Digital Switchover (DSO) Programme

Radio DSO Block 11C Tyne and Wear

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000A	08/03/11	Draft version for review.
001	15/03/11	Initial release
2.0	6/6/11	New editorial area. Added Shotleyfield in Case 4

Table of Contents

1 Tyne & Wear DSO Narrative

The current DAB allocation for Tyne and Wear is 11C and this has not been changed. The editorial area, however has been extended. The nearest co-block multiplexes are for Glasgow and South Yorkshire. These are shown in Figure 1.1. The Tyne and Wear boundary is shown in red.

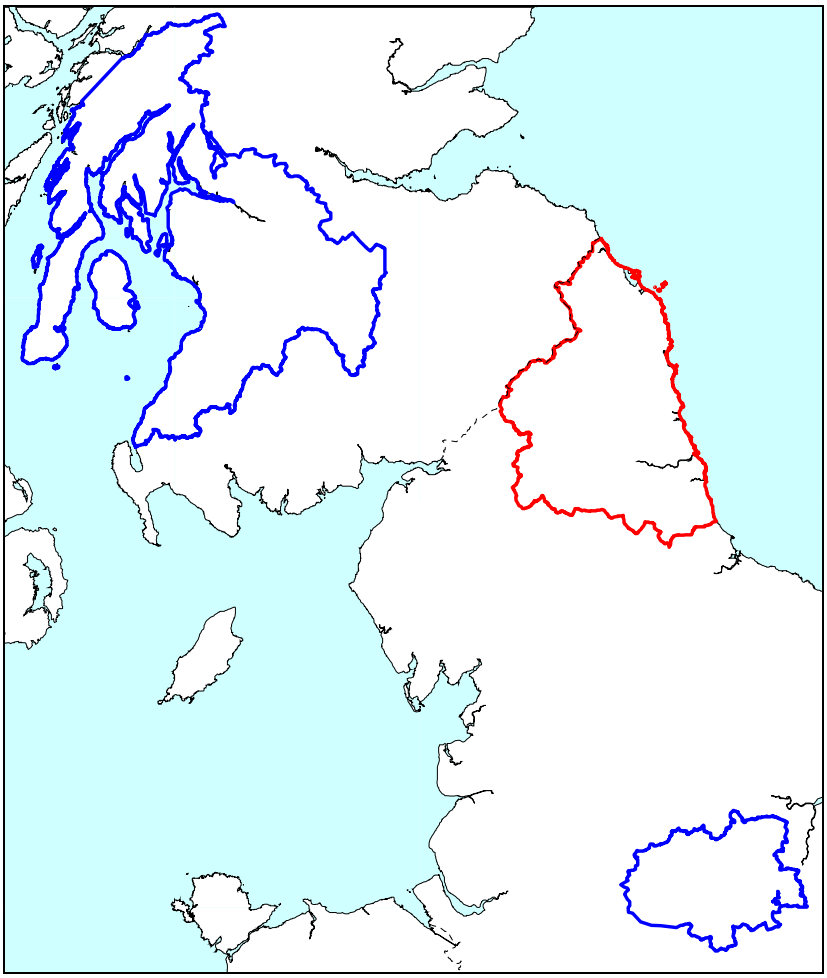

Figure 1.1: Proposed 11C Block Allocation

The Tyne and Wear editorial area has been expanded northwards to the Scottish border and now includes Coldstream and Berwick-upon-Tweed. The area has also been extended to the west slightly. The original Tyne & Wear editorial area and the revised editorial area are shown in figure 2.1. The original editorial area is shown by blue diagonal lines; the enlarged editorial area is shown with a yellow boundary.

In addition there is an overlap with the Teeside multiplex to the south, around the towns of Durham, Peterlee and Consett. This is also shown in figure 1.2, the Teeside multiplex is shown by grey crosses.

