

North Essex Authorities

Infrastructure Order of Cost Estimate [41,000 Homes]

North Essex Authorities
Gleeds Cost Management
Project LNCM 0931

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Executive Summary

Gleeds have undertaken a review of the cost of infrastructure works associated with the development of 41,000 homes across 3 new garden communities in North Essex. This report is based on the design information contained within AECOM's Infrastructure Planning, Phasing and Delivery (NEGC IPPD) Draft Report dated July 2019..

We have identified clear assumptions within our report under Section 5.

This estimate reflects prices at Q4 2018 based on the details referenced therein. The pricing basis of this preliminary budget estimate is current market conditions and should be reviewed at regular intervals of no longer than 3 months.

Throughout the cost estimating process we have worked collaboratively with other consultants. The infrastructure requirements have been informed by review of the design information as set out in the AECOM IPPD Draft Report July 2019, and in some cases estimated using metrics outlined in ECC Developer's Guide to Infrastructure Contributions Document. We have also incorporated Essex County Councils' guidance on Education requirements, UCML guidance on utilities provisions, Essex Highways guidance on Rapid Transit System requirements and the North Essex Authorities guidance on Per Unit Contributions.

A number of benchmark data are identified within this report; however, the following are key priorities during the next stage of the feasibility design;

- Inflation Forecast to be reviewed
- Refined design information to determine accurate benchmark information
- Strategic review of associated risk

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Introduction

Introduction

Overview

Gleeds have been asked to provide cost advice for the community infrastructure and enabling works required to support the delivery of 41,000 homes across three new garden communities over a number of phases in Essex to Garden Community Principles.

Whilst it is too early to provide detailed substantiation behind the Order of Cost Estimate contained within this report, this report aims to give the NEA the intended guidance of the likely cost associated with the infrastructure works.

This report presents the findings of a “high-level” design assessment based on AECOM’s IPPD Draft Report dated July 2019. Identifying three broad locations at West of Braintree, Tendring Colchester Borders and Colchester Braintree Borders. It is noted that these analysis and options will continue to evolve, and the basis of our report is the assumed delivery of 41,000 homes as outlined within AECOM’s IPPD Draft Report dated July 2019 and the number of homes proposed for each of the Garden Communities is as follows:

Site	Gleeds	AECOM
	Number of Residential Units	Number of Residential Units
1 - West of Braintree	12,500	12,500
2 - Tendring Colchester Borders	7,500	7,500
3 - Colchester Braintree Borders	21,000	21,000
	41,000	41,000

Garden Community	NEA	ONS	Gleeds
	Number of Residential Units	Anticipated Population	£ / Residential Unit
Site 1 – West of Braintree	12,500	30,000	£64,000
Site 2 – Tendring Colchester Borders	7,500	18,000	£66,000
Site 3 – Colchester Braintree Borders	21,000	50,400	£63,000

Please note: £ / Residential Unit rates reflect prices at 4Q2018 and include 10% Professional Fees and 10% Risk.

Infrastructure Costs per Site:

	Site 1	Site 2	Site 3	All Sites
	West of Braintree	Tendring Colchester Borders	Colchester Braintree Borders	
Number of Units	12,500	7,500	21,000	41,000
	(£ Total)	(£ Total)	(£ Total)	(£ Total)
Education	105,930,000	65,250,000	172,350,000	343,530,000
Healthcare & Community	23,260,000	13,020,000	36,090,000	72,370,000
Open Space	39,850,000	23,910,000	66,950,000	130,710,000
Utilities - Scheme-Wide Enabling Works	230,420,000	138,640,000	389,980,000	759,040,000
Additional Onsite Requirements	8,340,000			8,340,000
Utilities - Off-Site Requirements	34,910,000	27,250,000	70,360,000	132,520,000
Transport	140,830,000	108,740,000	248,850,000	498,020,000
Per Unit Contributions	81,690,000	30,710,000	117,600,000	230,000,000
Total Construction Cost (exc. Fees and Risk)	665,230,000	407,520,000	1,101,780,000	2,174,530,000
Cost per Unit (exc. Fees and Risk)	53,000	54,000	52,000	53,000
Professional Fees (10%)	66,520,000	40,750,000	110,180,000	217,450,000
Project Risk (10%)	73,180,000	44,830,000	121,200,000	239,200,000
Total Cost at 4Q2018 (exc. VAT)	804,930,000	493,100,000	1,333,160,000	2,631,180,000
Cost per Unit	64,000	66,000	63,000	64,000

Assumptions:

- Number of units as per the AECOM IPPD Draft Report dated July 2019.
- Anticipated population assumes a population per household rate in line with the Office for National Statistics (ONS, 2017) average of 2.4 persons per household.

Professional Fees and Risk Allowances:

- Professional fees assumed at 10%.
- Project risk assumed at 10%. Given the high-level nature of this estimate, we have assumed 10% Risk as a reasonable starting point. Risk allowance and allocation on an item by item basis should be strategically reviewed as a key priority.

This report provides the analysis and conclusions that derived from a select group of documents given the works that has gone into the Garden Communities Charter and the three Borough Councils Local Plan process. We also used the objectives as set out in the NEGC Concept Feasibility Study. A schedule of information used can be found in Appendix D.

Background

The NEA's preferred option is to deliver the Garden Communities through an infrastructure led approach.

This report outlines the conceptual masterplan work undertaken by AECOM to further support the NEA's infrastructure planning, phasing and delivery of the three garden communities. We have also accounted for several changes to the design which have been advised by the NEA and their advisers

The principal objective for this report is to:

Set the Cost Framework for the delivery of the Garden Communities Infrastructure as outlined in AECOM's IPPD Draft Report dated July 2019.

