



# Wirral Council Water Cycle Study

Outline Study: Main  
Planning Report

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## Acronyms & Abbreviations

Abbreviation	Description
AMP	Asset Management Plan
BGS	British Geological Society
BOD	Biochemical Oxygen Demand
CAMS	Catchment Abstraction Management Strategy
CBA	Cost Benefit Analysis
CFMP	Catchment Flood Management Plan
CSH	Code for Sustainable Homes
CLG	Communities and Local Government
CSO	Combined Sewer Overflow
CWC	Cheshire West and Chester
DEFRA	Department for Environment, Food and Rural Affairs
DO	Dissolved Oxygen
DWF	Dry Weather Flow
DWI	Drinking Water Inspectorate
EQS	Environmental Quality Standard
FEH	Flood Estimation Handbook
FFT	Flow to Full Treatment
GQA	General Quality Assessment
GWMU	Groundwater Management Unit
HA	Highways Agency
HMWB	Heavily Modified Water Body (under the Water Framework Directive)
l/h/d	Litres/head/day (a water consumption measurement)
LCC	Liverpool City Council
LDDs	Local Development Documents
LDF	Local Development Framework
LPA	Local Planning Authority
MI	Mega Litre (a million litres)
NE	Natural England
NWA	No Water Available (in relation to CAMS)
OFWAT	The Water Services Regulation Authority (formerly the Office of Water Services)
O-A	Over Abstracted (in relation to CAMS)
O-L	Over Licensed (in relation to CAMS)
P	Phosphorous
PE	Population Equivalent
PPS	Planning Policy Statement
PR	Periodic Review
PS	Pumping Station
pRamsar	Proposed Ramsar Site

Abbreviation	Description
pSPA	Proposed Special Protection Area
RBMP	River Basin Management Plan
RSS	Regional Spatial Strategy
RQO	River Quality Objective
SAC	Special Area for Conservation
SFRA	Strategic Flood Risk Assessment
SHLAA	Strategic Housing Land Availability Assessment
SPA	Special Protection Area
SPD	Supplementary Planning Document
SPZ	Source Protection Zone
SS	Suspended Solids
SSSI	Site of Special Scientific Interest
SWMP	Surface Water Management Plan
SuDS	Sustainable Drainage Systems
UKTAG	United Kingdom Technical Advisory Group (to the WFD)
UU	United Utilities PLC
UWWTD	Urban Wastewater Treatment Directive
WC	Wirral Council
WCS	Water Cycle Study
WFD	Water Framework Directive
WRMP	Water Resource Management Plan
WRMU	Water Resource Management Unit (in relation to CAMS)
WRZ	Water Resource Zone (in relation to a water company's WRMP)
WTW	Water Treatment Works
WwTW	Waste Water Treatment Works

# 1 Executive Summary

## 1.1 Introduction

- 1.1.1 Wirral Council (WC) is projecting a significant increase in housing and employment provision over the period to 2027. This growth represents a challenge to ensure that both the water environment and water services infrastructure has the capacity to sustain this level of proposed growth.
- 1.1.2 An Outline Water Cycle Study (WCS) has therefore been undertaken to identify any constraints to growth that may be imposed by the water cycle and how these can be resolved. Furthermore, it provides a strategic approach to the management and use of water which ensures that the sustainability of the water environment in the study area is not compromised.
- 1.1.3 Three potential growth scenarios covering housing and employment targets have been tested in the Outline WCS. WC was not in a position to provide a definitive list of potential development locations; hence it has been necessary to carry out the assessment of capacity at a strategic level in this Outline Study.

## 1.2 Wastewater Assessment

### ***Wastewater Treatment***

- 1.2.1 To determine whether future development in the Wirral might be constrained by capacity at the receiving waste water treatment works (WwTW), an assessment of the existing dry weather flow (DWF) was compared to the discharge consent limit. The potential increase in DWF was calculated as a result of the projected growth for both housing and employment. In the absence of WwTW specific information on actual DWF or headroom (capacity), a theoretical approach to determining DWF was taken. This involved using information on population, daily per capita sewage production, infiltration to the sewage connection and trade effluent flow.
- 1.2.2 There are four (4) WwTW in Wirral, all of which receive waste water generated from Wirral only. Birkenhead, Bromborough and North Wirral (Meols) WwTWs are operated by United Utilities PLC (UU) and Heswall WwTW is operated by Dŵr Cymru Welsh Water (DCWW). The theoretical assessment suggests that Birkenhead, Bromborough and Heswall WwTWs have capacity to accept wastewater generated by the projected growth, and the Outline WCS has shown that wastewater from growth for all three scenarios in these catchments can be accommodated within existing consent conditions. It is noted that although the capacities for Bromborough and Heswall WwTWs are not expected to be exceeded, the remaining DWF headroom in the discharge consent at these WwTW is less than 10% for some growth scenarios.
- 1.2.3 North Wirral (Meols) WwTW currently has limited capacity to accept and treat any further wastewater from growth. Projected growth in the WwTW catchment area will require an

increase in the DWF volume that the WwTW is currently consented to discharge. Therefore a solution is required to treat additional wastewater generated as a result of growth.

- 1.2.4 Calculations undertaken for each growth scenario show that North Wirral (Meols) WwTW has a theoretical solution to discharge greater volumes (DWF) than currently consented, but to a higher quality (to prevent additional loading). Hence North Wirral (Meols) WwTW can be considered at this stage to be able to accept growth from all three scenarios without having a detrimental impact on the water quality of the receiving waterbody. The results show that a solution is achievable within the limits of conventional treatment and the DWF consent limit for the WwTW is not considered to be a show-stopper to growth.
- 1.2.5 A number of actions have been considered in order to remove the capacity constraints at North Wirral (Meols) WwTW to enable it to support growth. Increasing the consented volume of the WwTW under the no-deterioration condition is considered to be the best option. The Environment Agency, UU and WC should work towards achieving this solution.

## **Sewer Network Capacity**

- 1.2.6 A high level assessment of capacity in the sewer network has been undertaken to determine whether there is likely to be sufficient capacity within the existing infrastructure to transmit additional wastewater flow generated, as a consequence of growth, to the various treatment works.
- 1.2.7 The conclusions from the assessment for the entire Borough are summarised below:
- The sewerage system is predominantly combined in Wallasey (Settlement Area 1), Birkenhead (Settlement Area 3) and the northern parts of Bromborough and Eastham (Area 4) and Hoylake and West Kirby (Settlement Area 6). With the exception of Settlement Area 8, which is largely rural, there is a significant presence of a separate system for surface water in all other areas.
  - The historical evidence of flooding shows a widespread distribution of sewer flooding, both in areas with predominantly combined systems (foul and surface water) and those with a significant proportion of a separate surface water sewer system. It is likely that limited sewer capacity is the main cause of this flooding, which highlights the need for surface water management. Hoylake and West Kirby (Settlement Area 6) has the least number of recorded sewer flooding incidents.
  - A number of pumping station, detention tanks and combined sewer overflows (CSOs) are located across the borough. This suggests that significant parts of the borough are reliant on sewage pumping and storage and suggests that there may be capacity issues within the existing sewer network system.
  - The Commercial Core (Area 2) and the Rural Area (Area 8) have the least sewer network coverage.
- 1.2.8 The study has shown that potential growth in all the urban Settlement Areas (1-7) is significant. Additional wastewater generated by the proposed development may be accommodated within the existing sewer network, however, flooding records coupled with the existence of pumping station, storage tanks and CSOs suggest that there could be constraints in the existing sewer network, which may limit growth. Modelling of the sewer network by UU may be required to determine where and when upgrades to (or provision of new) trunk sewers will be required once development locations are identified.
- 1.2.9 Proposed growth in the Commercial Core (Settlement Area 2) is very significant, yet there is limited sewer network coverage in the northern parts of the area in addition to the potential constraints due to capacity limitations of pumping stations in the area. Whilst proposed growth in the Rural Area (Area 8) is relatively small, the sewer network coverage in the area is also very sparse.
- 1.2.10 The requirement to provide wastewater network infrastructure solutions will impact upon development phasing as opposed to absolute housing numbers and should be assessed in more detail in collaboration with UU, once development locations are identified.

## 1.3 Water Supply Assessment

- 1.3.1 Future water demand following growth proposed in all three growth scenarios has been calculated for Wirral. For each housing scenario, six different water demand projections have been calculated based on different rates of water consumption for new homes that could be implemented through planning policy.

### **Available Water Resources**

- 1.3.2 The EA's assessment of water availability<sup>1</sup> suggests that the sandstone aquifer underlying most of the Wirral is at its limit of available resources without causing adverse impact on rivers and ecosystems that rely on it; hence further abstraction from this resource is unlikely in the future.
- 1.3.3 Available water resources have been assessed according to the final Water Resource Management Plan (WRMP) as published by UU in September 2009. The results show that there are adequate water resources within the Integrated Water Resource Zone (covering Wirral) to cater for growth, without having a significant impact on the environment, through the realisation of the west-east link (transfer of water), water source enhancements and a water resources and demand strategy including leakage reduction and water efficiency.
- 1.3.4 The assessment has shown that the three growth scenarios assessed in this WCS for Wirral, are likely to be fully catered for by the provision of supply as set out in UU's WRMP. In considering the growth scenarios for the borough, it is also prudent to promote higher levels of water efficiency in new homes and commercial buildings to reduce water demand and achieve sustainable water supply.

### **Water Supply Infrastructure**

- 1.3.5 UU has undertaken an assessment of the existing water supply infrastructure supplying sites identified in the Strategic Housing Land Availability Assessment (SHLAA), on behalf of WC. The majority of sites identified as part of the SHLAA and Employment Land studies are either infill or adjoining existing settlements (very little Greenfield development). It is therefore likely that a small proportion of entirely new infrastructure will be required.
- 1.3.6 The assessment indicated that some of the Settlement Areas have low resource availability associated with connectivity or pressure issues, presence of iron pipes or requiring network reinforcement. These sites are predominantly located in Settlement Area 2 (Commercial Core), particularly around Birkenhead Docks, West of Settlement Area 3 in the Tranmere area and Settlement Area 4 near the Port Sunlight and Bromborough Pool area.
- 1.3.7 The phasing of potable water supply infrastructure or upgrades could therefore be considered to be a constraint to development within Wirral, particularly in the Commercial Core (Area 2) which is located in the Wirral Growth Point Area and should be further assessed once preferred development sites are known.

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<sup>1</sup> Environment Agency, The Dee Catchment Abstraction Management Strategy, March 2008, Environment Agency, The Lower Mersey and Alt Catchment Abstraction Management Strategy, March 2008

### ***Water Neutrality***

- 1.3.8 An assessment of the likelihood of achieving water neutrality at the end of the plan period (2027) has been undertaken in the Outline WCS.
- 1.3.9 The assessment combined potential future water demand projections based on different water use levels for new homes<sup>2</sup> with various water demand management measures in existing properties, ranging from installation of water meters (in unmetered properties) to retrofitting of low water use taps and shower heads. Water neutrality is theoretically feasible in Wirral for all three growth scenarios.
- 1.3.10 An initial policy pathway to achieving neutrality has been set out in the Outline study. WC may wish to consider undertaking a detailed water efficiency and water neutrality policy pathway in collaboration with UU once preferred growth sites and locations are known.

## **1.4 Ecological Assessment**

- 1.4.1 Designated ecological sites that have the potential to be affected by growth and its impact on the water environment have been considered. In the main, the majority of growth is unlikely to alter conclusions already drawn in the production of UU's WRMP on abstraction and the Review of Consents<sup>3</sup> process for wastewater undertaken for wastewater discharges. The Wirral HRA identified Dee Estuary SAC, SPA and Ramsar site, Mersey Estuary SPA and Ramsar site, Mersey Narrows and North Wirral Foreshore pSPA, pRamsar and Liverpool Bay pSPA, Ribble and Alt Estuaries and Ramsar Sites and pRamsar as potential sites that could be affected by growth
- 1.4.2 The Outline WCS shows that growth is unlikely to jeopardise achievement of the WFD targets for all the identified designated sites, provided that the future increase in DWF for North Wirral (Meols) WwTW is counterbalanced by a reduction in the concentrations of the consented water quality parameters. The next stage of the HRA should take these findings into consideration and be informed and refined if necessary by further studies.

## **1.5 Flood Risk and Surface Water Management**

### ***Flood Risk to Development***

- 1.5.1 The Strategic Flood Risk Assessment and Preliminary Flood Risk Assessment for Wirral have been used in this Outline WCS to inform the assessment of flood risk to potential development locations at a strategic level.

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<sup>2</sup> Using the 5 future demand calculations from the water resources assessment

<sup>3</sup> Undertaken as part of the requirements under the Habitats Directive

- 1.5.2 The following key flood risk issues have been identified:
- The borough has areas which lie within the Flood Zone 2 and 3, including parts of Mid-Wirral (Settlement Area 5), Commercial Core (Settlement Area 2) and Wallasey (Settlement Area 1).
  - One of the main rivers draining the area, the River Birket, relies on pumping, and the area is reliant on flood defences to minimise flood risk to the existing development both from fluvial and tidal flood risk and surface water drainage channels. Failure of these defences constitutes a residual risk of flooding to the area.
  - The sewerage system in the study area relies on pumps. Surface water flooding from the system is a key flood risk that needs to be considered due to the finite capacity of this pumped system and the storage tanks.
  - Groundwater flood risk also exists in parts of the study area and the risk is particularly significant for developments which require a deep foundation.
- 1.5.3 The northern part of Mid-Wirral (Area 5) is the key location where growth options are more likely to be constrained by flood risk to development. The risk of flooding from fluvial and tidal sources is generally low in Birkenhead (Area 3), Bromborough and Eastham (Area 4), Heswall (Area 7), and Hoylake and West Kirby (Area 6).
- 1.5.4 As per National Planning Policy Framework (NPPF), when allocating land for development in Local Development Documents WC should apply the Sequential Test to steer development towards areas of low flood risk and to demonstrate where necessary, that there are no reasonably available sites in areas with a lower probability of flooding that would be appropriate to the type of development or land use proposed.
- 1.5.5 Flood risk can be managed through planning by ensuring that planning applications are accompanied by appropriate levels of flood risk assessment, as is currently the case in Wirral, in accordance with NPPF. The Outline WCS has flagged up the uncertainty with regard to flooding from non-fluvial and tidal sources, especially surface water flooding (sewers and direct runoff), and this needs to be investigated further. WC is in the process of producing the Wirral Local Strategy for Flood Risk Assessment, which will incorporate the findings of further studies on the risk from ordinary watercourses.

### ***The Management of Surface Water Runoff***

- 1.5.6 Surface water management is a key flood risk consideration in the study area due to the fact that some of the land put forward for development will be within areas where surface water runoff is managed via pumping systems. These systems are designed to ensure that surface water flooding does not inundate generally low lying urban areas and high grade agricultural land.
- 1.5.7 New development must consider the impact of further urbanisation on the existing pumped system, and discharge of surface water must be mitigated within the pumped limitations of the drained system. The incorporation of Sustainable Drainage Systems (SuDS) into development footprints at an early stage is therefore essential to meeting the aspiration of sustainable water management in the study area.

- 1.5.8 In order to give an indication of SuDS suitability for the Outline WCS, the likely capacity for infiltration type SuDS within the Settlement Areas has been considered. Whilst most of the areas have permeable underlying geology, some parts of the study area may not be suitable for infiltration SuDS due to the presence of Source Protection Zones and depending on groundwater vulnerability. As a result, many areas will therefore be reliant on surface attenuation and runoff restriction, which will require sites to make land provision for this mitigation. Once growth locations are known, further advice on types of suitable SuDS and opportunities for linking to green infrastructure should be provided from further study.

## 1.6 Cross-boundary Issues

- 1.6.1 In carrying out this WCS, consideration has been made to the potential cross-boundary issues that may exist now, and in the future, with the neighbouring Cheshire West and Chester authority: Cross boundary issues have been assessed in terms of water supply, wastewater treatment capacity and ecological and HRA issues.

### ***Water Supply***

- 1.6.2 Water resources for both Wirral and Cheshire West and Chester are assessed on a regional scale by UU in the WRMP. UU also undertook a local assessment on water supply infrastructure to SHLAA sites to look at local supply issues. In developing the outline WCS, this study was referred to in addition to the WRMP and no cross-boundary issues were identified.
- 1.6.3 The current WRMP is being updated and will be issued in 2014 and will include revised housing figures from all Districts. This should provide an updated indication of the cumulative impacts that future development in Districts may have on regional and local water supply.

### ***Wastewater Treatment***

- 1.6.4 The WCS found that the catchment areas of the WwTWs for the Wirral effectively covered the entire area of the Wirral and included only minor areas covered by Cheshire West and Chester – notably a small wooded area called Booston Wood near Ellesmere Port. Due to the small size and lack of developed areas, cross boundary issues were not deemed to be significant.

### ***Ecology and HRA***

- 1.6.5 Ecological and HRA issues assessed in WCS are predominantly associated with wastewater discharges. The Outline Wirral WCS assessed this locally to Wirral. There is some potential for increased development in CWC to impact on downstream areas in Wirral, however local WwTW discharge licenses in CWC should ensure no adverse impacts on receiving waterbodies and designated sites as a result of going through a RoC.

## 1.7 Key Constraints and Next Steps

- 1.7.1 A summary of the constraints identified for Wastewater Treatment and Water Supply at the following locations, for which a solution needs to be identified in further studies:
- Wallasey (Area 1) – wastewater transmission and water supply transmission.
  - Commercial Core (Area 2) – wastewater transmission and water supply transmission.
  - Birkenhead (Area 3) – wastewater transmission and water supply transmission.
  - Bromborough and Eastham (Area 4) – wastewater transmission and water supply transmission.
  - Mid-Wirral (Area 5) – wastewater treatment (North Wirral [Meols] WwTW), wastewater transmission and water supply transmission.
  - Hoylake and West Kirby (Area 6) – wastewater treatment (North Wirral [Meols] WwTW), wastewater transmission and water supply transmission.
  - Heswall (Area 7) – wastewater treatment (North Wirral [Meols] WwTW) and wastewater transmission.
  - Rural Areas (Area 8): wastewater treatment (North Wirral [Meols] WwTW) and water supply transmission. New wastewater infrastructure (sewer network) may be required in areas where there is limited existing networks.
- 1.7.2 Once development locations and numbers are confirmed, further investigations on WwTW capacity, wastewater transmission, surface water management and water supply will be required in order to determine the impact of infrastructure on phasing of growth in these locations. This outline assessment has been undertaken at a strategic level based on best estimates of where growth is likely to occur on a settlement by settlement basis. Further studies are therefore recommended, once site allocations are more clearly defined through the site allocations process, to address the potential constraints and knowledge gaps identified in this report.

## 2 Introduction

### 2.1 Terms of Reference

- 2.1.1 URS Infrastructure and Environment UK Ltd (URS) has been commissioned by Wirral Council and Liverpool City Council to undertake a Scoping and an Outline Water Cycle Study (WCS) for the Metropolitan Borough of Wirral, Liverpool and the Mersey Heartlands Growth Point. This report documents the findings of the Outline WCS specifically for Wirral. The findings for Liverpool and the Mersey Heartlands Growth Point are reported separately. This WCS will inform the evidence base of Wirral's Local Development Framework (LDF).
- 2.1.2 Water cycle strategies are required to ensure that proposed growth does not adversely impact on the existing water cycle environment and that new water services infrastructure can be planned for and provided alongside new development in a sustainable and cost effective manner.

### 2.2 Growth in Wirral

- 2.2.1 Wirral is expected to experience a significant increase in housing and employment growth up to the end of the planning period of 2027. This growth represents a challenge in ensuring that both the water environment and water services infrastructure have the capacity to sustain this level of proposed growth.
- 2.2.2 It is therefore a key objective of the Wirral WCS to identify any constraints on housing and employment growth that may be imposed by the water cycle and how these can be resolved i.e. by ensuring that appropriate water infrastructure is provided to support the proposed development. Furthermore, it should provide a strategic approach to the management and use of water to ensure that the sustainability of the water environment in the area is not compromised.

### 2.3 Study History

- 2.3.1 The Wirral WCS is being undertaken initially in two stages, as recommended by the Environment Agency (EA) guidance for Water Cycle Studies<sup>4</sup>.
- 2.3.2 The draft Scoping report was reported in September 2011<sup>5</sup>, the aim of which was to define the study area, establish the WCS steering group and indicate, at an initial high level, the key water infrastructure and water environment constraints that have the potential to impact on growth during the plan period for the administrative area of the authority.
- 2.3.3 The Scoping study showed that although no 'showstoppers' were identified, there are some potential constraints on housing growth in the study area requiring further assessment; in particular, management of drainage, wastewater treatment, water availability and control of demand for potable water. This Outline WCS therefore takes the assessment of the impact

<sup>4</sup> Environment Agency (2009), *Water Cycle Study Guidance*.

<sup>5</sup> URS, The Wirral, Liverpool and Mersey Heartlands Growth Point, Water Cycle Study Scoping Report, September 2011

of planned growth in Wirral a step further, building on the findings of the Scoping WCS, and identifying areas where further assessment may be required.

## 2.4 Water Cycle Study Reporting

2.4.1 The undertaking of a WCS requires a significant amount of technical data collection, analysis and interpretation. This technical work requires agreement by all stakeholders involved, such that the findings of the study can be agreed and signed up to by all parties leading to an approved strategy. However, it is acknowledged that the key purpose of the WCS is to provide a planning evidence base to the authorities' Local Plan and associated Local Development Documents (LDD), and is therefore primarily a planning based document.

2.4.2 This Outline WCS has been reported via two key documents:

- **The Main Planning Report** (this report) – this report presents the Outline Water Cycle Strategy as a planning summary of the study process, assessments and findings, with full conclusions of the Outline strategy and policy recommendations. It is intended to be a planning based document used as the main reference point for the Water Cycle Study; and
- **The Technical Appendices** – this section provides the full details of all the technical assessments undertaken, including methodology, calculations, data used, full findings and further legislative background.

2.4.3 The accompanying Technical Appendices report sets out the key starting assumptions for the assessment work; however, a key issue most pertinent to this non-technical report is the acknowledgement that whilst the favoured growth locations have been assessed, specific sites within the growth areas have not been identified. This has therefore necessitated a high level strategic assessment of the infrastructure required to service proposed growth and hence it has not been possible to determine site specific infrastructure requirements such as household connections, local pumping stations or site specific Sustainable Drainage Systems (SuDS).

## 2.5 Study Contributors

### ***Steering Group***

2.5.1 This Outline Study has been carried out with the guidance of the Steering Group, comprising the following organisations:

- Wirral Council (WC);
- Liverpool City Council (LCC);
- United Utilities Water Plc (UU);
- Dŵr Cymru Welsh Water (DCWW); and
- Environment Agency (EA).

## **Consultation Strategy**

- 2.5.2 The WCS aims to influence, and be influenced by, a wide range of stakeholders in addition to those included on the Steering Group, ranging from groups who have an influence on decisions relating to solutions, to groups directly affected by policy recommendations, such as water efficiency measures on developers and the wider public.
- 2.5.3 Various stakeholders, including the Steering group, were therefore considered as part of a consultation strategy. The stakeholders were grouped into three different tiers as described below:
- **Tier A** - Budget and scope setters, key decision makers: WC and LCC (by virtue of the joint commission);
  - **Tier B** - Essential data providers, project contributors: Wider Steering Group (encompassing EA, UU, DCWW);
  - **Tier C** - Secondary providers of data and project contributors: Mersey Environmental Advisory Services, Natural England, Countryside Council for Wales,
- 2.5.4 Consultation responses were received from DCWW, EA, Natural England, Countryside Council for Wales, Merseyside Environmental Advisory Service and Cheshire West and Chester Council, which have been incorporated into the final version of this report.
- 2.5.5 In their response<sup>6</sup> to the draft Outline WCS report for Wirral, United Utilities suggested that the following text forms part of the study:

*"The Water Cycle Study has been produced independently by URS Ltd, commissioned by Wirral and Liverpool City Council. The Water Cycle Study is a snapshot assessment of the availability of water and wastewater services at the time the independent study was undertaken.*

*Recommendations outlined in the Water Cycle Study such as the use of Sustainable Urban Drainage Systems (SUDS) and achieving water efficiency standards to Level 4 of the Code for Sustainable Homes are supported. The local planning authority and United Utilities will work closely to consider how the impact of growth on water and wastewater infrastructure can be most appropriately managed.*

*Applicants are encouraged to engage in pre-application discussions with the local planning authority and United Utilities at the earliest opportunity."*

## **2.6 Outline Study – Aims and Objectives**

- 2.6.1 The overall aim of the project is to complete a holistic Water Cycle Study for Wirral and the Growth Point area with a view to determining whether the growth planned in the study area can be accommodated by the existing water supply sources and infrastructure and waste water infrastructure without having a detrimental effect on the environment and how such constraints can be removed where they exist. Constraints due to flood risk in the study area

<sup>6</sup> Letter from UU to Wirral Council – Ref: DC/13/652, 2<sup>nd</sup> May 2013

are also considered in the WCS. As such, the WCS tests the impact of the proposed development on the water cycle, defines the existing baseline capacity for growth without the need for new infrastructure and determines where new infrastructure or further investigation is required to overcome constraints that may limit the required growth levels in the study area.

### ***Outline Study Scope***

- 2.6.2 The key aim of the Outline study is to define the baseline capacity of both the water environment and the water services infrastructure in relation to each growth area. This will then be followed by the identification of the key environmental and infrastructure constraints and indication of approximately how many new dwellings and jobs can be provided in each settlement area before new infrastructure or mitigation is required. Where there is insufficient capacity, the Outline Study then provides an outline strategy for providing solutions or mitigation to allow development to proceed in a sustainable way.
- 2.6.3 The Outline study will specifically undertake the following:
- address the issues identified in the Scoping Study;
  - identify environmental risks, including flood risk, and constraints relevant to the water cycle;
  - determine whether environmental resources can sustain further development (with particular reference to Water Framework Directive targets and UKCP09 climate change projections);
  - identify any potential impacts of development on the hydrologically linked specially designated conservation sites and watercourses in the Wirral study area and other sites or features of significant nature conservation importance, within and outside the study area, resulting from additional abstraction and wastewater discharge;
  - determine if, where and when development might overload existing infrastructure, and if capacity exists for development without the need for additional infrastructure;
  - determine if major new water infrastructure or management interventions are needed to support development;
  - establish effective liaison with neighbouring Growth Point areas to determine cumulative impacts on the water environment and infrastructure, if cross boundary issues are identified;
  - produce an Outline WCS report to contribute to the evidence base for the Local Development Framework Core Strategy, Infrastructure Plan and Habitat Regulations Assessment;
  - formulate water related policy recommendations for WC;
  - identify any outstanding concerns about infrastructure provision that need to be addressed in a detailed WCS, if required; and
  - determine the need for a Detailed Water Cycle Study for WC and, if it is required, what the study should include.
- 2.6.4 At the time of completing the Outline WCS, specific growth locations in each settlement area were not available at the level of detail required to assess specific local capacity and constraint issues in relation to the water environment and water services infrastructure. Hence, the Outline study has been undertaken at a strategic growth location level, based on

the number of new dwellings expected per existing urban area. For some technical water cycle elements, this has necessitated a higher level assessment as explained in subsequent sections of this report.

- 2.6.5 Where more than one solution is possible, or further information is required to determine the solution, a Detailed WCS or further studies are recommended. The Detailed WCS will require a firmer understanding of specific distribution of growth to avoid having a number of permutations of how development areas can be brought forward, which could change the requirement on site specific infrastructure such as sewerage connections and water supply pipes.

## 2.7 Study Area

- 2.7.1 The administrative area of WC is shown in Figure 2-1. The figure provides the geographic scope of the Outline Study and includes the Wirral Growth Point Area. Whilst the geographic scope of the Outline Study is limited to growth within the WC District, the wider area should be considered where it has the capacity to impact on growth within the study area i.e. through shared water resources or development outside of the Wirral draining to a WwTW within the study area that could utilise spare capacity.
- 2.7.2 Neighbouring Local Authorities (shown in Figure 2-2) have not been considered as it became clear during the course of the study that they do not have a direct impact on Wirral, although they have a cumulative impact as they are all located in the same water resources zone.

