Water for Cambridge: South Level IDB Study - Gap Analysis and Feasibility Assessment

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Acronyms / Abbreviations

Acronym / Abbreviation	Full Name
ADA	Association of Drainage Authorities
ALS	Abstraction Licencing Strategy
AP	Assessment Point
AW	Anglian Water
BGS	British Geology Survey
DEFRA	Department for Environmental Food and Rural Affairs
DWI	Drinking Water Inspectorate
DWSP	Drought Water Safety Plan
EA	Environment Agency
EA FCRM	Environment Agency Flood and Coastal Risk Management
EFI	Environmental Flow Indicator
EOETS	Ely Ouse Essex Transfer Scheme
ESW	Essex and Suffolk Water
GIS	Geographical Information Systems
GOGS	Great Ouse Groundwater Scheme
HoF	Hands off Flows
IDB	Internal Drainage Board
INNS	Invasive Non-Native Species
LNR	Local Nature Reserve
MOSL	Market Operator Services Ltd.
NHH	Non-Household
NIAB	National Institute of Agricultural Botany
NNR	National Nature Reserve
NRFA	National River Flow Archives
OD	Ordinance Datum
PAHs	Polycyclic Aromatic Hydrocarbons
PBDE	Polybrominated diphenyl ethers
PFAS	Per- and poly-fluoroalkyl substances
PWS	Public Water Supply
PyWR	Python for Water Resources
RFD	Reason For Deterioration
RNAG	Reason for Not Archiving Good
SAC	Special Area of Conservation
SL	South Level IDBs
SLD	South Level Datum
SPA	Special Protection area
SSSI	Site of Special Scientific Interest
SUVA	Specific UV Absorbance
SWMI	Significant Water Management Issue
THMs	Trihalomethanes
WFD	Water Framework Directive
WIMS	Water Information Management System
WRE	Water Resources East

Acronym / Abbreviation	Full Name
WRMP	Water Resources Management Plan
WTW	Water Treatment Works

1 Introduction

1.1 Scope of report

This Data Gap and Feasibility Assessment report has been prepared by Stantec UK Ltd ('Stantec') on behalf of our client, Water Resources East, to study and analyse datasets related to the South Levels area. The data collected is to inform the Water for Cambridge project looking at the potential to capture, store, and deliver surplus water from the South Levels area into the Public Water Supply for Cambridge and other uses.

A previous study completed by JBA in March 2025 aimed to understand how agricultural reservoirs could be used to enhance Public Water Supplies. This study has been completed in response to this JBA initial report and aims to take the study into further detail.

There are three anticipated stages of Water for Cambridge South Levels' Study

Stage 1: Gap Analysis and Feasibility Assessment

Stage 2: Future Study Phases including potential Modelling

Stage 3: Design and Deliverables

This report is part of a package associated with Stage 1, of which a suite of technical documents is provided, as follows:

1. Data Gap and Feasibility Assessment
2. Catchment Conceptualisation and Water Balance Assessment
3. Optioneering

The Stage 2 and 3 parts of the project are subject to the findings of the Stage 1 works.

1.2 Study area

The South Levels are located within the East Anglia region, across the north of Cambridge and surrounding Ely, see Figure 1.1 The study area covers the entire South Level catchment area, totalling an area of just over 910 km².

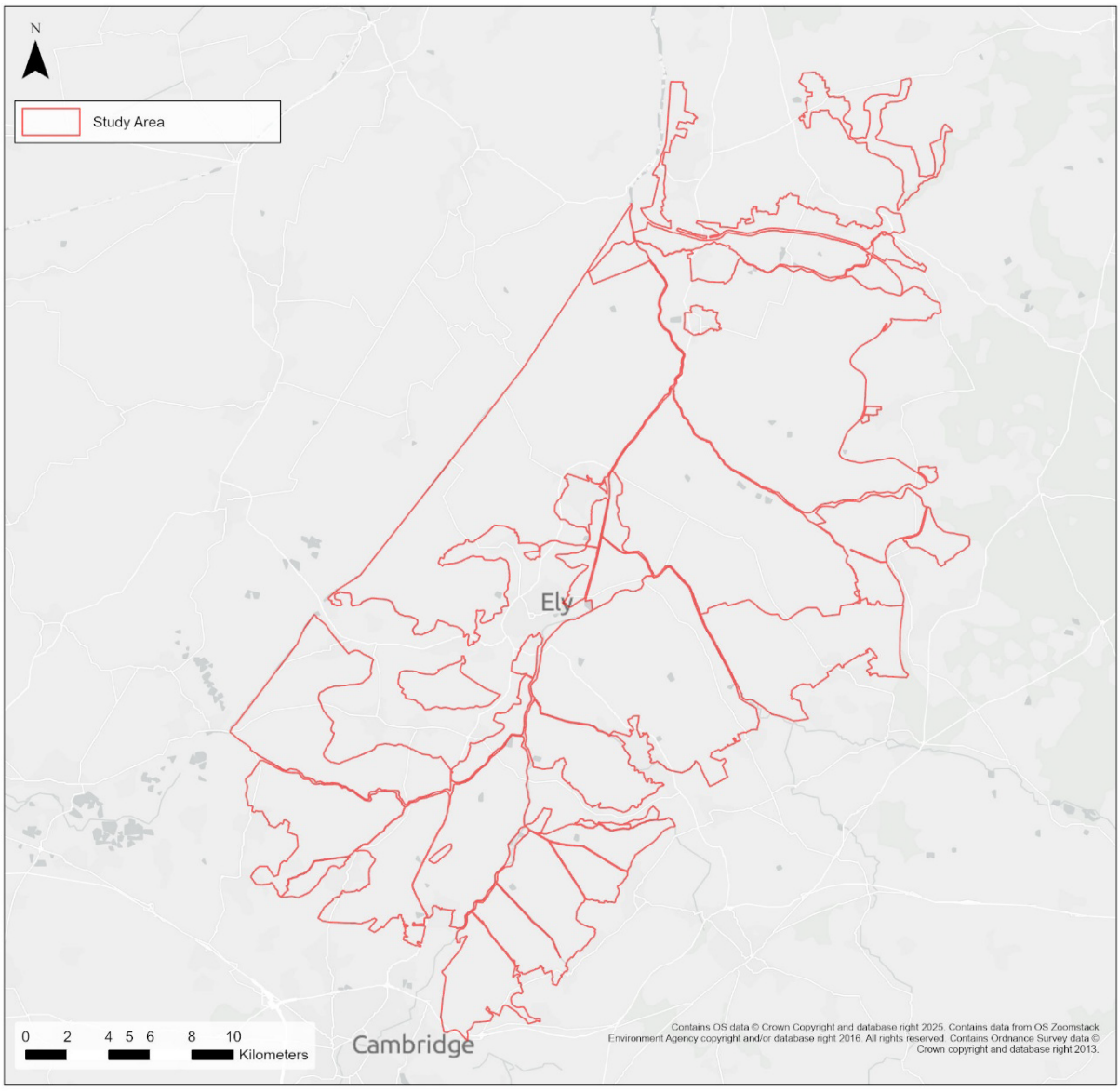


Figure 1.1 South Level IDB Boundary

The study area historically consisted of wetland, which frequently experienced flood events and in the 1000s had a thriving fishing eel industry[1]. Since then, the Fens have slowly been drained for agriculture, requiring greater management of flood events. This has resulted in the topography of the South Levels

[1] A brief history of the Great Fen | The Great Fen

to subside and sink through drying out over the past 400 years, leaving rivers and watercourses higher than the surrounding area. As a result, water must be pumped to the main rivers using infrastructure such as pumping stations at confluence points, since it can no longer drain via gravity and natural processes.

The South Levels comprises 15 Internal Drainage Boards (IDB), as shown in Figure 1.2 covering a range of Environment Agency designated Main Rivers, as seen in Figure 1.3 and Appendix A.

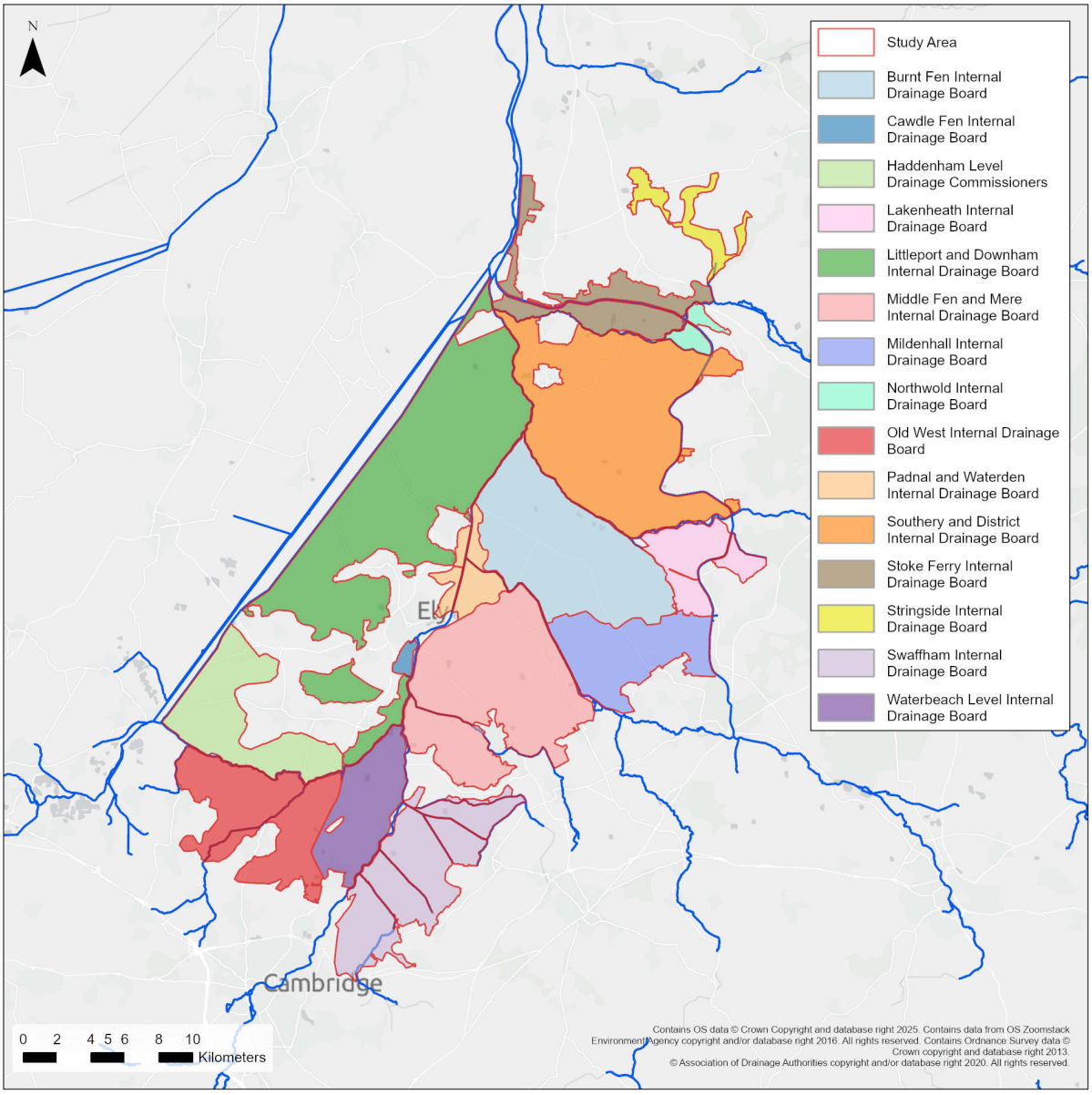


Figure 1.2 IDB extent within the South Level

The study area is primarily open agricultural land crossed by local drainage ditches, EA designated Main Rivers and IDB drains. The EA Main Rivers include the Cam, Ely Ouse, Great Ouse, Little Ouse, Lark, Wissey and the Cut off Channel. To the west, the study area is bounded by the New Bedford River, which is the primary border between the Middle and South Level IDB catchments, which can be

seen in Figure 1.3. Whilst the study area is indicated in grey in Figure 1.3, the Figure 1.2 above shows Haddenham IDB falls within the Middle Level. There are areas of Haddenham and Littleport and Downham which discharge into the Hundred Foot drain and have not been included in this study, as they are associated with a different hydrological regime on the tidal Great Ouse rather than the Ely Ouse.

The study area is unique as rivers are perched above the surrounding land due to the history of draining the Fenland area, lowering the land level to below sea level in places. This leads to unusual water management activities, with a strong impact from intense rainfall patterns and water levels influenced heavily by the IDBs management, refer to Appendix B for more details on the IDB catchment conveyance system.

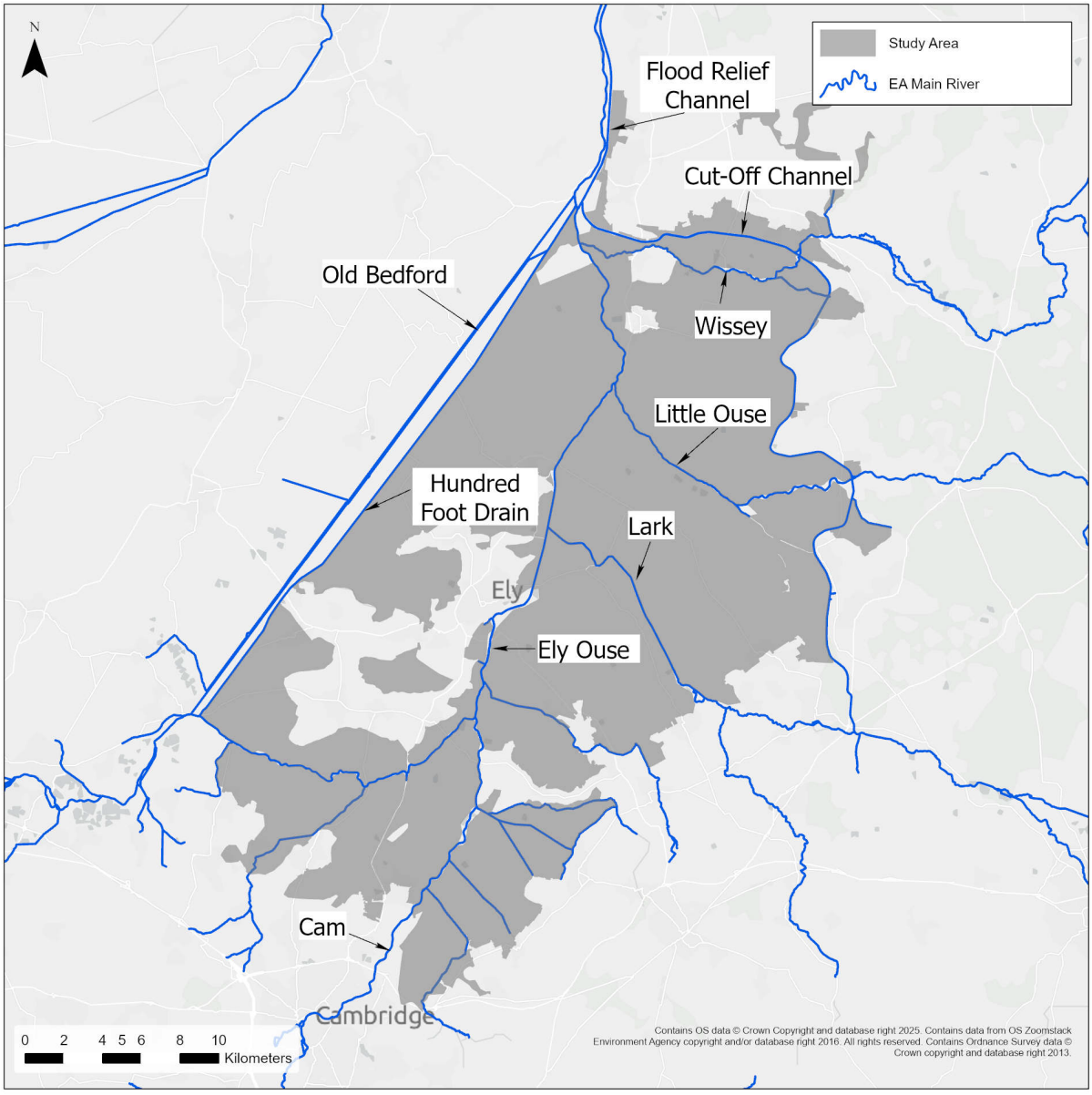


Figure 1.3 Hydrology map

1.3 Sources of information

This Gap Analysis and Feasibility Assessment report has been prepared based on numerous sources of information, gathered from a range of Stakeholders, Landowners, and online sources.

A Data Register has been prepared by Stantec UK Ltd, to be referred to alongside this report, refer to Appendix C. The Data Register is a record of meetings, consultations, online publicly available data, and data received from third parties.

1.4 Report structure

The Gap Analysis and Feasibility Assessment is structured as followed:

- Catchments: The sub-catchments comprising the study area.
- Surface Water Hydrology: Displays available data of the surface water hydrology.
- Groundwater Hydrology: Displays available data of the groundwater hydrology.
- Rainfall Hydrology: This section provides information on the available rainfall data.
- Water Quality: This section sets out the available data regarding water quality from varied sources.
- Infrastructure and Operational Management: Identifies the assets and structures within the South Levels area, including the Denver Complex.
- Environmental Considerations: Discloses the environmental status of the study area with the considerations of ecology, RNAG, landowner knowledge, EA incident reports, and designated sites.
- Gaps Identified: Is a summary of data gaps detected, and which would be recommended for compilation in future study stages.

1.5 Caveats and exclusions

The findings of this Data Gap Analysis and Feasibility Assessment report are based on information available at the time of this study. Data which has been received after the 2nd of February has not been included within this report, although has been added to the Data Register in Appendix C, this includes:

- Anglian Water network schematic (received 13th of February 2026)

This Local Resilience Option is in the early stages of design and stakeholder consultation. Therefore, the plans and data requirements are subject to change, as further information becomes available, such as costings and supporting technical investigations (for example, hydrological data, ecological surveys, flood risk analysis, and heritage).

2 Catchments

2.1 Licencing

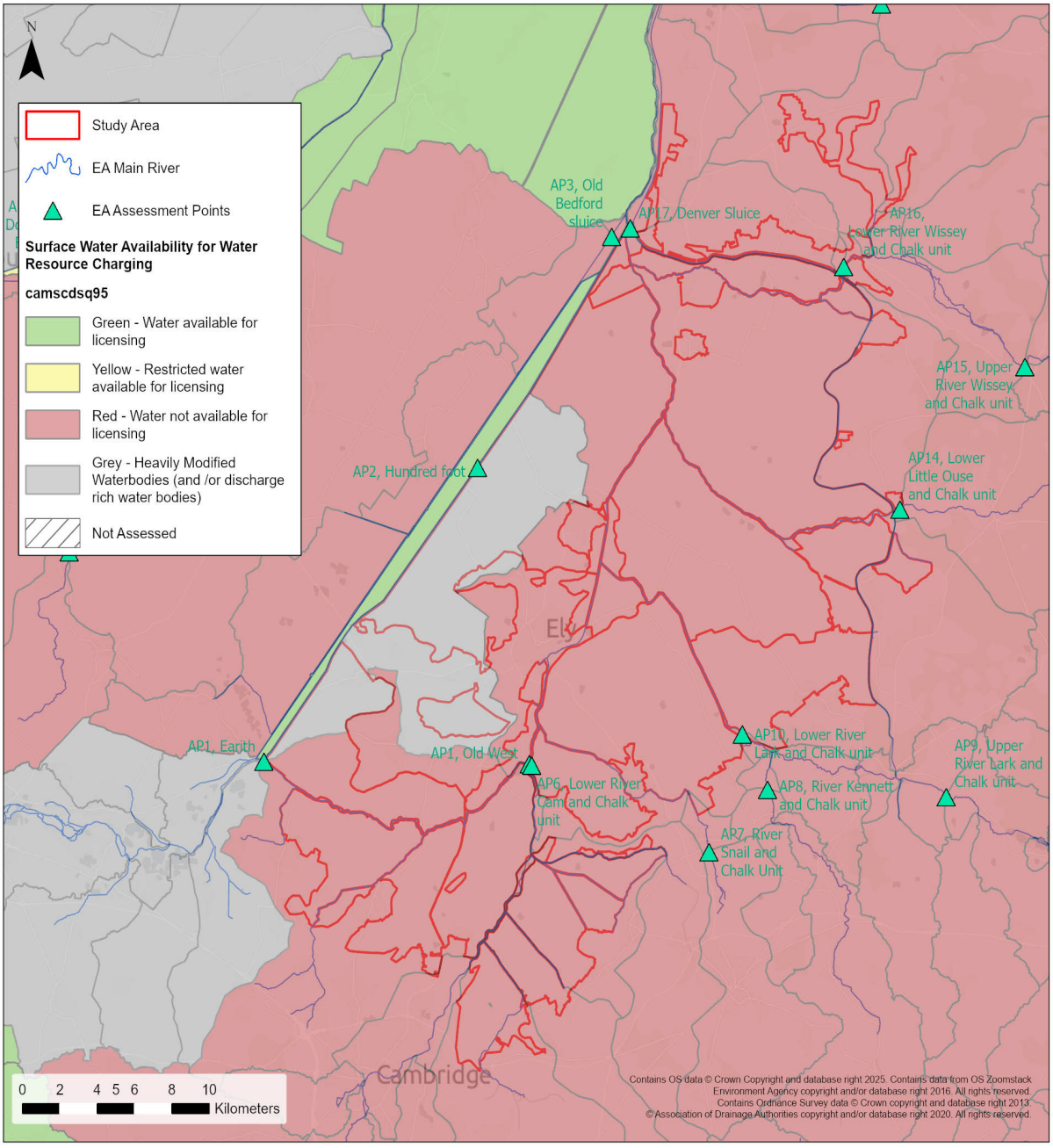


Figure 2.1 Abstraction Location Strategy Surface water under Q70 and Q95 low flow conditions

Abstraction licencing within the South Level IDB falls mostly within the Cam and Ely Ouse catchment area however, to the west the study area borders the Middle Level IDB. As a result, there is a mix in the licencing strategy within the South Level IDB and a small section of the study area, the ‘Hundred Foot

drain,' falls under the Old Bedford Including Middle level Abstraction Licensing Strategy (ALS) which operates under a different agreement, refer to Appendix D for further details.

