Australia Broadband Assessment Excepts

2011

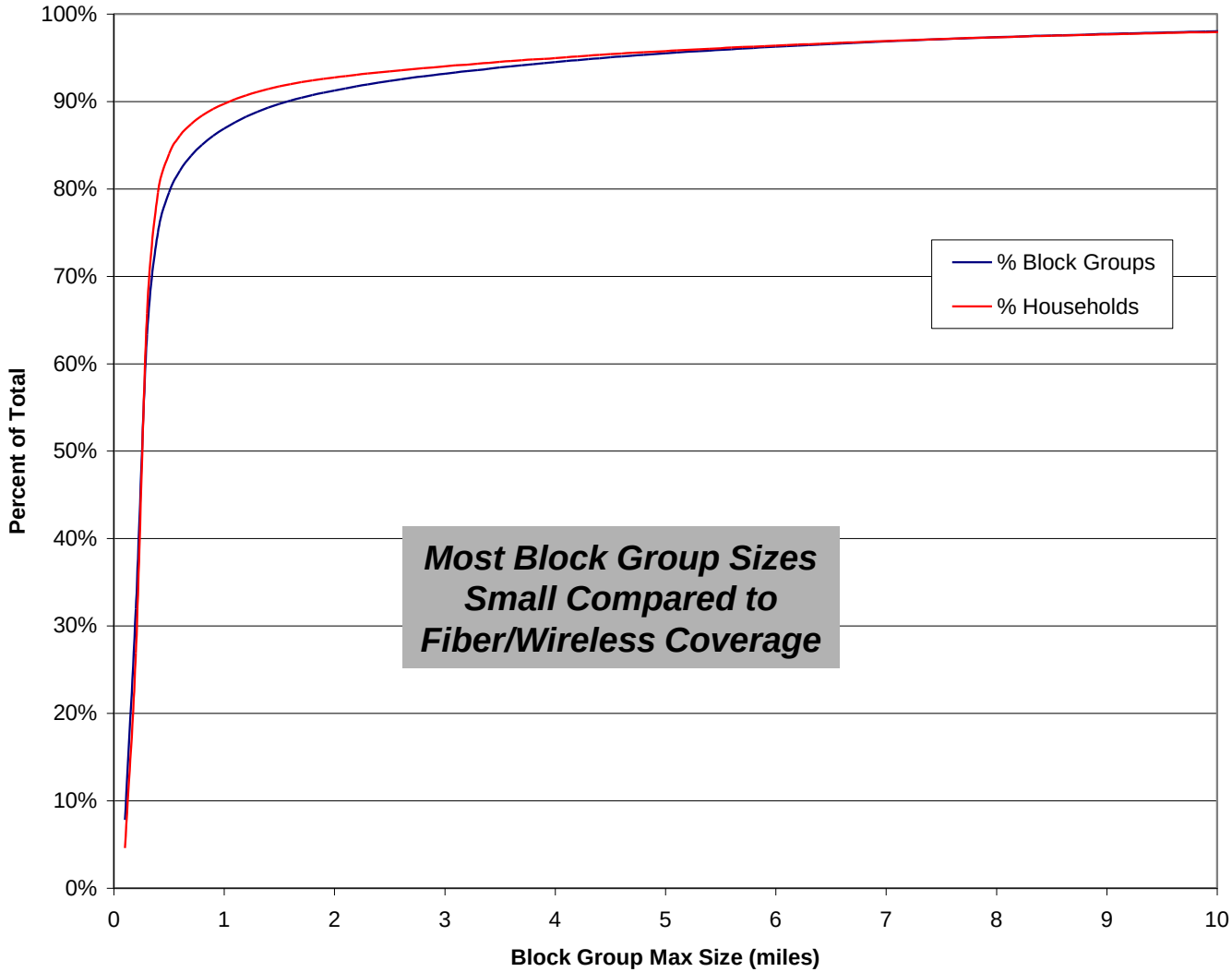
Preliminary Assessment Objectives

- **Provide broadband Internet access to all households and businesses in Australia**
- **Use a wide range of access technologies including fiber, wireless and satellite**
- **Determine optimum access technology at a block group level based on household density and fiber deployment**
- **Estimate satellite bandwidth demand based on realistic broadband user traffic profiles from Asia and North America**
- **Develop preliminary satellite design and per beam capacity estimates**
- **Note:**
  - *This preliminary study was followed by a more detailed analysis to revisit access technology for each block code and optimize the beam coverage*

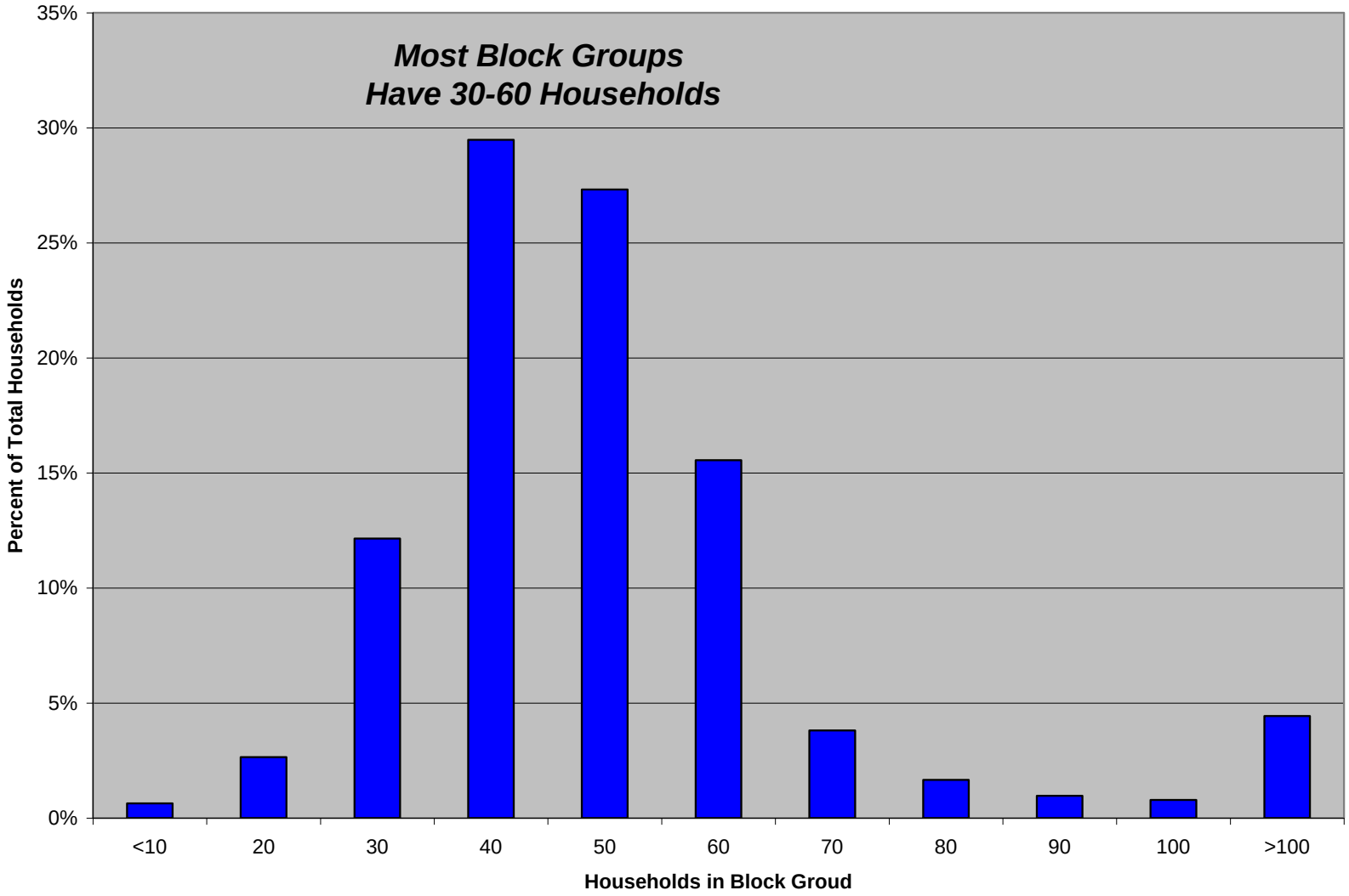
Target Market

- **Based on 2006 Census Block Group Data**
  - 315,000 block groups
  - 8.447 Million Households
- **Block Groups Features**
  - Small in Size - 90% of block groups are less than 1 mile in size
  - Small in Population – 90% of block groups have less than 65 households
- **Ideal for performing fiber/wireless SATCOM coverage parametric analysis**
  - Other demographic data (age, income, education level, etc.) can also be combined to build more accurate demand model

