DEMAND AND FEASIBILITY STUDY FOR ESTABLISHING HIGH QUALITY SCIENCE PARK(S)

Final report to Leicestershire County Council, Leicester City Council, Blaby District Council, Charnwood Borough Council, North West Leicestershire District Council, Oadby & Wigston Borough Council and Leicestershire Training and Enterprise Council

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1. Introduction and Policy context

Background to the study

1.1 This is the final report of a study undertaken by Segal Quince Wicksteed Ltd (SQW), in association with BBP Property Consultants Limited (BBP) on the demand for, and feasibility of establishing further science parks in Leicestershire. The study was commissioned by a consortium of local authorities and the Leicestershire TEC, led by Leicestershire County Council.

1.2 The adopted Leicestershire Structure Plan makes provisions for small technology transfer facilities and for one high quality B1 Science and Technology Park close to, or with good transport links with, centres of higher education in the county. Although some progress has been made in identifying small scale sites for technology transfer (some sites have already been developed), large sites for more substantial science park development(s) have not yet been identified through the planning process with the exception of Loughborough Science Park.

1.3 It is considered part of the role of planning policy to ensure that adequate and suitable land is available for particular types of technology-based activities which the county wishes to attract and retain. The rationale for this positive intervention is three-fold:

- they are high-value, high-growth activities with substantial positive knock-on effects for the local economy
- they often have specialist property requirements such as the preference for clustering or linking with a higher education institution, that are not being systematically addressed by the property markets
- they often involve small but fast-growing firms which lack the resources to undertake development themselves. These firms therefore have to rely on second-hand or speculatively-built premises, a form of development that is only justified on the strength (or perceived strength) of demand.

Policy context

1.4 It remains the intention of the County Council to continue supporting the development of both large and smaller sites for technology-based activities. Indeed, a similar policy has been carried through in the Leicestershire, Leicester and Rutland Structure Plan (consultation draft) advocating support for 'small scale technology transfer facilities close to centres of higher education and for one high quality B1b science and technology park'. A site for the latter may be in addition to employment land allocations made elsewhere in the plan or be part of an existing or proposed employment land allocation.

1.5 In addition, other policy documents support such provision. RPG8 (for the East Midlands) advocates that planning policy should 'ensure the provision of science and business parks related to existing industrial and research facilities' within the Derby/Nottingham/Leicester triangle (which includes most of Leicestershire[1]). The area includes a large labour force, major industrial and service activities, all six of the region's universities, excellent motorway links and the East Midlands airport. Within the main principles for development, the document also advocates that 'structure plans should identify the areas of opportunity where regional locational advantages coincide with development needs'. Such opportunities for investment and economic development should be compatible with environmental aims and with the strategy to concentrate growth in the main urban areas.

1.6 The recently formulated 'Draft Economic Strategy for Leicestershire' also puts the 'knowledge' economy at the centre of its strategic vision. It describes a healthy local economy with evident strengths that have not been sufficiently recognised or promoted in a way that enables synergies and dynamic linkages to develop. It proposes that, inter alia, more networking opportunities, more ventures with universities, the provision of incubator facilities, raising the profile of local industry, joint training initiatives, strengthening of regional and local supply chains and a more coherent approach to sector targeting for inward investment, will provide the drivers for achieving the 'diffusion of knowledge and skills … and … improving the competitiveness of our business' (part of the vision statement). Physical provision of sites and locations that can encourage such networking activities and provide opportunities for inward investment are recognised in the strategy as mechanisms in achieving this vision.

1 Throughout this report references to 'Leicestershire' and 'the county' refer to the old county area including the City of Leicester and Rutland.

Structure of the report

1.7 In addressing the study objectives as laid out in the study brief, this report is based on a review of available background and best practice material, a series of consultations with some 30 professionals from planning authorities, the universities and the property industry in Leicestershire, site visits and a workshop held at Leicestershire TEC offices with some 25 participants.

1.8 It is structured as follows:

- *Chapter 2* provides an overview of science park developments in the UK, highlighting key issues applicable to Leicestershire with particular reference to the Science Park in Loughborough
- *Chapter 3* discusses definitions of the 'high-tech' sector and provides an overview of the sector in Leicestershire, including emerging trends
- *Chapter 4* considers the property requirements of this sector and the level and nature of demand for science park or similar developments in Leicestershire
- *Chapter 5* provides an evaluation of sites that may be suitable for accommodating 'high-tech' uses based on a framework developed in consultation with the Steering group
- *Chapter 6* assesses the planning and labour market implications of developing science park(s) in Leicestershire, including recommendations as to an appropriate planning framework
- *Chapter 7* concludes the report by making recommendations as to next steps and partnership arrangements required to implement the conclusions of this study.

1.9 In addition, there are two annexes:

- *Annex A* contains examples of planning permissions, conditions, agreements and other control instruments as applicable to other science parks in the UK
- *Annex B* contains a list of consultees and a list of workshop participants.

2. Experience of UK Science Parks

2.1 This section of the report considers the experience of science and technology parks in UK in general, and of the Loughborough Science Park in particular. It then considers the regional context for science park development before identifying some key issues for Leicestershire in the light of this experience and context.

UK science parks

2.2 By the end of 1997 (the latest date for which comprehensive statistics are available) there were 53 science parks and similar schemes which were members of the UK Science Parks Association (UKSPA). Between them these schemes accommodated a total of 1,414 companies employing over 27,000 people. At the end of 1997 seven new science parks were under construction, demonstrating the continuing interest in the concept.

2.3 Most science parks in UK are quite small - average developed floorspace amounted to 14,000 sq m per scheme at the end of 1996 - and accommodate mainly small firms - average 19 employees per firm. Of course these averages hide considerable variations in scale of scheme and target market. UK science parks range in size from small incubator facilities (eg Bangor Innovation Centre and Merseyside Innovation Centre are both approximately 1500 sq m) through more rounded but still small scale projects (eg Brunel Science Park in West London, and Manchester Science Park both have less than 10,000 sq m of space on constrained urban sites) to more extensive schemes (eg Cambridge Science Park, Heriot Watt Science Park in Edinburgh and Surrey Research Park at Guildford are all over 100 acres in extent). Whilst smaller schemes tend to focus on new and very small firms, larger schemes are more varied and some have attracted substantial inward investment (for example, 40% of firms on the Cambridge Science Park are foreign owned).

2.4 Science park development densities depend on the type of scheme. Those in parkland settings are similar to business parks, with typical plot ratios (ie floorspace to total site area) of between 0.15 and 0.2. In contrast, small inner urban schemes comprising single building innovation centres may have plot ratios around 0.5. Tenant expectations regarding parking provision etc are usually similar to those for business parks.

2.5 Employment densities average 25 sq m per employee on all UK science parks, which is very similar to that for standard office accommodation. There are variations according to use: for example software firms tend to have higher employment densities than biotech firms, firms undertaking manufacturing or lab based R&D tend to have lower densities than those undertaking consultancy or desk based R&D. The size of firm also impacts on employment

densities - St John's Innovation Park, focused primarily on new and small firms, has 12 sq m per employee, whereas the equivalent figure for Cambridge Science Park, on an adjacent site but with a higher proportion of larger firms, is 25sq m. These factors appear more important than the distinction between urban and rural locations - Aston Science Park in inner Birmingham has 19sq m per employee.

2.6 A few schemes have a specific sectoral or technology focus (eg Cardiff Medicentre and Haslar Marine Technology Park in Gosport identify their specialist focus in their names), but most accommodate a mix of business types. IT, computer and telecoms related firms comprise one third of all tenants on UK science parks, with biotech and technical consultancy firms comprising just over 10% each. Supporting services comprise over 15% of all tenants demonstrating that science parks are not purely high tech (although in most cases these service activities are directly related to the high tech sector).

2.7 The mix of activities also varies. Some schemes allow a wide range of activities (including manufacturing) others are more restrictive. However, few can afford an exclusive focus on R&D (an exception is High Cross Research Park in Cambridge, which is owned by the University and has developed much more slowly than the Cambridge Science Park or St John's Innovation Park, largely because of this restriction). Overall only 20% of employment on UK science parks is in R&D.

2.8 Most science parks are partly or wholly owned by publicly funded organisations, because most require patient capital - that is owners who can afford, and are willing, to take a long term perspective on returns on their investment. Universities and local authorities are frequently involved, often as land owners, although rarely are they the only parties. Public/private partnerships are increasingly common, but vary in their success. Like all such arrangements, partners have different objectives and pressures, and unless these are clearly articulated and differences resolved at the outset they invariably cause problems at some stage in the development process.

2.9 There are very few examples of genuine science parks being developed solely with private sector capital. As far as we know, Cambridge is the only location in the country where private developers have been willing to undertake large scale projects with planning permissions restricting all occupiers to R&D and related activities only. There are examples elsewhere of private partners playing a major role, but none where the public sector has not been required, in one way or another, to reduce the risk of developing for such a narrow market segment.

2.10 Despite the reluctance of the private sector in most cases to develop science parks, it is

interesting to note that some of the most successful schemes have been able to charge premium rents. For example, rent on Cambridge Science Park, which is on the northern edge of the city, are as high as any in area, including the city centre.

Loughborough science park

2.11 The Loughborough Science Park was conceived in the mid-1980s but it was 1993 before the first occupier moved onto the site. This was the national headquarters of British Gas Research (BGR). The attraction of BGR was a major achievement but also largely dictated the nature of subsequent investment. BGR was attracted to Loughborough by a combination of factors including its inability to secure planning permission on a site at Kenilworth (due to greenbelt restrictions) and the presence of an allocated site in Loughborough specifically catering for the sort of uses which they wished to develop.

2.12 The policy intention of the Loughborough Science Park was that it should be restricted to new technology uses which could demonstrate a particular need to be located near to Loughborough University. BGR clearly met this restriction and at the time expected to expand on the site beyond their initial investment which involved acquiring the entire Science Park site and developing a large area immediately. BGR's investment brought major benefits to Loughborough, including 700 new jobs (although this was less than originally planned) and a blue chip company for both the science park and the town. Plans for further on-site expansion were however re-considered and BGR proceeded to market the land to other users.

2.13 The planning permission that was granted to BGR contained a condition which stated that the buildings should be first occupied by BGR but that use restrictions would be relaxed for subsequent users. Although this did involve a risk of diminishing control over the buildings' use, it was at the time felt necessary to secure appropriate funding for the development. The outline planning consent for the remainder of the science park site not developed by BGR has a restrictive condition (established following an appeal decision) which limits development to any use within B1(b) and uses within B1(a) and B1(c) which can demonstrate a direct and functional link with Loughborough University or with any other research institution in the town.

2.14 The second tenant - Loughborough Sound Images (now Blue Wave Systems) - was previously located in, and had substantially outgrown, the Loughborough Technology Centre.

Again, it was an excellent opportunity, meeting the science park criteria and ensuring the firm expanded in Loughborough rather than moved elsewhere. A similar first-occupier condition (as that applying to BGR) was also agreed for the LSI development and LSI built 6,000 sq m of B1 space, more than its immediate needs but consistent with its growth expectations.

2.15 The remainder of the site remained uncommitted until 1997, when 3M approached the Borough Council for a renewal of the original outline permission in order to consolidate their existing operations in Loughborough and their planned European Headquarters within the remainder of the Science Park site. Once again, this was an opportunity to ensure a locally based firm grew in the town rather than moved elsewhere and the proposed uses were deemed to accord well with the existing restrictive conditions. Specific proposals and an application for detailed planning permission are awaited.

2.16 The Science Park is therefore now fully committed, although 3M have still to construct their building. It is entirely occupied by three firms, and although all three are appropriate tenants on a science park and might otherwise not have invested in Loughborough, there is a concern that the scheme has not really achieved its original objective of supporting the development of a cluster of small locally formed high tech businesses.

