks to support more sustainable travel choices. This ambition will continue to evolve alongside the LPU.

1.0 INTRODUCTION

PURPOSE OF THE STRATEGIC FRAMEWORK COMMISSION

1.1 Wokingham Borough Council (WBC) is preparing a Local Plan Update for the period to 2036. Around 280 sites have been promoted as available for development across the Borough including some locations of a scale for strategic growth. WBC is assessing all of the sites, however to better understand the suitability, capacity and infrastructure needs of the more complex sites at Grazeley, Barkham Square and Twyford/Ruscombe (Figure 1: Location of Study Sites), WBC procured master planning and technical support through a competitive tender in September 2017. David Lock Associates and Peter Brett Associates were jointly appointed to undertake the evidence study.

1.2 In addition, the commission requires the preparation of a Borough-wide Infrastructure Delivery Plan and Integrated Transport Study to support the wider Local Plan Update as it moves forward.

1.3 The outputs of the master planning commission will be used as evidence to assist WBC in shaping the growth strategy for the Borough. The three sites subject to this study, or any combination of them, may or may not be included in the Wokingham Local Plan Update Preferred Options, which will be subject to public consultation in late 2018.

1.4 For the avoidance of doubt, the master planning commission is not a decision-making study, nor does it commit WBC or West Berkshire District Council to any particular strategy for managing growth.

1.5 Part of the site at Grazeley falls within the administrative boundary of West Berkshire District Council (WDBC). WDBC is also preparing a Local Plan Review to 2036 and is joint commissioner of the master planning commission for Grazeley. The Grazeley sites within WBDC were amongst the 230 submitted through WBDC's 'Call for Sites'.

RELATIONSHIP TO GREEN BELT AND AGRICULTURAL LAND QUALITY

1.6 The sites at Twyford/Ruscombe lie within the Metropolitan Green Belt surrounding London. This area, and parts of the others, are also understood to comprise higher quality agricultural land.

1.7 The Green Belt and agricultural land quality are two very important constraints which WBC will need to have regard to when assessing options for shaping the growth strategy for the Borough. National policy on the Green Belt is clear that alterations to the boundary of the Green Belt can only be made in exceptional circumstances. Case law has established that all other reasonable options to meet development needs must be looked at before deciding whether exceptional circumstances do or do not exist. This has been reaffirmed in draft revisions to national planning policy.

1.8 The master planning commission does not consider whether exceptional circumstances exist with regards to Green Belt or whether any potential loss of higher quality agricultural land is justified. The purpose of the commission is simply to gather evidence on whether specified scales of development are deliverable from both a design, infrastructure and viability perspective. The evidence work will allow WBC to understand the level of impact and opportunity that exists as part of any future decision. Gathering this evidence is undertaken without prejudice to that future decision and does not indicate any pre-determination of the issue.

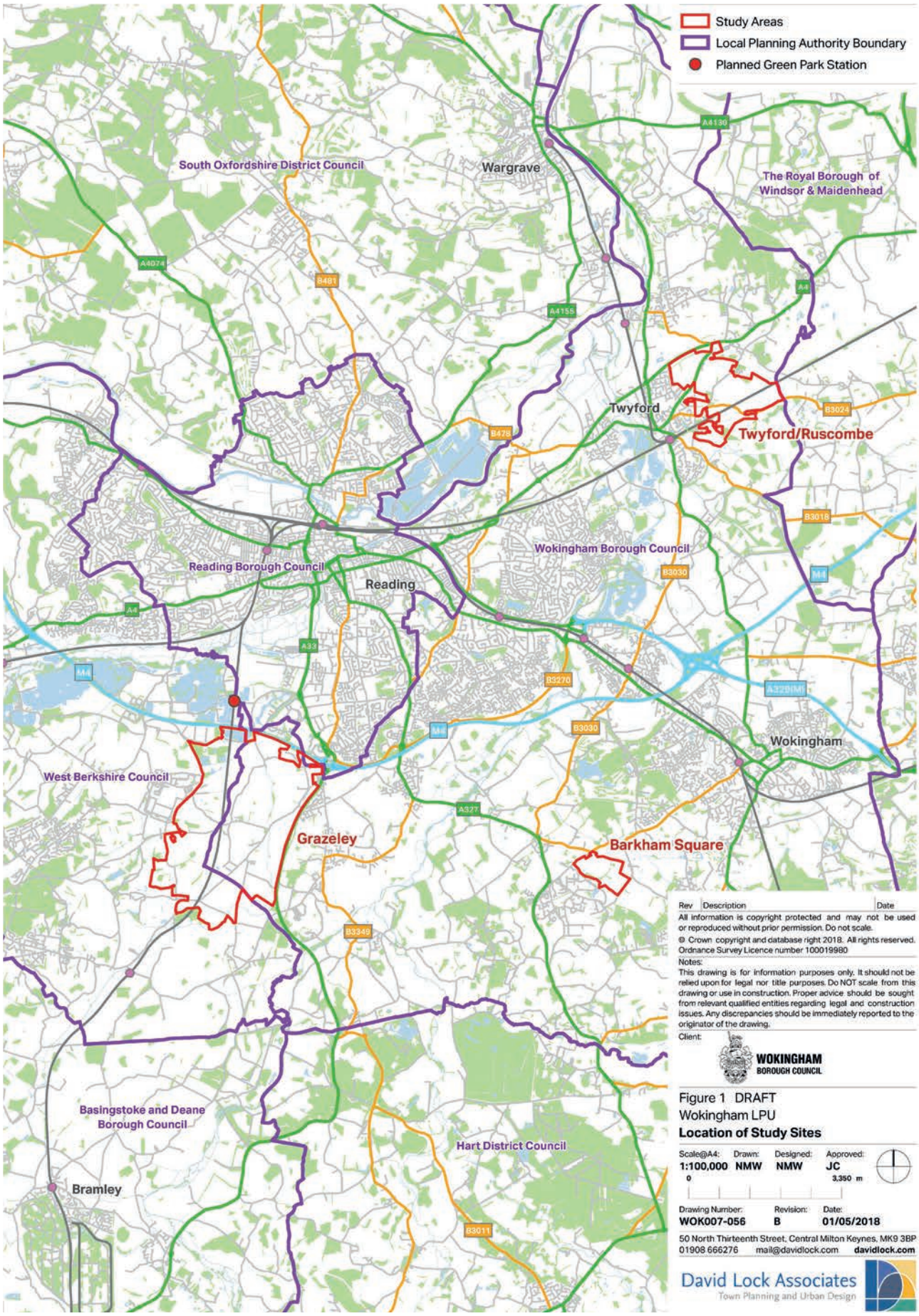


Figure 1: Location of Study Sites

STUDY BRIEF AND SCOPE

1.9 The project brief sets out the following study objectives:

- To deliver strategic master plan options for potential Local Plan Strategic Development Sites. Options should be visionary, innovative, deliverable, flexible and fully integrated into the land use planning system and supported by a robust evidence base.
- To deliver a Wokingham Borough-wide Infrastructure Delivery Plan (IDP) 2036 (2050) that considers the cumulative impact of all existing and potential growth on infrastructure requirements across the Borough and identifies deliverable interventions, supported by stakeholders, necessary to deal with issues like congestion on the transport network.
- To support the inclusion of selected preferred options throughout the Wokingham Borough Council Local Plan Update process to adoption, and West Berkshire Council Local Plan as appropriate.

1.10 The brief also states that "Master plan option components should include:

- A Strategic Framework (written statement) which sets out the aims and objectives for regeneration of the area based on analysis of the baseline data and supporting work;
- A Spatial Master plan (plans, visuals, written documentation) which develops the broad vision into three dimensional proposals; and
- An Implementation Plan – A written statement addressing programme, cost and other issues.

The options should be of sufficient standard to be included in Wokingham Borough Council's Local Plan Update Preferred Options Document and, in relation to Grazeley, West Berkshire District Council's new Local Plan as appropriate.

1.11 The brief required master planning to test a range of options at each potential location:

- Grazeley
  - 10,000 dwellings (WBC only)
  - 5,000 dwellings (WBDC only)
  - An overarching 15,000 dwelling option
- Barkham Square
  - 1,000 dwellings
  - 750 dwellings
  - 500 dwellings
- Twyford/Ruscombe
  - 1,000 dwellings
  - 2,250 dwellings
  - 3,500 dwellings (+ 3,500 dwellings built around the Poynton principles of continuous moving traffic)

The brief notes that "it may become apparent in the evidence gathering stage that a different scale option / options are more appropriate" for each location.

ROLE AND STRUCTURE OF THIS REPORT

1.12 This report sets out the options (described as 'growth scenarios') in response to the brief. It explains the information used as the basis for master planning and it explains how consultation with both technical and community stakeholders have informed the growth scenarios. It provides a list of infrastructure requirements in relation to each growth scenario. The methodology for arriving at the growth scenarios is explained in Section 2 of the report.

1.13 The report aims to secure both councils' agreement to the growth scenarios prior to non-statutory consultation during Summer 2018.

1.14 Section 3 sets out the baseline viability. Sections 4, 5 and 6 of the report address each site in turn to provide the following information:

- Background and Analysis
  - o Site Environmental Studies
- Consultation Outputs
  - o Technical Stakeholder Workshops
  - o Community Stakeholder Workshops
- Growth Scenarios
  - o Summary of key master planning considerations
  - o A suggested Vision for placemaking
  - o Description and plan for each growth scenario
  - o Infrastructure requirements for each growth scenario

1.15 Section 7 provides an overview of the viability assessment for the growth scenarios. Section 8 comprises an integrated transport study, examining the transport opportunities and requirements for different travel options arising from each location.

2.0 STUDY METHODOLOGY

2.1 The project methodology includes a number of tasks arranged under four stages of work:

- Stage 1: Project set-up and baseline assessments
- Stage 2: Generating growth scenarios
- Stage 3: Identifying favoured growth scenarios if appropriate
- Stage 4: Local Plan Update input

STAGE 1 PROJECT SET-UP AND BASELINE ASSESSMENTS

Site Environmental Studies

2.2 Background studies and analysis undertaken to inform work on master planning, infrastructure requirements and viability included:

- Desk top studies and site walkovers to establish environmental considerations;
- A review of the Wokingham traffic model;
- Discussions with WBDC on the status of their traffic model;
- A review of data published by national agencies including the Environment Agency, Highways England, Natural England and Historic England;
- Site visits to observe landform, site features, views and context; and
- Constraints and opportunities mapping.

2.3 Meetings were held with the site promoters to gain an understanding of their views on the development potential at each location.

Baseline Viability

2.4 An analysis of the residential and commercial markets for each location was undertaken to gain an insight into the local property market dynamics, local demand and supply.

2.5 The Stage 1 viability exercise included a review of the Community Infrastructure Levy (CIL) for both authorities, residential sales evidence and market activity, commercial occupancy rates and recent transactions, land values based on transactional information, and perceptions of local agents and local authorities. Site specific market issues affecting each location were also examined.

STAGE 2 GENERATING GROWTH SCENARIOS

2.6 Stage 2 focused on master planning to generate growth scenarios. Technical and community stakeholder's workshops played an important role in informing the master planning, raising awareness of issues on-site and within the wider context, and providing the opportunity to share knowledge and opinions.

Technical Workshops

2.7 Technical workshops were structured around four key master planning considerations:

Green and Blue

2.8 The 'Green and Blue' workshop addressed matters relating to green infrastructure, landscape, countryside, nature and flood risk and drainage. The key objectives were to:

- identify locally consented developments and flood risk / drainage / environmental schemes;
- understand known 'hotspots', constraints and opportunities;
- explore any site-specific issues;
- explore policy and design standards;
- establish available data sets for use within the commission; and
- discuss local perceptions and opinions in relation to the natural environment and flooding matters.

2.9 Representatives of the following organisations contributed to discussions:

- Environment Agency
- Natural England
- Berks, Bucks and Oxon Wildlife Trust
- Wokingham Borough Council (including landscape and countryside officers)
- West Berkshire District Council
- Bracknell Forest Council
- Homes England

Transport and Environmental Health

2.10 The main purpose of the workshop was to explore in broad terms the potential opportunities arising from strategic scale development, and to understand the nature of the transport improvements required to achieve sustainable development at each possible strategic development location, along with any environmental health considerations. The objectives included:

- identify locally consented developments and proposed transport and environmental schemes;
- understand known constraints and opportunities;
- explore any site-specific issues;
- explore policy and design standards;
- establish available data sets and models for use within the commission; and
- discuss local perceptions and opinions in relation to transport and environmental matters.

2.11 The Transport and Environmental Health workshop brought together representatives from the following organisations:

- Highways England
- Network Rail Western
- Southwest Railways
- Great Western Railway
- Reading Cycle Campaign
- Wokingham Borough Council
- West Berkshire District Council
- Reading Borough Council
- Bracknell Forest Council
- Hampshire County Council
- Homes England
- Office for Nuclear Regulation and Ministry of Defence (in relation to AWE Burghfield)
- Site promoters

Community Wellbeing

2.12 The main purpose of the Community Wellbeing workshop was to explore, in broad terms, the potential opportunities arising from strategic scale development, and to understand the nature of the social infrastructure and community facilities required to achieve sustainable development at each potential strategic development location. More specifically, the key objectives were to:

- identify current facilities, capacity constraints and opportunities for expansion;
- understand broad requirements for on-site community facilities;
- identify development and delivery challenges that need to be addressed;
- explore any wider initiatives or additional community benefits arising from development;
- explore the potential for shared infrastructure solutions borough-wide and in the wider Reading area; and
- establish positive working relationships between stakeholders in the interest of achieving the best overall solutions.

2.13 Four themes were explored through the workshop:

- Education and housing
- Health and emergency services
- Sport and recreation
- Community meeting spaces and cultural heritage.

2.14 The workshop was attended by representatives from the following organisations:

- Thames Valley Police (TVP)
- TVP Crime Prevention Unit
- Royal Berkshire Fire and Rescue
- NHS Wokingham
- Berkshire West Clinical Commissioning Group
- Wokingham GP Alliance
- Wokingham Borough Council (including education, housing and mental health officers)
- West Berkshire District Council
- Hampshire County Council
- Homes England
- Site promoters

Utilities

2.15 The workshop objectives were to:

- identify provision for utilities, capacity constraints and opportunities for reinforcement of utilities infrastructure to supply the three locations;
- identify planned investment by the undertakers to increase capacity in the associated regions;
- understand how future capital investment decisions will be taken in relation to the locations, in the event that they are included in the Local Plan Update;
- explore the potential for shared infrastructure solutions borough-wide and in the wider Reading area; and
- establish positive working relationships between stakeholders in the interest of achieving the best overall solutions.

2.16 The utilities workshop was attended by representatives of the following organisations:

- Thames Water
- Thames Water Treatment Works
- South Eastern Water
- Thames Waste Water
- Thames Water Networks
- SGN (gas providers)
- SSE (electricity providers)
- BT Openreach
- Wokingham Borough Council
- West Berkshire District Council
- Bracknell Forest Council
- Hampshire County Council
- Reading Borough Council
- Hampshire County Council (representing Central & Eastern Berkshire authorities through the preparation of the Joint Minerals and Waste Plan).

2.17 The findings from the workshops are discussed for each location in sections 4, 5 and 6 of this report.

Community Workshops

2.18 Community stakeholder workshops were attended by representatives of the organisations shown in the table below:

Grazeley representatives	Barkham Square representatives	Twyford/ Ruscombe representatives
WBC WBDC Parish Councils: • Beech Hill • Burghfield • Shinfield • Stratfield Mortimer • Swallowfield • Wakefield Burghfield Neighbourhood Plan Group John Redwood MP	WBC Parish Councils: • Arborfield & Newlands • Barkham • Finchampstead	WBC Parish Councils: • Charvil • Ruscombe • Twyford

Workshop Activities

2.19 All workshops commenced with an explanation of the current Local Plan position and the master planning commission by council officers. At Twyford/Ruscombe, confirmation was given that the study will not consider whether exceptional circumstances exist with regards to Green Belt or whether any potential loss of higher quality agricultural land is justified.

2.20 For the first activity, participants were divided into groups to discuss the strengths, weaknesses and opportunities of the location.

2.21 In the case of Twyford/Ruscombe, discussions were extended to consider in more detail current challenges within the village and surroundings and concluded with a discussion to identify locations within and around the village where residential development might be deemed to be acceptable.

2.22 The Grazeley workshop included a subsequent discussion about Garden City Principles as a way of responding to the proposition by WBC and WBDC. Groups prioritised what they thought to be the most important principles and expanded on how each might manifest itself in development at Grazeley.

2.23 The Barkham Square and Grazeley community representatives' workshops included an exercise using a digital tool called CHLOE. Developed in-house by David Lock Associates, CHLOE is an interactive master planning and reporting tool that promotes discussion and engagement by allowing its users to engage and contribute to the design process.

2.24 The main uses included in CHLOE exercises:

- Residential (low density 30 dph).
- Residential (higher density 45 dph or 60 dph).
- Mixed use local/district centre (50% residential/50% other).
- Employment.
- Secondary schools and/or primary schools.
- Primary schools.
- Suitable Alternative Natural Green Space (SANG).
- Sports pitches.
- Other open space (amenity space, allotments).
- Other infrastructure.

2.25 Each site was displayed on a hexagonal grid and the touch screen used to indicate the land use type for each hectare (or smaller area if set). A dashboard alerts the user to whether there is a deficit or surplus of open space types or schools according to the amount of residential use plotted.

2.26 As approaches are built up tile-by-tile using CHLOE, live updates are reported back to guide the user through the design process allowing them to make informed decisions about education provision, open space standards and other infrastructure to ensure that the development in question is sustainable and that the area's needs are met. Users can customise assumptions for each site, including: residential densities, household size and child yield and open space standards allowing different scenarios to be tested, recorded and compared. A togglable layer can show or hide the site's constraints and opportunities, such as: drainage, topography, existing nearby facilities, green infrastructure and transport to provide more detailed information to the user about the area in question.

2.27 For Grazeley, each small group was tasked with trying to achieve at least 10,000 dwellings on the site whereas for Barkham Square groups were given different targets of 500, 750 or 1,000 dwellings to achieve. In both cases, it was made clear that the exercise was undertaken on a without prejudice basis and did not signal agreement of the development or the proposed housing numbers.

2.28 Each group provided key feedback points about the thinking behind the final output. Whilst each output is not to be taken literally as a master plan scenario, a number of themes or ideas were taken from the exercise for further consideration in the master planning process. These are considered in more detail for Barkham Square and Grazeley in sections 4 and 5.

2.29 The Twyford/Ruscombe workshop did not include the CHLOE exercise in view of the clearly expressed resistance to the principle of Green Belt release. Instead, participants discussed possible locations within Twyford and Ruscombe where new homes might be provided. Highlighted potential locations included small brownfield sites and land west of the Henley branch line/south of the A4.

NEXT STAGES

2.30 The Growth Scenarios contained in this report will be subject to informal consultation to help ensure that the evidence provided in this report is robust. The final evidence will be used by WBC and WDBC, alongside other evidence studies, to prepare the strategy for growth within the Local Plan Update Preferred Options. In the event that one or more of the sites forms part of the strategy for growth, further work will be undertaken with regard to that growth scenario.

3.0 BASELINE VIABILITY

COMMERCIAL PROPERTY MARKET

Overview

3.1 The Thames Valley sub-market area benefits from strong functional relationships with the key M4 markets, including outer London Boroughs, Heathrow Airport and Reading. The key sub-markets include Reading, Wokingham, Bracknell, Slough and Maidenhead. There is a substantial stock of employment space in Berkshire; some 6.5million sqm of which the majority is offices. Take-up of stock between 2000-2012 showed a healthy level of demand, partly driven by the influence of Reading which has seen the largest increase in prices outside of London. Although the average rate of take-up has slowed in the last two years, the Thames Valley economy is expected to grow 2.4% per annum from 2017-2021 - ahead of the UK average. The tech market plays a significant role in the Reading office market with an estimated 44,000 jobs in the sector (14 tech jobs per 1,000 people).

3.2 Office supply in Wokingham Borough is lower than in the administrative areas of Reading or Bracknell although the development of Green Park Business Park at junction 11 of the M4 has increased the offer with 40% being located within the Borough. Thames Valley Park and Winnersh Triangle Business Park operate within the Reading market and capture larger requirements and command higher rents. In contrast, Wokingham town centre office market, and Mulberry Business Park, offer smaller, more diverse and competitive office space.

Market activity

3.3 The office market has concentrated to some extent on Reading town centre following the Network Rail £900m upgrade of the railway station, but there has been a healthy investment market in the wider area, for example the £98.3m acquisition of the Foster Wheeler building in 2015. Average rents in Wokingham, however, are generally lower than the western corridor average (£230.88 per sqm compared to £286.32 per sqm) but, following a period of negative net absorption in 2012-2015, there has been healthy rental growth up to and including 2017 in Wokingham.

3.4 Wokingham Borough has also emerged as a hub for hi-tech/industrial space in the Thames Valley in the last 10 years linked to research companies associated with Reading University and the advent of Thames Valley Science Park.

Future requirements

3.5 The Economic Development Needs Assessment (EDNA) for the Central Berkshire Functional Economic Market Area (FEMA) (including WBC, Reading Borough Council, Bracknell Forest Council and the Royal Borough of Windsor and Maidenhead) (October 2016) sets out a synopsis of the employment market, concluding that:

- employment space within the Central Berkshire FEMA is now evenly split between offices and industrial, following a decade or so of office growth and reduction in industrial space;
- Reading is the dominant location for employment uses but with significant employment clusters adjoining Reading within other boroughs; and
- Wokingham Borough recorded a net gain in employment space over the last 10 years (2006-2016).

3.6 More specifically, the study sets out scenarios for possible future employment requirements. Three scenarios were assessed: (i) projections of employment growth in the main B class sectors (labour demand) derived from economic forecasts from Cambridge Econometrics; (ii) consideration of past trends in completions of employment space using monitoring data from the boroughs; and (iii) estimating future growth of local labour supply based on population projections. Application of these scenarios to Wokingham Borough for the period 2013-2036 indicates the following gross employment land requirements:

Table 1: Gross employment land requirements (Ha) for Wokingham Borough by scenario 2013-2036

		1. Baseline Labour Demand (ha)	2. Past Completion rates (ha)	3. Labour Supply
Wokingham	Offices B1a/B1b	29.1	22.0	30.9
	Industrial B1c/B2/B8	28.0	18.4	33.0
	Total B Class Land acres (ha)	**57.1**	**40.4**	**63.9**

RESIDENTIAL MARKET

Overview

3.7 Average house prices in Wokingham Borough and WBDC are higher than those in the south east. HM Registry data shows mean average prices of £461,555 and £518,651 (October 2017) respectively compared to a south east average of £377,272. ONS data for lower quartile prices shows a price paid of £321,000 in Wokingham Borough and £265,000 in WBDC (June 2017). This has resulted in pressures on affordability. The ratio of median income to median gross average income for Wokingham Borough in December 2016 was 10.35 and for WBDC 9.68, compared to 9.43 for the south east. Wokingham Borough house prices are in part driven by its demographics with higher than average owner occupation and residents in managerial and professional occupations; and lower unemployment and deprivation. It also regularly appears in the Top Ten places to live in the country. In combination, these factors have led to strong demand and higher house prices.

Potential strategic development locations

3.8 Turning to the three locations of Grazeley, Twyford/ Ruscombe and Barkham Square, on-line property transaction data has been analysed to indicate the current residential market conditions. This has been done by reference to the postcode areas within which each potential strategic site is located (RG7 for Grazeley, RG10 for Twyford/Ruscombe and RG40 for Barkham Square).

RG Area Postcode Map Source: https://en.wikipedia.org

3.9 Whilst postcode sectors provide only a broad indication of values in an area they are nevertheless useful in establishing the tone in a location. For reference, the settlements covered within the three postcode areas are set out below:

- RG7 - Aldermaston, Bradfield, Burghfield Common, Riseley, Silchester, Mortimer, Swallowfield, Theale, Woolhampton
- RG10 - Charvil, Hurst, Ruscombe, Twyford, Wargrave, Waltham St Lawrence
- RG40 - Wokingham (east and town centre), Finchampstead, Barkham (south), Wick Hill

3.10 The table below summarises some of the key data for each postcode to illustrate the strength of the respective local markets:

Table 2: Summary of prices, sales and rents for each location (Source: Zoopla)

	Grazeley (RG7)	Twyford / Ruscombe (RG10)	Barkham Square (RG40)
Average price paid (Oct 2016-Oct 2017)	£447,160	£531,371	£486,364
No. of sales (Oct 2016-Oct 2017)	412	185	390
Average current asking prices (Oct 2017)	£522,719	£676,492	£517,775
Average current asking rent (average)	£1,399pcm	£2,641pcm	£1,371pcm

3.11 An assessment of the residential market data for each location reveals the following:

- All three locations have experienced house price growth over the last 12 months and all three have average house prices in excess of the south east and national average.
- Grazeley area has the lowest mean average house prices. Most sales have been between £200,000 and £400,000 and there is evidence of shortage of supply in smaller terraced and flats (probably given proximity to Reading).
- The Twyford/Ruscombe local market relates more to Henley/Maidenhead than Wokingham and Reading. Average values are more than double the national average (since 2013) and it has the highest average prices of the three locations. Fastest sales are for flats and for larger detached properties.
- The Barkham Square area is the middle of the three locations in terms of prices but has had the highest number of sales in last 12 months due to the adjoining Arborfield Green (Arborfield Strategic Development Location). Detached and Semi-detached properties sell the quickest indicated highest demand over supply.

3.12 In terms of values, the data shows a range of £3,821-£4,219 per sqm (£355-£392 per sq ft) for Grazeley, £4,349-£4,941 per sqm (£404-£459 per sq ft) for Twyford/Ruscombe, £4,327-£4,564 per sqm (£402-£424 per sq ft) for Barkham Square. Values by property type for each location are set out below:

Grazeley

Property type	Mean Av current value	Mean Av £/sq ft and £/m2	Av no. beds	Av £ paid (last 12mths)
Detached	£700,887	£392 £4,219	4.1	£592,533
Semi detached	£424,205	£395 £4,251	3.1	£395,215
Terraced	£335,226	£391 £4,209	2.7	£340,384
Flats	£254,011	£355 £3,821	1.9	£231,263

Twyford/Ruscombe

Property type	Mean Av current value	Mean Av £/sq ft and £/m2	Av no. beds	Av £ paid (last 12mths)
Detached	£812,394	£451 £4,854	4.0	£674,313
Semi detached	£500,128	£459 £4,941	3.2	£513,139
Terraced	£380,517	£452 £4,865	2.5	£368,208
Flats	£288,592	£404 £4,349	1.8	£270,320

Barkham Square

Property type	Mean Av current value	Mean Av £/sq ft and £/m2	Av no. beds	Av £ paid (last 12mths)
Detached	£726,240	£417 £4488	4.1	£680,818
Semi detached	£438,968	£402 £4,327	3.1	£439,566
Terraced	£372,571	£407 £4,381	2.7	£357,408
Flats	£300,861	£424 £4,564	1.9	£309,984

3.13 It should be noted that the figures recorded above reflect the sales of all stock throughout the three areas. New housing developments seek to set a new value tone for an area and the asking prices of new homes can be considerably higher than that for existing homes (as much as 20% according to an article 'Old v New' from onthemarket.com, 2015). For example, current asking prices at the Crest development at Barkham Place in Arborfield Green for a 3 bed semi-detached properties range from £480,00 to £515,000 i.e. between 10% and 15% higher.

