

Appendix E

Environmental assessment and monitoring

1 Introduction

1.1 Background

As a statutory undertaker for water supply, we have a duty to ensure that we comply with environmental legislation, and for our drought plan, ensure that any environmental impacts of our actions are identified, minimised and mitigated. The likely impacts on the environment of implementing the supply actions within this drought plan have been assessed, in accordance with the guidance provided by the Environment Agency and in consultation with the appropriate competent authorities as required. This includes details of any likely changes because of our actions to water flows and levels, Water Framework Directive ecological status, designated sites, priority habitats and other protected areas. Designated sites include Sites of Special Scientific Interest (SSSIs), Special Areas of Conservation (SACs), and Local Nature Reserves (LNRs), which are indicated on Figure 1.1. Water Framework Directive water bodies and assessment points are shown on Figure 1.2.

This drought plan includes an assessment of:

- Likely impact of implementing supply side options
- Likely impact from the increased use of existing licences
- Details of permits required to implement any options
- The risks of implementing any supply side option
- Monitoring and mitigation actions required for any drought management action

We do not consider that our actions in this plan would impact on cultural or heritage sites, the spread of non-native species, water quality or biodiversity under the NERC1 Act 2006.

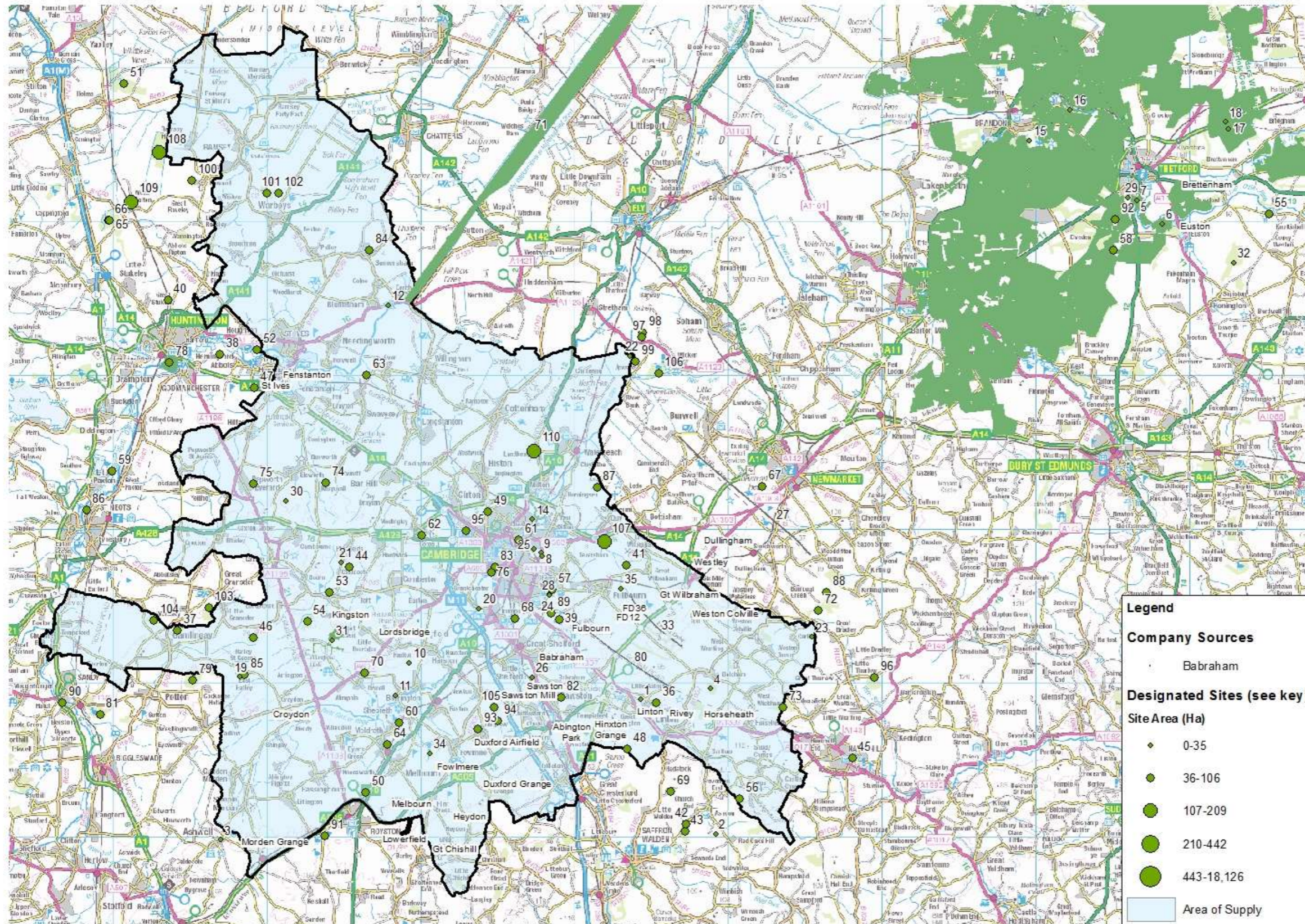
1.2 Environmental Assessment

We have considered the likelihood and frequency of drought management actions occurring, together with the level of environmental impact they may cause by assessing the available data and taking account of the sensitivity of receptors, such as designated or protected sites and features. Our assessments have wherever possible, followed the recommended approach in preparing an Environmental Assessment shown in Figure 1.3.

¹ Natural Environment and Rural Communities Act

Figure 1.1 Locations of designated sites

Cambridge Region Area of Supply Showing Company Sources and Statutory Environmental Designations



Key to sites

| Map Label | Name | Area (ha) | Designation(s) |
|-----------|------------------------------|-----------|----------------|
| 1 | Alder Carr | 7 | SSSI |
| 2 | Ashdon Meadows | 1 | SSSI |
| 3 | Ashwell Springs | 0 | SSSI |
| 4 | Balsham Wood | 35 | SSSI |
| 5 | Barnham Cross Common | 69 | LNR |
| 6 | Barnham Heath | 79 | SSSI |
| 7 | Barnhamcross Common | 69 | SSSI |
| 8 | Barnwell | 3 | LNR |
| 9 | Barnwell II | 4 | LNR |
| 10 | Barrington Chalk Pit | 97 | SSSI |
| 11 | Barrington Pit | 4 | SSSI |
| 12 | Berry Fen | 15 | SSSI |
| 13 | Blagrove Common | 5 | SSSI |
| 14 | Bramblefields | 2 | LNR |
| 15 | Breckland Farmland | 13392 | SSSI |
| 16 | Breckland Forest | 18126 | SSSI |
| 17 | Brettenham Heath | 234 | NNR |
| 18 | Bridgham & Brettenham Heaths | 442 | SSSI |
| 19 | Buff Wood | 16 | SSSI |
| 20 | Byron's Pool | 4 | LNR |
| 21 | Caldecote Meadows | 9 | SSSI |
| 22 | Cam Washes | 167 | SSSI |
| 23 | Carlton Wood | 10 | SSSI |
| 24 | Cherry Hinton Pit | 13 | SSSI |
| 25 | Coldham's Common | 49 | LNR |
| 26 | Dernford Fen | 10 | SSSI |
| 27 | Devil's Dyke | 40 | SSSI |
| 28 | East Pit | 13 | LNR |
| 29 | Elm Road Field, Thetford | 5 | SSSI |
| 30 | Elsworth Wood | 7 | SSSI |

