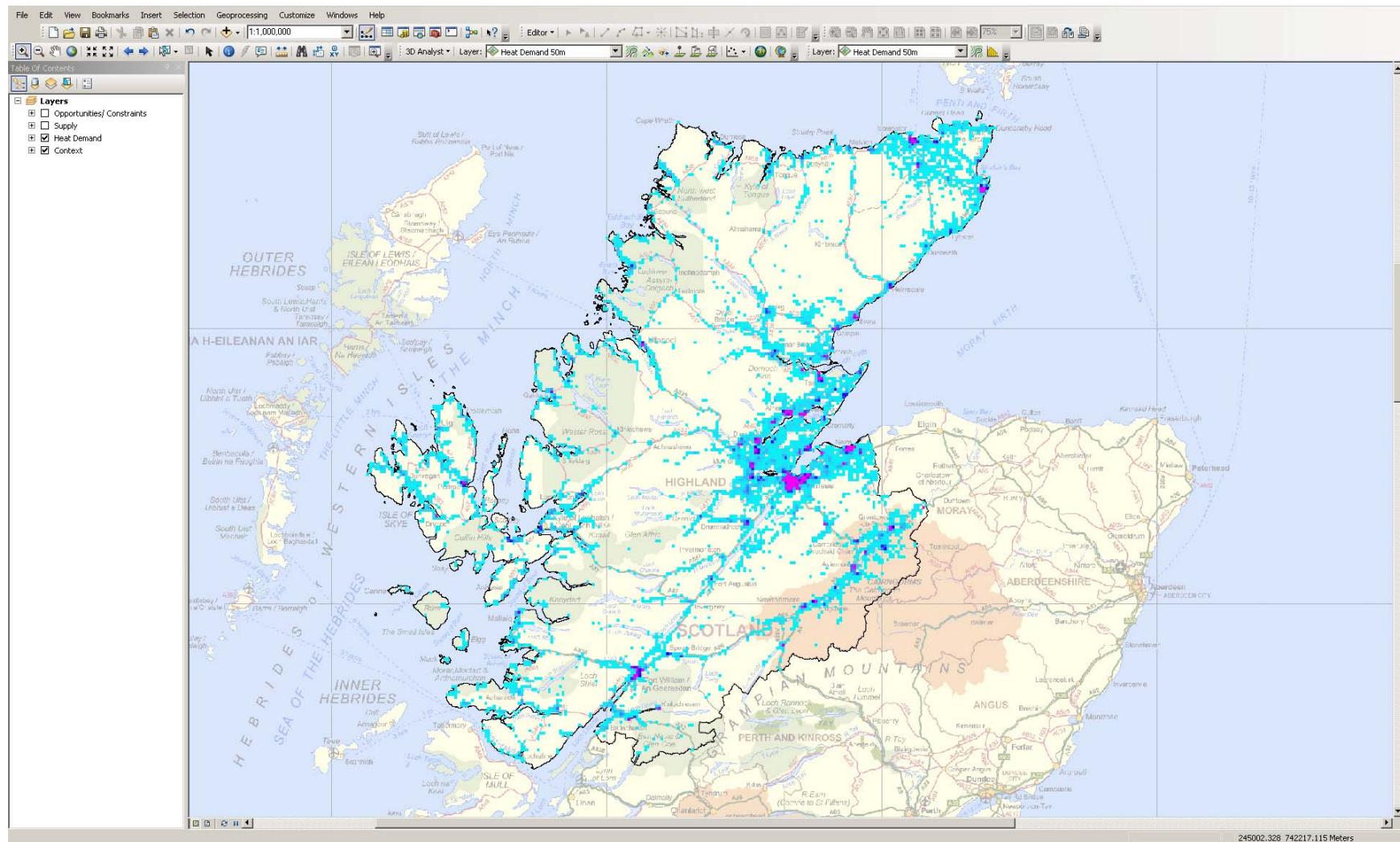


Use and Application of the Heat Map



Functionality

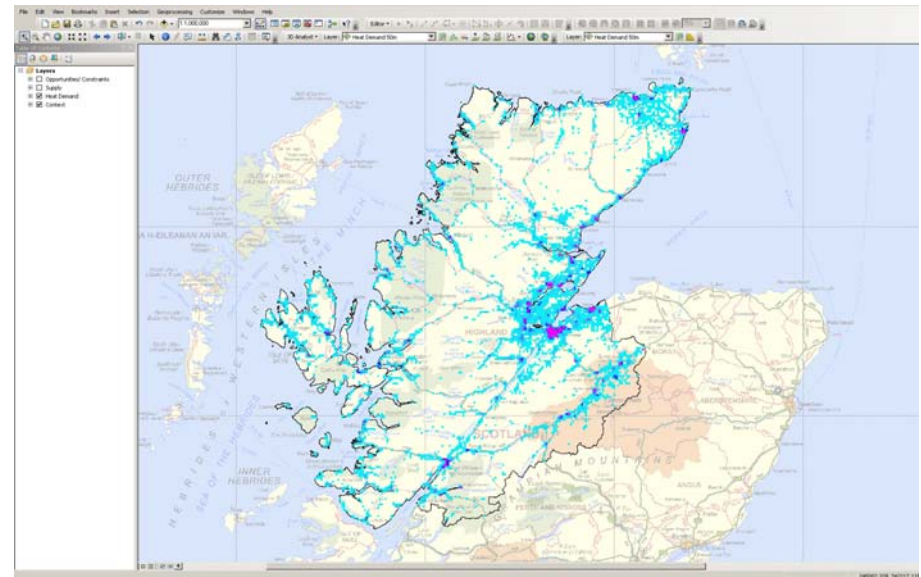
The use of GIS brings a range of additional functionality to the Heat map. Functions include:

- Viewing
- Interrogation
- Spatial Analysis
- Predictions
- Update/ monitoring

Viewing

At its simplest level the Heat Map can be used to view information about a range of topics related to renewable heat in the Highlands: Viewing options include:

- Zoom in/ out
- Switching on/ off layers
- Change symbology
- Isolating features



**LIVE
DEMONSTRATION**

Interrogation

The Heat Map has been developed to be mainly used within a GIS environment. One major difference between using the map within GIS and as a traditional hard copy format is the range of additional information that can be accessed from each layer within the map. This is known as **attribution**.

Each layer exhibits a range of useful existing attribution.

DZ_NAME	No_House	No_House_FP	Perc_FP	FP_Rank	No_HA_Houses	No_THC_Houses	DZ_Area_sqKms
Glencoe	226	50.745276	22.453662	179	10	13	509.497501
Ardgour, Sunart and Morvern	431	108.09115	25.079153	127	30	45	754.842471
Balachulish	349	86.414613	24.760634	133	14	75	4.143124
Kinlochleven	450	157.665281	35.036729	11	33	178	0.841697
Nether Lochaber	231	49.095216	21.25334	203	2	7	182.189271
Glen Nevis	368	113.032607	30.715382	41	44	112	121.55497
Fort William Achintore	272	61.021733	22.43446	180	44	13	1.286689
Fort William Lundavra	293	54.428823	18.57639	249	8	38	0.136178