The report consists of 5 sections comprising:

- Total Infrastructure Requirements by Phase:
 - West of Braintree
 - Tendring Colchester Borders
 - Colchester Braintree Borders
- Assumptions
- Appendices

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Total Infrastructure Requirements by Phase – West of Braintree

Site 1: West of Braintree

Infrastructure	Demand Arising From Development	Unit of demand	Rate	Notes	Commentary / Assumptions	Total
1 Education						
1.1 Primary Schools: 2 Form Entry (including 56 place EY+C facility)	14	FE	3,150,000	Requirement as advised by the NEA.	2FE facilities and EY + C Assuming 210 places per FE and 56 places per EY. Excludes temporary accommodation.	52,290,000
1.2 Secondary Schools	12	FE	3,690,000	Requirement as advised by the NEA.	Assuming 150 places per FE. Excludes temporary accommodation.	44,280,000
1.3 Standalone Early Year Facilities (56 place, above those co-located with Primary)	8	Facilities	1,170,000	Requirement as advised by the NEA.	Assuming 56 places per facility. 7 EY facilities within primary schools. 15 in total required by development. Excludes temporary accommodation.	9,360,000
2 Healthcare & Community						
2.1 General Practitioners	2805	m2	3000	Based on West of Braintree Social Infrastructure Standards EXD/013E Braintree Council Website	Demand arising 17 GPs. Assuming 1800 population per GP. Assuming a population of 30,000 (2.4/unit). Assuming 165 m2 / GP.	8,415,000
2.2 Dentists	900	m2	3,000	Based on West of Braintree Social Infrastructure Standards EXD/013E Braintree Council Website	Demand arising 18 Dentists. Assuming 1760 population per dentist. Assuming a population of 30,000 (2.4/unit). Assuming 50 m2 / Dentist.	2,700,000
2.3 Community Space and Libraries	3600	m2	2,500	Library Space based on ECC Social Infrastructure Standards, Arts Council. Community Space provisions as advised by the NEA and their advisers.	Demand arising 900 m2 of Library Space. Assuming 30 m2 per 1000 persons. Demand arising 1800m2 of Community Space. Assuming 60 m2 per 1000 persons. Demand arising 2nr 1800 m2 facilities. Assuming a population of 30,000 (2.4/unit). As advised by the NEA, the cost for Community Space and Library Facilities has been phased in accordance with unit delivery.	9,000,000
2.4 4 Court Sports Centre	1428	m2	1,450	Based on ECC Social Infrastructure Standards, Colchester SPG Provision of Open Space, Sport and Recreational facilities 2006.	Demand arising 3 nr facilities. Assuming 0.072 facilities per 1000 persons. Assuming 476m2 per facility. Assuming a population of 30,000 (2.4/unit).	2,070,600
2.5 4 Lane Swimming Pool	490	m2	2,200	Based on ECC Social Infrastructure Standards, Colchester SPG Provision of Open Space, Sport and Recreational facilities 2006.	Demand arising 2 nr facilities. Assuming 0.048 facilities per 1000 persons. Assuming 245m2 per facility. Assuming a population of 30,000 (2.4/unit).	1,078,000
3 Open Space						
3.1 Open space	240	ha	140,000	Based on ECC Social Infrastructure Standards, based on an average of Braintree, Colchester and Tendring LPA. Uplifted to 8ha per 1000 people as advised by the NEA.	Assuming a population of 30,000 (2.4/unit). Including; 8ha total open space per 1000 population.	33,600,000

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8	Phase 9	Phase 10
Cumulative Development									
1351	2853	4108	5156	6665	8223	9224	10658	11866	12500
Phased Development									
1351	1502	1255	1048	1509	1558	1001	1434	1208	634
Education									
2FE + EY 7,470,000	2FE + EY 7,470,000	2FE + EY 7,470,000		2FE + EY 7,470,000	2FE + EY 7,470,000		2FE + EY 7,470,000		2FE + EY 7,470,000
	6FE 22,140,000					6FE 22,140,000			
1 1,170,000	1 1,170,000		1 1,170,000	1 1,170,000	1 1,170,000	1 1,170,000	1 1,170,000		1 1,170,000
Healthcare & Community									
2 990,000	2 990,000	1 495,000	2 990,000	2 990,000	1 495,000	2 990,000	2 990,000	1 495,000	2 990,000
2 300,000	2 300,000	2 300,000	2 300,000	2 300,000	2 300,000	1 150,000	2 300,000	2 300,000	1 150,000
11% 972,720	12% 1,081,440	10% 903,600	8% 754,560	12% 1,086,480	12% 1,121,760	8% 720,720	11% 1,032,480	10% 869,760	5% 456,480
1 690,200				1 690,200				1 690,200	
1 539,000					1 539,000				
Open Space									
24.00 3,360,000	52.80 7,392,000	19.20 2,688,000	28.80 4,032,000	52.80 7,392,000	12.00 1,680,000	12.00 1,680,000	12.00 1,680,000	26.40 3,696,000	0.00 -

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**Total Infrastructure Requirements by
Phase – Tendring Colchester Borders**

