GLAINTELLIGENCE UNIT

A pupil flow based model for school roll projections in London

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Greater London Authority

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Background

- Education provision is expensive - 4–6% of national income[1]
- Responsibility for state provision lies with LAs
- GLA provides supporting role by producing school roll projections
- Population of London is growing

[1] https://www.ifs.org.uk/tools_and_resources/fiscal_facts/public_spending_survey/education

Background

- Education provision is expensive - 4–6% of national income[1]
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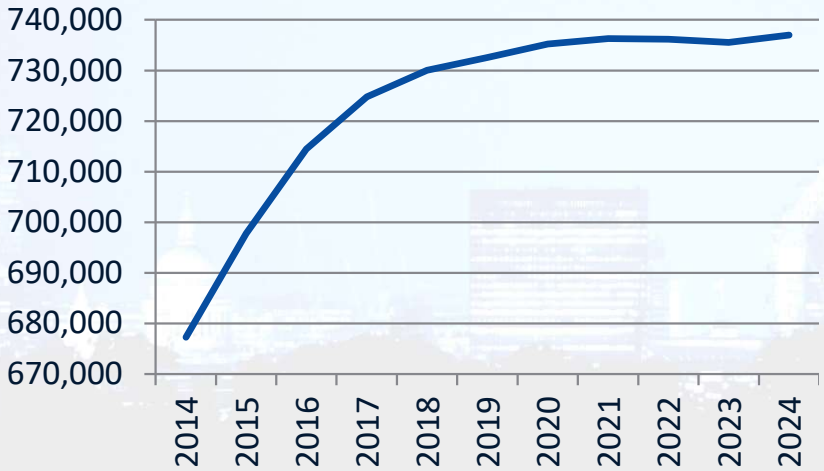
- Population of London is growing

State school place demand (primary)



http://data.london.gov.uk/dataset/pan-london-school-place-demand

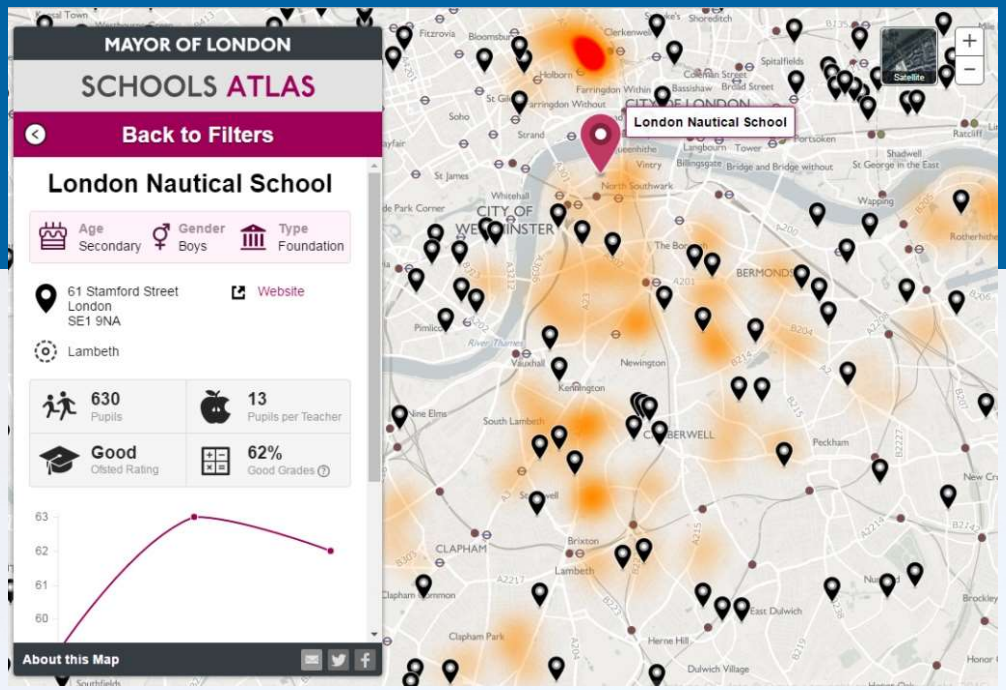
[1] https://www.ifs.org.uk/tools_and_resources/fiscal_facts/public_spending_survey/education

