

**United Nations Expert Group on the Integration of
Statistical and Geospatial Information
First Meeting
New York, 30 October - 1 November 2013**

Agenda: Item 11

Application of GIS in the 2011 Australian Census and Plans for 2016¹

Prepared by
Australia Bureau of Statistics

¹ This document is being produced without formal editing

Application of GIS in the 2011 Australian Census and Plans for 2016

Presentation to UN Statistical-Geospatial
Expert Group
October 2013

Overview

This presentation covers:

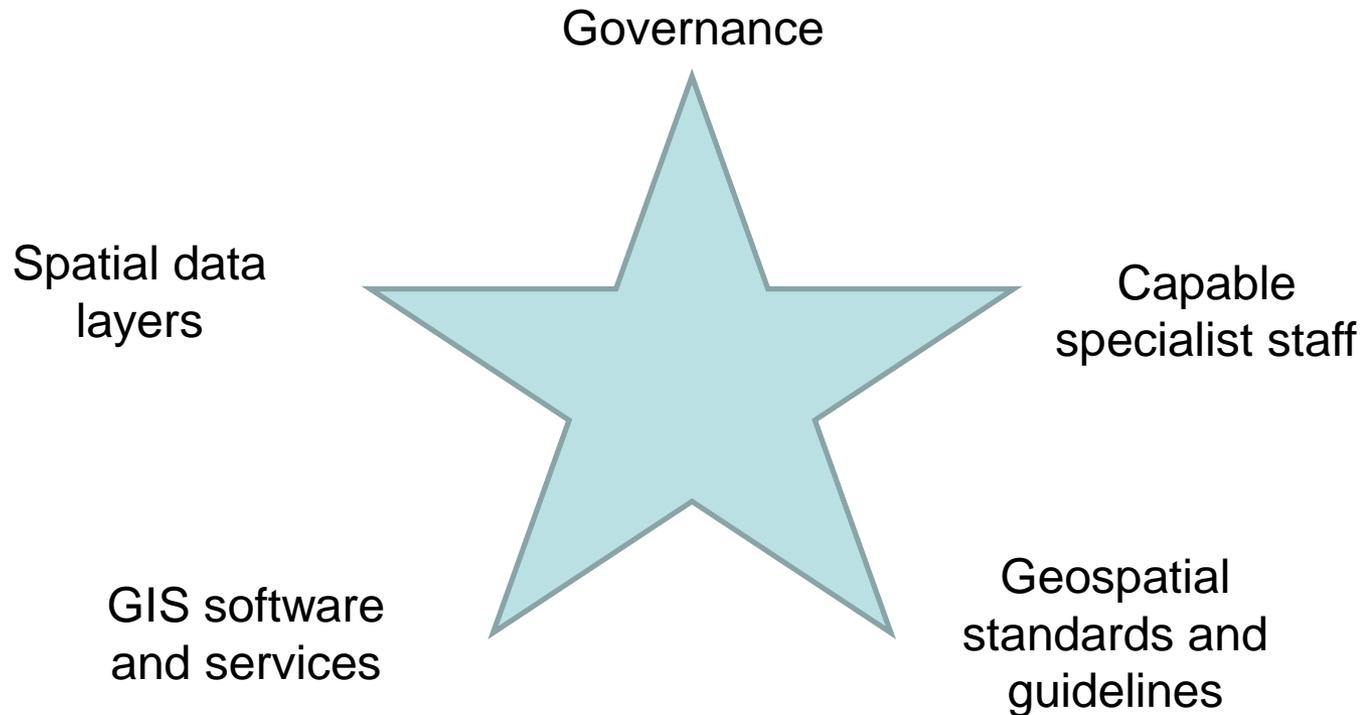
- GIS infrastructure and data requirements
- Applications
 - Design of statistical areas for output
 - Map production
 - Management reporting
 - Address geocoding
 - Dissemination
 - Analytical capability
- Mobile tools

What does this duck have in common with GIS?



GIS Infrastructure

- An organisation requires a developed GIS infrastructure to gain benefits from GIS



What are the data requirements to support GIS operations?

Location Information - data layers (themes)