2.17 Whilst it is true that this objective has not been achieved, it would be wrong to view the scheme as a failure. On the contrary, it has been invaluable to the town's economy, in providing a suitable location for three key employers. What is now needed, if the original expectations are to be met, is to extend the site and provide speculatively built, high specification small units (eg from 200 to 1,000 sq m) to complement the existing technology centre). Unless advance units can be provided it is unlikely that small firms will be able to move to the site. But it seems unlikely that such units will be built by the private sector under a restrictive planning permission without the public sector's involvement to reduce the risk. This could be in the form of a head lease or rental guarantees rather than capital investment. We would also expect the initiative to be successful, given the substantial number of small, growing high tech firms in the Loughborough area.

Comparisons with other schemes

2.18 The 'Cambridge Phenomenon' is frequently cited as the best UK example of the contribution of small high tech firms and university-industry collaboration to economic growth. The statistics are impressive - over the last 15 years the number of high tech firms has grown from 320 to 1,200, and the employment in these firms from 13,700 to 33,000. This is in an area with a total population of under 300,000 people.

2.19 Cambridge has two established science parks, plus a pure research park, which together provide over 150,000 sq m of space for high tech firms, and two more major schemes with B1(b) planning permissions are currently under construction. However, in many respects Cambridge is unique because of the outstanding applied research capability of the University and a number of specialist research institutions in the area.

2.20 A more interesting comparison for Leicestershire, particularly in a regional context, is with experience in the West Midlands. There are now five established science and technology parks in the West Midlands, plus a regional business park and a variety of other high quality business park developments. The five science parks provide in total approximately 100 ha of land specifically for high tech firms (Table 2.1). The schemes vary in scale, location and character, and therefore offer high tech firms a genuine choice of property suited to their needs. Although there have been some difficulties in the development of some of the schemes, all can now be considered to be successful projects providing their sponsors with a reasonable return (whether in financial or other terms) and the region with an excellent infrastructure for technology based business growth.

Table 2.1: Summary information on West Midlands science parks

Scheme	Location	Size	Ownership	Key characteristics
Aston Science Park	Inner Birmingham	29,000 sq m	Birmingham City Council, Aston University, Lloyds Bank	Transformed derelict/run down inner city area into thriving business community. 100 firms, 1,200 jobs
Birmingham Research Park	Inner Birmingham/ University campus	4,509 sq m, 3ha	University of Birmingham	Small development on university campus, incubator space
University of Warwick Science Park	Edge of Coventry/ university campus	17 ha	University of Warwick	Mix of incubator, SME and inward investment. Attracted private and ERDF investment
Warwick Technology Park	Edge of Warwick, close to M40 junction	56 ha	Warwickshire County Council (originally in JV with Tarmac Properties)	Difficult JV relationship in early period. U of Warwick now involved in management
Wolverhampton Science Park	Inner Wolverhampton, close to university	13 ha development site. 2 multi use buildings as first stage development	Joint venture Wolverhampton Borough Council and Wolverhampton University	Difficult inner city site. Initial development City Challenge funded; EP involvement in more recent stages

2.21 The West Midlands schemes were developed independently by different sponsors. With the exception of Warwick Technology Park, which because of its location close to a junction of the M40 was expected to attract investment from outside the region, all were established primarily to meet demand from locally formed, small high tech firms, or spin outs from the related university. Therefore the different schemes are not really in competition with each other, and each appears to have established a niche market which creates sufficient demand. Public sector support was important to the development of all the West Midlands schemes, including in some cases special regeneration funds (eg ERDF, City Challenge). However, the private sector has also played a significant role. For example, Barclays Bank provided the funding for the incubator and park management building on the University of Warwick Science Park ('the Barclays Centre'), Lloyds Bank is a joint venture partner in the Aston Science Park company, and Tarmac Properties were joint venture partners with Warwickshire County Council on the first phase development of the Warwick Technology park.

2.22 There is no formal collaboration between schemes, although all except Warwick Technology Park (which until recently did not have a link with a university or other research centre) are members of UKSPA, which provides a forum for exchange of information, for example on management issues. Recently the University of Warwick Science Park established an incubator facility on the Warwick Technology Park, 15 miles away. This was at the invitation of the County Council (now the scheme's owners), which wanted an incubator facility on the scheme (previously it was dominated by large firms and a review undertaken by SQW pointed out that the absence of speculatively built small units effectively prevented SMEs from moving onto it), and also suited the Science Park's management which wanted the opportunity to manage additional incubator space elsewhere in the sub-region.

Regional context

2.23 Compared with the West Midlands, the East Midlands region has a very limited supply of science park space, comprising only a scheme linked to the University of Nottingham, the science park at Loughborough, and the innovation centre managed by De Montfort University (which is mainly occupied by the University's commercial arm, De Montfort Expertise Ltd). In total this amounts to less than one third of the provision in the West Midlands, yet there are six universities and a student population of nearly 100,000 in the region (compared with seven universities and nearly 120,000 students in the West Midlands).

2.24 There are also over 1,000 research based firms in the East Midlands. The region therefore has substantial technology resources which we feel are not fully recognised or properly supported by appropriate infrastructure. This is beginning to change. For example, a Regional Innovation and Technology Transfer project (RITTS, a programme part funded by

the European Commission) is currently underway, five of the region's universities have recently collaborated to submit a joint bid for technology transfer resources under the University Challenge Fund, and the Loughborough Advanced Technology Initiative is a good example of a local programme to support networking among technology based organisations.

2.25 These initiatives are encouraging, but more needs to be done to support the formation and growth of innovative, locally formed technology based businesses and inward investment by high tech firms. The development of more science parks could help in this process. Although they are only one part of the supporting 'infrastructure' which needs to be put in place, they are a highly visible demonstration of a region's commitment to technology based growth. With the establishment of the RDA, there is a major opportunity to put science parks on the regional agenda for economic development, and to secure some public sector resources to achieve appropriate development.

Key issues for Leicestershire

2.26 The above review has identified a number of issues which will need to be addressed if further science park space is to be developed in Leicestershire. These include:

- *Science parks are likely to need both public and private sector funding*. Public funding will almost inevitably be needed to offset some of the risk, and also to ensure the scheme provides the anticipated economic development and technology transfer benefits. Private capital is likely to be essential both because the public sector does not have sufficient resources to fund the scheme alone, and because it brings with it development and management expertise which will be vital to the success of the project

- *There are benefits from providing a choice of locations and premises for high tech firms*. The West Midlands experience suggests that a variety of schemes in different locations with different characteristics can all succeed, and provide a supportive environment for the formation and growth of local high tech firms, and the attraction of inward investment. The scale and mix of provision within a region should enable firms to find suitable premises at each stage in their growth, whether this is on the same scheme (eg at least 50% of each new phase of Aston Science Park has been occupied by existing tenants outgrowing their units) or different schemes (eg moving from an incubator facility to a larger science park nearby)

- *Science park investors must have a long term perspective*. Science parks rarely succeed quickly. It often takes at least five years for a scheme to attract sufficient firms to give it a momentum and market profile. In time however, well developed and managed schemes can command premium rents.

- *Science parks serve a variety of markets*. Some attract mainly large firms and inward investment, others are specifically intended to attract small locally formed firms and spin outs from the related institution. Over time the larger schemes can appeal to both markets but in the first phases of development they are usually focused on one in particular

- *Science parks create their own demand*. The experience of many science parks is that, provided they are well conceived and implemented, they stimulate demand which previously was partly concealed. High growth, high tech firms benefit from the visibility and status, as well as the linkages, offered by a science park location. Movement of such firms from elsewhere in the local area frees up existing space which in turn enables other firms to 'trade up'.

- *Small firms need advance units*. If small firms are the main target market, it is essential to provide speculative units ready for occupation, preferably on short term leases which suit the needs of fast growing high tech firms.

- *High quality management is crucial*: This includes both property management and support for business development and technology transfer. It is not necessary to have a large number of people in the management team, but it is essential to have people with an understanding of small firms development, excellent business networks, and links into the related institution. Many science parks choose to separate property management (which may be contracted out to a specialist agency) from the other management functions

- *Successful science parks can command premium rents*: Experience suggests that in time successful science parks can establish a profile and image which enables them to charge premium rentals.

- *A window of opportunity*: formation of the RDA may create a window of opportunity to put science parks on the regional economic development agenda.

3. Research and technology activities in Leics: Existing strengths and characteristics

General definitions of the research and technology sector

3.1 The research and technology sector (or 'high-tech' sector as often referred to) is not easy to define, as it cuts across conventional sectoral definitions. The SIC definition of 'research and development activities' for example includes only 'pure' research establishments and excludes the bulk of 'high-tech' employment within SMEs which combine an element of research and development (R&D) with production. Sectoral definitions of 'high-tech' may also conceal the extent of R&D intensity within firms and establishments classified as such. Suitable definitions are however essential for an analysis of trends within the sector, enabling appropriate targeted policy responses such as the provision for science park accommodation.

3.2 We choose to define the sector for both analytical and planning policy purposes in terms of a matrix of different criteria. Firms should meet at least *two* of the following *four* criteria *and* their activities must be environmentally acceptable (i.e. unlikely to cause a nuisance to other firms on the same site - see Chapter 5):

- they should be part of a 'high-tech' sector – engaging in the manufacture, operation or maintenance of advanced technological products or providing services that are knowledge-intensive (e.g. computer software, multi-media and information management)
- they should focus on research and development, product or process design, applications engineering, high-level technical support or consultancy
- a good proportion of their staff have scientific or engineering degrees
- they should have active R&D related linkages with a university or other (corporate) research facility.

3.3 In addition, the research and technology sector could include other, small activities which focus on providing specialist services to firms meeting the criteria above. These can include contract R&D, specialist venture capital, and legal and patenting services. It is however unlikely that these activities merit the same type of policy support as the activities defined above.

3.4 In more general terms, the research and technology sector contains the following types of establishments:

- Corporate research and development centres - the research laboratories of major corporations tend to be consolidated on major purpose-built sites. Examples in Leicestershire include 3M, British Gas and Astra Charnwood
- Medium-sized operators largely in high-growth niches. Examples in Leicestershire include Blue Wave Systems, MJ Technologies and Virtuality
- Small businesses in high-growth niches with low entry barriers. This category includes the majority of start-ups and young businesses
- Private contract research organisations providing services such as testing, technical consultancy and prototyping
- Small firms engaged in high-tech production/assembly with little or no R&D. These make up a high proportion of high-tech activity but can not easily be identified.

Characteristics of the research and technology (RT) sector in Leicestershire

3.5 The RT sector in Leicestershire appears to be fragmented and diluted in terms of both sectoral activities and geographical location. With the exception of a relatively strong concentration of RT establishments in Loughborough, there is little evidence of concentrated 'hot-spots' of RT activity in other parts of the county. This may suggest a failure to attract major investment projects; it may also partly reflect the growth model of the 'independent, family-run business' which has traditionally characterised the Leicestershire economy.

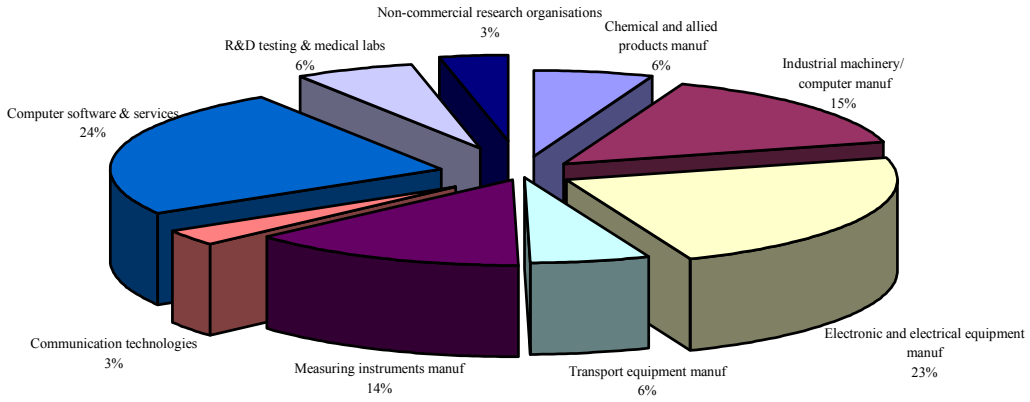
3.6 The 'Draft Economic Strategy for Leicestershire' estimates the size of the 'high-tech' sector in Leicestershire at around 20,500 people, or 5.2% of total employment in the county. Though admittedly a broad definition of the sector was used, this figure does not include 'high-tech' employment in 'knowledge-intensive' services such as computer software. The study confirmed the dominance of electronics, automotive components and transport equipment industries within this broadly defined sector and estimated that about a fifth of sectoral output is accounted for by industries based within the City of Leicester.