Block Group Size Distribution



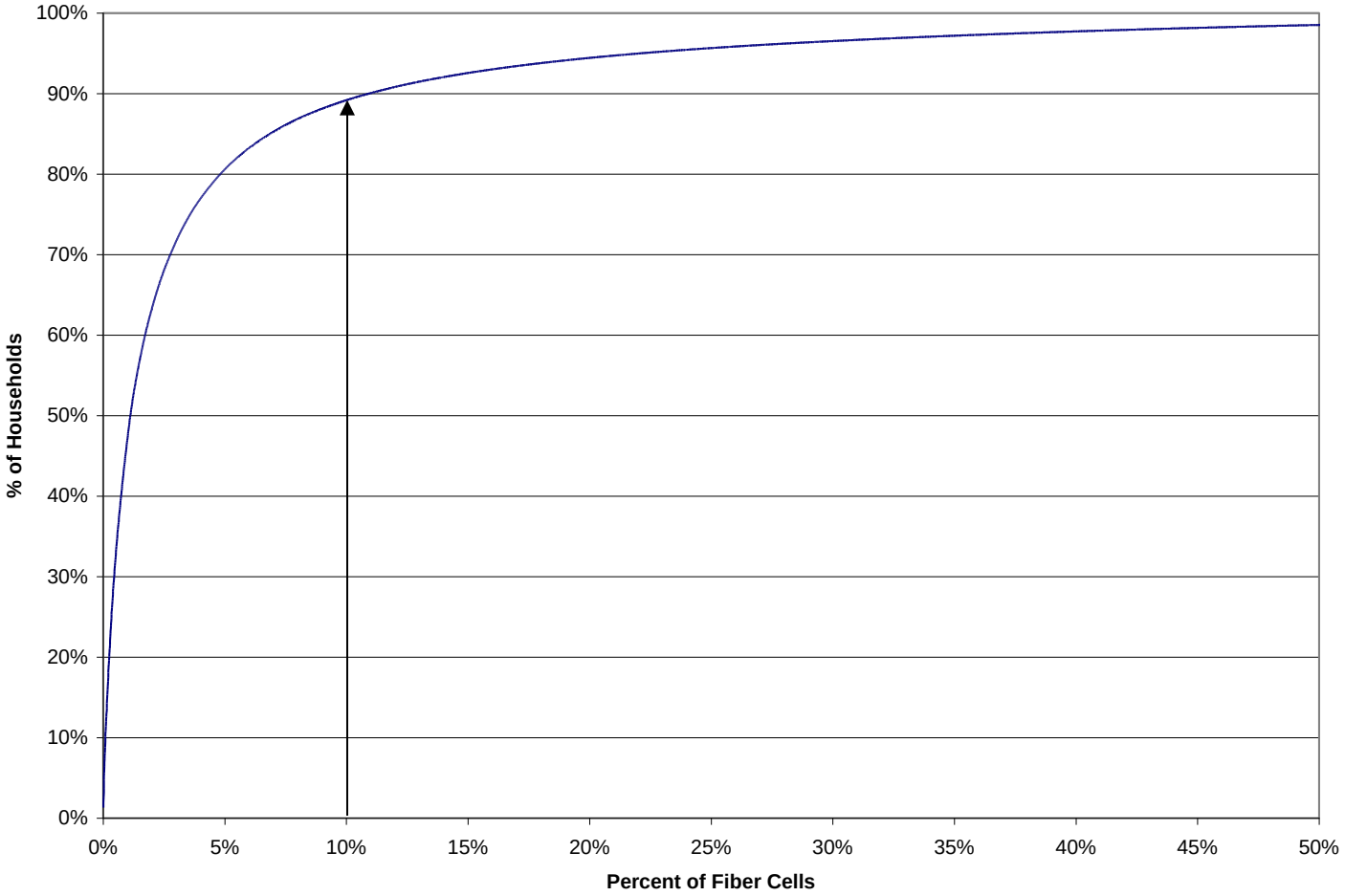
Block Group Household Count



Fiber/Wireless Coverage

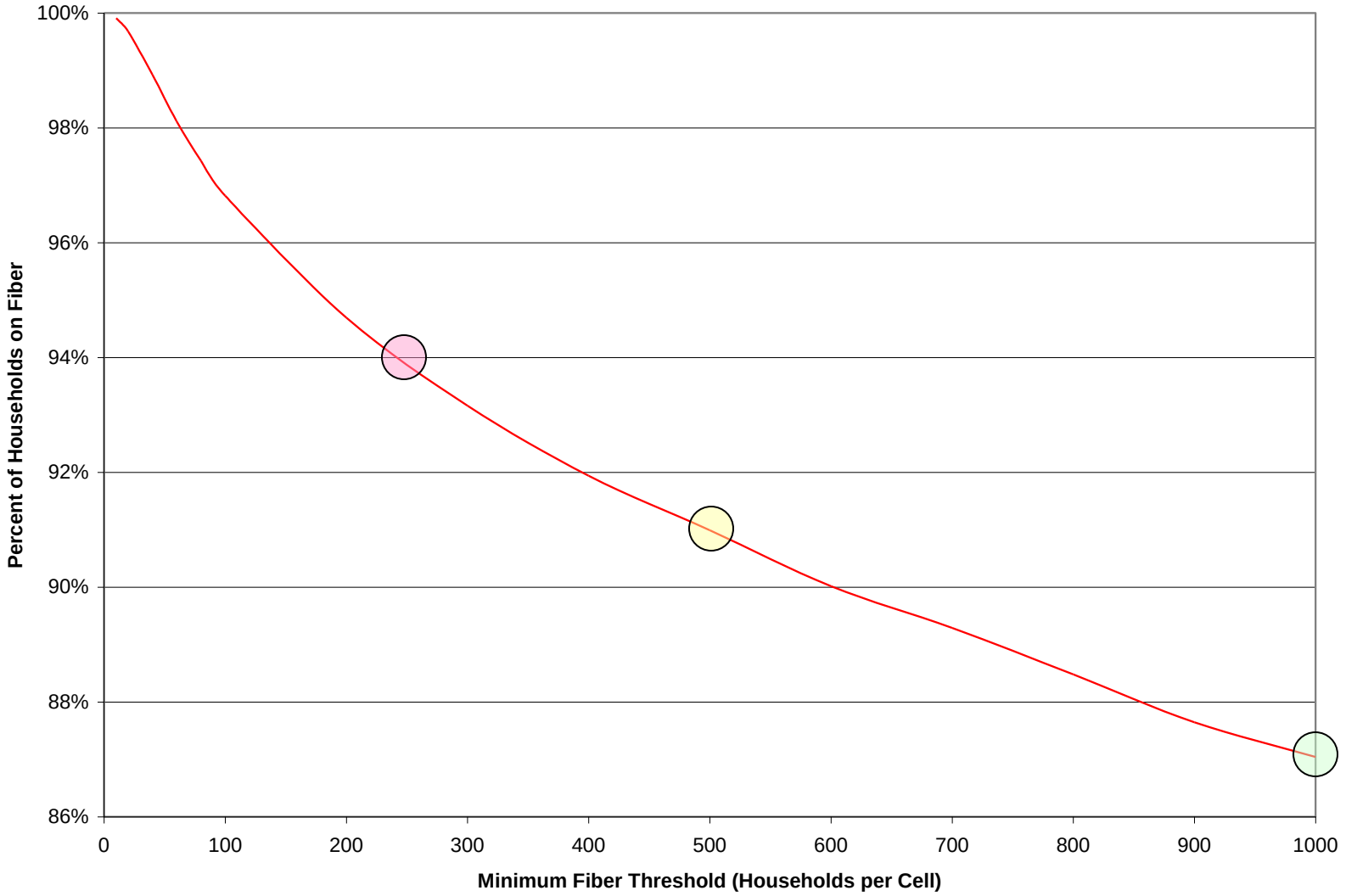
- **Performed preliminary assessment of fiber coverage using population density**
  - Country divided into 5 mile (diameter) coverage cells
  - Households in each cell determined using block group data
  - Fiber coverage determined based as a function of household density
  - Cells not optimized to maximize coverage (can be)
  - Compared potential fiber deployment to NBN design
- **Evaluated satellite coverage and capacity requirements for**
  - Minimum 1000 HH per cell for fiber (87% on Fiber/Wireless)
  - Minimum 500 HH per cell for fiber (91% on Fiber/Wireless)
  - Minimum 250 HH per cell for fiber (94% on Fiber/Wireless)
  - Eliminated very isolated cells without nearby fiber