4.18	Low Pressure Residential Connections			Based on UCML's Utilities Review	Assuming 7,500 nr low pressure residential connections. Includes gas pressure reduction systems and on-site medium pressure mains lay. Excludes off-site mains lay and upstream reinforcements or connection enabling works. Excludes connections to commercial.	3,375,000	23%	17%	17%	12%	21%	10%
							776,250	573,750	573,750	405,000	708,750	337,500
5	Utilities - Off-Site Requirements											
	Electricity											
5.1	132 kV connection to Primary Substation from Colchester Grid substation			Based on AECOM IPPD background work		9,200,000		100%	9,200,000			
5.2	Adoption of existing overhead electricity transmission infrastructure.			Based on UCML's Utilities Review	Diversion financially unfeasible	Excluded						
5.3	Electricity Diversion Works			Based on UCML's Utilities Review		1,500,000	100%	1,500,000				
	Potable Water											
5.4	Connection to closest feasible supply source with capacity (e.g. trunk main or reservoir)			Based on AECOM IPPD background work		4,100,000	100%	4,100,000				
5.5	Budget cost per lowering of the Affinity Water 12" AC Distribution Water Main to accommodate a site entrance.	3	Site Entrances	75,000	Based on UCML's Utilities Review	Assuming lowering of the distribution water main to accommodate site entrances within Brightlingsea Road, Elmstead Road and Colchester Road.	225,000	100%	225,000			
	Waste Water / Foul Water											
5.6	Upgrades to water course discharges			Based on AECOM IPPD background work	Allowance for environmental enhancement / EA regulations. Note: Does not account for university student population	1,050,000	100%	1,050,000				
5.7	Connection to existing waste water treatment works via new pumping station - primary and secondary collection networks			Based on AECOM IPPD background work	Pumped to Colchester WRC (5.2 km pipeline). Note: Does not account for university student population.	5,300,000	100%	5,300,000				
	Gas											
5.8	Extension to Medium Pressure network			Based on AECOM IPPD background work	2 km pipeline based on £1.022m/km	2,044,000	100%	2,044,000				
5.9	1 No. Medium to Low Pressure reducing station			Based on AECOM IPPD background work		635,000	1731	1874	1863	1472	1277	783
5.10	Re-routing of 12" Medium Pressure Gas Main through the new on-site road network	1	Station	635,000	Based on UCML's Utilities Review		122,089	132,249	131,403	103,886	90,170	55,203
	Telecommunications											
5.11	Development of access chambers for BT Telecoms network, BT Openreach fibre optic network and private telecoms network throughout development.			Based on AECOM IPPD background work		2,150,000	23%	17%	17%	12%	21%	10%
5.12	Openreach diversion works associated with Mount Pleasant and Allen's Farm off Tye Road.			Based on UCML's Utilities Review		95,000	494,500	365,500	365,500	258,000	451,500	215,000
5.13	Openreach diversion works associated with highway works on the A133.			Based on UCML's Utilities Review		200,000	100%	95,000				
	Transport											
6.1	New signalled access onto A133 (primary access to site) (TCB2a)		% of total provision		Based on AECOM IPPD background work, amendments to these costs as advised by the NEA.		100%					

6.2	Secondary signalised access onto A133 (TCB2b)		% of total provision		Based on AECOM IPPD background work, amendments to these costs as advised by the NEA.		2,500,000		2,500,000						
							2,500,000			100%					
6.3	Interim highways improvements measures (including improvements to Greenstead roundabout and A133 Hare Green roundabout) (TCB3)		% of total provision		Based on AECOM IPPD background work, amendments to these costs as advised by the NEA.										
							3,000,000			100%					
6.4	A120-A133 Link Road (TCB1)		% of total provision		Based on Jacobs HIF review & funding bid										
							41,000,000			100%					
6.5	On site RTS route and related improvements/facilities (TCB4)		% of total provision		Based on Jacobs RTS Study 2019	Cost relates to higher investment scenario. Low end of the range (as allowances for risk/contingency added separately). Allowance as a proportion of overall funding requirements.									
							16,600,000			20%	20%	20%	20%	20%	0%
6.6	Contribution to provisions of off site RTS network (TCB5)		% of total provision		Based on Jacobs RTS Study 2019	Cost relates to higher investment scenario. Low end of the range (as allowances for risk/contingency added separately). Allowance as a proportion of overall funding requirements.									
							38,100,000			27%	30%	14%	14%	15%	0%
6.7	Park & Ride facilities and interchange with RTS (TCB6)		% of total provision		Based on Jacobs RTS Study 2019	To provide for interchange between modes, including provision of park & ride (as appropriate)									
										50%		50%			
6.8	Upgrade existing walking / cycling infrastructure (TCB7a)		% of total provision		Based on AECOM IPPD background work, amendments to these costs as advised by the NEA.										
							3,150,000			50%	50%				
6.9	Various combined segregated pedestrian / cycle "Greenways" through site (TCB7b)		% of total provision		Based on AECOM IPPD background work, amendments to these costs as advised by the NEA.										
							1,890,000			23%	17%	17%	12%	21%	10%
6.10	Internal road network		% of total provision			Required to facilitate access to site (based on no.resi built per phase). Included in enabling costs									
7	Per Unit Contributions														
7.1	Investment in early phase bus/transit services (TCB9)	7,500	% of total provision		Based on AECOM IPPD background work, amendments to these costs as advised by the NEA.	3,710,280 allocated by percentage of units per phase									
							3,710,280			23%	17%	17%	12%	21%	10%
7.2	Travel plan measures (smarter choices, car clubs, charging points, etc) - Straight Line Cost Over Time	7,500	% of total provision	500	Allowance as advised by the NEA.	Aligned to Modal Shift analysis (ITP). Delivered from day one with funding annually - based on £500 cost per unit.									
							3,750,000			23%	17%	17%	12%	21%	10%
7.3	Open Space Endowment	7,500	% of total provision	2,100	Allowance as advised by the NEA.	£/unit									
							15,750,000			23%	17%	17%	12%	21%	10%
7.4	Employment Space	7,500	% of total provision	1,000	Allowance as advised by the NEA.	£/unit									
							7,500,000			23%	17%	17%	12%	21%	10%
	Subtotal Total Cost Per Phase						407,513,680			1,725,000	1,275,000	1,275,000	900,000	1,575,000	750,000
	Plus Professional fees at 10%			10%						9,282,923	14,797,213	5,265,807	4,334,946	5,114,930	1,956,180
	Plus Contingency at 10%			10%						10,210,522	16,276,934	5,792,388	4,768,440	5,626,423	2,151,798
	Total Scheme Cost Per Phase									112,315,741	179,046,277	63,716,264	52,452,841	61,890,652	23,669,778
	Total costs at 4Q2018 (excluding VAT)									112,315,741	179,046,277	63,716,264	52,452,841	61,890,652	23,669,778
	Accumulative number of units									1442	1562	1552	1227	1065	652
	Total % of units									19%	21%	21%	16%	14%	9%
	Total Cost per Unit									77,889	114,626	41,054	42,749	58,113	36,303

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Total Infrastructure Requirements by
Phase – Colchester Braintree
Borders

