The River Regeneration Trust

Scoping Study Report

Broadmead Peninsula Economic Regeneration and Land Improvement Scheme

20th November 2013

Produced for:
Bath & North East Somerset Council

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Special thanks are given to other members of The River Regeneration Trust not involved with the scoping study but whose contributions have been vital. Thanks are also given to B&NES Planning Team for their support, White Design for use of their architectural concept designs and ModCell/BaleHaus photos, and Environmental Gain for use of their sketch and ecology text in this report. The Scoping Study would not have been possible without the dedication of the B&NES River & Canal Champion, Councillor Dave Laming, and the valued contributions of companies and landowners of Broadmead Peninsula who supported the study and our ideas. Thank you all.

Project Team

The River Regeneration Trust vision is to open up the river corridor and re-connect it with the local community. We wish to promote and encourage leisure and sustainable development, creating homes, employment and lifestyle opportunities, whilst maintaining the heritage of the river.

We want to bring about investment from the public and private sectors, to liaise with landowners and stake holders to ensure their projects and aspirations reflect those of the local authority and the Core Strategy, meeting the demands of Bath as a World Heritage Site.

We will assist in dealing with flood issues making the river corridor a safer place to live and invest. This will include protecting biodiversity by maintaining a healthy ecosystem. Our vision is simple: The River Regeneration Trust - Reconnecting Communities with the River Avon.

Contributors to the report:

Ian Humphreys Over 40 years with a number of National and International contractors in a variety of management positions, culminating with 11 years as Director of a market leading construction company. In 1997 Ian established a project and construction management company (Hawkeley Construction Management) looking after the interests of Clients/Developers and ensuring their construction projects are completed on time, within budget and are built to an acceptable standard.

James Hurley BSc Hons MCWM has over 35 years' experience in construction including two high-level consultancy teams delivering sustainability and waste and resource efficiency strategies for major projects in UK and Middle East including Olympic Park London, Crossrail, Qasr Al Sarab and Falcon City of Wonders. He is considered a leading light in materials resource efficiency and is well published nationally and internationally. He specialises in the Circular Economy and employment related developments.

Jeremy Douch BA Hons Dip TP MCILT has over 20 years' consultancy experience as a transport planner providing inputs to regeneration and development projects. Although based locally, he has worked on commissions throughout the UK for both public and private sector Clients. He specialises in promoting sustainable transport strategies to facilitate economic growth. Recent projects include a transport strategy in Wokingham including a new relief road and road bridge over a rail-line, and transport inputs to the Lower Bristol Road in Bath, Regeneration Delivery Plan.

Philip Challinor qualified as an architect and General Practice Chartered Surveyor with over 25 years in regeneration projects, including the beneficial relocation of some of the major businesses within the Olympic Park zone to other areas of East London. Appointed by Hammersmith London (the Business Improvement District set up by LBH&F) to provide advice on Hammersmith Flyover and the outdoor media towers that currently provide £2m of funding to the area. Philip was responsible for the planning of Phase One of the University of Bath's Sports Village.

Andrew Beard BA Hons RTPI has 28 years' experience as a town planner, 16 within local government at Bristol City Council undertaking both policy and development control work and since 2001 has provided expert planning services to the private sector with CSJ Planning Consultants. Most recently Andrew has delivered the Keynsham Town Hall regeneration approval, now under construction and a range of secondary school developments in BANES.

Executive Summary

Bath & North East Somerset (B&NES) Council commissioned The River Regeneration Trust (TRRT) to undertake a detailed scoping study into the employment opportunities in the Broadmead Peninsula, focussing particularly on the creation of green jobs, which will be used as part of the evidence base for the Placemaking Plan for Keynsham. This report shows that a Circular Economy approach to development will create hundreds of new jobs, will significantly add value to the area and reinforce the economic ambitions of B&NES to create a broad range of employment opportunities for local people. It would also create sustainable markets for their recyclates and ensure that their approach to jobs and housing is sustainable and compliant with National Planning Policy Framework.

Deliverability and viability of employment floorspace and housing are central to the scoping study, but in a way that complements existing industry, agriculture and leisure that are trading and employing on the site. These include Wessex Water, Broadmead Industries (collection of businesses and multiple starter units), Avon Valley Adventure & Wildlife Park, Avon Valley Farm (including 30 businesses and starter units), Bendalls Farm, and DS Smith Recycling (formerly Severnside Recycling). Our three Outline Proposals incorporate options for all these sites to ensure deliverability of employment floorspace and housing is undertaken though a phased, strategic and equalised Action Plan that can deliver a new HGV-compliant access and two-way over-bridge.

Our three Outline Proposals (Options A-C) generated by CityCAD software, were cross-referenced with employment floorspace and housing in the Core Strategy, the ambitions of landowners and the requirements of a Circular Economy Environment Park. The estimated number and types of new, permanent jobs (in addition to construction/seasonal jobs) and housing for Options A-C are:

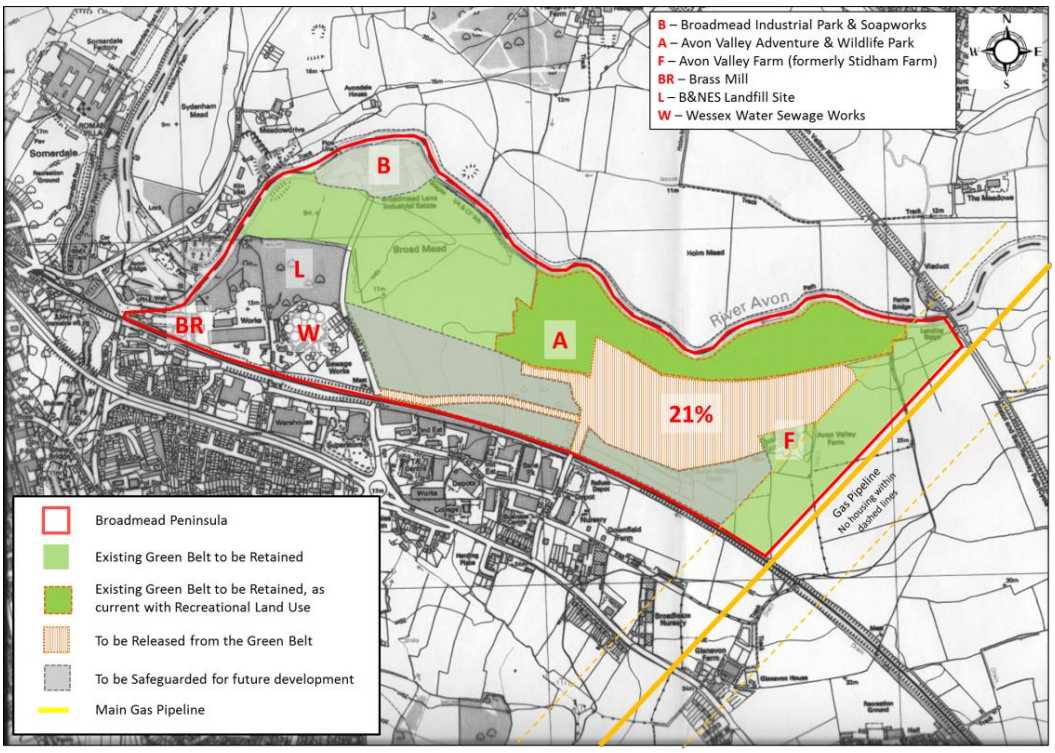
Broadmead Peninsula 2013-2029	New Green Jobs		
Land Use Type	**Option A**	**Option B**	**Option C**
Housing (C3)	4	4	4
Offices (B1)	189	189	149
Industry (B2 & B8)	312	312	268
Shops & Hotels	22	48	22
Health & Education	20	20	20
Leisure	17	17	17
Open Space, Marina & Wetland	8	8	8
Rail Sidings	0	18	10
Waste Facilities	0	12	8
TOTAL	**572**	**628**	**506**

Broadmead Peninsula 2013-2029	Number of Houses		
Housing Type	**Option A**	**Option B**	**Option C**
Semi-detached or Detached	390	400	430
1-bed Flats	63	95	45
2-bed Flats	198	139	144
Houseboats	80	80	80
TOTAL	**731**	**714**	**699**

Our transport and movement strategy for Broadmead Peninsula provides access in a phased manner ensuring a deliverable and viable approach for each of Options A-C. Minor highway improvements as part of Phase 1 can release a significant quantum of development (circa 1/3rd)before a high capacity primary route from Keynsham Road from the west is delivered. Longer term a new high capacity link over the rail-line is proposed. Although current bus routes can be accessed within a short walk, new services penetrating Broadmead Peninsula are planned. Opportunities to move people/goods on the River Avon are central to our vision, alongside a high quality network of walking and cycling linkages. These include to/from Keynsham rail station, onto National Cycle Route 4 and via rail under-passes linking into the nearby Keynsham town centre. Our initial highway capacity assessment shows that:

- Pixash Lane over-bridge would be able to support Phase 1 of the development in each of Options A-C with a significant level of spare capacity.
- The A4/Pixash Lane junction will operate within capacity with Phase 1 of development traffic in 2018, in each of Options A-C.

In terms of flood and environment, Broadmead Peninsula is well screened from many wider views and has established habitats, hedgerows, tree lines and some noted species around existing employment space and recreational facilities. Whilst it is currently mainly rural in character, there is scope for development within the heart of the site, outside the flood plain, with minimum release of Green Belt (21% of Broadmead Peninsula) and strategically chosen safeguarded land. This will retain the general openness of the Green Belt in relation to the gap between Keynsham and Saltford and the link north across the river to South Gloucestershire. As shown below, Green Belt can be retained along the river corridor with recreational use, a marina, wetland and reuse of existing buildings taking place within appropriate development for the Green Belt. It creates a transition from general development north of the railway line, becoming less dense and urban fringe to the river.



We do not agree with the Green Belt Phase2 Study in that the site is a high negative impact, nor the Sustainability Assessment that stated an impact across to South Gloucestershire. In any event the landscape impact has to be 'balanced' with other factors of sustainability. For example, economic growth from green jobs, environmental enhancement from new parkland/wetland/woodland, and social benefits of affordable homes, public access, cycle-ways, a nature trail and heritage trail. Development here would in fact retain a greater gap between Keynsham and Saltford along the A4 (the key element in this location) that doesn't harm the five national purposes of Green Belt or the additional local purpose. Broadmead Peninsula is a better solution in Green Belt terms than closing and narrowing the gap between Keynsham and Saltford south of the railway line, along the A4 and south of the A4. A new Community Forest is planned either side of the national gas pipeline, that will mask any visual impact of the Broadmead Peninsula from the East and prevent merging with Saltford. This is an ideal location for removing land from Green Belt without risking encroachment.

In summary, Broadmead Peninsula should be promoted as a strategic location in the Core Strategy with minimum release of Green Belt and some safeguarded land for employment floorspace and housing in East Keynsham. It will establish a national pathfinder Environment Park for the Circular Economy, create hundreds of new permanent jobs, give access to truly affordable housing for key workers and first time buyers and integrate recreation and leisure space alongside the River Avon.

Introduction

Broadmead Peninsula Concept

Keynsham has been identified as a key, strategic location for redevelopment and the creation of sustainable employment that is less dependent on the Public Sector. As such it is likely that the town will increase in population from 15,553 to around 17,000 by 2021. The Keynsham Town Centre Vision, adopted by Bath & North East Somerset (B&NES) Council includes proposals for the redevelopment of Keynsham Town Centre and edge of town redevelopments that include Riverside and Somerdale. The Vision for Keynsham and the Council's Priorities for Action also identify the need for Creating New Jobs. To help meet this need, The River Regeneration Trust (TRRT) was asked by B&NES to conduct a scoping study into employment and housing opportunities in the Broadmead Peninsula, focussing particularly on the creation of green jobs, which will be used as part of the evidence base for the Placemaking Plan for Keynsham. This will significantly add value to the area and reinforce the economic ambitions of B&NES to create a broad range of employment opportunities for local people, to create sustainable markets for some of their recyclates and to ensure that the approach to employment and housing is sustainable and compliant with National Planning Policy Framework.

Broadmead Peninsula could regenerate existing buildings as flood resilient business units

There is increasing interest in using the river for transport, leisure and relaxation alongside the need to create sustainable local economies, affordable homes and places for leisure and entertainment. Broadmead Peninsula offers a strategic location for sustainable development that is compliant with the National Planning Policy Framework, the Vision for Keynsham and the Council's Priorities for Action. It would provide significant support to the local economy, generate creative tourism, skilled, semi-skilled and manufacturing jobs and affordable homes that are allocated for first time buyers and key workers. It would also provide facilities for residential, pleasure, visitor and holiday water craft, enhance the local ecology and support existing businesses.

The opportunity for state-of-the-art flood management, hydro power, anaerobic digestion and materials management will contribute to further diversification of established businesses that have been local employers since the 17th Century.

Part of the Avon Valley Adventure & Wildlife Park could be enhanced with a water ecology park

The marina, water ecology park and constructed wetland would add great value to the strategic flood risk management infrastructure, acting as a flood compensation tank to protect down-stream developments and businesses at Broadmead, Keynsham, Somerdale and Bristol. It would serve as a three-tier surface water buffer system, supported by Wessex Water and Environment Agency as a land management solution (not engineered solutions) for the Bristol Avon Catchment Strategy. Broadmead Peninsula has the backing of key stakeholders and landowners, have parking and infrastructure to support Phase 1, will enhance existing business and recreational land use, and will generate least controversy than other locations being considered for essential release of Green Belt.

Early concept design of the constructed wetland and early learning aquatic centre

To help support the sustainability needs of local people and strategic direction of B&NES, the Broadmead Peninsula concept prepared by members of The River Regeneration Trust is to examine the role that it could play in waste, tourism and jobs. Not only does the location benefit Somerdale redevelopment, the transport of waste along the river and providing an alternative tourist honeypot, it would also provide the best location for treatment, reuse, reconditioning, remodelling and remanufacturing of domestic, commercial, industrial, construction and demolition waste in addition to existing recycling activities with no need for energy recovery or disposal. The Broadmead Peninsula concept would add value to the local area and the wider West of England.

Overview of Scoping Study

The Scoping Study of Broadmead Peninsula has been prepared for B&NES Council as part of their Core Strategy and Placemaking Plan. It is to identify the possibility of the area being promoted as a strategic location for employment floorspace, housing and associated transport and infrastructure requirements. The scoping study is to include Outline Proposals for a variety of employment mix (B1, B2 & B8), private and affordable housing, the B&NES Environment Park, as well as opportunities for a marina, constructed wetland, water ecology park, primary school, early learning aquatic centre and associated leisure facilities and services.

The Scoping Study needs to take account of Core Strategy Policies including KE3; 25,000-30,000m^2 additional employment floorspace and 250 additional homes (30% affordable) for East Keynsham to meet overall needs. It also needs to take account of established businesses, employment activities and recreational use of the area, in order to demonstrate how the site could easily accommodate a significant increase in employment floorspace and 250 homes with existing capacity in peak hour using existing infrastructure. On this basis it could be allocated to meet Core Strategy employment and housing need as an urban extension of Keynsham, connecting the river to the town with minimum release of Green Belt. The scoping study also needed to identify a Master Plan opportunity for significant development to deliver green jobs, an Environment Park, improved water sewerage capacity, development of increased recreational activities and a further 500 homes, which can all be brought forward in a sustainable location close to the town centre. This would need to incorporate new infrastructure such as a new road, junction improvements and demonstrable access to the site.

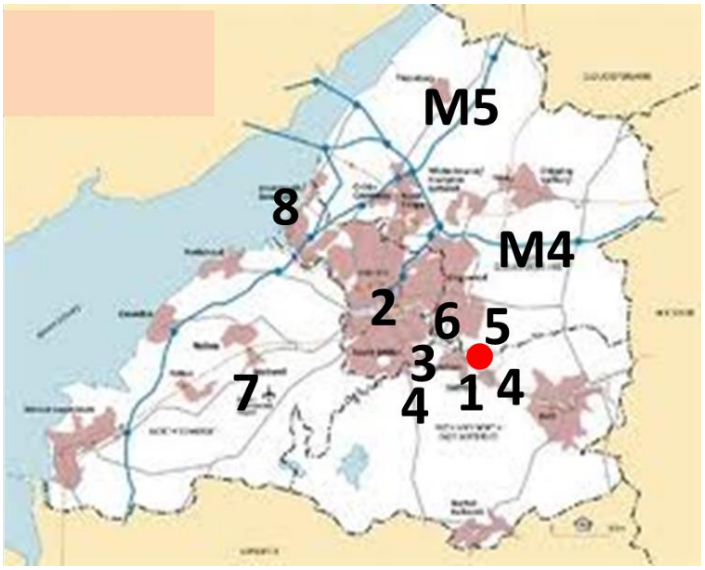
It should be noted that whilst the focus of the Scoping Study was to be on jobs, there was an understanding that a quantum of housing was needed in terms of viability and delivery. The Outline Proposals would therefore need a balanced approach with a mixed community that could reduce out migration and loss to the local economy. The Scoping Study would also need to demonstrate that the Outline Proposals were in tune with sustainable development and land reclamation, where there was opportunity to build upon existing facilities that are in close proximity to the town that can create a transition of development towards the river. In this way, Broadmead Peninsula could be shown to reduce inner density by moving towards edge of town recreational facilities which serve the urban area. Our Outline Proposals (initial master-plans) should also look at complementary land uses, many of which suppress the need to travel. Creating long-term jobs on Broadmead Peninsula would reduce the need for Keynsham residents to ‘out-migrate’ in the morning peak and returning in the evening peak. This would benefit Keynsham becoming a self-sustainable community and in transport terms creating a release of some local highway capacity.

Ultimately, our Outline Proposals for integrated development for employment floorspace, homes and enhanced leisure facilities would need to help drive local economic stimulus and enhance the viability of shops and services in the town, including the high street, as well as providing additional revenue to local public transport operators. This multiplier effect is an important consideration throughout the Scoping Study, ensuring that Broadmead Peninsula complemented and not compete with the town or Somerdale, which would in-turn allow Keynsham to further invest in infrastructure and services, providing a more sustainable community and reducing the need to travel by road.

This is not a comprehensive report; rather it is a first step for TRRT in identifying strategic locations along the River Avon Corridor and to advise B&NES and the West of England what is feasible, deliverable and should be given due consideration in planning and Major Projects. Similarly, to provide landowners and interested parties a concept design for their further consideration, a phased Master Plan and planning applications to B&NES Council that is in tune with their strategic thinking.

Outline of Study Area

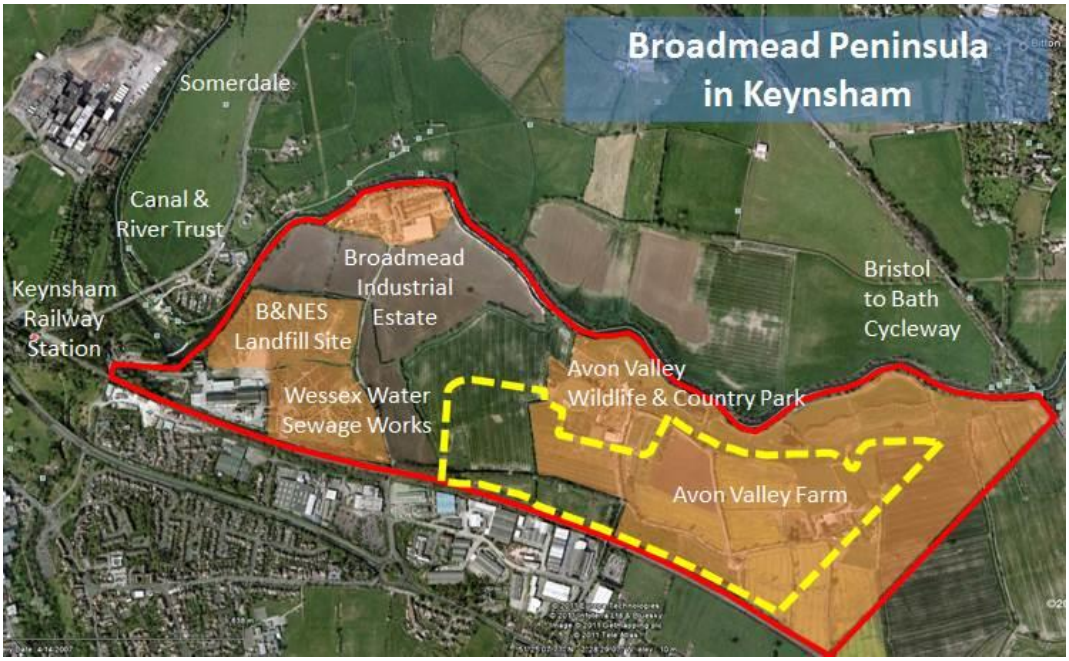
Broadmead Peninsula in Keynsham is a strategically important transport location in the West of England (WoE), shown as a red spot in the figure below. The Broadmead Peninsula provides wide-reaching opportunities for strategic movement of passengers and freight by river and rail modes rather than by the highways. This would bring decongestion and environmental benefits to the town, as well as providing improved bus reliability. These benefits will stretch as far and wide as the A4 trunk road (1), Avon Ring Road (2), London to Bristol railway line (3), River Avon & River Chew (4), the Bristol-Bath National Cycle Route (5), local and strategic bus routes (6), Bristol Airport (7), the eventual Avonmouth Deep Port (8) as well as two major motorways the M4 and M5.



Location of Broadmead Peninsula in Keynsham within the West of England boundary

It is worth considering the important geographic location of Keynsham and Broadmead Peninsula in the wider West of England (WoE), including the bordering counties of Bristol, South Gloucestershire and North Somerset. The WoE has a population of 1 million people with 500,000+ jobs, 4 world class universities, 67,000 university students and 83,000 college students. There are 28 million day visitors and 3.1 million overnight trips annually, generating £1.8 billion annual from tourists. Tourism alone employs 55,000 people and 3.2 million visits to the top ten visitor attractions. The integrated, enhanced and sustainable development proposed for the Broadmead Peninsula could play an evolving and important role in this growing population and interest in tourism, with all the inherent jobs needed for leisure, entertainment and housing. Broadmead Peninsula provides geographic opportunities for Keynsham not only as an independent and thriving town, but one that is firmly fixed in serving the needs of the community and future proofed in a circular economy world.

Broadmead Peninsula in Keynsham (red solid line on the figure below) is approximately 105 hectares (260 acres) of land that incorporates Broadmead Industrial Estate, Wessex Water sewage treatment works, B&NES landfill site, Avon Valley Farm. Avon Valley Adventure & Wildlife Park, Bendalls Farm, DS Smith Recycling and some smaller land interests. It is in north east Keynsham, east of Somerdale and situated between Bath and Bristol. It is close to the River Avon and close to the main railway line and local highway routes. It is bounded by River Avon to the north, railway to the south, river to the west and the national main gas pipeline to the east.



Broadmead Peninsula boundary for the Scoping Study

The yellow dashed line on the figure above identifies East Keynsham plots A1, A2 and A3, as defined in Option 1 of Arup's East Keynsham Development Concept Options report (A1-A3). This was used during the Core Strategy Representations, Strategic Housing Market Assessment, Strategic Housing Land Availability Assessment and the Schedule of Changes for the Core Strategy. In fact the Environ Sustainability Appraisal (2013) considered this area the ''…most suitable to accommodate the strategic levels of development'', favouring plots 19 (Broadmead Peninsula, Arup A1-A3) and 21 (south west of the A4, Arup C2-C4) in Cell M (East Keynsham) where there is low to moderate sensitivity or impact. As Environ suggest, ''Provided care is taken to avoid impact on buried sites such as the known Roman site near the Country Park development is unlikely to result in a significant negative impact''.

Environ land plots for Cell M (left) and Arup land plots for Option 1 (right) used in this report

Broadmead Peninsula

1. Existing Information

POLICY KE3 Land adjoining East Keynsham

Policy KE3 of the Core Strategy considers land to be removed from the Green Belt in Keynsham by the Placemaking Plan in order to provide for development of around 250 dwellings, 25,000-30,000 m^2 of employment floorspace and associated infrastructure up to the year 2029. The Placemaking Plan will allocate a site for development and define a revised detailed Green Belt boundary. The key planning requirements included in KE3 are repeated in full here:

a. Mixed use development to include 25,000-30,000 m2 of employment land in an expansion to Broadmead/Ashmead/Pixash Industrial Estate and around 250 dwellings in the plan period.
b. Be developed to a comprehensive Master Plan, reflecting best practice as embodied in 'By Design' (or successor guidance), ensuring that it is well integrated with Keynsham. Dwellings should face onto the open countryside and create an attractive boundary treatment.
c. Ensure that the principles and benefits of Green Infrastructure contained in the Green Infrastructure Strategy and other guidance and best practice are embedded in the design and development process from an early stage. Key requirements include provision of habitat connectivity through the retention and enhancement of the existing high valued habitat; provision of well integrated green space (formal, natural and allotments); provision of cycle and pedestrian links through the site connecting to the existing network particularly towards Keynsham town centre, Clay Lane Bridge and NCN4; and provision of well integrated Sustainable Urban Drainage Systems. All watercourses running through the area should remain open and will need to be incorporated into development proposals.
d. Appropriate site assessment and ecological surveys to be undertaken to inform site Master Planning with particular attention to potential impacts to protected sites and priority species. Species rich hedgerows, ponds, ditches and trees should be retained and enhanced, and habitat suitable for priority species provided as required.
e. Identify and assess the landscape character, landscape features and significant view points and the likely effects of development on them. Protect and enhance these aspects and mitigate to avoid or minimise the effects. Significant aspects of landscape include the character of the Avon Valley; trees and woodland, tree belts, hedges and field patterns; Ellsbridge Historic Park and Garden; and Manor Road community woodland. Significant viewpoints include local properties; long distance views from the Cotswold escarpment; the River Avon Trail; local Public Rights of Way; and Manor Road community woodland.
f. Assess and evaluate any direct or indirect impacts on designated heritage assets and their visual/landscape settings. Prepare and implement management schemes (including avoidance or physical separation) in order to mitigate the impacts of development and ensure the long-term protection and enhancement of the designated heritage assets and their settings. Designated heritage assets potentially affected by development at this location include Keynsham Manor (Grade II), manor West (Grade II) and Elsbridge House (Grade II).
g. Assess and evaluate any impacts on non-designated heritage assets. The degree of harm to or loss of non-designated heritage assets will be balanced against the positive contribution made by the development and the extent to which harm/loss can be mitigated. Non-designated heritage assets of equal significance to designated heritage assets will be subject to the same considerations as designated historic assets. Non-designated heritage assets

potentially affected by development at this location include Medieval Keynsham Manor and fishponds, Prehistoric and Roman occupation, and Elsbridge House (local Park and Garden).

h. The assessment and evaluation of the above designated and non-designated heritage assets should also consider their cumulative or collective "group value" and also understand the heritage assets' relationship to other environmental considerations such as landscape, historic hedgerows, ancient woodland and ecology.

i. Ensure good public transport provision particularly towards Keynsham town centre, the railway station and other local facilities and services.

j. Provision of routes crossing the A4 for pedestrians and cyclists.

k. Development should scope potential for and incorporate renewable energy.

l. Educational needs generated by the development must be met; a primary school is to be provided on site, unless an alternative solution can be found and agreed with the Education Authority.

m. Provide integrated waste management infrastructure.

n. New water mains and sewer site connections required, including separate systems of drainage and downstream sewer improvements to critical sewers.