Coverage vs. Households Passed



90% of Households Covered with 10% of Potential Fiber Cells

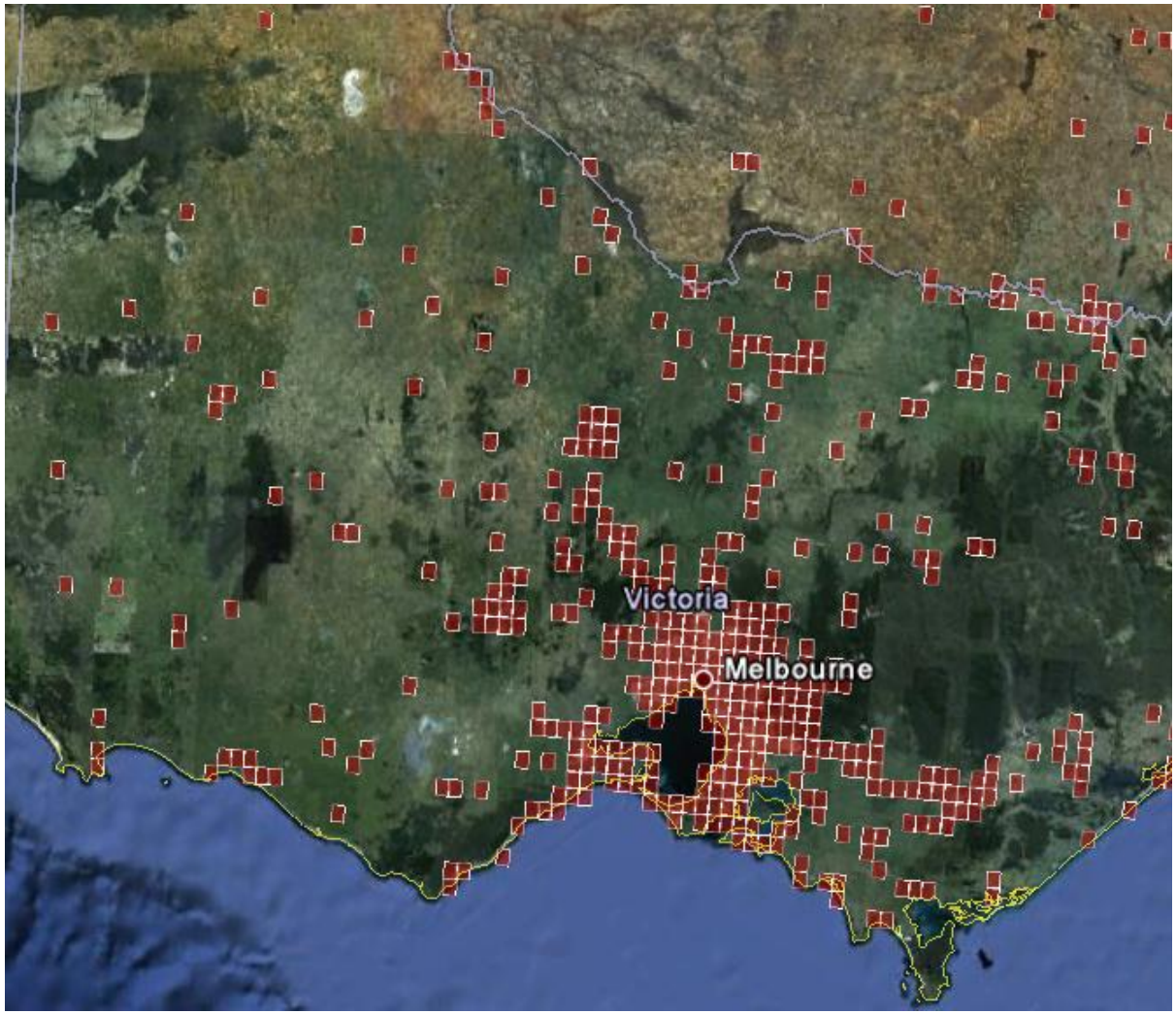
Fiber/Wireless Coverage Parametric Analysis