Fort William Upper Achintore	274	60.79511	22.187996	187	3	98	0.348358
Moidart	234	65.205721	27.865693	87	25	8	130.074502
Fort William Argyll Road	301	70.454836	23.406922	162	30	71	0.250925
Fort William Plantation	265	85.486631	32.259106	27	134	74	0.082742
Fort William Central	264	77.150786	29.223783	62	132	21	0.468893
Inverlochy	352	84.693509	24.060656	151	34	16	0.385775
Caol South East	334	81.167136	24.301538	144	104	112	0.147855
Caol West	282	69.68442	24.710787	136	7	74	0.30052
Camaghael and Lochyside	294	62.989041	21.424844	200	39	13	2.173561
Caol North East	349	84.074729	24.09018	149	5	114	0.164564
Corpach West	275	78.643564	28.597659	71	25	70	1.061345
Corpach East and Banavie	267	45.662968	17.102198	261	<Null>	10	1.361636
Ardnamurchan & Small Isles	257	68.750017	26.750979	98	14	8	376.627437
Glen Spean & Kinlochlaggan	244	62.668583	25.683845	116	10	30	698.442196
Loch Eil	366	76.081018	20.787163	209	24	4	708.166985
Spean Bridge	215	39.981278	18.595943	247	22	27	3.821715
Badenoch & Strathspey South West	251	54.350696	21.653664	198	8	5	955.822317
Glegarry	254	57.08329	22.473736	178	5	13	977.174877
Mallaig	329	76.296258	23.190352	167	19	56	0.644013
Arisaig, Morar and Knoydart	317	60.750477	25.473337	118	25	20	350.658573
Newtonmore	419	104.317011	24.896661	132	40	42	1.89445
Kingussie South West	242	58.645059	24.233495	145	28	16	0.819134
Kingussie North East	334	64.371727	19.272872	237	34	68	0.433242
Kinraig	267	70.484211	26.39109	107	15	12	454.937713