Site Preparations and Earthworks																				
4.1	General demolition and site clearance 1,286 ha = m²	12,860,000	m²		1					12,860,000	1,561,571	1,260,280	1,657,103	1,529,728	1,696,295	1,805,911	1,854,902	1,494,210		
4.2	Strategic Earthworks; cut and fill	12,860,000	m²		1					12,860,000	1,561,571	1,260,280	1,657,103	1,529,728	1,696,295	1,805,911	1,854,902	1,494,210		
Highways																				
4.3	Primary and secondary road network	12,860,000	m²		10					128,600,000	15,615,714	12,602,800	16,571,029	15,297,276	16,962,952	18,059,114	18,549,019	14,942,095		
Drainage																				
4.4	Foul and surface water network	12,860,000	m²		2					25,720,000	3,123,143	2,520,560	3,314,206	3,059,455	3,392,590	3,611,823	3,709,804	2,988,419		
Landscaping																				
Cost captured in open-space																				
Noise attenuation																				
Cost captured in open-space																				
Waste Management																				
4.7	Provision for recycling on site, excluding new amenities	21,000	Nr		250					5,250,000	637,500	514,500	676,500	624,500	692,500	737,250	757,250	610,000		
Energy																				
4.8	104 No. 11 kV to 400 V distribution substations	104	Substations		315,000					32,760,000	3,978,000	3,210,480	4,221,360	3,896,880	4,321,200	4,600,440	4,725,240	3,806,400		
4.9	12 No. 11 kV ring circuits from primary substation to connect to distribution substations.	12	Ring Circuits		315,000					3,780,000	459,000	370,440	487,080	449,640	498,600	530,820	545,220	439,200		
4.10	400 V LV circuits from distribution substations to end users	21,000	Circuits/Unit		1,300					27,300,000	3,315,000	2,675,400	3,517,800	3,247,400	3,601,000	3,833,700	3,937,700	3,172,000		
4.11	Residential Electricity Connections					Based on UCML's Utilities Review		Assuming 21,000 nr residential connections. Excludes off-site mains lay from the POC location and any upstream reinforcement. Excludes connections to commercial.												
										34,125,000	15%	12%	15%	13%	14%	18%	13%	0%		
4.12	Budget cost per Low Voltage (LV) Service Disconnection		Unit		1,800	Based on UCML's Utilities Review		Number of existing properties within the core development area likely to be demolished is unknown.			5,118,750	4,095,000	5,118,750	4,436,250	4,777,500	6,142,500	4,436,250	-		
Potable water																				
4.13	New network of distribution pipework	21,000	Network		1,300					27,300,000	3,315,000	2,675,400	3,517,800	3,247,400	3,601,000	3,833,700	3,937,700	3,172,000		
4.14	Water mains, connections and infrastructure charges							Assuming the supply of 21,000 nr dwellings. Excluding Infrastructure charge inflations. Excluding connections to commercial.												
										32,900,000	15%	12%	15%	13%	14%	18%	13%	0%		
											4,935,000	3,948,000	4,935,000	4,277,000	4,606,000	5,922,000	4,277,000	-		
Waste Water																				
4.15	New network of collection pipework	21,000	Network		1,300					27,300,000	3,315,000	2,675,400	3,517,800	3,247,400	3,601,000	3,833,700	3,937,700	3,172,000		
4.16	Plot connections for all properties to waste water distribution network	21,000	Connections		500					10,500,000	1,275,000	1,029,000	1,353,000	1,249,000	1,385,000	1,474,500	1,514,500	1,220,000		
Gas																				
4.17	Low Pressure Residential Connections					Based on UCML's Utilities Review		Assuming 21,000 nr low pressure residential connections. Includes gas pressure reduction systems and on-site medium pressure mains lay. Excludes off-site mains lay and upstream reinforcements or connection enabling works. Excludes connections to commercial.												
										8,720,250	15%	12%	15%	13%	14%	18%	13%	0%		
											1,308,038	1,046,430	1,308,038	1,133,633	1,220,835	1,569,645	1,133,633	-		
Utilities - Off-Site Requirements																				
5.1 New 2 x 125 MVA Primary Substation																				
			MVA			Based on AECOM IPPD background work				22,860,000			100%							
													22,860,000							
5.2 12km 132 kV Overhead Line connection to Colchester substation																				
			% of total provision			Based on AECOM IPPD background work Based on 12km line at £1.022m per Km				12,270,000			100%							
											12,270,000		12,270,000							
5.3 Electricity Diversion Works																				
						Based on UCML's Utilities Review				3,700,000			100%							
											3,700,000		3,700,000							
Potable Water																				
5.4	Connection to closest feasible supply source with capacity (e.g. trunk main or reservoir)					Based on AECOM IPPD background work				4,100,000			100%							
											4,100,000		4,100,000							
5.5 Budget cost per lowering of a 100mm distribution water main to accommodate a site entrance.																				
			Site Entrance		15,000	Based on AECOM IPPD background work														
Waste Water / Foul Water																				
5.6	Upgrades to water course discharges / Surface Water		upgrades			Based on AECOM IPPD background work				2,175,000			100%							
											2,175,000		2,175,000							
5.7 13km connection to existing waste water treatment works																				
						Based on AECOM IPPD background work				13,300,000			100%							
											13,300,000		13,300,000							
Gas																				
5.8	Upgrade to low pressure gas mains					Based on AECOM IPPD background work				5,325,000			100%							
											5,325,000		5,325,000							
5.9 1 No. Medium to Low Pressure reducing station																				
			1 Station		635,000	Based on AECOM IPPD background work				635,000			100%							
											635,000		635,000							
5.10 Budget cost per lowering of a 180mm Low Pressure Gas Main to accommodate a site entrance.																				
			2 Site Entrance		26,000	Based on UCML's Utilities Review		Assuming 2nr site entrances					100%							
													52,000							
5.11 Budget cost per lowering of a 225mm Medium Pressure Gas Main to accommodate a site entrance.																				
			2 Site Entrance		54,000	Based on UCML's Utilities Review		Assuming 2nr site entrances					100%							
													108,000							
Telecommunications																				
5.12	Development of access chambers for BT Telecoms network, BT Openreach fibre optic network and private telecoms network throughout development					Based on AECOM IPPD background work				5,440,000										
5.13 Budget cost per fibre provider for the diversion of underground apparatus at a single location.																				
			3 nr		130,000	Based on UCML's Utilities Review		Assuming 3nr providers					12%	10%	13%	12%	13%	14%	12%	
											660,571	533,120	700,983	647,101	717,562	763,931	784,655	632,076		
											390,000		390,000							