Local agent perspective

3.14 Vail Williams undertook a review of current market conditions and reported that overall demand is strong, especially in areas close to a direct rail link to London (Wokingham, Twyford). Developer build-out rates have been typically 4-6 sales per week for each development being brought forward. This equates to 48-72 per annum per individual developer site. Land values vary according to site specifics, site size and services but vary from about £2.1m per ha to £3.7m per ha for fully serviced sites where major infrastructure is being facilitated by a lead developer. Average plot values are in the range of £95,000-£125,000 per dwelling.

3.15 The above provides a snapshot in time of the residential market in the three areas. Further detailed analysis will inform the viability testing to establish value bands which reflect the location and character of the new areas coming forward.

4.0 GRAZELEY

4.1 Through the Local Plan Update process, a number of connected sites were promoted totalling 916 hectares to the south of Junction 4 of the M4 and west of the A33. These sites taken together comprise the area of search for the master planning exercise (Figure 2: Grazeley Area of Search). The existing village of Grazeley lies within the southern part of the area and the Reading to Basingstoke railway line bisects the area in a north-south direction. AWE Burghfield lies immediately to the west; the AWE Detailed Emergency Planning Zone (published March 2018) makes up 34% of the site. It imposes restrictions on land use with the exception of informal open space. For the purposes of this study it is assumed that land within the DEPZ is available for use as SANG and other informal open space, and consequently the area of search has been reduced by approximately 25% from 916ha to 687ha to reflect the current DEPZ boundary.

4.2 The site is currently being promoted by Hallam Land Management, Wilson Enterprises and the Englefield Estate. Small areas within the site are owned by WBDC, and land adjoining the site is owned by WBC. Collectively, these organisations have sought to secure Garden City status for the site. A series of Garden City principles have been agreed by all parties, and there is consensus that any development should be planned, designed and delivered on the basis of these principles if the site forms part of the growth strategy within the Local Plan Update.

4.3 The site is the subject of a current Housing Infrastructure Fund (HIF) application process, and at the time of writing has progressed to Stage 2 of the process. WBC is preparing a joint business case, with WBDC and Reading Borough Council, to submit to Ministry for Housing, Communities and Local Government (MHCLG).

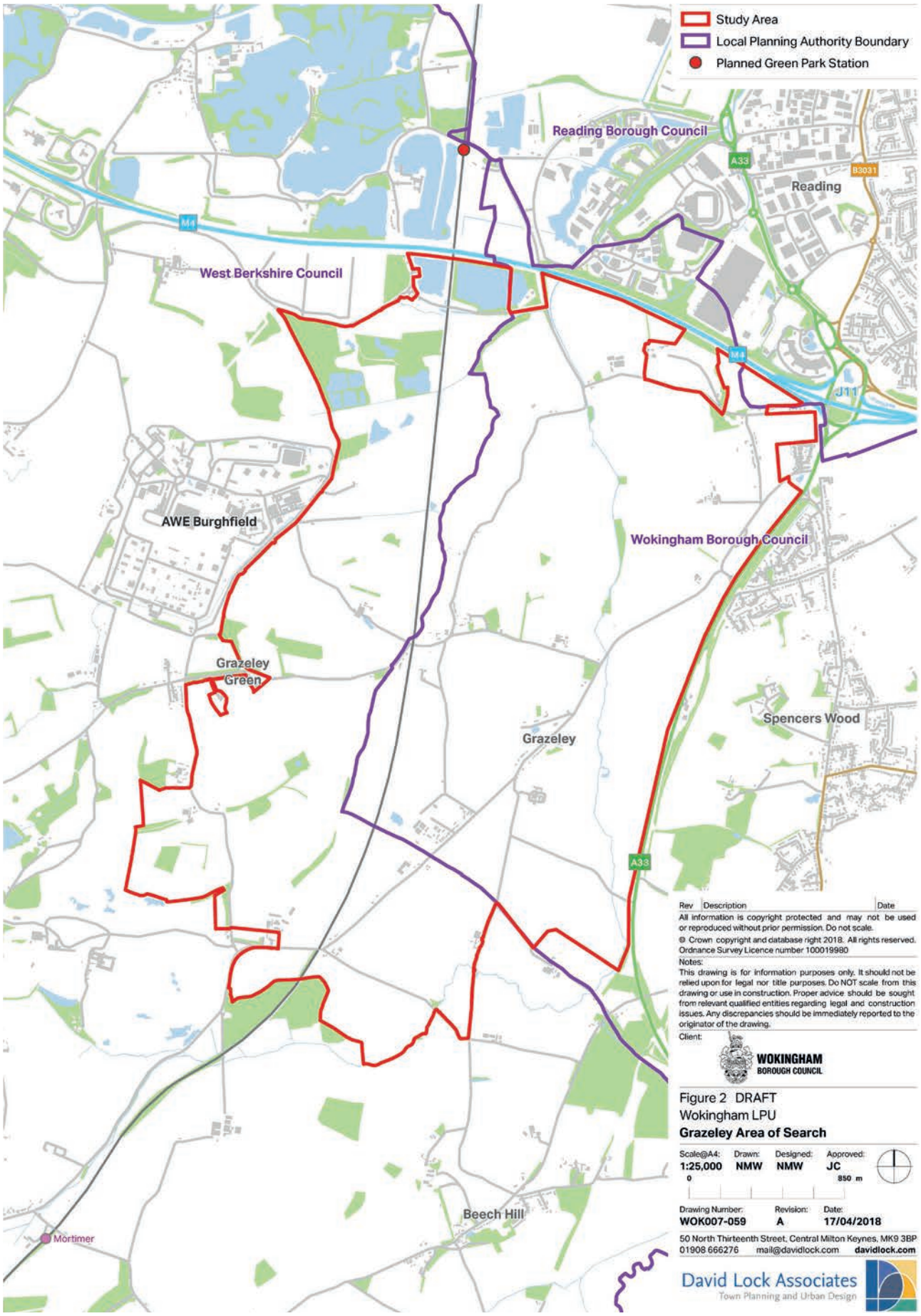


Figure 2: Grazeley Area of Search

BACKGROUND AND ANALYSIS

Site Environmental Studies: Summary Findings

4.4 Key site environmental constraints are shown in Figure 3 and are summarised below. The site contains no insurmountable environmental risks to development.

Flooding and Drainage

4.5 The principal watercourse on the site is the Foudry Brook, which flows in a northerly direction. Several tributaries flow into the brook, most notably the Burghfield Brook, which enters the site at a midway point along its western boundary. Several smaller brooks join the Burghfield Brook west of the railway line, and several other minor watercourses and drains are present. The presence of water is apparent on the site, although the Foudry Brook runs at low levels.

4.6 The flood map for the site is due to be updated by the Environment Agency following recent hydraulic modelling for the Grazeley area. Risk of flooding is addressed in national planning policy which ascribes categories of risk through 'zones' and identifies the relative vulnerability of different land uses. The site includes Flood Zone 1 (low probability of flooding, having a less than 1 in 1,000 annual probability of flooding, with all land uses regarded as acceptable), Flood Zone 2 (medium probability of flooding, having between 1 in 100 and 1 in 1,000 annual probability of flooding, with essential infrastructure, water compatible uses, and less vulnerable and more vulnerable uses generally regarded as acceptable), Flood Zone 3a (high probability of flooding, having a 1 in 100 or more annual probability of flooding, with less vulnerable and water compatible uses generally permitted) and Flood Zone 3b (functional floodplain where water has to flow, with water compatible uses and essential infrastructure permissible subject to design and construction requirements). Any development should be located on land outside Flood Zone 3 and ideally in Flood Zone 1 to negate the need for a Sequential Test, the purpose of which is intended to direct development towards low flood risk areas unless exceptional circumstances are present. Detailed flood risk assessment will be required at the outline planning stage.

4.7 The area may be susceptible to surface water flooding in the event of extreme rainfall. The pattern of surface water flooding may be altered by development, and this would need to be addressed when surface water management is considered at the detailed master planning stage. However, this is not considered to be a significant constraint to development.

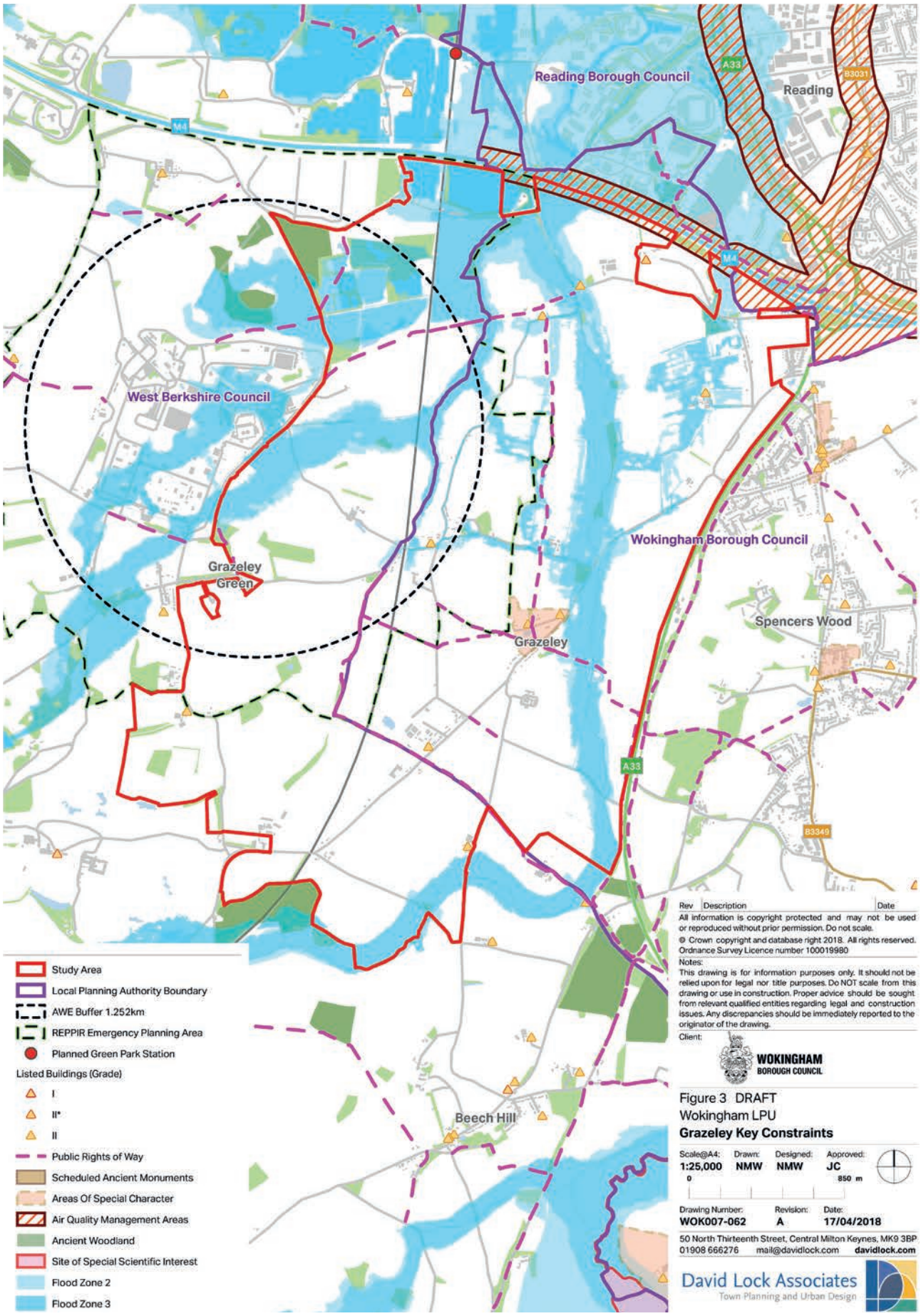


Figure 3: Grazeley Key Constraints

Transport & Highways

4.8 The background analysis included a review of the Thames Valley Berkshire Local Enterprise Partnership (LEP) study of the Grazeley site and the Grazeley Train Station Review, and examination of existing transport and access constraints.

4.9 There is consistency in the conclusions drawn in each piece of work which can be summarised as follows:

- In transport terms, Grazeley presents an opportunity for very sustainable development if significant investment in transport infrastructure is made. The location offers scope for new home building on a sizeable scale and economic growth to benefit the wider area. Investment in transport infrastructure would include the items listed below.
- M4 crossing should be enhanced to support public transport and direct links to Green Park (a major employment destination).
- Access to the site from the A33 would be possible. In due course any development proposals will need to take into account the findings of the current Corridor Study for M3-M4 Connectivity.
- Reading MRT could be extended through the site to link with Mortimer Station. Interchange could be enhanced beyond the current Mereoak Park and Ride facility, and there is potential for a second park and ride at the southern entrance to the location, to capture traffic travelling north towards Reading.
- New and improved connections across the A33 would deliver better walking/cycling and public transport connections with Shinfield.
- There is great potential to create extensive walking and cycling connections.
- The benefits of a new railway station at Grazeley are widely recognised and it is reasonable to assume a new station can be delivered.

Air Quality

4.10 An Air Quality Management Area (AQMA) is in place at junction 11 of the M4 and extends westwards along the northern boundary of the site and encroaches 60m into the site. Additional traffic impact arising from development may require mitigation. Residential development would ideally be located away from AQMA and thereby away from the M4 and the northern section of the A33, however commercial development, which is less sensitive to air quality constraints could be located closer. Gradual reductions in emissions through tighter standards and a shift towards electric vehicles will help to reduce air quality problems in the future.

Noise and Vibration

4.11 The M4, A33 and railway line are all potential noise sources. Detailed consideration of the impact of any night-time freight movement would be required. Barrier mitigation or other screening may be needed to ensure development is within guideline levels. Residential development would ideally be located away from sources of noise and thereby away from the M4 and A33.

Geotechnical

4.12 The site is considered to have no major sources of contamination or hazardous ground gases due to the majority of land being used for farming. There are no geological or geomorphological features of conservation value across the site. The geoenvironmental constraints are considered very low.

4.13 The northern part of the site has a level of river terrace deposits which follow the floodplain of the Foudry Brook and are in a Mineral Safeguarded Zone. These deposits are believed to be shallow and may not be of sufficient quantity to warrant large scale extraction.

4.14 There are limited areas of low risk ground conditions due to clay deposits, which may present some construction risks, but not untypical for sites of this scale.

Waste

4.15 There is an emerging Minerals and Waste Plan for central and eastern Berkshire. The site will be subject to review for mineral deposits and possibly the search for a waste to energy facility by Hampshire County Council who currently act as the waste and mineral planning authority on behalf of WBC and the other central and eastern Berkshire authorities who are jointly preparing a Minerals and Waste Plan.

Agricultural Land

4.16 Agricultural land is classified according to its quality, productivity and versatility. Grade 1 land is 'excellent', Grade 2 'very good', Grade 3a 'good', Grade 3b 'moderate', Grade 4 'poor' and Grade 5 'very poor'. Grades 1, 2 and 3a are considered 'Best and Most Versatile' and are capable of producing the best crops. At Grazeley, the site contains some Grade 3a land, but is predominantly Grade 3b with some smaller pockets of Grade 4 land. A detailed agriculture and soils survey should be undertaken to confirm this.

Ecology

4.17 The site lies within an identified Impact Risk Zone (IRZ) for nearby areas designated as Site of Special Scientific Interest, Special Protection Area, Special Areas of Conservation and Ramsar. Additionally, the site falls within the IRZ for the Thames Basin Heaths, and most of the site is within the 5-7km of the closest part of the Heaths; consequently, any development would trigger a need for the provision of Suitable Alternative Natural Greenspace (SANG).

4.18 Much of the site is agricultural land of limited ecological value. Habitat of value includes the Foudry Brook, as well as pockets of deciduous woodland (designated as Local Wildlife Sites), scattered trees, hedgerows and orchards.

4.19 Habitats on site have the potential to support a variety of species including roosting Bats, breeding Birds, Reptiles, Badgers, Great Crested Newts, Otters, Water Voles and White-clawed Crayfish. The impact of any development proposals on such habitats would need to be assessed through an Environmental Impact Assessment at the outline planning stage.

Heritage

4.20 The site includes a small number of listed buildings and associated curtilages, several of which are located within the existing village of Grazeley. The village has the potential to act as a focal point in placemaking, and consideration should be given to the manner in which new development relates to the village.

Sustainable Resources

4.21 Development would be expected to deliver high levels of resource efficient design, consistent with the requirements of WBC and WBDC guidance or policy in place at the time and comply with the Government's requirements for nearly zero energy building design.

4.22 Special regard for water consumption is needed within the Thames Valley. Thames Water and South East Water's Water Resource Management Plans highlight the need for careful balancing of future supply and demand.

SUMMARY OF CONSULTATION OUTPUTS

Technical Stakeholder Workshop Outputs

4.24 The following key points have informed the master planning process to date and can be carried forward by WBC and WBDC in the event that the site forms part of the growth strategy within the Local Plan Update.

Green and Blue

4.25 Early planning of a green and blue framework should be pursued, with clear objectives and principles established. It is estimated that up to 60% of the site may be green/blue. The implementation of green and blue infrastructure in the early phases of development should be secured. Requirements for long term landscape and water management and funding should also be considered at the design stage.

4.26 The Foudry Brook is an important structuring element and can be employed as a placemaking and value enhancing device. It has a low flow and any drainage strategy would need to consider retaining a low flow in the interests of water quality and biodiversity. There would be a requirement to prevent discharge into the brook in the first 5mm of rainfall.

4.27 A system for sustainable urban drainage to manage run-off rates should be procured. This would need to be located outside the floodplain. Any alleviation scheme could also consider the wider flooding issues including AWE Burghfield.

4.28 The Environment Agency position (and national policy) is a presumption against re-modelling floodplain purely for the purpose of increasing development land. There is, however, scope to consider how a flood plain can be reconfigured to improve flow, flood mitigation, biodiversity and recreation (and which could then mean a better development opportunity). Further information/ survey work will need to inform any development proposals.

4.29 Flood risk is a matter of considerable concern for AWE Burghfield given the nature of the on-site operations and the importance of maintaining safe evacuation routes at all times. Any development would need to demonstrate that it will not have a detrimental impact on AWE Burghfield, and there is clear potential to consider how new development might be engineered to provide flood relief for AWE.

4.30 The site has been intensively farmed for many years. Remaining hedgerows and trees are scattered alongside the Foudry Brook or at field edges. These could structure a concept of green fingers emanating from the main green corridor out into development.

4.31 SANG will be required at a standard of 2ha per 1,000 population as the site lies within the 7km radius of the Thames Basin Heath SPA. SANG should provide functional connected habitat of ecological value, and wherever possible existing habitat should be retained. SANG should have a natural feel, be accessible and ideally be in a single location capable of providing a 2.3km circular walk. Delivery could be phased. Maintenance of SANG needs to be secured for 80 years.

4.32 There are no statutory nature conservation designations within the site. However, surveys to establish details of the site's ecology, and appropriate mitigation of impact will need to accompany any development proposals.

4.33 Pockets of ancient woodland exist within the site. In the event development proposals coming forward, tree surveys will be required. Opportunities exist for tree and woodland planting to shape the character of any development and provide woodland habitat.

4.34 Existing public rights of way should be retained, and where possible or appropriate they should be enhanced and extended to allow good public access for recreation.

4.35 The site is open and mainly flat, rising only in the south near Beech Hill. This means that views into and out of the area are possible.

Transport and Environmental Health

4.36 Means to minimise external trips by car should be considered. Lack of peak period capacity at Junction 11 indicates a need to consider additional links across the M4 for sustainable transport. There is scope to expand park and ride capacity and extend its function to 24 hours to suit work patterns and lifestyle demands. Green Park and Mortimer stations should be utilised in advance of the delivery of a new station (potentially by 5,000 completions), and any new station should not replace either Green Park or Mortimer but operate in addition.

4.37 Internal trips should be maximised through the on-site provision of jobs, services and facilities.

4.38 A clear vision for cycling should be established at the outset. Interest in a Dutch model of shared road space was expressed. Beyond the site, enhanced greenways should connect to other destinations including east of the A33.

4.39 Junction 11 is an Air Quality Management Area, requiring the pursuit of an Air Quality Action Plan to reduce air quality to within acceptable limits. This may be impacted by additional traffic movements arising from Grazeley.

4.40 Emergency evacuation routes aligned south-east/ north-west for AWE Burghfield would ideally be built into the master plan.

4.41 Improved connections to AWE Burghfield should be created to support employees living at Grazeley.

4.42 Future proofing should be built in to any development – for electric vehicles, autonomous vehicles and electrification, and duelling of the railway line.

Community Wellbeing

4.43 A settlement of 15,000 homes would generate a need for two secondary schools and seven primary schools (comprising four 3FE and three 2FE schools) on site. Provision for apprenticeships and training schemes in conjunction with local colleges should also be explored.

4.44 The Clinical Commissioning Group and National Health Service are working towards a new model of healthcare to co-locate GPs, outpatient appointments and other forms of healthcare in Health Hubs, with capacity for between 30,000 – 50,000 patients. Grazeley would be a suitable and preferred location for a new Health Hub, which could be developed in stages as the community grows.

4.45 There is a high level of demand for key worker housing for public sector staff and private elderly care, both of which could be met in part by strategic scale development.

4.46 Under current planning policies, 35% affordable housing will be required, with a mix of 1,2 and 3 bed properties, based on 70% affordable rent and 30% shared ownership.

4.47 Understanding about the relationship between good mental health and the built environment should inform the design of new places. Connectivity and densities similar to traditional Victorian terrace typologies are most conducive to good mental health.

4.48 Emergency service response times within the locality are constrained by heavy traffic volumes. Grazeley lends itself to the provision of a 'tri-service' facility for the three emergency services. Further work is needed to model future demand.

4.49 Community services should include community centres, library facilities, and indoor and outdoor sports provision. Local retail facilities should be provided on a scale which meets the needs and demands of a sizeable community.

4.50 Opportunities for job creation and economic growth should be considered. Incubator hubs and business start-up premises should be provided.

Utilities

4.51 The workshop confirmed that there are no incumbents to development. Investment can be made to ensure the provision of utilities to the site including potable water, foul water drainage, electricity, gas and telecommunications. In time the supply of electricity for electric vehicles will need to be addressed. However, this is not a site-specific issue and applies generally regardless of the location of new growth.

4.52 Several supply lines cross the site, and any requirements for easements and stand-off will need to be considered at the point at which development proposals are brought forward. This includes a high-pressure gas main in the north of the site and overhead electricity cables.

Community Stakeholder Workshops

Strengths, Weaknesses and Opportunities

4.53 Workshop participants identified a range of issues which are relevant to the master planning exercise.

4.54 There was broad recognition of the traffic problems in the area, with comments about the potential for additional traffic lanes on the M4 and on the A33 to the south of the site to address congestion. The rural nature of the area currently leads to high levels of car dependency, especially as local services have diminished. Workshop participants prioritised the retention of Mortimer Station alongside any new Grazeley station and would not welcome a relocation of Mortimer station to the Grazeley site.

4.55 Investment in adequate levels of infrastructure is regarded as an essential pre-requisite of strategic scale development. Progress on the HIF bid is welcome. Infrastructure should be timed so that it is in place when needed, and to establish good travel habits from the outset. Good health facilities, schools and appropriate levels of shopping will be needed.

4.56 Economic growth should be planned alongside new homes. Opportunities for business development, from large employers to Small and Medium-sized Enterprises (SMEs) and home working to reduce travel demand should be provided. Large employment facilities should be located close to junction 11 and along the A33 to provide a protective barrier against noise and vehicle emissions for homes.

4.57 Green infrastructure should be accessible to the public. Open space should be integral to residential layouts and could ensure an attractive setting for higher density development.

4.58 The limited amount of development on the site at present opens up the possibility of contemporary house design, and higher densities would be possible in places in conjunction with green and blue infrastructure; the opportunity for canals to create an attractive setting for development was raised. The heritage of the area should not be overlooked, and the future setting of Grazeley village warrants careful consideration.

4.59 Housing affordability is widely recognised as a problem. Development on a strategic scale should cater for all incomes and provide a range of tenures. Homes built by the local authority would be welcome, and a return to local authority mortgages was raised as a possibility.

4.60 There is clear acknowledgement of the constraints imposed by floodplain, AWE Burghfield and the M4 AQMA. This will determine areas that are unsuitable for housing.

Discussion on Garden City Principles

4.61 Four groups discussed which Garden City principles should be prioritised; the top priorities for each group are recorded in the table opposite.

Group 1	Group 2	Group 3	Group 4
1. Strong local jobs offer for sustainable employment opportunities.	1. High quality design, with development structured around neighbourhoods.	1. Excellent connectivity to strategic links and the development of a strong local jobs offer.	1. A strong local identify and cultural offer, with civic functions should be pursued.
2. Taking advantage of existing and planned infrastructure including MRT and rail links.	2. A clear sense of character and identity of its own, with variable densities and live/work units.	2. High quality green infrastructure and provision for leisure including indoor sports facilities.	2. Higher density development which would allow more greenspace to be created. Buildings should be of very high quality.
3. Utilising the watercourses to create interest, recreation and ecological habitat.	3. A range of tenures including council-built homes.	3. A range of housing and tenures to achieve a balanced community, to include self-build plots.	3. Greenspace should be abundant and cater for wildlife, food production and green links beyond the site.
	4. Integrated transport systems and timely provision of infrastructure.		
All groups highlighted the importance of a strong vision, strong local leadership and involvement in the development process. A single body should be responsible for the delivery of the development. A new Town Council may be warranted in time.			

CHLOE Concept Plans

4.62 The workshop included an afternoon workshop session of interactive master planning using the 'CHLOE' master planning tool. Community representatives worked in a number of small groups (facilitated by the project team) to prepare master plan proposals for the Grazeley site. Whilst differences in approach were demonstrated between the groups, a number of key issues arose from the CHLOE master planning workshop including the following points and themes.

