The dual approach to managing water

Solutions to water problems in the Stroud Valleys

Adam Broadhead

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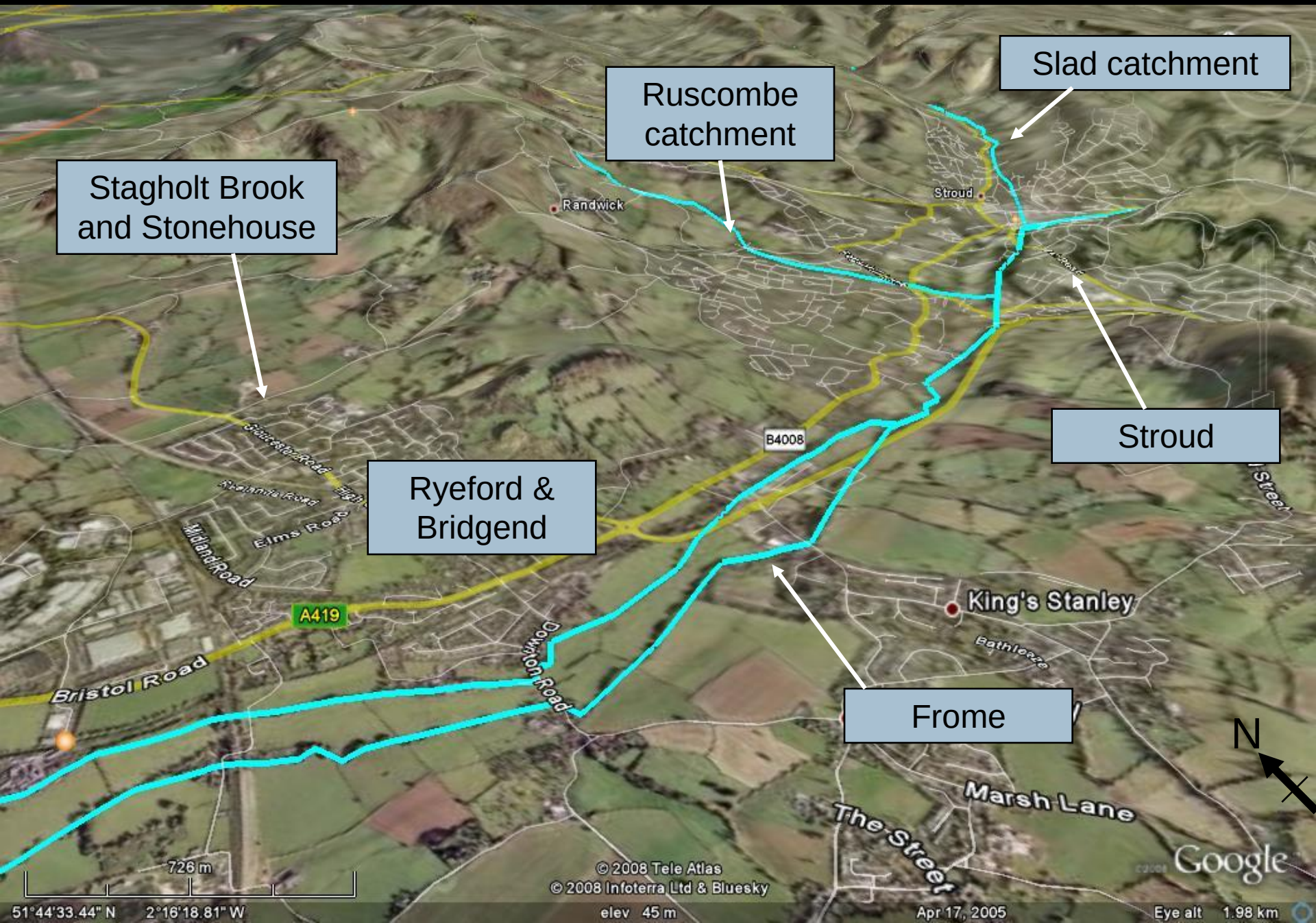
Problems

- Flooding from rivers and sewer surcharging into property and land.
- Depletion of aquifers.
- Pollution of water courses, possible public health risk.
- Loss of habitat and biodiversity.
- Rising costs of living.
- A battle between interested parties in control of environmental management.

Current problems are all inter-related and stem from mismanagement of water as a ***resource***

Dual-approach to managing water

- With flooding as a focus, the optimum solution will come from a holistic, catchment-scale and long-term plan.
- Flooding in the Stroud valleys is controllable **if:**
  - **Upstream** areas attenuate and store flows
  - **Downstream** areas contain excess water.