Figure 2-1: Wirral WCS Study Area

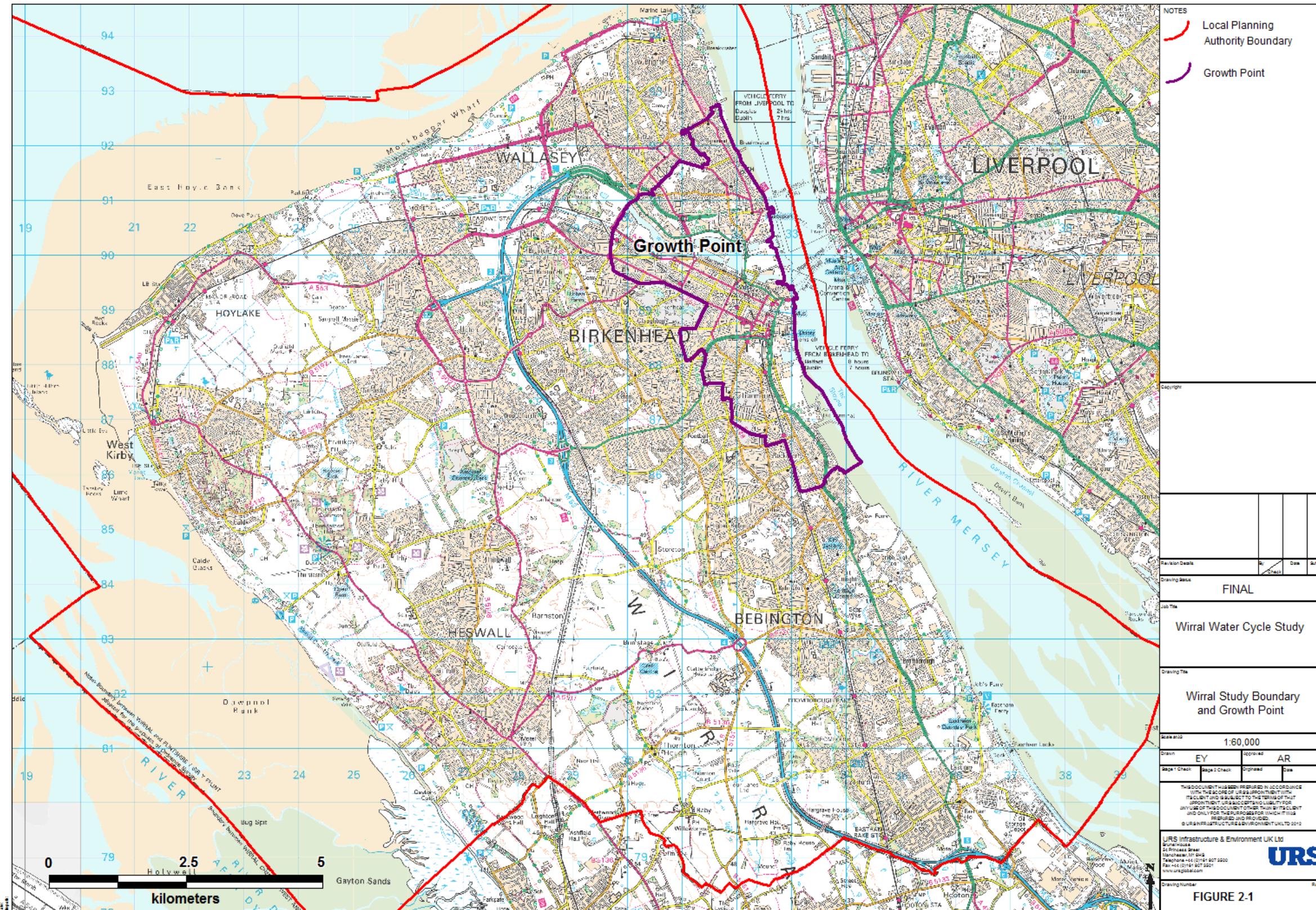
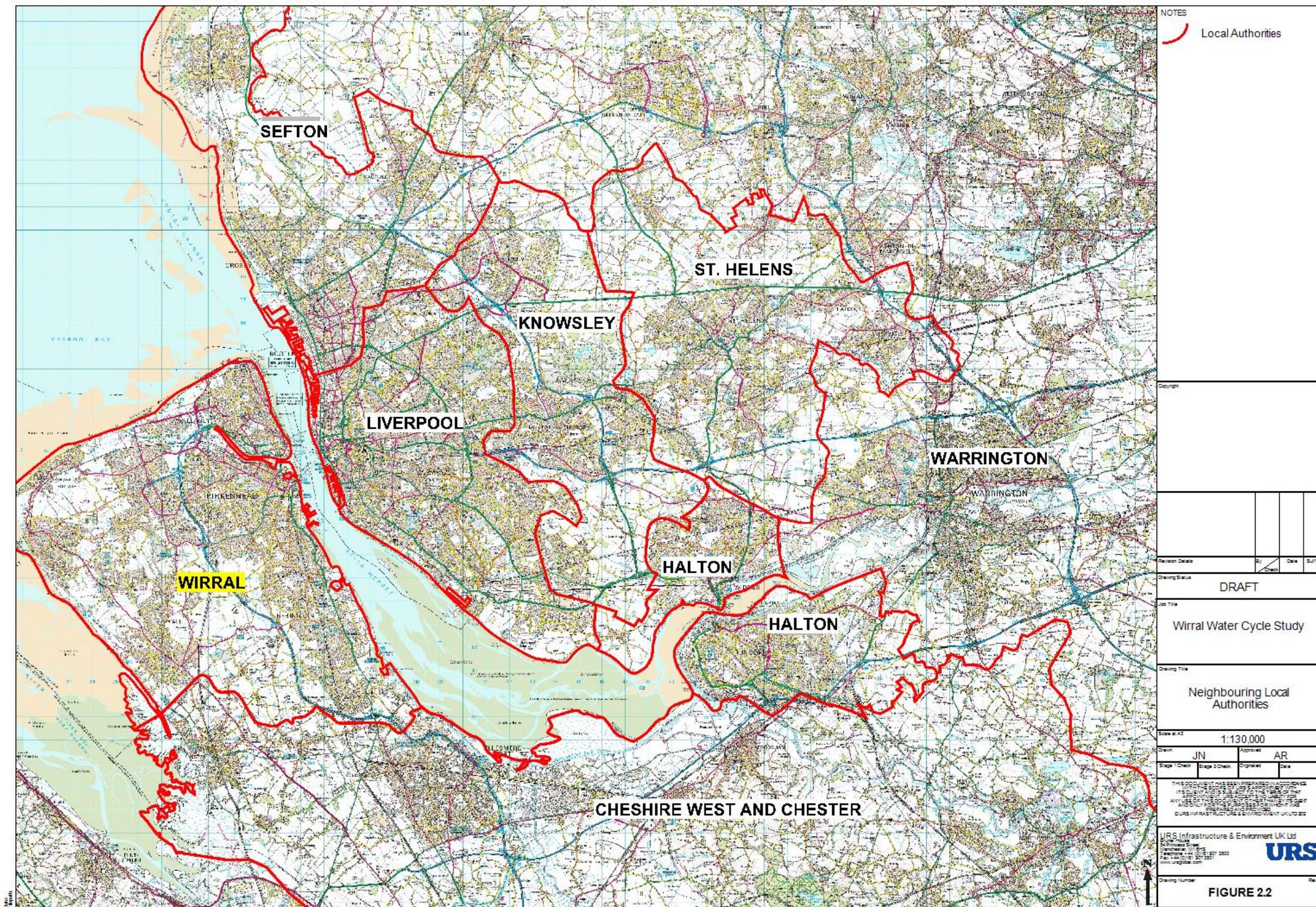


Figure 2-2: Wirral's Neighbouring Local Authorities



## 3 Policy and Supporting Information

### 3.1 Introduction

- 3.1.1 National, regional, sub-regional and local planning policy and associated documents provide guidance for delivering sustainable development. The following is a summary of the legislative, policy and guidance drivers which have informed and shaped the development of this WCS and its deliverables, and have been considered at all stages in the WCS process.

### 3.2 Legislation and Policy

#### ***International and National***

**Table 3-1: Water Related European and National Legislation, Policy and Guidance**

Directive/Legislation/Guidance	Description
Code for Sustainable Homes	The Code for Sustainable Homes has been introduced to drive a step-change in sustainable home building practice, providing a standard for key elements of design and construction which affect the sustainability of a new home. It will become the single national standard for sustainable homes, used by home designers and builders as a guide to development and by home-buyers to assist their choice of home.  It will form the basis for future developments of the Building Regulations in relation to carbon emissions from, and energy use in homes, therefore offering greater regulatory certainty to developers. The Code sets out a minimum water demand per person as a requirement for different code levels. CLG is currently in consultation on proposals to make certain code levels mandatory for all new homes. At present, only affordable homes must reach a certain code.
Bathing Waters Directive 76/160/EEC	To protect the health of bathers, and maintain the aesthetic quality of inland and coastal bathing waters. Sets standards for variables, and includes requirements for monitoring and control measures to comply with standards.
Environment Act 1995	Sets out the role and responsibility of the EA.
Environmental Protection Act 1990	Integrated Pollution Control (IPC) system for emissions to air, land and water.
Future Water, February 2008	Sets the Government's vision for water in England to 2030. The strategy sets out an integrated approach to the sustainable management of all aspects of the water cycle, from rainfall and drainage, through to treatment and discharge, focusing on practical ways to achieve the vision to ensure sustainable use of water. The aim is to ensure sustainable delivery of water supplies, and help improve the water environment for future generations.

**Table 3-1: Water Related European and National Legislation, Policy and Guidance**

Directive/Legislation/Guidance	Description
Groundwater Directive 80/68/EEC	To protect groundwater against pollution by 'List 1 and 2' Dangerous Substances.
Habitats Directive 92/44/EEC	To conserve the natural habitats and to conserve wild fauna and flora with the main aim to promote the maintenance of biodiversity taking account of social, economic, cultural and regional requirements. In relation to abstractions and discharges, can require changes to these through the Review of Consents (RoC) process if they are impacting on designated European Sites.
Making Space for Water, 2004	Outlines the Government's strategy for the next 20 years to implement a more holistic approach to managing flood and coastal erosion risks in England. The policy aims to reduce the threat of flooding to people and property, and to deliver the greatest environmental, social and economic benefit.
National Planning Policy Framework	Planning policy in the UK is set by the National Planning Policy Framework (NPPF). This explains statutory guidelines and advises local authorities and others on planning policy and operation of the planning system. A WCS helps to balance the requirements of various planning policy documents, and ensure that land-use planning and water cycle infrastructure provision is sustainable.
Pollution Prevention and Control Act (PPCA) 1999	Implements the IPPC Directive. Replaces IPC with a Pollution Prevention and Control (PPC) system, which is similar but applies to a wider range of installations.
Water Industry Act 1991	Sets of the duties and powers of Water and Sewerage Companies
Water Act 2003	Implements changes to the water abstraction management system and to regulatory arrangements to make water use more sustainable.
Water Framework Directive (WFD) 2000/60/EC	The WFD was passed into UK law in 2003. The overall requirement of the directive is that all river basins must achieve 'good ecological status' by 2015, or by 2027 if there are grounds for derogation. The WFD, for the first time, combines water quantity and water quality issues together. An integrated approach to the management of all freshwater bodies, groundwaters, estuaries and coastal waters at the river basin level has been adopted. It effectively supersedes the majority of water related legislation which drives the existing licensing and consenting framework in the UK.  The EA is the body responsible for the implementation of the WFD in the UK. The EA have been supported by UKTAG <sup>7</sup> , an advisory body which has proposed water

<sup>7</sup> The UKTAG (UK Technical Advisory Group) is a working group of experts drawn from environment and conservation agencies. It was formed to provide technical advice to the UK's government administrations and its own member agencies. The UKTAG also includes representatives from the Republic of Ireland.

**Table 3-1: Water Related European and National Legislation, Policy and Guidance**

Directive/Legislation/Guidance	Description
	quality, ecology, water abstraction and river flow standards to be adopted in order to ensure that water bodies in the UK (including groundwater) meet the required status <sup>8</sup> . These have been finalised and issued within the first round of River Basin Management Plans (RBMP) in 2009.
Natural Environment & Rural Communities Act 2006	Covering Duties of public bodies – recognises that biodiversity is core to sustainable communities and that Public bodies have a statutory duty that states that “every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity”
EC Shellfish Waters Directive 2006/113/EEC	To protect or improve shellfish waters in order to support shellfish life and growth, therefore contributing to the high quality of shellfish products directly edible by man. Sets physical, chemical and microbiological water quality requirements that designated shellfish waters must either comply with ('mandatory' standards) or endeavour to meet ('guideline' standards).
Water Resources Act 1991	Protection of the quantity and quality of water resources and aquatic habitats. Parts have been amended by the Water Act 2003.
Land Drainage Act 1991	Sets out the statutory roles and responsibilities of key organisations such as Internal Drainage Boards, local authorities, the EA and Riparian owners with jurisdiction over watercourses and land drainage infrastructure.
Flood & Water Management Act 2010	<p>The Flood and Water Management Act 2010 is the outcome of a thorough review of the responsibilities of regulators, local authorities, water companies and other stakeholders in the management of flood risk and the water industry in the UK. The Pitt Review of the 2007 flood was a major driver in the forming of the legislation. Its key features relevant to this WCS are:</p> <ul style="list-style-type: none"> <li>• To give the EA an overview of all flood and coastal erosion risk management and unitary and county councils the lead in managing the risk of all local floods.</li> <li>• To encourage the uptake of sustainable drainage systems by removing the automatic right to connect surface water discharges to sewers and providing for unitary and county councils to adopt SuDS for new developments and redevelopments.</li> <li>• To widen the list of uses of water that water companies can control during periods of water shortage, and enable Government to add to and remove uses from the list.</li> </ul>

<sup>8</sup> UK Environmental Standards and Conditions (Phase I) Final Report, April 2008, UK Technical Advisory Group on the Water Framework Directive.

**Table 3-1: Water Related European and National Legislation, Policy and Guidance**

Directive/Legislation/Guidance	Description
	<ul style="list-style-type: none"> <li>• To enable water and sewerage companies to operate concessionary schemes for community groups on surface water drainage charges.</li> <li>• To make it easier for water and sewerage companies to develop and implement social tariffs where companies consider there is a good cause to do so, and in light of guidance that will be issued by the SoS following a full public consultation.</li> </ul>

***Habitats Directive & the Review of Consents***

- 3.2.1 Specific mention is made in this section with respect to the Habitats Directive as it has a potentially significant influence on both the wastewater and waste supply strategies, owing to an ongoing review process that has been undertaken by the EA (and EA Wales), Natural England and the Countryside Commission for Wales over several years.
- 3.2.2 The review process is referred to as the Review of Consents (RoC). The process requires the EA to review all of the existing consents and licences it has issued for both discharges and abstractions to and from rivers and/or groundwater. The purpose of the review is to determine whether, if used to their maximum permitted level, the current licences and consents are likely to impact on the integrity of ecologically designated sites which became protected under the Habitats Directive. The licences and consents being reviewed were issued prior to sites becoming designated, so the review is a retrospective process necessitated by the legislative requirements brought in by the Habitats Directive and its transposition into UK law as the Habitats Regulations.
- 3.2.3 The potential effects of the consents and licences are considered in isolation and in combination with others. In relation to consents to discharge, the pollutant load of these discharges is considered as well as the impact of the volume of discharge on habitat integrity; whilst for abstraction licences, the direct impact of reduced water availability in a groundwater or river system is determined for impact on any protected habitat reliant on the river or groundwater conditions.
- 3.2.4 If the conclusion points to the need to revoke or modify any permission, the EA must work with the licence or consent holder to ensure that they are compensated by considering alternatives for replacing the lost permission.

### 3.3 Local Development Frameworks

- 3.3.1 The consultation on the Wirral Core Strategy Preferred Options was completed in January 2011, and the Core Strategy was published in late 2012. Anticipated adoption of the Core Strategy is early 2014.
- 3.3.2 Some of the policies and proposals in the adopted Unitary Development Plan (February 2000) were saved to remain in force through the Secretary of State. The adopted Unitary Development Plan will be progressively replaced by a series of Development Plan Documents prepared as part of the Local Plan for Wirral.
- 3.3.3 The Wirral Unitary Development Plan includes the following water-related strategic policies:
- **Strategic Policy WAT1 Fluvial and Tidal Flooding:** states that planning permission will only be granted for new development which would not be at risk from fluvial or tidal flooding, or which would not increase these risks to other developments.
  - **Strategic Policy WAT2 Protection of the Water Environment:** where appropriate and particularly in vulnerable areas, the local planning authority will impose land-use planning controls and obligations directed at the prevention of the pollution of watercourses and groundwater.
  - **Policy WA1 Development and Flood Risk:** development will not be permitted in 'washland' areas unless the developer is willing to provide compensatory storage and/ or flood protection to an appropriate standard as part of the development. Where land is in an area protected from tidal flooding by embankments or within a floodplain but at a lower risk of fluvial flooding and the land is protected by flood embankments, which are properly maintained and provide an acceptable standard of safety, development may be permitted, subject to consultation with the EA and where necessary the imposition of appropriate conditions, for example, with respect to minimum floor level. Development which would itself increase the risk of flooding to other properties or which would reduce the effectiveness or impede the maintenance of flood control structures or works will not be permitted. Development which would adversely affect the integrity and continuity of tidal and fluvial defences or which would compromise the access requirements for maintenance or emergency purposes will not be permitted.
  - **Policy WA2 Development and Land Drainage:** Where proposed development could lead to a significant increase in surface water run-off from the area, or are situated in an area where the EA has indicated that there may be drainage problems, consultation with the EA or the local Land Drainage Authority will be required and conditions may be imposed requiring storage within the surface water system.
  - **Policy WA3 Development and Groundwater Protection:** In considering proposals for development, the Local Planning Authority will have regard to the need to protect sources of groundwater. The Local Planning Authority may impose conditions and obligations directed at preventing derogation in terms of both quality and quantity.

- **Policy WA4 Safeguarding Water Resources:** In considering proposals for development, the Local Planning Authority will look to safeguard water resources and water supply to water users, unless it can be demonstrated that there are adequate water resources which already exist or will be provided in time to serve the development.
- **Policy WA5 Protecting Surface Waters:** The Local Planning Authority will only permit development which includes satisfactory arrangements for the disposal of foul sewage, trade effluent or contaminated surface water, does not exacerbate existing problems such as premature or increased frequency of discharges through storm sewer overflows due to inadequate infrastructure or lack of sewer capacity and will not lead to spillage or leakage of stored oils or chemicals or other potentially polluting substances.
- **Policy WA6 Development within River Corridors:** In considering proposals for development within river corridors, the Local Planning Authority will have regard to the need to conserve or enhance the natural character of those watercourses or encourage appropriate water-based or waterside recreation. In addition, adequate provision should be made to secure permanent areas for river maintenance purposes.
- **Strategic Policy POL1 Restrictions for Polluting and Hazardous Uses:** The local planning authority will restrict potentially polluting or hazardous development to locations that will not compromise public safety; result in loss of amenity; or cause harm to the nature conservation interest, recreational value, tourist potential or landscape quality of the countryside, coast or estuaries.
- **Policy PO1 Potentially Polluting Development:** Potentially polluting development or land-use will only be permitted when the Local Planning Authority is satisfied that the proposed development would not cause harm or nuisance to neighbouring uses, the natural environment or general amenity, as a result of discharges to air, land or water, or from noise, smells, dust, soot, ash, grit or vibration; any measures required to comply with pollution control legislation will not lead to an unacceptable loss of amenity by virtue of noise or visual intrusion; and the real or perceived risk of a pollution incident occurring and the extent of its potential consequences, would not have unacceptable land-use implications beyond the boundary of the site, including prejudicing the realisation of land-use and other environmental planning objectives set out elsewhere in the Plan.

### 3.3.4 The Core Strategy Preferred Options policies relating to water include the following:

- **Preferred Option 3 - Spatial Vision:** There will be a greater emphasis, across all sectors, on securing sustainable approaches to design and construction; energy; water; flood risk, waste management; carbon impact; local employment and production; and mitigation, adaptation and resilience to climate change.
- **Preferred Spatial Objective 5 - Environmental Quality:** To ensure that development and investment will enhance and improve the locally distinctive characteristics and assets listed in the Settlement Area Policies.
- **Preferred Spatial Objective 6 - Flood Risk:** To direct new development away from areas that may be liable to flooding.

- **Preferred Option 16 - Development Management:** The Core Strategy will set out a list of the main issues that will need to be addressed when considering the appropriateness of any new development proposal or land allocation. The list of main issues will include impact on mitigation, adaptation and resilience to climate change (including impact on flood risk, coast protection, river maintenance, sustainable drainage, water and energy conservation and emissions), impact on the capacity of local infrastructure and services (including foul and surface water drainage), impact on wider environmental requirements (including environmental improvements; the quality of air, land and water; protection of water resources; sustainable construction and waste management; and natural processes).
- **Preferred Option 18 - Green Infrastructure:** All development proposals and land allocations will be assessed against their contribution to the delivery of any other related initiatives and strategies including river corridor and catchment area management plans; surface water management plans; flood alleviation; sustainable urban drainage; heritage characterisations; conservation area appraisals and management plans; and other local improvement plans.

## 3.4 Water Company Planning

### ***Financial and Asset Planning***

- 3.4.1 Water companies currently plan for asset management and the financial procurement required for it through the Asset Management Plan (AMP) process, which runs in 5 year cycles. The Water Services Regulation Authority (known as The Office of Water Services or OFWAT) is the economic regulator of the water and sewerage industry in England.
- 3.4.2 In order to undertake maintenance of its existing assets and to enable the building of new assets (asset investment), water companies seek funding by charging customers according to the level of investment they need to make. The process of determining how much asset investment is required is undertaken in conjunction with:
- **The Environment Agency** - as the regulator determining investment required to improve the environment, this is a two way process between the EA and Water Companies and is conducted through the National Environment Programme;
  - **The Drinking Water Inspectorate (DWI)** - who determine through a two way process with the Water Companies where investment is required to assets to improve quality of drinking water; and
  - **OFWAT** - who along with the EA require Water Companies to plan sufficiently to ensure security of supply (of potable water) to customers during dry and normal years.
- 3.4.3 The outcome is a Business Plan which is produced by each water company setting out the required asset investment over the next 5 year period, the justification for it and the price increase required to fund it.
- 3.4.4 OFWAT determines how much a water company can charge its customers and considers views of the Water Company, regulators (EA and DWI) and consumer groups (Consumer

Council for Water). This process is known as the Price Review and is undertaken on a 5 year cycle. This review allows OFWAT to determine the price limits for the proceeding 5 years that allow the Water Company to raise funds required for necessary investment into asset management (the AMP period).

- 3.4.5 At the time of undertaking the Wirral Outline WCS, OFWAT had determined the price limits for the AMP5 period (1 April 2010 to 31 March 2015), which dictates the investment that UU and DCWW will be able to undertake over the next five years. A review of UU's final Business Plan has identified that there is over £3.6 billion to be spent during the period up to March 2015 across the area<sup>9</sup> serviced by UU, with DCWW spending £1.3 billion<sup>10</sup>.
- 3.4.6 Where significant water cycle infrastructure investments are not included within the AMP5 business plan, funding cannot be sought until the next Price Review in 2014 (PR14) for inclusion in AMP6 (2015 - 2020) or subsequent AMP periods. Only in exceptional circumstances will Water Companies seek to deviate from their Business Plan and submit an interim determination within the current AMP cycle to provide funding for unforeseen investment requirements.

### **Water Resource Planning**

- 3.4.7 Water companies produce Water Resource Management Plans (WRMP) on a statutory basis covering 25 year planning horizons. WRMPs set out how a water company plans to provide and invest in existing and new water resource schemes (e.g. reservoirs) to meet increases in demand for potable supply, as a result of new development, population growth and climate change over the next 25 year period. The statutory WRMPs will be updated in five yearly cycles to coincide with the PR and AMP process. UU's current WRMP was finalised in September 2009 and has been used in this WCS.
- 3.4.8 The EA has developed Catchment Abstraction Management Strategies (CAMS) for the Lower Mersey and Alt catchment and the River Dee catchment. These CAMS set out strategies to manage water abstraction within each catchment until 2014. This outline WCS has been informed by the CAMS in terms of water supply and abstraction management.

## **3.5 Guidance**

- 3.5.1 The EA has issued a National Guidance (The Water Cycle Study Guidance<sup>11</sup>) document to ensure that water cycle studies are carried out in a consistent way. The approach set out in the guidance forms current best practice and the basis for the methodology followed in this WCS.
- 3.5.2 Although a Surface Water Management Plan (SWMP) has not been undertaken by WC, with respect to the management of surface water, the WCS has utilised guidance on the development of SWMPs and management of surface water as issued by DEFRA<sup>12</sup>.

<sup>9</sup> <http://beta.unitedutilities.com/5543.aspx>

<sup>10</sup> Dwr Cymru Welsh Water, Business Plan 2010 – 2015,

<sup>11</sup> <http://publications.environment-agency.gov.uk/pdf/GEHO0109BPFF-e-e.pdf>

<sup>12</sup> DEFRA (2010), Surface Water Management Plan technical Guidance - <http://www.defra.gov.uk/environment/flooding/documents/manage/surfacewater/swmp-guidance.pdf>

### 3.6 Wirral Flood & Water Management Studies

3.6.1 In line with policy and legislation requirements, there are several flood and water management studies, either completed or ongoing in the study area, that are interlinked with the WCS. Figure 3-1 shows the linkages between these study reports and the WCS.

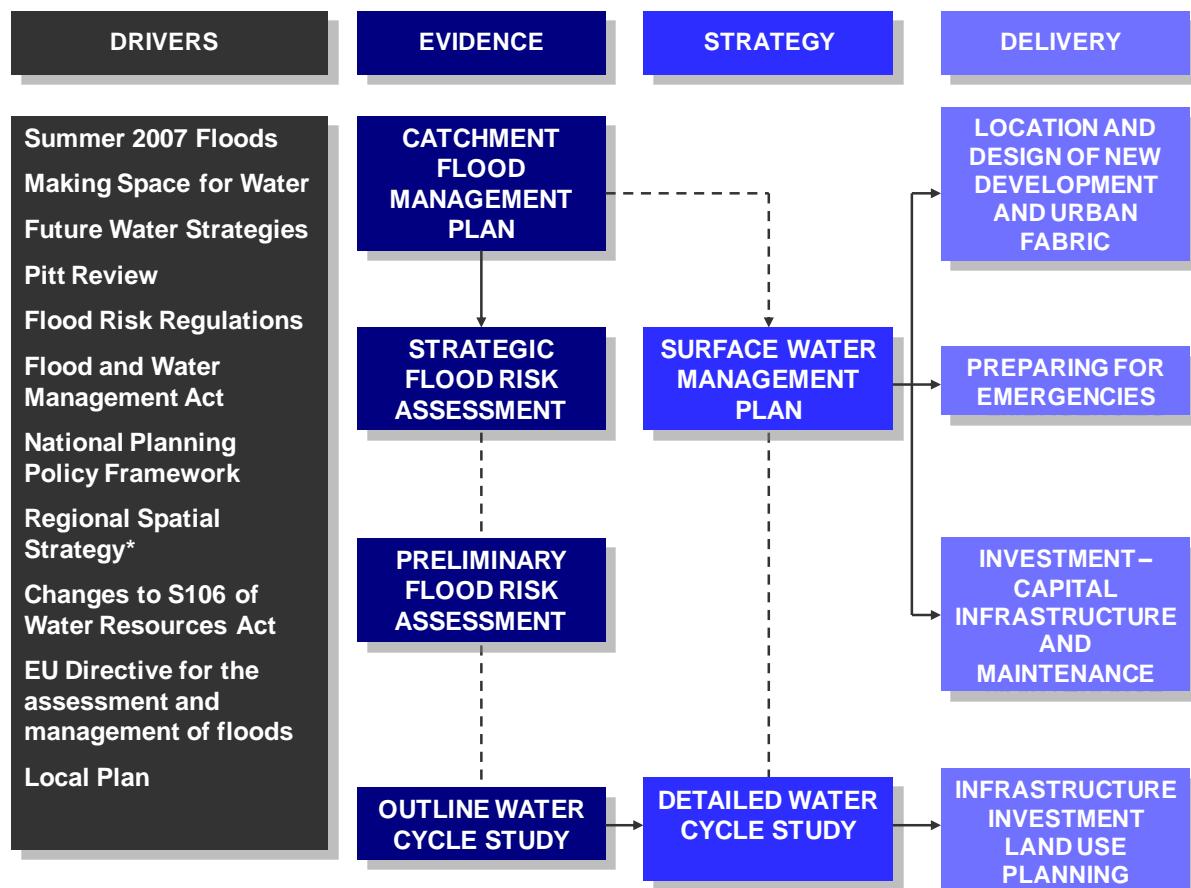


Figure 3-1: Linkages between water and flooding management studies<sup>13</sup>

#### Studies Progress

3.6.2 A Level 1 Strategic Flood Risk Assessment (SFRA), with level 2 elements, was completed on behalf of WC in 2009. The SFRA aims to inform the sustainability appraisals, land allocations and development control policies of the LPA. It provides an evidence base that informs the LDF in relation to the overall spatial strategy for the Borough as well as the allocation of individual sites with respect to all forms of flooding, including flooding from rivers and the sea, flooding from groundwater, surface water and sewerage and other artificial forms of flooding (e.g. reservoirs and canals). The Outline WCS has been informed by the SFRA in terms of flood risk to development areas and management of surface water.