| | | | |
|----|---|-----|-----------|
| 31 | Eversden and Wimpole Woods | 67 | SSSI |
| 32 | Fakenham Wood and Sapiston Great Grove | 201 | SSSI |
| 33 | Fleam Dyke | 12 | SSSI |
| 34 | Fowlmere Watercress Beds | 40 | SSSI |
| 35 | Fulbourn Fen | 27 | SSSI |
| 36 | Furze Hill | 6 | SSSI |
| 37 | Gamlingay Wood | 48 | SSSI |
| 38 | Godmanchester Eastside Common | 30 | SSSI |
| 39 | Gog Magog Golf Course | 88 | SSSI |
| 40 | Great Stukeley Railway Cutting | 35 | SSSI |
| 41 | Great Wilbraham Common | 24 | SSSI |
| 42 | Hales and Shadwell Woods | 15 | SSSI |
| 43 | Hales Wood | 8 | NNR |
| 44 | Hardwick Wood | 15 | SSSI |
| 45 | Haverhill Railway Walks | 14 | LNR |
| 46 | Hayley Wood | 52 | SSSI |
| 47 | Hemingford Grey Meadow | 1 | SSSI |
| 48 | Hildersham Wood | 8 | SSSI |
| 49 | Histon Road | 1 | SSSI |
| 50 | Holland Hall (Melbourn) Railway Cutting | 3 | SSSI |
| 51 | Holme Fen | 269 | SSSI; NNR |
| 52 | Houghton Meadows | 5 | SSSI |
| 53 | Kingston Amenity Area | 2 | LNR |
| 54 | Kingston Wood and Outliers | 47 | SSSI |
| 55 | Knettishall Heath | 92 | SSSI |
| 56 | Langley Wood | 32 | SSSI |
| | Lattersey Field | 12 | LNR |
| 57 | Limekiln Close (and West Pit) | 3 | LNR |
| 58 | Little Heath, Barnham | 46 | SSSI |
| 59 | Little Paxton Pits | 127 | SSSI; LNR |
| 60 | L-moor, Shepreth | 7 | SSSI |
| 61 | Logan's Meadow | 1 | LNR |
| 62 | Madingley Wood | 15 | SSSI |

| | | | |
|----|--------------------------------|------|-----------|
| 63 | Mare Fen | 16 | LNR |
| 64 | Melwood | 1 | LNR |
| 65 | Monks Wood | 156 | NNR |
| 66 | Monks Wood and The Odd Quarter | 169 | SSSI |
| 67 | Newmarket Heath | 279 | SSSI |
| 68 | Nine Wells | 1 | LNR |
| 69 | Nunn Wood | 10 | SSSI |
| 70 | Orwell Clunch Pit | 2 | SSSI |
| 71 | Ouse Washes | 2514 | SSSI |
| 72 | Out and Plunder Woods | 39 | SSSI |
| 73 | Over and Lawn Woods | 45 | SSSI |
| 74 | Overhall Grove | 17 | SSSI |
| 75 | Papworth Wood | 9 | SSSI |
| 76 | Paradise | 2 | LNR |
| 77 | Park Wood | 55 | SSSI |
| 78 | Portholme | 106 | SSSI |
| 79 | Potton Wood | 85 | SSSI |
| 80 | Roman Road | 12 | SSSI |
| 81 | Sandy Warren | 16 | SSSI |
| 82 | Sawston Hall Meadows | 7 | SSSI |
| 83 | Sheep's Green and Coe Fen | 17 | LNR |
| 84 | Somersham | 9 | LNR |
| 85 | St Denis Church | 0 | LNR |
| 86 | St. Neot's Common | 33 | SSSI |
| 87 | Stow-cum-Quy Fen | 30 | SSSI |
| 8 | Ten Wood | 18 | SSSI |
| 89 | The Beechwoods | 10 | LNR |
| 90 | The Riddy | 8 | LNR |
| 91 | Therfield Heath | 147 | SSSI; LNR |
| 92 | Thetford Heaths | 271 | SSSI |
| 93 | Thriplow Meadows | 3 | SSSI |
| 94 | Thriplow Peat Holes | 12 | SSSI |
| 95 | Traveller's Rest Pit | 2 | SSSI |

| | | | |
|-----|---|-----|-----------|
| 96 | Trundley and Wadgell's Woods, Great Thurlow | 79 | SSSI |
| 97 | Upware Bridge Pit North | 2 | SSSI |
| 98 | Upware North Pit | 1 | SSSI |
| 99 | Upware South Pit | 1 | SSSI |
| 100 | Upwood Meadows | 6 | SSSI; NNR |
| 101 | Warboy's and Wistow Wood | 44 | SSSI |
| 102 | Warboys Claypit | 13 | SSSI |
| 103 | Waresley Wood | 54 | SSSI |
| 104 | Weaveley and Sand Woods | 62 | SSSI |
| 105 | Whittlesford - Thriplow Hummocky Fields | 56 | SSSI |
| 106 | Wicken Fen | 254 | SSSI; NNR |
| 107 | Wilbraham Fens | 62 | SSSI |
| 108 | Woodwalton Fen | 209 | SSSI; NNR |
| 109 | Woodwalton Marsh | 1 | SSSI |
| 110 | Worts Meadow | 6 | LNR |

Figure 1.2 Water Framework Directive sites

Cambridge Region Area of Supply Showing Company Sources and Water Framework Directive Rivers and Monitoring Network