Slad catchment
Ruscombe catchment
Stagholt Brook and Stonehouse
Stroud
Ryeford & Bridgend
Frome
Randwick
Stroud
B4008
Midland Road
Elms Road
A419
Bristol Road
Dorton Road
King's Stanley
Bathleze
Marsh Lane
The Street
N
726 m
© 2008 Tele Atlas
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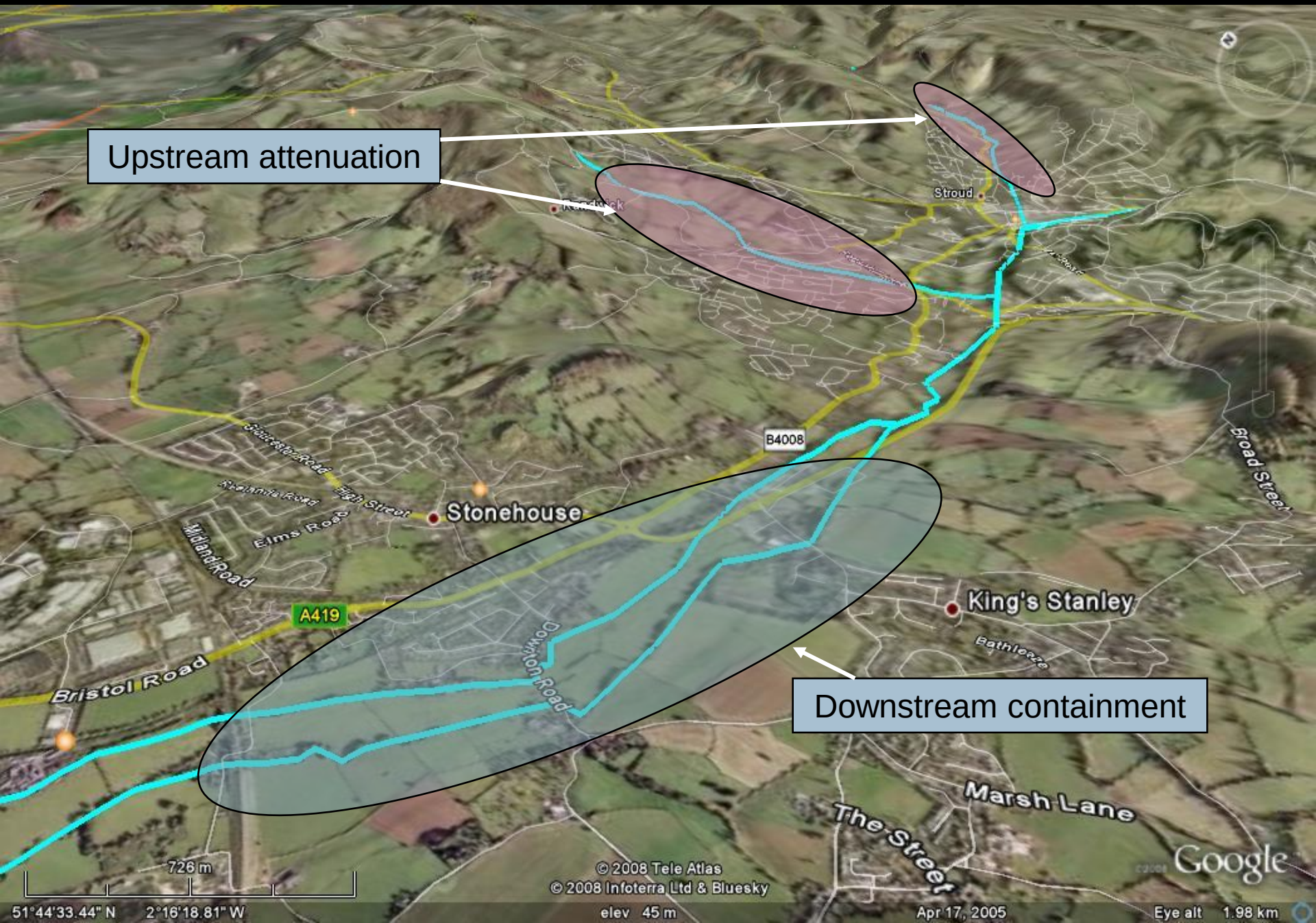
Google
51°44'33.44" N
2°16'18.81" W
elev 45 m
Apr 17, 2005
Eye alt 1.98 km


