EB/088

AECOM

NORTH ESSEX GARDEN COMMUNITIES

INFRASTRUCTURE PLANNING, PHASING AND DELIVERY

FINAL REPORT

July 2019

NORTH ESSEX GARDEN COMMUNITIES

INFRASTRUCTURE PLANNING, PHASING AND DELIVERY

Please note, this report is formatted to be read at A3.

Quality information

Document name	Ref	Prepared for	Prepared by	Date	Reviewed by
INFRASTRUCTURE PLANNING, PHASING AND DELIVERY	01	North Essex Authorities	AECOM	July 2019	BC

Revision history

Revision	Revision date	Authorised	Position
First Draft	10 September 2018	BC	Project Director
Second Draft	13 November 2018	BC	Project Director
Final Draft	02 July 2019	BC	Project Director

The North Essex Authorities shared Section 1 Local Plans have identified 3 Garden Communities as part of the long term strategic approach to future growth. A considerable body of evidence has been developed to support the project through the early stages of the planning process and to build commitment to the project. This report provides additional intelligence on infrastructure planning, phasing and delivery, ahead of site specific masterplanning to follow.

01 Introduction

1.1 Introduction

This report builds on the three North Essex Garden Community Concept Frameworks and provides recommendations on infrastructure delivery and phasing at each Garden Community. This work is presented at a high level and will be expected to be revisited when more detail is provided by the forthcoming masterplanning exercises. The data within the report uses the published Concept Frameworks as a starting point and are subject to change in subsequent phases of planning.

As well as demonstrating the feasibility of the Garden Community proposals in Section 1 of their Local Plans, the information in this report will assist the North Essex Authorities in their intended programme of community and stakeholder engagement to prepare masterplans and Development Plan Documents (DPDs) for the three Garden Communities. Therefore while the information in this report is a robust basis to demonstrate the feasibility of the Garden Community proposals, it will be this community-led programme of engagement, as well as more detailed discussions with infrastructure and service providers, that will determine the exact requirements of each phase of development within the Garden Communities

Report Structure

Garden Community Principles

A summary of the key characteristics partners should ensure are met.

The following structure is repeated for each of the three North Essex Garden Communities

Concept Framework

A headline review of the existing Concept Framework alongside summary of site wide infrastructure costs.

Indicative masterplan plans and land use budget

This chapter presents an indicative masterplan and land use budget of each Garden Community.

Movement and Connectivity Baseline

Setting the baseline understanding and likely future interventions for transport.

Utilities Baseline

Setting the baseline understanding and likely future interventions for utilities.

Total infrastructure required by phase

This chapter presents the enabling infrastructure to deliver each Garden Community.

1.2 Previous studies

Evidence Base Volume 1: Baseline, June 2016

A collation of existing data covering a wide range of social, economic and environmental themes. The report provides a contextual oversight for the broad search areas.

Evidence Base Volume 2: Opportunities and Constraints, June 2016

Providing a synthesis of the key opportunities and constraints arising from the analysis and understanding of the evidence base presented in the Baseline Compendium for each site.

Evidence Base Volume 3: Options and Evaluation, June 2016

Identifies high level site options for the broad search areas. A high-level indicative development capacity was provided based on a series of common assumptions, with the options subsequently evaluated using a Site Appraisal and the Garden Cities & Large Sites Financial Model (originated by ATLAS). The outcomes of each evaluation is presented but no conclusions drawn.

North Essex Garden Communities Charter, June 2016

The Charter sets out 10 placemaking principles developed to articulate the Councils' ambition for the Garden Communities, and help drive forward their development. These are based on the Town and Country Planning Association's (TCPA) Garden City Principles, but adapted for the specific North Essex Context in the 21st Century.

Concept Feasibility Studies

West of Braintree Concept Framework-May 2017

Colchester Braintree Borders Concept Framework-October 2017

Tendring Colchester Borders Concept Framework-October 2017

1.3 North Essex Garden Community Principles

The North Essex Garden Communities Charter sets out 10 placemaking principles developed to articulate the North Essex Authorities' shared ambition for the Garden Communities, and help drive forward their development. These are based on the Town and Country Planning Association (TCPA) Garden City Principles, but adapted for the specific North Essex Context in the 21st Century.

The Garden Communities will seek to reflect and respond to the opportunities afforded to place-making, living and working, from technology and data, together with addressing the needs of climate change and climate resilience.

Figure 1: North Essex Garden Communities Charter

The table below summaries how each Garden Community will address the Charter's principles in terms of infrastructure planning, phasing and delivery.

Table 1: Garden Community Principles assessment

Criteria	Assessment
1: Green infrastructure	The Garden Communities are all structured around a very strong green infrastructure network, protecting and cherishing ecological assets and integrating green corridors into neighbourhoods[1].
2: Integrated & sustainable local transport	Enhancements to public transport through the introduction of a rapid-transit network, with both strategic and local links, will be implemented from the outset alongside improved active mode connections to and from neighbouring settlements. New junctions and highway realignments will mitigate existing and future traffic.
3: Employment opportunity	Dedicated employment land, to be confirmed in economic studies, will be located close to the strategic networks, providing good potential to deliver jobs in close proximity to new homes. These will be alongside jobs within the centres and residential areas.
4: Living environment	Community infrastructure will be delivered upfront and in a timely fashion. Early years and primary education and primary healthcare can all be delivered from the outset as part of phase 1 of each Garden Community, with secondary schools either within phase 1 or phase 2, all within the plan periods.
5: Smart and sustainable living	Strategic infrastructure corridors with high levels of self-sufficiency are incorporated, as well as potential to think more strategically about alternative forms of delivery and future proofing.
6: Good design	Masterplanning work to follow will define the distinct characteristics of each Garden Community, within the flexible frameworks provided by the Concept Frameworks.
7: Community engagement	On-going and meaningful engagement with existing and future residents, businesses and organisations will be crucial in establishing locally-led visions and instilling community stewardship from the outset.
8: Active local stewardship	Community engagement and long-term stewardship programmes will be defined and put into place during the planning phase.
9. Strong corporate & political public leadership	The North Essex Authorities are wholly committed to high quality placemaking and to the provision of all necessary infrastructure from the outset. This will benefit residents of nearby places as well as the Garden Communities.
10. Innovative delivery structure	A local delivery vehicle, to be defined, will provide the opportunity to think differently about how provide high quality infrastructure and development, including mechanisms for capturing uplifts in land value and securing external funding.

[1] Pending more detailed masterplanning, we have assumed a core open space provision of around 8 hectares per 1000 population. By 'core', we mean excluding country parks or land left open on the edge of the Garden Communities. The TCPA Garden City Principles state that 50% of a Garden City (including private and semi private space) should be green space and half of this should be publically accessible, which suggests c.25% of the area for public open space. A benchmarking exercise of Garden Communities being planned at the moment, including those tested at AAP examination such as Welborne in Fareham, suggests provision of core open space of 7.5 hectares/1000, plus, where appropriate, country park provision at 4-8 hectares/1000 is typical. As such, 8 hectares/1000 is a generous level of open space within and immediately around the community, to be tested further in the next stages of planning.

This Section sets out key assumptions and infrastructure and phasing strategies to enable delivery at West of Braintree.

02 West of Braintree

2.1 Concept Framework

The West of Braintree Concept Framework defines a spatial option for the long term delivery of a Garden Community and is framed by the following key principles:

- **Land use, capacity and placemaking** - A landscape led framework provides 5 principal residential parcels incorporating various open space typologies with high levels of access to social infrastructure and local employment opportunities embedded within the development.
- **Access and movement** - Underpinned by a region-wide integrated transport strategy, which would include rail and bus based corridors. A Rapid Transit (RT) network will serve the site and provide a clear link with future growth areas. A local bus network allows for short and long distance travel as well as interchange between the movement hierarchy. High quality streets and connections through the site will ensure that the modal choice for local journeys (under 2.5km) is predominantly via active modes.
- **Infrastructure and sustainability** - Spatial identification of the social, educational and community infrastructure to support the new community as well as setting the opportunity to consider combined utility corridors and other sustainable on-site approaches to waste water treatment and on-site power generation.
- **Green / blue infrastructure** - A site-specific green and blue infrastructure framework sets a coordinated approach to open space, landscape and green / blue assets. This includes formal and informal open space, key structuring landscape principles and proposals, as well as the relationship with surrounding context and overall setting.
- **Phasing and delivery** - An informed position on how the development could be phased and delivered within the site constraints and opportunities, including key infrastructure requirements and delivery commentary.

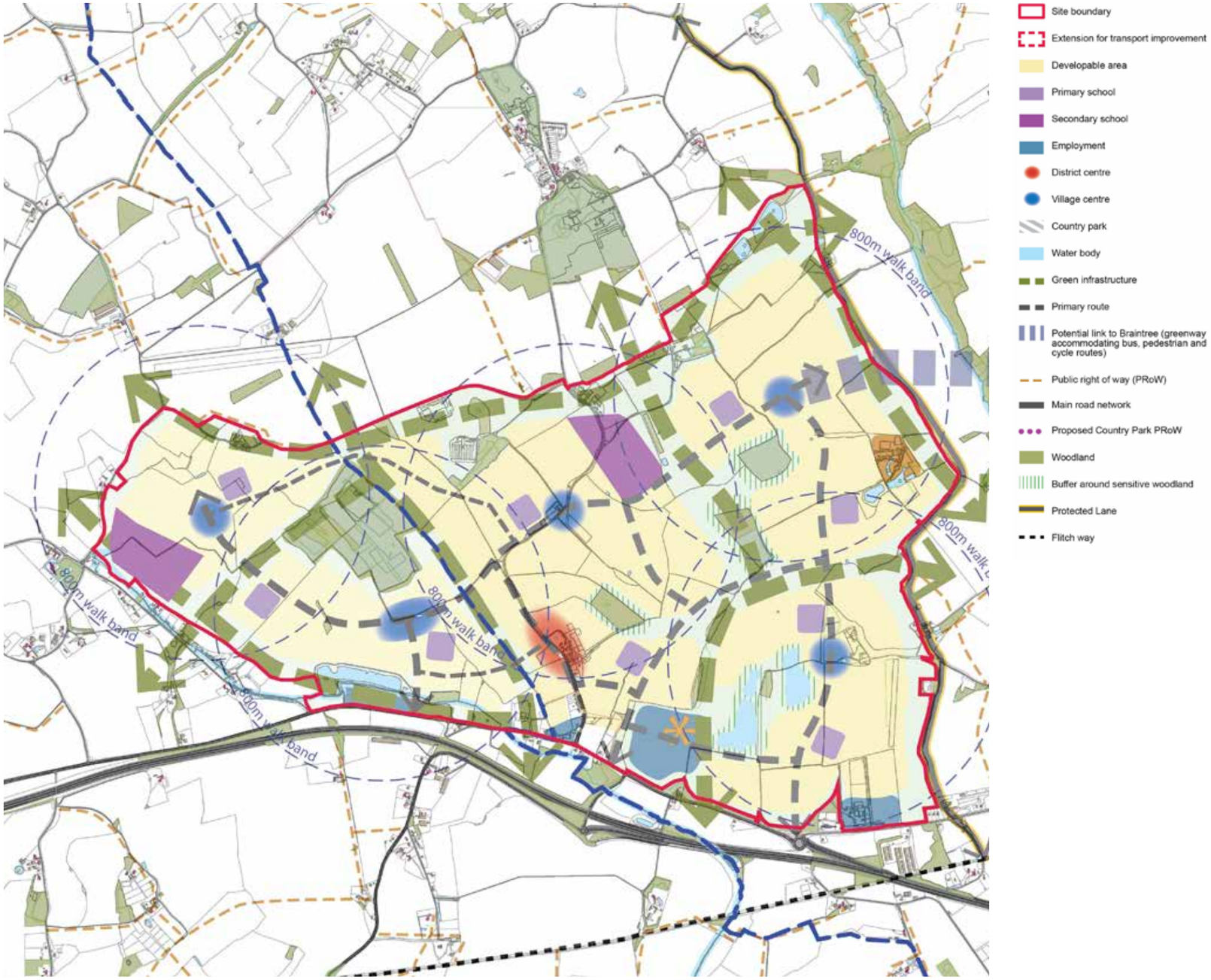

Figure 2: West of Braintree Concept Framework preferred spatial structure (2017)

2.2 Indicative masterplan and land use budget

The Uttlesford District Council Local Plan was submitted for examination in January 2019. The updated plan included a different boundary for the Garden Community to that used in the Concept Framework. The plan that follows is based on the submission Local Plan boundary and takes account of more detailed work on the need for employment land, outlined by Cebr in their July 2019 report.

Table 2: West of Braintree Land Use Budget

	Area	Dwellings
Residential (ha)	320.30	
Dwellings in Residential		11,371
Mixed Use (ha)	18.00	
Dwellings in Mixed Use		1,080
Primary School (ha)	14.70	
Secondary School (ha)	15.80	
Employment (ha)	43.40	
Open Space (ha)	238.63	
Infrastructure (5%)	34.25	
Total	**685.09 Ha**	**12,451**

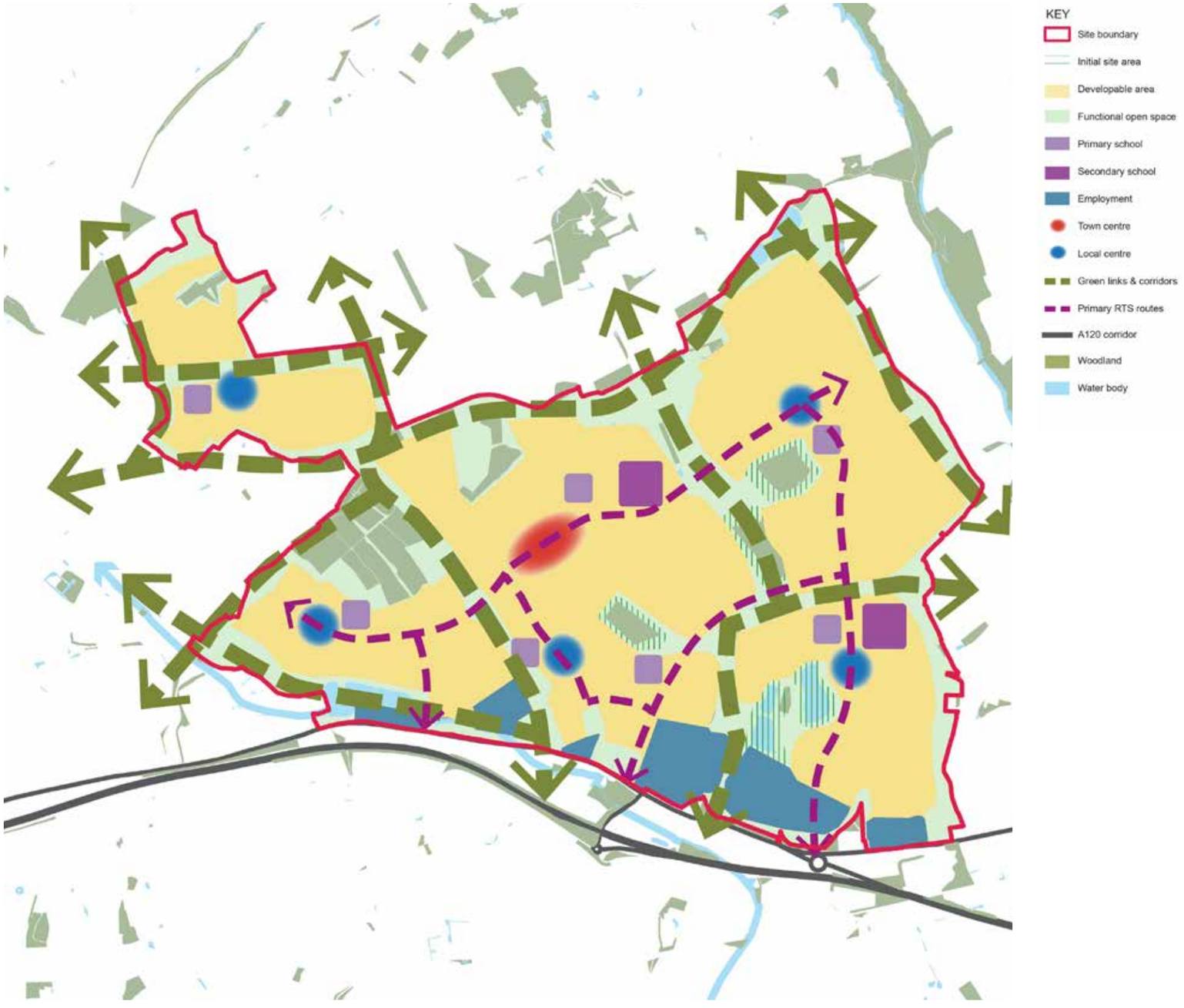

Figure 3: West of Braintree Indicative masterplan (derived from Concept Framework and Uttlesford submission Local Plan)

2.3 Movement and connectivity baseline

There is some capacity in the transport network, but Phase 1 would require key junction upgrades and network enhancements to mitigate the impact of development.