3.7 In our experience the total figure appears to be quite high, if a more refined definition of the sector on the lines suggested earlier is applied. An examination of the Dun & Bradstreet marketing database suggests that around 500 companies in Leicestershire satisfy some stricter sectoral criteria and previous experience suggests that about half of these might be undertaking research and development activities. Indeed, this estimate is closer to the membership of the Loughborough Advanced Technology Initiative (LATI) which includes some 200 members. We

consider the distinction important in understanding the nature of demand for science park accommodation and the extent to which policy support is justifiable.

3.8 In terms of its sub-sectoral composition, Leicestershire's research and technology sector contains more firms engaged in manufacturing activities than services when compared to the UK average - 63% of Leicestershire RT firms engage in manufacturing, compared to 53% for the UK (Source: Dun & Bradstreet). Electronics, industrial machinery and measuring instruments account for the activities of over half the firms in the sector; computer software accounts for another quarter as shown in the breakdown in Figure 3.1. Compared with the UK picture, the chart suggests particular strengths in *industrial machinery* (e.g. metal cutting tools), *electronic components* (e.g. switchgear), *industrial measuring instruments* (e.g. materials testing and measurement) and *vehicle parts and accessories*.

Figure 3.1. The Research and Technology Sub-sectors in Leicestershire



Source: Dun & Bradstreet, UK, 1997

Emerging trends

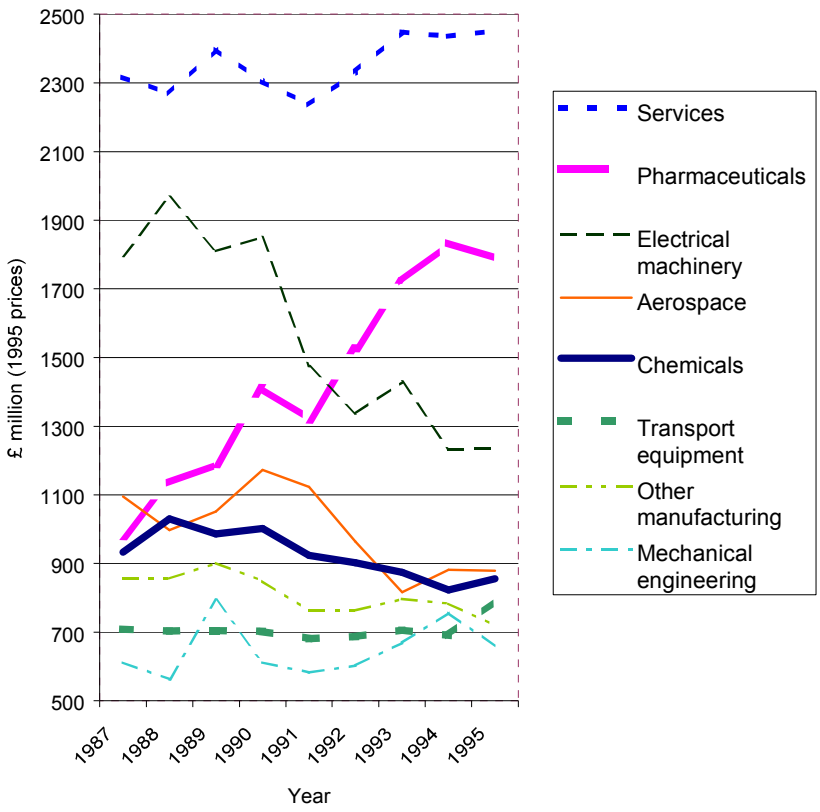
3.9 Most of the growth in research and technology activity is likely to stem from the existing local research and technology base. Growth prospects do however need to be assessed in relation to national growth trends and an analysis of comparative advantage. The first task is

to evaluate the extent of 'fit' of the current research and technology base in Leicestershire with national growth prospects. Second, it is necessary to understand the specific characteristics of the locale that are particularly conducive to business competitiveness and those that can potentially support further diversification.

National growth trends

3.10 Research and development activity performed by business enterprises in the UK has largely remained stable at 1.3-1.4% of GDP and totalled £9.4bn in 1995. A little less than 70% of this was own-funded with 12% funded by government and another 19% funded from abroad. The sectoral breakdown of R&D performed in business enterprises is dominated by research in chemicals/pharmaceuticals (28%) and services (26%), sectors in which Leicestershire has not traditionally had major strengths. Together with transport equipment, these are the three sectors that recorded real term growth during the last decade (see Figure 3.2) with the more traditional sectors such as electrical machinery and mechanical engineering recording real term decline.

Figure 3.2: Expenditure in R&D performed in UK businesses[2] in real terms (in rank order by value in 1995



Source: Office of Science and Technology

2 The statistics are compiled from a selection of large enterprises and largely exclude research and development undertaken in small establishments

3.11 Without down-playing the importance of the services and pharmaceuticals sectors, the statistics may conceal the increasing trend of sub-contracting activity to mainly smaller, more specialist firms. This is for example particularly applicable to component development in the engineering sectors. The trend may indeed benefit regions such as Leicestershire which enjoy high accessibility to national markets but lower property costs than perhaps more 'core' regions closer to London, the M4 corridor and Cambridge which have so far supported the bulk of RT activity in the UK.

3.12 It is also important to emphasise that the broad sectoral breakdown may conceal interesting developments within these sectors, as well as cross-sectoral developments. Moreover, past trends are not necessarily good indications of future trends as the rate of change and innovation is rapid and as conventional statistics are inadequate to describe trends within sub-sectors or to keep pace with the organisation and sectoral changes taking place.

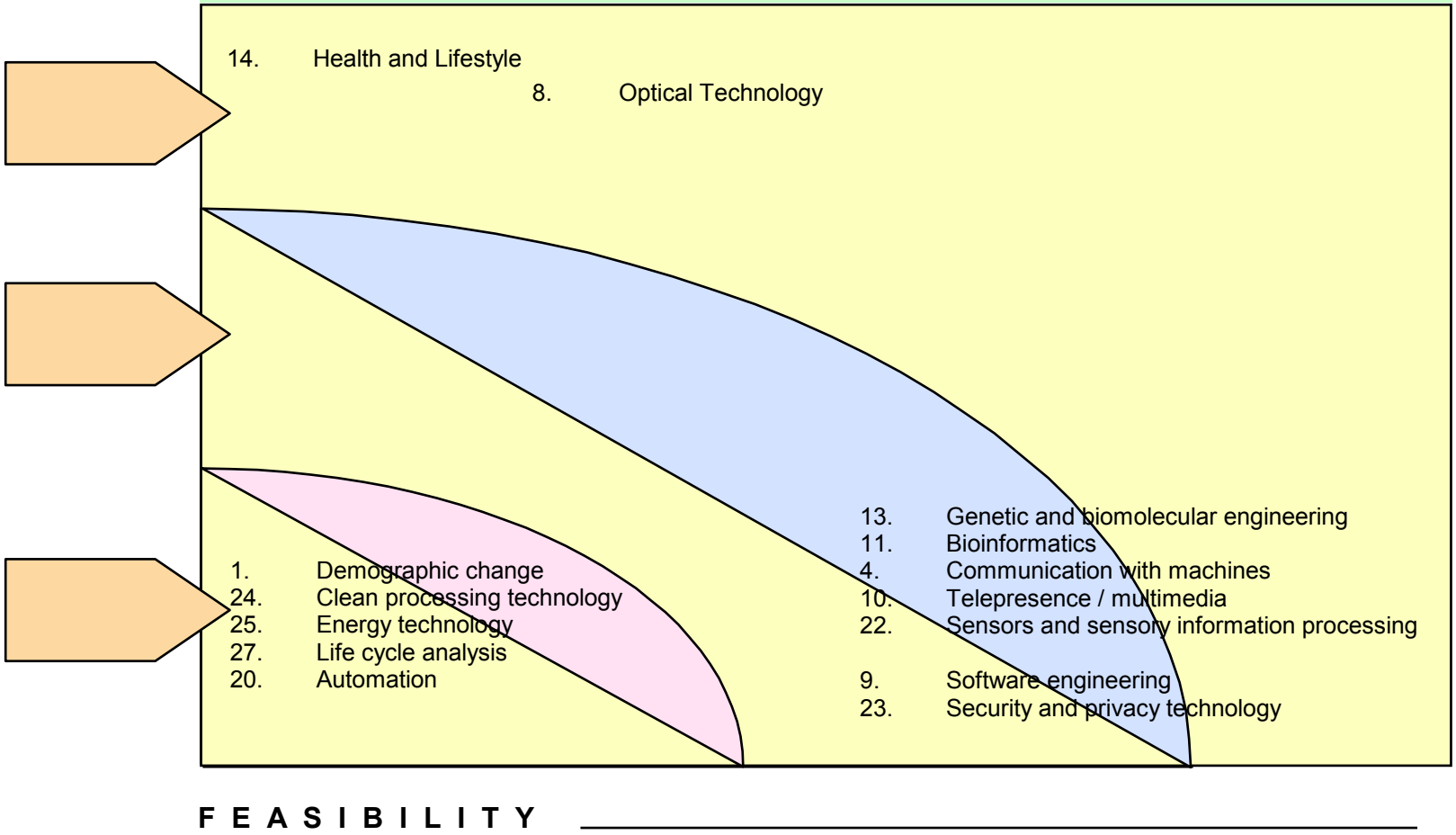
3.13 We have therefore looked at some of the outputs of the UK National Technology Foresight[3] exercise, conducted in 1995, where a large number of experts were consulted about key technological and market drivers to arrive at a common view about future opportunities and emergent technologies. One of the major themes of the National Foresight exercise was the growing importance of cross-sectoral technologies that combine previously unrelated research disciplines. Areas such as the environment, health and multi-media are obvious examples where inter-disciplinary research and product development might be particularly applicable.

3.14 Another theme highlighted in Foresight was the development of products based on generic technologies which may have a diversity of applications in markets such as pollution monitoring and real-time health monitoring. Security technology, materials testing, smart cards and sensors are such examples.

3.15 More analytically, one output from the exercise was mapping emerging technologies on scales of attractiveness (to incorporate anticipated changes in lifestyles, consumer demand and demographic change) and feasibility (to incorporate factors such as economic viability and technology availability). The result is reproduced in Figure 3.3 overleaf. Out of the 360 recommendations of the 15 expert panels, 11 areas were considered to be key priorities for development in the UK and another 11 were considered as 'intermediate areas', with regard to both market opportunities (attractiveness) and the ready availability of economically viable technologies (feasibility).

3 The National Foresight exercise brought together teams of expert panels to consider key drivers of change – whether technological, demographic or market-related, and identify priorities for both market applications and policy. A Delphi survey was also conducted to seek expert views on timescales when key milestones would be reached. The exercise was conducted in 1993-1995; a new round is just beginning.

Figure 3.3: GENERIC PRIORITIES IN SCIENCE AND TECHNOLOGY - RELATIVE ASSESSMENT OF ATTRACTIVENESS AND FEASIBILITY



Key Priority Areas

12. Biomaterials
17. Materials
21. Process engineering and control
18. Materials processing technology

3.16 It is evident that Leicestershire is well-geared to developing a number of these areas, with clear strengths in *materials*, *materials processing*, *process engineering* and *information technology*. In some – such as materials processing – there are matching academic and corporate strengths and potential synergies that will need to be promoted. In other areas, the strengths of the local academic base will need to be more pro-actively exploited to assist in the process of diversification of the economic base and to encourage the creation of new businesses. In relation to the three higher education institutions in the county, some possibilities are considered below.