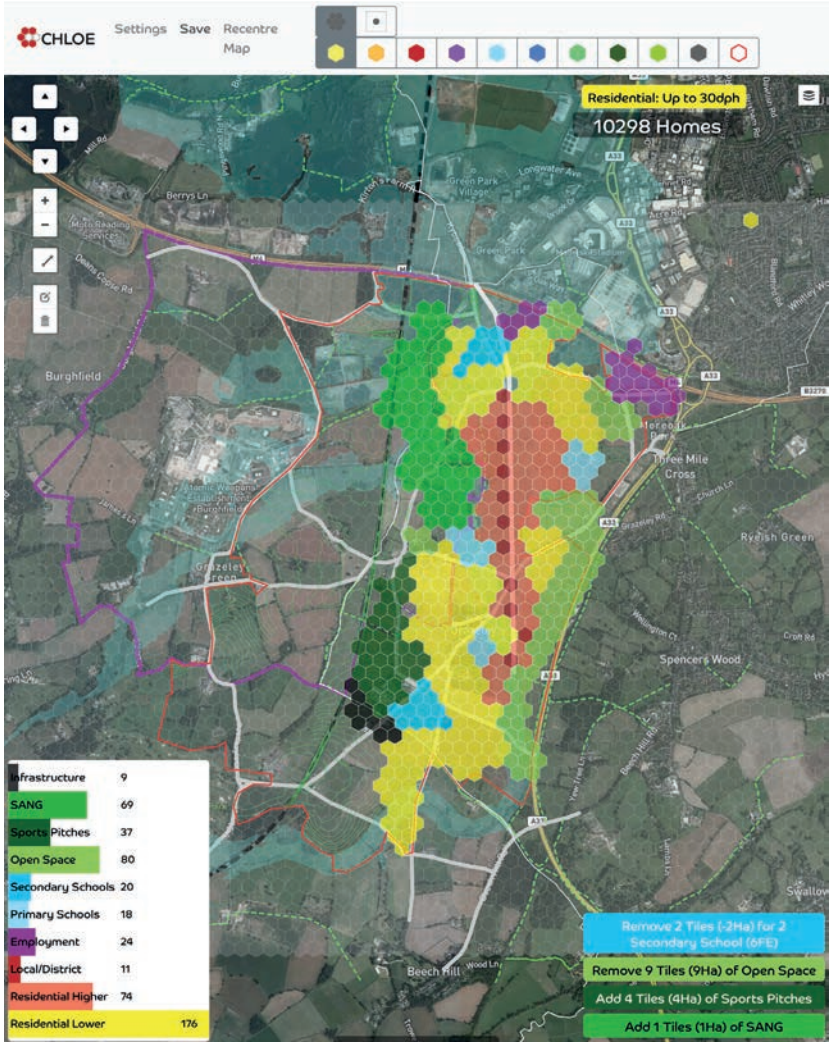
4.63 AWE Burghfield, emergency planning zone: all groups ruled out development within the DEPZ. The DEPZ runs across local authority boundaries. Land uses proposed within and immediately adjacent to the DEPZ offered some master plan design thoughts, notably with strategic scale provision of formal open space - potentially in the form of Sports Hub(s), SANG and informal open space.

4.64 Strategic Green Infrastructure: All groups illustrated high level design proposals for strategic green infrastructure, commonly in the form of 'Green Landscape Corridors' that either aligned with constraints (e.g. landscape set around water courses, flood zones, the AWE DEPZ and adjacent to strategic road and rail routes) and/or as strategic level connections across the site, providing a setting for development and connections into the wider network of strategic Green Infrastructure (e.g. links to water bodies and recreation associated with aggregates extraction to the north of the study area).

4.65 An example workshop master plan generated using CHLOE is shown below. It illustrates the approach of allocating green infrastructure landscape uses within and immediately adjacent to site constraints (including the AWE DEPZ, east of the A33 and associated with areas of flood risk).

4.66 *Residential Density:* it was notable that most of the groups included reasonably large areas of higher residential density development. The CHLOE tool applied an average residential density of 60 dwellings per hectare (dph) for areas of higher density development (compared to an average of 30 dph for areas of lower residential density). The creation of master plans with large areas of higher density development, in some cases larger in area than lower density even (see example below), was generally identified as a means of using land efficiently and creating a form of sustainable development. The workshop participants quickly realised that when the site constraints have been taken account of (notably the factors listed above - no development within the AWE emergency planning zone nor within floodzones) that the residual land area for new homes was smaller than first anticipated, therefore housing density is a key issue to be addressed.

4.67 A second example workshop master plan generated using CHLOE is shown below. It illustrates the approach of large areas of higher residential density housing (av. 60dph) as shown with the areas of pink colour. In this example the higher density housing is significantly larger than the lower density housing, both in terms of area and number of homes provided.

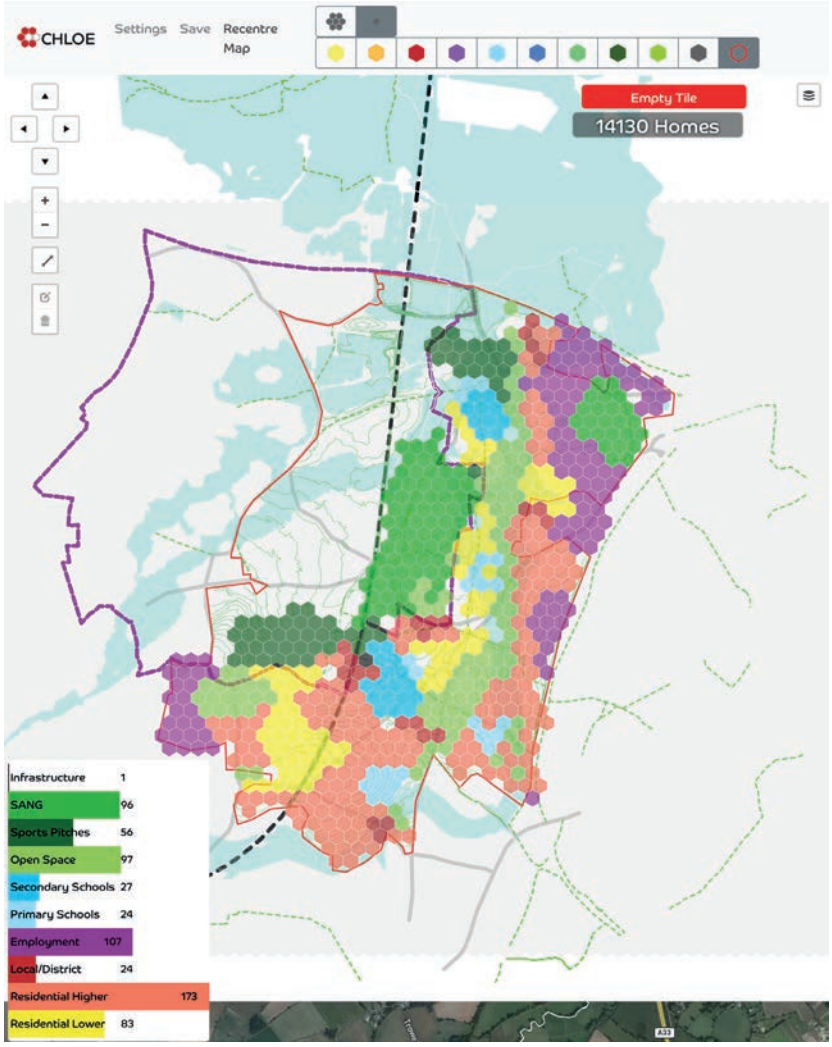


Grazeley workshop - CHLOE master planning tool output: Plan 5

4.68 *Employment:* a consistent master plan design approach across most of the CHLOE workshop groups was the creation of significant areas of employment (c. 20ha + in many cases) close to the M4 motorway junction 11 at the northern end of the site study area. This approach was seen to have benefits of access (via the motorway) and links to existing business and commercial employment to the north of M4 junction 11 (Green Park, Madejski Stadium & surrounds) and the planned Green Park Station. It would also act to mitigate the impact of motorway noise and traffic emissions on residential areas by forming a suitable barrier.

4.69 *A new Railway Station as Hub:* a number of groups proposed a new railway station within the site, both as an element of strategic infrastructure to aid access and movement and also as the anchor to a proposed hub of activity – a Local, Neighbourhood or District Centre as a focus of mixed use development with the highest density housing and a concentration of other supporting land uses and community infrastructure.

4.70 *Education:* all groups showed a number of education sites (for primary and secondary schools) dispersed across the site study area. The location varied across the different groups' proposals, some showing schools associated with hubs of mixed use activity, infrastructure (new railway station) and higher density housing.



Grazeley workshop - CHLOE master planning tool output: Plan 6

SUMMARY OF KEY CONSIDERATIONS

4.71 The following summary represents a synthesis of the Stage 1 findings and the key points arising from the consultation workshops, which give rise to several important master planning considerations.

4.72 The site comprises a large expanse of arable farmland within proximity of major sources of employment at Reading and AWE Burghfield. It is well located to transport infrastructure including junction 11 of the M4, the existing station at Mortimer and future station at Green Park and is also served by Reading Mass Rapid Transit scheme (MRT) via the Mereoak Park & Ride. The benefits of the location, alongside the relatively limited environmental constraints to development, indicate that subject to appropriate master planning and appropriate mitigation the site could offer the potential for sustainable development.

4.73 The study brief seeks a visionary approach to the master planning so that ideas about high-quality development and placemaking can be captured. The following considerations, which emerged through the background analysis and consultation, and are illustrated in Figure 4, have informed the master planning in response to this requirement. The application of Garden City principles to the site is considered appropriate and beneficial, if there continues to be firm commitment from all parties.

4.74 The AWE Burghfield DEPZ effectively dictates that no built development can occur within its boundary (limited and low levels of low density employment and informal use such as SANG may be considered acceptable, subject to risk assessment processes). Discussions with AWE and the Office for Nuclear Regulation (ONR) have also highlighted a preference for broad distribution of population (as opposed to high concentrations in limited locations), and the importance of good routes to cater for an evacuation event.

4.75 The DEPZ has the effect of reducing the overall area of search by approximately 25% and elongating it in a north-south direction between the railway and the A33. This will influence the configuration of development between two key movement corridors, albeit access to each will be determined by limited opportunities to locate a new station outside the DEPZ and limited opportunities to create new junctions on the A33.

4.76 The proximity of employment at AWE Burghfield, Green Park and Reading Town Centre, amongst other locations, indicate the potential for living and working in proximity, and that excellent connections to these locations by sustainable modes should be secured. To achieve this the master plan should look to strengthen and extend physical connections, whilst configuring new development to maximise the number of people living within easy access of those connections.

4.77 Careful consideration should be given to residential densities. There is an opportunity for a bold approach here, given the characteristics and advantages of the location, along with scope to use greenfield land very efficiently, and the potential to generate a critical mass of people to ensure a vibrant and mixed community as well as helping to make transport services and local businesses more viable over the longer term.

4.78 Improved connections may include upgrades to the existing bridges across the railway and M4 to ensure their suitability for public transport, walking and cycling. In addition, there is scope to connect across the A33 to link communities at Three Mile Cross and Spencers Wood with Grazeley. With the provision of new internal road infrastructure to serve the development, existing lanes may be downgraded to form a network of pedestrian and cycleways.

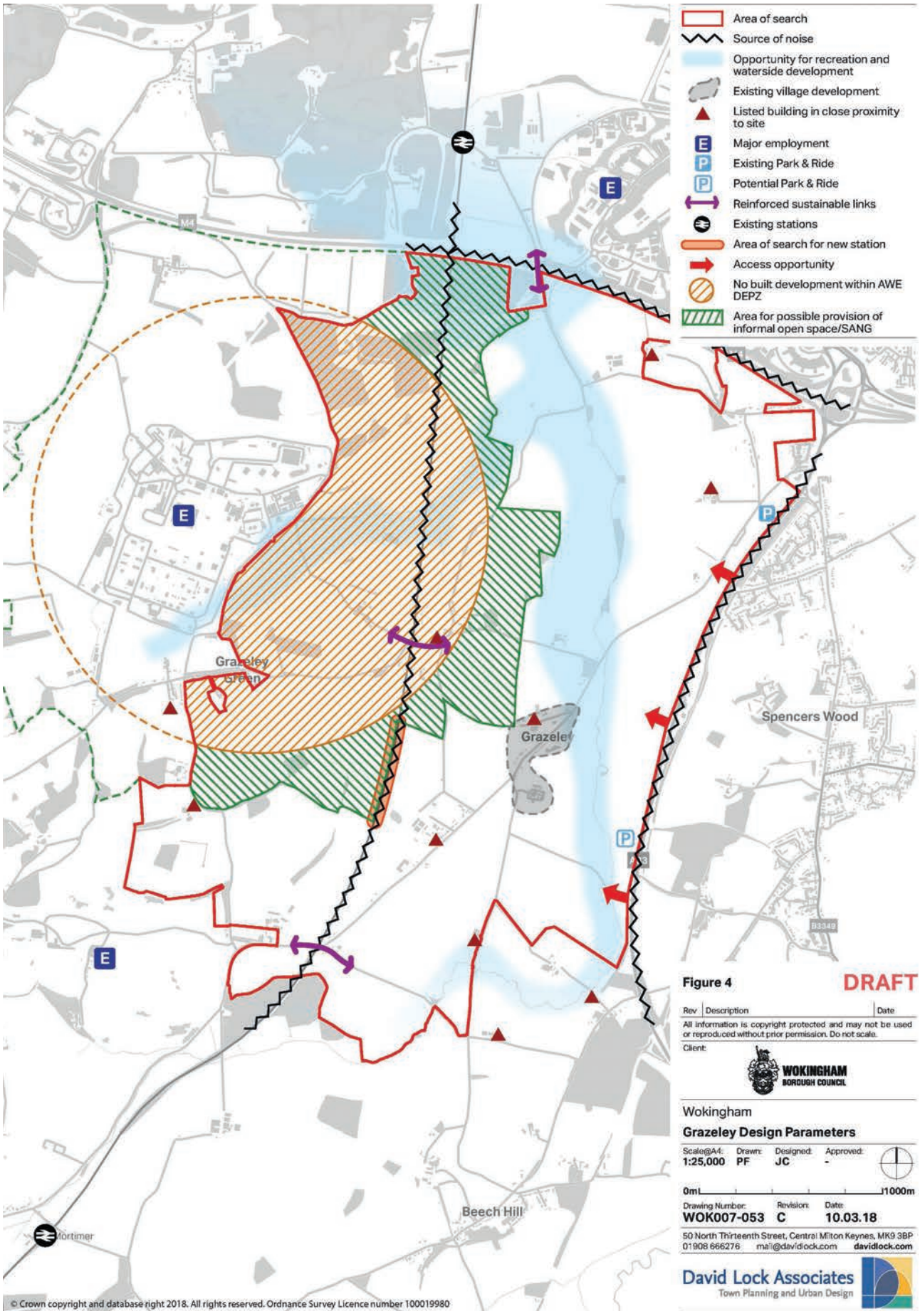


Figure 4: Grazeley Design Parameters

4.79 To the east there is scope to break the severance of the A33 by providing new east/west walking, cycling and public transport links to Shinfield, Three Mile Cross and Spencers Wood.

4.80 There is clear potential for a new station from Grazeley to link with Reading (and onwards to London, the west and the North) and Basingstoke to the south. Potential locations for a new station are effectively limited to those outside the DEPZ, and therefore lie within the southern part of the site.

4.81 Excellent transport connections and the growth in homes indicate that new employment opportunities could be delivered at the site. In particular, proximity to Junction 11, Green Park and a major conference and training venue at Wokefield Park suggest that job creation could be an integral part of growth at Grazeley. A combination of opportunities, from significant inward investment through to premises for SMEs and provision for home-working or community hub working could be created if a scheme of significant scale were to be achieved.

4.82 Promoting the use of rail access into Reading may also include better access to Mortimer and Green Park stations by sustainable modes.

4.83 Principal road access into the site from the A33 indicates a need for new junctions, and the possible requirement for improved road access adjacent to Mereoak Park and Ride. However, these need to be considered in the context of a hierarchy and priority for public transport provision. There is scope to explore the potential for additional park and ride provision within the southern area of the site to capture journeys from the A33 south, thus releasing capacity at Mereoak for M4 users.

4.84 The railway, A33 and M4 are sources of noise. The need to mitigate the impact of noise on residential properties has implications for the configuration of land uses within the site, including the potential to locate employment uses where they can form a sound barrier between noise sources and living environments.

4.85 The Foudry Brook offers the opportunity to integrate water into the master plan. The brook's continuous and linear presence through the site means that it would be within walking distance of a large number of homes. Aligning green infrastructure with the brook would offer scope to manage flood potential and provide opportunities for informal recreation. Reconfiguration of the floodplain may be permissible; given the scale of the site an opportunity exists to consider different ways in which water can bring character to the development.

4.86 Existing pockets of development within the site including Grazeley village have the potential to act as a focus for placemaking. Consideration should be given to the protection of the village character and the village's future role in the context of large scale development. Grazeley primary school, village hall and existing employment areas such as Diddenham Park could provide community facilities and access to jobs in the early phases of the scheme.

4.87 Considerable investment in schools, open space, community facilities and local services will be needed to support a development of this scale. The location of these elements can reinforce good placemaking, help foster a sense of community, and enable easy and safe travel by walking and cycling.

4.88 The site is relatively flat, but not without features. Hedgerows cross the site, generally in a north-west / south-east direction, giving protection against prevailing winds. Several mature trees and pockets of woodland add character, and it is worth considering how mature vegetation can be retained and enlarged as part of landscape framework.

4.89 The flatness of the site indicates that development will be visible from the surrounding area. Successful integration of the development, particularly areas of higher density development, into the wider landscape will demand an ambitious approach to architectural, landscape and environmental design.

4.90 In summary, the following factors are relevant:

- The location presents the opportunity for a development with excellent sustainable transport connections. The scale of the site indicates that alongside new homes, there is good potential for business growth. Grazeley should be considered as a destination for employment, as well as an origin of employees.
- Higher than typical residential densities would help to maximise the potential of the location. This signals the possible need for different approach to home design and housing mix, with a higher proportion of bespoke design and more apartments and terraced forms than might normally be found on greenfield developments.
- A comprehensive approach to green and blue infrastructure should be pursued to ensure the early delivery of recreation, flood mitigation and sustainable urban drainage, SANG and ecological habitat. Opportunities for food production should be sought. The landscape should be designed to ensure good long-term management and maintenance. Some use of land within the AWE DEPZ may be suitable for low levels of recreation use.

A VISION FOR AN EXEMPLAR PUBLIC TRANSPORT ORIENTATED DEVELOPMENT

The unique locational qualities at Grazeley, coupled with strong potential for the delivery of rail and rapid bus travel, point to a vision of a new settlement which breaks new ground in terms of its bold approach to urban development. Greenfield development in England typically adopts a suburban character, built at c.35 dph, and largely predominated by family sized housing. Whilst schemes of a strategic scale do deliver good amounts of public open space and local schools and services commensurate with the needs of a new community, they rarely achieve an intensity of population capable of supporting high quality public transport which operates at a frequency sufficient to coax people from their cars.

Grazeley has the potential to break this mould, with early consultation indicating a willingness to consider a scheme which is more ambitious in terms of its built form and density. However, quality is an essential prerequisite, and there is broad recognition that a clear commitment from all stakeholders and the site promoters to quality across all aspects of the scheme is necessary to achieve place quality and a sustainable community. Garden city principles provide a good starting point.

The following thoughts point to the type of place Grazeley could become if there is genuine pursuit of garden city principles.

- Well designed, beautiful homes suited to 21st Century lifestyles should be available to all households regardless of type, size, tenure and ability to pay. The scale of Growth Scenario 1 would allow scope for all types of houses. Achieving higher density development indicates a greater proportion apartments and terraced homes, but these types of dwellings can be attractive to families as well as to smaller households if they offer good flexible living space and good access to greenspace and local amenities.
- A range of jobs and business opportunities should be integral to Grazeley, giving people a real chance to work and live in close proximity, and forgo the lengthy commutes which create congestion and reduce quality of life. Grazeley is well connected and will become part of a wider economic network. State of the art telecommunications will be critical in supporting entrepreneurship and investment. To accommodate all business activity, from large employers to SMEs and homeworking, and from traditional trades and professions to the as yet unknow jobs of the digital age, Grazeley should offer well designed and flexible business premises as part of a wider mix of public and community activities.

- Grazeley can support active and healthy lifestyles. The quality, design and accessibility of public open space should afford opportunities from informal recreation and children's play to formal sports and local food production. All scales of spaces, from strategic SANG down to local pocket parks, should be connected as part of a wider green infrastructure network. Everyone living and working at Grazeley should be able to see and walk to greenspace with ease and have the opportunity to grow their own food.
- Transport links within Grazeley and to the wider area can be possible without the car in the majority of cases. High quality public realm can do a great deal to encourage walking and cycling; tree lined streets, good lighting and direct routes should be provided. Bus infrastructure and good bus/rail interchange facilities should make travel by public transport convenient and comfortable. Frequent services should extend beyond the peak hour to make travel by bus and rail a genuine choice for many. Car clubs can reduce the need to own a car, but ensure access when cars prove necessary. Future proofing for electric and autonomous vehicles will be essential.
- Generous green infrastructure at Grazeley provides scope for sustainable urban drainage and net biodiversity gains. The settlement can create opportunities for flora and fauna which cannot co-exist to the same extent with intensive farming.
- Creating an infrastructure rich settlement means delivering the means to support and sustain the growth of community. Schools and adult learning, medical facilities, local shopping, meeting places, community centres, libraries, local policing, cultural venues and sports facilities must be delivered at a rate which is commensurate with the growth of the population, and to provide the trellis upon which the fledgling community can thrive. There is considerable scope for job creation in helping to establish and support community, from community development workers to teachers, maintenance workers, police community support officers, local representatives, artists, craftsmen and youth workers.
- Good design will be essential to the creation of a successful place. Buildings should be energy efficient and relevant to the age in which they are created. Water can play a clear role in creating a distinctive character and should help to create an attractive setting for homes, workplaces and recreation. The public realm will be the glue that holds the place together; it should be crafted with care and attention to detail, as well as being durable and resilient to use. Investment in good materials and tree and shrub specimens, with good aftercare, will pay dividends over the longer term.

Growth Scenario 1: **15,000 HOMES**

4.91 The master planning exercise for Grazeley supports the proposition that the site can accommodate 15,000 homes and associated land uses. However, given the impact of AWE Burghfield DEPZ on the area of search, the achievement of 15,000 dwellings is likely to be dependent on a different approach to development densities and placemaking than that which would typically be the case in a greenfield location. In itself this is conceivable and would represent the efficient use of land and a concentration of population capable of supporting public transport and local services.

4.92 Consultation with community representatives to date indicates a willingness to see a development of higher residential densities and a more contemporary, urban character, subject to good design and the timely delivery of quality infrastructure. This points to a scheme which is highly walkable, well connected by public transport and potentially with a large proportion of apartments and terraced housing.

4.93 Development on the basis of Garden City principles is a credible objective for a development of this scale, and the principles in themselves should be used to guide a clear and articulate vision for Grazeley in the event that the Council decide to progress the allocation. The vision should explain the type of place that is sought. Scope to reference similar high quality, high density settlements outside of the main metropolitan centres is limited in the UK, although Cambridge offers some useful exemplars for higher density greenfield development. A vision could include an account of the desired place quality and opportunities to be made available in terms of housing mix and tenure, scope for employment and business investment, the ambition to create an infrastructure rich development, and the importance of natural greenspace, community wellbeing and environmental sustainability.

Concept Plan

4.94 The master plan (Figure 5) includes the following features:

- Key structuring elements include the Foudry Brook and its corresponding floodplain, a proposed alignment for MRT to connect the Mereoak Park & Ride, a proposed new Grazeley Station and a further park & ride within the south of the site.
- There is generous provision of SANG and informal open space within the AWE DEPZ. This dominates the western area of the site, with the railway line acting as an edge to publicly accessible open space. The provision of generous amounts of public open space could enhance the overall quality of the development, offering scope for outdoor activity, food production, ecological habitat and biodiversity, residential amenity and sustainable urban drainage. Open space should be accessible and will need to be designed and maintained to a high standard if it is to enhance the quality of life for the Borough's residents.
- Business uses are clustered adjacent to Junction 11 and alongside the M4 to form a protective barrier against noise and vehicle emissions, and to take advantage of the proximity of the strategic road network and Green Park.
- Development is concentrated in two locations north and south within the site. Within the northern area, existing floodplain is designed to create an urban setting based around a series of canals. Residential densities are assumed to be high, with an overall average of c. 60 dph. One secondary school and four primary schools are provided, along with a district centre providing retail and community uses.
- Within the southern area, the majority of which falls within WBDC, an intense urban quarter around a new station and MRT route is proposed. This area includes space for retail, community uses, business and higher density residential development of 80-100dph. The area includes one secondary school and three primary schools.
- Areas of woodland and hedgerows help to structure the site at a more local level.

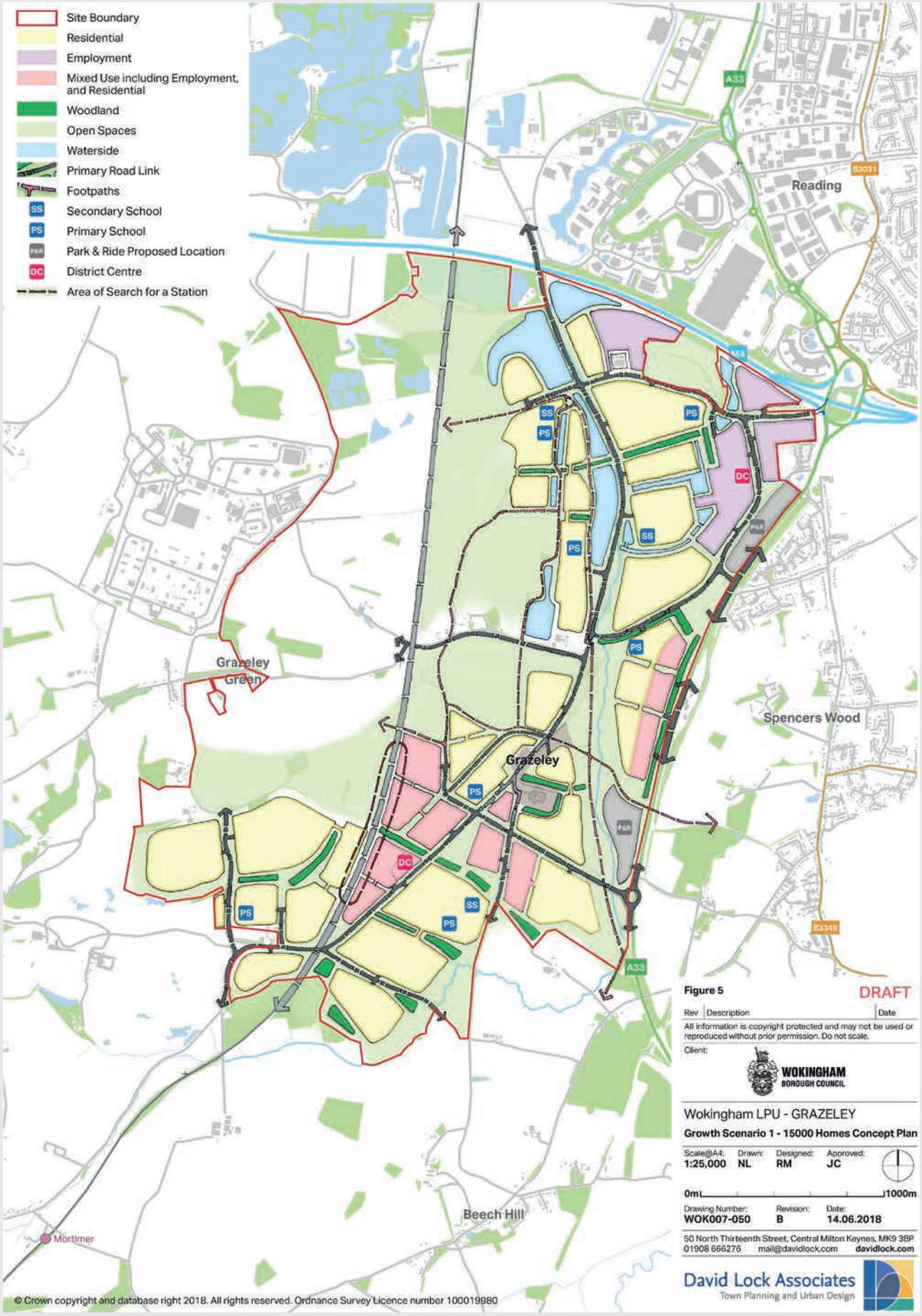


Figure 5: Grazeley Growth Scenario 1 - 15,000 Homes Concept Plan

Growth Scenario 1: **15,000 HOMES**

Access & Movement

4.95 Analysis of the access and movement patterns arising from Grazeley Growth Scenario 1 indicate that 48% of journeys from the site would be to Reading during AM and PM peak travel periods. Whilst most users are likely to travel by car based on current choice and behaviour, greater use of sustainable transport could be supported by the provision of a new station, improved bus services, an extension to MRT and additional park and ride facilities. In addition, during the AM peak, there is scope for trips to the north (6%), Maidenhead and Slough (9%), London (95%), Bracknell (6%) and Wokingham (5%) to be made by train via Reading station. Overall, a total of 35% of AM peak trips could be made by train if a new station is developed. Convenient bus travel from within Grazeley to the new station would further encourage rail use.