Key Findings - Roads

Current Situation

- The site is located north of the B1256 with a limited connection to the A120 trunk road provided in close proximity.
- The existing access onto the A120 in the vicinity of the site only features east facing slip roads. Development would therefore result in increased traffic using the B1256 to head west.

Future and Wider Issues

- The existing access onto the A120 in the vicinity of the site only features east facing slip roads. Development would therefore result in increased traffic using the B1256 to head west.
- Improving access to the A120 would be a requirement of delivery of this site

Key Findings - Public Transport

Current Situation

- The current public transport provision at West of Braintree is limited to local bus routes running on the B1256 at a very low frequency.
- Existing bus routes running along the A120 to from Stansted Airport do not serve the site.
- The main public transport connection from the site remains Braintree Station located approximately 5km east of the site and providing a train up to every 45 minutes to Witham or London during the peak hour.

Future and Wider Issues

- The potential for greater public transport connectivity has been identified in the concept framework and further explored by Jacobs' North Essex Rapid Transit study suggesting main corridors of movements between the 3 North Essex sites and their main local employment centres such as Stansted or Chelmsford.

Key Findings - Active Modes

Current Situation

- Existing provision for active modes (walking and cycling network) is very limited on site. However, PROWs exist across the site in various locations.
- Other dedicated walking and cycling corridors are located close to the site such as Flitch Way (Cycle Route 16, connecting Braintree Town Centre via a wider network of Sustran Routes) and Pods Lane but are mainly used for leisure purposes.
- An existing walking and cycling bridge over the A120 provides an active mode connection to the Flitch Way.
- The nature of the roads mean pedestrian footway connections are limited; in many cases to one side of the carriageway or not present in the case of the country lanes.

Future and Wider Issues

- Building on the garden communities principles, West of Braintree has the potential to plan for an important number of internalised movements to be undertaken by walk or cycle thanks to high-quality and dedicated infrastructure on-site
- For wider hinterland/commuting movements, significant improvements would be required to increase the quality of the existing infrastructure and encourage cycling as an alternative to the car towards Braintree in particular.

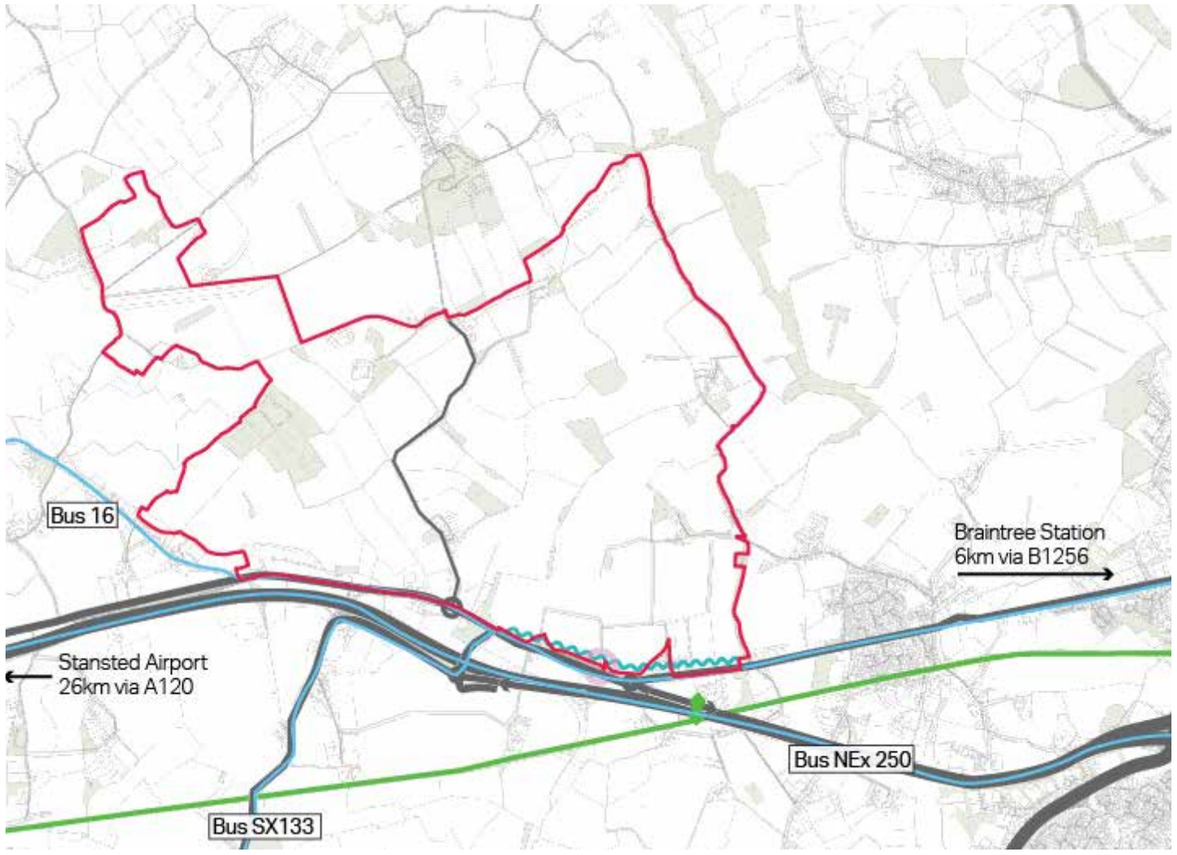

Figure 4: West of Braintree Movement and connectivity baseline. AECOM.

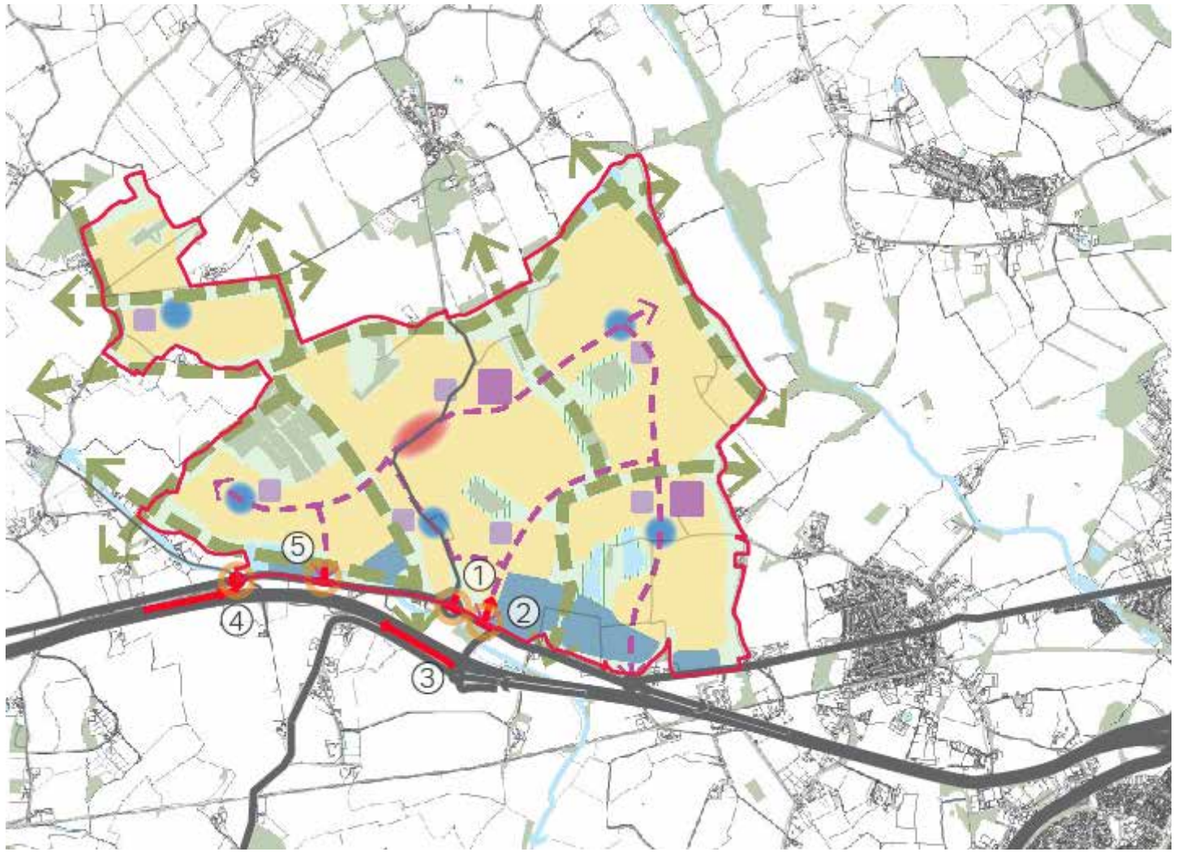

Figure 5: West of Braintree Movement and connectivity potential interventions. AECOM.

Existing infrastructure

- A Road
- B Road
- Lane
- Main access to site
- Sterilised edge (quarry site, estimated extraction for 12 years)
- Indicative quarry priority junction to serve as access for mineral extraction
- Bus route
- Flitch way (leisure trail)
- A120 cycle/pedestrian crossing

Proposed infrastructure

- Additional new road infrastructure
- Primary RTS Routes
- Emergency access
- Roundabout or signalised junction
- ① Blake End Rd/B1256 junction improvements
- ② New at grade eastern junction with B1256
- ③ Grade separated A120 westbound sliproad
- ④ New grade separated A120/B1256 junction
- ⑤ New at grade western junction with B1256

2.4 Utilities baseline

This section provides a high level analysis of utilities based on preliminary conversations with service providers and desk-based study. Further discussions will be required as masterplans are worked up and more detail emerges.

Key Findings - Electricity

Current Situation

- In a meeting with AECOM on 19th May 2016, UK Power Networks advised all the networks west of Braintree are 11kV rural supplies, mainly overhead lines. These would have limited capacity to supply new developments.
- The nearest primary substation is east of Braintree.

Future and Wider Issues

- Overhead lines are inherently less reliable than underground cables, as they are more susceptible to storm damage.
- Supplying areas west of Braintree will require long underground 11kV cable routes. These routes would have to go through Braintree, causing significant disruption.
- A new primary substation would have to be established early in the life-cycle of the Garden Community, but not as part of Phase 1. It is expected that there will be high costs for the 132kV infrastructure to supply the new primary substation, as well as the costs of the substation itself, in the future.

Key Findings - Waste Water

Current Situation

- At a meeting with AECOM on 20th May 2016, Anglian Water advised that the water recycling centre (WRC) at Bocking would be able to accept waste water for development capacities up to 2032, but thereafter a new recycling plant will be required.

Future and Wider Issues

- The Bocking WRC is a long way (approximate 6 km) from the proposed development area and infrastructure and pumping costs would be high.
- A better alternative would be to establish a new WRC near the development; this could discharge its treated effluent to the River Brain.

Key Findings - Telecommunications

Current Situation

- Evidence limited with additional investigation under masterplanning required.

Future and Wider Issues

- Telecommunication network will be made available to the development at no cost, following a commitment by BT Openreach to serve all developments of more the 30 homes with high speed broadband.

Key Findings - Water Supply

Current Situation

- In a meeting with AECOM on 20th May 2016, Anglian Water confirmed that in principle water supply should be possible, subject to further assessment of need and anticipated new and upgraded infrastructure.

Future and Wider Issues

- Proposed growth within the study area and the surrounding areas will increase the water supply deficit to the resource zone. Additional supply measures such as supply transfer from resource zones with surplus and demand reduction measures have been identified by Anglian Water which could help to accommodate the additional demand.

Key Findings - Gas

Current Situation

- There is no specific information of gas in this area, but the general advice from National Grid is that there is capacity in the medium pressure network in the region, but local low pressure upgrades will be required.

Future and Wider Issues

- Given the proximity of the Gas main as shown in Figure 6 and the advice from National Grid, there are not anticipated to be any future issues in connecting the early phases of development to the Gas network.

