ELSICK DEVELOPMENT COMPANY

Chapelton of Elsick

Energy Statement

rsp consulting engineers

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1.0 INTRODUCTION

RSP Consulting Engineers LLP were asked by Turner Townsend Project Management to present an Energy Statement in support of the development at Chapelton of Elsick, Aberdeenshire.

When completed the development will comprises up to 4045 new dwellings, associated community facilities and extensive commercial development. A full breakdown of the areas of use types is provided in Figure 1.0.1.

Development Type	Floor Area (no. of dwellings)
Dwellings	4045 dwellings
Retail~~Community and Schools~~	18~~26~~,171~~755~~ m²
Finance and Profession~~Office~~	1,800~~25,860~~ m²
~~Retail and Other Commercial~~Business (Office)	31~~28~~,339~~342~~ m²
Hotels	3,529 m²
Residential Institution	30 Beds
Non Residential Institution	20,118 m²
Assembly and Leisure	900 m²

Figure 1.0.1: Table of building types and floor areas in development

On 2nd October 2013 Planning Permission in Principle was granted for the entire development and Full Permission was achieved for the first phase comprising 802 units.

The purpose of this Statement is to set out the strategy for demonstrating compliance with national and local policy and conditions attached to the planning permission.

2.0 DRIVERS FOR ENERGY STRATEGY

2.1 NATIONAL POLICY

The Scottish Government has shown a desire to lead the way when it comes to reducing CO2 emissions and in 2009 brought into force the **Climate Change (Scotland) Act.** This along with the associated **Energy Efficiency Action Plan** and **Renewables Policy** set the approach for reducing energy consumption and increasing renewable energy in Scotland in order to respond to climate change.

The 2009 Climate Change Act sets ambitious and legally binding targets to reduce Greenhouse Gas (GHG) emissions by 42% by 2020 and by 80% by 2050 based on 1990 levels.

These emissions reduction targets have paved the way for numerous further strategy and vision documents to be published to show how the targets can be met in each sector. Due to its significant contribution to national GHG emissions and perception of being 'easy to treat' buildings have become a target for policy makers.

The **Outline for a Draft Heat Vision** was published by the Scottish Government in January 2013. This sets out progress and further action required in addressing energy from heat consumption and renewable heat. A key policy highlighted in this document is that on the Scottish Governments approach to biomass:

'The Scottish Government supports the deployment of biomass in heat only or combined heat and power plants, particularly off gas grid and at a scale which maximises heat use and local supply.'

The document refers to a **District Heating Action Plan** document which will be published in the near future.

The main regulatory method the Scottish Government has for improving energy efficiency and reducing the GHG emissions associated with buildings is through the **Building (Scotland) Regulations.** The first standard for CO2 emissions targets for new buildings was introduced in 2007. This requires all new buildings to demonstrate that they meet set targets for CO2 emissions associated with energy use. These standards were revised in 2010 to reduce the CO2 emission target by 30% and will be revised again in 2013/14 and are likely to reduce the standard by a further 43% for non domestic buildings and 21% for domestic buildings, equating to total reductions of 60% and 45% respectively over 2007 standards.

It is expected that a further reduction in the target will be introduced in 2016/17 and may require net zero CO2 emissions from new buildings. This would be in line with the recommendations from the **Low Carbon Building Standards Strategy for Scotland** (The Sullivan Report) which was published in 2007 and recommended the step changes required in Building Regulations in order to recognise zero carbon buildings.

In 2011 a new Section of Building Regulations guidance was introduced in Scotland, **Section 7 Sustainability.** This introduced a rating system for new domestic and non domestic buildings

to demonstrate sustainable design beyond the Building Regulations Standards. Targets are set in terms of CO2 emissions, energy use, water use, materials and acoustics for levels from Bronze to Gold, with a further level of Platinum reserved for future developments in standards.

2.2 LOCAL POLICY

The Aberdeenshire Local Development Plan sets out a vision for the future of the local area up to 2023. It outlines the councils approach to sustainability and low carbon development in line with national principles and targets.

Aberdeenshire Carbon Neutrality in New Developments is a supplementary guide to the Local Development Plan. It has been revised recently and now simply requires new construction to achieve at least a 'Bronze Active' rating under the Section 7 Sustainability. To achieve a 'Bronze Active' rating requires the inclusion of low carbon or renewable technology.

Comment [T&T1]: Does this document not also require very onerous reductions to be met – that was the concern from the house builders

It is noted in the supplementary guidance that this is an interim position only and the council is currently considered how best to achieve carbon neutrality by 2016 for new developments.