5

Assumptions

Assumptions

Education;

Primary Schools, Secondary Schools and Early Years Facilities:

- Requirement based on the design information in AECOM's IPPD Draft Report dated July 2019.
- Assumes 210 places per FE for Primary Schools.
- Assumes 150 places per FE for Secondary Schools.
- Assumes a 20% uplift to Secondary School rates to account for 6th Form provisions.
- Assumes 56 places per facility for Early Years.
- A 2FE Primary School with 56 place Early Years facility (2FE + EY) assumes a cost of 2FE Primary plus the cost of a standalone 56 place Early Years facility.
- The phasing of the costs is based on the phasing as provided in AECOM's IPPD Draft Report dated July 2019.
- We have based our estimated cost per education facility on Gleeds benchmark information as appended to this report. See Appendix, A and B.
- Costs exclude risk and professional fees.

Health and Community:

GPs:

- Assumes a population per household rate in line with the Office for National Statistics (ONS, 2017) average of 2.4 persons per household, generating a population of 30,000 people in West of Braintree, 18,000 people in Tendring Colchester Borders and 50,400 people in Colchester Braintree Borders.
- Assumes 1800 people per GP, as defined by the NHS. Outlined in West of Braintree Social Infrastructure Standards EXD/013E, Tendring Colchester Borders Social Infrastructure Standards EXD/013B and Colchester Braintree Borders Social Infrastructure Standards EXD/013C on Braintree Council's Website.
- Assumes an allocation of 165m² of healthcare space per GP as per AECOM's IPPD background work.
- The phasing of the costs is based on the phasing as provided in the AECOM's IPPD background work.
- We have based our estimated cost per healthcare facility on Gleeds benchmark information as appended to this report. See Appendix C.
- Costs exclude risk and professional fees.

Dentists:

- Assumes a population per household rate in line with the Office for National Statistics (ONS, 2017) average of 2.4 persons per household, generating a population of 30,000 people in West of Braintree, 18,000 people in Tendring Colchester Borders and 50,400 people in Colchester Braintree Borders.
- Assumes 1760 people per Dentist, as defined by the existing ratio of Dentists to population across England 2015. Outlined in West of Braintree Social Infrastructure Standards EXD/013E, Tendring Colchester Borders Social Infrastructure Standards EXD/013B and Colchester Braintree Borders Social Infrastructure Standards EXD/013C on Braintree Council's Website.
- Assumes an allocation of 50m² of healthcare space per Dentist as per AECOM's IPPD Background Work.
- The phasing of the costs is based on the phasing as provided in the AECOM's IPPD Background Work.
- Costs exclude risk and professional fees.

Community Space and Libraries:

- Assumes a population per household rate in line with the Office for National Statistics (ONS, 2017) average of 2.4 persons per household, generating a population of 30,000 people in West of Braintree, 18,000 people in Tendring Colchester Borders and 50,400 people in Colchester Braintree Borders.
- Assumes 30m² of Library Space per 1000 people as defined by Essex County Council Social Infrastructure Standards, Arts Council. Outlined in West of Braintree Social Infrastructure Standards EXD/013E, Tendring Colchester Borders Social Infrastructure Standards EXD/013B and Colchester Braintree Borders Social Infrastructure Standards EXD/013C on Braintree Council's Website.
- Assuming 60 m² of Community Space per 1000 people as advised by the NEA.
- Assumes provision of 1800m² facilities based on AECOM's IPPD Background Work for libraries at 600m² facilities, proportionally increased to include community space.
- The phasing of the costs is based on the phasing as provided in AECOM's IPPD Background Work.
- As advised by the NEA, Community Space and Library costs have been phased in accordance with unit delivery.
- Costs exclude risk and professional fees.

4 Court Sport Centres:

- Assumes a population per household rate in line with the Office for National Statistics (ONS, 2017) average of 2.4 persons per household, generating a population of 30,000 people in West of Braintree, 18,000 people in Tendring Colchester Borders and 50,400 people in Colchester Braintree Borders.
- Assumes 0.072 facilities per 1000 people, as defined by Essex County Council Social Infrastructure Standards, Colchester SPG Provision of Open Space, Sport and Recreational facilities 2006. Outlined in West of Braintree Social Infrastructure Standards EXD/013E, Tendring Colchester Borders Social Infrastructure Standards EXD/013B and Colchester Braintree Borders Social Infrastructure Standards EXD/013C on Braintree Council's Website.
- Assumes provision of 476m² facilities based on AECOM IPPD Background Work.
- The phasing of the costs is based on the phasing as provided on AECOM's IPPD Background Work.
- Costs exclude risk and professional fees.

4 Lane Swimming Pools:

- Assumes a population per household rate in line with the Office for National Statistics (ONS, 2017) average of 2.4 persons per household, generating a population of 30,000 people in West of Braintree, 18,000 people in Tendring Colchester Borders and 50,400 people in Colchester Braintree Borders.
- Assumes 0.048 facilities per 1000 people, as defined by ECC Social Infrastructure Standards, Colchester SPG Provision of Open Space, Sport and Recreational facilities 2006. Outlined in West of Braintree Social Infrastructure Standards EXD/013E, Tendring Colchester Borders Social Infrastructure Standards EXD/013B and Colchester Braintree Borders Social Infrastructure Standards EXD/013C on Braintree Council's Website.
- Assumes provision of 245m² facilities based on AECOM's IPPD Background Work.
- The phasing of the costs is based on the phasing as provided in AECOM's IPPD Background Work.
- Costs exclude risk and professional fees.