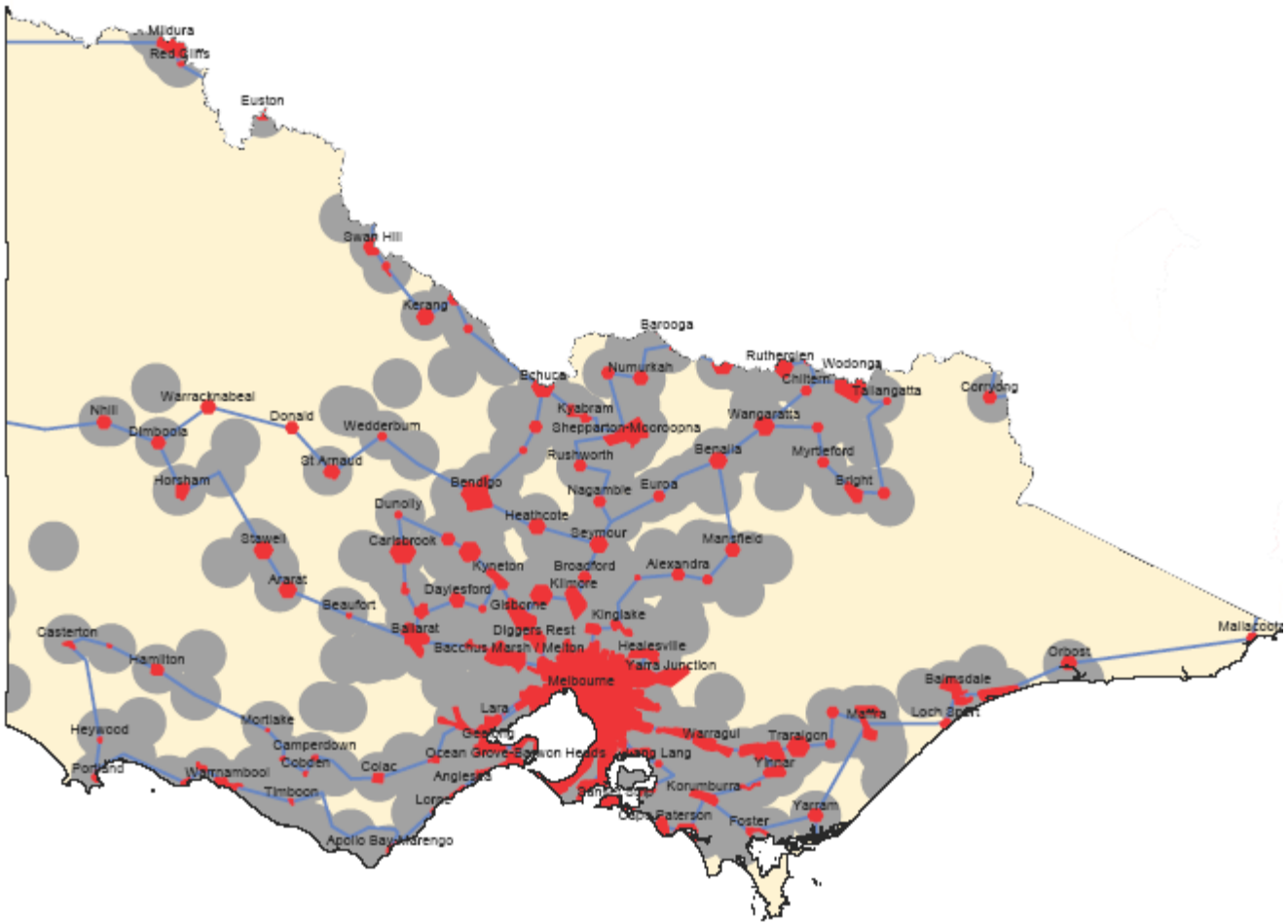
Potential Melbourne Area Fiber

Fiber

100 miles



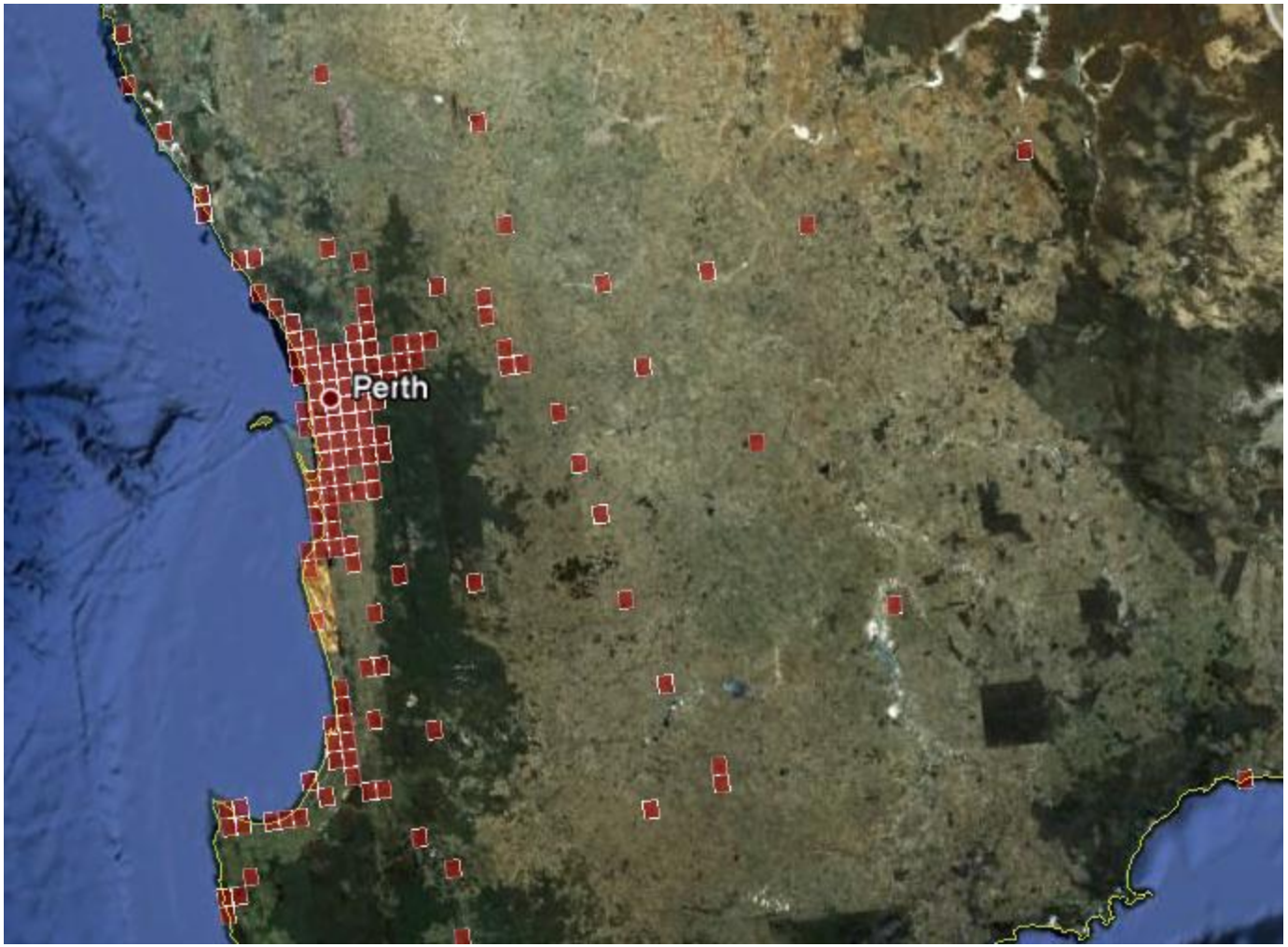
NBN Potential Fiber and Wireless Coverage