Similar design to the primary school being proposed for Broadmead Peninsula

This reiterates in detail what POLICY KE1 in the Keynsham Spatial Strategy suggested, that there is a need for some releases of Green Belt land to the east of Keynsham to accommodate employment and housing growth. It was also important that projects being proposed for the released land should make better use of the existing green and blue infrastructure (e.g. parks and rivers) running through and surrounding the town which should be enhanced, made more accessible and linked up. The Broadmead Peninsula aims to achieve this.

Employment Floorspace

In terms of economic development, the Core Strategy suggests that Keynsham should plan for about 1,600 net additional jobs in 2011-2029 and make provision for the changes in employment floorspace to include:

- Office floorspace from about 13,000m2 in 2011 to about 20,200m2 in 2029
- Industrial/Warehouse floorspace from about 52,000m2 in 2011 to 60,300m2 in 2029 to address future requirements arising in Keynsham and Bath

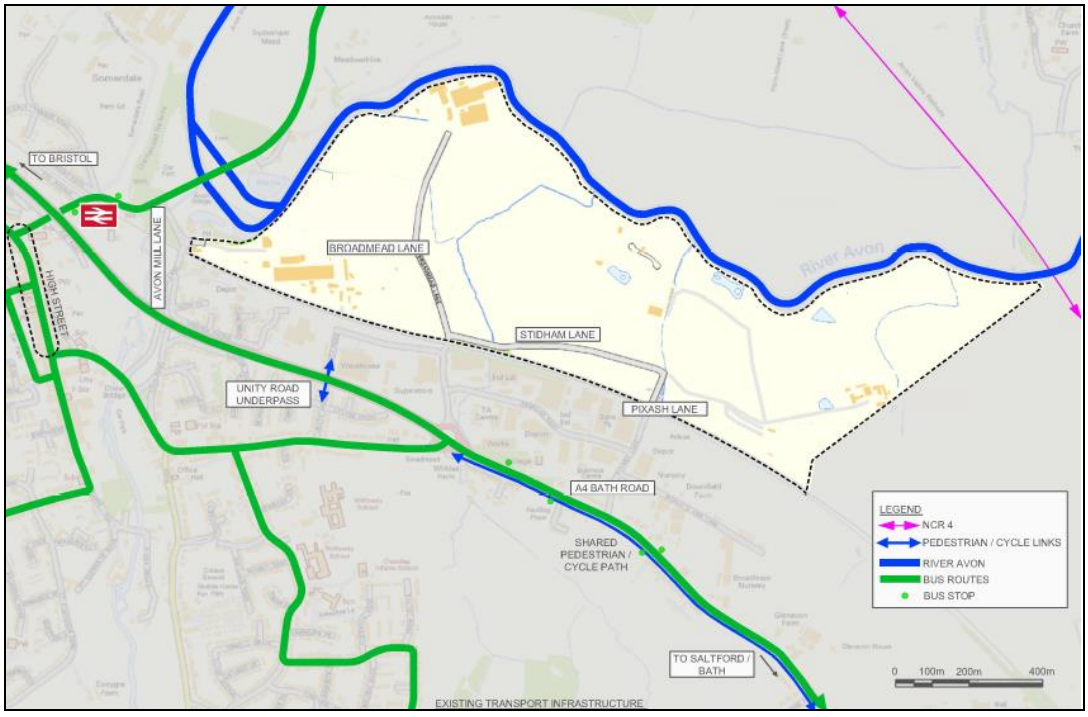
- Retain and extend the Broadmead/Ashmead/Pixash Industrial Estate as an area for business activity (use classes B1, B2 and B8) complementing the role of the town centre and enable its intensification through higher density business development
    - B1 - Offices (but not for banks, building societies, estate agents, employment agencies, betting offices), health and medical services, research and development of products and processes, laboratories, high tech, any industrial process appropriate in a residential area
    - B2 – General industrial process other than one falling within classes B1, B3 (special industry A) or B7 (special industry E)
    - B8 – Use for wholesale warehouse, open air storage, distribution centre or repositories

These will be in addition to existing businesses in the area; Broadmead Peninsula currently contains a number of small and micro businesses, facilities and services.

Existing Transport Infrastructure and Services

The Peninsula is situated to the north of the Bristol Temple Meads to London Paddington rail line and is surrounded on three sides by the River Avon. The Peninsula can be accessed by road via the Pixash Lane (low capacity) road bridge which links into the A4; via the rail underpasses at Broadmead Lane and Unity Road (which also feed onto the A4) and from the west via Avon Mill Lane with a road link that accesses the recycling facility (see map below).

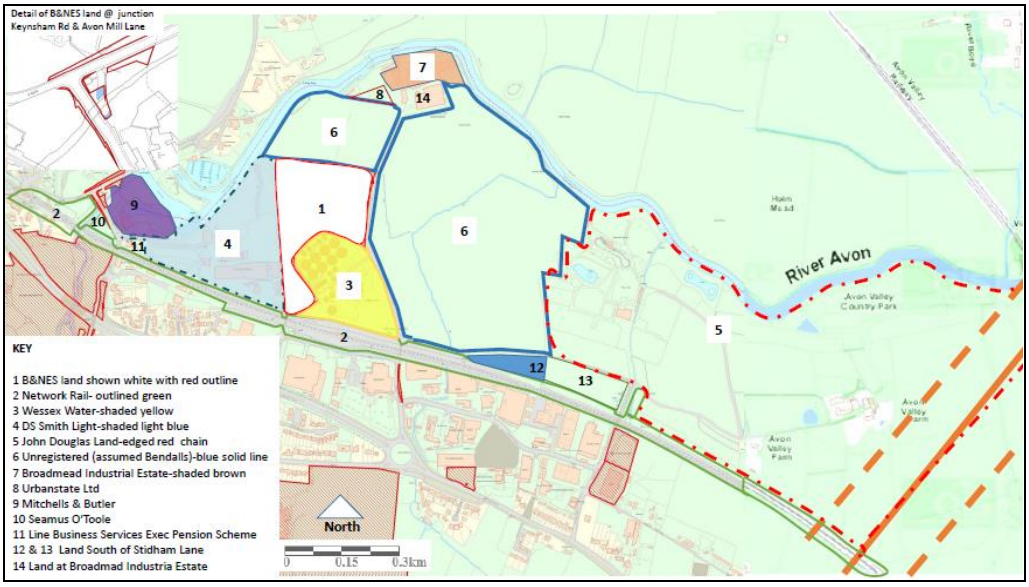
There are a number of high frequency local bus services that can be reached within a short walk if the Broadmead site – bus stops are located on the A4 and along the A4175. Keynsham rail station which offers services between Bath and Bristol (and beyond) is situated to the south west of the Peninsula. Local segregated cycle routes operate along the A4; to the south of the site into Keynsham and National Cycle Route 4 runs to the north east of the proposed development area. There is a network of footpaths, including along Unity Road and under the A4, and rights of way. The River Avon offers another potential movement corridor.



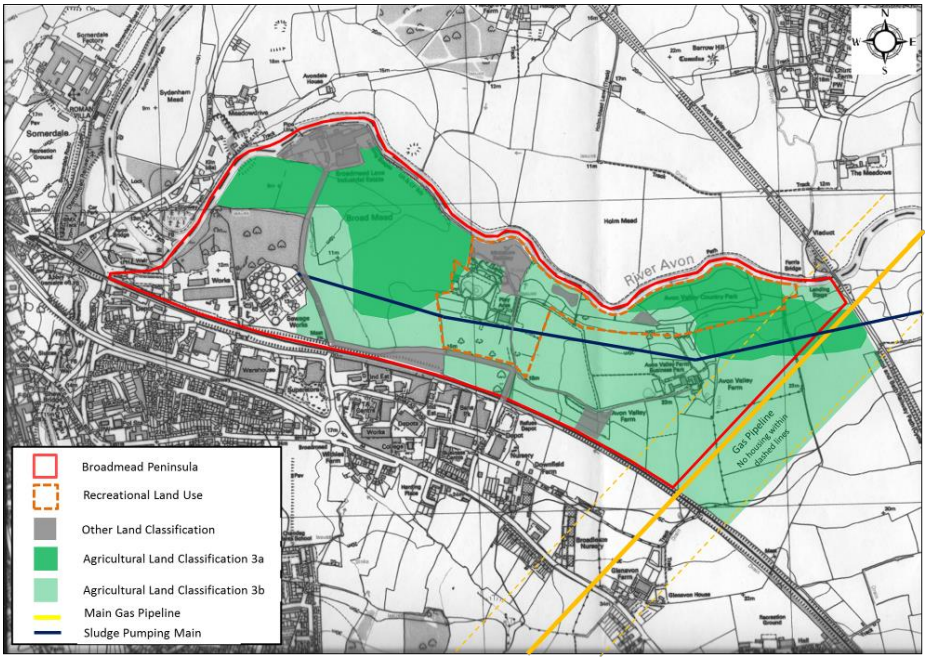
Current transport network around Broadmead Peninsula

Existing Land Ownership, Use & Agricultural Land Classification

The following two maps show existing, known land ownership and land use/classification on Broadmead Peninsula, which is primarily for agricultural, industrial or commercial use. There are a number of major facilities including DS Smith Recycling, Broadmead Industries, Wessex Water sewage treatment works, B&NES landfill site, two farms and a small number of houses. Some of these businesses are in the Green Belt, but in a much less conspicuous location than other plots being promoted in East Keynsham and arguably elsewhere. The second map below shows that most of the land not classed as Industrial or Other (in grey), is either Agricultural Land Classification 3b (light green, developable) or 3a (dark green, should be safeguarded for crops). One area is already classed for Recreational Use (within the orange dash line), which currently accommodates part of the Avon Valley Adventure & Wildlife Park.



Current Land Ownership by registered and unregistered plots



Current land use type and Agricultural Land Use Classification

Existing Ecological Priorities

There are a number of important ecological features that warrant retention and/or further survey. These were identified in the Preliminary Ecological Survey & Assessment of Broadmead Peninsula completed by Bristol Regional Environmental Records Centre (BRERC) and commissioned by B&NES:

- River Avon SNCI (designated site)
- Broad Mead field SNCI (designated site)
- There are a number of Target Noted trees in fields and hedgerows that may harbour nesting birds, bat roosts and insect populations
- Hedgerows with seven or more specified woody species qualify as “important hedgerows” under the Hedgerow Regulations 1997
- All hedgerows surveyed in this area were composed predominantly of native species and therefore meet the criteria for UK BAP Priority Habitat Hedgerows
- The stream and pond are likely to meet Priority Habitat status
- A Badger Sett
- An area of Marshy Grassland/Tall Ruderal vegetation
- A compartment of mature Pine trees with native understorey that represents a buffer from the Great Western mainline railway

In addition to the Target Noted areas identified for further survey, it was also recommended that other areas were subject to further detailed survey if likely to be affected by development. Such areas may also warrant protection with buffer zones to reduce any potential impacts.

Green Infrastructure Priorities

Broadmead Peninsula will play a vital role in the Green Infrastructure Strategy of B&NES, where valuing people, place and nature is the vision. The Bristol Bath Railway Path and the River Avon & Canal Corridor are two emerging geographical projects that will benefit from the wetland mosaic, green corridor and community woodland in our Outline Proposals as green and blue infrastructure. These will provide green space (formal, informal & allotments), enhance established hedgerows and maintain a landscape buffer between Keynsham and Saltford. This will include educational material and Nature/Heritage Trails to add to the Access to the Outdoors Information Project. Together these will add value to the People, Place and Nature of the Broadmead Peninsula Green Infrastructure, where there will be ‘’…a particular focus on activities that benefit children, older people and others with restricted mobility, and improving community access to nature.’’ (Valuing People, Place and Nature, B&NES, 2013)

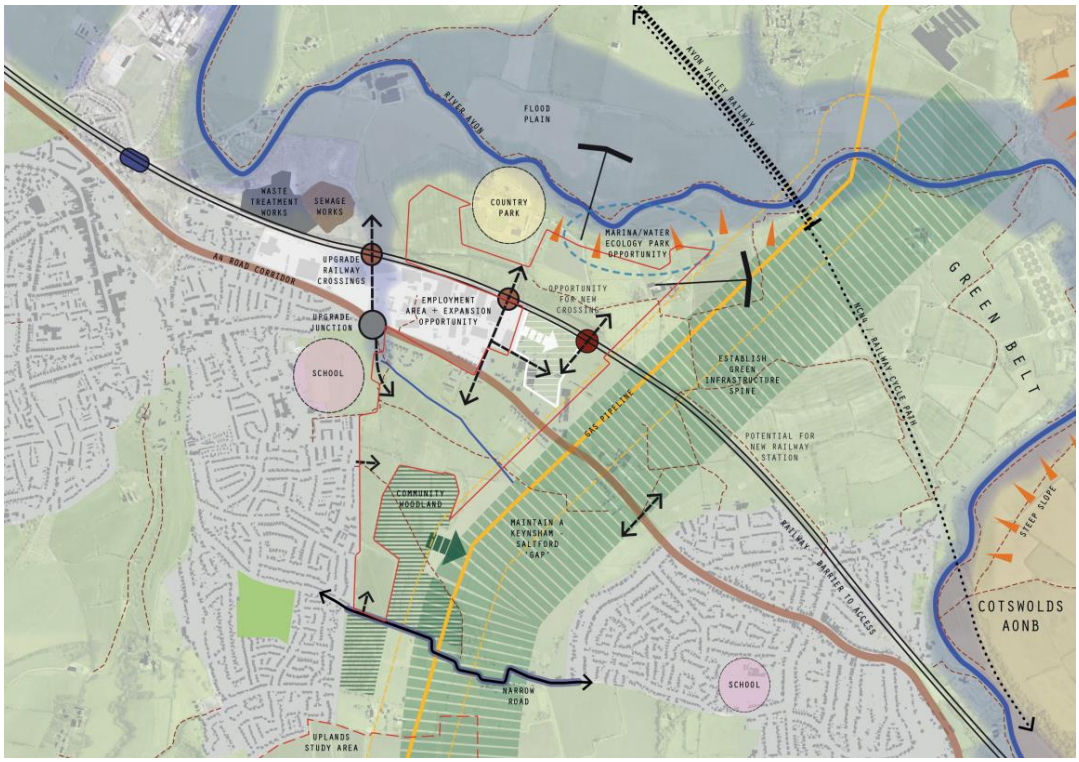
Existing Housing Need

In terms of housing, there is a need to make provision for around 2,100 new homes between 2011-2029, including affordable housing and an appropriate housing mix to meet the needs of the local community. Housing need for Keynsham has been defined by B&NES Council using the District border of B&NES as their Housing Market Area. This need will be reviewed in 2016 as part of the proposed Strategic Housing Market Assessment for the West of England, when the B&NES HMA will be deemed to be either a component part of the West of England HMA or as an neighbouring HMA. There is currently no data available to determine the extent of unmet need within the B&NES HMA or Bristol HMA, which both have a weighting on the housing need within B&NES. Until at such time that this unmet need has been ascertained, the housing need within B&NES is as recorded in their Core Strategy subject to a planned review.

The housing numbers for A1-A3 have been guided by those included in the Arup East Keynsham Development Concept Options report and aligned with the proposals under consideration within the Core Strategy Hearings. A minimum of 250 additional houses are being sought to meet local needs.

Housing Availability

The Arup East Keynsham Development Concept Options report included as evidence in the Schedule of Changes consultation assessed the key constraints and opportunities, gross developable area and net housing quantum for plots A1-A3 (shown in figures below). This clearly shows that our proposed housing numbers included in the Outline Proposals within this report is well within their calculated numbers. These also take into account an 80% efficiency factor and a lesser 35 dwellings per hectare ratio. This was further verified in the Strategic Housing Land Availability Assessment which identifies that developable land is available for housing in Plot A1-A3 in East Keynsham; albeit any impact on the urban and landscape character would need to be lessened during development. Our Approach, Delivery Strategy and Action Plan is clearly defined in this Scoping Study, taking account of the essential recommendations of the Arup East Keynsham Development Concept Options report, Environ Sustainability Assessment and the Strategic Housing Land Availability Assessment.



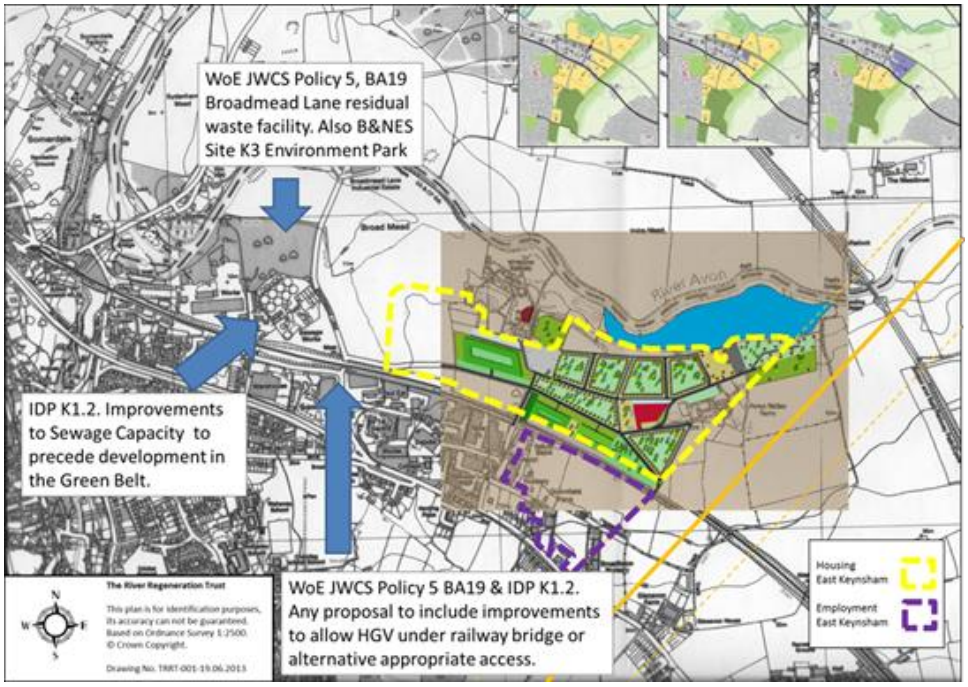
Arup East Keynsham Constraints & Opportunities Summary (2013)

	Gross developable area (Ha)	Density (dwellings/ Ha)	Total housing quantum	Site efficiency factor	Net housing quantum
A1	9.8	35	343	80%	274
A2	6.8	35	238	80%	190
A3	13.2	35	462	80%	370
PLOT A	*29.8*	*35*	*1043*	80%	*834*

Arup Residential Development Quantum for A1-A3 Plots (2013)

Housing Location in A1-A3

The location of the housing and residential houseboats aligns with the three options proposed by Arup in their options and constraints detailed in East Keynsham Development Concept Options report, submitted as part of the Schedule of Changes to the Core Strategy. This is complemented by three key infrastructure items, also included in the Core Strategy and as evidence in the consultation process. The diagram below identifies these infrastructure items, the three options proposed by Arup and location of housing and houseboats within Arup's A1-A3 plot (yellow dashed line).



Early CityCAD design to fit the East Keynsham plots A1-A3 and Key Infrastructure Items

Landfill, Material Wastes & B&NES Environment Park

The table below shows a summary of key waste streams within B&NES, WoE and the South West; waste class by location in 2007/08 and forecast for 2020 where data exists (tonnes).

	2007/08			2020
	B&NES	**WoE**	**South West**	**WoE**
Municipal Solid Waste (MSW)	79,000	541,353	2,574,000	662,055
Construction & Demolition (C&D)	70,000	2,482,356	12,620,000	3,104,464
Commercial & Industrial (C&I)	180,000	932,734	5,083,000	1,166,488
Hazardous	1,000	84,652	353,127	109,043
TOTAL (tonnes)	330,000	4,041,095	20,630,127	5,042,050

B&NES, West of England & South West Key waste Volumes and Prediction

Interestingly, MSW is only 13% of overall waste which corresponds with B&NES, and that only 43% of this is recovered for recycling, composting etc. (see table below). For Commercial and Industrial waste only 34% is recycled, the remainder mostly going to landfill. Only 60% 0f Construction and Demolition waste is recycled (mostly as inert materials), the remainder going to landfill or exempt sites. There is an urgent need for a better understanding of the mass balance within B&NES.

Household Waste Summary (Tonnes)	2007/08	2008/09	2009/10	2010/11	2011/12
Total Household Waste Collected	79,430	80,041	77,779	74,728	74,718
Total Household Waste Recycled	21,464	20,550	20,752	21,679	22,383
Total Household Waste Composted	12,647	13,540	12,221	12,611	16,479
Total Household Waste Landfilled	44,942	46,150	44,579	40,422	30,656
Total municipal waste landfilled (includes household and commercial waste)	55,507	52,743	50,660	45,603	33,767
Percentage of domestic waste sent for recycling or composting	42.94%	42.59%	42.39%	45.89%	52.01%

The figure below shows the current destinations for B&NES recyclates and the distance travelled:

Destination for B&NES Recyclates, B&NES Connect, Summer 2013

The West of England Partnership (B&NES, Bristol, North Somerset and South Gloucestershire) have very few facilities for dealing with residual waste - the left over waste that cannot be reused, recycled or composted. Currently this is sent to landfill sites elsewhere in the country, wasting a potential resource and damaging the environment. Together the Joint Waste Core Strategy for West of England (2010), evidence gathering for B&NES Infrastructure Delivery Programme (Waste Services), the Joint Residual Municipal Waste Management Strategy (West of England 2008) and B&NES Waste Strategy Towards Zero Waste 2020 (2005) indicate a clear requirement for a materials recovery facility that would lend itself to an state-of-the-art Environment Park. Our Outline Proposals include a locally sited Manufacturing Eco Park to service the Circular Economy.

The B&NES Infrastructure Delivery Programme (IDP) February 2013 includes Broadmead Lane Residual Waste Management Site (KI.15) and Relocation of Waste Transfer Station to Pixash Lane (KI.19). The IDP also states that the Broadmead Lane facility is likely to come forward for development led by the private sector and/or the waste industry, who would provide the facility and charge gate fees for receiving and treating waste including commercial and industrial waste from businesses. The IDP goes on to say that some types of treatment facilities for residual waste and other segregated waste streams such as food waste, including from businesses, restaurants, catering companies etc., may also be proposed by a range of developers in combination with renewable energy supply. It is expected that residual waste facilities will be funded by private operators, partnership developments and Green Investment Bank.

Broadmead Lane access to Keynsham sewage treatment works and B&NES landfill site

The B&NES landfill site at Broadmead Lane (BA19) has been identified as one of two locations to locate a Material Recovery Facility (MRF) as part of the West of England Joint West Core Strategy. The site covers 4.49 hectares west of Broadmead Lane and above the Keynsham sewage treatment works of Wessex Water. Access to the site is currently restricted and any development would need to incorporate improvements to allow HGV access and the needs of pedestrians, as well as flood mitigation measures, decontamination of land, land stability and nature conservation constraints. The Joint Waste Core Strategy seeks to deliver 85% diversion from landfill of municipal, commercial and industrial wastes through recycling, composting and residual waste treatment. A minimum of 50% of this total is to be recycled or composted, the remaining 35% through residual treatment.

Improved HGV access to the site will replace the existing use of Pixash Lane Bridge by HGVs

The B&NES IDP also recognises that Broadmead Lane is allocated in the B&NES Local Plan for waste management purposes as well as considered appropriate for residual waste treatment development in the West of England Joint Waste Core Strategy. It notes specific infrastructure that is required in order to bring forward this site to include:

- The existing access is inadequate. Traffic management and highway improvement measures are required at the railway bridge to facilitate access including for HGV movements, pedestrians and cyclists, or to provide alternative access.
- Topographical survey together with hydraulic and hydrological studies of bridge improvement area (and any infrastructure that is required as a result) having regard to flood flow and flood storage capacity in order to ensure safe access to the site
- Appropriate remediation of potential land contamination

2. Outline Proposals

Relationship with Keynsham

The town centre of Keynsham is within 400m of the western end of Broadmead and within a 10 minutes cycle ride from its eastern extremities. Easy access is provided along the riverside path beside the River Chew to within a few metres of the main shops. Keynsham High Street is facing a challenging future similar to most towns in the UK. No doubt strategies moving the focus from retailing to social activities will be attempted, but the reality is that the more people living in the catchment area, the more chance of them spending money in the local High Street.

Bristol and London have both shown how a high street like Keynsham can be regenerated in less than a decade, about the same time it will take to create homes and businesses for more than 1,000 new customers from Broadmead Peninsula. These new residents of the Peninsula will provide a local and hopefully prosperous market for the High Street, to help boost local trade and employment but most importantly boosting the confidence in Keynsham as a high quality, vibrant and lively place to live. Besides residential, the aim is to build off the activities that already take place on the Broadmead Peninsula to create socio-economic benefits for the whole of Keynsham.

