
Final report

Water cycle evidence for Shropshire Local Plan

Prepared for
Shropshire Council

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Introduction

1.1 Shropshire local plan context

Following several stages of production and consultation, the Core Strategy was submitted to the Secretary of State in July 2010. It was subsequently subject to an Examination in Public (EiP) by the Planning Inspectorate, including a two week formal public hearing session in November 2011. The adopted Core Strategy incorporates the binding recommendations set out in the Planning Inspector's report and accompanying appendices. Shropshire Council formally adopted the Core Strategy Development Plan Document¹ (DPD) on 24 February 2011.

The Core Strategy sets out the strategic planning policy for Shropshire, including a 'spatial' vision and objectives. It also sets out a development strategy identifying the level of development expected to take place in Shropshire (excluding the Borough of Telford and Wrekin) up until 2026.

Following the adoption of the Core Strategy, Shropshire Council has worked with partners and the local community to prepare the Site Allocations and Management of Development (SAMDev) Plan DPD² which will be submitted to the Planning Inspectorate at the end of July 2014, in readiness for independent examination and subsequent adoption by Shropshire Council

The SAMDev Plan sets out proposals for the use of land and policies to guide future development in order to help deliver the vision and objectives of the Core Strategy for the period to 2026. As such, the SAMDev Plan sets out:

- sustainable growth targets for Shropshire's market towns;
- community hubs and community clusters in the rural area where some further development will be permitted, and;
- appropriate sites for future housing and employment
- development management policies which will be used in the consideration of planning applications.

1.2 Previous water cycle study

A water cycle study was prepared by Halcrow Group Limited for Shropshire Council's Core Strategy in 2010³. Whilst the outcome of this original study has helped to inform preparation of the SAMDev Plan, it is recognised that a number of the housing targets assessed in the 2010 water cycle study have changed as part of the SAMDev consultation process. Whilst the Core Strategy sets out the strategic vision and objectives for future development, it is the SAMDev Plan which sets out proposals for the use of land and policies to guide future development, including housing guidelines and site allocations. Shropshire Council commissioned Halcrow to update the water cycle evidence, thereby providing an addendum to the original Water Cycle Study to take account of the SAMDev process. This report provides the outputs of that update and should be read alongside the original study, thereby providing the most up to date water cycle evidence.

1.3 Scope of this study

New housing can have a number of impacts on the water cycle:

1. New housing generates additional demand for water supply. The impact can be mitigated by ensuring housing is built with water demand management in mind, i.e. providing water efficient fixtures such as low flush toilets and sustainable design features such as rainwater harvesting.

¹ <http://www.shropshire.gov.uk/planningpolicy.nsf/open/BA2DFED09485194980257922004CC90D>

² <http://www.shropshire.gov.uk/planningpolicy.nsf/open/9F75B1E4E30A1E3B80257922004CC8EE>

³ <https://www.shropshire.gov.uk/media/161806/shropshire-outline-water-cycle-study-report.pdf>

However, new homes will always generate some additional demand for water supply, even if built to the highest sustainability and water efficiency standards.

2. New housing creates additional wastewater. This additional wastewater needs to be conveyed by the local wastewater network, which is normally owned and / or operated by the water company. If there is not enough capacity within this network, it can cause problems with sewer flooding and with environmental quality. The additional wastewater then needs to be treated at the local wastewater treatment works, which is normally owned and operated by the same water company. Additional flow being treated can lead to a deterioration in water quality in the river that the treatment works discharges to unless the standard to which the sewage is treated is increased. In addition, there might be insufficient capacity within the existing wastewater treatment works to cope with the additional flow. Both of these issues can require hard engineering solutions, which can prove expensive in terms of both money and time. It is essential that any improvements needed are economically viable, technically feasible, and can in principle be funded and delivered in advance of housing being occupied.
3. New housing on previously undeveloped land creates additional surface water runoff. Unless managed properly, this additional surface water runoff can create a risk of flooding to a new development, and can also increase the risk of flooding to existing housing in the same catchment. It is now a policy requirement to manage any additional surface water runoff from a development on site using Sustainable Drainage Systems.

This study does not look at flood risk⁴ and surface water management or water resources and supply, as detailed policies on both have already been adopted as part of the Core Strategy DPD following the recommendations of the original Water Cycle Study. Core Strategy Policy CS18 (Sustainable Water Management) sets a water efficiency requirement for new development of 105l/h/d to protect Shropshire's water resources. The policy also sets out detailed requirements to manage flood risk and surface water drainage, in accordance with the National Planning Policy Framework. Evidence of flood risk has informed the site selection process for the SAMDev Plan and will form the basis of future guidance for developers in the form of a SuDS Handbook, developed as part of the Local Flood Risk Management Strategy and in accordance with the Flood and Water Management Act 2010.

This study therefore focuses solely on assessing the impact of development on wastewater. This report takes account of the SAMDev process and forms an addendum to the original Water Cycle Study. Together, the original Water Cycle Study and this report provide the most up to date water cycle evidence.

1.4 Study partners

Shropshire Council and Halcrow have actively engaged with the following organisations in the preparation of this report; Environment Agency, Severn Trent Water, Welsh Water and United Utilities.

1.4.1 Water companies

Figure 1-1 below shows the areal coverage of the UK water companies.

Dwr Cymru Welsh Water: Dwr Cymru is the regulated company that provides water supply and sewerage services to over three million people living and working in Wales and some adjoining areas of England. With respect to Shropshire, Welsh Water provides service to the northern part of Shropshire.

Severn Trent Water: Severn Trent Water is the regulated company that provides water supply and sewerage services to over three million people living and working in the Midland and some adjoining areas of Wales. With respect to Shropshire, Severn Trent Water provides service to the Southern part of Shropshire.

⁴ An updated Level 1 Strategic Flood Risk Assessment has been prepared to provide additional evidence for flood risk

United Utilities – United Utilities is the regulated company that provides water and sewage services to around seven million people in North West England. With respect to Shropshire, United Utilities provides service to the Market Drayton Area.



Figure 1-1 Water Company responsibilities

1.4.2 Environmental regulator

The Environment Agency – The Environment Agency is the water quality regulator for wastewater treatment works. The methodologies used in this report have been discussed and agreed with the Environment Agency and are suitable for the assessment of wastewater and environmental capacity at a strategic level, to inform Shropshire’s Local Plan. However, should a water company be at risk of breaching its Environmental permit as a result of development, it is the responsibility of the water company to contact the Environment Agency to secure a variation to its permit. The Environment Agency will apply the policies and procedures in place at that point in time when determining any permit condition, therefore any permits referred to in this report should be considered indicative.

Wastewater treatment and water quality

2.1 Wastewater treatment works capacity assessment

2.1.1 Methodology

The information used in this assessment has been provided by the relevant water companies in response to a data request issued by the Client, Shropshire Council. No additional independent assessment of WwTW capacity has been undertaken as part of this report. Development figures and locations were supplied to the water companies and their responses regarding hydraulic capacity were used to prepare the results table below. A simple Red, Amber, Green coding has been applied to highlight potential capacity issues. The development data used for this assessment has been provided by Shropshire Council in accordance with their SAMDev Plan and is up to date at the time of writing (March 2014).

The allocation of development to WwTW has been undertaken using GIS mapping of development locations against WwTW catchment areas as supplied by the water companies. Development sites were assigned to WwTWs if they were situated within a drainage catchment. The results have been reviewed by the water companies and any known exceptions reallocated to the appropriate WwTW. It should be noted that a degree of uncertainty remains over some of the allocations and can only be determined through the Development Planning process at the point of a planning application when drainage connections are known.

We have excluded non-strategic settlements and sites from further assessment at this stage on the understanding from the water companies that the proposed development in these cases is small enough to be accommodated with negligible impact on the water companies' established investment planning cycles.