<sup>13</sup> Adapted from Water Cycle Guidance, Environment Agency 2009

- 3.6.3 The EA's Catchment Flood Management Plans (CFMPs) give an overview of the flood risk by river catchment. They recommend ways of managing those risks now and over the next 50-100 years. CFMPs consider all types of inland flooding, from rivers, ground water, surface water and tidal flooding. They also take into account the likely impacts of climate change and how development can meet present day needs without compromising the ability of future generations to meet their own needs. Wirral Borough is covered by both the Mersey Estuary CFMP which was completed in September 2008 and the River Dee CFMP completed January 2010.
- 3.6.4 A preliminary Flood Risk Assessment (PFRA) was prepared by WC in June 2011. The PFRA was prepared in accordance with EA guidance to support the Lead Local Flood Authorities (LLFAs) in managing local flood risk under the Flood Risk Regulations 2009, which implement the European Floods Directive. LLFAs are required to prepare PFRAs as a high level documentation of local flood risk from surface runoff, groundwater and ordinary watercourses. LLFAs are required to collect information on past (historic) and future (potential) floods to identify Flood Risk Areas (areas where the risk of flooding is significant).

## 3.7 Supporting Documents

- 3.7.1 In addition to the legislation and guidance set out in Tables 3.1 above, the following studies and reports are relevant and, where available, have been used within the Wirral Outline WCS:
- North West Growth Area Water Cycle Strategy Scoping Study;
  - Wirral Level 1 Strategic Flood Risk Assessment (SFRA)<sup>14</sup>;
  - Wirral Waters Flood Risk Assessment;
  - Mersey Estuary CFMP<sup>15</sup>;
  - River Dee CFMP<sup>16</sup>;
  - North West England and North Wales Shoreline Management Plan SMP2;
  - The Lower Mersey and Alt CAMS;
  - The Dee CAMS;
  - North West River Basin District, River Basin Management Plan (RBMP)<sup>17</sup>;
  - Dee River Basin District RBMP<sup>18</sup>;
  - The Environment Agency Groundwater Protection Policy<sup>19</sup>;
  - The Environment Agency Review of Consent Process;
  - Wirral Habitats Regulations Assessment – Interim Screening Assessment<sup>20</sup>
  - UU Water Resources Management Plan<sup>21</sup>;
  - The SuDS Manual<sup>22</sup>

<sup>14</sup> Wirral Council, Level 1 SFRA, Faber Maunsell, 2009

<sup>15</sup> Environment Agency Mersey Estuary Catchment Flood Management Plan, 2008

<sup>16</sup> Environment Agency Wales River Dee Catchment Flood Management Plan 2010

<sup>17</sup> Environment Agency, River Basin Management Plan, North West River Basin District <http://www.environment-agency.gov.uk/research/planning/124837.aspx>

<sup>18</sup> Environment Agency, River Basin Management Plan, Dee River Basin District, <http://www.environment-agency.gov.uk/research/planning/124748.aspx>

<sup>19</sup> Environment Agency, Groundwater protection: policy and practice. <http://publications.environment-agency.gov.uk/pdf/GEHO1006BLMW-e-e.pdf>

<sup>20</sup> Wirral Metropolitan Borough Council Local Development Framework For Wirral Core Strategy Development Plan Document, Habitats Regulations Assessment – Interim Screening Assessment, 2009

<sup>21</sup> United Utilities, Final Water Resources Management Plan, September 2009, <http://www.unitedutilities.com/WaterResourcesPlan.aspx>

### 3.8 Data Summary

- 3.8.1 The undertaking of a Water Cycle Study requires a large amount of data collection, much of which is reliant on the willingness of third parties to supply in order to allow the study to be progressed. This study has built on data collated as part of the Scoping Study and further detailed information that has been requested. A catalogue of the data collected, identifying the data provider in each case, is included in Appendix B of the Technical Appendices Report - Data Request.

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<sup>22</sup> CIRIA, The SUDS Manual, C697, 2007

## 4 Proposed Growth

### 4.1 Introduction

- 4.1.1 Wirral Council provided three growth scenarios for assessment in the WCS. Each scenario included growth in dwelling numbers, jobs and employment land and were divided into 8 Settlement Areas as identified in the Preferred Options for the Core Strategy. Information on specific development locations within the Settlement Areas was not available as WC has not yet reached site allocation stage.

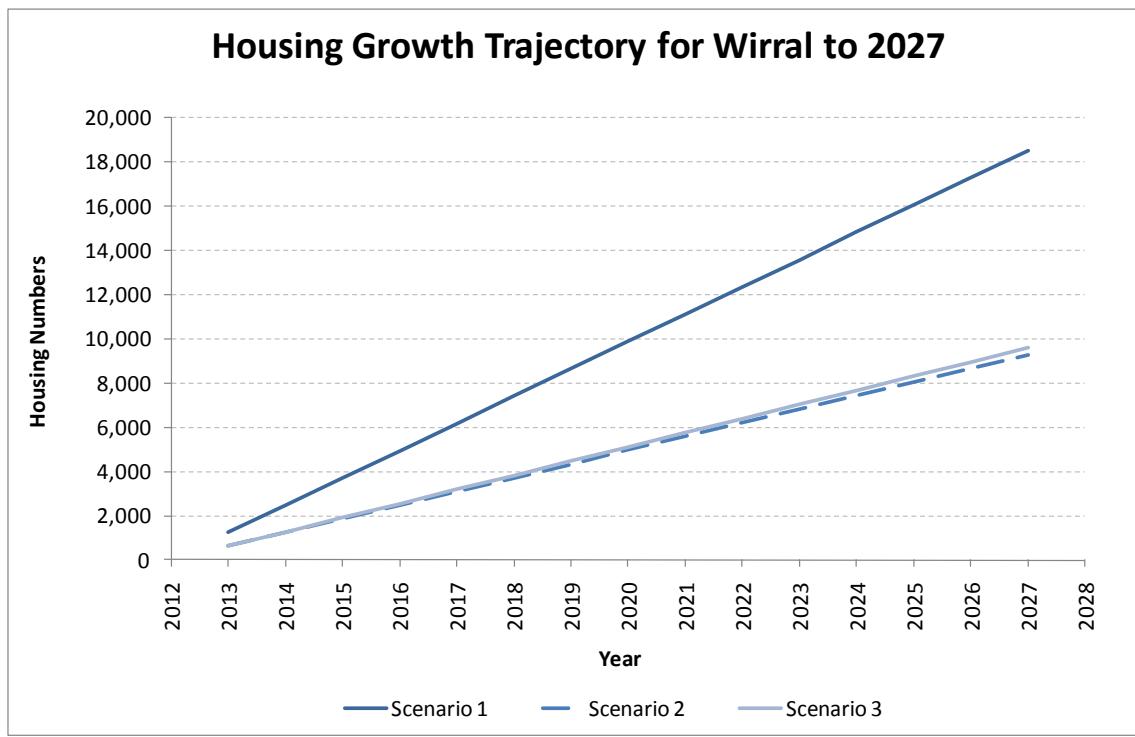
### 4.2 Housing

- 4.2.1 Three possible housing growth scenarios have been calculated for the proposed growth in each Settlement Area for the planning period 2013-2027. The scenarios have been developed so that the impact of a range of potential growth outcomes on the water cycle can be assessed.
- 4.2.2 Scenario 1 is based on WC's Preferred Options for the Core Strategy<sup>23</sup> for new housing development. Scenario 1 is based on Policy Option 3A 'Capacity Model' including Wirral Waters. Scenario 2 is based on Policy Option 3B 'Capacity Model' excluding Wirral Waters. Scenario 3 is based on Policy Option PO2 'Needs Model'. The housing growth figures for Scenario 2 and 3 are very similar (9,300 and 9,600 respectively); however, the spatial distribution is different.
- 4.2.3 In order to determine the impact of potential growth in housing numbers on water supply and wastewater infrastructure, the number of dwellings was converted into number of people using an average of the forecast occupancy rate (2.19 people) over the planning period as provided by WC (Table 4-1).
- 4.2.4 At the time of undertaking the Outline WCS, WC did not have the required level of certainty regarding preferred development sites for growth. Therefore, the Outline WCS has assessed growth at a strategic level, according to housing targets within key settlements as a whole. For each of the three growth scenarios, numbers of dwellings per settlement have been assessed at a strategic level (as opposed to site specific) to identify capacity constraints in the water services infrastructure serving each settlement area and the impact this will have on the water environment.
- 4.2.5 In order to quantitatively assess the impact of the three growth scenarios on the wastewater infrastructure, a spatial representation of the location of potential development was required. This was because some of the Settlement Areas drain into more than one WwTW.
- 4.2.6 The housing scenarios and the broad locations of where the growth will occur were agreed with WC prior to commencing the baseline assessments. The methodology used in determining the housing figures per settlement and per scenario is included in Appendix C of the Technical Appendices Report.

<sup>23</sup> Wirral Council, Preferred Options for the Core Strategy, November 2010

## 4.3 Employment

- 4.3.1 Employment growth scenarios have been calculated for the proposed employment growth in Wirral, based upon a Capacity Model and historical take up of employment land. These scenarios also relate to the period 2013-2027 and, for the purposes of the WCS, employment land area has been converted into job numbers to allow an assessment of impact on infrastructure capacity. As with the housing growth, explanations of how the employment growth scenarios were calculated are included in Appendix C of the Technical Appendices Report.
- 4.3.2 It should be noted that the growth figures have been agreed with WC based on best available knowledge at the time of undertaking the Outline WCS. They are subject to change and should be reviewed in any future studies.
- 4.3.3 The housing and employment figures are presented in the following section, including targets per settlement, annual trajectories over the planning period and a spatial proportional representation of where growth is proposed to occur across each Settlement Area.
- 4.3.4 Table 4-1 provides a summary of the proposed growth by Settlement Area and Figure 4-1 shows the cumulative growth figures over time.
- 4.3.5 Figure 4-2 to Figure 4-4 present a spatial representation of the proposed growth (housing and job numbers) for the three scenarios. Appendix C of the Technical Appendices Report provides a summary of how the growth figures were processed to provide a spatial representation.



**Figure 4-1: Housing growth trajectory for Wirral to 2027**

**Table 4-1: Growth Scenarios per Settlement Area in Wirral (values in parenthesis are calculated population)**

Settlement Area	Scenario 1			Scenario 2			Scenario 3		
	Housing	Jobs	Employment Area (ha)	Housing	Jobs	Employment Area (ha)	Housing	Jobs	Employment Area (ha)
1 Wallasey	630 (1380)	144	1.61	630 (1380)	144	1.61	1320 (2891)	149	1.66
2 Commercial Core	13455 (29466)	14843	53.01	4230 (9264)	5938	63.9	-45 (-99)	6212	66.84
3 Birkenhead	1830 (4008)	128	1.34	1830 (4008)	128	1.34	2040 (4468)	504	5.29
4 Bromborough & Eastham	1875 (4106)	12114	65.77	1875 (4106)	6855	65.77	1230 (2694)	5703	54.71
5 Mid-Wirral	225 (493)	1634	17.34	225 (493)	1634	17.34	2235 (4895)	844	8.96
6 Hoylake & West Kirby	135 (296)	22	0.22	135 (296)	22	0.22	1170 (2562)	111	1.13
7 Heswall	120 (263)	0	0.0	120 (263)	0	0.0	1410 (3088)	2	0.03
8 Rural Area	255 (558)	877	4.72	255 (558)	877	4.72	240 (526)	188	1.01
<b>Total</b>	<b>18525</b>	<b>29761</b>	<b>144.01</b>	<b>9300</b>	<b>15598</b>	<b>154.9</b>	<b>9600</b>	<b>13713</b>	<b>139.64</b>

Note: Equivalent population was calculated from the number of dwellings based on forecast average property occupancy rate of 2.19

Figure 4-2: Spatial Representation of Growth in Wirral (Scenario 1)

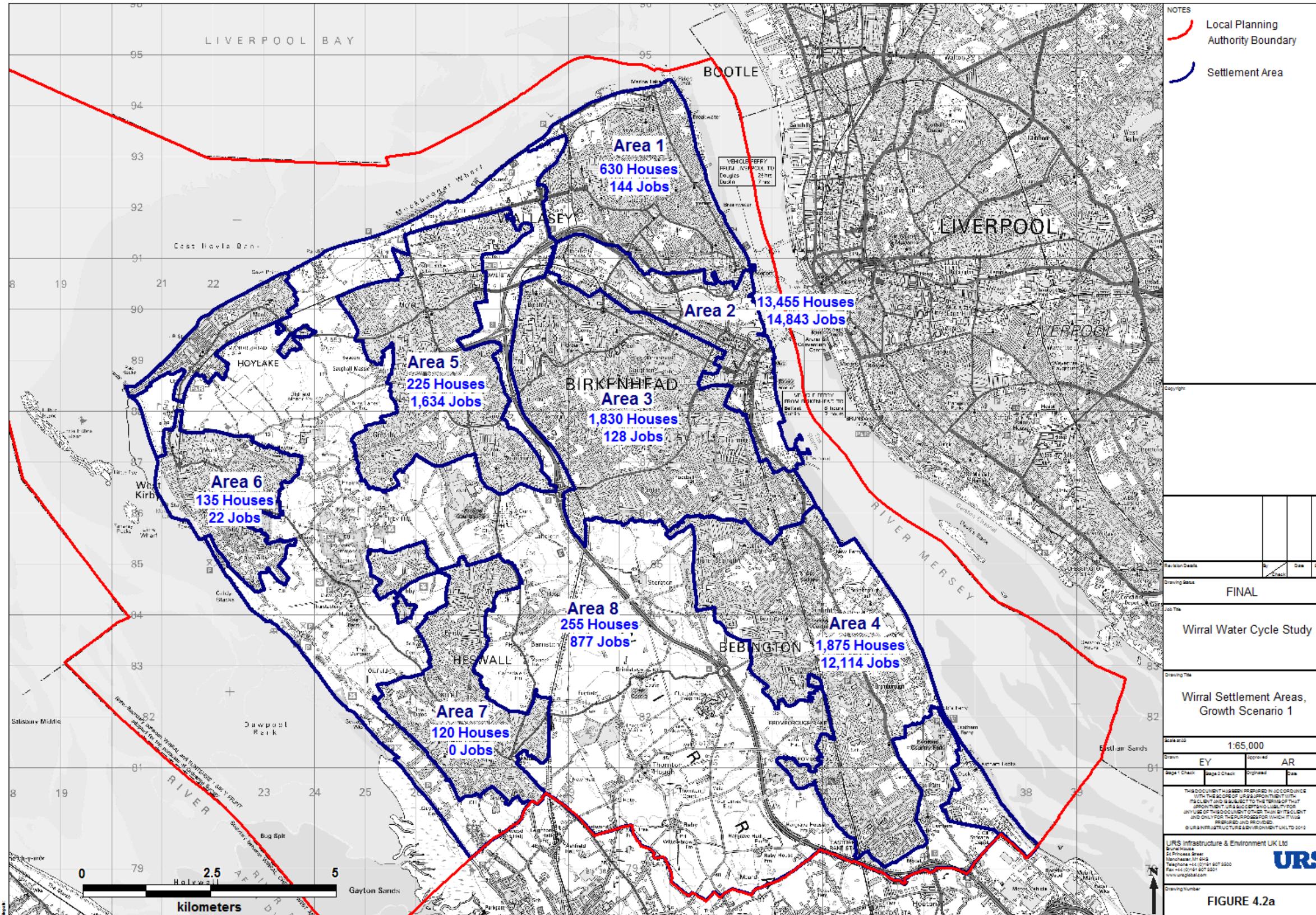


Figure 4-3: Spatial Representation of Growth in Wirral (Scenario 2)

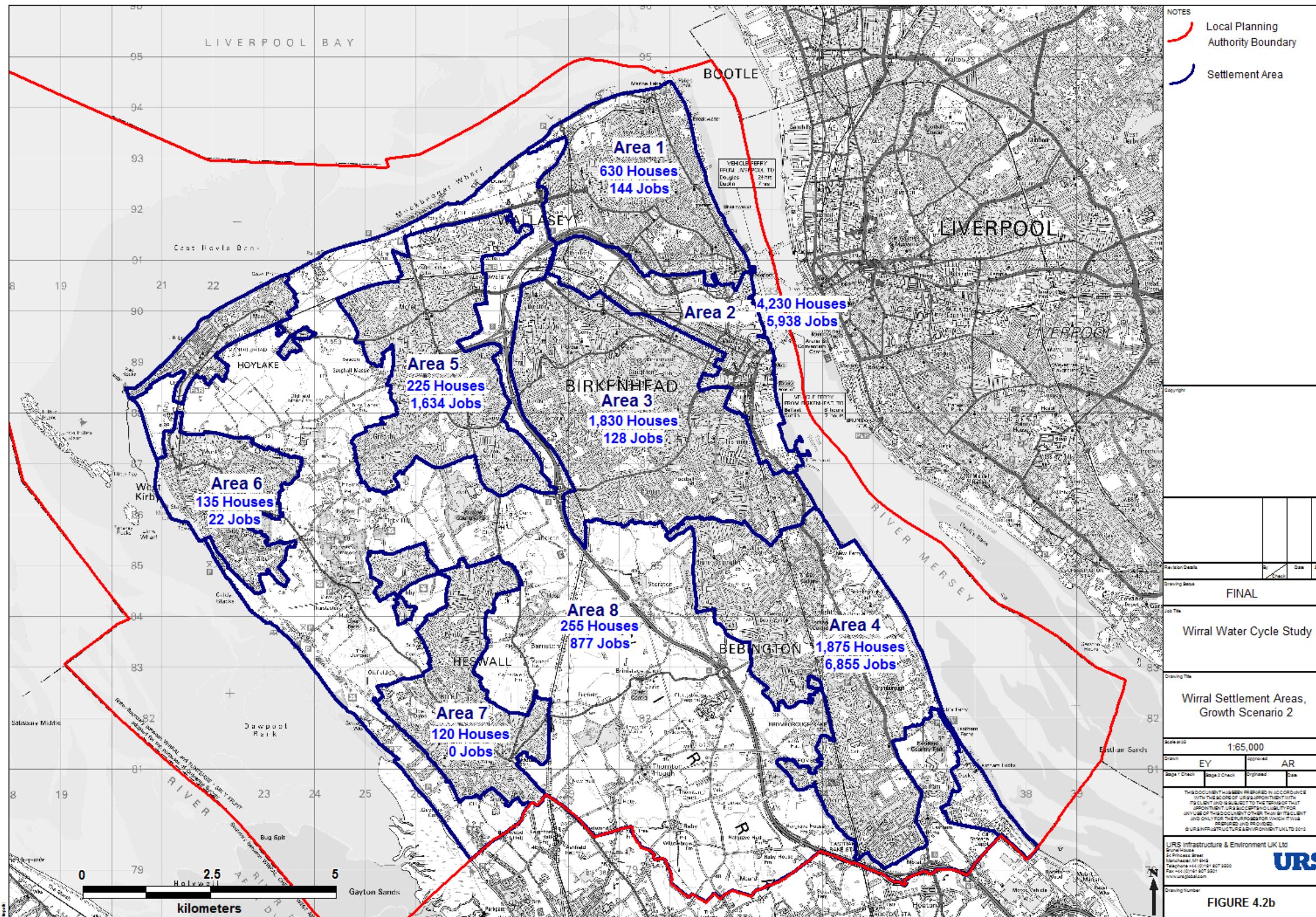
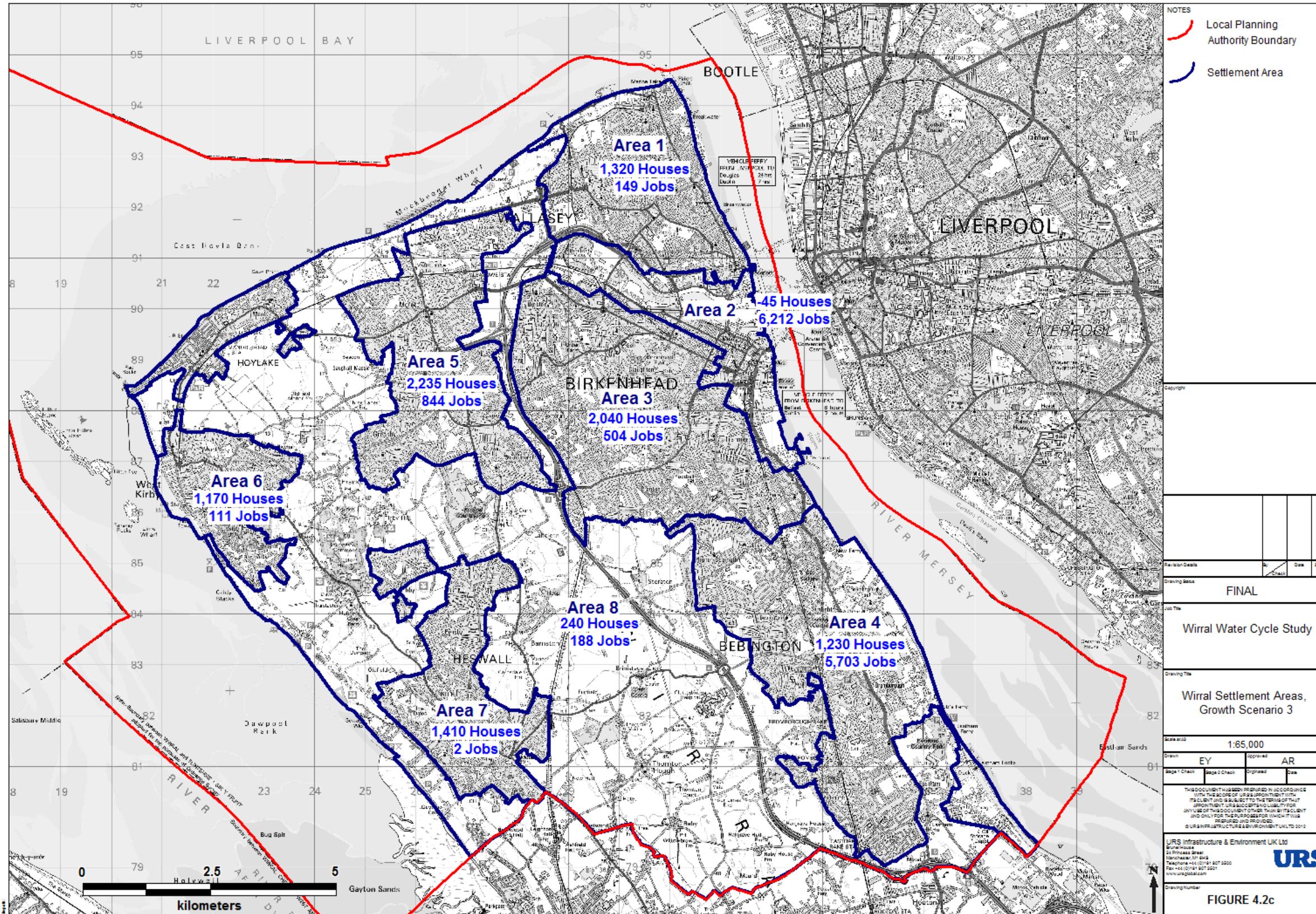


Figure 4-4: Spatial Representation of Growth in Wirral (Scenario 3)



## 5 Overview of Study Approach and Methodology

### 5.1 Introduction

- 5.1.1 The WCS broadly follows the EA guidance and investigates three key areas: Water Resources and Water Supply, Wastewater collection and treatment and Flood Risk Management (Figure 5-1). The water resources and wastewater assessments investigates the impact of growth on both the existing infrastructure and the water environment.
- 5.1.2 The key output for the Outline study is to provide a capacity and constraints assessment (of the water environment and water infrastructure) for each of the proposed housing and employment development areas. This gives an approximate numerical value to the number of houses or jobs that can be provided in each proposed development scenario before infrastructure capacity is reached or the impact of growth on the environment is considered to be significant.

### 5.2 RAG Assessment

- 5.2.1 The results of the assessment are represented using a traffic light assessment matrix or Red, Amber and Green (RAG) assessment. Where there are no constraints or no infrastructure or environmental improvements are required the result is shown as **Green**. Where a constraint is identified and additional improvements are required the result is either **Amber** or **Red**. In general terms Amber means that a fairly straightforward solution is available whereas Red means that either a solution is not available, or where a solution may be available, the cost and timing implications may be significant and need to be investigated further.
- 5.2.2 The level of detail of the assessment of each WCS element depends on the amount of data available; however, the general approach and RAG assessment principle applies in each case. Further details of the assessment methodology can be found in the Technical Appendices Report.
- 5.2.3 The traffic light assessment gives a visual representation of constraints, both spatially and over time to highlight where and when new infrastructure is required to facilitate development and mitigate impact on the water environment.