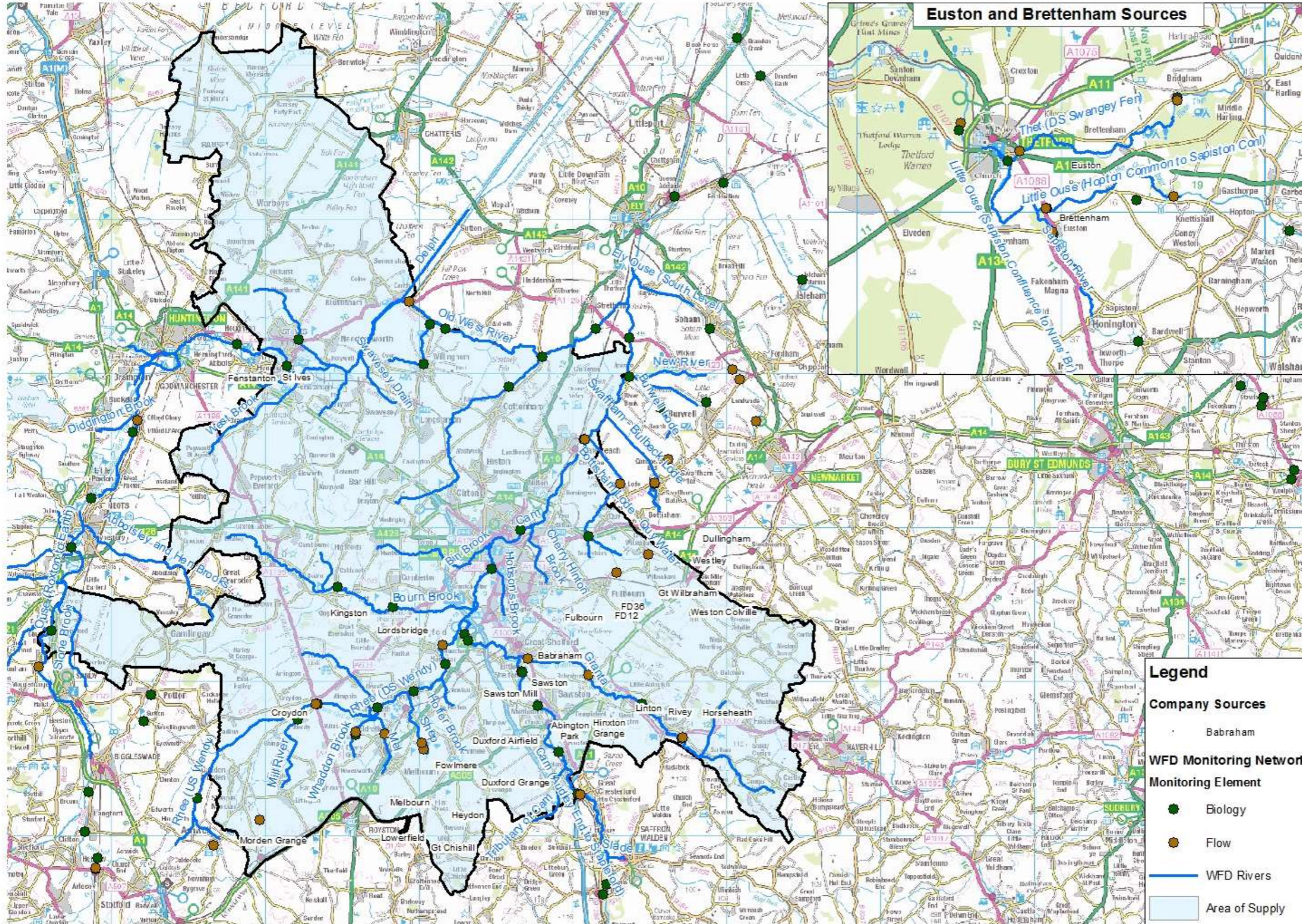
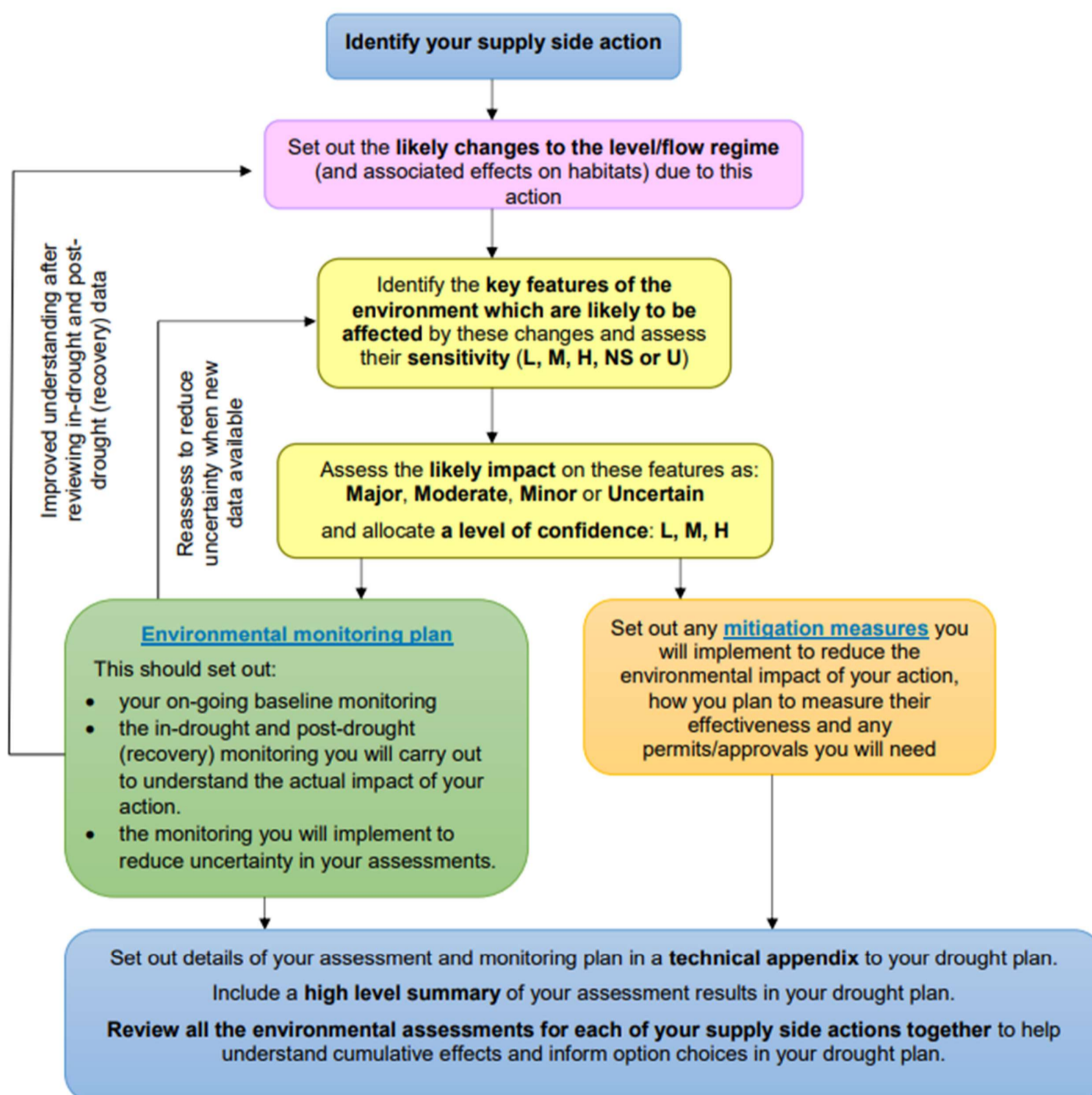


Figure 1.3 How to prepare an Environmental Assessment



Source: Environmental Assessment for Water Company Drought Planning LIT55303, Environment Agency

1.3 Statutory Designated Sites

We have considered the environmental effects of this plan on designated sites, to which the following legislation applies:

- Conservation of Habitats and Species Regulations 2010 – Habitats Directive
- Wildlife and Countryside Act 1981 (as amended by the Countryside and Rights of Way Act 2000)
- Habitats Regulations Assessment (HRA) and Strategic Environmental Assessment Directive (SEA)
- Water Framework Directive, River Basin management Plans and UK Biodiversity Action Plan
- Other protected areas under international agreements such as Ramsar sites and non-statutory sites, such as local wildlife sites and reserves.

The results of the environmental assessments that include designated sites is presented in Table 1.1

The sensitivity of sites to abstraction has been assessed during the Restoration of Sustainable Abstraction Programme (RSA) in conjunction with the Environment Agency and continues to be assessed as part of the EA Sustainable Catchments programme. We have assessed the impacts of increasing abstractions within existing licenced quantities to inform our drought management decision making, where this includes flexing abstractions within our published deployable output and abstraction licences.

Table 1.1 Environmental Impact Assessment of Drought Management Options

| Action to increase water supply (including time-scale and time of year) | Summary of likely environmental impacts; features considered | Risk to the environment (L, M, H) & how assessed | Baseline information used | additional monitoring requirements | mitigation methods | Impact on other activities | Details of permits and permissions required |
|---|--|---|---|---|--|----------------------------|---|
| <p>Increase abstraction at Brettenham within licence above recent actual volumes.</p> <p>As required, all year/peak demands</p> | <p>GB10503304307: Sapiston River – Risk of Deterioration (u/s inGB105033043090)</p> <p>GB105033043090: Little Ouse (Sapiston Confluence to Nuns' Br) - Risk of Deterioration</p> <p>AP12: Upper Little Ouse and Chalk unit (in GB105033043100) – Risk of Deterioration</p> <p>AP13: River Thet and Chalk unit – Risk of Deterioration (link to E Wretham Heath Habitats Dir) – no issues</p> | High. Assessed on basis of WFD Deterioration risk (EA Sustainable catchments, Jan 2016) | <p>RSA investigations</p> <p>EA WRGIS</p> <p>EA WFD Compliance points</p> | <p>Flow monitoring in Sapsiton-AWS AMP6 programme continuation.</p> <p>Flows in Lt Ouse</p> <p>Flows in Upper Lt Ouse at Euston Bridge against flow target 94l/s</p> <p>Programme of flow and ecological monitoring</p> | <p>GOGS to support river flows: Upper Lt Ouse</p> <p>Potential additional augmentation from Brettenham</p> <p>Agricultural licences reduced: Lt Ouse, Sapiston</p> | none | new augmentation discharge licences |
| <p>Increase abstraction at Euston within licence above recent actual volumes.</p> <p>As required, all year</p> | <p>GB10503304307: Sapiston River – Risk of Deterioration (u/s inGB105033043090)</p> <p>GB105033043090: Little Ouse (Sapiston Confluence to Nuns' Br) - Risk of Deterioration</p> <p>AP12: Upper Little Ouse and Chalk unit (in GB105033043100) – Risk of Deterioration</p> | High. Assessed on basis of WFD Deterioration risk (EA Sustainable catchments, Jan 2016) | <p>RSA investigations</p> <p>EA WRGIS</p> <p>EA WFD Compliance points</p> | <p>Flow monitoring in Sapsiton-AWS AMP6 programme continuation.</p> <p>Flows in Lt Ouse</p> <p>Flows in Upper Lt Ouse at Euston Bridge against flow target 94l/s</p> <p>Programme of flow and ecological monitoring</p> | <p>GOGS to support river flows: Upper Lt Ouse</p> <p>Potential additional augmentation from Brettenham</p> <p>Agricultural licences reduced: Lt Ouse Sapiston</p> | none | new augmentation discharge licences |
| <p>Increase abstraction at Westley within licence above recent actual volumes.</p> <p>As required, all year/peak demands</p> | <p>AP7: River Snail (link to Chippenham Fen Habitats Dir.) - no issues</p> <p>GB105033042700: Bottisham Lode - Quay Water -no flow issues</p> <p>GB105033042780: New River (link to Wicken Fen Habitats Dir.) -no issues</p> <p>GB105033042710: Swaffham - Bulbeck Lode – Risk of Deterioration</p> | Moderate. Assessed on basis of WFD Deterioration risk (EA Sustainable catchments, Jan 2016) | <p>RSA investigations</p> <p>EA WRGIS</p> <p>EA WFD Compliance points</p> | Flows in Swaffham - Bulbeck Lode | Lodes Granta river support Scheme: Swaffham Bulbeck Lode, River Granta | | n/a |