Admin. boundaries

- State & local government boundaries,
- Suburbs, Statistical Areas

Addresses locations , Place Names

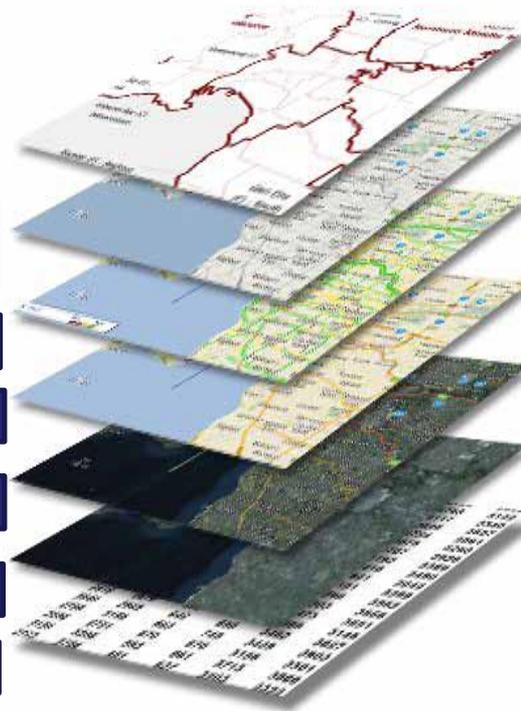
Transport, Hydrology

Land and Property

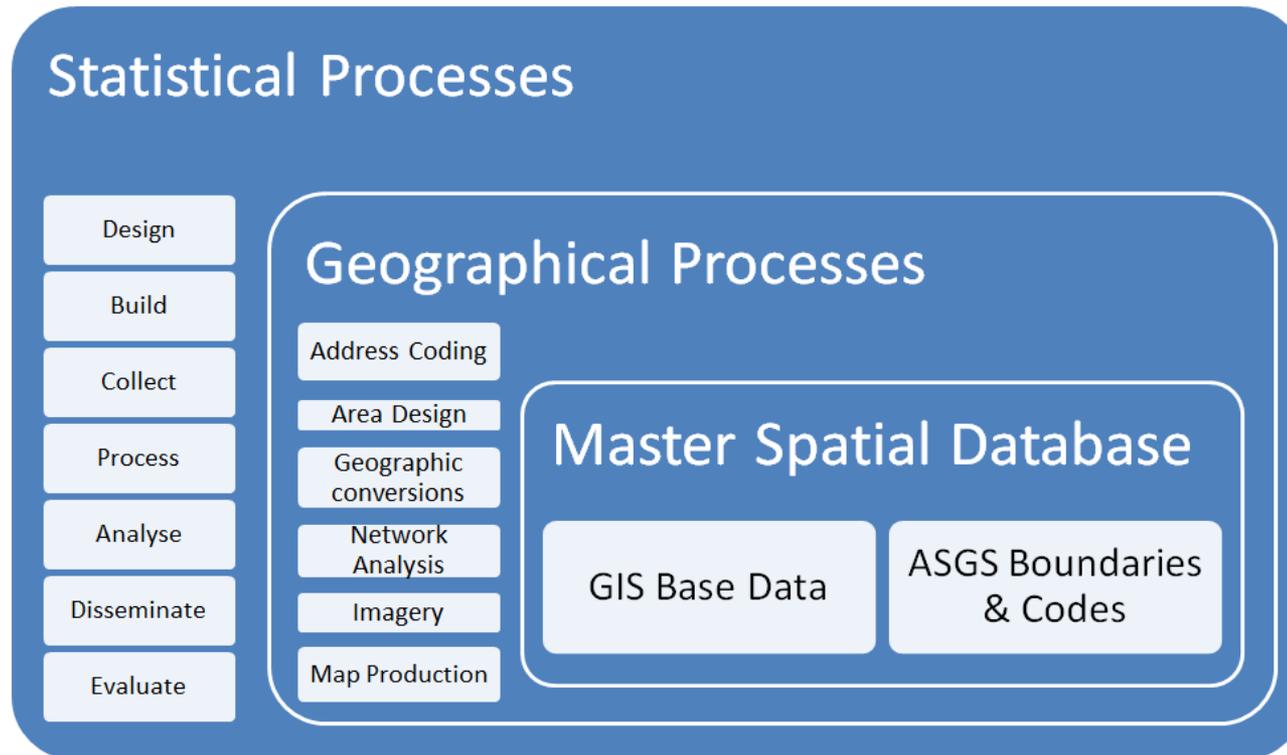
Imagery

Elevation