4.96 The following provisions are made for access and movement:

- An area of search for a new station is outlined. This is located 2km north of Mortimer Station. A new station would include a new station car park (1,000 spaces) and public transport interchange.
- New bus services and associated bus stop infrastructure to support the development.
- A route for an MRT extension is provided to serve two park and ride facilities (Mereoak and an additional facility) and the proposed station. The MRT route would also function as a primary access road, and a network of secondary and tertiary streets would give access into residential areas.
- M4 junction improvements (junctions 10-12) and upgrades to the current A33 junction.
- New junctions on the A33 provide access into the site including to a new park and ride is located adjacent to the southern junction.
- Railway crossings are assumed to be upgraded and potentially increased in number. The M4 crossing to connect to Green Park and the Kennet and Avon Canal is also enhanced. Crossings over the A33 to connect to existing villages would further enhance sustainable travel choices.
- Public rights of way are retained, enhanced and extended where appropriate. A network of footpaths and cycleways will provide access throughout the site.
- My Journey Travel Planning is assumed to support residents in their use of sustainable travel.

Infrastructure requirements

4.97 The following summary of infrastructure requirements has been identified. It is assumed that land for schools, community buildings and sustainable transport infrastructure, as well as affordable housing will be delivered via a S106 agreement. HIF funding will be needed in the early phases of delivery to ensure infrastructure can be provided at a rate which is commensurate with the early growth of the community, and to fund major infrastructure items including a new station. Items identified in the HIF process are noted in the table below:

Infrastructure Required	Indicative Funding
Highway Access	
New access junctions and A33 upgrades	Developer (HIF)
Internal residential roads	Developer
Primary road to function as MRT route	Developer (HIF)
Off-site highway and junction works to enhance capacity	Developer
Public footpaths to connect to existing	Developer
Railway and M4 crossing upgrades	CIL / Developer (HIF)
M4 Junction 11 upgrade	CIL/Developer (HIF)
Sustainable Transport	
My Journey Travel Planning	Developer
Bus services and bus stop infrastructure	Developer
Public transport strategy including expansion of MRT services	Developer
Station, station car park and public transport interchange	CIL (HIF)
New Park & Ride	Developer/CIL (HIF)
MRT Extension	CIL (HIF)
Off-site pedestrian and cycle improvements	Developer
Strategic Flood Alleviation	
Site preparation and drainage works	Developer
Utilities	
Energy, water and waste	Providers + Developer
Education	
7 primary schools	CIL (HIF)
2 secondary schools	CIL
Further education & adult learning	CIL
Public Open Space	
SANG	CIL
Allotments	CIL
Children's play	Developer
On-site parks and amenity space	Developer
Sports pitches	CIL
Community facilities	
Community centres, indoor sports & library provision	CIL

Growth Scenario 2: **10,000 HOMES**

4.98 The provision of 10,000 homes on land within Wokingham Borough can be achieved by adopting an equally bold and ambitious approach to development character, density and intensity. The application of Garden City principles is an appropriate objective.

Concept Plan

4.99 The master plan (Figure 6) contains the following features:

- Key structuring elements include the Foundry Brook and its corresponding floodplain, a proposed alignment for MRT to connect the Mereoak Park & Ride, a proposed new Grazeley Station and a further park & ride within the south of the site.
- There is generous provision of SANG and informal open space within the AWE DEPZ. This dominates the western area of the site, with the railway line acting as an edge to publicly accessible open space.
- Business uses are clustered adjacent to Junction 11 and alongside the M4 to form a protective barrier against noise and vehicle emissions, and to take advantage of the proximity of the strategic road network and Green Park.
- Most of the development is concentrated in the north of the site, with a smaller area of development to the south; the two are separated by a green connection linking the SANG and existing communities to the east of the A33. Within the northern area, existing floodplain is designed to create an urban setting based around a series of canals. Residential densities are assumed to be high, with an overall average of c. 60 dph. One 6FE and one 8FE secondary school and five primary schools (comprised of two 3FE and two 2FE schools) are provided, along with a district centre providing retail and community uses.
- Within the southern area, a new station is proposed. This area includes space for retail, community uses, business and higher density residential development at 80-100 dph. The area includes one 3FE primary school.

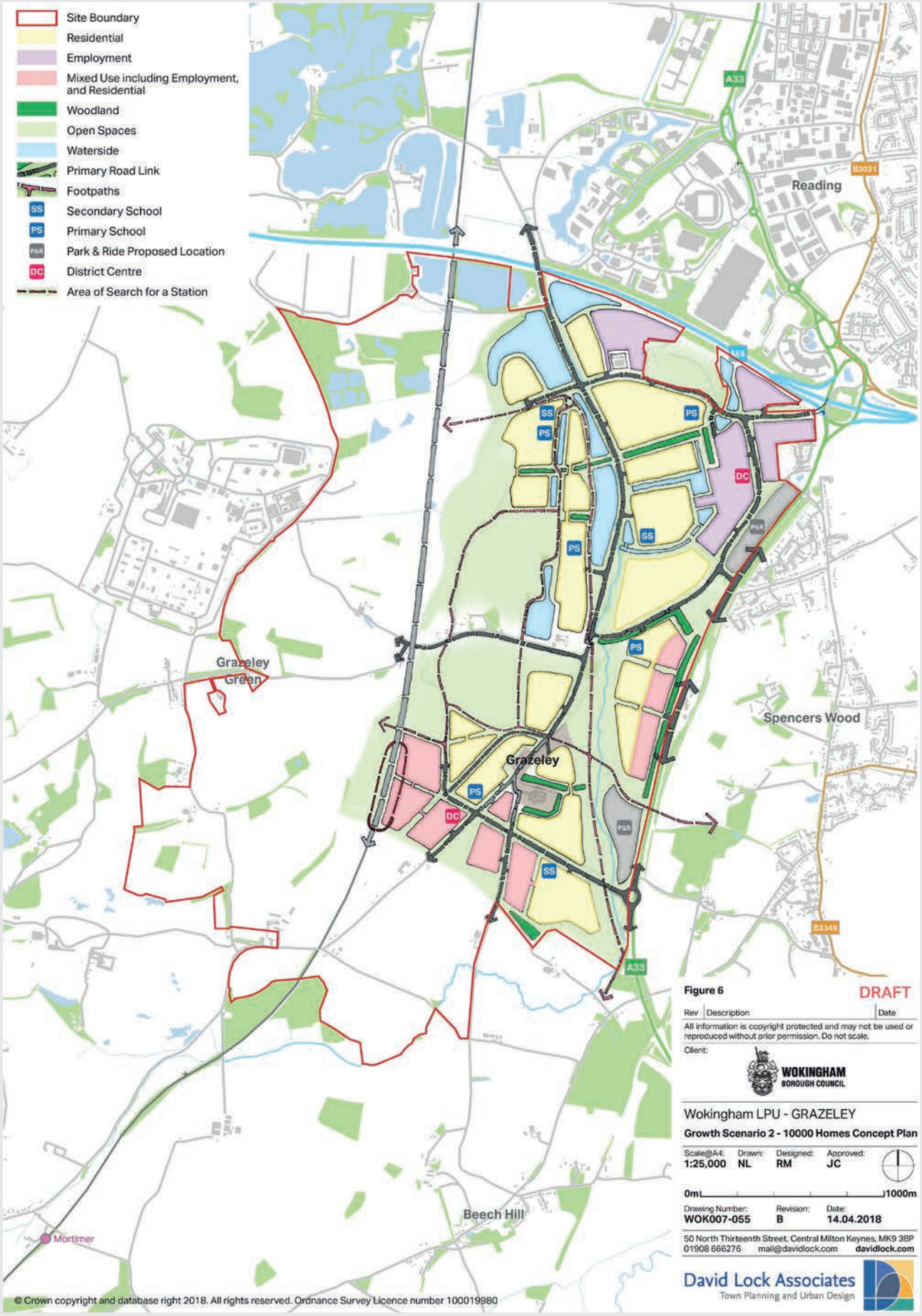


Figure 6: Grazeley Growth Scenario 2 - 10,000 Homes Concept Plan

Growth Scenario 2: **10,000 HOMES**

Access & Movement

4.100 Trip distribution patterns for Grazeley Scenario 2 are expected to be the same as for Scenario 1, but the scale of movement will reduce given the decrease in housing numbers.

4.101 The following access and movement arrangements are proposed:

- An area of search for a new station is outlined. This is located more than 2km north of Mortimer Station. However, it sits at the edge of the AWE DEPZ, and further work is needed to confirm the acceptability of the location. The station would include a new station car park for 1,000 cars and a public transport interchange.
- A route for MRT is provided to serve two park and ride facilities and the station. The MRT route would also function as a primary access road, and a network of secondary and tertiary streets would give access into residential areas.
- Enhanced bus services to serve the development.
- New junctions on the A33 provide access into the site at its southern edge and at a midway point. The new park and ride is located adjacent to the southern junction. Potential enhancements to and crossings of the A33.
- M4 junction improvements (junctions 10-12).
- Railway crossings are assumed to be upgraded, as is the M4 crossing to afford better access to Green Park.
- Public rights of way are retained, enhanced and extended as appropriate. New pedestrian and cycle ways will create access throughout the site.
- My Journey Travel Planning is assumed to help residents plan their travel by sustainable modes.

Infrastructure requirements

4.102 Infrastructure requirements are listed below. HIF funding is unlikely to be available for a development of 10,000 dwellings.

Infrastructure Required	Indicative Funding
Highway Access	
New access junctions and A33 upgrades	Developer
Internal residential roads	Developer
Primary road to function as MRT route	Developer
Off-site highway and junction works to enhance capacity	Developer
Public footpaths to connect to existing	Developer
Railway and M4 crossing upgrades	CIL / Developer
M4 Junction upgrades	CIL/Developer
Sustainable Transport	
My Journey Travel Planning	Developer
Bus service and bus stop infrastructure	Developer
Public transport strategy including expansion of services	Developer
Station, station car park and public transport interchange	CIL
Off-site pedestrian and cycle routes	Developer
New Park and Ride	CIL/Developer
MRT extension	CIL
Strategic Flood Alleviation	
Site preparation and drainage works	Developer
Utilities	
Energy, water and waste	Providers + Developer
Education	
5 2FE primary schools	CIL
2 secondary schools	CIL
Further education & adult learning	CIL
Public Open Space	
SANG	CIL
Allotments	CIL
Children's play	Developer
On-site parks and amenity space	Developer
Sports pitches	CIL
Community facilities	
Community centres, indoor sports & library provision	CIL

Alternative 10,000 Home Growth Scenario

4.103 Growth Scenario 2 identifies how 10,000 homes might be achieved in WBC. In the event that WBC and WBDC decided to pursue a 10,000-dwelling option across the whole area of search it would be possible, subject to density adjustments, to utilise the master plan for Growth Scenario 1. The infrastructure requirements for Growth Scenario 2 would be relevant.

Growth Scenario 3: **5,000 HOMES**

4.104 The 5,000-home scenario is contained with WBDC. It assumes higher density development as per Growth Scenarios 1 and 2. It should be noted that the Area of Search within West Berkshire does not include a boundary with the A33, and therefore the creation of a new primary road access is dependent on land within Wokingham Borough.

Concept Plan

4.105 The master plan (Figure 7) can be described as follows:

- The railway line divides the site into two parts, whilst the Foudry Brook creates a perimeter to development to the south and east.
- SANG and informal open space are located within the AWE EPZ. This is located in the north-western part of the site, and improved crossing of the railway is assumed to ensure public access to informal open space for residents living east of the railway line.
- Residential densities are assumed to be high, with an overall average of c. 60 dph. One secondary school and three primary schools (one 3FE and two 2FE) are provided, along with a district centre providing retail and community uses.
- An intense urban quarter at the heart of the development is proposed. This area includes space for retail, community uses, business and higher density residential development at 80-100 dph.
- Areas of woodland and hedgerows help to structure the site at a more local level.

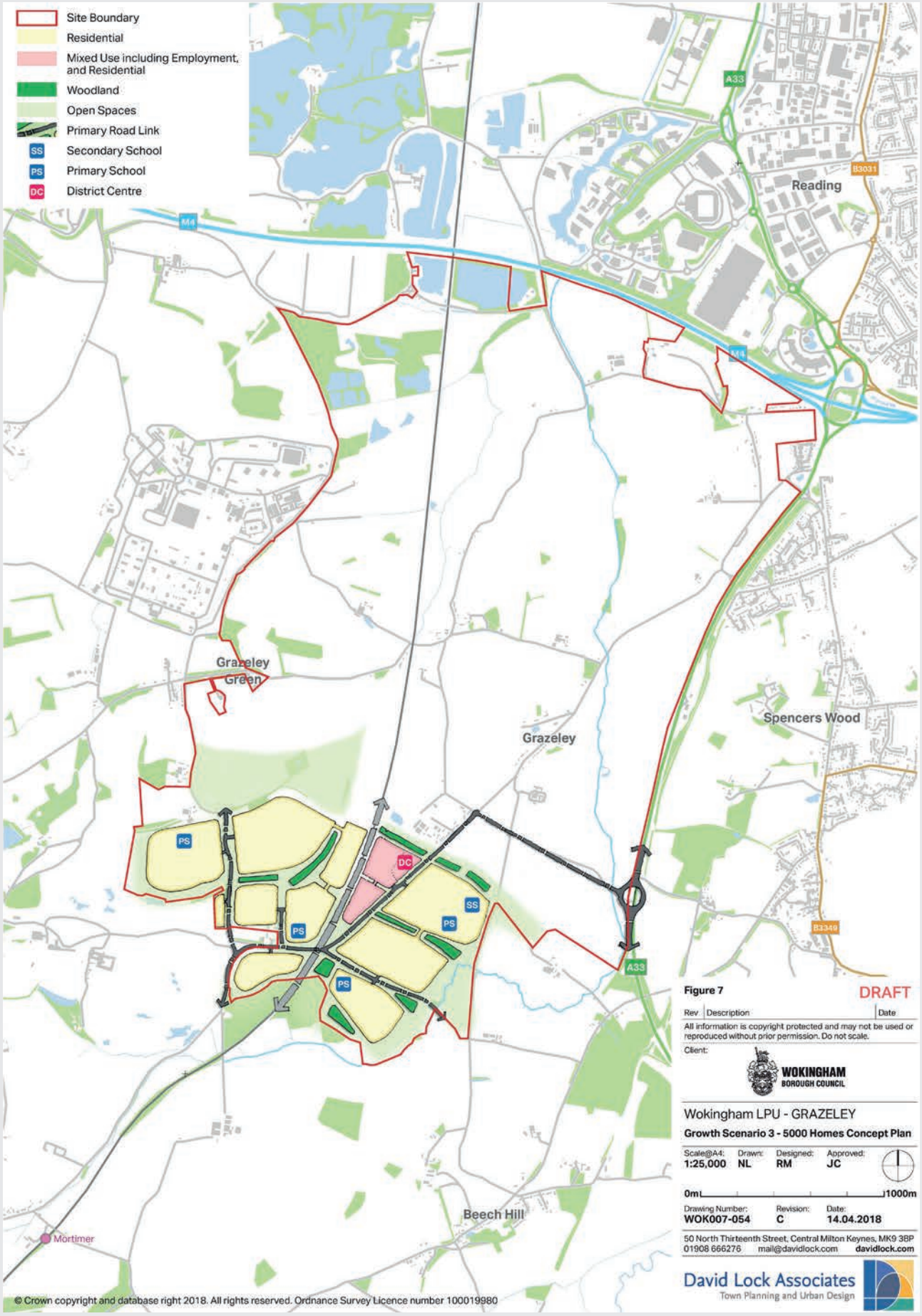


Figure 7: Grazeley Growth Scenario 3 - 5,000 Homes Concept Plan

Growth Scenario 3: **5,000 HOMES**

Access & Movement

4.106 Trip distribution patterns for Grazeley Growth Scenario 3 are expected to be similar to Scenarios 2 and 3. However, trips will reduce given the reduced number of homes. Opportunities for rail travel will be reduced.

4.107 The following access and movement arrangements are included. Whilst opportunities for sustainable travel are less extensive (a station would be very unlikely), a requirement to promote travel by alternative modes would be equally valid for a development of 5,000 homes.

- Upgrades to the A33 junction and potential to expand the Mereoak Park and Ride, subject to WBC's agreement.
- A new junction is created on the A33, giving access across land in Wokingham Borough to the development and providing the potential for bus and vehicular access.
- Routes for walking and cycling would be provided within the development, and also to connect beyond the site to Mortimer Station.
- My Journey Travel Planning is assumed to help residents use sustainable transport for their journeys.

Infrastructure requirements

4.108 The following infrastructure requirements have been identified:

Infrastructure Required	Indicative Funding
Highway Access	
New access junctions with adjoining highways	Developer
Internal residential roads	Developer
Off-site highway and junction works to enhance capacity	Developer
Public footpaths to connect to existing	Developer
Railway crossing upgrades	CIL / Developer
Sustainable Transport	
My Journey Travel Planning	Developer
Bus service and bus stop infrastructure	Developer
Public transport strategy including expansion of services	Developer
Off-site pedestrian and cycle routes	Developer
Potential improved access to Mortimer Station	Developer
Strategic Flood Alleviation	
Site preparation and drainage works	Developer
Utilities	
Energy, Water and Waste	Providers + Developer
Education	
3 2FE primary schools	CIL
1 secondary school	CIL
Further education & adult learning	CIL
Public Open Space	
SANG	CIL
Allotments	CIL
Children's play	Developer
On-site parks and amenity space	Developer
Sports pitches	CIL
Community facilities	
Community centres, indoor sports & library provision	CIL

5.0 BARKHAM SQUARE

5.1 Land at Barkham Square lies immediately north of the Arborfield SDL, and south-west of the village of Barkham. It is bounded to the east by Commonfield Lane, to the west by Langley Common Road and to the south by Princess Marina Drive. Barkham Square Farm, a Grade II listed building, lies to the north-east of the site. The site measures 58 hectares and is being promoted by Crest Nicholson. The Area of Search is shown in Figure 8.

5.2 There are no significant environmental constraints to development, although important issues including transport and drainage will need to be addressed if the site progresses through the planning process. Key environmental constraints are shown in Figure 9.

BACKGROUND AND ANALYSIS

Site Environmental Studies: Summary Findings

Flooding & Drainage

5.3 The site is bisected by a tributary of the Barkham Brook which flows in a westerly direction, just beyond the northern boundary of the site, to join the River Loddon. Minor watercourses flow into the main tributary, affecting the western part of the site. A corridor approximately 50m wide associated with the main tributary includes Flood Zone 3 and Flood Zone 2 land. The remainder of the site is classified as Flood Zone 1, with a low risk of flooding, and is therefore suitable for development subject to detailed hydraulic modelling to confirm this baseline position. Any master plans for the site should accommodate all minor watercourses, with an assumed corridor width of 20m.

5.4 The site has the potential for surface water flooding in the event of extreme rainfall; areas at risk coincide generally with the watercourses. The nature of surface water flooding is likely to change as a consequence of any development.

Transport & Highways

5.5 The proximity of the site to the Arborfield SDL, which will deliver 3,500 homes, indicates a requirement for excellent connectivity between the two. Within the site, consideration should be given to the bridging of the Barkham Brook tributary; the nature of the crossing may be dependent on the scale of the development and opportunities to create greater connectivity within the locality.

5.6 Access by bus to Reading and Wokingham currently runs at a 30-minute frequency. Whilst services to Reading are perceived as convenient, those to Wokingham are viewed by local residents as indirect.

5.7 Highway improvements arising from the Arborfield SDL, including the consented Arborfield Cross bypass and completed schemes at the Nine Mile Ride extension and Greenway between Finchampstead and Arborfield Green, will provide some local relief. However, further consideration of the highway network is needed.

Air Quality

5.8 The site is not affected by an AQMA, and consequently there are no air quality constraints to development. An air quality assessment will be needed at the outline planning stage to understand the possible impacts on existing and planned homes at Langley Common Road and Arborfield Garrison.

Noise and Vibration

5.9 Langley Common Road, Barkham Street and Commonfield Lane are potential noise sources. Mitigation may be required to ensure any development falls within guidance for noise and vibration levels.

Figure 8: Barkham Square Area of Search

Geotechnical

5.10 The site is considered to have no major sources of contamination or hazardous ground gases due to its agricultural nature. Although the site is not part of the MoD land to the south, its close proximity cannot rule out any indiscriminate material linked directly to that operation.

5.11 The level of mineral resources is considered low around the Bagshot Formations and very low around London Clay.

5.12 Overall geotechnical constraints, subject to the water table, are likely to be very low. The geoenvironmental constraints are very low.

Waste

5.13 There is an emerging Minerals and Waste Plan for central and eastern Berkshire. The site will be subject to review for mineral deposits and possibly the search for a waste to energy facility by Hampshire County Council who currently act as the waste and mineral planning authority on behalf of WBC and the other central and eastern Berkshire authorities who are jointly preparing a Minerals and Waste Plan.

Agricultural Land

5.13 The site is low quality agricultural land comprising a mix of Grade 3 and 4.

Ecology

5.14 The site lies within an identified Impact Risk Zone (IRZ) for nearby areas designated as Site of Special Scientific Interest, Special Protection Area, Special Areas of Conservation and Ramsar. Additionally, the site falls within the IRZ for the Thames Basin Heaths, and the site is within the 5km of the closest part of the Heaths; consequently, any development would trigger a need for the provision of Suitable Alternative Natural greenspace (SANG).

5.15 The site is dominated by pasture fields, with the most likely valuable habitat related to the Barkham Brook tributary, hedgerows, woodland (including some ancient woodland), ponds and trees. The site has the potential to support roosting Bats, breeding Birds, Reptiles, Badgers, Great Crested Newts, Dormice, Otter, Water Vole and White-clawed Crayfish. At the outline planning stage, a full ecological survey and Environmental Impact Assessment will be required, and suitable mitigation identified. Habitats should be retained and enhanced, and opportunities for new habitats identified.

Heritage

5.16 Arborfield SDL includes a number of listed buildings; the impact of development on these has been assessed through the relevant planning applications. At Barkham Square, Barkham Square Farm is listed. It has a large curtilage at the front of the property which is enhanced by a number of mature specimen trees. Opportunities exist to step development away from the curtilage, and at the same time face new homes towards the listed building to enhance their outlook.

Sustainable Resources

5.17 Development would be expected to deliver high levels of resource efficient design, consistent with the requirements of WBC and WBDC guidance or policy in place at the time and comply with the Government's requirements for nearly zero energy building design.

5.18 Special regard for water consumption is needed within the Thames Valley. Thames Water and South East Water's Water Resource Management Plans highlight the need for careful balancing of future supply and demand.

Figure 9: Barkham Square Key Constraints

SUMMARY OF CONSULTATION OUTPUTS

Technical Stakeholder Workshops Outputs

5.19 The following key points have informed the master planning process to date and can be carried forward by WBC if the site is allocated for development:

Green and Blue

5.20 The landscape at Barkham Square is regarded as higher quality and is visually prominent in places due to its gently undulating topography. A carefully designed tree-planting scheme should be included in any development proposals to reduce visual intrusion.

5.21 As a consequence of the local geology, local water courses are iron-rich.

5.22 The Barkham Brook tributary is the most ecologically important feature of the site; it provides habitat for Otters and Water Voles. Ecology survey work would need to be carried out as part of an environmental assessment in the event of development proposals coming forward.

5.23 The brook has limited scope for infiltration due to the underlying geology. Consequently, the brook floods during heavy rain, which impacts off-site at Biggs Lane. Any development at Barkham Square should explore the opportunity to resolve flooding at Biggs Lane to ensure safe access at all times.

5.24 Areas of hedges and woodland, including ancient woodland, should be protected and enhanced through an appropriate management regime.

5.25 Development at Barkham Square would need to be self-sufficient in terms of open space provision, including SANG provision. It should not rely on proposed open space provision at Arborfield SDL. SANG could be provided off-site on land owned by WBC. New provision should be contiguous with the Arborfield SDL SANG.

5.26 Mature trees along Commonfield Lane would be better protected if the lane could be downgraded. Conversely, works to upgrade the highway network may affect some trees.

Transport

5.27 Barkham Square should be seamless with and well connected to Arborfield SDL. Connections should include footpaths and greenways for safe and sustainable travel to local schools and shops, and provision for bridleways, as well as vehicular access.

5.28 East-west connections should also be provided to integrate development, which will necessitate the crossing of the Barkham Brook. This could help to reduce the impact of the development on local junctions and may allow Barkham Street to be downgraded. Additionally, the potential to close School Lane to through traffic should be explored. Amendments to the local road network would also benefit the Bull Inn junction, potentially permitting better public transport priority.

5.29 Certainty is needed to ensure that new/planned infrastructure investment will generate sufficient capacity to accommodate additional homes within the area, including Arborfield Relief Road, Nine Mile Ride extension and Shinfield Relief Road.

5.30 Onward travel to Winnersh, Winnersh Triangle and Wokingham Stations should be improved. This includes the opportunity to cycle to Wokingham via planned Greenway extensions and direct commuter routes.

Community Wellbeing

5.31 There is scope to fund and extend secondary provision at Bohunt School to accommodate pupils from Barkham Square. However, additional primary school places will be needed; dependent on the scale of the proposed scheme, these may be delivered through the expansion of the nearby proposed 2FE primary school at Arborfield Green to create a 3FE school, or a new school on-site.

5.32 The CCG's current stated position is that it does not intend to open a new GP practice at Arborfield SDL, and this position will remain unchanged if development at Barkham Square is forthcoming. Future additional patients would be accommodated at surgeries in Finchampstead, Swallowfield and Shinfield. However, the Arborfield SDL SPD makes provision for a new health facility within the district centre, and this remains the ambition of both WBC and the developers of the SDL.

5.33 No additional provision is needed for emergency services. Multiple points of access into the scheme would be required for emergency vehicles.

5.34 Arborfield SDL is an exemplar of proactive dialogue relating to Secure by Design at all stages of the planning process; this model should be pursued for Barkham Square.

5.35 Under current planning policies, affordable housing will be sought at a rate of 35%, with a mix of 1, 2 and 3 bed homes, and on the basis of 70% affordable rent and 30% shared ownership. There is a gap in the provision of private elderly care, keyworker housing and private rented sector homes. WBC has over 190 households on its self-build list.