LIVE DEMONSTRATION



Analysis

As part of the Heat Map development a range of GIS functionality was agreed and developed. A series of tools were created for use by Highland Council staff providing the following functionality:

- Scenario development
- Development Proposals Summary
- Search – Areas of High/ Low demand
- Search – Skills/ Suppliers
- Postcode reporting
- Identifying clusters of heat demand and fuel poverty
- Data update

Scenario development

The challenge:

Understanding the impact of new/ proposed developments on heat demand within a defined area.

The solution:

Build a tool which allows the user to create a new Heat Map based upon future development scenarios

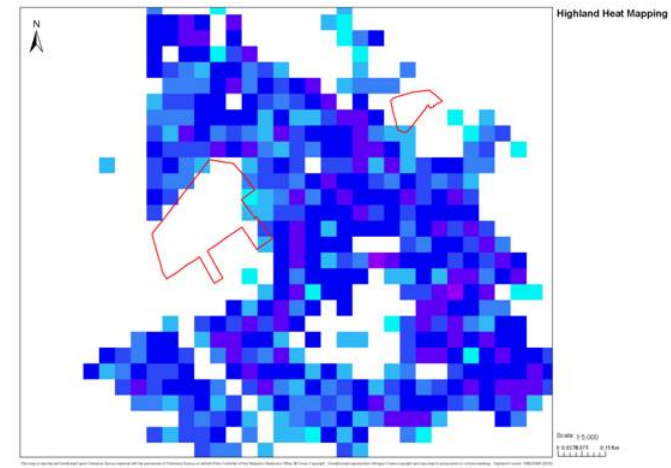
Required information:

- Development location
- Development details

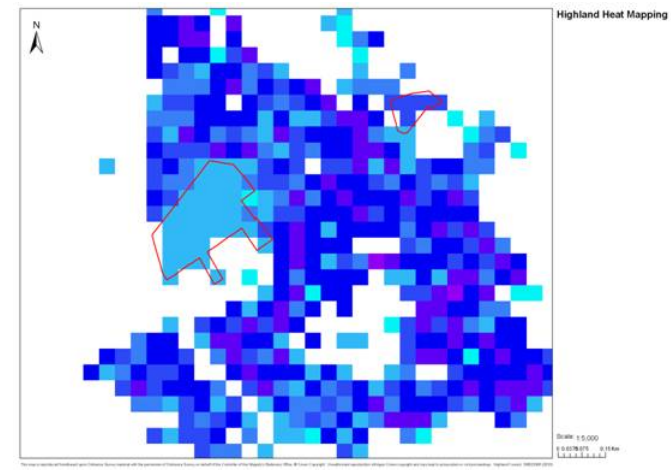
Outputs:

Revised Heat Map that can be analysed further for relationship to potential sources of heat supply