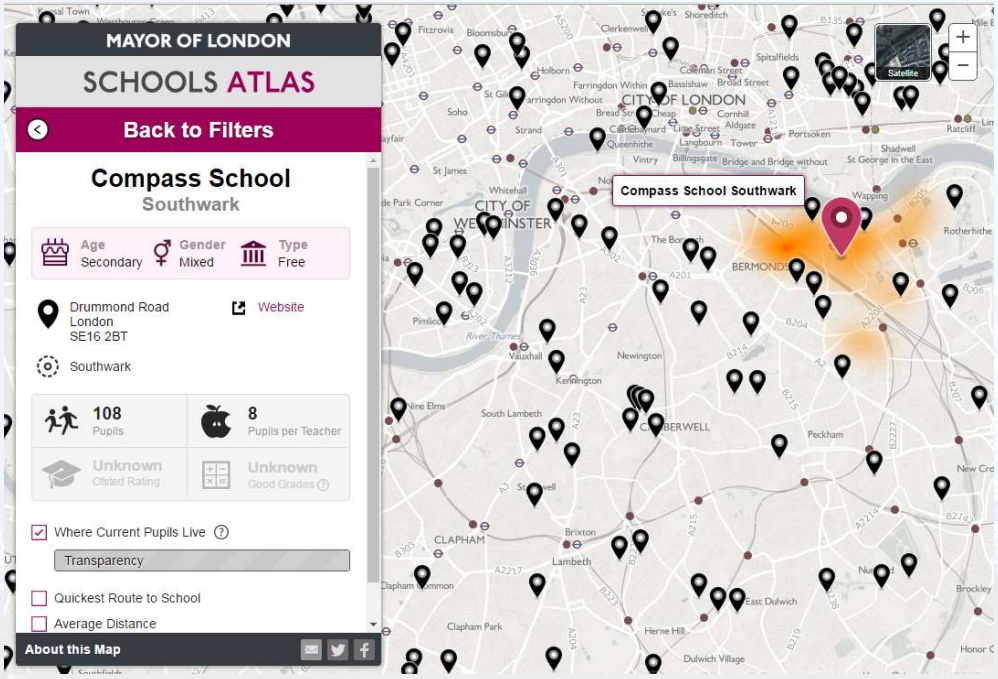
Challenges for London

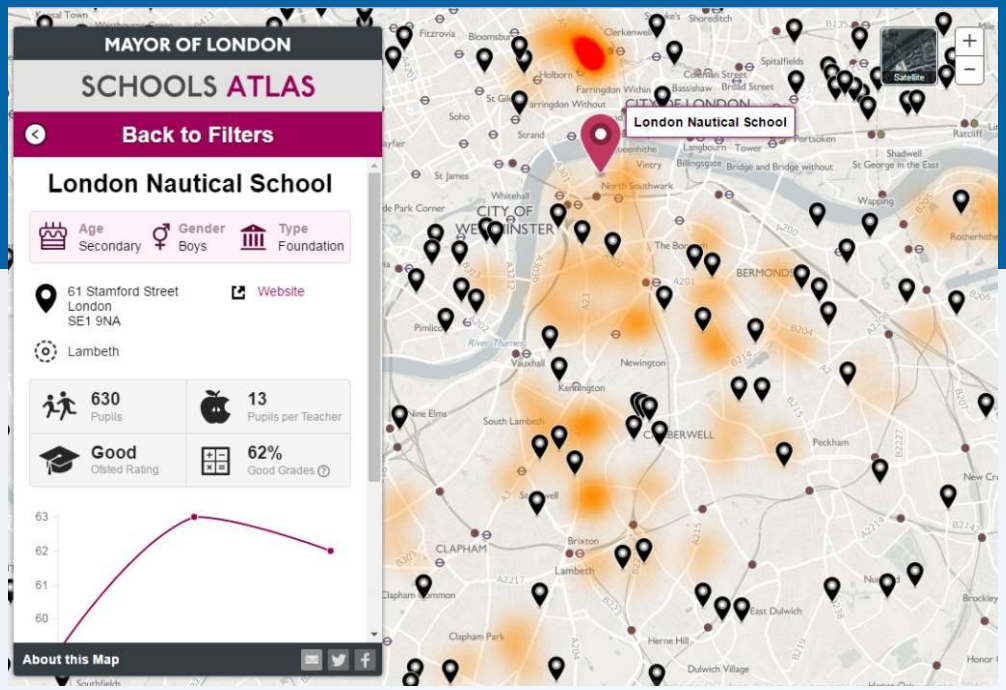
- High population density
- Good transport links

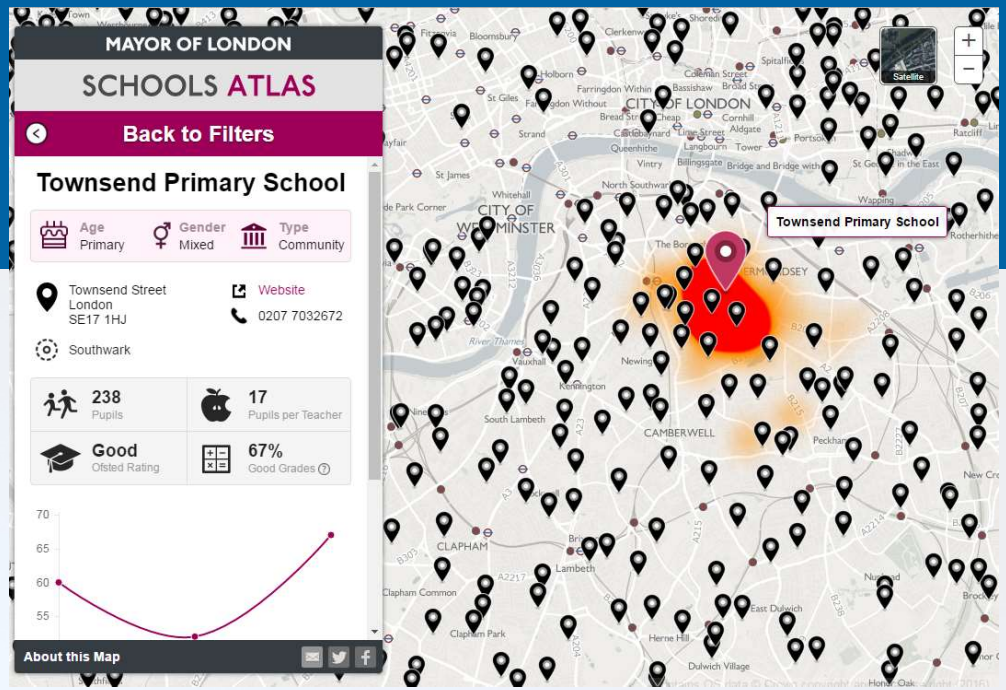
} high cross border mobility

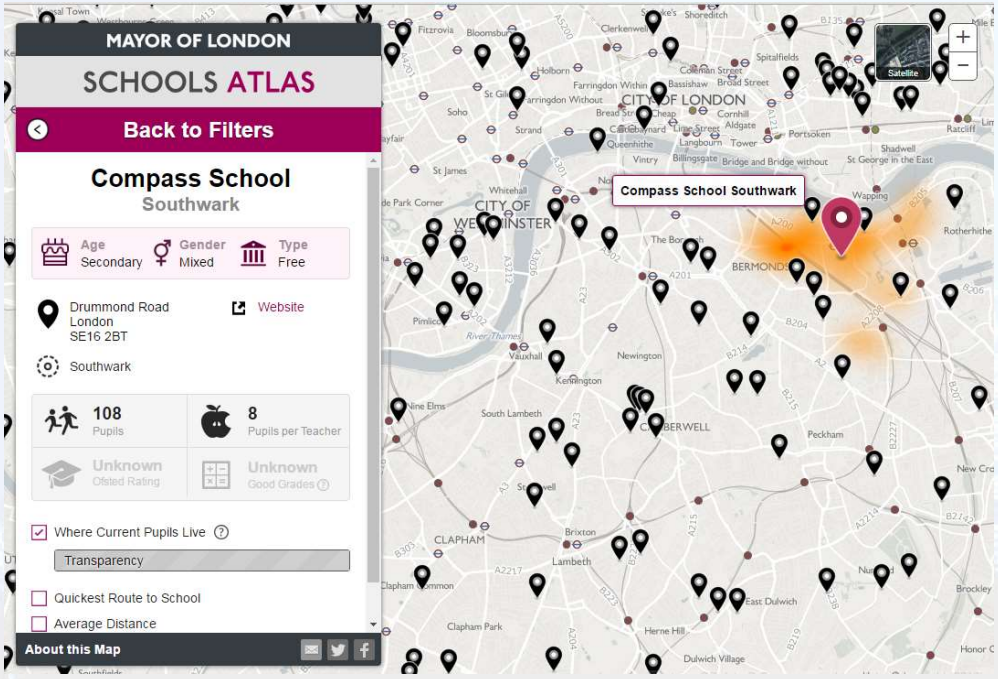
- Highly diverse – areas all have different characteristics
- Children often don't attend nearest school