Geodetic Datum



GIS Software and Services



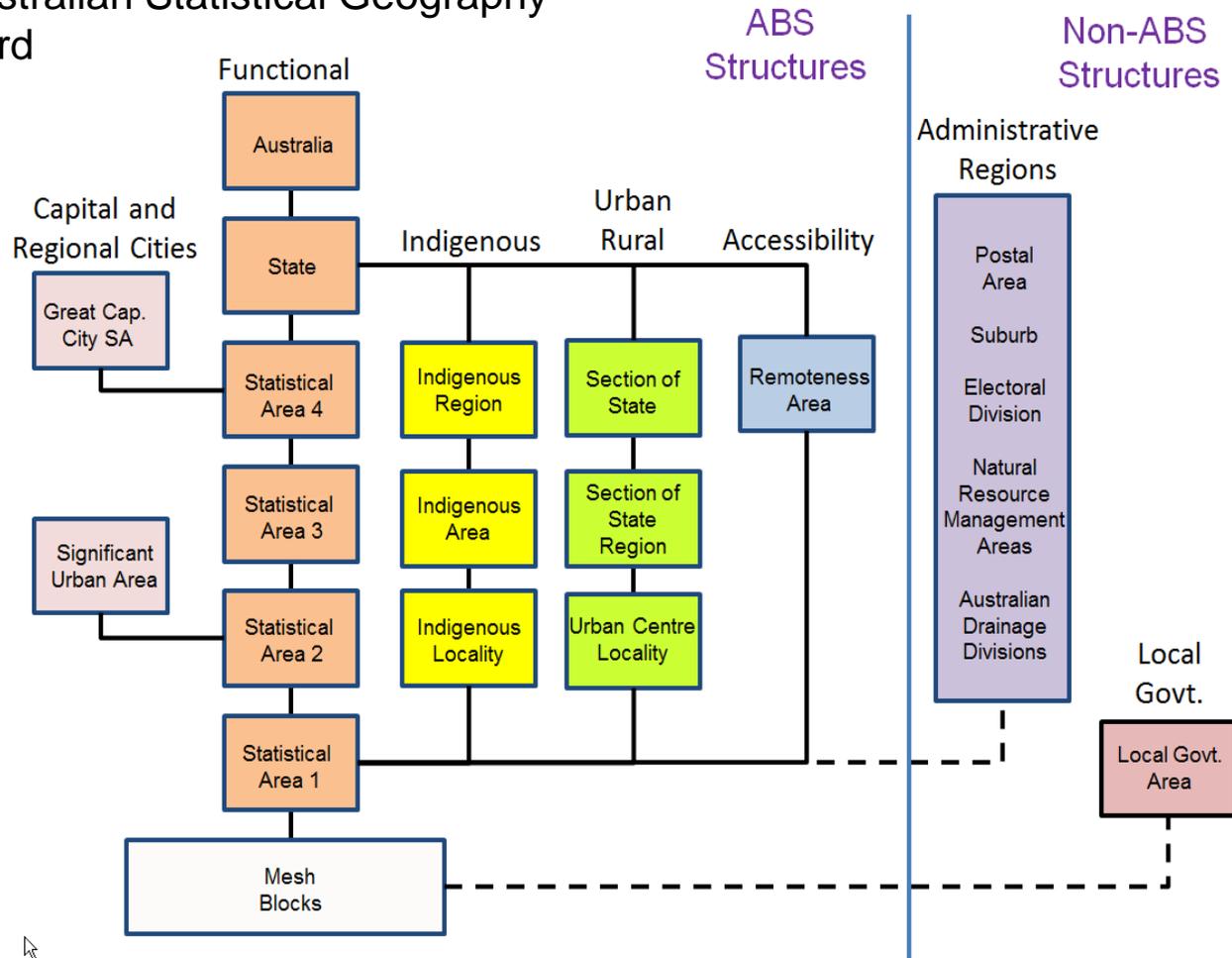
Software

Esri ArcGIS,
Pitney Bowes – MapInfo
Safe Software FME
Python / .net / Java / C

Oracle
SQL Developer
SPARX Enterprise Architect

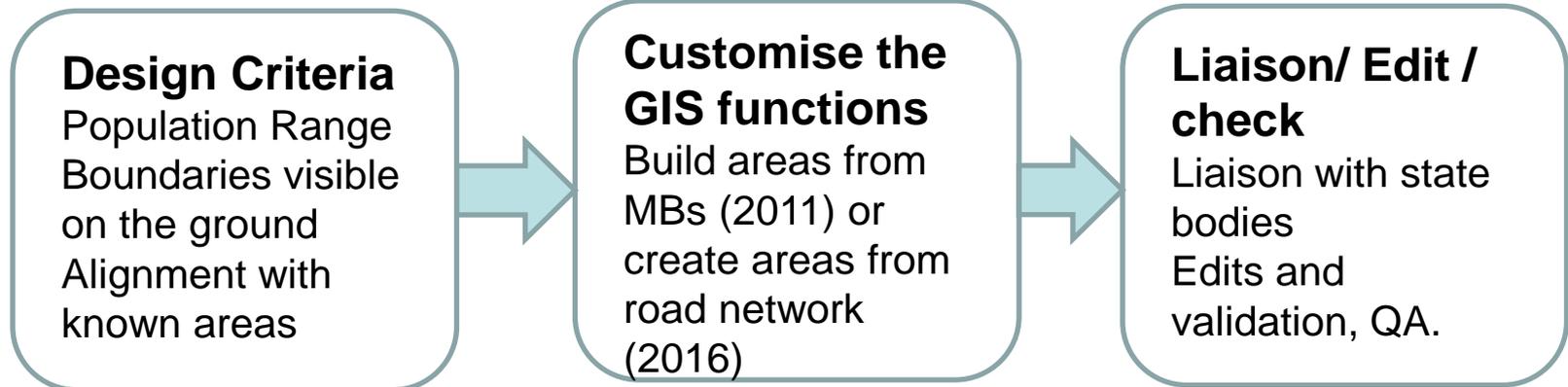