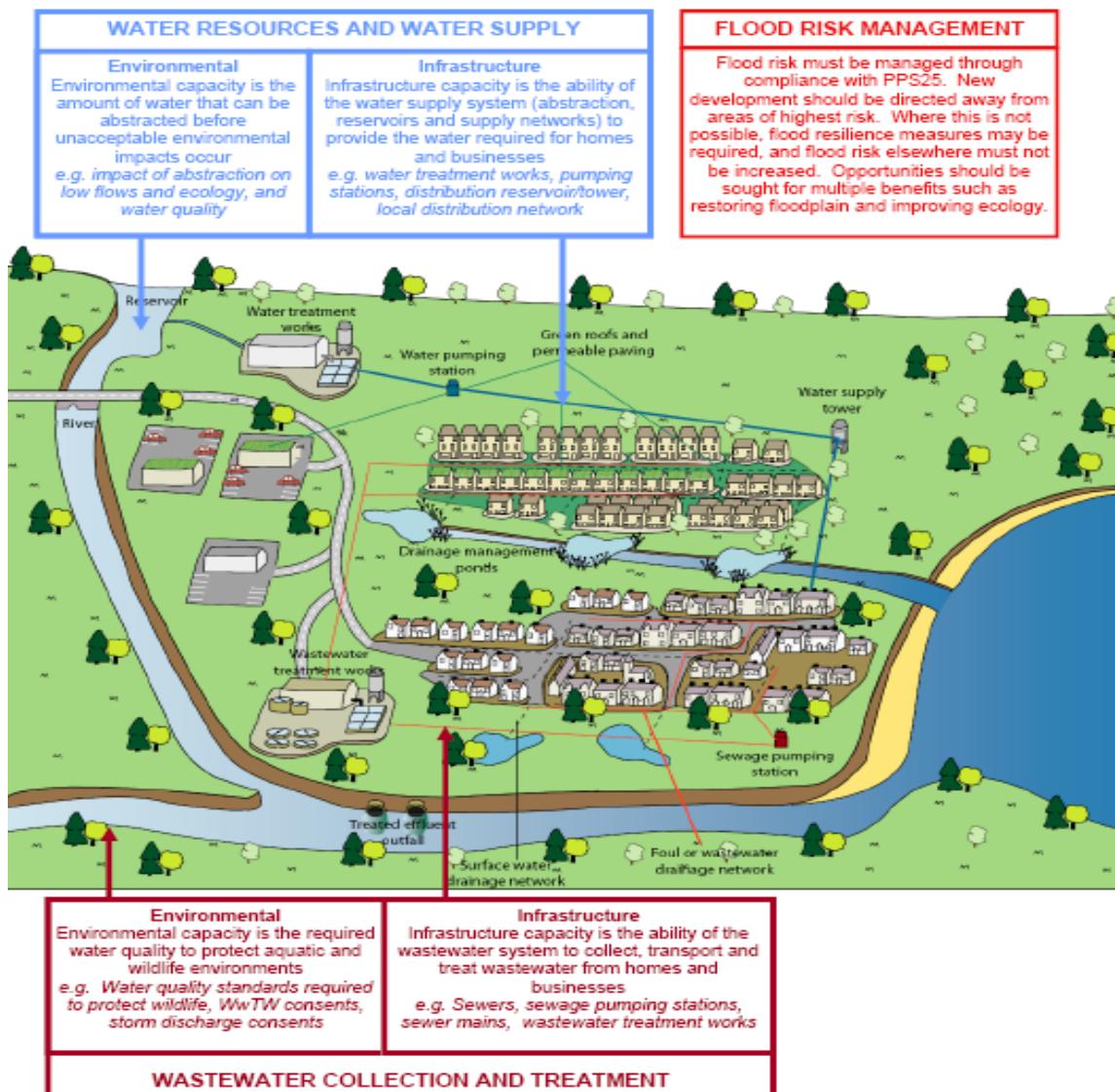


Figure 5-1: Water Cycles Study Components<sup>24</sup>

<sup>24</sup> Source: Environment Agency, Water Cycle Study Guidance, January 2009

## 6 Wastewater Assessment

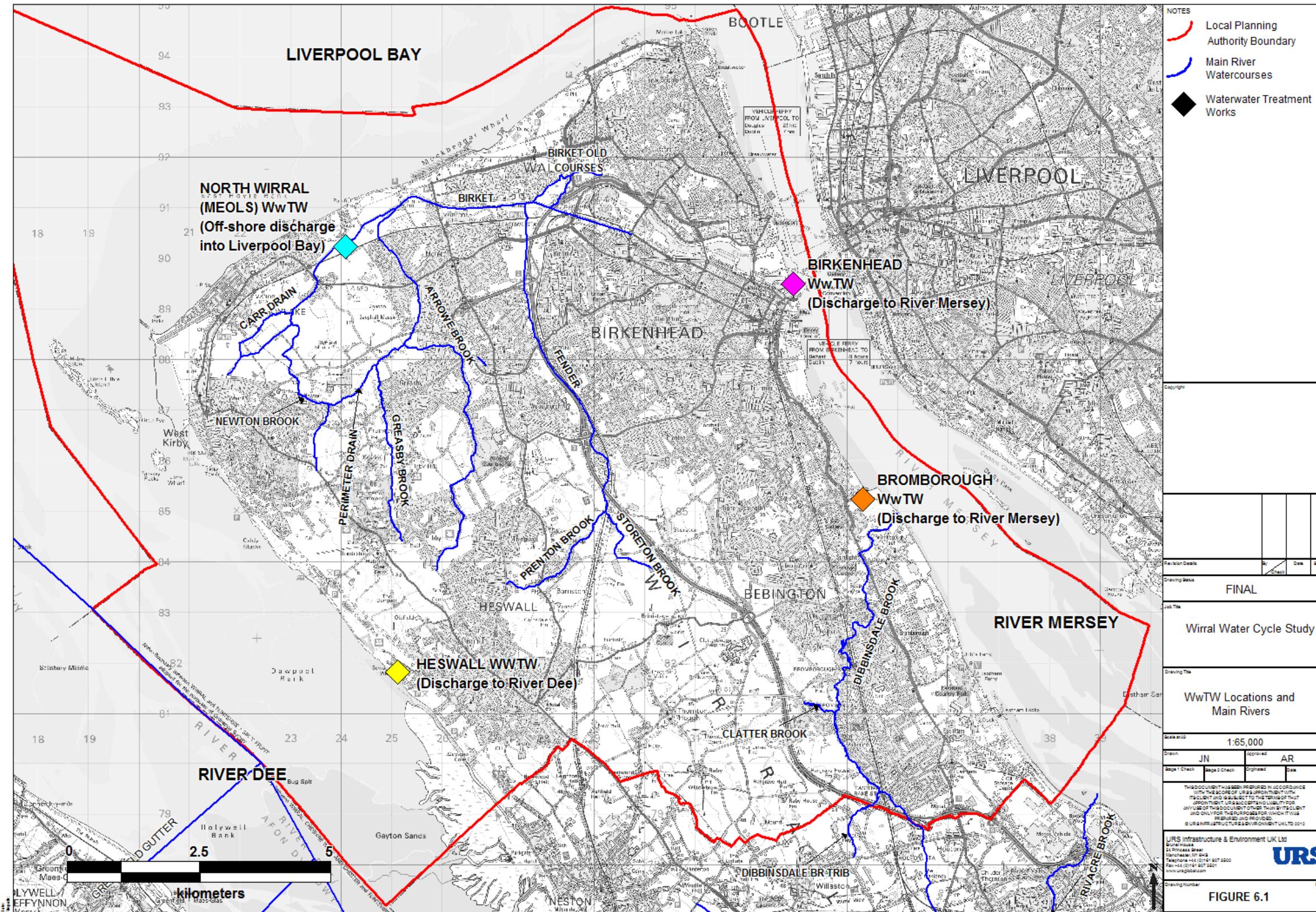
### 6.1 Introduction

- 6.1.1 The wastewater assessment addresses two key areas for wastewater infrastructure and water environment (including water quality and ecology). The infrastructure assessment comprises:
- the baseline with respect to treatment of wastewater and how much 'spare' capacity is available in existing wastewater treatment facilities; and
  - the baseline with respect to wastewater or sewer network and whether there is scope to use the existing and/or planned network system before upgrades are required.
- 6.1.2 An important aspect of the wastewater assessment is the determination of the environmental capacity of the waterbodies receiving the treated effluent discharges. Discharge of additional treated wastewater from new development could potentially have a detrimental impact on: the water quality of receiving waters; the hydrological/hydraulic regime of receiving waters and associated habitats; and, potential increase in flood risk downstream of the discharge. The Outline WCS focuses on the water quality aspects of tidal waters, because all WwTWs in Wirral discharge into tidal waters. Hydraulic capacity issues of the receiving waters are therefore not considered to be an issue for Wirral because of the dominance of tidal conditions in tidal waters.
- 6.1.3 This section presents a summary of the methodology for the outline wastewater assessment and the results of the assessment. Full details of how the assessments were undertaken (including the calculations and modelling), and the full results are provided in Appendix D (Wastewater Assessment – Detailed Assessment) of the Technical Appendices Report.

### 6.2 Wastewater Treatment in the Study Area

- 6.2.1 There are four WwTW within the study area located in Birkenhead, Bromborough, North Wirral (Meols) and in Heswall. Birkenhead, Bromborough and North Wirral (Meols) are owned and operated by UU; Heswall is owned and operated by DCWW.
- 6.2.2 The drainage catchments are completely self contained and waste water generated in Wirral discharges only to these WwTW, which in turn, only receive waste water generated by developments within Wirral.
- 6.2.3 Full details of all WwTW are shown in Appendix D of the Technical Appendices report with their various flow parameters, location and receiving waterbody. The location of each WwTW and corresponding receiving water body is shown in Figure 6-1.

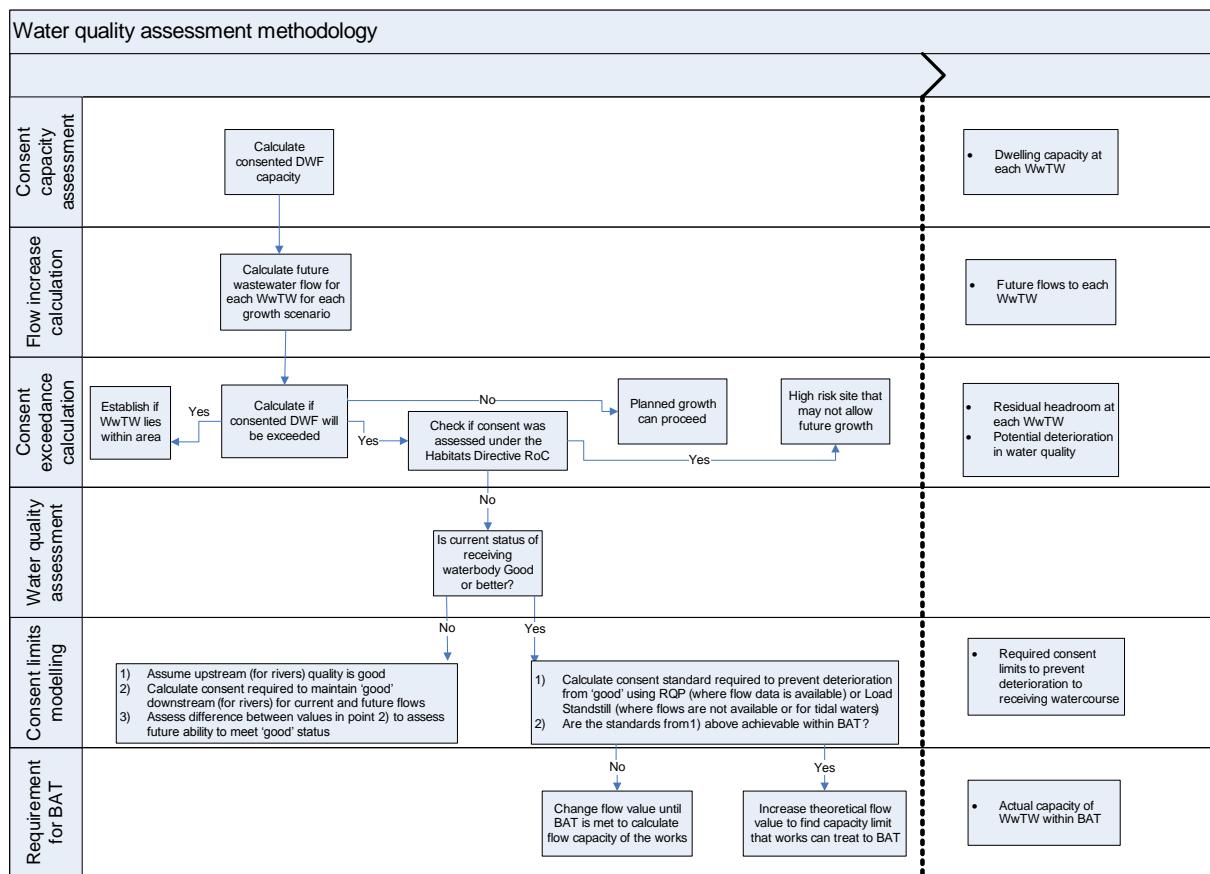
Figure 6-1: WwTW locations and main rivers/'protected' watercourses in Wirral



## 6.3 Wastewater Treatment Capacity and Environmental Assessment

### ***Assessment Methodology Overview***

- 6.3.1 The assessment methodology used in this WCS is based on meeting the objective of the Water Framework Directive (WFD) of no deterioration in water quality status, which the EA has adopted. The EA's Dee and North West River Basin Management Plans set the base status for the classification of waterbodies. This approach provides the best available methodology to assess the impacts of growth on legislative water quality targets for receiving waterbodies (under the WFD and Habitats Directive) and it has therefore been used as the basis of the following assessment methodology.
- 6.3.2 It is important to note that the EA has undertaken a RoC for the Mersey Estuary, which did not identify changes to the consented DWF for any of the WwTW located in Wirral. The RoC information for the Dee was not available and therefore could not be reviewed as part of the study.
- 6.3.3 The assessment methodology is described fully in Appendix D of the Technical Appendices Report, however, in simplified terms, the steps undertaken were as follows (an example summary process diagram is provided in Table 6-1):
- **Step 1** - the proposed growth locations within each Settlement Area were mapped and overlain with the wastewater catchments or drainage areas to determine the WwTW they discharge into.
  - **Step 2 - (WwTW capacity assessment)** – the capacity of each WwTW to accept further flow from growth was calculated using industry standard calculations for each growth scenario (theoretical assessment). This was undertaken for each growth scenario in each settlement area.
  - **Step 3 - (1st stage of RAG assessment)** - if the additional flow can be accepted by the WwTW without requiring an increase in the flow it is consented to discharge, then growth is considered to have a solution for that catchment (Green RAG status).
  - **Step 4 - (Environmental assessment)** - if calculated flow would exceed the consented flow as a result of growth, a water quality modelling exercise was then undertaken to determine whether the increase in flow would result in deterioration in water quality of the receiving waterbody or impact on ecological sites linked to the receiving waterbody. This exercise included an assessment on what quality conditions would have to be applied to each WwTW in order to meet legislative water quality targets and whether these are achievable within the limits of conventional treatment processes and technology.
  - **Step 5 (2nd stage of RAG assessment)**– if the quality conditions that would have to be applied to the discharge are within the limits of conventional treatment, then a solution is considered to be available and the improvements required to deliver these standards would need to be investigated in the WCS (Amber RAG status). If the conditions cannot be met within the limits of conventional treatment and technology, then a solution with existing infrastructure is not available and further investigations to determine a viable alternative option is required in a Detailed WCS (Red RAG status).

**Table 6-1: Diagrammatic representation of the water quality assessment methodology**


6.3.4 All the WwTWs in Wirral discharge into tidal waters therefore a load standstill calculation method has been applied to determine the consent limits required to ensure that the loading in effluent discharges do not exceed the current consent limits. It is important to note that the WwTW consent has two components; flow and water quality parameters (in this instance biological oxygen demand). The load standstill calculation works on the basis that flow can be increased whilst reducing the concentrations of the water quality parameter to ensure that the loading in effluent flows remains the same.

### **Capacity Assessment Results – Steps 1 to 3**

6.3.5 For each housing and employment scenario, the additional wastewater flow that would be generated in each WwTW catchment as a consequence of the proposed growth was calculated based on the following assumptions:

- an average occupancy rate of 2.19 for all new dwellings (average projection over the period 2013-2027 provided by WC);
- a per capita water consumption figure of 125 litres<sup>25</sup> per day for residential use;
- an assumed average per job use of 28 litres per day<sup>26</sup>;
- an assumed per hectare use of 64.8 m<sup>3</sup> per day for general industrial use<sup>27</sup>; and

<sup>25</sup> Taken as the Building Regulations minimum for new homes plus 5 litres for garden watering

<sup>26</sup> Taken from guidance for excessive use provided in CIRIA C657 (2006) Water Key Performance Indicators and Benchmarks for Offices and Hotels

<sup>27</sup> Taken from guidance for hydraulic design for foul sewers for industry where the proportion of wet industry is unknown, WRC (2006) Sewers for Adoption, 6<sup>th</sup> Edition

- UU advised that a daily infiltration rate of 100 litres per person per day should be used.
- 6.3.6 Wastewater generated per person (residential element) was calculated based on the number of dwellings and an average occupancy rate (2.19 people) multiplied by a water consumption rate (125 litres/person/day). Refer to Appendix D of the Technical Appendices for more information on calculation of DWF for the growth scenario.
- 6.3.7 Assessment of the existing capacity indicates that there is some capacity within the existing DWF consent at all four WwTWs (i.e. the daily dry weather flow for each WwTW is less than the consented flow), which indicates that they have capacity for some growth.
- 6.3.8 Birkenhead, Bromborough and Heswall WwTW all have sufficient spare capacity to accept and treat the additional wastewater likely to be generated by the three projected growth scenarios. Growth in each of the three scenarios for all three WwTW does not result in the exceedance of their consented discharge limit – therefore, growth in these catchments can be accepted within current consented limits for all three proposed growth scenario.
- 6.3.9 North Wirral (Meols) WwTW on the other hand has limited capacity to accept and treat any further wastewater from growth without requiring an increase in the volumes that it is consented to discharge<sup>28</sup>. Whether the existence of a constraint should be classified as amber or red depends on the existence of a solution within the limits of conventional treatment or not. If a solution can be found within the limit of conventional treatment then it is classified as amber otherwise the constraint is considered to be significant, in which case it is classified as red.
- 6.3.10 In their response to the draft Outline WCS report for Wirral, United Utilities confirmed that they will work closely with Wirral Council to consider how the impact of growth on water and wastewater infrastructure can be most appropriately managed and that applicants for new development are encouraged to engage in pre-application discussions with the local planning authority and United Utilities at the earliest opportunity.
- 6.3.11 Although the assessment does not show Heswall WwTW as exceeding its current consent in future growth scenarios, it is worth noting that the DWF calculated for Heswall for Growth Scenario 3, is at 94% of the consented value. Similarly Bromborough WwTW has less than 10% of the current consent available when future growth scenarios are taken into consideration. The sensitivity of growth to areas draining into these WwTW should therefore be tested in future investigations.
- 6.3.12 The findings of the study in relation to Heswall WwTW were confirmed by DCWW. In their response to the draft Outline WCS report for Wirral, DCWW stated the following:

*“We can confirm that we do not foresee any restrictions on Heswall WwTW receiving foul flows from any of the above scenarios, however, this appears to be the maximum development flows that could be accommodated within the WwTW. Similarly to the sewage network, if any additional development were to take place and there were no*

<sup>28</sup> In UU's Business Plan 2010-15 (published in 2009) a risk-based methodology was applied to UU's wastewater system over a 25 year planning period. This identified 'at risk' WwTWs according to their relative exposure to demand-led impacts and requirement for investment in AMP5. Chapter C4 Appendix 1: Wastewater Supply/Demand Management Plan indicated that North Wirral (Meols) WwTW was considered at 'medium' risk, with Birkenhead WwTW classed as 'business as usual' and Bromborough WwTW as 'low' risk.

*improvement works planned for the WwTW, should a developer wish to proceed in advance of any planned regulatory improvements by DCWW, then financial contribution from developers are required to fund these essential improvement to avoid exacerbation of current license conditions*<sup>29</sup>.

- 6.3.13 Several of the Settlement Areas are affected by this limited capacity at North Wirral (Meols) WwTW, including:
- Part of Settlement Area 5 Mid-Wirral;
  - All of Settlement Area 6 Hoylake and West Kirby;
  - Part of Settlement Area 7 Heswall; and
  - Part of Settlement Area 8 Rural Area.
- 6.3.14 The analysis shows that the consented volumetric capacity will be exceeded for all 3 growth scenarios for North Wirral (Meols) WwTW. Temporal analysis suggests that the DWF consent will be exceeded in 2015 for Scenario 1 and 2 (72 houses, 331 jobs and 3.2 hectares of B2 use land), and in 2014 for Scenario 3 (418 houses, 128 jobs and 1.2 hectares of B2 use land). This effectively means that there may not be enough lead time for UU to implement infrastructure upgrades within AMP5 (2010-2015), if an agreement to increase the current consent is not reached with the EA.
- 6.3.15 Full details of the scenarios are included in Appendix D of the Technical Appendix report, including how each growth scenario impacts on the residual dwelling capacity of each WwTW. These results are included as mapped catchments with dwelling numbers in the Technical Appendices report. This has been based on the assumption that new development would connect to the existing UU and DCWW system.
- 6.3.16 For growth located within North Wirral (Meols) WwTW catchment, it was necessary to move to Step 4 in the process, and determine whether a solution to increase consented discharges exists which is both feasible (within the limits of conventional treatment) and can ensure downstream and local area WFD and Habitats Directive water quality targets and ecological site requirements can be met.

### **Capacity Assessment Results – Steps 4 & 5**

- 6.3.17 Before the calculations required for Steps 4 & 5, it was important to define the targets that need to be met in the receiving tidal waters to meet legislative water quality requirements and to ensure downstream ecological sites were not adversely affected.
- 6.3.18 A review of ecological sites in the study areas was undertaken to determine which of these sites are hydrologically linked or hydrologically dependent on groundwater or surface water systems in the study area. A further screening assessment was then undertaken to determine if any of the groundwater resources or surface water systems linked to the sites were likely to be altered as a result of discharges of treated wastewater. These sites were then assessed for potential impact as a result of discharges likely to occur due to growth in

<sup>29</sup> DCWW response letter to Draft Water Cycle Study – Wirral (December 2011), Reference DS/RP/WIR/20-WCS

the study area. This screening process has used the EA's RoC process and conclusions from the WCS Scoping report.

- 6.3.19 There are a number of consented CSOs in the study area, which can affect water quality in the receiving watercourses they discharge into. However, unlike the WwTWs a comprehensive assessment of the capacity and potential water quality impacts associated with an increase in the frequency of discharges from CSOs cannot be undertaken within the scope of the Outline WCS. This may be considered further on a case by case basis when a better idea of development locations is known.

## 6.4 Ecological Site Assessment

### ***Habitats Directive sites***

- 6.4.1 There are a number of hydrologically sensitive, internationally important sites either within or linked to the study area that could potentially be affected by additional wastewater discharges from WwTW or combined sewer overflows (CSOs) in Wirral as a result of growth. The location of all ecological sites (including national, regional and local) are listed below and shown in Figure 6-2.
- Liverpool Bay SPA;
  - Dee Estuary/ Aber Dyfrdwy – SPA, SAC Ramsar;
  - Mersey Narrows and Wirral Foreshore pSPA and pRamsar;
  - Mersey Estuary, SPA, Ramsar; and
  - Ribble and Alt Estuaries SPA and Ramsar sites.

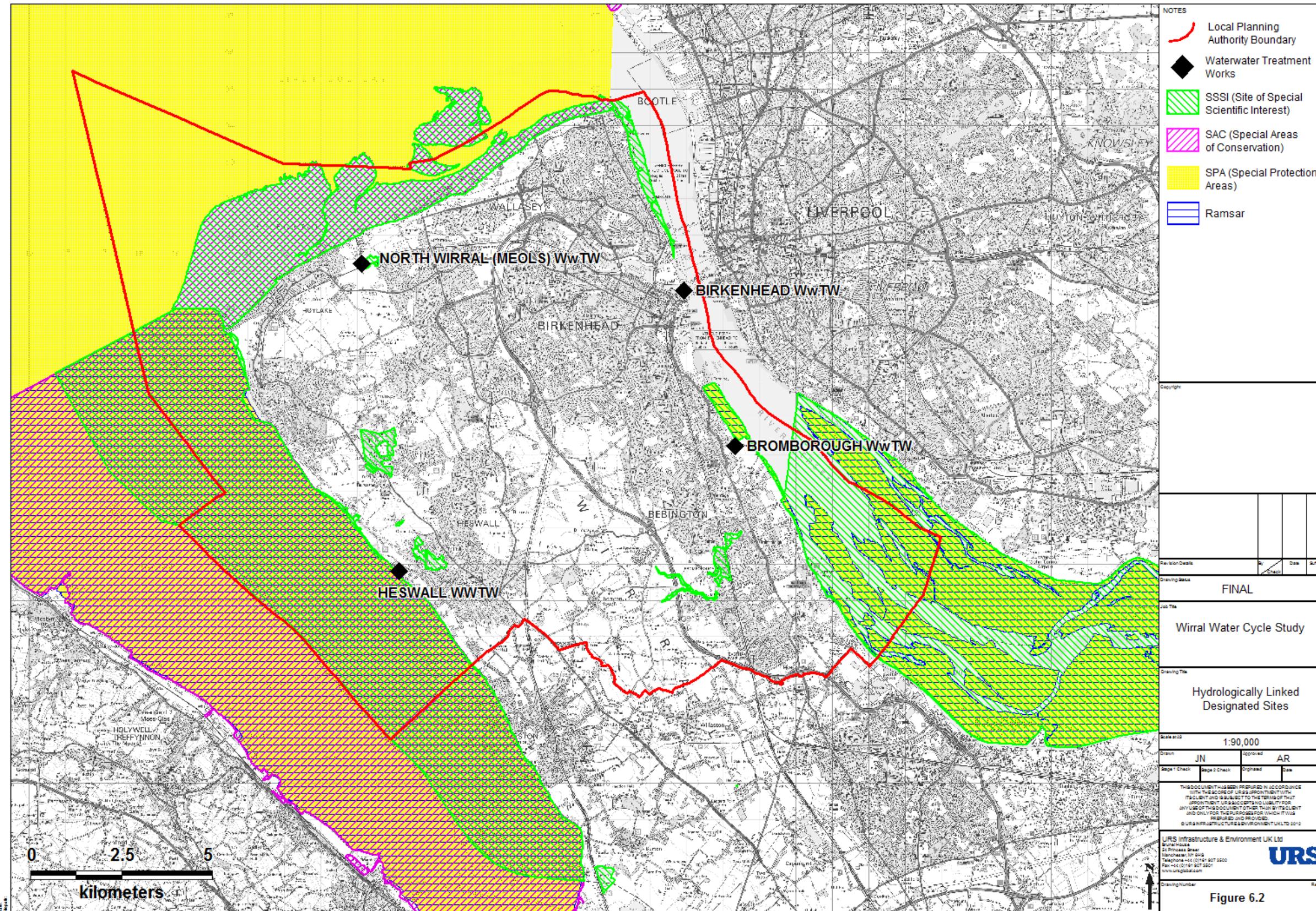
### ***Sites of Special Scientific Interest (SSSI)***

- 6.4.2 There are also a number of nationally important SSSI sites in the study area (other than those already mentioned) that have hydrological links or dependencies on surface water systems, and which may be affected by discharges from WwTW and CSOs. These are listed below, as a result of additional wastewater discharge:
- North Wirral Foreshore SSSI (North Wirral [Meols] WwTW, CSOs);
  - Mersey Narrows SSSI (Birkenhead and Bromborough WwTW, CSOs);
  - New Ferry SSSI (Birkenhead and Bromborough WwTW, CSOs);
  - Mersey Estuary (Birkenhead and Bromborough WwTW, CSOs);
  - Dee Cliffs (Heswall WwtW, CSOs);
  - Dee Estuary (Heswall WwtW);
  - Red Rocks (Heswall WwtW, CSOs)

## Local Sites

- 6.4.3 There are a number of non-statutory sites in Wirral. None of the WwTWs discharge into these sites, although they may potentially be affected by CSO discharges.

Figure 6-2: Location of Hydrologically linked Designated Sites in Wirral



## **Water Quality Modelling Results**

- 6.4.4 For North Wirral (Meols) WwTW catchment, where capacity is expected to be exceeded as a result of growth, a solution is required to treat the additional wastewater generated as a result of growth.
- 6.4.5 The outline preferential solution for this WwTW is to determine if the WwTW can increase the volume it is permitted to discharge without causing deterioration to water quality in Liverpool Bay and associated waterbodies and at the same time not adversely impacting on designated ecological sites. This solution is preferred because it is less costly and less energy demanding compared to building a new facility and can be delivered within a relatively shorter time.
- 6.4.6 The Outline WCS therefore undertook calculations for the North Wirral (Meols) WwTW to determine what ‘quality conditions’ would need to apply to the increase in permitted (or consented) volumes of discharge consent to maintain downstream quality in the receiving waterbody (i.e. no additional load).
- 6.4.7 In theory, WwTW can treat wastewater to any quality required (i.e. up to drinking water quality); however, the better the quality (and tighter the standard met), the more energy is required and the more expensive it becomes.
- 6.4.8 There is a point at which the energy used or the cost involved makes the treatment process unsustainable, in some cases, and treatment up to this point is termed to be ‘within the limits of conventional treatment’<sup>30</sup>. Therefore, the outputs of the calculation process were assessed to determine whether the quality conditions that would need to be applied to the increase in discharge were achievable within the limits of conventional treatment.
- 6.4.9 If the required standards are achievable within the limits of conventional treatment, then it is considered that a solution is feasible in theory and a further assessment may be needed to confirm whether the improvements in treatment processes required are achievable based on whether:
- there is available land space in which to increase treatment processes; or
  - the increase in discharge rates is acceptable to the EA from a water quality and ecological point of view.
- 6.4.10 Further investigations may also need to consider at what point in the planning period these improvements can be in place (thus affecting development phasing) based on preferred development locations.
- 6.4.11 Where the quality conditions required are not achievable within the limits of conventional treatment, an alternative solution needs to be defined as part of a Detailed WCS; this could be one of the following:

<sup>30</sup> For audit purposes, the technical definition of ‘limits of conventional treatment’ in this context is a limit of 5mg/l of BOD.

- a new or upgraded WwTW facility;
- a reduction in proposed growth in this location, or redistributed to a catchment with capacity;
- an alternative location for discharging treated wastewater, i.e. where downstream water quality standards required are less stringent or to groundwater;
- a reduction in the volume of wastewater generated by growth (through stricter water use policy for new builds and reduction in existing household water use – i.e. water neutrality); or
- attenuation of discharge rate through storage of excess flow.