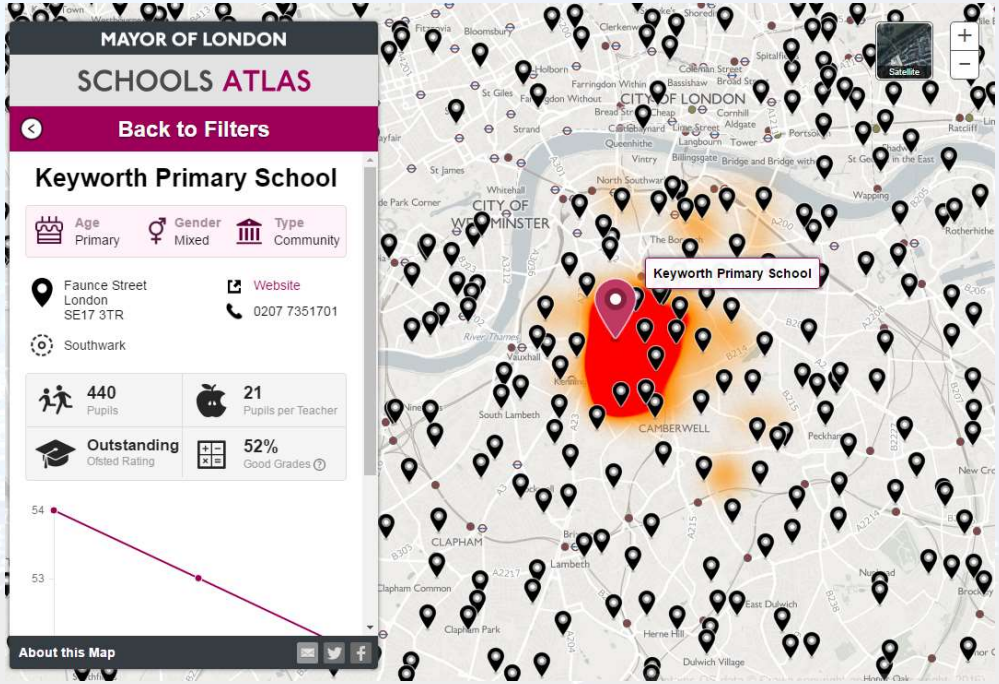

MAYOR OF LONDON
SCHOOLS ATLAS
Back to Filters
London Nautical School
Age Secondary
Gender Boys
Type Foundation
61 Stamford Street
London
SE1 9NA
Website
Lambeth
630 Pupils
13 Pupils per Teacher
Good Ofsted Rating
62% Good Grades
63
62
61
60
About this Map
London Nautical School


MAYOR OF LONDON
SCHOOLS ATLAS
Back to Filters
Compass School
Southwark
Age Secondary
Gender Mixed
Type Free
Drummond Road
London
SE16 2BT
Website
Southwark
108 Pupils
8 Pupils per Teacher
Unknown Ofsted Rating
Unknown Good Grades
Where Current Pupils Live
Transparency
Quickest Route to School
Average Distance
About this Map
Compass School Southwark









Schools Atlas: maps.london.gov.uk/schools

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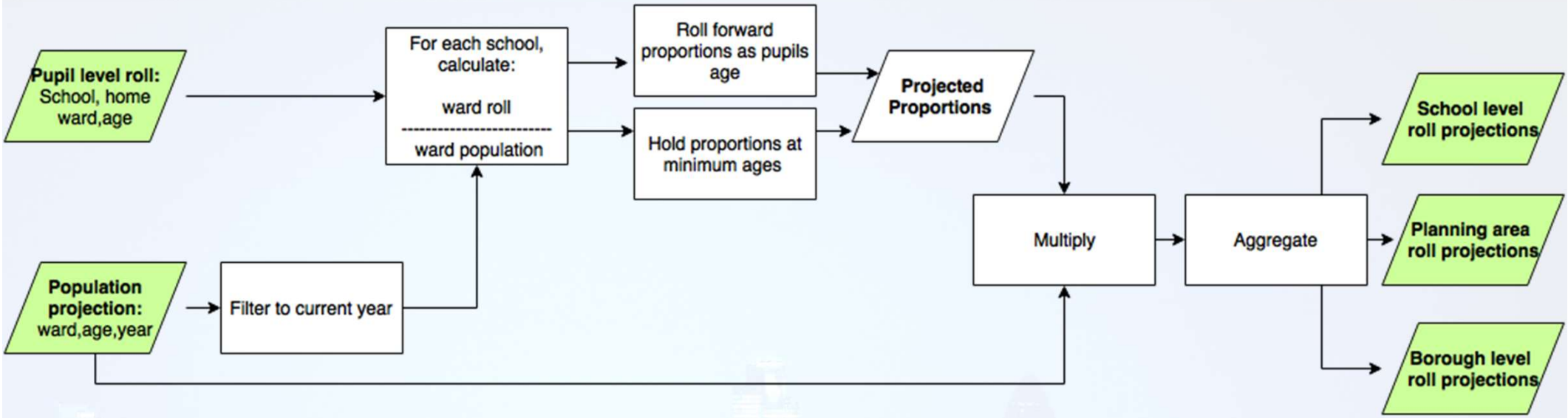
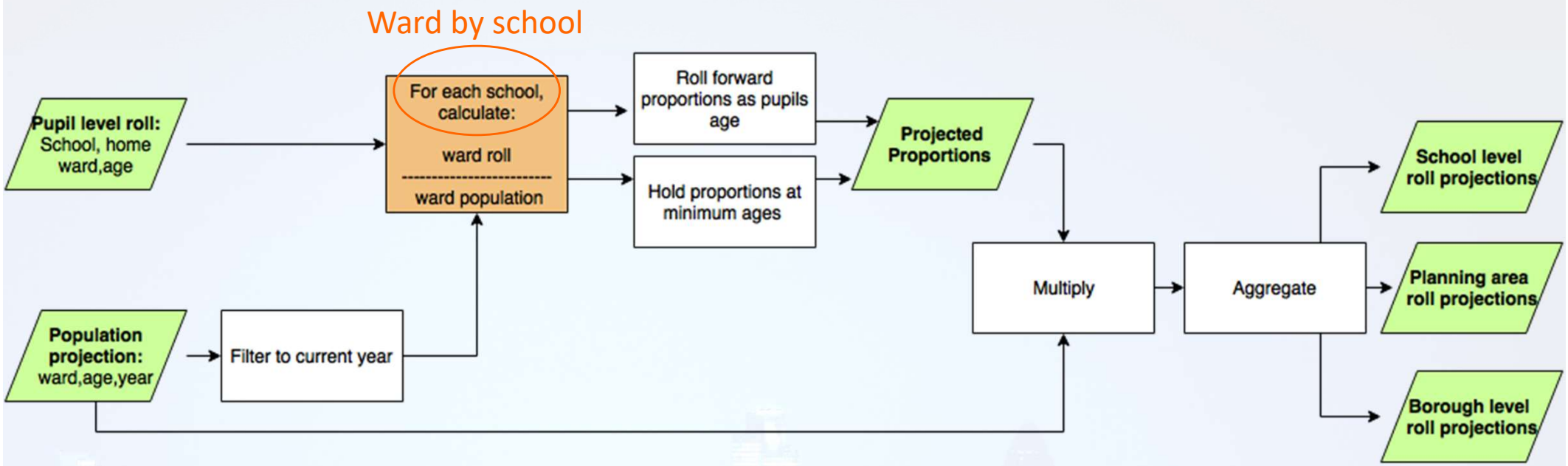
Changes to model