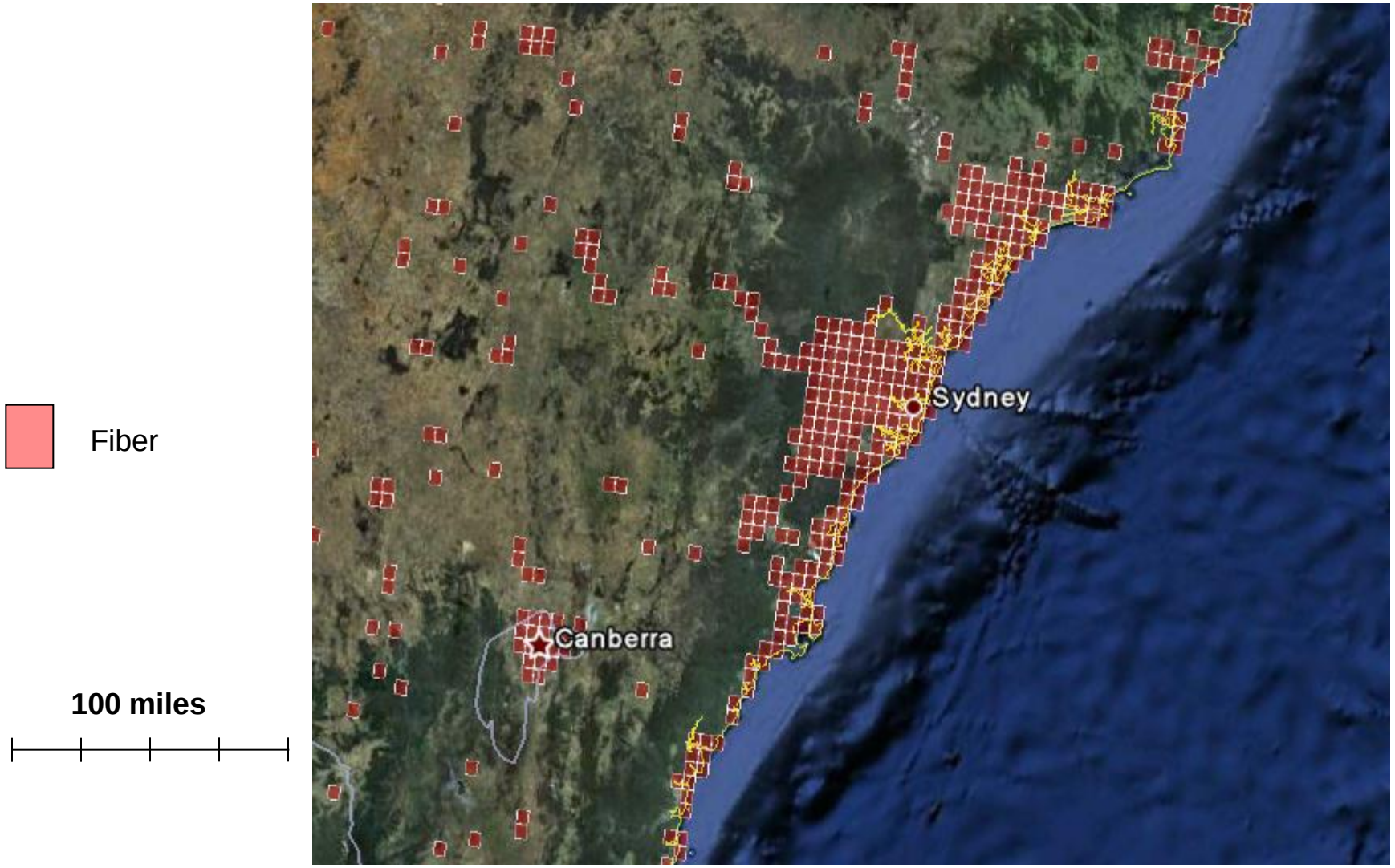
Potential Perth Area Fiber

Fiber

100 miles



Potential Sydney Area Fiber



Potential Brisbane Area Fiber

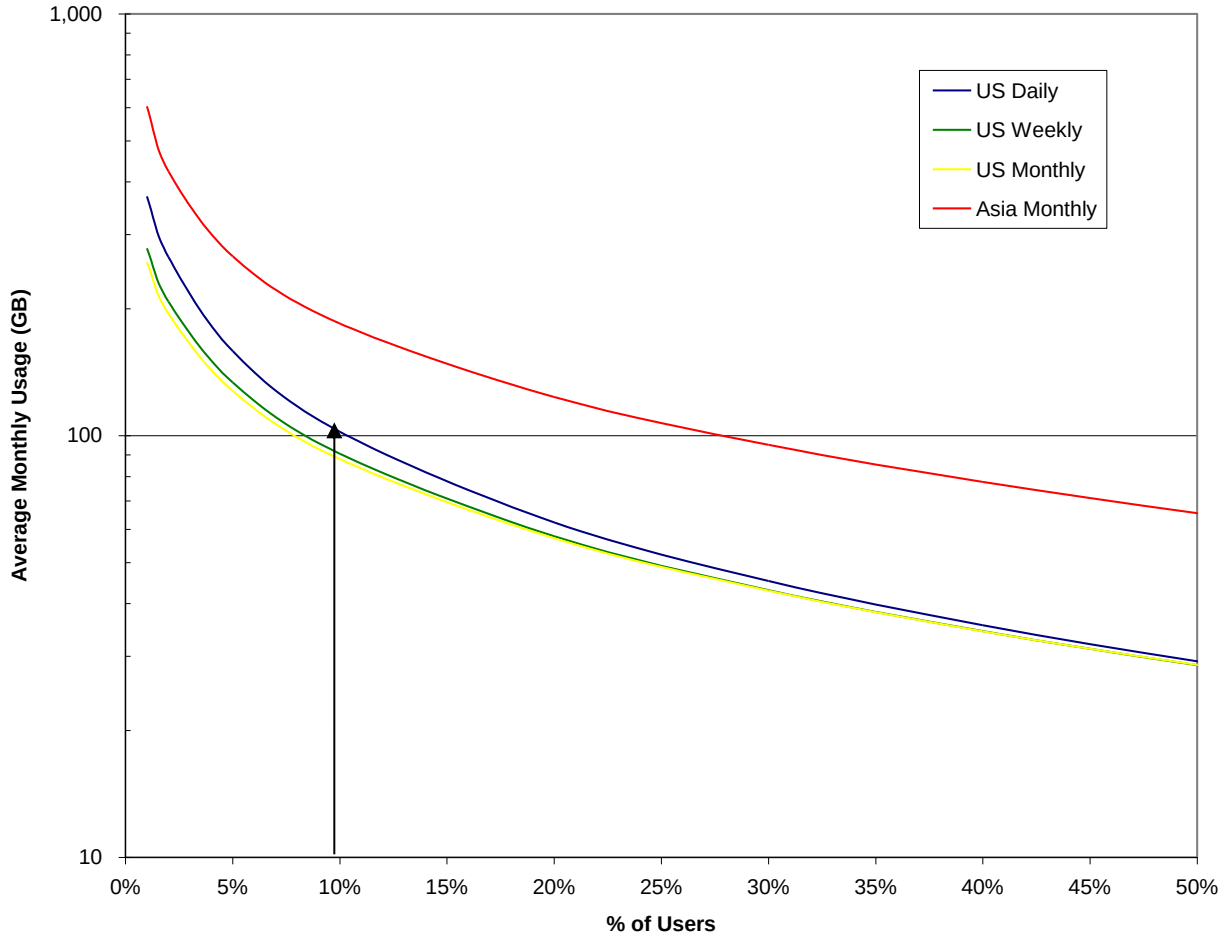
Fiber

100 miles

Capacity Analysis

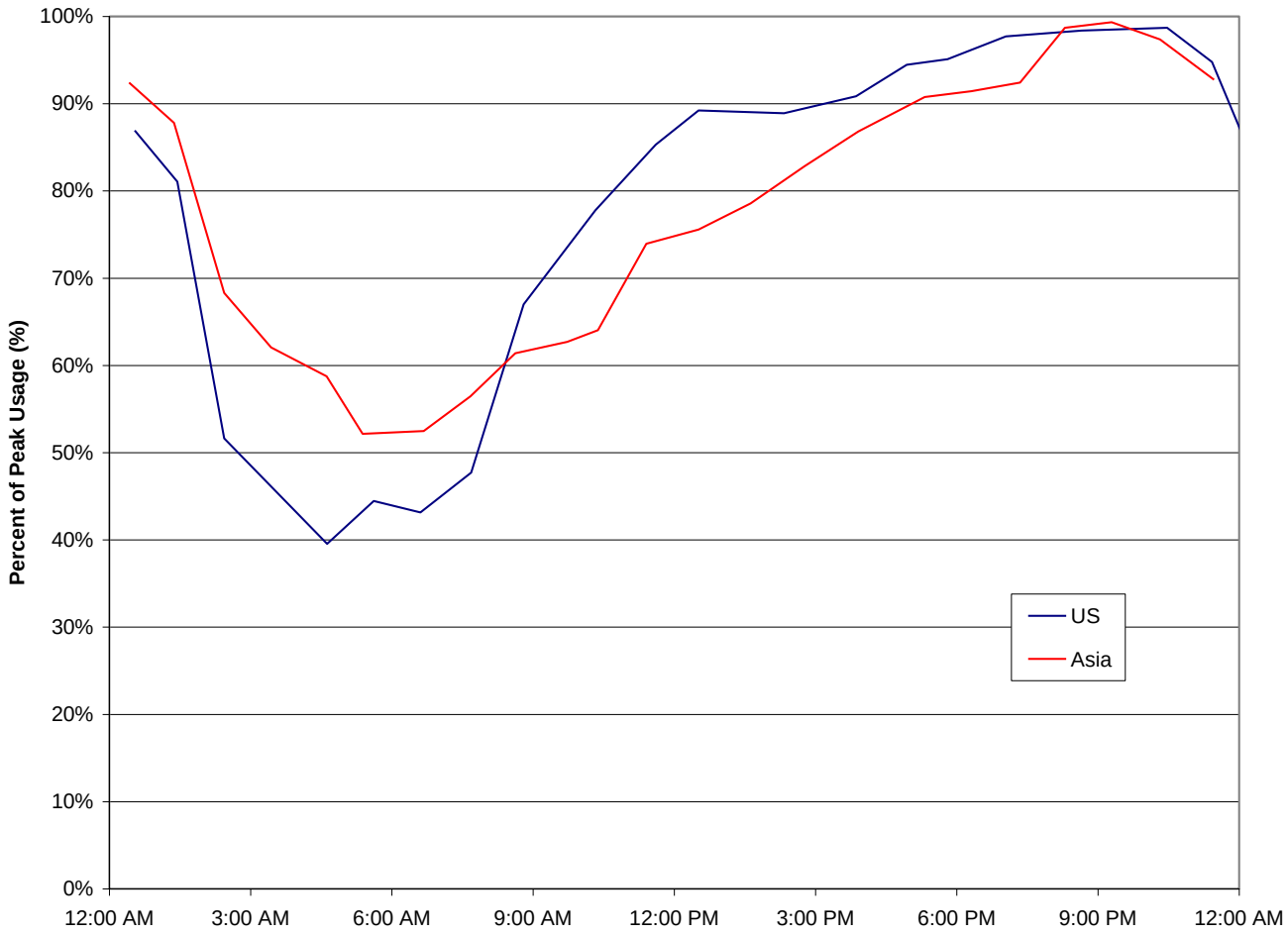
- **Capacity requirements per household based on 2010 broadband internet usage study**
  - Evaluated requirements using US and Asia Usage profiles
  - Only looked at downstream requirements (driver)
  - Broadband usage is dominated (43%) by Real-time entertainment
- **Typical Monthly Usage**
  - US: 15 GB (mean), 4 GB (median), 57 GB (Top 20%), 3 hours per day (mean)
  - Asia: 35 GB (mean), 15 GB (median), 123 GB (Top 20%), 5 hours per day (mean)
- **Diurnal Usage of Target market fairly flat**
  - 30% capacity over mean required for peak busy hour
- **Capacity per household per month based on average for Top 50% of current broad-band users**
  - Insures that satellite design can support future demand for the next twenty years
  - US: 115 kbps per household per month
  - Asia: 226 kbps per household per month