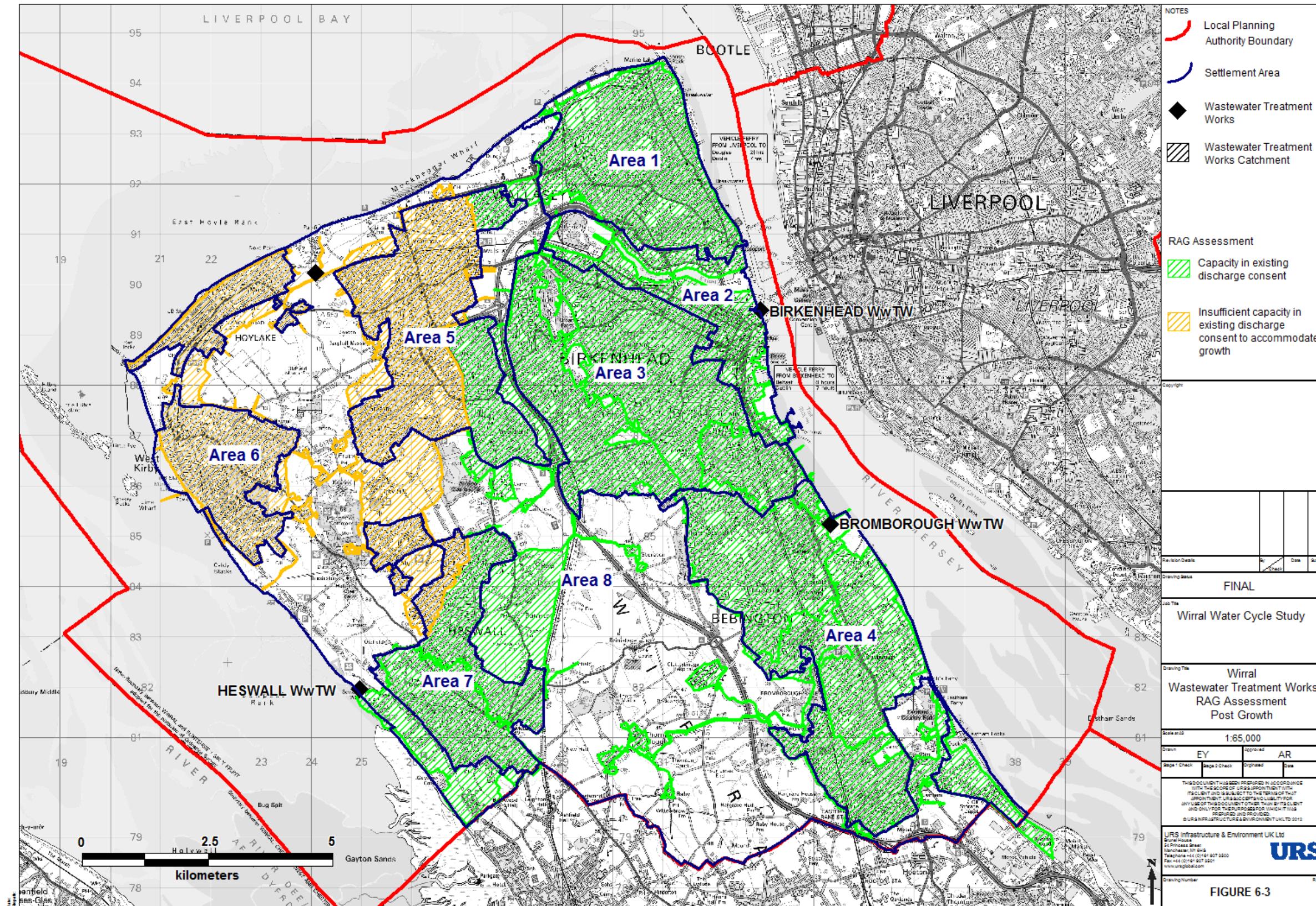
- 6.4.12 The process was agreed with the EA and undertaken for all three housing growth scenarios. Details of the approach are included in Appendix D of the Technical Appendices report.
- 6.4.13 The analysis confirms that North Wirral (Meols) WwTW has a theoretical solution to increase the consented volumes of discharge (but treated to a higher quality) and hence can be considered at this stage to be able to accept growth from all three scenarios and still meet the EA's no deterioration policy on water quality. The feasibility and timing implications of doing so need to be investigated further, once it is known where preferred growth sites will be located, in consultation with EA, UU and WC.
- 6.4.14 The assessment shows that with the additional flows from growth up to 2027 to North Wirral (Meols) WwTW, the consent would need to be marginally tightened from 30 mg/l for BOD (95%ile) to 26.9 mg/l in order to prevent deterioration of the receiving waterbody. This is not considered to be a major constraint as the quality targets could be achieved with conventional wastewater treatment technologies and therefore not have a negative impact on the surrounding designated Shellfish water, Bathing Water and Natura 2000 sites. Table 6-2 summarised the result of the analysis for the three scenarios.

**Table 6-2: Summary of modelling results & suggested BOD consent limits for North Wirral (Meols) WwTW**

Development Scenario	DWF (m <sup>3</sup> /d)	Suggested BOD consent limit (mg/l as 95% ile)
1	17,693	28.2
2	17,693	28.2
3	18,587	26.9

- 6.4.15 It follows from above that the limited capacity at North Wirral (Meols) WwTW can be solved within the limit of conventional treatment. The constraint is therefore classified as amber in the RAG assessment and the catchment for the North Wirral (Meols) WwTW (and the Settlement Areas it drains) are mapped as amber in Figure 6-3. Any growth in these areas will require the consent parameters of the discharge to be reviewed and altered or an alternative solution that will enable compliance with the tidal discharge 'no deterioration' water quality requirements (e.g. attenuation of additional flows).

Figure 6-3: WwTW Capacity Post-Growth



***Water Framework Directive Targets and Next Stage of the HRA***

- 6.4.16 A Habitats Regulation Assessment (HRA) was undertaken on behalf of WC, to inform the Council's Core Strategy Preferred Options. The HRA report concluded that adverse effects could occur (principally 'in combination' with other development within Merseyside) on European sites in the absence of amendments to Core Strategy policy through impacts of dock, port and channel construction and operation, recreational disturbance, deteriorating water quality from the discharge of treated sewage effluent, coastal squeeze & loss of supporting habitat and possible impacts of renewable energy schemes. The European sites are listed below, and associated direct WwTW outfalls:
- Dee Estuary SAC, SPA & Ramsar site (Heswall WwTW)
  - Mersey Estuary SPA & Ramsar site (Bromborough WwTW)
  - Mersey Narrows & North Wirral Foreshore pSPA & pRamsar site (downstream of Birkenhead and Bromborough WwTW);
  - Liverpool Bay pSPA & pRamsar site (North Wirral (Meols) WwTW); and
  - Ribble and Alt Estuaries SPA & Ramsar site (Birkenhead, Bromborough, North Wirral (Meols) WwTW).
- 6.4.17 Table 6-3 shows the WFD based water quality targets for the above sites. The wastewater assessment has shown that North Wirral (Meols) WwTW is the only WwTW that will exceed its current discharge consent as a result of growth and all other WwTW in Wirral will still have headroom in their consent for all three growth scenarios, although Heswall and Bromborough are shown to be close to reaching their capacity in some scenarios.
- 6.4.18 It can therefore be deduced from the outline assessment that growth will not jeopardise achievement of the WFD targets for the Dee Estuary SAC, SPA & Ramsar site, Mersey Estuary SPA & Ramsar site and Mersey Narrows & North Wirral Foreshore, provided that the increase in DWF at North Wirral (Meols) WwTW is counterbalanced by a reduction in the concentration of the allowable water quality parameters of the discharge.
- 6.4.19 This study has determined the reduction in water quality parameters required to meet WFD targets, based on calculations that ensure no increase in overall load and that these are achievable within the limits of available technology. Whilst Habitats Directive targets for the sites are not directly comparable to WFD targets, ensuring no increase in loading of key parameters will also ensure that discharge of additional treated sewage effluent will not adversely impact on the European Sites.
- 6.4.20 Provided that there is no increase in load, the North Wirral Foreshore pSPA and Liverpool Bay pSPA & pRamsar site targets will not be adversely affected by growth with respect to the discharge of additional treated sewage effluent. The next stage of the HRA should take these findings into consideration and be informed and refined if necessary in further studies.

**Table 6-3: Downstream waterbodies WFD status and targets**

Wastewater Treatment Works	Actual receiving waterbody	Downstream WFD waterbody	Current Overall Status	Target Overall Status	Current DO status	Target DO status
Birkenhead	Mersey Estuary	Mersey GB531206908100	Moderate	Good (2027)	Good (DO)	Good (DO)
Bromborough	Mersey Estuary	Mersey GB531206908100	Moderate	Good (2027)	Good (DO)	Good (DO)
Heswall	Dee Estuary	Dee (N. Wales) GB531106708200	Moderate	Good (2027)	High (DO)	High (DO)
North Wirral (Meols)	Liverpool Bay	Mersey Mouth GB641211630001	Moderate	Good (2027)	High (DO)	High (DO)

### ***Further Modelling***

6.4.21 It is recommended that the water quality modelling for North Wirral (Meols) WwTW is reviewed once a clearer distribution of development locations has been identified by WC through the site allocations process. The EA should be consulted to confirm the acceptability of the “no-deterioration” policy and to agree the new discharge consent limits if required to accommodate growth.

### ***Ecological Enhancement Opportunities***

6.4.22 There are opportunities available to enhance the biodiversity of Wirral through initiatives associated with the WCS. As a first step towards identifying these opportunities the Green Infrastructure Framework for North East Wales, Cheshire and Wirral (Mersey Dee Alliance, March 2011) was reviewed in order to determine which, if any, WwTWs are physically close to any of the green corridors initiatives identified in the Framework.

6.4.23 An assessment of areas of priority for green infrastructure investment identified a number of areas within Wirral that have a significant need or present a significant opportunity for green infrastructure.

6.4.24 The Green Infrastructure Framework identifies several areas as priorities for green infrastructure action. All four WwTWs were identified as being located within or immediately adjacent to the action plan areas:

- W1 Wirral Coastal Park and Wirral Way – contains Heswall and North Wirral (Meols) WwTWs;
- W2 Birkenhead & Wallasey housing renewal areas, including Wirral Waters; and
- W3 Mersey Shore (Ellesmere Port to Seacombe) – contains Birkenhead and Bromborough WwTWs.

6.4.25 Opportunities to enhance the green infrastructure are discussed later in section 9.3.

## 6.5 Wastewater Network Assessment

- 6.5.1 The North West Regional Water Cycle Study<sup>31</sup> listed 4 pumping stations that were identified as requiring investment to ensure that operation could be maintained and that they could support additional flows generated by future development (Bidston Grant, Moreton, Leasowe Road, Stavordale Road pumping stations). UU have been unable to confirm whether these pumping stations have been upgraded since the regional WCS was published in 2009, therefore, upgrades may be required depending on the amount of development directed to the catchment draining into these pumping stations.
- 6.5.2 Most of the sewers in Wirral are combined sewers, which collect both foul flows and surface water runoff from the area they are connected to. In order to quantify the impact of planned developments on the existing sewer network it is necessary to undertake detailed sewer network modelling which will take into consideration the effect of rainfall in addition to foul water flows from development sites on the hydraulic capacity of the sewers.
- 6.5.3 A full assessment of capacity would require knowledge of development site locations and the areas contributing surface water runoff to the sewerage system, in addition to detailed information on the sewer network. As this information was not available at this stage of the WCS and given the complexity and time required to undertake such an assessment, it has not been possible to determine the constraints and location of pinch points in the existing sewer network. Therefore, a high level assessment of potential capacity and connectivity issues in the catchment networks draining to the key WwTWs has been carried out based on the existing data on the sewer network and historical evidence of flooding.
- 6.5.4 Although information on existing pinch point and capacity issues within the existing sewer network were not available to inform the study, both UU and DCWW provided general information on their respective sewer networks, which was relied upon in conjunction with historical evidence of flooding as documented in Wirral's PFRA, for the assessment. Full details and results of the assessment are included in Appendix F of the Technical Appendices Report.
- 6.5.5 The high level assessment involved:
- assessing frequency of current sewer flooding incidents, which highlight current incapacity in the network;
  - assessing location of wastewater pumping stations and storage tanks, the adequate functioning of which are key to the performance of the sewer network. Although the presence of storage tanks in itself does not necessarily mean that a capacity problem exists, they underline the need to minimise additional flows discharging into the combined sewerage system;
  - assessing the coverage of the sewer network in growth areas.
- 6.5.6 The conclusions of the assessment are summarised below.

<sup>31</sup> Halcrow Group Ltd, North West Growth Area Water Cycle Strategy Scoping Study, May 2009

## **General Conclusions for the Council**

- The sewerage system is predominantly combined in Wallasey (Area 1), Birkenhead (Area 3) and the northern parts of Bromborough and Eastham (Area 4) and Hoylake and West Kirby (Area 6), respectively. With the exception of Area 8, which is largely rural, there is a significant presence of a separate system for surface water in all other areas.
- The historical evidence of flooding shows a widespread distribution of sewer flooding, both in areas with predominantly combined systems and those with a significant proportion of a separate surface water system. It is likely that surface water is the main cause of this flooding, which highlights the need for surface water management. Hoylake and West Kirby (Settlement Area 6) has the least number of recorded sewer flooding incidents.
- A number of pumping stations, storage tanks and CSOs are located across the borough. This suggests that significant parts of the borough are reliant on sewage pumping and suggests that there may be capacity issues within the sewer network system.
- The Commercial Core (Area 2) and the Rural Area (Area 8) have the least sewer network coverage. The lack of sewerage coverage is potentially a major constraint in the Commercial Core (Settlement Area 2) where a very significant amount of development is planned within the Wirral Growth Point area.

## **Settlement Area Summary**

- 6.5.7 As discussed below, the assessment shows that there may be potential capacity constraints within the sewer network in all the development areas either as a result of limited network coverage or hydraulic capacity.
- 6.5.8 **Wallasey (Settlement Area 1):** The sewer network coverage for the area is extensive and is predominantly a combined system, which drains into Birkenhead WwTW.
- 6.5.9 **Commercial Core (Settlement Area 2):** Apart from the area south east of the docks, the sewer network coverage for the area is relatively sparse. This might pose a potential problem given the significant amount of planned development.
- 6.5.10 **Birkenhead (Settlement Area 3):** The sewer network coverage for the area is extensive. The sewer network is mainly a combined system in the eastern section of Settlement Area 3, with a separate surface water system in the western section. The area drains into Birkenhead and Bromborough WwTWs.
- 6.5.11 **Bromborough and Eastham (Settlement Area 4):** The sewer network coverage for the area is extensive and comprises a mixture of combined and separate systems, which drains into Bromborough WWTW.
- 6.5.12 **Mid-Wirral (Settlement Area 5):** The sewer network coverage for the area is extensive and comprises an evenly balanced system of combined and separate surface water network, which drain into either Birkenhead WWTW or North Wirral (Meols) WWTW.

- 6.5.13 **Hoylake and West Kirby (Settlement Area 6):** The sewer network coverage in the urban area is extensive and is predominantly a combined system, with extensive surface water networks, which drains into North Wirral (Meols) WWTW.
- 6.5.14 **Heswall (Settlement Area 7):** The sewer network coverage in the urban area is extensive and is mainly a combined system, with the north western section draining into North Wirral (Meols) WWTW, the eastern section draining to Birkenhead WWTW and the western section draining into Heswall WWTW.
- 6.5.15 **Rural Area (Settlement Area 8):** The sewer network coverage in the area is very sparse, however the amount of development planned for the area is very small.

### ***Further Work***

- 6.5.16 Due to the flat topography of the study area, the sewer system relies on pumping (rather than gravity) to transmit wastewater flow and in many cases, the wastewater system is mainly combined with separate surface water sewers in some areas. This means that the capacity is not just dependent on foul water from the number of connected properties; but also on runoff during storm events. More detailed, site specific assessment therefore needs to be undertaken including sewer network modelling to determine the capacity within the system, and performance and capacity of pumping stations and storage tanks during storm events. It is proposed that this should be undertaken by UU in consultation with WC once sites are identified to enable an assessment to be made.

## **6.6 Wastewater Assessment: Recommendations**

- 6.6.1 The Outline WCS has highlighted several areas of further work that may need to be undertaken once further clarification and numbers for housing and employment growth become available on preferred locations. Recommendations for this further work are discussed in the subsequent section, along with an indication of stakeholder's involvement.
- 6.6.2 Recommendations on Outline phasing implications are provided in Section 10 (Settlement Area Assessments) for those areas where a known constraint or potential future constraint has been highlighted. Recommendations on initial Outline policy for wastewater are included in Section 13.

### ***Wastewater Treatment***

- 6.6.3 For North Wirral (Meols) WwTW, which requires an increase in dry weather flow above consented volumes, but which can meet water quality targets within the limits of conventional treatment, further investigations are required to:
- Refine growth scenarios and associated flow calculations for WwTW;

- in conjunction with UU, determine whether process capacity upgrades are technically and physically possible at site, and determine what impact the timing of upgrades have on phasing of development; and
- in conjunction with UU and the EA, determine if an increase in flow will have an impact on water quality and ecology.

6.6.4 It is also required to determine the impact that delivering such solutions will have on:

- phasing for key growth areas;
- sustainability in terms of energy usage; and
- deliverability of sites and infrastructure (cost and practicality).

### ***Wastewater Transmission***

6.6.5 A quantitative or semi-quantitative assessment of capacity or detailed modelling assessment of network capacity may be required at several key locations (once development locations are known) to determine if upgrades to sewer mains, pumping stations, detention tanks or new sewer provision is necessary. It is recommended that this is carried out by UU using their existing network models once the site locations are known. Applicants for new development are encouraged to engage in pre-application discussions with the local planning authority and United Utilities at the earliest opportunity.

## 7 Water Supply Assessment

### 7.1 Water Demand Calculations

#### ***Methodology***

- 7.1.1 The future water demand following proposed growth has been calculated for all three growth scenarios. For each housing scenario, six different water demand projections have been calculated based on different rates of water use for new homes that could be implemented through potential future policy<sup>32</sup>. For the purpose of undertaking the calculations, WC provided information showing an anticipated decrease in occupancy rates from 2013 to 2027 (from 2.25 to 2.14 people per home) in new homes to reflect changing demographics and an anticipated movement of individuals within the study area as well as inward migration. For the purpose of the calculations, the occupancy rate was averaged across the development period to 2.19 people per household.
- 7.1.2 The projections were derived as follows:
- **Projection 1** – New homes would use UU average metered household consumption of 139 l/h/d reducing to 130 l/h/d by 2024, this should be considered to be the ‘business as usual’ projection (assuming new homes will have the same level of water consumption as for metered properties currently);
  - **Projection 2** – New homes would use UU new metered household consumption (normal year) of 118 l/h/d;
  - **Projection 3** – New homes would conform to Part G of the Building Regulations requirement (in force as of the 6th April 2010) of 125 l/h/d (equivalent to the Code for Sustainable Homes (CSH) Level 1/2 rating of 120 l/h/d plus 5 l/h/d for outdoor use);
  - **Projection 4** – New homes would achieve CSH Level 3/4 rating of 105 l/h/d;
  - **Projection 5** – New homes would achieve CSH Level 5/6 rating of 80 l/h/d; and
  - **Projection 6** – the suggested policy projection (125 l/h/d to 2019, 105l/h/d from 2020 onwards).
- 7.1.3 Projection 6 is intended to represent water use as policy changes in the future, reflecting the application of minimum ratings under Part G of the Building Regulations and the CSH for all new homes, which will be achieved in a stepped approach in line with government aims set out in Building a Greener Future: Towards Zero Carbon Development<sup>33</sup>.
- 7.1.4 The Wirral HRA stated that the strategic planning of development requires that local planning authorities have a role in ensuring that the pressures on available water resources are minimised as far as is practical, using the Core Strategy as a mechanism to deliver measures to supplement those adopted by the EA and water companies as part of their wider resource planning roles.

<sup>32</sup> NB – employment demand remains constant at 28 litres per job created and industrial process demand at 64.8m<sup>3</sup>/day/hectare

<sup>33</sup> DCLG, Building a Greener Future: Towards Zero Carbon Development, 2007.

- 7.1.5 The HRA states that Core Strategy Preferred Option Policy 15 (Better Design) promotes sustainable construction and design including water conservation. The HRA recommends that a specific reference within this Policy could be made for a requirement for new development to achieve a minimum of Level 4 under CSH to ensure that water issues are adequately considered. The suggested policy projection is in line with this recommendation of 105 l/h/d by 2020.

### ***Calculated Water Demand***

- 7.1.6 A full breakdown of the cumulative demand for each housing scenario is included in Appendix G of the Technical Appendices report. Table 7-1 summarises the range of future additional demand (in Millions of litres or Mega litres per day) for each housing scenario.

**Table 7-1: Additional future water demand by 2027 for the Borough**

Housing Scenario	Future Demand (Ml/d)	
	Max <sup>34</sup>	Min <sup>35</sup>
Scenario 1	12.06	9.93
Scenario 2	9.35	8.28
Scenario 3	8.75	7.64

- 7.1.7 Figure 7-1 shows this information as a trajectory over the plan period.
- 7.1.8 The results show that demand for water in Wirral could be reduced by up to 2.13 Ml/d by 2027 (Scenario 1) by adopting more stringent water consumption approaches. The suggested policy projection gives a saving of between 0.37 and 0.74 Ml/d by 2027.
- 7.1.9 Furthermore, taking the findings of Wirral's HRA into account (as outlined in paragraphs 7.1.4 and 7.1.5 above), it is recommended that a minimum code of level 4, under the CfSH, should be encouraged for new developments.
- 7.1.10 In their response to the draft Outline WCS report for Wirral, United Utilities indicated that the recommendations outlined in the Water Cycle Study, such as achieving water efficiency standards to Level 4 of the Code for Sustainable Homes are supported, and that UU will work closely with Wirral Council to consider how the impact of growth on water and wastewater infrastructure can be most appropriately managed.

<sup>34</sup> based on UU's average metered household consumption of 139 l/h/d reducing to 130 l/h/d by 2024,

<sup>35</sup> based on demand if new homes meet code levels 5/6 under Code for Sustainable Homes (80l/h/d)

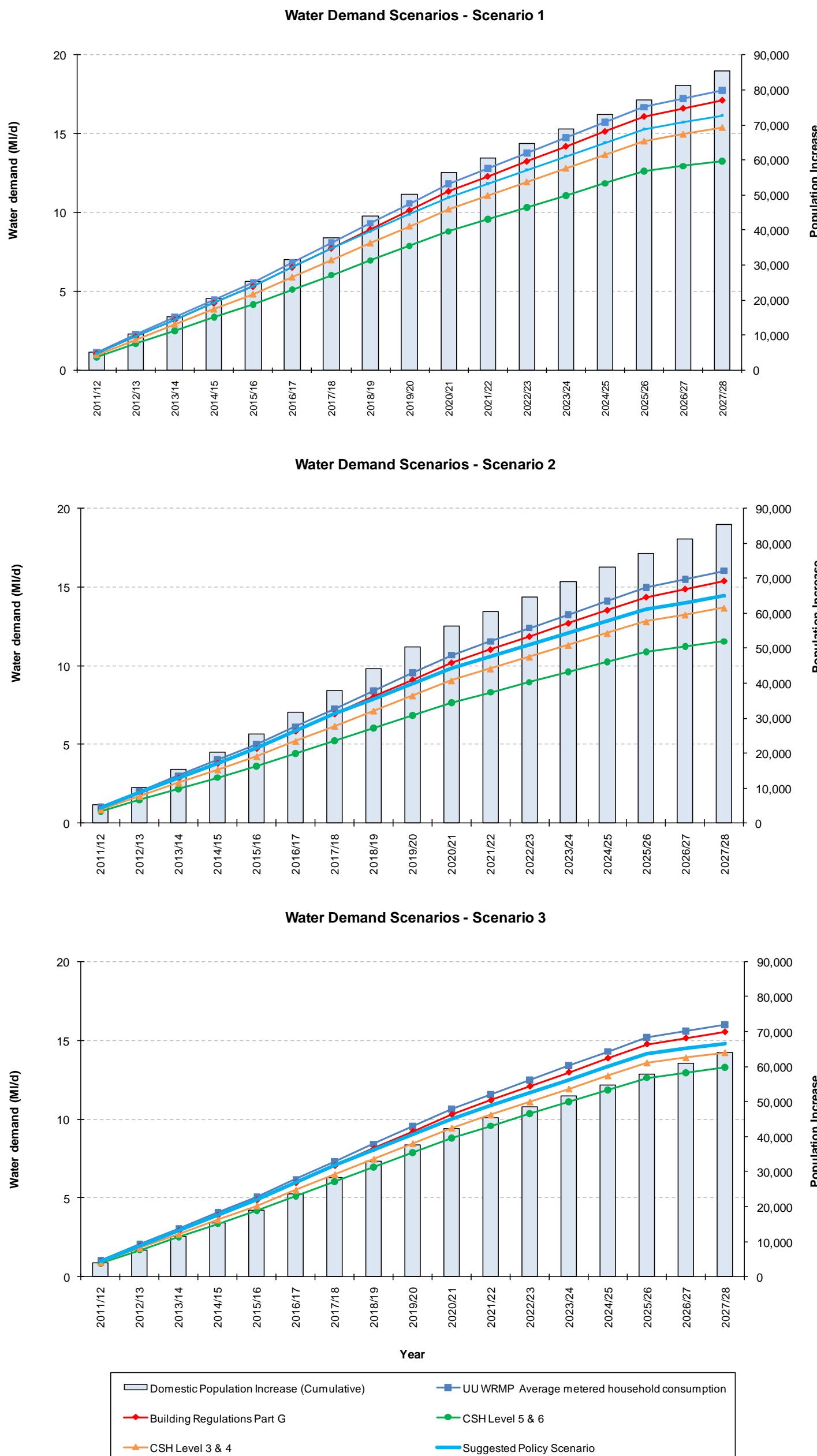


Figure 7-1: Cumulative predicted demand for water by 2027

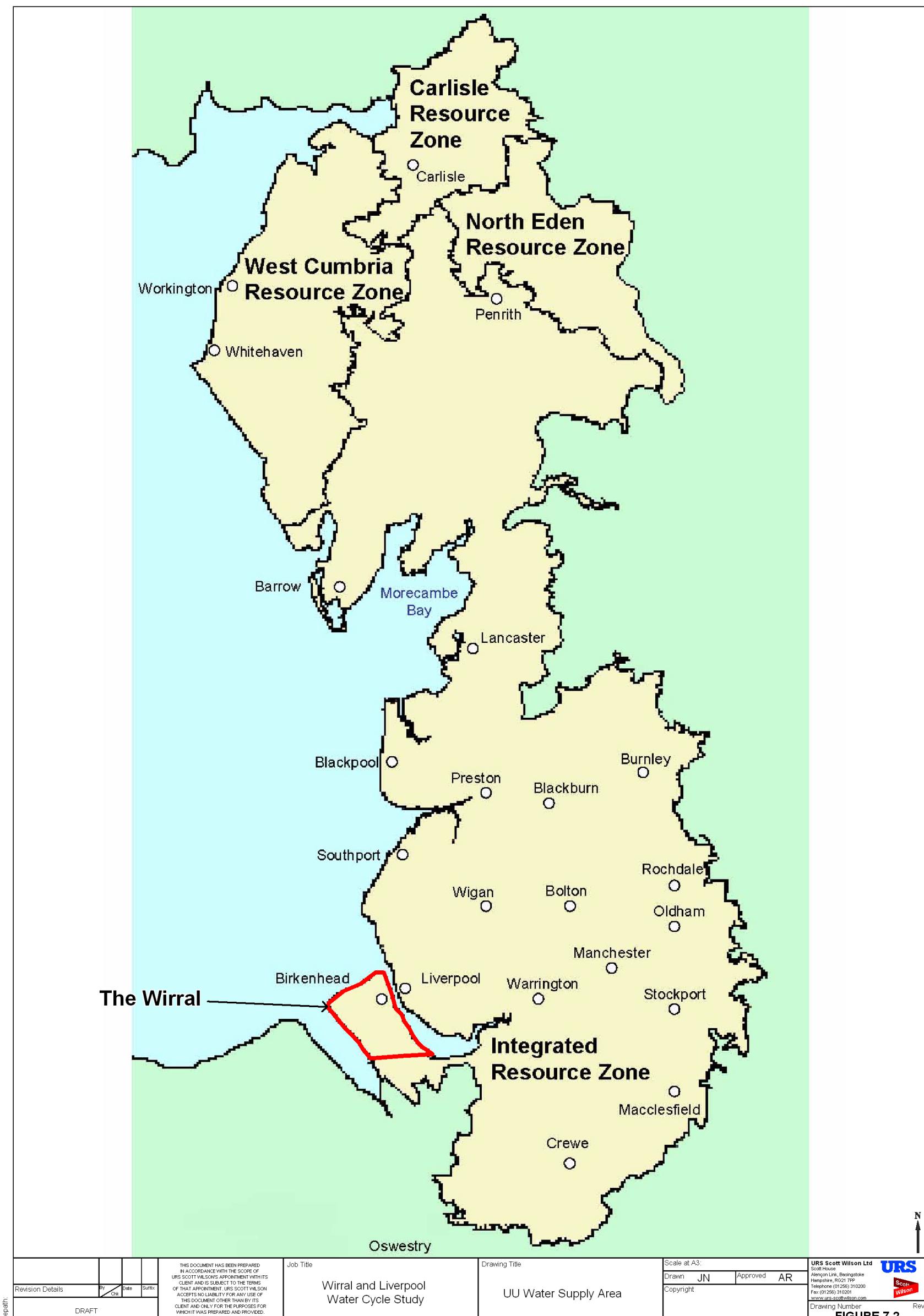
## 7.2 Water Resource Availability and Environmental Assessment