This study uses a Hands-off Flow (HoF) value of 12 m/s at Denver. During a discussion with the EA on the 20th of November this was confirmed this applies to licences upstream of Denver. Noting that it does not apply to licences in IDB areas pumping to the Hundred Foot Drain or Middle Level.

The Old Bedford Including Middle Level ALS operates between summer and winter month abstractions, categorising summer as March to October and winter as November to February. During summer, the ALS is under a RED condition (Water not available for abstraction), due to the recent actual flows that are below the Environmental Flow Indicator (EFI) and, therefore, lower than the required flows to support Good Ecological Status. This area does not fall under the 'Areas Sensitive to Abstraction[2]' zones or The Great Fen Project area[3].

As detailed in the Old Bedford including Middle Level ALS by the EA (2017)[4], abstraction is forbidden when the level within the IDB drain is below 97.25 South Level Datum (SLD) at the grid reference: TL508 891.

For the wider South Levels area, the abstraction licenses are agreed by a flow level percentile rather than the time of year, assessed within a catchment as seen in Figure 2.1.

Table 2-1 A summary table of the water available at each assessment point by flow condition for abstraction from the Cam and Ely Ouse Abstraction Licensing Strategy Policy (2020).

Assessment Points (AP) licensing:	Name:	Q30	Q50	Q70	Q95
AP17	Denver Sluice	Available	Restricted	Not available	Not available
AP16	Lower River Wissey and Chalk	Available	Restricted	Not available	Not available
AP14	Lower Little Ouse and Chalk	Restricted	Restricted	Not available	Not available
AP10	Lower River Lark and Chalk	Restricted	Restricted	Not available	Not available
AP08	River Kennett and Chalk	Restricted	Restricted	Not available	Not available
AP06	Lower River Cam and Chalk	Available	Restricted	Not available	Not available
AP01	Old West	Available	Restricted	Not available	Not available

[2] Areas sensitive to abstraction are areas in close proximity to protected sites or restricted water supply as a result of obstructions or infrastructural limitations
[3] Great Fen Project Area is a project aiming to restore ancient wetlands and wildlife habitats
[4] 227_10_SD01_XXXX Abstraction Licensing Strategy

At each of the seven assessment points within the IDB catchment area, water resource availability is assessed dependant on flow, as seen in Table 2-1. As the main rivers in this area are very responsive to the flows, meeting abstraction demand has been linked to HoFs, though can include more local hands off levels within the IDBs. Within the Cam and Ely Ouse Abstraction Strategy report, Gov.UK (2020)[5], the abstraction licensing sectors with the highest consumption levels are proportioned, as seen below. Table 2-2 shows the Amenity and Environmental sector is the highest abstractor within the South Levels with the Public water supply and other potable uses as the second highest. This is valuable when assessing how the abstracted water is used, and where it goes within the system.

Table 2-1. shows that the South Level IDB has water available for at least 70% of the time in 4 locations: AP01, 06, 16 and 17. Also important is under Q70 conditions or greater, the ALS is not available and is restricted at Q50. These variations are factored into the HoF, with the aim to protect and maintain the environment and the rights of other abstractions.

Table 2-2 The proportion of different sectors based on licensed abstraction quantity within the Cam and Ely Ouse catchment area. Data from: Cam and Ely Ouse abstraction licensing strategy (ALS) Policy paper, December 2020.

Abstraction licence sector	Proportion of total licensed quantity (%)
Public water supply and other potable uses	32%
Agriculture	14.6%
Industry	3.1%
Amenity/ Environmental	50.2%

2.1.1 Landowner abstraction licencing

Whilst online data resources provide an opportunity to gain a surface level understanding of how the South Levels operate, understanding, on a local scale, the following:

- How water is transferred (refer to Section 3 Landowner questionnaire (Transfer and Conveyance))
- How efficient the conveyance system is (refer to Section 3 Landowner questionnaire (Transfer and Conveyance))
- How water quality is tested and/or managed (refer to Section 6. Water Quality).

This is highly valuable, and essential to the progress of this study. To obtain this data, a landowner questionnaire was sent out to those who manage land within the study area supported with face-to-face

[5] Cam and Ely Ouse abstraction licensing strategy (ALS) - GOV.UK

consultation on the 15th of December 2025. Responses are confidential, and landowners' responses have been anonymised.

Methods

To gain a greater understanding of how water was abstracted within landowner boundaries, the two following questions were asked:

> *Q6a) Following on, which type abstraction sources did your land use and (to your best knowledge) how much water was abstracted from it?*
>
> *Q6b) If your answer was 'Reservoir' which category of reservoir abstraction, which subcategory does it fall under? Please include the quantity again.*

Results

Discussions with landowners highlighted that the agricultural abstraction licences are not fully utilised to full capacity. The estimated percentage use of abstraction licences during summer months are shown below:

- *1/3 of abstraction utilised: Normal year*
- *1/2 of abstraction utilised: Drought year*

Further detail to the results of the landowner questionnaire question 6a and b, can be found in section 7.5 Reservoirs.

2.2 Flood Risk Zones

The classification of flood risk areas is defined as follows:

- Zone 1: Low probability (Land less than 1 in 1000 (0.1%) annual probability of river or sea flooding)
- Zone 2: medium probability (Land whereby 1 in 100-1000 (1%-0.1%) of river flooding)
- Zone 3: high probability (Land with a greater than 1 in 100 (>1%) annual probability of river flooding).

The South Levels have been categorised as predominantly within Flood Zone 3 based on the Flood map for planning mapping[6], and as seen in Figure 2.2. This covers a large proportion of the South Levels extent, see Appendix E for further information regarding mapping. These maps do not consider the defences structures which protect against flooding and maintain water levels.

[6] Map – Flood map for planning – GOV.UK

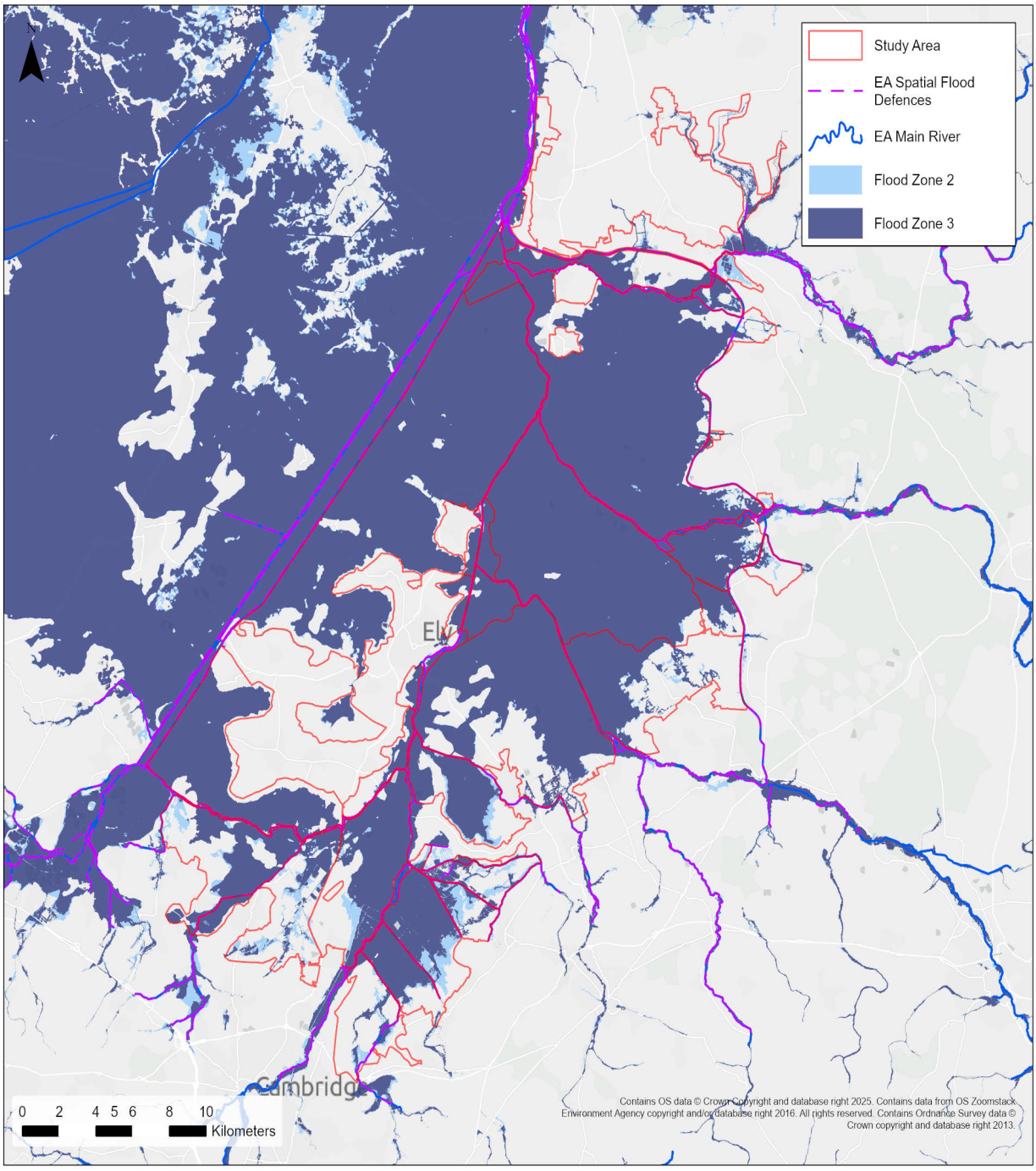


Figure 2.2 EA Flood Zone map

3 Surface water Hydrology

Investigating the hydrology within the South Level IDB is key to understanding the water available and how the conveyance system, water quality and structures interact. Using data from various sources from online publicly available, requested and the landowner questionnaire[7], a range of data has been found and help identify any gaps. The EA hydrology and NRFA stations are shown below in Figure 3.1.

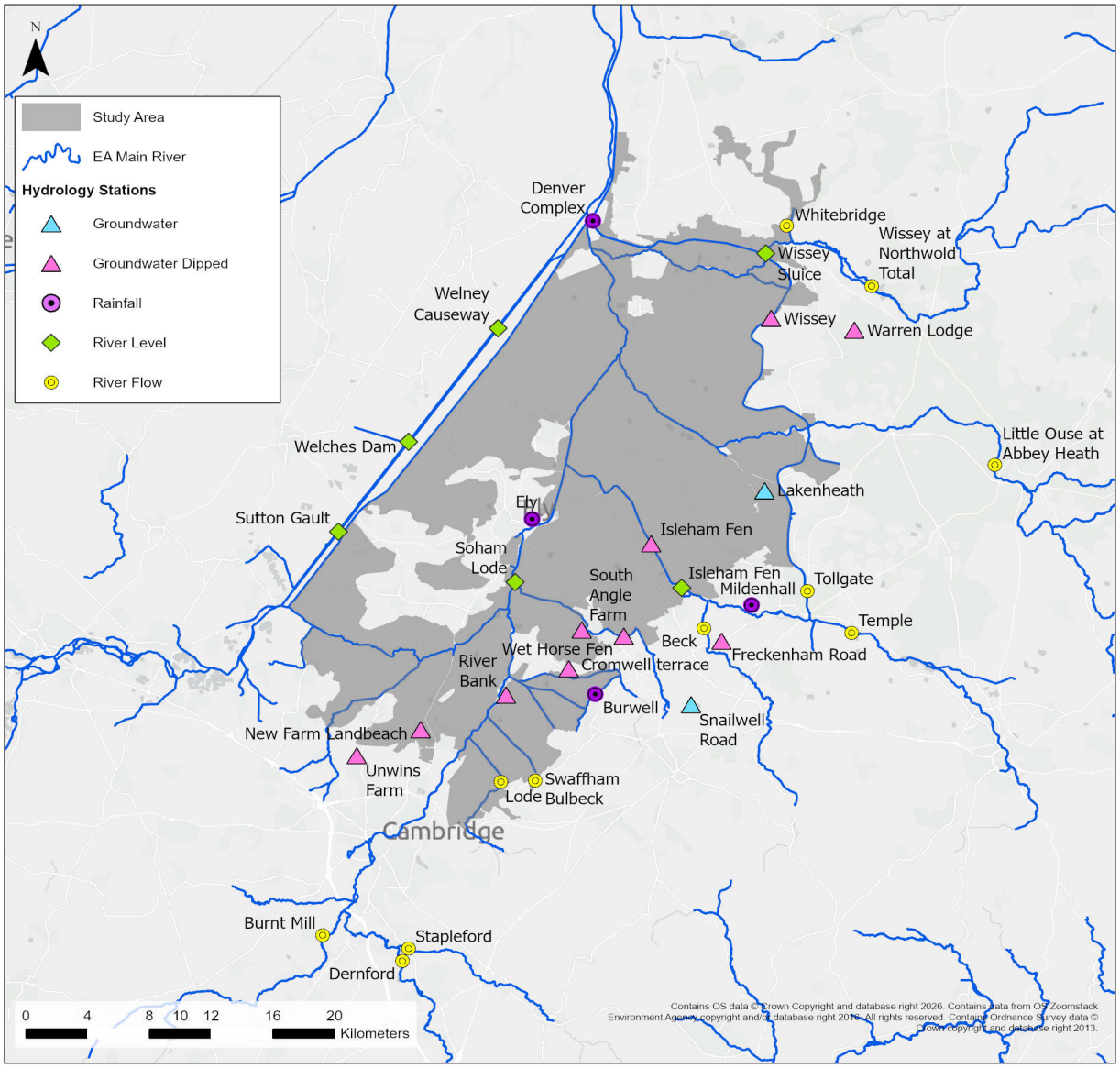


Figure 3.1 Hydrology Explorer and NRFA Stations

[7] Landowner questionnaire was sent out on 24th November 2025 and received responses by 16th December 2025 with a face-to-face meeting with landowners on the 15th of December. Aiming to gain an understanding of local knowledge within the IDB area on conveyance, water quality and existing/ future infrastructure plans.

The EA open hydrology datasets were downloaded for a range of stations as shown in Figure 3.1, with data covering the period of record from 1999 to 2025. The date range was established on an initial evaluation of the data record completeness. Further details are provided in the following sections.

3.1.1 River Flow

River flow data accounts for the type of river the station is located on, whether it is EA main river or other channel types, and the bedrock type upon which the river sits, refer to Appendix F for further details. The raw data extends from 1962-2025 and the selected period of record for this study 1999-2025 covers both drought and flood years.

Out of the 9 stations: Beck, Burnt, Dernford, Lode, Stapleford, Swaffham, Temple, Toll Gate and White Bridge, only 2 stations have data which is missing. In these cases, both direct infilling and scaling of the missing data was used to account for seasonal variation across a year; an example of this method can be seen in Figure 3.3, which is an extract from Figure 3.2 using data from Tollgate on the Cut Off Channel.

Figure 3.2 is an example of the graphs produced; further assessments have been made for the remaining 8 stations and can be found in Appendix F.

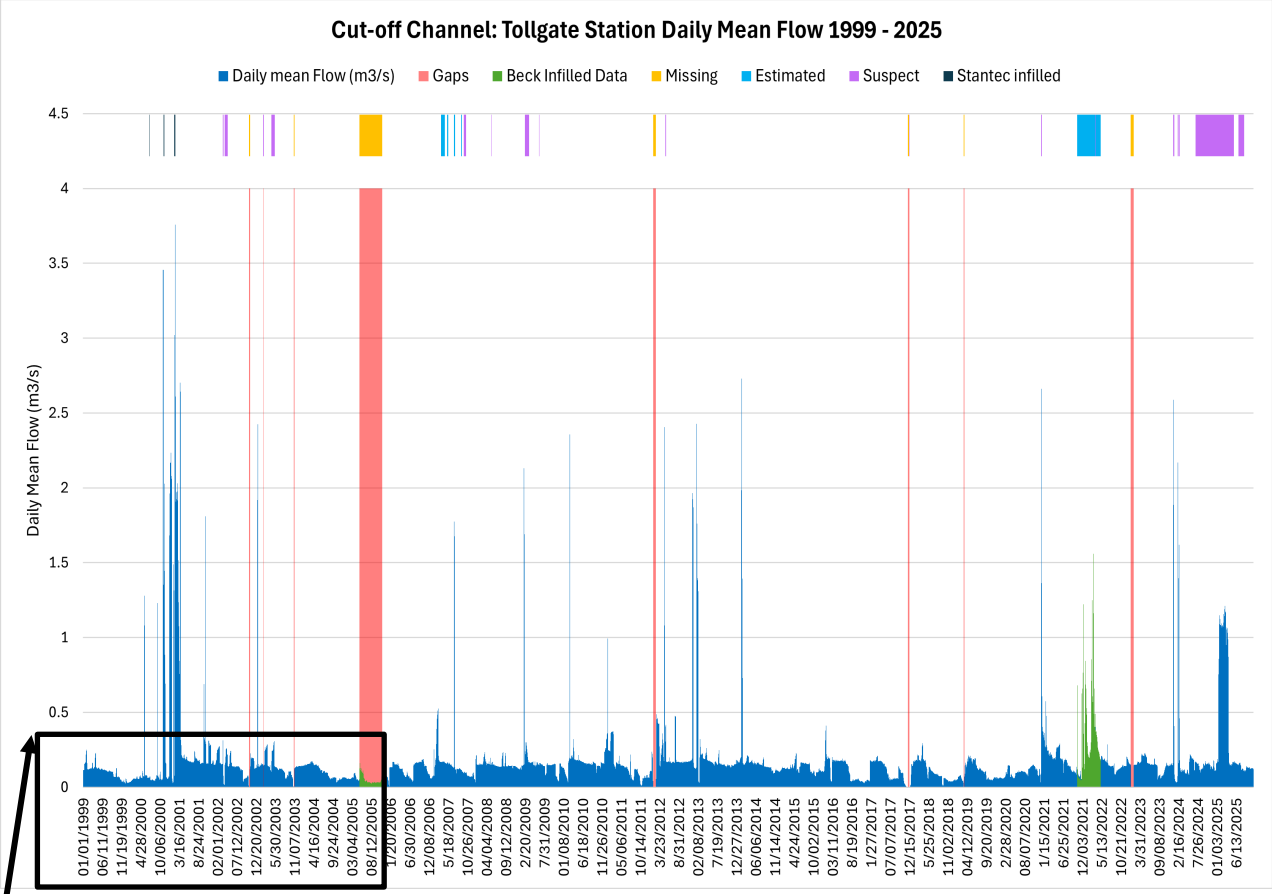


Figure 3.2 Hydrology Explorer Data from Tollgate Station on the Cut Off Channel, River Flow Data

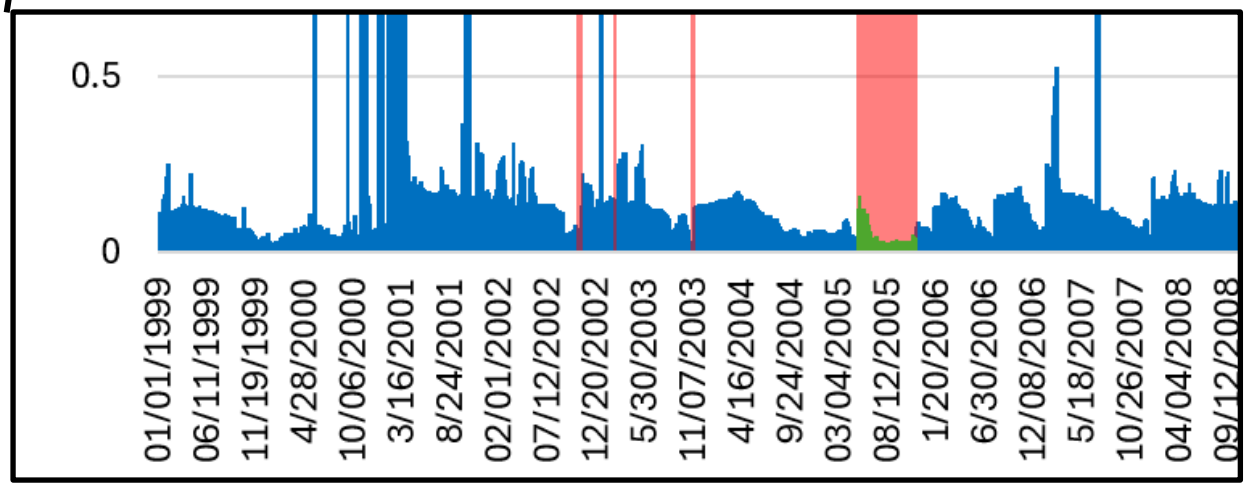


Figure 3.3 Extract from Figure 3-2 showing the Beck infilled data on a smaller scale

3.1.2 River Level

Three river level stations within the South Levels are located at Wissey, Isleham, and Soham, which covers an expansive area of the South Level study area. Whilst there are no significant data gaps, as seen in Appendix F, a more detailed review on data suitability needs to be undertaken before completing further stages of this project using this data. As part of the initial feasibility stage and for current purposes, the current infilling method has been considered appropriate.

