

Natural Flood Management in Pumped and Heavily Modified Catchments

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Shire Group Of IDBs



Water Level Management through Internal Drainage Boards (IDBs)

- IDBS role and responsibilities
- Challenges
- Building effective relationships
- Total Catchment Management
- Asset Management
- Catchment Modelling



IDB Overview



IDB's **formed** through Constitution Orders under the *Land Drainage Act*.

Purpose is to protect people and property against river and surface water flooding through *water level management* within the *Drainage District*.

Roles and responsibilities under *LDA, Flood & Water Management Act, Flood Risk Regulations, Public Bodies Bill, FCERM, Water Framework Directive*

They **fulfil their role** through maintaining *Ordinary Watercourses* and *Assets* to balance water levels.

Funded through *drainage rates* and *special levies*

Report to Defra, and *EA* has a **supervisory** role.



Strategic Options Report

- Danvm Water Level Management Options Report
 - <https://www.shiregroup-idbs.gov.uk/wp-content/uploads/2017/02/2013s7706-Danvm-DC-WLMS-Report-v5.pdf>
- Water Level Management Statement =
 - <https://www.shiregroup-idbs.gov.uk/wp-content/uploads/2018/02/Danvm-Watercourse-Maintenance-Statement-v2Feb2018.pdf>



Challenging times?