Upstream attenuation
Downstream containment
Stroud
B4008
Stonehouse
King's Stanley
A419
Bristol Road
Midland Road
Elms Road
High Street
Downton Road
Marsh Lane
The Street
Broad Street
726 m
© 2008 Tele Atlas
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Google
51°44'33.44" N 2°16'18.81" W
elev 45 m
Apr 17, 2005
Eye alt 1.98 km

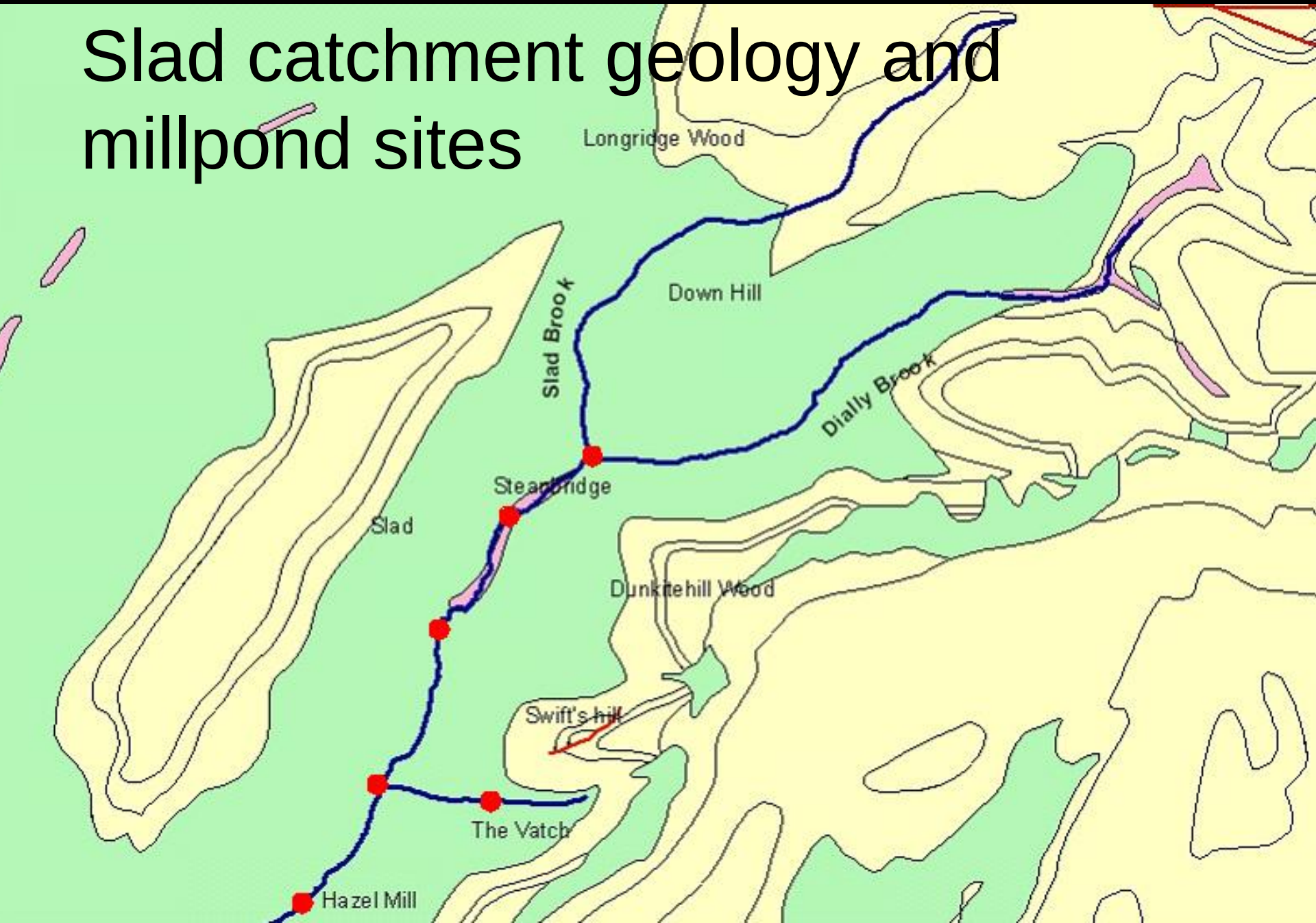
First part of the jigsaw

- **Upstream attenuation**: retain water in the upper catchments by restoring disused millponds or creating new impoundments. Validated in the Slad catchment by Ilaria Pretto (Water 21 Engineer).