Before




After












Highland Heat Mapping Scenario Development

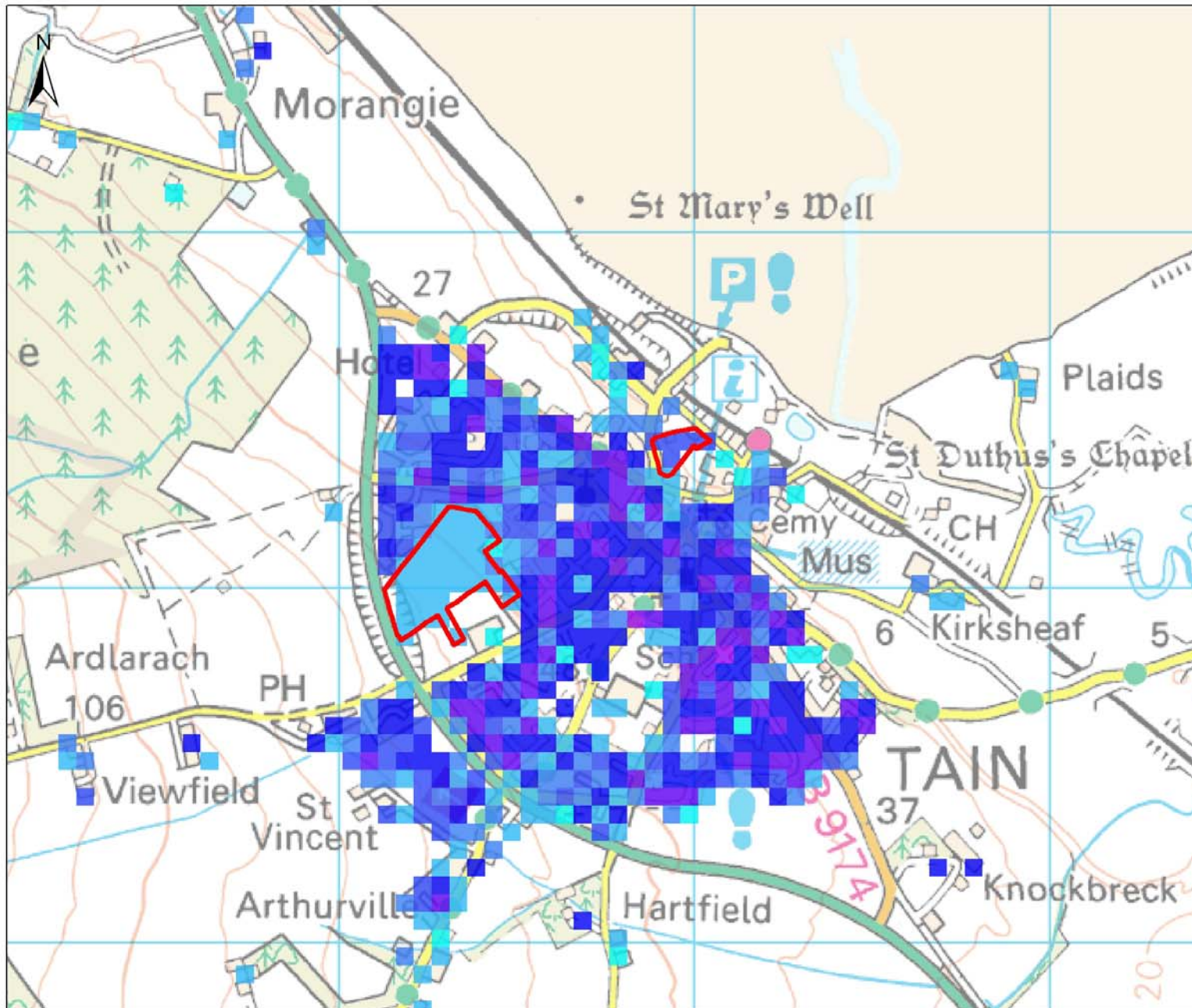
Legend

 Proposed development

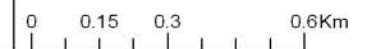
Revised Heat Map

kWh/km²

-  1 - 1,500
-  1,500 - 3,000
-  3,000 - 4,500
-  4,500 - 6,000
-  6,000 - 10,000
-  10,000 - 20,000
-  20,000 - 50,000
-  50,000 - 100,000
-  100,000 +



Scale: 1:10,000



This map is reproduced from based upon Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office, © Crown Copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. Highland Council, 100023389 (2010)

Development Proposals Summary

The challenge:

Summarise heat demand and supply within a user specified location.