| | | | | | | | |
|--|---|--|--|--|--|----------------------------------|--|
| | | | | | | | |
| <p>Increase abstraction at Fleam Dyke within licence above recent actual volumes.</p> <p>As required, all year</p> | <p>GB105033042670: Cherry Hinton Brook – Flow compliance to support ecology</p> <p>AP2: River Granta and Chalk unit – Risk of Deterioration impacting on flow targets set</p> <p>GB105033042700: Bottisham Lode - Quay Water – not flow dependant</p> <p>GB105033042710: Swaffham - Bulbeck Lode – Risk of Deterioration</p> <p>GB10503303762: Hobson's Brook – Risk of Deterioration</p> | <p>Moderate. Assessed on basis of WFD Deterioration risk (EA Sustainable catchments, Jan 2016)</p> | <p>AMP4 NEP Investigations</p> <p>EA WRGIS</p> <p>EA WFD Compliance points</p> | <p>Continuation of 2016 flow & ecology monitoring in Cherry Hinton Brook</p> <p>monitoring in River Granta at Babraham gauge</p> <p>Flows in Swaffham - Bulbeck Lode</p> <p>gauged flows at Nine Wells</p> <p>additional monitoring u/s of Hobsons Brook</p> | <p>Lodes Granta River support Scheme: Swaffham Bulbeck Lode, River Granta</p> <p>Use as preference to Babraham increased abstraction</p> <p>Agricultural licences reduced: Granta</p> | <p>none</p> | <p>n/a</p> |
| <p>Increase abstraction at Babraham within licence above recent actual volumes.</p> <p>As required, all year</p> | <p>Hobson's Brook (GB105033037620) – Risk of Deterioration</p> | <p>Moderate. Assessed on basis of WFD Deterioration risk (EA Sustainable catchments, Jan 2016)</p> | <p>AMP4 NEP Investigations</p> <p>EA WRGIS</p> <p>EA WFD Compliance point</p> | <p>gauged flows at Nine Wells</p> <p>additional monitoring u/s of Hobson's Brook</p> | <p>Reductions in abstraction equivalent to proposed licence change.</p> <p>Agricultural licences reduced</p> | <p>Amenity at Nine Wells LNR</p> | <p>n/a</p> |
| <p>Increase abstraction at Horseheath within licence above recent actual volumes.</p> <p>As required, all year/low flows</p> | <p>River Granta (GB105033037810) Risk of deterioration</p> | <p>Moderate. Assessed on basis of WFD Deterioration risk (EA Sustainable catchments, Jan 2016)</p> | <p>AMP 3 & AMP4 NEP Investigations, AMP6 implementation</p> <p>EA WFD Compliance point</p> | <p>Flows at Babraham gauge</p> <p>Flows and ecology upstream of EA river support discharge - Bartlow</p> | <p>Maintain flow target 26l/s at Babraham gauge.</p> <p>EA Lodes Granta scheme in operation</p> <p>Potential augmentation from Horseheath or Linton.</p> <p>Reductions to abstraction at Linton & Rivey.</p> | | <p>new augmentation discharge licences</p> |
| <p>Increase abstraction at Linton within licence above recent actual volumes.</p> <p>As required, high flows</p> | <p>River Granta (GB105033037810) Risk of deterioration</p> | <p>High. Assessed on basis of WFD Deterioration risk (EA Sustainable catchments, Jan 2016)</p> | <p>AMP 3 & AMP4 NEP Investigations, AMP6 implementation</p> <p>EA WFD Compliance point</p> | <p>Flows at Babraham gauge</p> | <p>Maintain flow target 26l/s at Babraham gauge.</p> <p>EA Lodes Granta scheme in operation</p> <p>Abstraction reductions at low flows as per AMP6 NEP proposal. Use Rivey & Horseheath abstractions in preference</p> | | |

| | | | | | | | |
|--|--|---|---|--|--|------------------------------|-------------------------------------|
| Increase abstraction at Rivey within licence above recent actual volumes. As required, high flows | River Granta (GB105033037810) Risk of deterioration | High. Assessed on basis of WFD Deterioration risk (EA Sustainable catchments, Jan 2016) | AMP 3 & AMP4 NEP Investigations, AMP6 implementation EA WFD Compliance point | Flows at Babraham gauge | Maintain flow target 26l/s at Babraham gauge. EA Lodes Granta scheme in operation Abstraction reductions at low flows as per AMP6 NEP proposal. Use Horseheath abstraction in preference | | |
| Increase abstraction at Fleam Dyke 12. within licence above recent actual volumes | GB105033042670: Cherry Hinton Brook – Flow compliance to support ecology AP2: River Granta and Chalk unit – Risk of Deterioration impacting on flow targets set GB105033042700: Bottisham Lode - Quay Water – not flow dependant GB105033042710: Swaffham - Bulbeck Lode – Risk of Deterioration GB10503303762: Hobson's Brook – Risk of Deterioration | Moderate. Assessed on basis of WFD Deterioration risk (EA Sustainable catchments, Jan 2016) | AMP4 NEP Investigations EA WRGIS EA WFD Compliance points | Continuation of 2016 flow & ecology monitoring in Cherry Hinton Brook monitoring in River Granta at Babraham gauge Flows in Swaffham - Bulbeck Lode gauged flows at Nine Wells additional monitoring u/s of Hobson's Brook | Lodes Granta River support Scheme: Swaffham Bulbeck Lode, River Granta Use as preference to Babraham increased abstraction Agricultural licences reduced: Granta | | |
| Increase abstraction at Croydon within licence above recent actual volumes | GB105033037820: Millbridge and Potton Brooks – Risk of Deterioration | Low. Assessed on basis of WFD Deterioration risk (EA Sustainable catchments, Jan 2016) | WFD Hydrology Programme EA WRGIS EA WFD Compliance points | Flow and GW Monitoring | HOF conditions to SW abstractions | | |
| Increase abstraction at Kingston within licence above recent actual volumes | AP5: Bourn Brook – Risk of Deterioration | Low. Assessed on basis of WFD Deterioration risk (EA Sustainable catchments, Jan 2016) | WFD Hydrology Programme EA WRGIS EA WFD Compliance points | Flow and GW Monitoring to determine deterioration in Woburn Sands | | | |
| Abstraction at St Ives during drought – recently returned source | GB105033042730: West Brook – Risk of Deterioration GB105033047921: Ouse (Roxton to Earith) - no issues (Habitats Dir) | Low. Assessed on basis of WFD Deterioration risk (EA Sustainable catchments, Jan 2016) | WFD Hydrology Programme EA WRGIS | Flow and ecological monitoring programme: West Brook Flow monitoring | HOF flows Q34 at Earith Flow Augmentation at Fenstanton PS | Marinas in vicinity - levels | new augmentation discharge licences |

| | | | | | | | |
|--|--|--|--------------------------|--|--|--|--|
| | | | EA WFD Compliance points | | | | |
|--|--|--|--------------------------|--|--|--|--|

1.4 Habitats Regulations Assessment

The EU Habitats Directive, which seeks to safeguard Europe's natural heritage, was transposed into UK law by the Habitats Regulations 1994. The Regulations require a Habitats Regulations Assessment (HRA) to be undertaken to determine whether plans are likely to have a significant effect on European Sites, including Special Areas for Conservation (SACs), candidate SACs (cSACs), Special Protection Areas (SPAs) and Ramsar sites (Wetlands of international importance). The Company has carried out the following HRA in fulfilment of its Habitats Regulations obligations.