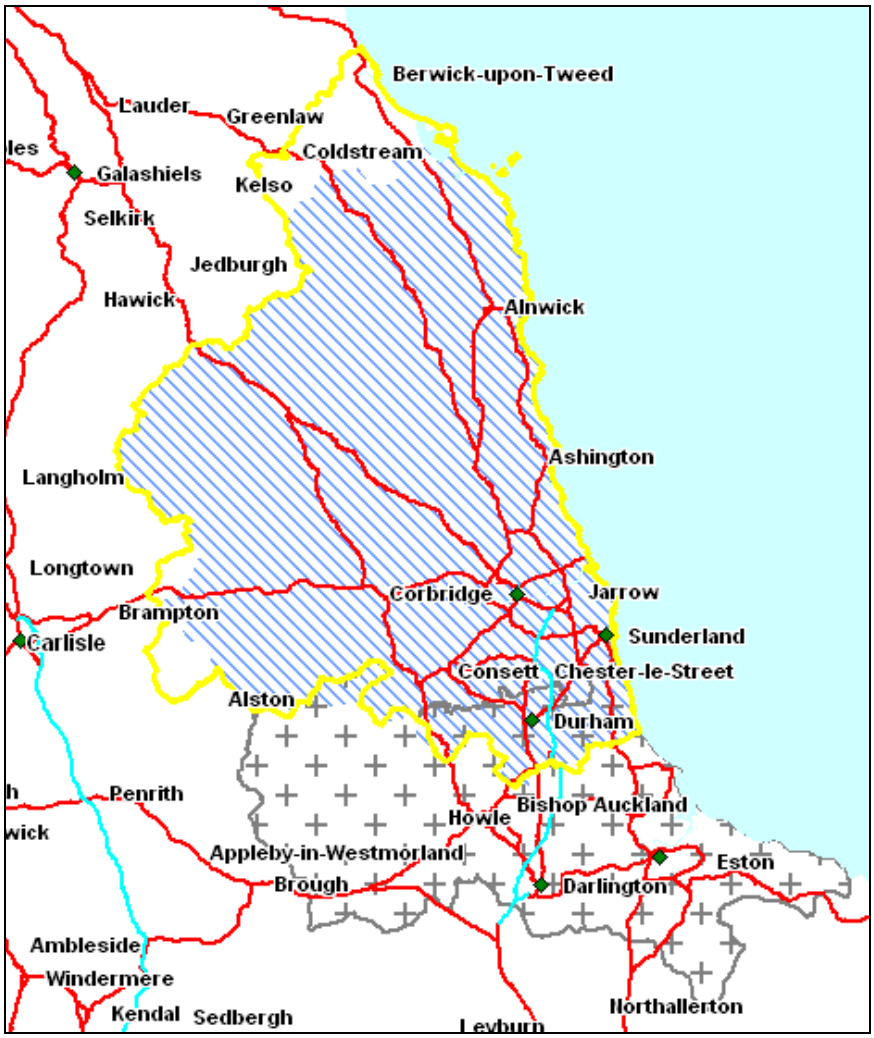

Figure 1.2:

Proposed 11C Block Allocation (yellow boundary) and the original Tyne and Wear area (Blue diagonal lines) overlap from Teeside Mux (Gray crosses)

In planning for each multiplex Ofcom have required coverage assessments:

- For each area four maps should be produced as follows:
    1. **Current Situation** - Map showing current actual coverage (or launch plans where a mux hasn't yet launched), including any transmitters which are required as part of the current licence, but which are not yet operational.
    2. **Modified Network 1** - Map showing the above, plus any improvements to existing infrastructure.
    3. **Modified Network 2** - Map of the above, plus additional smaller infill transmitters focused on areas where FM coverage is robust.
    4. **Modified Network 3** - Map of the above, plus additional transmitters to provide near universal coverage.