We have also excluded sites which cannot be properly accounted for due to lack of data, either because it is unclear whether the developments would drain to a WwTW catchment without a disproportionate level of investigation by the water company, or because the development is spread over several locations and cannot be assigned to WwTW without more detail regarding the number of homes in each location. This will be finally determined through the Development Management process. We have also prioritised development on more strategic sites, given the strategic nature of the SAMDev Plan and because small growth will have less of a material impact on wastewater or treatment capacity. A table showing the allocation of development sites to treatments works is provided in Appendix A.

Severn Trent Water provided comments on the sites it considered to be strategic and also provided the following statement:

“This study has been prepared following close partnership working with Shropshire Council, as the Local Planning Authority, the water companies (Severn Trent Water, United Utilities and Welsh Water) and the Environment Agency. Whilst all the proposed development settlements and site allocations identified within the SAMDev Plan have been reviewed as part of the study, a detailed assessment of the impacts on existing wastewater infrastructure is focused on the strategic settlements and sites. This is because the strategic development areas are perceived to have the greatest level of development certainty and are likely to have the greatest impact on the wastewater infrastructure, therefore requiring appropriate planning. A review of the smaller development settlements indicated that a detailed assessment was not required at this time, since it is believed that the scale of development proposed within these locations can be accommodated as part of the water companies' established investment planning cycles. These investment planning cycles form part of the general duty placed upon the water companies, whereby there is an obligation to provide such additional capacity as may be required to treat additional flows and loads arising from new domestic development.”

United Utilities provided the following statement:

- “We are unable to assess the individual and cumulative impact of these sites on our infrastructure at present as we would need to understand the proposed connection points and discharge rates of each individual site;
- We would be happy to work with the Council in order to develop a drainage Masterplan for Market Drayton. This would involve identifying the most sustainable drainage solution for all of the proposed developments within the settlement; and
- Based on the current data, it is likely that the following proposed development sites would discharge foul flows into our network.
 - Land between Croft Way and Greenfields Lane;
 - Land off Rush Lane Market Drayton; and
 - Sych Farm.

The remaining additional sites are outside our operational area. Please note:

- The wastewater treatment works [WwTW] serving the Market Drayton settlement is outside our operational area and therefore we cannot comment on the impacts of development on the WwTW or its receiving watercourse/s; and
- Land at Newcastle Road is outside our operational area but is located within a Groundwater Protection Zone 1, therefore liaison will be required with the Environmental Agency.”

2.1.2 Results of WwTW capacity assessment

Table 1 Results of the capacity assessment at each development location and the corresponding WwTW

Development locations	Water company	WwTW name	Final assessment of hydraulic capacity
Albrighton	Severn Trent Water	Albrighton	There is hydraulic capacity. Although a new discharge permit is not required to serve growth additional treatment capacity may be required. This can be provided to deal with future growth demand if required.
Baschurch	Severn Trent Water	Baschurch	No current capacity, but given sufficient notice no problems are envisaged with providing further capacity.
Bishops Castle	Severn Trent Water	Bishops Castle	There is hydraulic capacity.
Bridgnorth	Severn Trent Water	Bridgnorth - Slads	There is hydraulic capacity.
Church Stretton	Severn Trent Water	Church Stretton	There is hydraulic capacity.
Cleobury Mortimer	Severn Trent Water	Cleobury Mortimer	There is hydraulic capacity.
Clun	Severn Trent Water	Clun	No comment provided.
Broseley	Severn Trent Water	Coalport	There is hydraulic capacity.
Craven Arms	Severn Trent Water	Craven Arms	There is hydraulic capacity.
Dorrington	Severn Trent Water	Dorrington	There is hydraulic capacity.
Gobowen, Whittington	Severn Trent Water	Drenewydd-Oswestry	There is hydraulic capacity.
Ellesmere	Severn Trent Water	Ellesmere - Wharf Meadow	There is hydraulic capacity. Although a new discharge permit is not required to serve growth additional treatment capacity may be required. This can be provided to deal with future growth demand if required.

Development locations	Water company	WwTW name	Final assessment of hydraulic capacity
St. Martins	Welsh Water	Five Fords (Wrexham)	There is hydraulic capacity.
Highley	Severn Trent Water	Highley	There is hydraulic capacity.
Ludlow	Severn Trent Water	Ludlow	No current capacity, but given sufficient notice no problems are envisaged with providing further capacity.
Market Drayton	Severn Trent Water	Market Drayton	There is hydraulic capacity.
Oswestry, Gobowen, Whittington	Severn Trent Water	Mile-Oak Oswestry	No current capacity, but given sufficient notice no problems are envisaged with providing further capacity.
Minsterley/Pontesbury	Severn Trent Water	Minsterley	No current capacity, but given sufficient notice no problems are envisaged with providing further capacity.
Minsterley/Pontesbury	Severn Trent Water	Pontesbury	There is hydraulic capacity.
Shrewsbury, Bayston Hill	Severn Trent Water	Monkmoor Shrewsbury	There is hydraulic capacity.
Much Wenlock	Severn Trent Water	Much Wenlock	There is hydraulic capacity.
Prees	Severn Trent Water	Prees - Higher Heath	There is hydraulic capacity.
Shawbury	Severn Trent Water	Shawbury	There is hydraulic capacity.
Shifnal	Severn Trent Water	Shifnal	There is hydraulic capacity.
Wem	Severn Trent Water	Wem - Aston Road	No current capacity, but given sufficient notice no problems are envisaged with providing further capacity.
Whitchurch	Severn Trent Water/ Welsh Water	Whitchurch	STW: There is hydraulic capacity in current investment period - may require investment in 2020-2025 plan. WW: Improvements will be required which would need to be funded through our Asset Management Plan or potentially earlier through developer contributions. Hydraulic modelling will be required for some of the larger development sites. No investment likely to be needed in AMP6 (2015-2020) to serve forecast growth; sufficient lead-in time to plan AMP7 investment (2020-2025)
Woore	Severn Trent Water	Woore	There is hydraulic capacity
Bucknell	Severn Trent Water	Bucknell	There is hydraulic capacity.
Cheswardine	Severn Trent Water	Cheswardine	No current capacity, but given sufficient notice no problems are envisaged with providing further capacity.
Cockshutt	Severn Trent Water	Baschurch	No current capacity, but given sufficient notice no problems are envisaged with providing further capacity.
Dudleston Heath / Elson	Severn Trent Water	Dudleston Heath	There is hydraulic capacity.
Hanwood and	Severn Trent Water	Monkmoor	There is hydraulic capacity.

Development locations	Water company	WwTW name	Final assessment of hydraulic capacity
Hanwood Bank			
Kinlet	Severn Trent Water		There is no public sewer system in Kinlet. Any development will need to be served by private sewer network and a package treatment plant.*
Kinnerley	Severn Trent Water	Kinnerley	There is hydraulic capacity.
Montford Bridge West	Severn Trent Water	Montford Bridge	No current capacity, but given sufficient notice no problems are envisaged with providing further capacity.
Nesscliffe	Severn Trent Water	Wilcot	There is hydraulic capacity.
Tilstock (50), Ash Magna/Ash Parva (15), Prees Heath (10), Ightfield and Calverhall (15)	Severn Trent Water	Golfhouse Lane, Prees (Tilstock)	There is hydraulic capacity.
Selattyn	Welsh water / Severn Trent Water	Five Fords and Drenewydd	No known capacity issues
Stoke Heath	Severn Trent Water	Stoke Heath	There is hydraulic capacity.
Worthen	Severn Trent Water	Worthen	There is hydraulic capacity.
Other sites draining to Five Fords - Weston Rhyn	Welsh Water	Five Fords	There is hydraulic capacity.
Welshampton	Welsh Water	Welshampton	No capacity at the works. Consideration should be given to the use of non-mains sewerage incorporating septic tanks in any new development, in accordance with 'Welsh Office Circular 10/99 Planning Requirement in respect of Non-Mains Sewerage'.*

* At Kinlet and Welshampton new development may need to be served by non-mains sewerage, including private sewers, septic tanks, and/or package treatment plants. In addition, there will be other rural locations across Shropshire where there is no existing public sewer system, and hence any development will need to be drained in a similar way. In such cases the relevant water company will determine the best technical, environmental and economic mechanism to drain foul sewerage from development. Consideration will be given to first time sewerage schemes if there is an environmental and economic case for such an approach.