2.3 PLANNING CONDITIONS

As explained above, on 2nd October 2013 Planning Permission in Principle (PPiP) was granted for the entire development and Full Permission for Phase 1a. The following condition is attached to the PPiP (Condition 25) and Full Permission (Condition 19):

> *"Prior to the construction of any buildings within a defined phase of the development hereby approved, a finalised Energy Statement shall be submitted to and approved in writing by the Planning Authority, including the following items:*
>
> *b) Full details of the proposed energy efficiency measures and/or renewable technologies to be incorporated into the phase of the development.*
>
> *b) Calculations using the SAP or SBEM methods, which demonstrate that the reduction in carbon dioxide emissions rates for the development, arising from the measures proposed, will enable the development to comply with the Council's Supplementary Planning Guidance on Carbon Neutrality in New Developments, unless otherwise agreed in writing (in this case a reduction in the predicted carbon dioxide emissions by 30% beyond the 2007 Building Regulations Carbon Dioxide Emissions Standard).*
>
> *The respective phase of the development shall not be occupied unless it has been carried out in accordance with the approved details in the Energy Statement. The carbon reduction measures shall be retained in place and fully operational thereafter."*

It is noted that the condition requires 30% beyond the 2007 Building Regulations, which is consistent with the 2010 Building Regulations that are currently in force. It also noted that the 2013/2014 Regulation will exceed the requirements of the planning condition.

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6.0 PROPOSED ENERGY STRATEGY AND LOAD ASSESSMENT

As this is a new development there are no existing heat and power demand profiles for the buildings therefore assumptions have been made based on CIBSE TM46:2008 and allowing for further improvements in thermal performance of buildings over the next five years.

Table 6.0.1 shows the heat and power demands of each phase of the Chapelton development. These are taken from the load schedule provided in Appendix A. The areas and phasing are subject to changes as the masterplan is developed. The peak heat and power figures were derived from predicted utility loads and therefore should be assumed to be worst case figures. More detailed heat profiling would be required for each building before the system can be accurately sized.

Phase of Development	Peak Power Use (kW)	Peak Heat Use (kW)	Total Annual Heat Consumption (kWh)	Timing of Phase
First 255 Dwellings	510	3,365	2,092,956	2014/15
Total Phase 1A	2,629	15,647	6,978,062	2015-17
Phase 1	6,084	32,594	12,659,041	2016-19
Phase 2	3,150	19,186	6,847,172	2019-23
Phase 3	1,770	10,739	3,829,314	2023-25
Phase 4	7,254	28,869	6,017,578	2023-25
Totals	**18,258**	**91,388**	**29,353,105**	

Table 6.0.1: Energy Demands for Each Phase of Development

In order to ensure sufficient base load and diversity in operating hours a summary of development types in each phase is provided in table 6.0.2. This information is taken from the load assessment in Appendix A.

Phase of Development	Number of Dwellings (No.)	Area of Non Domestic Development (m^2)
First 255 Dwellings	255	-
Total Phase 1A	802	11,881
Phase 1	1744	34,091
Phase 2	1320	10,200
Phase 3	740	5,800
Phase 4	241	95,465
Totals	4045	145,556

Table 6.0.2: Floor Area and Number of Dwellings in Each Phase

The table shows that, due to the absence or limited phasing of non-domestic development to balance the load, the first 802 dwellings should be excluded from consideration of a district heating system. It is proposed that the first 802 dwellings will go ahead without a district heating system.

The regulatory and planning requirement for these units (to deliver 30% beyond the 2007 Building Regulation Carbon Dioxide Emission Standards) will be delivered through building fabric improvements and micro-renewables delivered on a building by building basis. Details of these measures will be provided through the Building Warrant process.

As Phase 1 progresses and the loads and the mix of domestic and non-domestic demands increase, the viability of a district heating system will be reviewed. However, the development employment and retail functions in the Town Centre and at Newtonhill will bring significant benefits to the case for a district heating system beyond Phase 1A.