3.17 **The University of Leicester**: The University is active in developing a strong *bio-medical* science portfolio and has set up a separate company to raise venture capital for development work. Industrial partners are potentially big pharmaceutical companies but experience from Cambridge and elsewhere suggests that a strong 'bio-science' base can support a good industrial network of smaller operators engaging for example in bio-informatics (computer simulation of biological processes) and food and health (impact of dieting in physical performance), both identified as priority areas in the Foresight exercise. Although an industrial base does exist in Leicestershire, further development and refined specialisation, perhaps geared to domestic markets, is needed to differentiate the Leicestershire 'cluster' from the leading centres of London, Cambridge and Oxford.

3.18 *Space research* is an area where the University can confidently claim intellectual leadership. The involvement of the University in the National Space Science Centre will undoubtedly raise the profile of the physical sciences faculty and may act as a further attraction to industrial partners. The faculty has developed a number of devices used in space, often in collaboration with major engineering companies and there is additional scope for the wider application of technologies related to the space programme e.g. the development of very small, very robust components. This activity could be a good potential source for spin-off commercial activities linked to research. In the past, the University has 'given away' potential commercial opportunities due to the lack of capital for development work. It is however active, together with Loughborough, De Montfort, Nottingham and Derby Universities, in pursuing a £6m University Challenge Fund bid for the development of infrastructure for technology transfer in the East Midlands.

3.19 The development of the National Space Science Centre itself is also thought to create potential demand for innovative design work – graphic design, software and the design and maintenance of the high-tech planetarium.

3.20 **Loughborough University**: The University has traditionally been geared towards industry-relevant teaching and training and applied research. Its engineering faculties have consistently achieved high ratings, featuring by most accounts in the top-five universities in the UK alongside Imperial College, Cambridge and UMIST. Its popularity is high, particularly among industrial recruiters, and the size of the Engineering faculty (2,500 full-time undergraduates in 1995/96, nearly twice as many as Cambridge) is a very important source for local graduate recruitment. The University maintains strong links with industry, particularly in terms of industrial placements and tailor-made training courses with partners such as British Aerospace, Ford, Rolls Royce and GEC.

3.21 A number of areas are seen by the University as 'pockets of excellence' – *automotive and aeronautical engineering*, *process engineering, electronics*, *laser and optical technology* – with many cross-market applications e.g. the use of lasers to measure combustion engine efficiency in vehicles and material processing. These are also areas which fit well with the current industrial profile in Leicestershire and with significant scope for stimulating further commercial activity. The University has in the past been linked to successful spin-offs such as Loughborough Sound Images (now Blue Wave Systems) and about half of the firms in the Technology Centre on Epinal Way are thought to be linked in some way or other to the University. The University is also playing an important pro-active role in the Loughborough Advanced Technology Initiative as well as other economic development projects. Although adjacent to the Science Park, the University is not really actively involved in it as the scheme accommodates only two (soon to be three) large firms (see paras 2.11 to 2.17).

3.22 **De Montfort University**: we understand that the University has good applied research capabilities, particularly in *textiles research* and design and *vision imaging/multi-media*. The University has also participated in a City Challenge project to develop a 8,000 sq m innovation centre by conversion of a building owned by Leicester City Council.. However, we understand that this is occupied primarily by the University's commercial arm (De Montfort Expertise Ltd) and a 3,000 sq m exhibition space (which is under-utilised). There are a small number of privately owned start-up companies in DMEL's space, on licence arrangements, but the centre is not really achieving its original intentions of supporting the formation and growth of a substantial number of innovative businesses.

Comparative advantages/disadvantages

3.23 We have assessed the historic strengths of the local 'high-tech' economy and the extent of fit with national sectoral trends, including the extent of compatibility with parts of the research portfolios of the three Universities. An assessment of emerging trends in research and technology activity in Leicestershire would however be incomplete without an analysis of

comparative advantages and disadvantages in retaining and enhancing the competitiveness of current activities and attracting new activities.

3.24 First, it is widely acknowledged that the strong potential of the Universities in stimulating economic activity and encouraging technology transfer has not been fully exploited. Although considerable progress has been made with a number of projects on the ground or currently in the pipeline, this is clearly a multi-role task that necessitates pro-active and well-co-ordinated approaches from all parties, including the universities and business leaders. A positive development is the Draft Economic Strategy for Leicestershire which advocates a knowledge-centred strategy focused on 'the diffusion of knowledge and skills and on improving the competitiveness of our businesses'. Several other initiatives such as the Leicestershire Structure Plan, the University Challenge Fund bid, the East Midlands RITTS and the National Space Science Centre may provide tangible foci for co-ordinated efforts. Pay-back periods are however likely to be long.

3.25 Second, a strong cluster of research and technology activity is emerging in Loughborough with substantial investments by 3M and Astra Charnwood as well as developments within and next to the University campus. This emerging cluster may be, perhaps more in the long-term, a significant attraction to inward investment, providing the 'comfort' factor for inward investors and a practical manifestation that the location has been tried and tested with a good track record in terms of services, recruitment and business environment. However, most of the investment and growth is likely to come from existing establishments with good links in the county. It is unreasonable to expect an inward investor to start from scratch with no capital base in a high-value, highly competitive market. Both inward and indigenous investment can be stimulated by exploring and facilitating partnerships – university-industry and industry-industry – which in turn can lead to 'softer' investments in joint ventures and strategic alliances. Business support organisations may have a critical role to play in this respect.

3.26 Third, the advantages of the county in terms of location and accessibility to national markets is well-documented. The county has not however communicated a positive and coherent image in terms of particular strengths – which are definitely not lacking – remaining a 'peripheral' location for high-tech activities. It will of course be unreasonable to expect a pattern of economic development similar to that in Oxford or Cambridge. However, there may be opportunities to exploit specific growth niches and support development of 'second-order' research functions such as contract R&D, testing, and component development linked mainly to national supply chains.

3.27 Fourth, arguably, Leicestershire is leading the East Midlands region in terms of education achievement and the presence of the three Universities ensures a large and high quality graduate population output each year. The good track record of local recruitment and the large number of locally-educated graduates who stay to work in the county provide evidence of the quality of the educational provision and the popularity of the local environment for young professionals. Both of these factors are pre-requisites for inward investment as well as for new business starts and provide an excellent base for further 'high-tech' economic activity.

4. Demand for land and premises

Methodology

4.1 Our methodology for assessing demand for land and premises for science park or similar facilities relies on already available research, experience of such developments elsewhere (see Chapter 2) and consultations with local authorities, business support organisations and property professionals in the county. Although targeted survey work can often provide further, quantifiable, evidence on the strength of demand, we have not conducted any primary research work as part of this study but have benefited from recent survey work commissioned by the County Council.[4] The adopted methodology does however suggest the likely sources, nature and size of demand for science park or similar accommodation within the county.

4.2 In assessing demand for science park or similar property provision for 'high-tech' uses, it is necessary, unlike in the case of conventional property schemes, to consider demand over the longer-term and with reference to development feasibility and the potential contribution of the scheme to economic development (including technology transfer and support for smaller firms). It is worth emphasising that commercial potential will be affected by the nature of the proposed restrictions on use and the flexibility in their application. Demand, in this context, therefore needs to be considered in the context of definitions of the target market (see Chapter 3) and the potential role of the public sector (in terms of planning restrictions, and various forms of support).

Growth of research and technology activities in Leicestershire

4.3 Experience elsewhere in the UK suggests that research and technology activities grow at fast rates typical of young, small enterprises trading in niche markets. For example, SQW's 1998 survey of bio-science in the Eastern region estimates employment growth of 5-10% in 1998/99 and over 20% in associated services. Similarly, SQW's 1997 survey of research and technology employment (largely conforming to the definition provided earlier) based around the M25/A10 junction revealed average growth expectations of 10-15% pa.. Though these figures are not directly applicable to the Leicestershire economic context (or indeed to the change in the economic environment since these surveys) they provide benchmarks against which performance of the equivalent sector in Leicestershire may be assessed.

[4] LCC: 'Employment land needs in Leicestershire', by Prism Research.

4.4 The 'Draft Economic Strategy for Leicestershire' anticipates a reduction in employment associated with 'manufacturing high-tech industries' in Leicestershire in the order of 3,500 jobs (or 17%) to 2007, largely the result of an increasing drive towards greater productivity and automation, and despite higher than average employment growth rates in the recent past. This assessment represents trends in *general* manufacturing activities and highlights the inconsistency in the definitions of the 'high-tech' sector. In our view, such decline is not typical of the growth of research and technology activities in other areas of the UK and it does not take into account the shift from manufacturing to services (e.g. from manufacturing of copiers to 'intelligent machines' with micro-processors) that characterises such activities. Perhaps more importantly, it does not necessarily equate with a reduced demand for premises (for example, some large high tech firms may reduce employment whereas growing small high tech firms still need appropriate premises. Also investment in technology may reduce labour requirements but not necessarily space requirements).

General property requirements

4.5 The property requirements of research and technology firms are in many ways similar to those of other environmentally-friendly business activities. Factors such as a proximity to the national motorway and rail network, site layout, a high quality working environment, access to a well-educated labour force and proximity to residences of existing staff are common requirements of most relocating RT firms.

4.6 Arguably, most of these requirements can be met through the normal functioning of the property markets and there is a range of good quality sites in Leicestershire that may meet at least some of these requirements. However, in some other ways, the profile of research and technology firms differs from that of other activities and hence the relative importance of property parameters tends to vary from the norm. In particular,

- firms engaging in research and technology activities start small and, if they survive, they tend to grow rapidly hence they need new premises more frequently than most firms
- the fast pace of growth necessitates a property tenure framework that provides security that, when firms outgrow their premises, they will not be tied down by long-term leases and that suitable premises or land for expansion are available nearby
- research and technology activities involve sizeable and continuous investment in product development and substantial financial risks. Locations attractive to a highly skilled workforce and with access to common services, possibly with preferential access to university research facilities (e.g. library, labs etc.) are particularly favoured

- availability of specialist facilities, including in some cases broad-band telecommunications infrastructure for high-speed electronic transfer, common meeting rooms and exhibition space are sometimes important factors and can provide considerable economies of scale if shared between a number of users

- firms are more likely to work together on collaborative projects, often with a university partner or in a joint venture with another industrial partner, therefore the benefits of clustering together become more apparent

- a good quality environment and a 'leading-edge' image are considered important when marketing advanced technological products or services.

4.7 Clearly, firms will have different views as to the importance of these factors for their business performance and a science park setting is *not* often an *essential* pre-requisite for business success. However, experience has shown that science park locations tend to be favoured by firms for which research and product development forms a substantial part of business activity (particularly when this is in conjunction with a university partner) and can, by implication, positively impact on business competitiveness.

4.8 Firms may in time be prepared to pay a premium (above market rents) for what they see as the advantages of a science park location but this is only possible when the scheme is established as a prestigious and functional business location. This raises valid questions as to the 'need' or 'demand' for a science park in Leicestershire and related to this, the need for and the extent of public sector intervention in the property markets. It is these questions that we address below.

Current demand for science park accommodation in Leicestershire

4.9 We have assessed current demand for science park accommodation with reference to the property needs of those firms that are more likely to benefit from the advantages it may offer. We have considered three main sources of demand: demand for start-up accommodation; demand from existing local firms outgrowing their premises and demand from inward investors.

Demand from start-ups/spin-offs

4.10 In comparison with the national average, Leicestershire high-tech firms tend to be longer established (9% are less than 3 years old in comparison with 12% for the UK) and 21% fall into the 10-19 employee band (or the 250-500k sales band) compared with 16% for the UK (Source: Dun & Bradstreet, UK, 1997). This picture is supplemented by VAT registrations/de-registrations (representative of all sectors) which show a decline of 1.7% in new business registrations in the period 1994-96 (0% for the UK) together with a 5.4%

decline in de-registrations (compared with a decline of 8.7% for the UK and 3.4% for the East Midlands). Slightly above average survival rates also characterise the county's firms. On the whole, this seems to suggest a stable pattern of growth characterised by lower than average entrepreneurial activity.