Stainforth Bridge Flooding Event



Stainforth Bridge Normal Flow



Heavily Modified Catchment Challenges

Low lying, flat, under-mined, subsided and within a basin

Ground Water and soil movement

Artificially pumped

Development

Siltation

Bank damage and erosion

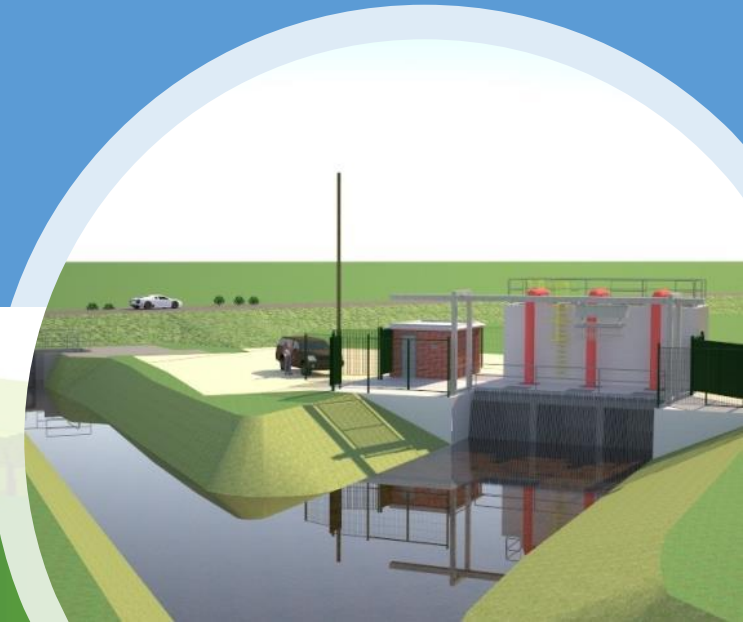
Fly tipping and obstructions

Land drainage design & perception

Water Quality

Livestock

Soil & Land management













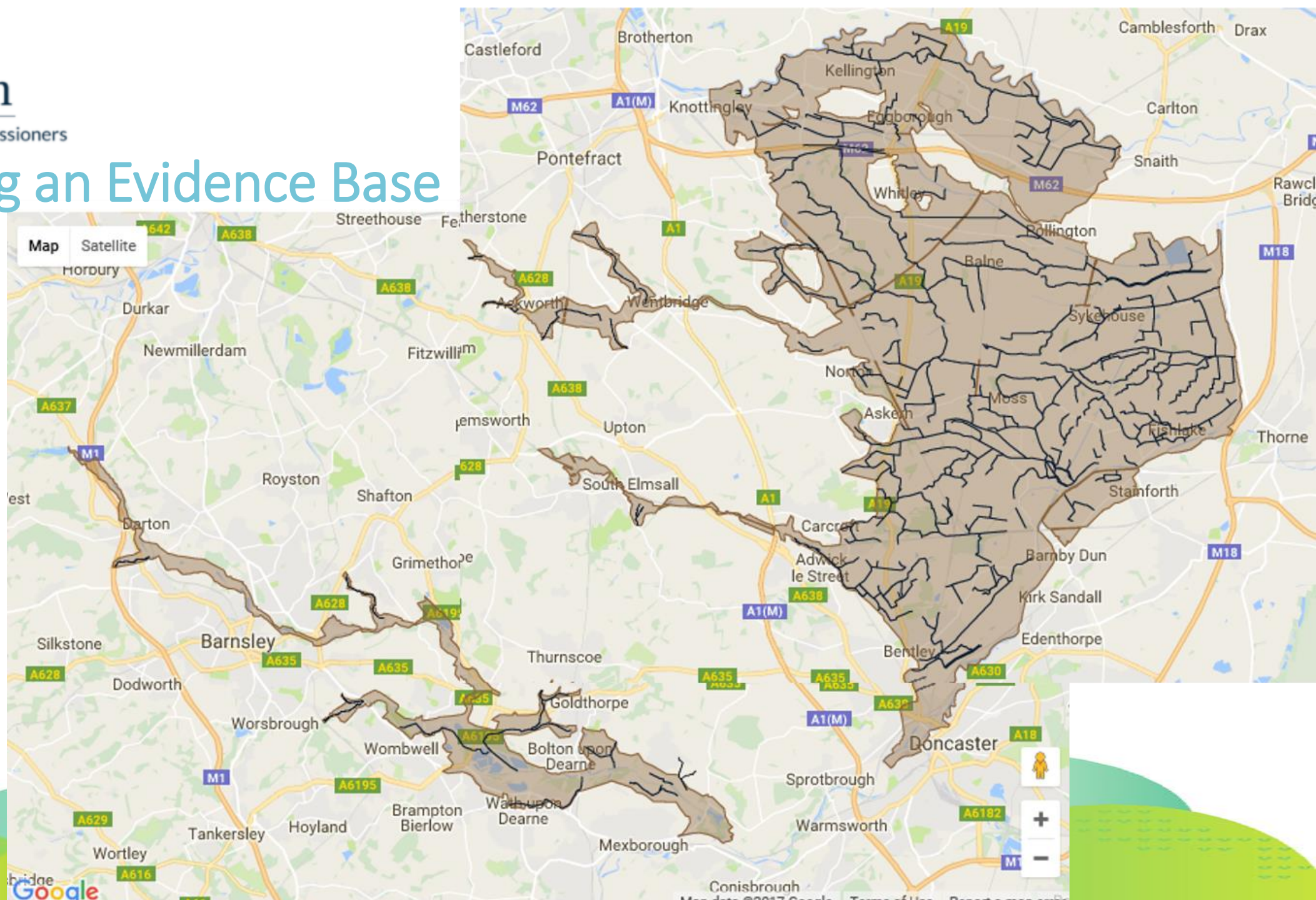


Shire

Group of IDBs



Establishing an Evidence Base



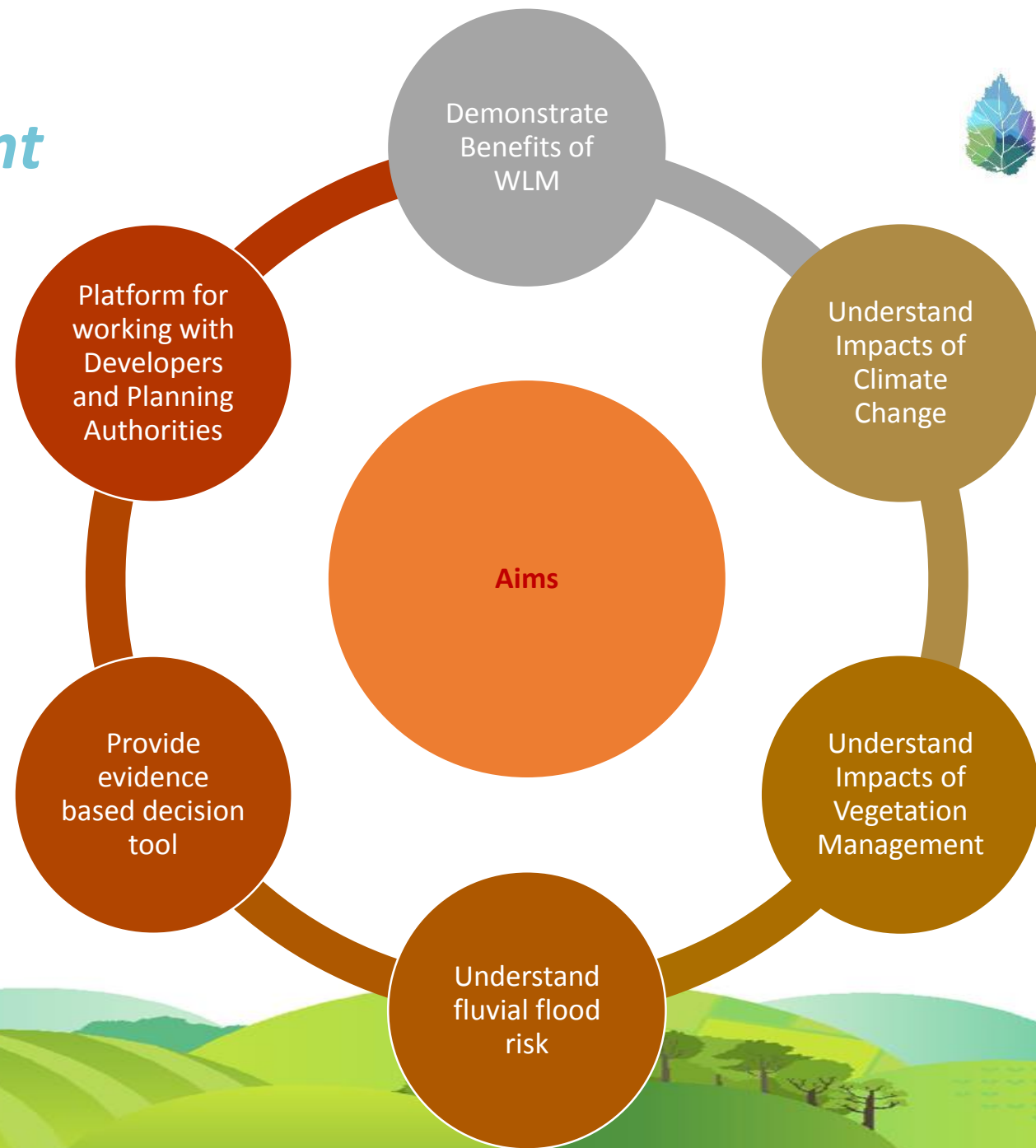
from *managing assets*
to **Asset Management**

Understand the
value of our
catchments

Value = Stakeholder
Expectations + Benefit

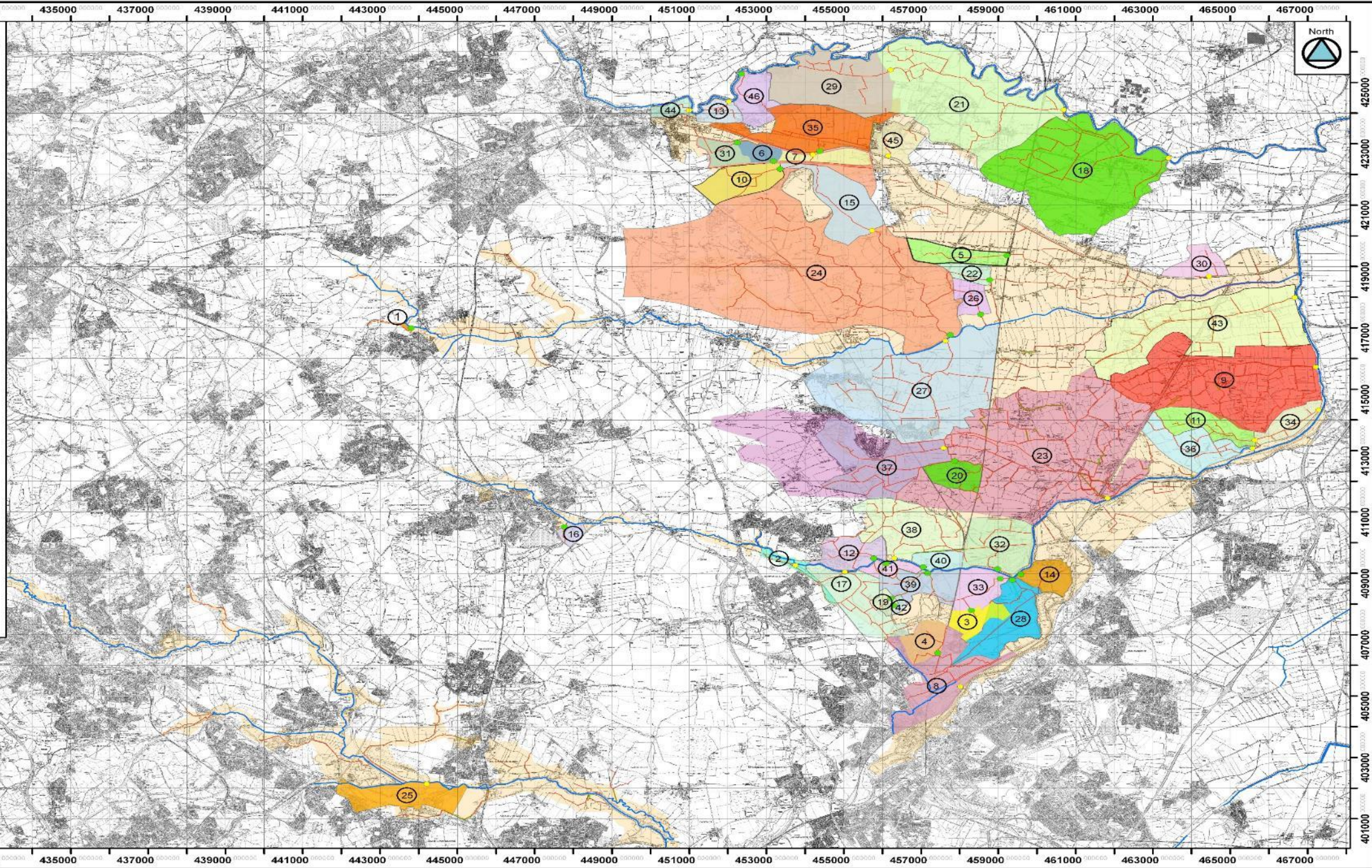
Benefit determined
from hydraulic
modelling

better information = better decisions



Pumping Stations

1. Ackworth School
2. Adwick Mill Dyke
3. Almholme
4. Arksey
5. Balne Fleet
6. Beal Lane Booster
7. Beal Lane
8. Bentley Ings
9. Blackshaw Clough
10. Blowell
11. Church Walk
12. Duckholt
13. East Ings
14. Flood Evacuation
15. Fulham Lane
16. Goodehole
17. Goosepool
18. Gowdall
19. Hall Villa
20. Haywood
21. Hensall
22. Jenny Lane
23. Kirk Bramwith
24. Lake Drain
25. Lake Outfall
26. Longwood
27. Norton Common
28. Norwood
29. Old Hee
30. Park Farm
31. Rampart
32. Reedholme
33. Sandall Knooking
34. Sour Lane
35. Southfield Lane
36. Taining Drain
37. Thistle Goit
38. Thornhurst
39. Tilts
40. Tilts Bridge
41. Tilts Hills
42. Toll Bar Rugby Club
43. Towns Clough
44. Town Drain
45. Whitley Bridge
46. Wood Holmes