Design of Statistical Areas for Output

The Australian Statistical Geography Standard



Collection Area Design

- Efficient field data collection - design of Census Collection Areas



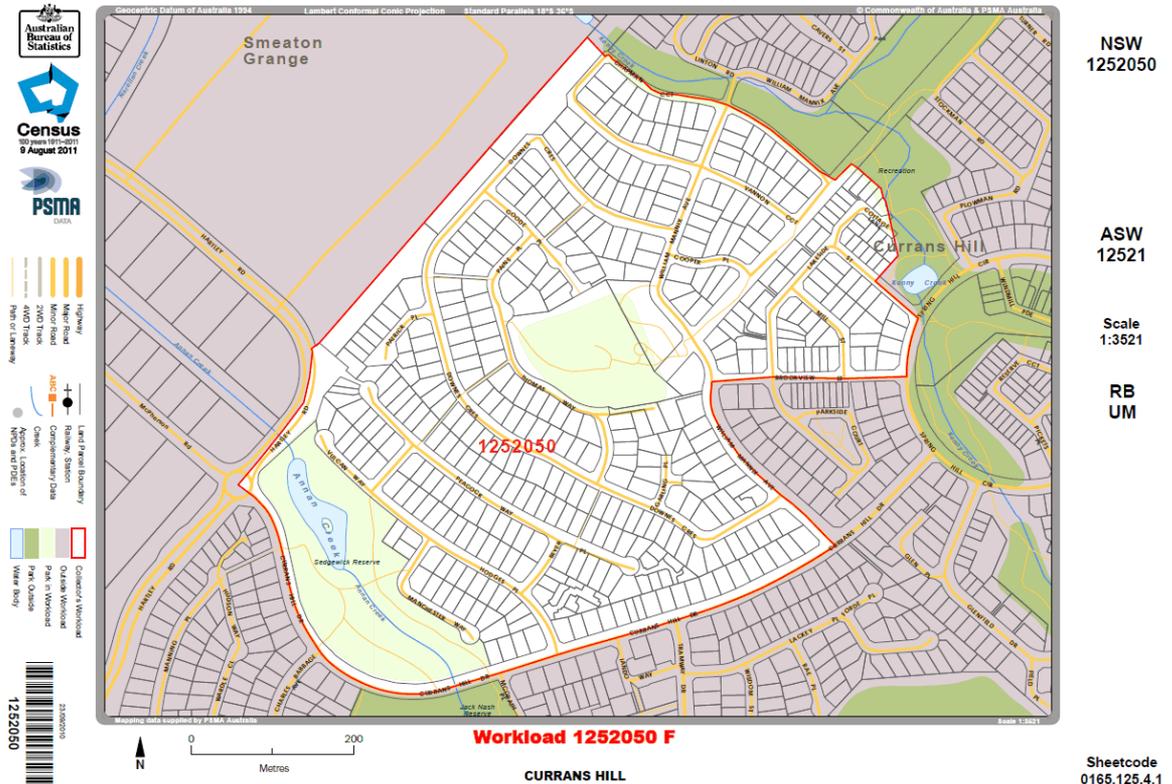
Map Production

Select appropriate
map template.