5.36 Connectivity between Barkham Square and Arborfield SDL to ensure easy access to planned community facilities and the SDL district centre will be critical. Additional library provision should be secured.

Utilities

5.37 There are no incumbents to the provision of utility services to Barkham Square including potable water, foul water drainage, gas, electricity and telecommunications.

5.38 At the outline planning stage, consideration of existing utility infrastructure would be required with providers regarding easements, health and safety and potential relocation. Existing infrastructure includes a medium pressure gas main, overhead electricity cables, potable water mains and foul sewers.

Community Stakeholder Workshops

Strength, Weaknesses and Opportunities

5.39 Workshop participants identified a range of issues which are relevant to the master planning exercise.

5.40 The area around Barkham Square is recorded as having one of the highest levels of car ownership in the UK. There are high traffic volumes at peak hours associated with out-commuting, and to a lesser extent school runs. The rural road network is ill-suited to the level of travel demand. The appeal of the rural setting is acknowledged as a major draw for affluent households; the area is a victim of its own attractiveness.

5.41 Bus services to Reading are reasonably good, but those to Wokingham are indirect, as are cycle connections, making it difficult to access the station and town centre by sustainable modes.

5.42 There are concerns about the timing and level of community infrastructure to be delivered at Arborfield SDL. Local shopping facilities would be welcome, especially if these negate some of the reliance on Wokingham town centre. There is widespread disappointment that a GP practice is not planned by the CCG for the SDL despite the opportunity existing in the adopted SPD, planning permission and lead developer aspiration.

5.43 There is significant concern about unplanned, incremental SDL expansion. Having accepted substantial new housing numbers at the SDL site, there is disappointment that further planned growth may occur. There is a feeling that the Arborfield/Barkham area has already taken its share of growth within the Borough. If Barkham Square is to be allocated, it should provide homes suitable for first time buyers and down-sizers. The area is ideal for a retirement village. Innovative forms of affordable housing, including units built by the Council should be provided.

5.44 A green infrastructure strategy should help to integrate the development into the landscape. Greenway connections should be extended and enhanced, but direct cycle connections for year-round commuting are also needed. SANG should also be provided. The Barkham Brook tributary should form the basis for open space, and flooding on Biggs Lane should be addressed as part of any drainage and flood management strategy. Views of the open countryside are valued by local people, and the loss of countryside and possible move towards coalescence of settlements is of major concern.

CHLOE Concept plans

5.45 The workshop included a session of interactive master planning using the 'CHLOE' master planning tool. Community representatives worked in a number of small groups (facilitated by the project team) to prepare master plan proposals for the Barkham Square site.

5.46 Different workshop groups focused on preparing master plan proposals for the three growth scenarios: 500 homes, 750 homes and 1,000 homes. Whilst differences in approach were demonstrated between the groups, a number of key issues arose including the points and themes listed below. The exercise revealed that some master planning themes were consistent across the three scales of development, whilst some other design issues were specific to certain scales of development.

5.47 *Strategic Green Infrastructure:* All groups illustrated high level design proposals for strategic green infrastructure, most commonly in the form of 'Green Landscape Corridors' aligned with site features and constraints. The most consistent feature was the provision of a central landscape corridor aligned on a broadly north-south orientation set around existing water courses (e.g. Barkham Brook) and flood zones, resulting in the creation of two areas of residential development to the east and west of the central green spine and brook.

5.48 *Green edge to the north/eastern site boundary:* most workshop groups prepared plan designs including predominantly green landscape edges to the north and east, notably providing a green setback / buffer to the existing property to the north/east of the site.

5.49 *Access:* points of access predominantly favoured access from the west, via Langley Common Road, rather than from the eastern edge (Commonfield Lane). Some options explored the potential to create points of entry and access from the southern boundary to promote direct links to the neighbouring Arborfield SDL site. Importance of good access between Arborfield and Barkham Square was emphasised by the approach towards the provision of community facilities (see below).

5.50 *Residential Density:* across the three growth scenarios, lower density residential development (c. 20-30 dwellings per hectare) was proposed in the workshop group proposals.

5.51 *Community facilities:* A broadly consistent approach across all scenarios was the assumption that the existing District Centre in the neighbouring Arborfield SDL site should serve Barkham Square, with enhanced community facilities. For the 500 and 750 home scenarios, the proposal was to increase the scale of primary school sites and provision off site (at Arborfield). This approach for off-site provision emphasises the need for clear and direct access connections between Barkham Square and Arborfield, particularly for walking and cycling to promote the concept of walkable communities.

Key master planning issues specific to options for up to 500 homes (see image below):

5.52 *Density:* focus on lower density development. 30dph was proposed as an average but it was notable that one group also tested an option of 20dph average density to accommodate their desire for retirement bungalows which has the consequence of expanding the area of built development which some workshop participants favoured as it was thought to reduce the potential for future, subsequent planning applications for additional homes on areas proposed as landscape land uses.

5.53 *Landscape:* potential to accommodate a large area of SANG, in the south-eastern part of the site, with connectivity to link to the existing Greenway that feeds into California Country Park.

5.54 The plan below gives an example CHLOE workshop master plan that illustrates the approach of significant areas of green infrastructure to the east, with lower density (20dph) area of residential development to the west. Note: the area of development is proportionally large (compared with other options) due to lower density (= greater area required).

Key master planning issues specific to options for up to 750 homes

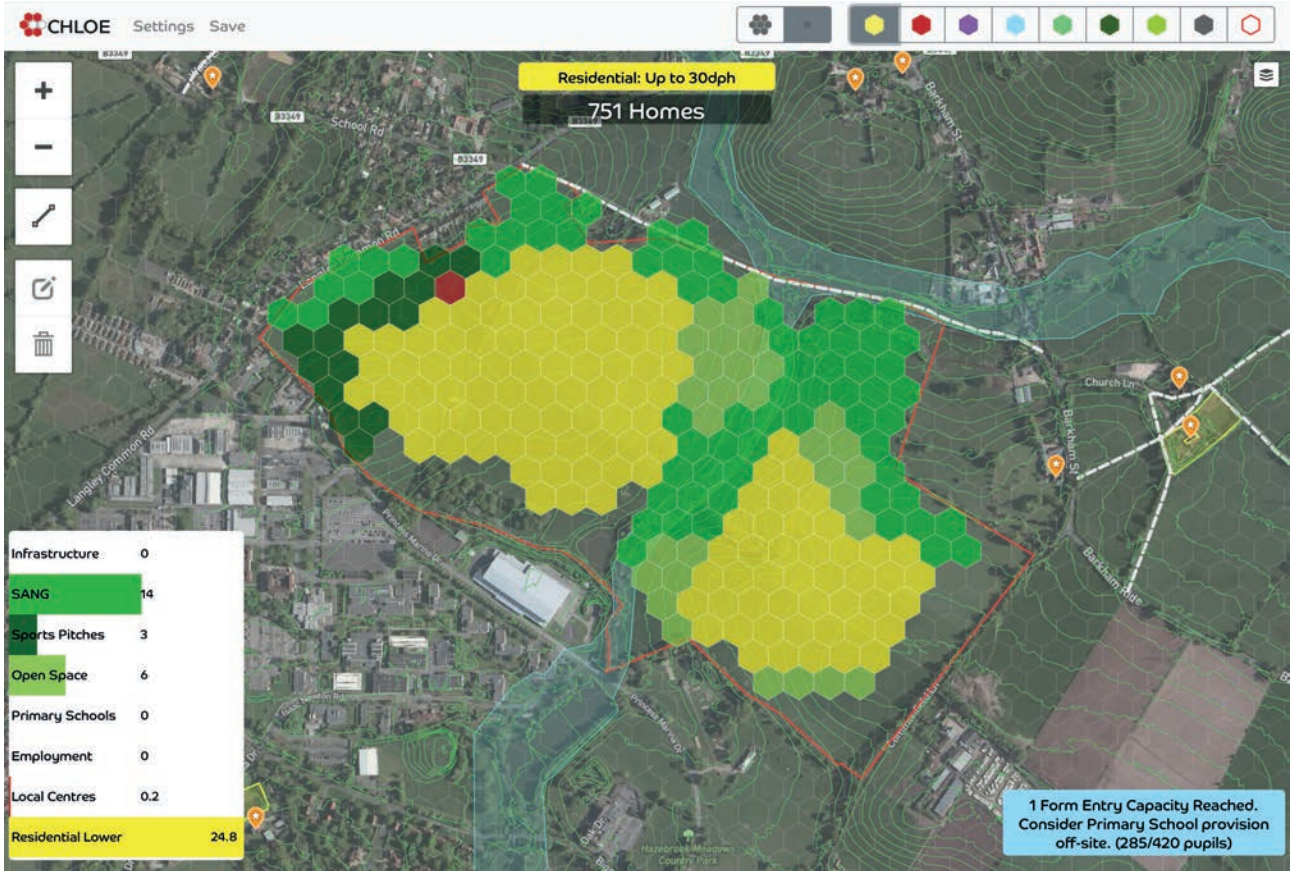
5.55 Density: focus on lower-medium density development with one scenario exploring 40dph as an average residential density, consequently reducing the land area required, and in turn increasing the area for on-site green infrastructure (see image below).

5.56 *Landscape:* the application of 40dph enabled provision of more SANG and open space than required by standard requirements.

5.57 *Access:* Promotion of direct access connections between Barkham Square and the Arborfield SDL site, see image below.

5.58 The plan below gives an example of a CHLOE workshop master plan that illustrates the approach of significant areas of green infrastructure to the north, with medium density (40dph) areas of residential development focused to the south to connect with Arborfield.

5.59 Example CHLOE workshop master plan that illustrates a scenario with an average of 30dph residential density. Less on-site green infrastructure, due to larger land area required for 30dph average density (compared with 40dph option).



Key master planning issues specific to options for up to 1,000 homes

5.60 *Density:* design options focused on lower density development with an average residential density of 30dph. This level of density resulted in the majority of the site area being used for residential development, which consequently impacts on Green Infrastructure (see below).

5.61 *Landscape:* reduced proportion of land available for on-site landscape provision, consequential requirement to provide some landscape features – notably SANG and Formal Open Space – off site (as illustrated in image below with off-site provision proposed on nearby site, to the east of Commonfield Lane).

5.62 *Access:* At this scale of development multiple access points would be required to serve the development, with points of entry proposed from all neighbouring roads and improved links to Arborfield to the south.

5.63 *Education:* notable provision of on-site primary school, required to serve larger scale community. The central location for primary school is important to ensure the promotion of walkable communities, centrally positioned to maximise potential for walking trips.

5.64 The plan below is an example of a CHLOE workshop master plan that illustrates the 1,000 homes at 30dph, with a centrally located primary school and off-site landscape features (e.g. SANG and/or formal open space).

SUMMARY OF CONSIDERATIONS

5.66 The following summary represents a synthesis of the Stage 1 findings and the key points arising from the consultation workshops, which give rise to several important master planning considerations. Figure 10 summarises these points.

5.67 Barkham Square comprises a gently sloping site set within attractive countryside and includes a small area of remnant ancient woodland. It is bisected by a tributary of the Barkham Brook which divides the site into two approximately equal halves – the brook is subject to flood during heavy rain, and infiltration rates are slow. The land immediately adjacent to the brook is therefore unsuited to development. This being the case, it lends itself to green infrastructure and habitat retention/enhancement.

5.68 The potential for inter-connectivity and inter-reliance between the planned growth at Arborfield SDL and Barkham Square is important. The SDL will deliver a new community with schools and local facilities. Any development at Barkham Square has the opportunity to integrate with Arborfield SDL and provide support for its services whilst ensuring it meets its own needs in terms of open space and the funding of additional primary school places. Physical connections between the two communities should be strong and should facilitate safe and sustainable travel.

5.69 SANG provision should be contiguous with new or planned SANG to enhance its appeal and ensure it fulfils its proper function.

5.70 Development offers the opportunity to address the flooding of the Barkham Brook tributary on Biggs Lane and Princess Marina Drive. A comprehensive approach to flood modelling and mitigation along the brook would enable possible solutions to be identified.

5.71 The listed building at Barkham Square Farm is set within a curtilage planted with mature trees. The master plan could explore the potential to locate open space adjacent to the curtilage in the interests of retaining more of the setting of the building.

5.72 The local road network is comprised of several rural lanes such as Commonfield Lane which are unsuited to large volumes of traffic movement generated by planned and potential development. Travel to Wokingham by bicycle or bus is difficult despite its close proximity.

5.73 The extent to which additional development presents the opportunity to deliver improvements to the strategic road network has been raised in consultation. This could also help to improve access for buses. Master planning provides scope to explore this solution in more detail.

5.74 Access to the site is limited. Commonfield Lane is not suitable for general access in its current condition. Access from Langley Common Road and through Arborfield SDL can integrate Barkham Square into the wider network.

5.75 In summary, the following points are applicable:

- Master planning should explore the potential for integration with Arborfield SDL. The greater the amount of development at Barkham Square, the greater the likelihood of a new school being required.
- The common element of the Barkham Brook, and its inherent opportunities and constraints, should be addressed through development.
- Opportunities for improvements to the local road network should be explored through master planning.

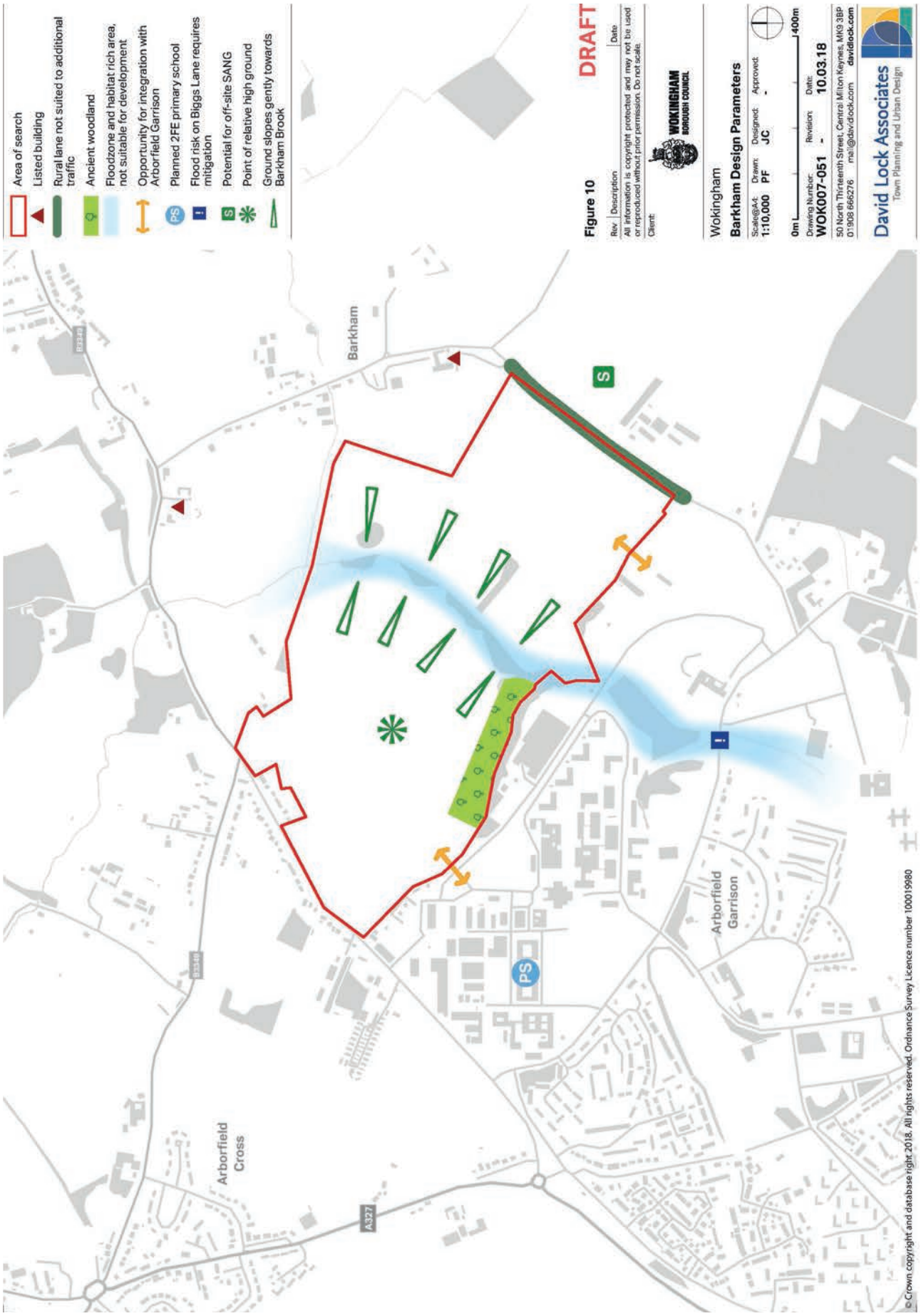


Figure 10: Barkham Square Design Parameters

BARKHAM SQUARE: A VISION FOR A MODERN RURAL COMMUNITY

The area south of Wokingham is characterised by a network of small villages and settlements set within attractive countryside. Development here potentially offers the benefits and attractiveness of rural living with the convenience of access to a major urban centre and regional transport infrastructure. Achieving an appropriate balance between quality of life and access to jobs and higher order services will be dependent to a good degree on improved travel choices, including cycling and bus services to Wokingham and other key destinations.

The site itself has the potential to offer an excellent rural living environment. Building on existing ancient woodland and tributaries, there is scope to create a strong landscape framework characterised by new woodland planting within which pockets of built development can nestle. Tree planting on higher ground, leaving it free from development, can help to visually integrate development into its surrounds. Community orchards and allotments can offer opportunities for local food production.

Building design can present a contemporary interpretation of the local rural vernacular, with a combination of traditional materials and modern methods of construction. The public realm can reinforce the village character, and community recreation can be focused on a traditional village green and a modern take on a 'village hall' – perhaps an internet café or flexible meeting space designed to high environmental standards and run by and on behalf of local residents.

Safe routes to school for all children should be created, and direct connections with Arborfield SDL will be key to this for secondary school pupils. Good links will encourage any additional residents living in the immediate vicinity of Arborfield SDL to use local shops and services, making them more viable over the longer term. This could reduce dependency on Wokingham for convenience shopping.

Growth Scenario 1: **1,000 HOMES**

5.76 The master planning exercise has confirmed that it is possible to accommodate 1,000 homes at Barkham Square, subject to the provision of SANG off-site, potentially on neighbouring land owned by WBC.

Concept Plan

5.77 The master plan (Figure 11) includes the following features:

- The structure of the master plan is derived from the Barkham Brook tributary, which forms a central green corridor midway through the site.
- A series of SuDS ponds are located at low points to accommodate surface water flooding, whilst higher ground is populated with new woodland planting to help reduce the visual impact of development on the wider landscape. Peripheral tree planting is proposed for similar reasons.
- New homes are concentrated in two neighbourhood units of approximately equal size to either side of the green corridor. Densities are assumed to vary between 25dph and 40dph to ensure a mix of house types.
- A new 2FE school is located adjacent to the curtilage of Barkham Square Farm, where playing fields can add to the green setting in acknowledgement of the listed status of the main house.
- A small mixed-use centre is located on the main route through the site. This may provide local shopping or a small community centre.

Figure 11: Barkham Square Growth Scenario 1 - 1,000 Homes Concept Plan

Growth Scenario 1: **1,000 HOMES**

Access & Movement

5.78 Analysis of trip distribution generated by Barkham Square Growth Scenario 1 indicates approximately 20% of trips will be to Reading during the AM and PM peak travel period. Other trips would be distributed throughout the area. The majority of trips are currently made by car, so increasing bus use would be dependent on good quality and convenient bus services to key destinations.

5.79 Access is arranged as follows:

- Public access for recreation is highlighted along the green corridors. These would be extended beyond the site to connect with public rights of way and the greenway network.
- Road access through the site to connect Langley Common Road with Barkham Ride is provided. The existing junction of Commonfield Lane, Barkham Street and Barkham Ride could be downgraded as a consequence.
- The new Langley Common Road / Barkham Ride link would enhance the primary road network within the vicinity, linking Barkham Ride with the new Arborfield bypass and reducing traffic at the junction of Barkham Road and Barkham Street.
- The new link road would necessitate the construction of an all-traffic bridge across the Barkham Brook tributary. This would need to be considered in the flood risk assessment and drainage strategy for the site.
- Secondary connections south to link with Arborfield SDL are included to facilitate integration.

Infrastructure requirements

5.80 The following summary of infrastructure requirements has been identified. It is assumed that land for a school site and affordable housing will be delivered via a S106 Agreement:

Infrastructure Required	Indicative Funding
Highway Access	
New access junctions with adjoining highways at Barkham Road and Commonfield Lane	Developer
Internal residential roads	Developer
Primary road connecting Langley Common Road with Barkham Ride, including a new bridge	Developer and/or CIL
Off-site highway and junction works to enhance capacity - Barkham Road roundabout - Barkham Bridge upgrade - California Crossroads upgrade - Commonfield Lane widening	Developer
Off-site pedestrian and cycle routes	Developer
Public footpaths to connect to Arborfield SDL	Developer
Sustainable Transport	
My Journey Travel Planning	Developer
Bus service and bus stop infrastructure	Developer
Public transport strategy including expansion of services	Developer
New footways and cycleways	Developer
Greenway extension	Developer
Strategic Flood Alleviation	
Site preparation works	Developer
Utilities	
Energy, water and waste	Providers + Developer
Education	
1 primary school	CIL
Secondary school place funding	CIL
Further education & adult learning	CIL
Public Open Space	
SANG	CIL
Allotments	CIL
Children's play	Developer
On-site parks and amenity space	Developer
Sports pitches	CIL
Community facilities	
Community space & library provision	CIL

Growth Scenario 2: **750 HOMES**

5.81 The site can accommodate 750 homes and meet the requirements for SANG within the site.

Concept Plan

5.82 The master plan (Figure 12) includes the following features:

- The Barkham Brook tributary acts as the focus for a large expanse of open greenspace in the central section of the site. SANG, sports pitches and parks would be accommodated within this area.
- SuDs ponds are located in lower lying areas and to correspond with the brook channels. Woodland planting is located on the higher ground and around the site's periphery to reduce the visual impact of the development.
- Two neighbourhoods are created to either site of the central greenspace. Residential densities are assumed to be between 30dph and 40dph to ensure a mix of house types.
- It is assumed that Arborfield SDL District Centre and the proposed local centre adjacent to Biggs Lane will provide community services and local shopping.

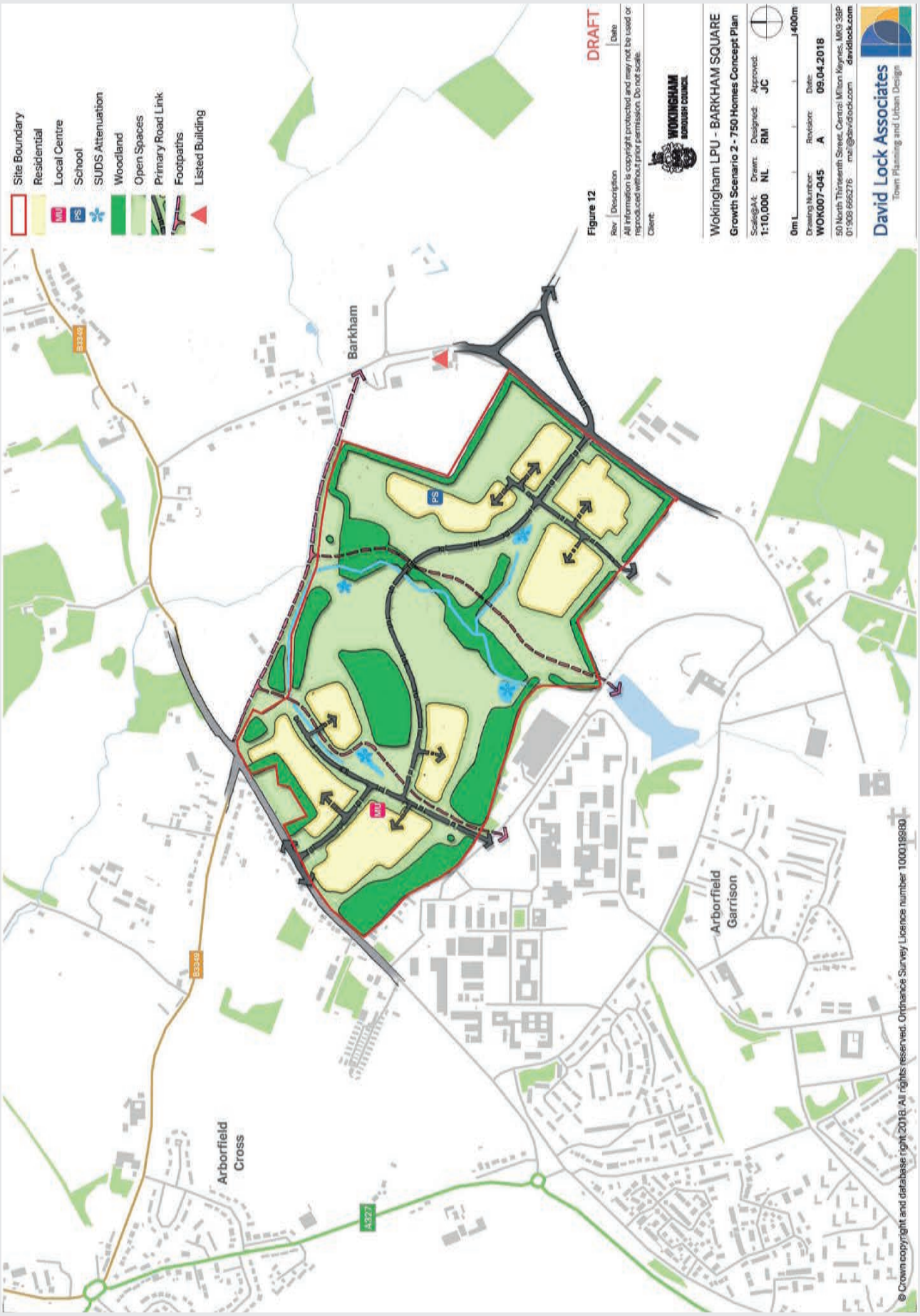


Figure 12: Barkham Square Growth Scenario 2 - 750 Homes Concept Plan

Growth Scenario 2: **750 HOMES**

Access & Movement

5.83 Trip generation would follow a similar pattern to Scenario 1, but overall numbers of trips would be less due to the reduced number of homes.

5.84 Access is arranged as follows:

- Public access for recreation is highlighted along the green corridors. These would be extended beyond the site to connect with public rights of way and the greenway network.
- Road access through the site to connect Langley Common Road with Barkham Ride is provided. The existing junction of Commonfield Lane, Barkham Street and Barkham Ride could be downgraded as a consequence.
- The new Langley Common Road / Barkham Ride link would enhance the primary road network within the vicinity, linking Barkham Ride with the new Arborfield bypass and reducing traffic at the junction of Barkham Road and Barkham Street.
- The new link road would necessitate the construction of an all-traffic bridge across the Barkham Brook tributary. This would need to be considered in the flood risk assessment and drainage strategy for the site.
- Secondary connections south to link with Arborfield SDL are included to facilitate integration.