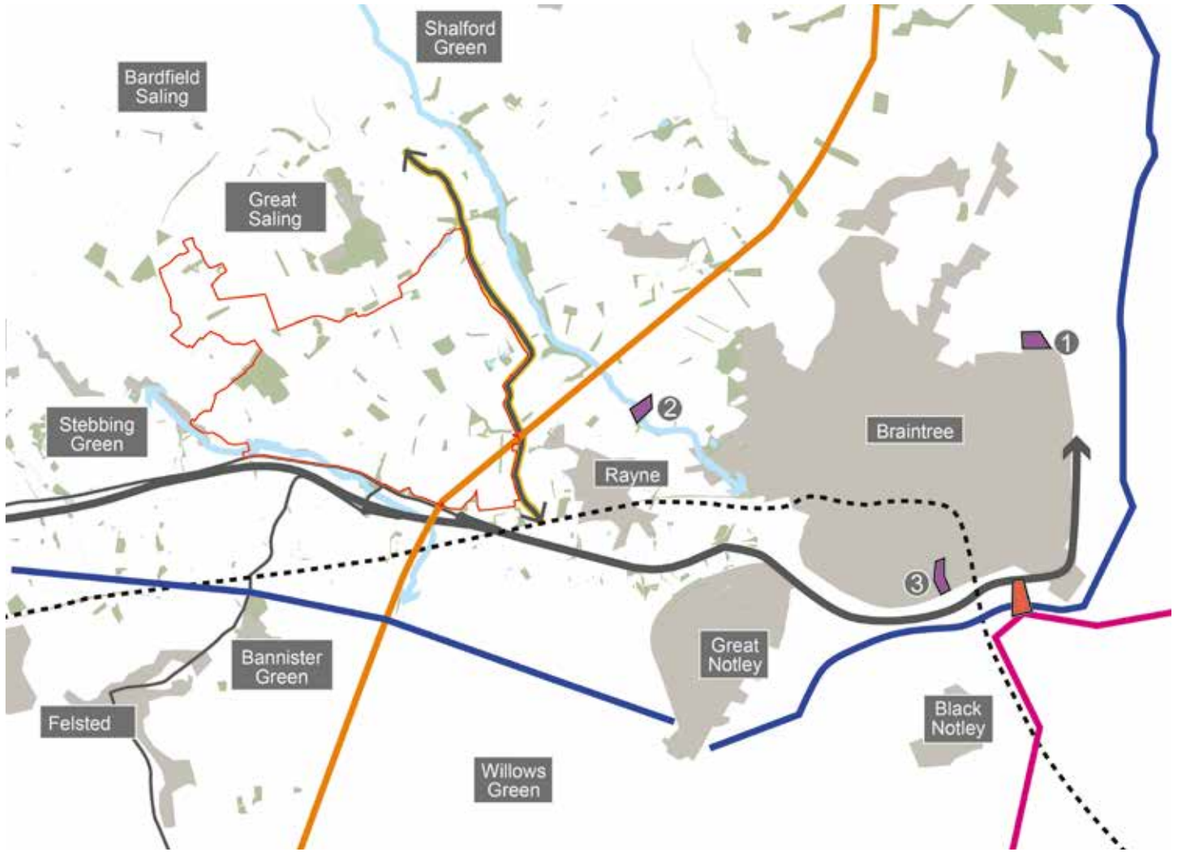

Figure 6: West of Braintree Utilities baseline. AECOM.

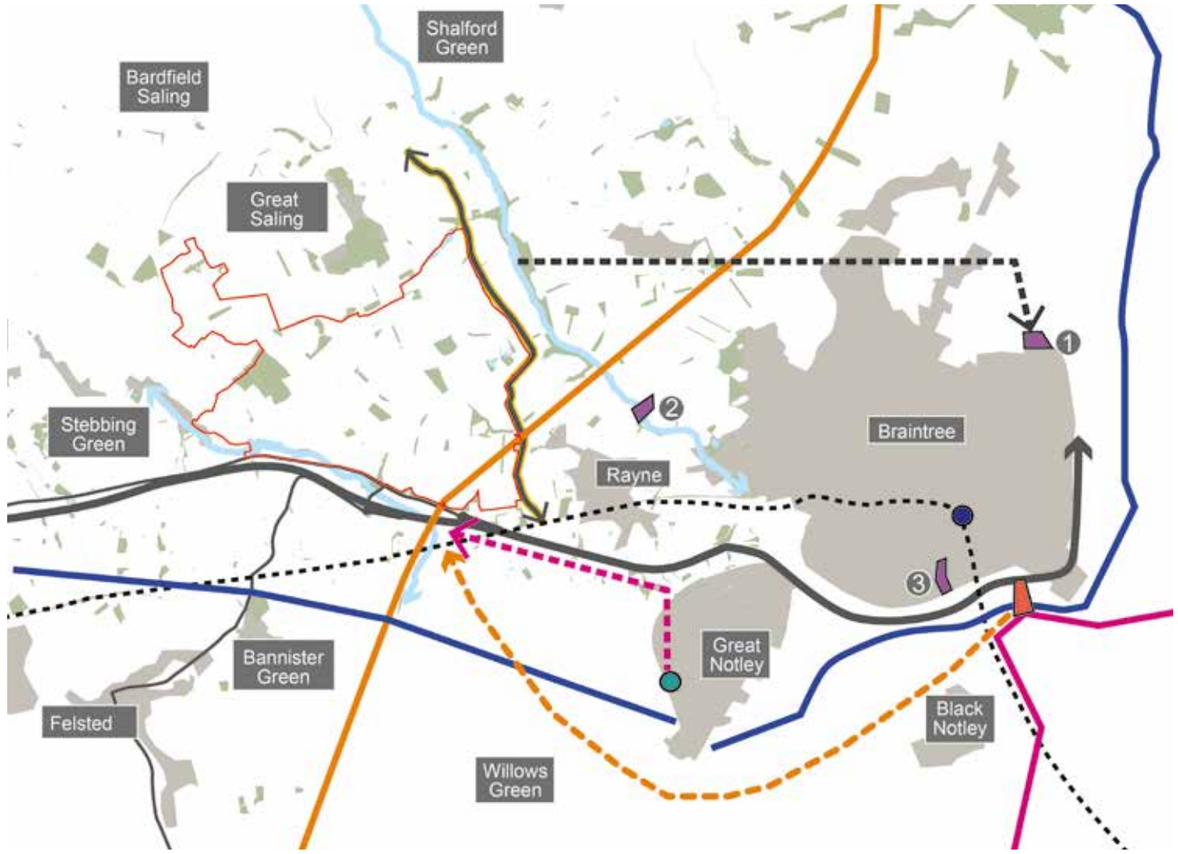

Figure 7: West of Braintree Utility interventions. AECOM.

Site area

Sewage treatment plant:

1 Bocking treatment plant

2 Rayne treatment plant

3 Braintree treatment plant

Braintree grid

33kV Pole line

132kV Tower line

Electricity supply via underground cable

Gas pipe - National grid

Sewage treatment

Lake and Elliot primary sub-station

West Braintree primary sub-station

Urban settlement

Woodland

Water body

Main road network

Primary Substation Supply

2.5 Total infrastructure requirements by phase

Project List

Infrastructure delivery forms a key element of the Garden Community principles. Table 3 contains the estimated infrastructure required to support development at West of Braintree and the figures below show phasing assumptions spatially. Please note the infrastructure highlighted is indicative and not based on a detailed masterplanning exercise.

In accordance with the Garden Community approach, the programme assumes the front-loading of several infrastructure items so that they are provided before the benchmarked trigger point.

Table 3: West of Braintree Infrastructure requirements

				Cumulative Development Schedule									
Infrastructure	**Demand arising from development**	**Unit of demand**	**Commentary/assumptions**	**Phase 1 1,351**	**Phase 2 2,853**	**Phase 3 4,108**	**Phase 4 5,156**	**Phase 5 6,665**	**Phase 6 8,223**	**Phase 7 9,224**	**Phase 8 10,658**	**Phase 9 11,866**	**Phase 10 12,500**
Education													
Primary Schools: 2 Form Entry (including 56 place EY+C facility)	14	FE	2FE facilities and EY + C Assuming 210 places per FE and 56 places per EY. Excludes temporary accommodation.	2FE + EY	2FE + EY	2FE + EY		2FE + EY	2FE + EY		2FE + EY		2FE + EY
Secondary Schools	12	FE	Assuming 150 places per FE. Excludes temporary accommodation.		6FE					6FE			
Standalone Early Year Facilities (56 place, above those co-located with Primary)	8	Facilities	Assuming 56 places per facility. 7 EY facilities within primary schools, 15 in total required by development. Excludes temporary accommodation.	1	1		1	1	1	1		1	1
Healthcare & Community													
General Practitioners	2,805	m^2	Demand arising 17 GPs. Assuming 1800 population per GP. Assuming a population of 30,000 (2.4/unit). Assuming 165 m^2 / GP.	2	2	1	2	2	1	2	2	1	2
Dentists	900	m^2	Demand arising 18 Dentists. Assuming 1760 population per dentist. Assuming a population of 30,000 (2.4/unit). Assuming 50 m^2 / Dentist.	2	2	2	2	2	2	1	2	2	1
Community Space and Libraries	3,600	m^2	Demand arising 900 m^2 of Library Space. Assuming 30 m^2 per 1000 persons. Demand arising 1800m^2 of Community Space. Assuming 60 m^2 per 1000 persons. Demand arising 2nr 1800 m^2 facilities. Assuming a population of 30,000 (2.4/unit).	11%	12%	10%	8%	12%	12%	8%	11%	10%	5%
4 Court Sports Centre	1,428	m^2	Demand arising 3 nr facilities. Assuming 0.072 facilities per 1000 persons. Assuming 476m^2 per facility. Assuming a population of 30,000 (2.4/unit).	1				1				1	
4 Lane Swimming Pool	490	m^2	Demand arising 2 nr facilities. Assuming 0.048 facilities per 1000 persons. Assuming 245m^2 per facility.. Assuming a population of 30,000 (2.4/unit).	1					1				

				Cumulative Development Schedule									
Infrastructure	**Demand arising from development**	**Unit of demand**	**Commentary/assumptions**	**Phase 1 1,351**	**Phase 2 2,853**	**Phase 3 4,108**	**Phase 4 5,156**	**Phase 5 6,665**	**Phase 6 8,223**	**Phase 7 9,224**	**Phase 8 10,658**	**Phase 9 11,866**	**Phase 10 12,500**
Open Space													
Open space	240	ha	Assuming a population of 30,000 (2.4/unit). Including; 8ha total open space per 1000 population.	24.00	52.80	19.20	28.80	52.80	12.00	12.00	12.00	26.40	0.00
Environment/waste - Allowance	12,500	units	Include allowance per unit to cover the provision of acoustic bunding / fencing to mitigate the impact of external sources of noise such as highways and public transport and localised solid waste recycling area.	1,351	1,502	1,255	1,048	1,509	1,558	1,001	1,434	1,208	634
Utilities - Scheme-Wide Enabling Works													
Site Preparations and Earthworks			Assume Site Area of 685ha plus an allowance for an additional 10% of this area to allow for works outside of the core development area and within the site boundary.	11%	12%	10%	8%	12%	12%	8%	11%	10%	5%
General demolition and site clearance 754 ha = m²	7,540,000	m²											
Strategic Earthworks; cut and fill													
Highways													
Primary and secondary road network													
Drainage													
Foul and surface water network													
Landscaping													
Cost captured in open space													
Noise attenuation													
Cost captured in open space													
Waste Management													
Provision for recycling on site, excluding new amenity	12,500	Nr											
Energy													
58 No. 11 kV to 400 V distribution substations	58	Substations											
9 No. 11 kV ring circuits from primary substation to connect to distribution substations.	9	Ring Circuits											
400 V LV circuits from distribution substations to end users	12,500	Circuits/Unit											
Residential Electricity Connections													
Budget cost per Low Voltage (LV) Service Disconnection		Unit											
Potable water													
New network of distribution pipework	12,500	Network											
Water mains, connections and infrastructure charges													
Waste Water													
New network of collection pipework	12,500	Network											
Plot connections for all properties to waste water distribution network	12,500	Connections											
Gas													
Low Pressure Residential Connections													
Additional onsite requirements													
New Plant to treat additional capacity onsite	1	Plant		100%									
1 No. Medium to Low Pressure reducing station	1	Station		100%									

				Cumulative Development Schedule									
Infrastructure	**Demand arising from development**	**Unit of demand**	**Commentary/assumptions**	**Phase 1 1,351**	**Phase 2 2,853**	**Phase 3 4,108**	**Phase 4 5,156**	**Phase 5 6,665**	**Phase 6 8,223**	**Phase 7 9,224**	**Phase 8 10,658**	**Phase 9 11,866**	**Phase 10 12,500**
Utilities - Off-Site Requirements													
Electricity													
Primary Substation 132/11 kV with 2 x 45 MVA transformers		MVA			100%								
132 kV connection to Primary Substation from Braintree Grid substation		Connection		100%									
Electricity Diversion Works				100%									
Potable Water													
Connection to closest feasible supply source with capacity (e.g. trunk main or reservoir)				100%									
Budget cost per lowering of a 100mm distribution water main to accommodate a site entrance.	5	Site Entrances	Assuming 5 nr Site Entrances	100%									
Waste Water / Foul Water													
Upgrades to water course discharges / Surface Water		Upgrades		100%									
Effluent from on-site waste treatment plant pumped 3.5km to River Brain				100%									
Gas													
Extension to Medium Pressure network		1km Pipeline		100%									
Telecommunications													
Development of access chambers for BT Telecoms network, BT Openreach fibre optic network and private telecoms network throughout development		% of total provision		11%	12%	10%	8%	12%	12%	8%	11%	10%	5%
Budget cost per fibre provider for the diversion of underground apparatus at a single location	3	Nr	Assuming 3nr Providers	100%									
Transport													
On site RTS route and related improvements/facilities		% of total provision		15%	12%	15%	13%	14%	18%	13%	0%	0%	0%
Contribution to provisions of off site RTS network		% of total provision		27%	30%	14%	14%	15%	0%	0%	0%	0%	0%
Various combined segregated pedestrian / cycle “Greenways” through site		% of total provision		11%	12%	10%	8%	12%	12%	8%	11%	10%	5%
Upgrade to existing pedestrian bridge over A120 to provide pedestrian / cycle connection between site and Flitch Way. At-grade or elevated link to continue into the site		% of total provision		100%									
New pedestrian / cycle bridge (combined with new junction arrangements) over A120 providing a connection between the site and Flitch Way, including new route south of A120		% of total provision			100%								
A shared use footway/Cycleway between Rayne and Blake End alongside the B1256		% of total provision		50%		50%							
Flitch Way east of Pods Lane and Rayne to retain rural character and setting. A 2km all-weather surfaced section from River Brain to Pods Lane in Rayne with sensitive lighting is proposed to improve connectivity to Braintree town-centre B123		% of total provision			100%								
Transit Hub & multi-modal interchange (with RTS)		% of total provision	Include in on site RTS allowance										
Upgrades to improve safety and operation at the B1417 / B1256 and B1256 / Blake End junction to form a new roundabout or signal controlled junction		% of total provision		100%									
Utilise existing access arrangements from the A120 junction with the addition of a new on-slip		% of total provision		100%									

				Cumulative Development Schedule									
Infrastructure	**Demand arising from development**	**Unit of demand**	**Commentary/assumptions**	**Phase 1 1,351**	**Phase 2 2,853**	**Phase 3 4,108**	**Phase 4 5,156**	**Phase 5 6,665**	**Phase 6 8,223**	**Phase 7 9,224**	**Phase 8 10,658**	**Phase 9 11,866**	**Phase 10 12,500**
All-vehicle off-slip and associated junction improvement at Stebbing Green		% of total provision			100%								
Additional infrastructure to form an all-movement junction between the A120 and B1417 and associated widening of the bridge structure		% of total provision		100%									
Bus only eastbound off-slip and eastbound on-slips to above junction		% of total provision			100%								
The addition of a full junction upgrade connecting the main site access with the above upgrades to the A120/B1417 junction		% of total provision			100%								
The addition of a new signal control or roundabout junction providing direct access from the B1256 junction through to the site		% of total provision			100%								
Internal road network		% of total provision	Include in enabling costs										
Per Unit Contributions													
Investment in early phase bus/transit services		% of total provision	Delivered from day one with funding annually for the first three phases	33%	33%	34%							
Contribution to Strategic highways (incl A120 improvement)		% of total provision		11%	12%	10%	8%	12%	12%	8%	11%	10%	5%
Travel plan measures (smarter choices, car clubs, charging points, etc) - Straight Line Cost Over Time		% of total provision	Aligned to Modal Shift analysis (ITP)	11%	12%	10%	8%	12%	12%	8%	11%	10%	5%
Open Space Endowment		% of total provision		11%	12%	10%	8%	12%	12%	8%	11%	10%	5%
Employment Space		% of total provision		11%	12%	10%	8%	12%	12%	8%	11%	10%	5%

This Section sets out key assumptions and infrastructure and phasing strategies to enable delivery at Tendring Colchester Borders.