There is one European Site which could be affected by Cambridge Water's drought plan, either alone or in combination with other plans and projects, and that is the East Wretham Heath area of the Breckland Special Area of Conservation (SAC). The Company's Thetford sources are located to the south of East Wretham Heath and, at the time that abstraction licences were originally granted for the sources, it was uncertain whether, and to what extent, abstraction would affect the water level. For this reason, elements of the licences were made temporary, and a cessation condition incorporated, until such time as the likely effects were better understood.

As part of its 2004 application to renew the temporary licence elements, and to have the cessation condition removed, the Company commissioned a detailed study, which involved a programme of test pumping, monitoring and modelling. The study concluded that pumping at licensed quantities had a negligible effect on the meres at East Wretham Heath and formed the basis of the Company's environmental assessment which accompanied its application. Following consultation with Natural England the Environment Agency approved the application and granted a renewal of the temporary elements of the licences until 2015, following which they were further renewed until 2018. The cessation clause was also removed as part of the renewal process. As this clause was the primary reason for the temporary element of the licences being time limited, we would expect the licences to be renewed at the same quantities. On renewal of these licences in 2018, the Environment Agency also applied an aggregate cap to the annual average abstraction at these sources, providing further precautionary protection to the environment, for non-designated sites.

Therefore there is no significant effect on the Breckland SAC from these abstractions, and this has been accepted by the Environment Agency. This drought plan contains no proposals to exceed the current licensed capacity of the Thetford sources. Accordingly, the Company has determined that the plan is unlikely to have a significant effect on a European Site, and that an Appropriate Assessment, under the Habitats Regulations, is not required. This conclusion has been endorsed by Natural England.

1.5 Strategic Environmental Assessment

European Directive 2001/42/EC, otherwise known as the Strategic Environmental Assessment or SEA Directive, requires the "assessment of the effects of certain plans and programmes on the environment". Information and guidance on how to comply with the Directive was published by the Office of the Deputy Prime Minister (ODPM), in its 2005 publication *A Practical Guide to the Strategic Environmental Assessment*. A subsequent UKWIR report², adapted the ODPM guidance for the water industry.

The decision-making process set out in the UKWIR report to determine whether plans require an SEA is presented in the form of a decision tree, which is reproduced as Figure 1.4

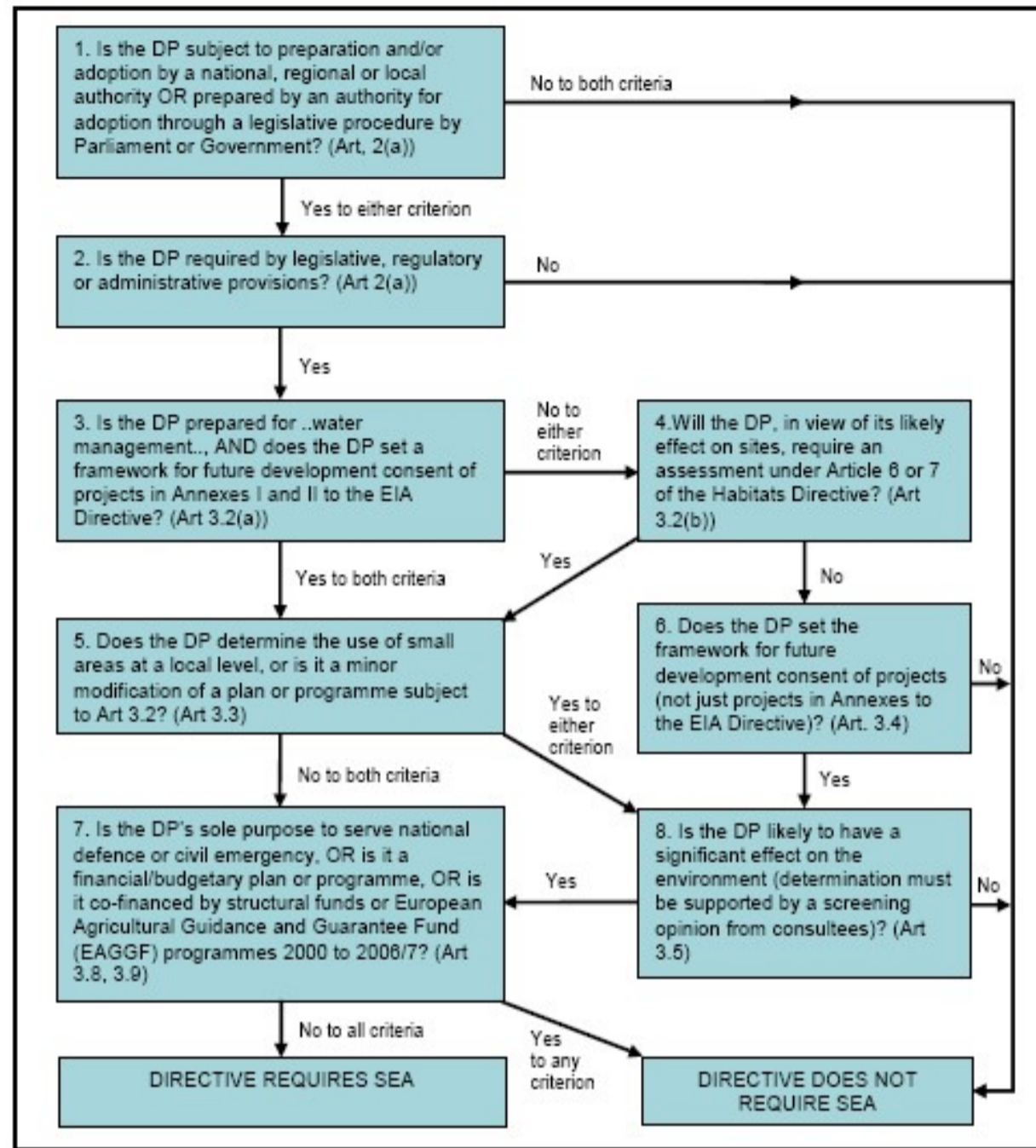
Water companies, as responsible authorities, must determine if their drought plans fall within the scope of the SEA Directive. The Company has followed the UKWIR guidance, the decision tree, and the Environment Agency's drought planning guideline to arrive at an informed decision in this regard. The conclusions from applying the process are summarised below.

- The response to questions 1 and 2 is "yes", as South Staffs Water is clearly an 'authority' within the meaning of the Directive, and the drought plan is a statutory requirement.
- In response to question 3, although the drought plan is prepared for water management, it does not set a framework for future development consent of projects in Annexes I and II to the EIA Directive (Art. 3.2(a))
- Question 4 asks whether the plan, in view of its likely effect on sites, requires an assessment under Article 6 or 7 of the Habitats Directive (Art. 3.2(b)). This question has been addressed in our environmental assessment and in Section 7.4 above and the Company has concluded, with the endorsement of Natural England, that no assessment is needed.
- Question 6 seeks to determine whether the plan sets the framework for future development consent of projects (not just projects in Annexes to the EIA Directive) (Art. 3.4). The drought plan for the Cambridge region drought plan does not set the framework for future development consent, and the answer is therefore "no" to this question.

Having followed published guidance it is the Company's conclusion that a Strategic Environmental Assessment (SEA) is not required in respect of this drought plan.

² Strategic Environmental Assessment – Guidance for Water Resources Management Plans and Drought Plans (07/WR/02/5), UKWIR 2007

Figure 1.4 Decision Tree for Strategic Environmental Assessment (SEA)



2 NEP Investigations

2.1 Previous Investigations

As part of an agreed variation of its Thetford abstraction licences in 2005 the Company voluntarily surrendered part of its licence at Fowlmere, where an AMP33 environmental investigation had concluded that sustained high abstraction rates may have had a detrimental effect on the Fowlmere Watercress Beds SSSI. The Fowlmere mitigation measures also involve the continuing operation, by the Environment Agency, of its Rhee Support Scheme boreholes to support groundwater levels at the site. As a further concession at Thetford, the Company revoked its Rushford licence, recognising the environmental benefit of not developing the site for abstraction purposes. The Brettenham licence variation included the removal of certain restrictions, following the Agency's acceptance of a detailed environmental impact assessment which concluded the licence variation would have no environmental impact on designated sites.