There are currently four access roads into the site under and over the rail line. Most of these are narrow, single archway accesses which are limiting, however a one way system is possible to at least facilitate the additional vehicle movements created by the first phases of development. Most of the Peninsula is within walking distance of Keynsham rail station providing an opportunity to create new homes and jobs with the minimum impact on new vehicle movements. There is also the possibility of reviewing the position of the station in order to increase its capacity and its attractiveness as a public transport hub with connections to bus, bike and possibly river borne routes. This potential moving of the station is possible due to the need for Network Rail to respond to the challenges of the planned electrification process and the pressure to provide a third line through Keynsham station. Network Rail have also indicated a willingness to participate in a feasibility study into the potential to facilitate rail transported freight, potentially linked to a regional waste facility at Filton. Transport issues are covered in more detail below.

Development Objectives

In creating a Master Plan for the Broadmead Peninsula, TRRT will consider the following objectives:

- Work with and add to the natural capital (environment & ecosystems) of the Peninsula
- Build on the history of the past and create the next layer, clearly building off what went before and is now
- Acknowledge the natural patterns of vegetation. These are often a good hook with the past and create a relevant geometry for the future
- Recognise the existing natural bio-systems and use them as a natural platform for future growth
- Re-use roads where possible in order to help preserve the patterns of the past and enhance them for the future
- Aim to create deliberate centres for community interaction based on activities such as the farm shop/ post office/ community hub

It is intended also to satisfy the following objectives and across the three Zones (table below):

- Reduce the migration issues of Keynsham by providing homes appropriate to those with local jobs and providing jobs for those with local homes
- Provide a safe and secure community capable of thriving with minimal reliance on externally produced power and other resources
- Provide business space for those people seeking to work near home especially those in innovative green jobs sectors
- Facilitate the creation of communities where social inclusion, caring for others, respect for the environment, and a culture of 'neighbourliness' pervades

Zone	Current Occupiers	Potential Development Gross Floor Area (GFA)	Targeted Jobs
Avon Valley Waterside Park	Avon Valley Adventure & Wildlife Park/Avon Valley Farm	60 acres 65,000m^2 employment floor space 500 new housing and affordable homes, 80+ houseboats	140 jobs in serviced offices and units for business start-ups, local trades-people, farm industries, farm foods, education, marina, wetland, live work studios
East of Broadmead Lane	Broadmead Industrial Estate, Bendalls Farm	20 acres 20,000m^2 of employment floor space 150 new housing in 'loft space' and live-work units similar to Paint Works in Bristol, possible marina	50 jobs in offices, self-storage, waste collection, small trades, repairs & maintenance, local courier
West of Broadmead Lane	Wessex Water, B&NES Landfill, Unity Road Industrial Estate, DS Smith Recycling	30 acres 110,000m^2 employment floor space No housing	380 'green jobs' in materials recovery & processing, product manufacturing, offices, research, education, self-storage, prefabricated systems, recycling, clean tech operations, hydro power, Anaerobic Digester, Micro Heat Grid

Summary objectives for the three zones of Broadmead Peninsula

Avon Valley Adventure & Wildlife Park and Avon Valley Farm

Avon Valley Adventure & Wildlife Park and Avon Valley Farm with its associated 30 starter units are accessible without major infrastructure works. This is principally from Pixash Lane with additional traffic accessing from the existing roundabout on the A4 along Broadmead Lane. Avon Valley Adventure & Wildlife Park occupies the longest length of the river Avon through Broadmead Peninsula with over 1,000m of riverbank. Much of this river bank is visible from the hills to the north, but less so towards the middle of the area and the rail line. The area is mostly out of the flood plain and has good internal infrastructure in terms of tertiary roads and facilities.

The Feasibility Study will examine the expansion of the existing leisure uses, constructed wetland and water ecology park in terms of development permissible within the Green Belt; especially as it already has Recreational Use classification. Outside of the floodplain (which is only about 10% of the

land here, proposals for a mixed community hub, housing, education centre, health centre and business starter units will be promoted. It is proposed therefore that the immediate river corridor can therefore remain in the Green Belt and the only area to come out of the Green Belt is the more southern and less visibly prominent area of the land.

Existing car park and access to the Avon Valley Adventure & Wildlife Park

East of Broadmead Lane

This is the central section of Broadmead Peninsula and its main employment zone. It currently accommodates a number of businesses from B1 offices/ workshops, B2 (manufacturing including steel fabrication), waste management/recycling and boat repairs. There are also houseboats on private moorings. Some of the stone buildings at the Broadmead Industrial Estate are robust examples of industrial archaeology and could be economically convertible to loft/studio space and possibly live work units similar to those at the Paint Works in Bristol. The viability of this will be examined in the feasibility study as a way of improving not just the employment density of the Peninsula, but also to provide a magnet for local entrepreneurs and businesses to become established in a creative environment.

Broadmead Industrial Estate seen from Broadmead Lane with Bendalls' land to the right

To the south of the Broadmead Industrial Estate is an area of farmland which is subject to huge flooding issues with flood waters passing over the land at great speed. Part of this land is being allocated by its owners for a marina. However, all watercourses need to remain open and a substantial watercourse corridor is required surrounding Broadmead Brook and subsidiary ditches, that requires significant attenuation of surface water run-off before discharge to the river. There is also an area of protected wildlife which could be enhanced with biodiversity or restored meadows.

West of Broadmead Lane

This area of Broadmead is closest to Keynsham Town Centre and Keynsham Rail Station. It has good access to the Keynsham Road and then north towards Bitten. There is also an easy route to the south east of the town centre and also onto the A4. Most of the site is owned by DS Smith Recycling, an international packaging business use this site as a regional collection and sorting facility for recycled paper and card. Much of the uses on site are accommodated in buildings that were the former Paper Mill. There is currently no through route across the site, although there is an access to Unity Road opposite the entrance to the Industrial Estate that is not in use at present. DS Smith Recycling is interested in increasing the efficiency of their operations on the site. The northern part of the site is within the floodplain and unsuitable for development, but our proposals include a wetland and hydro power in this area in conjunction with Wessex Water.

B&NES Unity Road industrial estate including a number of small and micro business units

Along the southern boundary of the site is the Wessex Water sewage works which mainly caters for waste from the east (Saltford) and is therefore ideally positioned to service the development of the Peninsula. There is also a possibility of utilising the landfill within the B&NES site and of processing other landfill waste from B&NES and converting it to products and manufacturing in the B&NES Environment Park and Materials Resource Efficiency Institute. This would assist B&NES aspirations to create zero landfill. This could also facilitate plans to reconsider the future of the Midland Road waste site in Central Bath. In addition, there is potential of utilising the sludge generated by the sewage treatment works and organic wastes from landfill, residual waste and by-products from the Environment Park and DS Smith Recycling as feedstock into an Anaerobic Digester and 'Duratrust' type process. This could be organised as a joint venture between B&NES, Wessex Water, DS Smith Recycling and other industrial units alongside a collaborative Micro Heat Grid

Outline Proposals - Options A, B & C (2013-2029)

The three Outline Proposals (Options A, B & C) over the following pages have been created using CityCAD software; this will be complemented with 'By Design' during the feasibility stage. This is a spatial planning software tool developed for early design decisions that accommodate the various elements of a sustainable community. The three phases of development for each Option indicate the types and location of employment floorspace, housing, transport, infrastructure and leisure facilities. In designing the Outline Proposals, we have taken account of other land use requirements such as environment, flood limits, employment type, land use type, ecology, heritage, nature corridors, recreational use, educational facilities and live-work environs.

Early CityCAD design of businesses, housing and constructed wetland

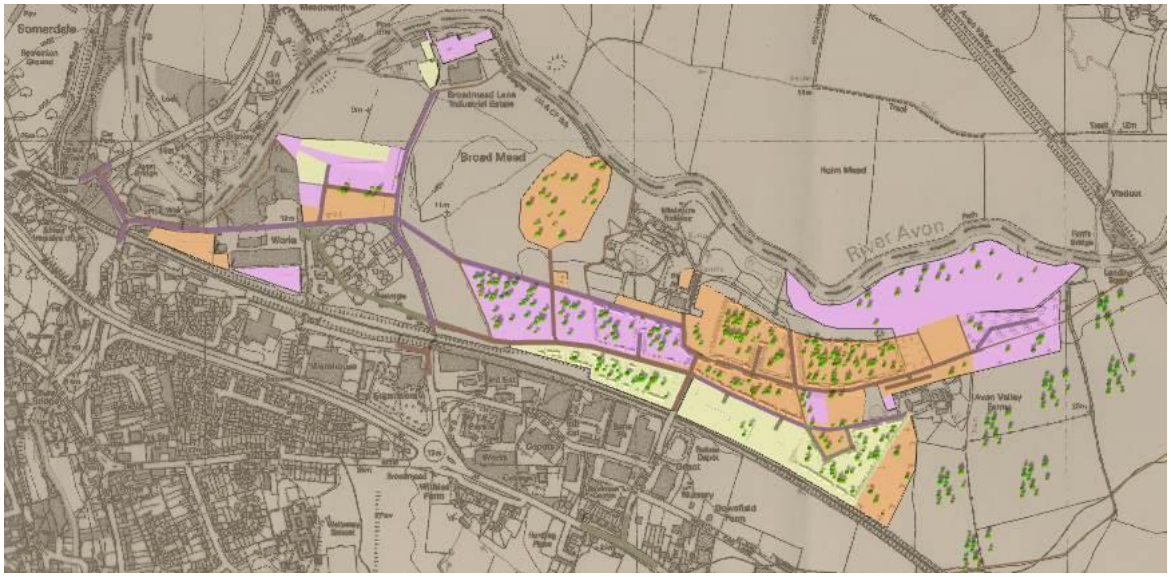
The CityCAD designs and phasing (phases 1-3) are an early impression on the types and location of housing, employment floorspace, infrastructure, transport routes and associated leisure and ecosystem services. However these initial impressions are purely for the scoping study, which will be interrogated and defined in more detail during the feasibility study. They will demonstrate the location and graduation of employment, housing and leisure activities from the railway line to the river bank, which will be promoted during the Core Strategy, Placemaking Plan and Planning.

Early concept design of the water ecology park, nature trail and early learning aquatic centre

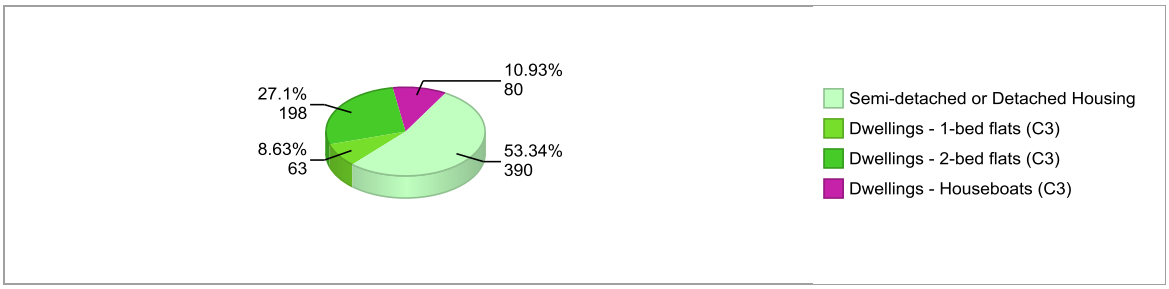
The following four pages summarise three Options A, B & C (2013-2029). A further three pages then summarise Phase 1 only for each Option A, B & C (2013-2019).

Option A (2013-2029)

Option A - Initial Plan



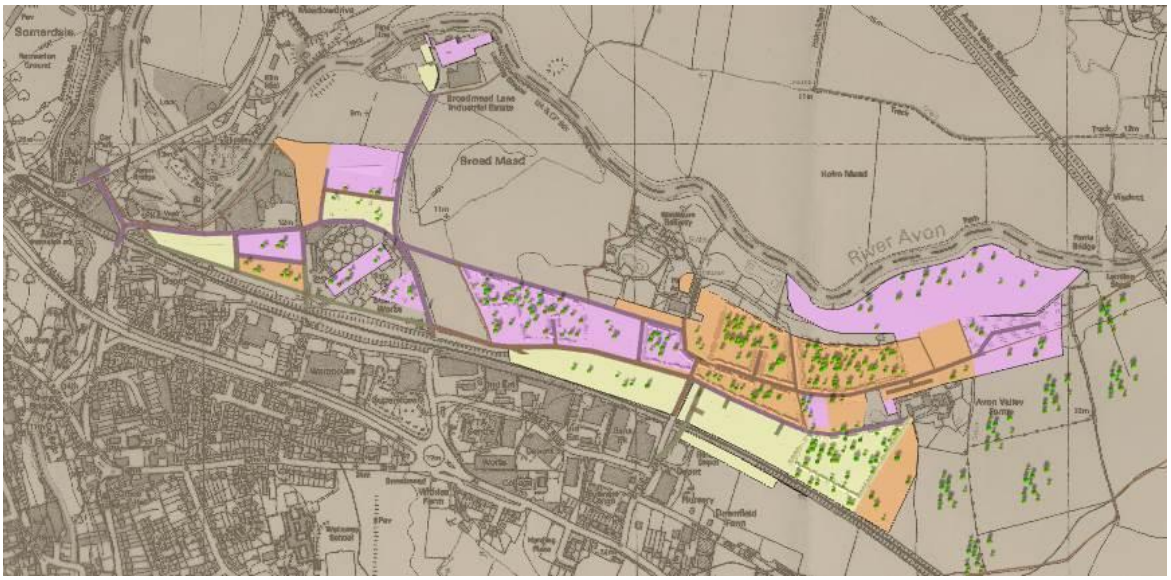
Option A Phases – Phase 1 orange, Phase 2 purple, Phase 3 yellow



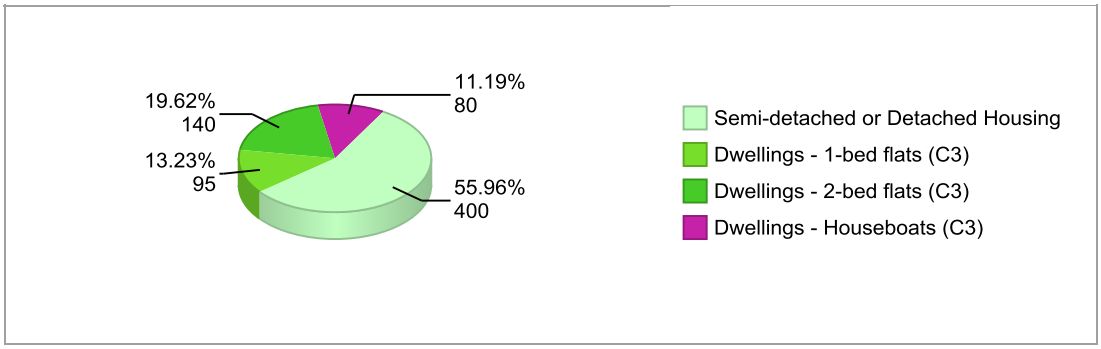
Option A - Housing 731 units

Option B (2013-2029)

Option B - Initial Plan



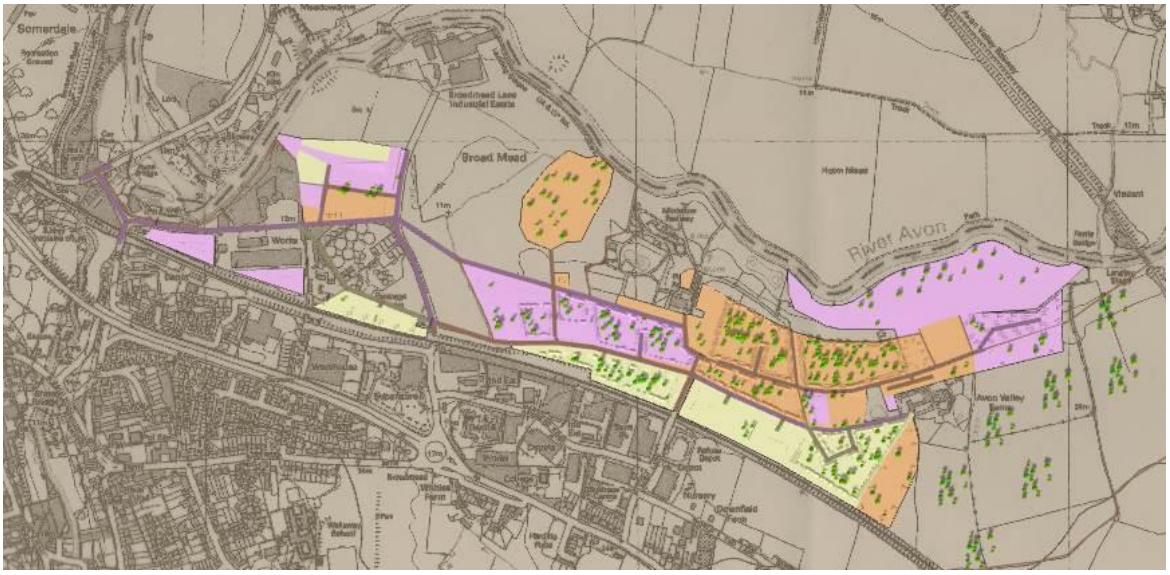
Option B Phases – Phase 1 orange, Phase 2 purple, Phase 3 yellow



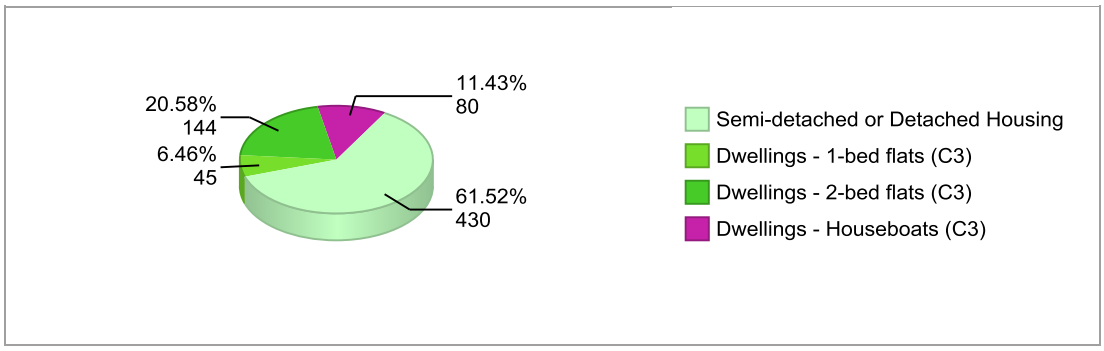
Option B - Housing 714 units

Option C (2013-2029)

Option C - Initial Plan



Option C Phases – Phase 1 orange, Phase 2 purple, Phase 3 yellow



Option C - Housing 699 units

Land Use and Employment Summary (2013-2029)

These are the land use and employment summaries for each Option A-C.

Option A	Gross Floor Area (GFA)			
Land Use Type	**m^2**	**Hectares**	**Acres**	**Jobs**
Housing (C3)	81,793	8.18	20.21	4
Offices (B1)	52,338	5.23	12.93	189
Insustry (B2 & B8)	27,485	2.75	6.79	312
Shops & Hotels	12,077	1.21	2.98	22
Health & Education	12,687	1.27	3.14	20
Leisure	1,478	0.15	0.37	17
Open Space, Marina & Wetland	214,898	21.49	53.10	8
TOTAL	**402,756**	**40.28**	**99.52**	**572**

Land Use & Employment Summary – Option A

Option B	Gross Floor Area (GFA)			
Land Use Type	**m^2**	**Hectares**	**Acres**	**Jobs**
Housing (C3)	78,145	7.81	19.31	4
Offices (B1)	52,735	5.27	13.03	189
Industry (B2 & B8)	17,220	1.72	4.26	312
Shops & Hotels	18,313	1.83	4.53	48
Health & Education	7,993	0.80	1.98	20
Leisure	1,478	0.15	0.37	17
Open Space, Marina & Wetland	151,237	15.12	37.37	8
Rail Station & Sidings	17,857	1.79	4.41	18
Waste Management Facilities	45,499	4.55	11.24	12
TOTAL	**390,477**	**39.05**	**96.49**	**628**

Land Use & Employment Summary – Option B

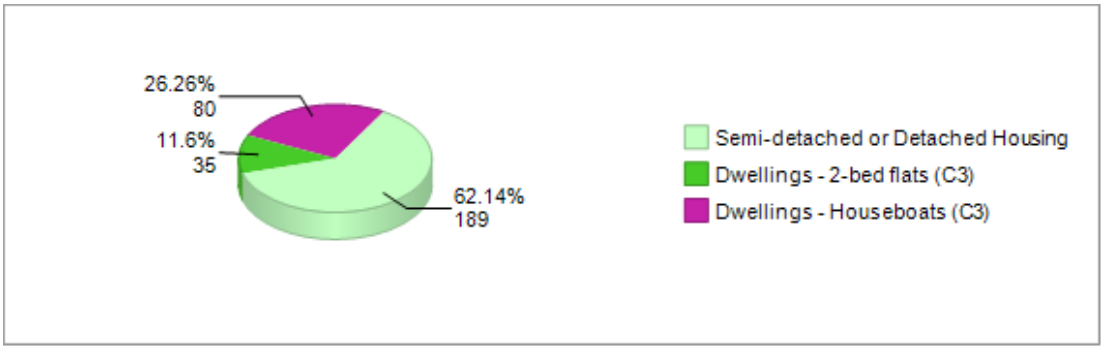
Option C	Gross Floor Area (GFA)			
Land Use Type	**m^2**	**Hectares**	**Acres**	**Jobs**
Housing (C3)	78,478	7.85	19.39	4
Offices (B1)	66,953	6.70	16.54	149
Industry (B2 & B8)	23,544	2.35	5.82	268
Shops & Hotels	12,158	1.22	3.00	22
Health & Education	7,993	0.80	1.98	20
Leisure	2,884	0.29	0.71	17
Open Space, Marina & Wetland	186,124	18.61	45.99	8
Rail Sidings	5,687	0.57	1.41	10
Waste Facilities	5,646	0.56	1.40	8
TOTAL	**389,467**	**38.95**	**96.24**	**506**

Land Use & Employment Summary – Option C

Option A Phase 1 (2013-2019)

The following three pages show the outline design, land use and employment summaries for each Option A-C, but for Phase 1 only.

Phase 1 - Option A Initial Plan



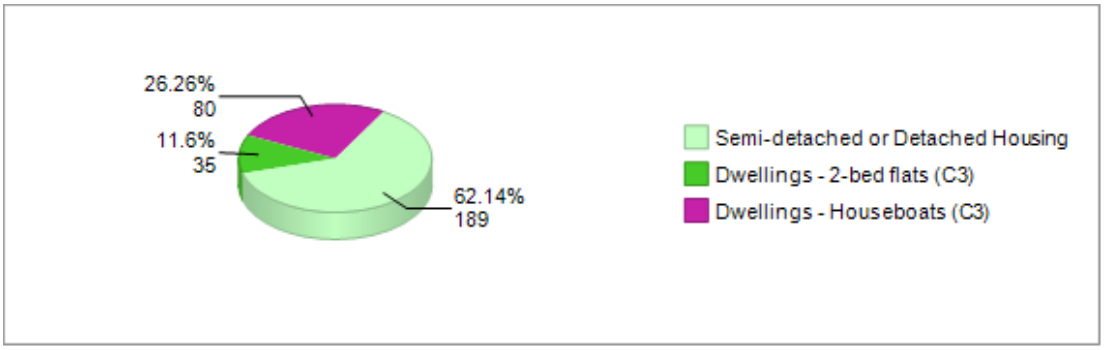
Phase 1 - Option A Housing 304 units

Option A - Phase 1	Gross Floor Area (GFA)			
Land Use Type	**m^2**	**Hectares**	**Acres**	**Jobs**
Housing (C3)	32,012	3.20	7.91	2
Offices (B1)	19,723	1.97	4.87	60
Industry (B2 & B8)	14,011	1.40	3.46	80
Shops & Hotels	8,700	0.87	2.15	16
Health & Education	2,793	0.28	0.69	3
Leisure	0	0.00	0.00	0
Open Space, Marina & Wetland	26,277	2.63	6.49	2
TOTAL	**103,518**	**10.35**	**25.58**	**163**

Phase 1 - Option A Land Use & Employment Summary

Option B Phase 1 (2013-2019)

Phase 1 - Option B Initial Plan



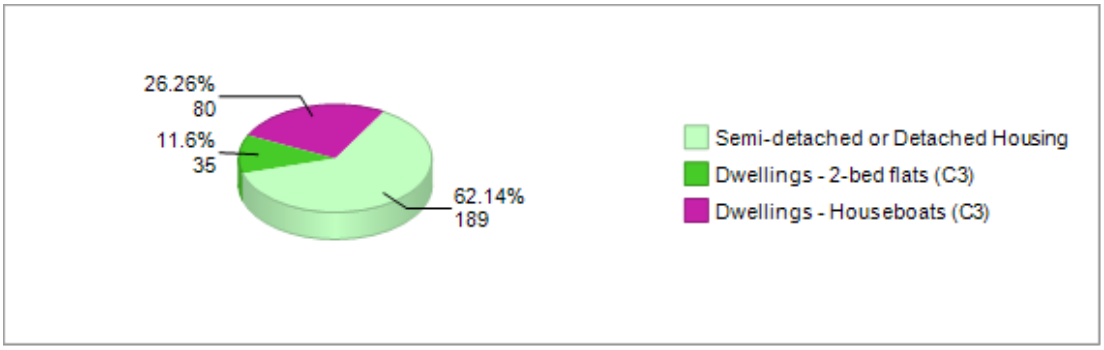
Phase 1 - Option B Housing 304 units

Option B - Phase 1	Gross Floor Area (GFA)			
Land Use Type	**m^2**	**Hectares**	**Acres**	**Jobs**
Housing (C3)	32,019	3.20	7.91	2
Offices (B1)	7,449	0.74	1.84	30
Industry (B2 & B8)	12,311	1.23	3.04	72
Shops & Hotels	14,269	1.43	3.53	30
Health & Education	2,793	0.28	0.69	3
Leisure	0	0.00	0.00	0
Open Space, Marina & Wetland	23,064	2.31	5.70	2
Rail Station & Sidings	0	0.00	0.00	0
Waste Management Facilities	9,329	0.93	2.31	8
TOTAL	**101,234**	**10.12**	**25.02**	**147**

Phase 1 - Option B Land Use & Employment Summary

Option C Phase 1 (2013-2019)

Phase 1 - Option C Initial Plan



Phase 1 - Option C Housing 304 units

Option C - Phase 1	Gross Floor Area (GFA)			
Land Use Type	**m^2**	**Hectares**	**Acres**	**Jobs**
Housing (C3)	32,019	3.20	7.91	2
Offices (B1)	7,449	0.74	1.84	30
Industry (B2 & B8)	9,389	0.94	2.32	65
Shops & Hotels	9,425	0.94	2.33	22
Health & Education	2,793	0.28	0.69	3
Leisure	0	0.00	0.00	0
Open Space, Marina & Wetland	56,844	5.68	14.05	4
Rail Sidings	0	0.00	0.00	0
Waste Facilities	1,038	0.10	0.26	4
TOTAL	**118,958**	**11.90**	**29.40**	**130**

Phase 1 - Option C Land Use & Employment Summary

Circular Economy – Major Employment through Processing, Manufacturing, Storage & Distribution

The three Outline Proposals and designs summarised above, centre on the creation of hundreds of permanent jobs that are linked to the Circular Economy. These will be via processing of material by-products and wastes, manufacturing of new products, use of products to manufacture construction elements and the building of some homes. In terms of sustainability, localism and creating a local skills base for the 21st Century, our proposals embed these activities and new businesses into the regeneration of the Peninsula.

