South Staffs Water

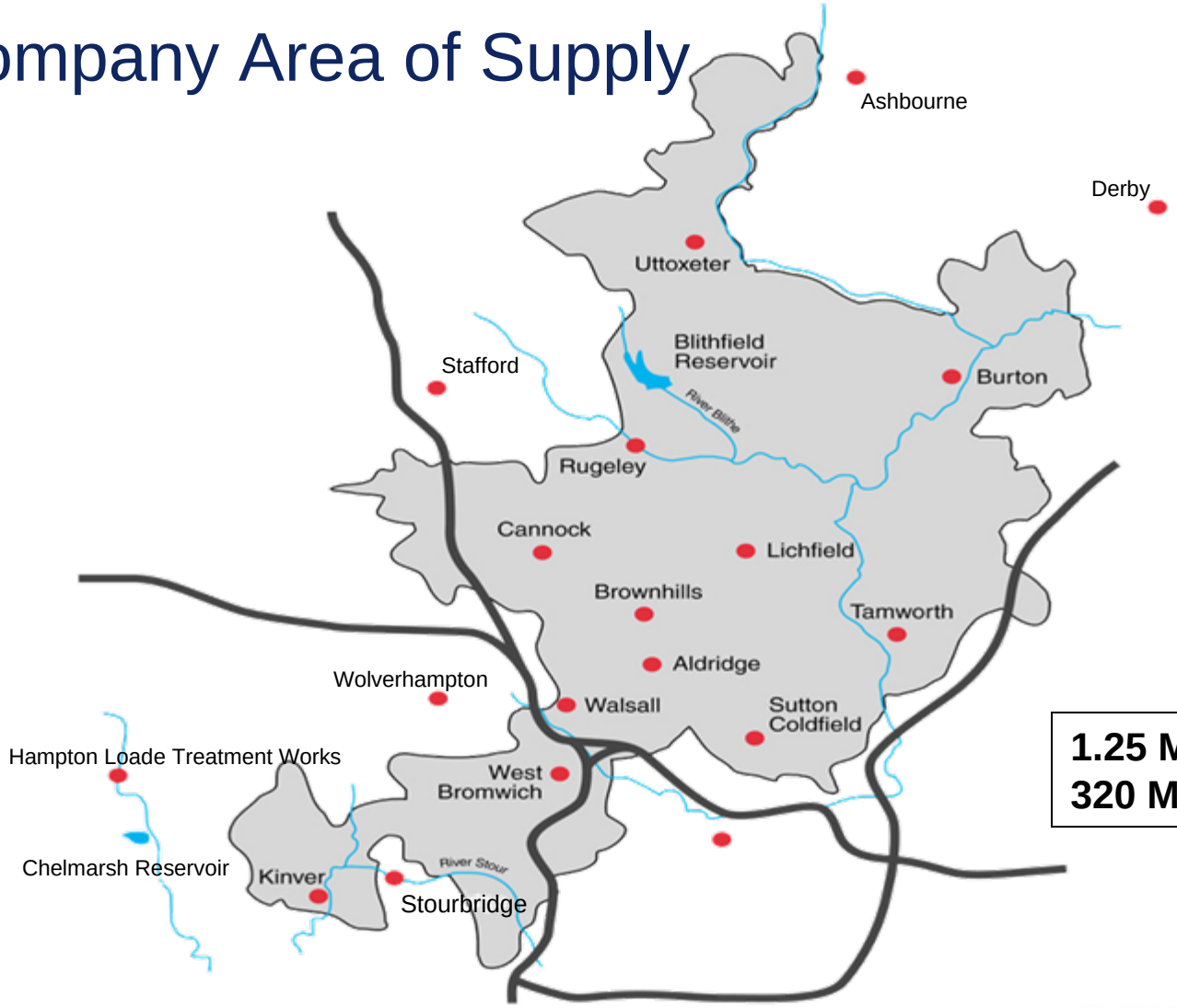
Groundwater Asset Maintenance

10th September 2008

Matt Hudson

Water Resources Manager

Company Area of Supply



1.25 Million Customers
320 Ml/d Ave Demand

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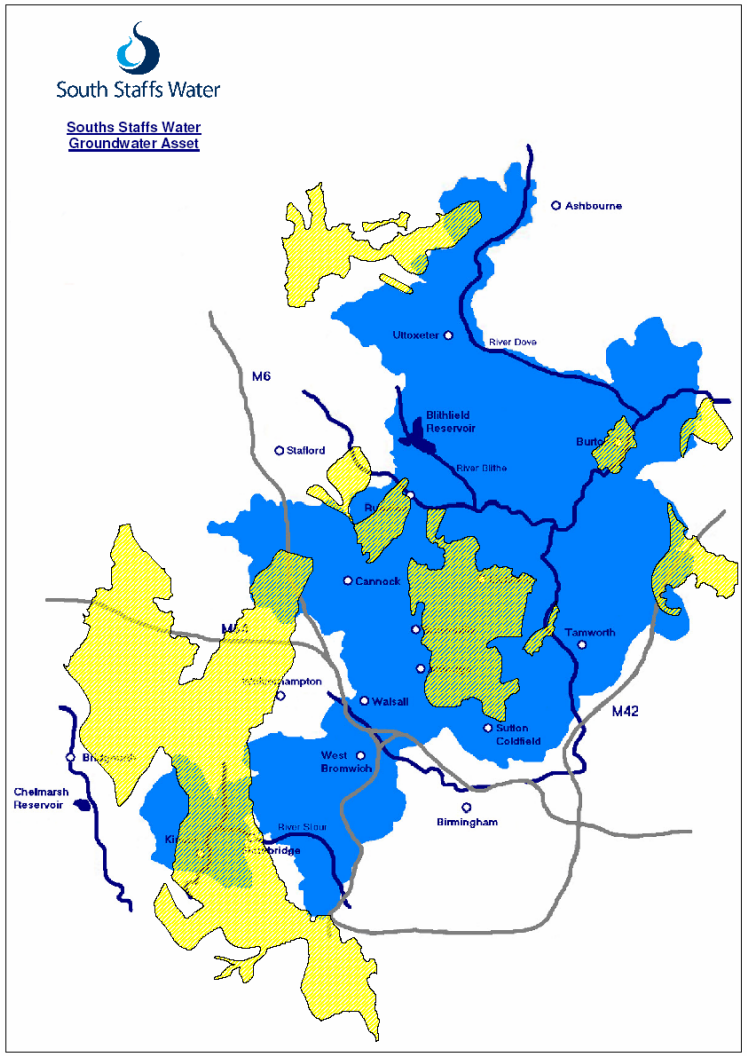
The Groundwater Asset



- 28 sources
- 64 boreholes 4 wells
- 130 –190 Ml/d
- Sherwood Sandstone

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Historical Approach to Investment

- Reactive to failures (bacti, turbidity, sand, structural failure etc)
- Relining, abandonment, occasional re-drillling, headworks, (also new treatment works or blending)
- No structured data collection, asset condition, performance monitoring or investment
- AMP4 nominal £1M following recognition of an increasing problem