Current Broadband Household Usage



10th Percentile Household Downloads 100 GB per Month

Diurnal Broadband Household User



Need to 30% headroom to Support Busy Hour Demand

US Bandwidth Allocated per Household

Average BW per Household (kbps)			
Percentile	US Daily	US Weekly	US Monthly
1%	1,481	1,116	1,034
2%	1,064	835	781
5%	637	537	513
10%	410	363	353
20%	250	232	229
30%	182	173	172
40%	143	138	138
50%	117	115	115
60%	99	98	98
70%	86	85	85
80%	75	75	75
90%	67	67	67
100%	60	60	60

Need to Allocate 115 kbps per broad-band household to meet Top 50th Percentile Demand

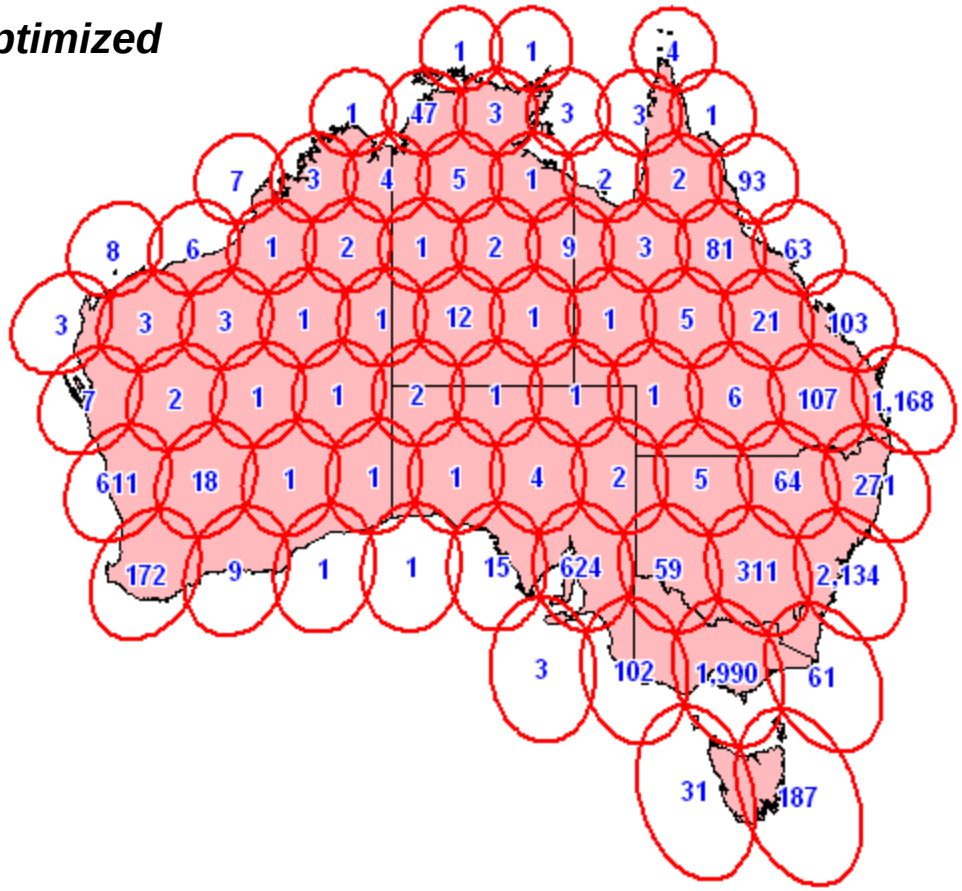
Satellite Coverage Analysis

- **Performed parametric analysis as a function of:**
  - Beam Size: 0.7, 0.9, 0.9 and 1.0 degree beams
  - Demand: US and Asia usage profile
  - Fiber Coverage: 250, 500, 1000 households per cell
- **No beam optimization was performed to load balance capacity**
  - Capability exists in current software
- **No Additional Wireless overlay (beyond 5 miles) used to reduce demand profile**
  - Capability exists in current software

Total Households Covered (in thousands*)