Produce map and
text file layer
using ruleset

Combine files to
create PDF

Print files



Sample A3 collector map

Management Reporting

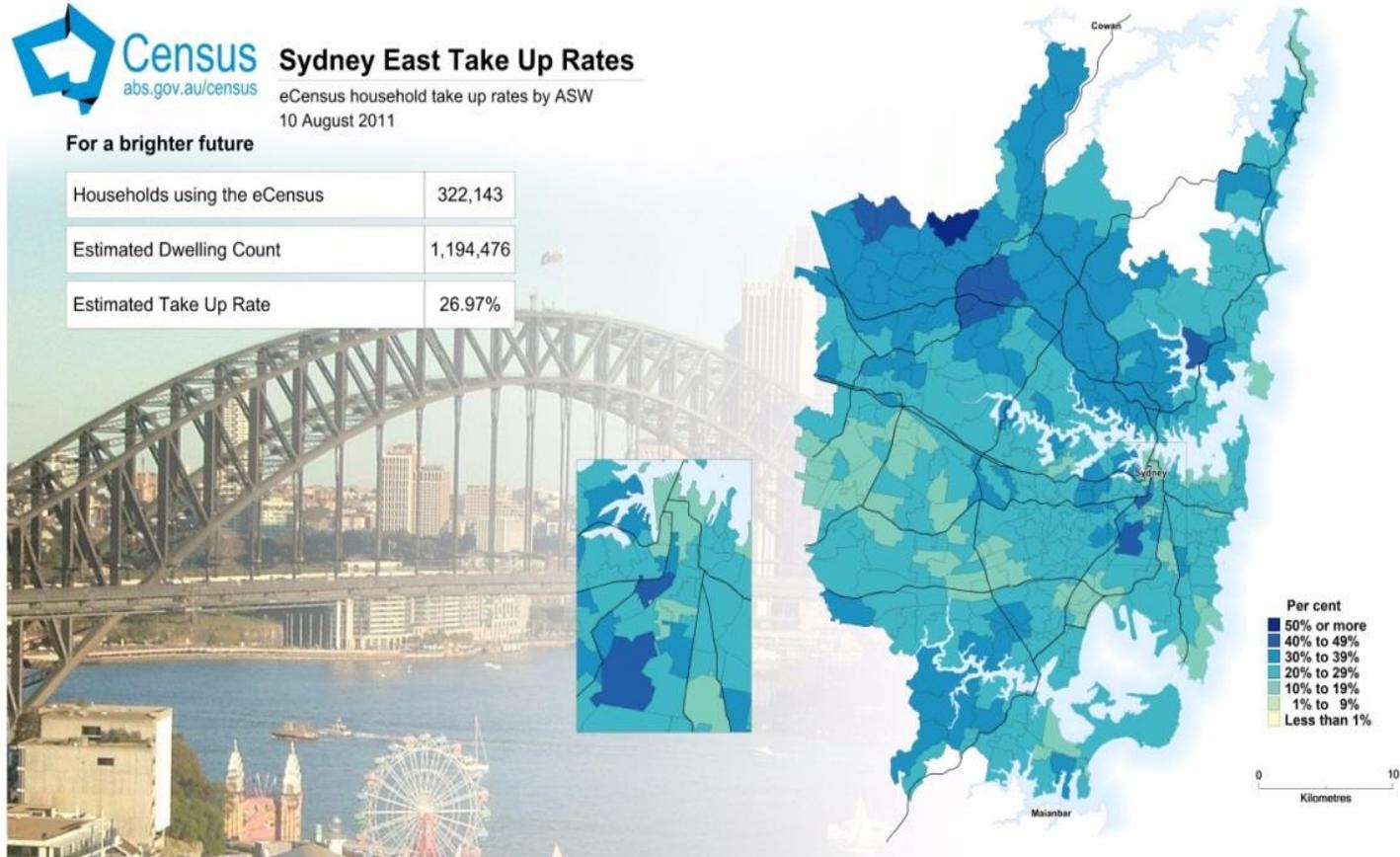


Sydney East Take Up Rates

eCensus household take up rates by ASW
10 August 2011

For a brighter future

Households using the eCensus	322,143
Estimated Dwelling Count	1,194,476
Estimated Take Up Rate	26.97%



Address Geocoding

- Fundamental to data quality
- Used to code dwelling addresses to output area
- Also used in field management systems - eg for dispatch of forms when people called in.

Type of Address	2011 Census addresses
Dwelling address	9,300,000
Usual address	1,000,000
1 year ago address	2,000,000
5 year ago address	9,000,000
Workplace address	10,000,000

Use in Dissemination

Navigation— eg confirming selected area

2011 Census QuickStats

All people - usual residents



Australia | Victoria | State Suburbs

North Bendigo

Code SSC21028 (SSC)



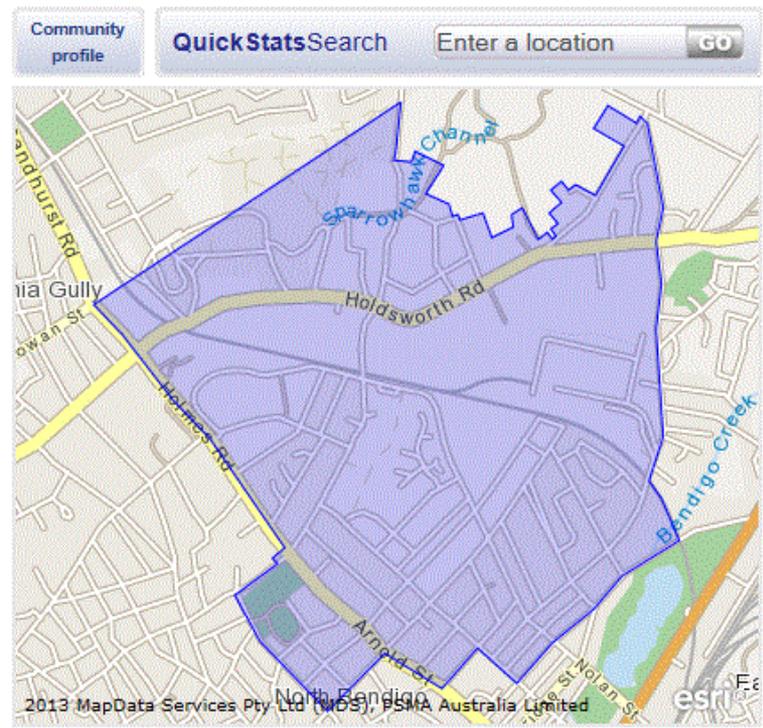
People	3,953
Male	1,877
Female	2,076
Median age	37