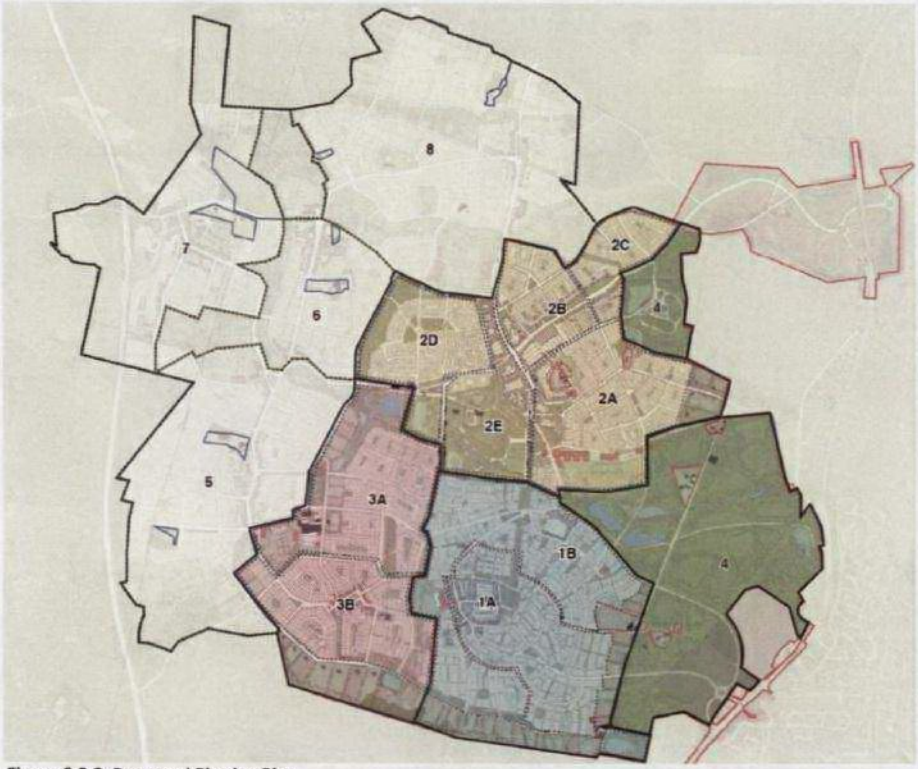

Figure 6.0.3: Proposed Phasing Plan

APPENDIX A LOAD ASSESSMENT

Year	Phase	Building Type	Building Description	Number of Dwellings or Floor Area of Non Residential	Cumulative Number of Dwellings	Gas Consumption (kWh/annum)	Cumulative Gas Consumption (kWh/annum)	Peak Gas Load (kW)	Cumulative Peak Gas Load (kW)	Electricity Consumption (kWh/annum)	Cumulative Electricity Consumption (kWh/annum)	Peak Electricity Load (kW)	Cumulative Peak Electricity Load (kW)
2014	1A	Residential	Low Density (large detached)	150	150	2,404,185 00	2,404,185.00	4,980.00	4,980 00	616,050.00	616,050 00	300.00	300.00
	1A	Residential	Low Density (small detached)	102	252	685,368 60	3,089,553 60	1,683.00	6,663 00	370,770.00	986,820.00	204.00	504 00
2015	1A	Residential	Low Density (small detached)	215	467	1,238,271.00	4,327,824 60	3,547.50	10,210.50	625,220 00	1,612,040.00	430.00	934.00
		Primary School	1FE Calmhill Primary School	3800	-	357,960.00	4,685,784.60	771.40	10,981.90	103,360.00	1,715,400.00	190 00	1,124.00
2016	1A	Residential	Low Density (small detached)	352	819	2,027,308.80	6,713,093.40	5,808.00	16,789.90	1,023,616.00	2,739,016.00	704.00	1,828.00
	1A	Community Building	Community Building	1955	-	175,950.00	6,889,043.40	195.50	16,985.40	62,560.00	2,801,576.00	97.75	1,925.75
	1A	Offices	Office	969	-	69,768.00	6,958,811.40	116 28	17,101.68	73,644.00	2,875,220.00	67.83	1,993.58
	1A	Retail	General Retail	2063	-	-	6,958,811.40	-	17,101.68	272,316.00	3,147,536.00	123.78	2,117.36
	1A	Supermarket	Supermarket	1437	-	90,531.00	7,049,342.40	215 55	17,317.23	459,840.00	3,607,376.00	172.44	2,289.80
	1A	Bars/ Restaurants	Restaurant	1657	-	357,912.00	7,407,254.40	3,761.39	21,078.62	145,816.00	3,753,192.00	372.83	2,662.63
	1B	Residential	High Density (semi)	18	837	88,009.20	7,495,263.60	237.60	21,316 22	44,020.80	3,797,212.80	36.00	2,698.63
2017	1B	Residential	High Density (semi)	370	1207	1,609,078.00	9,304,341.60	4,884.00	26,200 22	904,872.00	4,702,084.80	740.00	3,438.63
2018	1B	Residential	Mixed Housing	370	1577	1,735,337.00	11,039,678.60	4,884.00	31,084 22	841,750.00	5,543,834.80	740.00	4,178.63
2019	1B	Residential	Mixed Housing	184	1761	862,978.40	11,902,657.00	2,428 80	33,513.02	418,600.00	5,962,434.80	368.00	4,546.63
	1B	HQ Office	HQ Office	6767	-	568,428.00	12,471,085.00	812.04	34,325 06	1,501,597.30	7,464,032.10	676.70	5,223.33
	1B	Light Industrial	Light Industrial	3203	-	115,308.00	12,586,393.00	640.60	34,965.66	89,505.10	7,533,537.20	160.15	5,383.48
	1B	Industrial	Industrial	6120	-	306,000.00	12,892,393.00	1,836.00	36,801.66	214,200.00	7,747,737.20	428.40	5,811.88
	1B	Distribution	Distribution	6120	-	195,840.00	13,088,233.00	1,224.00	38,025 66	85,680.00	7,833,417.20	306.00	6,117.88
	2	Residential	Mixed Housing	186	1947	872,358 60	13,960,591.60	2,455.20	40,480 86	423,150.00	8,256,567.20	372.00	6,489.88
2020	2	Residential	Mixed Housing	370	2317	1,735,337.00	15,695,928.60	4,884 00	45,364 86	841,750.00	9,098,317.20	740.00	7,229.88