Scale : NTS

Figure 4-2: Kirk Bramwith HEC-RAS model schematic view



Pumping Stations

Pumped Catchment	Properties	Pumped Catchment	Properties	Pumped Catchment	Properties
Ackworth	0	Gowdall	709	Southfield Lane	154
Adwick Mill	40	Hall Villa	533	Taining Drain	79
Almholme	226	Haywood	56	Thistle Goit	229
Arksey	1835	Hensall	1879	Thornhurst	85
Balne Fleet	59	Jenny Lane	34	Tilts Bridge	30
Beal lane Booster	1	Kirk Bramwith	3436	Tilts	99
Beal Lane	50	Lake Outfall	1690	Tilts Hills	29
Bentley Ings	4501	Lake Drain	1123	Toll Bar Rugby	23
Blackshaw Clough	385	Longwood	25	Town Drain	873
Blowell	137	Norton Common	3086	Towns Clough	621
Church Walk	344	Norwood	364	Whitley Bridge	701
Duckholt	579	Old Hee	917	Woodholmes	268
East Ings	109	Park Farm	15	TOTAL PROPERTIES	26380
Flood Evacuation	0	Rampart	8		
Fulham Lane	268	Reedholme	81		
Goosehole	5	Sandall Nooking	0		
Goosepool	604	Sour Lane	90		

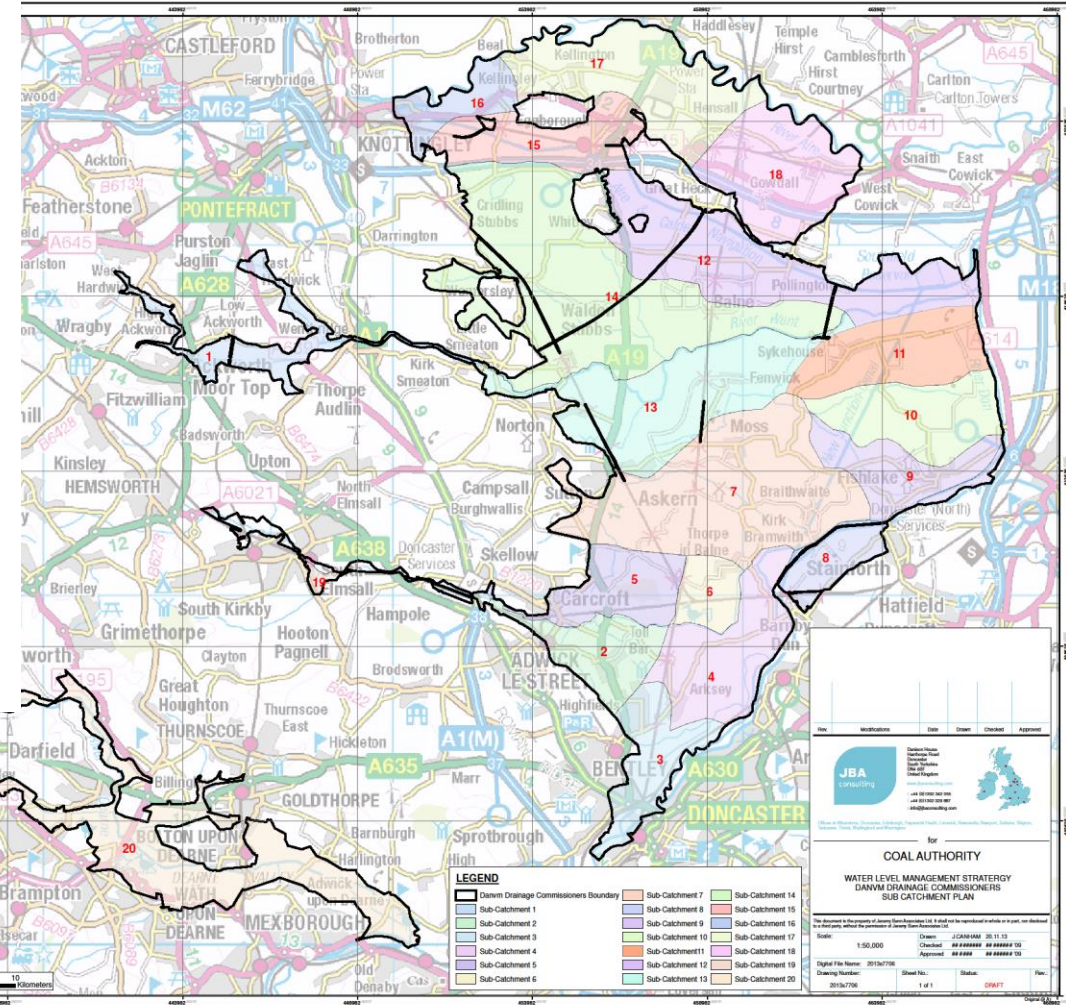
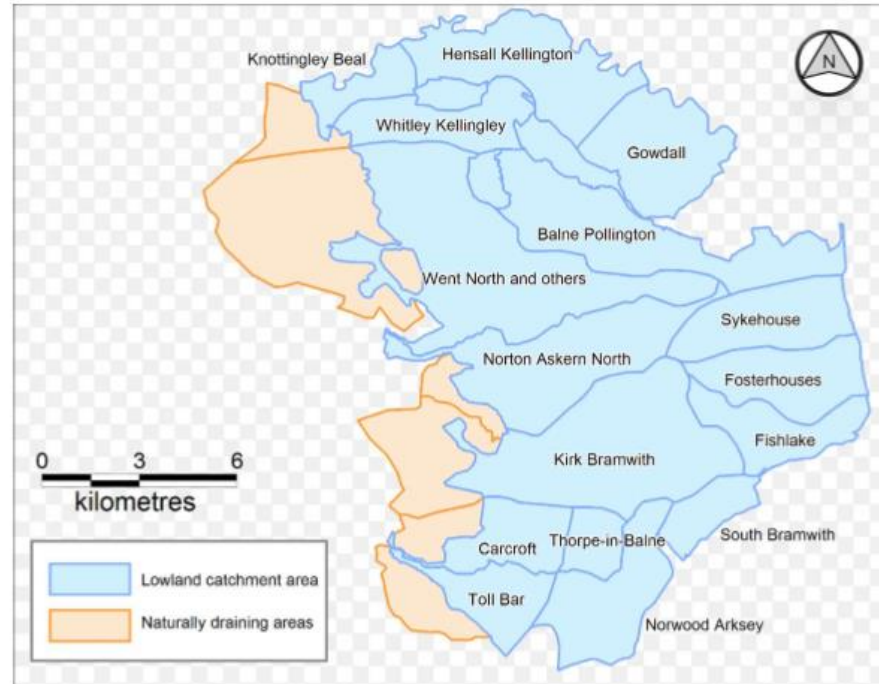
- 46 Stations in total spread across 20 sub-catchments
- 3 Stations not currently accounted for Stoney Lane, Field Houses and Great Heck