0.7 degree beams
134E Satellite

Coverage NOT Optimized

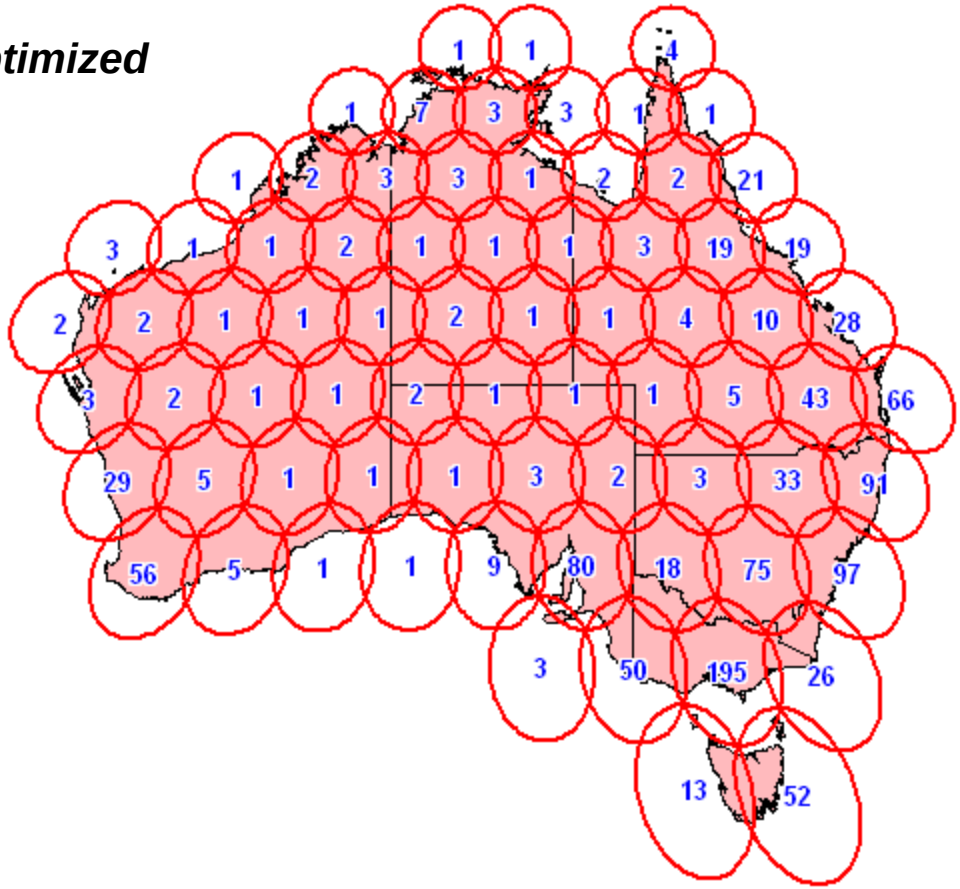


*Rounded up to nearest thousand

Underserved Households Covered* - Minimum Fiber Cell 1000 Households

0.7 degree beams
134E Satellite

Coverage NOT Optimized

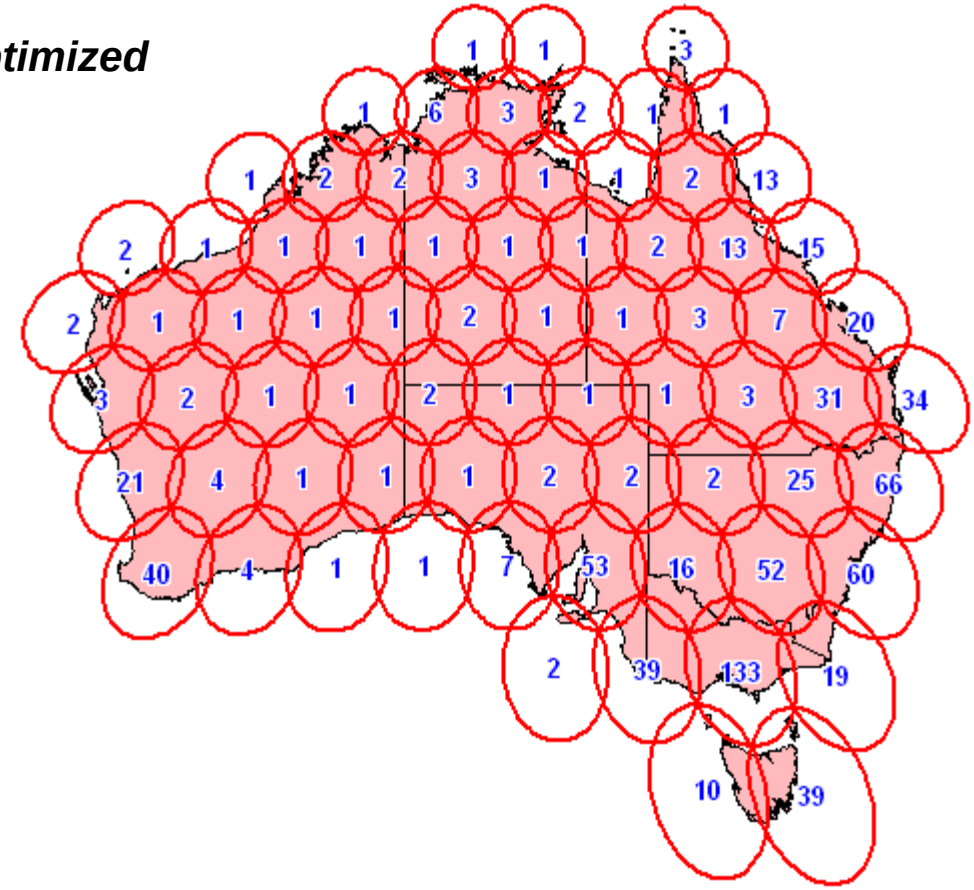


*In Thousands rounded up to nearest thousand

Underserved Households Covered* - Minimum Fiber Cell 500 Households

0.7 degree beams
134E Satellite

Coverage NOT Optimized

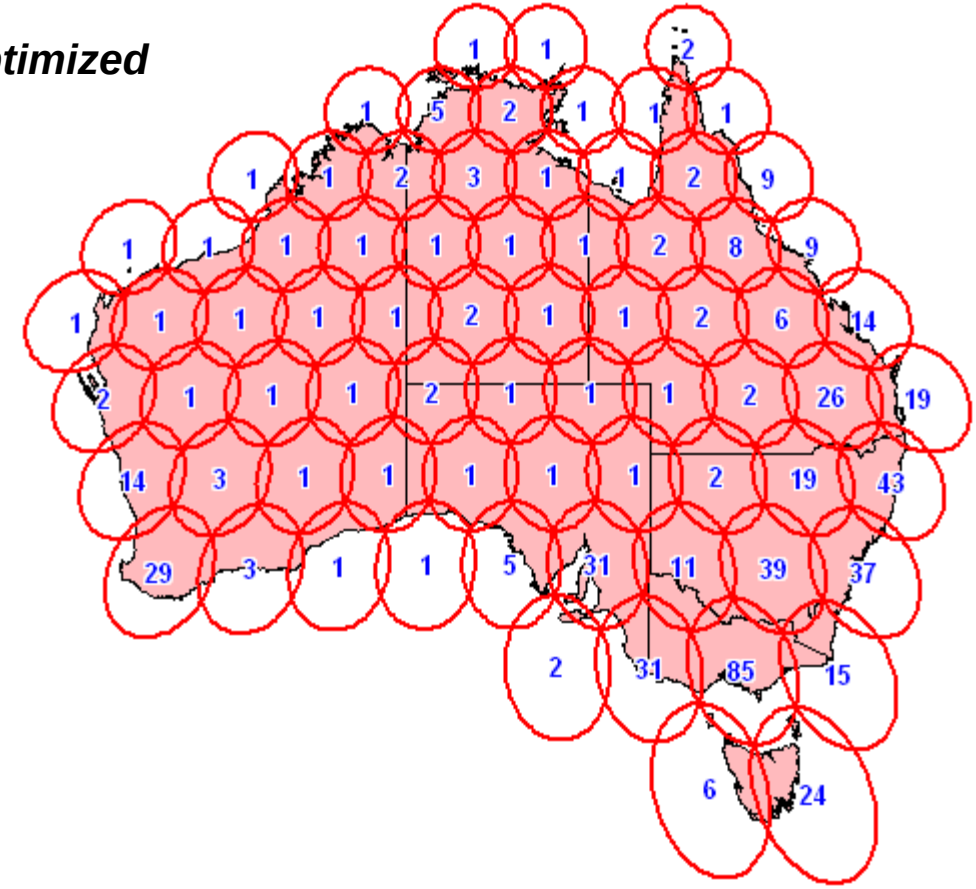


*In Thousands rounded up to nearest thousand

Underserved Households Covered * - Minimum Fiber Cell 250 Households

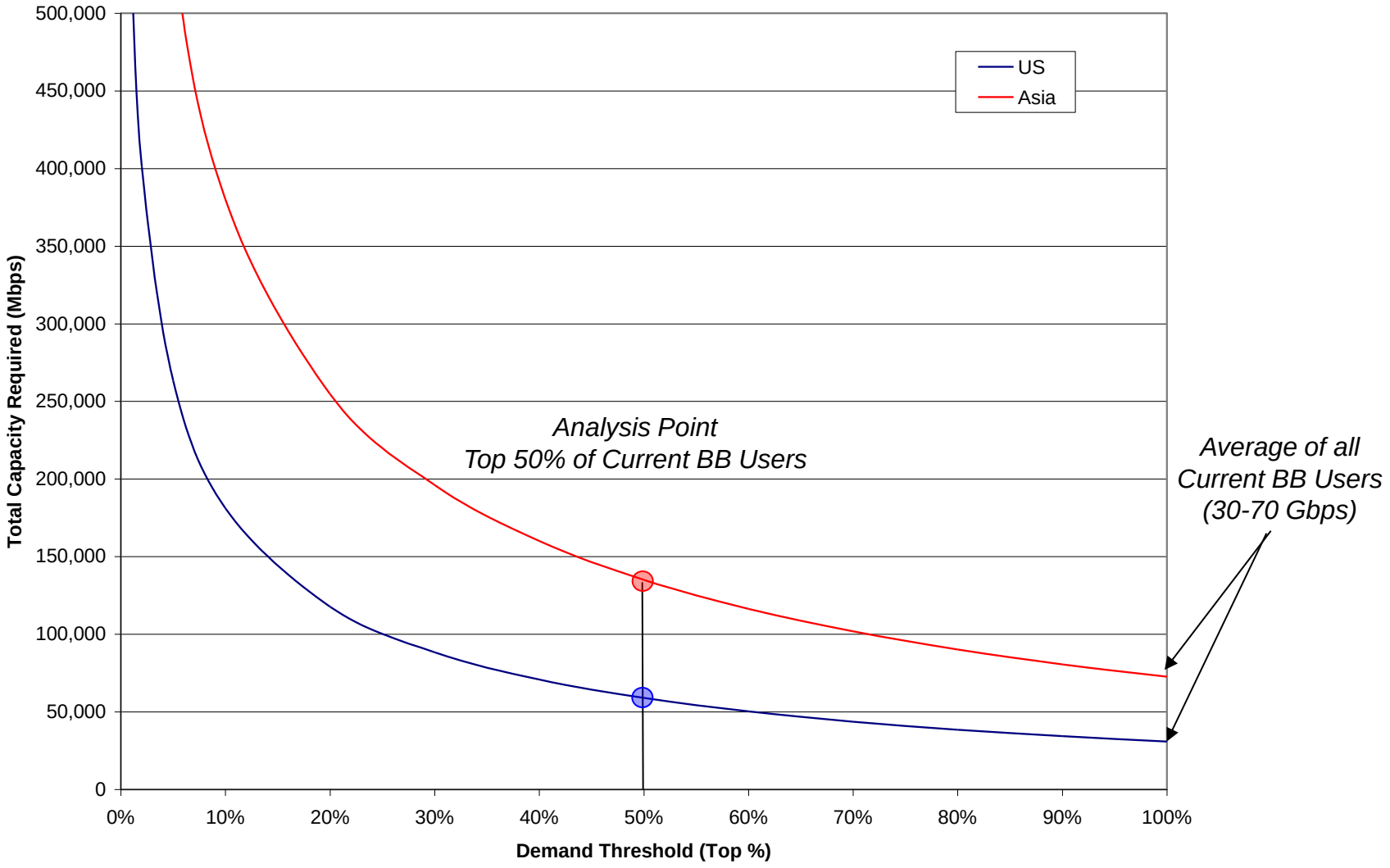
0.7 degree beams
134E Satellite

Coverage NOT Optimized