2.2 Water quality assessment

2.2.1 Methodology

Development can adversely affect water quality in two principal ways:

- increases in final effluent load from WwTW which causes a deterioration of water quality, and;
- increases in intermittent discharges from combined sewer overflows (CSOs), pumping stations, and storm tanks at WwTW.

This water quality assessment looks at the first of these. The latter point has been addressed by the water companies within their wastewater network capacity assessment (CSO overflows could be increased by network incapacity).

The future expansion potential of a wastewater treatment works with respect to water quality is determined by assessing the environmental permit, set by the Environment Agency. This permit is based on the ecological sensitivity of the receiving watercourse and specifies a maximum flow and an effluent quality that the WwTW has to achieve to meet water quality targets without causing environmental damage.

As the population connected to a WwTW increases, the amount of treated wastewater (or effluent) being discharged to the receiving water generally increases in proportion to the population increase. When this increase in population causes the WwTW to exceed the permitted maximum discharge volume allowed by the Environment Agency, a new or revised consent will be required and upgrades might be needed to the WwTW to improve the standard of treatment and ensure river quality does not deteriorate as a result.

To understand the environmental impact of growth we have assumed the number of additional homes likely to be connected to each WwTW based on the SAMDev proposals (see section 2.1.1 for more details on allocation of development to WwTW)⁵, and assessed each works to identify whether:

- a new permit would be required due to forecast flows being in breach of the WwTW permitted flows;
- a new permit may be required to prevent water quality deterioration, and;
- the scale of development will make it technically impossible to achieve good Water Framework Directive status in the future.

The data for the assessment was obtained from the following sources:

- DWF from WwTW – water company
- Current sewage effluent quality – water company / Environment Agency
- Consented DWF – water company
- Consented quality – water company
- River flow – Environment Agency / Natural Resources Wales

We have carried out a water quality impact assessment using the following sequential process. The results are presented as a Red, Amber, Green assessment using the criteria described under each step.

A. Permitted capacity – will a new permit be required due to forecast flows being in breach of the WwTW permitted flows?

Table 2 RAG assessment description for the permitted capacity assessment

Permitted capacity	Forecast growth will exceed permitted DWF	Rationale
Amber	Y	Forecast development might lead to the WwTW exceeding its flow consent, although other catchment measures such as infiltration reduction and sustainable surface water management could offset the increase.
Green	N	Forecast development is within the permitted capacity at the WwTW, therefore a new consent will not be required for growth to occur.

⁵ Where there was uncertainty about where a major site drained to we have assumed a proportional split between the nearest treatment works

B. No deterioration assessment – will a new consent be required to prevent forecast flows causing a deterioration in water quality?

Where there is capacity for the housing forecasts within an existing permitted consent, no further assessment has been undertaken. Where we identified a risk that consented capacity might be breached, we have calculated what effluent quality will be needed for the future forecast dry weather flow to maintain the same load of pollutants in the effluent discharge ('load standstill'). This is based on the consented flow and discharge from the WwTW.

There is a risk that undertaking load standstill on consented DWF and discharge could result in a deterioration of current water quality because water companies operate WwTW at lower flows and tighter discharge than their consent to ensure there is some headroom. Therefore, current downstream water quality may be better than planned downstream water quality. However, the Environment Agency has confirmed that as part of PR14 they carried out no deterioration assessments to determine if the use of available consented DWF would cause a deterioration in WFD classification. The results showed that for all WwTW apart from Ellesemere Wharf Meadow there would be no deterioration in WFD classification by using the available consented DWF. There may be an AMP6 scheme to address this under the National Environment Programme. For all other works we can be confident that our load standstill calculations will prevent deterioration of WFD classification.

Table 3 RAG assessment description for the no deterioration (load standstill) assessment

No deterioration assessment	Rationale
Red	A consent tighter than that which can be achieved with current wastewater treatment technology* might be required to prevent any increase in pollutant load in the effluent discharge. Where this is the case a RQP assessment has been carried out
Green	A new permit, but one which can be achieved with current technology, might be required to ensure that the pollutant load in the effluent discharge does not increase.

*The limits of current technology have been assumed (based on EA advice) as:

- 5mg/l as a 95%ile Biochemical Oxygen Demand
- 1mg/l as a 95%ile Ammonia
- 0.5mg/l as an annual average Total Phosphate⁶

C. WFD good status assessment – will the scale of development make it technically impossible to achieve good status in the future?

A detailed modelling assessment (river quality planning assessment) takes account of parameters in the receiving watercourse as well as the discharge from the treatment works. Therefore, the RQP assessment supercedes the load standstill. If a load standstill is identified as being 'red', but the RQP indicates it is 'amber' or 'green' then the RQP result should be used in preference.

This type of assessment has been carried out for WwTW where future dry weather flow (including forecast development) is predicted to exceed the current permit **and** either:

- the growth leads to a greater than 10% increase in dry weather flow; or
- an RQP assessment was undertaken in the previous WCS (assuming the necessary data is available)

This assessment was undertaken using the data specified above provided by the water companies, the Environment Agency and Natural Resources Wales. In-river water quality was assumed to be at the mid-point of WFD good status. As a result, the assessment considers whether the development will prevent achievement of good status. Where good status would require a consent below that attainable using the

⁶ Value derived from <http://cdn.environment-agency.gov.uk/scho0812busk-e-e.pdf>

best available technology, a further assessment was undertaken to check whether good status was attainable given the current discharge from the WwTW.

Table 4 RAG assessment description for the WFD good status assessment

WFD good status assessment	Current DWF can achieve good status	Future DWF can achieve good status	Rationale
Red	Y	N	Without growth WFD good status can be achieved within the limits of BAT. However, with forecast development the WwTW will be required to treat beyond the limits of BAT. Growth would therefore be a barrier to achieving good WFD status
Amber	N	N	It is not possible to achieve good status within the limits of BAT with or without growth; therefore growth should not be constrained by WFD targets.
Green	Y	Y	Forecast development can meet the requirements of the WFD good status within the limits of BAT

2.2.2 Results of water quality assessment

Table 5 provides a key summary of the water quality findings for the WCS update. Phosphate consent issues for the Clun catchment are described separately in Section 2.2.2.1.