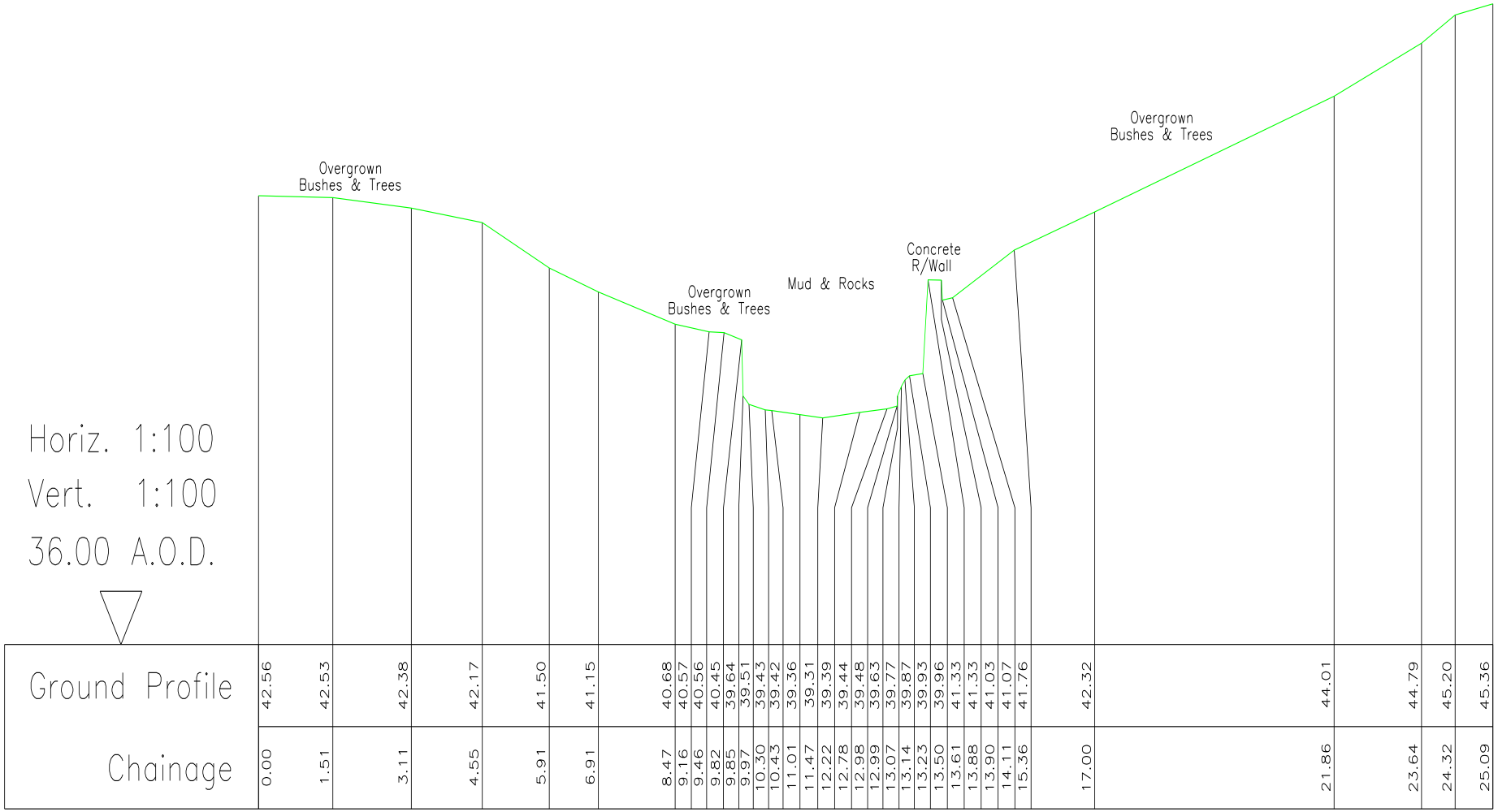
- **Primary** purpose to increase infiltration, reducing runoff, and limiting flooding.

- **Secondary** benefits such as small-scale hydro power, fisheries, habitat restoration, improved agricultural irrigation, silt retrieval and community supported utilities.