	2	Primary School	Gillybrand Primary School	3800	-	238,640.00	15,934,568.60	771.40	46,136.26	90,440.00	9,188,757.20	190.00	7,419 88
	2	Secondary School	Gillybrands Community Secondary School	3400	-	217,600.00	16,152,168.60	690 20	46,826.46	85,680.00	9,274,437.20	170.00	7,589 88
2021	2	Residential	Mixed Housing	370	2687	1,735,337.00	17,887,505 60	4,884.00	51,710.46	841,750.00	10,116,187.20	740.00	8,329.88
2022	2	Residential	Mixed Housing	370	3057	1,735,337.00	19,622,842.60	4,884.00	56,594.46	841,750 00	10,957,937.20	740.00	9,069.88
2023	2	Residential	Mixed Housing	24	3081	112,562.40	19,735,405 00	316.80	56,911.26	54,600.00	11,012,537.20	48.00	9,117.88
		Library	Library on Secondary School Campus	1000	-	80,000 00	19,815,405.00	100 00	57,011 26	49,000.00	11,061,537.20	50.00	9,167.88
		Community Building	Community Building	2000	-	120,000 00	19,935,405 00	200.00	57,211.26	56,000.00	11,117,537.20	100.00	9,267.88
	3	Residential	Mixed Housing	346	3427	1,622,774 60	21,558,179.60	4,567 20	61,778.46	787,150 00	11,904,687.20	692.00	9,959.88
2024	3	Residential	Mixed Housing	370	3797	1,735,337.00	23,293,516 60	4,884.00	66,662.46	841,750.00	12,746,437.20	740.00	10,699.88
		Community Building	Community Building	2000	-	120,000.00	23,413,516.60	200.00	66,862 46	56,000.00	12,802,437.20	100.00	10,799.88
		Primary School	Newhall Primary School	3800	-	238,640 00	23,652,156 60	771.40	67,633.86	90,440.00	12,892,877.20	190.00	10,989.88
2025	3	Residential	Mixed Housing	24	3821	112,562.40	23,764,719.00	316 80	67,950 66	54,600.00	12,947,477.20	48.00	11,037.88
	4	Residential	Mixed Housing	241	4062	1,130,314.10	24,895,033.10	3,161.20	71,131.86	548,275.00	13,495,752 20	482.00	11,519.88
	4	Medical Centre	Medical Centre	5000	-	400,000.00	25,295,033 10	625.00	71,756.86	245,000.00	13,740,752.20	250.00	11,769.88
	4	Hotel	Hotel	100	-	742,400 00	26,037,433.10	2,030.00	73,786.86	487,200.00	14,227,952.20	348.00	12,117.88
	4	Supermarket	Supermarket	5500	-	231,000.00	26,268,433.10	825.00	74,611.86	1,540,000 00	15,767,952 20	660.00	12,777.88
	4	General Retail	General Retail	6445	-	-	26,268,433.10	-	74,611.86	744,397.50	16,512,349.70	386.70	13,164.58
	4	Bars/ Restaurants	Bars/Restaurants	3910	-	563,040.00	26,831,473.10	8,675.70	83,487.56	301,070 00	16,813,419.70	879.75	14,044.33
	4	Financial/Prof Services	Financial/Prof Services	1530	-	-	26,831,473.10	-	83,487.56	149,940.00	16,963,359.70	107.10	14,151.43
	4	Offices	Offices	13160	-	631,680.00	27,463,153 10	1,579.20	85,066.76	875,140.00	17,838,499.70	921.20	15,072.63
	4	HQ Office	HQ Office	4963	-	416,892.00	27,880,045 10	595.56	85,662.32	1,101,289.70	18,939,789.40	496.30	15,568.93
	4	Light Industrial	Light Industrial	22637	-	814,932.00	28,694,977.10	4,527.40	90,189.72	491,222.90	19,431,012 30	1,131.85	16,700 78
	4	Industrial	Industrial	13260	-	663,000.00	29,357,977.10	3,978.00	94,167.72	464,100.00	19,895,112.30	928 20	17,628 98
	4	Distribution	Distribution	13260	-	424,320.00	29,782,297.10	2,652.00	96,819.72	185,640 00	20,080,752 30	663.00	18,291 98
				Totals		29,782,297.10		96,819.72		20,080,752.30		18,291 98	

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