The current transmission characteristics (case 1) for Tyne and Wear are shown in table 1.1

Site Name	ERP	Site height m a.o.d.	Antenna height m a.g.l.	Antenna Type
Burnhope	4 kW	240	277	Cardioid
Fenham (see footnote 1)	0.2 kW[1]	120	35	Yagi (shared with North – East, and Digital 1)

Table 1.1: Tyne & Wear Current Transmission Characteristics

1.1 Outgoing interference and sensitivity to other co-block multiplexes

There is some loss of coverage from due to co-channel interference at 1% time both for the existing coverage and for the DSO plan, but it is not significant and there is no region disproportionately affected. Typically the major population centres remain robustly protected from incoming co-channel interference, the outlying mobile coverage is less well protected from CCI, but this, by the nature of the terrain around Tyne & Wear is fairly sparsely populated.

[1] The Fenham transmitter ERP was increased from 200W to 1.4kW during the writing of this report, for consistency the original 200W ERP for Fenham has been maintained for Case 1. The increase in ERP has been considered for Case 2.

2 Coverage of Multiplex

2.1 Existing Multiplex Consideration – Case 1

The existing coverage Tyne & Wear; is limited partly by its use of only two transmitters. Increasing the DAB coverage for Tyne and Wear multiplex over this enlarged area, consideration has been given to improve the coverage from the existing transmitters. The existing coverage is shown is shown in Figure 2.1.

2.2 Modified Network 1 –Change to Existing infrastructure – Case 2

The existing Tyne & Wear transmitter Fenham is operating at 200W, and the centre of Newcastle has some pockets of poor coverage, it is proposed that Fenham use an ERP of 1.4kW for DSO. There is unlikely to be much prospect of changing the antenna at this very busy site.

During the writing of this report, the Tyne & Wear Fenham DAB ERP has been increased to 1.4 kW (from 200W) as part of a series of increases in ERP on behalf of Bauer Radio. This recent increase in ERP at Fenham uses a yagi antenna which is shared with Digital 1, MXR North East and EMAP Tyne and Wear. There is no spare capacity for any further increase in ERP without re-engineering this shared antenna. The BBC DAB service from this site uses a separate cardioid antenna.

At this time, consideration has not been given to modifying Burnhope, however on previous occasions, comparisons have been made between the use of Burnhope and Pontop Pike, and the benefit to the urban areas in Newcastle from Burnhope typically outweighs any benefit to outlying areas south of these transmitters achieved by changing sites.

This coverage is shown in:-

Figure 2.2 Case 2 Modified Network 1 - Increase in ERP at Fenham

This does increase the coverage in and around Newcastle-upon-Tyne; but does little to extend the coverage beyond the city, especially to the populated areas to the north.

2.3 Modified Network 2 - Comparison to existing Coverage – Case 3

In order to improve coverage the following transmitters have been considered for addition to this multiplex:-

Sunderland, Morpeth, Chatton, Newton, Peterlee and Shilbottle.

There are existing DAB services at some of these sites. MXR North East uses Sunderland, and BBC national uses Sunderland, Morpeth and Chatton.

Newton, Peterlee and Chatton do not yet have DAB services planned. The use of these sites would significantly improve the DAB coverage and be closer to the current VHF coverage in this area.

This coverage is shown in:-

Figure 2.3 Case 3 Modified Network 2 - Increase in coverage for Tyne and Wear.

This coverage significantly increases the indoor populations; however roads coverage is still poor; especially inland and along some of the major routes.

2.4 Extension to DAB coverage to the Roads Network – Case 4

In order to improve coverage predominantly for the road network; and to make the coverage more contiguous the following transmitters have been considered for addition to this multiplex:-

Berwick-upon-Tweed, Haydon Bridge, Haltwhistle, Shotleyfield and Byrness. No DAB services are planned for these sites yet. The use of these sites would significantly improve the DAB coverage for the major routes within this editorial area.

This coverage is shown in:-

Figure 2.4 Case 4 Modified Network 4 - Increase in coverage for Tyne and Wear.

2.5 Coverage Maps

These maps included with this report are

Figure 2.1 Case 1 - Tyne & Wear 11C Existing - interference limited coverage 1%

Figure 2.2 Case 2 Modified Network 1 - Tyne & Wear with Fenham increased in ERP interference limited coverage 1% time

Figure 2.3 Case 3 – Modified Network 2 – interference limited 1% time

Figure 2.4 Case 4 - Modified Network 3 – Interference Limited 1%

Coverage maps for DAB are presented with three colours.