Investigations and final reports were completed in AMP4 for the Dernford Fen, Sawston Hall Meadows and Thriplow Peat Holes SSSIs. As a result of these, it was concluded that the impact of the Company's abstraction regime on the ecology of the site, and on the flows of an adjacent chalk spring, was minimal, and the EA closed the investigations. No sustainability changes have been required because of abstraction impacts at Dernford Fen and Sawston Hall Meadows. However, as these assessments have been made based on historic abstraction regimes, Natural England have requested that we have due regard to these sites where increased abstraction within existing licences is proposed in our drought plan. The sources that may impact these SSSIs are Duxford, Hinxton Grange and Sawston. This plan does not propose to increase abstraction at these sites above the historical quantities; however, in the unlikely event this is required we will liaise with the EA and Natural England to identify the requirement for monitoring or mitigation as appropriate.

2.2 River Granta

The Company has undertaken investigations and options appraisal at this Biodiversity Action Plan (BAP) and Water Framework Directive (WFD) designated site during AMP3, AMP4 and AMP5 under the RSA programme. It was concluded that abstraction at Linton and Rivey Hill sources had an impact on flows at the site. A sustainability reduction of 3.5MI/d across the two licences has been confirmed by the EA as necessary to mitigate the impact of abstraction, and this is included in our WRMP19, as a reduction to DO. This has been implemented by a Hands Off Flow condition (HOF) on both licences, whereby abstraction is progressively reduced as gauged flows in the Granta reduce effective from April 2020. It is expected that these conditions would be in force early in a drought sequence, and consequently reduced outputs will be available from these sources. However, the reduction in supply will be offset by demand management and the use of licenced headroom elsewhere.

2.3 Nine Wells Local Nature Reserve (LNR) & Hobson's Brook

Investigations were undertaken at Nine Wells during AMP4 which concluded that Babraham PS has an impact on spring flows at the Nine Wells site, which can be susceptible to dry conditions. This impact has been quantified as a reduction in gauged flow rate at the springs that equates to 1.92MI/d. For the completion of the NEP scheme and implementation a licence condition and flow augmentation has been put in place, effective from April 2020, and is included as a reduction to DO in the WRMP19. Hobson's Brook is a WFD water body fed by the springs at Nine Wells, and the implementation solution for Nine Wells is expected to meet any flow deficits in Hobson's Brook.

2.4 Cherry Hinton Brook

The NEP requirement for Cherry Hinton Brook in AMP6, was for an options appraisal; however, as there was limited flow and ecological information for the water body, the Company undertook to do further investigations to gather data. This was following a walk over survey that indicated multiple pressures other than abstraction in the reaches above the WFD monitoring point. Investigations were undertaken over a 12 month period and have concluded that abstraction does not impact on flows in the upper reaches. The conclusions of further detailed modelling work indicated a small impact from Fleam Dyke at fully licenced quantities around the headwaters of the brook, and an indicative sustainability change has been included in WRMP19 for implementation in 2024.

³ Note – the term 'AMP' refers to a water industry regulatory 5 year planning period: hence, AMP3 refers to the period 2000/01 to 2004/05; AMP4 refers to the period 2005/06 to 2009/10; and AMP5 covers the period 2010/11 to 2014/15.

3 Drought Monitoring Plan

3.1 Overview

It is a requirement of the Water Industry Act 1991 for water companies to monitor the effect of drought and of the measures taken under the drought plan. In addition, the Environment Agency Drought Plan Guidelines require an Environmental Monitoring Plan to monitor the impacts of drought actions and recovery following a drought.

This section outlines the monitoring in place and undertaken by both the Environment Agency and the Company to understand the effects of drought and the actions taken during a drought. It is the responsibility of the Company to undertake any additional monitoring to understand the effects on the environment of any of the drought actions that we implement. The review of environmental monitoring, and preparation for monitoring in a drought, along with and the implementation of enhanced monitoring programmes, are associated with drought actions triggered in a drought sequence.

3.2 Baseline Monitoring

As a drought progresses, and prior to any formal drought measures being instigated by the Company, normal communications with the Environment Agency and Natural England will be escalated, as outlined in the Communications Plan. We will provide the Environment Agency with a detailed weekly and monthly update of our water resources situation, via email communications and monthly meetings. Any operational concerns (such as high outage levels) which may impact on resource availability will be highlighted in the updates, in addition to the impacts of the drought itself. This will also include reporting on drought triggers, customer demands, any PR campaigns that are being formulated and any other pertinent data or information.

3.3 Meteorological and Hydrometric Monitoring

Regular monitoring of rainfall against a historic long term record is undertaken by the Company, which provides an indication of cumulative rainfall through the year. In addition to this we receive monthly weekly data for soil moisture deficit (SMD), and effective rainfall over the catchment area from the Met Office. This, in combination with groundwater monitoring provides a good indication of the likelihood of impending drought conditions. Rest water levels (RWLs) are recorded at 6 key drought monitoring sites monthly, and at all other sites where it is operationally practicable to do so – this accounts for 80% of our sources. The telemetry system provides daily pumping water levels at all sites, and the long-term trends across all sites are monitored on a monthly basis.

The Environment Agency maintains a network of hydrometric and environmental monitoring for the purposes of protection and improvement of the water environment. This information is made available to water companies on request. This includes essential hydrology and ecological data of baseline conditions which the Company will require for much of its drought monitoring, and impact assessments. The EA has identified key sites for drought monitoring, included in the EA Drought Plan for the Anglian region, for which we would expect to share data in the event of a drought. Baseline data on the monthly water situation for the region is made available by the EA by means of a monthly report which also provides an outlook of conditions versus the long-term average.

The Company also receives daily telemetry data from gauges at Nine Wells Springs, and the EA Babraham gauge for the River Granta, which have been identified as key monitoring points with specific flow requirements relating to Company abstractions. These are maintained and operated by the Company and the Environment Agency respectively.

3.4 Ecological Monitoring

The Environment Agency hold the most comprehensive monitoring network, including historical data for flow and ecology, at WFD assessment points and for designated sites which have been investigated for the RSA programme. We would use this baseline data as far as possible to inform our impact assessments for drought options. A number of exceptions where we have already begun additional monitoring to inform NEP or WFD schemes are;

- Tributary of River Granta (Bartlow) to monitor the flow and ecological impact of Horseheath PS
- River Sapiston, and Little Ouse, flow and ecological monitoring to support the environmental assessment for licence renewal of Euston and Brettenham sources
- Cherry Hinton Brook, flow and ecological monitoring during 2016 to support NEP Options Appraisal

We have prepared comprehensive Environmental Monitoring Plans that set out the pre drought, in drought and post drought monitoring that we would undertake to complement any existing EA monitoring and our own on-going monitoring programme, for those included above, and any other waterbodies identified in our Environmental impact screening. These are detailed in Section 5.

3.5 Enhanced Monitoring Plan

When a drought sequence appears imminent, as indicated by regular monitoring, and in addition throughout a drought, the frequency of regular monitoring will be increased. Rest Levels at indicator sites will where practicable be assessed on a weekly basis as part of the regular drought management meetings, and sites vulnerable to water levels will be managed so that their deepest advisable pumping water level (DAPWL) is not exceeded. Pumping programmes and drought action timings will be adjusted according to the vulnerability of sources. We would begin to obtain MORECS data from the MET office on a weekly basis as the situation worsens and utilise MET office forecasts and regular EA updates to determine likely longer term drought scenarios as part of our drought management preparation.

The start of a drought sequence will prompt a data request to collate updated available flow and ecological data from the EA monitoring points to assess the impact of any drought options implemented. As our drought management plans progress and actions are implemented, further monitoring requirements will be assessed and undertaken in conjunction with the EA to assess any impact of the drought options. Specific OBH monitoring data will also be requested from the EA to supplement the use of our own drought trigger levels.