Broadmead Peninsula project will demonstrate how we make better use of materials that are already in landfill or destined for landfill through proven fibre polymer composite processes to make a product range of sheets, insulation panels, boards, beams and blocks. The manufacture of these innovative products will partially replace existing supplies used for manufacturing, construction and marina developments with limited risk to existing markets through an initial market penetration of only 1% - 5%. In this way we not only mitigate the depletion of resources and materials security concerns, we also contribute to the 'low carbon economy' through better management of embodied carbon, natural resources and discarded waste. The associated processing, manufacturing, storage and distribution will demonstrate that returning waste materials to productive use in higher-grade applications is innovative, adds value, is precisely targeted at currently unmet needs and helps developers procure responsibly sourced local materials. With increasing demand to procure materials with higher recycled content and minimise global environmental impact, our products provide integrated solutions for waste, process, manufacturing and construction supply chains that is economically sound and creates a broad range of local, green jobs.

Waste into materials into products into design into construction – the circular economy

There are a number of social, economic and environmental benefits that will accrue both inside and outside the project, not least a spatial economic model of how resource efficiency across the supply chain can 'step and repeat' in other locations at the regional, national and international levels. Broadmead Peninsula will demonstrate that there are better, more sustainable and productive methods of dealing with our 'difficult wastes' that can have multiple lifecycles rather than one lifecycle followed by landfill or incineration – this is the Circular Economy advocated by central governments. The Prototype Development Centre will show that the choice of location and critical selection of supply chain partners and their individual industrial and academic skills can add great value, create green jobs, up-cycle societal by-products and establish behavioural models that make best use of resources and minimise our impact on the environment. It will also show that a commercial, integrated approach to capitalisation of existing resources and commercialisation of materials destined for landfill into higher grade applications will provide sustainable businesses and emerging markets for higher recycled content and responsibly sourced materials. Locally it will help sustain Keynsham with skilled and 21st Century green jobs following the closure of Somerdale.

The Feasibility Study to follow this Scoping Study will provide a clear analysis of the economics of establishing materials processing plant and associated production, manufacturing, distribution and sales of the products, houseboats and pre-fabricated homes to the domestic market. The analysis will assume a Base Case scenario (the expected cost and estimated service lives) for the production of 45,000/m3 of product (10,000 tonnes of feedstock) per annum, alongside two other sized scenarios yet to be decided. The analysis will take into account the following which is not conclusive:

- Investment costs including initial capital costs and capital replacement costs
- Operating costs
- Sensitivity analysis (one at a time sensitivity and a probabilistic Monte Carlo Simulation)
- Analysis of economies of Savings to Investment by increasing the size of the plant
- Investigation of different scenarios varying the price earned from the products and manufactured units as well as size and capacity of the production and manufacturing plant

Similarly, the investment costs considered at the feasibility stage will consist of:

- Purchase of land for best-fit siting of buildings, storage and distribution
- Construction of buildings, factories, wharf and storage space
- Materials processing and product preparation machinery
- Transportation engineering, infrastructure and wharf
- Electro-technology, laboratory and prototype development and testing
- Engineering and infrastructure works
- Pre-fabrication, assembly and distribution
- Office, design, marketing, sales and distribution services and support units
- Evaluation + 1 year exclusively negotiation option
- Various (tools, plant, furniture, vehicles, etc.)

Putting it all together – hundreds of jobs manufacturing the future homes and leisure spaces

Our proposed mix of employment floorspace includes, but is not limited to:

- Factory for materials management, processing and manufacturing
- Warehouse and open air areas for storage and distribution
- Factory for manufacturing products, houseboats and pre-fab homes
- Offices for product design, administration and sales
- Offices and laboratory for product design, high tech applications and educational purposes
- Units for installation, servicing and maintenance of products, houseboats & pre-fab homes
- Wharf for intake/ distribution of materials, products, houseboats and pre-fab homes
- Materials processing facility for manufacturing sheets, boards and beams
- Boatyard, boat storage, boat maintenance, sales and distribution
- marina chandlery, café and ancillary buildings for servicing the moorings
- Micro-business units
- Live-work units
- Early learning aquatic centre
- Farm produce distribution and sales
- Materials Recovery Facility (if Broadmead is allocated by B&NES)

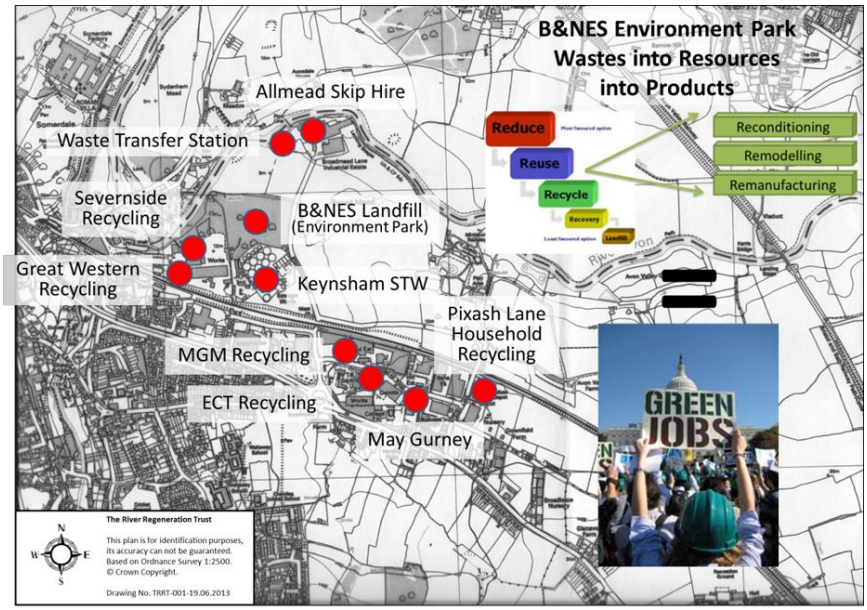
Types of processing, manufacturing and distribution companies for the Environment Park

Material Recovery Facility, Industrial & Manufacturing Units

In determining the type, capacity, viability and fit of the Material Recovery Facility, industrial buildings, manufacturing plant and distribution /storage units, a number of key criteria will be assessed during their selection and design. This will be completed during the Feasibility stage and incorporate the following criteria used by the Waste & Resources Action Programme (WRAP) in their assessment and selection process for allocation of recycling capacity grants:

- Value for money (for all criteria) and financial robustness
- Quality of facility design and arrangements for marketing and use of facility outputs
- Quality of arrangements for sourcing input materials
- Robustness of Planning, Waste Management Licence (WML) & Site Tenure

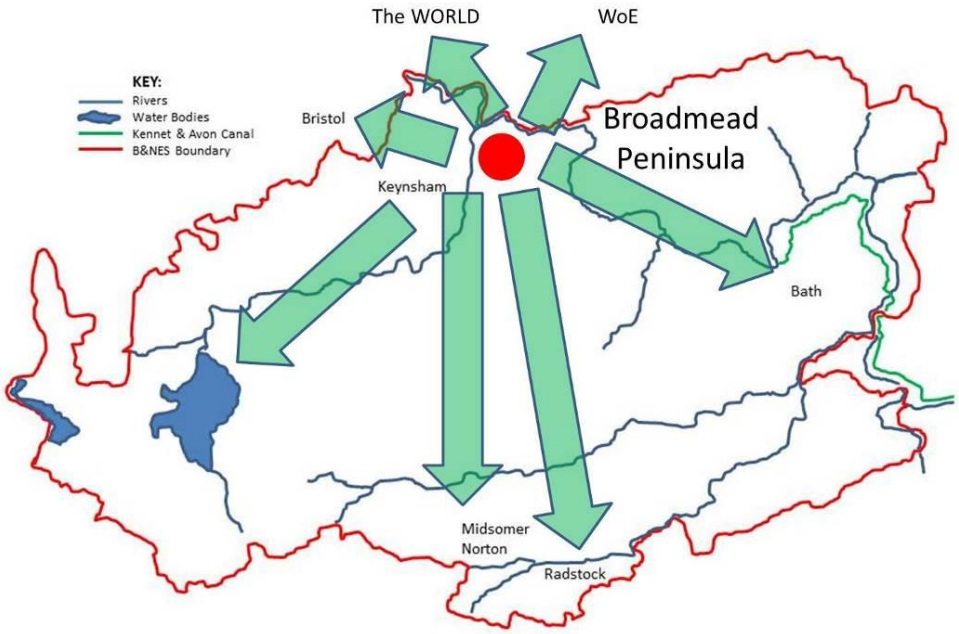
- Corporate environmental commitment & overall environmental impact of the new facility
- Corporate commitment to Safety, Health and Environment (SHE)
- Facility overview and five year tonnage projections
- Input material sourcing and output end markets
- Facility design, planning and licensing
- Milestones, project plan, project team and track record
- Capital cost breakdown, viability of investment and project financing



Hundreds of green jobs centred on the Environment Park and existing waste/recycling companies

Broadmead Peninsula has established links to existing businesses that are already engaged with waste, materials, trading and markets. Eventually the manufacturers of Broadmead Peninsula products will trade locally, regionally, nationally and internationally to replicate that of brass, soap and chocolate of the past. There is an obvious need to uplift the established businesses in this area.

Existing businesses in need of an uplift, improved access, better facilities and flood defence



Proposed short- and long-term distribution network for Broadmead Peninsula Products

Pre-fabricated Houses and Houseboats

Pre-fabricated houses will be used for Phase 1 of the development and for each of Options A-C as well as traditional construction techniques. It is proposed that ModCell and/or BaleHaus (University of Bath) will be used as they can be manufactured locally and in a flying factory (a deconstructable and re-locatable unit). This system has been used to great effect elsewhere on projects, such as the low-impact community development shown below.

Low impact community design using ModCell pre-fabricated homes, wetland and allotments

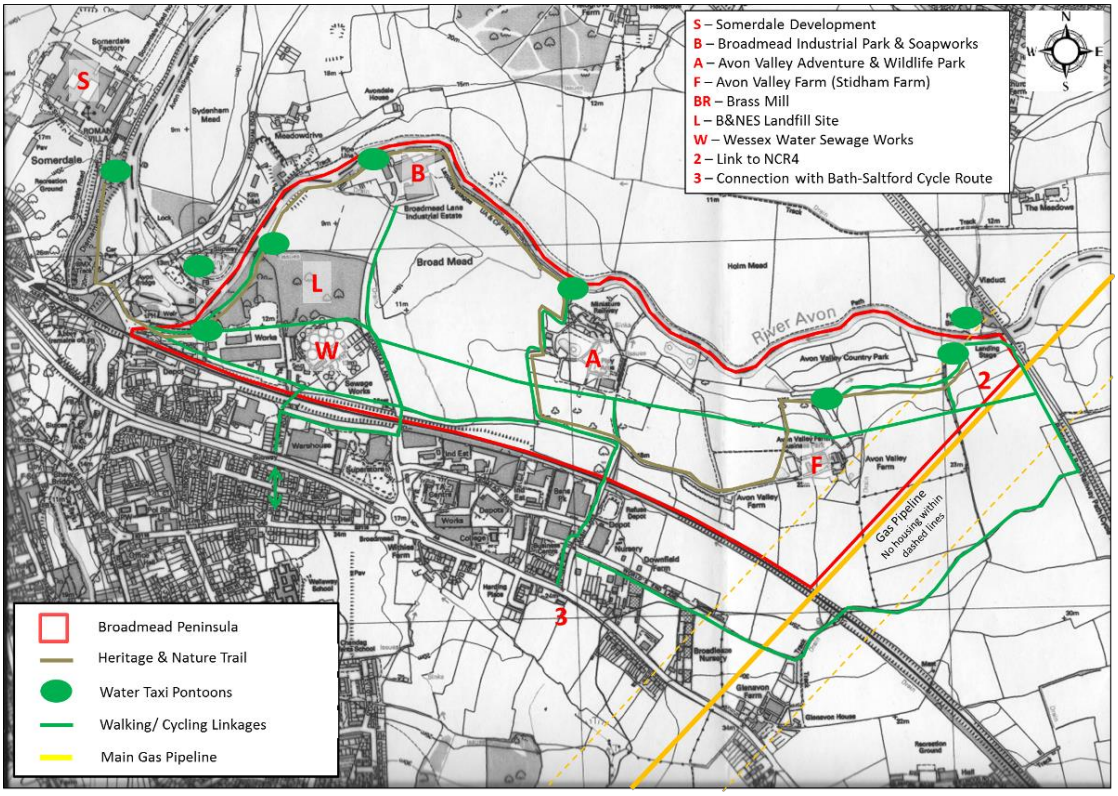
A range of materials and products could be developed using a 'Duratrust' (refer to Kings Lynne) type process and manufacturing units that will include Houseboats, Pontoons, Sheet Materials, Boards, I-Beams, Blocks, Posts, Panels and Pallets. This will demonstrate the application of the recent B&NES

Procurement Strategy 2013, which encourages an 'Think Local, Procure Local, Invest Local, Employ Local' approach to sustainable procurement. There is also the likelihood that some houseboats in the marina can be classed as C3 units, which is supported by Stephen Williams MP at Department for Communities and Local Government. C3 houseboats are also recognised by HM Revenues & Customs if they are fixed to the shoreline, have permanent services attached and do not have an engine. Only C3 houseboats are suitable for New Homes Bonus and Council Tax.

Early designs for pre-fabricated homes nestled into the landscape

Public Access, Cycleway, Heritage & Nature Trails

Our Outline Proposals A-C also show how Broadmead Peninsula will create a network of pedestrian, public, cycle and river transport and access routes linked to businesses, homes, leisure facilities and both Keynsham High Street and Saltford (see map below).



Proposed public access, cycle-ways, water taxi pontoons and nature/heritage trails

Avon Valley Waterside Park

The Avon Valley Adventure & Wildlife Park, Avon Valley Farm and Avon Valley Business Units will be enhanced with new employment floor space, a marina, constructed wetland, water ecology park and early learning aquatic centre. These will form the Avon Valley Waterside Park, mostly in the recreational land use area and alongside the necessary housing to afford the infrastructure items needed on the Peninsula. The pictures below show the current activities on the Adventure & Wildlife Park that would be enhanced with an early learning aquatic centre. Avon Valley Waterside Park could work independently or in collaboration with the Bendalls marina plans.

A canal route would link the Avon Valley Waterside Park and associated water ecology park, marina and constructed wetland with the River Avon. It provides the principal access and egress route (downstream there is an outfall from the water ecology park), so it would need to be sufficiently wide enough to facilitate ease of use and include a holding zone on the River Avon side to reduce waiting craft on the main river. Facilities and services will be provided to offer waterside development opportunities including a restaurant, gift shop, viewing platform and pedestrian / cycling routes. The canal route will also include sluices to supply replacement and flood waters into the Waterside Park occupying the flood plain.

Current Adventure & Wildlife Park activities (left) and future early learning aquatic centre (right)

Marina, Services & Marina Berths

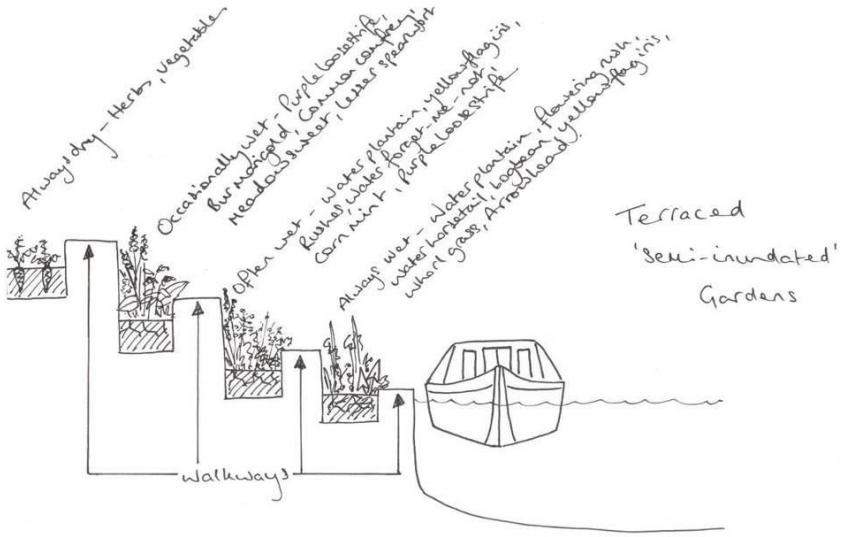
A marina is proposed outside the flood plain providing residential houseboats for 80+ homes. Outside the marina and part of the constructed wetland, there will be capacity for 317+ pleasure, visitor and holiday moorings which are either permanent or short-term. The marina will be accessed on land by two new transport routes; one south of the marina for permanent residents and staff and one at a tangent to Broadmead Lane, which is primarily for visitors, coaches and water craft using the Waterside Park. A dedicated car, trailer and coach park is adjacent to the marina, which is suitably screened for noise, vibration and dust. This will minimise impact on the marina and ensure

the peaceful pleasure of residents and visitors. Our initial prediction for the number and type of off-line berths and the potential annual income from berthing fees alone is shown in the table below, which is based on evidence of four local marinas (table does not include the 80+ houseboats).

Schedule of Berths

Size (ft)	Number	%	Linear ft	£/annum
70	31	10	2,150	139,163
60	163	51	9,754	631,204
55	49	15	2,675	173,126
50	6	2	320	20,709
45	45	14	2,016	130,465
35	24	8	851	55,085
Total	317	100	17,766	1,149,753

Proposed schedule of berths in the constructed wetland, excluding the 80+ houseboats in the marina



Early sketch by EnGain to identify the terraced semi-inundated gardens for the constructed wetland

Our investigations support the position of the Canal & River Trust, that there is a strong demand for moorings in the region, especially residential moorings. Initial talks with Canal & River Trust, Kennet & Avon Canal Trust, Port Avon marina, Bristol Harbour and Phoenix Marine indicate that there is congestion and excess demand for berths in the area. This is supported by the fact that many have waiting lists for secure high quality moorings. Introducing 317 berths at Avon Valley Waterside Park would increase the number of berths within 4 hours cruising of Bath and Bristol by approximately 18%. Our proposed marina would include premium facilities as well as services for river travellers:

Proposed Marina Facilities	
Electricity / water / gas supply	Wet /dry dock facilities
Toilets	Boat / engineer repairs
Showers	Chandlery
Refuse disposal and recycling	Car parking
Pressure wash and blacking	Slipway
Telephones	Laundrette
Diesel, petrol, propane, solid fuel	Trailer storage
Mobile and fixed pump out	Nearby pub or restaurant

Proposed marina facilities that will also be accessible to the off-line berths in the constructed wetland

Other commercial opportunities associated with the marina could include boat sales, hire boat operations, a narrowboat holiday company and narrowboat servicing club.

Constructed Wetland & Water Ecology Park

The proposed constructed wetland and water ecology park has three primary functions:

- One is to act as a 'soft' flood management system for down-stream developments through the capture, storage and controlled dispersal of up-stream flood waters through a series of balancing ponds and water corridors.

- The second function is to provide a boaters lake for non-engine craft including, sailing dinghies, rowing boats, wind surfing boards, canoes, kayaks and similar type craft. Areas of the boating lake will include picnic tables, bar-b-q facilities, fishing pontoons, children facilities and water ecology teaching zones and pedestrian /bicycle routes.

- The third function is to provide peaceful nature walks within and alongside a series of ecological corridors that will include sensitive areas set-aside for specialist flora and fauna. This will ensure that habitats and species diversity is optimised and conserved by a full time Warden.

Early design of the edge of the Constructed wetland and nature trail visitor centre

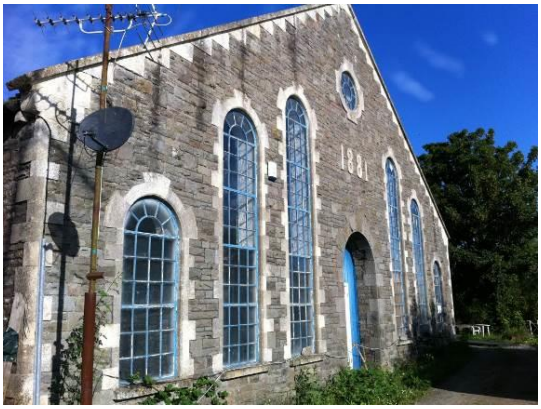
Riverside Cafe & Restaurant

The idea of a riverside cafe/restaurant was based on a scheme run in partnership between Canal & River Trust and Scottish and Newcastle Pub Enterprises. Under that scheme, prime waterside locations are developed to serve visitor numbers and to encourage increased recreation and leisure opportunities. A share of profits can be reinvested into the care and maintenance of the Waterside Park and riverside. For Avon Valley Waterside Park, a transfer of suitable development land could provide the necessary conditions for a café/restaurant partnership.

Keynsham & Avon Valley Heritage & Nature Trail

The regeneration of Keynsham's lost heritage at the Bartelt Soap Factory circa 1881, Brass Mill, Stidham Farm as well as Somerdale and the Roman Villa, would play a vital role in Broadmead Peninsula. These would define and capitalise on the tourist and educational economies that would

visit the area for heritage or nature experiences. The Keynsham and Avon Valley Heritage & Nature Trail will be accessible by ferry, bicycle and pedestrian routes closely linked to Keynsham High Street, Saltford and Keynsham rail station. It would include significant signs and meanings in the landscape, businesses and riparian eco-zones that would tell a story of what was and is now.



The Soap Works façade and Avon Valley Adventure & Wildlife Park in need of an uplift

The Trail would navigate through the marina(s), water ecology park, historic buildings, sustainability research institute, hydropower arrays, warden-led education fun zones and early learning aquatic centre as well as riverside remnants of the past. The Trail Wardens would explain how we are combating climate change that integrates the water-world rather than turning our backs on it. Rivers and floods are a natural occurrence, but if we use them to our advantage and build economies around them then it is to our advantage. This will show the Broadmead Peninsula as a successful development of ideas, businesses and living adjacent to the flood zone rather than shutting it off behind concrete walls and sheets of steel. Broadmead Peninsula will help prepare and discover ways to live with the ecology and landscape of our riverside ecotones.

Heritage and Nature Trails would integrate with riverside retirement homes, holiday chalets and a touring caravan park rather than the temporary facility arranged for the Caravan Club each year

Water Supply & Balance

Studies will need to be completed during the feasibility stage to ascertain the flow rates in and out of the marina, constructed wetland and water ecology park. This will ensure that they are balanced with the river, land drains and SUDS systems in order to capture, store and softly release the water balance in tune with river rates and mooring draft. A demand model and provisional water balance

model will be required in order to ascertain the volume of water required to sustain the canal route, Waterside Park complex and the network of lake, balancing ponds and water corridors to the exit sluices. Initial discussions with Canal & River Trust and Wessex Water have given their endorsement of an integrated development that makes best use of the river, flood and SUDS.

Pumping Demand Modelling

It is believed that gravity will play a large part in delivering and moving water through the Waterside Park and associated balancing ponds, boating lake and water corridors. However, there may be some need of pumping, so modelling will be required to indicate the delivery capacities of the pumps to complement the gravity systems and to ensure a healthy demand. The modelling will take account of any peak periods of demand, when the balance is low and the location and capacity of pumps to maintain a healthy water balance across the site. All existing water courses and the River Avon would need to continue to follow their present routes, apart from the abstraction of water from the River Avon and into the constructed wetland and water ecology Park. Sluices would eventually return the net balance back into the River Avon. This allows the present river system to remain intact and avoids the need to manage large variations in water flows. Essentially, the water level of the canal route, constructed wetland and water ecology park are the same as the River Avon itself (albeit a dam would sustain an minimum level in river drought periods). It is only during flood events that the Waterside Park which occupies the existing flood plain receives flood water as it always has, but controls the capture, storage and soft release of the flood water to reduce flood risk down-stream. In effect, the Avon Valley Waterside Park will be a truly Sustainable Drainage System (SUDS) that provides significant benefits to flood defence and containment elsewhere.

Waste Transport by Road, Rail & River

The transport of waste is mostly conducted along the road using numerous types of vehicles. There will always be need for transport by road, but where there is commercial opportunity to transport by river or rail these should be promoted. The feasibility study will investigate how best to transport waste, where this should occur, where to best place facilities, what types of waste would be transported and to which facilities (existing and new) certain types of waste should go. Our Outline Proposals A-C includes options for waste by river, rail sidings and a river wharf for receiving and separating waste. The Environment Park and associated facilities would receive pre-treated waste (separated) so that maximum value could be recovered from the waste streams. Ultimately, some waste will end up going to landfill or better still through anaerobic digestion, but our Outline Proposals needed to incorporate a river borne involvement.