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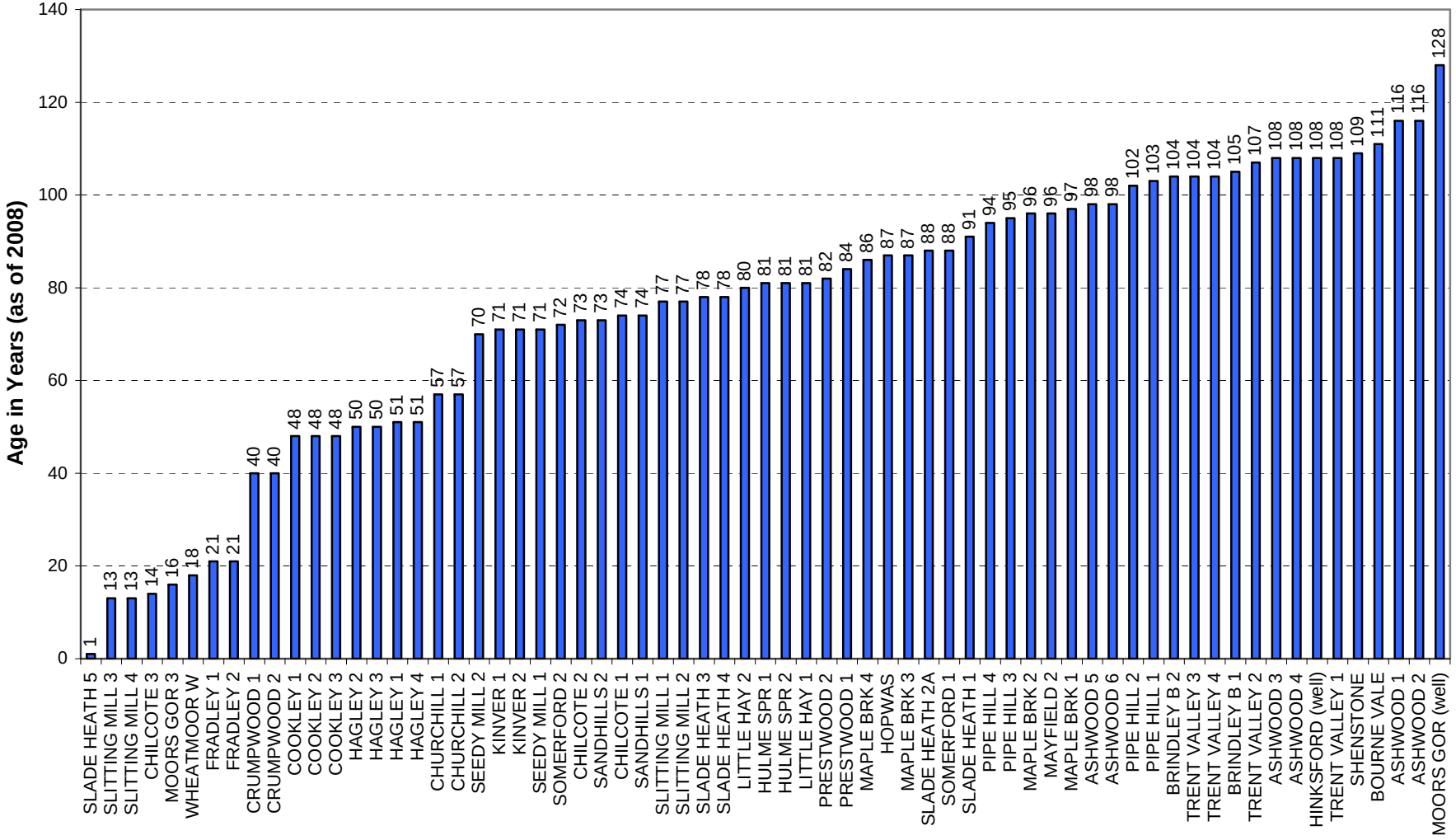
Age of South Staffs Boreholes and Wells



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The PR09 Approach

- Board approval
- Data collection and collation
- Asset condition and performance grading
- Strategic overview

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Condition and Performance Matrix

Condition Grade	Performance Grade	Action Required
1	1	Routine Monitoring Only
2	2	Routine Monitoring Only
3	3	Additional monitoring may be required.
4	4	Investigation may be required. Consideration for Investment in next AMP
5	5	Immediate Action

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Asset Condition

- corrosion and encrustation
- biofouling
- lining integrity
- infill or collapse
- Individual boreholes scored 1-5