03 Tendring Colchester Borders

3.1 Concept Framework

The Tendring Colchester Borders Concept Framework defines a spatial option for the long term delivery of a Garden Community and is framed by the following key principles:

- **Land use, capacity and placemaking** - A landscape led framework provides 7 development parcels each with its own characteristics and each with a particular role to play in the new community as a whole.
- **Employment** - Employment land includes an extension to the University's Knowledge Gateway, and a Business Park adjacent to the A120 with a mix of employment uses supported by Park and Ride, and served by a Mass Rapid Transit network, and employment floorspace within the district and local centres
- **Access and movement** - a key element of the access and movement strategy is the integration of a mass rapid transit system that connects Colchester Town and its stations with the University and with the new Garden Community. A new junction on the A120 will be required to provide a highway link to the A133 and to provide access to the Garden Community. The link road is proposed to form a development edge which will define the eastern extent of the new community which could be designed as a 'Parkland Avenue', with junctions to provide access into core development areas.
- **Open Space**- The landscape framework extends the green landscape of the urban edge of Colchester into the new suburb to provide a strong landscape link that connects existing communities and Salary Brook with the new Garden Community. The Framework emphasises a central 'east-west' orientated corridor between Greenstead, Salary Brook and new Country Park towards the rural eastern edge of the Suburb and on to Elmstead Market to the east. There is also potential to link across the A120 to Ardleigh Reservoir.
- **Phasing and delivery** - An informed position on how the development could be phased and delivered within the site constraints and opportunities, including key infrastructure requirements and delivery commentary.

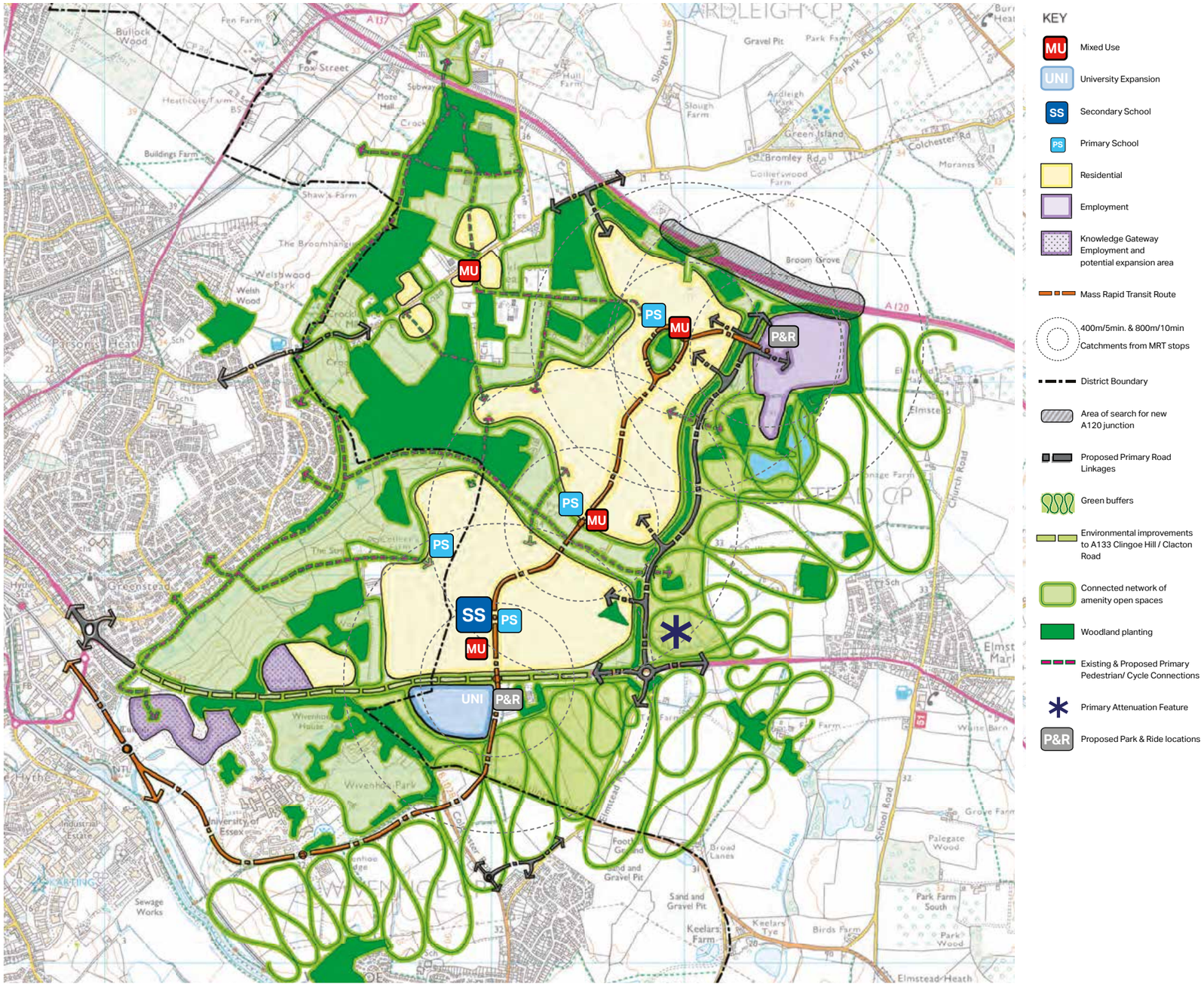

Figure 8: Tendring Colchester Borders Concept Framework. Source: David Lock Associates (2017)

3.2 Indicative masterplan and land use budget

The plan that forms the basis of this current exercise is an iteration of the Tendring Colchester Borders Concept Framework. The modifications shown in this revised plan are minimal and derive from an update to the approach to infrastructure provision and to take account of more detailed work on the need for employment land, outlined by Cebr in their July 2019 report.

The other principal change is the re-calibration of open space, across the site, with a target level of provision that is more in keeping with the standard assumed across all three Garden Community sites.

Table 4: Tendring Colchester Borders Land Use Budget

	Area	Dwellings
Residential (ha)	196.06	
Dwellings in Residential		6,960
Mixed Use (ha)	9.00	
Dwellings in Mixed Use		540
Primary School (ha)	15.00	
Secondary School (ha)	10.00	
Employment (ha)	24.50	
Park and Ride	3.67	
Open Space (ha)	144.73	
Infrastructure (5%)	21.21	
Total	**424.17 Ha**	**7,500**

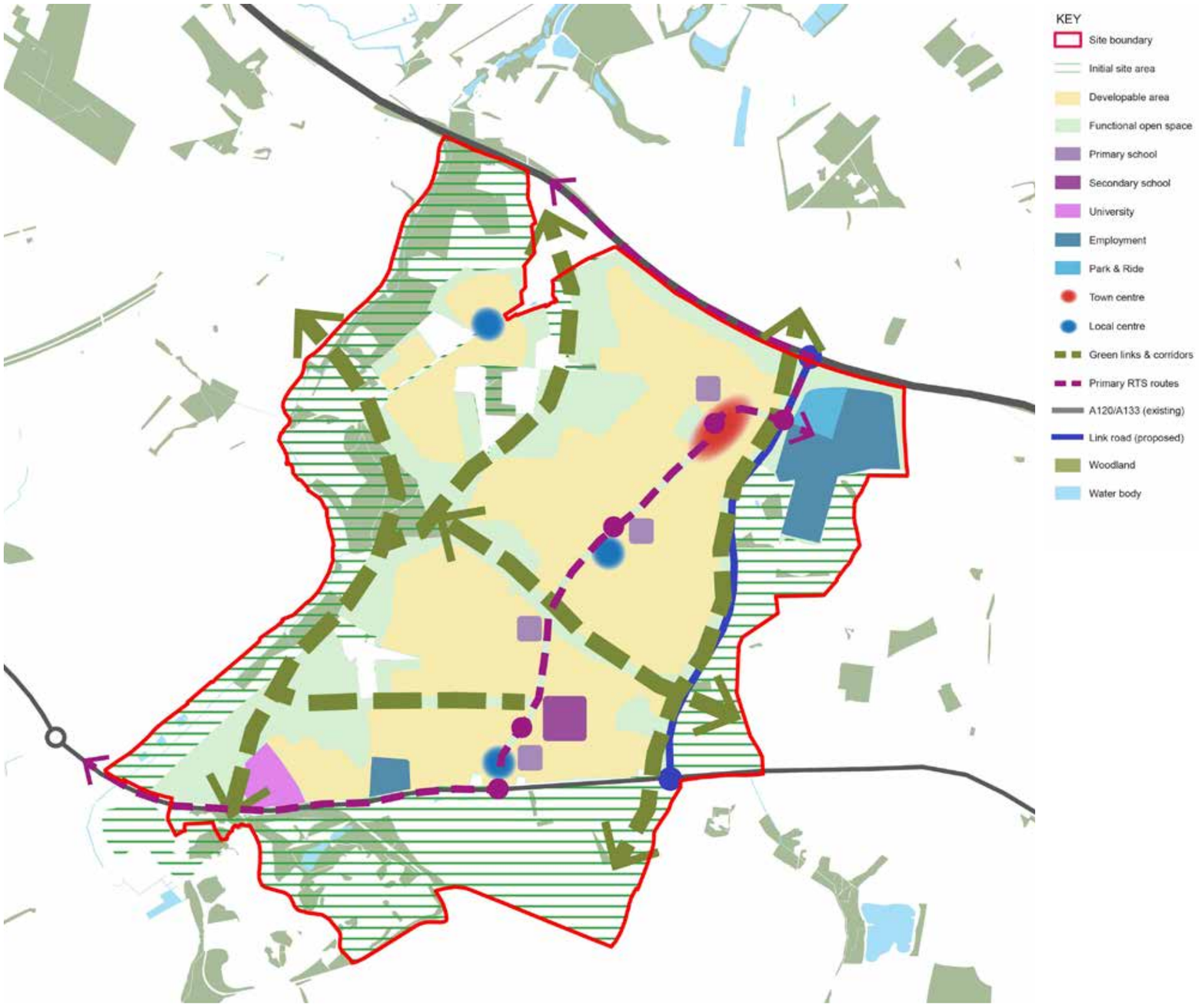

Figure 9: Tendring Colchester Borders Indicative masterplan (derived from Concept Framework)

3.3 Movement and connectivity baseline

Whilst Phase 1 is well located to access the local road and bus networks, access for active modes will require enhancing. Some existing junctions will also require improvements in order to mitigate the impact of development, unless the A133 – A120 link road is delivered in parallel with Phase 1.

Key Findings - Roads

Current Situation

- The site is located on the eastern fringe of Colchester between the A133 to the south and the A120 to the north providing opportunities for connection with the A120 trunk road.
- Bromley Road and Harwich Road both pass through the site providing connections onto the A137 for links to and from Colchester town centre.
- In addition, numerous roads (predominantly rural roads) run through the site, providing wider vehicular access to the area.

Future and Wider Issues

- The development of the Tendring Colchester Borders site will require direct connections to the A120 and A133 which could be delivered phased with development in the form of new junctions.
- A number of existing junctions and links surrounding the site operate near to or at capacity during the peak periods. Improvements will therefore need to be brought forwards to these links and junctions in tandem with sustainable connections to minimise the impacts on the existing highway network.

Key Findings - Public Transport

Current Situation

- Local bus routes operate within the vicinity of the site at a relative high frequency, whilst more strategic bus routes provide low frequency inter-urban connections.
- The closest rail station to the site is Hythe station, located approximately 2.3km southwest of the centre of the site but only 800m from the southern boundary. It offers services on the Sunshine Coast line (GEML branch) providing up to two trains per hour between London and Clacton-on-Sea, and another train per hour in either direction between London and Walton-on-the-Naze. Both services connect with Colchester Mainline Station from where connections on the wider GEML are achievable with up to 10 services per hour to London.

Future and Wider Issues

- The potential for greater public transport connectivity has been identified in the concept framework and further explored by Jacobs' North Essex Rapid Transit study suggesting main corridors of movements between the 3 North Essex sites and their main local employment centres such as in the Tendring District and Colchester.

Key Findings - Active Modes

Current Situation

- Existing provision for active modes (walking and cycling network) is very limited on site. However, PROWs exist across the site in various locations.
- Other dedicated walking and cycling corridors are located close to the site such as the NCN 51 (long-distance cycle route) and Colchester cycle network running along the western edge of the site.
- Bromley Road allows movements across the A120 for cyclists and pedestrians, reducing the severance effect of this road and good pedestrian footway links are in place on the A133 linking the University site and west towards the town centre.
- The nature of the roads that cross the site mean pedestrian footway connections are limited; in many cases to one side of the carriageway or not present at all in the case of the rural roads.

Future and Wider Issues

- Building on the garden communities principles, Tendring Colchester Borders has the potential to plan for an important number of internalised movements to be undertaken by walk or cycle thanks to high-quality and dedicated infrastructure on-site.
- For wider hinterland/commuting movements, significant improvements would be required to increase the quality of the existing infrastructure and encourage cycling as an alternative to the car towards Tendring in particular.

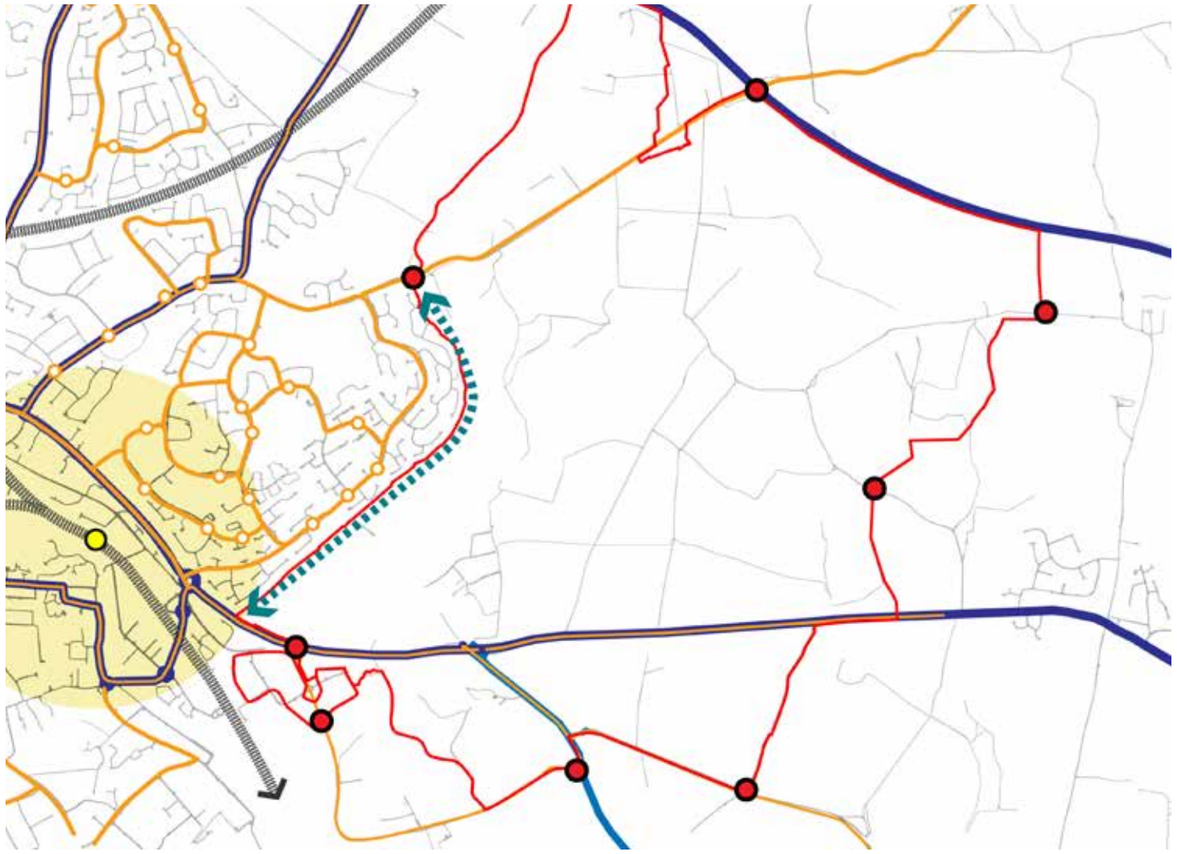

Figure 10: Tendring Colchester Borders Movement and connectivity baseline. AECOM.