*In Thousands rounded up to nearest thousand

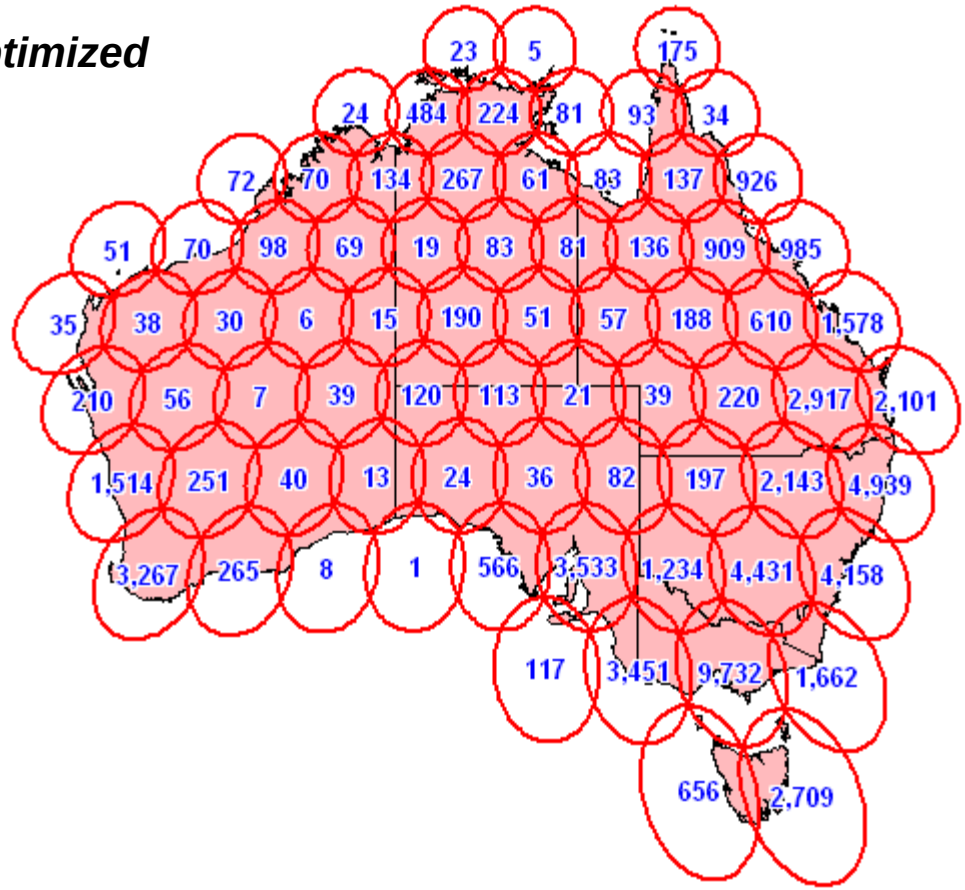
SATCOM Capacity Requirements
- 94% of Households Covered with Fiber & Wireless



Capacity (in Mbps) Required Per Beam - US Broadband Profile

0.7 degree beams
134E Satellite
250 Households Threshold

Coverage NOT Optimized

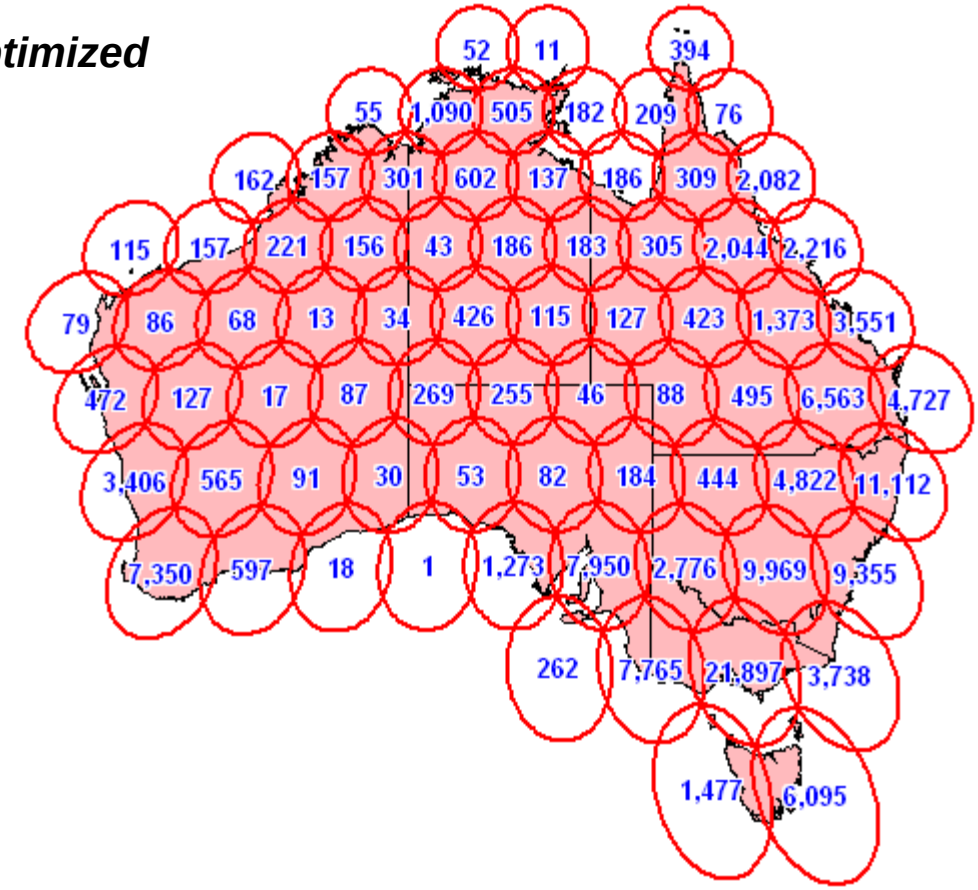


Requires Nearly 60 Gbps SATCOM Capacity to Support Underserved Market

Capacity (in Mbps) Required Per Beam - Asia Broadband Profile

0.7 degree beams
134E Satellite
250 Households Threshold

Coverage NOT Optimized



Requires Nearly 135 Gbps SATCOM Capacity to Support Underserved Market

For More Details Contact
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www.stratogis.com