New	Previous
Pupil level input data	School level input data
Links to: Pupil home ward population	Linked to: School planning area population
Net effect of cross border flows transparent	Net effect of cross border flows opaque
Private school take-up transparent	Private school take-up opaque
Built in R	Built in Excel/VBA

Methodology

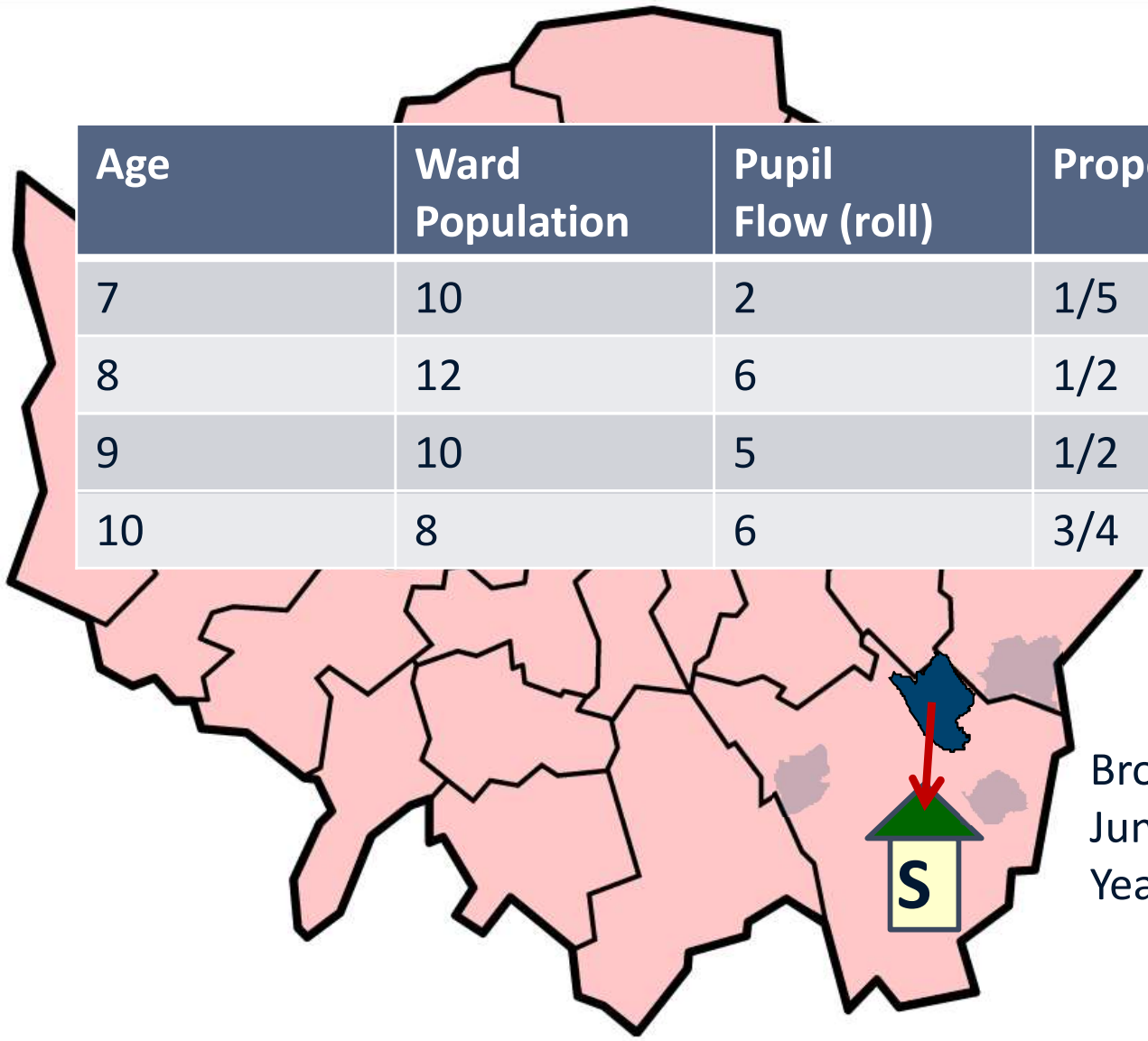


Methodology



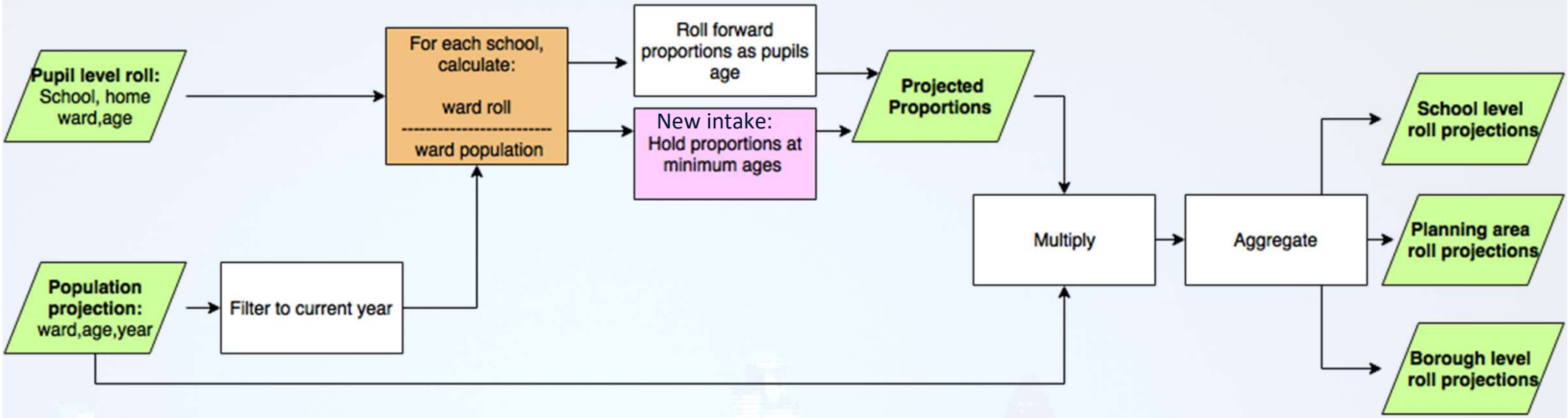
Pupil flow proportion

Age	Ward Population	Pupil Flow (roll)	Proportion
7	10	2	1/5
8	12	6	1/2
9	10	5	1/2
10	8	6	3/4



Bromley
Junior Phase Primary
Year 3 to Year 6

Methodology



New intake from ward

- Case A: hold the current youngest year

Primary School
Year 3 to Year 6

Single Ward

Age	Proportion	+ 1 year
7	1/5	**1/5**
8	1/2	1/5
9	1/2	1/2
10	3/4	1/2

School maximum age group

New intake from ward