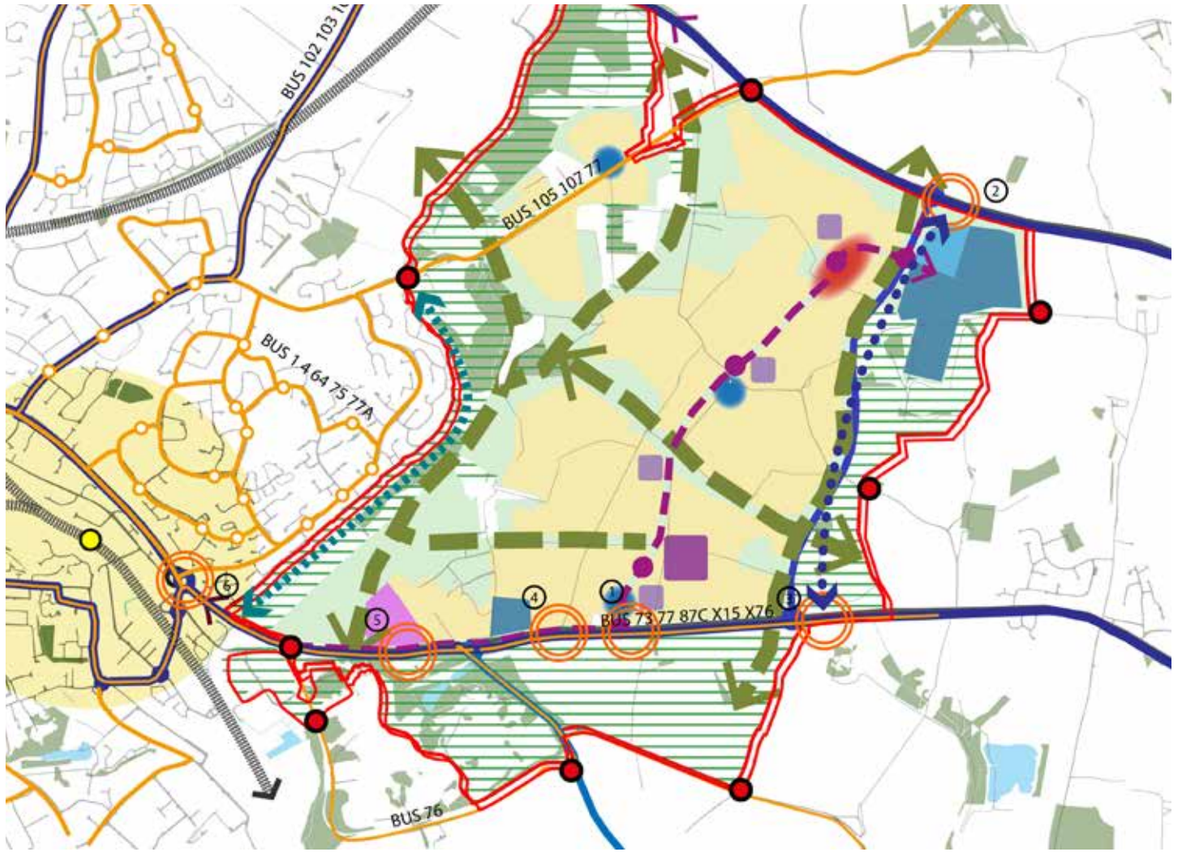

Figure 11: Tendring Colchester Borders Movement and connectivity potential interventions. AECOM.

Existing Infrastructure

- Site boundary
- Existing bus route
- Bus stop
- Salary Brook trail
- Railway
- Railway station
- 800m (10 min walking) Radius
- A Roads
- B Roads
- Minor Roads
- Existing access to the site

Proposed Infrastructure

- Site boundary
- Proposed A133/120 link road
- Primary RTS Routes
- Proposed junction improvement to provide access to site
- (1) Proposed signalised primary access junction
- (2) Proposed A120 grade separated junction
- (3) Proposed A133/120 link road junction
- (4) Proposed signalised secondary access junction
- (5) Proposed junction improvement
- (6) Proposed improvements to Greenstead junction

3.4 Utilities baseline

This section provides a high level analysis of utilities based on preliminary conversations with service providers and desk-based study. Further discussions will be required as masterplans are worked up and more detail emerges.

Key Findings - Electricity

Current Situation

- A meeting was held with UKPN to discuss issues relating to capacity of power available in the four areas under consideration. These informal meetings are referred to as "surgeries" by UKPN and are designed to offer some headline advice ahead of any formal engagement.
- UKPN advised that they expect a capacity demand somewhere between 5MW and 10 MW would trigger the need for a new primary substation.
- There is some good information in the evidence base for this area. General information is provided in the UKPN Regional Development Plan (RDP), and this is amplified through a meeting with UKPN in September 2014. Some network reinforcement will be needed in the period to 2031 to ensure that the Regulated reliability criteria are maintained under winter loading conditions.

Future and Wider Issues

- Development east of the Salary Brook could be supported by upgrading Colchester Primary substation, but distribution may be more costly owing to the need to install new circuits under the river but other supply options could be made available to the area, subject to further study. Specifically, the substation at Lawford could be upgraded which would avoid the river crossing.

Key Findings - Waste Water

Current Situation

- The Colchester Waste Water Treatment Plant, now referred to Water Recycling Centre (WRC), is near capacity. There is a high level strategy to expand the plant, but expenditure will only be committed in response to developer demand. Expansion will have a fairly long lead-in time, so there may be some constraint on early development.
- There are a number of small WRC's with some capacity in this area. These include WRC's at Fingringhoe and Great Bromley. These could serve early development, but before the end of the plan period (2033), waste water would have to be pumped to Colchester WRC at Hythe, or a new treatment plant would have to be built. Pumping to Hythe would involve a river crossing.

Future and Wider Issues

- Most sewers are running with limited spare capacity, and infrastructure upgrades will be needed to support new development. This offers the opportunity to explore new approaches.
- Development in North Colchester may trigger the need for a new WRC within this region also; there could be an opportunity to install a WRC with sufficient capacity to serve both sites, benefiting from economies of scale and providing a more sustainable water cycle.

Key Findings - Gas

Current Situation

- According to an email from National Grid Gas in September 2014, the high and medium pressure network is expected to be able to deliver the predicted additional demand from new development, but the low pressure network will require reinforcement where connections to new development are required.

Future and Wider Issues

- A new pipeline connecting the existing Medium Pressure main to a new pressure reducing station will be required.

Key Findings - Telecommunications

Current Situation

- Evidence limited with additional investigation under masterplanning required.

Future and Wider Issues

- Telecommunication network will be made available to the development at no cost, following a commitment by BT Openreach to serve all developments of more the 30 homes with high speed broadband.

Key Findings - Water Supply

Current Situation

- There is some general information in the Anglian Water development plan covering the period 2015 to 2020. The region east of Colchester (referred to in the Anglian Water development plan as "South Essex") is predicted to be in water deficit condition by 2030.

Future and Wider Issues

- Water will need to be delivered from other areas within the Anglian Water region, or supplemented by neighbouring water companies, namely Affinity Water to the south and Severn Trent to the west. The Anglian water predictions are based on average growth trends; any accelerated growth will bring the date forward. There is no specific information about the proposed development area. There are no major supply projects planned during the current review period (to 2020) – the focus is firmly on demand reduction by tackling leakage and installing water meters.
- The Ardleigh Reservoir, located to the north of the site, could provide additional supply, however this is subject to agreement with the relevant stakeholders. It would also require upgrades to existing as well as new infrastructure.

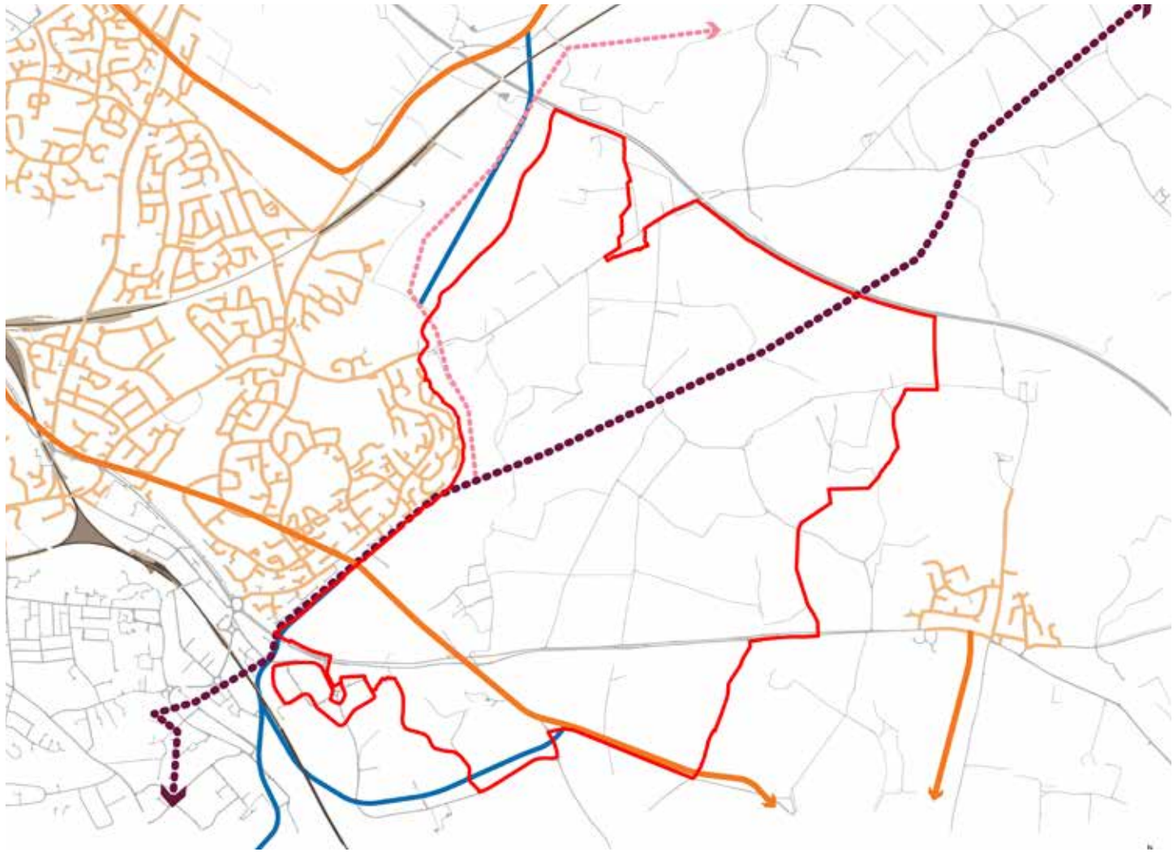

Figure 12: Tendring Colchester Borders Utilities baseline. AECOM.

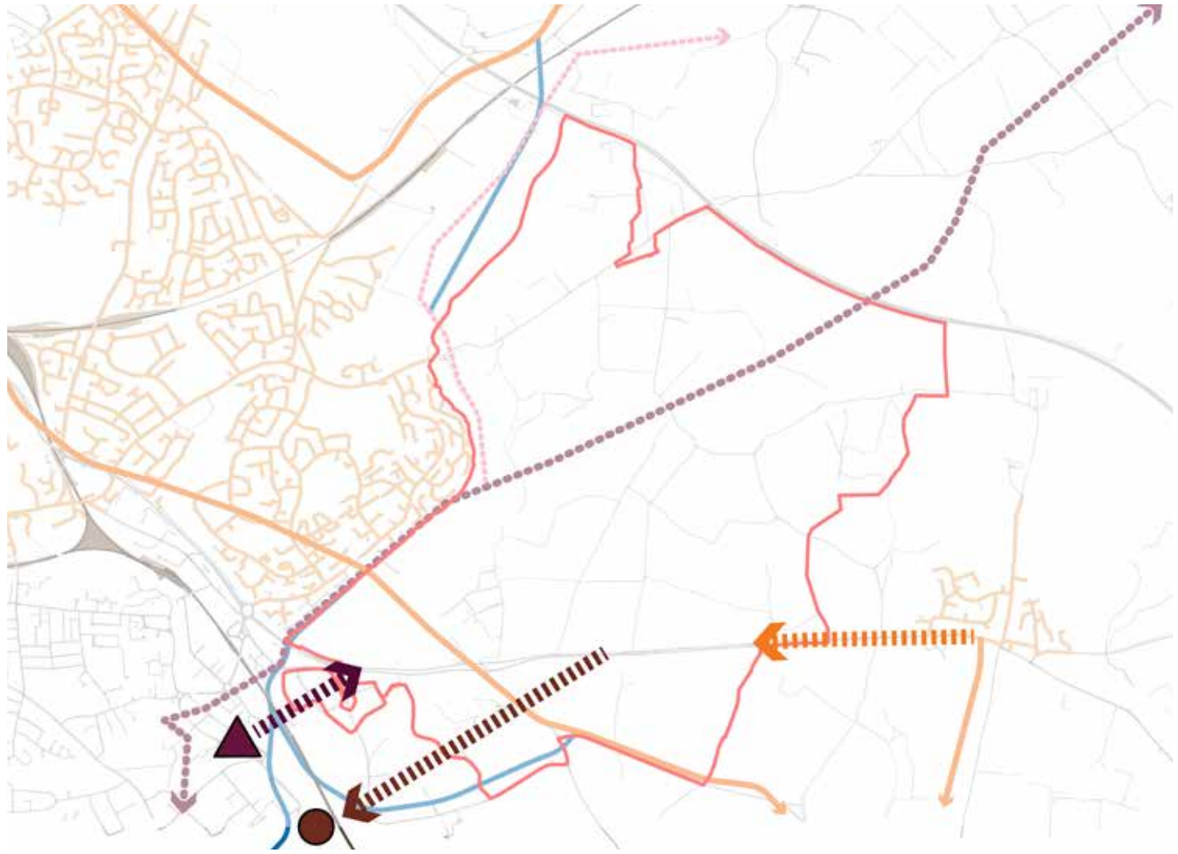

Figure 13: Tendring Colchester Borders Utility interventions. AECOM.