SECTION 2

2.2.3 Results of water quality assessment

Table 5 Conclusions from water quality assessment

WwTW	Current DWF (m ³ /d)	Consented DWF (m ³ /d)	Forecast no. homes / employment land	Future DWF with additional development (new consent highlighted in orange)	No. homes / employment land which can be accommodated before new consent needed	Current BOD / Ammonia / Phosphate	Future BOD / Ammonia / Phosphate to ensure 'no deterioration'	Future BOD / Ammonia / Phosphate to ensure and good WFD status	Conclusions and Options
Albrighton	1036.9	1280	114 homes, 2 ha employment	1107	633 homes, 18 ha employment	15 / 5 / -	Not assessed	Not assessed	-
Baschurch	962.6	1200	240 homes	1055	618 homes, 18 ha employment	20 / 5 / -	Not assessed	Not assessed	-
Bishops Castle	344.8	546	65 homes, 2.8 ha employment	406	523 homes, 15 ha employment	15 / 5 / 1	Not assessed	Not assessed	-
Bridgnorth - Slads	2339.3	2954	300 homes, 7.1 ha employment	2547	1600 homes, 47 ha employment	30 / No data / -	Not assessed	Not assessed	-
Church Stretton	1373.7	1800	166 homes, 2 ha employment	1463	1110 homes, 32 ha employment	15 / 5 / -	Not assessed	Not assessed	-
Cleobury Mortimer	416.2	500	42 homes, 1 ha employment	445	218 homes, 6 ha employment	45 / No data / -	Not assessed	Not assessed	-
Clun	108.4	119	68 homes, 0.6 ha employment	142	27 homes, 0 ha employment	25 / 20 / -	20 / 16 / Phosphate described in Section 2.2.2.1	Current / 7 / Phosphate described in Section 2.2.2.1	New BOD and Ammonia consents can be met within the limits of BAT to ensure no deterioration and ensure good WFD status. STW will be investing in phosphate stripping at the works in AMP6 as part of the NMP actions
Coalport (Broseley)	14283.3	17700	35 homes, 2 ha employment	14323	8897 homes, 263 ha employment	25 / 10 / 1.5	Not assessed	Not assessed	-
Craven Arms	486.7	1224	375 homes, 13.5 ha employment	806	1920 homes, 56 ha employment	25 / 5 / 1	Not assessed	Not assessed	-
Dorrington	63.2	110	65 homes	88	121 homes, 3 ha employment	45 / 20 / -	Not assessed	Not assessed	-
Drenewydd-Oswestry	1063.7	2484	321 homes	1187	3698 homes, 109 ha employment	10 / 3 / -	Not assessed	Not assessed	-
Ellesmere - Wharf Meadow	596.5	1280	312 homes	716	1779 homes, 52 ha employment	25 / 7 / -	Not assessed	Not assessed	-
Five Fords (Wrexham)	23777	27720	108 homes	23818	10268 homes, 304 ha employment	50 / 16 / No consent until 2015	Not assessed	Not assessed	-
Highley	538.7	781	35 homes	552	630 homes, 18 ha employment	25 / 10 / -	Not assessed	Not assessed	-
Ludlow	3247.9	3500	344 homes, 6 ha employment	3458	656 homes, 19 ha employment	30 / 12 / 1	Not assessed	Not assessed	-

Market Drayton	2929.1	3400	618 homes, 24 ha employment	3477	1226 homes, 36 ha employment	10 / 5 / 2	9 / 4 / 2	Current / 4 / 0.5	No deterioration targets achievable within the limits of BAT. BOD and ammonia consents can be set within the limits of BAT to achieve WFD good status. To meet WFD good status will require a P consent beyond the limits of BAT with or without growth. Based on forecast growth a new consent would not be required until AMP7. STW will continue to monitor the works performance and will plan upgrades as and when required. STW has indicated the proposed consents limits to meet no deterioration can be met with current treatment processes. However, this will be confirmed as and when the consent is renewed.
Mile-Oak Oswestry	4813.6	4890	1830 homes, 45 ha employment	6100	198 homes, 5 ha employment	20 / 3 / -	16 / 2.5 / -	14 / 3 / 0.3	No deterioration targets achievable within the limits of BAT. BOD and ammonia consents can be set within the limits of BAT to achieve WFD good status. To meet WFD good status will require a P consent beyond the limits of BAT with or without growth. There are viable options to treat additional flows from growth which drains to Mile Oak: 1) transfer flows from new development to Drenewydd which has significant headroom in the consent, 2) transfer existing flows to Drenewydd, or 3) undertake an infiltration reduction programme in Oswestry.
Minsterley	393.8	625	69 homes, 1 ha employment	433	602 homes, 17 ha employment	15 / 5 / -	Not assessed	Not assessed	-
Pontesbury	343	376	69 homes, 1 ha employment	382	85 homes, 2 ha employment	25 / 10 / -	23 / 9 / -	Current / Current / 3 or 4 mg/l depending on upstream river flow assumptions	STW has indicated the proposed consents limits to meet no deterioration can be met with current treatment processes. However, this will be confirmed as and when the consent is renewed.
Monkmoor Shrewsbury	16836.4	20838	5137 homes, 43 ha employment	19366	10420 homes, 308 ha employment	25 / 10 / -	Not assessed	Not assessed	-
Much Wenlock	501.5	680	25 homes	511	464 homes, 13 ha employment	15 / 5 / -	Not assessed	Not assessed	-
Prees - Higher Heath	314.1	443	97 homes	351	335 homes, 9 ha employment	40 / 15 / -	Not assessed	Not assessed	-
Shawbury	618.7	1433	50 homes	638	2120 homes, 62 ha employment	20 / 10 / -	Not assessed	Not assessed	-
Shifnal	1407.6	2082	804 homes, 5 ha employment	1781	1756 homes, 52 ha employment	10 / 3 / -	Not assessed	Not assessed	-
Wem - Aston Road	1455.8	1570	128 homes, 4 ha employment	1557	297 homes, 8 ha employment	15 / 5 / -	Not assessed	Not assessed	-
Whitchurch	2209	2592	1389 homes, 15 ha employment	2937	997 homes, 29 ha employment	10 / 3 / 1	8 / 2.5 / 0.8	7 / 1 / 0.1	No deterioration targets achievable within the limits of BAT. BOD and ammonia consents can be set within the limits of BAT to achieve WFD good status. To meet WFD good status will require a P consent beyond the limits of BAT with or without growth.

									Depending on the pace of growth in Whitchurch a new consent may not be required until early in AMP7 (2020-2025). Welsh Water has confirmed they are already meeting the proposed 'no deterioration' limits within current technology, and therefore could meet tighter consents as and when required. Welsh Water estimate the current works can accommodate a further c.750 dwellings before investment is needed to improve treatment capacity. There are options to deliver improved treatment capacity including an additional primary tank and possibly a new humus settlement tank, or tertiary treatment to remove additional solids. For phosphate there is a secondary dosing system on site which is not currently used; therefore there is additional capacity for more stringent phosphate if and when required.
Woore	151.7	295	50 homes	171	373 homes, 11 ha employment	25 / 15 / -	Not assessed	Not assessed	-
Bucknell	197.5	280	87 homes	231	214 homes, 6 ha employment	45 / 20 / 2	Not assessed	Not assessed	-
Cheswardine	69.6	90	11 homes	74	53 homes, 1 ha employment	80 / 25 / -	Not assessed	Not assessed	-
Dudleston Heath	71.7	142	23 homes	81	183 homes, 5 ha employment	15 / 15 / -	Not assessed	Not assessed	-
Kinnerley	31.8	70	50 homes	51	99 homes, 2 ha employment	25 / 15 / -	Not assessed	Not assessed	-
Montford Bridge	49.3	32	17 homes	56	Consent currently exceeded	Descriptive	Descriptive	Descriptive	Proposed growth is small, and current descriptive consents so growth will not cause an issue at the WwTW
Wilcot (Nescliffe)	49.7	186	20 homes	57	354 homes, 10 ha employment	20 / - / -	Not assessed	Not assessed	-
Golfhouse Lane, Prees (Tilstock)	129	190	90 homes	164	158 homes, 4 ha employment	15 / 5 / -	Not assessed	Not assessed	-
Stoke upon Tern Parish**	-	-	-	29	-	50 / - / -	-	-	-
Worthen	128	206	29 homes, 0.25 ha employment	142	203 homes, 6 ha employment	15 / 5 / -	Not assessed	Not assessed	-
Welshampton	No data	No data	13 homes		0 homes, 0 ha employment	Unknown	Not assessed	Not assessed	-
Bomere Heath	166.9	240	50 homes	186	190 homes, 5 ha employment	25 / 15 / -	Not assessed	Not assessed	-
Chirbury	30.7	29	49 homes	50	Consent currently exceeded	25 / - / -	15 / - / -	No tightening of current consent	Descriptive consents for ammonia and phosphate can be maintained, no proposed investment at the works will be required
Condoover	74.2	110	22 homes	83	93 homes, 2 ha employment	40 / 20 / -	Not assessed	Not assessed	-

Ditton Priors	43	63	48 homes	61	52 homes, 1 ha employment	20 / 15 / -	Not assessed	Not assessed	-
Hinstock	111.3	165	59 homes	134	139 homes, 4 ha employment	15 / 10 / -	Not assessed	Not assessed	-
Hodnet	104.4	150	63 homes	129	118 homes, 3 ha employment	40 / - / -	Not assessed	Not assessed	-
Knockin	29.8	-	17 homes	36	-	Descriptive	Descriptive	Descriptive	Descriptive consents can be maintained, no proposed investment at the works will be required
Onibury - Church close	15.5	18	13 homes	20	6 homes, 0 ha employment	Descriptive	Descriptive	Descriptive	Descriptive consents can be maintained, no proposed investment at the works will be required

* Current consent already exceeded based on available data. Therefore future consent calculated from current consent + additional development (rather than current consent + additional development)

**There is significant uncertainty about which treatment works catchment Stoke-upon-Tern-Parish will discharge too. If it discharges to Stoke Heath WwTW, Severn Trent Water comments indicate there is capacity to take flow. However, if it discharges to either Stoke on Tern – Mayfields or Stoke on Tern Langleydale further assessment would be required.