Waste transported by barge equal to nine, eleven tonne Lorries off the road

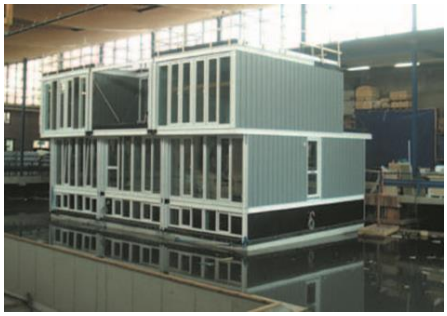
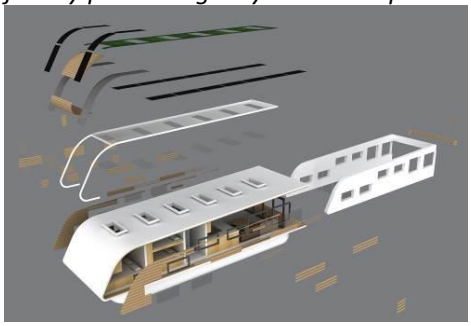
Environment Park & Materials Recovery Facility

A state-of-the-art materials resource efficiency centre would act as a central location along the river to receive, treat, reuse, recondition, remodel, remanufacture and recycle from all non-hazardous waste streams from a large area. This will incorporate a materials recovery facility, processing facility and product manufacturing facility as part of the B&NES Environment Park. It will act as a key strategic point along river, road and rail that will help serve a large number of towns, villages and hamlets within the economic boundaries of B&NES and WoE. The waste and materials resource efficiency centre and associated industries and skills will make best use of the Ellen MacArthur Institution and Circular Economy concept.

Materials Resource Efficiency Centre of Excellence

Broadmead Peninsula will include a state-of-the-art research establishment for materials resource efficiency and sustainability spin-out businesses, affiliated with the University of Bath and sponsored by the Circular Economy. Broadmead Research Institute would concentrate on the development of spatial economic businesses that interconnected their technical and high-skill minds to the semi-skilled works of materials resource efficiency and flood mitigation strategies. Climate Change is real and educational facilities need to demonstrate how they apply minds to physical and land managed solutions, not necessarily engineered solutions. Avon Valley Waterside Park would be central to the Broadmead Research Institute ethos and educational syllabus. Conversely, the materials resource efficiency centre and associated businesses that transport waste by river would act as proving grounds to test their ideas and develop spin-outs that actually delivered new economies. These would include the design and manufacture of Passive designed houseboats and pre-fabricated elements for housing that will be partially used on the site.


State-of-the-art indoor materials recovery facility processing recyclates into products

Manufacturing facilities to pre-fabricate homes and houseboats using recycled products

Water would play a vital and functional role that weaved all the materials, waste, flood, tourism, transport, homes, jobs and economies into a functional way that we use the rivers and its resources. Broadmead Research Institute would be an educational foundation stone for climate change living through the Circular Economy.

3. Flood and Environmental Issues

Flood Issues

A Flood Risk Management Strategy (FRMS) was commissioned by B&NES to identify where strategic and site based flood risk management measures can be implemented to make sites at risk of flooding developable without increasing the flood risk elsewhere. Key infrastructure items on Broadmead Peninsula including the Landfill Site and Paper Works (DS Smith Recycling) were considered alongside local proposed development sites. The FRMS was influenced by the requirements of PPS25, RPG10 and the draft Regional Spatial Strategy for the South West, the Strategic Flood Risk Assessment (SFRA) undertaken for B&NES, the Bristol Avon Catchment Flood Management Plan, the Bath Flood Defence Scheme Addendum to Option Identification Appraisal, the Adopted Local Plan and the Core Strategy Spatial Options.

The SFRA Level 1 for B&NES identified that Keynsham was a main 'critical area' at risk of flooding predominantly from river sources. The SFRA Level 2 took these findings further and recommended a 'Scoping Report' for flood risk management should be undertaken to identify potential options for managing flood risk in key areas and to provide an outline assessment of these options. Subsequently, the The Flood Risk Management Strategy Scoping Report for B&NES identified options for the 'critical area', which included raising defences or ground at the key sites in Keynsham. The FRMS study completed by Atkins in 2010 built on previous findings using more up-to-date modelling to provide detailed site by site recommendations.

For the two sites in Keynsham, there was a need for ground raising or raised defences within proposed development sites, in combination with flood resilient design (for raised defences only) and a flood storage area to offset loss of floodplain capacity. As Atkins suggests, "There is an opportunity to incorporate the floodplain storage area downstream of Somerdale and/or the flood storage area identified downstream of Bath." In identifying the potential FRM options and developing success criteria Atkins recommends that the FRMS should focus on the 'critical areas' including those in Keynsham. It also recommended that further investigation should be undertaken in the combination of raised defences (with various standards of protection) alongside other approaches, such as flood warning and flood resilience.

In raising defences or ground raising at Keynsham, it is worth noting that Keynsham currently benefits from a Standard of Protection of around 1 in 50 years, with the exception of Somerdale which is only around 1 in 10 years (although some defences were constructed by the original owners). The current plans at Somerdale are addressing their local issues through a combination of flood defence, floodplain improvements and sustainable drainage systems on site. Unfortunately, other Keynsham sites did not demonstrated a viable business case for an off-site solution, leaving the provision of site specific flood defences and sustainable drainage systems (SUDS) as the only practical solutions. Further investigation of flood modelling data shows that only the Keynsham Landfill Site (BA19, Broadmead) is at significant risk of flooding. However, this does not take account that there is substantial risk to Wessex Water sewage treatment works and more so the DS Smith Recycling facility from increased flood events as a result of climate change. Given the results of the economic appraisals for Keynsham, the recommended flood risk management approach in these areas is a combination of integrated building defences at all sites, as well as a small number of on-site flood storage at particular locations.

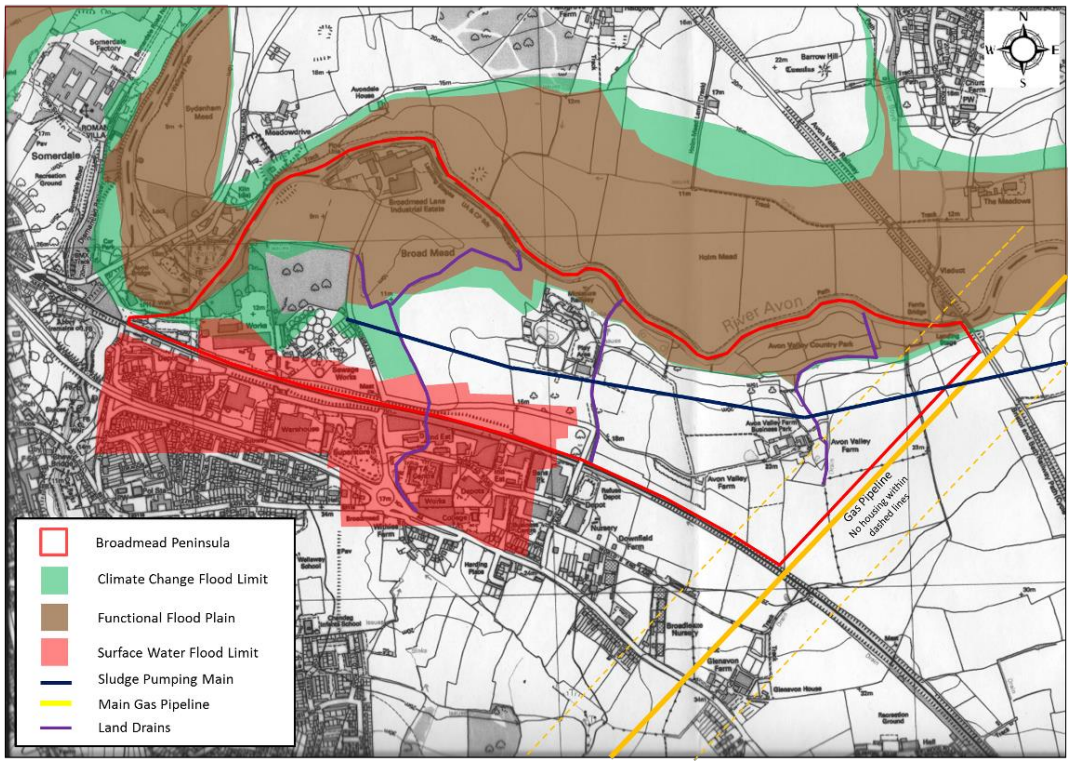
Item KI.20d Water Drainage at East of Keynsham Urban Extension in the Infrastructure Delivery Programme indicates that all watercourses running through the area should remain open and will need to be incorporated into development proposals. Mitigation of poor drainage south of World's End Lane is required. A substantial watercourse corridor is required surrounding Broadmead Brook

and subsidiary ditches and requires significant attenuation to provide for surface water run-off to restrict flows before discharge.

The Flood Risk Management Strategy completed by Capita Symonds (2009) suggested that the Environment Agency would require level for level storage for loss of floodplain, for example any loss of floodplain or raised defences from the flood conveyance scheme in Bath. Similarly, the proposed flood defences around the landfill, sewage works and DS Smith Recycling on Broadmead Peninsula. Capita also recommended afforestation, rural land use change upstream and storage/wetland creation as three flood risk management options for Keynsham; exactly what we are proposing in the marina, constructed wetland, water ecology park and constructed woodland.

Flood Risk

The location of the houses and residential houseboats is outside of the climate change flood limit and on land classed as Grade 3b; which is not needed to be set aside for food production. This is in contrast to Grades 1, 2 and 3a which does need to be restricted from development. The diagram below also shows the location of environmentally important areas including Sites of Special Scientific Interest and Sites of Nature Conservation Interest, none of which are within the A1-A3 area for housing. This has been recently corroborated by a habitat 1 ecological survey.

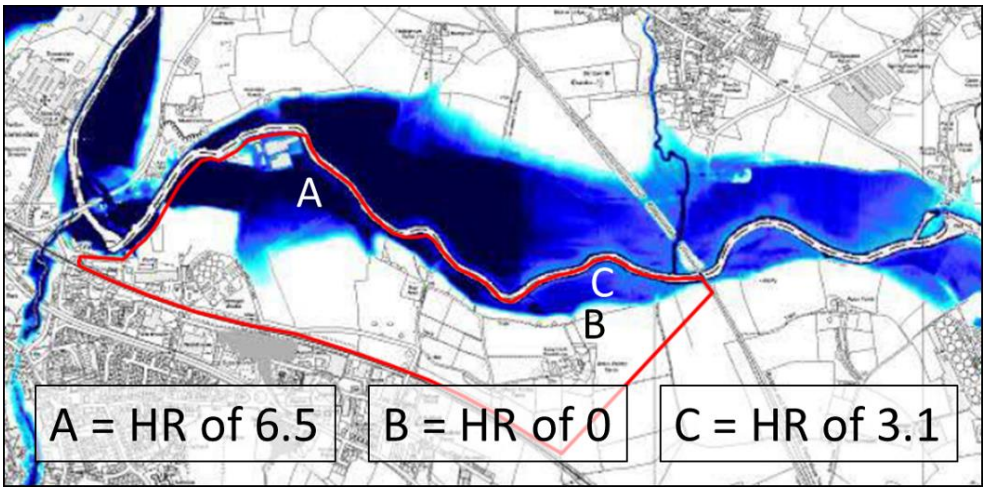


Flood risk map of functional floodplain, climate change and surface water flood limits

Flood Hazard Rating

The location for the residential houseboats is in location B which is outside of the floodplain and has a zero flood hazard rating (determined by velocity and depth of flood water). This is in contrast to location A where a separate marina is being proposed with an extreme flood hazard rating of 6.5, and location C where we propose the constructed wetland, water ecology park and off-line marina

berths (not residential) which has a significantly less flood hazard rating than A. The location for a marina is shared by Arup Constraints & Options report which identifies the marina in location B.



Flood Hazard rating map showing the best location for off-line berths (C) and marina (B)

The formula for the Flood Hazard Rating is HR = d x (v + 1.5) + DF (Defra 2010)

Where HR = (flood) hazard rating

D = depth of flooding (m)

V = velocity of fllodwaters (m/sec)

DF = debris factor (0, 1, 2 probability that debris will lead to a significantly greater hazard)

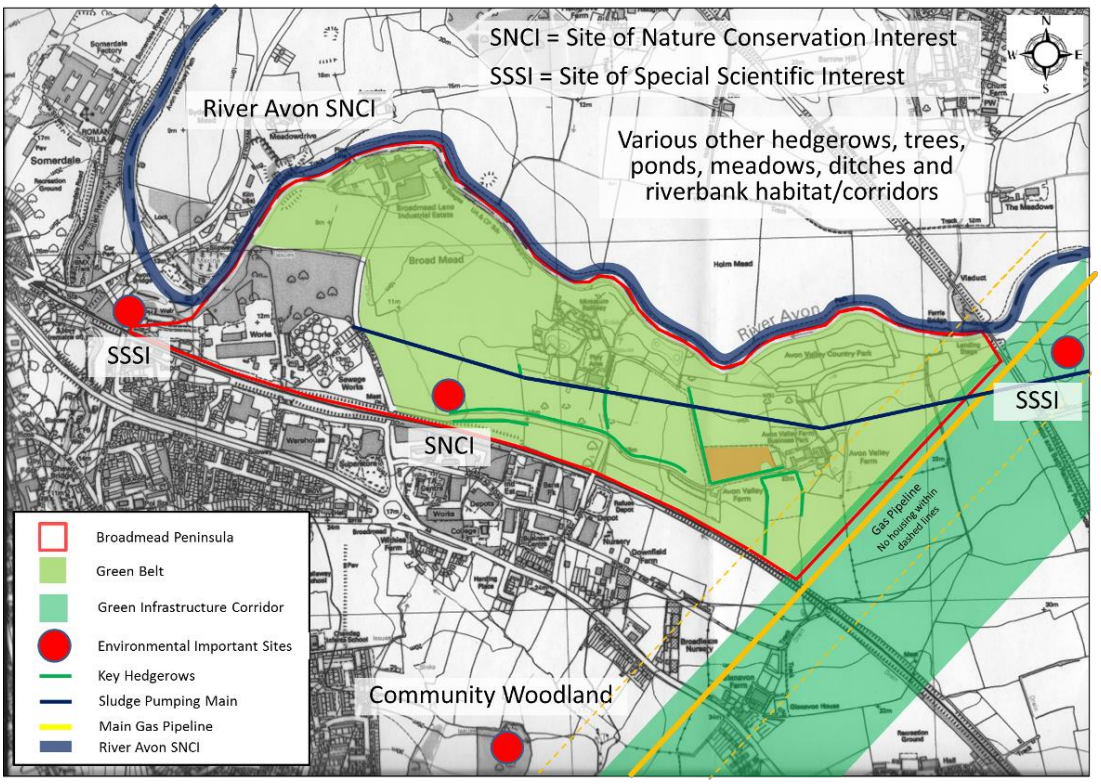
Key Environmental Issues

The preferred option evaluated at this stage of the scoping study is also the preferred option for ecological enhancement. Although the canal route, marina and Waterside Park will have some adverse environmental impact on the existing flood plain generally used for a low-value crop, the ecological enhancement of the development will significantly increase biodiversity, improve existing habitats and generally be sensitive to existing ecological corridors, hedgerows and trees. The only woodland in the study area is small areas of wet woodland around the River Avon and isolated trees on land.

The area is dominated by arable land used largely for low-value crop farming. The fields are large with wide margins of uncultivated land and bordered by generally species-poor hedgerows. The soils in successful crop growing areas are likely to have good drainage and be of medium to high fertility. Initial trial pits have been undertaken by the landowners to locate the water table in the proposed area for the marina, but formal site investigations have not yet been commissioned. The existing route to the site will be upgraded and lifted above the flood level with incorporated sluices for water balancing. However, two new vehicle access routes will be created to align with existing hedgerows, tree-lined stream and small number of brooks. There will be some minor dissecting of existing hedgerows, but the existing biodiversity value of these corridors as a whole is limited.

There is very little standing water within the study area, although during floods the low lying areas receive flood waters that override the riverbank. It is this natural phenomena that the Waterside Park will enhance, capture, store, use and transfer as and when required. The River Avon sweeps around the site as a natural meander, and a small number of ponds are within the site. There are a

few tiny spring-fed streams and brooks running into the River Avon. General ecological mitigation and enhancement proposals have been considered by the The River Regeneration Trust, including sympathetic and soft engineering using native species of local provenance, creating artificial places of shelter for otters and water voles, enhancing existing and creating new areas of importance for wildlife. Ecological measures will be informed by further assessment and detailed design during the formal Environmental Impact Assessment processes.



Map of key environmental issues and opportunities for enhancing green infrastructure and habitats

The Infrastructure Delivery Programme (IDP) item KI.20c refers to green infrastructure at East of Keynsham Urban Extension (including ecology) which:

- Must comply with the Green Infrastructure Strategy by ensuring that the principles of GI and related benefits are embedded in the development
- Provide for green space (informal, formal and allotments) as part of a comprehensive Green Infrastructure Strategy for the location.
- Mitigation of landscape impact by extending the community woodland to the south and providing additional structure planting and improving hedgerows. Species rich hedgerows, ponds, ditches and trees should be retained and enhanced, and habitat suitable for the population of skylarks provided.
- Maintain a landscape buffer between Keynsham and Saltford
- Provision for Public Rights of Way
- Should incorporate Sustainable Urban Drainage Systems

Green Belt

In terms of the emerging Core Strategy, the Council is required to provide for strategic housing growth, which is proving highly problematic in terms of the significant constraints of the BANES area

in relation to green belt; historic designations; topography and proximity to other main towns and cities and the needs of the West of England. The Council has taken a position that requires the removal of the Green belt designation in order to meet the overall demand. 250 units are agreed for Keynsham East in relation to existing capacity (particularly transportation access and links)

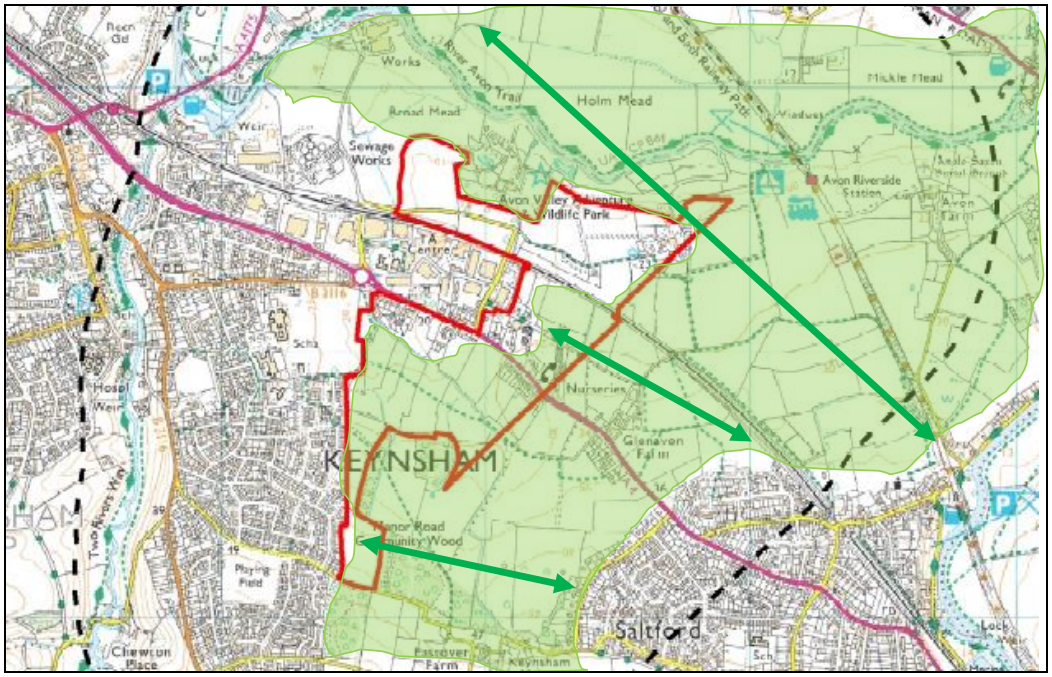
There are three key areas to the east of Keynsham that could come forward as an expansion of the town 'bolting on' to existing services and infrastructure, but clearly there are wider place making objectives that need to be assessed in relation to maintaining a strategic gap between Keynsham and Saltford; delivering a complimentary amount of employment and jobs; bringing forward new services and facilities; and dealing with existing environmental problems. The issue of 'rolling back' the Green Belt has been assessed by Arup in relation to the five national purposes and an additional local issue of the strategic gap between Keynsham and Saltford. Our view in terms of the sustainability appraisal in relation to relaxation of Green Belt at Broadmead peninsula is:

- The site is within 400-800 metres of existing services of Keynsham
- There are existing linkages with highway capacity in phase 1 which can accommodate 250 houses
- There are significant areas outside of flood risk where development can take place
- The site can link the river asset back to the town
- There are existing businesses and homes within the peninsula
- There is opportunity to create a Master Plan and vision for the area that can deliver a more comprehensive development for 700 houses, jobs and services and importantly can deliver river transport, environmental upgrading, water treatment improvements, and deliver new marina development
- Phase 1 can start delivery of the environment park development
- Opportunities for infrastructure delivery in phase 2 to provide a new link road through the area from Avon Hill and a new bridge to cross the railway line (Pixash Lane or other)
- Existing recreational uses can be maintained
- A new community woodland can be expanded to preserve the strategic gap between Keynsham and Saltford.
- A site for Travellers could be included within the development
- Development would not compromise the attractive rural setting of both the river and openness towards Saltford and South Gloucestershire

Part of the Green Belt on Avon Valley Adventure & Wildlife Park with Recreational Use status

In terms of the Green Belt much of the river corridor can remain and accommodate recreational uses, and this will importantly link the gap with Saltford to the land over the river in South Gloucestershire. A strategic release of Green belt at the Broadmead peninsula will allow an urban extension of Keynsham to take place reconnecting the river with the town. The site can be designed with a green infrastructure network, which provides SUDS / surface water infiltration / rainwater interception, habitats and recreation functions. A wider vision for Broadmead can offer significant benefits over smaller scale developments in respect of local energy sources and micro heat grid infrastructure, and as such offer greater sustainability benefits in this respect.

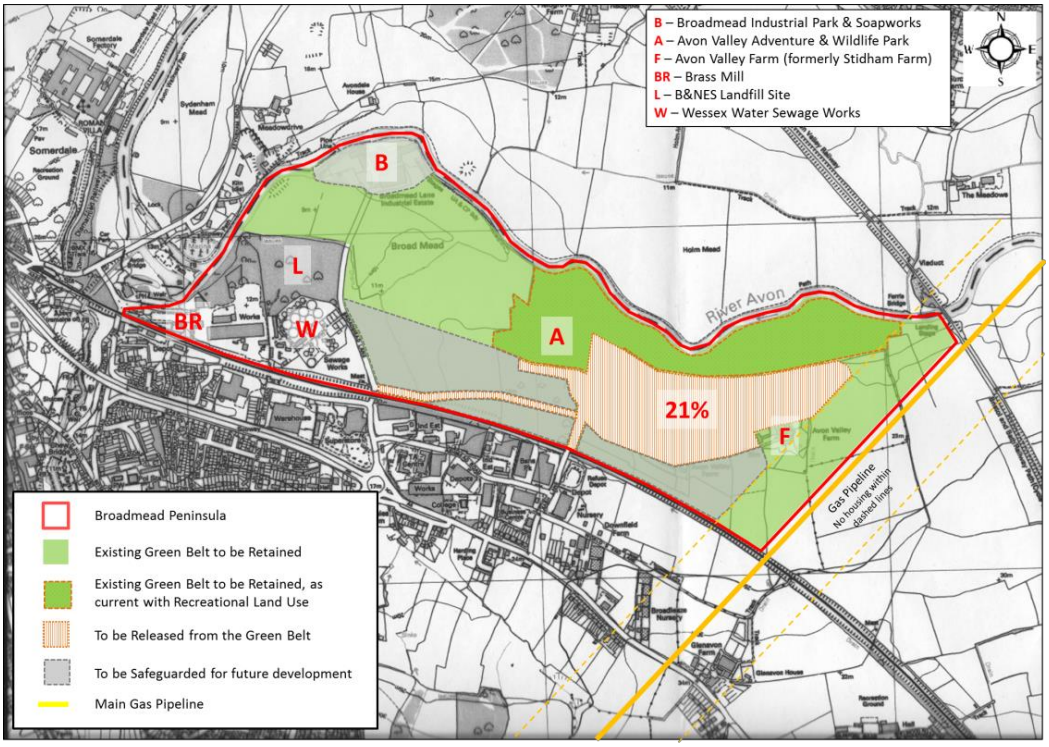
Another benefit of an urban extension at Keynsham is that it will allow a comprehensive community to be created, which is well planned, with adequate infrastructure, and benefiting the surrounding neighbourhoods. A suggested altered Green Belt boundary would be:



Map showing the extent of Green Belt and areas being considered for essential release of Green Belt

Proposed site for the constructed wetland and off-line moorings, in the floodplain, retained as Green Belt and maintaining the green corridor of the River Avon Green Infrastructure Strategy. It is well screened by elevated land to the right of the picture, leading to the marina outside the floodplain

We have set out a proposed new boundary to remove the Green belt from parts of the peninsula but retain it to maximum affect along the river and as part of an urban fringe transition. The figure below shows the extent of existing Green Belt that will be retained, Green Belt to be released for the development of Phase 1 of Options A-C, and Green Belt to be safeguarded for future development. Only 21% (22 hectares, 54 acres) of Broadmead Peninsula (105 hectares, 260 acres) would need to be release from Green Belt. In these regards, Broadmead Peninsula is a better solution in Green Belt terms than closing and narrowing the gap between Keynsham and Saltford south of the railway line, along the A4 and south of the A4.



Proposal for minimal release of Green Belt (21%) and safeguarded land on Broadmead Peninsula

The development of Broadmead peninsula would not prejudice the Green Belt purposes in relation to Keynsham:

- Purpose 1: to check the unrestricted sprawl of Bath and Bristol
- Purpose 2: to prevent the merging of Bristol, Keynsham, Saltford and Bath
- Purpose 3: to assist in safeguarding the countryside from encroachment
- Purpose 6: to preserve the individual character, identity and setting of Keynsham and the villages and hamlets within the Green Belt

The proposed Broadmead peninsula development would not comprise the five Green Belt purposes set out in NPPF paragraph 80:

- It will still restrict sprawl from large built up areas to the river and beyond
- It will prevent Keynsham and Saltford merging with a significant gap retained
- It will not damage the surrounding countryside from encroachment
- It will not affect the special a character of historic towns or elements in Keynsham or Bath

- It will include elements of regeneration and recycling and treatment of derelict or spoiled land in the peninsula

And lastly the sixth local criterion to preserve the gap again of Keynsham / Saltford and any smaller local countryside villages are not affected.