3.5 Infrastructure requirements by phase

Project List

Infrastructure delivery forms a key element of the Garden Community principles. Table 5 contains the estimated infrastructure required to support development at Tendring Colchester Borders and the figures below show phasing assumptions spatially. Please note the infrastructure highlighted is indicative and not based on a detailed masterplanning exercise.

In accordance with the Garden Community approach, the programme assumes the front-loading of several infrastructure items so that they are provided before the benchmarked trigger point.

Table 5: Tendring Colchester Borders Infrastructure requirements

				Cumulative Development Schedule					
Infrastructure	**Demand arising from development**	**Unit of demand**	**Commentary/assumptions**	**Phase 1 1,442**	**Phase 2 3,004**	**Phase 3 4,556**	**Phase 4 5,783**	**Phase 5 6,848**	**Phase 6 7,500**
Education									
Primary Schools: 2 Form Entry (including 56 place EY+C facility)	8	FE	2FE facilities and EY + C Assuming 210 places per FE and 56 places per EY. Excludes temporary accommodation.	2FE + EY	2FE + EY	2FE + EY		2FE + EY	
Secondary Schools	8	FE	Assuming 150 places per FE. Excludes temporary accommodation.		8FE				
Standalone Early Year Facilities (56 place, above those co-located with Primary)	5	Facilities	Assuming 56 places per facility. 4 EY facilities within primary schools, 9 in total required by development. Excludes temporary accommodation.	1	1		2		1
Healthcare & Community									
General Practitioners	1,650	m^2	Demand arising 10 GPs. Assuming 1800 population per GP. Assuming a population of 18,000 (2.4/unit). Assuming 165 m^2 / GP.	2	2	2	1	2	1
Dentists	550	m^2	Demand arising 11 Dentists. Assuming 1760 population per dentist. Assuming a population of 18,000 (2.4/unit). Assuming 50 m^2 / Dentist.	3	2	1	2	2	1
Community Space and Libraries	1,800	m^2	Demand arising 540 m^2 of Library Space. Assuming 30 m^2 per 1000 persons. Demand arising 1080m^2 of Community Space. Assuming 60 m^2 per 1000 persons. Demand arising 1nr 1800 m^2 facilities. Assuming a population of 18,000 (2.4/unit).	19%	21%	21%	16%	14%	9%
4 Court Sports Centre	952	m^2	Demand arising 2 nr facilities. Assuming 0.072 facilities per 1000 persons. Assuming 476m^2 per facility. Assuming a population of 18,000 (2.4/unit).	1			1		
4 Lane Swimming Pool	245	m^2	Demand arising 1 nr facility. Assuming 0.048 facilities per 1000 persons. Assuming 245m^2 per facility.. Assuming a population of 18,000 (2.4/unit).	1					
Open Space									
Open space	144	ha	Assuming a population of 18,000 (2.4/unit). Including; 8ha total open space per 1000 population.	38.88	47.52	1.44	28.80	20.16	7.20
Environment/waste - Allowance	7,500	units	Include allowance per unit to cover the provision of acoustic bunding / fencing to mitigate the impact of external sources of noise such as highways and public transport and localised solid waste recycling area.	1442	1562	1552	1227	1065	652

				Cumulative Development Schedule					
Infrastructure	**Demand arising from development**	**Unit of demand**	**Commentary/assumptions**	**Phase 1 1,442**	**Phase 2 3,004**	**Phase 3 4,556**	**Phase 4 5,783**	**Phase 5 6,848**	**Phase 6 7,500**
Utilities - Scheme-Wide Enabling Works									
Site Preparations and Earthworks			Assume Site Area of 403ha plus an allowance for an additional 10% of this area to allow for works outside of the core development area and within the site boundary.	19%	21%	21%	16%	14%	9%
General demolition and site clearance 443 ha = m²	4,430,000	m²							
Strategic Earthworks; cut and fill									
Highways									
Primary and secondary road network									
Drainage									
Foul and surface water network									
Landscaping									
Cost captured in open space									
Noise attenuation									
Cost captured in open space									
Waste Management									
Provision for recycling on site, excluding new amenitys	7,500	Nr							
Energy									
33 No. 11 kV to 400 V distribution substations	33	Substations							
7 No. 11 kV ring circuits from primary substation to connect to distribution substations.	7	Ring Circuits							
400 V LV circuits from distribution substations to end users	7,500	Circuits/Unit							
Residential Electricity Connections									
Budget cost per Low Voltage (LV) Service Disconnection		Unit							
Potable water									
New network of distribution pipework	7,500	Network							
Water mains, connections and infrastructure charges									
Waste Water									
New network of collection pipework	7,500	Network							
Plot connections for all properties to waste water distribution network	7,500	Connections							
Gas									
Low Pressure Residential Connections									
Utilities - Off-Site Requirements									
Electricity									
132 kV connection to Primary Substation from Colchester Grid Substation					100%				
Electricity Diversion Works				100%					

				Cumulative Development Schedule					
Infrastructure	**Demand arising from development**	**Unit of demand**	**Commentary/assumptions**	**Phase 1 1,442**	**Phase 2 3,004**	**Phase 3 4,556**	**Phase 4 5,783**	**Phase 5 6,848**	**Phase 6 7,500**
Potable Water									
Connection to closest feasible supply source with capacity (e.g. trunk main or reservoir)				100%					
Budget cost per lowering of the Affinity Water 12" AC Distribution Water Main to accommodate a site entrance.			Assuming lowering of the distribution water main to accommodate site entrances within Brightlingsea Road, Elmstead Road and Colchester Road.	100%					
Waste Water / Foul Water									
Upgrades to water course discharges			Allowance for environmental enhancement / EA regulations. Note: Does not account for university student population.	100%					
Connection to existing waste water treatment works via new pumping station - primary and secondary collection networks			Pumped to Colchester WRC (5.2 km pipeline). Note: Does not account for university student population.	100%					
Gas									
Extension to Medium Pressure network				100%					
1 No. Medium to Low Pressure reducing station	Station	% of total provision		19%	21%	21%	16%	14%	9%
Re-routing of 12" Medium Pressure Gas Main through the new on-site road network				100%					
Telecommunications									
Development of access chambers for BT Telecoms network, BT Openreach fibre optic network and private telecoms network throughout development.				19%	21%	21%	16%	14%	9%
Openreach diversion works associated with Mount Pleasant and Allen's Farm off Tye Road.				100%					
Openreach diversion works associated with highway works on the A133.				100%					
Transport									
New signalised access onto A133 (primary access to site)		% of total provision		100%					
Secondary signalised access onto A133		% of total provision		100%					
Interim highways improvements measures (including improvements to Greenstead roundabout and A133 Hare Green roundabout)		% of total provision		100%					
A120-A133 Link Road		% of total provision			100%				
On site RTS route and related improvements/facilities		% of total provision		20%	20%	20%	20%	20%	
Contribution to provisions of off site RTS network		% of total provision		27%	30%	14%	14%	15%	
Park & Ride facilities and interchange with RTS		% of total provision		50%		50%			
Upgrade existing walking / cycling infrastructure		% of total provision		50%	50%				
Various combined segregated pedestrian / cycle "Greenways" through site		% of total provision		19%	21%	21%	16%	14%	9%
Internal road network		% of total provision	Include in enabling costs						

				Cumulative Development Schedule					
Infrastructure	**Demand arising from development**	**Unit of demand**	**Commentary/assumptions**	**Phase 1 1,442**	**Phase 2 3,004**	**Phase 3 4,556**	**Phase 4 5,783**	**Phase 5 6,848**	**Phase 6 7,500**
Per Unit Contributions									
Investment in early phase bus/transit services		% of total provision		19%	21%	21%	16%	14%	9%
Travel plan measures (smarter choices, car clubs, charging points, etc) - Straight Line Cost Over Time		% of total provision	Aligned to Modal Shift analysis (ITP). Delivered from day one with funding annually.	19%	21%	21%	16%	14%	9%
Open Space Endowment		% of total provision		19%	21%	21%	16%	14%	9%
Employment Space		% of total provision		19%	21%	21%	16%	14%	9%

This Section sets out key assumptions and infrastructure and phasing strategies to enable delivery at Colchester Braintree Borders.

04 Colchester Braintree Borders

4.1 Concept Framework

The Colchester Braintree Borders Concept Framework defines a spatial option for the long term delivery of a Garden Community.

The framing principles are similar as for the other Garden Communities, promoting a landscape-led vision, a high level of economic self-sufficiency and a strong emphasis on public transport other sustainable modes.

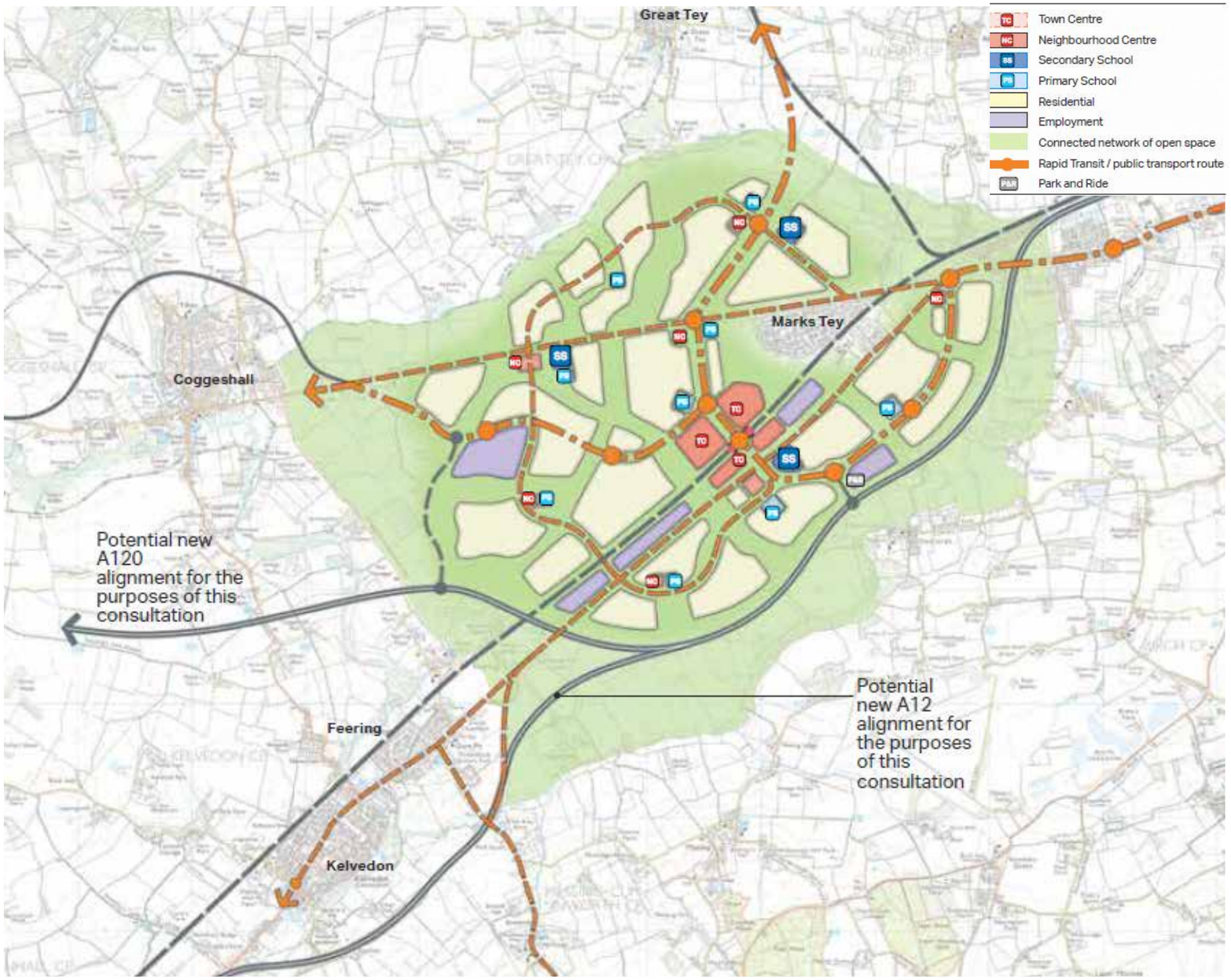

Figure 14: Colchester Braintree Borders Concept Framework (Source: DLA 2017)

4.2 Indicative masterplan and land use budget

The plan that forms the basis of this current exercise is an iteration of the Colchester Braintree Borders Concept Framework and takes account of more detailed work on the need for employment land, outlined by Cebr in their July 2019 report.

Instead of relocating Marks Tey train station, the analysis in this report assumes that it stays in situ but is linked from the outset by a high quality rapid transit network.

The other principal change is the re-alignment of the A12. This has the effect of removing land that was previously considered for development. There is potential to develop land east of a new junction, subject to A12 realignment and it being considered suitable to form part of the Garden Community and being considered by future masterplanning to inform the Development Plan Document.

Another key change from the original Concept Framework plan is the re-calibration of open space, across the site, with a target level of provision that is more in keeping with the standard assumed across all three Garden Community sites.