Asset Performance

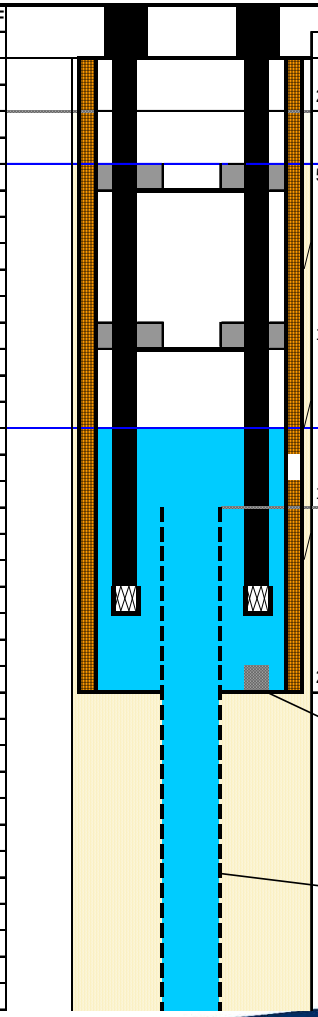
- loss of yield/drawdown
- turbidity
- coliforms
- crypto risk
- sand pumping
- other (iron, manganese, salinity etc)
- Individual boreholes scored 1-5

Data Collation – Geology/Construction

Source: HINKSFORD
Borehole:
Borehole code: HF1

Engine house floor level: 64.08mAOD
Original ground level: 61.94mAOD

SOUTH STAFFORDSHIRE WATER PLC



mbEHF	Depth	Description	Log	Depth	Notes
0.00					
1.00					
2.00	2.1	Wellhead chamber			**2.14m - Original G.L**
3.00			DA		
4.00		**Original RWL: 3.7 (1900**		3.81	
5.00	5.0	**1st stage girders**			
6.00					
7.00					
8.00					7.15m Feeder of water
9.00					
10.00					
11.00	11.0	**2nd stage girders**			
12.00					
13.00					
14.00		**PWL: 14.4 (10/1997)**			13.55m Feeder of water
15.00					13.8m pipe in hole ends
16.00					15.7m Hole in brickwork
17.00	16.9				
18.00					
19.00		**Shaft driven pumps**			18.1m Feeder of water
20.00		**PUMP INLET: 21.28m**			
21.00					CASCADING WATER - When W.L in well drops below top of BH casing, water cascades into well from borehole
22.00					
23.00		3.657m dia. Brick lined			
24.00	24.1	Well			
25.00		Metal debris on well floor			
26.00					
27.00					
28.00					
29.00					
30.00					
31.00		Heavily encrusted yellow / orange deposits (CCTV 1992)			
32.00					
33.00					
34.00					
35.00					
36.00					