SECTION 2

2.2.3.1 Clun catchment

The lower 4.7km of the River Clun is a Special Area of Conservation (SAC) designated for freshwater pearl mussel. A Nutrient Management Plan (NMP) has been produced by Natural England and the Environment Agency to provide a long term, whole-catchment strategic view of the types and combinations of measures that are needed to achieve the favourable condition of the River Clun SAC by 2027. The Nutrient Management Plan is the primary document to manage water quality in the catchment and ensures it meets the favourable condition targets (FCTs). Based on the NMP sewage treatment works in the catchment contribute 35% of total phosphate load on an annual basis. Population growth, if not managed properly, could hinder the ability to meet the FCTs for phosphate, which are:

- 0.02 mg/l as an annual average by 2019, and;
- 0.01 mg/l as an annual average by 2027.

Based on the latest SAMDev figures provided by Shropshire Council the settlements listed in Table 6 will be within the Clun catchment.

Table 6 Growth within Clun catchment

Settlement name	Drains to WwTW	Housing growth excluding completions	Employment land (ha)
Bishops Castle	Bishops Castle	65	2.8 (Business Castle Business Park)
Bucknell	Bucknell	87	0.9 (Timber Yard Station Year of B4367)
Clun	Clun	68	0.6 (windfall allowance)
Aston on Clun, Hopesay, Broome, Long Meadow End, Rowton, Round Oak, Beambridge and Horderley	Unknown, possibly Aston-on-Clun for some of these sites	14	0
Clungunford	Unknown, non mains sewerage	14	0.1 (windfall allowance)
Lydbury North	Lydbury North	0	0

The NMP notes “since the current level of phosphate in the Clun SAC is considerably higher than the favourable condition targets, there is little or no environmental capacity within the river to accept additional phosphate without other actions for phosphate management being in place (Natural England, Pers. Comm.).” For the majority of works assessed in this WCS we have assumed that permit headroom can be utilised before a new consent can be issued. However, in the Clun catchment the Environment Agency has advised this is not the case. Therefore the water quality assessment should be based on current actual flow and quality, rather than permit flow and quality. Therefore to accommodate growth as outlined in Table 6 will require a reduction in phosphate effluent quality to offset the additional load generated from development.

The NMP has simulated the effect of population growth on effluent quality, and suggests up to an 8% increase in phosphate concentrations in the river without any mitigation measures in place (under a full licence scenario).

Using the growth figures outlined in Table 6 we have calculated the load standstill for phosphate for Bishops Castle, Bucknell and Clun, using the latest available data in the NMP and provided from water companies. At Clun phosphate discharge would need to reduce by approximately 1 mg/l. Bishops Castle

and Bucknell already have phosphate stripping in place, and should therefore be able to reduce effluent discharge as needed to offset the impact of growth.

Table 7 Load standstill calculations for WwTW in Clun catchment which have defined growth

WwTW	Current DWF (m ³ /day) (from water company)	Mean phosphate concentration mg/l (taken from NMP)	Current P load (kg/day)	Future DWF (m ³ /day)	Future mean phosphate discharge required to maintain same load mg/l
Bishops Castle	345	0.46	0.16	406	0.39
Bucknell	198	0.61*	0.12	243	0.50
Clun	108	5.23	0.59	142	4.14

* Data obtained from Severn Trent Water for this study indicated the current discharge was 0.91 mg/l. This will need to be clarified

The NMP investigated a series of options to reduce phosphate concentrations from STW, including transferring flows between catchments, phosphate stripping, and wetland treatment. The NMP also outlined an option to reduce total loads across the WwTW catchments by up to 75%, which STW have indicated may be possible during AMP6. The NMP notes *“the precise details of how this will be achieved will be determined as part of an early start Severn Trent Water investigation during AMP6 that will establish a new monitoring network across the catchment and evaluate each of the works in detail to consider the most cost-effective means of delivering this reduction.”* STW have confirmed they are proposing to upgrade the Clun WwTW in AMP6 to meet the requirements for no deterioration and contribute towards the FCTs.

The NMP also notes that there are external process which could offset some of the effects of growth, such as phosphate limits on kitchen detergents in 2015, stating that *“it has been estimated that this will reduce effluent phosphate concentrations by up to 1mg/l at STWs that do not currently have P stripping in place (Severn Trent Water, Pers. Comm.).”* There are defined options for the Clun catchment, and the next steps of the NMP will be to develop an action plan to deliver the preferred set of options.

In any case policies CS18 and MD8, and the settlement policies for the Bishops Castle (Policy S2) and Craven Arms (Policy S7) areas set out the framework for ensuring that infrastructure and environmental capacity is provided in advance of development taking place. In particular these settlement strategy policies state that *“the River Clun Special Area of Conservation (SAC) will be protected by ensuring that all development in the River Clun catchment clearly demonstrates that it will not adversely affect the integrity of the SAC. New development must incorporate measures to protect the SAC. These includes phasing development appropriately to take account of infrastructure improvements, particularly waste water infrastructure and applying the highest standards of design, in accordance with Policies CS6 and CS18 and the guidance in the Sustainable Design SPD and the Water Management SPD.”*

Wastewater networks

3.1 Wastewater network capacity assessment

3.1.1 Methodology

The information in this chapter has been provided by the relevant water companies in response to a data request issued by the Client, Shropshire Council. No independent assessment of network capacity has been undertaken as part of this report. Development figures and locations were supplied to the water companies and the statements below regarding network capacity are those provided in response. A simple Red, Amber, Green coding has been applied to highlight potential capacity issues.

3.1.2 Results of wastewater network capacity assessment

Development location	Water company	Final assessment of network capacity
Albrighton	Severn Trent Water	There is network capacity (subject to hydraulic modelling), provided surface water is dealt with sustainably.
Baschurch	Severn Trent Water	There is network capacity, provided surface water is dealt with sustainably, subject to capacity at the downstream pumping station (subject to hydraulic modelling).
Bishops Castle	Severn Trent Water	There is network capacity.
Bridgnorth	Severn Trent Water	Hydraulic modelling required.
Church Stretton	Severn Trent Water	Hydraulic modelling required and developer will have to provide sewers for some sites.
Cleobury Mortimer	Severn Trent Water	Problems with development in South West - hydraulic modelling required. Developer will have to provide sewers for sites in the north.
Clun	Severn Trent Water	No comment provided
Broseley	Severn Trent Water	There should be capacity, but the pumping station and CSO performances will need to be evaluated.
Craven Arms	Severn Trent Water	Modelling required to assess hydraulic restrictions in sewer.
Dorrington	Severn Trent Water	There is network capacity (subject to hydraulic modelling), provided surface water is dealt with sustainably.
Gobowen, Whittington		Provided surface water is dealt with sustainably and foul only flows are connected into the network, these two development sites are not envisaged to cause any capacity issues (subject to hydraulic modelling). The DS pumping station will need to be assessed for capacity as part of any planning application.
Ellesmere	Severn Trent Water	Lots of development will need to drain through small sewers before being pumped, therefore hydraulic modelling is required.
St. Martins	Severn Trent Water / Welsh Water	STW: No current capacity issues, but the amount of development means hydraulic modelling should be undertaken. WW: Several incidents of flooding recorded, current AMP includes capital improvement scheme for St Martins. Would require developers to undertake modelling to ensure development won't cause a reoccurrence of this flooding problem. Hydraulic modelling will also be required for STM029 Land