Key Ecological Features

In 2013 and as part of the Core Strategy hearings, B&NES commissioned an ecological assessment north of the railway line and within the Broadmead Peninsula to complement the HRA Review of the Conservation of Habitats and Species Regulations 2010 and a Preliminary Ecological Assessment south of the railway line. These ecology reports show that the area has two local wildlife Sites of Nature Conservation Interest (SNCIs) which are not of statutory importance, but they should be considered and unaffected directly by any proposals. The key environmental considerations include:

- There are some hedgerows that are significant around the site - these will need to be retained and protected from works.
- There will be a general requirement to improve/enhance biodiversity and not just to mitigate for losses.
- Native planting will be required within the development and its perimeter.
- Bats - the River Avon and the Broad Mead pastures may well be important for foraging bats (especially the rarer horseshoes). So any development will need to take account of these. It is a fairly dark area now, so development lighting will need to be properly controlled if horseshoes are using the area. Hence the Policy statement from the Council with regard to internationally protected wildlife sites Special Areas of Conservation (SACs) in the vicinity.
- Birds - Chew Valley Lake is internationally protected for birds. The farmland around Broadmead may be used by important species, and these will need to be investigated and considered in any development proposal.

Established hedgerows and tree lines to be retained and enhanced during the design stage

More comprehensive and detailed surveys and an Environmental Impact Assessment (EIA) will be undertaken as part of the feasibility and Master Planning stages, but our initial thoughts of development intervention at this time include:

- To keep and improve good trees and hedgerows as they are of intrinsic importance and good for bats and dormice, as well as foraging creatures like hedgehogs.
- Considerations how the development proposals will increase an otherwise dark area and how lighting will be managed, for example dark corridors for rare bats using the area.

- Improve the river banks and protect the river from any potential pollution during construction and from the use of the development.
- Incorporate sustainable urban drainage systems (SUDS) that are relevant, strategically placed and in line with the B&NES Flood Risk Management Strategy and Wessex Water Ecosystem Services to show how water use, storage and drainage will be managed.
- Ensure there can be good ecological gains over and above any losses, through the creation of new habitats that fit in the landscape and aquatic ecotones that will include a water ecology park, constructed wetland and ecological enhancement across the site and over the national gas main to act as green and blue infrastructure of containment.
- Avoid damaging badger setts wherever possible, but undertake considerate badger relocation using an artificial badger sett and sett destruction license where necessary.

Other environmental aspects that will also need to be considered and adjusted during the Master Planning and development stages include:

- Environmental constraints and opportunities mapping to overlay key issues early in the development process to complement the Arup East Keynsham study and this Scoping Study.
- Landscape and amenity value and effects upon it from earthworks, infrastructure development, construction and change of land use.
- Flood risk and drainage strategy and modelling that takes into consideration the Bristol Avon Catchment Flood Management Plan, Level 2 B&NES Strategic Flood Risk Assessment and B&NES Flood Risk Management Strategy (FRMS), FRMS Site Specific Options Keynsham, FRMS SUDS Types and Keynsham Flood Risk Priorities reports.
- Effects of earthworks on groundwater and river flows, including pollution potential and changes in hydrological patterns.
- An integrated Construction Management Plan that maps together individual construction sectors across the site and within individual BREEAM or CEEQUAL frameworks to avoid acute environmental effects and maximise environmental and sustainability benefits.
- An earthworks movement, storage and distribution programme to maximise materials reuse on site and minimise removals from site with all the associated nuisances (lorry movements, noise, dust, vibration, congestion).
- A phased and detailed traffic management strategy regarding access and capacities which have been initiated in this Scoping Study.
- Protect established ecology wherever possible to avoid damaging it, removing it or displacing wildlife and to encourage improved habitat diversity and capacity.
- Conduct early archaeological studies to identify and record/conserve archaeology and to improve our understanding of the heritage of the site and to build this into the heritage trail.
- Locate and treat existing ground contamination and risk, especially where there are significant earthworks in the floodplain, land drains and the River Avon.
- Incorporate greater public access and ease of access to the site through a new network of pedestrian and transport mediums.

4. Infrastructure Requirements

To develop our strategy in providing a sustainable community to the north of the rail line at Broadmead peninsula, significant infrastructure investment will be required. This will help stimulate housing, employment land uses, tourism and other activities. Some infrastructure is already in place to serve the existing businesses and homes, but our plans will require enhanced connectivity, innovative technologies, new plant, water and electrical services etc. Our strategy will involve liaising with the key stakeholders and building from policy documents such as the Core Strategy, Infrastructure Delivery Plan, the Wessex Water capital programmes, Environmental Agency flood compensation plans, Network Rail's Route Utilisation Strategy, bus operators, the Local Planning and Highways Authority and so on.

This section focuses on infrastructure provision to serve the Broadmead Peninsula and looks at the following key areas:

- **Transport infrastructure** – provision of a balanced accessibility both within the site and connecting to external linkages. Detail of our transport strategy is contained in section 5, although this chapter summarises some of the areas of interest.
- **Services** – provision of water, drainage, sewerage, gas and electricity.
- **Innovation** – potential anaerobic digestion, hydro power and micro heat grid.
- **Land** – geotechnics, hydrogeology and land classification.
- **Buildings** – homes and businesses, materials recovery facility, waste processing into product plant, houseboat and pre-fabricated elements, manufacturing plant, waste by barge, wharf and carnage store zone, marina services and tourist related buildings, micro business units, early learning aquatic centre, and primary school.

Infrastructure needs to be affordable and deliverable – viability is detailed in section 6.

Transport Infrastructure

The detail of our strategy, phasing and deliverability is contained in section 5. However the key areas of interest aligning with the Local Development Framework's Draft Infrastructure Delivery Programme (as published by B&NES in February 2013), and which are relevant to Broadmead Peninsula relate to:

- Enhancement of facilities for pedestrians / cyclists crossing the A4 – this will help connect the site via Pixash Lane and Broadmead Lane with the A4 segregated pedestrian and cycle way, which the Local Plan sets out as a key route. Unity Road also offers an opportunity to formalise from Broadmead into Keynham – our plans look to promote this link as a sustainable transport corridor.
- Enhancement for pedestrians / cyclists accessing Keynsham town centre, Chandag local centre, Saltford local centre, Keynsham rail station and the adjacent schools. As well as the initiatives in the previous point the new primary site road will offer segregated walking and cycle lanes off-set from the road. This link will permeate the regeneration area, linking in with other roads and help to create a continuous cycle route from Hanham / Somerdale in the west, through Broadmead and onto national Cycle Route 4 (NCR4).
- Footpath and cycle lanes to be provided within the site with strategic routes to encourage travel by foot and cycle particularly to Keynsham town centre. The primary road will have 2m footways on one side and a 3m pavement / cycle-way on the other. Secondary and tertiary roads will also be pedestrian and cycle friendly and incorporate shared space

concepts. There is also the added benefit of the Peninsula actively involving the River Avon, with walk links ages to river landing stations for access to leisure activities and river boats.

- Bus routes to be provided within the development to serve the site. Connections to existing bus stops adjacent to the site should be provided. Our phased strategy incorporates strong and direct linkages to existing services along the A4 in Saltford and into Keynsham town centre. Accessibility mapping is provided in section 5. We are also proposing a high quality bus route through the site utilising the new primary route and running within 400 metres of the main land uses.
- A junction required onto the A4. Our plans include an upgrade of the Pixash Lane / A4 junction. In Phase 3 when a new road bridge over the rail line is proposed this junction will become busier. Detailed transport modelling during study feasibility will determine the scale and type of junction arrangement required. Broadmead Lane onto the A4 already provides a high capacity junction.

Pixash Lane road bridge; Broadmead Lane under-bridge

- The IDP states that any development north of the railway line will need to demonstrate that safe, appropriate and satisfactory access can be gained to the site. The IDP requires a new road bridge over the railway line (or capacity improvements to Pixash Lane over-bridge) with the under-bridge at Broadmead Lane serving as a secondary / emergency access. Pedestrian / cycle links should also be made to the public right of way network at Clay Lane Bridge to form a link to NCR4. All of these considerations have been taken forward in our phased development strategy and are laid out in detail in the detailed Transport and Access section of this document.
- Demand management measure through Saltford and Keynsham – focus on sustainable transport measures and providing complementary land uses that reduce the need to travel will be central to plans.

Utilising sustainable transport opportunities and quieter streets

- Provision of a robust travel plan – this will be a key application submission document addressing infrastructure needs, public transport services, information on alternatives to car journeys, and target setting for mode-split and monitoring of success. As well as the movement of people, freight will be highlighted with significant potential for the movement of goods by river and rail – providing environmental and de-congestion benefits. Our strategy also centres on the circular economy whereby materials on site are used to build homes and boats.

Services

The Peninsula will deliver water, sewerage, drainage, and power facilities across the site. These will incorporate the following:

- Water drainage. Cost not quantified in Infrastructure Delivery Plan, but this will be a consumed development cost with drainage facilities across the Peninsula. Best practice guidance will be applied to the drainage strategy including Sustainable Urban Drainage Systems (SUDS) approaches. This will apply to housing and other land uses and the road network. These will include a range of applications including below ground storage, wetlands, soakaways, filter drains, filter beds, above ground storage, permeable paving, swales and green roofs.
- Potable water will be piped using existing mains, upgraded and increased to meet the proposed needs. Greywater and blackwater systems will be integrated into the proposed sewerage network that will include a proposed underground stormwater tank, activated sludge process (ASDP), constructed filter bed systems and use of non-potable water as part of the water management strategy on the Environment Park.
- Sewerage infrastructure requirements. Cost not quantified in IDP but part of standard development build-out costs.
- Electric Power in various phases is already provided to the site. This will need to be enhanced and increased to meet the capacity of the proposals. This will be connected to the proposed micro heat grid and renewable energy infrastructure. Solar power, hydro power and anaerobic digestion form part of the energy mix for the site and facilities.
- A major national gas line runs to the east of the Peninsula. Gas will be provided to all land uses via the existing network and as with electric power, will be upgraded and increased as required.

Landfill Regeneration

The landfill along Broadmead Lane is an important infrastructure item that is in need of considered and timely regeneration. It is a former landfill site that is unlined, overgrown and insufficiently defended from climate change flood limits. It threatens to leach into the River Avon and has some interesting if not ecologically important flora and fauna. It is not in the Green Belt and is currently elevated out of the functional floodplain. It is in a strategically important position to help facilitate a joint flood and regeneration partnership between B&NES, Wessex Water and DS Smith Recycling which are all in need for a mixture of flood defence, sustainable drainage systems and flood resilient access and egress to their sites.

The majority of the landfill site was originally allocated in the draft Wansdyke Local Plan for employment development. This was further supported by Policy GDS.1 in B&NES Local Plan 2007 which approved the landfill Site K3 for development of an Environment Park. Site K3 is now a Saved Policy in the current Core Strategy and Local Development Framework. The River Regeneration Trust also proposed a Materials Recovery Facility, Anaerobic Digester, Micro Heat Grid and processing of

recycled products for construction, manufacturing and local jobs in 2012. The West of England Joint Waste Core Strategy Policy 5 has identified BA19 Broadmead Lane as a residual waste facility. Key Development Criteria for BA19 state that the existing access is inadequate. Any proposal should incorporate improvements to the access to allow HGV movements under the railway bridge or provide alternative appropriate access. Any changes to the carriageway in the vicinity of the site must also take into account needs of pedestrian movements.

The Flood Risk Management Strategy completed for B&NES identified a number of development sites across the region. These included KM11 Broadmead Lane Landfill and KM9 Paper Mill. These are both in within Flood Zone 3 (3a high probability of flooding, and 3b functional floodplain) and the Climate Change 1% AEP flood limit, which are Flood Risk Priorities that require Integrated Building Defences and some Flood Storage. In fact Keynsham will suffer from increased flooding in the future from rivers (more tidally influenced), surface water and sewers.

Wessex Water Sewage Treatment Works

Foul water from development sites will require network and treatment capacity to treat the additional flows from housing and employment activities. Wessex Water undertakes a strategic review every five years to help inform business planning and a rolling programme of infrastructure investment to sustain service standards. The Local Development Framework and Core Strategy major sites provide an indication of future capacity and needs. Previous assessments of Keynsham Sewage Treatment Works have indicated that growth will exceed capacity during 2015-2020 depending on growth and the recent downturn in construction activity. Wessex Water are currently assessing the next five year needs and a range of short and long term options to meet the additional treatment capacity, in addition to recent improvements which have enhanced the available capacity. Additional demand from the Somerdale development is expected to be met by the chocolate factory process that needed significant volumes of trade effluent that is no longer discharged. However, additional capacity from further developments in the local area will need reconsideration.

Land

There are a number of “land elements” that will be delivered. Green space will be delivered in line with policy and in keeping with the high quality master-planning for the Peninsula. This has been included in more detail in the Flood & Environment and Outline Proposal sections.

Buildings

There are a variety of building infrastructure needs which will be consumed via general development costs. However there are other wider requirements, as set out in policy (B&NES IDP) where contributions towards off-site provision, or on-site provision as part of the Broadmead master-planning will be needed.

- Contribution required towards new educational provision estimated in the IDP at £5m.
- Broadmead Lane Residual Waste management site – cost not quantified but key part of our regeneration strategy.
- Relocation of Waste Transfer Station to Pixash Lane – costs estimated at £7.2m. Within our red line boundary or off-site contribution?

5. Transport Requirements

Research has shown that transport is the number one issue in planning applications / regeneration schemes in the UK, regardless of development type or geography. Concerns over traffic levels, site servicing and general access issues can typically dominate discussions and lock-up opportunities. Our team have invested considerable time and expertise early on in the regeneration process to find opportunities and solutions which will save time and money going forwards. Our vision, in line with B&NES aspirations is to create a sustainable community – providing travel choice for all journeys to / from the site regardless of trip purpose is key to the promotion of Broadmead Peninsula as an integrated development; as is providing complementary land uses that reduce the need to travel at all. Focus has been centred on both internal site movements, and external trips.

Our transport approach is for delivery of housing and employment in the short term with an eye for the wider vision of the Peninsula, future-proofing the development towards a longer term sustainable community. In terms of viability, which is essential to give the scheme credibility and to put forward confidence in deliverability, we have set out a phased strategy in transport planning terms. The regeneration will take a stepped approach in transport infrastructure provision allowing sustainable access to the Broadmead Peninsula in a viable manner. However, phasing is important, not just for viability but over engineering and creating excessive capacity before it is required, can have a damaging effect including attracting more trips (including suppressed traffic) onto the highway network. The timeline for delivery will be based on providing the appropriate transport capacity as development comes forward. Our team will work closely with the Local Highway Authority and other key transport providers in progressing our scheme.

Our master-plan looks at complementary land uses – many of which reduce the need to travel. Creating jobs will also reduce the need for Keynsham residents to “out-migrate” in the morning peak, returning in the evening peak – this creating a release of some local highway capacity. Additional residents and people visiting leisure land uses (largely off-peak travel) will generate local economic stimulus and enhance the viability of shops and services in the town, including the high street. This multiplier effect will in-turn allow Keynsham to further invest in its infrastructure and services, providing a more sustainable community and in turn reducing the need to travel (particularly by vehicular modes).

Furthermore our plans centre on the “circular economy” – for example utilising the waste and materials industrial usages on the Peninsula and using these products to build boats and homes. We will also be promoting use of the River Avon, with an aim of moving freight (and people) on this asset – this will reduce the movements of Heavy Goods Vehicles (HGVs) to and from the area. Current infrastructure and access to the Broadmead Peninsula can be utilised and managed to support a certain quantum of development coming forward in the short term. The longer term vision can be realised by carefully planned infrastructure provision and travel planning. The following paragraphs centre on the phased approach to access the regeneration opportunity.

Phase 1 – Making best use of existing infrastructure

We appreciate that current highway capacity into the Peninsula is limited. However, there are some access points and opportunities to develop a sustainable transport strategy. The following sections describe current transport infrastructure and services and set out a strategy to deliver homes and jobs in the short term to meet policy aspirations, whilst not compromising our ambitious longer term regeneration plans. Phase 1 concentrates on low cost interventions to mobilise development in the first five years of the vision.

Highway access

Avon Mill Lane - road access from Avon Mill Lane via a road spur to service the industrial activities to the west of the site – this route has space for two passing HGVs leading into the DS Smith Recycling land. Avon Mill Lane is a two-way road which routes under the rail line to the south of the site, then joining the B3116 Bath Hill / Bath Road. To the north, Avon Mill Lane links in with the A4175 Station Road / Keynsham Road (routes from Keynsham town centre to Bitton, and onto Bristol and Bath).


Broadmead access from Avon Mill Lane

Broadmead Lane - heading east, Broadmead Lane feeds off the A4 / B3116 roundabout by the Co-operative supermarket. This link utilises a low capacity (single lane of traffic) under the railway line and then routes towards the Broadmead Lane Industrial Estate, located alongside the river. Almost immediately north of after the railway line, Stidham Lane is accessed off Broadmead Lane and runs in an eastwards direction to Pixash lane. Broadmead Lane (south of the rail line) also joins Unity Road which forms another low capacity highway route under the railway – this link offers potential for a walking / cycle link to Keynsham as it also feeds into an under-pass of the A4. In Phase 1 of the transport strategy, these routes under the rail line can also act as emergency access points.

Pixash Lane – this route joins the A4 via a priority junction (Pixash Lane being the minor arm). This junction benefits from right hand turn stacking into Pixash Lane and there is highway land available if capacity improvements are required. Pixash Lane is a two way road providing access to a number of industrial units to the south of the railway; it then bridges over the rail-line – allowing single file traffic and then accesses Avon Valley Park and farm buildings. Pixash Lane can link in with Broadmead Lane to the north of the rail line, via Stidham Lane.


Figure 5.1 - A4 / Pixash Lane junction

Local rail network - the development is in close proximity to Keynsham rail station (situated to the north of Keynsham town centre on Keynsham Road) – services run between Bath and Bristol Temple Meads (and beyond) and although frequent at peak times, are irregular at off-peak times with main high speed services not calling at the station. The journey times into Bath Spa or Bristol Temple

Meads are around 10 minutes. The station car park is low capacity and station facilities are limited – these include a small sheltered area, help point and manned ticket booth which operates at peak times only. The rail line forms a boundary to the south of Broadmead Peninsula.

Figure 5.2 - Keynsham railway station

The regeneration also allows opportunities for the movement of freight by rail, removing HGV traffic off the highway network. Our team are continuing discussions with Network Rail to explore the possibility to provide rail sidings to service the industrial land uses on the Broadmead site.

Bus services - areas of Broadmead Peninsula can access the A4 Bath Road bus services via a relatively short walk or cycle. Regular bus services route along the A4 between Bath and Bristol and to other local centres. Journey times are approximately 20 minutes into the centre of Bath and a similar duration into Bristol city centre. Accessibility mapping is shown in Figure 5.4.

Cycle links - the well-used and high quality segregated National Cycle Route 4 (NCR4) routes between Bath and Bristol (and beyond) and runs via the north-east of the site crossing the river at Ferris Bridge. The A4 also provides a cycle corridor and includes a number of segregated sections via Saltford and Keynsham (and linking into Bath and Bristol).

River Avon - the site offers direct frontage onto the River Avon. Our wider vision for the regeneration of the River Avon includes the promotion of river boats, potentially for leisure and commuter travel. There are the obvious advantages of providing leisure / tourist river trips; the business case for generating a commuter business for journeys into Bristol or Bath is more complex as this relies on an attractive journey generalised cost compared to other modes, with the value of time for a commuter being high. We also see the river playing a lead role in the movement of freight to the industrial sites in the locality and may be able to transfer materials during the construction process. Each barge can take a significant numbers of HGVs off the road network. We propose a boat landing station as part of the scheme and a number of access points onto the river.

Local accessibility – Figures 5.4 and 5.5 map out accessibility from the Broadmead Peninsula to Keynsham town centre and local public transport nodes. Industry guidance in PPG13 and re-iterated by the CIHT recommend that distances of 2kms and 5kms respectively represent maximum walking and cycling distances to land uses. Guidance on distance to transport nodes (such as bus stops and rail stations) varies to some extent – however in London the Public Transport Accessibility Level (PTAL) suggests a distance threshold of 960 metres to a rail node.

The vast majority of the Broadmead Peninsula lies within 2 km of Keynsham town centre and also within this distance to Saltford. Areas of the Peninsula are within 400 meters of the nearest bus stop, with the vast majority of the site falling within 800 metres. Almost the whole of Broadmead is within 2 km of the rail station.

Figure 5.3 - Unity Road tunnel under the railway and walking / cycle link under the A4

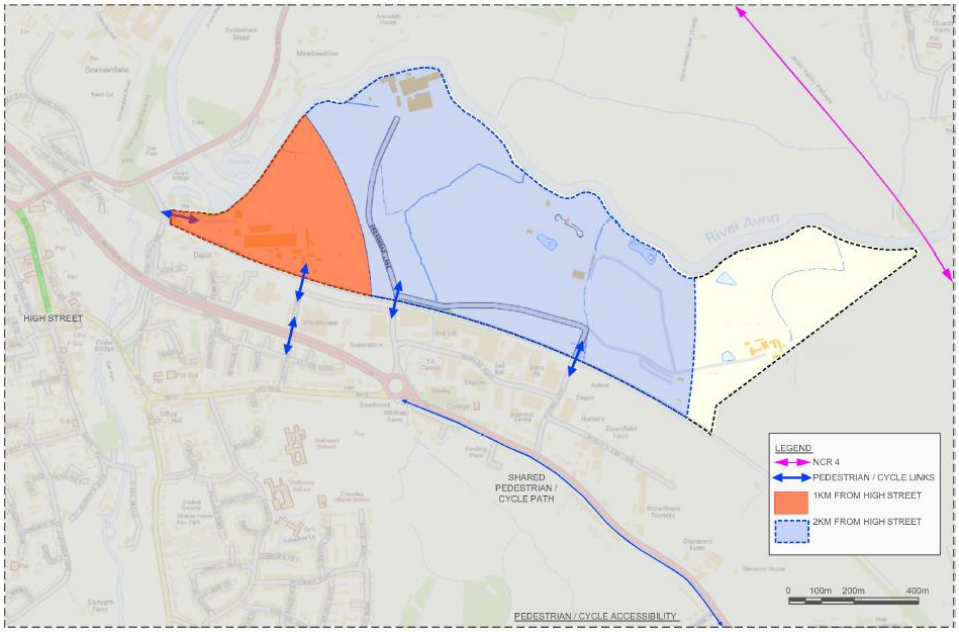


Figure 5.4 - Pedestrian / cycle linkages and distances to Keynsham High Street

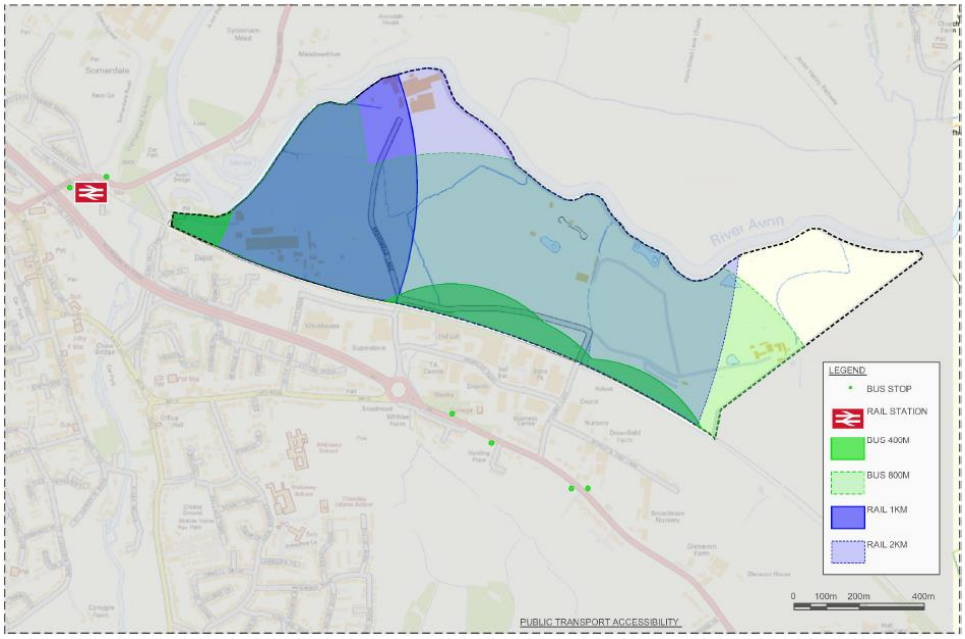


Figure 5.5 – Distances to public transport nodes

There are a variety of land uses – largely business / industrial, agricultural and leisure that are currently being accessed via the existing infrastructure. Our vision encompasses a master-plan that will deliver complementary activities which will reduce the need to travel – for example a strong mix of affordable and market led housing supply, jobs, industrial usage and leisure activities. Funds for new infrastructure will be realized from the selling of homes and other development. Initially traffic capacity can be met by existing infrastructure – Pixash Lane road bridge allows a link into the Peninsula along with under rail tunnels. Some of these rail tunnel linkages can be promoted as pedestrian / cycle access. Currently Pixash Lane provides (primarily) access to the Avon Valley Park - largely a generator of off-peak vehicle access. Housing and employment uses will generate more peak time travel – however, a small quantum of development can be delivered without major infrastructure investment. There are local high frequency bus services running along the A4 Bath Road and opportunities for cyclists to link in with both NCR4 and the improved (with areas of segregated cycle lanes) route into Bath along the A4.

Figure 5.6 - A4 Bath Road bus services and segregated cycle-way

A planned approach to managing the current transport infrastructure in the short term will give confidence in scheme viability and deliverability and allow an element of development to progress quickly without creating a significant negative impact in traffic terms. The preliminary cost / viability of this approach is set out in section 6.