The solution:

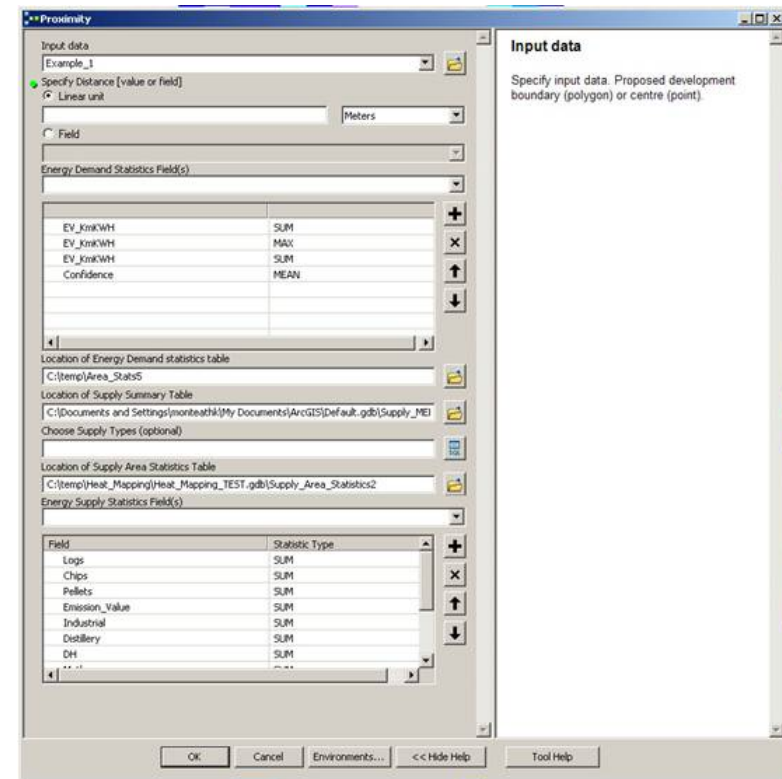
Analyse the spatial relationship of new/ proposed development in relation to existing heat demand and potential supply

Required information:

- Development location
- Search distance

Outputs:

Tabular summary for specified statistics



Legend

- Clynelish distillery
- Red Heat Map
- m2
- 1 - 1,500
- 1,500 - 3,000
- 3,000 - 4,500
- 4,500 - 6,000

Table

Area_Stats5

Rowid	OBJECTID_12_13	FREQUENCY	SUM_EV_KMKWH	MAX_EV_KMKWH	SUM_EV_KMKWH_1	MEAN_CONFIDENCE
1	0	5607	9765279.204666	1176886.5	0	2.55904

(0 out of 1 Selected)

Area_Stats5

EV_KmKWH MAX
EV_KmKWH SUM

Table

Supply_Area_Statistics_EXAMPLE

OBJECTID *	FREQUENCY	SUM_Logs	SUM_Chips	SUM_Pellets	SUM_Emission_Value	SUM_Industrial	SUM_Distillery	SUM_DH	SUM_Methane	SUM_Landfill	SUM_Coal	SUM_LPG	SUM_Oil
1	15	1	1	1	247586	2	5	<Null>	2	<Null>	3	<Null>	1

(0 out of 1 Selected)