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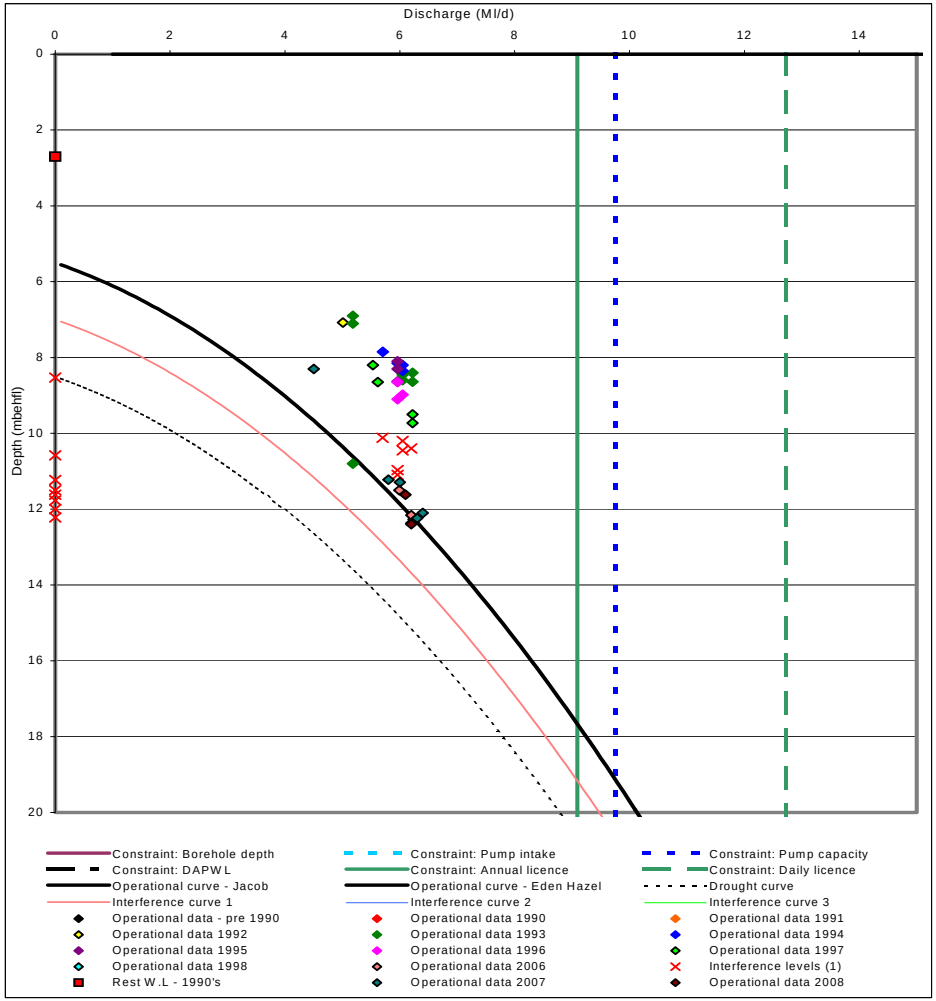
Data Collation – Yield/Drawdown



