



bmd renewables

KENNET CENTRE NEWBURY

*Initial Geo-Exchange System
Cost Estimate v2 October 24*

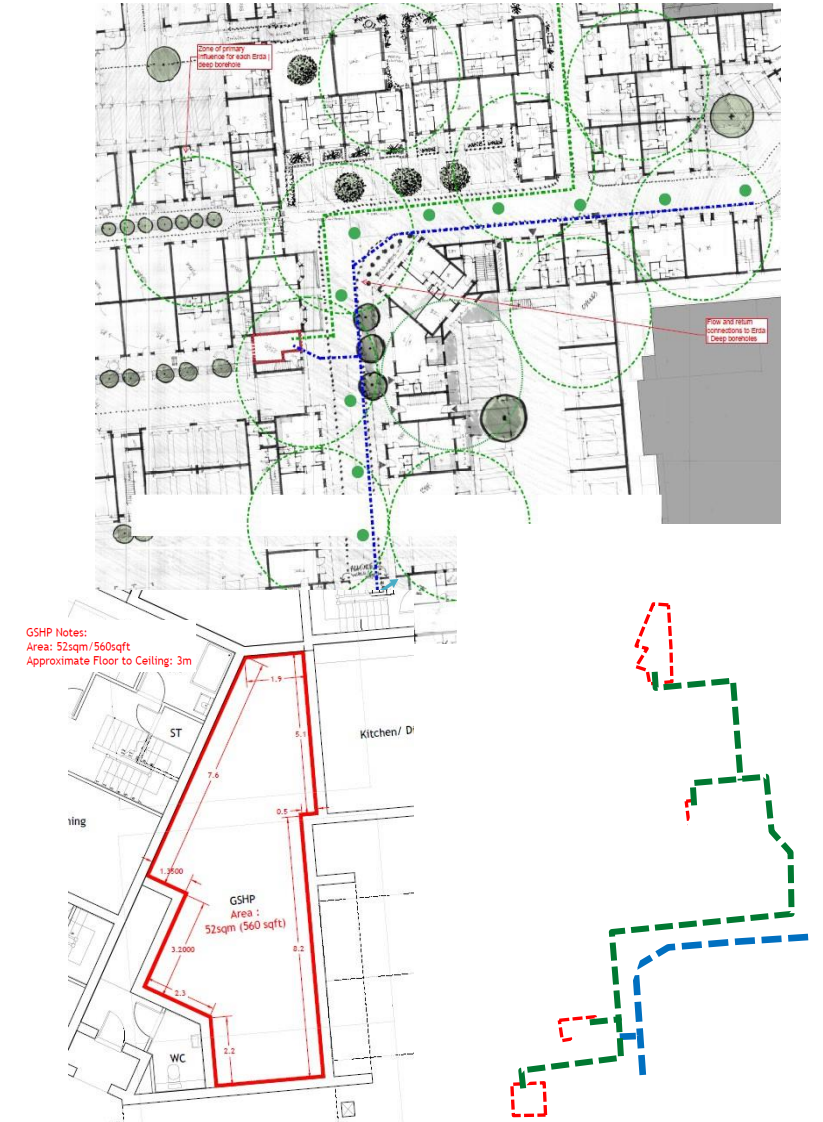
BASIS OF ESTIMATE

- BMD Renewables and Erda have been asked to produce a concept design and initial cost estimate for a heat network to serve the proposed 317 unit residential and retail development at Kennet Centre Newbury
- Further details of our concept design can be found in the document 'Kennet Cntr Erda GeoExc Concept rev3 Oct 24'.
- In summary our proposal is for a system designed by Erda Energy Ltd and implemented by BMD renewables based on Erda's Geo-Exchange technology including:
 - 22 No 300m deep Erda | Deep Borehole Heat Exchangers
 - 300m of Flowlines to connect the Boreholes to 4 No plantrooms
 - Phased installation of 4 No Plantrooms three housing 364kw R134a heat pumps with c1000litres of buffer storage and one housing network distribution pumps Each plantroom connects to a single flow and return circuit (by others) to distribute heat at 65°C
- The estimate excludes:
 - Distribution pipework from the plantrooms to residential units
 - All systems within each unit including Heat Interface Units and secondary systems
 - Prelims assumed to be provided by the Main Contractor including site accommodation, management & security and discharge licences



ESTIMATE

- Based on the assumptions above BMD Renewables estimates costs to implement the proposed design at between **£3.4m and £3.9m** excld VAT
- This is broken down approximately as follows:
 - Design and Prelims – 7%
 - Boreholes and Flowlines – 45%
 - Heat Pumps and associated plant – 48%
- The estimate allows for 5% distribution losses and assumes three phases of installation across three years
 - Phase 1 – Boreholes, Flowlines and First and Network Plantroom
 - Phase 2 – Second Plantroom
 - Phase 3 – Third Plantroom
- Moving from an estimate to a firm offer would typically include three further design phases (RIBA 2 through 4) with fee estimates estimated at between £40 to £60k. These costs are included in the total system cost estimates above.



ENERGY COSTS

- Costs have been calculated for the annual and effective cost per kWh of heat delivered from heat pumps when compared to a gas counterfactual.
- Assumptions and rationale
 - Both Heat Pumps and Gas are configured as a centralised heat network supplying heat at 65°C to HIUs in each residential unit. Distribution losses are the same for each option.
 - Energy costs based on figures published by the Dept. for Energy Security and Net Zero in March 24. In both cases figures used are average annual prices in 2023 for 'very small' end customers. These are:
 - Electricity – 32.28 p/kWh
 - Gas – 10.15p/kWh
 - Costs for Heat pumps are calculated by applying a CoP of 3.75. Boilers efficiency is 85%.
 - Energy Demand, Network pumping costs (for Heat Pumps and Gas) and Erda|Deep pumping costs (Heat Pumps only) are calculated as follows

	Heating Hot Water		Losses	Primary Energy Total	Network Pumping	Erda Deep Pumping
Dwelling Type	kWh		kWh	kWh	kWh	kWh
House	3,117	3,288	320	6,725	67	101
Maisonette	1,994	3,212	260	5,466	55	82
Duplex	1,516	3,108	231	4,855	49	73
Flat	1,126	2,663	189	3,978	40	60

COSTS BY DWELLING TYPE

Using the assumptions above costs for primary energy and heat distribution are calculated below before presenting a total cost for each dwelling type and an effective cost for each kWh delivered.

Dwelling Type	Energy	Network Costs	Total Cost	Cost	Energy £ per	Network Costs	Total Cost	Cost
	Cost Heat Pump	Heat Pump	Heat Pump	per Unit	Cost Gas	Gas	Gas	per Unit
	£ p/a			£ p/kWh	£ p/a	£	£	£ p/kWh
House	£578.91	£99.09	£678.00	£0.10	£978.72	£21.71	£1,000.43	£0.15
Maisonette	£470.54	£80.54	£551.08	£0.10	£795.51	£17.65	£813.15	£0.15
Duplex	£417.94	£71.54	£489.47	£0.10	£706.57	£15.67	£722.25	£0.15
Flat	£342.46	£58.62	£401.09	£0.10	£578.98	£12.84	£591.82	£0.15