The occurrence of a drought would trigger the resumption of data collection for sites investigated previously for the RSA (Restoring Sustainable Abstraction) programme. This would utilise existing monitoring boreholes and gauges and would be agreed in advance with the EA and Natural England. In particular, the following measures would be considered at these sites previously investigated, this monitoring would be complemented by the monitoring proposed in our Environmental Monitoring detailed in Section 5.

- Sawston Hall Meadows – log groundwater levels on and around the SSSI – (OBHs now operated by the EA)
- River Granta – log groundwater levels around the site, and log river flows at additional gauging stations or locations upstream in the catchment
- Dernford Fen – log groundwater levels on and around the SSSI
- Thriplow Meadows – log groundwater levels at existing EA boreholes
- Nine Wells – log flows downstream of gauge, and EA OBH

3.6 Increasing Abstraction Within Existing Licence Quantities

The Company's deployable output figure, as presented in our WRMP19 is derived from our licenced abstraction rights, with reductions applied for WFD no deterioration risk. The licenced headroom forms the basis of our supply options, and would be required only in a severe drought, and for a limited time only, is therefore exempt under WFD No deterioration as any deterioration that might occur would be temporary and due only to changes in the groundwater balance element. This supply option would only be considered once all other demand management and non-abstraction supply side options had been exhausted. These licences are issued and regulated by the Environment Agency, and could be revoked where there is serious environmental damage, therefore our monitoring programme will be applied to ensure that this is not the case, and impact is temporary and appropriate mitigation is in place.

The current status for the Cam Ely Ouse catchment, in which our licenced abstractions are located, is defined by the Environment Agency CAMS licencing strategy⁴ as over licensed and over abstracted. This is on the basis that the groundwater balance indicates more water has been abstracted historically than is available. Hence, no further new licenced groundwater abstractions (consumptive) would be granted. The assessment is made on water resources available at low flows, typical of dry conditions. Environmental impacts are assessed at groundwater dependent designated sites, and by WFD compliance for surface water bodies where the groundwater abstractions may also impact. Any increases in overall abstraction could potentially lead to some temporary damage to the environment, and impact on River Basin Management Plan objectives.

The Sustainable Catchments programme has screened the likely impact of all abstractions on designated sites, WFD status and the likely risk of Deterioration to WFD status under a fully licenced scenario – under which all granted licences in the catchment are being used at full quantities. Using this assessment we have reviewed the likely sources where we may expect to require a greater volume than historically abstracted, and the sensitivity of environmental features to any increase. The results of our assessment are included in Table 3.1, and summarised in table 3.2 are those abstraction licences where the risk is sufficient to require some enhanced monitoring to determine the impact of increased abstraction.

Amongst other sources, we would make best endeavours not to increase abstractions at Sawston, Duxford Airfield or Hinxton Grange above historical levels as there is a minor remaining risk of impact from these abstractions to designated sites. This was an issue of concern raised by of Natural England and the Environment Agency in the pre consultation on this plan. We do not expect to increase the annual average abstraction at Great Wilbraham as the EA also have commented that this may impact another, non-designated site. The source may however be required to abstract at peak daily volumes during periods of high demand during a drought sequence. Similarly, the EA have commented on the increased use of Fleam Dyke licenced quantities, which is likely in a drought sequence, however the increase in volumes is relatively minor, and we will monitor the effect of this on flows at the relevant site, mindful that the natural effects of drought will also have an impact.

⁴ <https://www.gov.uk/government/publications/cams-the-cam-and-ely-ouse-abstraction-licencing-strategy>

We are fully committed to the long term sustainability of water resources and minimising the impact on the environment from our actions. Droughts will however have some environmental impact that is beyond our control, and we have a duty to maintain supplies to customers. This drought management plan sets out the way in which we intend to do this, with the least environmental impact for our actions as is possible. The plan does not propose an overall or sustained long term increase in abstractions but sets out how we intend to manage the available resources licensed to use, in the most effective manner.

Table 3.1 Assessment of Environmental Risk from Increased use of licenced abstractions

| Licence | Source Name | Deployable output (M/d) | Annual Average licensed quantity (M/d) | Increase in 10 Yr daily Average | Increase to 10Yr Ave DO utilised (M/d) | Increase to 2016 Daily Average | Increase to 2016 DO utilised (M/d) | Increase in EA Assessment period | Increase to EA assessment DO utilised (M/d) | Increase to 1995 Daily Average | Increase to 1995 DO utilised (M/d) | MAX Increase to DO utilised (M/d) | |
|----------------------------|-----------------|-------------------------|--|---------------------------------|--|--------------------------------|------------------------------------|----------------------------------|---|--------------------------------|------------------------------------|-----------------------------------|--|
| 6\33\28\G\50 | Abington Park | 1.00 | 1.00 | 30% | 0.30 | 48% | 0.48 | 18% | 0.18 | 0% | 0.00 | 0.48 | |
| 6\33\28\G\7 | Babraham | 9.09 | 9.09 | 37% | 3.40 | 22% | 2.00 | 46% | 4.14 | 44% | 4.04 | 4.14 | |
| 6\33\44\G\221 | Brettenham | 11.34 | 11.34 | 47% | 5.38 | 19% | 2.19 | 63% | 7.11 | 78% | 8.86 | 8.86 | |
| 6\33\34\G\203 | Dullingham | 3.60 | 4.50 | 50% | 1.79 | 63% | 2.27 | 57% | 2.05 | 10% | 0.36 | 2.27 | |
| 6\33\30\G\191 | Duxford Grange | 3.41 | 3.41 | 6% | 0.19 | 8% | 0.28 | 6% | 0.19 | 34% | 1.16 | 1.16 | |
| 6\33\30\G\167 (&167) | Duxford | 4.56 | 4.56 | 16% | 0.73 | 32% | 1.45 | 1% | 0.02 | -1% | -0.04 | 1.45 | |
| 6\33\42\G\107 | Euston | 8.00 | 8.00 | 44% | 3.51 | 11% | 0.89 | 30% | 2.39 | 35% | 2.77 | 3.51 | |
| 6\33\30\G\26 | Fowlmere | 3.60 | 3.60 | 11% | 0.39 | 19% | 0.67 | 17% | 0.62 | 17% | 0.59 | 0.67 | |
| 6\33\30\G\192 | Gt Chishill | 1.06 | 1.15 | 6% | 0.07 | 20% | 0.21 | 0% | 0.00 | 3% | 0.04 | 0.21 | |
| 6\33\34\G\123 | Gt Wilbraham | 5.67 | 5.67 | 32% | 1.83 | 48% | 2.73 | 3% | 0.16 | 32% | 1.84 | 2.73 | |
| 6\33\30\G\169 | Heydon | 1.13 | 1.13 | -1% | -0.02 | 7% | 0.08 | 9% | 0.10 | 17% | 0.19 | 0.19 | |
| 6\33\28\G\52 | Horseheath | 2.30 | 2.30 | 91% | 2.10 | 80% | 1.85 | 83% | 1.90 | 100% | 2.30 | 2.30 | |
| 6\33\28\G\12 | Linton | 1.93 | 1.93 | 42% | 0.81 | 45% | 0.87 | 44% | 0.85 | 42% | 0.80 | 0.87 | |
| 6\33\30\G\193 | Lowerfield | 3.41 | 3.41 | 10% | 0.33 | 30% | 1.03 | 6% | 0.19 | 3% | 0.10 | 1.03 | |
| 6\33\30\G\156 | Melbourn | 7.94 | 7.94 | 31% | 2.43 | 13% | 1.00 | 35% | 2.80 | 12% | 0.93 | 2.80 | |
| 6\33\30\G\171 | Morden Grange | 1.50 | 2.27 | 25% | 0.37 | 61% | 0.91 | 7% | 0.11 | 9% | 0.14 | 0.91 | |
| 6\33\28\G\51 | Rivey | 2.20 | 2.20 | 36% | 0.78 | 23% | 0.51 | 32% | 0.71 | 22% | 0.48 | 0.78 | |
| 6\33\28\G\13 (&38) | Sawston | 1.49 | 1.49 | 30% | 0.44 | 22% | 0.32 | 22% | 0.33 | 97% | 1.44 | 1.44 | |
| 6\33\34\G\110 | Westley | 11.39 | 11.39 | 47% | 5.39 | 41% | 4.68 | 60% | 6.87 | 59% | 6.76 | 6.87 | |
| 6\33\34\G\179 | Weston Colville | 2.92 | 3.65 | 18% | 0.53 | 9% | 0.26 | 26% | 0.74 | 13% | 0.38 | 0.74 | |
| 6\33\34\G\179 | Fulbourn | 1.49 | 1.49 | 23% | 0.34 | 25% | 0.37 | 16% | 0.24 | 14% | 0.21 | 0.37 | |
| 6\33\27\G\39 | Hinxton Grange | 5.77 | 5.77 | 6% | 0.32 | 8% | 0.48 | 1% | 0.07 | 34% | 1.96 | 1.96 | |
| 6\33\34\G\24 | Fleam Dyke | 15.57 | 15.97 | 29% | 4.48 | 30% | 4.63 | 17% | 2.70 | 32% | 5.02 | 5.02 | |
| Supply side options | | | | | | | | | | | | | |
| 6\33\26\G\20 | St Ives | 1.62 | 4.72 | 100% | 1.62 | 100% | 1.62 | 100% | 1.62 | 100% | 1.62 | 1.62 | |
| 6\33\32\G\20 | Kingston | 1.00 | 1.00 | 71% | 0.71 | 100% | 1.00 | 23% | 0.23 | 8% | 0.08 | 1.00 | |
| 6\33\30\G\27 | Croydon | 1.99 | 1.99 | 57% | 1.13 | 0% | 0.00 | 34% | 0.67 | 33% | 0.66 | 1.13 | |
| 6\33\34\G\24 | Fleam Dyke 12 | 3.27 | 3.27 | included in Fleam Dyke above | | | | | | | | | |