- Case B: youngest year has no contribution

Primary School
Year 3 to Year 6

Single Ward

Age	Proportion	+ 1 year	+ 1 year	+ 1 year
7	0	0	0	0
8	1/2	0	0	0
9	1/2	1/2	0	0
10	3/4	1/2	1/2	0

School maximum age group

New intake from ward

- Case B: youngest year has no contribution

Primary School
Year 3 to Year 6

Our Solution

Age	Proportion
7	0
8	1/8
9	0
10	1/8

Average = 1/16

New intake from ward

- Case B: youngest year has no contribution

Primary School
Year 3 to Year 6

Our Solution

+ 1 year

Age	Proportion	
7	0	1/16
8	1/8	0
9	0	1/8
10	1/8	0

Average = 1/16

New intake from ward

- Case B: youngest year has no contribution

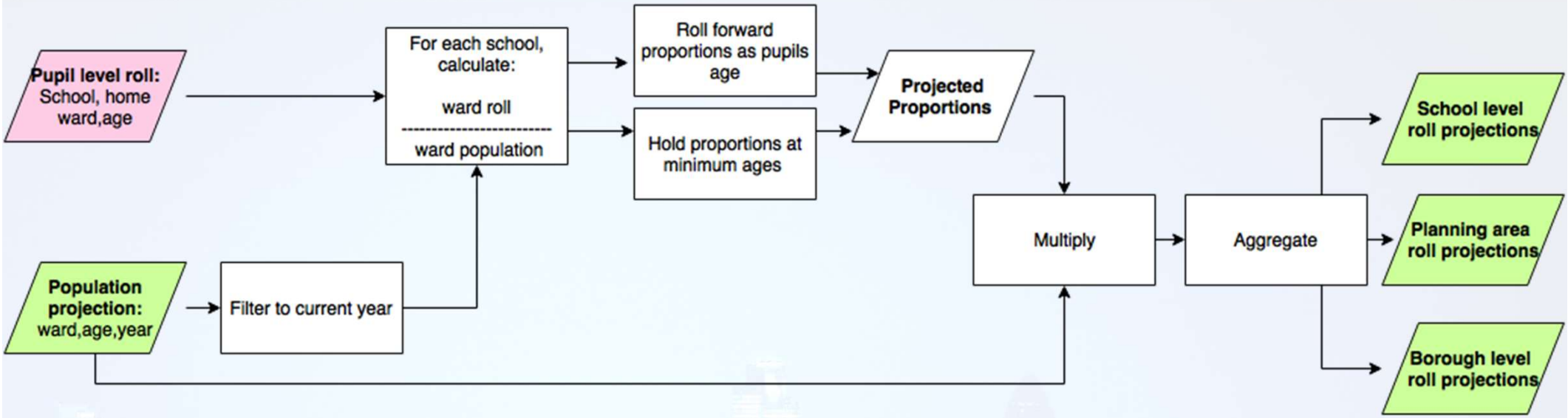
Primary School
Year 3 to Year 6

Our Solution

Age	Proportion	+ 1 year	+ 1 year	+ 1 year	+ 1 year
7	0	1/16	1/16	1/16	1/16
8	1/8	0	1/16	1/16	1/16
9	0	1/8	0	1/16	1/16
10	1/8	0	1/8	0	1/16