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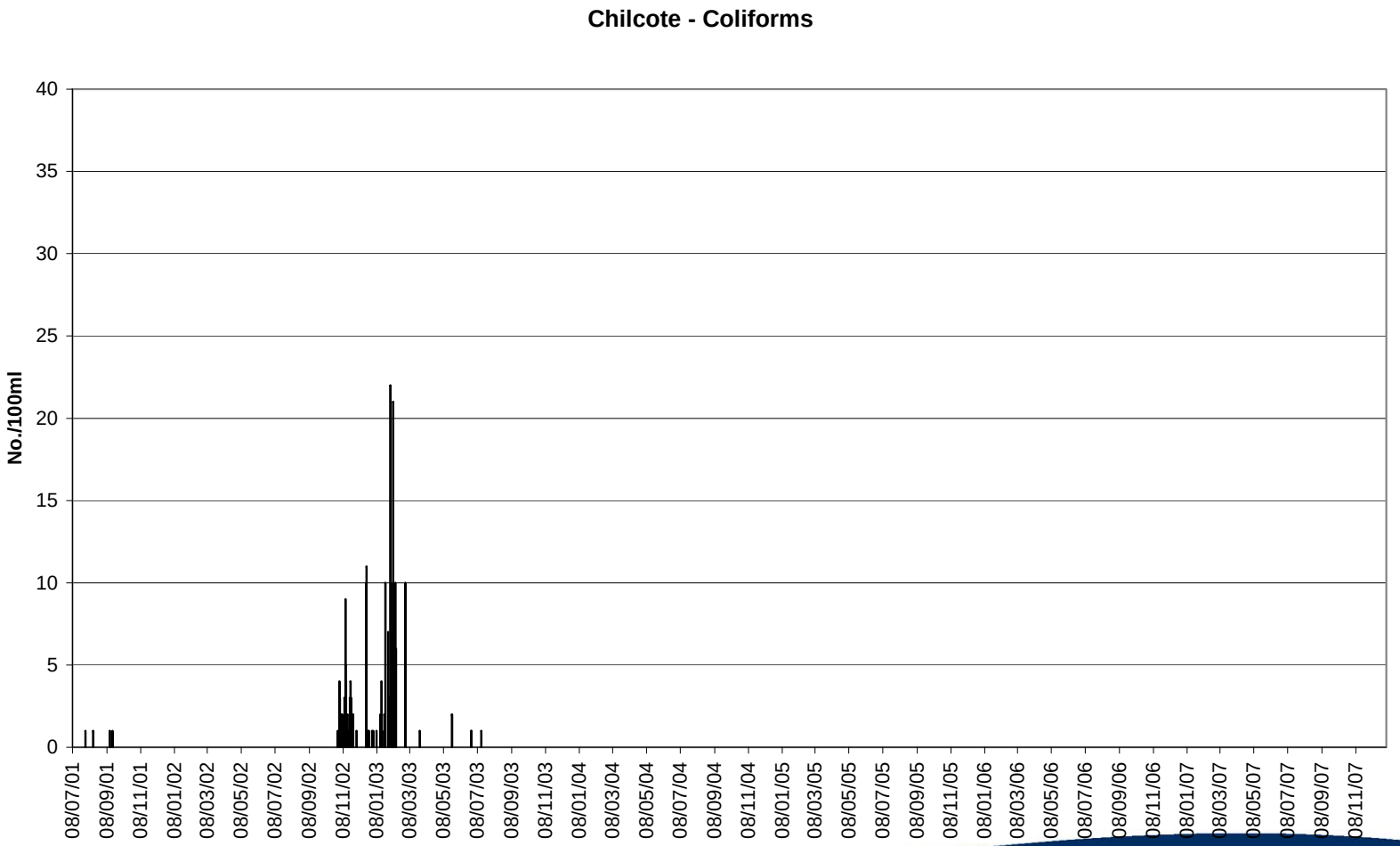
Data Collation – CCTV/Logging

- 95% cctv coverage (mainly1995-2000)
- 25% logging coverage
- New policy of cctv/logging when pumps are out
- New slimline cameras can remove the need for pump removal, and enable cctv under pumping conditions