Modelling – Defining Sub Catchments

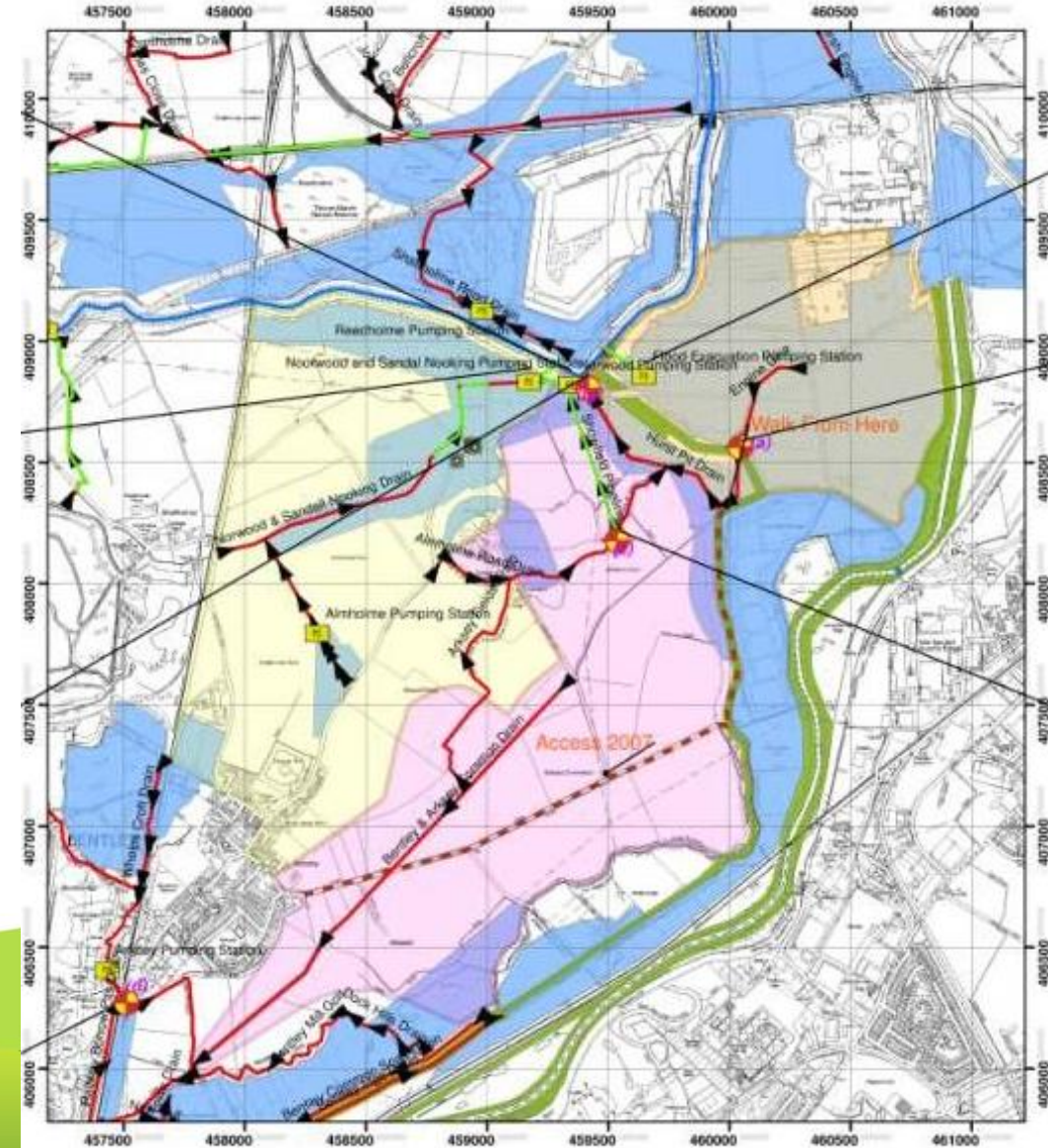
- 1.Ackworth
- 2.Goosepool
- 3.Bentley Ings
- 4.Norwood
- 5.Thornhurst
- 6.Reedholme
- 7.Kirk Bramwith
- 8.South Bramwith
- 9.Fishlake
- 10.Blackshaw Clough
- 11.Towns Clough
- 12.Pollington & Balne
- 13.Norton Common
- 14.Lake Drain
- 15.Eggborough
- 16.Knottingley
- 17.Hensall
- 18.Gowdall
- 19.South Elmsall
- 20.Dearne Valley