In Appendix F, a comparison of the river level trends has been made against each station location in the datum. This is to ensure the comparison is between the trends in the data, rather than the river level value.

Figure 3.4 shows Wissey and Isleham stations as a comparison and the flow values from the data sets, relative to each other. Whilst both data sets are scaled to each other, there is a greater variation between the high and low river level time series even when scaled, which can be more evident when looking at the extract in Figure 3.5.

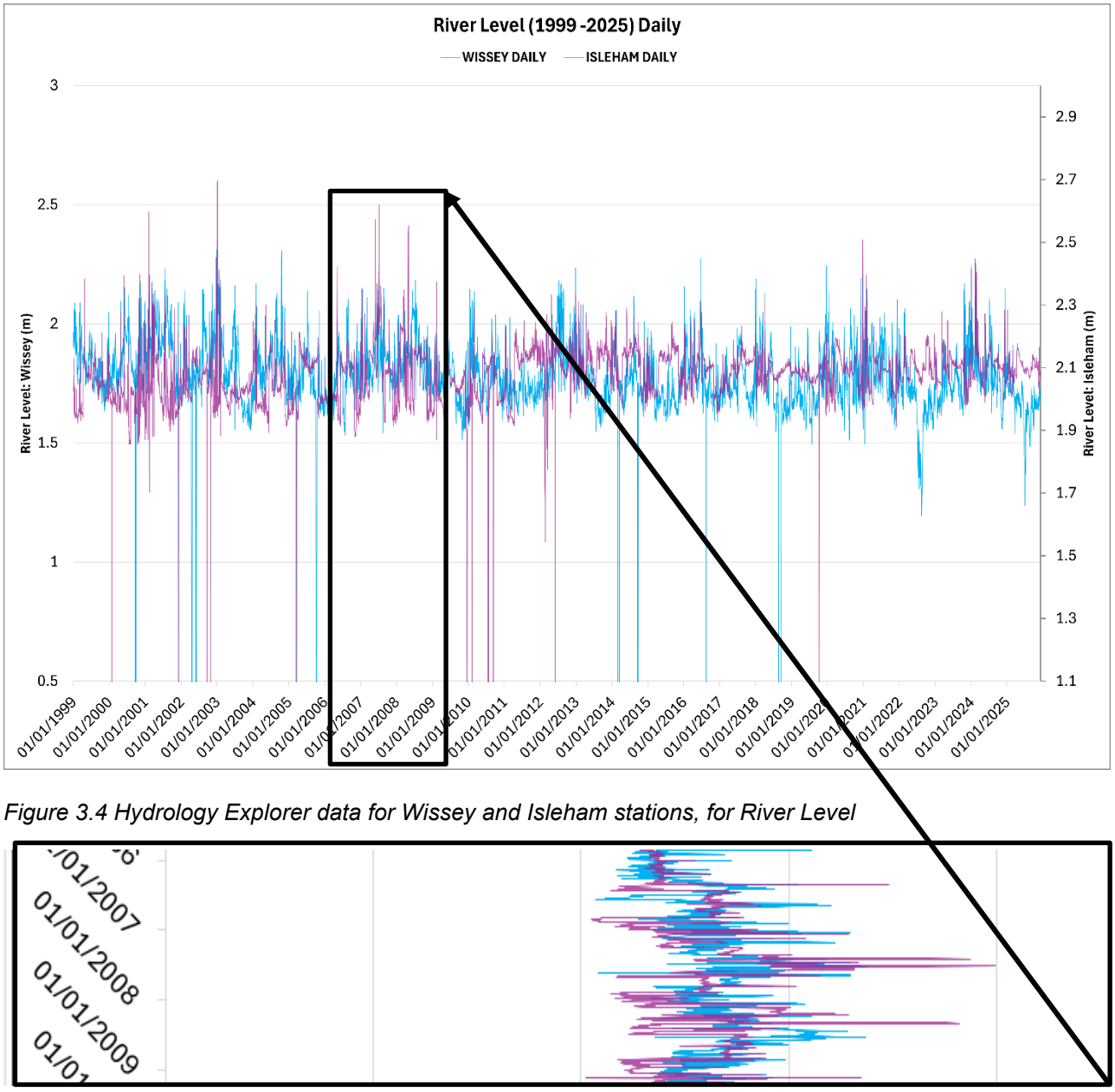


Figure 3.4 Hydrology Explorer data for Wissey and Isleham stations, for River Level

Figure 3.5 Extract for the beginning of Figure 3-4: Hydrology Explorer data for Wissey and Isleham stations, River Level

3.2 National River Flow Archives

To gain an understanding of the volume of water within the South Levels, gauged river flow data from the National River Flow Archives (NRFA) was downloaded from three-gauge stations. These three locations are Bottisham on the River Cam, Abbey Heath on the Little Ouse and Northwold on the Wissey.

Abbey Heath and Northwold station data aligned with the EA Hydrology Explorer data station found in Appendix F, common period of record (1999-2024), with the full data set extending from 01/01/1968-30/09/2024 for Abbey Heath as seen in Figure 3.6, and from 13/02/1956 to 30/09/2024 for Northwold.

This allows for a fair assessment across the different type of data, as they are comparable across the same period of record as seen in Appendix G.

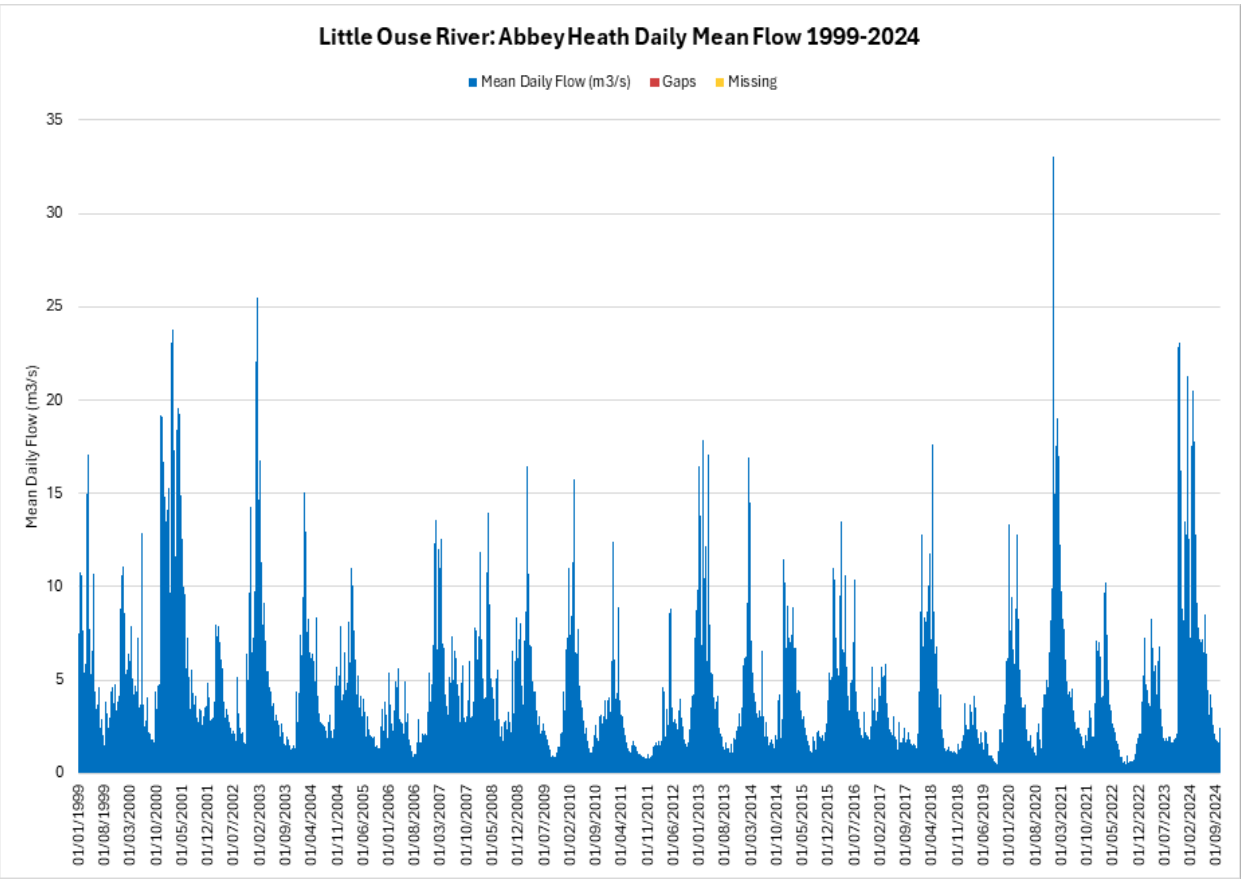


Figure 3.6 NRFA data, Abbey Heath on the Little Ouse River

For the Bottisham station, located on the River Cam, the period of record is from 01/10/1936 to 09/11/1987 which does not cover the common period of record with the other stations.

This discrepancy is identified as a data gap resulting from Bottisham's period of record not aligning with the common period shared by the other two stations, as illustrated in Figure 3.7. The data is not appropriate to use within the Catchment Conceptualisation and Water Balance Assessment report as the data record stops 8 years prior to the common period of record. The flows on the River Cam were therefore estimated using three upstream river gauging stations (Dernford, Burnt Mill and Stapleford) to create the best estimation of the flow values.

3.3 IDB area

GIS data was received from the Ely Group of Internal Drainage Boards on the 4th of November 2025, and this has been presented in mapping using ArcGIS Pro software. The GIS files identified the location of pumping stations, drains and other structures building a picture of the IDB asset distribution across the Ely Group of Internal Drainage Board and the Downham Market Group area. Figure 7.1 shows the location of the pumping stations, drains, inlets, syphons, reservoirs, culverts, ditch flaps, overspills and tidal outfalls.

A meeting was held with Ely Group of Internal Drainage Boards, on the 13th of November 2026, to refine the mapping and to help divide the IDB area into smaller sub catchments. This enabled further assessment on the operation of the pumping stations across the IDBs, insight on the location and function of assets, conveyance routes and confirming direction of flow. More detailed information on the operation of the Downham Market Group area and assets was not available at the time of writing the report and is therefore missing from this analysis.

As mentioned previously in Section 2 Catchments, the catchment maps are provided in Appendix B and display additional information. For further details on the water balance assessments, please see the Catchment Conceptualisation and Water Balance Assessment report, by Stantec.

3.4 Regional Water Supply Plans

It was important to consider operation of water transfers within the South Levels area as well as ensuring that this study aligns with prior works. A meeting was held on the 14th of November 2025 with WRE. Following this, WRE issued the following information:

- A response from Market Operator Services Ltd. (MOSL) covering the top consuming supply points by location
- A catchment dashboard showing Non-Household (NHH) supply points and water volumes by catchment
- Python for Water resources (PyWR) models and schematics related to the South Levels area

  (this has not been considered as was not made available at the time of writing this report).

3.4.1 Document review

Water Resources Management Plans (WRMP) and resource planning documents currently available applicable to the study were also assessed. These documents address water systems, future plans within the area, and gives an insight into the current and future supply, demand and general environment as well as the drought resilience within the study area. Further details regarding the documents viewed, as part of the Data Gap Analysis and Feasibility Assessment, can be found in Appendix C. These are listed below:

Regional water resources plan for Eastern England (December 2023) WRE[8], highlights the IDBs potential to play a role in identifying the large infrastructure options available within the region. Focusing more on catchment level local supply solutions, supporting the water need in the area in a more integrated way.

Cambridge Water Final WRMP (March 2025)[9], details areas of important water resource options and surface water discharges.

[8] wre.org.uk/wp-content/uploads/2023/12/WRE-Regional-Water-Resources-Plan-for-Eastern-England.pdf
[9] cam-water-resources-management-plan-2024-final.pdf

Anglian Water WRMP (April 2025)[10], details areas of important water resource options. It looks to increase the pumping capacity into the River Ouse and updating the baseline climate change sensitivity for future flows.

Anglian Water WRMP Technical document (April 2025)[11], includes flood water at Earith as a good opportunity to connect the Fenland water to the wider Cambridge region for water resource options.

Refer to the data register in Appendix C for further information on the referenced documents.

3.4.2 Anglian Water Fen Reservoir papers

AW provided relevant studies in relation to water availability on the Denver Complex, the Wash and environmental concerns regarding tidal extent. This included assessments which considered the feasibility of utilising Ely-Ouse at Denver as a potential source of water. For this location to be used for abstraction was ultimately discounted, due to high unreliability of yield, and a lack of additional yield from other sources.

Stantec also received three relevant restricted reports completed by Mott MacDonald:

1. Fens Reservoir Baseline Hydrology (December 2020)
2. Baseline Hydrology for Fenland Reservoir- Phase 1 (April 2020)
3. Fens Reservoir: Sources of Supply assessment (November 2023)

Across all three reports, the South Levels IDB and the relief channel was not mentioned, which is highlighted as a gap in the data to be considered in future stages. IDBs, generally, however are mentioned with the following themes covered:

- Water level management operations within IDBs in relation to the Fens Reservoir
- Quantifies the flood risk of the project
- Middle Level abstractions and the option to reduce the hydraulic load at St Germans pump, with the additional capacity at these new reservoirs.

Denver Complex coverage in the reports:

- Original plan was to support 80 Ml/d of water to the reservoirs from Denver; however, the Bedford Ouse at Earith could exceed more than this in its supply, therefore a supply from the South Levels was not needed.
- Denver was excluded from further plans as additional flows into the Fens Reservoir system had high carbon cost[12]

[10] V6 WRMP24 main report
[11] anglianwater.co.uk/siteassets/household/corporate/wrmp24/wrmp24-supply-side-option-development.pdf
[12] Carbon cost the process of taxing the additional emissions produced by a business, industry or scheme by creating a market for emissions reductions through the emission trading scheme (ETS)- What is carbon pricing and does the UK need it?

- Emphasis on the transfer capabilities restricting the abstractions around Denver
- AW created a new flow series at the Ely Ouse at Denver as part of the WRMP24
- Identified a drought year as a year when abstraction rates reached 85% of the maximum licenced amount

3.5 Landowner questionnaire (Transfer and Conveyance)

As mentioned in Section 2.1.1 Landowner abstraction licencing, the landowner questionnaire was distributed to gauge a greater understanding the operation of the South Levels on a localised scale. This questionnaire was also used to gain an understanding on the conveyance within the landowner boundaries. The anonymised questionnaire responses can be found in Appendix H.

3.5.1 Method

Two queries were posed to landowners specifically to help understand the current water management within the ditches and assesses the conveyance effectiveness within their ditch lengths. As looking for transfer routes with efficient conveyance would allow for a more feasible option and eliminates areas of poor conveyance in the optioneering report.

These two questions are as follows:

> *Q1) Do the ditch lengths within your land hold water during the summer months, or does the water tend to evaporate/ drain away?*
>
> *Q2) Do the ditch lengths on your land hold pinch points of concern?*

3.5.2 Results

The most common response from landowners to Question 1 was there were no significant concerns; the ditches retained water during the summer months and are regarded as a temporary storage method, though they usually remain free flowing. Landowners noted that although the drains reach high levels during periods of prolonged rainfall, this is not a concern because water flows freely into the IDB network system.

All responses consistently indicated that water moves through the system and along ditch lengths during winter, while these features maintain water at a level below the field line in the summer months. It was also emphasised when an issue in conveyance did occur, it was often from obstructions of the assets which can be dealt with quickly.

Regarding Question 2, landowners did not view this as a concern. Although there was some ponding in nearby areas, they believed it was caused by land drainage, rather than blocked culverts, poor ditch maintenance, or influence from the IDB.

The landowners made clear during this consultation, that they considered the management of the system to be well maintained and controlled within the South Level.

These responses contributed to evaluating the existing water levels within the ditches but did not address the feasibility of accommodating additional water. Further examination is required to understand how the local system manages increased water for transfer along the ditch lengths, as well as to determine the additional capacity that the ditches can support.

4 Groundwater Hydrology

4.1 Geology

4.1.1 British Geological Survey

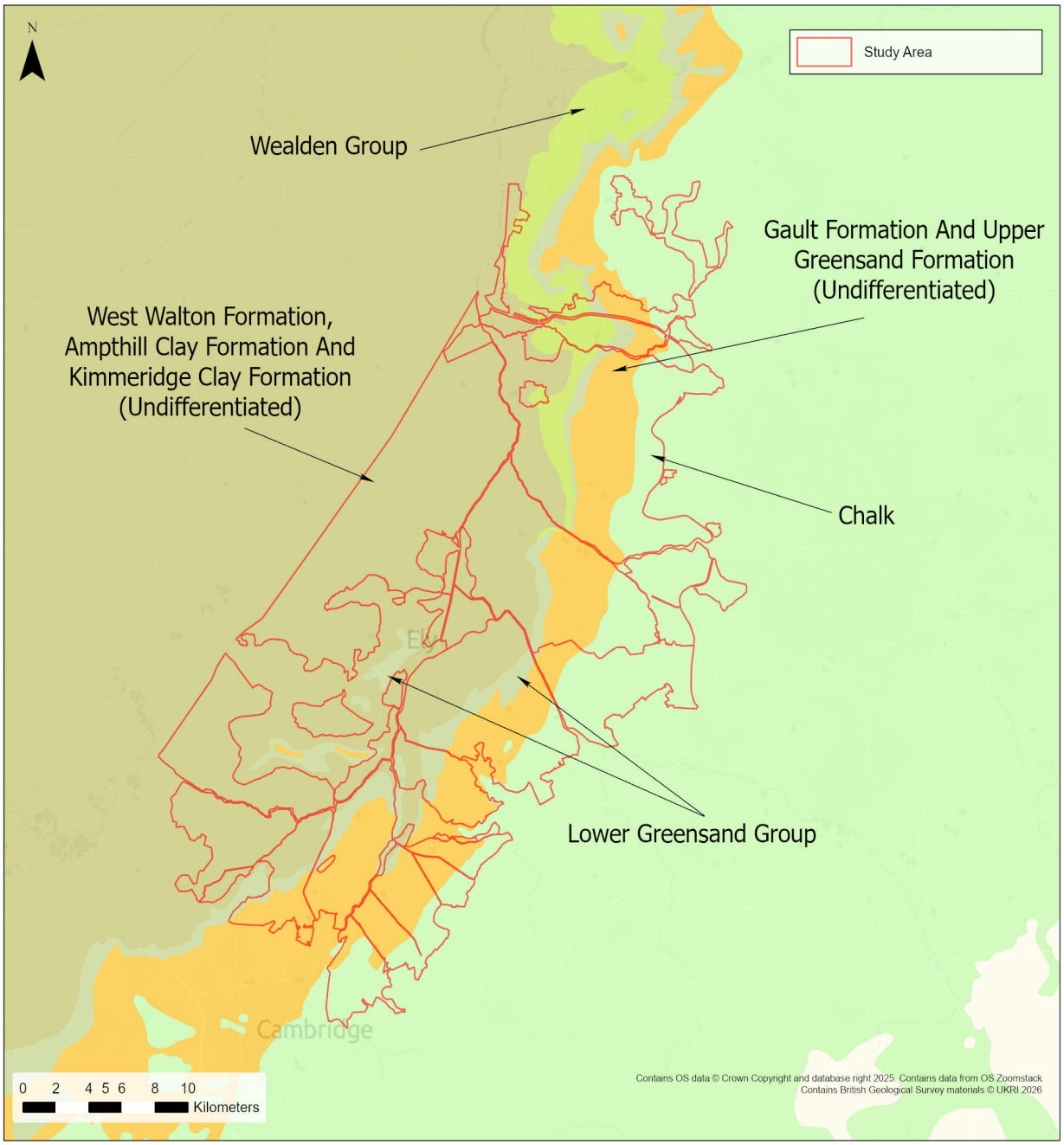


Figure 4.1 Bedrock geology: British Geology Survey

The British Geological Survey (BGS) mapping shows the bedrock geology at a scale of 1:625000, as seen above in Figure 4.1. In the east of the South Levels' study area, the Chalk Group (White Chalk

Sub-Group shifting eastwards to the older Grey Chalk Sub-Group) forms the bedrock geology (further details found in Appendix I), and is the predominant aquifer used for Public Water Supply (PWS) and spray irrigation within the eastern and central portions of the study area.

The bedrock transitions from the Chalk Group to the older Gault Formation and Upper Greensand Formation in a north to south trending outcrop. The Lower Greensand Group is variably at outcrop to the west of this, preceding the Wealdon, and Ampthill and Kimmeridge Clay (undifferentiated) formations, dominant as the bedrock geology. The outcrop of these clays extends West to beyond the study area, excepting only for outliers of the Lower Greensand Group, such as underlies the City of Ely. Where the Lower Greensand bedrock, there is an aquifer which is separated by a layer of gault clay from the Chalk.