Table 7: Colchester Braintree Borders Land Use Budget

	Area	Dwellings
Residential (ha)	563.73	
Dwellings in Residential		19,730
Mixed Use (ha)	20.00	
Dwellings in Mixed Use		1,200
Primary School (ha)	24.00	
Secondary School (ha)	30.00	
Employment (ha)	51.70	
Open Space (ha)	421.56	
Infrastructure (5%)	58.47	
Total	**1,169.46 Ha**	**20,930**

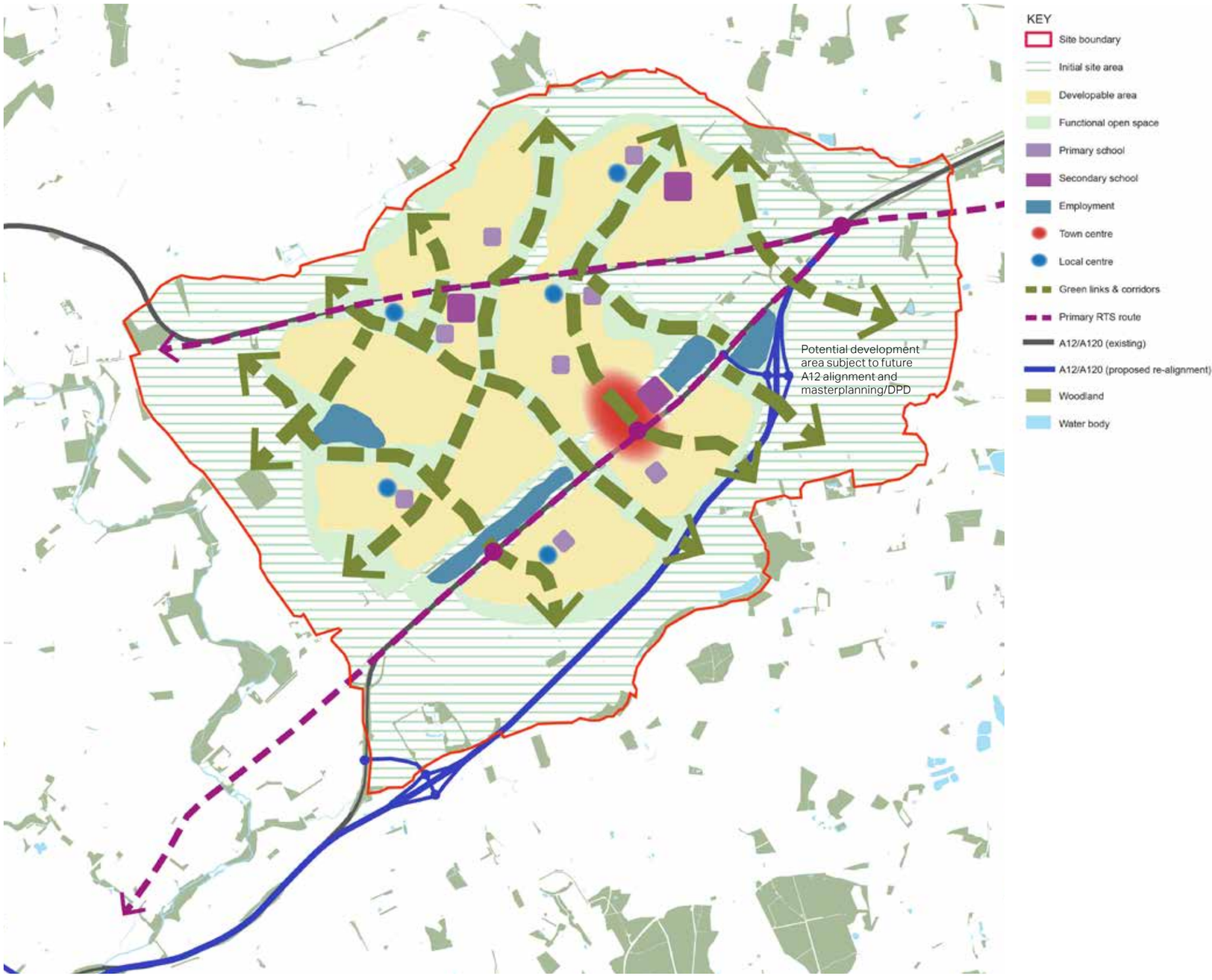

Figure 15: Colchester Braintree Borders Indicative masterplan (derived from Concept Framework)

4.3 Movement and connectivity baseline

The development site is well connected to the Strategic Road Network with the A12 and A120 passing through the site, however careful consideration should be given to their proposed realignments and the benefits this could bring to delivering access to the site.

Key Findings - Roads

Current Situation

- The site extends southwest from the A12 / A120 interchange (Junction 25). The A12 runs parallel to the southeast boundary and the A120 is an east-west link passing through the northern section of the site. Both the A12 an A120 currently experience high levels of peak period congestion.
- There are a number of small access roads into the site from the main trunk roads. These roads (predominantly rural roads) run through the site, providing wider vehicular access to the area.

Future and Wider Issues

- Highways England has proposed to upgrade the A12 between Junction 19 (Chelmsford) and Junction 25 (A120 Interchange). The upgrade in the vicinity of the site is proposed as an off-line widening scheme.
- Essex County Council are also proposing the realignment of the A120 of which a preferred route has been identified linking Galleys Corner in Braintree with the A12 south of Kelvedon, with the existing A120 proposed to be downgraded.
- Improving access to the site from the A12 and A120 would be a requirement of delivery of this site.

Key Findings - Public Transport

Current Situation

- The existing bus routes run along the A12 and A120 with a number of bus stops serving Marks Tey with connections between Chelmsford and Colchester.
- Marks Tey train station lies in the northeast corner of the site and sits on the Great Eastern Main Line serving stations up to every 20 minutes between London and Colchester during the peak periods.

Future and Wider Issues

- The potential for greater public transport connectivity has been identified in the concept framework and further explored by Jacobs' North Essex Rapid Transit study suggesting main corridors of movements between the 3 North Essex sites and their main local employment centres such as Stanstead and Chelmsford.
- The realignment of the A12 and A120 provides opportunities for improved local access and reallocation of road space for sustainable modes.

Key Findings - Active Modes

Current Situation

- Existing provision for active modes (walking and cycling network) is constrained to main road corridors limiting connectivity. There are some PROWs that exist across the site in various locations, including Essex Way which runs across the northern section of the site.
- There are no National Cycle Network (NCN) routes of note in close proximity to the site.
-

Future and Wider Issues

- Building on the garden communities principles, Colchester Braintree Borders has the potential to plan for an important number of internalised movements to be undertaken by walk or cycle thanks to high-quality and dedicated infrastructure on-site.
- For wider hinterland/commuting movements, significant improvements would be required to increase the quality of the existing infrastructure and encourage cycling and public transport as an alternative to the car towards Colchester in particular.

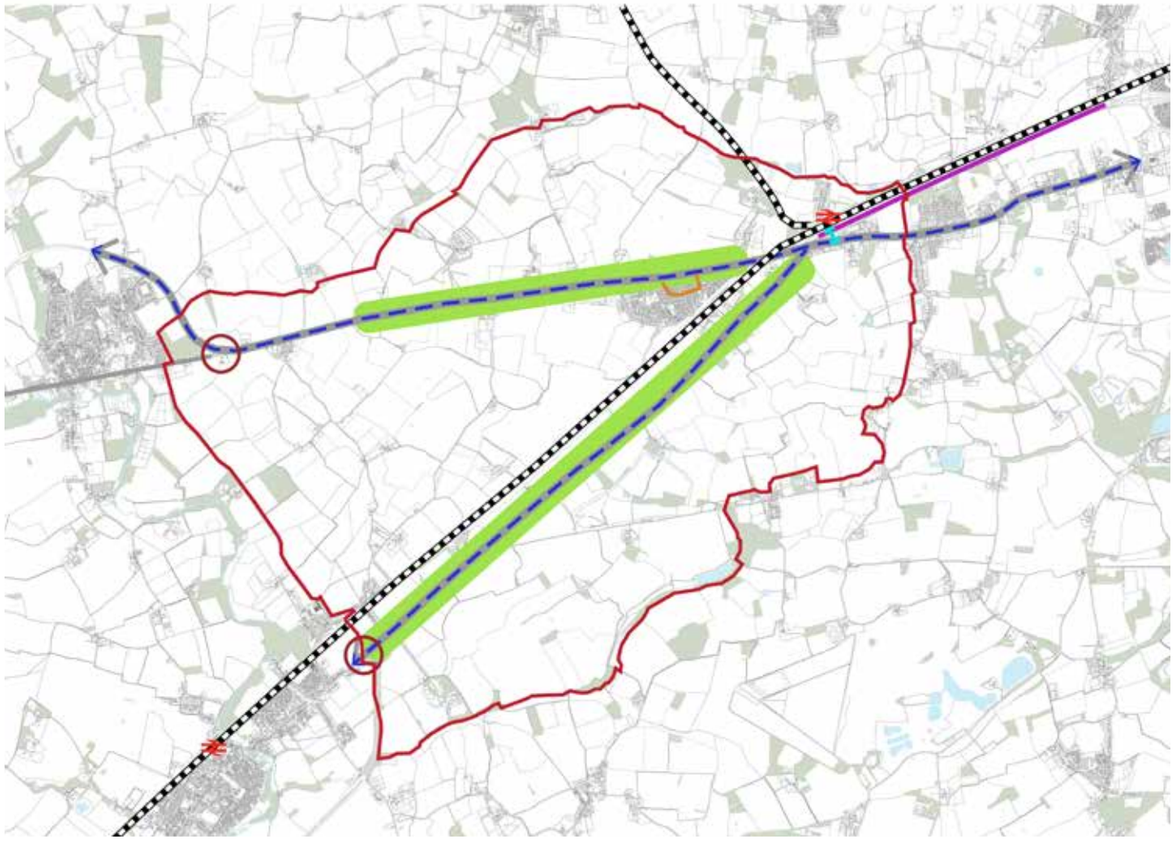

Figure 16: Colchester Braintree Borders Movement and connectivity baseline. AECOM.

Existing Infrastructure

- Site boundary
- Railway
- A Road
- B Road
- Strategic bus route
- Local bus route
- Junction identified over capacity by 20 32 (Local Plan Jacobs Modelling)
- Identified key bottle neck
- Pedestrian bridge
- Road >100% stress

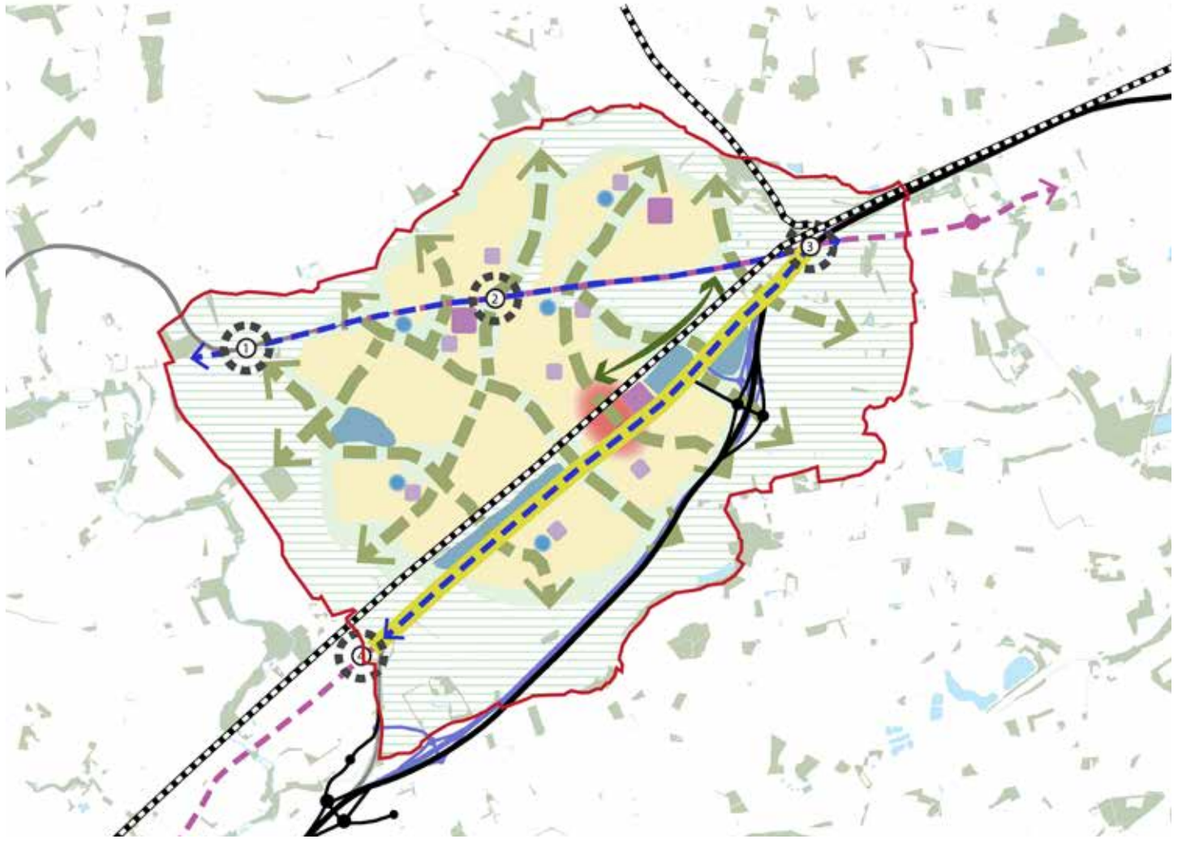

Figure 17: Colchester Braintree Borders Movement and connectivity potential interventions. AECOM.

Proposed Infrastructure

- Site boundary
- Railway
- Road to be downgraded
- Public transport corridor
- Primary RTS routes
- Proposed A12

Junction improvements:

1. A120/B1024
2. Site accesses
3. Marks Tey interchange junction
4. A120/Keivedon Road
5. A120/A131/Coggershall Road (Brainti shown)

- A120 proposed road connection
- Walking and cycling improvements

4.4 Utilities baseline

This section provides a high level analysis of utilities based on preliminary conversations with service providers and desk-based study. Further discussions will be required as masterplans are worked up and more detail emerges.

Key Findings - Electricity

Current Situation

- According to UKPN there is some spare capacity in the local electrical network. The new substation at Witham has sufficient capacity to support the early phases of development.

Future and Wider Issues

- Approximately 10,000 new homes would trigger the need for a new primary substation, and new distribution infrastructure would be required for any level of development

Key Findings - Waste Water

Current Situation

- The development area falls within the Copford water recycling centre (WRC).

Future and Wider Issues

- Anglian Water has advised that the high level strategy is to minimise capacity at this WRC. There is no surrounding land available to upgrade this WRC to increase its capacity to meet the additional demand resulting from significant development. Upgrades to the Colchester WRC are viable, and would provide sufficient capacity for the development.

Key Findings - Telecommunications

Current Situation

- Openreach, Virgin Media, Vodafone and Interoute have confirmed assets adjacent to A12 London Road.

Future and Wider Issues

- Protection and diversion works may be required for these assets if new highway connections are to be made to the A12 or B1408.
- Telecommunication network will be made available to the development at no cost, following a commitment by BT Openreach to serve all developments of more the 30 homes with high speed broadband.

Key Findings - Water Supply

Current Situation

- Anglian Water is the supplier of fresh water to the area, as part of their South Essex Resource Zone. The main sources of supply are groundwater abstraction and surface water from the River Colne being pumped to storage at the Ardleigh reservoir.

Future and Wider Issues

- The local area is expected to fall into a supply deficit by 2040, without accounting for the extra demand resulting from development at CBB. A number of options are being assessed, which in conjunction with demand reduction and water efficiency measures could provide sufficient additional capacity to supply the proposed development.

Key Findings - Gas

Current Situation

- There is a medium pressure (MP) main that runs along the southern carriageway of the A12, and a low pressure (LP) main that runs along the B1408 London Road.

Future and Wider Issues

- National Grid Gas advised in September 2014 that the medium pressure network is expected to be able to deliver the predicted additional demand from new development, but the low pressure network will require reinforcement in places.
- Unlike the other two Garden Communities, Colchester Braintree Borders does not require a new pressure reducing station.