Figure 3-1: Catchments split between natural and artificially draining areas

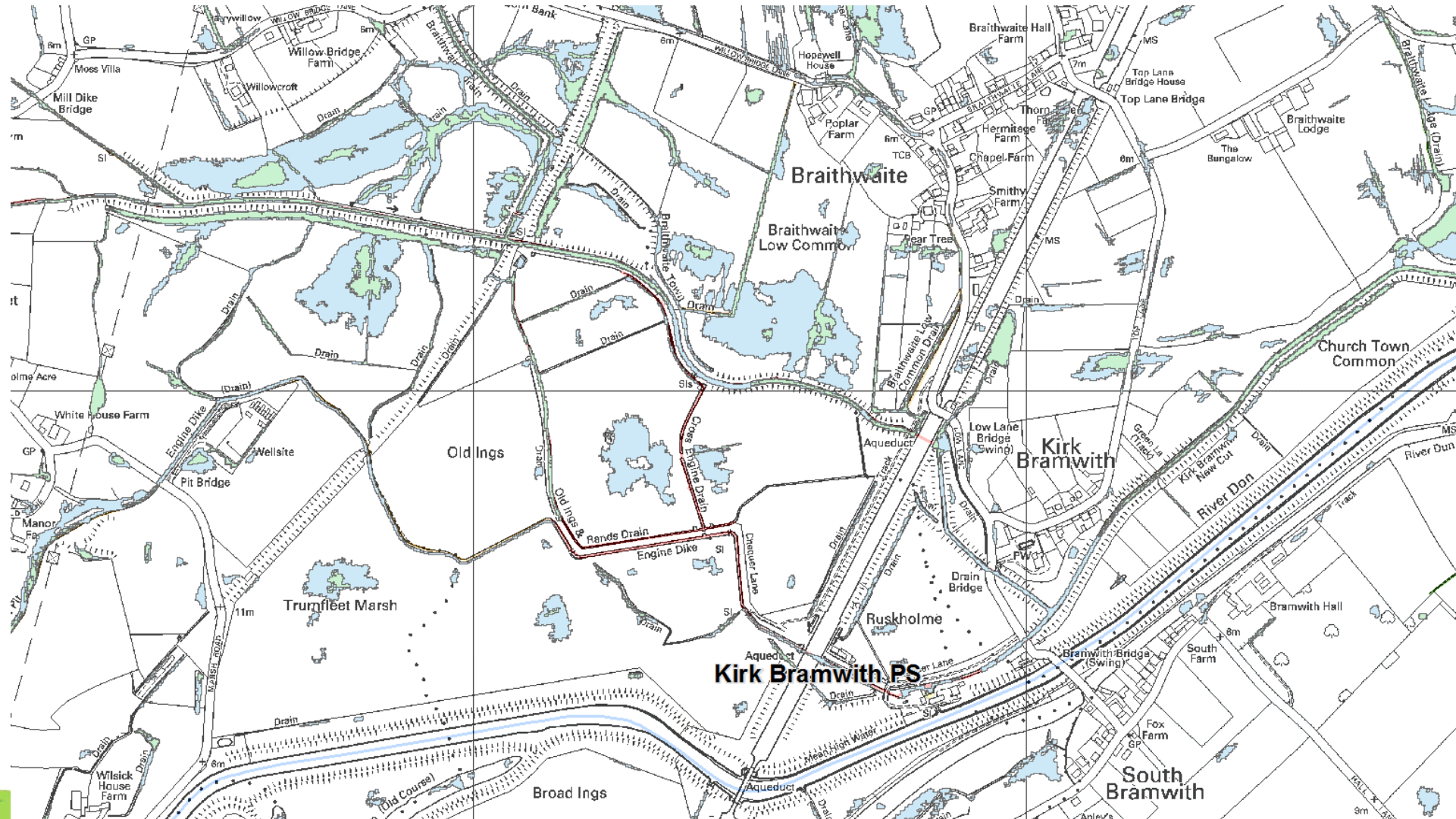


Optioneering

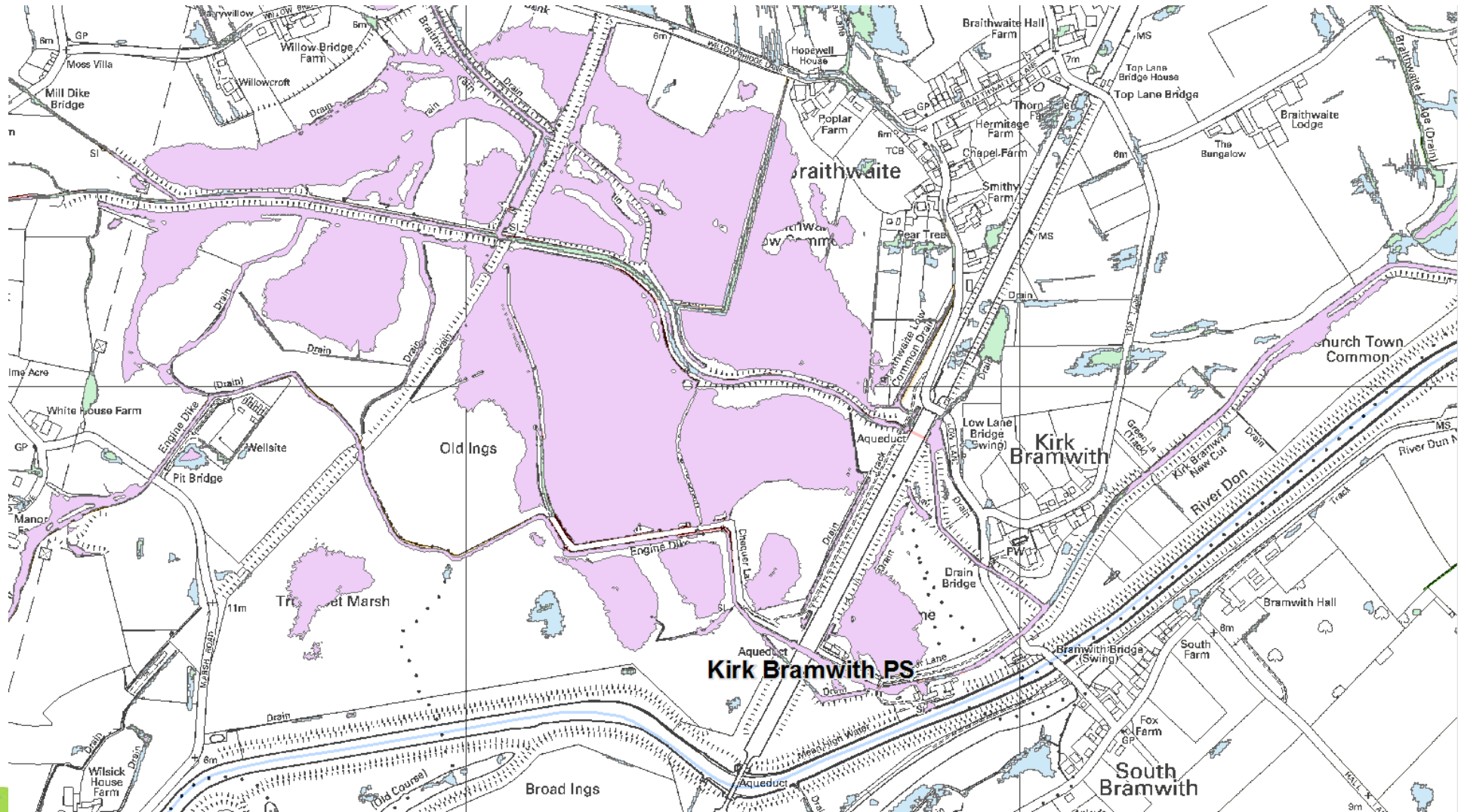
- Review of current operating rules against flows/type of pumps, motors etc. including writing interface with existing model to review pump efficiency
- Blockage Scenarios
- Saturation during a series of storm events
- Critical duration tests
- Long term multiple storm events with and without pumping
- Comparison of night time tariff
- Storage and pump station rationalisation