Families	946
Average children per family	1.9

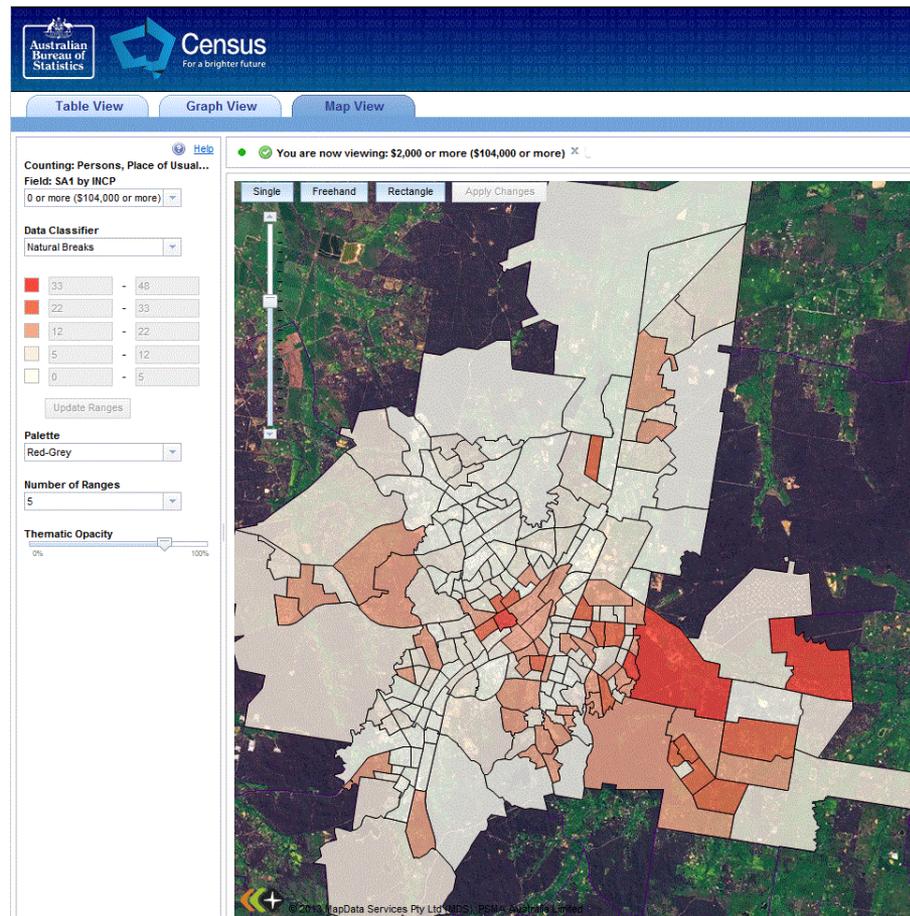


All private dwellings	1,714
Average people per household	2.3
Median weekly household income	\$891
Median monthly mortgage repayments	\$1,148
Median weekly rent	\$200
Average motor vehicles per dwelling	1.6



Use in Dissemination

Table Builder - Map View— eg number of high income earners by area

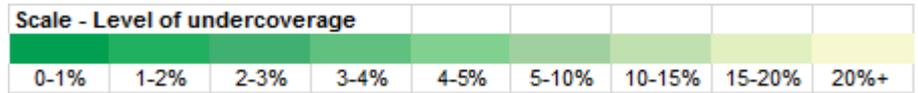
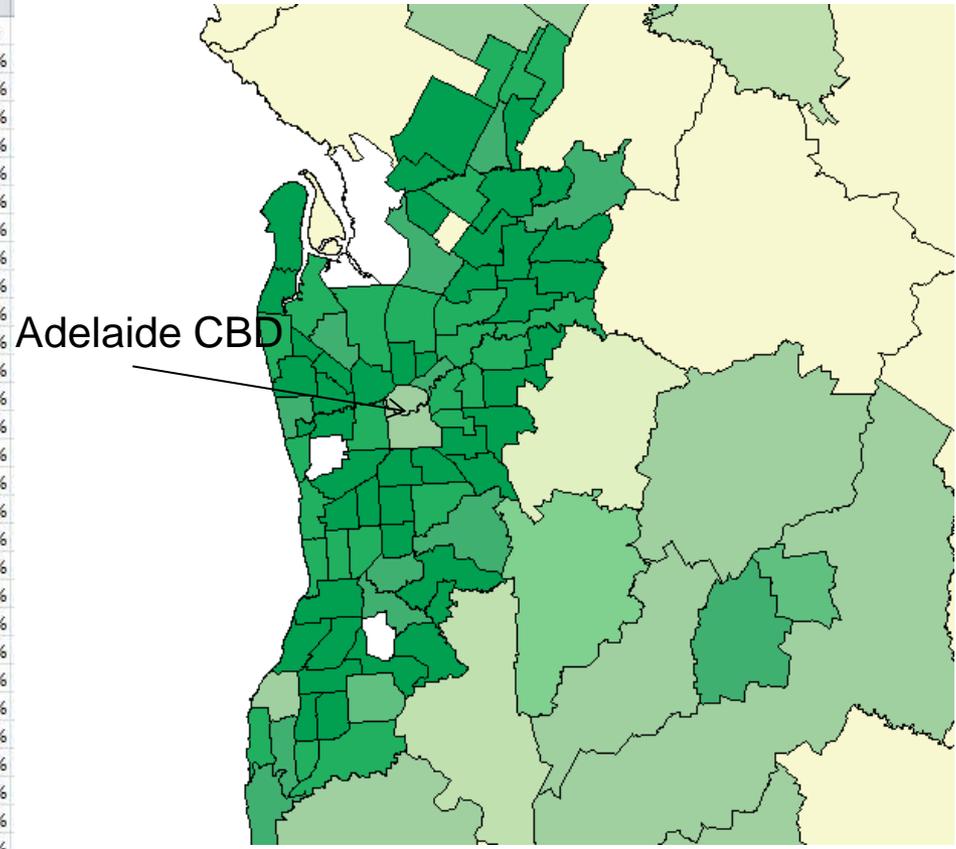