The BGS also maps the superficial deposits overlying bedrock. The majority of the South Levels is covered by Peat or has no known superficial deposits. There is Alluvium shown towards the Ouse Washes boundary close to the Northern region, and along most of the rivers, and evidence of residual Till/ Diamicton in some areas. The South of the study area has patches of River Terrace deposits along with the Lacustrine deposits in the East, as seen in Figure 4.2 below.

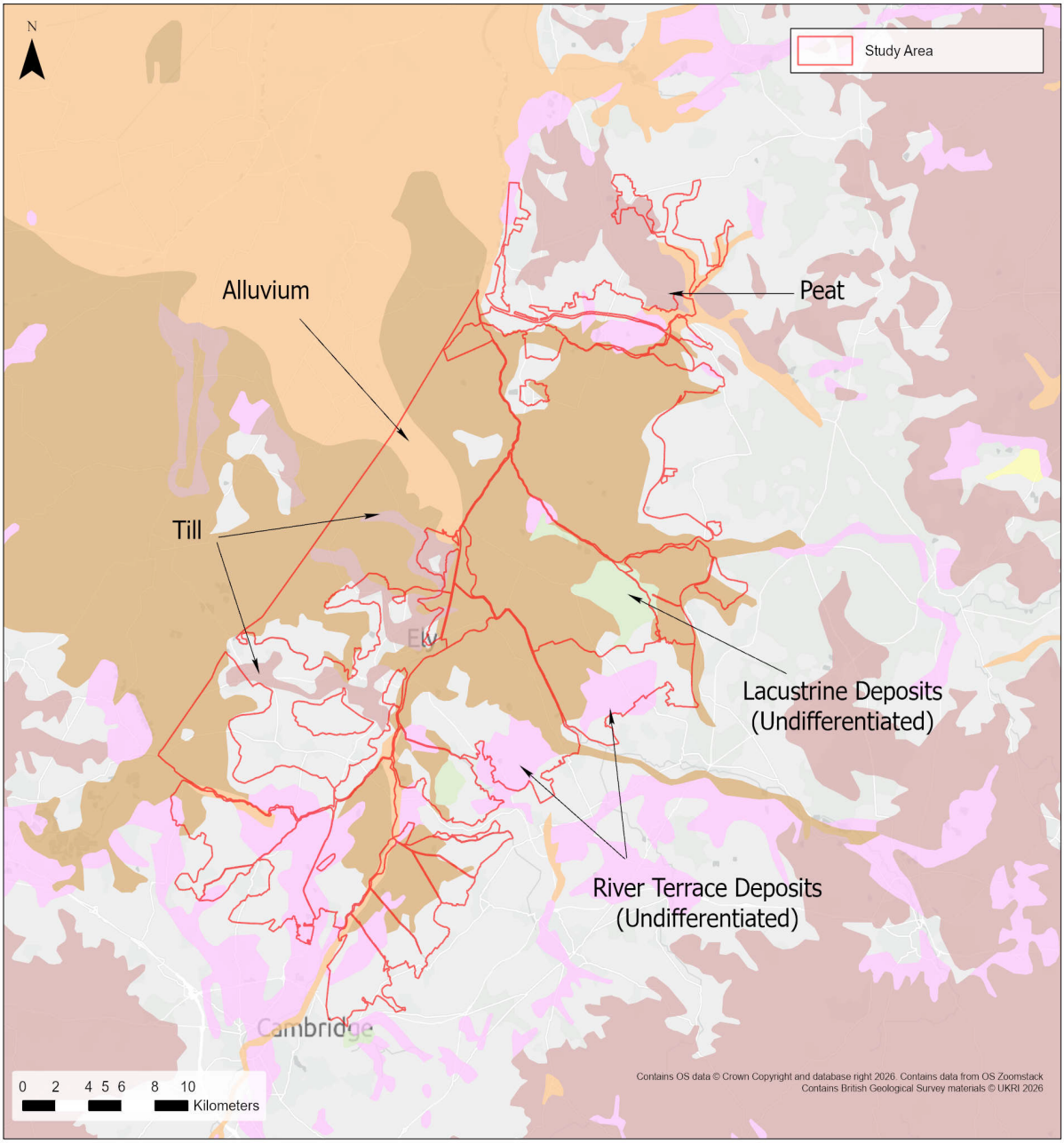


Figure 4.2 Superficial Geology: British Geology Survey

4.1.2 Fenland Peat Mapping

The Fenland Peat mapping is a non-profit organisation based in Cambridgeshire. The historic influence of draining the Fens has resulted in a current day, highly variable soil type, therefore being able to map this allows farmers to utilise their land more and respond with crops which thrive under differing soil compositions.

The Fenland Peat Mapping enclosed in Appendix J shows the South Levels contain on Black fibrous peat soil over sand/ clay, light black over clay, sandy loam, and silty soils. These peat soil types are

favourable for agriculture and therefore benefit the landowners operating on the land. Assessing these soil types against the BGS mapping (1:625000) shown in Figure 4.1, shows there is a correlation between the undifferentiated Upper Greensand and Gault Formation outcrop and clay, meaning that the area of outcrop of this Formation supports more peat-based soil type, refer to Figure 4.3.

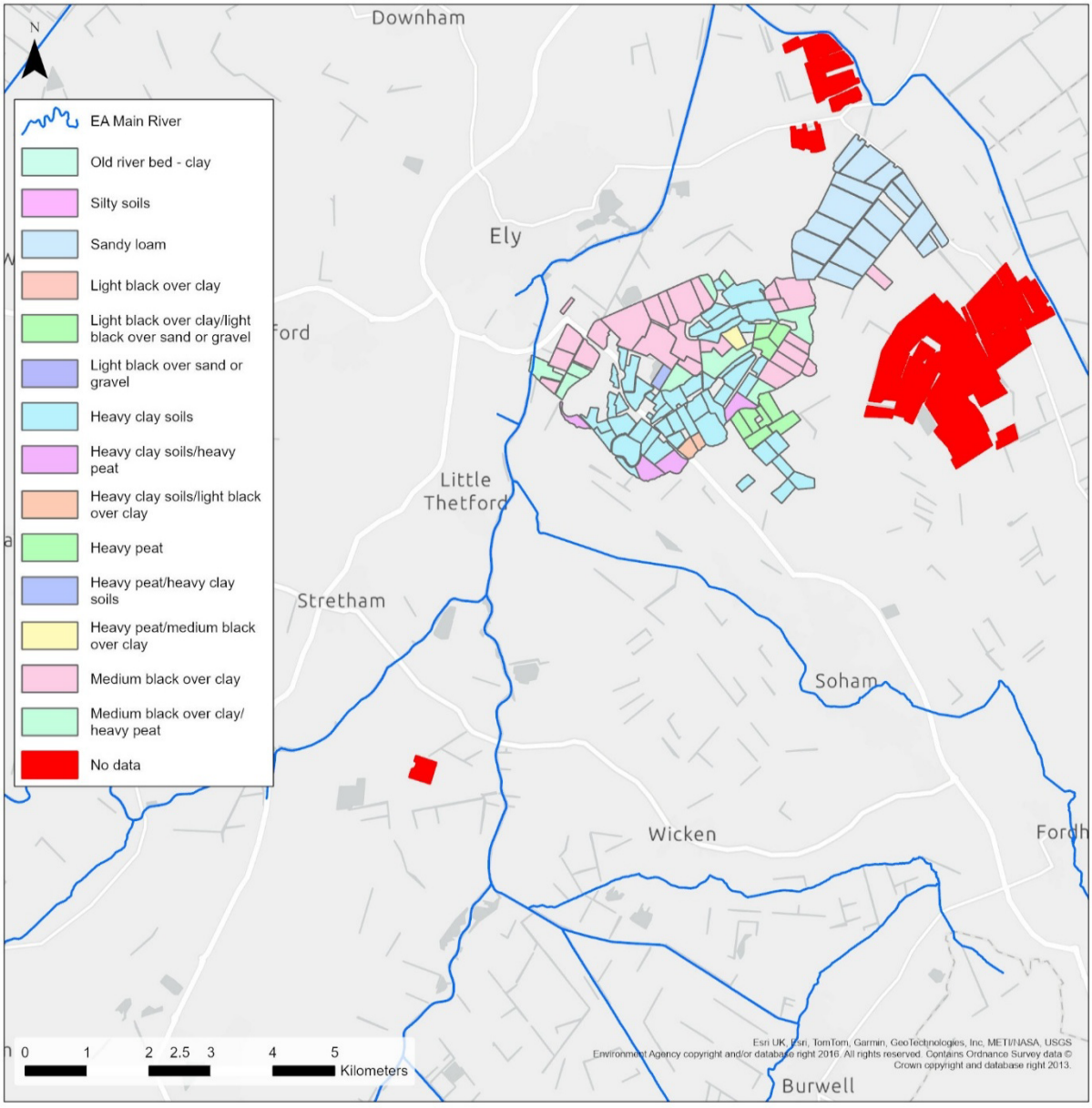


Figure 4.3 Fenland peat maps TL 55903 78811

Similarly, the chalk-based geology results in the soil type Deep Sooty black peat soil over Chalk and Deep black fibrous peat soil over clay, refer to Figure 4.4. This is also applicable to areas which border the Cut Off Channel, the furthest reach on the East of the study area. As the bedrock geology transitions into more sandy deposits such as the Lower Greensand Group and the Upper Greensand and Gault Formation, the sandstone rock reflects sedimented soil with Light Black peat soil over sand or gravel, which become more prominent.

Bedrock in the Western/ central region of the study area is the Ampthill and Kimmeridge Clay Formations, refer to Figure 4.1 from the BGS. This figure shows clay-based properties within the soils; Heavy Clay soils, Medium black peat soil over clay and Heavy peat. The are also found frequently in the land surrounding Ely, refer to Figure 4.3. The Fenland Peat Maps provided did not disclose the soil type. This data we assume does exist, however at time of writing, this was not available for use and is therefore a data gap. There is approximately 20% of missing data on average, across the five graphs in Appendix J.

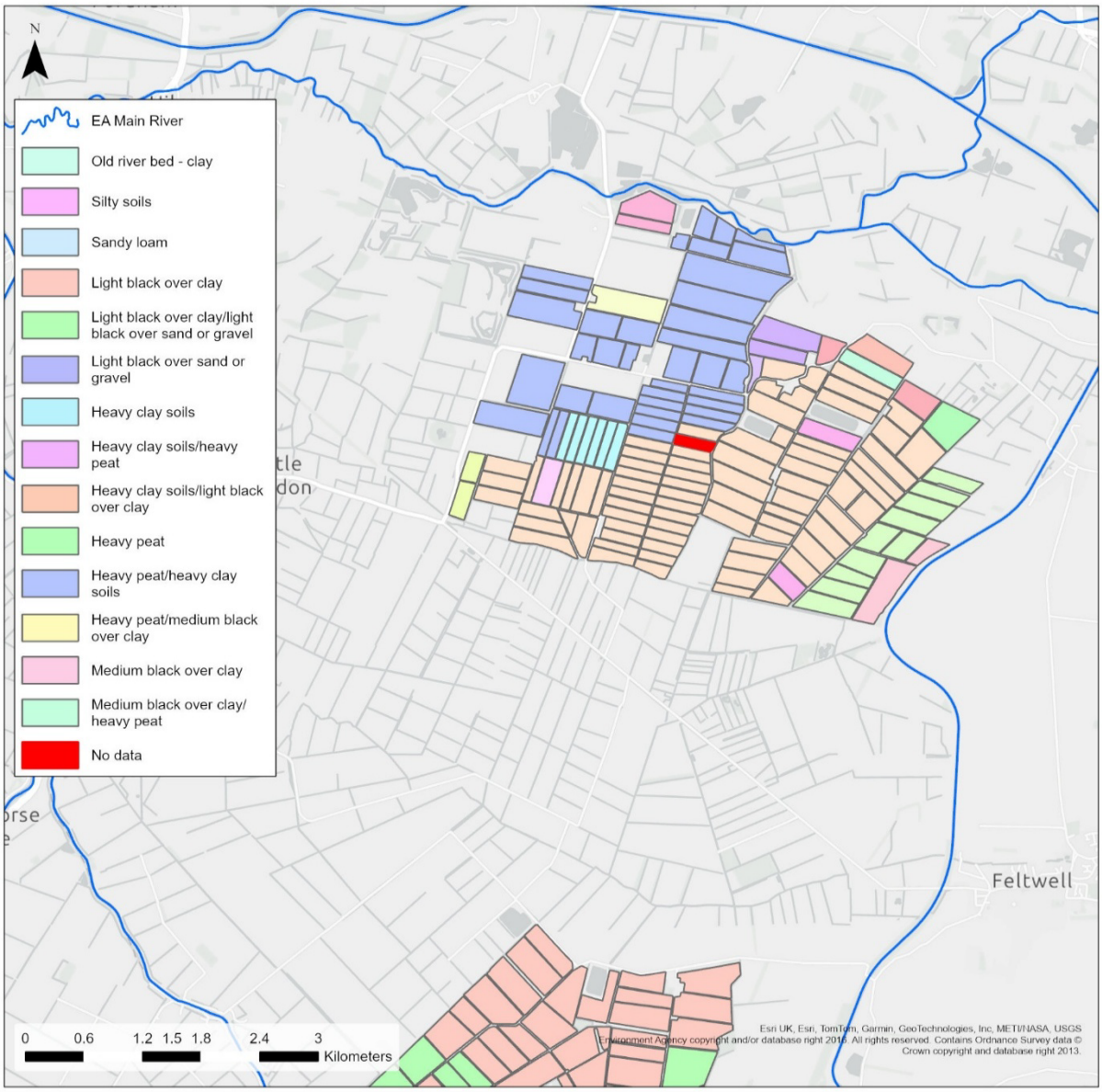


Figure 4.4 Fenland peat maps TL 66877 95835

4.1.3 Groundwater Telemetry Data

The common period for recording of groundwater at telemetry stations is from 2010-2021, covering fewer years of a common period[13] than the record of rainfall, river level, river flow and groundwater (dipped) data. The gaps within the data sets are apparent through the time series, as shows repeated values in the raw data, suggesting that there is suspected data infilling for the missing data. This is clearer within Appendix F for the two stations.

With only two stations of this type in the South Levels, it covers a limited area and should be assumed to be a data gap. For future studies, to further understand the water available, it will be necessary for data to be assessed on the wider catchment dynamics. There are also stations which sit outside of the study area which could be of value in the next stages of development.

Due to the Eastern edge of the South Levels having strong interaction between chalk streams and the groundwater, the groundwater daily time series reflects the differing water levels. Further information can be found in Appendix G. As seen in Figure 4.5, the data sets sit within two axes, with one site operating at a level between ~0 mAOD and -1.5 mAOD and another station between 13 and 16.5 mAOD, thus displaying the trend of the data as opposed to the exact values.

[13] Common period is a uniform time period whereby all data is extracted from. This is to establish trends and patterns within the same time period

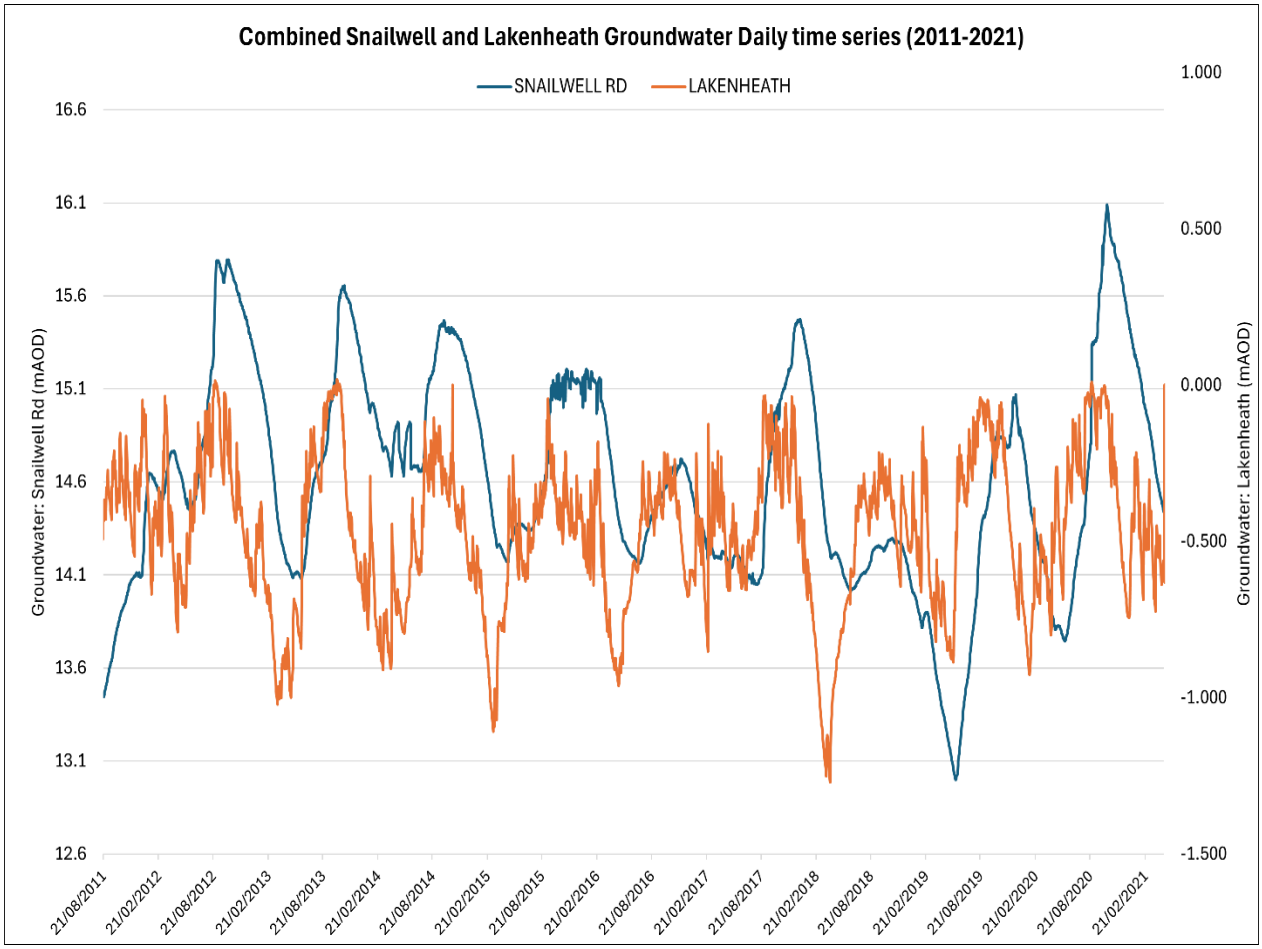


Figure 4.5 Hydrology Explorer data for combined station data of Lakenheath and Snailwell, Groundwater Telemetry data

4.1.4 Groundwater Dipped

Within the study area are 10 boreholes that have been regularly dipped. Data covers the 1999-2025 period and can be compared to the majority of other data sets, excluding groundwater at telemetry stations. There are various gaps within each data set which have been amended through estimated infills from surrounding sites.

This approach would not normally be recommended, due to differing geology and soil influencing groundwater interaction and therefore would not be used for future stages. However, for this initial feasibility stage, infilled data from surrounding stations is adequate to gauge an understanding of the South Levels groundwater interactions and trends. This can be seen below in Figure 4.6 and Figure 4.7.

Data from the BGS downloaded as a GIS layer, was used to determine the geology type of each location, refer to Appendix I for more details. These are shown to be situated on Gault formation and upper Greensand Formation, Lower Greensand Group, or Chalk.