Open Space:

- Assumes a population per household rate in line with the Office for National Statistics (ONS, 2017) average of 2.4 persons per household, generating a population of 30,000 people in West of Braintree, 18,000 people in Tendring Colchester Borders and 50,400 people in Colchester Braintree Borders.
- Based on ECC Social Infrastructure Standards outlined in West of Braintree Social Infrastructure Standards EXD/013E, Tendring Colchester Borders Social Infrastructure Standards EXD/013B and Colchester Braintree Borders Social Infrastructure Standards EXD/013C on Braintree Council's Website.
- Uplifted to 8ha per 1000 population as advised by the NEA.
- Assumes a blended rate across the open space.

- The phasing of the costs is based on the phasing as provided in AECOM's IPPD Background Work.
- Costs exclude risk and professional fees.

Environment/Waste:

- Allowance of £500/unit to include noise attenuation and on-site recycling points.
- Covers 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.
- Costs exclude risk and professional fees.

Site-Wide Enabling Costs

- Based on the requirements outlined in AECOM's IPPD Background Work and UCML guidance on utilities provisions.
- Site-Wide Enabling Costs are based on the Core Developable areas as outlined in AECOM's IPPD Draft Report dated July 2019. We have included an additional 10% of the core developable area as an allowance for works outside of the core developable area and within the site boundary.
- In the case of Tendring Colchester Borders (TCB), the site area is less the University area of 15.4ha and the Park & Ride area South of the A133 of 2.78ha which will be brought forward separately to the core Garden Community as advised by the NEA.
- Costs exclude risk and professional fees.

Utilities

- Based on the requirements outlined in AECOM's IPPD Background Work and UCML guidance on utilities provisions.
- In the absence of phasing information associated with the UCML items, we have assumed that residential connection costs are phased by unit delivery and all other costs are attributed to Phase 1.
- We have assumed 5nr site entrances to West of Braintree (Site 1), 3nr site entrances to Tendring Colchester Borders (Site 2) and 4nr Site Entrances to Colchester Braintree Borders (Site 3).
- We have assumed 3nr fibre providers for each site.
- Costs exclude risk and professional fees.

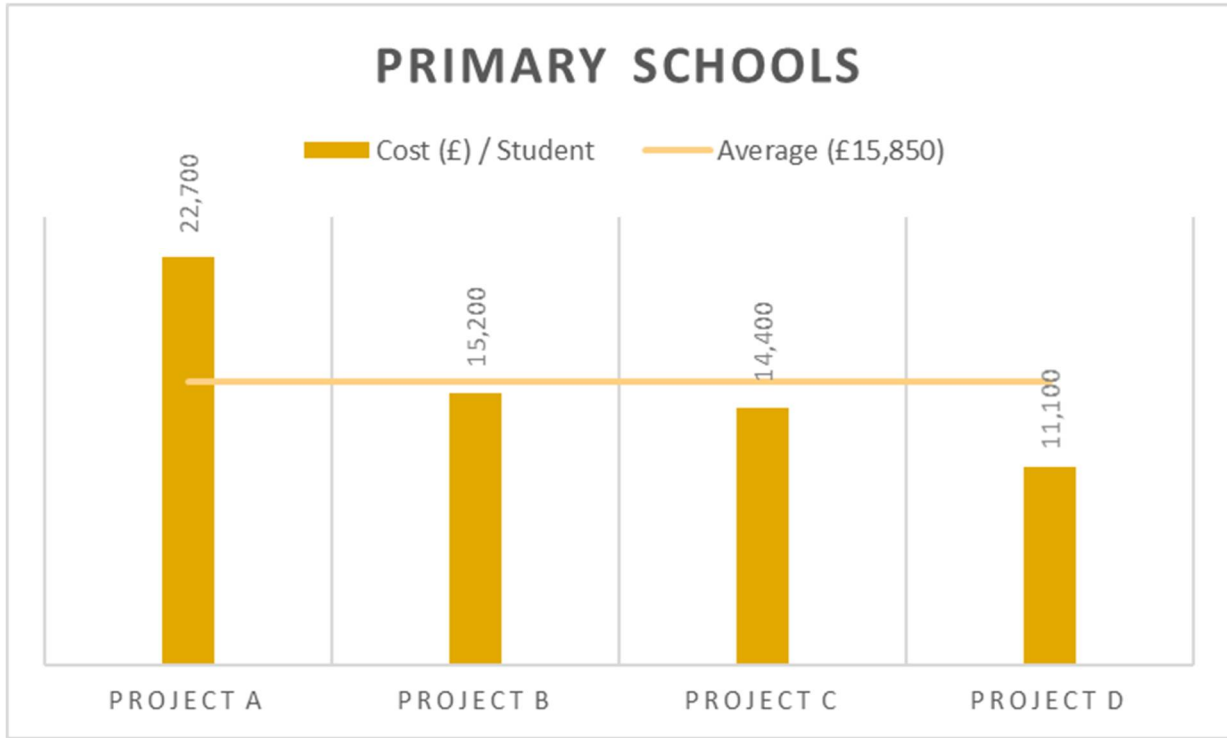
Transport

- Transport costs are based on AECOM's IPPD Background Work. Some amendments have been made to the design as advised by the NEA.
- Rapid Transit System Costs are as advised in the Essex Highways - Rapid Transit System for North Essex: From vision to plan document dated July 2019.
- RTS Costs are based on the lower end of the range provided for the higher investment scenario. It is assumed that these costs exclude risk and professional fees.
- Per unit contributions are as advised by the NEA.
- Costs exclude risk and professional fees.