Infrastructure requirements

5.85 The following summary of infrastructure requirements has been identified. It is assumed that affordable housing will be delivered via a S106 Agreement:

Infrastructure Required	Indicative Funding
Highway Access	
New access junctions with adjoining highways including Barkham Road and Commonfield Lane	Developer
Internal residential roads	Developer
Primary road connecting Langley Common Road with Barkham Ride to include a new bridge	Developer and/or CIL
Off-site highway and junction works to enhance capacity, including widening of Commonfield Lane	Developer
Public footpaths to connect to Arborfield SDL	Developer
Sustainable Transport	
My Journey Travel Planning	Developer
Bus service and bus stop infrastructure	Developer
Public transport strategy including expansion of services	Developer
Off-site pedestrian and cycle routes	Developer
Greenway extensions	Developer
Strategic Flood Alleviation	
Site preparation works	Developer
Utilities	
Energy, Water and Waste	Provider + Developer
Education	
Arborfield SDL Primary school extension	CIL
Bohunt Secondary school place extension (300 spaces)	CIL
Further education & adult learning	CIL
Public Open Space	
SANG	CIL
Allotments	CIL
Children's play	Developer
On-site parks and amenity space	Developer
Sports pitches	CIL
Community facilities	
Community space & library provision	CIL

Growth Scenario 3: **500 HOMES**

5.86 The site can accommodate 500 homes on site and meet all corresponding requirements for open space.

Concept Plan

5.87 The master plan (Figure 13) includes the following features:

- The Barkham Brook tributary is retained as an ecological corridor, and development is set back from the brook.
- SuDs ponds are located at low points in the site, and new woodland planting is proposed for the higher ground and at the site's periphery to help manage the visual impact of the scheme.
- Residential development is concentrated in a single neighbourhood to the west of the Barkham Brook tributary.
- Land to the east of the tributary is retained for public open space including SANG and sports pitches.
- No provision is made for a primary school; it is assumed demand for primary school places would be met through the expansion to 3FE of the proposed primary school at Arborfield SDL.

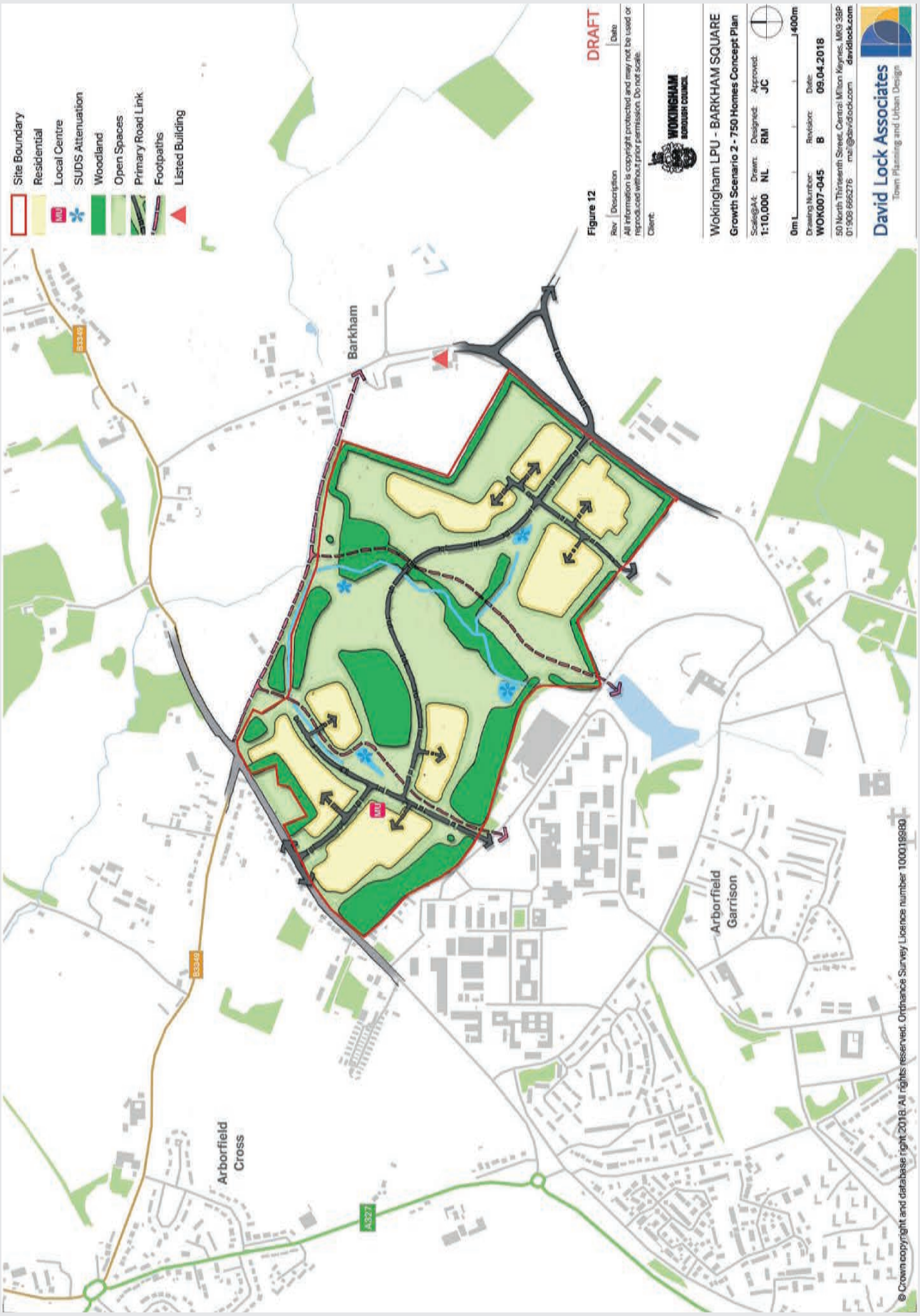


Figure 13: Barkham Square Growth Scenario 3 - 500 Homes Concept Plan

Growth Scenario 3: **500 HOMES**

Access & Movement

5.88 Similar trip distribution patterns to Scenarios 1 and 2 are anticipated.

5.89 Access is arranged as follows:

- Connected points of access are proposed from Langley Common Road and Arborfield SDL.
- A bridge crossing of the Barkham Brook tributary is for pedestrian and cycle use only.
- Public access for recreation is highlighted along the green corridors. These would be extended beyond the site to connect with public rights of way and the greenway network.

Infrastructure requirements

5.90 The following summary of infrastructure requirements has been identified. It is assumed that affordable housing will be delivered via a S106 Agreement:

Infrastructure Required	Indicative Funding
Highway Access	
New access junctions with adjoining highways including Barkham Road	Developer
Internal residential roads	Developer
Off-site highway and junction works to enhance capacity	Developer
Sustainable Transport	
My Journey Travel Planning	Developer
Bus service and bus stop infrastructure	Developer
Public transport strategy including expansion of services	Developer
Pedestrian and cycle routes including bridge crossing and connections to Arborfield SDL	Developer
Strategic Flood Alleviation	
Site preparation works	Developer
Utilities	
Energy, water and waste	Provider + Developer
Education	
Arborfield SDL primary school extension	CIL
Bohunt secondary school extension	CIL
Further education & adult learning	CIL
Public Open Space	
SANG	CIL
Allotments	CIL
Children's play	Developer
On-site parks and amenity space	Developer
Sports pitches	CIL
Community facilities	
Community space & library provision	CIL

6.0 TWYFORD / RUSCOMBE

6.1 This potential strategic site lies immediately to the east of Twyford village, within the parishes of Twyford and Ruscombe. The area of search (Figure 14) identified through the 'Call for Sites' amounts to 259 hectares, of which 178 hectares lie between the A4 and the Western mainline. 81 hectares lie to the south of the railway. The eastern edge of the site is bound by open countryside. All of the area lies within the Green Belt.

BACKGROUND AND ANALYSIS

Site Environmental Studies: Summary Findings

6.2 Key environmental constraints are summarised in Figure 15. Critically these include the designation of Best and Most Versatile agricultural land. The Green Belt is a policy designation, although opportunities to identify potential future edges to the Green Belt in the event of Green Belt release require consideration of site features in the master planning exercise. As is explained in the introduction, this study does not make recommendations in relation to development in the Green Belt and the merits of Green Belt release requiring an Exceptional Circumstances exception test are not a consideration for this study.

Flooding and Drainage

6.3 The River Loddon is immediately adjacent to the western edge of Twyford village centre.

6.4 The majority of the site is within Flood Zone 1, and these areas should be considered suitable for development in terms of flood risk. To the south of the railway there is a large area of land within Flood Zone 3b; under national planning policy any development here should be either water compatible or essential infrastructure. Detailed hydraulic modelling should be undertaken to confirm the extent of floodplain.

6.5 The geology of the area is permeable. There is a possibility of surface water flooding within the site at several locations, possibly due to the low-lying position of Twyford and therefore the risk of groundwater flooding should also be considered.

Transport and Highways

6.6 The background analysis included a review of the Thames Valley LEP study (Sustainable Transport Delivery Excellence Programme, February 2017) of the Twyford/Ruscombe site, along with work undertaken previously by PBA, and examination of existing transport and access constraints.

6.7 There is a degree of consistency between the findings of the different studies, most notably:

- Any large-scale development at Twyford/ Ruscombe should prioritise transport, with development density linked to accessibility.
- The A4 could provide the principal access to any development, with access from the south delivered subject to crossing the railway and floodplain.
- Access to Twyford Station by walking, cycling and public transport could be enhanced.
- The extension of the Reading MRT to Twyford via the A4 should be considered.
- A hierarchical cycle network could be promoted.
- Future proofing for technological changes such as autonomous vehicles should be considered.

6.8 A Twyford Station review was completed in 2017. It considered various options for the future of the station including station improvements, the development of new platforms for separate services, the separation of the Henley branch line, and the relocation of the station.

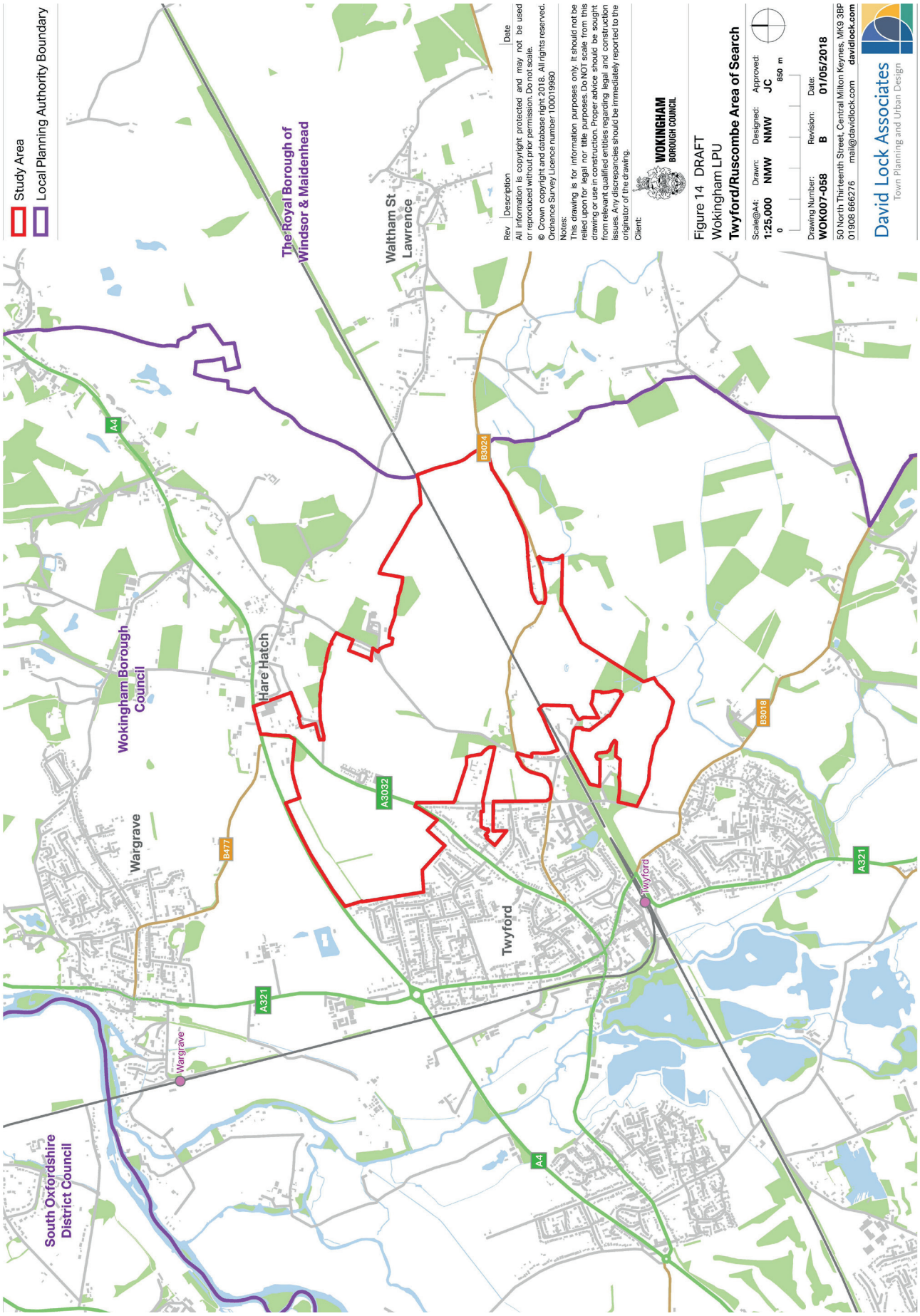


Figure 14: Twyford / Ruscombe Area of Search

6.9 The report highlighted the heavy reliance of most station users on the car, and the limiting factors of constrained station parking and poor access by public transport. Consequently, demand at Twyford station is buoyant but static. The report also states that this situation may change once the Crossrail service commences, and once the Western Rail Access to Heathrow is delivered. Additional traffic congestion would occur as a result. Additional station parking provision would help to alleviate on-street parking around the station, whilst improved access by public transport to strategic links would reduce the impact of traffic on the village centre crossroads and the associated AQMA.

6.10 The road network within Twyford and at the site is constrained. Most through traffic and station traffic from the north uses the village centre crossroads, which is narrow and unsuited to large volumes of traffic. Buildings sit close to the highway and there is no scope to widen the carriageways. There is no convenient alternative route for traffic to the crossroads.

6.11 The railway line is a barrier to movement; four existing bridges provide north-south connectivity, though three of these are subject to height and width restrictions and do not offer dedicated pedestrian paths.

6.12 Twyford benefits from bus services to Reading, Wokingham and Maidenhead, but these services do not currently extend through the site.

Air Quality

6.13 The site is not located within an AQMA, however impact on the nearby AQMA at Twyford crossroads will be a consideration in the event that development occurs. Air quality impacts may also arise along the A4 and A3032 London Road, which may influence the configuration of any potential development and the location of homes within the site.

Noise and Vibration

6.14 The A4, A3032 and railway are potential sources of noise and vibration, and their potential impact on any development will need to be considered in more detail if a planning application is forthcoming. This may be mitigated in part by the electrification of the line for certain services.

Geotechnical

6.15 There are no known major sources of contamination or hazardous ground gases. However, some level of mining has taken place historically on the site, and limited areas of contaminated land adjacent to the railway have been identified. These will need to be considered in the master plan. Overall, the geotechnical constraints are very low.

Waste

6.16 There is an emerging Minerals and Waste Plan for central and eastern Berkshire. The site will be subject to review for mineral deposits and possibly the search for a waste to energy facility by Hampshire County Council who currently act as the waste and mineral planning authority on behalf of WBC and the other central and eastern Berkshire authorities who are jointly preparing a Minerals and Waste Plan.

Agricultural Land

6.17 Much of the site is Grade 1, 2 and 3a Best and Most Versatile farmland. There are also some areas of Grade 3b land. A detailed agricultural land survey would be required to confirm the extent of each grade.

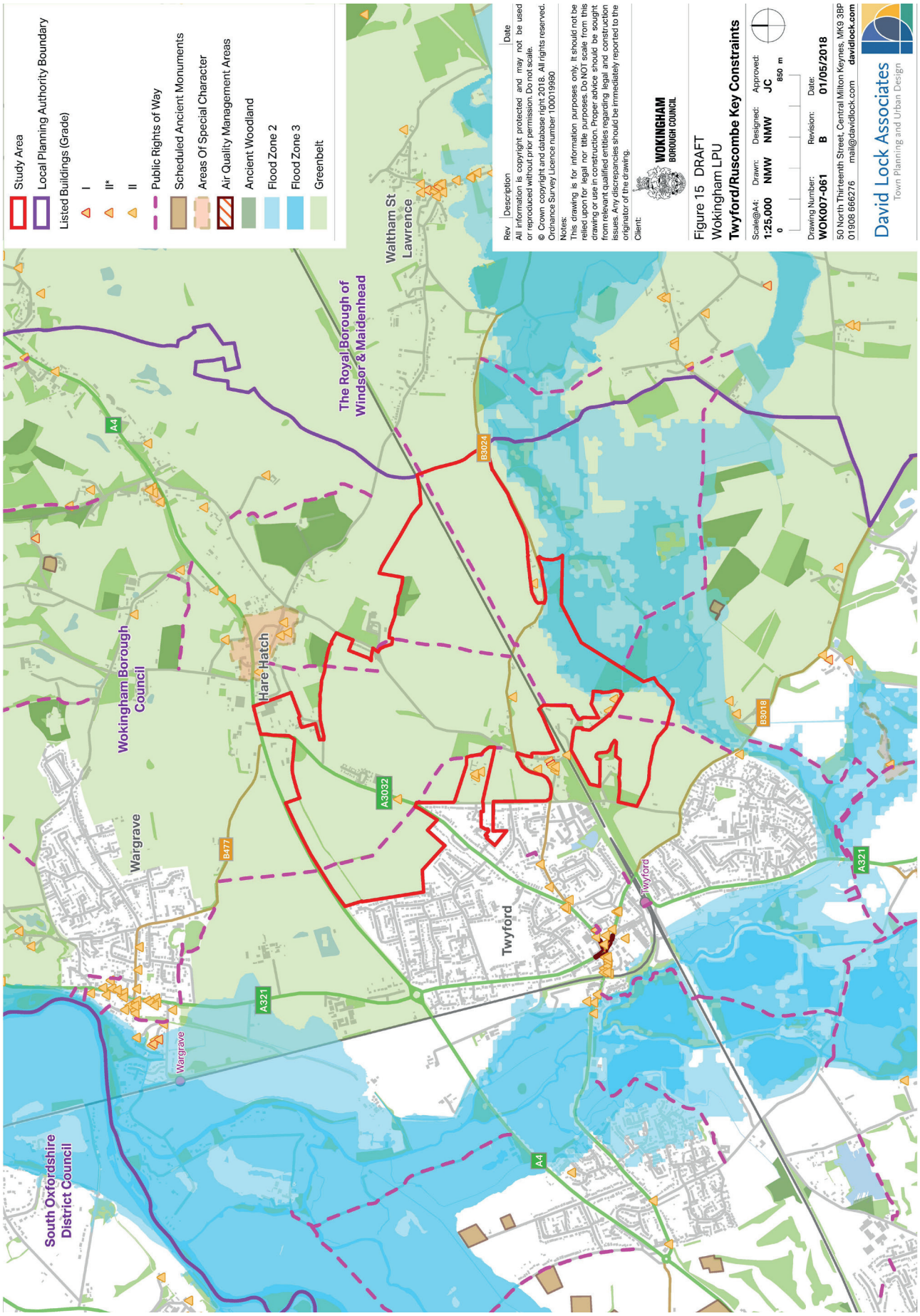


Figure 15: Twyford / Ruscombe Key Constraints

Ecology

6.18 The site lies within an identified Impact Risk Zone (IRZ) for nearby areas designated as Site of Special Scientific Interest, Special Protection Area, Special Areas of Conservation and Ramsar.

6.19 The site predominantly consists of agricultural fields, which are of inherently low ecological value. However, there are some areas of hedgerow, deciduous woodland (including ancient woodland), ponds, ditches and areas designated as local wildlife sites. These have the potential to support a variety of wildlife including roosting Bats, breeding Birds, Reptiles, Badgers and Great Crested Newts. Full ecological surveys will be needed if the site is allocated, and proposals to mitigate any impact from development should include retained, enhanced and new habitat creation.

Heritage

6.20 Ruscombe Conservation Area lies to the east of the village and is flanked by the area of search on its north and eastern boundaries. It includes St. James Parish Church, which is listed and parts of which date back to the 14th Century. The conservation area has a village character which is enhanced further by green open spaces and mature trees.

6.21 Twyford crossroads is part of Twyford conservation area, with several listed buildings located here. The amenity, quality and character of the conservation area are undermined by the traffic which dominates the village centre.

Sustainable Resources

6.22 Development would be expected to deliver high levels of resource efficient design, consistent with the requirements of WBC and WBDC guidance or policy in place at the time and comply with the Government's requirements for nearly zero energy building design.

6.23 Special regard for water consumption is needed within the Thames Valley. Thames Water and South East Water's Water Resource Management Plans highlight the need for careful balancing of future supply and demand.

SUMMARY OF CONSULTATION OUTPUTS

Technical Stakeholder Workshops Outputs

6.24 The following key points have informed the master planning process to date and can be carried forward by WBC if the site is allocated for development.

Green and Blue

6.25 The site lies within the London Metropolitan Green Belt. National planning policy states that the council would need to demonstrate "Exceptional Circumstances" before the Green Belt boundary could be altered and the site could be released for development. Any new Green Belt edge would need a defensible boundary. A case for new Green Belt provision within the Borough, to off-set any loss at Ruscombe, would equally need to demonstrate Exceptional Circumstances.

6.26 Local ecology includes the presence of Reptiles along the railway corridor and Great Crested Newts found at a number of ponds within the site.

6.27 No SANG is required in this location as it is over 7km from the Thames Basin Heaths Special Protection Area.

6.28 The Twyford Brook hydraulic model will need to be updated. Substantial areas of land to the south of the railway are included in the floodplain. Overland flow routes extend through field centres rather than along field boundaries, with corresponding benefits for habitat. Any development would need to ensure not only appropriate flood risk management, but also protection of habitat.

6.29 Any new railway bridge would have a visual impact on the landscape, as the recent electrification would require the bridge to be in excess of 10m in the air. Alternatively, it may be possible to extend the existing tunnel underneath the railway at Waltham Road or create a new underbridge. However, measures to prevent flooding would be needed due to its low-lying level.

Transport and Environmental Health

6.30 The existing crossroads in Twyford village centre is a designated AQMA as a result of congestion. As such, any new development should not increase or lead to the prolonging of the existing air quality problems. Potential solutions include upgrades to existing easterly routes including New Road and the existing rail crossing, a new eastern connection around Twyford, to include a rail crossing (over or under the tracks), and the downgrading (one-way, or traffic along one-axis) or potential closure of the crossroads to vehicular traffic. The latter may help to retain the village feel, which is currently being eroded by traffic volumes.

6.31 Vehicular access to Twyford Station is relatively poor and adds to the congestion at the crossroads. There are concerns that the new Crossrail service and future Heathrow connection will continue and potentially reinforce the popularity of the station, exacerbating existing problems.

6.32 Car parking associated with the station gives rise to a number of concerns. The existing station car park is too small to cater for the level of demand, which leads to commuter parking on nearby residential streets. The current car park could be decked to create sufficient capacity, or a new location (potentially the adjacent allotments or at Stanlake Meadow) may be preferable to increase the number of spaces. Additional cycle parking is needed.

6.33 A new park and ride sited off the A4, with links to the station, may assist in reducing demand for station parking but would only be attractive if accompanied by bus priority measures. Good interchange facilities would also be needed to the south of the station to ensure easy access.

Community Wellbeing

6.34 There is no existing surplus school capacity in Twyford at primary and secondary level. New primary schools would be needed on-site for development of a strategic scale. Detailed consideration to the constraints of the Piggot School site will be required – there may be limited scope for expansion, or the school could potentially be relocated to accommodate growth in pupil numbers.

6.35 Twyford Health Centre has room to expand and the practice has indicated its willingness to accommodate new patients through expansion of its premises. The premises are owned by the GPs, and funding could be sourced from the CCG and through commercial loans.

6.36 Twyford police station is earmarked for closure in the short to medium term. However, if development occurs TVP would require a 'touch-down' facility, potentially as part of a larger community building, to ensure a local presence.

6.37 Royal Berkshire Fire & Rescue raised concerns about flooding of the A4 to the west of Twyford, which can become cut-off, leading to difficulties in evacuating the area. New road access to the east would alleviate this problem to maintain safe access and response times.

6.38 Under current planning policies, 35% affordable housing would be needed as a mix of 1, 2 and 3-bedroom properties, based on provision of 70% affordable rent and 30% shared ownership. There is a local shortage in private elderly care, private rented homes and self-build plots.

6.39 The need for a community facility / library in Twyford is well established. Neither Ruscombe nor Twyford Parish Councils have office facilities.

Utilities

6.40 Subject to potential upgrades to capacity that would be funded by a future developer, there are no utility capacity issues which would prevent or limit development at Twyford/Ruscombe – potable water, foul water drainage, gas, electricity and telecommunications could be delivered to the site.

6.41 In the event that development proposals come forward, discussions in relation to existing utility infrastructure will be needed, including overhead electricity cables and a medium pressure gas main.

Community Stakeholder Workshops

6.42 The workshop discussions provided an opportunity for community representatives to express their views about the positive and negative aspects of living in Twyford and Ruscombe. Whilst slightly divergent views were recorded for each parish as a consequence of the different experiences, lifestyles and travel choices, there was a general consensus that the area offers a high quality of living.

6.43 The parishes have cohesive communities. It has experienced limited development since the 1980's. The village acts as the hub for the surrounding area. Village residents are able to walk and cycle. Provision for buggies and wheelchairs in the village centre is poor due to narrow pavements

6.44 Those living in outlying areas tend to drive into the village, which creates congestion (school and station traffic in particular contribute to this) and air quality problems. Twyford Parish Council has proposed environmental improvements for the village crossroads, but whilst these would improve space for pedestrians they would increase queue lengths for cars, thus worsening the air quality problem. It is recognised that a village 'bypass' would help, possibly utilising New Road and Stanlake Road. The Hare-Hatch/Wyevale junction at the A4 is perceived locally as requiring reconfiguration to improve safety.

6.45 Formal parking provision is limited which leads to on-street parking. A park and ride facility is seen as one possible solution for this. There are mixed feelings about the possibility of building further parking on the allotments, which is resisted by Twyford residents.

6.46 There is a lack of housing which is affordable to many households. Some housing on a limited scale may be welcomed to help address this problem. However, whilst workshop participants recognised the potential that new development would have to assist affordability, traffic and air quality issues within Twyford, the prevailing view was to resist Green Belt release and development on a strategic scale.

6.47 Workshop participants worked together to identify a small number of sites outside the Green Belt where development might be considered acceptable for c. 200 new homes. No discussion on the potential for development on land designated Green Belt occurred, with participants not wishing to engage given that options outside the Green Belt to meet development needs were still being considered and were, in their view, likely to be sufficient.