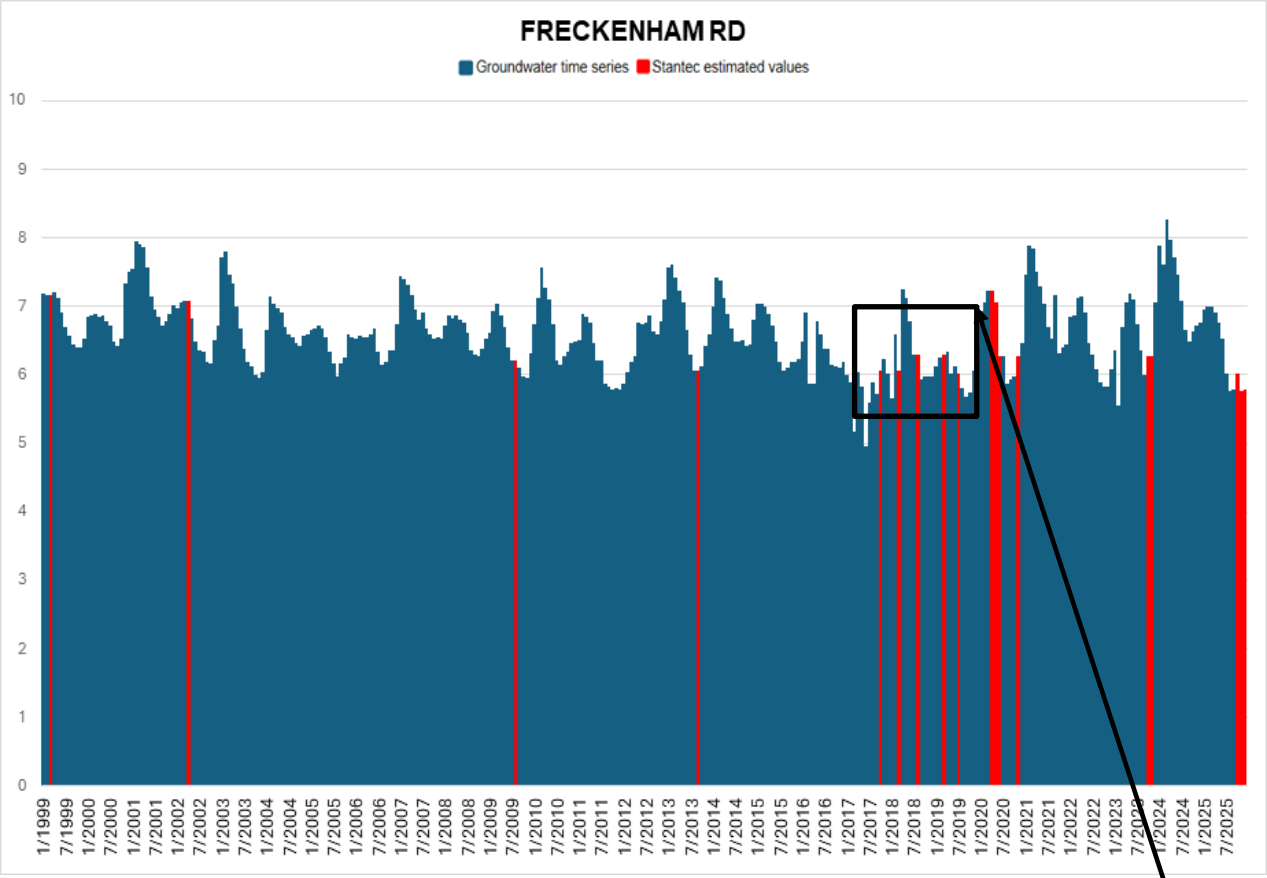


Figure 4.6 Hydrology Explorer data for Freckenham Road, for Groundwater Dipped data

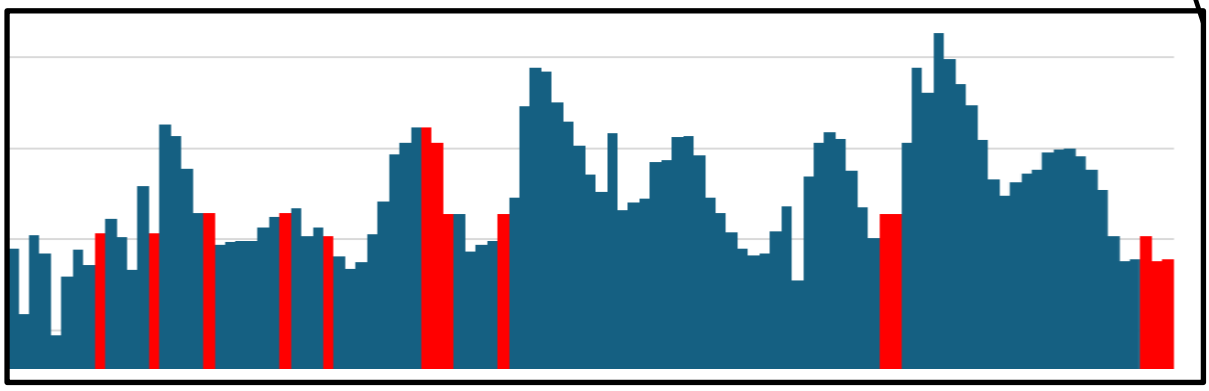


Figure 4.7 Extract from Figure 4.6 showing the infilled data for Freckenham Road, Groundwater dipped data

For the data to be representative across the year, it has been categorised into each quarter of the year: Q1, Q2, Q3 and Q4.

4.1.5 Academic papers

The following papers have been used as part of the Optioneering report. These have been used to inform discussions around peatland soil nature, climate change resilience and sustainability in arable agriculture and hydraulic performance and losses.

Rezanezhad, F., Price, J.S., Quinton, W.L., Lennartz, B., Milojevic, T. and Van Cappellen, P. (2016) 'Structure of peat soils and implications for water storage, flow and solute transport: A review update for geochemists', Chemical Geology, 429, pp. 75–84. doi: 10.1016/j.chemgeo.2016.03.010

Holman, I.P., Hess, T.M., Rey, D. and Knox, J.W. (2021) 'A multi-level framework for adaptation to drought within temperate agriculture', Frontiers in Environmental Science, 8, Article 589871. doi: 10.3389/fenvs.2020.589871.

Chengot, R., Knox, J.W., Holman, I.P., 2021. Evaluating the Feasibility of Water Sharing as a Drought Risk Management Tool for Irrigated Agriculture. Sustain. 13 (3), 1456. https://doi.org/10.3390/SU13031456.

Knox J.W., Kay M.G., Holman I.P., Hess T., 2020. Irrigation water strategy for UK agriculture and horticulture. irrigation-strategy-2020.pdf.

4.2 EA Groundwater Conceptualisation Reports

The EA provided four restricted access groundwater investigation reports as part of the data package REF- EIR2025_40422, received on the 18th of December 2025. The four reports have been referenced in Appendix K and are listed below:

Northern East Anglia Chalk Groundwater Investigation: Final Report - Lark Catchment

- This report was developed in response to previous studies and the uncertainties raised regarding the catchment water balance.

Cam and Bedford Ouse Groundwater Investigation: Final Report - Ouzel and Ivel Catchments

- Produced to improve and develop hydrological models and monitoring. A framework for groundwater resources and groundwater quality management.

Cam and Bedford Ouse Groundwater Investigation: Final Report - Rhee and Cam Catchments

- Produced to improve and develop hydrological models and monitoring. A framework for groundwater resources and groundwater quality management.

Northern East Anglia Chalk Groundwater Investigation: Final Report - Wissey Catchment

- This report was developed in response to previous studies and the uncertainties raised regarding the catchment water balance.

The South Levels is located across the Wissey, Little Ouse and Lark catchments but the core information associated with the South Levels area is provided in the Little Ouse report. Key details from the reports are summarised below:

- The South Level operation in the winter, and during periods of rainfall, is for surface water drainage to be conveyed from east to west and pumped into elevated rivers.
- During winter months the main inputs of water to the South Levels fens are direct rainfall plus seepages from groundwater.
- During summer months drainage water levels are maintained for irrigation by slackers which allow transfer of water from the main rivers.
- Groundwater generally flows east to west with close interaction with the chalk topography with narrow lateral gradients.
- As a result of draining the Fens, the groundwater now discharges to the low-lying drains (opposed to the main river channels).
- The reduction in groundwater discharges can be accounted by intensive ground water abstractions and construction on the Cut Off channel in the 1960s. The main rivers are used to support the demand from spray irrigation. Reference was made to leakage from these rivers to the land in some places.
- Southwest of the study area is influenced by the Lower Lark group of public water supply abstractions; the groundwater divide is highly variable here, shifting 3km between wet and dry spells.
- There are clear interactions between groundwater and the IDB drains to the East of the groundwater divide, where chalk streams influence groundwater.
- The abstraction for public water supply from the Chalk is intensive in the southwest, particularly in dry years when Great Ouse groundwater Scheme (GOGS) boreholes are used.
- The largest proportion of groundwater abstraction demand is met at the expense of groundwater that would have flowed upwards from the Chalk to discharge to the surface watercourses

There are several uncertainties identified in the EA reporting, as summarised below:

- Magnitude and distribution of groundwater discharges to the lower reaches of the main rivers.
- Magnitude of groundwater leakage from or discharge into the Cut off Channel and the effects this channel has on groundwater discharges to the low-lying drains and ditches within the South Level.
- Groundwater and surface water interactions in these areas and the degree to which leakage occurs from the main rivers.
- Effectiveness of transfers from Lark Head Sluice in providing addition resources for irrigation in the South Level.
- What part near surface deposits have in supporting baseflow in headwater streams during dry periods.
- The impacts of groundwater abstraction on surface water flows, particularly through dry periods/droughts.
- Storage and transmission of the recharge in the aquifer influence the magnitude and patterns of groundwater and surface water interactions, water balances at wetland sites and availability of water for abstraction.

5 Rainfall Hydrology

5.1 Hydrology Explorer data

The raw data covering the selected data period (1999-2025), includes drought and flood years across the 4 station locations: Burwell, Denver, Ely and Mildenhall. The Burwell station has significant data gaps, spanning over a year of missing data at points in the time series. To amend these gaps and complete a full time series graph, infilling data from nearby stations was adopted, as seen in Appendix F, with the data set from Ely rainfall station used to cover the larger data gaps.

Due to the nature of rainfall data displaying the amount of rain over the period, there are natural breaks within the common period of record over drought. During these dry periods across the four stations, weather patterns within the Met Office Cambridge NIAB data[14] records where cross referenced. From this it was noted during the drought periods the Met Office records correlated with the low values in the Hydrology Explorer Data. Further details can be found in Appendix F.

It was considered appropriate at the feasibility stage, for missing data gaps to be infilled by size of gap: For gaps of <5 days, basic infilling using the surrounding data[15] was applied. This estimation gave the most reliable results within the time series as it was using data which already existed within the dataset itself. Data with gaps larger than >5 days used infill data from a nearby station, an example of this method is illustrated at the station of Denver, see Figure 5.1, which uses data from Ely.

[14] Cambridge National Institute of Agricultural Botany (NIAB) weather station from the UK Historical Weather Data from the Met Office: Met Office Cambridge Niab Historic Data Download | UKHW
[15] Surrounding data is the data which sits around the gaps and is used within the missing data gap

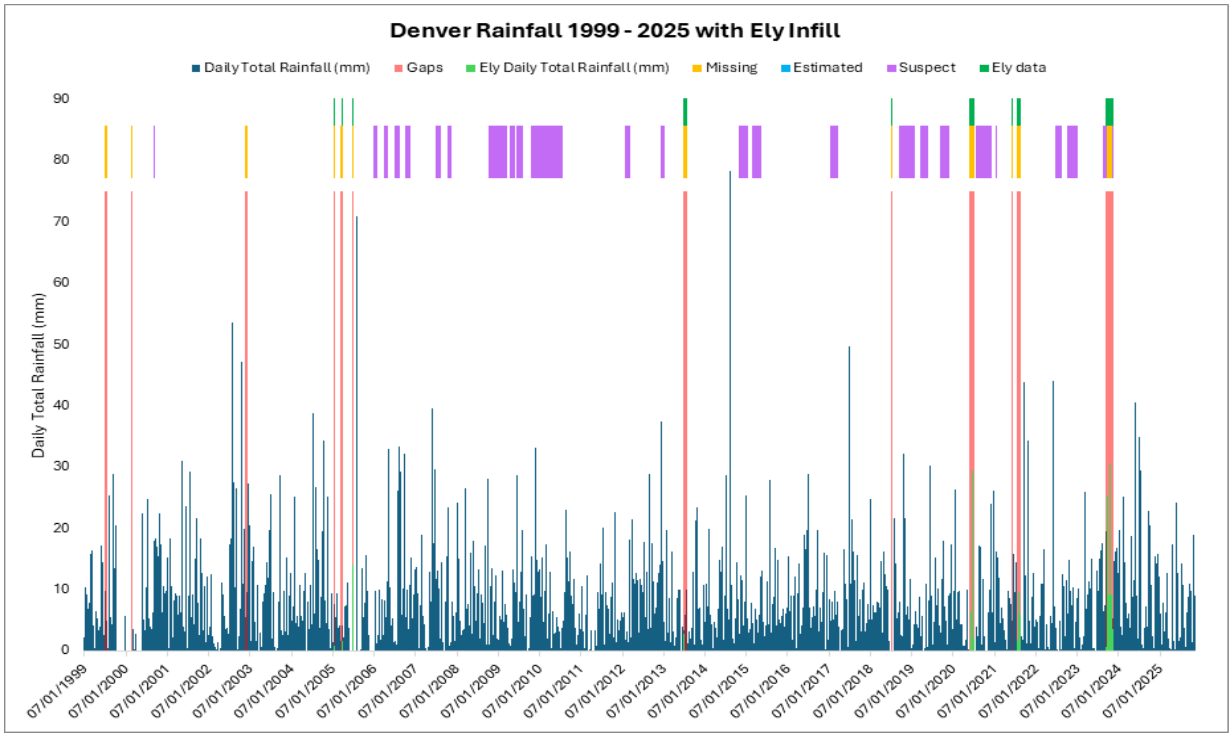


Figure 5.1 Hydrology Explorer data for Denver Rainfall using Ely station to infill gaps

The dataset exhibited patterns of estimated or suspect data across all four stations, as detailed in Appendix F. These occurrences of unreliable data introduce potential uncertainties into the analysis conducted for water balance calculations.

5.2 IDB rainfall data

From the data package issued by the Ely IDB, on 19th of November 2025, monthly rainfall data for each pump station was supplied. This was not used for this feasibility assessment, as the hydrology explorer data provided a daily timeseries, covering the same area. However, this data set could be useful for future stages.

6 Water Quality

It is essential to consider the quality of water within the South Levels whilst also assessing the potential availability. The Drinking Water Inspectorate (DWI) implements strict rules for drinking water standards for public water supply. The DWI was established to ensure clean drinking water to the UK by requiring water companies to implement the Inspectorates assessments and measures. This study also considered to the Environmental Quality Standards (EQS) designed to prevent harmful effects on ecosystems and aquatic life as well as human health within water bodies. This initial study considers the information already available within the study area through multiple sources and looks for several contaminants including chemical, microbiological and metal traces tests, whilst also considering some of the basics around hardness of water.

6.1 The Water Quality Archive

6.1.1 Background

The EA Water Quality Archive is an open data source which covers a range of environmental determinants for environmental monitoring purposes on a localised scale. Within this study, the South Level study area and the immediate area were used to identify Water Quality archive assessment points.

The Water Quality archive dataset (2020 – 2025) includes between 133 to 154 annual water quality sampling locations with over 300 determinants across the South Levels and the immediate surrounding area, as summarised:

- 2020: 133 sampling locations
- 2021: 123 sampling locations
- 2022: 125 sampling locations
- 2023: 130 sampling locations
- 2024: 154 sampling locations
- 2025: 147 sampling locations, see Figure 6.1 and Appendix L for more detailed maps.

Within the study area of the South Levels IDB boundaries in 2025, there were 52 water quality sampling locations recorded for both compliance and non-compliable purposes. The water type is summarised below:

- River / Running Surface Water = 13
- Pond / Lake / Reservoir Water = 1 (*Lords Ground Reservoir*)
- Groundwater = 1
- Groundwater – Purged / Pumped / Refilled = 2
- Final Sewerage = 22
- Crude Sewerage = 7
- Trade Effluent – Freshwater Returned Abstracted = 2
- Any trade effluent = 4

This water quality archive data will be reviewed in detail in subsequent stages of this project. The specific water quality sampling points will be reviewed when the location of the transfers and water source or store is known.

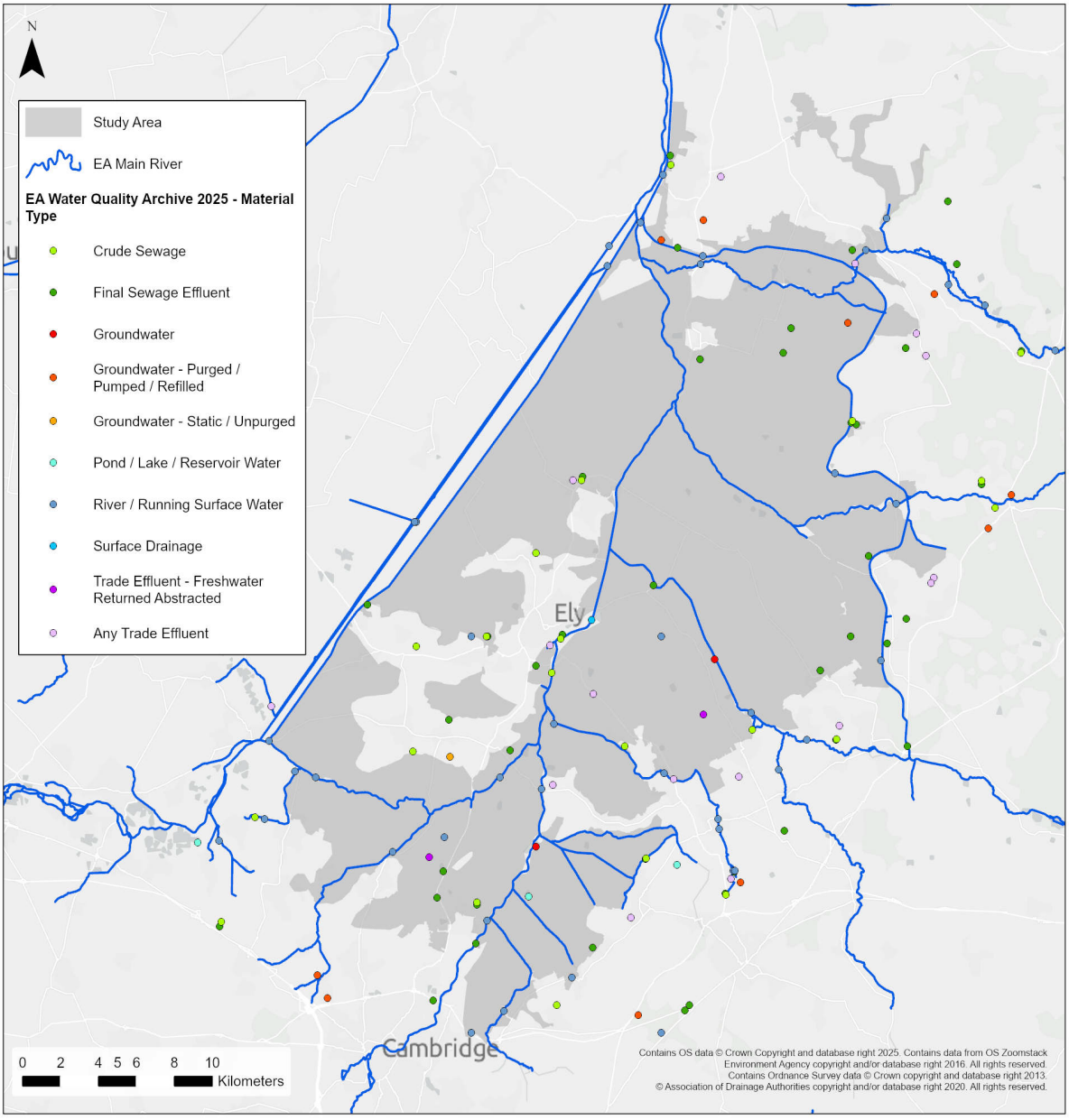


Figure 6.1 EA water quality archive sampling points (2025)

6.2 Essex and Suffolk Water

The Drinking Water Safety Plan (DWSP) for Essex and Suffolk Water was requested, however at the time of writing this has not been received. This DWSP was requested for the Ely Ouse to Essex Transfer Scheme (EOETS) as this provides drinking water to Essex supplied from the Denver area. It is therefore recommended this be reviewed as part of any future study.

6.3 Landowner questionnaire (Water Quality)

6.3.1 Methods

The questionnaire asked the following regarding water quality:

> *Q4) Looking at the water quality of your ditches, what did you test for in the summer/ winter months, and how did they perform? Please specify which criteria you test for.*

This enables the study to consider what is tested and during the different seasons, to account for seasonal variation. This data is not publicly accessible and therefore very valuable as otherwise would be a potential gap for further assessment. There was a range of quality of responses with some farmers offering full data sets and others keeping the responses brief.

6.3.2 Results

In the responses with full data sets, the landowners receive a 'Pass' or 'Fail' rather than the exact value. Whilst this is helpful with knowing a baseline answer and a general idea of water quality in the South Levels, the threshold of what is a 'Pass' or 'Fail' was unclear and has been identified as a gap within the data. Further details regarding the responses can be found in Appendix H.

Notably many of the landowners tested for water microbes consistently throughout the responses. This covers: Coliforms, E. Coli, and Enterococci.

The consensus during the face-to-face consultations with the landowners was the locations of these tests were conducted either within ditch lengths, local reservoirs, or the IDB main drains. The differing tests across summer/ winter months showed testing for water microbes occurs during summer months and heavy metals more frequently during winter months. Testing locations were also conducted in areas with potential water pollution and were therefore frequently tested for contaminants. Crop rotation also plays a role in what is being tested for and when, as the standard of water quality for one type may be different for another.

The results of these individual tests are highly valuable when comparing the landowner testing matrix with the DWI and seeing how these align against each standard. The DWI covers a range of measures to ensure safe drinking water through water quality and safety. An expectation of the DWI is to ensure safe, clean drinking water which meets the set %[16] compliance requirements.

The responses also highlighted the importance of the 'Red Tractor Certified Standards'. Which is a standard organisation within the UK which farmers must comply for water quality testing. Further information on this is found in Section 6.5 Water quality data comparison.

6.3.3 Red Tractor

Red Tractor Assured is an organisation which sets a certification and standards system for the farming industry to follow and comply. The licencing signifies if the produce has fulfilled and met the

[16] The percentage allowance which meets the minimum DWI requirements before failure of water quality.

requirements enforced by the organisation, allowing for customer assurance and reliability through the mandatory standards.