Blue = Mobile coverage (99% locations at 99% time)

Dark Green = Indoor coverage (80-95% locations at 99% time)

Light Green = Robust Indoor coverage (>95% locations at 99% time)

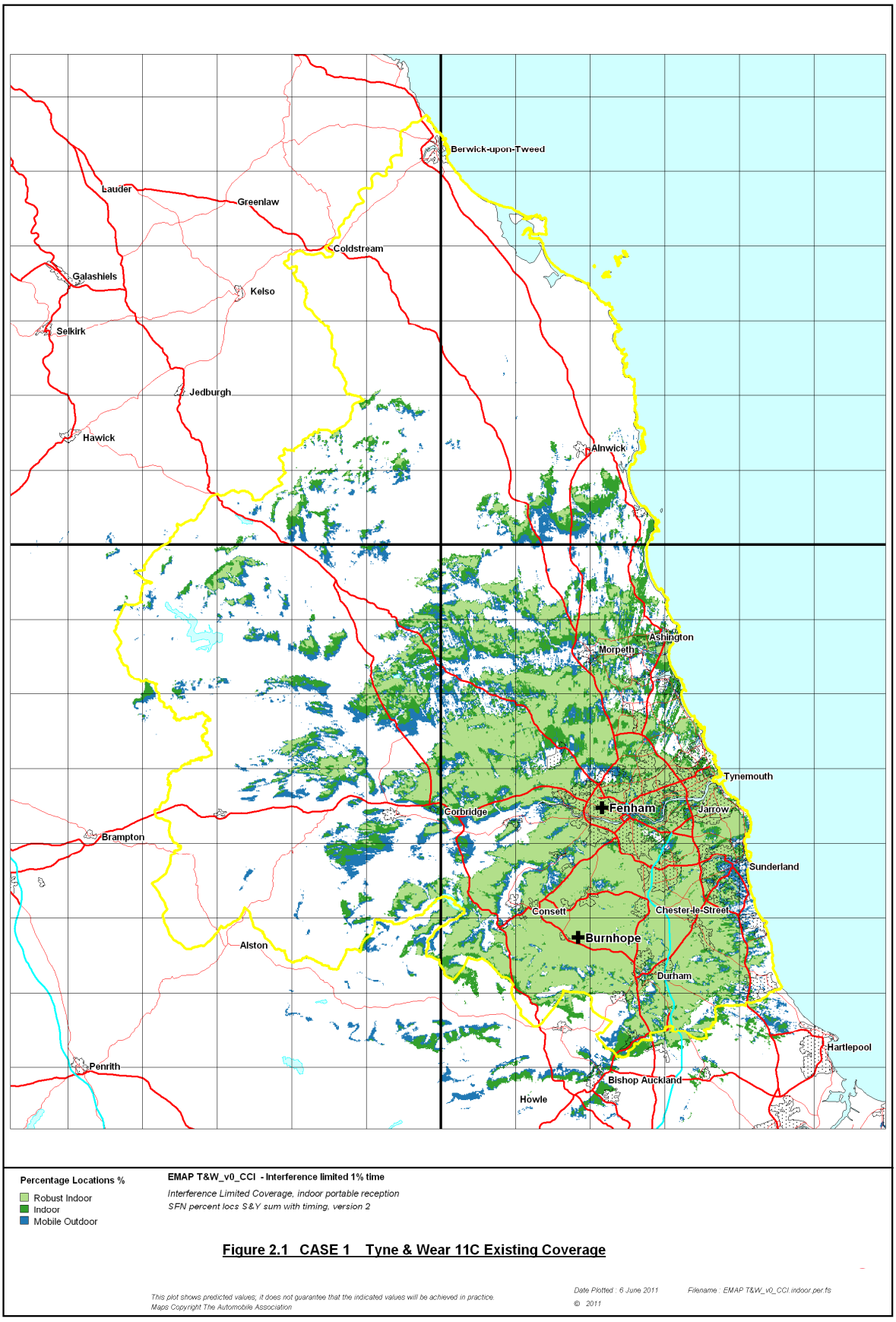

Figure 2.1 CASE 1 Tyne & Wear 11C Existing Coverage

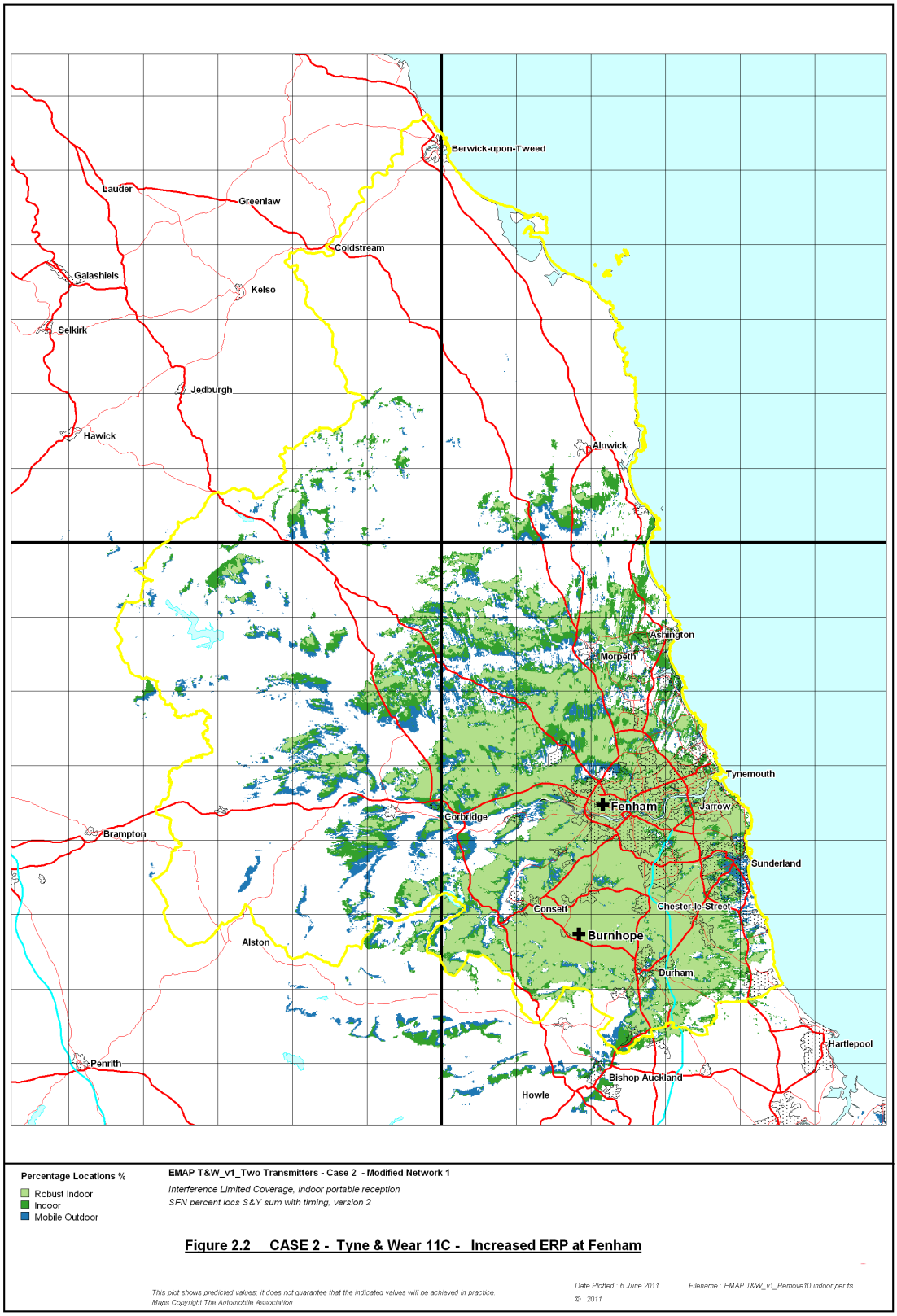

Figure 2.2 CASE 2 - Tyne & Wear 11C - Increased ERP at Fenham