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Appendix A

Benchmark Data Primary School

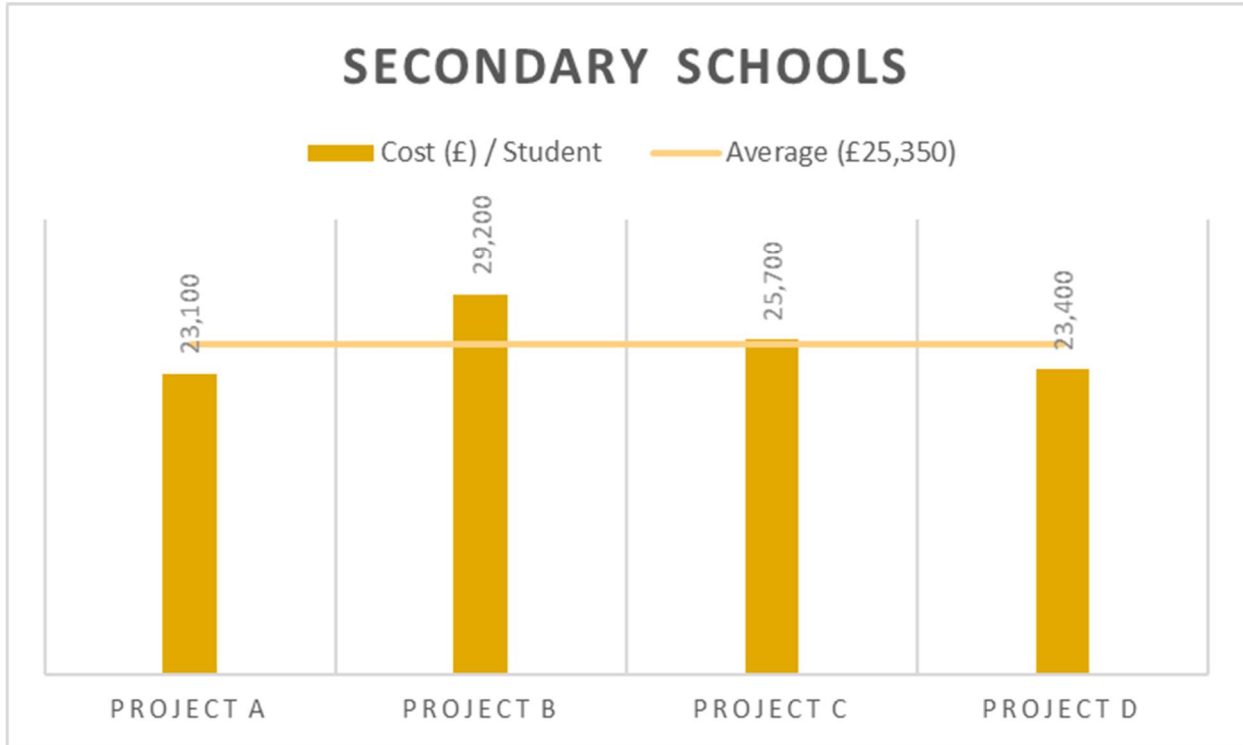


Project A	The construction of a new two storey primary school to accommodate 315 pupils
Project B	New modular build 2FE primary school
Project C	New build single storey primary school to accommodate 420 pupils
Project D	New modular build primary free school to accommodate 420 pupils

Please note: Costs exclude risk and professional fees.

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Appendix B
Benchmark Data Secondary
Schools



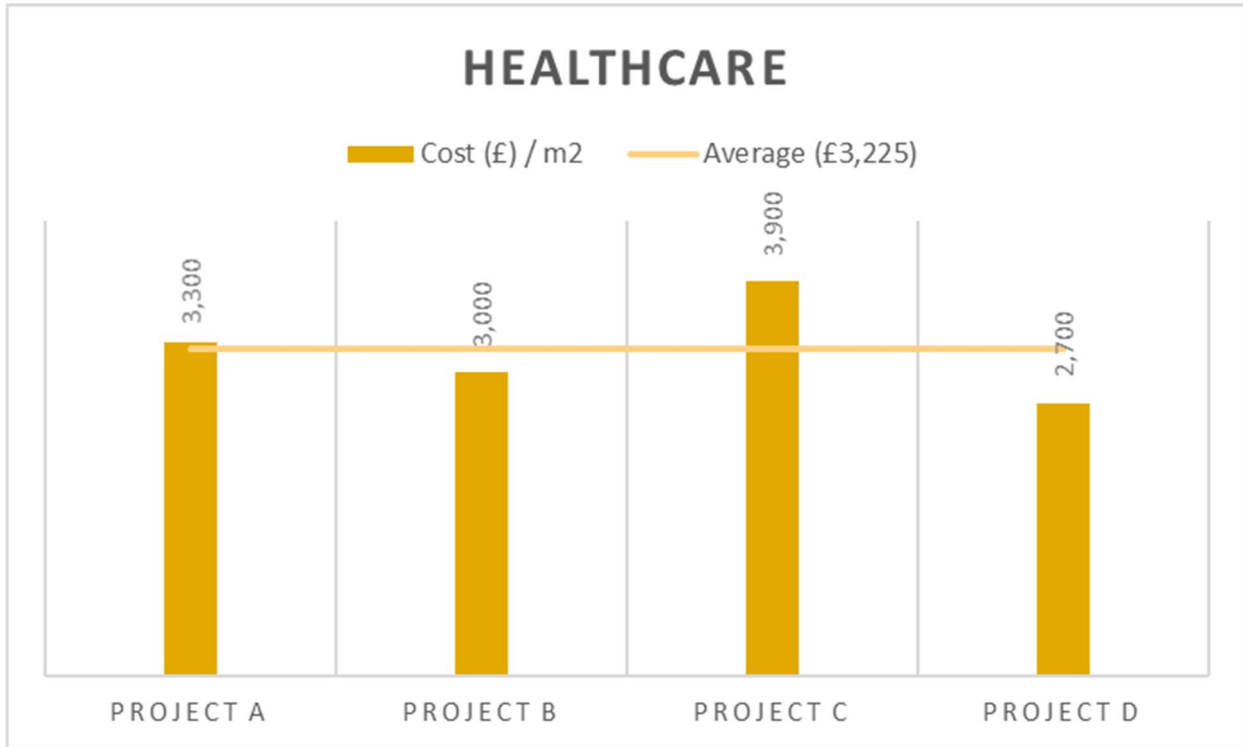
Project A	New build secondary school to accommodate up to 1300 pupils
Project B	New build secondary school to accommodate up to 1150 pupils
Project C	New build secondary school to accommodate up to 1229 pupils
Project D	A new build medium sized skill Academy for up to 1,232 pupils

Please note: Costs exclude risk and professional fees.