The landowner questionnaire highlighted the importance of this certification and the relevance of it to this study, as it lists the determinants which are tested for certification. Stantec approached the Red Tractor organisation on 9th January 2026 to query the type of determinants. There are 300+ determinants which Red Tractor test for thus assessing this against the DWI list of determinants, this information helps reduce the need for extra monitoring in the next stage of assessment.

Red Tractor provided guidance with supporting links to relevant online documentation. This includes the Irrigation Fresh Produce Standards as of February 2026[17], RT Standards Fresh Produce Water Matrix 2021[18] and listed on the Red Tractor website is the Crops and Sugar Beet Standards[19] which details irrigation sources, volumes and the licences within farms under the Red Tractor certification.

6.4 Anglian Water Report

Anglian Water (AW) supplies public water and treats wastewater for a large region of the East of England. Through this, they are a key stakeholder in the water management levels within the South Levels and wider Cambridgeshire area and hold vital information valuable to this study. Due to the nature of the data, some of the data is restricted and therefore cannot be presented in a format available to the wider public.

AW disclosed a list of determinants which are tested for, as detailed in their water quality testing reports. Comparing this data against the DWI determinant list, would reduce the testing and monitoring in future stages.

6.4.1 Anglian Water - Restricted Data

Capacities at Stoke Ferry Water Treatment Works (WTW) and Marham WTW have also been considered. AW disclosed there are treated network constraints associated with the Stoke Ferry option but spare treatment capacity currently at Marham, but the options are of limited benefit to Cambridge. This is considered further in the Stantec Optioneering report.

6.5 Water quality data comparison

Below is a comparison of landowner (received 13th of January 2026 following the Landowner questionnaire discussions) and AW (received 12th January 2026) water quality data. This has summarised the environmental and drinking water parameters that have standards against them under the DWI and EQS.

[17] Irrigation - Fresh Produce (PR) - Red Tractor Assurance
[18] RTStandardsV5_FreshProduce_SINGLES.pdf
[19] Irrigation - Crops & Sugar Beet (CR) - Red Tractor Assurance

6.5.1 Drinking Water Inspectorate Comparison

Landowners monitor 16 DWI parameters, (note: pesticides and PFAS are classed as one parameter group and not counted as individual parameters). The data received from AW covers 35 DWI parameters. There are some pesticides that are only monitored in one source, the River Wissey, it is assumed that these have been identified as potential risks in this catchment but not in the other catchments monitored. The only parameter monitored by the Landowners not monitored by AW if Faecal Streptococci (generally monitored as Enterococci).

Parameters not monitored:

- Acrylamide - The main source in drinking water is thought to be from residual acrylamide monomer from polyacrylamide coagulants used in the treatment of drinking-water. Therefore, it is not expected to be a high risk in raw waters and as such not a priority for monitoring.
- Gross Alpha, Gross Beta and Tritium - These are often monitored for at the treated water sampling location. However, for any new source it is advisable to gather some data on background concentrations. Total indicative dose would only be required if there were detections above the PCV for any of the three other radiological parameters.
- Pesticides - The pesticides listed in the data pack ref: WQ_GapAnalysis within the Gap Analysis tab that do not have any monitoring available are not necessarily required for DWI purposes. These are listed as the EQS standards. They would only be required to be monitored if thought to pose a risk within the catchment and likely to be present in the water. If these are new raw water sources for drinking water, it would be advisable to understand the potential pesticides used in the catchment to ensure the correct pesticides are being monitored for.

The Landowners pesticide risk assessment provided lists only those substances that have been detected, not the full list analysed for. This would be required to help understand what pesticides have been reviewed. Anglian Water's data includes a large suite of pesticides, which it is assumed are based on risk within these catchments. Therefore, if the catchment areas overlap or have similar land uses, then this suite would be applicable to the new sources.

- Chromium VI - Due to chromium (total) concentrations being <3 ug/l, the risk from chromium VI is considered low based on the available data but should further chromium (total) data indicate concentrations >3 ug/l regularly, it would be advised to monitor for chromium VI.

The DWI treats Trihalomethanes (THMs), Polycyclic Aromatic Hydrocarbons (PAHs) and Pesticides: Total as parameters where compliance is assessed using summed concentrations. For THMs and PAHs, the DWI specifies exactly which compounds fall under each group. The concentrations of the individual specified substances are summed and compared against the relevant total standard value. THMS are not generally considered to pose a high risk in raw water sources.

The DWI requires that each individual pesticide meets its own parametric limit, 0.01 ug/l and that the sum of all detected pesticides does not exceed the total pesticides limit, 0.05 ug/l. There are 4 named pesticides within the standards that have a different limit, 0.03 ug/l. Each water company is expected to review the risk within each catchment and ensure the pesticides most likely to be used and therefore found in the water are monitored for, this is a risk-based monitoring programme. Without knowing what

pesticides are analysed for in the Landowners assessment, nor the potential risks within this catchment, it is not possible to comment on whether all the appropriate pesticides are monitored for.

Based on the Landowners pesticide risk assessment provided, which lists only those substances that have been detected, not the full list analysed for, there were 2 pesticides detected: flufenacet (detected twice at 0.2 and 0.4 ug/l) and carbetamide at 0.6 ug/l. The individual pesticide drinking water standard is 0.1 ug/l. Anglian Water's data covers a broad range of pesticides, 75 substances.

Additional Parameters recommended

As well as those in the Gap Analysis tab (within the data pack ref: WQ_GapAnalysis-Book1) that are not monitored that relate to drinking water standards, the following are also recommended to be monitored for new drinking water sources:

- UV254 and DOC. For use alongside TOC for disinfection by products risk assessment. Using UV254 and DOC you can calculate Specific UV Absorbance (SUVA), higher SUVA correlates with increased risk of forming DBPs.
- Geosmin and 2-MIB - These are potential taste and odour concerns related to algae. As algae are present in the raw water monitoring data, it may be advisable to add these parameters to any monitoring suite.

6.5.2 Environmental Quality Standards

Landowners monitor 11 WFD Environmental Quality Standard (EQS) parameters whereas AW covers 51 WFD (EQS) parameters. It should be noted that as the waterbody type is not yet understood, all parameters in the data pack ref: WQ_GapAnalysis- WFD tab, that outlines the determinants that must be monitored for each type of waterbody, including rivers, lakes, and transitional/coastal waterbodies have been included in the gap analysis regardless of type. From this, 41 of the WFD (EQS) parameters are not monitored for by AW or Landowners. These 41 parameters are detailed in Table 6-1 below.

Table 6-1 Table of WFD (EQS) parameters that are not monitored by Anglian Water or Landowners

Parameter	Category
2,4-dichlorophenol	Industrial chemicals – phenols
3,4-dichloroaniline	Industrial chemicals – aromatic amines
Acid Neutralising Capacity (ANC)	General
Aclonifen	Pesticide – herbicide
Benthic invertebrates	Biological – ecology
Benzyl butyl phthalate	Industrial chemicals – plasticisers
Bifenox (Methyl 5-(2,4-dichlorophenoxy)-2-nitrobenzoate)	Pesticide – herbicide
Biochemical Oxygen Demand (BOD)	General
Brominated diphenyl ethers (PBDEs) - total PBDE (or congener) numbers 28, 47, 99, 100, 153 and 154	Industrial chemicals – flame retardants
Carbon tetrachloride	Industrial chemicals – chlorinated solvents
Chromium (III)	Metal

Chromium (VI)	Metal
Cybutryne	Pesticide – herbicide
Cyclodiene pesticides - Total (Aldrin, Dieldrin, Endrin, Isodrin)	Pesticide – insecticide
Cypermethrin	Pesticide – insecticide
DDT total / p,p'-DDT	Pesticide – insecticide
Diazinon	Pesticide – insecticide
Dichlorvos	Pesticide – insecticide
Dicofol	Pesticide – acaricide
Dimethoate	Pesticide – insecticide
Dioxins and dioxin-like compounds	Industrial chemicals – POPs
Dissolved Inorganic Nitrogen (DIN)	Nutrients
Fish	Biological – ecology
Heptachlor & heptachlor epoxide	Pesticide – insecticide
Hexabromocyclo-dodecane (HBCDD)	Industrial chemicals – flame retardants
Hexachlorocyclohexane	Pesticide – insecticide
macroalgae	Biological – ecology
Macrophytes	Biological – ecology
Methiocarb	Pesticide – insecticide
Octylphenols (4-tert-Octylphenol)***	Industrial chemicals – endocrine disruptors
Permethrin	Pesticide – insecticide
Phenol	Industrial chemicals – phenols
Phytobenthos	Biological – ecology
Phytoplankton	Biological – ecology
Quinoxyfen	Pesticide – fungicide
Salinity	General
Saltmarsh	Biological – ecology
Seagrass	Biological – ecology
Tributyltin compounds (tributyltin-cation)	Organotin compounds
Trichlorobenzenes	Industrial chemicals – chlorinated aromatics
Triclosan	Industrial chemicals – biocide

The WFD Schedule 3 determinants to be monitored (including the Part 3 EQS-specific parameters) should be used as the primary guidance for identifying which EQS parameters require monitoring (see the WFD tab). Once a site investigation has been completed and there is a better understanding of the water quality within the relevant waterbodies, a more detailed parameter list (see the EQS tab) can then be applied.

The parameters listed in the EQS tab are typically used during the HA1 screening to assess whether wastewater contains any substances associated with the processes that influence the discharge, for example, industrial activities or factories. If such substances are identified, further in-depth testing using the additional parameters in the EQS tab should be undertaken, followed by a risk assessment. Normal practice is to identify any parameters likely to be present and then analyse for these not the full suit. This list would be agreed with the Environment Agency and 12 months' worth of data would be required (a minimum of 12 samples).

Seasonality

It should be noted that the Landowners data is one sample per year. All data received is from months February, March and May. It is normally recommended that data is collected across the year to ensure seasonality, weather patterns, and flow changes are captured as the risk profile for different parameters can vary across the year.

An in-depth review of the frequency of sampling for individual parameters within the AW data has not been completed, however there is more data available for these two locations and data from across the year

7 Infrastructure and Operational Management

The South Levels are a heavily managed area which require structures in place to maintain water levels within the system. Such infrastructure has been in operation managing the Fens for hundreds of years with pumping stations used to pump water out from the Cambridge extent to Kings Lynn and the Washes. Figure 7.1 below shows the location of IDB assets, received from the Ely Group of IDBs and includes the Downham Market IDB assets.

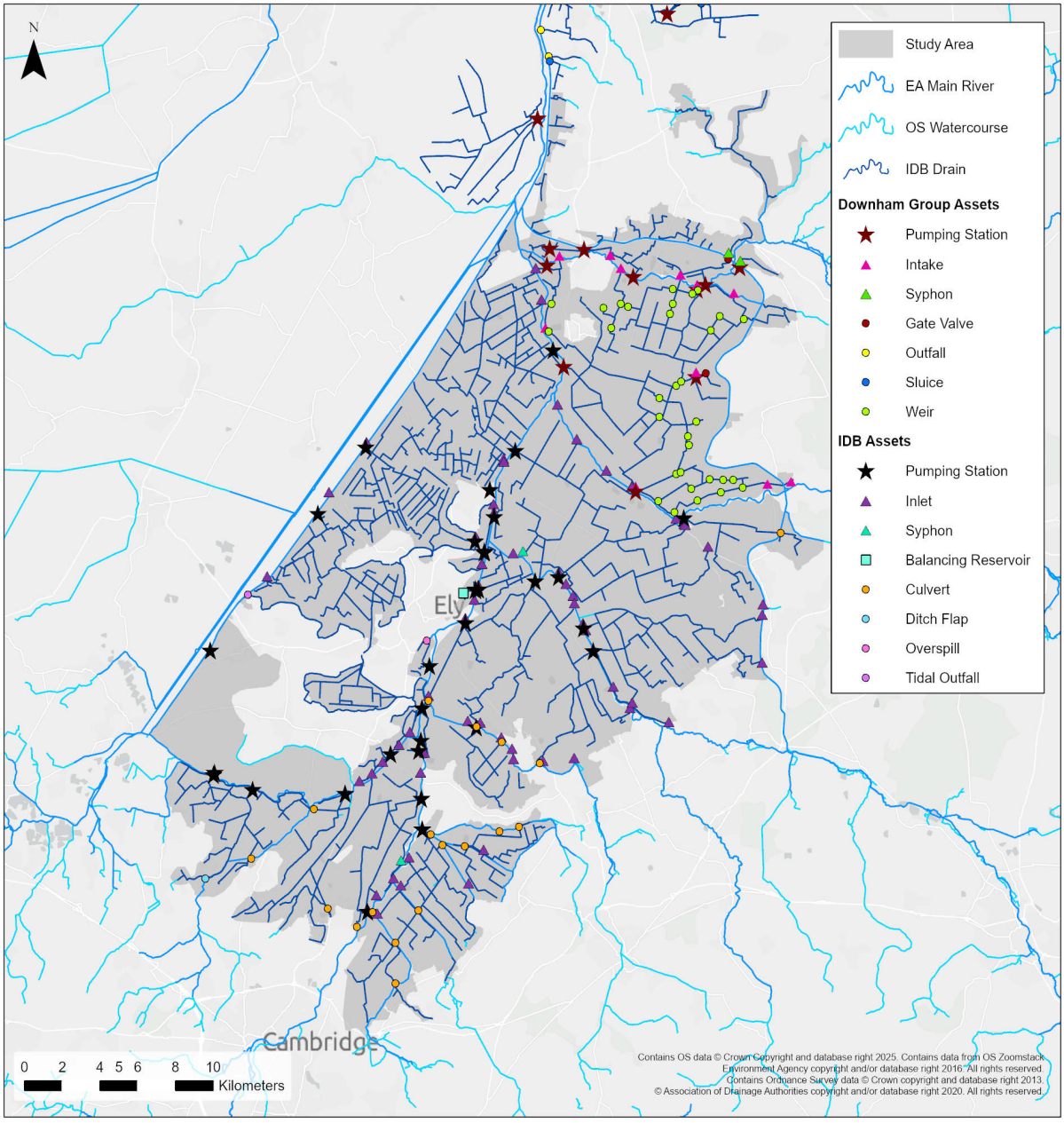


Figure 7.1 IDB asset locations for Ely Group and Downham Market Group IDB

7.1 Denver Complex

The Stantec report 'Denver sluice site visit December 2025' (Figures 4-8) illustrates the current structures and more detailed information on each sluice / asset at the site.

Each sluice operates to manage or redirect water within the system at the confluence of five water courses as shown in Figure 7.2. The Denver Sluice ("Little Eyes Sluice") is the first built sluice and operates to prevent the flow of tidal water upstream of Denver from Kings Lynn. It also is in place to maintain levels at Ely which only operate with a 30 cm bandwidth of variability. A.G Wright Sluice (Head sluice), functions as a flood relief sluice, discharging the high flows into the flood relief channel. The Residual sluice is a box sluice which is in operation to allow for the EOETS HoF to be transferred into the flood relief channel at Denver. Linking to this sluice is the Impounding sluice which when closed allows the Diversion Sluice to transfer the excess water after the HoF has been met to the Cut Off channel for the EOETS.

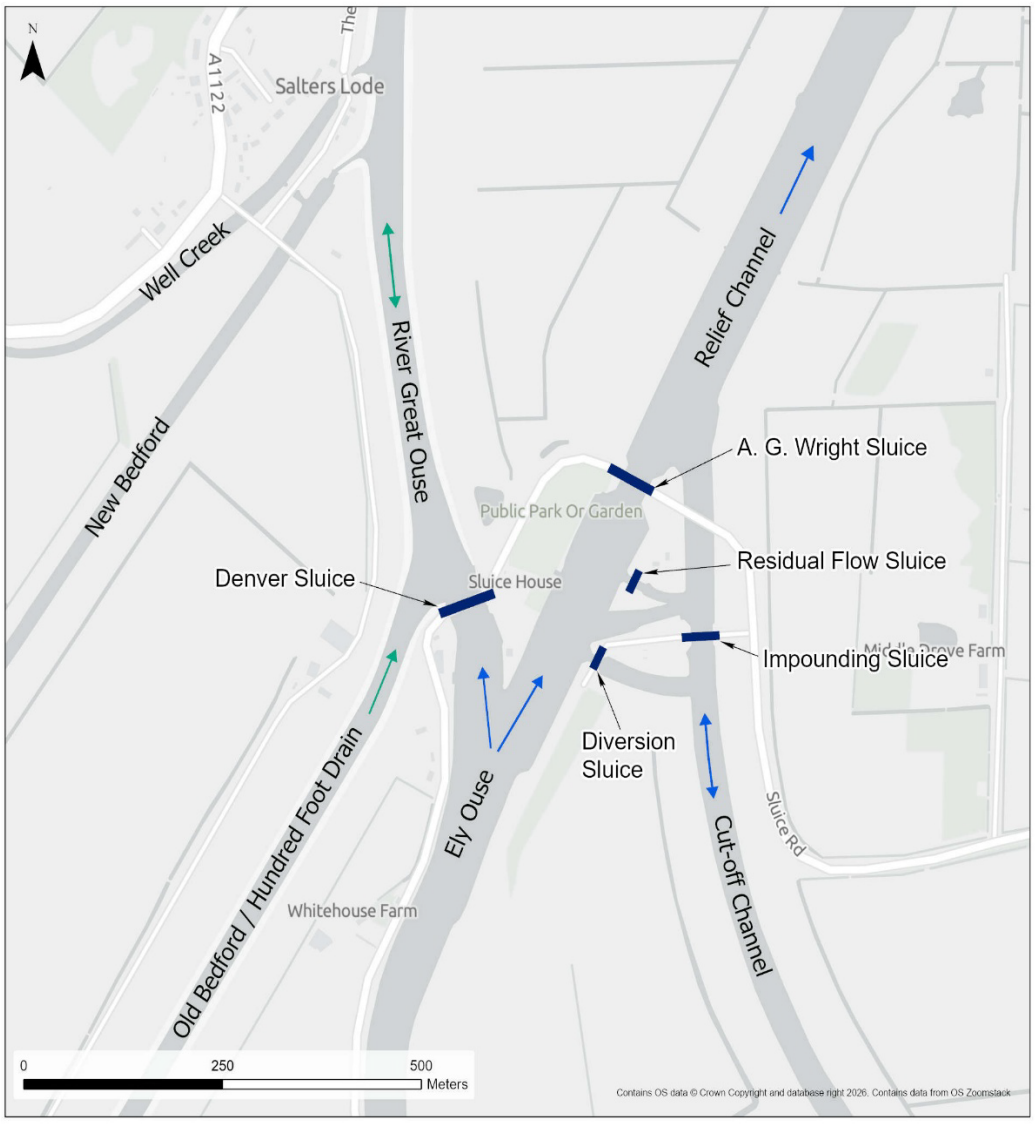


Figure 7.2 Denver Complex Operation extent

7.1.1 Denver Sluice Complex Site visit

In the north of the South Levels area, the Denver Sluice complex is operated by the EA and is a complex water management system of tidal and fluvial sluices in the Fens. On the 4th of December 2025, a site visit was completed to gain a better understanding of how the complex operates. The EA Flood Control and River Management (FCRM) Denver Sluice and Lock keeper, provided the Denver sluice Operating instructions (2014), Managing the Denver Complex (2008) and The Denver Complex (unknown date).

Following the site visit, a summary of the operation of the Denver Complex was prepared and is enclosed in Appendix M. This uses site visit photos, information delivered on the day, and the additional documents sent from the EA to supplement the report. This site visit provided additional understanding of the conveyance route through the system and how each structure plays a role. Further information and details can be found in Appendix M.

There are five sluices, one fish pass, one hydraulic turbine generating renewable energy and two locks all within this complex. These all control the conveyance routes and direction of flows in the surrounding water courses, therefore understanding how much water moves through and when, supplements the option of using Denver as a potential resource.

7.2 Ely Ouse to Essex Transfer Scheme

The Ely Ouse to Essex Transfer Scheme (EOETS), diverts water away from the Washes, bypassing Kings Lynn and redirects water towards Essex and Colchester. This diversion occurs at the Denver complex, further details on how this is managed and operated can be found in the Denver Site Visit Report, refer to Appendix M.

The EOETS scheme was established in 1972 and uses a combination of pipelines and open channel conveyance. The aim was to prevent usable potable water from being lost to the Washes and has been effective at providing a steady flow of clean pumped water into the driest part of the UK.

7.3 Great Ouse Groundwater Scheme

The Great Ouse Groundwater Scheme (GOGS) is a water management scheme which abstracts water from 15 EA operated boreholes. These boreholes raise water from the water table and are used during dry summer months to maintain water availability and to offer a sustainable water resource.

During the Denver Complex site visit, the EA FCRM Operator made it clear that the GOGS has become less of a water resource option in recent years. It was explained due to high losses in the system less of the resource arrives and requires destination, so it has not been used as a resource in more recent years.

7.4 IDB Assets

7.4.1 Association of Drainage Authorities

The Association of Drainage Authorities (ADA) is an organisation which covers a UK wide membership for drainage and managed waterways, and the South Level IDB is included within this association. The maps of each individual drainage boards offer valuable insight on how the IDBs operate at a local scale.