4.11 This picture is, on first sight, at odds with the success of property schemes for small firms such as the Loughborough Technology Centre on Epinal Way and the Whitwick Business Centre in Coalville which achieved quick occupation, partly but not wholly by 'high-tech' firms. This seems to suggest that suitably-priced start-up accommodation may be scarce and that further public sector involvement in developing and/or managing such schemes may benefit existing small firms and help stimulate more start-up activity.

4.12 It is widely accepted that the potential of the county's universities in stimulating such start-up activity has not been fully exploited. Some areas of research are considered to be particularly suited to commercial exploitation, and therefore new economic activity, but there is little evidence of a systematic effort to encourage spin-off activity via staff incentive policies or equity participation in commercial ventures. Anecdotal examples of spin-off activity from the universities have nevertheless been reported. At the same time, there seems to be a shortage of seed or venture capital to support new technology projects below the threshold most funds are willing to consider.

4.13 These are by no means uncommon problems but highlight the difference between the current base-line and what can potentially be achieved in Leicestershire if these issues are addressed. We also note that, in terms of the development and management of incubator facilities, substantial experience already exists within the county, particularly in NW Leicestershire (inter alia, the Whitwick Business Centre. Small business units partly funded under RECHAR are also planned), Charnwood (notably the Loughborough Technology Centre) and Leicester (the DMU Innovation Centre).

Demand from existing local firms

4.14 Experience elsewhere suggests that two thirds of demand for science park accommodation is accounted for by relocations of small but expanding, local firms outgrowing their premises. Research and technology firms are typically small, young and growing, therefore tend to be more mobile and more likely to require new or additional premises for expansion.

4.15 An assessment of the level of demand from this segment clearly needs to relate to the current size of the sector in the county. The 'Employment Land Needs in Leicestershire' study estimates the sector at 16% of the county's employment, higher than the 5% assumed in the 'Draft Economic Strategy for Leicestershire' which does not include high-tech services. In our view, neither of these figures provide an accurate indication of the size of the research and technology sector in Leicestershire which typically represents less than 2% of local

employment. All of these definitions are relevant for a demand assessment but it is the latter group that are most likely to benefit from locating in science park accommodation and which merit most public sector support.

Table 4.1. Indicative sizes of the 'high-tech' sector in Leicestershire.

Definition	*As % of total employment*	*Size (employment)*
Broad 'high-tech', including services	16%	61,000
High-tech manufacturing	5%	20,500
Research and technology	<1-2%	3-7,000

4.16 The Prism study confirmed that the high-technology sector has been highly mobile in the last three years. 37% of high-tech firms interviewed have been established at their present site for 3 years or less and an estimated 19% had moved from other premises (the inference is not made that the balance represent start-ups due to the low statistical base of the sectoral estimates). These estimates do however compare with averages of 22% and 9% respectively, across the sample, indicating, quite strongly, high levels of take-up from the high-tech sectors.

4.17 On the basis of these estimates, about 12% of high-tech firms move to new premises in any one year. Most relocations represent movements *within* local authority boundaries indicating generally low levels of geographical mobility typical of small firm relocations. The main reasons for relocation seem to be 'strongly premises-related' mainly linked to expansion and cramped premises. No particular geographical pattern in the pattern of movements was identified with companies generally choosing to locate close to their previous premises.

4.18 The geographical pattern of preferences for new locations therefore closely reflects the existing distribution of current economic activity. The Central Leicestershire Urban Area, which currently accounts for 44% of the county's economic activity, and perhaps a similar proportion of research and technology activity, is the preferred location for the same proportion of movers. In terms of setting, high-technology firms mainly favour business park locations on the outskirts of a city or major town according to the Prism research (70% of high-tech firms expressed such a locational preference and 52% expressed a preference for a business park setting). This is largely supported by experience elsewhere. In terms of the type of accommodation sought by high-tech firms (wishing to relocate in the next three years), two thirds would require units under 500 sq m and another 15% for units between 500 and 1,000 sq m.

4.19 Overall, Prism estimates that high-tech relocation activity will account for 16% of all relocation activity in the county in the next three years, a proportion similar to the sector's contribution in the county's employment total. In terms of floorspace, this may account for a requirement of 50-140,000 sq m. Table 4.2 converts these estimates into annual requirements and uses similar ratios as in Table 4.1 to calculate indicative levels of demand from the different high-tech sectors described previously.

Table 4.2. Indicative demand estimates from growing high-tech firms – Anticipated annual take-up

	Floorspace (sq m)		Site area (ha)	
	Minimum	*Maximum*	*Minimum*	*Maximum*
Broad high-tech, incl. services	17,000	47,000	8.5	23.5
High-tech manufacturing	5,500	15,300	2.75	7.65
Research and technology	800-2,000	2,300-5,400	0.4-1.0	1.15-2.7

Source: Indicative SQW estimates based on Prism Research

4.20 The conversion of floorspace to site area requirement is based on a development density ratio of 0.2 which is typical of campus style science park developments elsewhere. A density ratio of 0.4 may be achieved in city centre locations, and for small schemes, therefore the land requirements may be less than indicated in Table 4.2 depending on the location and nature of the proposed projects.

4.21 The estimates suggest strong demand and high anticipated levels of take-up among the high-tech sectors over the next three years. Arguably, most of this demand may be satisfied within existing premises and *does not represent a 'net' requirement*. However, three points are worth making with respect to additional provision

- first, there is a widely held view that good quality, modern units under 1,000 sq m are particularly scarce, yet they represent more than three quarters of demand from the high-tech sectors. The main reason for this supply gap seems to be the reluctance of private developers to embark on speculative new build, given the current economic climate, yet many of the firms seeking accommodation lack the resources to undertake development themselves. This market failure provides a rationale for policy intervention

- second, it remains desirable from the economic development point of view to encourage the clustering of the county's currently fragmented research and technology base, preferably close to one or more of the universities, and provide the conditions for a strong visual impact. Such a development could encourage better interaction with the county's higher education institutions and provide a focus for

inward investment and further business development activity. The core occupants could be the small group of RT firms which may draw immediate benefits from a science park location but other 'high-tech' activity should not be excluded

- third, although most demand will be 'local' (that is originating largely from within the county, depending of course on the location of the site(s) relative to the county boundary and the motorway network), a high-profile site may attract other 'high-tech' firms relocating from neighbouring areas who would be looking for clustering or image benefits in a science park location. We note that there are no specialist property schemes in the East Midlands region that can currently claim such a profile.

Demand from inward investment

4.22 Experience elsewhere suggests that inward investment is unlikely to be a major source of demand for science park accommodation at least in the short-term. Very few science parks enjoy an international profile and then it has only been achieved after some years – for example, Cambridge Science Park took some ten years to attract its first major international inward investor. Most major investors are in any case prepared to build their own premises (as in the case of 3M and British Gas in Charnwood) and may not require policy support. A number of well-located sites are available in Leicestershire, including Grove Park in Blaby District (J21) and Finger Farm in NW Leicestershire (J23a).

4.23 Interviews with local property professionals have suggested that the 'chronic shortage' of good quality industrial and office space, especially around Leicester and Loughborough, is now beginning to be addressed. However, the availability of quality sites is likely to be only one factor influencing the locational decisions of major investors. Particularly in the research and technology sector, it is unlikely that an investor would consider a 'virgin' location for a major investment project without prior links with a local industrial partner or, more likely, with a local higher education institution. This is largely because factors such as the quality of the labour force and the quality of the local research base are likely to feature more highly in the list of priorities than financial assistance or property costs.

4.24 Arguably, neither of these qualities have so far been sufficiently marketed in relation to inward investment. However, existing quality sites are limited to motorway locations most of which are some distance from existing clusters of 'high-tech' activity and from university campuses. In the long-term it may therefore be desirable to consider other sites close, or more accessible, to existing clusters of research and technology activity, or university campuses, even though there does not appear to be immediate need.

Demand for science park(s) in Leicestershire

4.25 In summary

- there is a continuing need to support the development of incubator facilities, both to accommodate existing demand and to stimulate further entrepreneurial activity. Such facilities can best be provided close to higher education institutions enabling better interaction with academic research staff and access to common facilities

- there are indications of strong relocation activity among local high-tech firms resulting in potentially high levels of property take-up. The general lack of modern, medium-sized units, which accounts for three quarters of expected demand from this sector, would justify a supportive planning policy framework but may in addition require public sector investment

- firms' locational preferences suggest that the distribution of development activity should broadly reflect the current distribution of economic activity in the county. There is however merit in supporting the clustering of similar firms in a small number of accessible locations, preferably close to higher education institutions

- demand for science park(s) would seem to represent a relatively small but not an insignificant proportion of the county's total land and premises requirements. This suggests that any such development(s) should not be an 'exclusive' scheme(s) but should accommodate a range of activities, including some of the county's high tech manufacturing industry that would benefit from (and be able to contribute to) synergies and a location within a cluster

- there is a strong rationale for a positive long-term commitment to supporting existing research and technology activity and encouraging further entrepreneurial activity through the planning system. A science park could provide the physical environment that would enable local firms to grow and expand in situ, by providing for a range of start-up units, ready-built high-spec medium-sized units and land for own-built premises as part of the same site

- a science park could additionally become the physical focus for high-tech entrepreneurial activity, enabling public resources to be targeted effectively and raising the profile of the county's research and technology industry. In the longer-term, the scheme(s) could act as a catalyst for economic diversification and inward investment.

5. Evaluation of candidate sites

Criteria for the evaluation of candidate sites

5.1 We should emphasise that the role of science parks in economic development goes beyond that of conventional property schemes. To succeed in their three main functions - namely, to assist in economic development, encourage technology transfer and stimulate networking, candidate sites for science park development would need to meet a range of criteria over and above those required for conventional property schemes. Moreover, because of the specific development parameters usually applicable to science park development (e.g. the extent of additional planning restrictions) a number of 'process' factors such as land ownership structure and potential partnership interest will need to be carefully considered.

5.2 We start with a brief exposition of the current and emerging strategic planning framework with regard to broad physical location of major development with which science park development(s) would need to comply. We follow this with an evaluation framework listing criteria that candidate sites should be assessed against, also suggesting a range of assessment measures, and end with an assessment of candidate sites.

Strategic planning framework

5.3 The adopted Leicestershire Structure Plan provides strong strategic guidance for the location of new employment development. The strategy aims for most new development to be accommodated within or adjoining existing urban settlements and, to a lesser extent, to locations along transport choice corridors offering most potential for viable public transport provision. The Plan further advocates that if insufficient land is identified within these broad locations, other locations meeting well-specified transport choice criteria could be examined in the local plan process.

5.4 The emerging structure plan strategy (The Leicestershire, Leicester and Rutland Structure Plan, consultation draft) puts further emphasis on concentrating development within the main urban areas, continuing to guide new development to locations where there is less reliance on the private car. It advocates a 'sequential approach' to plan-making where well-accessible urban areas are given highest priority for employment development before less central locations are considered. It proposes that other development not meeting transport choice criteria should not be permitted until minimum public transport standards are already satisfied. The strategy aims to accommodate most (80%) of new development within and adjoining the main urban areas with priority given to the City of Leicester and other major settlements.

5.5 The emerging structure plan however recognises that the capacity of the urban areas may not be enough to accommodate all of the Plan Area's development needs. It advocates that large, strategic, greenfield sites possessing a critical mass for adequate public transport, infrastructure and mixed use provision, should be allocated in local plans but clarifies that further major development along the M1, the A5 or other main corridors will not be supported unless it is well-related to urban areas. In practice, the application of this strategy will clearly need to relate with the preferences of moving firms.

Other criteria

5.6 Given the current shortages of good quality sites and the difficulties in getting science park developments off the ground without substantial public sector investment, it may be necessary to show some flexibility in the application of planning strategy. Ideally, this should set the framework but not directly dictate the location of potential development sites.