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Appendix C

Benchmark Data: Healthcare



Project A	New build 'Health Park' to accommodate a range of primary and community services
Project B	The construction of two single storey health centre with associated car parking, landscaping and servicing provisions
Project C	New Build GP Clinic
Project D	New Build Medical Centre



Appendix D

Schedule of Information Used

Document	Author	Date
North Essex Garden Communities - Infrastructure Planning, Phasing and Delivery Draft Report (IPPD Background Work)	AECOM	Up to July 2019
EXD/013E AECOM Benchmark Social Infrastructure Standards (Site 1 - West of Braintree)	AECOM	
EXD/013B AECOM Benchmark Social Infrastructure Standards (Site 2 - Tendring Colchester Borders)	AECOM	
EXD/013C AECOM Benchmark Social Infrastructure Standards (Site 3 - Colchester Braintree Borders)	AECOM	
The Essex County Council Developers' Guide to Infrastructure Contributions	Essex County Council	2016
North Essex Garden Communities - Concept Feasibility Study. Volume 3 - Garden Communities Concept Options & Evaluation	AECOM	Jun-16
EB/013/1/2 North Essex Local Plans (Section 1) Viability Assessment Main Report	Hyas	Apr-17
Essex Highways - Rapid Transit System for North Essex: From vision to plan	Essex County Council, Ringway Jacobs	2017
UCML Utilities Review	UCML	2019

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Appendix E

Social Infrastructure Requirements

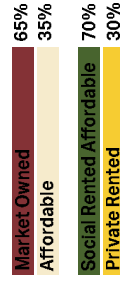
Social Infrastructure Requirements

Social infrastructure will form an integral part of any future Garden Community. The provision of recreation, culture, health, education and community facilities ensures that residents' well-being is enhanced and walkable, vibrant and accessible communities created. As such, an indicative understanding of the likely social infrastructure requirements of the Garden Community is important to determine with respect to generating a cost estimation for use in the viability assessment. For this exercise AECOM's Social Infrastructure Model (SIF) was used (with the exception of education calculations), with the following assumptions and standards applied.

The following household and tenure assumptions have been applied to assess the population impacts of the proposed housing growth across each site and option.

Housing Tenure Mix

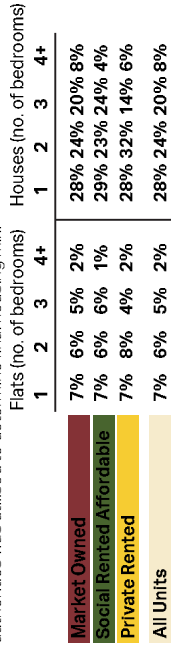
Housing tenure mix was determined based on a review of the housing mix assumptions from policy or evidence base of each local authority.



Housing Size Mix

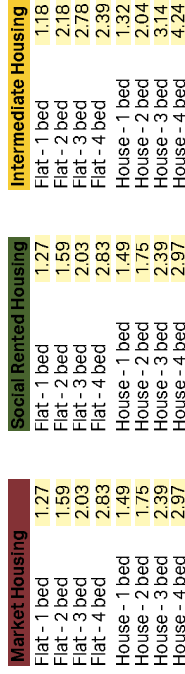
Assumption that 80% of future dwellings would be houses and 20% flats - reflecting current ratio in Essex County.

To determine the housing size mix, a review of the SHMA for Colchester and Braintree allowed for the identification of a target tenure. The average between both local authorities was utilised to determine final housing mix.



Average Household Size by Unit Type

The average household size was determined by utilising the 2011 Census data by collating all three local authorities, to ensure appropriate proportions of households and population are accounted for.



Social Infrastructure Standards

The Household tenure, size and mix assumptions have been used to inform the population profiles of each site and development option. These have been assessed against the following bespoke list of planning standards from a list of national and local resources.

Topic	Standard	Ref.
Early Years	early year demand per 2 bed+ Flat	Essex County Council - Developers' Guide to Infrastructure Contributions 2016
	early year demand per 2 bed+ House	0.090
	places per nursery	56
Primary Schools**	Sq.m per 56 place nursery	337
	Pupil Demand per 2 bed+ Flat	0.150
	Pupil Demand per 2 bed+ House	0.300
Secondary Schools**	Primary School Pupils in 1 Form Entry	210
	Pupil Demand per 2 bed+ Flat	0.100
	Pupil Demand per 2 bed+ House	0.200
Sixth Form	Secondary School Pupils in 1 Form Entry	150
	Proportion of 16-17 year olds in Sixth Form	32%

Topic	Standard	Ref.
Primary Health Centre	People per GP	1,800
Dental Practice	People per Dentist	1,760
Acute Hospital	People per Bed	510
Library Space; based on branch	Sq.m per 1,000 person	30
Police Station	Population per Station	25
Fire Station	Population per Station	1,180
Ambulance Station	Population per Station	65
Indoor Sports Facility (4 court hall)	facility per 1,000 person	0.072
Swimming Pool (4 lanes)	facility per 1,000 person	0.048
Natural Green Space	ha per 1,000 person	2.000
Outdoor Sports	ha per 1,000 person	1.530
Parks and Gardens	ha per 1,000 person	1.320
Amenity Green Space	ha per 1,000 people	0.883
Allotments	ha per 1,000 people	0.227
Children's Playspace (Informal)	ha per 1,000 people	0.208
Children's Playspace (formal)	ha per 1,000 people	0.142
Green Corridor	ha per 1,000 person	0.750

** Bespoke Essex County Council Standards Applied