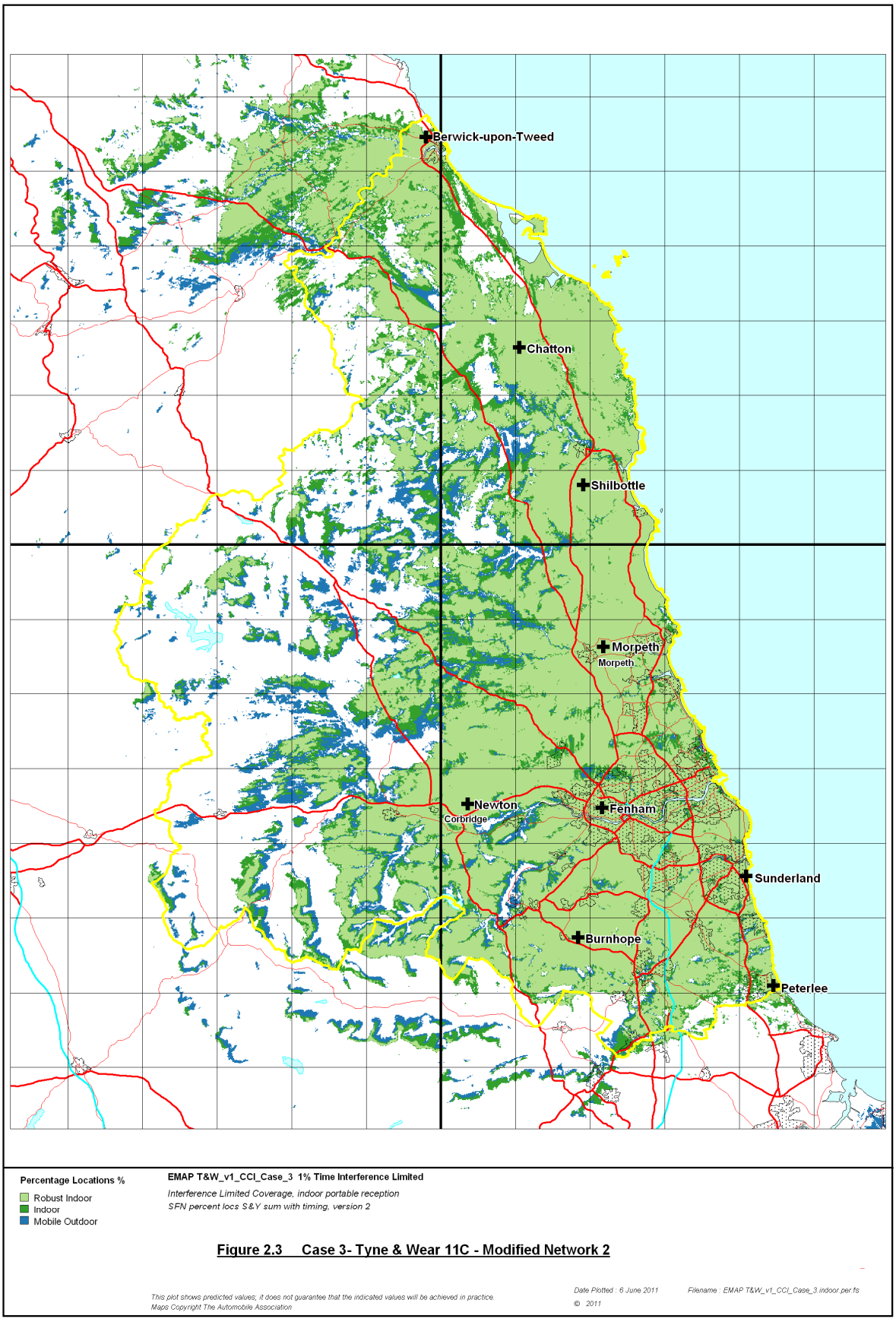

Figure 2.3 Case 3- Tyne & Wear 11C - Modified Network 2

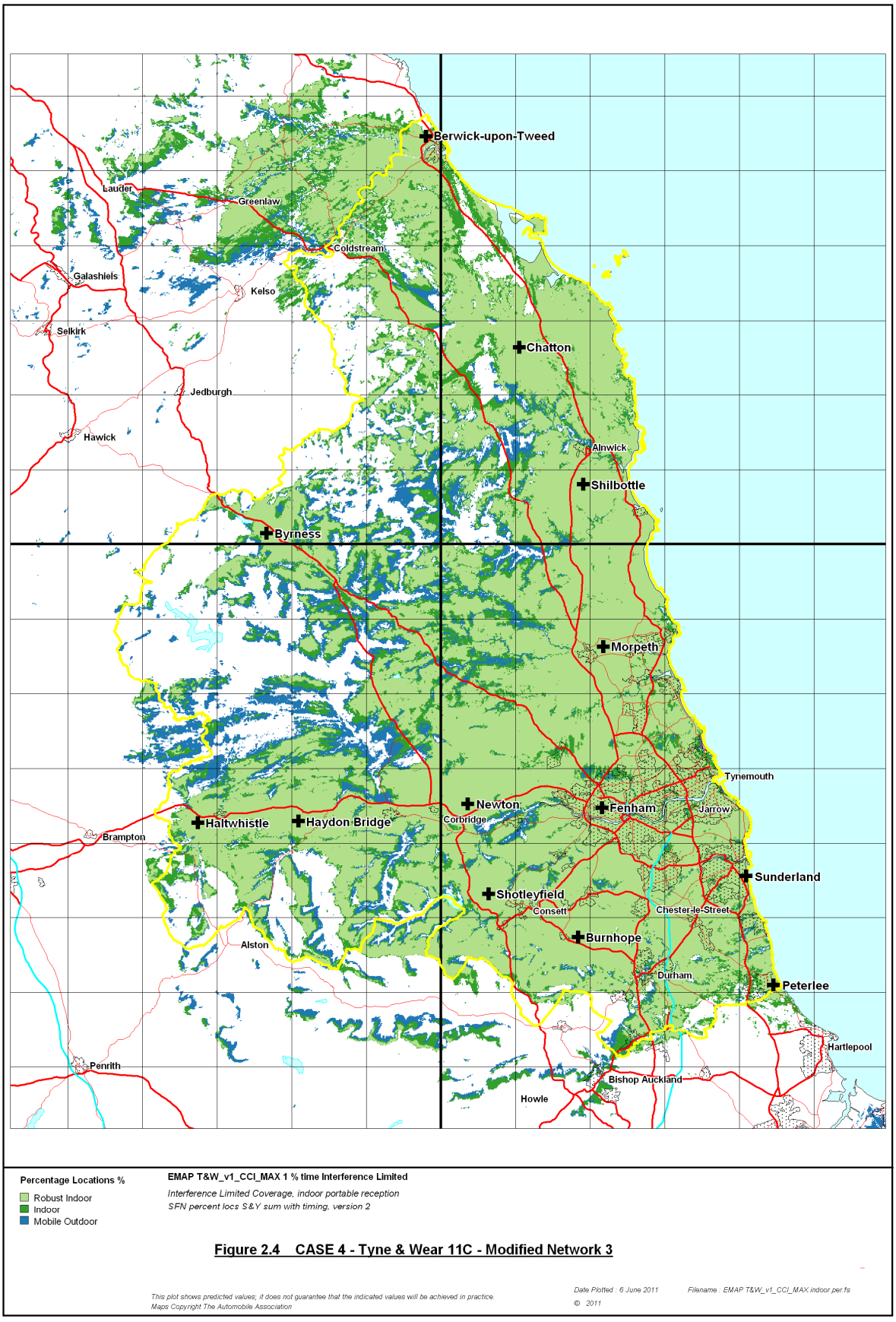

Figure 2.4 CASE 4 - Tyne & Wear 11C - Modified Network 3

2.6 Population Coverage Tables

The following population coverage tables 2.1 and 2.2 are coloured thus:-

Case 1

Light Yellow = Existing Tyne and Wear *(2 transmitters- pre ERP increase at Fenham*)