5.7 From the implementation point of view, we consider that the best sites for science park development are those that are most likely to be developed and most likely to deliver the intended economic development benefits. If a science park is to be developed with mainly private finance, factors such as market appeal and a degree of flexibility in the negotiation of planning controls and the nature of development are essential. It is also desirable that such sites are close to an existing cluster of research and technology activity and to a university campus. To attract public funding a location within a regeneration area is likely to be important.

5.8 For both privately and publicly-developed science parks we would also consider it essential that the sites are of interest to and/or are likely to attract the active involvement of one or more of the local universities. Indeed, there are a number of sites that can potentially accommodate 'high-tech' activities in a high quality, business park setting. Most of these are however unlikely to offer linkages with higher education institutions and therefore unlikely to deliver technology transfer benefits.

5.9 In relation to these factors, we have developed a simplified framework for the assessment of potential sites. We have designed this on the basis of six main criteria and a number of sub-criteria which are presented in Table 5.1. We have subsequently applied this framework to evaluate a long list of identified candidate sites.

Table 5.1. Simplified evaluation framework for assessing suitability of sites for science park development

Criteria	*... in terms of*
1 Location	▪ Market interest: developer and end user ▪ Accessibility: road, public transport and on foot ▪ Within an existing high tech cluster ▪ Limited alternative supply in the district
2 Site	▪ Size (gross and net) ▪ Opportunities for expansion ▪ Overall quality and image
3 Constraints	▪ Ownership structure ▪ Unusual costs (difficult site) ▪ Requirements for off-site infrastructure works ▪ Planning policy
4 Likely to involve local university	▪ Involvement in site and/or ▪ Physical proximity
5 Capacity to attract public funding	▪ Location in a regeneration area or brownfield land ▪ Other factors e.g. positive local authority
6 Degree of control over activities	▪ Land-ownership and/or scope for equity participation ▪ Flexibility to negotiate planning controls.

Candidate sites

5.10 A number of sites have been identified through the consultations process as potentially suitable for science park development or for accommodating 'high-tech' uses. Our list was supplemented with a longer list of sites supplied to us by Leicestershire County Council (itself compiled from each borough/district making up the client group). We have applied the evaluation framework developed here to assess whether any of the sites are suitable for science park development and to differentiate those that we consider suitable, from those that may, on first sight, be attractive, but which are unlikely to offer the kind of linkages with local universities or the kind of cluster benefits that a 'best practice' science park should build on and develop, therefore fulfilling broader economic development objectives.

5.11 The assessment was conducted on the basis of information collected as part of the study (in terms of background material and the consultation interviews), feedback from the steering group and site visits. Inevitably, the thrust of the work programme has been such that some of the more interesting sites have received more attention and therefore a more thorough evaluation from the outset of the study. Availability of information about the sites and the interests of those consulted (which have included members of the steering group) have also influenced the balance of effort devoted to particular sites.

5.12 The following matrix (Table 5.2) presents our evaluation of the list of site options that have been identified as part of the study or have been brought to our attention by the steering group, *based on the information available to us.*

Candidate sites for science park development

5.13 Three sites emerge from this analysis as suitable for science park or similar development. We list these opportunities and offer some commentary below.

5.14 **Land adjacent to the National Space Science Centre (NSSC), Leicester**: The funding package for the £47m NSSC is currently being finalised with construction likely to be completed by February 2001. The centre itself will be housed in a new landmark building (designed by Nicholas Grimshaw and Partners) which will accommodate a visitor/exhibition centre, a planetarium and a 'Challenger Learning Centre' estimated to attract around 300,000 visitors a year. In addition, the centre will house a specialist educational and research facility and a Research Centre linked to the University of Leicester (the Research Centre will partly be housed in the visitor centre and partly within the University campus). The project sits in the middle of an area which on-going work has identified as a possible regeneration Priority Investment Area for English Partnerships.

5.15 A number of short-term site development opportunities exist within this broader regeneration area around the centre. Two of these, totalling 5.3 ha – the Council Depot (owned by Leicester CC) and the Abbey Lane Dairy Depot (largely owned by the Co-operative) are adjacent to the NSSC and are felt currently to be under-used, yet with substantial redevelopment potential. We understand that Leicester City Council are considering relocation of the depot elsewhere, an option costed at around £3m (which significantly exceeds the redevelopment value of the land) and that the Co-Operative are generally supportive of re-redevelopment though a small part of the land (not owned by the Co-Operative) may have to be subject to compulsory purchase.

Table 5.2: Evaluation of candidate sites

Location	Site	Evaluation criteria					
		1 Location	*2 Site*	*3.Constraints*	*4.Likely to involve local university*	*5.Capacity to attract public funding*	*6.Degree of control over activities*
Blaby	Grove Park, Enderby	B	A	A	E	E	E
	Kirby Park Farm, Kirby Muxloe	B	C	B	E	E	E
	Part of Alliance and Leicester site, Narborough	B	B	A	E	E	E
Charnwood	Land adjacent to the Loughborough Science Park	A	A	B	A	C	C
	Garendon Park, Loughborough	B	A	D	B	C	C
	Garats Hay, Old Woodhouse, Loughborough	C	B	D	D	D	C
	Land east of Loughborough, near Cotes (A60)	C	C	D	D	D	B
Harborough	Potential sites on either side of the A6 on the edge of Oadby	C	C	C	E	D	C
Leicester	Land adjacent to National Space Science Centre	C	C	C	A	A	A
	Lancaster Road allotments	A	C	C	A	D	B
	Freeman's Wharf (Powergen)	B	C	B	C	B	C
	Bursom Extension	E	C	C	E	C	A
North West Leics	Finger Farm	B	A	A	E	C	E
	Gimbro Farm	B	A	A	E	C	E
Oadby & Wigston	Wigston Harcourt	C	C	C	D	E	C
	Land west of Saffron Road	E	D	C	E	E	D

Key: A = very good; E = very poor

5.16 Re-development options, including development as a science park, are currently the subject of a separate study. In our view, the national profile of the NSSC, the close involvement of the University and the City Council and the possibility of obtaining gap funding can, together, be strongly supportive of science park development. The out-of-centre location of the site in the middle of a regeneration area (with the possibility of linking it with leisure development and a waterside location, a model applied successfully elsewhere (e.g. at Aston Science Park in Inner Birmingham, which is bisected by a canal, and in Newcastle, where the International Centre for Life, including a visitor attraction, a genetics research centre and a biotech incubator facility is currently under construction close to the station) is also attractive on policy grounds.

5.17 We are however cautious that the site has not been tried-and-tested in terms of market appeal and that considerable public sector investment (significantly exceeding the £3m for relocating the council depot) is needed to reverse the 'down-market' image of the area and enable privately-funded development. This investment will also need to be related to English Partnerships' Investment Priorities. Although the NSSC has already attracted a small number of enquiries from firms wishing to associate themselves with the centre, recent re-development proposals for its adjacent sites by a local property developer have been described as 'disappointing'. There also appears still to be some uncertainty about private sector matching funding for the NSCC. However, assuming it proceeds as planned the NSSC will act as a focus for intensive regeneration effort involving both the public and private sectors. Provided problems such as access and land assembly can be overcome, the site has strong potential for science park and related uses.

5.18 **Land adjacent to the Loughborough Science Park, Loughborough**: The area within and around the Loughborough Science Park (LSP) has been subject to a number of recent developments which are worth noting. First, British Gas has recently restructured its research operations and has sold part of its land holding to 3M. Part of the purpose-built British Gas research building is also currently on the market for multiple occupation. Second, 3M intend to develop the remainder of the science park site for their own use in order to house their European HQ. We understand that they have also negotiated the purchase of 10ha of additional land to the west of the LSP for their 'long-term expansion needs'. Third, Leicestershire County Council, Loughborough University and Charnwood Borough Council are looking into the possibility of developing a 3,000 sq m building on or close to the far (south-west) end of the University campus to accommodate firms out-growing the Technology Centre at Epinal Way. This scheme may possibly be integrated with a planned University training college, though plans have yet to be finalised.

5.19 It is generally accepted that there is an urgent need for high specification B1 accommodation in Loughborough and elsewhere in Charnwood borough, as well as a shortage of land for accommodating more traditional manufacturing uses. In view of the development of LSP by just three firms, land for accommodating high-specification B1 units is particularly in short supply, though parts of the British Gas building, the Blue Wave Systems building and the current 3M building may be suitable for multiple occupation. The Loughborough Technology Centre and a new managed workspace facility (a project led by the Borough Council on former operational railway land owned by the Borough Council) may in addition stimulate further demand for small units from young firms outgrowing their current premises. An informal survey recently conducted by LATI has for example confirmed the strength of this demand.

5.20 We see developments taking place in Loughborough as positively enhancing its position as a lively centre for research and technology activities, perhaps the only identifiable 'cluster' of such activities in the county. The apparently strong demand from high tech firms confirms the attractiveness of the location which both the University and the Borough Council are active in promoting. Experience of the development of LSP suggests that unmet demand is mainly for ready-built high-spec small units but, in the medium-term, land for design-and-build premises may also be required, mainly by expanding local firms if further clustering and inward investment are to be encouraged. The 10 ha 3M site adjacent to the LSP is well-located in relation to the University and the M1 though the intentions of its owner are unclear. The site is not currently allocated for development but there may be significant scope for negotiation in bringing the development of the site forward, partly for science park uses, subject to a detailed planning and environmental assessment.

5.21 **Lancaster Road allotments, Leicester:** This is a small (0.95 ha), environmentally sensitive site, owned by Leicester City Council, which has an excellent location, adjacent to the university campuses of both Leicester and De Montfort Universities, and close to the rail station and the city centre. We understand that the site has outline planning consent for 4-storey university teaching and laboratory premises and that Leicester City Council has recently received an application for a renewal of this consent. Given the size, location and public ownership of the site it is worth considering the potential for development of small incubator units for start-up businesses, but access issues may need to be resolved and the University's internal needs may take priority.

Other sites

5.22 **Grove Park, Enderby, Blaby**: This is a high quality employment site next to J21a of the M1 and adjacent to Meridian Business Park, Fosse Park and large scale retail and leisure developments on the outer ring road of Leicester. The site is being marketed as a high-profile, regional business park (though an element of B8 on a strip of the site has also been allowed at the recommendation of the Inspector presiding at the Local Plan Inquiry) for large, corporate tenants, an image which its owners seek to develop and retain. The site has already attracted two tenants but the cost of design and build development (and/or the cost of the land) may be prohibitive for small high-tech firms and there is currently no intention to develop speculative units (again, rent levels could be high). There is however potential to attract large, high-tech inward investors from a wider region (and the area's academic strengths are being actively marketed).

5.23 **Kirby Park Farm, Kirby Muxloe, Blaby:** The 9.3 ha site is adjacent but not immediately accessible to the M1. It is however within walking distance of the Park and Ride at Leicester Forest East and has good transport links into Leicester. The site is currently vacant and adjoins a housing area in the south and an industrial area in the east. Although potentially attractive to high-tech activities, it is in private ownership with planning permission for 4.6ha of B1 and 4.7ha of B2 and further restrictions on use would not have been justified. The potential for the provision of a choice of ready-built units for small occupiers could however be explored with the developers.

5.24 **Carlton Park, Blaby**: This is a substantial 21.4 ha site with permission for B1 which has accommodated the headquarter offices of Alliance and Leicester. Part of the site is deemed by its owners to be surplus to own-use requirements and is intended to be developed as a business park. It is a prominent site and the setting could provide a good quality environment for high-tech activities and an excellent location close to the M1 in a parkland setting. Although the site is likely to be attractive to some 'high-tech' firms, the current B1 planning permission provides no flexibility to negotiate more restrictive uses.

5.25 **Garendon Park, Loughborough**: The site proposed for the National Sports Centre is an environmentally sensitive area not allocated for development but well-located in relation to Loughborough University's campus, the Loughborough Science Park and the M1. This site could be considered as a long-term opportunity for accommodating spill-over activity from the Loughborough Science Park and possibly from other, related developments and its planning status could be kept under review.

5.26 **Garats Hay, Old Woodhouse, Loughborough**: The site is a former MoD site partly located within the Charnwood Forest area and sensitive in planning terms. A number of buildings stand in attractive grounds, some of which may be converted for alternative uses. It is deemed by the local authority as appropriate for small-scale employment and leisure uses.