Data Collation – Water Quality



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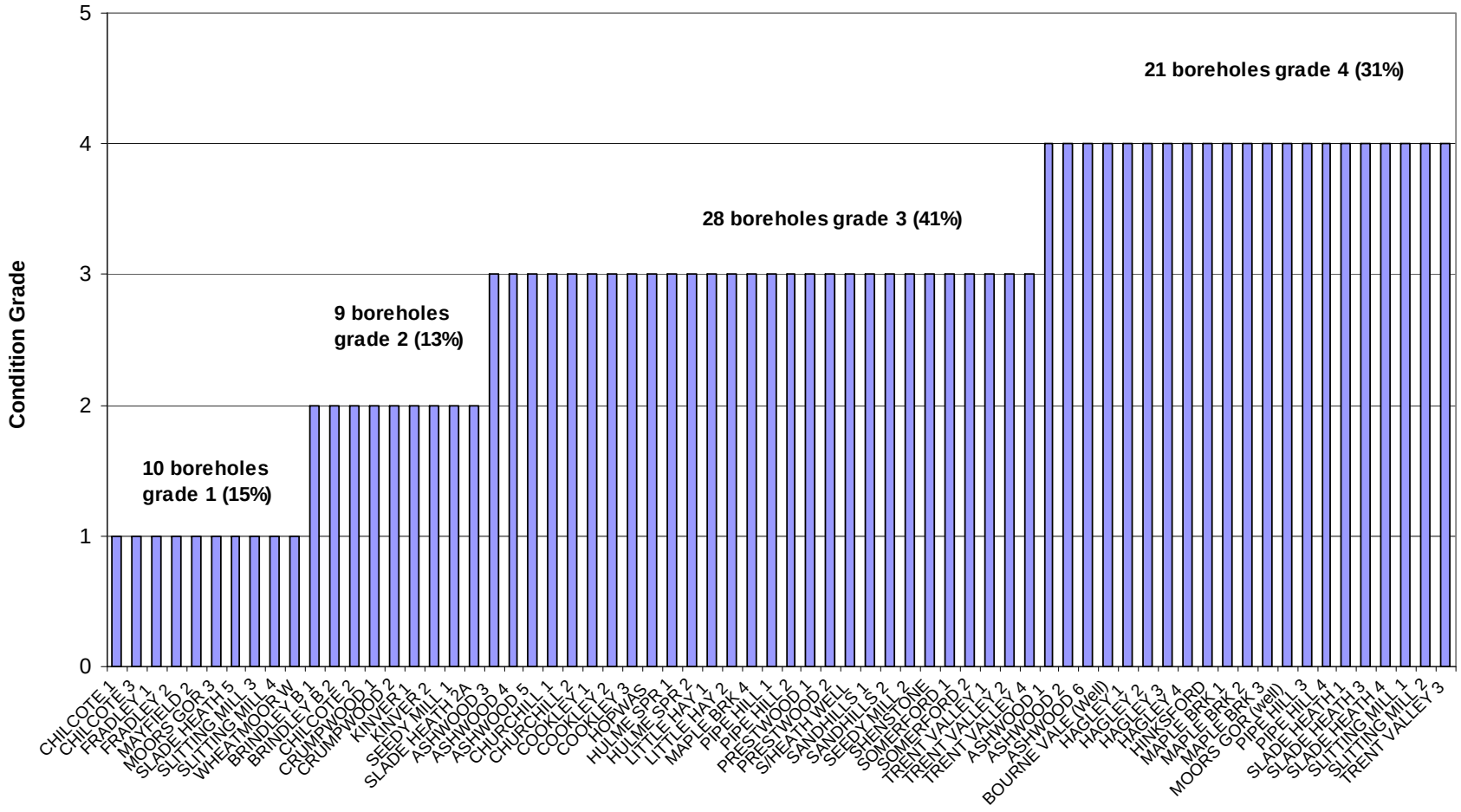
South Staffs Water PR09 Borehole Asset Condition Assessment