SUMMARY OF CONSIDERATIONS

6.48 The following summary represents a synthesis of the Stage 1 findings and the key points arising from the consultation workshops, which give rise to several important master planning considerations. Figure 16 highlights the main design parameters.

6.49 All land to the east of the village is within the Green Belt. The site comprises large field units and is intensively farmed. Its landscape is visually appealing and accessible for walkers in part via a public right of way which passes a local wildlife site and Ruscombe conservation area, with its listed church. It has limited environmental constraints to development to the north of the railway (small pockets of woodland, small areas of archaeological interest and some localised ground contamination), but substantial areas of floodplain lie to the south of the line.

6.50 Any consideration of development potential should have full regard to the existing village of Twyford, which would function as the 'host-settlement'. Twyford is an attractive place which is much liked by its residents, many of whom walk to the village centre and station. It has a number of valued community assets including local allotments and a recreation ground. The village centre is a conservation area and offers a range of shops including a Waitrose supermarket. Community facilities and services are good, but there is a desire for additional provision including a library service and community building.

6.51 However, the village suffers from a number of environmental problems, many of which occur as a result of growing travel demand. Most notably, the village crossroads has a designated AQMA, which places an obligation on the local authority to act to reduce exceedances of acceptable emission levels as quickly as possible. Traffic congestion is the main cause of poor air quality, and the volume of traffic using the crossroads at peak hour extends beyond its design capacity. Consequently, the physical environment is poor and the effect on human health is a concern (many secondary age children walk through the crossroads en-route to the Piggot School).

6.52 The road network around the station is constrained, and this problem is exacerbated by on-street parking by rail users. Dedicated station parking is very limited. The forthcoming Crossrail services, whilst leading to timetable changes, are unlikely to diminish the appeal of Twyford Station, making it more attractive for some commuters. Network Rail has indicated a desire to construct a multi-storey car park to cater for demand – the impact of such a proposal on traffic and air quality is untested as yet.

6.53 The consequences of the above clearly indicate that if development at Ruscombe were to occur, provision for alternative traffic routing (including a railway crossing) to avoid the crossroads would be necessary to mitigate against likely travel demand. In practice this would present the potential for betterment at the crossroads by dispersing traffic across a wider network. In due course this could reduce vehicle emissions and pave the way for environmental improvements in the village centre.

6.54 Locations for a railway crossing are limited. An overbridge would be highly visible due to the elevated track. An underbridge would be less visually intrusive but would require engineering solutions to manage floodwater. Upgrading the existing underbridge at Wargrave Road is worthy of exploration.

6.55 Additional station parking could be delivered to the south of the railway. Previous ideas included construction of a multi-storey car park on the allotments. However, this valued community asset would be difficult to replace. Alternative locations should be explored through the master planning exercise.

6.56 The A4 provides a clearly defined edge to the north of Twyford, and currently contains the village leaving a clear gap with Wargrave. The A4 provides convenient access to Reading and Maidenhead. The junction of the A4 and the A3032 is recognised locally as an accident spot, which suggests it is unsuitable for general development access. Master planning presents the opportunity to explore the potential for a new junction.

6.57 In the event of development, new school places will be required. Development may trigger the need for an expanded, replacement or additional secondary school. At least one new primary school, and possibly several will be needed for greater numbers of homes.

6.58 Housing affordability is a concern for local people, and there is a perception that smaller homes in particular are needed to cater for local demand.

6.59 In summation, the following points are relevant to the master planning exercise:

- The area of search adjacent to Twyford village is constrained due to the quality of agricultural land and its Green belt designation.
- The existing road network within Twyford/ Ruscombe is heavily constrained and could not absorb the impact of significant new development. Consequently, alternative solutions for through traffic and station traffic should be sought. A new A4 junction and opportunities for crossing the railway warrant specific consideration.
- There are a number of features which are worthy of careful consideration as part of the master planning exercise, including existing woodland pockets, Ruscombe conservation area and the local wildlife site.
- Provision for schools and community facilities will be needed to cater for new residents.

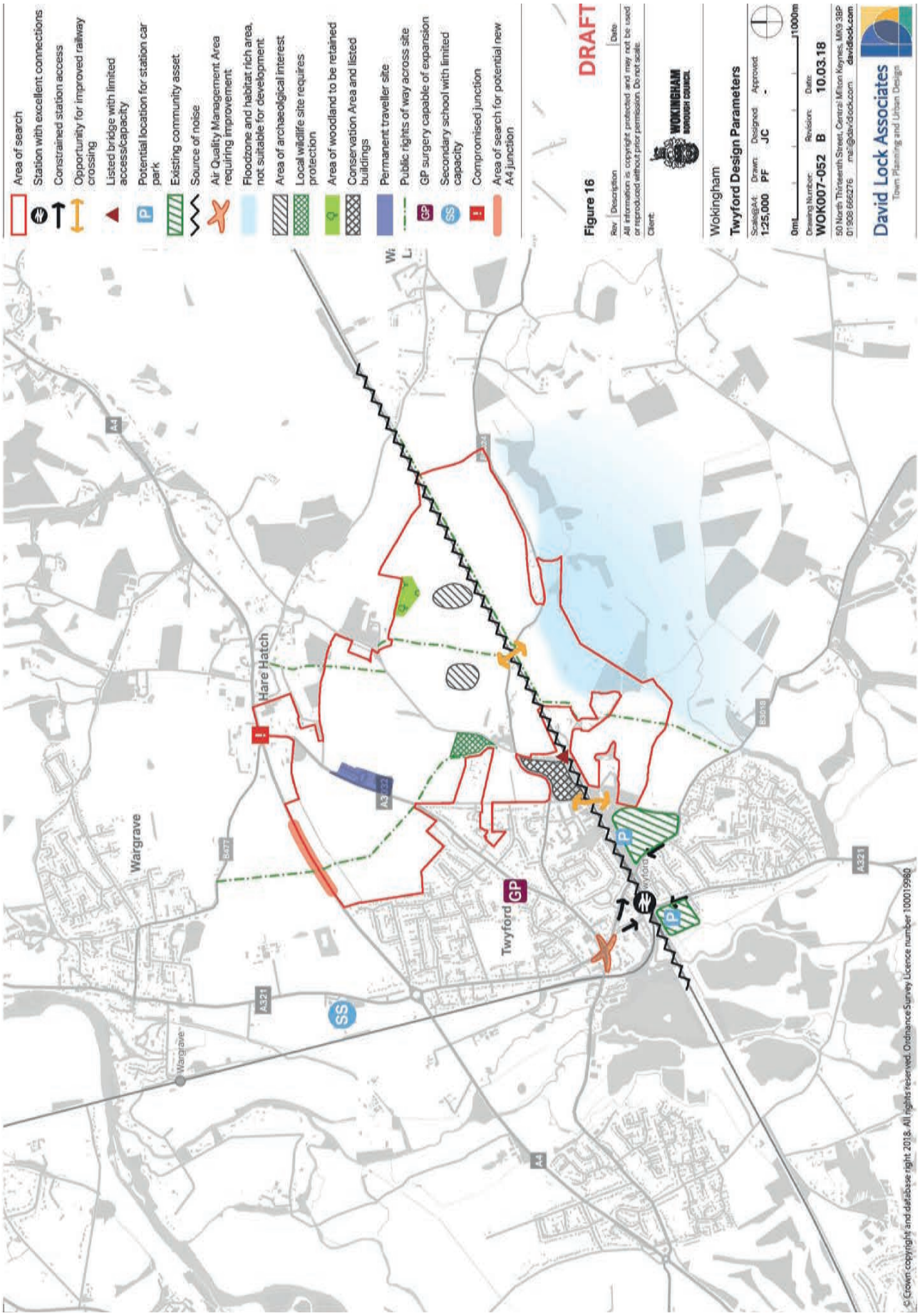


Figure 16: Twyford / Ruscombe Design Parameters

A VISION FOR A SUSTAINABLE AND THRIVING BERKSHIRE VILLAGE

Development at Twyford and Ruscombe would ensure the very clear benefits and attractiveness of the location could be enjoyed by a greater number of people. In addition, the excellent regional transport links, reinforced by the advent of Crossrail, indicate that the village has potential for development which offers sustainable travel choices, especially for commuters.

Whilst the principle and scale of any development at Twyford and Ruscombe are to be determined through the LPU process, the following ideas indicate the type of place that could be realised.

- The attractive setting could create good life chances for many families, including those in need of homes which are affordable. Greenfield development typically offers generous amounts of open space and new schools which would attract young families, helping to counterbalance the impacts of an aging population.
- Maintaining a compact village form would ensure residents can walk and cycle to the village centre and to the station, improving the overall environmental sustainability of the settlement. Safe and convenient walking and cycling routes should be integral to the design of any new development.
- The layout of any development could ensure good connections and access to the open countryside are maintained for all residents, and the rural character experienced around the periphery of the village could permeate the development by creating green fingers or corridors. A network of public footpaths would provide walking routes.
- Very high design quality could be supported by high land values. Investment in good architecture and landscape design should prevail, and ensure a sensitive design response to village character, especially near to Ruscombe. There is also scope for

Environmental improvements at the cross roads could create a clean and attractive pedestrian environment

A new recreation ground adjacent to Ruscombe (New Road sits in the foreground)

innovation and advanced building design through the introduction of modern modular homes. The environmental credentials of the development could be regarded as a key attraction.

- Development which delivers an alternative route for traffic would pave the way for regeneration and environmental improvement within the village centre, with cleaner air quality and a more attractive setting, helping local businesses to thrive. New businesses could establish, and the village could grow a vibrant evening economy. Village centre improvements would be further supported by substantial investment in the station environment and a transport interchange.
- Village assets, which underpin village life and which are highly valued by existing residents could be replicated in areas of new development; new allotments, a new recreation ground adjacent to Ruscombe and new village school would enhance the quality of new homes.

A 1,000 space car park could be created on park of Twyford recreation ground, with sufficient space left for sports pitches

Over the longer term, regeneration in the village centre could enhance local shopping

There is potential for redevelopment of the station car park for new apartments

Growth Scenario 1: **3,500 HOMES**

6.60 The master planning exercise has confirmed that it is possible to accommodate 3,250 homes at land east of Twyford at an average density of around 35 dph; 3,500 homes would require marginally higher densities, or the inclusion of additional sites to the west. This includes the provision of some development to the south of the railway line, outside of the floodplain. Best and Most Versatile land would be lost as a consequence of development at this scale.

6.61 To achieve 3,500 homes, additional land to the west of Twyford, adjacent to the A4, plus a number of infill sites could be developed.

Concept Plan

6.62 The master plan (Figure 17) includes the following features:

- A new defensible edge to the Green Belt is established by the construction of a new road at the eastern edge of the master plan area. In addition, new structural woodland is proposed to mirror the existing eastern edge of Twyford and reduce the visual impact of development when viewed from the adjoining open countryside.
- To the south of the railway the floodplain creates a natural defensible barrier to the Green Belt.
- Green open space is clustered around the Ruscombe conservation area. This incorporates the existing local wildlife site and introduces a new recreation ground for the provision of formal sports facilities. A green gap links this area with new woodland at the eastern edge.
- Large parcels for residential development are identified to the north and south of the railway. These parcels are capable of being designed in detail to produce high quality living environments with a mix of house types and tenures. Higher density development to the south of the railway in proximity to the station and village centre is assumed.
- A secondary school annex and two primary schools are provided to cater for need arising from the development. Community facilities can be accommodated close to principal access routes.
- A limited number of infill sites within Twyford are identified, and greenfield land to the west of the village, south of the A4, could also be included.

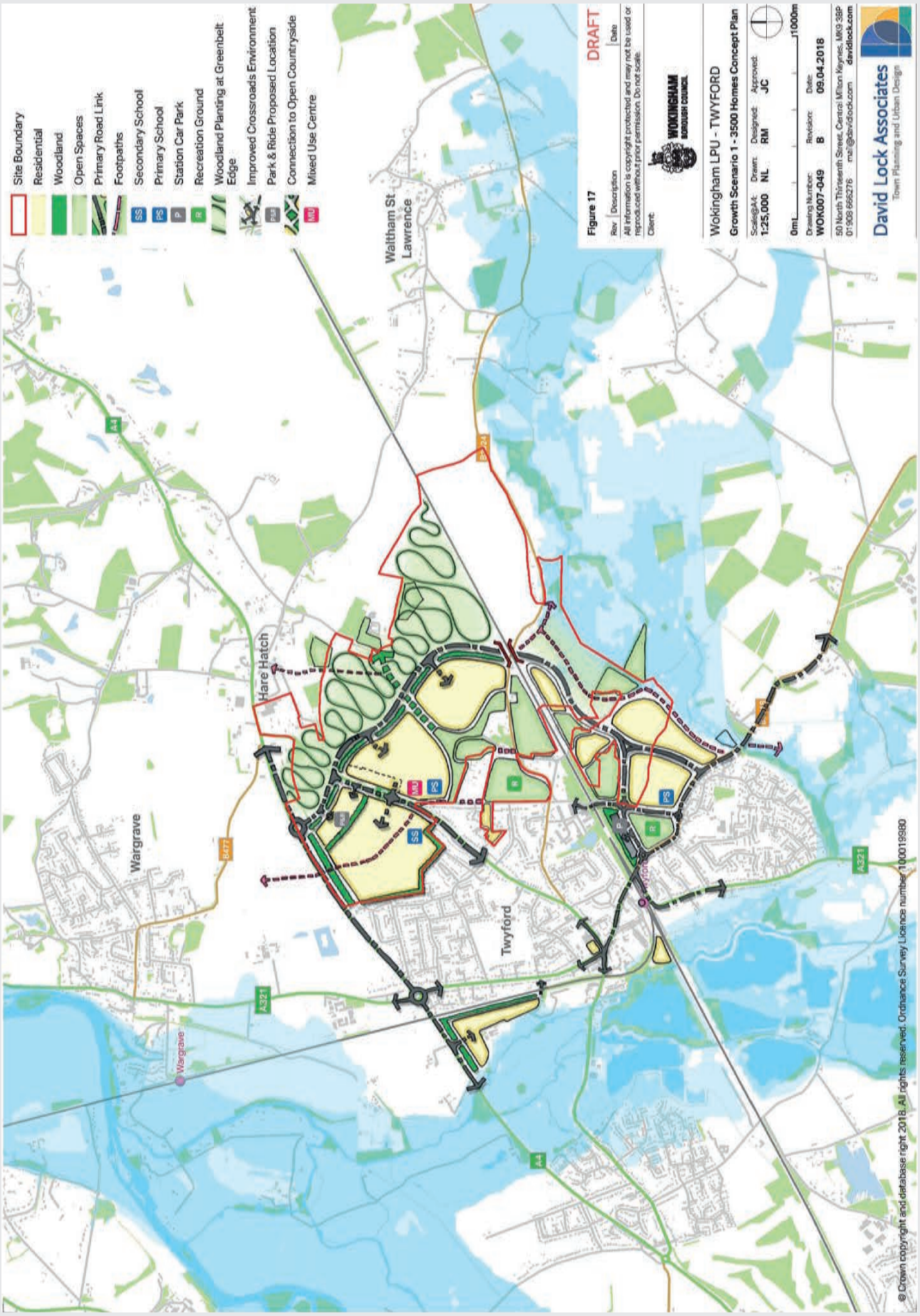


Figure 17: Twyford / Ruscombe Growth Scenario 1 - 3,500 Homes Concept Plan

Growth Scenario 1: **3,500 HOMES**

Access & Movement

6.63 Analysis of trip distribution arising from Twyford/ Ruscombe Growth Scenario 1, based on current trip patterns, indicates that 32% of Am and PM peak trips are to Reading. Most trips are currently made by car and train. The potential to capture more trips by train could be realised through development with good connections to Twyford Station. 17% of AM and PM peak trips are to London, and 15% are to Maidenhead and Slough.

6.64 The following provisions are included for access and movement:

- A new eastern route around Twyford creates an alternative route from the A4 to the B3018 to cater for through traffic and station traffic, relieving the village crossroads of traffic congestion and paving the way for environmental and air quality improvements. Whilst the route would function as a bypass to the village, it is proposed that it is designed with frontage development to create an attractive edge to the expanded village.
- A new / replacement crossing underneath the railway is proposed.
- A relocated and replacement junction is proposed at the A4 to improve safety and capacity. The current A4 junction could be closed, with local access only to the northern part of London Road.
- A new multi-storey station car park for 1,000 spaces is located alongside the railway on the Twyford recreation ground. This is a five-minute walk from the station's southern entrance. Whilst considerable space would remain for recreational use (with the possibility of an upgrade to the facilities), any loss is compensated for by the creation of a new recreation ground adjacent to Ruscombe conservation area.
- A new road connection would connect Stanlake Road to the B3018 to provide access to the multi-storey car park and allow bus access to the station. An interchange facility would be provided at the southern access to the station.
- It is assumed that some investment will be made to upgrade Twyford Station.
- A new park and ride facility is proposed adjacent to the replacement A4 junction.

Infrastructure Requirements

6.65 The following summary of infrastructure requirements has been identified. It is assumed that land for school site(s) and affordable housing will be delivered via a S106 Agreement:

Infrastructure Required	Indicative Funding
Railway Infrastructure	
New forecourt and ticket office	Third Party
New public transport interchange	Third Party
New 1,000 space multi-storey car park	Developer
Highway Access	
New outer road connection	Developer
New A4 junction/roundabout	Developer
New railway tunnel	Developer
New recreation ground link with B3018	Developer
Sustainable Transport	
My Journey Travel Planning	Developer
Bus service and bus stop infrastructure	Developer
Public transport strategy including expansion of services	Developer
Footpaths and cycleways	Developer
Electric vehicle charging points	Developer
Village crossroads and environmental improvements	CIL
Strategic Flood Alleviation	
Site preparation works	Developer
Utilities	
Energy, water and waste	Provider + Developer
Education	
2 x 2FE Primary school	CIL
Secondary school annex	CIL
Further education & adult learning	CIL
Public Open Space	
Allotments	CIL
Children's play	Developer
On-site parks and amenity space	Developer
Sports pitches	CIL
Community facilities	
Community space & library provision	CIL
Indoor sports provision	CIL

Growth Scenario 2: **2,250 HOMES**

6.66 The site can accommodate 2,250 homes north of the railway at an average residential density of 35 dph. However, land to the south is included in the master plan for access purposes. Best and Most Versatile land would be lost as a consequence of development at this scale.

Concept Plan

6.67 The master plan (Figure 18) includes the following features:

- A new defensible edge to the Green Belt is established by the construction of a new road at the eastern edge of the master plan area. In addition, new structural woodland is proposed to mirror the existing eastern edge of Twyford and reduce the visual impact of development when viewed from the adjoining open countryside.
- Green open space is clustered around the Ruscombe conservation area. This incorporates the existing local wildlife site and introduces a new recreation ground for the provision of formal sports facilities. A green gap links this area with new woodland at the eastern edge.
- Large parcels for residential development are identified to the north of the railway. These parcels are capable of being designed in detail to produce high quality living environments with a mix of house types and tenures.
- One secondary school annex (potentially as a sixth form facility) and one 3FE primary school is provided to cater for need arising from the development. Community facilities can be accommodated close to principal access routes.
- Additional land for new homes is also identified west of Twyford and south of the A4, along with potential infill sites on the current station car park and adjacent to the village crossroads. The latter would entail the medium-term redevelopment of the 1960's development within the north-east segment of the crossroads. A separate study of this area has been prepared with a view to understanding the constraints and opportunities of redevelopment.

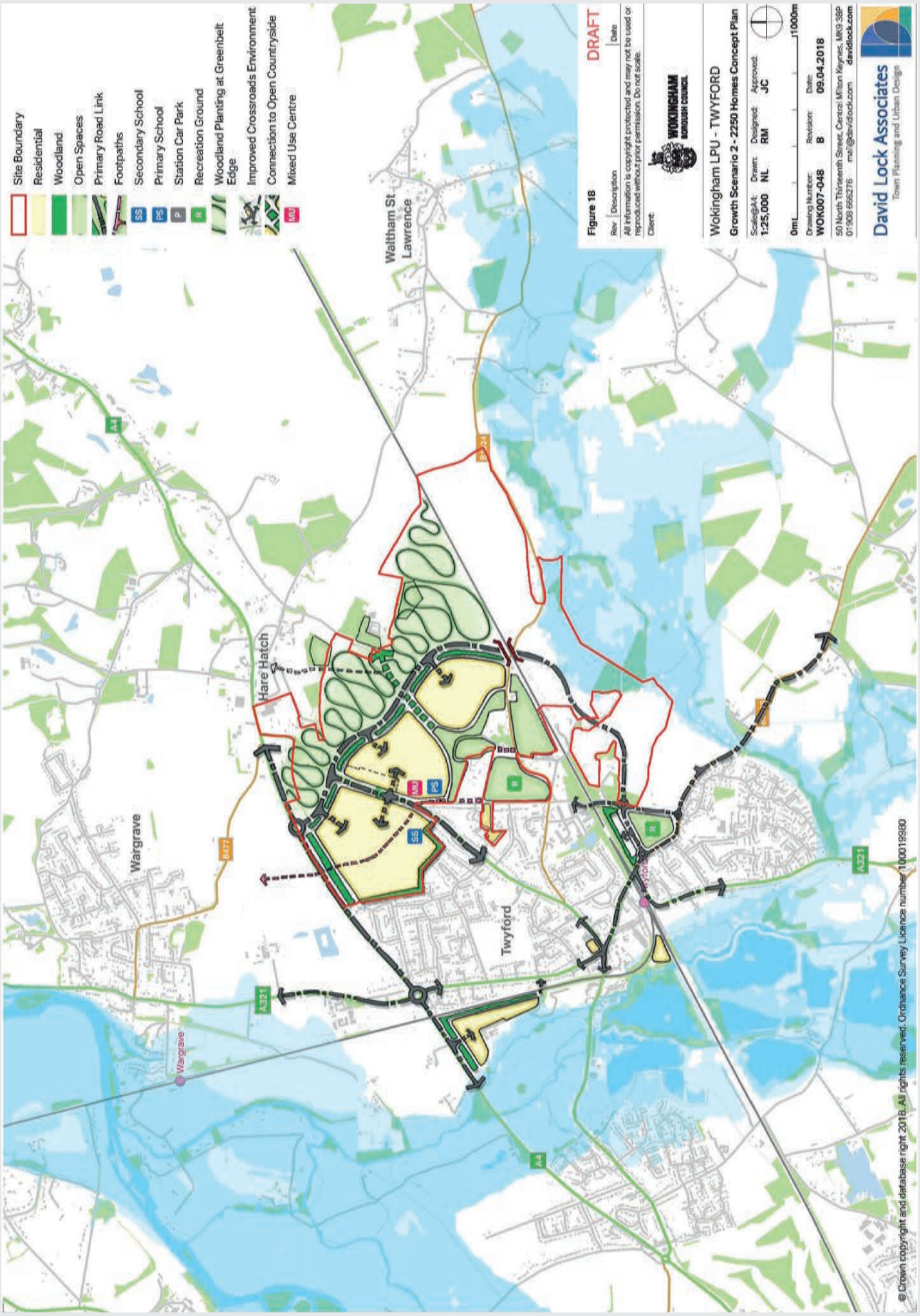


Figure 18: Twyford / Ruscombe Growth Scenario 2 - 2,250 Homes Concept Plan

Growth Scenario 2:
2,250 HOMES

Access & Movement

6.68 The following provisions are made for access and movement:

- A new eastern route around Twyford creates an alternative route from the A4 to the B3018 just south of the railway line to cater for through traffic and station traffic, relieving the village crossroads of traffic congestion and paving the way for environmental and air quality improvements. Whilst the route would function as a bypass to the village, it is proposed that it is designed with frontage development to create an attractive edge to the expanded village.
- A new / replacement underbridge to the railway is proposed.
- A relocated and replacement junction is proposed at the A4 to improve safety and capacity. The current A4 junction could be closed, with local access only to the northern part of London Road.
- A new multi-storey station car park for 1,000 spaces is located alongside the railway on the Twyford recreation ground. This is a five-minute walk from the station's southern entrance. Whilst considerable space would remain for recreation use (with the possibility of an upgrade to the facilities), any loss is partially compensated for by the creation of a new recreation ground adjacent to Ruscombe conservation area.
- A new road connection would connect Stanlake Road to the B3018 to provide access to the multi-storey car park and allow bus access to the station. An interchange facility would be provided at the southern access to the station.
- It is assumed that some investment will be made to upgrade Twyford Station.

Infrastructure Requirements

6.69 The following summary of infrastructure requirements has been identified. It is assumed that land for school sites and affordable housing will be delivered via a S106 Agreement:

Infrastructure Required	Indicative Funding
Railway Infrastructure	
New station forecourt and ticket office	Third Party
New public transport interchange	Third Party
New 1,000 space multi-storey car park	Developer
Highway Access	
New outer road connection	Developer
New A4 junction	Developer
New railway tunnel	Developer
New recreation ground link with B3018	Developer
Sustainable Transport	
Travel Plan	Developer
Bus service and bus stop infrastructure	Developer
Public transport strategy including expansion of services	Developer
Footpaths and cycleways	Developer
Electric vehicle charging points	Developer
Village crossroads and environmental improvements	CIL
Strategic Flood Alleviation	
Site preparation works	Developer
Utilities	
Energy, water and waste	Provider + Developer
Education	
1 x 3FE Primary school	CIL
Secondary school annex	CIL
Further education & adult learning	CIL
Public Open Space	
Allotments	CIL
Children's play	Developer
On-site parks and amenity space	Developer
Sports pitches	CIL
Community facilities	
Community space & library provision	CIL
Indoor sports provision	CIL

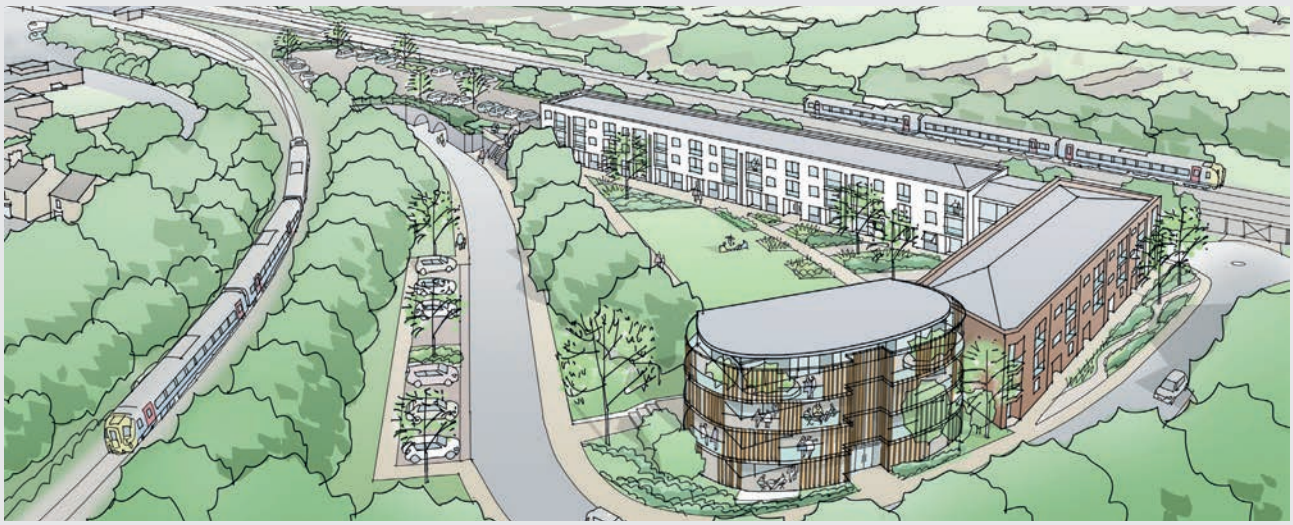
A VISION FOR 500 HOMES AT TWYFORD

In the event that a limited number of new homes are to be provided at Twyford (up to 500 homes), it would remain possible to effect some positive changes.