Analytical Capability - Undercoverage of the Geocoded National Address File – Adelaide Region

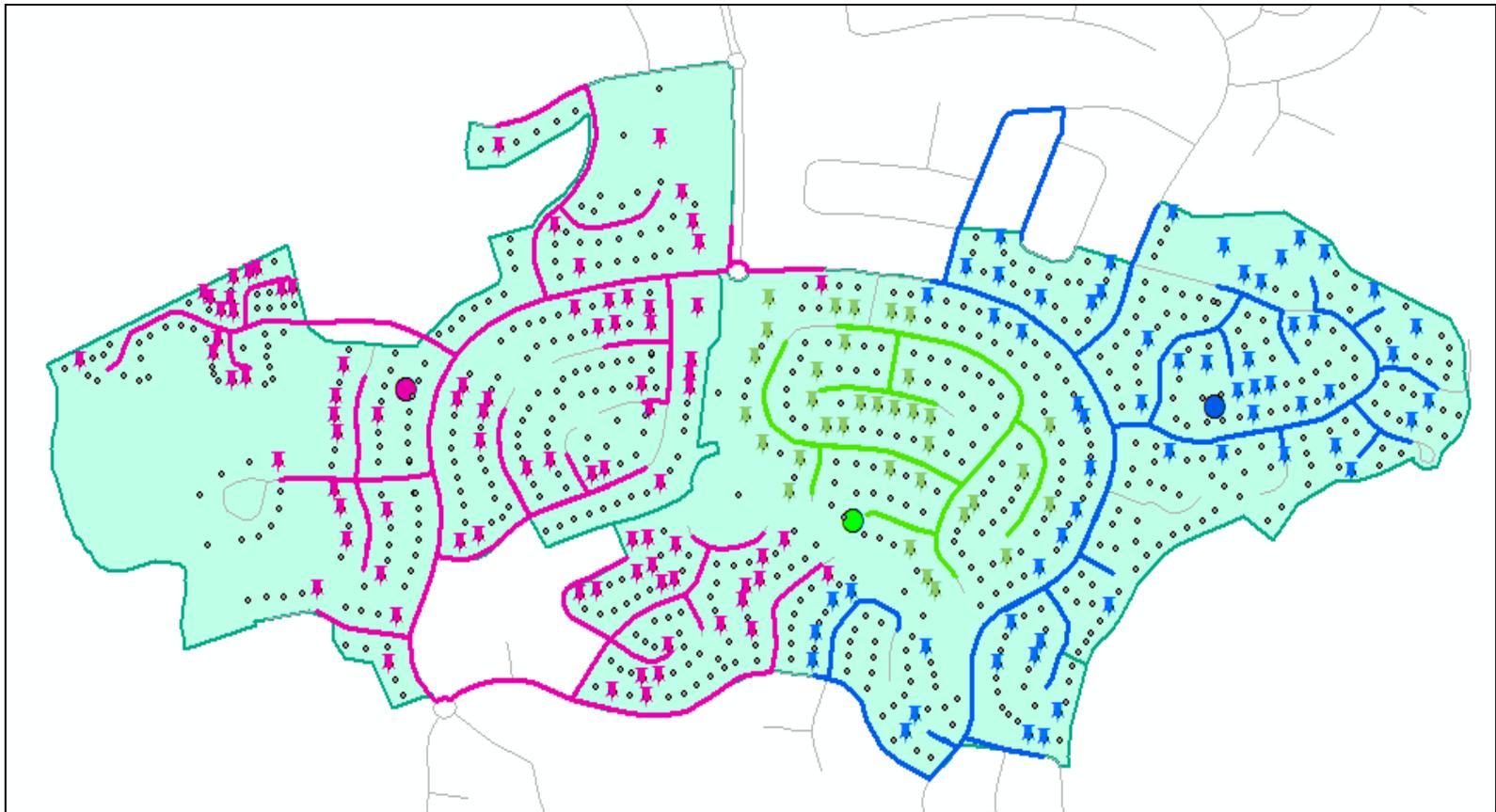
	A	D	E	F
1	SA2 Code	SA2	Undercoverage	Overcoverage
2	401011001	Adelaide	7.82%	248.82%
3	401011002	North Adelaide	5.50%	96.80%
4	401021003	Adelaide Hills	20.66%	128.90%
5	401021004	Aldgate - Stirling	4.69%	46.88%
6	401021005	Hahndorf - Echunga	5.46%	78.63%
7	401021006	Lobethal - Woodside	9.55%	93.25%
8	401021007	Mount Barker	2.67%	54.91%
9	401021008	Mount Barker Region	6.78%	109.70%
10	401021009	Nairne	3.12%	55.22%
11	401021010	Uraidla - Summertown	19.58%	95.79%
12	401031011	Burnside - Wattle Park	0.74%	21.47%
13	401031012	Glenside - Beaumont	0.92%	26.03%
14	401031013	Toorak Gardens	0.87%	33.52%
15	401041014	Athelstone	0.17%	15.96%
16	401041015	Paradise - Newton	1.28%	27.05%
17	401041016	Rostrevor - Magill	0.83%	25.55%
18	401051017	Norwood (SA)	1.37%	69.69%
19	401051018	Payneham - Felixstow	1.23%	38.42%
20	401051019	St Peters - Marden	1.41%	39.54%
21	401061020	Nailsworth - Broadview	0.62%	27.30%
22	401061021	Prospect	0.93%	23.75%
23	401061022	Walkerville	2.85%	30.05%
24	401071023	Goodwood - Millswood	0.84%	31.75%
25	401071024	Unley - Parkside	0.75%	35.36%
26	402011025	Gawler - North	8.44%	51.28%
27	402011026	Gawler - South	8.41%	42.54%
28	402011027	Lewiston - Two Wells	9.80%	78.38%
29	402021028	Craigmore - Blakeview	1.70%	20.29%
30	402021029	Davoren Park	1.85%	32.08%
31	402021030	Elizabeth	2.01%	29.27%
32	402021031	Elizabeth East	0.59%	20.32%
33	402021032	Munno Para West - Angle Vale	9.54%	68.76%
34	402021033	One Tree Hill	30.34%	150.34%