Development location	Water company	Final assessment of network capacity
		at Rhos y Lan Farm to establish whether sufficient capacity exists within the sewerage network to accommodate the new flows.
Highley	Severn Trent Water	No comment provided
Ludlow	Severn Trent Water	Modelling required to ascertain any impact on the network especially at known hydraulic issue points.
Market Drayton	Severn Trent Water	The 907 dwellings identified for Market Drayton could have an adverse impact on United Utilities PLC sewerage network, but this would be dependent on the location and flows involved, the flows from the sewerage network discharges into Severn Trent assets. United Utilities PLC believes the hubs identified for Market Drayton will not impact on United Utilities PLC infrastructure assets as it is understood that they will be covered the Severn Trent network; this can only be clarified at planning application stage when the connection points have been identified. Severn Trent Water have advised that provided surface water is dealt with sustainably and foul only flows are connected into the network, the flows from this development are not envisaged to cause any capacity issues (subject to hydraulic modelling).
Oswestry, Gobowen, Whittington	Severn Trent Water	Hydraulic modelling required due to the large size of the proposed development.
Minsterley/ Pontesbury	Severn Trent Water	Hydraulic modelling will be required to understand if additional pumping capacity is required and to assess some known flooding problems. There are also some known external flooding incidents in Pontesbury just before flows reach the treatment works that will need assessing.
Shrewsbury, Bayston Hill	Severn Trent Water	Review modelling work in light of changed development figures.
Much Wenlock	Severn Trent Water	There is a known flooding problem immediately upstream of the main outfall sewer to the WwTW. There is a combined sewer overflow on the main outfall sewer. Otherwise, there appears to be a reasonable level of hydraulic performance in the catchment. Further assessment will be needed when planning applications are received, although the scale of development would be unlikely to require significant investment.
Prees	Severn Trent Water	There is network capacity (subject to hydraulic modelling).
Shawbury	Severn Trent Water	There is network capacity (subject to hydraulic modelling), provided surface water is dealt with sustainably.
Shifnal	Severn Trent Water	There appears to be a lot of planned development to the East of Shifnal. Although on a site-by-site basis there shouldn't be any major capacity problems, the culmination of flows from all planned sites could severely affect the capacity of the system. The system is built up of fairly small diameter sewers with all planned sites primarily connecting into 150mm diameter foul sewers. It would be preferable to develop the sites South of the railway line as flows from the planned Northern sites have to pass through a pinch point where there is known external flooding. The extra

Development location	Water company	Final assessment of network capacity
		foul flows could exacerbate the current problems. It is strongly recommended that hydraulic modelling is undertaken for all planned sites in combination (rather than site-by-site) so the true extent of any impact can be ascertained. Flows will gravitate South through Shifnal to a 225mm diameter pumped rising main which pumps to the treatment works. This will have to be assessed for the extra flows to ascertain any detrimental impact.
Wem	Severn Trent Water	There is network capacity (subject to hydraulic modelling), provided surface water is dealt with sustainably.
Whitchurch	Welsh Water	<p>STW: These developments are on the very edge, and outside of Severn Trent's region. We do not have any records of sewers in this area and hence cannot comment on hydraulic capacity. It is likely that flows will drain into Welsh Water's region.</p> <p>WW: Given the size of the proposed allocation it is unlikely that sufficient capacity exists within the sewerage network to accommodate the foul flows generated, it will be necessary to carry out a hydraulic modelling assessment.</p>
Woore		<p>United Utilities PLC owns an area of the sewerage network, but this drains to a Severn Trent owned WwTW.</p> <p>Infrastructure investment may be required to support any development served by the United Utilities PLC owned sewerage network, but this can only be confirmed at planning application stage when connection points are confirmed.</p>
Bucknell	Severn Trent Water	There is network capacity (subject to hydraulic modelling).
Cheswardine	Severn Trent Water	There is network capacity (subject to hydraulic modelling).
Cockshut	Severn Trent Water	There is network capacity, provided surface water is dealt with sustainably. Hydraulic modelling should be undertaken due to distance flows must travel to reach the treatment works.
Dudleston Heath / Elson	Severn Trent Water	There is network capacity (subject to hydraulic modelling).
Hanwood and Hanwood Bank	Severn Trent Water	There is network capacity, provided surface water is dealt with sustainably. Hydraulic modelling should be undertaken due to distance flows must travel to reach the treatment works.
Kinlet	Severn Trent Water	There is no public sewer system in Kinlet. Any development will need to be served by private sewer network and a package treatment plant.
Kinnerley	Severn Trent Water	There are no records of flooding in Kinnerley. Due to the small scale of development, the impact on the sewerage infrastructure is likely to be low
Montford Bridge West	Severn Trent Water	There is network capacity, provided surface water is dealt with sustainably.
Nesscliffe	Severn Trent Water	There is network capacity (subject to hydraulic modelling).
Tilstock (50), Ash Magna/Ash Parva (15), Prees Heath (10), Ightfield and	Severn Trent Water	There is network capacity, provided surface water is dealt with sustainably and there is sufficient capacity at the pumping stations downstream of each site (subject to hydraulic modelling).

Development location	Water company	Final assessment of network capacity
Calverhall (15)		
Selattyn	Welsh Water	There are no known capacity issues
Stoke Heath	Severn Trent Water	There is network capacity (subject to hydraulic modelling), provided surface water is dealt with sustainably.
Worthen	Severn Trent Water	There is network capacity (subject to hydraulic modelling), provided surface water is dealt with sustainably.
Other sites draining to Five Fords - Weston Rhyn	Welsh Water	There are incidents of flooding downstream of this site which will need to be overcome if development is to proceed. Land south of Brookfields (Weston Rhyn) and Land at Sawmills - The site is crossed by a public sewer which will restrict development density for the site.
Welshampton	Welsh Water	There are only a few sections of DCWW asset in this area so it is not expected that the proposed growth would have an adverse impact upon our sewerage assets. No comment from STW.

Conclusions

4.1 Summary of findings

4.1.1 Wastewater treatment

Development locations have been allocated to the appropriate WwTW in accordance with best available information. Statements regarding available hydraulic capacity at these WwTW have been provided by the relevant water companies. A review of the responses supplied has highlighted ten development locations where upgrades to part or all of the WwTW may be required in order to provide adequate hydraulic capacity for proposed development. Of these, only **Welshampton WwTW is identified as a potentially limiting factor for development because there is no capacity for new development and additional capacity cannot be provided because the WwTW discharges to land**. In this case the water company has recommended that consideration should be given to the use of non-mains sewerage incorporating septic tanks in any new development, in accordance with 'Welsh Office Circular 10/99 Planning Requirement in respect of Non-Mains Sewerage'. In addition, there is one development location; **Kinlet; where there is no existing WwTW or public sewer system**. The water company has stated that any development here will need to be served by private sewer network and a package treatment plant. This could lead to development being delayed due to planning, funding and adoption issues.

There is also one WwTW; **Clun WwTW; for which no water company statement has been provided**. However, it should be noted that the Clun catchment has been assessed in detail as part of the River Clun SAC Nutrient Management Plan, which has included an assessment of the impact of proposed development and the management measures that need to be put in place. The River Clun SAC Nutrient Management Plan has informed the SAMDev Plan for those parts relating to the Clun catchment.

4.1.2 Water quality

A full assessment of water quality impact is not appropriate at this stage for many of the sites, given the scale and level of certainty of development and/or the amount of data available. A load standstill (and RQP no deterioration where necessary) assessment has been undertaken for those sites where sufficient information was available and a need was identified (see Section 2.2.1), to assess whether a new water quality consent will be required for any determinand and if so, whether the new consent will be technically feasible. The assessment has also considered consents required to meet WFD good status with and without growth to understand whether growth is a barrier to achieving good ecological status.