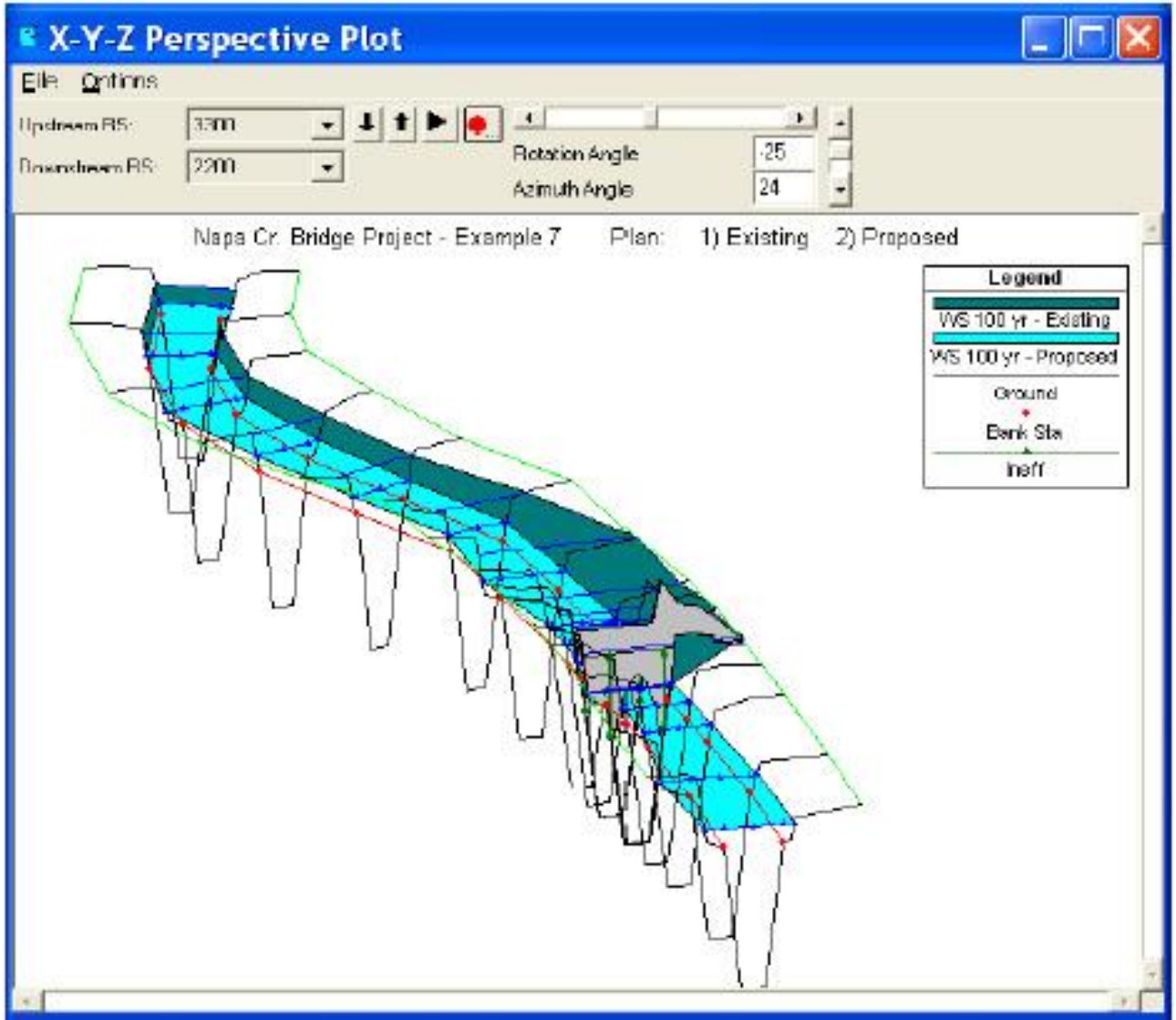
Slad catchment geology and millpond sites