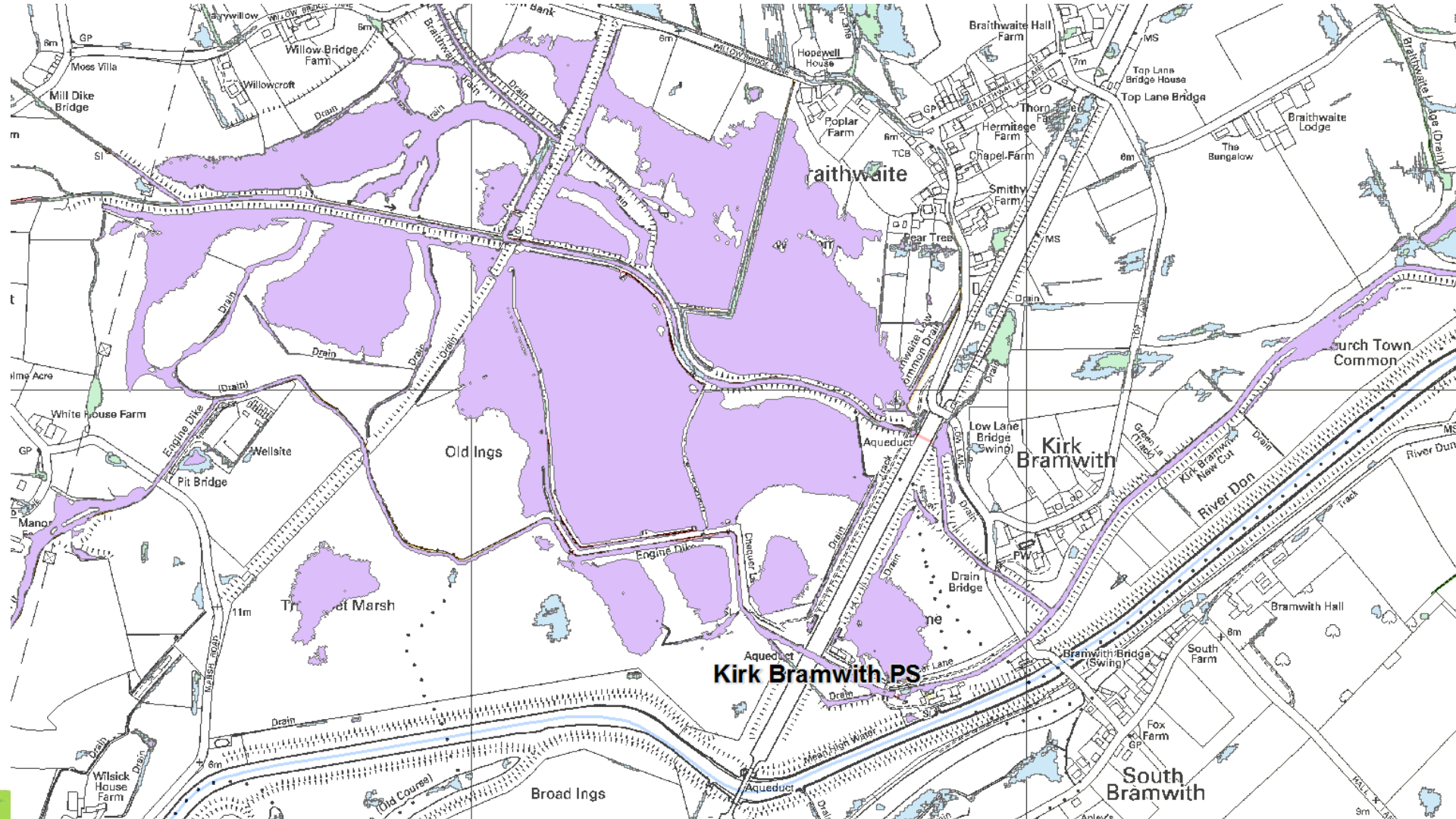
Outputs: EA 1in1000yr Surface Water



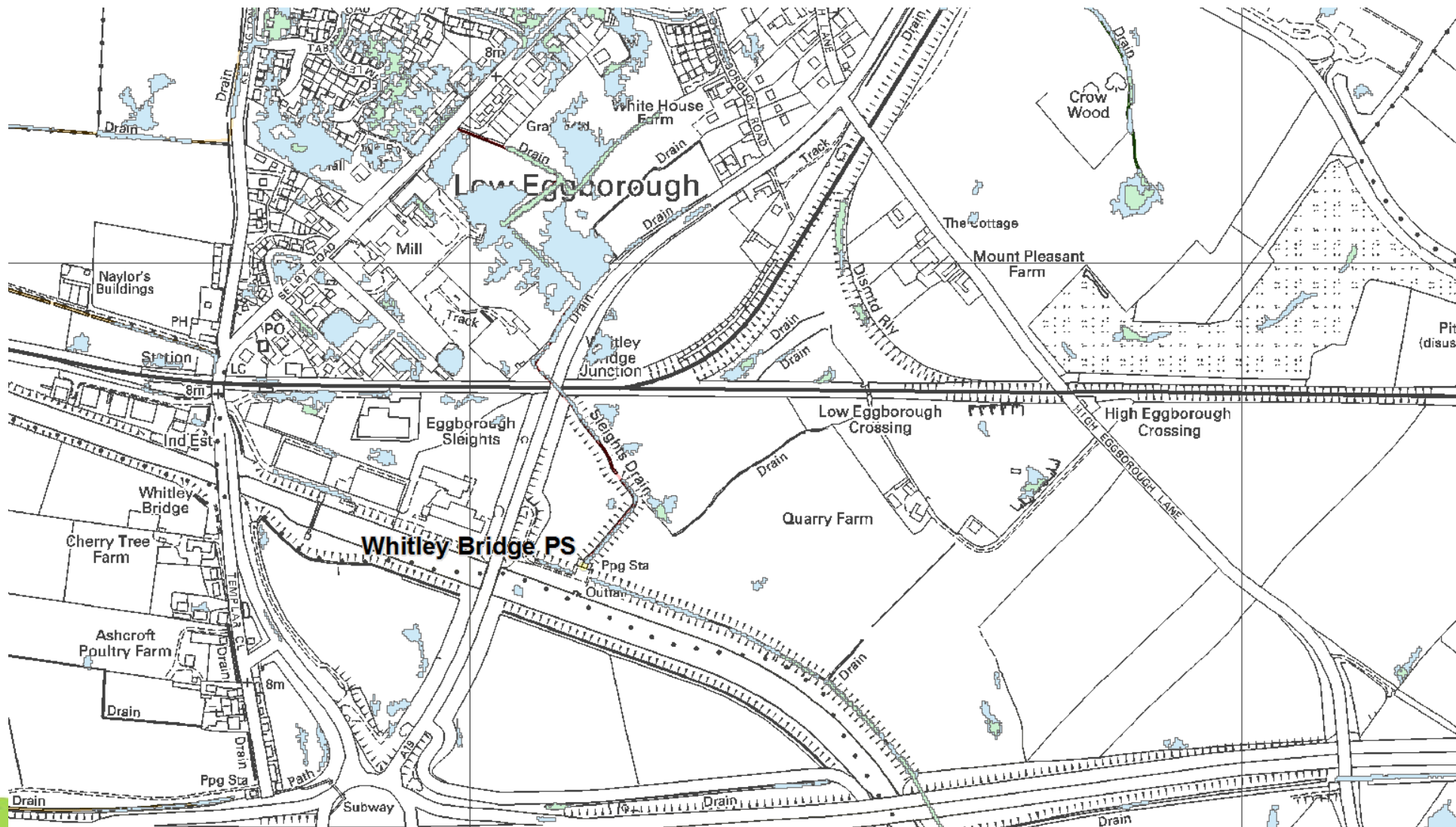
Outputs: IDB 1in1000yr Surface Water



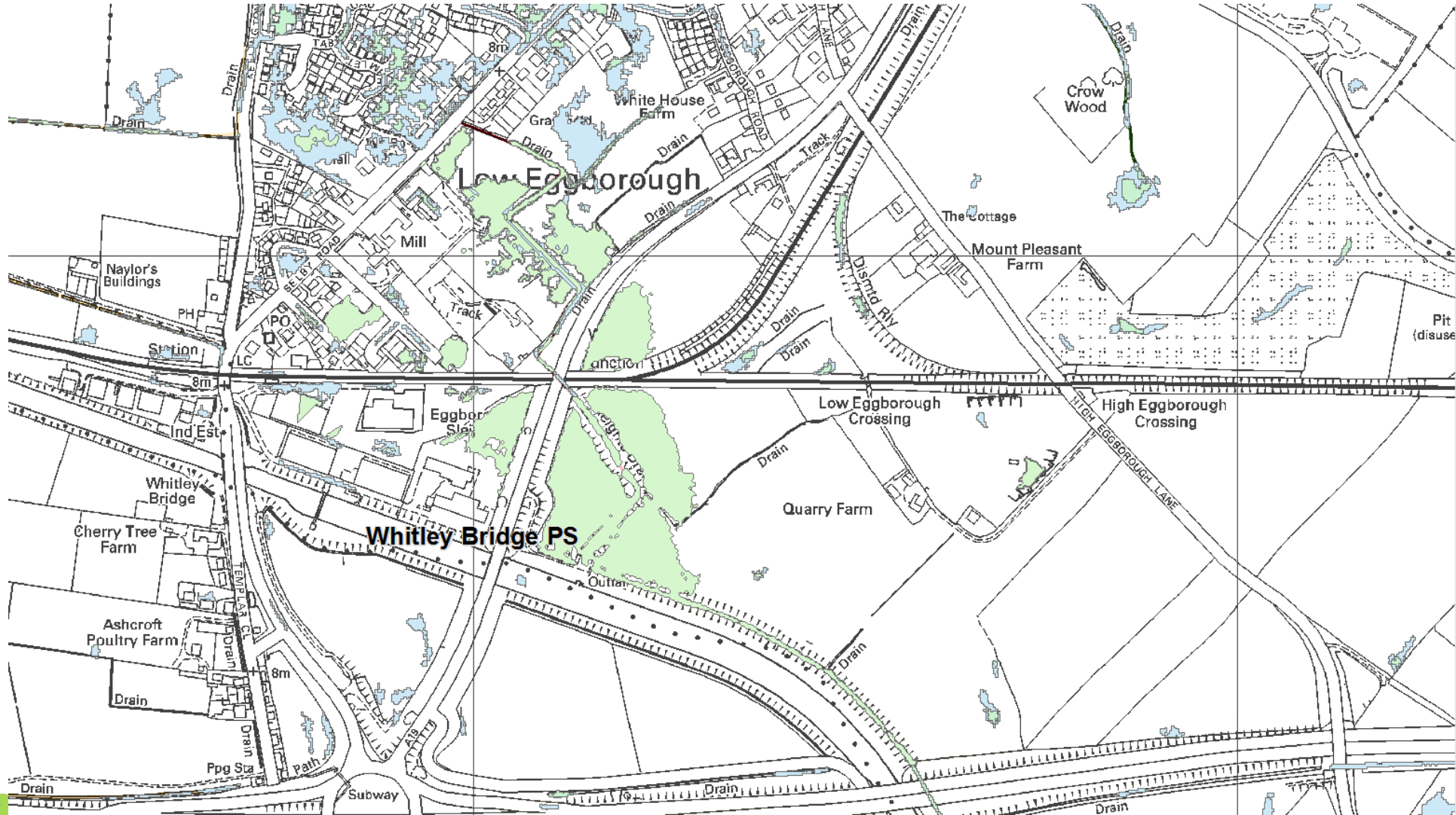
Outputs: IDB 1in100yr, pumps fail 24 hrs @ peak