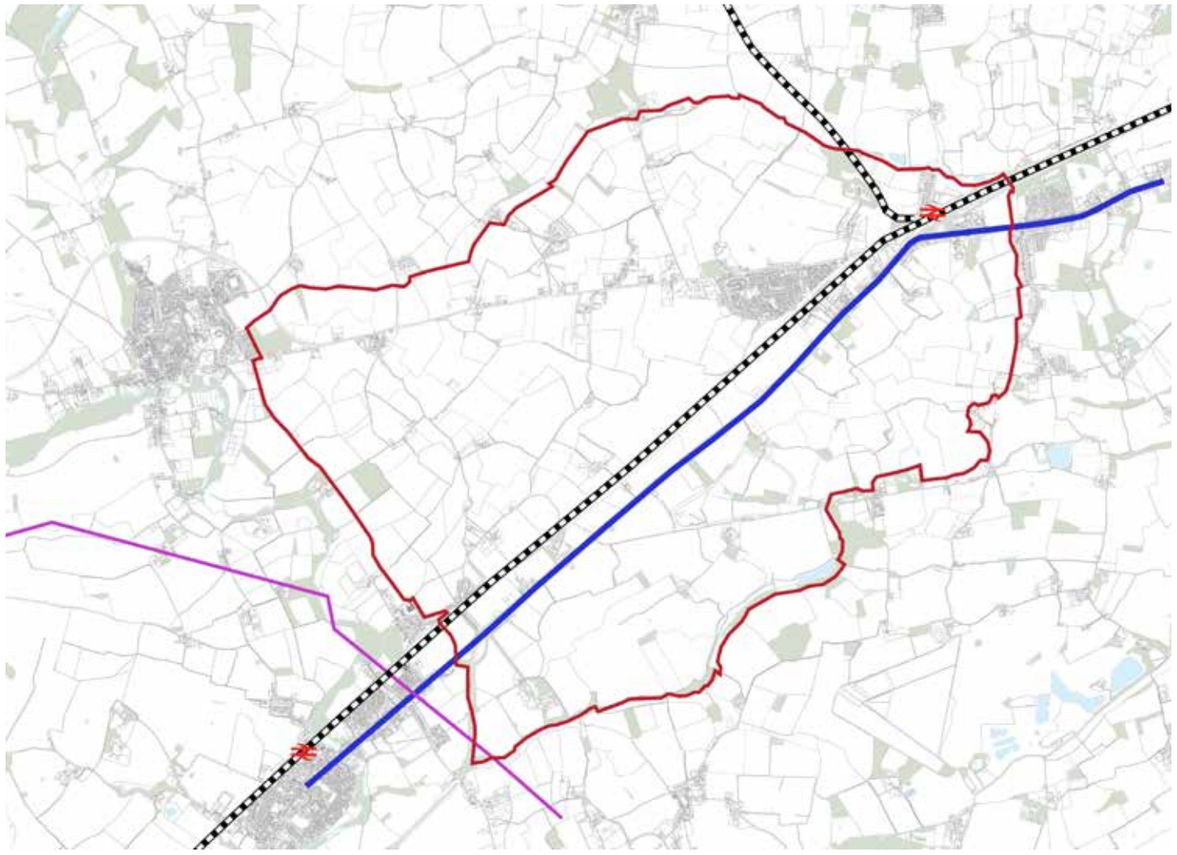

Figure 18: Colchester Braintree Borders Utilities baseline. AECOM.

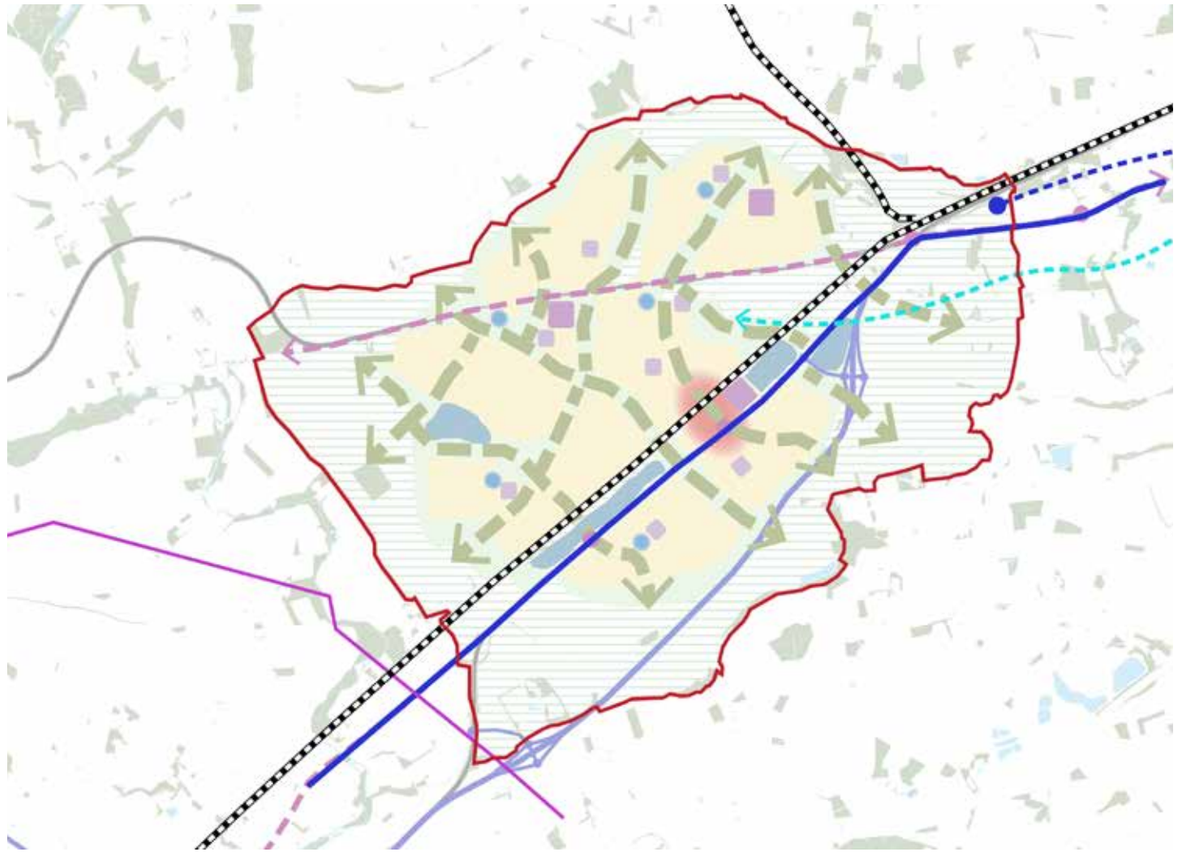

Figure 19: Colchester Braintree Borders Utility interventions. AECOM.

Existing infrastructure

- Site boundary
- Railway
- 33,000 V Tower Line
- Medium pressure gas pipe

Proposed infrastructure

- Site boundary
- 132/11 kV Primary Substation
- 12km 132kV overhead line connection to Colchester
- New pipeline to existing Water Recycling Centre

4.5 Infrastructure requirements by Phase

Project List

Infrastructure delivery forms a key element of the Garden Community principles. Table 8 contains the estimated infrastructure required to support development at Colchester Braintree Borders and the figures below show phasing assumptions spatially. Please note the infrastructure highlighted is indicative and not based on a detailed masterplanning exercise.

In accordance with the Garden Community approach, the programme assumes the front-loading of several infrastructure items so that they are provided before the benchmarked trigger point.

Table 8: Colchester Braintree Borders Infrastructure requirements

				Cumulative Development Schedule							
Infrastructure	**Demand arising from development**	**Unit of demand**	**Commentary/assumptions**	**Phase 1 2,550**	**Phase 2 4,608**	**Phase 3 7,314**	**Phase 4 9,812**	**Phase 5 12,582**	**Phase 6 15,531**	**Phase 7 18,560**	**Phase 8 21,000**
Education											
Primary Schools: 2 Form Entry (including 56 place EY+C facility)	22	FE	2FE facilities and EY + C Assuming 210 places per FE and 56 places per EY. Excludes temporary accommodation.	2nr 2FE +EY	2FE + EY	2nr 2FE +EY	2FE + EY	2nr 2FE +EY	2nr 2FE +EY	2FE + EY	
Secondary Schools	20	FE	Assuming 150 places per FE. Excludes temporary accommodation.	8FE		6FE			6FE		
Standalone Early Year Facilities (56 place, above those co-located with Primary)	14	Facility	Assuming 56 places per facility. 11 EY facilities within primary schools, 25 in total required by development. Excludes temporary accommodation.	2	2	1	3	1	3	2	
Healthcare & Community											
General Practitioners	4,620	GPs	Demand arising 28 GPs. Assuming 1800 population per GP. Assuming a population of 50,400 (2.4/unit). Assuming 165 m^2 / GP.	4	4	4	4	4	4	3	1
Dentists	1,450	Dentists	Demand arising 29 Dentists. Assuming 1760 population per dentist. Assuming a population of 50,400 (2.4/unit). Assuming 50 m^2 / Dentist.	4	4	4	4	4	4	3	2
Community Space and Libraries	5,400	m^2	Demand arising 1512 m^2 of Library Space. Assuming 30 m^2 per 1000 persons. Demand arising 3024m^2 of Community Space. Assuming 60 m^2 per 1000 persons. Demand arising 3nr 1800 m^2 facilities. Assuming a population of 50,400 (2.4/unit).	12%	10%	13%	12%	13%	14%	14%	12%
4 Court Sports Centre	1,904	m^2	Demand arising 4 nr facilities. Assuming 0.072 facilities per 1000 persons. Assuming 476m^2 per facility. Assuming a population of 50,400 (2.4/unit).	1		1		1	1		
4 Lane Swimming Pool	735	m^2	Demand arising 3 nr facilities. Assuming 0.048 facilities per 1000 persons. Assuming 245m^2 per facility.. Assuming a population of 50,400 (2.4/unit).	1		1			1		
Open Space											
Open space	403	ha	Assuming a population of 50,400 (2.4/unit). Including; 8ha total open space per 1000 population.	60.48	60.48	56.45	100.80	52.42	32.26	40.32	
Environment/waste - Allowance	21,000	units	Include allowance per unit to cover the provision of acoustic bunding / fencing to mitigate the impact of external sources of noise such as highways and public transport and localised solid waste recycling area.	2,550	2,058	2,706	2,498	2,770	2,949	3,029	2,440

				Cumulative Development Schedule							
Infrastructure	**Demand arising from development**	**Unit of demand**	**Commentary/assumptions**	**Phase 1 2,550**	**Phase 2 4,608**	**Phase 3 7,314**	**Phase 4 9,812**	**Phase 5 12,582**	**Phase 6 15,531**	**Phase 7 18,560**	**Phase 8 21,000**
Utilities - Scheme-Wide Enabling Works											
Site Preparations and Earthworks			Assume Site Area of 1,169ha plus an allowance for an additional 10% of this area to allow for works outside of the core development area and within the site boundary.	12%	10%	13%	12%	13%	14%	14%	12%
General demolition and site clearance 1,286 ha = m²	12,860,000	m²									
Strategic Earthworks; cut and fill											
Highways											
Primary and secondary road network											
Drainage											
Foul and surface water network											
Landscaping											
Cost captured in open space											
Noise attenuation											
Cost captured in open space											
Waste Management											
Provision for recycling on site, excluding new amenitys	21,000	Nr									
Energy											
104 No. 11 kV to 400 V distribution substations	104	Substations									
12 No. 11 kV ring circuits from primary substation to connect to distribution substations.	12	Ring Circuits									
400 V LV circuits from distribution substations to end users	21,000	Circuits/Unit									
Residential Electricity Connections											
Budget cost per Low Voltage (LV) Service Disconnection											
Potable water											
New network of distribution pipework		Network									
Water mains, connections and infrastructure charges											
Waste Water											
New network of collection pipework	21,000	Network									
Plot connections for all properties to waste water distribution network	21,000	Connections									
Gas											
Low Pressure Residential Connections											
Utilities - Off-Site Requirements											
Electricity											
New 2 x 125 MVA Primary Substation		MVA				100%					
12km 132 kV Overhead Line connection to Colchester substation		% of overall provision		100%							
Electricity Diversion Works				100%							
Potable Water											
Connection to closest feasible supply source with capacity (e.g. trunk main or reservoir)				100%							

				Cumulative Development Schedule							
Infrastructure	**Demand arising from development**	**Unit of demand**	**Commentary/assumptions**	**Phase 1 2,550**	**Phase 2 4,608**	**Phase 3 7,314**	**Phase 4 9,812**	**Phase 5 12,582**	**Phase 6 15,531**	**Phase 7 18,560**	**Phase 8 21,000**
Waste Water / Foul Water											
Upgrades to water course discharges / Surface Water		Upgrades		100%							
13km connection to existing waste water treatment works				100%							
Gas											
Extension to Medium Pressure network				100%							
1 No. Medium to Low Pressure reducing station	1	Station		100%							
Budget cost per lowering of a 180mm Low Pressure Gas Main to accommodate a site entrance.	2	Site Entrance	Assuming 2nr site entrances	100%							
Budget cost per lowering of a 225mm Medium Pressure Gas Main to accommodate a site entrance.	2	Site Entrance	Assuming 2nr site entrances	100%							
Telecommunications											
Development of access chambers for BT Telecoms network, BT Openreach fibre optic network and private telecoms network throughout development				12%	10%	13%	12%	13%	14%	14%	12%
Budget cost per fibre provider for the diversion of underground apparatus at a single location	3	Nr	Assuming 3nr providers	100%							
Transport											
A3 - Active Modes link (Church Lane - Marks Tey station)		% of total provision		100%							
Park & Ride facilities & interchange with RTS		% of total provision	To provide for interchange between modes, including provision of park & ride (as appropriate)	10%	90%						
Internal Road Network			Include in enabling costs								
Walking and Cycling connections				100%							
Additional bridges over railway line (2 vehicular & 3 pedestrian/cycle)				40%	14%		40%	6%			
A2 & A4 - Active Modes Connections to Rural Hinterland, Cycle Links		% of total provision	A4 upfront (cycle links) with remainder hinterland	30%	10%	15%	10%	10%	15%	10%	
Marks Tey Station and junction package & Stane St reduction			Various work to station and environs	58%	42%						
R2 - A12 Southern junction with Garden Community. R2 in MAS			Delivered in line with A12 improvements.	100%							
Widest realignment of A12 as part of improvements			Delivered in line with A12 improvements.	100%							
A12 capacity improvements around Kelvedon			Delivered in line with A12 improvements.	100%							
On site RTS route and related improvements/facilities				60%	20%	20%					
Contribution to provisions of off site RTS network				60%	20%	20%					

				Cumulative Development Schedule							
Infrastructure	**Demand arising from development**	**Unit of demand**	**Commentary/assumptions**	**Phase 1 2,550**	**Phase 2 4,608**	**Phase 3 7,314**	**Phase 4 9,812**	**Phase 5 12,582**	**Phase 6 15,531**	**Phase 7 18,560**	**Phase 8 21,000**
Per Unit Contributions											
Investment in early phase bus/transit services		% of total provision		75%	25%						
Contribution to A120		% of total provision	Delivered from day one with funding annually	12%	10%	13%	12%	13%	14%	14%	12%
Travel plan measures (smarter choices, car clubs, charging points, etc) - Straight Line Cost Over Time		% of total provision	Aligned to Modal Shift analysis (ITP) Delivered from day one with funding annually	12%	10%	13%	12%	13%	14%	14%	12%
Open Space Endowment		% of total provision	Delivered from day one with funding annually	12%	10%	13%	12%	13%	14%	14%	12%
Employment Space		% of total provision		12%	10%	13%	12%	13%	14%	14%	12%