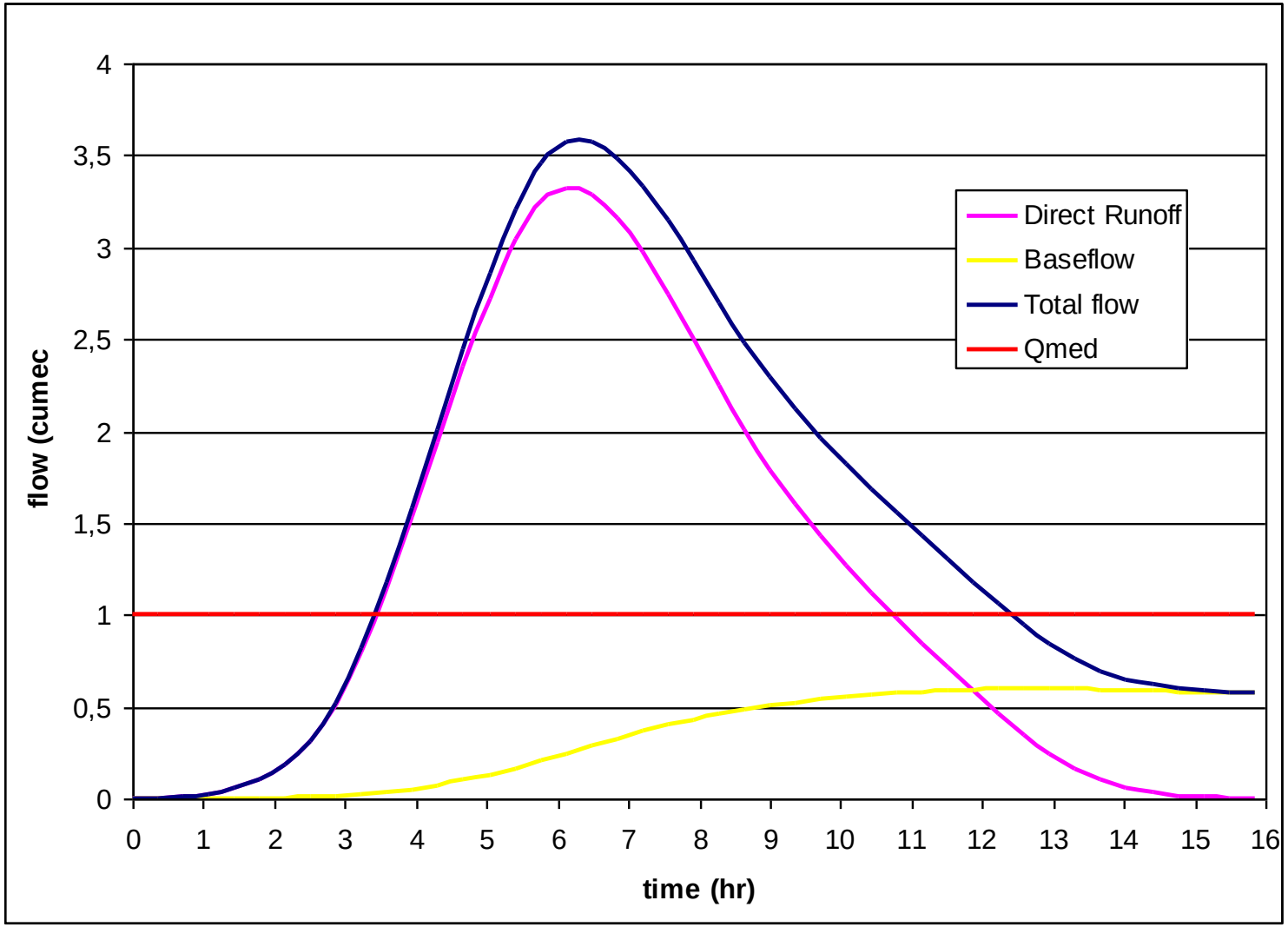
Topographic surveys



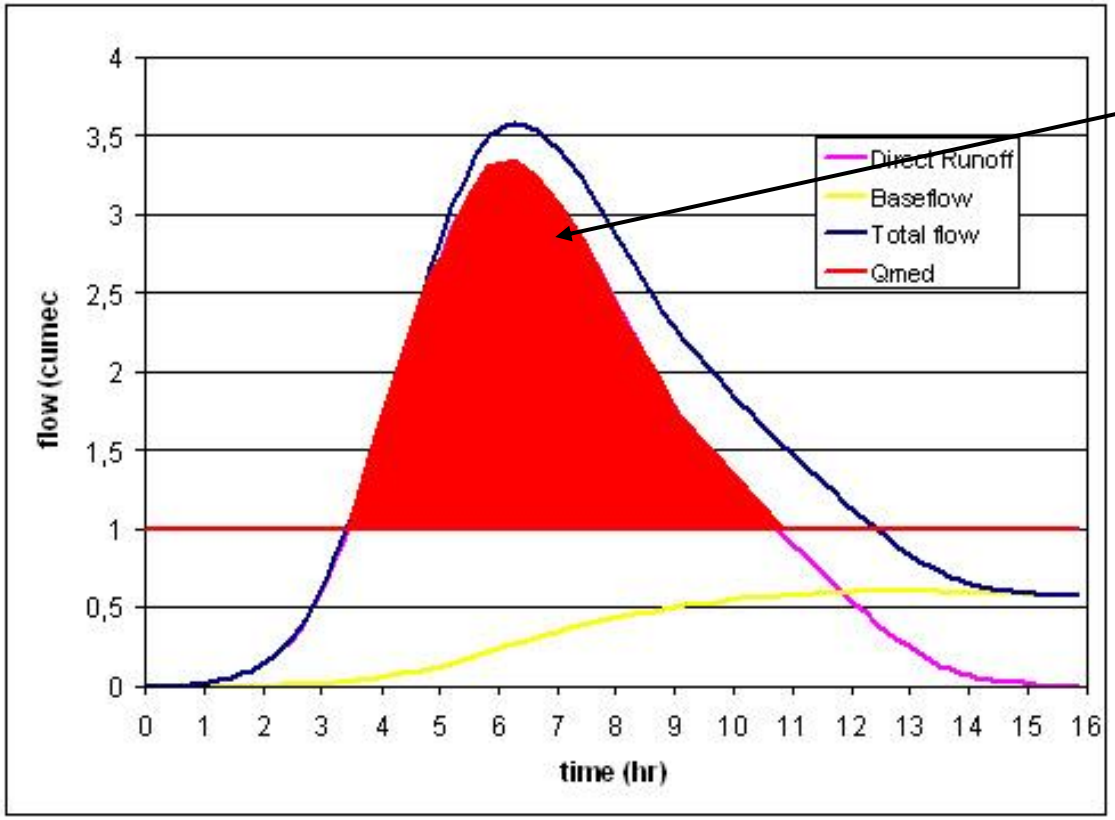
Hydraulic modelling



Hydrograph analysis



Hydrograph analysis



44,000 cubic metres of water to store in Slad catchment for a 1 in 100 year flood event.

Water 21 proposal

- Flooding is reduced by restoring the traditional and natural upstream water storage.
- These are to be dispersed as several small impoundments:
  - **maximum storage capacity** for the biggest floods,
  - maximum **secondary benefits** such as biodiversity and hydro-power,
  - **minimal costs** and disruption.

The second piece of the jigsaw: lowland floodplain

Image source: (www.wikipedia.org, 2008)