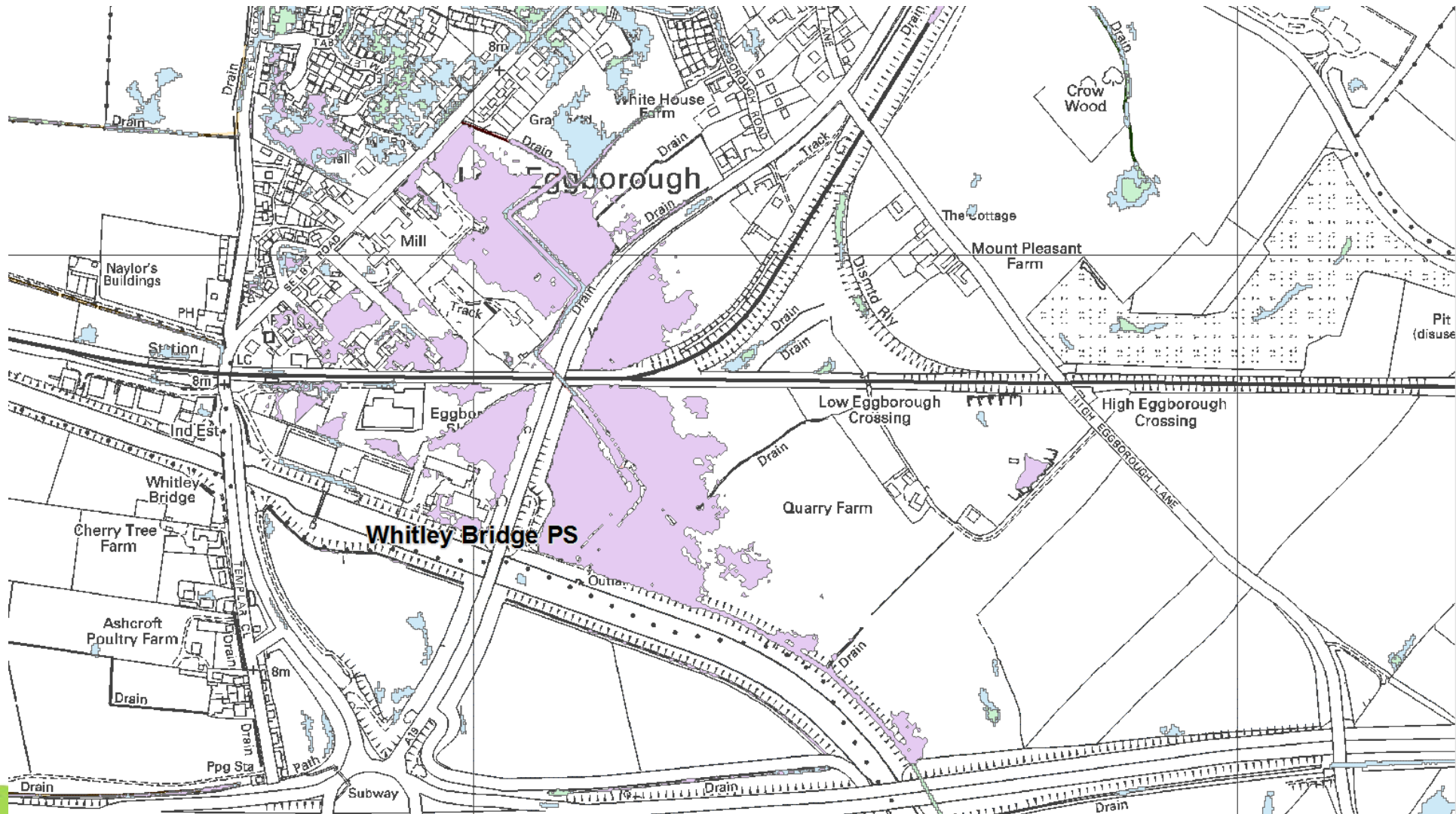
Outputs: EA 1in1000yr Surface Water



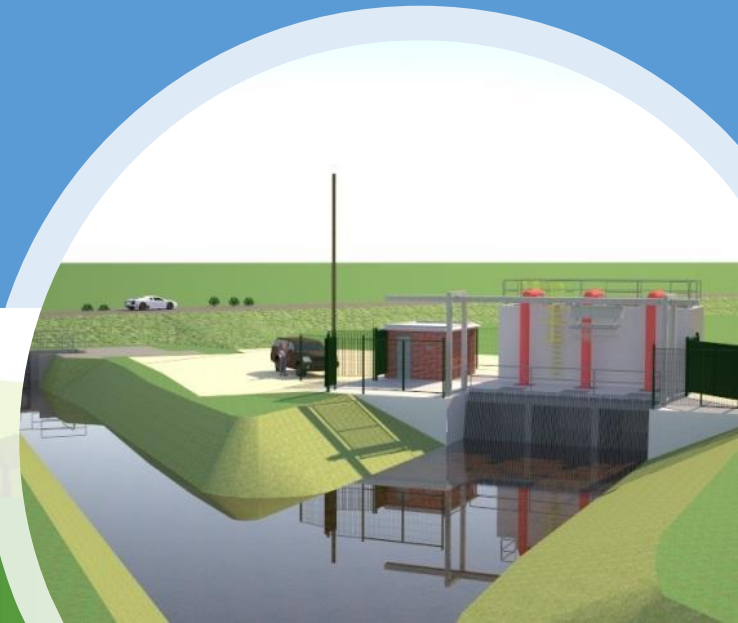
Outputs: IDB 1in1000yr Surface Water



Outputs: IDB 1in100yr, pumps fail 24 hrs @ peak



What are the Opportunities?