Table 3.2. Summary of risk from use of existing licences

| Source | Potential Increase in abstraction | % increase of licence (EA assessment) | Likelihood | Impact | Monitoring |
|------------|-----------------------------------|---------------------------------------|------------|----------|--|
| Babraham | 4.2MI/d | >18% | High | Moderate | Monitor flow at Nine Wells |
| Brettenham | 7.1MI/d | >63% | Low | High | Monitor Flows in rivers Sapiston, Little Ouse, and Upper Lt Ouse |
| Euston | 2.4MI/d | >30% | High | High | Monitor Flows in rivers Sapiston, Little Ouse, and Upper Lt Ouse |
| Horseheath | 1.9MI/d | >83% | High | Moderate | River Grant flow, and Bartlow tributary flows |
| Linton | 0.85MI/d | >44% | Low | High | River Granta flows |
| Rivey | 0.70MI/d | >32% | Low | High | River Granta flows |
| Westley | 6.83MI/d | >60% | Low | Moderate | none required |
| Fleam Dyke | 2.65MI/d | >17% | High | Moderate | Flows in Cherry Hinton Brook; River Granta |

4 Mitigation Measures

All of our supply options are within existing licences, which have all been reviewed under the RSA programme for impacts on sensitive or designated sites. Some of these licences are supported by existing river support schemes. Baseline, in drought and post drought monitoring will allow assessment of any unacceptable impacts. Where these are identified, mitigation will be to withdraw the drought action.

4.1 River Flows

There are two river support schemes, and a water transfer scheme licenced and operated by the Environment Agency, described in detail in the Agency's own drought plan, which mitigate impacts on low flows, and in some cases the effects of a drought.

The first support scheme is the River Rhee Groundwater Support Scheme, which comprises eight borehole sites that are used to support eight tributaries including three SSSIs – Ashwell Springs, Fowlmere Water Cress Beds and Thriplow Meadows. Some tributaries are supported annually, others only in dry or drought conditions. The second is the Lodes Granta Groundwater Development Scheme, which is comprised of six borehole sites used for supporting ten points of discharge to the Lodes and the River Granta. This scheme is designed to mitigate the effect of licenced abstractions during dry periods. The Lodes Granta scheme mitigates the impact of our licenced abstractions at Linton, Rivey and Horseheath. It does not protect against droughts in which the watercourse would naturally dry up.

Although most of the boreholes have been operated most years, neither scheme was designed to mitigate the effects of a severe drought. The abstraction licences for these are time limited, with a review date in 2018. Discussions with the EA have confirmed that these licences have been renewed. Whilst we would expect these to be available to support flows during dry conditions, the licences may not be sufficient to fully mitigate the impacts of drought on river flows in combination with increased abstractions for water supply within existing licences. We will work closely with the EA to monitor the effectiveness of these schemes during a drought by adapting our abstractions wherever practical, to minimise any impacts.

The EA also operate the Ely Ouse to Essex Transfer Scheme (EOETS) and the Great Ouse groundwater scheme (GOGS), which transfers surface water to Essex, supplemented by GOGS to provide additional water at low flows. This is of note as the operation of the scheme ensures flows in the Thet and Little Ouse are maintained at low flows, mitigating some of the impact from the Company abstractions at Thetford on surface water bodies. Although it is primarily a water resources transfer scheme, it is likely to support flows, the effectiveness of which will be monitored during a drought.

4.2 Environmental Impacts

All of the proposed drought actions, including supply side options, fall within the existing permits for abstraction, and therefore it is not considered necessary to proposed detailed mitigation measures. Nevertheless, we have assessed and screened the potential environmental impacts as a result of changing our abstractions to inform comprehensive environmental monitoring plans. Our Environmental Monitoring Plans shown in Appendices I through N have been compiled to ensure we monitor any change as a result of our planned measures and can readily identify any areas where mitigation may need to be considered. These plans have identified any Protected Species that should be considered as part of any proposed mitigation measures.

Where drought measures or actions propose to increase abstractions within existing licences, we have undertaken an appraisal of the magnitude of risk in our Environmental Assessment in Appendix F, and propose an appropriate level of monitoring in our Environmental Monitoring Plans. The risk of Deterioration is low as any increases in abstraction are temporary measures and will be outside of the WFD RBMP assessment of deterioration of status.

4.3 Mitigation Measures

Our Environmental Monitoring Plans have identified proposed mitigation measures should the drought monitoring identify any adverse impacts as a result of implementing a drought action. These would be considered and implemented, depending on feasibility, and include, but are not limited to;

- Return to recent actual abstraction, if there is evidence of ecological distress, and/or if reduced flows are considered to be having serious detrimental environmental consequences on affected water bodies (noting that this would not have an immediate effect on stream flows).
- Translocation of protected species (flora and fauna) to aid recovery if localised effects (low flows/drying) due to abstraction occur. If species are present upstream of identified impacts then natural downstream recolonisation could be relied upon.
- Fish rescue and relocation should fish become trapped above or below river structures or other barriers to connectivity during drought action implementation.
- Habitat modification to concentrate remaining flow within the stream channel.
- Consider requirements for installation of fish refugia within the watercourses in consultation with the Environment Agency.
- Funding of appropriate reasonable measures (e.g. habitat restoration) could be considered to remedy any impacts that are observed to have occurred

Any mitigation deemed necessary through discussions with the Environment Agency and any other bodies would be undertaken by the most appropriate organisation – this may be the Environment Agency, other approved organisation or contractor appointed by the company.

4.4 Compensation

The monitoring and mitigation measures proposed and considered do not require further permits, approvals or compensation to third parties, until such time as a mitigation requirement is deemed to be necessary as a result of monitoring, and agreed as appropriate.

5 Environmental monitoring Plans

Our detailed environmental monitoring plans have been produced by a specialist independent consultant, for the waterbodies as described earlier in this appendix. These are available as sub sections to this appendix as follows and are available on request.

- Appendix E.1 – Bottisham Lode Monitoring Plan
- Appendix E.2 – Cherry Hinton Brook Monitoring Plan
- Appendix E.3 – Hobsons Brook Monitoring Plan
- Appendix E.4 Little Ouse, River Thet and Sapiston River Monitoring Plan
- Appendix E.5 – Millbridge Common Brook Monitoring Plan
- Appendix E.6 river Granta Monitoring Plan