Figure 5.7 - Broadmead Lane – road link to Pixash Lane; local retail facilities

Phase 1 Highway Improvements

Phase 1 will see an upgrade to Stidham Lane (route linking Broadmead Lane to Pixash Lane. This will offer an alternative to Pixash Lane and provide additional highway capacity into the site. This route will be an option to cyclists, who can then link into Unity Road and the underpass towards Keynsham town centre. Stidham Lane will be upgraded to a two-way secondary route and include a shared foot

/ cycle-way. Stidham Lane onto the rail underpass (at Broadmead Lane) can also act as a secondary and emergency access in Phase 1. The junction from Broadmead Lane, under the railway can be changed in terms of priorities and road markings if required going forwards.

Highway Capacity

In order to give decision-makers confidence that Phase 1 is deliverable with minimal works to the highways network, therefore making up the shortfall in five year housing, we have undertaken an assessment of highways capacity.

Traffic Generation

We have undertaken some initial TRICS (industry standard database for calculating traffic generation by a range of land uses) trip rate assessments for the residential and industrial employment land uses proposed for Phase 1. This is based on 250 new homes and 24,500 m^2 Gross Floor Area (GFA) of employment. The homes represent a mix of privately owned dwellings and give an indication of trip generation – this will be firmed up once we develop the Master Planning and have a more definite approach to house size, make up of affordable homes etc.

Employment and residential development generate tidal trip patterns. Residential development generates higher levels of departures in the AM peak and higher levels of arrivals in the PM peak. The opposite is true for industrial employment, with the highest inbound flow in the AM peak, and highest outbound flow in the PM peak. Thus these land uses complement each other and result in a balanced trip generation profile. This balanced trip generation profile facilitates a greater level of development to be achieved in Phase 1 rather than would occur with a more tidal flow profile. This generates revenue from the site which can be used to invest in the infrastructure required to deliver the long-term vision for the site. Furthermore, there is significant potential for people to both live and work on the Broadmead Peninsula, limiting the level of external trips generated.

The results are set out in Tables 5.1 and Table 5.2, with 5.3 showing total traffic generation for Phase 1. We have concentrated on the traditional network weekday peak hour periods, as this is of the key concern for the Local Highway Authority.

Time Period	In	Out	Total Trips
0800 – 0900	28	95	123
1700 - 1800	79	37	116

Table 5.1 – Trip generation from 250 new homes

Time Period	In	Out	Total Trips
0800 – 0900	131	25	157
1700 - 1800	12	105	117

Table 5.2 – Trip generation from 24,500 sqm of industrial employment

Time Period	In	Out	Total Trips
0800 – 0900	159	121	280
1700 - 1800	91	142	233

Table 5.3 – Total trip generation for Phase 1

The results show that the development has the potential to generate 280 **two-way** trips in the AM peak, and 233 **two-way** trips in the PM peak. In terms of the biggest volumes of traffic in any one direction, Phase 1 will generate 159 vehicle arrivals in the AM peak, and 142 vehicle departures in the PM peak - this equates to between two and three vehicle movements per minute into the site in

the morning, and out of the site in the evening. The flows out of the development in the morning and into the Peninsula in the evening will be less. Whilst the AM peak generates slightly more traffic, it is considered that the traffic impact of Phase 1 of the development will be greater in the PM peak. This is because the PM peak has the highest level of outbound traffic, which will need to join the A4, opposed by the heavy traffic flows. The local highway network is therefore more sensitive to increases in outbound traffic than inbound. For this reason, the PM peak was chosen for assessment.

Traffic Distribution

Given that the housing land use will be complemented by a significant level of employment, we have taken a conservative approach that 10% of the jobs will be staffed by people living in the new Broadmead Peninsula homes. We have also made the conservative estimate that only 40% of the traffic will route via Stidham Lane and Broadmead Lane to the A4, despite the Stidham Lane improvements and higher capacity of the Broadmead Lane approach to the A4. The remaining 50% of traffic will therefore use Pixash Lane. Trip generation along Broadmead Lane and Pixash Lane, using these assumptions, is presented in Table 5.4.

Access	In	Out	Total Trips
Broadmead Lane	36	57	93
Pixash Lane	46	71	117

Table 5.4 – PM peak Phase 1 traffic generation by access

In order to determine traffic distribution, we have utilised data from *Appendix E of the "B&NES Background Evidence to the Schedule of Proposed Changes to the Core Strategy",* dated April 2013 – "Distribution of Car Trips from Keynsham East Ward". In summary the traffic to / from the proposed development will route as shown in Table 5.5.

Direction	Percentage of Trips	Number of Trips (IN)	Number of Trips (OUT)
West (Bristol / Keynsham etc)	78%	64	99
East (Bath etc)	22%	18	29

Table 5.5 – Trip distribution from Broadmead Phase 1

Background Traffic Flows

In order to properly assess the traffic impact of the development we have undertaken a PM peak hour (1700-1800) traffic survey at the A4/Pixash Lane junction on Tuesday 22nd October 2013. This has enabled us to determine the link flow along the A4, as well as turning movements for assessing the capacity of the junction itself. For the purpose of a robust assessment, we have applied a compound traffic growth rate of 1% per annum to through traffic on the A4, to account for economic growth and other development, up to an assessment year of 2018. 2018 represents the target for delivering the five year housing allocation.

Traffic Impact and Capacity Assessment

The percentage impact of the development on A4 link flows can be seen in table 5.6.

Link	Eastbound	Westbound
A4 (west of Pixash Lane)	+3.6%	+5.4%
A4 (east of Pixash Lane)	+2.1%	+1.6%

Table 5.6 - Percentage impact of Phase 1 on A4 link flows in 2018

Phase 1 of the Broadmead development will have a minimal impact on the A4, with the highest percentage impact being a 5.4% increase on the westbound flow to the west of Pixash Lane. All other increases in link flow will be less than 5%.

The capacity of Pixash Lane is constrained by the single file traffic crossing the railway line. Given the nature of slow moving traffic and the need to give-way if required, the capacity of this link is estimated at around 500 / 600 vehicles per hour (a standard two-way link would offer circa 1,100 vehicles per hour in each direction). Baseline traffic flow on the Pixash Lane bridge is currently very low. At peak periods, Pixash Lane only experiences minimal trips to / from the Avon Valley Park and to the agricultural buildings.

Phase 1 of the Broadmead development will increase the level of traffic using the Pixash Lane bridge. The highest time period for trip generation from Phase 1 proposals will be 280 two-way trips in the AM peak - however, many of these trips will route via Stidham Lane / Broadmead Lane (and not use Pixash Lane over-bridge). It is therefore considered that the Pixash Lane bridge will remain within link capacity with Phase 1 in place. However, it would be beneficial to traffic flow to reduce conflicts.

One traffic management option for the bridge would be the implementation of traffic signals at either end, with green time being allocated on a demand responsive basis. A LinSig (Industry Best Practice software for assessing the capacity of signalised junctions) model has been developed for this scenario. It is good practice to design junctions to operate below 90% saturation to account for fluctuations in traffic flow. We have worked backwards from this point to analyse the practical capacity of a signalised Pixash Lane bridge. It was found that the bridge could accommodate 1,050 vehicles per hour, and therefore **Pixash Lane over-bridge would be able to support Phase 1 of the development with a significant level of spare capacity.**

The bridge currently has verges on both sides – we suggest that these are cleared to provide highway and a walk-way on one side. The junction capacity of the A4/Pixash lane junction in its current format has been analysed with the addition of Phase 1 development traffic in 2018. This has been assessed using PICADY software (Industry Best Practice software for priority junctions). Geometric parameters such as road widths and visibility have been measured on site. The results can be seen in Table 5.7.

Movement	Maximum Ratio of Flow to Capacity	Maximum Queue
Pixash Lane Left	0.884	4.0
Pixash Lane Right	0.869	4.4
A4 (E) Right into Pixash Lane	0.052	0.1

Table 5.7 - A4/Pixash Lane 2018 plus Phase 1 PM Peak Traffic Capacity Results

Junctions operating within an RFC lower than 0.9 are considered to be operating within practical capacity, with spare capacity built in to accommodate fluctuations in traffic flow. The assessment shows that **the A4 / Pixash Lane junction will operate within capacity with Phase 1 development traffic in 2018** with all RFCs below 0.9 – development traffic includes the documented 250 new homes and 24,500 m^2 of employment as part of Phase 1 of the Broadmead development.

Conclusion

The traffic impact assessment exercise carried out above should give decision-makers the confidence that, with limited investment in terms of new supporting infrastructure, 250 homes can be delivered in line with the five year supply target. Furthermore, a balanced development mix can be achieved such that these homes will not be delivered in isolation but can be built as part of a sustainable

community incorporating employment and other ancillary uses. The results show that this can be accommodated with the limited level of investment assessed, without unacceptable impacts on the local highway network.

Phase 2 – Road link from west of site and sustainable linkages

Additional homes, industrial / employment space / education and leisure uses can be delivered through more significant investment in transport infrastructure. An upgraded route (suitable for HGV use) linking with Avon Mill Lane / Keynsham Road to the west of the Peninsula will provide a step change in traffic capacity to the area. This aligns with Council policy in providing suitable HGV access from Avon Mill Lane and the upgraded road link will penetrate the wider site with tertiary roads providing access off this main primary link. This primary road link will also provide a segregated footpath and cycle-way along the route of the road but set-back in order to develop an attractive corridor; and the link will be sympathetically landscaped. We acknowledge current capacity constraints at the Avon Mill Lane junction (particularly heading southwards via the rail tunnel into Keynsham) and at the Avon Mill Lane / Keynsham Road priority junction. There is potential in highway land to re-configure the Avon Mill Lane junction with our proposed site entrance including primary road into the development, and it may be appropriate to provide signals to improve traffic flow via the railway tunnel. There is scope to increase the capacity at the Avon Mill Lane / Keynsham Road junction by some widening and having some right hand turn stacking. Outcome from junction capacity modelling may also cite traffic lights as a potential solution.

Capacity modelling work will provide detail on junction type and scale. The primary route will be a standard two-way route with a 7.3 metre carriageway. There will be a 2 metre pavement on one side, and a 3 metre pavement / cycle-way on the other. Along the route, there will be intersections with secondary routes including Broadmead Lane and Pixash lane – these will either form priority junctions (with the primary site road being the major arm) or small roundabouts. The primary road will also potentially allow buses to run close to the development areas as this primary site access road links in with Pixash Lane.

Figure 5.8 - Avon Mill Lane / Broadmead Peninsula junction; Avon Mill Lane / Keynsham Road

Secondary routes will typically be between 5.5 metres and 7.3 metres in width and where possible include pavements. Other tertiary routes servicing housing and other land parcels and likely to be in the order of 5.5 metres wide and the streets may function as shared space with on-road cyclists. Minor routes could be narrower at 4.8 metres in width. Secondary / tertiary roads and shared space will be part of the overall development strategy and costs will be consumed as parcels of build-out are realised.

This Phase will also allow for a more formal approach to walking and cycling routes via the rail underpasses – providing direct desire lines to the A4 cycle corridor, the A4 bus stops and into the centre of Keynsham. The cycle strategy will also allow for a continuous link from the west of the Peninsula (and to the rail station) alongside the primary site road and then onto NCR4. The link will also tie in with the Somerdale cycle infrastructure, and onto Hanham; and to cycle linkages to the south of the development. During this Phase we will also promote an off-road cycle link running close to the River Avon and offering an attractive leisure route for cyclists. The route will be lit and will run from the west of the Broadmead Peninsula (linking in with the current rail station) and onto NCR4, to the east of the site. Cycle linkages via the rail tunnels will become more attractive as vehicles will primarily route on the newer higher capacity road link offering improved journey times.

Figure 5.9 - Potential bridge design for cycle / pedestrian route over River Chew

In order to economically provide a third lane across the existing Avon Mill Lane road bridge over the river Chew, it is intended to remove the footpaths on either side and widen the road to use the full extent of the bridge. This will provide for a right turn out onto the Keynsham Road. The footpaths and cycle ways can then be combined in a new lightweight bridge which can then be designed to be an iconic structure at the gateway into Broadmead. This will take cyclists and pedestrians to the west bank of the Chew where they can link into existing riverside walkways at the lower level and the existing footpath adjacent to the Station car park at the higher level. This bridge will herald the beginning of a safe and secure cycle network which extends throughout the peninsula satisfying the needs of cyclists of all ages and abilities. This bridge also avoids the need to create additional capacity through the railway arches for cyclists and pedestrians it is intended to provide a dedicated bridge across the River Chew. This bridge will thread through the existing trees with minimal damage as this is a protected landscape area. Its secondary purpose is to encourage greater use of the bike by creating an exciting and attractive access route to Broadmead from the town centre. Although more expensive than a typical footbridge, the special nature of its design and function should allow it to attract additional community based funds to facilitate its construction. This could even extend to the creation of naming rights. We also plan to create linkages between the development areas and NCR4 in this Phase, and create linkages to river ferry taxi pods.

Figure 5.10 - Proposed cycle crossing at Avon Mill Lane / Potential solution for Avon Mill Lane – A4175 junction

One proposed option in Phase 2 is to create a one-way road system from Broadmead Lane via Unity Road rail under-bridge, along a new road to the Broadmead Lane / Stidham Lane junction and back through Broadmead Lane rail under-bridge – traffic moving in a clockwise direction. In order to implement this scheme without creating a detrimental impact on pedestrians and cyclist, we propose punching a footway / cycle-way through the Unity Road under-bridge, thereby keeping the pedestrian cycle desire line from the central area of the Peninsula through to Keynsham.

We have identified the land owners along the route of this proposed primary route and have set up Memorandums' of Understanding with some of the key landowners; namely B&NES, Wessex Water, Broadmead Industries, Avon Valley Farm and Avon Valley Adventure & Wildlife Park. We will engage in continuous dialogue and equalisation measures will be investigated in order to compensate the landowners appropriately as they will all realise benefit from enhanced transport linkages. Although industrial and employment land uses are central to our proposals, HGV movements will be minimised as the regeneration will benefit from the circular economy approach. Waste and materials will be used to build houseboats and homes and some construction materials will be moved by river and possibly rail, as well as by road.

Phase 3 – Road over rail bridge and bus loop

As cash-flow and development magnitude increases, there will be the need for additional transport capacity for the Peninsula - this can be achieved by building a higher capacity road bridge crossing over the railway (over and above the capacity provided by the current Pixash Lane bridge), towards the east of the Peninsula. Either an upgrade of Pixash Lane, or a new bridge would be options. The approach for a new bridge would require upgrading World's End Lane with a junction onto Pixash Lane, the provision of a primary route with footway / cycle-way and linking into the Phase 2 built section of the primary road to the north of the rail line. This new route over the rail-line will also meet Council aspirations in providing a link between the A4 Bath Road and onto the A4175 Keynsham Road providing a step chance in local highway capacity provision. This route will allow for further bus penetration throughout the site - we will also be looking at a new bus loop through the site, providing a route from the A4 / Pixash lane, over the rail line, through the development and onto Avon Mill Lane. The detail will be worked up during the feasibility study, but the route could potentially also enhance the accessibility of the Somerdale site. We understand that improvement to the Pixash Lane / A4 junction will also need to be delivered at this point in time, with potentially the need for traffic signals.

There is also the possibility of relocating Keynsham rail station to provide a better located facility with room for expansion. This could be tied into the electrification works and also into the delivery of the new rail over bridge. **However the regeneration is not dependent on this new infrastructure coming forwards.** This opportunity provides the ability to increase parking capacity at the station and provide enhanced passenger facilities. A new station located to the east of its current positions would allow platform length for the High Speed (8-car) Trains. Pedestrian, cycle and bus access to the station would be central to the planning of this station and the on-way traffic arrangement as set out in "Phase 2" can be utilised.

The benefit of the site being located close to the rail network also provides the substantial incentive of a third line to benefit both passenger services and rail freight activities – allowing for passing trains and usage as a freight route.

Phasing Summary

A summary of the proposed Phasing strategy is contained in Table 5.8

Phase	Transport Strategy
Phase 1	Make best use of existing infrastructure: • Traffic management on Pixash Lane road bridge over the rail line • Upgrade to Stidham Lane • Implement complementary land uses • Formalise walking and cycle routes
Phase 2	New road link (suitable for HGVs) from Avon Mill Lane; and develop sustainable linkages: • Build primary route with suitable pavements and segregated cycle lane • Secondary road network to connect with primary road • Re-configure Avon Mill Lane / site access junction; and Avon Mill Lane / A4175 to create additional capacity • Implement leisure cycle route from west of site through to NCR4 running close to River Avon • Formalise walking / cycle linkages along Unity Road from Peninsula, into Keynsham • Allow for bus penetration of site • Potential one-way road system from Broadmead Lane / Unity Road / Stidham Lane • Linkages to River Avon
Phase 3	New road over rail line and bus loop: • Provide additional highway capacity over the rail line through delivering a new bridge with supporting highway network; or widening Pixash Lane bridge • Re-configure Pixash Lane / A4 junction to provide additional capacity • Formalise bus route (loop) through the Peninsula • Potential to deliver a new rail station

Table 5.8 – Phasing Strategy Summary

Delivering high quality access arrangements

We will work closely to ensure highways, segregated walking and cycle routes, and distances to bus stops will all be planned to meet Council standards / be located within a short walk or cycle journey. Although B&NES does not have an official highway design guide, we are well versed with working to Manual for Streets 2 and DMRB approaches.

In order to give confidence that the appropriate scale and type of highway junctions are being planned, in order to meet forecast capacity, a technical process needs to be carried out. Traffic survey data at the A4 / Pixash Lane junction and the Avon Mill Lane / A4175 junction will be collected. Other locations may be required – this will be formally agreed through dialogue with the Local Highway authority. We will assess trip generation from the mix of land uses at key points of the project lifecycle, utilising the industry standard TRICS software and by reference to census and journey to work data, we will look at the distribution of these journeys. Validated junction assessment models for the current year will be developed and growth factors applied to represent planning and economic factors into the future, along with the trip generation from the site's proposals. This will inform the decision on junction type and scale with respect to the Avon Mill Lane access, and any mitigation required at the A4 / Pixash Lane priority junction.

This modelling can also be used to determine the scale of development that can come forward before interventions or capacity enhancements are required. Detailed design work including formalisation of highways, walking and cycle routes, and Road Safety Audits will take place at the appropriate time. Our team has all the skills, expertise and resource to provide these inputs which will be central to creating this sustainable community.

Addressing Core Strategy objectives

Our strategy centres on meeting Core Strategy objectives. Although many of the objectives relate indirectly to transport, this report focuses on the key headlines referring to transport and accessibility criteria. These are set out in Table 5.9.

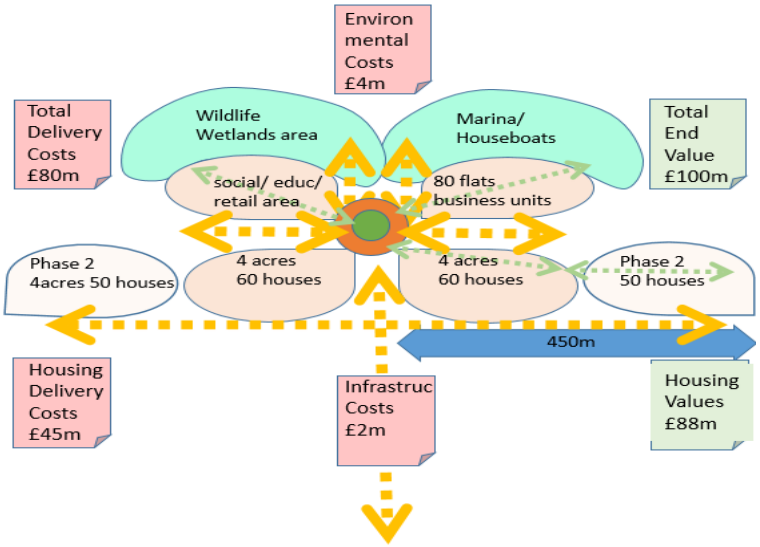
Core Strategy Objective	Key Factors	Commentary
Objective 1: improve accessibility to community facilities and local services.	Help everyone access basic services easily, safely and affordably. Increase access to and participation in community and cultural facilities activities.	Well located to encourage travel by public transport services along the A4. Keynsham rail station is walkable and adjacent to the western end of the site. Keynsham and Saltford town centres are also walkable and master-planning will use desire lines (via current rail and road bridges and underpasses). NCR4 runs to the north east of the area and site infrastructure will link into this route. A mix of housing, employment and leisure activities as part of the regeneration will reduce the need to travel. Retail land uses are accessible both in the town centre but also adjacent to the southern edge of the site (such as the Co-operative supermarket off Broadmead lane). Potential to redevelop and enhance Keynsham rail station through site-wide master-planning. Major opportunity to provide travel choice to all – vehicular travel, buses, rail, walking and cycling and river transport.
Objective 2: improve the health and well-being of all	Improve health. Reduce health inequalities Promote healthy lifestyles, especially routine daily exercise	Strong mix of leisure land uses planned for the site including access to the river. A4 is identified in policy as a cycle route, as is NCR4 – master-planning will promote connections with these linkages. Strong pedestrian links through the site and connecting with existing external desire lines such as Unity Road. New primary road will offer off highway pedestrian and cycle links. Proposed new leisure cycle route through the Peninsula running close to the River Avon and connecting with Avon Mill Lane to the west, and NCR4 to the east of the site. Mix of complementary land uses will encourage sustainable travel to work, beneficial to health and well being.
Objective 4: promote stronger more vibrant and cohesive	Promote stronger more cohesive communities.	Potential to contribute to strengthening the existing communities in adjacent areas including viability of Keynsham town centre,

communities		Somerdale, industrial and housing areas to the south of the rail line. Potential to enhance linkages with NCR4 and other cycle routes and access with the river. Encourage movement of freight by rail and river.
Objective 7: ensure communities have access to a wide range of employment opportunities, paid or unpaid.	Give everyone in the region access to satisfying work opportunities, paid or unpaid. Reduce poverty and income inequality. Provide a diverse range of employment opportunities in a variety of sectors.	Good access to Keynsham and Saltford town centres. Good access to employment areas to the south of the site and north of the A4. Opportunity to meet housing need and provide employment including a boost to the circular economy. Strong connections to the centres of Bath and Bristol through car, bus, rail and cycle modes. Opportunity to provide affordable homes and house boats.
Objective 10: ensure everyone has access to high quality and affordable public transport and promote cycling and walking	Make public transport, cycling and walking easier and more attractive. Promote sustainable transport to reduce the need for major transport infrastructure.	Good access to existing bus services routing along the A4 offering connections with Keynsham, Saltford, Bath and Bristol. Opportunity to further develop the local cycle network with links to NCR4 and the A4 cycle corridor. Proposed new leisure cycle route running close to the River and linking with Keynsham rail station and NCR4. Opportunities to improve walk links from the Peninsula to Keynsham and Saltford. Excellent access to rail station with services to Bath / Bristol and direct links further afield including Cardiff, Southampton, Salisbury, Weymouth and Portsmouth. Potential to promote river transport.
Objective 11: reduce the need and desire to travel by car	Reduce the need / desire to travel by car.	Key opportunity to promote travel choice for all. Site well served by cycle, bus and train links. Promotion of water based transport. Complementary land uses will reduce need to travel and the regeneration will provide stimulus to the town centres and reduce Keynsham out commuting. Focus on transport of freight by rail and water and concentration of circular economy – reducing on road HGVs, giving de-congestion benefits and improvement to air quality and reduction in noise and vibration. Opportunity to relocate rail station, driving the ability to improve passenger facilities. Potential to provide 3rd line thereby enhancing service reliability and creation of siding to service industrial land uses.

Table 5.9 – Meeting Core Strategy Objectives

6. Initial Costings

Accurate financial modeling will be carried out in the feasibility study. The assumed overall cost for the proposed development of Broadmead Peninsula is approximately £450m but creates a value of over £600m. This is sufficient to attract investors and developers and to incentivise the landowners and stakeholders to work together to deliver the project.



Funding for Phase 1 of Option A in our Outline Proposals will require approximately £81m of capital for construction including 304 homes and variety of businesses. This can be broken down as follows:

Type of Cost	Approx. Costs	Potential Funding Sources	Comments
Housing	£29m	House-building Industry	2 stage bidding process to select Preferred Bidder
Affordable Housing/ Houseboats	£11m	Registered Social Landlord	2 stage bidding to select Preferred Bidder early on
Employment Space	£6m	Developer	Shortlist of 5 developers
Hotel/ Conference/Leisure	£8m	Leisure Partner	Competitively tendered
The Hub-social & educational centre of the Project	£3m	Infrastructure Partner	Shortlist of 3 contractors
Access Costs (alterations to Pixash Lane & Broadmead Lane	£1m	Infrastructure Partner/ Public Sector Funds	Opens up site for job creation & environmental benefits & enhancement
Wetlands/ Marina area	£4m	Infrastructure Partner/ Biodiversity grants	Creates tangible environmental benefits and leisure facilities
Sewers, Services	£1m	Wessex Water & Developers	Development costs & service provider contracts
Community Infrastructure Levy	£5m	Bank	Figure is variable, could be a balance of grant income
Professional Fees & Finance Costs	£13m	Bank	
TOTAL	£81m		
SALES TOTAL	£105m		

The estimated profit margin (profit on cost) is therefore in excess of the target of 25%.This is mainly achievable as the phasing of the development minimises the debt requirement for the site, reducing banking costs overall to less than £5m. Financial modelling will be carried out in the feasibility study.

Minimising Estate Management Costs

Beyond the completion of the development, It is the TRRT's target to achieve as close to a self-sufficient environment as possible. The different uses on the site will be designed to have complimentary demand and supply curves. For instance the off peak demands of the leisure and most of the commercial operations will leave sufficient capacity for peak time residential needs. Working with Wessex Water as an Environmental Partner as well as a major landowner and water and sewage treatment provider, will ensure that a high level of expertise and innovation will be applied to every step of the service delivery process. The minimal external energy demands will be met by a series of renewable energy initiatives on the site. Besides local solar panels, energy will also be created by a micro hydro scheme on the weir and an Anaerobic Digestion system linked to the Sewage Works. These could also feed into a micro heat grid.