- 7.2.1 The Scoping study has already completed an assessment of the existing baseline with respect to locally available resources in the sandstone aquifers and the main river systems. This assessment was based on the EA's CAMS for the Dee, Lower Mersey and Alt and is not repeated in this Outline WCS. Instead, the Outline study has used the final version of UU's Water Resources Management Plan (WRMP) to determine available water supply against predicted demand. Figure 7-2 shows UU Water Supply area.
- 7.2.2 A full assessment of the available water resources in the study area has been undertaken and is included in Appendix G of the Technical Appendices report. This section of the planning report summarises the key findings with respect to available water supply against projected water demand with growth.
- 7.2.3 UU manages available water resources within the Water Resource Zones (WRZ), which supplies water to Wirral. The areas within the zone share the same raw resources for supply and are interconnected by supply pipes, treatment works and pumping stations such that customers can share the same available 'surplus of supply' of water when it is freely available; but also share the same risk of supply when water is not as freely available during dry periods (i.e. deficit of supply). Water supplied to Merseyside in the integrated WRZ is primarily sourced from the Vyrnwy Reservoir (Llyn Efyrnwy) in north Wales, the River Dee and groundwater sources in Cheshire. During times of additional demand, the supply is supplemented by water from the Lake District<sup>36</sup>.
- 7.2.4 The Integrated WRZ covers Wirral and the baseline supply-demand balance for this WRZ is anticipated to remain in surplus of supply to the forecast demands until 2020.
- 7.2.5 The water available for use in the Integrated WRZ is expected to reduce by 24.8 Ml/d between 2009-10 and 2014-15. There will be an increase in 2012-13 of 16.6 Ml/d due to the introduction of a bi-directional pipeline, known as the "West-to-East Link", between Merseyside and North Manchester. Water availability will then reduce markedly by 2014-15, mainly due to the anticipated 32.9 Ml/d sustainability reductions arising from the proposed abstraction licence changes for the Haweswater and Thirlmere reservoirs and rivers Brennand and Whitendale. A deficit is anticipated to occur by 2022-23 which is expected to increase to the end of the planning period of 2034-35 (deficit of 74.6 Ml/d)<sup>37</sup>.
- 7.2.6 A water resources and demand strategy including leakage reduction, water efficiency and water source enhancements are anticipated to ensure that the demand is met by supply to 2034-35. The source enhancements included in 2034-35 within the Integrated WRZ are Widnes groundwater (22.7 Ml/d), Southport groundwater (22.5 Ml/d) and Oldham groundwater (2.5 Ml/d)

<sup>36</sup> Halcrow (2009) North West Growth Area WCS Scoping Report

<sup>37</sup> UU WRMP

**Figure 7-2: United Utilities Water Supply Area**  
 (Source: United Utilities, Final Water Resources Management Plan September 2009)



- 7.2.7 The solutions identified by UU would remove the deficits in the supply and demand balance for the Integrated WRZ including Wirral. However, it is important to note that the solutions rely on transfer of resources to the WRZ in an area reliant on finite groundwater abstractions. The EA's assessment of water availability<sup>38</sup> suggests that the sandstone aquifer is at its limit of available resources without adverse impact on rivers and ecosystems that rely on it; hence further abstraction (beyond those proposed in the WRMP) and transfer is unlikely in the future.
- 7.2.8 The assessment concludes that, whilst the WRZ that supplies the study area has abstractions that are hydrologically linked to designated European sites, the information provided in the WRMP indicates that abstractions are not likely to lead to a significant effect on European sites, following limited sustainability reductions that may be required subsequent to the completion of the RoC process. As such, there is no reason to conclude that there should be any adverse impact on these sites related to the delivery of the WRMP.
- 7.2.9 It is noted that UU states in its adopted WRMP that the RoC process is not completed and that further sustainability reductions may be put forward; if so, this conclusion may have to be revised but the implication of the WRMP is that UU has taken these possible sustainability reductions into account. The WRMP is due for review in 2014 and it is understood that it will be subjected to a HRA at the next iteration. The assumptions based on the WRMP at this stage will need to be revisited when the next iteration of the WRMP has been agreed.
- 7.2.10 The housing and population growth forecast for Wirral in the North West of England Plan: Regional Spatial Strategy to 2021 (9000 homes) has been incorporated into UU's demand forecast and the subsequent growth points for an additional 29,448 dwellings, above Regional Spatial Strategy levels by 2016-17. Further consultations with WC during the study have shown that not all scenarios being tested in the WCS have been incorporated in UU's demand forecast. Although the effect of additional housing in Wirral alone is not likely to overstretch the resource availability within the Integrated WRZ, a cumulative effect of demand increase could potentially have a significant impact on the supply-demand balance. WC should therefore consult UU if additional developments are identified in future.
- 7.2.11 It should be highlighted that, to date, development and population growth in the Wirral has been less than that anticipated in the WRMP. However, the rate of future growth may still mean that the targets originally catered for in the WRMP are still achievable and, until the WRMP is reviewed by UU, the conclusions can still be regarded as valid.
- 7.2.12 In order to cater for the higher levels of growth proposed it would be prudent to promote water efficiency in new homes and commercial buildings to reduce the additional demand and make supply of water more sustainable. The Outline WCS has therefore undertaken an assessment of feasibility of achieving Water Neutrality in the Study Area, as described in Section 8 of this planning report.
- 7.2.13 It is worth noting that, at the time of writing the final WRMP, UU stated that they were abstracting less water from the environment than at any time since the 1960s and that their

<sup>38</sup> Environment Agency, The Dee Catchment Abstraction Management Strategy, March 2008, Environment Agency, The Lower Mersey and Alt Catchment Abstraction Management Strategy, March 2008

water resources and demand strategy will reduce average water demand in each water resource zone. UU have produced a 2010-11 annual review<sup>39</sup> of the WRMP. This states that no material changes have arisen since publication of the 2009 WRMP.

## 7.3 Water Supply Infrastructure

- 7.3.1 UU have undertaken an assessment of the water supply infrastructure supplying sites identified in the SHLAA, on behalf of WC<sup>40</sup>. The assessment involved identifying if there are any supply issues (pressure, capacity, etc) that may hinder development at the sites. It should be noted that the majority of sites identified as part of the SHLAA and Employment Land studies are either infill or adjoining existing settlements (very little Greenfield development). It is therefore likely that little entirely new infrastructure will be required and the remainder could be supplied through the existing network.
- 7.3.2 UU undertook the water supply infrastructure assessment and categorised water supply to the SHLAA sites as high, medium or low water resource availability as follows:
- **High** – Water and connections available; no expected difficulty in accommodating identified demand growth;
  - **Medium** – Connections not widely available; potential requirement for funding to assist in meeting the new water supply demand; and
  - **Low** – Network at capacity; funding required to meet new water supply demand.
- 7.3.3 Figure 7-3 shows the traffic light assessment undertaken on the SHLAA sites, which is summarised below by Settlement Area:
- **Low Resource Availability** (red) - Settlement Area 2 (network reinforcement) particularly around the Docks, West of Settlement Area 3 in the Tranmere area (pressure issues), Settlement Area 4 near the Port Sunlight, Bromborough Pool and Eastham area (network connectivity issues)
  - **Medium Resource Availability** (amber) - Settlement Area 1 (pressure issues, connectivity and reinforcement required), Settlement Area 5 (Leasowe area relating to network reinforcement and connectivity issues) and Settlement Area 6
  - **High Resource Availability** (green) - Settlement Area 7 and 8 (bar the area near Clatterbridge Hospital)
- 7.3.4 The phasing of potable water infrastructure or upgrades could therefore be considered to be a constraint to the initial phasing of development within Wirral (particularly in Settlement Area 2, 3 and 4) and should be assessed in more detail, in collaboration with UU, once preferred development sites are known.
- 7.3.5 UU have a 14 year cleaning and maintenance programme (2006-2020), involving the cleaning and refurbishment of water mains in the North West. This programme involves undertaking a water mains cleaning or refurbishment process for approximately 40

<sup>39</sup> United Utilities, Annual Review of Water Resources Management Plan 2010/11, June 2011

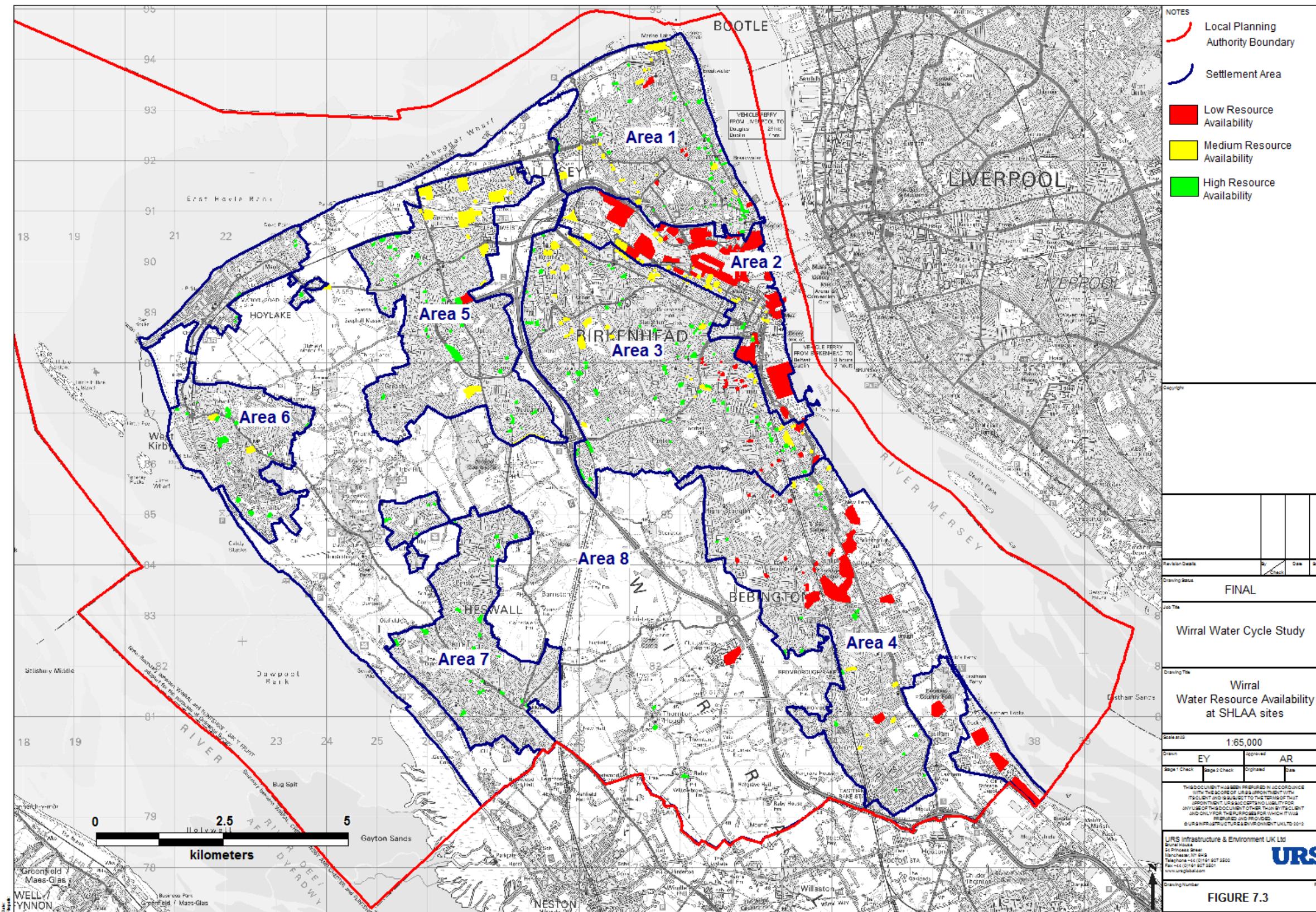
<sup>40</sup> This was an indicative assessment and would have to be reviewed in more detail should a connection request come forward. The ranking is based on a site by site basis and multiple developments scenarios have not been considered; these could have a significant impact on the available water supply and/or the existing/future infrastructure requirements.

kilometres of pipes in Wallasey and Birkenhead to improve supply and is expected to be completed by 2015. This will help to secure continuity of supply rather than creating additional capacity.

## 7.4 Water Supply Recommendations

- 7.4.1 The Outline WCS has highlighted several areas of further work that need to be undertaken once further clarification is available on preferred location and numbers for housing and employment growth. Recommendations for this further work related to water supply are set out in the subsequent section, along with an indication of stakeholder's involvement.
- 7.4.2 Recommendations on initial outline policy for water resources are included in Section 12.
  - Water resource availability towards the end of the plan period (2027) is reliant on intra- and inter-zone transfer, metering and water efficiency measures. The WRMP indicates that the calculated demand can be met by supply in the water resource zone. If growth scenarios are anticipated to be greater than that used within this outline assessment, it is essential that these levels are compared to the growth figures used by UU in the production of their 2009 WRMP to determine whether additional resources are required to support growth.
  - If additional resources are required, it will be necessary to determine if sustainable solutions for local abstraction are available for developers to allow future growth to occur in conjunction with the EA and UU.
  - Once preferred development locations are known a detailed study, in conjunction with UU, may be required to determine resilience in water supply trunk mains, pumping stations and water treatment works in key locations. This assessment will need to determine when upgrades to supply infrastructure will need to be phased in and what impact this will have on development phasing.
  - New development should aim to achieve the water use target under Code Levels 3 & 4 of the Code for Sustainable Homes.

Figure 7-3: Water resource availability for SHLAA sites



## 8 Water Neutrality

- 8.1.1 The Outline WCS has identified that meeting demand for water in some parts of the study area towards the end of the plan period is reliant on strategic transfers of water within the Integrated Water Resource Zone. The UU WRMP states that sufficient resources are likely to be made available for growth up to the end of the plan period; however, the CAMS states that water resources in the study area are close to their sustainable limit and may require further sustainability reductions in the future.
- 8.1.2 It is therefore essential to consider how demand for water in new housing and employment provision can be managed by making new homes as efficient as possible and taking measures to reduce demand from existing population and employment provision.
- 8.1.3 In their response to the draft Outline WCS report for Wirral, United Utilities indicated that the recommendations outlined in the Water Cycle Study, such as improving water efficiency standards are supported, and that UU will work closely with Wirral Council to consider how the impact of growth on water and wastewater infrastructure can be most appropriately managed.

### 8.2 Water Efficiency in the study area

#### ***Water Neutrality***

- 8.2.1 Water neutrality is a concept whereby the total demand for water within a planning area after development has taken place is the same (or less) than it was before development took place. In order for the water neutrality concept to work, the additional demand created by new development needs to be offset by reducing the demand from existing population and employment. If this can be achieved, the overall balance for water demand is 'neutral'.
- 8.2.2 The likelihood of achieving water neutrality can be enhanced by maximising water efficiency within new developments (housing and employment) by introducing a water neutrality concept at a development wide level. It is an aim for any development, (new housing or new employment), to use no more water than is absolutely necessary and re-use as much water as is practical.
- 8.2.3 The first step of any water efficiency plan in Wirral should be to look at water efficiency measures being undertaken by UU.

#### ***UU Future Water Efficiency Plan***

- 8.2.4 A summary of UU's water efficiency measures and targets included in the WRMP are as follows:
- distributed over 550,000 cistern devices free of charge to household customers since 1997/98 and are now distributing the "Save-a-flush" water saving cistern device;

- offer customers household water audits, which provides them with the opportunity to both educate customers with water efficiency messages and provide them with devices to help them save water at home. They have also trialled “visit and fix” home audits;
- regularly visits major industrial, commercial and institutional customers to promote water conservation and the related services such as Water Audit Service;
- provides water conservation information in a range of information packs including: “water savers” packs, to educate and raise awareness of customers;
- UU provides a free meter option scheme, and compulsorily meters new and unmeasured non-households (where appropriate);
- Water butts / composters / trigger hoses;
- UU offers subsidised water butts to all domestic customers in the region for rainwater collection; and
- UU conduct “visit and fix” home audits using qualified, amongst other things to fit “EcoBeta” dual flush conversion devices to save water.

## 8.3 Water Efficiency Targets

- 8.3.1 UU was notified by OFWAT of the mandatory requirement to introduce Water Efficiency Targets as a measure of the company’s obligation to promote water efficiency. This set a target saving of 2.95 Ml/d each year.
- 8.3.2 The Water Efficiency Targets are based on carrying out activities aimed at increasing water savings by household and non-household customers and is set at 1 litre per property per day for each year, which equated to 2.95 Ml/d, and a requirement to provide information to consumers on how to use water more wisely.
- 8.3.3 UU has included the benefits of the Water Efficiency Targets in their baseline demand forecast.

### ***Water Efficiency in New Homes***

- 8.3.4 New homes can be fitted with a range of fittings to reduce demand. In addition, new developments can have community wide measures to reduce the demand in water, these can range from rainwater harvesting to grey water recycling – the use of wash water from showers and sinks in toilets after on site treatment.
- 8.3.5 The CSH sets six levels of sustainability for new build housing. Each level includes mandatory requirements for energy performance and water usage. Level 1 is entry level above building regulations, and Level 6 is the highest, reflecting exemplary developments in terms of sustainability. This provides a flexible outline for improving the overall sustainability of a house. Table 8-1 outlines the water use that must be achieved to reach each of the CSH levels.

**Table 8-1: Code for Sustainable Homes – Water consumption targets for the different code levels and examples of how these targets can be attained in new build**

CSH levels.	Litres/person/day	Examples of how to achieve water efficiency level.
1	120	Install efficient equipment within the home – 18l max volume dishwasher and 60l max volume washing machine. Install 4/6l dual flush toilets. Install 6-9l/min showers. Educate users about how to be efficient water users. Installation of water meters.
2		
3	105	As above. In addition, install water butts and equipment to use rainwater in the garden. Install aerating fixtures into bathrooms and kitchens.
4		Include surface water management in the surrounding development.
5	80	As above, in addition: Grey water recycling, reduction of surface water from the development. Provide water audits for people to show them where they can reduce water usage.
6		

- 8.3.6 The examples of water efficiency measures included in Table 8-1 provide an outline of the possible ways to improve water efficiency. There are many more possibilities that are site specific. Other steps which should be considered in new buildings include: rainwater harvesting from roofs and paved areas (through the use of permeable surfaces); grey water recycling (with some mains support) which can provide enough water to run all toilets, a washing machine and outside taps. These recommendations should be considered further in a detailed study at a site specific level, including a high-level assessment of the possible cost and energy use implications of rainwater harvesting and greywater recycling.
- 8.3.7 Measures such as spray taps, water efficient showers and appliances, low flush toilets and outdoor water butts can achieve the water efficiency levels specified above. These add a minimal cost in the range of £200-£800 to development per house. Water meters should also be installed by water companies. Increased water efficiency will directly reduce consumer water and energy bills and reduce carbon dioxide emissions.
- 8.3.8 Strategic community approach to water harvesting and reuse provides an opportunity to achieve significant water savings and should be considered for future developments. Non-residential developments should form part of such proposals. The Wirral Waters developments may be suitable for such an approach.

### ***Water Efficiency in Existing Homes***

- 8.3.9 There are possibilities within existing homes to achieve significant savings and to improve efficiency and reduce the baseline water consumption, thereby theoretically freeing up water availability for new homes. Existing homes can be retrofitted with a range of fixtures to increase efficiency in these homes, including retrofitting water meters, and installing water efficient fixtures and fittings.

- 8.3.10 The cost of retrofitting water saving devices depends on the size and the age of property, as well as the scale (single property or a number of properties). However, findings from the Environment Agency report Water Efficiency in the South East of England<sup>41</sup>, costs have been used as a guide to potential costs of retrofitting of water efficient fixtures and fittings and are presented in Table 8-2 below.

**Table 8-2: Water Saving Methods**

Water Saving Method	Approximate Cost per House
Variable flush retrofit toilets	£50 - £140
Low Flow Shower Head Scheme	£15-£50
Aerating Taps	£10-£20

## 8.4 Water Neutrality Feasibility Assessment

### **Feasibility Assessment**

- 8.4.1 Achieving water neutrality should be a key sustainability aspiration for the study area. In order to determine the Outline feasibility of achieving water neutrality, a high level assessment of the likelihood of achieving water neutrality at the end of the plan period (2027) has been undertaken in the Outline WCS.
- 8.4.2 The assessment combined potential future water demand projections based on different water use levels for new homes<sup>42</sup> and combined these with different options for installing water demand management measures in existing properties, as described in the following section.
- 8.4.3 A draft water neutrality policy pathway could be developed further by WC, has been included as Appendix H of the Technical Appendices report.

## 8.5 Water Neutrality – Measures for Existing Homes

- 8.5.1 In assessing the feasibility of water neutrality, the first step is to consider whether the savings created by installing meters into existing unmetered homes would be sufficient to offset the increase in water demand from the new development. This is because metering is a specific water management strategy proposed by UU in its WRMP and is a generally accepted as a management measure which brings immediate tangible benefits.

<sup>41</sup> Environment Agency (2007) Water Efficiency in the South East of England, Retrofitting existing homes, <http://publications.environment-agency.gov.uk/pdf/GEHO0407BMNC-E-E.pdf>

<sup>42</sup> Using the 6 future demand calculations from the water resources assessment

- 8.5.2 On average, the savings created per person as a result of installing a water meter is 12 litres a day.
- 8.5.3 There are further possibilities within existing development to achieve significant savings through improving efficiency and reducing the baseline water consumption, thereby theoretically freeing up water availability for new homes. Existing homes can be retrofitted with a range of fixtures to increase efficiency in these homes, this can include:
- water efficient fixtures and fittings – for example, flow restrictors or aerating fixtures;
  - low flush or dual flush toilets;
  - water efficient dishwashers and washing machines
  - installation of water butts for garden use; and
  - education of the existing population about water efficiency and in particular about water efficient fixtures, fittings and appliances can help to reduce water demand. This can be achieved through, for example, water audits or community education programmes.
- 8.5.4 Based on findings from the EA report Water Efficiency in the South East of England<sup>43</sup> some of these measures have been considered as a guide to potential reductions in water demand through the use of water efficient measures in existing homes (Table 8-3).

**Table 8-3: Water Saving Methods**

<b>Water Saving Method</b>	<b>Potential Saving</b>	<b>Comments/uncertainty</b>
Ultra Low Flush replacement Scheme	50-55l/hhold/d	4.5l toilet assumed to be used. Need incentive to replace old toilets with low flush toilets.
Variable flush retrofit device	21-29l/hhold/d	Need incentive to buy equipment and install the equipment. Potential problems with operation particularly if installed incorrectly.
Low flow shower head scheme	12-14l/hhold/day	Cannot be used with electric, power or low pressure gravity fed systems.
Metering Scheme	5-10% reduction. = 33.5/hhold/d saved	This can be implemented through compulsory metering or through metering on change of occupancy.
Low use fittings	49.9l/hhold/day (conservative est.)	This includes fitting low use taps, low flow showerhead and a variable flush device.

- 8.5.5 The water savings in Table 8-3 for litres per household were converted into savings per person using the occupancy rate of 2.25 for existing homes (note this occupancy rate differs to that used for proposed new homes at 2.19). The results for two retrofitting options for new homes in the study area are shown in Table 8-4.

<sup>43</sup> Environment Agency (2007) Water Efficiency in the South East of England, Retrofitting existing homes, <http://publications.environment-agency.gov.uk/pdf/GEHO0407BMNC-E-E.pdf>

**Table 8-4: Retrofitting Options for existing homes**

<b>Retrofit Option</b>	<b>Potential Saving</b>	<b>Measures Included</b>
High Intervention	27 l/h/d	Low flush toilet and a low flow shower.
Low Intervention	21.7 l/h/day	Low use fittings.

- 8.5.6 Finally, the retrofitting options were combined with reductions achieved from metering properties that are not currently metered, to give five demand option scenarios with the following potential savings as shown in Table 8-5.

**Table 8-5: Demand Management Options for Existing Homes**

<b>Demand Option</b>	<b>Description</b>	<b>Potential Saving</b>	<b>Measures Included</b>
1	Metering only	14.5 l/h/d	Meters in all non metered properties, no retrofitting
2	Low intervention retrofit only	21.7 l/h/d	No metering, installation of low use fixtures and fittings in all existing properties
3	High Intervention retrofit only	27 l/h/d	No metering, installation of low flush toilets and low flow shower head
4	Metering and low intervention retrofit	36.3 l/h/d	Meters in all non metered properties, installation of low use fixtures and fittings in all existing properties
5	Metering and high intervention retrofit	41.50 l/h/d	Meters in all non metered properties, installation of low flush toilets and low flow shower heads

## **Assessment Results**

- 8.5.7 This section summarises the key findings and the key results of the water neutrality assessment.
- 8.5.8 The proportion of unmetered houses in the North West region is approximately 68.4%<sup>44</sup>, so assuming 137,800 existing properties in Wirral<sup>45</sup>; approximately 94,255 will not have a meter. Using an occupancy rate of 2.25 (for existing properties as agreed with WC), introducing meters could lead to a potential saving of 3.08 Ml/d (Table 8-4). Calculations of demand from new housing presented in this WCS suggest that, even if new homes are built to CSH Level 5 or 6 (80 l/h/d), demand for water from new properties (and employment) could reach up to 9.9 Ml/d.
- 8.5.9 This shows that the necessary savings to achieve neutrality in Wirral cannot be solely achieved through 100% metering of existing properties for all three scenarios. This is a

<sup>44</sup> Based on linear interpolation of UU's WRMP data for 2006 (21%) and 2014 (38%)

<sup>45</sup> Taken from Wirral Council Housing Market Assessment, Sept 2010

consequence of the significant levels of housing which are proposed. Therefore a wider programme of measures to improve water efficiency may be required for both homeowners and businesses within Wirral in order to meet the extra demand from new development.

**Table 8-6: Water Neutrality Achievability Assessment**

**(a) – Scenario 1**

New homes & employment demand Projections	New demand (MI/d)	Demand Management Option				
		1	2	3	4	5
Projection 1	12.06	-8.99	-5.33	-3.69	-2.24	-0.62
Projection 2	11.47	-8.40	-4.74	-3.10	-1.65	-0.02
Projection 3	11.75	-8.68	-5.03	-3.38	-1.93	-0.31
Projection 4	10.94	-7.87	-4.22	-2.57	-1.12	0.50
Projection 5	9.93	-6.86	-3.20	-1.56	-0.11	1.52
Projection 6	11.33	-8.25	-4.60	-2.96	-1.50	0.12

**(b) – Scenario 2**

New homes & employment demand Projections	New demand (MI/d)	Demand Management Option				
		1	2	3	4	5
Projection 1	9.35	-6.28	-2.63	-0.98	0.47	2.09
Projection 2	9.06	-5.98	-2.33	-0.69	0.77	2.39
Projection 3	9.20	-6.12	-2.47	-0.83	0.62	2.25
Projection 4	8.79	-5.72	-2.06	-0.42	1.03	2.65
Projection 5	8.28	-5.21	-1.56	0.09	1.54	3.16
Projection 6	8.99	-5.91	-2.26	-0.61	0.84	2.46

**(c) - Scenario 3**

New homes & employment demand Projections	New demand (MI/d)	Demand Management Option				
		1	2	3	4	5
Projection 1	8.75	-5.67	-2.02	-0.38	1.08	2.70
Projection 2	8.44	-5.37	-1.71	-0.07	1.38	3.01
Projection 3	8.59	-5.51	-1.86	-0.22	1.24	2.86
Projection 4	8.17	-5.09	-1.44	0.20	1.66	3.28
Projection 5	7.64	-4.57	-0.91	0.73	2.18	3.80
Projection 6	8.37	-5.29	-1.64	0.01	1.46	3.08

### **Water Neutrality Summary**

8.5.10 The key points of the initial water neutrality assessment are:

- Wirral can theoretically achieve water neutrality aspirations for all three growth scenarios.
- in order to attain neutrality, Wirral would be required to facilitate a programme of retrofitting in all existing homes.

- For Growth Scenario 1 this would require universal metering of all existing homes and a significant programme of installing high intervention water efficiency devices such as dual flush toilets.
- For Growth Scenario 2 a lower intervention would be feasible (low flow taps etc) with universal metering of all existing homes.
- For Growth Scenario 3, no metering of existing properties is required, however, a high intervention retrofit would be required, as well as a water demand of 105 l/p/day.