5.27 **Land east of Loughborough near Cotes on the A60, Charnwood**: The site is being promoted by its owner/developer as a stand-alone mixed use development comprising 1,000-1,500 dwellings, 200 acres of parkland and 20ha of employment. It is located near the A60 (from Loughborough to Nottingham) to the east of Loughborough. The site is outside the current planning framework but because of this the developer may be willing to negotiate a measure of speculative build and restrictions on use on parts of the employment area. Off-site infrastructure works and public transport provision would also be necessary.

5.28 **Freeman's Wharf (Powergen site), Leicester:** This inner-city site is privately owned but lies in a Potential Development Area within the Leicester City Challenge area and is listed as a high priority in the County Council's Derelict Land Strategy. It has a potentially attractive riverside location close to Leicester and De Montfort Universities. The City Council aspires to at least 5ha of the 13ha site being developed for B1 uses and there is already development interest for mixed uses including open plan B1 offices (ranging from 6-20,000 sq.feet) and retail uses. The site has already been cleared with some infrastructure laid down and can potentially be attractive to high-tech firms on the assumption that some of the offices are provided on a ready-built basis in a quality setting. There also appears to be considerable flexibility as regards the provision of a mix of uses on different parts of the site and the possibility of ready-built office unit provision should be explored with the developers.

5.29 **Bursom Extension, Leicester:** The 14ha site lies in the Beaumont Leys regeneration area on the edge of Leicester and has been designated as a high quality business park in the Leicester Local Plan. The City Council accepts that stricter adherence to national planning guidelines may not warrant allocation of the entire site for B1. Other options are currently being considered including B2/B8 uses and smaller scale B1 (mostly non-office) uses within a residential development. The land is in City Council ownership and may accommodate some local demand from firms seeking a location on the outskirts of Leicester. The provision of ready built units could therefore be explored.

5.30 **Finger Farm, Gimbro Farm, NW Leicestershire**: These substantial (20ha + 20ha) development projects adjacent to the East Midlands airport are well-located in relation to the national motorway network and are highly attractive for B1/B2 and B8 uses, though not very well-related to urban centres or widely accessible by public transport. 'High-tech' activity

may well be attracted to these sites but both sites have planning permissions which allow for no negotiating flexibility in the provision of size and type of premises that could be particularly attractive to 'high-tech' users. In addition, we understand that Gimbro Farm is to be developed entirely for use by DHL.

5.31 **Wigston Harcourt, Oadby & Wigston**: This is one of the few high quality employment sites potentially available in the borough. A proposal is currently being examined by Oadby and Wigston Borough Council for 15 ha of employment use within a much larger mixed use development (including 35ha of housing) phased over a number of years. The development will also necessitate redesign of the green wedge boundary and careful phasing. Small scale 'high-tech' activities (on at least part of the site) would fit well in this environmentally sensitive site which is subject to community consultation. The site is however remote from other employment areas in the borough and some distance from the University of Leicester (some student halls are located in the northern part of the borough). It could however be an opportunity, perhaps through the provision of small units, to assist in the economic development of the borough and may be attractive to some of the borough's resident managers who currently work in Leicester but wish to establish their own businesses.

5.32 **Land to the West of Saffron Road, Oadby & Wigston**: This brownfield site is held by different Crown agencies (largely MoD and Offgas) and there is scope for consolidation or redevelopment on parts of the site while 0.8ha have been allocated for employment uses in the local plan and another 2.1ha remain vacant. Although accessible by rail, the site is not well-located in relation to the road network and may lack market appeal. There is currently no indication of developer or occupier interest.

5.33 **Sites on either side of the A6 adjoining Oadby, Harborough**: Proposals have been submitted by a private developer for large scale development (25ha + 25ha) on greenfield land on either side of the A6 on the boundary between Oadby and Harborough districts. The sites have direct access to the A6, which is an existing transport choice corridor, and are also well-related to Oadby town centre, though not linked directly with the national motorway network. Development has so far been resisted by the District Council but there is a shortage of alternative, high quality sites within the district.

Concluding remarks

5.34 As noted earlier, high-tech uses can be accommodated in most good quality business-park-type settings without the need for making special planning provisions. If such provisions (e.g. for more small unit accommodation or for increased landscaping) are deemed to be necessary, these will generally have to be negotiated with the developer before any formal

commitments are made. A number of good quality sites capable of accommodating high-tech uses but perhaps not meeting the full range of criteria for 'best practice' science park development have been identified through this assessment process. These are generally those that are well-located and are likely to be least constrained by site or planning restrictions (Columns 1-3 in Table 5.2)

5.35 In addition, a number of sites may face significant development constraints – both in terms of planning policy and in terms of development feasibility while there is uncertainty as to their market appeal. These sites could represent long-term opportunities but are unlikely to be strong candidates for quality development attractive to high-tech uses.

6 Planning issues and labour market implications

6.1 This section considers the planning issues and labour market implications related to development of one or more science parks in Leicestershire. In relation to planning issues, we first discuss how high tech activities can be defined, since it is impossible to use the planning system effectively unless it is clear what is meant by the terminology.

Defining high tech activities

6.2 A major problem of planning for high tech activities is that there is no clear-cut definition of high tech. Most people would intuitively claim to understand the term, but translating that understanding into a definition that can be used in planning documents is problematic. The following paragraphs consider four factors which may be taken into account:

- the sector to which a firm is categorised
- the proportion of staff likely to be engaged in R&D and related activities on the site in question
- the proportion of qualified scientists and engineers in the workforce to be based at the site
- the environmental impact of the proposed activities.

Sector

6.3 As discussed in Section 3, sectoral definitions of high tech are most commonly used, but are fraught with difficulties. Problems include:

- the difficulty of using the Standard Industrial Classification to identify high tech activities, which cut across sectors as traditionally defined
- the changing nature of high tech- new sectors are constantly emerging, other decline in significance (e.g. multi media is now well established, but was hardly recognised as a sector five years ago and is not easy to identify in the Standard Industrial Classification)

- the fact that the sector to which the firm is classified may not relate in any way to the activities actually carried out at a particular site. For example, a computer manufacturer may be expected to fall within a high tech category, but the storage and distribution of computers is not a specialised technological activity.

6.4 This means the specification of sectors should at most provide guidance as to what may or may not be considered as high tech, but there should not automatically be a presumption against a proposal if the sector in which it falls is outside the high tech grouping.

6.5 In Leicestershire sectors which may expected to fall within the high tech definition would include:

- established clusters in the county such as industrial machinery, electronic components, measuring instruments and vehicle parts and accessories

- areas in which the universities in the county have distinctive research expertise, including space science and related applications, bio-medicine, materials and optical technologies

- other activities commonly accepted as high tech such as information and communications technologies (including computer hardware and software), multi media, pharmaceuticals and biotechnology

- nationally growing activities in which Leicestershire may have a distinctive advantage because of location and/or existing strengths. Examples include materials processing, process engineering and IT.

Proportion of the workforce engaged in R&D

6.6 It is reasonable to assume that a firm with a high proportion of it's workforce engaged in R&D can be classified as high tech. However, it is more problematic both to define R&D and what might be considered a high proportion of resources devoted to it.

6.7 The core activity of R&D is quite clear, but there are a number of other activities which firms often classify as 'broadly' R&D. These include product design and adaptation, prototype manufacture, applications engineering, and high level technical support functions.

6.8 An additional difficulty is how firms 'count' R&D employees. Some have defined R&D departments, and include all employees in the department as their R&D employment. Others may not have a separate department, but do have employees undertaking a variety of R&D related activities. Most firms undertake R&D in the same building as other activities such as manufacturing or marketing and sales. This must be taken into account in assessing whether a proposal should be classified as high tech. In general we suggest that if at least 15% of the workforce is engaged in R&D and related activities (as discussed above), then the whole of the business unit can legitimately be considered as high tech (note that on UK science parks as a whole only 20% of activities are categorised as R&D).

Proportion of qualified scientists and engineers in the workforce

6.9 Because of the difficulty in defining R&D, the proportion of qualified scientists and engineers in the workforce is sometimes used as an alternative. In this case measurement is less problematic, since there are reasonably clear definitions of what 'qualified' means - a scientist must have a degree in a scientific discipline, and an engineer must have an engineering degree or be a member, or eligible for membership, of a relevant professional institution.

6.10 However, these definitions omit employees who may contribute substantially to high tech activities based on experience rather than qualifications, or who are highly trained technicians but without the academic qualifications. Generally the way around this problem is to set the proportion of QSEs quite low (possibly 15% again).

Environmental impact

6.11 Environmental impact is in a different category to the above criteria. Some high tech activities may have adverse environmental impacts, many do not. But science parks are generally regarded as clean environments (although in practice some fall well short of this image) and therefore it is unacceptable to allow polluting or environmentally intrusive activities onto the few designated sites because of the adverse impact on neighbouring firms and surrounding areas.

6.12 We suggest, therefore, that whilst the other factors are used for guidance, it should be a clear stipulation that high tech activities seeking a science park location must be environmentally clean and not create nuisance for neighbouring activities. The requirement for a high environmental quality may largely be achieved through a B1 permission.

Links with a university or other research centre

6.13 According to the UKSPA definition (which is also that used by the International Association of Science Parks - IASP) a science park much have functional links with a university or other research establishment. It may therefore be reasonable to accept a firm which has active research links with a university as meeting the criteria for entry to a science park.

Supporting services

6.14 On most science parks there is a variety of service activities which are not in themselves high tech, but provide services useful to high tech firms. Examples include specialist financial and business services (eg risk capital, patent agents) and, particularly when the site is some distance from a retail centre, small scale retail, restaurant and similar services.

Other factors

6.15 Since there is a shortage of high specification small units in the county, a factor which could be taken into account in determining the acceptability of a particular proposal is a commitment to provide speculatively built premises suitable for the needs of high tech firms.

Using these factors as guidelines

6.16 Table 6.1 seeks to translate the above discussion into a set of guidelines which can be used in a planning policy context. It must be emphasised that these guidelines are intended, as their name implies, for guidance only. For example, interpreted literally an office of a high tech multinational would not be acceptable if the only activity it plans to undertake on a science park is sales and marketing, whereas a low tech firm wanting to establish an R&D facility on the site would be acceptable. Whilst there would probably be no dispute about the latter, as long as the activities were environmentally acceptable, there may well be concern about turning away a blue chip high tech multi-national which can act as a magnet for genuine high tech activities.

Table 6.1: Guidelines for defining high tech activities

Primary considerations	
Firms should meet at least two of the following four criteria, **and** the activities planned for the site must be environmentally acceptable	
Firm within a 'high tech' sector	Firm undertakes activities Including, but not necessarily confined to: advanced industrial machinery, electronic components, measuring instruments, precision vehicle parts and accessories, materials processing, process engineering, information and communication technologies, computer hardware and software, multi media, space science and related technologies, biotechnology, bio-medicine, optical technologies, pharmaceuticals, chemicals, aerospace, scientific and technical instruments, test equipment and services, knowledge intensive business services, environmental technologies, genetic and biomolecular engineering, bioinformatics, communication with machines, telepresence, sensors and information processing, security systems and advanced office equipment
Focus on R&D, product or process design, applications engineering, high level technical support or consultancy	At least 15% of staff on the site should be involved in these functions, or
Proportion of qualified scientists and engineers in the workforce	At least 15% of the staff are qualified scientists and engineers, or
Established linkages with a research facility	Existing active links with a university or research institution in the East Midlands region
Environmental condition (which all firms must meet)	
Environmentally acceptable	Conformity with all environmental legislation and not including any activities likely to cause a nuisance to other firms on the site
Other considerations	
Secondary tenants with a focus on providing services to primary tenants	Allowable activities may include, but not necessarily be restricted to, financial institutions offering specialist services to technology based companies and other convenience services such as small scale retail and restaurant facilities. Secondary tenants should occupy no more than 10% of the total floorspace allocated to primary organisations on sites of less than 5 acres and no more than 5% of total floorspace on larger sites
Provision for small firms	Provision of floorspace specifically to meet the needs of small firms undertaking high tech activities (i.e. unit sizes of less than 5,000 sq. ft) should be regarded favourably and may allow more lenient interpretation of the primary considerations.