Average = 1/16

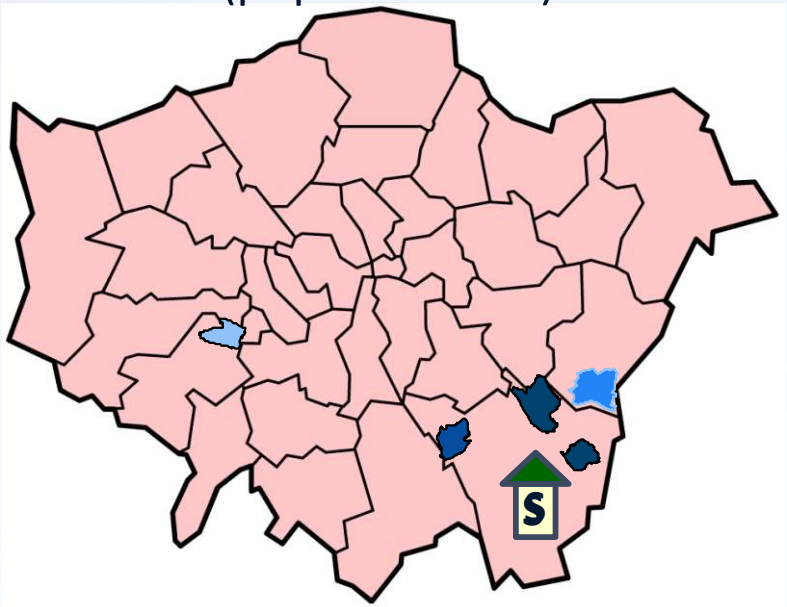
Methodology



Pupil level roll vs School level roll

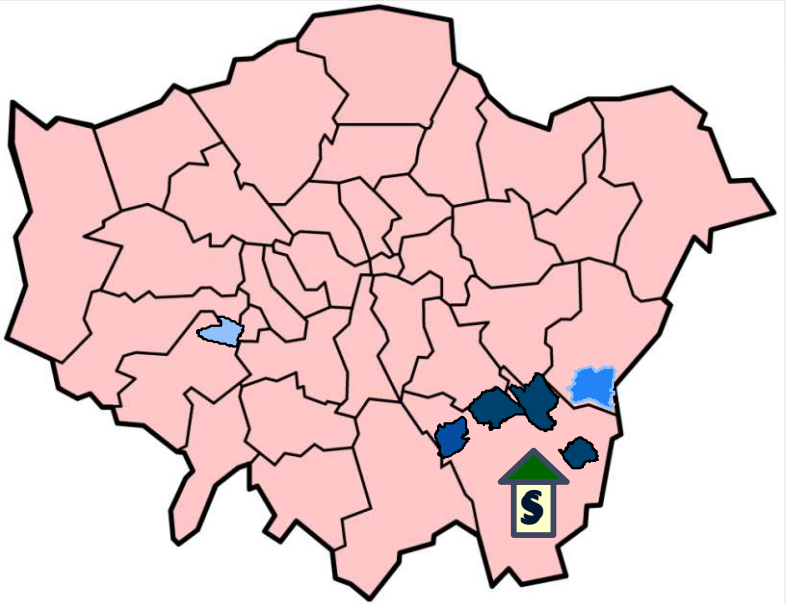
Pupil level

2016 pupil distribution
(pupil level roll)



School level

2015 pupil distribution (NPD)



Roll forward by one year

Scale ward contributions to
match 2016 school roll

Data sources

- Pupil level roll
  - Age, school, home ward

APRN	Age	School URN	Ward
35173489	4	104736	E05000385
38372049	4	104736	E05000027

Data sources

- Pupil level roll
  - Age, school, home ward

APRN	Age	School URN	Ward
35173489	4	104736	E05000385
38372049	4	104736	E05000027

- School level roll
  - Age, school, number on roll
  - National Pupil Database from DfE