The operation of the IDB network is to manage water levels which results in the draining of the Fens and pass water out to Denver sluice and eventually to the Washes. This transfer of water is through a number of routes within the system such as pumping stations, EA designated Main Rivers and ditch lengths. The IDB network operates seasonally with penstocks open in the summer to allow for the flow of water into the IDB area, allowing landowners to access more water. Under winter conditions, pumping stations are in operation to move water into the EA designated Main Rivers to remove excess water within the IDB area. The IDB drains allow for the circulation of water throughout the South Levels Catchment, as can be seen as per Figure 7.1 above.

Figure 7.1 contains the following:

- Typical direction of flow within ditch lengths, main channels, and rivers (during the winter).
- Pumping stations
- Pipes
- Culverts
- Tidal outfalls
- Inlet/ pen stocks/ slackers
- Syphons

Figure 7.1 does not include: (Data gap)

- Sluices
- Weir structures (this is only included in some IDBs, therefore not included in the majority of maps)

7.4.2 Pumping stations

The Ely Group of IDBs provided pumping station information on the 19th of December 2025. This included monthly pumping hours for each pumping station in the IDB against rainfall for the period January 2012-September 2025 which is disclosed below in Table 7-1 and Table 7-2.

Table 7-1 Pumping station data – Discloses each IDB and the pumps within them and the maximum capacity available at each location. This does not include the pumping hours in relation to rainfall patterns, this data is found in Appendix N.

Pumping station/ IDB name	Pumping type	Capacity
Whitehall, Burnt Fen	Electric X2	1.7m³/s (each)
Lark, Burnt Fen	Diesel X1 Electric X3	1.7m³/s 0.867 m³/s
Cawdle Fen	Flygt submersible X2 Hawthorne Davey vertical suspended	0.365m³/s 0.174 m³/s
Lakenheath	Sulzer x2	0.78 m³/s (each)
Ten Mile, Littleport & Downham	Vertical spindle mixed flow x2	2.585 m³/s (each)
Oxlode, Littleport & Downham	Vertical spindle mixed flow x2	2.286 m³/s (each)
Hundred Foot, Littleport & Downham	Single Gwynns (diesel) Submersible x 3 (electric)	3.38 m³/s 1.59 m³/s
Wood Fen, Littleport & Downham	Single vertical mixed flow	1.02 m³/s
Little Thetford, Littleport & Downham	Single vertical mixed flow	0.378 m³/s
Stretham, Littleport & Downham	Single vertical mixed flow	0.22m³/s
Prickwillow, Middle Fen and Mere	Sulzer x2	1.7m³/s (each)
New Mill, Middle Fen and Mere	Harland Johnson x2	0.887m³/s (each)
Henny Fen, Middle Fen and Mere	Allen Gwynne Sulzer	1.022m³/s 1.022m³/s
Harrimere, Middle Fen and Mere	Allen Gwynne	0.452m³/s
Overall, Middle Fen and Mere	Vertical suspended x2	N/A
Alder Fen, Mildenhall	Sulzer x2	1.02m³/s
Chear Fen, Old West	Gwynne x2	1.3 m³/s (each)
Chear Fen Blackstone, Old West	Old Blackstone engine driving Gwynne (backup only)	N/A
Smithy Fen, Old West	Gwynne (backup only)	N/A
Queenholme, Old West	Electric	N/A
Padnal No.1, Padnal & Waterden	Sulzer	0.7 m³/s
Padnal No.2, Padnal & Waterden	Allen Gwynne	0.35 m³/s
Kerridge, Padnal & Waterden	Allen Gwynne	0.16 m³/s
Redmoor, Padnal & Waterden	Electric	0.16 m³/s
Waterden, Padnal & Waterden	Allen Gwynne	N/A
Upware, Swaffham	Allen electric vertical suspended Allen electric submersible x 2	2.1 m³/s 1.5 m³/s
Bottisham Locks, Waterbeach Level	Sulzer	0.359m³/s
Cam, Waterbeach Level	Allen Gwynne x 2 (diesel) Electric	1.0m³/s 1.217m³/s
Holt Fen, Waterbeach Level	Flygt	0.254 m³/s

Table 7-2 Following on from Table 7-1, the below pumping station capacities originate from Stantec legacy projects. Total capacity values are disclosed in response to the N/A provided in Table 7-1.

Pumping station, IDB	Pumping type	Capacity
Waterden, Padnal & Waterden	Allen Gwynne	0.156 m³/s
Queenholme, Old West	Electric	3.274 m³/s
Overall, Middle Fen and Mere	Vertical suspended x2	2.04 m³/s

The pump capacity and number of pumps was not provided for Waterden, Queensholme, Old West and Overfall pumping stations. However, this information was available from the Stantec project database on behalf of the Ely IDB and following approval from the Ely IDB was used to infill these gaps. For further information refers to the Stantec Catchment Conceptualisation and Water Balance Assessment report.

At the Ely IDB meeting of the 13th of November 2025, information was shared on the use of pumping stations across the South Levels, including whether pumping stations were backup or support pumps or whether they were in normal usage. This data can be found in Table 7-1 and Table 7-2 above, and further information in Appendix N.

There are some pumping areas which had missing data. Whilst the maximum pumping capacities can be noted in Table 7-1, there is no current information available for the following three factors; individual pump hours, the start/ stop levels for individual pumps and the duty/ assist pump arrangements. This data would need to be used to inform a water balance assessment in the future stages of the study. All three factors play a role in shaping how the pumping capacities operate and this is reflected in the Catchment Conceptualisation and Water Balance Assessment report.

7.5 Reservoirs

As part of the landowner questionnaire, information on the usage, capacity and conveyance between their reservoirs was provided. Understanding the current abstraction rates and sources of stored water within the landowner's area allow for a greater understanding on the already available transfer systems available within the study area.

7.5.1 Methodology

Linking to the conveyance section of this report (refer to Appendix B), in the questionnaire the landowners answered the following questions about their reservoirs:

> *Q6 (a & b): which type of abstraction sources did your land use and (to your best knowledge) how much water was abstracted?*

7.5.2 Results

In reference to question 6(a & b), the majority of the participants responded with abstractions from their local ditch systems or reservoirs. With the landowners using 'Reservoir direct' and 'Put and take' options for abstraction, no landowners responded with "piped" as a technique used, though one suggested they are interested in moving to a piped system in the future. This is relevant to the study

when assessing the potential transfer options, as these options used are conveyance routes, which could be utilised within the optioneering process. The most frequent answer to abstraction sources was from the local ditch systems, the IDB main drain system was a close second, with many landowners using both types.

At time of writing, there are no pipelines or transfer routes between IDB areas to move large volumes of water, nor a proposed plan. However, there are syphons within IDBs to aid with drainage activities around EA main river watercourses.

Results showed from the landowners who responded that the EA main river system, boreholes or any other types are not used and the reservoir abstractions used “Put and take” technique only.

7.6 Penstocks / Intakes

The location of IDB intakes is shown in Figure 7.1. There is no data available for the volume, operation or seasonality of water which the existing penstocks allow into the IDB system. This is a significant data gap, and assumptions have been used to inform the Catchment Conceptualisation and Water Balance Assessment report at this feasibility stage.

8 Environmental Considerations

When considering water availability within the study area, being aware of the level of environmental impact of different options is important. Online accessible data was downloaded from the online Catchment Data Explorer (DEFRA) for the relevant catchment locations within the South Levels area.

The landowner questionnaire also asked questions on areas to protect and areas of concern. It is acknowledged that most endangered species are protected within designated sites, some local wildlife may not fall into this category thus this questionnaire was an opportunity to identify any areas where this could be the case. Refer to Appendix H for further details.

8.1 Water Framework Directive

The Water Framework Directive (WFD) (2000/60/EC) (Commission of the European Communities, 2000) established a framework for a European wide approach to action in the field of water policy. Its aim is to ensure all inland and near shore watercourses and water bodies (including groundwater) are of 'Good' status or better, in terms of ecology, and chemical, biological and physical parameters, with the first management cycle having ended in 2015 and the second cycle ended in 2021. Therefore, any activities or developments that could cause detriment to a nearby water resource or prevent the future ability of a water resource to reach its potential status, must be mitigated to reduce the potential for harm and allow the aims of the Directive to be realised.

8.1.1 Ecological Status

Applicable to the South Level IDB, DEFRA has split the operational catchments into two sections: 1. South Level and the Cut Off channel (820 km^2)[20]. 2. Cam Lower (346 km^2)[21], as seen in Figure 8.1. Figure 1.3 shows the location of these operational catchments and the EA main rivers.

[20] South Level and Cut-Off Channel Operational Catchment | Catchment Data Explorer
[21] Cam Lower Operational Catchment | Catchment Data Explorer

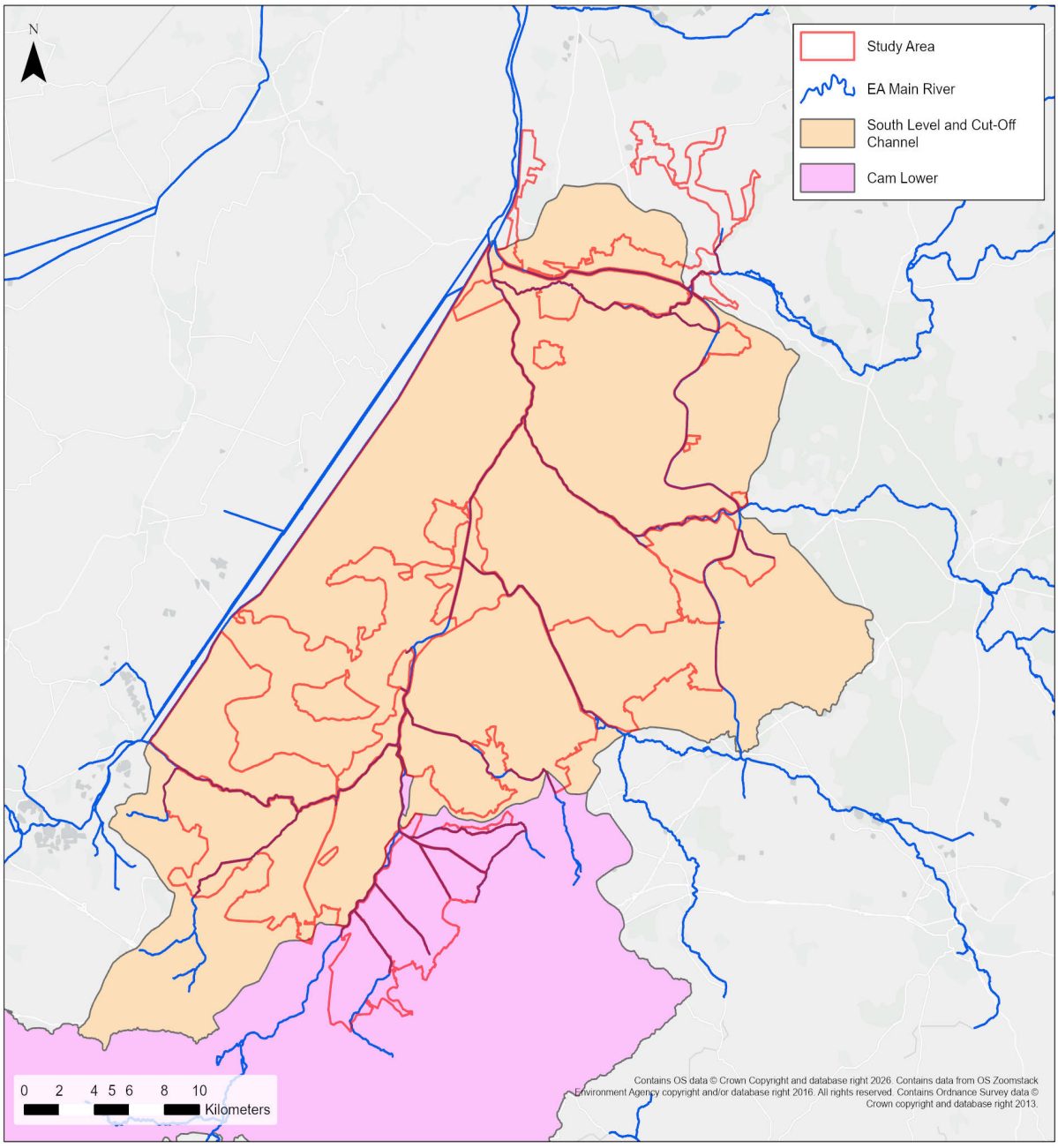


Figure 8.1 Water Framework Directive Operational Catchments

The overall status includes lake and river water body systems that have been reviewed over multiple years. The latest classification was conducted in 2022, so unless otherwise noted, the chemical status referenced in this section of the report is from that year. As seen in Table 8-1, all locations were of moderate or higher ecological status in the 2022 report with one achieving a ‘Good’.

Table 8-1 shows the chemical status in 2019 and lists all waterbodies within the South Levels as scoring a ‘Fail’, this is due to the status being given to the lowest performing determinant.

The Hydromorphological designation of each water body categorises water bodies on the level of modification undergone by human activity. This rating enables the assessment of a water body's

ecological health and potential, as heavily modified water bodies often correlate with lower ecological status.

Table 8-1. Water Framework Directive–: South Level and the Cut Off Channel and the Cam River waterbodies. Data from: Cam and Ely Ouse Management Catchment | Catchment Data Explorer

Water body	Ecological Status 2022	Chemical Status 2019	Hydromorphological designation	Catchment area (km²)	No. Protected areas
South Level and the Cut Off Channel					
Ely Ouse (Ouse Level: River	Moderate	Fail	Artificial	466.24	11
Old West River: River	Moderate	Fail	Heavily Modified	194.22	5
Cut-Off Channel: River	Moderate	Fail	Artificial	151.65	6
Cam River					
Burwell Lode: River	Moderate	Fail	Heavily Modified	40.52	4
Swaffham Bulbeck Lode: River	Moderate	Fail	Heavily Modified	43.69	2
Bottisham Lode-Quy water: River	Moderate	Fail	Heavily Modified	99.59	2
Stow Cum Quy Fen: Lake	Moderate	Fail	Artificial	0.006	2
Cam: River	Moderate	Fail	Heavily Modified	36.82	3
New River: River	Moderate	Fail	Heavily Modified	58.5	4
Soham Lode: River	Moderate	Fail	Heavily Modified	66.5	5

In the study area, the Cut-Off Channel catchment and the Cam lower catchment have an ‘Artificial’ or ‘Heavily modified’ rating, and neither waterbody achieves any rating higher than ‘Moderate’, as seen in Table 8-1 below. As mentioned in Section 2, the Fens have undergone large scale draining over 400 years, with the fertile soil promoting exceptional conditions for crops to be grown. The system continues to require heavily modified management and increasingly complex systems such as the Denver Complex, to maintain water levels.

In the South Level and Cut-Off Channel there are a total of 23 protected areas and in the Cam Lower there are 22, as seen in Appendix O. Assessing the location of protected areas is important when looking at conveyance and transfer routes within the system. This is to ensure water management of these protected sites is not impacted by the addition of water.

8.1.2 Reasons for Not Achieving Good Results

The WFD assessment identifies reasons why a waterbody did not pass the criteria for achieving Good status (Reasons for Not Achieving Good (RNAG)) and the environmental factors which play a part of

this (Figure 8.2 shows the location of these waterbodies listed in Table 8-1). RNAGs link to the Reasons For Deterioration (RFD), and Significant Water Management Issues (SWMI)[22]. The later are categorised by the mechanism by which it is impacting the waterbody:

- *Diffuse source*: An indirect cause of pollution e.g. Surface run off.
- *Flow*: Drainage or extreme low flow conditions
- *Physical moderation*: Urban development
- *Point source*: An exact location of the pollution is known, often found in rivers, transitional or coastal zones.
- *Unknown* (Pending investigation)
- *Invasive non-native species*: preventing the spread of species which pose as a threat to the ecosystem.

The SWMI outlines management issues in sub-sections and explains their outcomes. When the RNAG or RFD was because of a chemical reason, the chemical in question was listed, as seen in Table 1.2 in Appendix O. Therefore, provides a good indicator of the main issues within a waterbody and whether there are long term areas to be addressed or avoided when looking at water availability. Further descriptions of each waterbody RNAG and reasonings is disclosed within Appendix O.

The 2025 data has not yet been released, therefore, in the next stages this data could be available for review. This will help identify any changes since 2022, although 2025 was a drought year and this may impact results.

[22] Significant water management issues - Environment Agency - Citizen Space

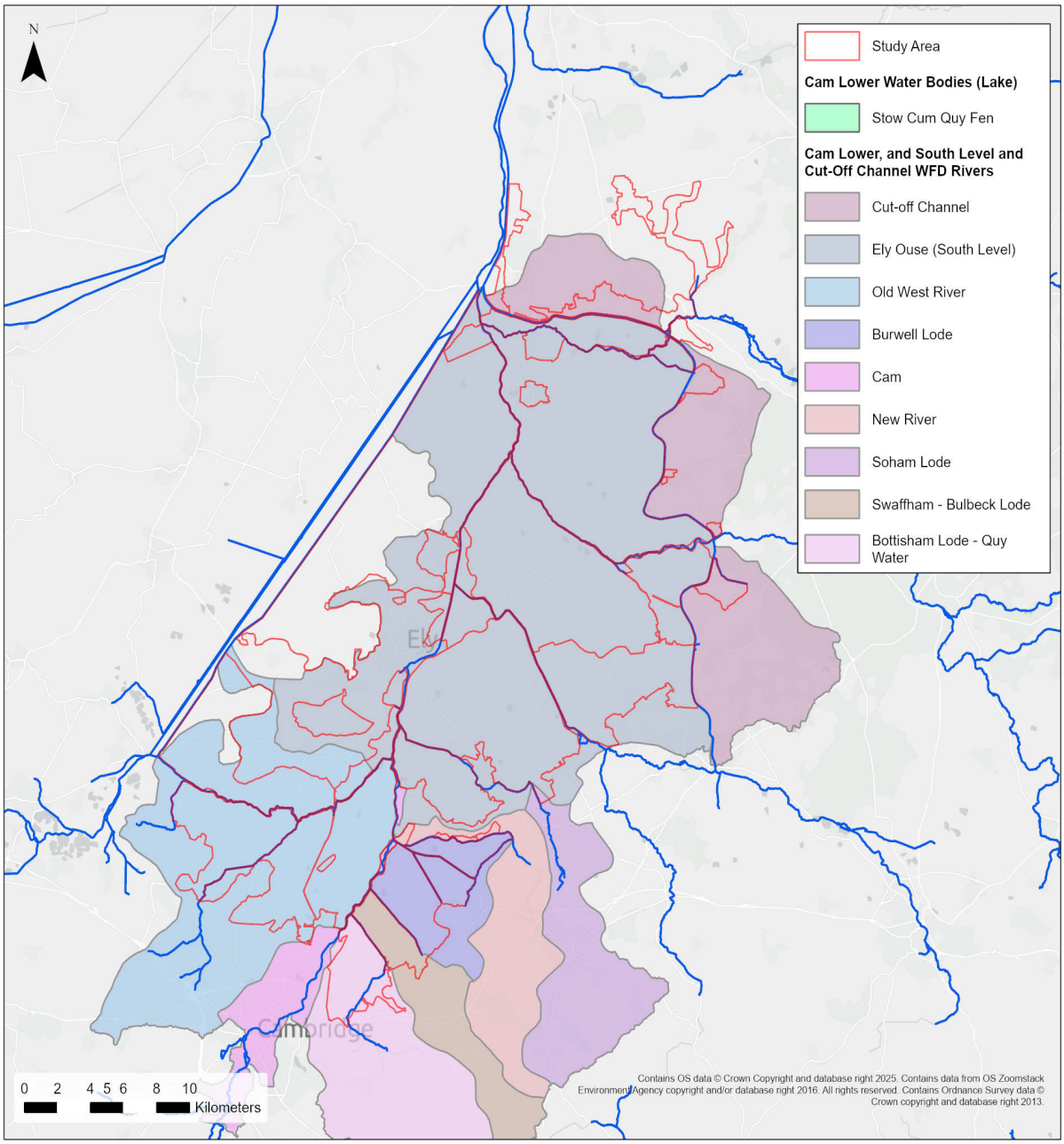


Figure 8.2 Water Framework Directive waterbodies within the South Levels

8.2 Designated sites

The UK contains areas holding great importance to the wildlife, biodiversity and the general environment, some of which are under conservation and designated. These areas need to be preserved and their importance maintained.