Case 2

Light Blue = Modified Network 1 *(2 transmitters – post ERP increase at Fenham)*

Case 3

Light blue + Orange = Modified Network 2 *(8 transmitters)*

Case 4

Light blue + Orange + Light Green = Modified Network 3 *(12 transmitters)*

Table 2-1. Population coverage proportional indoor 99%T: Total 816924

Site scenario and incremental additional sites	Site Type	Individual Gross Interference Limited coverage within Editorial Area	Number of households within Editorial Area	Increase in number of households	Incremental percentage increase of population	Percentage of Editorial Area
Current Tyne and Wear Mux	Existing Infrastructure		586358			71.78
Modified Tyne & Wear Mux	Existing infrastructure (Burnhope Unchanged, Fenham 1.4kW)		602756	16398	2.00%	73.78
Sunderland	Existing DAB site	52793 (6.46%)	648097	45341	5.55	79.33
Morpeth	Existing DAB site	49172 (6.02%)	699562	51466	6.30	85.63
Chatton	Existing DAB site	11202 (1.37%)	723678	24116	2.95	88.59
Peterlee	Existing FM site	9939 (1.22%)	735637	11959	1.46	90.05
Newton	New site	11988 (1.47%)	747421	11784	1.44	91.49
Shilbottle	Existing FM site	11247 (1.38%)	754187	6766	0.83	92.32
Shotleyfield	New Site	16649 (2.04%)	763825	9639	1.18	93.50
Berwick-upon-Tweed	New Site	7499 (0.92%)	771586	7761	0.95	94.45
Haydon Bridge	New Site	3389 (0.41%)	775275	3689	0.45	94.90
Haltwhistle	New Site	2541 (0.31%)	776178	903	0.11	95.01
Byrness	New Site	204 (0.02%)	776848	670	0.08	95.09

Table 2-2. Road coverage 99% locations, 99%T: Total 1221 km

Site scenario and incremental additional sites	Site Type	Total road length in km	Increase in number of road length in km	Incremental percentage increase of road length	Percentage of roads within the editorial area
Current Tyne and Wear Mux	Existing Infrastructure	738.5			60.48
Modified Tyne & Wear Mux CASE 1	Existing infrastructure (Burnhope Unchanged, Fenham 1.4kW)	716.8	-21.7 (losses due to increase in incoming CCI)	-1.77	58.71
Sunderland	Existing DAB site	740.8	24.0	1.97	60.67
Morpeth	Existing DAB site	843.9	103.0	8.44	69.11
Chatton	Existing DAB site	929.8	86.0	7.04	76.15
Peterlee	Existing FM site	935.2	5.4	0.44	76.59
Newton	New site	972.5	37.3	3.05	79.65
Shilbottle	Existing FM site	986.1	13.6	1.12	80.76
Shotleyfield	New Site	993.0	6.9	0.56	81.33
Berwick-upon-Tweed	New Site	1026.7	33.7	2.76	84.09
Haydon Bridge	New Site	1068.3	41.6	3.41	87.50
Haltwhistle	New Site	1076.9	8.5	0.70	88.19
Byrness	New Site	1113.8	37.0	3.03	91.22

Table 2-3. Summary of Coverage within Editorial Area for Each Case

Case	Indoor Household (& percentage coverage)	Mobile Road Coverage (& percentage coverage) 99% locations
1	586,358 (71.78%)	738.5 (60.48%)
2	602,756 (73.78%)	716.8 (58.71%)
3	754,187 (92.32%)	986.1 (80.76%)
4	776,848 (95.09%)	1113.8 (91.22%)

Case 1 - Light Yellow = existing sites unchanged
Case 2 - Light Blue = modified network 1
Case 3 - Orange = modified network 2
Case 4 - Light Green = modified network 3