- The village could retain its compact character, ensuring walking and cycling to local facilities and to the station would continue to be possible, improving the overall environmental sustainability of the settlement. Safe and convenient walking and cycling routes should be integral to the design of any new development.
- Limited development to the north-east of the village could bring about relief for the village crossroads as a result of traffic improvements through the creation of a new road connection from the A4 to New Road and upgraded rail crossing. This would breathe new life into the village centre, with cleaner air quality and a more attractive setting, helping local businesses to thrive. This may pave the way over the longer term for environmental improvements.
- Very high design quality could be supported by high land values. Investment in good architecture and landscape design should prevail and ensure a sensitive design response to village character. There is also scope for innovation and advanced building design through the introduction of modern modular homes. The environmental credentials of the development could be regarded as a key attraction.
- Existing brownfield land could be redeveloped, leading to wider environmental improvements to the village.

Environmental improvements at the cross roads could create a clean and attractive pedestrian environment

Over the longer term, regeneration in the village centre could enhance local shopping



There is potential for redevelopment of the station car park for new apartments

Growth Scenario 3: **500 HOMES**

6.70 A scenario for 500 homes has been prepared in response to comments made by community representatives, who expressed concern about Green Belt release, but also acknowledged the benefits of limited housing growth in respect of affordability. Consequently, this study has substituted the requirement for a scenario for 1,000 homes, as set out in the Brief, with a 500-home scenario. In preparing Growth Scenario 3, the opportunity to relieve the village crossroads has again been considered.

Concept Plan

6.71 The master plan (Figure 19) accommodates the following:

- Limited Green Belt release is proposed adjacent to the A4 on land defined by a public right of way which connects London Road and the A4. A new road at the urban edge would provide a defensible edge to the Green Belt.
- A further site is identified west of Twyford and south of the A4.
- A number of small infill sites within Twyford and Ruscombe could also provide new homes. This includes the possible redevelopment of the current station car park in the event that a new car park is provided; this idea has been tested separately to understand the opportunities and constraints of development in this location, given the difficult access conditions.
- Primary and secondary school requirements are assumed to be met through extensions to existing schools.

Figure 19: Twyford / Ruscombe Growth Scenario 3 - 500 Homes Concept Plan

Growth Scenario 3: **500 HOMES**

Access & Movement

6.72 The following provisions are made for access and movement.

- A new junction on the A4 is provided, and a new road connection between the A4 and London Road created. This road connects with New Road, which is upgraded to accommodate additional capacity, ensuring a more even distribution of through traffic and station traffic across the network.
- An upgraded or replacement bridge over the railway connects to Stanlake Road to complete alternative route.
- A replacement car park is provided on the Twyford allotment site, leaving the current recreation ground intact.

Infrastructure Requirements

6.73 The following summary of infrastructure requirements has been identified. It is assumed that affordable housing will be delivered via a S106 Agreement. No community facilities are included.

Infrastructure Required	Indicative Funding
Railway Infrastructure	
New forecourt and ticket office	Third Party
New public transport interchange	Third Party
New multi-storey car park	Third Party
Highway Access	
New outer road connection	Developer
New A4 junction	Developer
Modify current railway bridge	Developer
Upgrades to New Road and Stanlake Road	Developer
Sustainable Transport	
Travel Plan	Developer
Bus service and bus stop infrastructure	Developer
Public transport strategy including expansion of services	Developer
Footpaths and cycleways	Developer
Electric vehicle charging points	Developer
Village crossroads and environmental improvements	CIL
Strategic Flood Alleviation	
Site works	Developer
Utilities	
Energy, water and waste	Provider + Developer
Education	
Primary school extension	CIL
Secondary school extension	CIL
Further education & adult learning	CIL
Public Open Space	
Allotments	CIL
Children's play	Developer
On-site parks and amenity space	Developer
Sports pitches	CIL
Community facilities	
Community space & library provision	CIL

7.0 VIABILITY REVIEW

7.1 The LPU must be supported by evidence which demonstrates the viability of development and infrastructure provision; unless schemes are deemed to be affordable, capable of delivering policy compliant measures including affordable housing, and generating an acceptable level of developer profit (without which there is no incentive to build), it would not be appropriate to pursue their allocation.

7.2 High level viability appraisals have been carried out based on the assumptions set out separately for each potential growth location, including the identified infrastructure items required to support and enable development. A Residual Land Value is derived from the appraisal process in each case, which has then been compared to the benchmark land value applied to greenfield sites in the CIL viability studies carried out for the setting of CIL. This was originally set at £300,000 per hectare but has been increased by the same indexation as CIL over the period since the CIL baseline figures were set and has therefore been tested at a relatively high hurdle rate of £375,000 per hectare.

7.3 This benchmark land value is set at a level which is intended to indicate that if this is exceeded, then development is viable, and will provide an appropriate incentive for a landowner to sell their land. It is considerably in excess of Existing Use Value in each of the locations considered.

7.4 This has been tested at a baseline level of appraisal, assuming a cautious level of value, and a relatively full level of cost. Two sensitivity tests have then been carried out:

- The first reflects the average Build Cost Information Service (BCIS) costs per M2 adjusted to disregard the provision of single storey development, and to reflect flatted development at no more than 5 storeys, and houses at no more than 3 storeys. This marginally reduces the cost per square metre from the baseline at £1,474 per M2 to £1,459 per M2. This could reasonably be further reduced at Grazeley to reflect the influence of the Reading market, where average costs are marginally lower again than the evidence indicates for Wokingham.

- The second test builds on the first and reflects the fact that the evidence for sales values is largely based on Land Registry data, which is somewhat out of date by the time it is available. A marginal increase of circa 2.5% per M3 of sales value has been allowed to reflect the impact of this, and that in the baseline an uplift of only 7% over second-hand values has been included to reflect that these will be new homes.

7.5 Table 1 uses a traffic light system to show where development is viable against the benchmark land value test (amber and green), and where it is not viable (red).

7.6 The Amber setting reflects a residual land value that is above the Benchmark Land Value, but by no more than 20%, suggesting it is more marginal than those in green, where the benchmark land value has been exceeded by more than 20%.

7.7 In each test, all policy requirements including CIL and affordable housing provision have been accounted for, and a market level of developer's profit has been allowed.

7.8 The table indicates that at Twyford and Barkham Square all tests show a viable outcome. The level of CIL generated in each location covers the identified cost of the off-site infrastructure required to deliver the development. However, at Grazeley, only the larger 15,000 option (based on the most optimistic test) indicates viability against the Benchmark Land Value, as there is a shortfall in the level of CIL generated compared to the anticipated off-site infrastructure costs required to enable the development. If the significant level of offsite infrastructure required to deliver the development can be funded so that the shortfall does not fall on the development itself, then the 15,000 unit option clearly becomes viable, and the 10,000 option is potentially deliverable but is more marginal.

7.9 A more detailed analysis of the Grazeley scenarios also indicates that for both the 10,000 and 15,000 unit tests the initial phases indicate a loss, largely due to the timing of investment needed in the upfront utilities infrastructure.

7.10 Both these outcomes indicate a strong case for early investment to secure housing delivery. This highlights the importance of the contribution of the Housing Infrastructure Fund in securing the planning and delivery of new homes.

Table 1: Viability outcomes - LPU Strategic Master planning options

Twyford units	Baseline cautious	Realistic	Slightly Optimistic
500			
2,250			
3,250			

Barkham Square units	Baseline cautious	Realistic	Slightly Optimistic
500			
750			
1,000			

Grazeley units	Baseline cautious	Realistic	Slightly Optimistic
5,000			
7,000			
10,000			
15,000			

Key:

Benchmark Land Value £375,000 per ha	
	Below Benchmark Land Value
	Benchmark Land Value + up to 20%
	Benchmark Land Value + > 20%

8.0 INTEGRATED TRANSPORT STUDY

PURPOSE OF THE INTEGRATED TRANSPORT STUDY

8.1 Wokingham Borough Council's (WBC) Third Local Transport Plan (LTP3) replaces their current Local Transport Plan (LTP2) which expired on 31March 2011. Unlike previous Local Transport Plans, where local authorities were required to renew the document at least every five years, LTP3 may be replaced as and when required. LTP3 therefore sets out a long-term strategy to 2026 – a timeframe that is consistent with Wokingham Borough's Local Development Framework Core Strategy. This is subject to the LPU update currently being undertaken.

8.2 This provisional Integrated Transport Study (ITS) seeks to consider the period beyond 2026, with a provisional period of up to 2036, but also as far as 2050, which includes the 2040 policy deadline for electric vehicles.

8.3 Cross boundary issues including regional and national context are addressed. As such both Reading Borough Council and WBDC's LTPs and associated policies need to be considered and would require the councils to work in partnership to secure the wider integrated benefits of future schemes.

CURRENT BOROUGH WIDE ISSUES

8.4 As part of the masterplanning study, consultation with transport stakeholders highlighted the larger local projects or those which could offer regional/ national benefit. The following key ssues have been identified as items that should be considered either prior to or post 2026, as appropriate.

- The principal congestion points across the Borough are focused on the motorway links and junctions that pass through the borough, the A roads that link urban settlements and in the town centres. (See Figure 20);
- These in part match some of the main areas of concern in terms of congestion and connectivity across the Borough and regionally;
- The majority of the infrastructure currently proposed are highway mitigation schemes or MRT and park and ride schemes designed to improve access to key employment hubs and station at Reading;
- Focus needs to be placed on the improvement of links north/south between M4 and M3 corridors;
- M4 Junction 10 and A329M are witnessing congestion issues following Highways England improvements of the M4 corridor between junction 12 to 10 which are likely to have capacity issues even post Smart Motorways (Highways England scheme to utilise hard shoulders between junction 13 and 12 as general traffic lanes);
- Regional improvements comprising the "Cambridge to Oxford Link" (new bus/train/ vehicle links) as part of the strategic growth corridor for 1 million homes, and the nature of its relationship with the Thames Valley needs to be understood, as does any Thames Valley equivalent to this national scheme;
- Station access throughout the area is constrained;
- There is potential to expand park and ride and Reading's MRT across WBC, Reading and Bracknell, including a dual-purpose facility to serve multiple towns such as Bracknell, Wokingham and Reading via a single site;
- Strategic connections between the development sites need to be accommodated with suitable connections to railway stations
- The electrification of the railway line south of Reading towards Basingstoke needs to be promoted;
- The emerging potential for a Third Thames Crossing will need to be understood as will the impact this would have on strategic traffic assignment arising from the emerging development;
- The impact of Heathrow Expansion, Western Link and Crossrail will influence people movement across the Borough and wider area, and changing travel patterns will impact across the wider area.

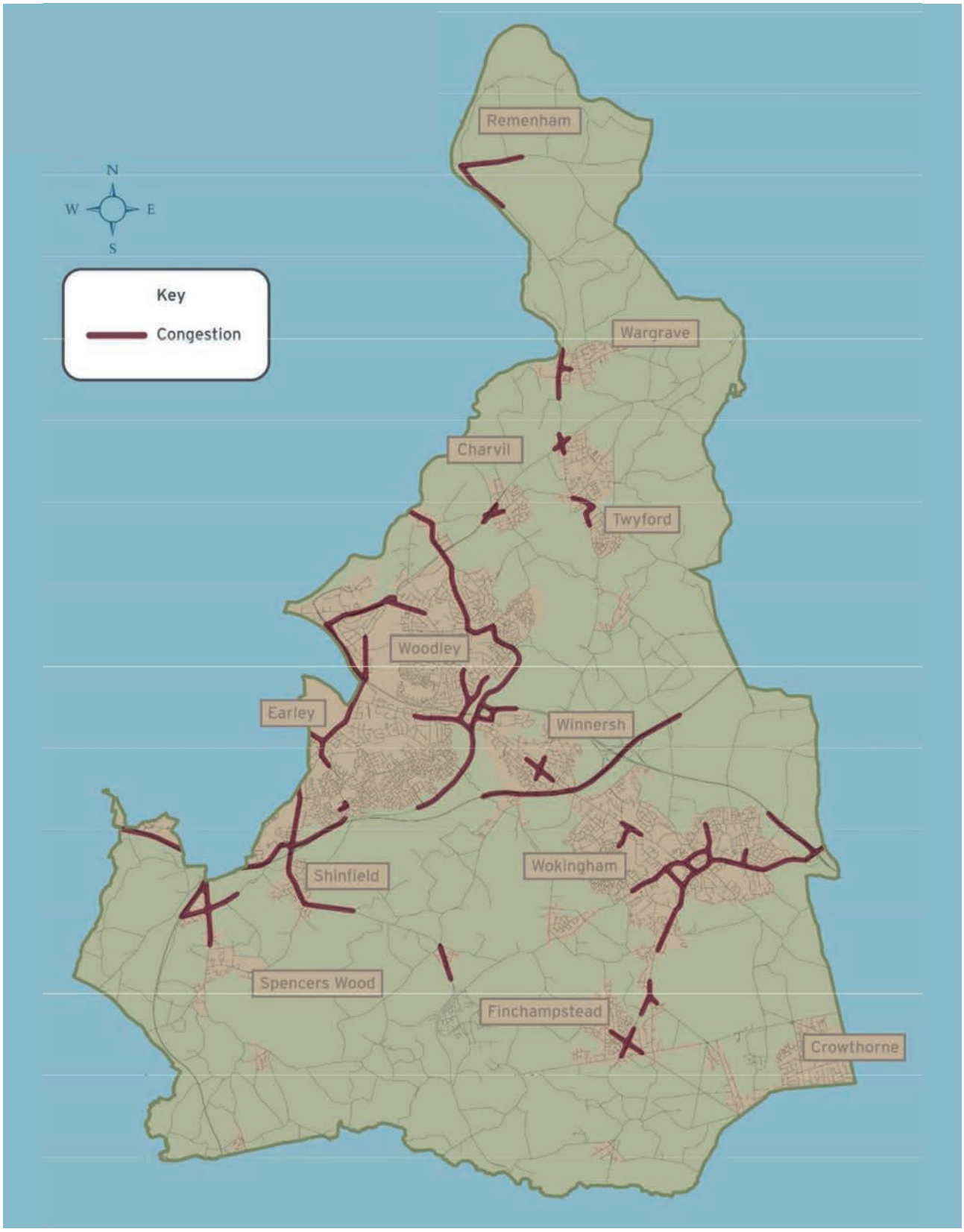


Figure 20: Network Congestion

PLANNED TRANSPORT INFRASTRUCTURE

Current LTP Goals and Options

8.5 The current LTP sets out 5 goals, which include highways, active travel, public transport, smarter choice and demand management, and strategic projects. The LTP also includes a wide range of measures, which are summarised below.

- Highway Goals
- Active travel goals
- Public transport goal
- Smarter choices and demand management goals
- Strategic project goals

Current Situation

8.6 The main transport related projects being considered in the context of the previous Local Plan period up to 2026 are set out below (Figure 21). These show schemes which are consented and being implemented, those that have consent to be implemented and those that are aspirations in part linked to current scheme extensions.

Current Policies

8.7 The current LTP includes a wide range of policies. Those which have are considered to be the most appropriate with respect to the wider/ regional issues across the Borough and beyond are summarised in the ITS report. The full list of policies included are found within Section 4 of the ITS.

8.8 The key theme is to balance network management and congestion by promoting modal shift to sustainable transport both within the Borough and cross border.

Current Challenge

8.9 The current LTP seeks to meet the challenges of accommodating an additional 13,230 new dwellings and associated mixed use development, over the next 15 years.

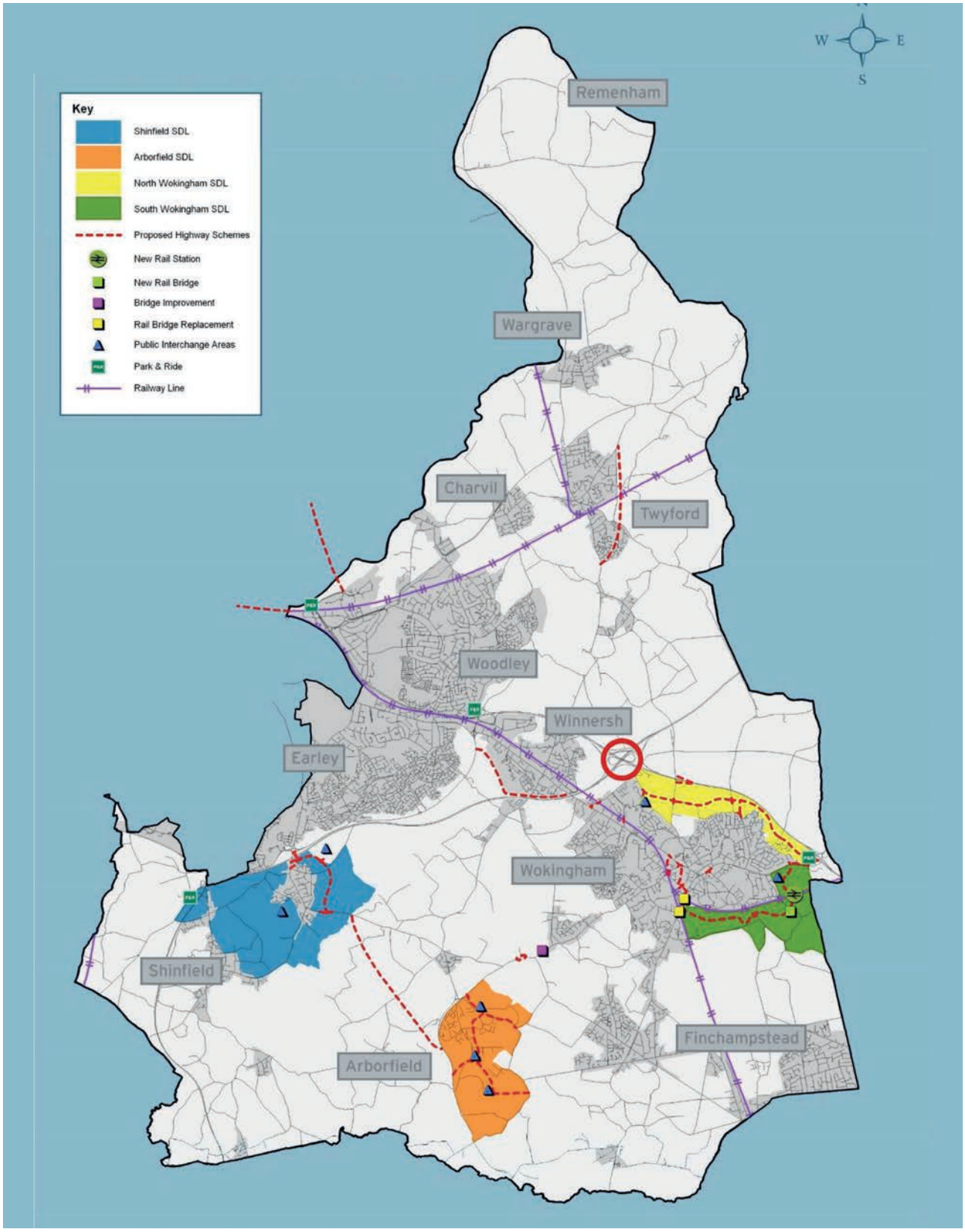


Figure 21: Indicative Strategic Projects

FUTURE TRANSPORT REQUIREMENTS TO SUPPORT GROWTH

Future Challenge

8.10 Moving forward there is a potential requirement to accommodate between 7,000-10,000 additional dwellings up to 2036 as part of the LPU. This includes development at the potential strategic sites subject to this study.

8.11 In addition, the surrounding Boroughs including WBDC and Reading will also have developments that will have a bearing on WBC's transport network and vice versa leading to growth outside of the Borough which may have a material impact on air quality and noise locally.

National/ Regional Schemes

8.12 As defined in the current LTP, there are number of major transport related schemes that will have a material impact on not only the transport network, but on how people chose to live, work and commute across the south east, as each will provide wider coverage and easier access to key destinations. These schemes include:

- Crossrail
- Western Rail Access to Heathrow
- High Speed 2
- Great Western Mainline Electrification
- Smart Motorways M4 and M3
- Cambridge to Oxford rail and motorway links
- Coast to Reading Link

Transport Vision

8.13 The following table and plan sets out a summary of the possible future major schemes that could be promoted under the following headings:

- Regional
- Walking and Cycling
- Smart City
- Local
- Public Transport
- Post 2035

Ref	Regional	Ref	Local
R1	Upgrade A33 to dual from Wellington Rbt to Basingstoke or consider new link M4 to M3	L1	Consider opening vehicle links to the services between Jct 11 and 12
R2	Consider widening of M4 beyond Smart Motorway Scheme	L2	Review and revise Jct 10 of the A329M
R3	Consider new junction between M4 Jct 10 and 11	L3	3rd Thames Bridge
R4	Consider connecting to Cambridge-Oxford Link	L4	East/West Link - Barkham
R5	New North/ South Link between M3/M4	L5	Twyford Relief Road
Ref	**Walking and Cycling**	**Ref**	**Public Transport (bus and rail)**
WC1	Review missing links between current significant urban areas	PT1	New Grazeley Railway Station and additional P&R site
WC2	Improve way finding across borough for all modes	PT2	Introduce new P&R at Coppid Beach
WC3	Seek to increase public realm areas in urban areas and promote walking and cycling	PT3	Extend MRT to Grazeley Station
WC4	Extend greenways	PT4	Extend MRT from Grazeley to Winnersh Triangle
WC5	Improve connections between sustainable modes ad urban areas	PT5	Extend MRT from Winnersh Triangle to Coppid Beach
Ref	**Smart City**	**Ref**	**Post 2035**
SC1	CCTV/ANPR Enforcement and Management	P1	Autonomous Vehicles
SC2	SCOOT and UTC Upgrade and Expansion	P2	Upgrade MRT to Tram/AV
SC3	Electric Vehicles		

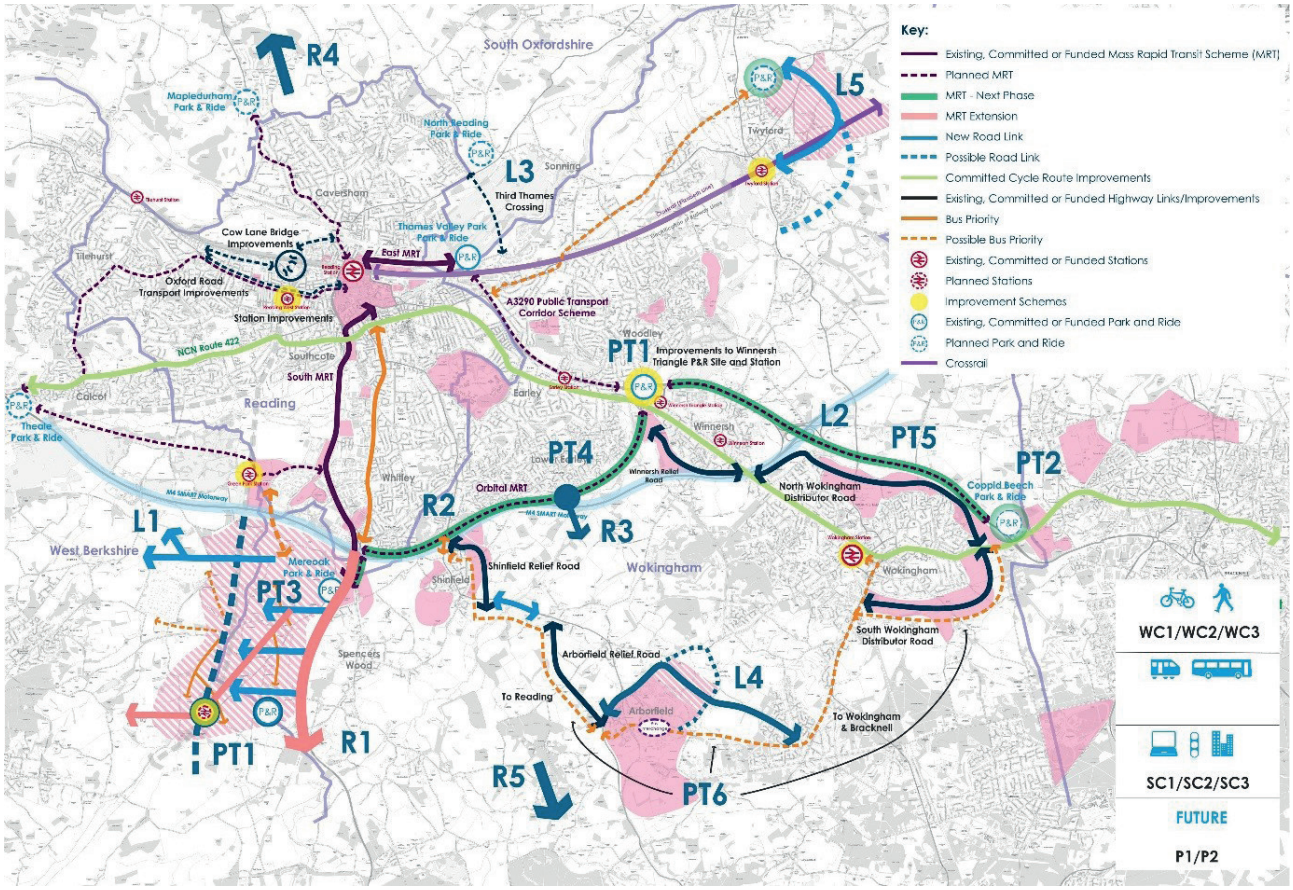


Figure 22: Possible Future Major Scheme

Summary

8.14 The ITS proposed vision is to build on the success of promoting sustainable travel while addressing key strategic links with new road schemes to address current and forecast congestion issues inside and outside the Borough working with neighbouring authorities, LEP, developers and Government.

8.15 The need to maintain economic growth through development in and around the Borough means that the ITS needs to look forward and consider how people movement will change in the future, especially with the promotion of better place making seeking to provide community led developments and facilities that limit the need to travel by car or promote more attractive modes for live/work movements.

8.16 This will need to place more emphasis on sustainable travel both locally and regionally, looking to provide early introduction of key infrastructure and services to influences peoples travel patterns early and provide viable and attractive alternatives to the car.

8.17 To achieve this the package of measures are of a scale that will need to secure funding for early delivery of such infrastructure and services to promote sustainable travel and thus will require hundreds of millions from local, national and developer funding streams secured by WBC working with neighbouring councils, regional bodies, Government and developers.

8.18 Highlighting the issues, promoting the solutions and seeking to implement them in advance of demand, to optimise modal choice is key to promoting the level of growth needed in terms of houses and employment both in and around the Borough. The need for cohesive and strategic thinking throughout the region will be key to assessing the issues and solutions holistically rather than on a Borough only basis.

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