The second piece of the jigsaw: lowland floodplain

- Some floodplain remains as Ryeford meadows, but currently does not flood to capacity.
- Elsewhere, floodplain is lost to development against recommendations from Association of British Insurers, Defra and more.

Benefits of floodplain restoration

- Storage of flood water, reducing damage elsewhere.
- Biodiversity – provides valuable habitat for endangered British wildlife and plant-life.
- Restoration of fisheries.
- Renewable biomass energy.
- Productive riverside farmland.
- Natural cleaning effect of vegetation to reduce impact of artificial agricultural chemicals.

Image source: (Wildlife Trust, 2008)

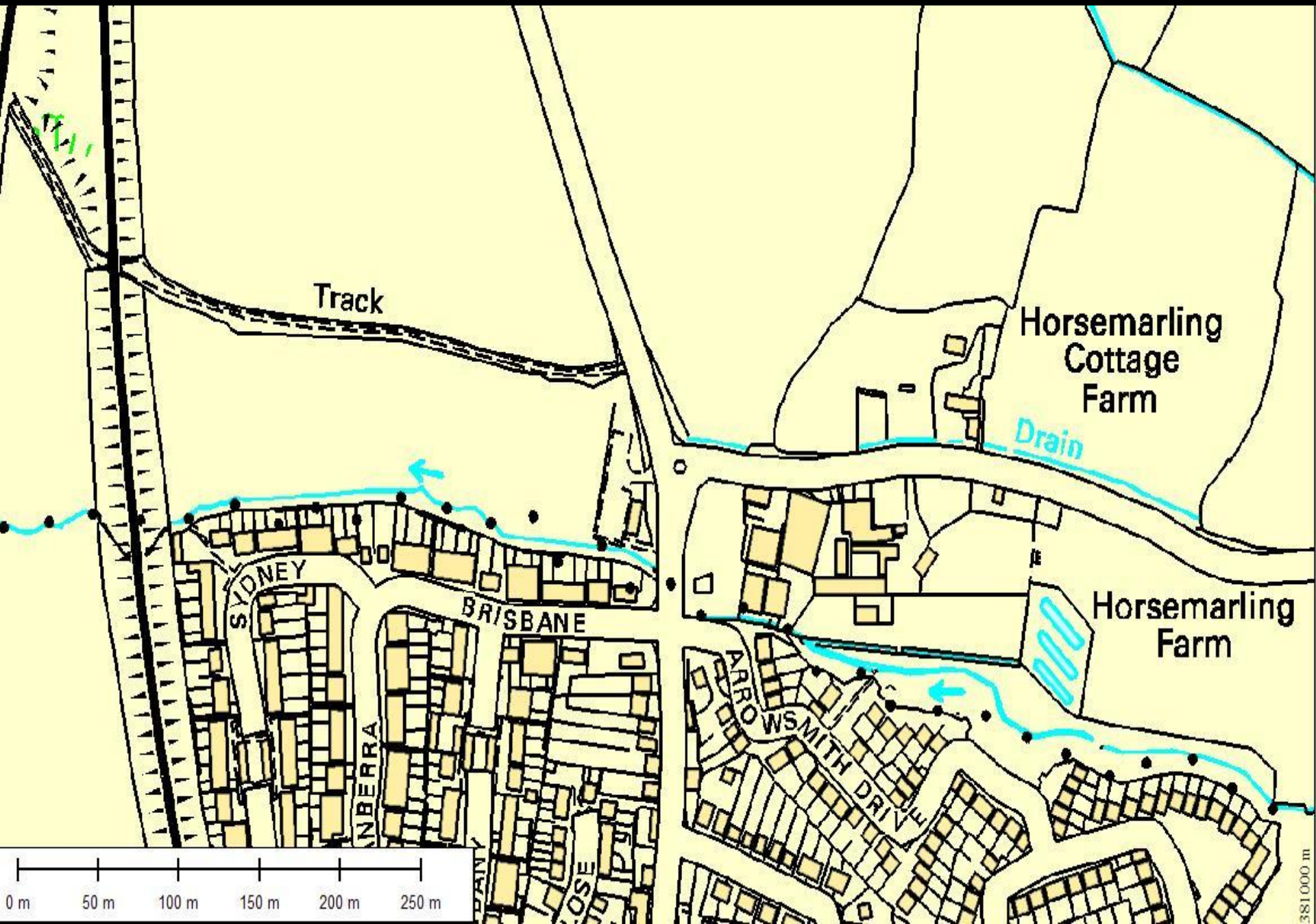
Who pays?