8.5.11 It is recommended that, should the Council consider neutrality as a realistic sustainability target, a detailed pathway to neutrality is developed to determine the exact requirements for achieving neutrality in terms of policy, developer contributions, funding implications, community involvement and what is technically required from new development. This will include:

- a list of recommended policies that are required to deliver water neutrality;
- the technical requirements of new development and requirement of retrofitting measures in order to deliver the policies;
- high level estimates of costs to deliver water efficiency savings in new homes and existing homes;
- options for funding water efficiency programmes as a solution to growth; and
- the evidence base behind the suggested policies, and where the evidence base does not exist, what is required to procure it.

## 9 Management of Flood Risk

- 9.1.1 It is important for the WCS to include an assessment of the constraints of flood risk, and the interventions required to mitigate it as a result of proposed growth. Both flood risk to, and flood risk from development needs to be considered in the overall assessment of growth as proposed in the authority's Local Plan.
- 9.1.2 Guidance on the assessment of flood risk is provided in National Planning Policy Framework (NPPF)<sup>46</sup>. The NPPF aims to ensure that flood risks are considered at all stages in the planning process. The NPPF sets out measures and guidance to avoid inappropriate development in areas at risk of flooding, and to direct development away from areas at highest risk. Where new development is necessary in higher risk areas and is considered to be consistent with wider sustainability objectives, the NPPF requires that a site-specific flood risk assessment is formulated and must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

### 9.2 Flood Risk to Development

- 9.2.1 The NPPF and its accompanying Technical Guidance<sup>47</sup> emphasises the active role that LPAs should have in ensuring that flood risk is considered in strategic land use planning. The NPPF encourages LPAs to undertake a Strategic Flood Risk Assessment (SFRA) as one of the documents to be used as the evidence base for strategic land use planning decisions as part of the LDF. A Level 1 SFRA has been completed for WC in 2009. The SFRA considers the sources of flood risk and maps out areas within the study area that are susceptible to flooding both now and in the future, according to the requirements of Planning Policy Statement 25: Development and Flood Risk (PPS25)<sup>48</sup> which preceded the NPPF.

#### Flood Risk Sources

##### *Fluvial Flood Risk*

- 9.2.2 The principal rivers running through Wirral are the rivers Fender, Birket, Arrowe Brook and Dibbinsdale Brook. The River Fender runs through the central Green Belt area merging with the River Birket which flows through the rural countryside of Hoylake, Leasowe and North Wirral. The resultant watercourse is culverted and discharges into the West Float under normal operating conditions and ultimately into the River Mersey. Some of the areas through which the Birket flows are susceptible to flooding.
- 9.2.3 The Dibbinsdale Brook flows through Bromborough and Eastham and discharges into the Mersey Estuary at Bromborough Pool. The SFRA describes the flood risk level along this brook as low because the majority of the watercourse runs through rural areas. There may however be some potential hazard in the downstream locations as a result of potentially fast flowing water in more urban areas.

<sup>46</sup> National Planning Policy Framework, Department for Communities and Local Government, March 2012.

<sup>47</sup> Technical Guidance to the National Planning Policy Framework, Department for Communities and Local Government, March 2012.

<sup>48</sup> Planning Policy Statement 25: Development and Flood Risk, Department for Communities and Local Government, December 2006.

- 9.2.4 There is also the potential issue of flooding from the Brimstage Brook, a tributary of the Dibbinsdale Brook in times of high rainfall, which poses a flood risk to Brimstage village. The Wirral SFRA confirms the existence of flood defences along the Fender and Birket in Wirral and along the North Wirral coast. Figure 9-1 shows the main rivers, flood defences and Shoreline Management Plan (SMP) policy boundaries in Wirral.

### **Tidal Flood Risk**

- 9.2.5 The principal tidal flood defence in Wirral is the Wallasey Embankment. The Wallasey Embankment provides a high standard of protection at present but the possibility of a breach during rare storm events was considered and analysed as part of the SFRA. The analysis shows a significant potential risk of tidal flooding behind the existing defences and highlights the potential trapping for floodwaters behind existing fluvial defences in Leasowe, which will inhibit the drainage of tidal flood waters into the Birket.
- 9.2.6 The SFRA highlights other areas potentially susceptible to tidal flooding such as Woodside, West Kirby, New Brighton and Birkenhead Docks. Overtopping of the existing coastal / tidal defences or the failure of existing pumping arrangement in the area can lead to severe tidal flooding as a result of the high tidal levels in the area. Figure 9-2 shows the flood outlines for extreme events (1 in 100 year fluvial, 1 in 200 year tidal and 1 in 1000 year events).
- 9.2.7 According to the North West England and North Wales SMP2, the long term plan for managing the North Wirral Frontage is to continue to provide protection, minimising flood or erosion risk to the majority of property and infrastructure along the north Wirral coast to achieve the social benefits, but altering historical approaches in doing so.

### **Groundwater Flood Risk**

- 9.2.8 Groundwater levels have been on the rise since 1986 and it has been reported in the Wirral PFRA, that the amount of pumping has been increased to keep the Mersey tunnels free of the rising groundwater. Rising groundwater levels could potentially have a significant effect on developments which require a deep foundation. The Wirral SFRA suggests further analysis to be undertaken to determine the longer term implications of the rising groundwater levels.

### **Surface Water Flood Risk**

- 9.2.9 Flood risk from surface water (direct runoff and sewer flooding) is not well defined within the study area. The Preliminary Flood Risk Assessment (PFRA) report for Wirral<sup>49</sup> states that records show that surface water flooding has occurred in the borough following a number of either high intensity storm events or extended periods of heavy rain.

<sup>49</sup> Wirral Council, Preliminary Flood Risk Assessment Report, 2011

- 9.2.10 There are a number of ordinary watercourses with an uncertain course and outfall location in Wirral. WC has recently commissioned a study to investigate and document the location of the outfalls for some of these watercourses. The intention is to build on this study to gain a better understanding of the actual course and flood risk associated with these watercourses in future to inform the development of the Wirral Local Strategy for Flood Risk Management.
- 9.2.11 The surface water drainage system within the catchment comprises mainly an extensive man-made sewer network which can surcharge during severe rainfall events leading to sewer flooding within the catchment. Incidents of flooding have been recorded at a number of locations in Wirral, as shown in Figure 9-3. The sources of flooding for these incidents include sewer flooding and flood records from WC including highways and land drainage flooding.

### ***Summary of Flood Risk Issues***

- 9.2.12 The flood risk issues can be summarised as follows:
- The borough has areas which lie within the Flood Zone 2 and 3, including parts of Mid-Wirral (Settlement Area 5), Commercial Core (Settlement Area 2) and Wallasey (Settlement Area 1).
  - One of the main rivers draining the area, the River Birket, relies on pumping, and the area is reliant on flood defences to minimise flood risk to the existing development both from fluvial and tidal flood risk and surface water drainage channels. Failure of these defences constitutes a residual risk of flooding to the area.
  - The sewerage system in the study area relies on pumps. Surface water flooding from the system is a key flood risk that needs to be considered as capacity of this pumped system and the storage tanks in the catchment is finite.
  - Ground water rebound is known to exist in parts of the study area and the risk is particularly significant for developments which require a deep foundation.

Figure 9-1: Main Rivers, Flood Defences and Shoreline Management Plan Policy Boundaries

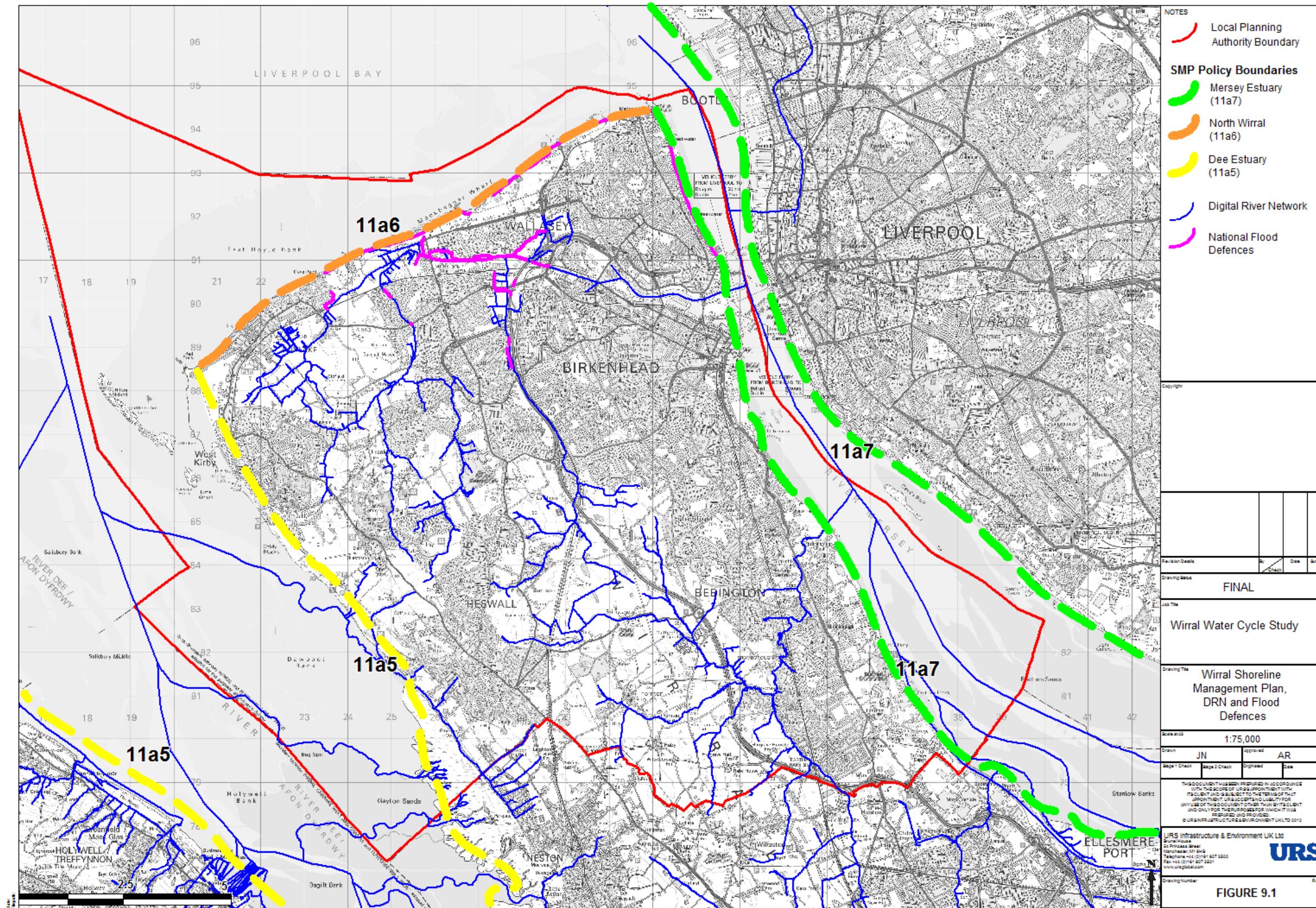


Figure 9-2: Flood Zones and Areas Benefiting from Defences in Wirral

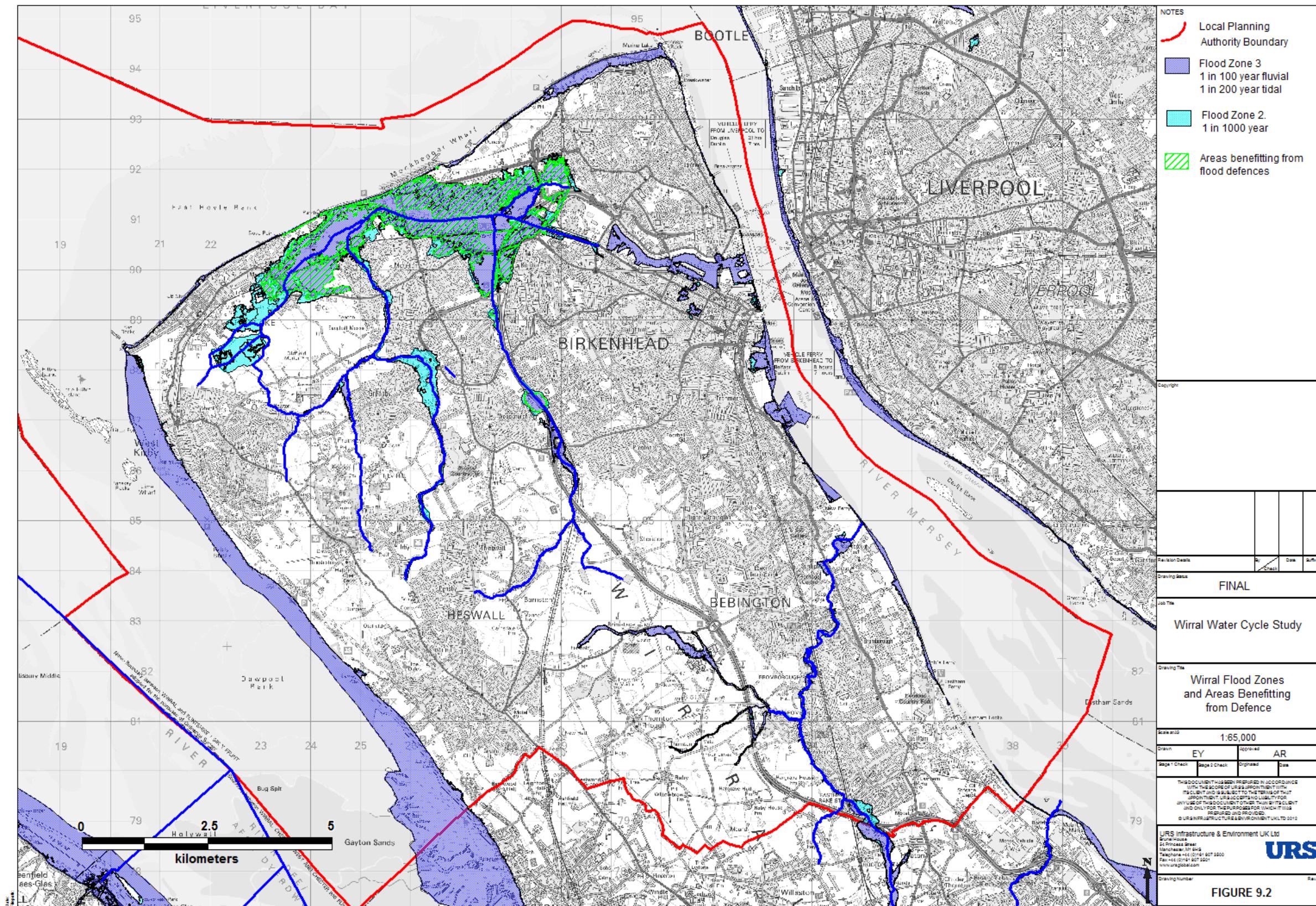
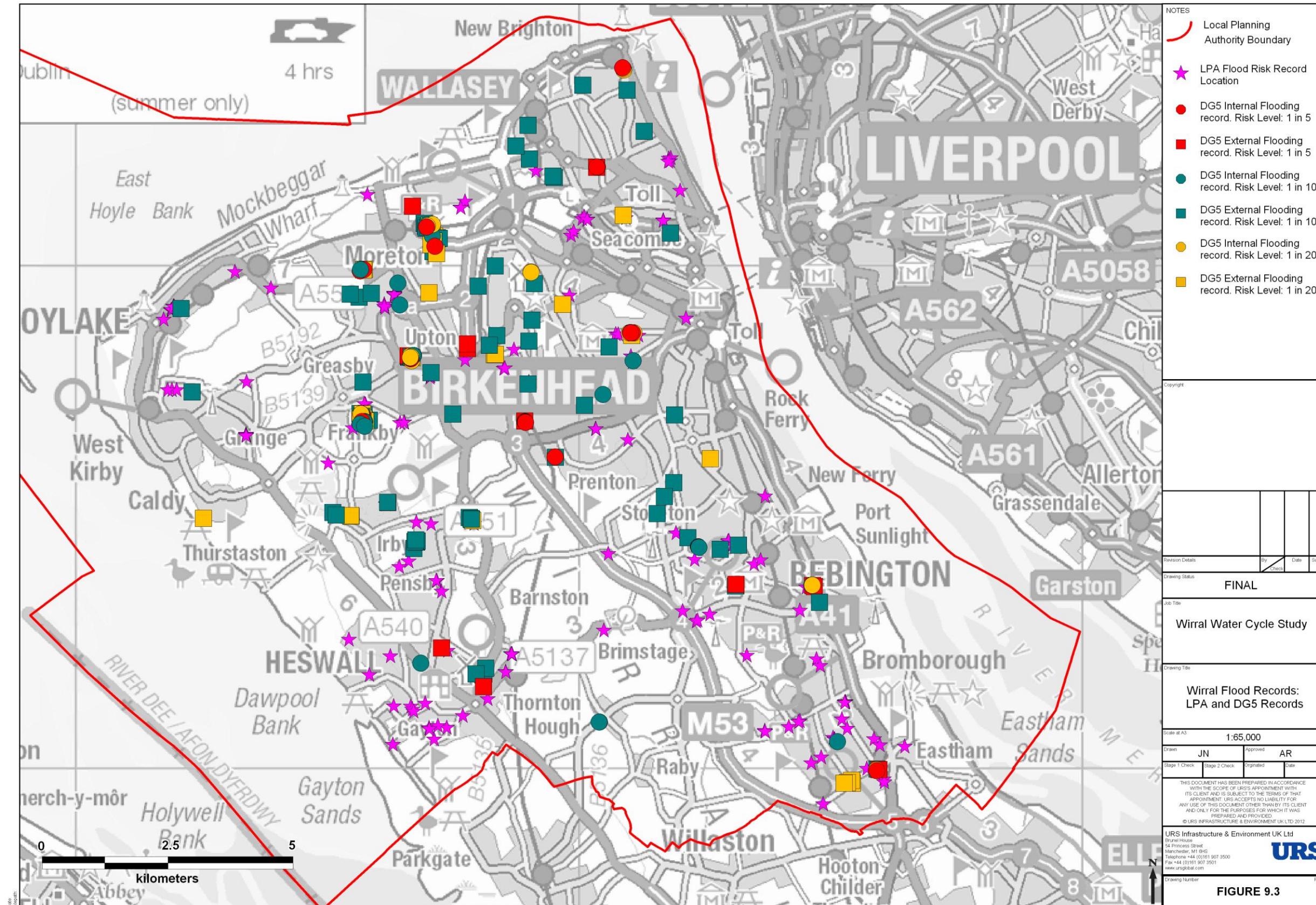


Figure 9-3: Incidents of Surface Water and Sewer Flooding in Wirral



## 9.3 Flood Risk from Development – Surface Water Management

- 9.3.1 Surface water management is a key consideration when assessing development within large areas. The NPPF requires new developments to manage runoff generated from impermeable surfaces as a result of change in land use to reduce the risk of flooding elsewhere. Urbanisation fundamentally alters the way in which rainfall drains to watercourses and has the potential to increase the rate and amount of water that enters watercourses or sewers, thus causing an increase in flood risk.
- 9.3.2 The WCS has shown that a significant part of Wirral discharges runoff into combined sewers, which have been shown to have potential capacity constraints. It is therefore essential that surface water drainage is managed separately from foul water, to reduce the pressure on the combined sewerage system and reduce the impact of runoff from growth in line with local and national guidance.
- 9.3.3 In their response to the draft Outline WCS report for Wirral, United Utilities indicated that the recommendations outlined in the Water Cycle Study, such as the use of Sustainable Urban Drainage Systems (SuDS) are supported, and that UU will work closely with Wirral Council to consider how the impact of growth on water and wastewater infrastructure can be most appropriately managed.
- 9.3.4 Often, the management of surface water is achieved via a requirement to restrict runoff from developed sites to pre-development rates using a range of Sustainable Drainage Systems (SuDS) which aim to maximise the amount of rainwater returned to the ground (infiltration), if ground conditions permit, and to hold back (attenuate) excess surface water. It is not always possible to apply infiltration based SuDS. Geological conditions or the need to protect groundwater resources may limit the applicability of infiltration based SuDS systems, in which case surface water attenuation systems or other methods such as rainwater harvesting have to be used.
- 9.3.5 It is also important to ensure that SuDS are multifunctional and incorporated as part of the overall provision of green infrastructure as far as possible. SuDS can provide opportunities for biodiversity enhancement and recreation.

### ***SuDS Suitability***

- 9.3.6 In order to give an indication of SuDS suitability for the Outline WCS, the opportunity for infiltration based SuDS for the Settlement Areas has been considered. A high level assessment has therefore been made, based on the geological conditions of the main growth areas as a whole using the following criteria:
- the presence of an aquifer underneath the site; and
  - the requirement to protect groundwater used as potable supply underneath sites from the effects of pollution as a result of different types of above ground development.

## ***Geology and Hydrogeology***

- 9.3.7 The Wirral peninsula is formed of Keuper marls, waterstones and basement beds, and Bunter sandstones and pebble beds belonging to the Triassic formation<sup>50</sup>. The northwestern boundary of the Wirral is underlain by post-glacial alluvium and blown sands.
- 9.3.8 There are two minor synclines running north and south bounded by fault lines. These are the Storeton/Liscard syncline and the Heswall/Moreton syncline. The formation divides into two principal parts with the lower 'Bunter' sandstone and the upper or 'Keuper', mainly of red marl with some firm sandstone at the base. The Bunter sandstone covers the largest area with the Keuper being confined to the northern part of Wirral<sup>51</sup>. The basement beds of the Keuper, composed of massive pale-red sandstone with beds of pebbly conglomerate, are the hardest rocks in Wirral and therefore rise in ridges. The next higher subdivision of the Keuper is the Waterstones, consisting of alternations of soft sandstone and red shaly marl. These beds pass upward gradually into the Keuper marl, which is composed almost wholly of red silty clay. In Wirral it is confined to the low ground and almost wholly concealed by drift.
- 9.3.9 The solid geology is generally overlain by a variable thickness of drift deposits of glacial boulder clay and sand and gravels, with alluvium and wind blown sands along the northern section and along the River Birkett. There are outcrops of Bunter sandstone and pebble beds at Bidston, Caldy, Thurstaston and Storeton hills.
- 9.3.10 Principal aquifers are highly permeable rock formations, generally fractured, and capable of supporting large abstractions. The Principal aquifer within Wirral is the Permo-Triassic Sandstone which is present over almost the entire Borough and forms the bulk of the Wirral aquifer unit. The aquifer is heavily exploited for both public water supply and for industrial abstraction. The chief quality of the Bunter is its free permeability and its storage of large supplies of good quality groundwater.
- 9.3.11 Secondary A aquifers within the Wirral are confined to the more permeable drift deposits. Secondary A aquifers are defined as permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers. These include blown sand along the coast between West Kirby and New Brighton and the alluvial deposits along the watercourses, particularly in the north around the Birket, the Fender and Arrowe Brook. Glacial sand and gravel occurs in a few small scattered deposits in the south east of the Borough which are classed as Secondary B aquifers. These deposits often occur as complex or mixed drift sequences and whilst they may generally reduce the vulnerability of the underlying aquifer, there may be hydraulic continuity between the two levels. Groundwater quality in the drift deposits is variable and may be highly susceptible to surface pollution.
- 9.3.12 Figure 9-4 shows the groundwater vulnerability map for Wirral. The map shows the location of aquifers and also the vulnerability of groundwater to pollution. The aquifers are classified

<sup>50</sup> BGS, Solid and Drift Geology Sheet 96, Liverpool, 1: 50,000

<sup>51</sup> Wirral Metropolitan Borough Council, Contaminated Land Inspection Strategy

by the EA into major, minor and non-aquifers according to their physical properties and their consequent value as a resource. The classification of the land surface (low, intermediate, high) reflects the ability of contaminants to leach through the covering soils and potentially pose a risk to groundwater. The maps also indicate areas where the presence of low permeability drift may provide additional groundwater protection.

- 9.3.13 The vulnerability maps are produced by the EA to provide a screening tool to help in the initial assessment of the risks posed by a surface-based activity (on the land/soil) to groundwater.
- 9.3.14 There are a number of major groundwater sources and associated Source Protection Zones (Figure 9-5), both within Wirral and adjacent to the borough boundary. These are located at Grange, Newton, Prenton, Arrowe Park, Clatterbridge and at Hooton and Gorstons within neighbouring LPA areas. Groundwater within this system also supports many small scale abstractions and additionally, provides base flow to Clatter Brook and discharges to the Dee and Mersey estuaries.
- 9.3.15 The Source Protection Zones (SPZ) classify groundwater source catchments into three zones:
- **SPZ1** is defined as the 50 day travel time from any point below the water table to the source;
  - **SPZ2** is defined by a 400 day travel time from a point below the water table; and
  - **SPZ3** is defined as the area around a source within which all groundwater recharge is presumed to be discharged at the source.
- 9.3.16 The EA publication Groundwater Protection: Policy and Practice (GP3)<sup>52</sup> set out their approach to groundwater protection and management. The following policies contained in Part 4 of that document are particularly relevant to discharge of surface water to groundwater sources:
- *"Providing there is no pollution, we will encourage the augmentation of groundwater resources through techniques such as SuDS and artificial recharge, particularly where resources are scarce, or where such activities would reduce the flood risk from development".*
  - *"Other than inside SPZ1, we will support the use of sustainable drainage systems for new discharges to ground of surface run-off from roads, vehicle parking and public/amenity areas, provided that an appropriate level of risk assessment demonstrates the groundwater conditions to be suitable. There should be adequate protective measures for groundwater and arrangements for effective management and maintenance of the system. (CIRIA 2000, 2004, 2007, SuDSWG )".*

<sup>52</sup> Groundwater protection: Policy and practice (GP3), Part 4 – Legislation and Policies, Environment Agency, 2008