Age	School URN	Number on Roll
4	104736	60

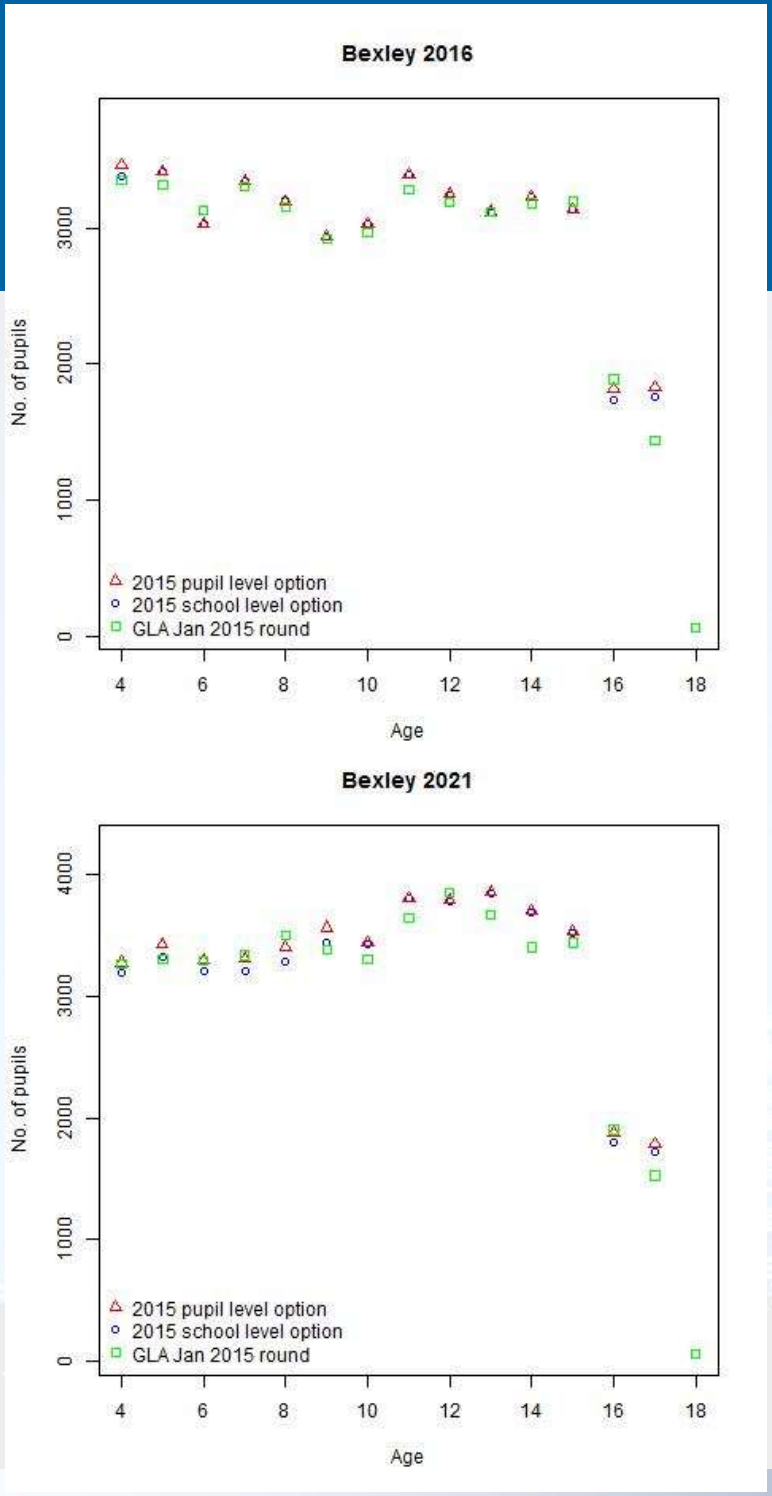
Data sources

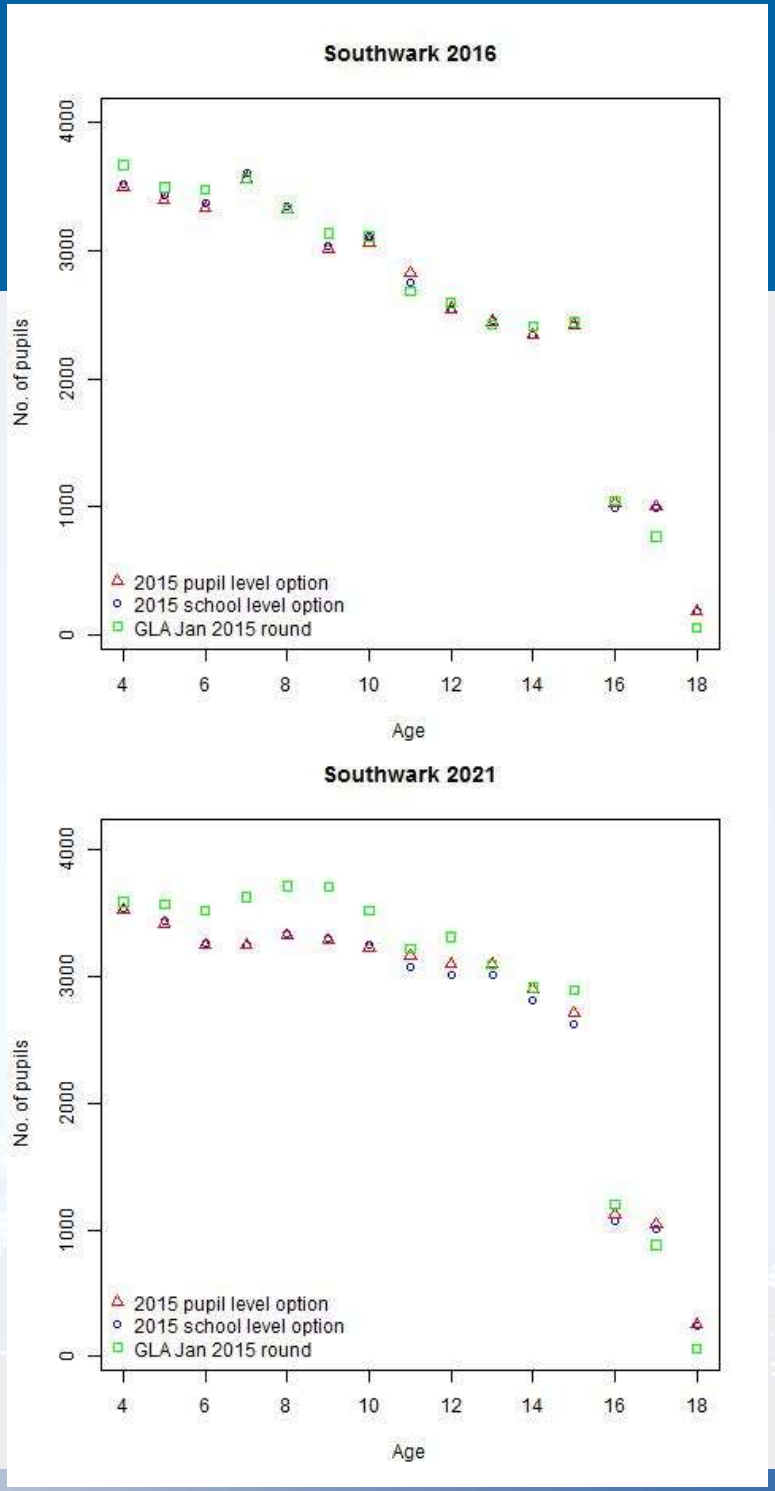
- Pupil level roll
  - Age, school, home ward
- School level roll
  - Age, school, number on roll
  - National Pupil Database from DfE
- GLA ward level population projections
  - MSOA will be available.
  - Incorporates housing development assumptions
  - Witan web interface has allowed boroughs to produce their own variants

Unexpected scenarios

- One school closed years gradually by not taking new intakes
  - New intake year increased by one each year
- A primary and secondary school combined and kept the primary school's unique reference number
  - The model cut off the aging at year 6
- Sure there will be more to come!

Model Comparisons


Bexley 2016
No. of pupils
0
1000
2000
3000
4
6
8
10
12
14
16
18
Age
2015 pupil level option
2015 school level option
GLA Jan 2015 round
Bexley 2021
No. of pupils
0
1000
2000
3000
4000
4
6
8
10
12
14
16
18
Age
2015 pupil level option
2015 school level option
GLA Jan 2015 round