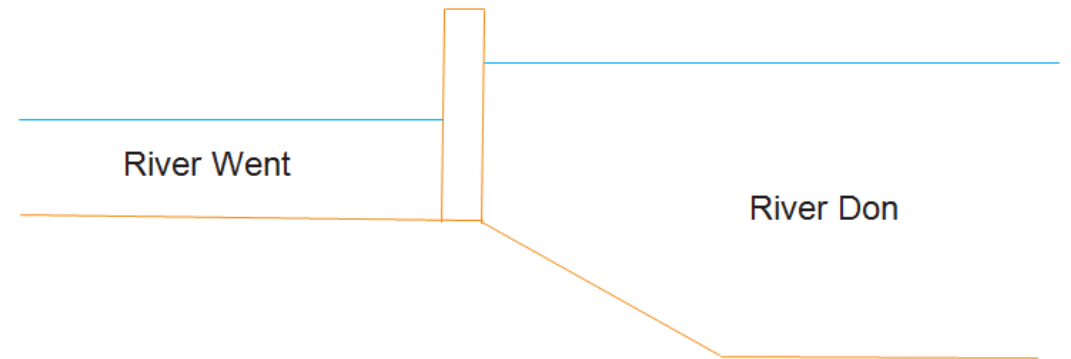
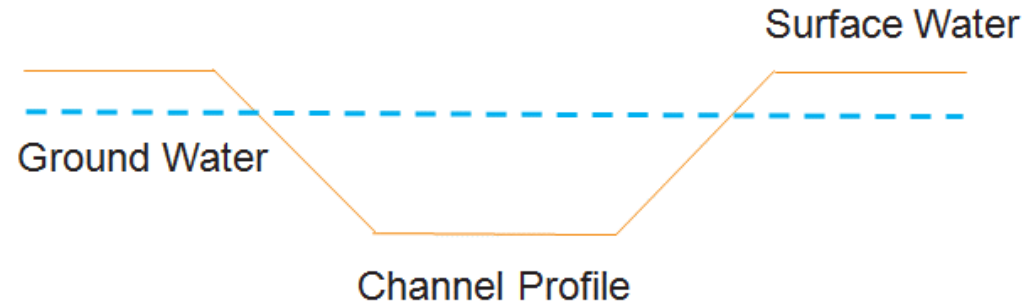


River Went

- 7.2 miles from the A19 to the River Don outfall
- Surveyed fall is 1.7 m (5.5 foot) over 10 km (6.2 miles) (1in6000)

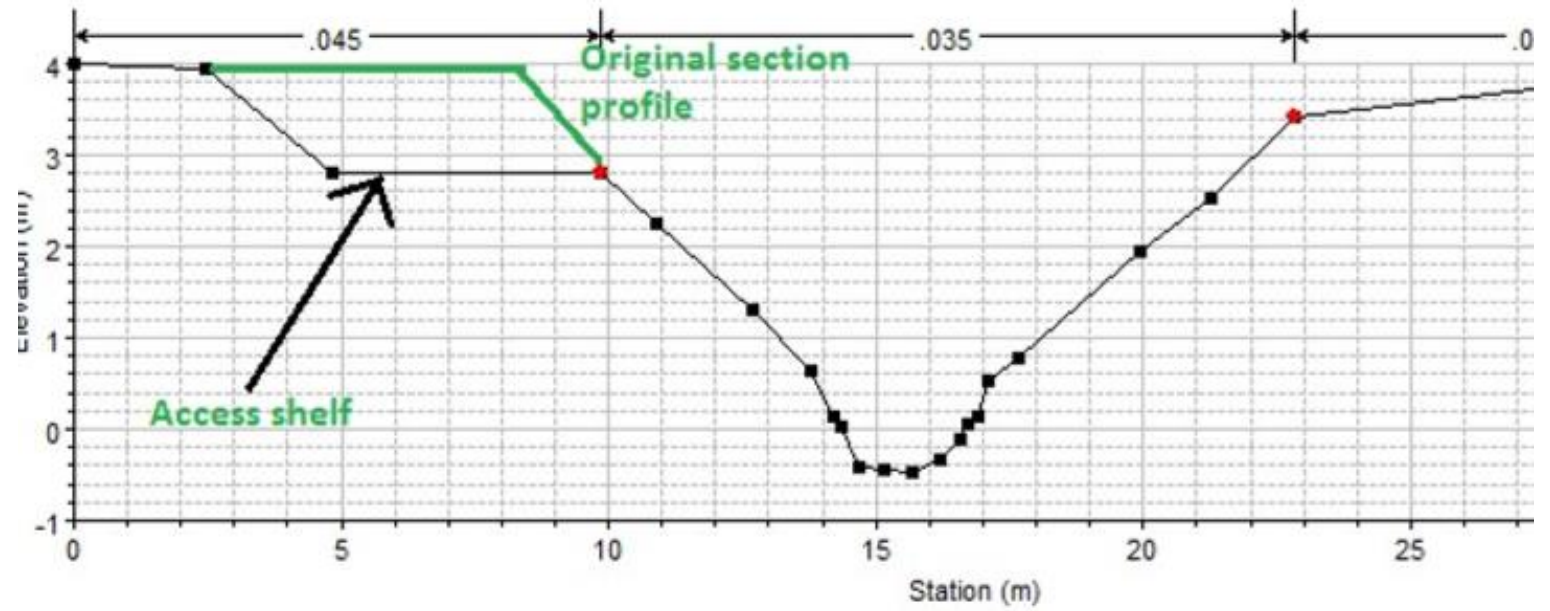
Challenges

- Watercourse is heavily modified (straightened and embanked)
- Land owners seek to crop up to banktop





it and database right 2018.



Berms & Storage & Altered Pump Rules



Flood Meadow

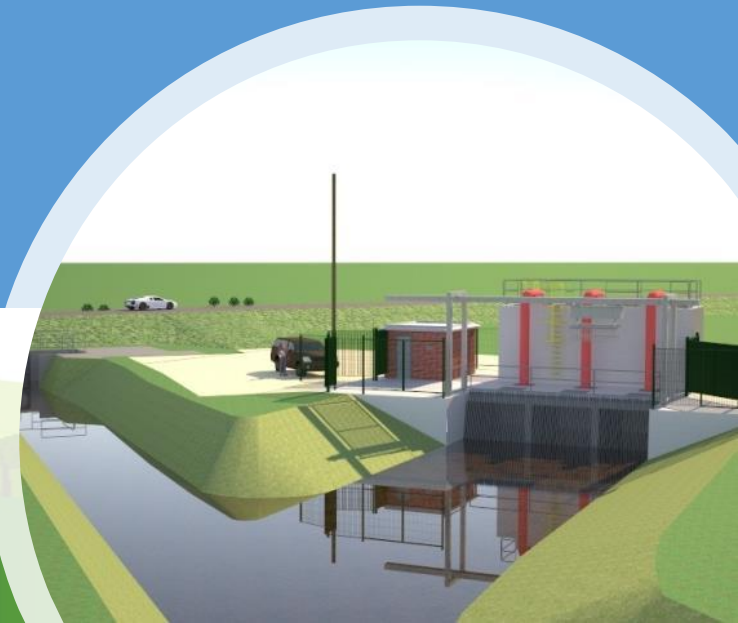




Engagement & Education

What are the Opportunities?

- Buffer strips, Berms, Lagoons/Storage
- Supporting the purchase of land for flood meadows
- Upper Catchment Studies
- Modifying pump rules and storage based on evidence
- Meandering Rivers
- Re-connecting flood plains and allowing for return to river
- New farming rules for water
 - Capturing information
 - Collecting data and offering support to RPA, NE, EA and Defra (IDB1)



Working in Partnership and raising awareness of riparian responsibilities

Owner/occupiers
Councils
Water Authorities
Utilities