At all sites assessed growth can be achieved whilst ensuring that consents do not need to be tightened beyond the current limits of BAT. Equally there are no sites where growth will be a barrier to achieving good ecological status. There are 3 sites (Mile Oak), Market Drayton and Pontesbury) where good status for Phosphate cannot be met within the limits of BAT but this is irrespective of growth. Therefore water quality is not a barrier to growth in these catchments.

At all works where a new discharge consent will be required to meet forecast growth Welsh Water and Severn Trent Water have confirmed there are options available to deliver the proposed infrastructure.

4.1.3 Wastewater networks

Development locations have been allocated to the appropriate drainage networks in accordance with best available information. Statements regarding network capacity have been provided by the relevant water companies. A review of the responses supplied has highlighted 17 development locations where existing capacity may not be adequate. The water companies have stated that hydraulic modelling is required for 15 of these locations to assess the cumulative impact of development, determine whether capacity can be provided and identify any network upgrades required to prevent proposed development from having a negative impact on network performance. The two highest risk wastewater networks are Kinlet and Much Wenlock.

Kinlet has no existing public sewer system. The water company has stated that any development here will need to be served by private sewer network and a package treatment plant. This could lead to development being delayed due to planning, funding and adoption issues.

There is a **known flooding problem** immediately upstream of the main outfall sewer to the WwTW serving the **Much Wenlock** development location. In addition, incidents of flooding downstream of the location described as, "**other sites draining to Five Fords - Weston Rhyn**". Both of these would need to be resolved before development can proceed. Part of the latter site (land south of Brookfields (Weston Rhyn) and Land at Sawmills (Weston Rhyn)), as well as Land at Allport Road (Whitchurch), Land north of Mill Park (Whitchurch) and Land at mount Farm (Whitchurch), is **crossed by a public sewer which will restrict development density** for the site as a result of the easement required by the water company.

No water company statements were provided for development at Clun and Highley so sewer network capacity cannot be assessed at this time.

4.2 Conclusions

The table below summarises the key issues from the WCS. No major showstoppers have been identified through the updated WCS, although there will be some phasing requirements to address infrastructure investment at the WwTW and within the wastewater network which will be reflected in the relevant settlement policy and within the LDF Implementation Plan.

Table 8 Summary of results

WwTW	Development Locations	WwTW Hydraulic Capacity	Water Quality	Wastewater Network Capacity
Baschurch	Baschurch	No current capacity, but given sufficient notice no problems are envisaged with providing further capacity.	-	-
	Cockshutt		-	There is network capacity, provided surface water is dealt with sustainably. Hydraulic modelling should be undertaken due to distance flows must travel to reach the treatment works.
Bishops Castle	Bishops Castle	-	Growth should be considered in the context of the NMP to ensure phosphate does not deteriorate	-
Bridgnorth Slads	Bridgnorth	-	-	Hydraulic modelling required
Bucknell	Bucknell	-	Growth should be considered in the context of the NMP to ensure phosphate does not deteriorate	-
Cheswardine	Cheswardine	No current capacity, but given sufficient notice no problems are envisaged with providing further capacity.	-	-
Church Stretton	Church Stretton	-	-	Hydraulic modelling required and developer will have to provide sewers for some sites.
Cleobury Mortimer	Cleobury Mortimer	-	-	Problems with development in South West - hydraulic modelling required. Developer will have to provide sewers for sites in the north.
Clun	Clun	No comment provided	Growth should be considered in the context of the NMP to ensure phosphate does not deteriorate	-
Craven Arms	Craven Arms	-	-	Modelling required to assess hydraulic restrictions in sewer.
Drenewydd-Coswestry	Gobowen and Whittington	-	-	These two development sites are not envisaged to cause any capacity issues (subject to hydraulic modelling). The DS pumping station will need to be assessed for capacity as part of any planning application.
Ellesmere Wharf Meadow	Ellesmere	-	-	Lots of development will need to drain through small sewers before being pumped, therefore hydraulic modelling is required.
Five Fords	St Martins	-	-	STW & WW: Amount of development means hydraulic modelling should be undertaken. Hydraulic modelling will also be required for STM029 Land at Rhos y Lan Farm to establish whether sufficient capacity exists within the sewerage network to accommodate the new flows.
	Other sites draining to Five Fords	-	-	Incidents of flooding downstream of this site which will need to be addressed. Land south of Brookfields (Weston Rhyn) and Land at Sawmills - site is crossed by a public sewer which will restrict development density for the site.
Kinlet	Kinlet	There is no public sewer system in Kinlet. Any development will need to be served by private sewer network and a package treatment plant.*	-	-
Ludlow	Ludlow	No current capacity, but given sufficient notice no problems are envisaged with providing further capacity.	-	Modelling required to ascertain any impact on the network especially at known hydraulic issue points.
Market Drayton		-	No deterioration targets achievable within the limits of BAT. BOD and ammonia consents can be set within	-

			the limits of BAT to achieve WFD good status. To meet WFD good status will require a P consent beyond the limits of BAT with or without growth.	
Mile-Oak Oswestry	Oswestry, Gobowen, Whittington ⁷	No current capacity, but given sufficient notice no problems are envisaged with providing further capacity.	No deterioration targets achievable within the limits of BAT. BOD and ammonia consents can be set within the limits of BAT to achieve WFD good status. To meet WFD good status will require a P consent beyond the limits of BAT with or without growth.	Hydraulic modelling required due to the large size of the proposed development.
Minsterley	Minsterley/ Pontesbury	No current capacity, but given sufficient notice no problems are envisaged with providing further capacity.		Hydraulic modelling will be required to understand if additional pumping capacity is required and to assess some known flooding problems. There are also some known external flooding incidents in Pontesbury just before flows reach the treatment works that will need assessing.
Pontesbury		-		
Monkmoor Shresbury	Bayston Hill	-	-	Review modelling work in light of changed development figures.
Montford Bridge	Montford Bridge West	No current capacity, but given sufficient notice no problems are envisaged with providing further capacity.	-	-
Much Wenlock	Much Wenlock	-	-	Known flooding problem immediately upstream of the main outfall sewer to the WwTW. There is a CSO on the main outfall sewer. Otherwise, reasonable level of hydraulic performance. Further assessment needed when planning applications are received, although the scale of development would be unlikely to require significant investment.
Shifnal	Shifnal	-	-	Lot of planned development to the East of Shifnal. The culmination of flows from all planned sites could severely affect the capacity of the system. The system is built up of fairly small diameter sewers. Preferable to develop the sites South of the railway line as flows from the planned Northern sites have to pass through a pinch point where there is known external flooding. The extra foul flows could exacerbate the current problems. Hydraulic modelling recommended for all planned sites in combination (rather than site-by-site) so the true extent of any impact can be ascertained.
Wem	Wem - Aston Road	No current capacity, but given sufficient notice no problems are envisaged with providing further capacity.	-	-
Welshampton	Welshampton	No capacity at the works. Consideration should be given to the use of non-mains sewerage incorporating septic tanks in any new development, in accordance with 'Welsh Office Circular 10/99 Planning Requirement in respect of Non-Mains Sewerage'	-	-
Whitchurch	Whitchurch	STW: There is hydraulic capacity in current investment period - may require investment in 2020-2025 plan. WW: Improvements will be required which would need to be funded through our Asset Management Plan or potentially earlier through developer contributions.	No deterioration targets achievable within the limits of BAT. BOD and ammonia consents can be set within the limits of BAT to achieve WFD good status. To meet WFD good status will require a P consent beyond the limits of BAT with or without growth.	Given the size of the proposed allocation it is unlikely that sufficient capacity exists within the sewerage network to accommodate the foul flows generated, it will be necessary to carry out a hydraulic modelling assessment.