- Must be **self-financing** to be sustainable.
- Subsidised by secondary benefits.
- Improved agricultural productivity.
- Community-led utilities e.g. silt retrieval for organic farming.

Stagholt Brook

The solution to Stroud-wide water problems can be demonstrated on a small-scale catchment such as the Stagholt Brook.


Source
Stagholt Brook
Persimmon Estate
Existing attenuation feature
B4008
Gloucester Rd
Brisbane
Albany
Adelaide Gardens
Allotments
Canberra
Little Australia
Melbourne Dr
Sydney
Perth
Railway embankment
Flooded homes
198 m
© 2008 Tele Atlas
© 2008 Infoterra Ltd & Bluesky
elev 47 m
2°16'48.68" W


Track
Horsemarling
Cottage
Farm
Drain
Horsemarling
Farm
SYDNEY
BRISBANE
ARROWSMITH DRIVE
0 m
50 m
100 m
150 m
200 m
250 m

The problem

- Frequent flooding at Little Australia – causing in excess of **£300,000** total damage each time.
- Has been flooded twice in 18 months.
- Narrow ‘choke point’ in the culvert.
- Poor water quality.
- Rubbish and siltation causing blockages.

Solutions

- **Do nothing**
  - Need to help vulnerable communities.
- **Widen the culvert**
  - Cost well into six figures.
  - Floods next fields and industrial estate.
  - Does not deal with water quality or silt issue.
- **OR…**

Proposed solution

- Flood attenuation at two or more small sites on the brook, providing safe storage for the largest of floods.
- Secondary benefits:
  - Self-financing silt retrieval for farmers' fields – cheap and effective organic fertiliser.
  - Biodiversity and habitat restoration.
  - Wetland plants treat diffuse pollution.

- Low-cost
- Long-term
- Multi-benefit

Holistic catchment-scale plan

Water management recommended by Water 21 is:

- **back-to-basics** – soft engineering is cheaper, easier, and more effective.

Water management recommended by Water 21 is:

- **naturalistic** – enhancement of the local biodiversity and landscape.

Water management recommended by Water 21 is:

- **belt-and-braces** – far greater margin of safety can be planned compared to current approaches.

Water management recommended by Water 21 is:

- **sustainable** - fixing the cause of the problem is the only long-term, cost-effective action.

Water 21 core values

- Community-led approach.
- Information-sharing and openness.
- Low-cost, long-term, holistic solutions.
- Respect for nature.

Conclusion

- The issues of water management in the Stroud Valleys are connected.
- The key to success is linking **upstream** and **downstream** – catchment scale planning.
- Water must be **attenuated** upstream.
- Water must be **contained** downstream.
- Many secondary benefits come from this.

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Registered Office
135 Aztec West
Bristol BS32 4UB
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