Example hydro power and anaerobic digesters

In addition the waste management systems on site, the project will operate on a zero waste to landfill philosophy which should lead to no transporting of waste off site. Most of the wastes generated will be recycled within the site and the balance converted to products and materials through the 'Duratrust' type process. There is no energy from waste plant included in our Outline Proposals. Minimising running costs whilst ensuring security of supply will maximise the attractiveness of Broadmead Peninsula for occupiers, delivery partners and investors. This self-sufficiency aspiration should set the site apart from other potential opportunities in the area.

Optimising profit margins during occupation will also assist in obtaining the type of finance being considered above. Further information on the Design, Build and Operate philosophy will be discussed within the Feasibility Report.

Delivery

Delivery of any development project requires total commitment on a number of different issues. At Broadmead this requires the following to be in place:

Commitment	Objective	Progress
Planning Certainty	Clarify quantum & liabilities of project through either Planning Consent or	TRRT is focused on assisting the Core Strategy, Placemaking Plan, Neighbourhood Development Orders etc. in order to clarify

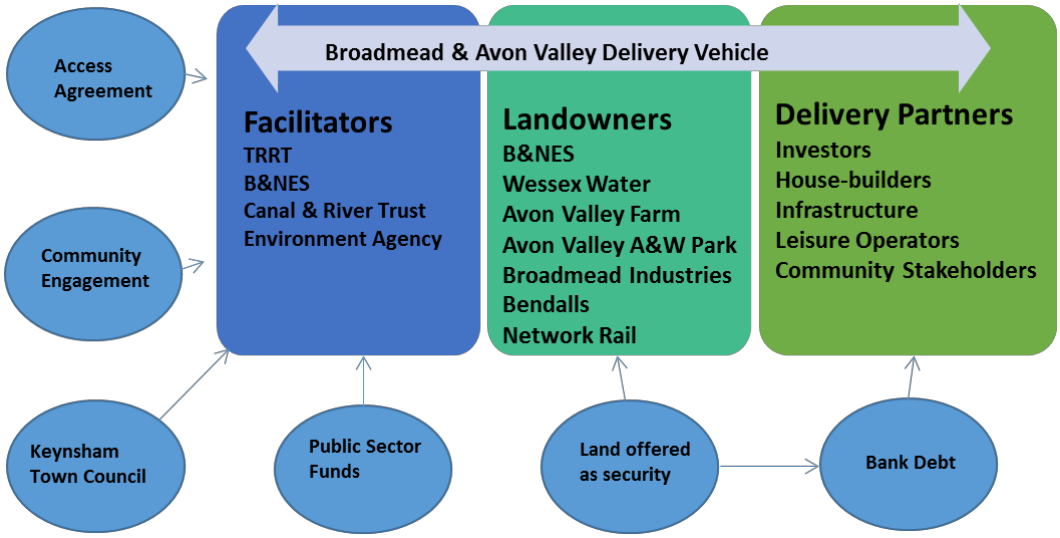
	Development Framework Agreement	planning picture
Landowner cooperation	Exclusivity Agreements and willingness to offer part of land as security against the bank loan	Memo of Understanding signed by key landowners. Discussions are on-going with: Avon Valley Farm, Wessex Water, B&NES, Broadmead Industries, Network Rail, DS Smith
Financial profitability	A targeted profit margin of 20% whilst achieving acceptable land values for the owners	An initial Financial Appraisal for Option A, Phase 1 only shows a 22% profit margin with land at £13,000/acre
Operator/End buyer certainty	The proposed development needs to be attractive to end occupiers and operators	New Leisure, business space and industrial uses will increase existing activities on site. The housing element is low risk and a representative sample of the house-building industry has confirmed strong interest.
Investor/ Developer interest	The project needs to be financially robust & deliver adequate returns to all investors	Interest has been expressed already from investors/developers and discussions are on-going
Secure Senior Debt	Securing senior debt funding is a function of the viability of the project	The market is currently able to attract senior debt on relatively good terms, especially for housing development with good levels of HomeBuy Scheme potential
Affordable Housing Content	Achieving a fixed percentage of affordable housing at minimum 30% with a preferred allocation to the economically active.	Working with Resident Social Landlords will ensure that the affordable housing element provides both beneficial social diversity and economic value
Infrastructure Contractor interest	Infrastructure requirements to be affordable at all stages of the development	Dialogue has already commenced with major infrastructure contractors on basis of a profit share deal on a contractor funded infrastructure programme.

The Delivery Vehicle

The key to delivery of the Broadmead Peninsula is to build an open, transparent vehicle from the strong relationships created by the TRRT with Landowners, Investors, Developers, House-builders and Infrastructure Partners. The format of the vehicle will evolve as the project proceeds with TRRT acting as the key facilitator, the objectives being to:

- Align development to the aspirations of the landowners, B&NES and other stakeholders
- Optimise land values in both the long and short terms
- Optimise returns to investors
- Maximise the benefits from public sector funding sources and CIL
- Motivate the development team to produce an inspirational addition to the B&NES landscape
- Inspire the community to go beyond engagement and actually help shape the programme

This vehicle could be a natural extension to the B&NES/TRRT partnership, e.g. a Development Partnership type organisation coordinating the resources and opportunities of the key stakeholders, landowners and delivery partners. A similar type vehicle has been responsible for delivering the development of over 1,500 flats, offices, restaurants and other riverside leisure facilities at Coin Street, Waterloo in London and was presented as a viable option to the November 2012 B&NES Scrutiny Panel. Similar Agencies, Authorities and Partnerships have also been used for mixed-use, leisure and employment-led developments for The Olympic Park (Olympic Delivery Authority, London Development Agency) and Greenwich Millennium Village (English Partnerships). The key relationships to embody in the Delivery Vehicle for Broadmead Peninsula are shown below:



Initial concept for the Broadmead & Avon Valley Delivery Vehicle

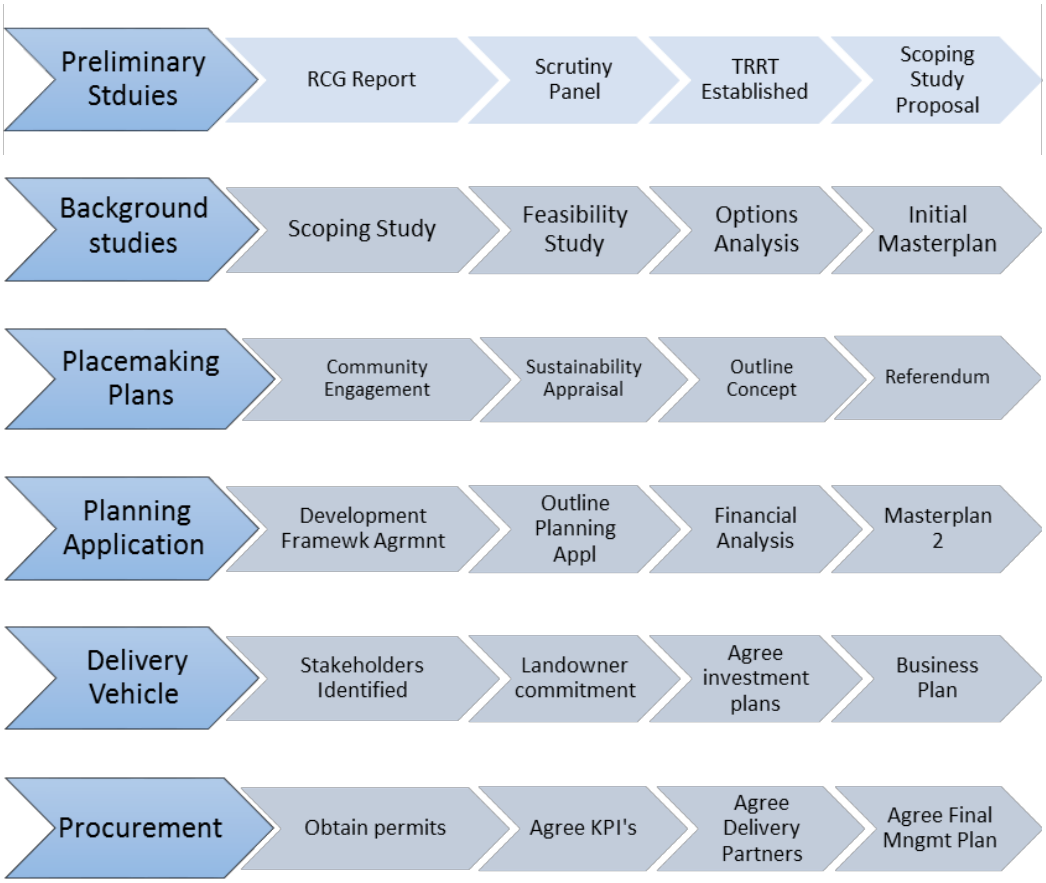
Shares in the delivery vehicle will be discussed in more detail in the Feasibility Study based on:

- **Equalised land area** (all landowners' land area is assumed to have the same equivalent value)
- **Expertise investment** (often referred to as sweat equity)
- **Private Equity investment**, i.e. based on the provision of working capital by private investors

7. Action Plan

This section of the Scoping Study is focussed on aligning future activities with B&NES' programme and priorities for the future. These will be worked out in more detail in the Feasibility Study. The intention here is to create a better understanding of the priorities for action. Not only is there time constraints due to the rigours of the Core Strategy, Placemaking Plan and Neighbourhood Development Plans, but there is also need to consider the timing of activities in relation to the Local and National Elections in May 2015. It is the aim to achieve key Planning Consents within the next 15 months and to create the opportunity for development to commence in the second quarter of 2015.

In order to minimise delays in the future, it is essential that the programme consider the process of community and stakeholder engagement at the outset. The assumption is that this process will be facilitated by a sophisticated on-line system to minimise the need to schedule formal meetings. The diagram below indicates the steps taken so far and those that need to be followed in order to facilitate the commencement of Phase 1 of development (Option A, B or C) within the second quarter of 2015. A more detailed programme is shown overleaf.



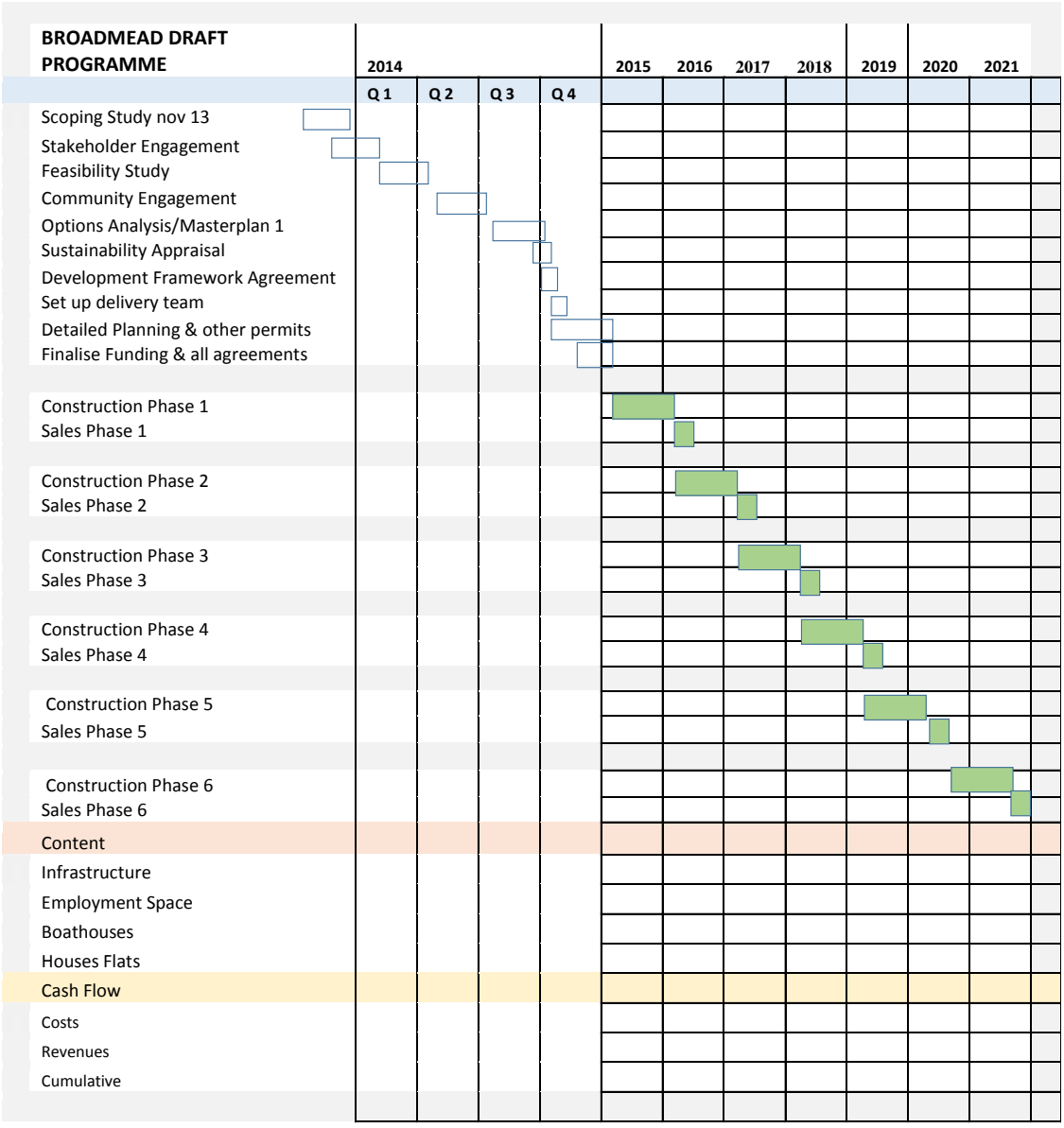
Stepped Action Plan to commence Phase 1 of Option A, B or C

Detailed Programme & Cash Flow

To translate the above Action Plan into a deliverable programme the following criteria are applied:

- Minimise debt requirement
- Maximise values by ensuring all phases have completed infrastructure in place
- Ensure amenities, e.g. farm shop, school, business spaces etc. are open at the optimum time

- Ensure facilities for enhancement of Avon Valley Farm and Avon Valley Adventure & Wildlife Park are in place at earliest possible date
- Allow time for the necessary access arrangements to the site to be made both legally and technically; some of these require the support of third party landowners
- Plan the construction phasing to optimise the sales process and ensure that maximum values can be achieved by creating the right settings for each phase of sales



Delivery Programme for Phase 1 of Option A, B or C

Financing the Development Process

This section provides an insight into the development risks that need to be managed and highlights the work to be done in the feasibility study. It discusses the project's financial objectives and potential methodologies for funding the process without compromising the aspirations of the

various stakeholders. It also considers the outcomes of initial appraisals implicit in the project. Key to a successful project is the creation, management and ownership of an effective Delivery Vehicle and Master Plan.

Landowners conventionally forge relationships with developer/investor/bank teams based on option agreements. These normally agree to pay the landlord a percentage of market value (less 'normal' development costs. These normal costs significantly reduce the proceeds to the landowners as developers need to cover significant amounts of risk, particularly in the planning phase, where development finance is in short supply. With TRRT in partnership with B&NES, it is able to minimise pre-planning risks and delays as it has a clearer perception of the constraints and criteria for determining planning consents. Development risks are therefore more calculable, fairer and more reasonable allocations of risk and rewards is therefore possible.

Minimising risk, maximising reward

Funding the initial stages of the development process, i.e. before planning consent has been granted, is the area of highest risk in any project particular with the challenges of the Green Belt, Heritage and AONB. Coupled with this is the problem of dealing with the planning uncertainties due to the issues surrounding B&NES's Core Strategy. Planning costs will be more fully evaluated during the feasibility study, but could be in the order of between £500,000 and £750,000.

Funding the Risk Capital to achieve Planning Consent

The proposal is to fund the planning consent risk capital from a number of sources:

- Private investors (likely to be the same as those that will provide the project's equity funding)
- Landowners - on the basis of a fixed sum per acre of developable land
- Shortlisted panel of house-builders/developers
- Shortlisted panel of infrastructure providers

Part of these contributions could be treated as loans paid back from the proceeds of future land. The remainder could be translated as equity stakes within the development vehicle and paid back as a pro-rata profit share. One concept to consider is as follows:

- a short list of say 5 housing developers is chosen from an openly advertised process
- selection is based on excellence and expertise and willingness to pay a refundable deposit equal to 20% of the costs to create a Development Framework Agreement (DFA)
- The DFA specifies the quantum and mix of housing, commercial uses and fully defines costs and CIL liabilities
- A single developer is selected to continue as Preferred Bidder (PB) and the four other bidders are all re-funded by the PB who then incorporates this liability in the development cash flow
- Final negotiations with the PB will be based on a detailed scheme to reduce development risk to a minimum, whilst ensuring that the landowners maximise value in an open and transparent process

This two-stage competitive process should encourage bids at least 25% more than would be the result of a traditional option agreement. It also allows for the developers expertise to be injected into the development strategy for the mutual benefit of the project.

Funding the Infrastructure Process

The provision of the Infrastructure necessary to support the development of a site as large as Broadmead is often an area of major uncertainty that distorts the understanding of risk. In the final negotiation of land value, the cost of infrastructure will often significantly reduce the net receipts to landowners, especially when the relationship with the developer is on a *solus* (lone) basis which is the norm with option agreements. The approach is to follow a similar two-stage selection process as with the developer. Once planning consent has been granted, a specific competitive tender process will be followed in order to select the optimum infrastructure partners and service providers.

Public Funding Sources

It is likely that some funds will need to be obtained from the public sector in order to deliver some of the non-commercial elements of the scheme such as decontamination and flood defence/storage. The following public sector funding sources will be investigated as part of the Feasibility Study:

- Growing Places Fund -allocated to South West LEPs as part of the RIF
- CIL/ S106 planning obligations on other projects (e.g. other major developments in the area)
- New Homes Bonus
- European Regional Development Fund
- Locally retained Business Rates e.g. through a Business Improvement District
- B&NES funds/reserve

Part of the money available from these sources will be considered as a loan, to be re-paid as soon as possible after sale of the relevant phase of the project.

8. Stakeholder Consultation

TRRT have established Memorandums of Understanding with key stakeholders and landowners on Broadmead Peninsula including:

- Wessex Water
- Avon Valley Adventure & Wildlife Park
- Avon Valley Farm
- Broadmead Industries

The Outline Proposals have been presented to:

- B&NES Cabinet and Key Officers
- B&NES Planning Team
- Wessex Water
- Avon Valley Adventure & Wildlife Park
- Avon Valley Farm
- Broadmead Industries

The Outline Proposals were also presented to local residents, businesses and Councillors during a Keynsham Town Council public meeting.

The following is a summary of personal communications and presentations:

- Consultation with B&NES highways officers
- Consultation with Network Rail
- Consultation with Wessex Water
- Consultation with Broadmead Industrial Park
- Consultation with Avon Valley Adventure & Wildlife Park
- Consultation with Avon Valley Farm
- Consultation with DS Smith Recycling (formerly Severnside Recycling)
- Consultation with B&NES Planning Department
- Consultation with B&NES Major Projects Team
- Consultation with Canal & River Trust
- Consultation with Keynsham Town Council
- Consultation with Curo Homes
- Consultation with ModCell and BaleHaus
- Presentation to Keynsham residents at Cadbury site
- Presentation to Keynsham Town Council

Further public and stakeholder engagement is planned for the feasibility stage.

9. Conclusion

Deliverability and viability of employment and housing numbers have been cross referenced with the Arup East Keynsham Development Concept Options report and the Strategic Housing Land Availability Assessment. These suggest that developable land on Broadmead Peninsula is available for employment floorspace and housing. We have taken into account flood risk, flood hazard rating, environmental areas, access and egress, land use, Green Belt purposes and agricultural land classification to ensure no significant barriers exist to development of our Outline Proposals. The current key constraint is access to the site using the four existing over and under railway bridges. These will be sufficient (with traffic management) to accommodate housing quantum up to 2019, but further numbers will require a new HGV-compliant access and a two-way over-bridge. We are confident these are both feasible and deliverable.

In terms of innovative construction techniques and the use of local materials and pre-fabricated construction elements for some of the housing, we will use the proven Modcell system for 20-30 units in phase 1, primarily as affordable homes for essential workers and first time buyers. The Broadmead & Avon Valley Partnership circular economic process (in development) will be used in phases 2-3 once the product range is approved by BRE and factory fully operational. A proportion of these innovative homes will be allocated for factory workers, first time buyers and essential workers as Build to Rent, Manufacture to Build to Rent/Buy or Private purchase. However the majority of apartments, houses and retirement homes will be built using traditional methods of construction and by established contractors and property managers e.g. Curo or similar company.

		Year Housing Supply Period from 13/1											
KEYNSHAM	**Total**	**13/14**	**14/15**	**15/16**	**16/17**	**17/18**	**18/19**	**19/20**	**20/21**	**21/22**	**22/23**	**23/24**	**24/25**	**25/26**
Proposed Green Belt Development		5 Year Housing Supply Period from 13/14												
East of Keynsham A1-A3 (TRRT)	**731**			65	75	80	84	54	52	70	70	70	70	41
East of Keynsham A1-A3 Mkt	468			42	48	51	54	35	33	45	45	45	45	26
East of Keynsham A1-A3 Aff	263			23	27	29	30	19	19	25	25	25	25	15
Total Cumulative Delivery				65	140	220	304	358	410	480	550	620	690	731
Project Phases				Phase 1				Phase 2		Phase 3				

Proposed housing supply for Option A over the three phase development

The Programme of delivery will be completed over three phases from 2015 to 2026, with a lead-in time of two years for planning, visualisation, marketing, investors and contractual agreements. The following table reflects the numbers and timing of housing delivery for Option A. The following table summarises the Transport Strategy for each phase:

Phase	Transport Strategy
Phase 1	Make best use of existing infrastructure
Phase 2	New road link (suitable for HGVs) from Avon Mill Lane; and develop sustainable linkages
Phase 3	New road over rail line and bus loop

Transport Strategy Summary – see detailed summary in Table 5.8

Our Scoping Study shows that Broadmead Peninsula could transform Broadmead and Avon Valley, support the needs of the Core Strategy, enhance the connectivity of Keynsham whilst creating hundreds of jobs, investment opportunities and housing mix. Broadmead Peninsula can be characterised as a transformational physical infrastructure project for Keynsham, B&NES and WoE.

The Broadmead Peninsula Scoping Study proposes a suite of outcomes that are aligned with current thinking, supports B&NES Major Projects, responds to the Local Growth White Paper and is strategically placed to service the needs of WoE. As we progress the project through feasibility and

planning, it may well attract funding from the Regional Growth, WoE Local Enterprise Partnership and help deliver B&NES targets for jobs and housing. It will be difficult to match elsewhere in WoE.

Summary of Key Findings

In summary, our Scoping Study indicates that Broadmead Peninsula could:

- Create hundreds of new, permanent jobs, more than one hundred temporary construction jobs over fifteen years, and a large number of temporary and seasonal jobs
- Provide employment-led riverside development for Keynsham
- Play a vital role in river transport and tourism along the River Avon Corridor
- Bring significant benefits to the existing farm and businesses at Avon Valley
- Absorb up-stream water catchment and manage down-stream flood risk, especially the sewage treatment works, landfill site and DS Smith Recycling
- Provide access to allocated homes and residential houseboats for local residents, key workers and first time buyers
- Manufacture pre-fabricated homes and houseboats designed and built locally to meet Passive and Code for Sustainable Homes design and C3 designation
- Establish a joint venture for Anaerobic Digestion and Micro Heat Grid
- Introduce an 80+berth marina for residential houseboats and 317 berths for pleasure, visitor and holiday water craft
- Include a constructed wetland and water ecology park for boat berths, dingy sailing, rowing, kayaks and other suitable marine craft
- Include a number of interconnected ponds and waterways to provide ecological corridors, create wildlife habitat for protected species whilst enhancing and protecting existing wildlife
- Incorporate allotments for residents to improve local food security
- Provide property uplift to adjacent developments, existing businesses and residential units
- Provide a traffic free walking and cycling route linked to existing routes that join the river in either direction to Bristol, Bath and the proposed Keynsham Green Infrastructure
- Capitalise on existing infrastructure, roads, utilities and car parks serving existing farm and businesses including surface water drainage flows for the marina and constructed wetland
- Generate an edge of town (Keynsham) ambience water space
- Deliver a significant tourist attraction accessible by ferry, road, cycle, pedestrian or train
- Present no significant conflicts with existing planning, tourism, housing or economic policies

Next Steps – Feasibility Study & Master Plan

To achieve the Scoping Study aspirations summarised above, it will be necessary to undertake the following steps. Building on the work to date, further detail will be identified during the feasibility stage and developed into a Master Plan for the site. The key components in the formal planning application process will include:

- Continue dialogue with key stakeholders including B&NES, Keynsham Town Council, Landowners, Environment Agency, Local Highway Authority, Network Rail, bus operators, and the general public.

- Undertake stakeholder and public consultation events including presentations, exhibitions and opportunities for inputs into the Master Plan, e.g. transport and accessibility priorities and detail.
- Commissioning of surveys for key components of the Master Plan (Economic, Transport, Social, Environmental, Economic Viability, Deliverability, Stakeholder Engagement) for use during the planning process. For example transport will require detailed local traffic flow information, local traffic accident data, trip generation and distribution, detailed transport capacity modelling – both at a localised individual junction capacities, and strategically by option testing utilising the Keynsham S-Paramics model, etc.
- Provide preliminary drawings for key components of the Master Plan, pre-application and planning application(s); for example transport interventions, housing, business zones, flood & SUDS, ecology and landscape, key services and infrastructure.
- Provide a detailed timeline, programme and costings of the preferred option and phasing.
- Prepare a site wide Sustainability Plan to integrate transport, environment, socio-economic activities, employment, materials, energy, water, flood, wastes and productivity.
- Prepare a detailed transport assessment to support the application and give decision makers the confidence that the regeneration will be achievable, viable and accessible.
- Provide an Environmental Impact Assessment.

A detailed breakdown of tasks and surveys for the Feasibility Study and Master Plan has been prepared for discussions with B&NES. This will establish TRRT as the key facilitator of the Broadmead Peninsula Delivery Vehicle.

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