⁷ Gobowen and Whittington can drain to Drenewydd or Mile Oak, hence why they are listed for both works

Appendix A

This appendix shows the allocation of development sites to WwTWs. Red text means Halcrow has assigned the WwTW to the development site using GIS information. Red highlighting means there is significant uncertainty about the where the development site drains to. This uncertainty is because the study focuses on a strategic assessment to support the SAMDev Plan. Exact development locations and connections to the drainage network will therefore not be known until a planning application is submitted as part of the Development Management process.

Table 9 Allocation of WwTWs to development sites

Settlement	WwTW
Albrighton	Albrighton
Bishops Castle	Bishops Castle
Bridgnorth	Bridgnorth Slads
Broseley	Coalport
Church Stretton	Church Stretton
Cleobury Mortimer	Cleobury Mortimer
Craven Arms	Craven Arms
Ellesmere	Ellesmere Wharf Meadow
Highley	Highley
Ludlow	Ludlow
Market Drayton	Market Drayton
Pontesbury	Minsterley
Much Wenlock	Much Wenlock
Oswestry	Mile Oak
Shifnal	Shifnal
Shrewsbury	Monkmoor
Wem	Aston Road
Whitchurch	Whitchurch
Bucknell	-
Chirbury	Chirbury STW
Clun	Clun
Lydbury North	Lydbury North
Brockton	Worthen
Worthen, Brockton, Binweston, Leigh and Aston Rogers	Worthen
Brompton, Marton, Middleton, Priest Weston, Stockton and Rorrington	Chirbury STW
Clungunford (Cluster - new)	Aston on Clun STW / Clunbury STW
Clunbury (Cluster - new)	Clunbury STW
Hope, Bentlawnt and Shelve	n/a
Snailbeach, Stiperstones and Pennerley	Snailbeach and Stiperstones
Wentnor and Norbury	Not in a catchment. A long way and equi-distant from several
Ditton Priors	Ditton Priors
Neenton	n/a
Acton Round, Aston Eyre, Monkhopton, Morville and Upton Cresset	Morville STW (Upton Cressett just outside boundary)
Hopton Wafers and Doddington	Hopton Wafers
Oreton, Farlow and Hill Houses	n/a
Silvington, Bromdon and Loughton	n/a
Stottesdon, Chorley and Bagginswood	Stottesdon - Stottesdon STW, Chorley - Chorley STW, Bagginswood - just outside areas
Kinlet, Button Bridge, Button Oak	Chorley STW / Highley STW
Land at Old Station Business Park, Neen Savage business park	n/a

Aston on Clun, Hopesay, Broome, Long Meadow End, Rowton, Round Oak, Beambridge and Horderley	Aston on Clun - Aston on Clun STW, others outside area - some closest to Aston on Clun STW and others to Craven Arms STW
Bache Mill, Boulton, Broncroft, Crofton, Middlehope, Peaton, Seifton, (Great /Little) Sutton, Westhope	Bache Mill - Diddlebury the moors STW, Others outside area but could go to Seifton IPS, Munslow STW, Ticklerton STW or Diddlesbury the moors STW
Cockshutt	Baschurch
Dudleston Heath/Elson	Dudleston Heath
Dudleston and Street Dinas	n/a
Tetchill, Lee and Whitemere	Ellesmere- Val View (for Tetchill) others outside area but could be same or Ellesmere Wharf (old wharf) TPS
Welsh Frankton, Perthy, New Marton and Lower Frankton	n/a
Welshampton and Lyneal	Lyneal
Welshampton and Lyneal	Welshampton
Burford	Tenbury
Clee Hill	Coreley- Clee Hill
Onibury	Onibury Wood Yard
Onibury	Onibury Church Close
Adderley	Outside areas, closest to Norton in haes STW and Betton byeways STW
Cheswardine	Cheswardine
Childs Ercall	Childs Ercall STW
Hinstock	Hinstock
Hodnet	Hodnet
Stoke Heath	Stoke upon Tern Parish. GIS shows Stoke Heath STW
Woore	Woore
Colehurst, Tyrley, Woodseaves (Sutton Lane) Woodseaves (Sydnall Lane)	Colehurst - Stoke Heath STW, Woodseaves sutton lane - Woodseaves hillside STW, Woodseaves Sydnall Lane - Woodseaves the nook STW, Tyrley - outside areas but closest to Woodseaves hillside STW
Marchamley, Peplow, Wollerton	Marchamley
Marchamley, Peplow, Wollerton	Peplow
Marchamley, Peplow, Wollerton	Wollerton
Bletchley	Moreton Say the drumbles STW or Moreton wood bletchley rd STW
Longford	Moreton saye the drumbles STW or Market Drayton STF
Longslow	Moreton saye the drumbles STW or Market Drayton STF
Moreton Say	Moreton Saye - the drumbles STW
Buildwas	Buildwas - park view STW
Gobowen	Drenewydd
Whittington	Drenewydd
Knockin	Knockin
Llanymynech and Pant	Pant Plas Cerrig
Ruyton XI Towns	Ruyton XI Towns
St Martins	Five Fords
Kinnerley, Maesbrook, Dovaston and Knockin Heath	Kinnerley - Kinnerley STW, Maesbrook - ouside but closest to Kinnerley STW and Knockin STW, Dovaston - outside but closest to same 2, Knockin Heath - same as previous
Llanyblodwel, Porthywaen Dolgoch, Llyncllys and Bryn Melyn	Llanyblodwel - outside rea, Porthywaen - outside area, Dolgoch - outside, Llyndys - just outside Llyncllys STW, Bryn Melyn - Llyncllys STW.

Park Hall, Hindford, Babbinswood and Lower Frankton	Park Hall - Drenewydd Oswestry STW, Hindwood - just outside, Babbinswood - Drenewydd Oswestry STW, Lower Frankton - outside but closest to the same or Tetchill val view or Perthy windy ridge STW
Selattyn, Upper/Middle/ Lower Hengoed and Pant Glas	Sellattyn and Hengoed - Drenewydd Oswestry, Pant-glas - just outside
Weston Rhyn, Rhosweil, Wem and Chirk Bank	Five Fords (Weston Rhyn)
Baschurch	Baschurch
Bayston Hill	Monkmoor
Bomere Heath	Bomere Heath
Nesscliffe	Wilcot
Albrighton (Ellesmere Road)	Outside an area, multiple options at equal distance
Bicton Village (part), and Four crosses (part)	Montford Bridge
Bicton Village (part), and Four crosses (part)	Monkmoor
Dorrington, Stapleton and Condover	Dorrington
Dorrington, Stapleton and Condover	Lower Common Stapleton
Dorrington, Stapleton and Condover	Condover
Fitz, Grafton Mytton and New Banks	New Banks - Grafton STW, Grafton - Baschurch, Fitz and Mytton outside but closest to Grafton STW
Fitz, Grafton Mytton and New Banks	
Great Ness, Little Ness, Wilcott, Hopton/ Valeswood, Kinton and Felton Butler	Wilcott and Kninton - Nesscliffe, Little Ness - Baschurch STW, Others outside but close to previous 2 and Nesscliffe Bank View STW
Hanwood and Hanwood Bank	Monkmoor
Fitz, Grafton Mytton and New Banks	Monkmoor
Fitz, Grafton Mytton and New Banks	Longden Commen
Montford Bridge West	Montford Bridge
Mytton	Outside area, close to multiple
Walford Heath	Baschurch
Uffington	Monkmoor
Weston Common, Weston Wharf and Weston Lullingfields	Baschurch
Atcham Business Park	Outside treatment works area
Poultry Farm, Ford	Ford
Shawbury	Shawbury
Myddle & Harmer Hill	Baschurch
Prees and Higher Heath	Higher Heath
Tilstock (50), Ash Magna/Ash Parva (15), Prees Heath (10), Ightfield and Calverhall (15)	Golfhouse Lane, Prees (Tilstock)