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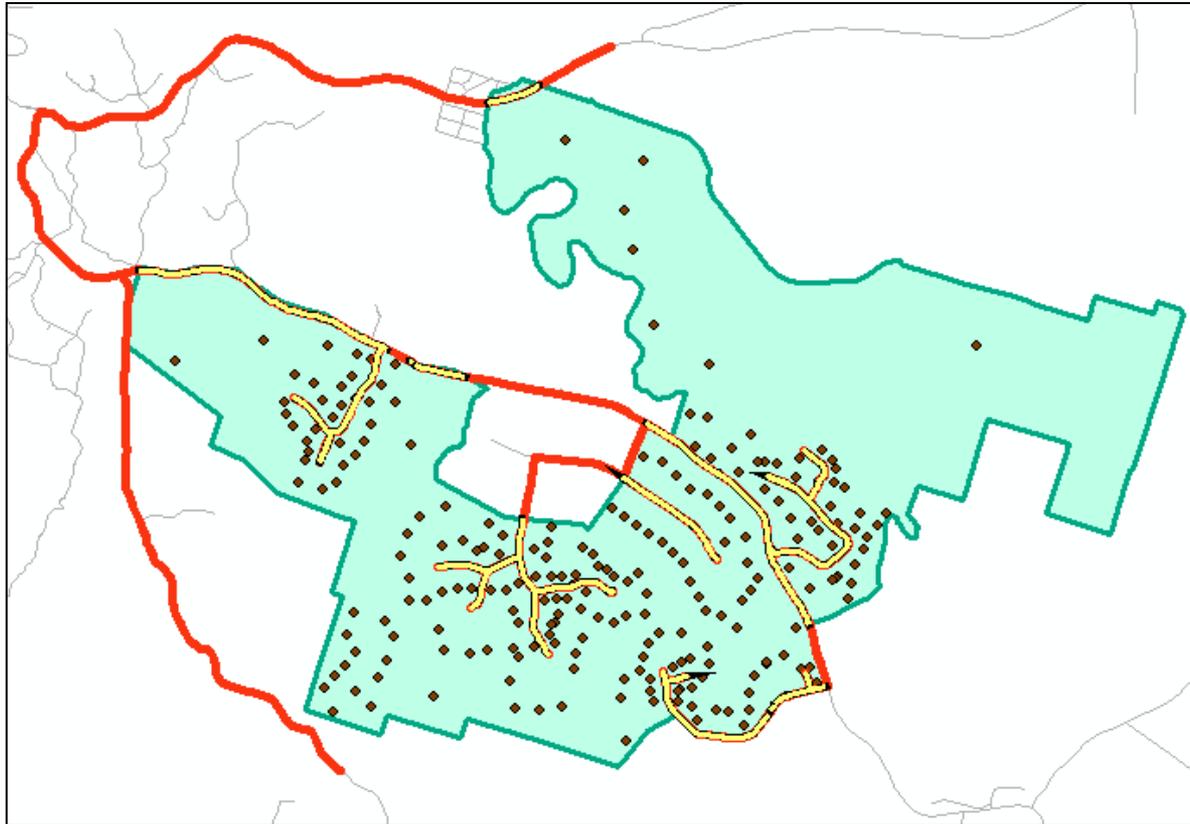
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Analytical Capability – Using network analysis to allocate work to field staff



Analytical Capability – Using network analysis improve area design



Green area = Workload area

Gold lines = travel on roads within the workload

Red lines = travel outside the workload

Mobile GIS

- Now a platform for dissemination. ABS app for iPhone.
- Opportunity to improve data quality
- Obvious efficiencies in operations.
- Risks of poor network coverage, device failure, data loss and operator error require careful consideration and management.



Conclusions

- GIS has many applications in conducting a Census - server based GIS, network analysis and mobile solutions are opening up new opportunities for greater corporate use and efficiency gains.
- Recognition of SSF will improve delivery of geospatial services.