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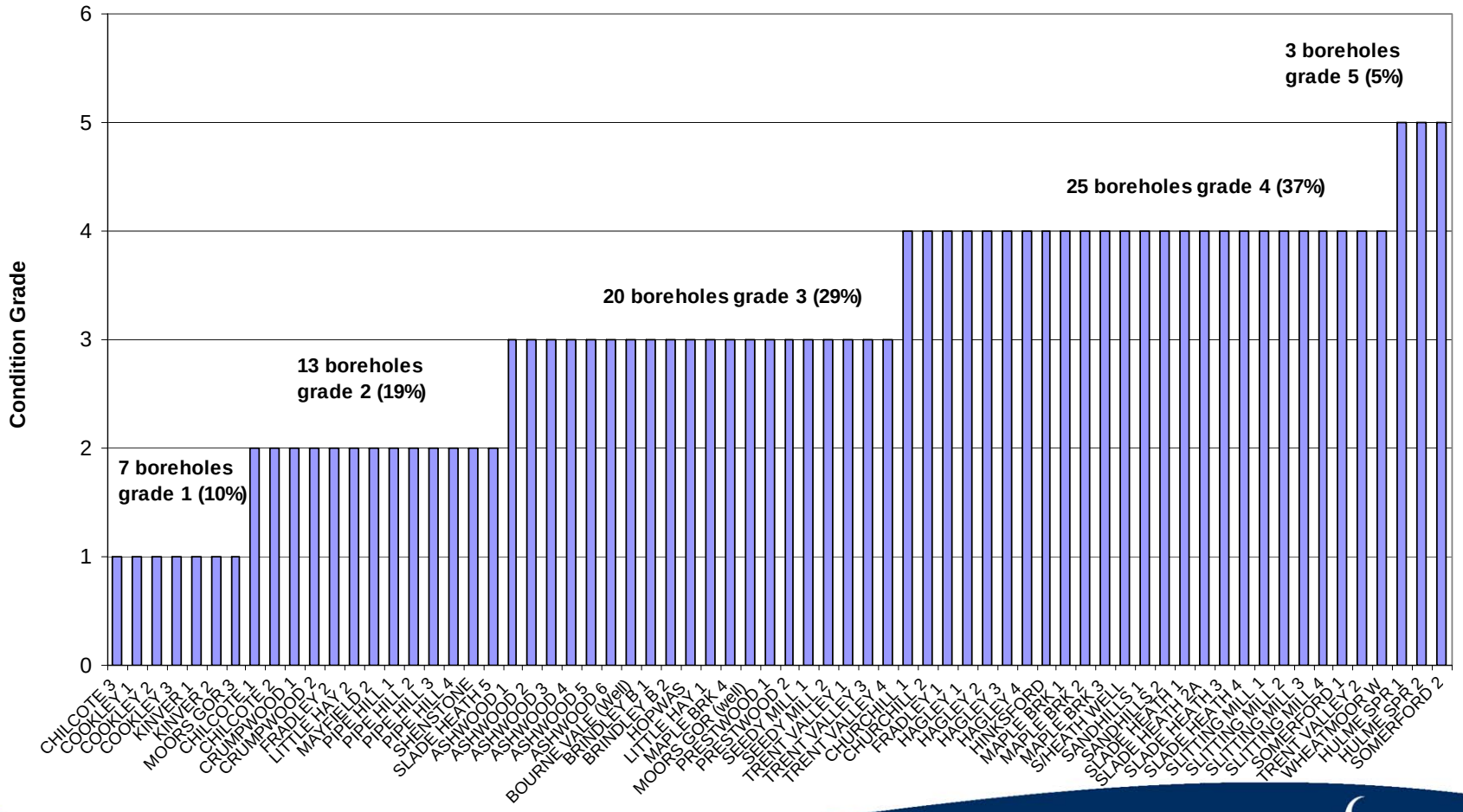
South Staffs Water PR09 Borehole Asset Performance Assessment



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Main Issues

- Turbidity (mainly sand, also aeration)
- Encrustation\biofouling, particularly of slotted casing
- Corrosion\casing integrity issues
- Brick lined wells
- Assorted water quality issues (e.g. salinity, sulphates etc)

PR09 Proposals

Source	Key Issue	Investment Proposal
Ashwood	Casing in poor condition	Licence and commission unused boreholes
Bourne Vale Well	Brickwork missing	Re-point/secure
Fradley	High sulphates	Drill new borehole
Maple Brook	High turbidity and sand	Drill 2 new boreholes
Slitting Mill	High turbidity and sand, and poor performance.	Drill 2 new boreholes
Trent Valley	High turbidity and sand	Drill 2 new boreholes

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Beyond PR09

- Simple qualitative assessment based on age, current condition and performance, strategic ranking
- Investment required at 10 boreholes per AMP up to 2025
- Reducing thereafter c.5 per AMP

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Conclusions

- “If it ain’t broke don’t fix it” is no longer an acceptable approach
- The age and condition/performance profile requires a significant and prolonged uplift in investment
- Simple condition and performance criteria
- Collect performance and condition data in a systematic auditable way
- Consider strategic importance and overall profile of asset condition/performance

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Conclusions

- Asset maintenance can deliver additional benefits, increased peaking capacity, cheaper pumping costs, operational reliability, improvements in water quality, and overall supply resilience.
- Opportunity to resolve a number of long standing problems
- Company reporter support, OFWAT funding ?
- Detailed design required