Supply Area Statistics EXAMPLE

Table

Supply_Summary_EXAMPLE

OBJEC	Name	Logs	Chips	Pellets	Comments	Emission_Value	Type	UPRN	Industrial	Distillery	DH	Methane	Landfill	Coal	LPG	Oil
1	Inverness Tree Services	1	1	<Null>	may be able to supply pellets shortly	<Null>	Woodfuel	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
2	Balcas Ltd	<Null>	<Null>	1	<Null>	<Null>	Woodfuel	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
3	Wood Group Engineering Ltd, Nigg	<Null>	<Null>	<Null>	Below reporting threshold for emission values	<Null>	Existing industrial heat production	<Null>	1	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
4	Trouw (UK) Ltd, Skretting, Inverbreakie Ind Estate	<Null>	<Null>	<Null>	Below reporting threshold for emission values	<Null>	Existing industrial heat production	<Null>	1	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
5	Teaninich Distillery Teaninich Ainess IV17 0XB	<Null>	<Null>	<Null>	<Null>	13049	Distillery	130069342	<Null>	1	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
6	Dalmore Distillery Ainess IV17 0UT	<Null>	<Null>	<Null>	<Null>	15465	Distillery	130089705	<Null>	1	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
7	Balblair Distillery Edderton Tain IV19 1LB	<Null>	<Null>	<Null>	<Null>	6426	Distillery	130061179	<Null>	1	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
8	Invergordon Distillery Golf View Terrace Invergor*	<Null>	<Null>	<Null>	<Null>	193313	Distillery	130117845	<Null>	1	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
9	Glenmorangie Distillery Glenmorangie Tain IV19 1P*	<Null>	<Null>	<Null>	<Null>	19331	Distillery	130107993	<Null>	1	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
10	Wood Group Engineering, Nigg	<Null>	<Null>	<Null>	<Null>	<Null>	Methane	<Null>	<Null>	<Null>	<Null>	1	<Null>	<Null>	<Null>	<Null>
11	Petley Hybrids, Petley Farm	<Null>	<Null>	<Null>	<Null>	<Null>	Methane	<Null>	<Null>	<Null>	<Null>	1	<Null>	<Null>	<Null>	<Null>
12	Mackenzie Bros	<Null>	<Null>	<Null>	<Null>	<Null>	Coal	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	1	<Null>	<Null>
13	Bruce Lindsay Coal Ltd	<Null>	<Null>	<Null>	<Null>	<Null>	Coal	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	1	<Null>	<Null>
14	W G Mackay	<Null>	<Null>	<Null>	<Null>	<Null>	Coal	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	1	<Null>	<Null>
15	Scottish Fuels	<Null>	<Null>	<Null>	<Null>	<Null>	Oil	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	1

(0 out of 15 Selected)

Supply_Summary_EXAMPLE

0

6Km

This map is reproduced from based upon Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office, © Crown Copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. Highland Council, 100023369 (2010)



Search – Areas of High/ Low Demand

The challenge:

To identify significant clusters of heat demand in a user specified location.

The solution:

Calculate the density of existing heat demand

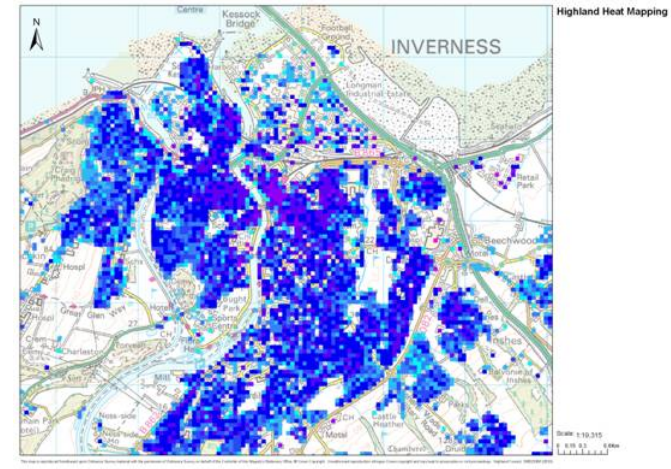
Required information:

- Search location and radius
- Output settings

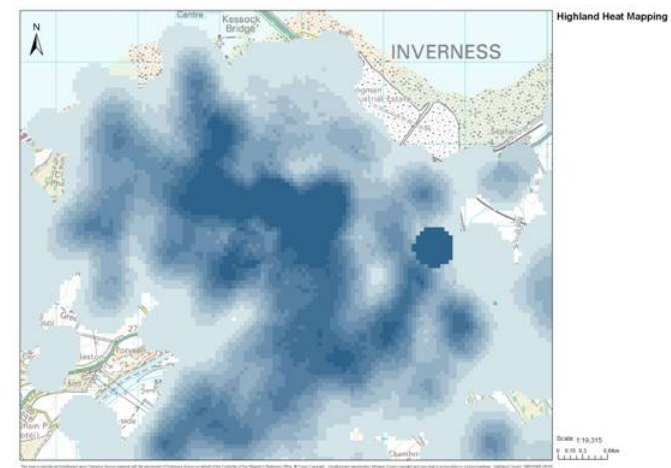
Outputs:

Density Map of Heat Demand

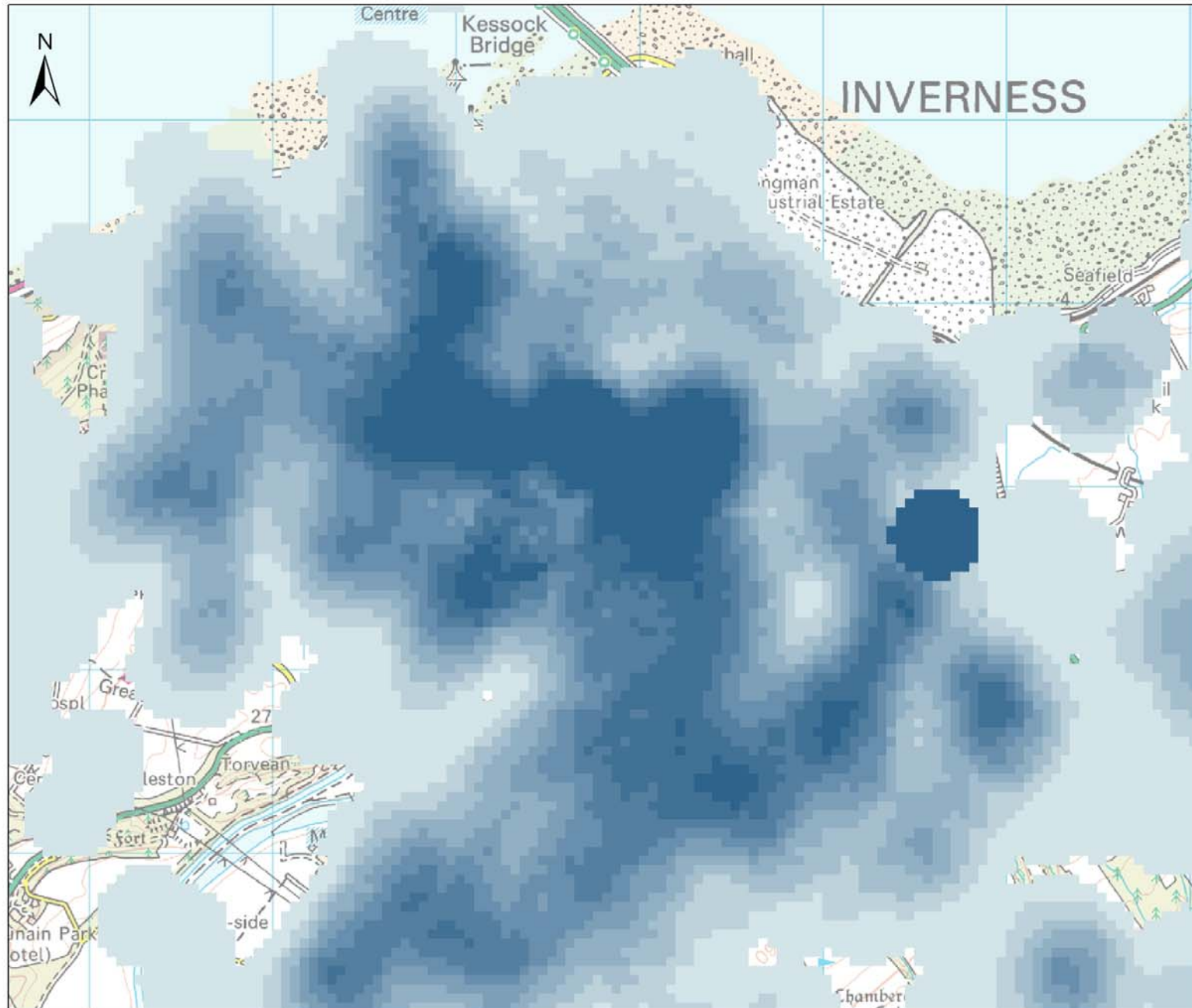
Before



After



Highland Heat Mapping



This map is reproduced from/based upon Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office, © Crown Copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. Highland Council, 100023369 (2010)

Scale: 1:19,315
0 0.15 0.3 0.6Km

Search – Skills/ Suppliers

The challenge:

Identify the skills & technology database within a specified distance of a selected location

The solution:

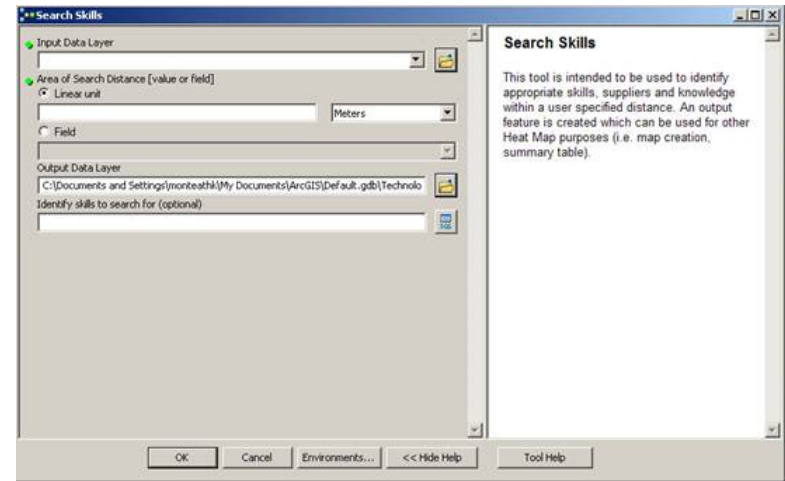
Analyse the Skills database to provide relevant information for the search area

Required information:

- Search location and radius
- Specification of skills to be searched

Outputs:

Tabular summary



ID	Name	Company	Address	Products	GROUP	SP	SRMS	ENCLP	WMS	DRMSAS	SOLAR	COMP	SP	TOTAL	Created	E	J	
1	1.Park	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14
2	2.Park	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14
3	3.Park	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14	123 Park Avenue, Reading, West Scotland, G2 14

Postcode Reporting

The challenge:

Summarise heat demand and supply within a specified distance of a selected postcode

The solution:

Analyse heat demand and supply within the specified location

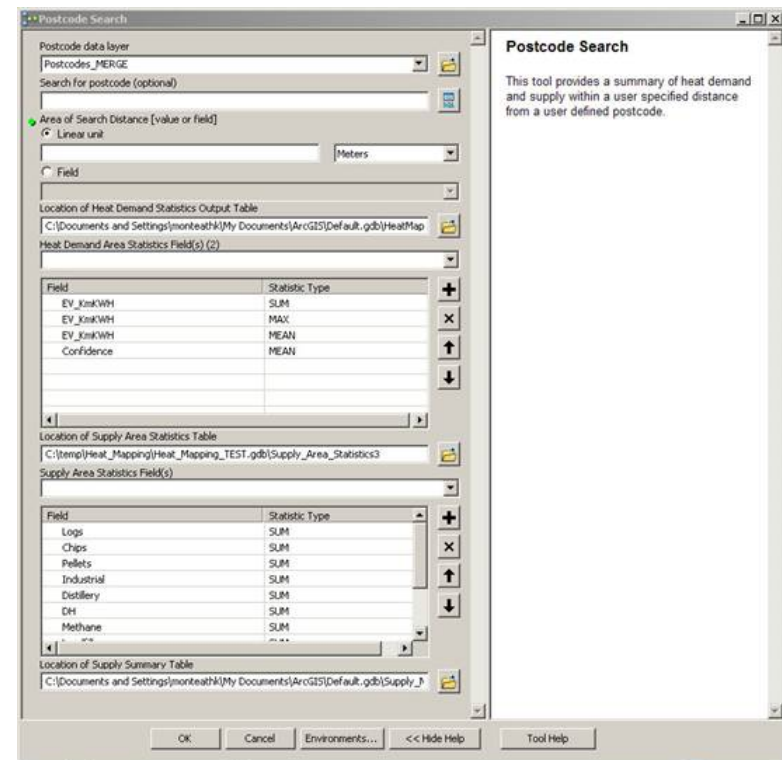
Required information:

Postcode location & search radius

Output statistics preference

Outputs:

Tabular summary



Summary

The functionality extends the use of the map beyond a traditional simple hard copy format.

The format of the map means it is flexible in how it can be used and can respond to the differing needs of users.

The main limitations that exist relate to:

- Knowledge/ awareness of users
- Data in some instances