Southwark 2016
No. of pupils
0
1000
2000
3000
4000
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6
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10
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16
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Age
2015 pupil level option
2015 school level option
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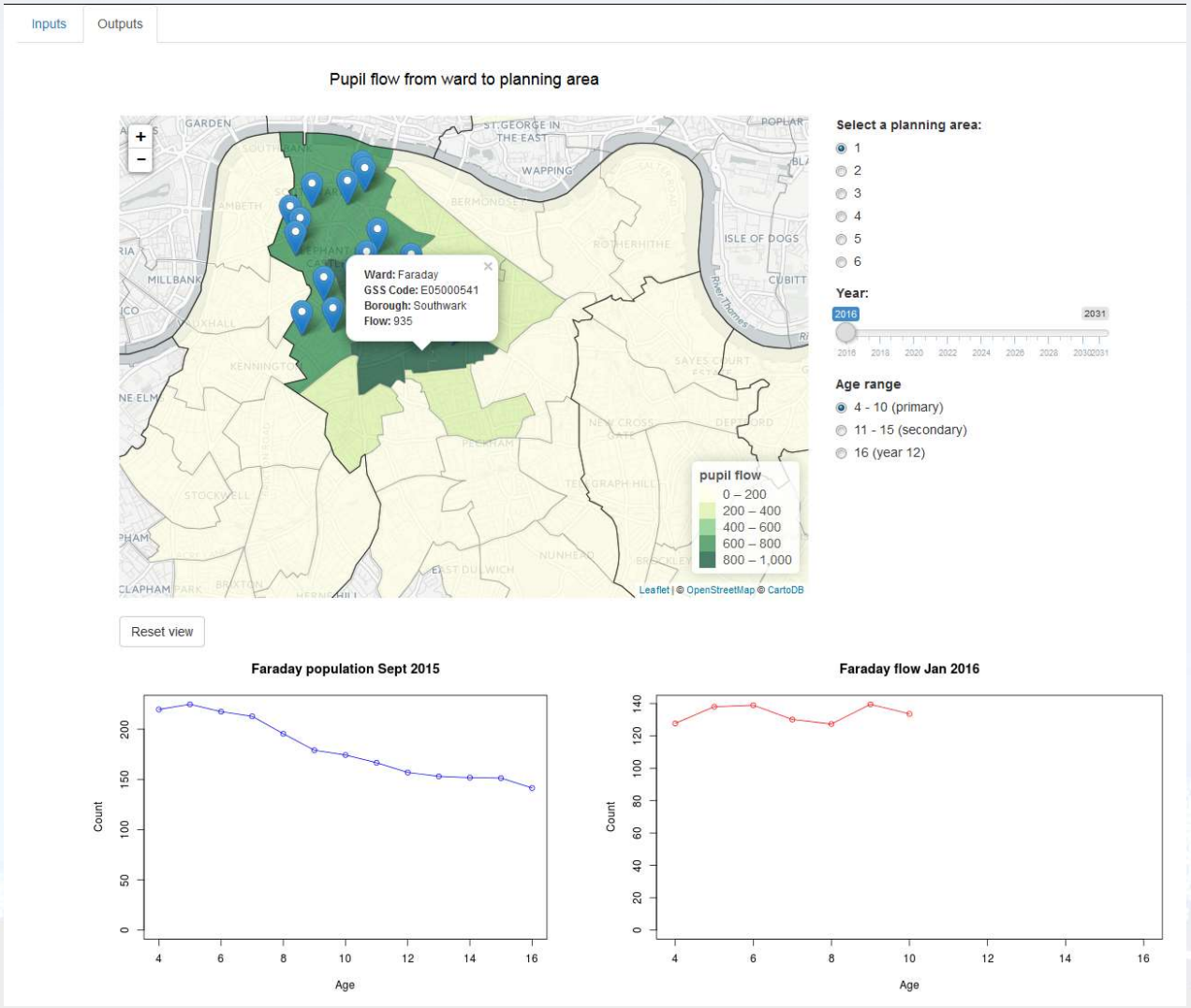
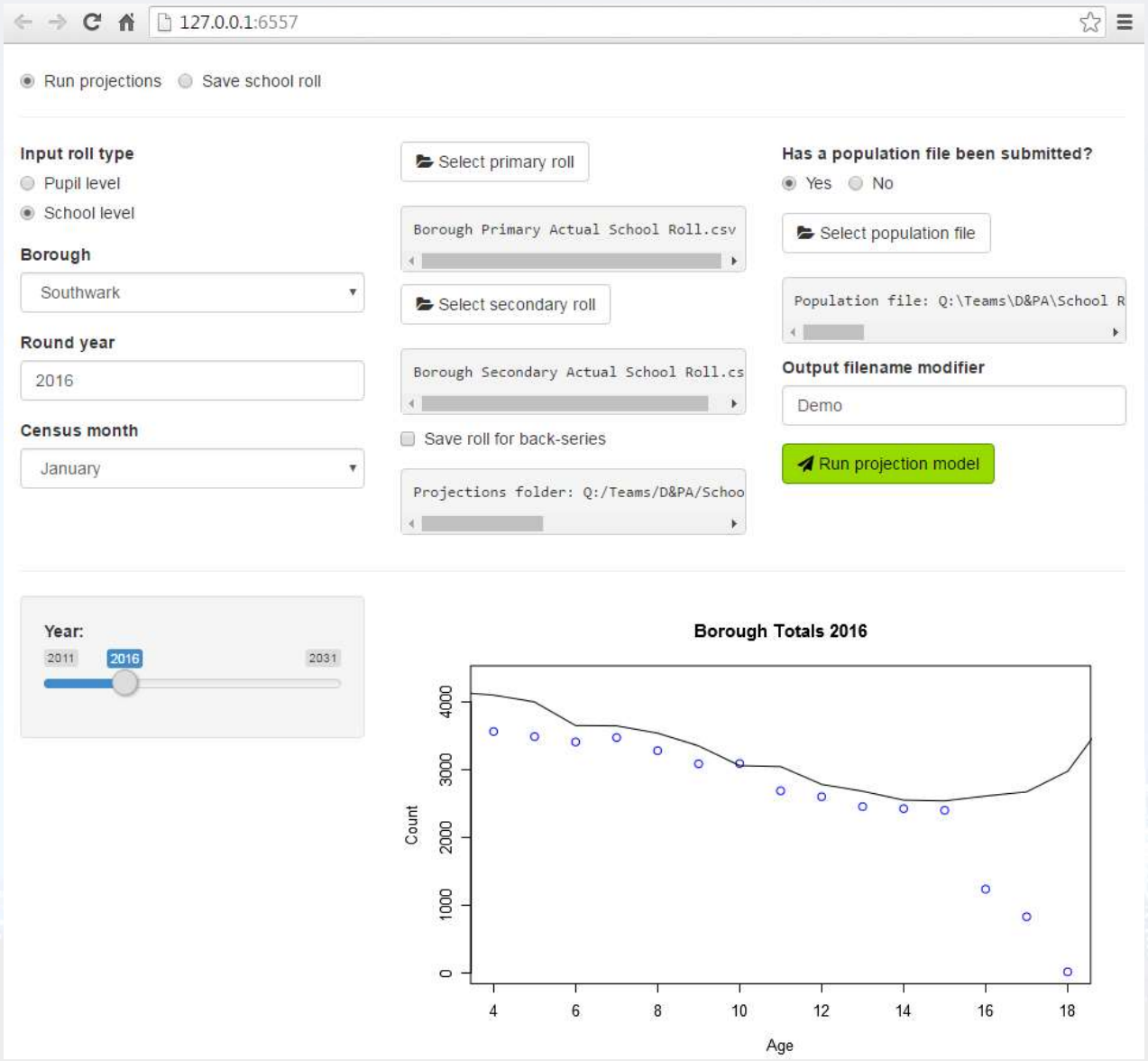
Age
2015 pupil level option
2015 school level option
GLA Jan 2015 round

Transparency



Integration of R into workflow



Future work

- Optimisation of current model
  - Back series
  - Aggregations
- What are we projecting?
  - Demand?
  - Uptake?
- New datasets
  - Pupil choice data
- New modelling methods: Agent based modelling?
  - Scenario testing around provision

Acknowledgements

- Ben Corr
- Monica Li
- William Tonkiss
- DfE