Planning issues

6.17 This section of the report considers ways in which the planning system can be used to achieve the objective of supporting the development of science parks and other premises specifically to meet the accommodation needs of high tech firms. It is divided into three main parts, which consider approaches which may be used in relation to planning policies and planning permissions, and then other complementary measures.

6.18 As a preface to proposals regarding planning policies and permissions, it is important to note that the planning system in this country is much more effective in controlling types of buildings which are developed than the uses made of them. High tech activities may be undertaken in a wide range of building types, from high quality offices to low grade industrial units, therefore designating land for a particular land use does not guarantee what types of activities will be undertaken there.

6.19 In addition, if anything is to be achieved in defining high tech for planning purposes it is essential to take into account the nature of the development process. Most developers build and then sell on to institutional investors, who are usually conservative in their investment decisions and are reluctant to purchase projects with restrictive planning permissions. Therefore a definition of high tech must strike a balance between accurately delimiting the appropriate range of activities, and ensuring that this range is not so narrow as to deter investment in sites designed for their use

Planning policies

6.20 We suggest that policy guidance includes the criteria discussed in the previous section which can be used to test whether or not a particular activity is, or is not, high tech. In a plan led system, this will provide a strong basis for designating sites and preventing other forms of development on them.

6.21 Another role for planning policy may be to clarify strategic intentions as to the mix of activities expected to take place on the key sites. For example, release of a greenfield site not currently designated for development may justify more onerous restrictions than a brownfield site where development would achieve regeneration objectives. Similarly, on a large site an integrated brief covering the whole area may introduce flexibility to negotiate restricted, and therefore riskier, development on parts of the site while making suitable concessions to enhance the commercial attractiveness of the scheme in other parts.

Planning permissions

6.22 Planning permissions must translate policies for science parks into detailed controls in a way which ensures development is appropriate for the needs of high tech firms and is not deterred by onerous restrictions. Experience elsewhere demonstrates that this is a difficult balance to achieve.

6.23 Three main methods have been used to ensure land is developed for high tech activities: the B1(b) Use Class, conditions on the planning permission, and Section 106 Agreements.

The B1(b) Use Class

6.24 The B1 Use Class was introduced in recognition of the fact that an increasing number of businesses require buildings which can be used for a variety of purposes. However, sub-divisions of the Use Class allowed for more restrictive permissions: including B1(b), for 'R&D activities'.

6.25 In practice B1(b) has been rarely used by planning authorities, largely because central government has consistently indicated that it is only appropriate in exceptional circumstances. For example, previous research undertaken by SQW revealed that out of a sample of 23 science and technology parks in UK none had a planning permission which restricted activities within the B1(b) Use Class. The Government has also allowed a number of appeals against the use of B1(b). We know of only one example of the use of B1(b) actually being advocated by Government, and this is on the northern edge of Cambridge adjacent to the Trinity Science Park, where there are intense and competing pressures for development.

6.26 There appear to be two main reasons for the Government's reluctance to uphold use of B1(b):

- it is contrary to the intention of the B1 Use Class, which was introduced to increase flexibility in the use of space by firms
- it is generally strongly resisted by developers and institutional investors, so that it is just not practical in many cases if any form of development is to be achieved.

6.27 Given the experience to date, we would not advocate the use of B1(b) in most situations in Leicestershire, because even with an appropriate policy context there appears to be a high risk of the restriction being overturned on appeal, or it preventing any form of development. However, it may be appropriate to designate a part of a large site for research and development and related activities though this designation may still be best implemented through a s106 agreement or a planning condition rather than a B1(b) permission.

Conditions on a planning permission

6.28 The alternative and more frequently used approach is to impose restrictive conditions on a B1 planning permission. Such conditions vary greatly in their wording, and we do not feel able to make specific suggestions because the degree of restriction and the detailed wording must depend on the particular characteristics of the site in question - including factors such as the location and size of the site, evidence of the scale and nature of demand, ownership, and whether the public sector can positively support development for high tech or is wholly reliant on private funding for the site's development.

6.29 We have some evidence that restrictive conditions may also be overturned on appeal. For example, the planning permission granted by Solihull Borough Council for development of the Birmingham Business Park, close to the National Exhibition Centre, included a requirement that the Council be allowed to vet all prospective tenants to ensure they complied with the requirement that they be 'high tech' activities. The developer, Arlington, objected to the uncertainty and delay caused by this referral process and appealed, successfully, to have the condition replaced with one which refers to 'high quality' activities.

6.30 There are of course examples of planning conditions for science parks, but since most are partly or wholly in public ownership such conditions tend to be consistent with the owners' long term economic development objectives rather than in conflict with short term commercial interests.

Section 106 Agreements

6.31 Section 106 Agreements (together with the predecessor Section 52 Agreements, and Section 50 Agreements in Scotland) are also used frequently to secure land for high tech activities. Because they are by definition agreements entered into freely by all parties signing them, they tend to be more secure against subsequent revocation that either a B1(b) designation or planning conditions. However, it is still essential for the wording to be seen as reasonable if the Agreement is to be upheld in the long term.

6.32 Institutional investors are generally as wary of Section 106 Agreements as they are of other restrictions on a planning permission, but owners may nevertheless be persuaded to enter into agreements which appear to them to be reasonable in the light of market conditions in order to get planning permission for development of a site.

Other approaches

6.33 Partly because of the limitations of the planning system in controlling, and particularly in stimulating, high tech activities, it is highly desirable for the organisations pursuing the economic development and technology transfer objectives to have an equity interest in the science park. Indeed, even with the flexible approach to defining high tech for planning purposes outlined in Table 6.1, public funding may still be necessary to persuade the private sector the become involved in a science park project. An equity interest provides scope for control over activities through various measures including vetting firms according to defined entry criteria, use of covenants and lease terms. The greater the equity stake, the more likely the owner is to achieve their objectives with respect to occupancy, although even with 100% ownership there may be short term financial pressures which override long term economic development objectives.

6.34 Some owners who have intended to sell a site but wish to retain control over its long term use may include covenants in the title to the land. These are difficult to overturn, since buyers generally make the purchase in full knowledge of the restrictions. However, covenants are often difficult to enforce in practice, relying on active 'policing' of a project and resort to the expense of legal proceedings if the covenant appears to be breached by a subsequent owner.

6.35 A third method used to control the types of activities firms undertake on a site is through conditions in the lease. These are generally quite effective if the owner demonstrates a willingness to enforce the conditions, but this approach depends on the land or building owner wanting to impose restrictive conditions. Whilst most private owners consider it important to prevent activities which are detrimental to the image or amenity of the project, it is unlikely that they would be willing to restrict activities to high tech as this may affect the financial security or value of their investment.

Labour market implications

6.36 A key consideration in location decisions by high tech firms is access to an appropriately skilled workforce. This often has two aspects: the availability of researchers with leading edge knowledge in the relevant areas of technology; and the availability of technical support staff in sufficient numbers.

6.37 In the case of Leicestershire, we have already pointed out the fact that there are six universities educating 87,000 students within 30 miles. This is a major resource which appears so far to have been underplayed in promoting the county to high tech firms. However, there also appears to be a limited match between the most distinctive research expertise in the local universities and the sectoral mix of established high tech firms. This

can only be addressed through closer links over an extended period between the university and business communities.

6.38 One area where there may be problems if the support for high tech business growth is successful is the quantity and quality of technical support staff. There is little tradition of R&D in industry in Leicestershire, and the labour supply is quite dispersed. Whilst firms always have the option of recruiting high level skills from elsewhere, technician level staff have to be found locally. Because high tech firms can often pay premium rates, it may be the traditional industrial sectors and public services which suffer the consequences of any shortages at this level (eg in Cambridge the universities and the health sector are the principal source of technicians recruited by high tech firms). A rounded approach to high tech growth will therefore need to include assessment of potential shortages at technician level as well as for high level skills, and to put in place early warning systems and appropriate training programmes.

7 Conclusions and next steps

7.1 The final section of this report considers the next steps. The Terms of Reference requested us to assess the demand and feasibility for developing further facilities for technically advanced companies within the area covered by the Structure Plan area and to advise on the best options for this provision. We have concluded:

- That there is a strong case for supporting development of a hierarchy of sites for high tech firms, including:
  - more incubator space to support spin outs from the county's universities and other high tech start ups. Incubator facilities should be a close as possible to the related institutions
  - existing high tech SMEs. Experience elsewhere is that well managed science parks provide a conducive environment for growth, and help improve links between firms and related universities. Science parks need to provide speculatively built small units if they are to attract SMEs. This would be particularly attractive in Leicestershire, where there is currently a shortage of such high quality B1 units under 1,000 sq m
  - inward investors. So far the county has not had a high profile for high tech inward investment, despite its excellent location and proximity to six universities and nearly 100,000 students.
- The best locations for additional provision to meet local demand are in Leicester and Loughborough, as close as practicable to the three universities. Ideally sites should be large enough to allow a mix of size of units to be developed, so that firms can move within the site as they grow.
- It is not possible to be as prescriptive about the best location for provision to meet demand from inward investment. Such firms have less need to be very close to a university, although proximity may help establish or reinforce links. They will certainly require an accessible location well related to the strategic road network, and to the main sources of technically qualified labour. Sites should therefore be close to the M1, and preferably on the edge of either Leicester or Loughborough. This may provide an opportunity for combining provision for SMEs and inward investors on a single site. Alternatively an existing or proposed high quality business park, rather than a more restrictive science park, may equally well meet the property needs of inward investors. In the latter case the public sector will need to put in place a

variety of initiatives to promote technology transfer and link them into the existing business tech community.

7.2 Achievement of these projects will require close collaboration between public and private sectors. We therefore suggest that partnership arrangements are put in place to take these ideas forward. In our view the partnership should involve representatives of the development industry, the universities, the relevant planning authorities, and possibly one or more high tech firms. It should be closely linked to the Regional Development Agency, which could be a crucial source of both policy support and resources. We suggest an early approach to the RDA with a specific proposal, in order to influence their agenda.

7.3 There will almost certainly be a need for some public funding, preferably to secure equity participation in a science park, but at least to ensure some control over the uses allowed onto the science park. Possible alternatives to a substantial equity interest include securing a covenant on part of the site in return for gap funding, or taking a head lease on one or more of the buildings.

7.4 The local authorities cannot rely on the planning system to achieve their objectives, although it can provide an important facilitating context. We would caution against the use of B1(b) to control private development, since it may well frustrate the project entirely, or it may be overturned later on appeal. It would be preferable to use a Section 106 Agreement, or failing that carefully worded planning conditions (some examples for existing science parks are provided in Annex A). Specifically in relation to Employment Policy 4 in the Consultation Draft for the Structure Plan Review, we suggest a change in the last sentence to omit reference to B1(b) and replace with a suggestion that appropriate restrictions be imposed, preferably through use of a S106 Agreement.

7.5 Whatever progress is made in implementing proposals for additional science parks, we see this as only one part of a range of support necessary to promote the growth of high tech business activities in the area. Science parks are highly visible symbols of high tech growth, and can therefore act as 'Flagships' for promoting an area, both internally and externally. This is a very important role, but on their own science parks will have limited impact. Other initiatives, such as measures within universities to support technology transfer and links with firms, support for technical training, supply chain initiatives, support for technology entrepreneurship, access to risk finance, and targeted promotion, are all important. Many of these measures are already included within the recently formulated Economic Strategy for Leicestershire, and we also expect them to be high on the agenda of the East Midlands RDA. An initiative to support development of more science parks in the county would therefore be timely.

7.6 We suggest that the next steps should be:

- To agree on the best site(s) to pursue in the short term
- To agree the key partners and lead responsibility for taking these proposals forward
- To develop a specific proposal based on a mix of public and private funding, to be submitted to the RDA as soon as practicable.