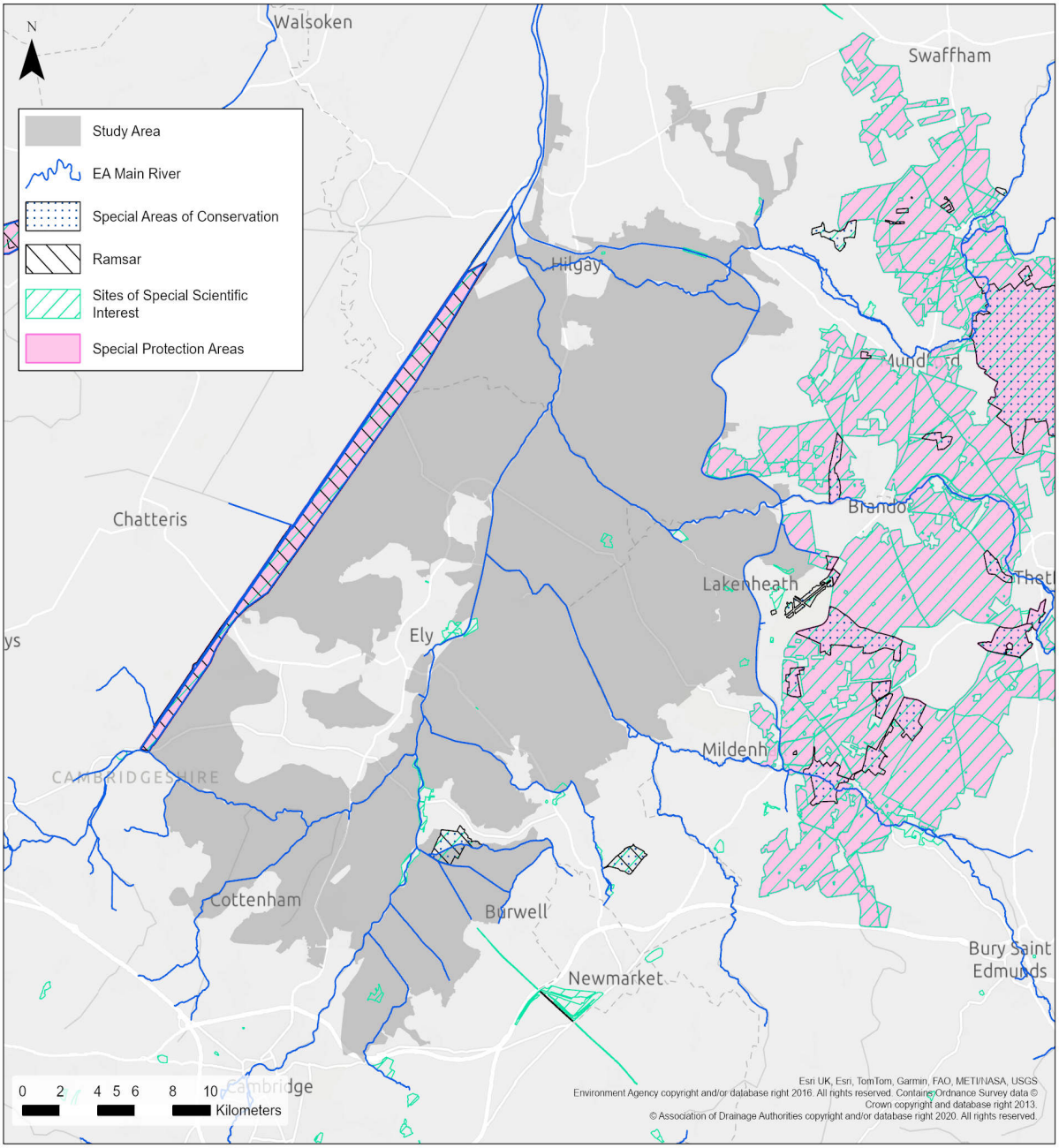


Figure 8.3 Location of Designated sites: SAC, Ramsar, SSSI and SPA

These sites are split up into five categories of designated sites:

1. Sites of Special Scientific Interest (SSSI):[23] Areas which have notable biological or geological importance (Figure 8.3)

[23] Magic Map Application- interactive map on the location of each designated site

2. Special Areas of Conservation (SAC): Designated when aligning with EU habitat protection and species of European significance (Figure 8.3)

3. Special Protection Areas (SPAs): Management/conservation of wild birds and their habitats. (Figure 8.3)

4. Ramsar sites[24]: Refers to wetlands of international importance under conservation and preservation of the sustainable use on wetlands. (Figure 8.3)

5. National Nature Reserves (NNR) and Local Nature Reserves (LNR): areas which are managed for the benefit to wildlife by conservation and management of biodiversity. (Figure 8.4)

The South Level IDB contains multiple designated sites which have been identified within Appendix P (Figure 8.3), some of the key water related sites are discussed below.

- Wicken Fen is categorised as NNR and SSSI, and categorised as a RAMSAR and SAC, under the EU Natura 2000. This area is managed through regulated water levels, protecting the various vegetation, waterbirds, assemblage of wetland plants and invertebrates.

- Ely Pits and Meadows, which in Figure 8.2 is the large SSSI Northeast of Ely and sits either side of the River Great Ouse.

- Shippea Hill is a SSSI located between the Little Ouse and the River Lark, to the East is Stallode Wash a SSSI.

- The North of the study area, as seen in Figure 8.2, also has two SSSI, the Hilgay Heronry just South of the Cut-Off Channel and Wretton which surrounds both North and South Banks of the Cut Off channel.

- In the South of the study area there is also the Cam Washes SSSI, Upware North Pitt SSSI/ Upware South Pit SSSI/ Upware Bridge Pit North SSSI. These sites all border the River Cam along a 7 Km extent. South of this is the Stow-cum-Quy Fen SSSI and is the most Southern location in Figure 8.2 to note.

The South Level IDBs borders two other designated sites: Chippenham Fen (categorised as NNR and SSSI) and the Ouse Washes (categorised as SSSI and Bird Sanctuary). This is important when looking on a wider scale and to acknowledge when looking at transfer routes/locations and the influence it could have on the functionally linked habitats.

[24] Home | Ramsar Sites Information Service

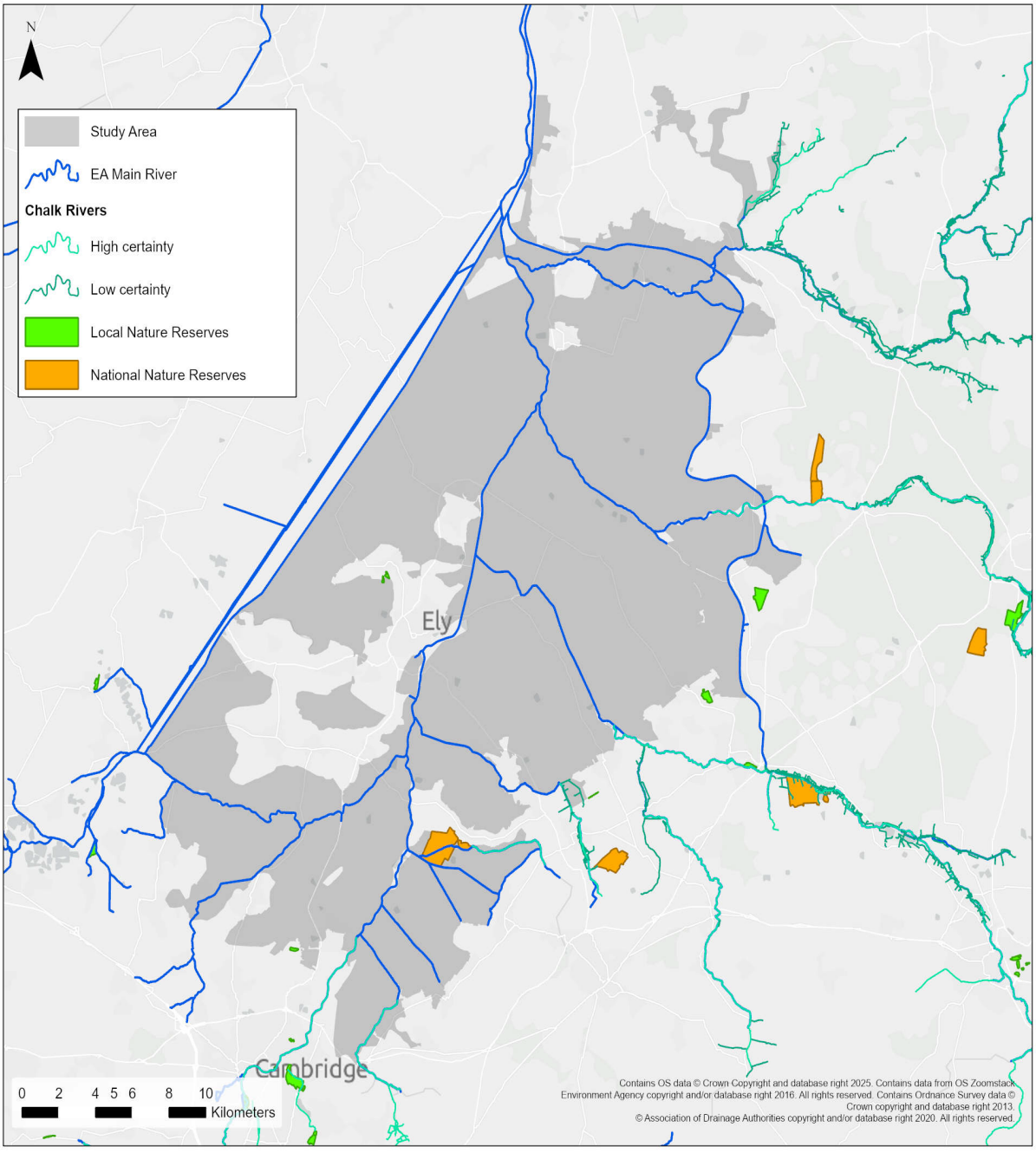


Figure 8.4 Location of National Nature Reserves, Local Nature Reserves and Chalk Rivers

Wicken Fen is classified as an NNR, along with other designated sites shown in Figure 8.4. These NNRs are just outside the IDB area but remain along EA main rivers. Their proximity to the study area makes them relevant, as they interact with local water sources and must be considered during optioneering.

The interaction with chalk rivers to the East of the region of study is also important when considering the conveyance systems within the study area. The UK has a large number of chalk rivers which are

internationally protected, therefore understanding the dynamics between chalk streams, groundwater and surface water transfers are a high priority to ensure their protection.

8.3 EA Incidents Reports

Environmental or reported pollution incidents within the South Level IDB has been provided by the EA, including the category, incident cause, pollutant type and disclosing the location of these reported incidents, see Figure 8.5. The response from the EA on the 27th of November 2025 states as following:

"The archive provides data on measurements and samples dating from 2000 for purposes including compliance assessment against discharge permits, investigation of pollution incidents or environmental monitoring"

The incident points within the South Levels, individual IDBs, and those in the immediate vicinity of the South Levels boundary are shown in Figure 8.5, further details have been identified within Appendix Q. Within the South Level IDB study extent, 71 incidents are recorded from 2012 to 2025, classed as either Category 3 (Minor) of which there were 4 counts and Category 2 (Significant) of which there were 67 Counts.

The Category 3 (Minor) counts consisted of:

- Sewage Materials (1 count),
- Contaminated Water (2 counts) and
- General Biodegradable Materials and Wastes (1 count).

The Category 2 (Significant) counts consisted of:

- Agricultural materials and wastes (5 counts)
- Sewage Materials (27 counts),
- Contaminated Water (10 counts),
- Oils and Fuels (10 counts).
- Other (15 counts)

In Figure 8.5, the land between the River Cam, River Great Ouse and the Hundred Foot Drain is shown to have very few reported incidents. The reported incidents are concentrated surrounding Ely along that stretch of the Great Ouse, which were predominantly in the Oil and Fuel category.

The IDB catchment headwaters and EA main rivers still could pose a potential risk within the system with conveyance routes downstream of the incidents. With this, the land not within the IDB area to the southwest of Ely has many reports of sewage materials, this is important to note as being an EA reported incident hotspot.

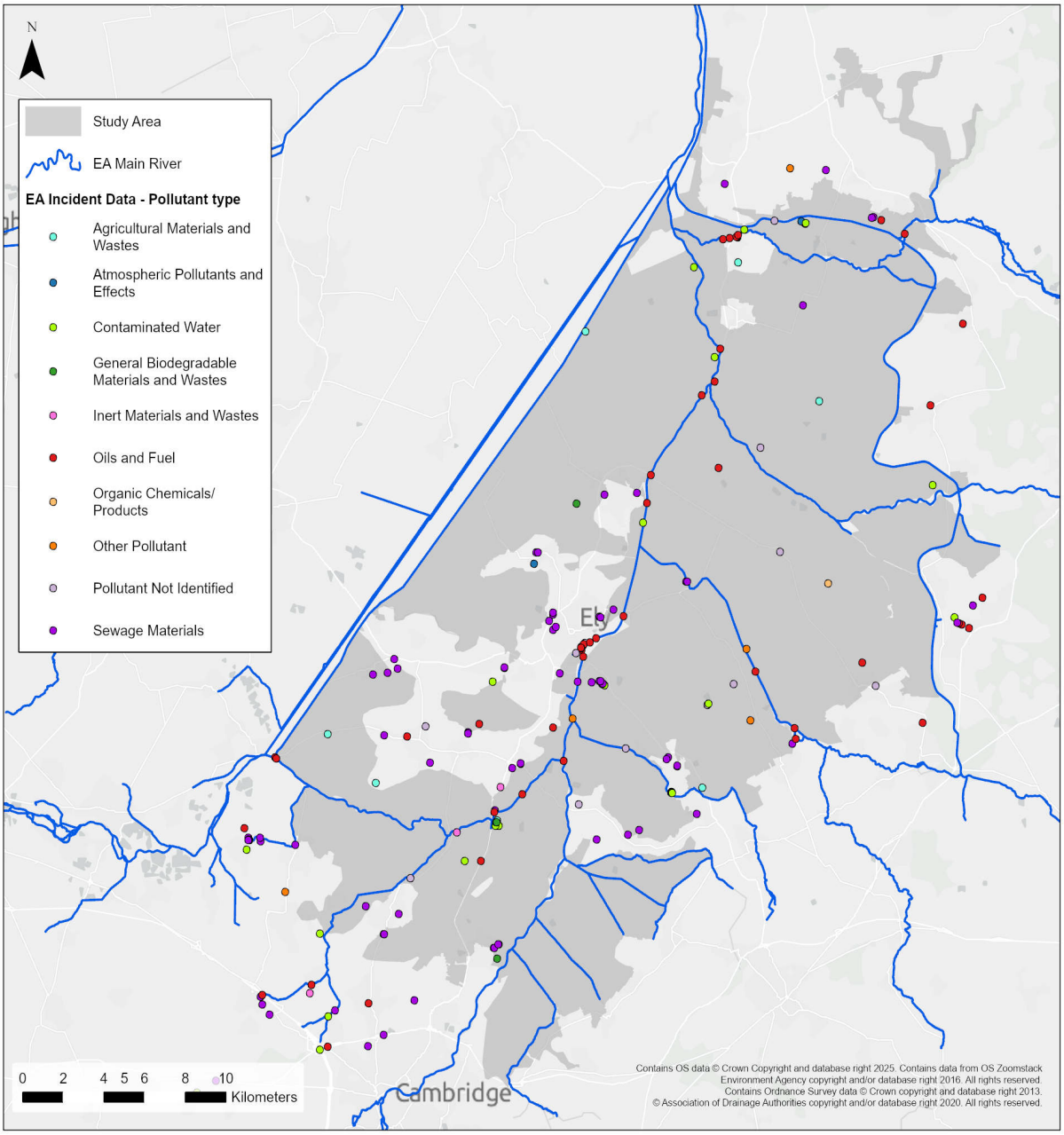


Figure 8.5 EA Incident reported locations

8.4 Landowner Questionnaire

There is limited publicly available data on ecological significance within the South Level IDB. Therefore, local knowledge, provided through the Landowner Questionnaire, is valuable in helping to fill this gap in the data.

8.4.1 Method

The questionnaire asked the following questions regarding ecological status:

> *Q7) Does your site contain any ecological significance which is not recognised as being a part of a designated site, but still should be noted as an area to protect/ preserve?*
>
> *Q8) Are there areas of your site which are a concern to surrounding ecology we should be aware of when looking into how water transfer would affect the South Level IDB?*

8.4.2 Results

The landowners responses showed none were located within an area which is designated, but confirmed efforts were being made to protect the wider environment and they are aware of the designated sites hydrologically connected to their catchments and voiced a strong desire to protect, in particular, any existing presence of water voles.

There is a lack of information regarding to the number and location of water vole habitats within this catchment and therefore any changes to water level management would need to consider any impacts to the water vole population, along with other protected species.

There was little feedback on any INNS species and pathogens which pose as a concern for the future. One landowner did confirm a history of Japanese Knotweed. This was stated as a well-managed issue and no longer a problem within the land water system, or for this study.

It is important to reduce the risk of widespread contamination between farms which could occur as a result of water transfers around the system, i.e. by moving water between farms or IDB land. If there is a known hotspot for water borne pathogens, which is self-contained, it would ideally be avoided in the transfer system and not considered as a part of the conveyance route. This would need to be considered as part of a future study.

9 Gaps Identified

Through an assessment of data provided, this Data Gap report has identified a series of gaps and associated unknowns.

The following data gaps highlight where any further data collection, clarification, or monitoring will be needed in the next stages of the project.

This section of this report has also been informed from the following potential stages:

Stage 2: Future Study Phases including potential Modelling

Stage 3: Design and Deliverables

9.1 Data Gaps

Surface water Hydrology

- Timeseries data gaps downloaded from the EA Hydrology Explorer (Hydrology Explorer). These have been infilled where appropriate to a degree appropriate for this study, however future infills may be required using more robust modelling techniques.

- The PyWR model for the area has not been received at the time of writing, so alignment with this has not been possible at this stage.

Groundwater Hydrology

- Missing data in the Fenland Peat maps, the full extent of peat across South Levels areas is not shown or is unknown in areas, this project is continuing and further information could be added at later stages (Fenland Peat Mapping).

- Timeseries data gaps downloaded from the EA Hydrology Explorer (Hydrology Explorer). These have been infilled using surrounding stations data for the feasibility stage, however this approach is not appropriate in future conceptualisation stages and thus would need further monitoring/ modelling.

Rainfall Hydrology

- Timeseries data gaps downloaded from the EA Hydrology Explorer (Hydrology Explorer). These have been infilled where appropriate however future infills may be required using more robust modelling techniques.

Water Quality

- Water Quality Archive data assessment for determinants linked to source and conveyance options (Water Quality Archive) was accessed but a more detailed review of this data is still required.

- There is a lack of clarity on the 'Pass' or 'Fail' thresholds received by Landowners under Red Tractor standards, limiting the ability to compare farmer data to DWI standards at the next stage (Red Tractor). Red Tractor were approached for further information but directed the project to the publicly available sources from which this information could not be fully retrieved.

- Hardness data for the South Levels has not been tested for within the area, and this may influence how influential that is to the water quality (Landowner Water quality).

- Parameters not monitored within the South Levels include Acrylamide, Gross Alpha, Gross Beta and Tritium, and Pesticides.

- The Drinking Water Safety Plans have not been received at the time of writing.

- The Environmental Water Quality, gaps were identified in the data, the most recent data being from 2022. At the time of writing, the 2025 data is not yet released, and should be reviewed in the next stage. It is important to highlight that 2025 was a drought year, and this may impact results.

Infrastructures and Operational Management

- Significant missing information on Penstock / Slacker intake volumes and operational regimes (Association of Drainage Authorities), means the volume, frequency and seasonality of water entering the IDB area from the EA Main Rivers and ordinary watercourses is unknown. This is required for accurate water balance assessments. The project has had to exclude the summer water balances from consideration at this stage, however as mentioned in the optioneering there are potential options which could be explored further if this information can be gathered.

- No available data has been provided for pumping stations with regard to individual pump hours, pump start/stop levels, and full duty/assist configurations.

- This is required for accurate water balance assessments, and assumptions will be required at the water balance assessment stage of this project analysis.

- Uncertainty relating to GOGS with the operation of, and long-term technical feasibility of this scheme.

- Downham Market IDB sub-catchments was not available at the time of writing this report, therefore the sub-catchments are based on assumptions.

- Denver Sluice data series has been infilled and adjusted by the EA which can impact the results as to how much is available, e.g. discrepancies between our water balance and the EA days available information.

Environmental considerations

- Information to be reviewed and/or obtained if limited available, on protected species such as water voles, including their distribution and population density (Reasons for Not Achieving Good Results).
- Landowner questionnaire requested environmental information, only came back with information regarding water voles. No information further information regarding species or environmental programs were offered.

9.2 Next Steps

The project should gather information on the summer operation of assets which allow the inflow of water into the IDB systems. This would allow the water balances to be closed, and aid with the options for transferring water around the system, such as by displacement rather than direct transfer.

It would also be useful to further understand the relationships of the IDB areas nearest the Cut off Channel with the groundwater and whether this poses additional constraints on the conveyance of water. Similarly, an improved understanding of soil properties and how they impact the water balance would assist with concerns about losses during conveyance.

It is considered to be appropriate to gain a greater understanding of the Red Tractor standards as these seem to cover many of the DWI requirements, and this may reduce the need for additional water quality sampling. It should be noted that water quality data must be sampled for a minimum of 12 months prior to a new source of water being introduced into public water supply.

Appendix A. Catchment maps

Appendix B. Data Register

Appendix C. Abstraction licencing

Appendix D. Flood risk zone

Appendix E. IDB area

Appendix F. Hydrology Explorer Data

Appendix G. National River Flow Archives

Appendix H. Landowner Questionnaire

Appendix I. British Geological Survey

Appendix J. Fenland Peat maps

Appendix K. Groundwater Investigation reports

Appendix L. Water Quality archive

Appendix M. Denver complex

Appendix N. IDB Assets

Appendix O. Water Framework Directive (WFD)

Appendix P. Designated sites

Appendix Q. EA incident report

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