Figure 9-4: Groundwater Vulnerability Map for Wirral

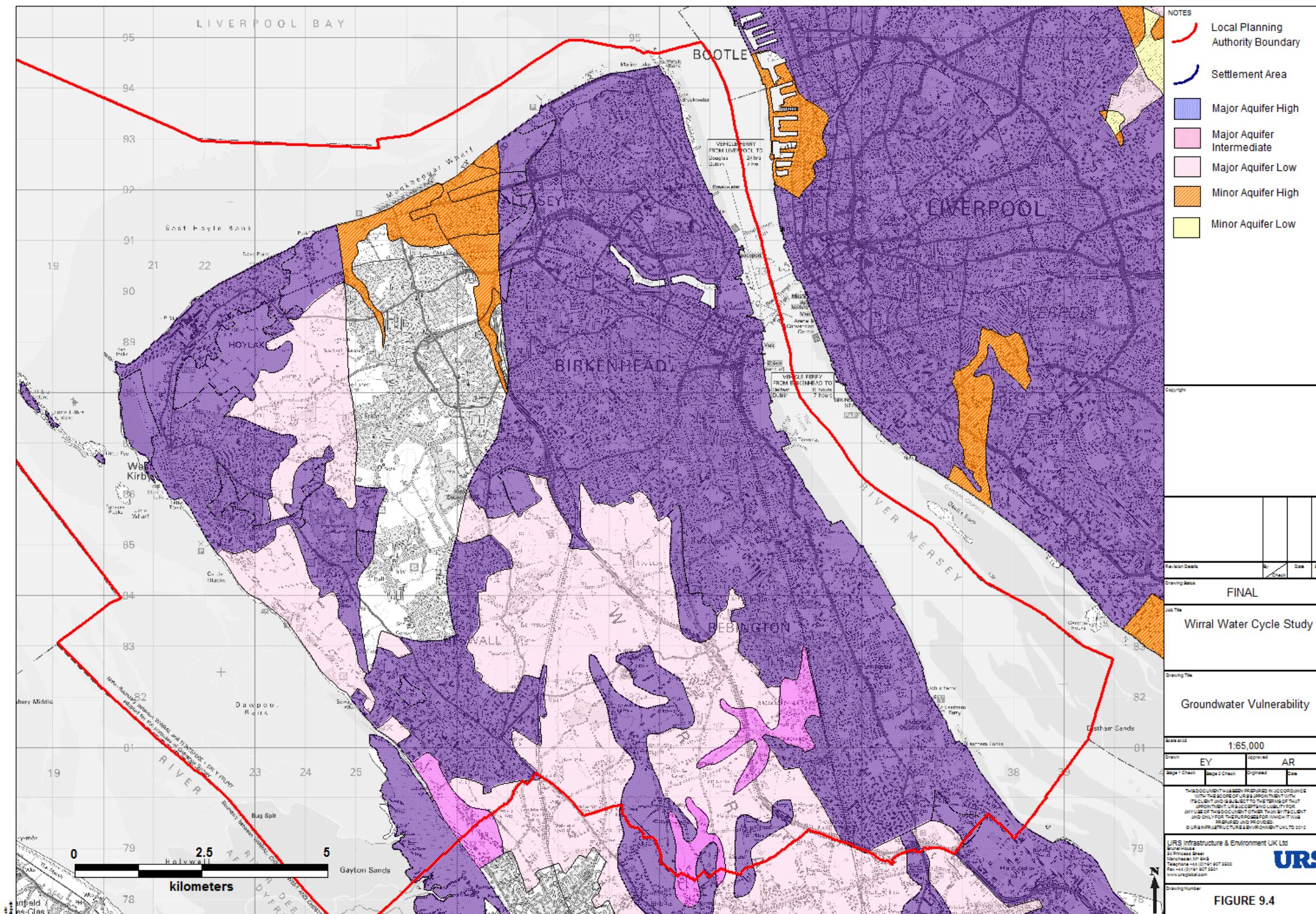
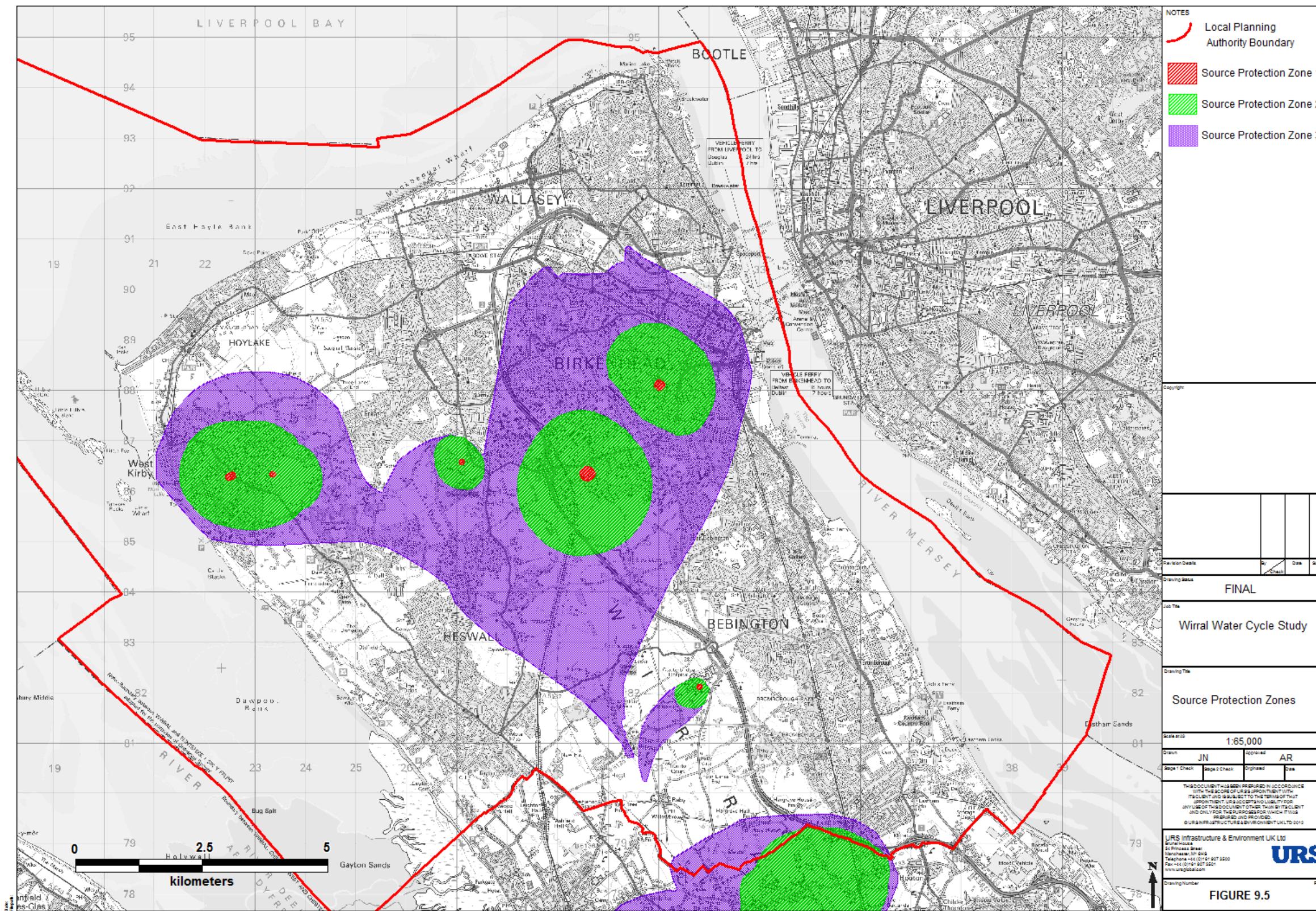


Figure 9-5: Source Protection Zone Map for Wirral



9.3.17 The existence of SPZs therefore does not mean that SuDS cannot be applied; however the EA have advised that SuDS may not be appropriate in SPZ1 and the existence of SPZ2 and SPZ3 underlines the need for source control of potential contaminants to protect groundwater resources. Consequently, the constraint on the use of infiltration-based SuDS is classified as amber in areas where SPZs exist in the study area and the applicability of SuDS should be determined on a case by case basis for new developments as part of the evidence to support planning applications in these areas.

9.3.18 Settlement Areas that partly lie within SPZs include:

- Commercial Core (Settlement Area 2) – SPZ3;
- Birkenhead (Settlement Area 3) – SPZ1, 2 and 3;
- Hoylake and West Kirby (Settlement Area 6) – SPZ1,2 and 3;
- Heswall (Settlement Area 7) – SPZ3; and
- Rural Area (Settlement Area 8) – SPZ1, 2 and 3.

### ***Enhancement of Green Infrastructure through SuDS***

9.3.19 SuDS can be broadly split into two types: source control and site control. Source control methods aim to control runoff at or close to the source e.g. green roofs, rainwater harvesting. Site control is the management of runoff from several areas e.g. the use of ponds. Table 9-1 has been reproduced from the SuDS Manual, CIRIA C679 and outlines typical SuDS components, particularly site control types that can be applied to reduce site runoff and contribute to the enhancement of Green Infrastructure in Wirral.

**Table 9-1: Typical SuDS Components**

<b>Component Description</b>	<b>Example</b>
Filter Strips	These are wide, gently sloping areas of grass or other dense vegetation that treat runoff from adjacent impermeable areas.
Swales	Swales are broad, shallow channels covered by grass or other suitable vegetation. They are designed to convey and/or store runoff, and can infiltrate the water into the ground (if ground conditions allow).
Infiltration Basins	Infiltration basins are depressions in the surface that are designed to store runoff and infiltrate the water to the ground. They may also be landscaped to provide aesthetic and amenity value.
Wet ponds	Wet ponds are basins that have a permanent pool of water for water quality treatment. They provide temporary storage for additional storm runoff above the permanent water level. Wet ponds may provide amenity and wildlife benefits.
Extended Detention Basins	Extended detention basins are normally dry, though they may have small permanent pools at the inlet and outlet. They are designed to detain a certain volume of runoff as well as providing water quality treatment.
Constructed Wetlands	Constructed wetlands are ponds with shallow areas and wetland vegetation to improve pollutant removal and enhance wildlife habitat.
Filter Drains and Perforated Pipes	Filter drains are trenches that are filled with permeable material. Surface water from the edge of paved areas flows into the trenches, is filtered and conveyed to other parts of the site. A slotted or perforated pipe may be built into the base of the trench to collect and convey the water.

- 9.3.20 The WwTWs in Wirral could also potentially contribute directly to initiatives within the GI Strategy, for example in the form of the creation of wetland green infrastructure (e.g. the creation of ponds and reed beds both of which are UK BAP priority habitats or using treated effluent to supply new water features). This is mainly associated with action plan area W2 (Birkenhead & Wallasey housing renewal areas, including Wirral Waters<sup>53</sup>), through the settlement-focussed initiative of ‘urban river & water management’.
- 9.3.21 The Flood Risk Regulations and the Flood & Water Management Act give Lead Local Flood Authorities statutory responsibilities with respect to local flood risk management, including the duty to adopt SuDS through the SuDS Approving Body (SAB) for Wirral. The duty to adopt SuDS does not apply to a drainage system or parts of it designed only to provide drainage for a single property. This implies that under the Act, WC would be responsible for the approval and maintenance of SuDS serving multiple properties, unless a developer volunteers to adopt the SuDS and for individual systems connected to a single property, the owner of the property will be responsible for its maintenance.
- 9.3.22 The FWMA states that SuDS must be constructed in accordance with the national standards for sustainable drainage. However, the national standards for sustainable drainage are still in development. On 20 December 2011 the Government launched a public consultation presenting proposals to implement the requirements SuDS in new and redeveloped sites in England, which are provided for in Schedule 3 of the Flood and Water Management Act (2010)<sup>54</sup>. The consultation period has now ended and the results are being analysed by Defra. The national standards were expected towards the end of the 2012 but no specific date has been given by Defra in recent announcements on their website. In the interim, the SuDS manual by CIRIA<sup>55</sup> provides the most comprehensive guidance and best practice with regard to the design and maintenance of SuDS.

## Key Findings

- 9.3.23 According to the broad assessment carried out in the Outline WCS, infiltration based SuDS systems are applicable in most parts of the borough, with the exception of areas that fall within SPZ1, provided adequate source control measures are put in place to prevent ground water contamination, and SuDS are designed to the national SuDS standards or the SuDS Manual (C697). Attenuation methods are therefore likely to play a major role in surface water management across the borough.

<sup>53</sup> Mersey Dee Alliance, Green Infrastructure Framework for North East Wales, Cheshire and Wirral, March 2011

<sup>54</sup> <http://www.defra.gov.uk/environment/quality/water/sewage/sustainable-drainage/>

<sup>55</sup> CIRIA (2007) The SUDS Manual C697

## 10 Settlement Area Assessments

### 10.1 Introduction

- 10.1.1 The WCS report has identified constraints in terms of proposed growth within Wirral in relation to the three key 'water cycle' areas:
- water resources;
  - wastewater treatment;
  - flood risk; and surface water management.
- 10.1.2 The resultant outcome is presented in the form of a constraints matrix for each of the key development areas. The matrix has been designed so that the amount of subjective interpretation of the data is minimised, although a certain degree of subjectivity still remain, not least due to the high level, strategic nature of the Outline WCS.
- 10.1.3 The most relevant and important constraints have been identified to aid the prioritisation and allocation of development within Wirral. For the purpose of the constraints matrices the results were amalgamated and put into generic colour coded categories, as outlined below.
- 10.1.4 In relation to the colour coding, it is important to note that a colour coding of red does not necessarily mean that the proposed development cannot take place, rather, it merely indicates that if development were to take place greater, more significant, and potentially costly constraints would have to be overcome which would most likely involve a higher level of infrastructure investment or greater strategic planning.
- 10.1.5 The constraints matrix and traffic light colour coding has been applied to each of the Settlement Areas in Wirral where growth is proposed, as described further in the subsequent sections.

### 10.2 Initial Phasing Recommendations

- 10.2.1 Key constraints have been identified for each Settlement Area, and hence initial recommendations on likely impact of these constraints on phasing of development has been provided, along with interim advice on how applications for development should proceed until a detail assessment has been completed.
- 10.2.2 It should be noted that the implications highlighted are relevant to all forms of development (including change of use).
- 10.2.3 It should also be noted that there is the potential for sites that have not been assessed as part of the WCS to come forward for development. In these cases it is recommended that specific assessments on the capacity and connection of water supply and wastewater collection and treatment should be undertaken as part of any planning application.

## Settlement Area 1 Wallasey

Water Resources	Wastewater Treatment and Transmission	Ecology	Flood Risk Management	Surface Water Management & SuDS Potential
Supply - Settlement Area 1 is located within UU's Integrated Water Resource Zone. This zone has forecasted supply surplus to 2020, with supply matching demand to 2035.	Treatment – The proposed growth can be accommodated within existing available headroom at Birkenhead WwTW.	No ecological constraints were identified in relation to water abstractions or discharges. Development levels are considered unlikely to materially increase impacts on European sites.	The area lies predominantly within FZ1. One of the SHLAA site is located in Flood Zone 2 and one in Flood Zone 3; however, the overall risk of flooding is considered to be reasonably low. Flood Risk assessments considering all sources of flooding should be carried on a site specific basis for proposed development once the precise locations have been established.	The area has permeable underlying geology and there are no groundwater Source Protection Zones present.  The suitability for infiltration SuDS is feasible, however, it will need to be assessed on a site-by-site basis.
Transmission – Some SHLAA sites in Settlement Area 1 have been identified by UU as having pressure and connectivity issues, with reinforcement required	Transmission – No sewer connection problems, but recorded sewer flooding incidents and presence of a storage tank, 5 pumping stations and number of CSO suggest that the existing sewer network may not be able to accommodate the significant amount of growth			

### ***Development Phasing and Interim Planning Implications***

- 10.2.4 The water supply network surrounding SHLAA sites has been identified as having potential limitations on supplying water. For Settlement Area 1, some constraints have been identified with the transmission of supply and it has therefore been classified as amber. Liaison with UU is therefore recommended prior to development so as to ascertain if additional infrastructure is necessary to supply the site. It is recommended that an informative on any planning application is provided.
- 10.2.5 Similarly, the sewer network may be limited by pumping stations, a storage tank and potential impact on CSO discharges. Therefore, liaison with UU is recommended prior to development to determine available capacity and clarify the need for additional connections. The purpose of the liaison is to allow the developer to demonstrate to the Council and other regulatory bodies (the Environment Agency) that consideration of the impacts of connecting has been taken into account. It is recommended that an informative on any planning application is provided.
- 10.2.6 It is recommended that advice on appropriate SuDS should be sought from WC as the SAB (SuDS Approval Body) under the Floods & Water Management Act prior to submission of details (designs and calculations) to support a planning application.
- 10.2.7 Developers should seek guidance from WC and the Environment Agency (EA) on whether a site specific flood risk assessment is required for sites located in Flood Zone 1. If development sites are located in Flood Zones 2 or 3, a Level 2 (and possibly) Level 3 site specific FRA will be required to show that these sites can fulfil the Exception Test under NPPF, depending on the risk of flooding and vulnerability classification of the development.
- 10.2.8 Proposals for runoff management from sites should include mitigation measures to ensure water quality effects do not impact on ecological sites.

## Settlement Area 2 Commercial Core

Water Resources	Wastewater Treatment and Transmission	Ecology	Flood Risk Management	Surface Water Management & SuDS Potential
Supply - Settlement Area 2 is located within UU's Integrated Water Resource Zone. This zone has forecasted supply surplus to 2020, with supply matching demand to 2035	Treatment – Birkenhead and Bromborough WwTWs have sufficient capacity within the DWF consent to treat additional foul flows within Settlement Area 2	No ecological constraints were identified in relation to water abstractions or discharges. Development levels are considered unlikely to materially increase impacts on European sites.	Most of the area lies within flood Zone 1; part of the area close to the West Float and East Float dock is located in Flood Zone 3. The risk of flooding from the Mersey and the Birket is therefore low. As some of the developments planned for the area are high rise buildings they will need a deep foundation, which may be vulnerable to groundwater flooding. Flood Risk assessments considering all sources of flooding should be carried on a site specific basis for proposed development once the precise locations have been established.	The area has permeable underlying geology but is partly located in Source Protection Zone 3. The suitability for SuDS and surface water management is feasible, but need to be assessed on a site-by-site basis. A strategic approach to surface water management could be a viable option. Early consultation with UU to determine available capacity and strategic solutions to surface water management should be undertaken for new developments.
Transmission – The majority of the SHLAA sites are identified as having low resource availability, predominantly associated with the requirement for network reinforcement, particularly around the Docks area	Transmission – Sparse sewer network, the existence of 5 pumping stations and a CSO suggest that the existing sewer network is not likely to sustain the significant growth in the area, which include the Wirral Water.			

### Development Phasing and Interim Planning Implications

- 10.2.9 The water supply network surrounding SHLAA sites has been identified as having potential limitations on supplying water. For Settlement Area 2, potentially serious constraints have been identified with the transmission of supply and it has therefore been classified as red. Liaison with UU is therefore recommended prior to development so as to ascertain if additional infrastructure is necessary to supply the site. It is recommended that an informative on any planning application is provided.
- 10.2.10 Similarly, the sewer network may be limited by pumping stations, a storage tank and potential impact on CSO discharges. Therefore, liaison with UU is recommended prior to development to determine available capacity and clarify the need for additional connections. The purpose of the liaison is to allow the developer to demonstrate to the Council and other regulatory bodies (the Environment Agency) that consideration of the impacts of connecting has been taken into account. It is recommended that an informative on any planning application is provided.
- 10.2.11 It is recommended that advice on appropriate SuDS should be sought from WC as the SAB (SuDS Approval Body) under the Floods & Water Management Act prior to submission of details (designs and calculations) to support a planning application. For those developments located within an SPZ or where contaminants have been identified on site, there is an increased potential for pollution from inappropriately located and/or designed infiltration SuDS (such as soakaways, unsealed porous pavement systems or infiltration basins) to transport contaminants into vulnerable groundwater resources and controlled waters. Therefore, for these areas, it is recommended that the Environment Agency are consulted early in the development process as a risk assessment may be required to demonstrate that pollution to groundwater would not result and that the proposed SuDS are compatible with the Groundwater Protection Policy<sup>56</sup>.
- 10.2.12 Developers should seek guidance from WC and the EA on whether a site specific flood risk assessment is required for sites located in Flood Zone 1. If development sites are located in Flood Zones 2 or 3, a Level 2 (and possibly) Level 3 site specific FRA will be required to show that these sites can fulfil the Exception Test under NPPF, depending on the risk of flooding and vulnerability classification of the development.
- 10.2.13 Proposals for runoff management from sites should include mitigation measures to ensure water quality effects do not impact on ecological sites.

<sup>56</sup> Groundwater protection: Principles and Practice (GP3), LIT 7562, November 2012, V1, Environment Agency

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### **Settlement Area 3 Birkenhead**

Water Resources	Wastewater Treatment and Transmission	Ecology	Flood Risk Management	Surface Water Management & SuDS Potential
Supply - Settlement Area 3 is located within UU's Integrated Water Resource Zone. This zone has forecasted supply surplus to 2020, with supply matching demand to 2035	Treatment – Birkenhead and Bromborough WwTWs have sufficient capacity within the DWF consent to treat additional foul flows within Settlement Area 3	No ecological constraints were identified in relation to water abstractions or discharges. Development levels are considered unlikely to materially increase impacts on European sites.	The area lies within FZ1 and hence flood risk is low. Flood Risk assessments considering all sources of flooding should be carried on a site specific basis for proposed development once the precise locations have been established.	The area has permeable underlying geology but there are areas of Groundwater Source Protection Zones 1, 2 and 3. The suitability for SuDS and surface water management is feasible, but need to be assessed on a site-by-site basis. A strategic approach to surface water management could be a viable option. Early consultation with UU to determine available capacity and strategic solutions to surface water management should be undertaken for new developments.
Transmission – the SHLAA sites in the western part of Settlement Area 3 are identified as having low resource availability, predominantly associated with pressure issues	Transmission – No sewer connection problems, but recorded sewer flooding incidents and the existence of 3 pumping stations, 4 storage tank and 2 CSO suggest that the existing sewer network may not be able to accommodate the significant amount of growth			

### **Development Phasing and Interim Planning Implications**

- 10.2.14 The water supply network surrounding SHLAA sites has been identified as having potential limitations on supplying water. For Settlement Area 3, potentially serious constraints have been identified with the transmission of supply and it has therefore been classified as red. Liaison with UU is therefore recommended prior to development so as to ascertain if additional infrastructure is necessary to supply the site. It is recommended that an informative on any planning application is provided.
- 10.2.15 Similarly, the sewer network may be limited by pumping stations, storage tanks and potential impact on CSO discharges. Therefore, liaison with UU is recommended prior to development to determine available capacity and clarify the need for additional connections. The purpose of the liaison is to allow the developer to demonstrate to the Council and other regulatory bodies (the Environment Agency) that consideration of the impacts of connecting has been taken into account. It is recommended that an informative on any planning application is provided.
- 10.2.16 It is recommended that advice on appropriate SuDS should be sought from WC as the SAB (SuDS Approval Body) under the Floods & Water Management Act prior to submission of details (designs and calculations) to support a planning application. For those developments located within an SPZ or where contaminants have been identified on site, there is an increased potential for pollution from inappropriately located and/or designed infiltration SuDS (such as soakaways, unsealed porous pavement systems or infiltration basins) to transport contaminants into vulnerable groundwater resources and controlled waters. Therefore, for these areas, it is recommended that the Environment Agency are consulted early in the development process as a risk assessment may be required to demonstrate that pollution to groundwater would not result and that the proposed SuDS are compatible with the Groundwater Protection Policy<sup>57</sup>.
- 10.2.17 Proposals for runoff management from sites should include mitigation measures to ensure water quality effects do not impact on ecological sites.
- 10.2.18 Developers should seek guidance from WC and the EA on whether a site specific flood risk assessment is required for sites located in Flood Zone 1. If development sites are located in Flood Zones 2 or 3, a Level 2 (and possibly) Level 3 site specific FRA will be required to show that these sites can fulfil the Exception Test under NPPF, depending on the risk of flooding and vulnerability classification of the development.

<sup>57</sup> Groundwater protection: Principles and Practice (GP3), LIT 7562, November 2012, V1, Environment Agency

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## Settlement Area 4 Bromborough and Eastham

Water Resources	Wastewater Treatment and Transmission	Ecology	Flood Risk Management	Surface Water Management & SuDS Potential
Supply - Settlement Area 4 is located within UU's Integrated Water Resource Zone. This zone has forecasted supply surplus to 2020, with supply matching demand to 2035	Treatment - Bromborough WwTW has sufficient capacity within the DWF consent to treat additional foul flows generated within Settlement Area 4	No ecological constraints were identified in relation to water abstractions or discharges. Development levels are considered unlikely to materially increase impacts on European sites.	The area lies within FZ1 and hence flood risk is reasonably low. Flood Risk assessments considering all sources of flooding should be carried on a site specific basis for proposed development once the precise locations have been established.	The area has permeable underlying geology and there are no groundwater Source Protection Zones present. The suitability for infiltration SuDS is feasible, however, it will need to be assessed on a site-by-site basis.
Transmission – the majority of the SHLAA sites are identified as having low resource availability, predominantly associated with the requirement for network reinforcement around the Spital, Port Sunlight and Bromborough Pool area	Transmission – No sewer connection problems, but recorded sewer flooding incidents and the existence of 10 pumping stations, 1 storage tank and 4 CSO suggest that the existing sewer network may not be able to accommodate the significant amount of growth			

## Development Phasing and Interim Planning Implications

- 10.2.19 The water supply network surrounding SHLAA sites has been identified as having potential limitations on supplying water. For Settlement Area 4, potentially serious constraints have been identified with the transmission of supply and it has therefore been classified as red. Liaison with UU is therefore recommended prior to development so as to ascertain if additional infrastructure is necessary to supply the site. It is recommended that an informative on any planning application is provided.
- 10.2.20 Similarly, the sewer network may be limited by pumping stations, storage tanks and potential impact on CSO discharges. Therefore, liaison with UU is recommended prior to development to determine available capacity and clarify the need for additional connections. The purpose of the liaison is to allow the developer to demonstrate to the Council and other regulatory bodies (the Environment Agency) that consideration of the impacts of connecting has been taken into account. It is recommended that an informative on any planning application is provided.
- 10.2.21 It is recommended that advice on appropriate SuDS should be sought from WC as the SAB (SuDS Approval Body) under the Floods & Water Management Act prior to submission of details (designs and calculations) to support a planning application.
- 10.2.22 Proposals for runoff management from sites should include mitigation measures to ensure water quality effects do not impact on ecological sites.
- 10.2.23 Developers should seek guidance from WC and the EA on whether a site specific flood risk assessment is required for sites located in Flood Zone 1. If development sites are located in Flood Zones 2 or 3, a Level 2 (and possibly) Level 3 site specific FRA will be required to show that these sites can fulfil the Exception Test under NPPF, depending on the risk of flooding and vulnerability classification of the development.

### **Settlement Area 5 Mid-Wirral**

Water Resources	Wastewater Treatment and Transmission	Ecology	Flood Risk Management	Surface Water & SuDS Potential Management
Supply - Settlement Area 5 is located within UU's Integrated Water Resource Zone. This zone has forecasted supply surplus to 2020, with supply matching demand to 2035	Birkenhead WwTW has the capacity to treat development within the section of Settlement Area 5 within its catchment area, but there would be a capacity shortfall of between 269 to 281 m3/day following the proposed growth at North Wirral (Meols) WwTW. However, a reduced BOD limit to negate any additional loading is theoretically within the limits of conventional treatment.	The Liverpool Bay SPA, Dee Estuary SAC and SPA, Mersey Narrows and North Wirral Foreshore pSPA and pRamsar have the potential to be affected by the increase in flow likely to be required (above consent conditions) at North Wirral (Meols) WwTW.	A Significant part of the area lies within Flood Zones 2 and 3, with some area benefiting from existing flood defences. The overall risk of flooding is therefore considered to be high. Residual flood risk can be managed and the SMP policy for the area is generally hold the line.	The northern part of the area has permeable underlying geology and there are no ground water Source Protection Zones present. However, a large part of the area does not have permeable underlying geology.
Transmission – The SHLAA sites in the Leasowe area of Settlement Area 5 is identified as having medium resource availability relating to network reinforcement and connectivity issues	Transmission – No sewer connection problems, but recorded sewer flooding incidents and the existence of 3 pumping stations, 3 storage tanks and 19 CSO suggest that the existing sewer network may not be able to accommodate the significant amount of growth.	However, statutory measures for future discharges would ensure no adverse impact on the European sites. The next stage of the Council's HRA should take these findings into consideration.	Flood Risk assessments considering all sources of flooding should be carried on a site specific basis for proposed development once the precise locations have been established.	The suitability for SuDS and surface water management is feasible, but need to be assessed on a site-by-site basis. A strategic approach to surface water management could be a viable option. Early consultation with UU to determine available capacity and strategic solutions to surface water management should be undertaken for new developments.

### **Development Phasing and Interim Planning Implications**

- 10.2.24 The water supply network surrounding SHLAA sites has been identified as having potential limitations on supplying water. For Settlement Area 5, some constraints have been identified with the transmission of supply and it has therefore been classified as amber. Liaison with UU is therefore recommended prior to development so as to ascertain if additional infrastructure is necessary to supply the site. It is recommended that an informative on any planning application is provided.
- 10.2.25 Similarly, the sewer network may be limited by pumping stations, storage tanks and potential impact on CSO discharges. Therefore, liaison with UU is recommended prior to development to determine available capacity and clarify the need for additional connections. The purpose of the liaison is to allow the developer to demonstrate to the Council and other regulatory bodies (the Environment Agency) that consideration of the impacts of connecting has been taken into account. It is recommended that an informative on any planning application is provided.
- 10.2.26 If all the planned development goes ahead, alternative options for wastewater treatment discharge conditions would be required at North Wirral (Meols) WwTW to meet European legislative requirements and protect hydrologically connected ecological sites. Consultation with UU, by developers, on developments located within the North Wirral (Meols) WwTW catchments prior to the submission of planning applications is recommended.
- 10.2.27 It is recommended that advice on appropriate SuDS should be sought from WC as the SAB (SuDS Approval Body) under the Floods & Water Management Act prior to submission of details (designs and calculations) to support a planning application.
- 10.2.28 Proposals for runoff management from sites should include mitigation measures to ensure water quality effects do not impact on ecological sites.
- 10.2.29 Developers should seek guidance from WC and the EA on whether a site specific flood risk assessment is required for sites located in Flood Zone 1. If development sites are located in Flood Zones 2 or 3, a Level 2 (and possibly) Level 3 site specific FRA will be required to show that these sites can fulfil the Exception Test under NPPF, depending on the risk of flooding and vulnerability classification of the development.

### **Settlement Area 6 Hoylake and West Kirby**

Water Resources	Wastewater Treatment and Transmission	Ecology	Flood Risk Management	Surface Water Management & SuDS Potential
Supply - Settlement Area 6 is located within UU's Integrated Water Resource Zone. This zone has forecasted supply surplus to 2020, with supply matching demand to 2035	Treatment – There would be a capacity shortfall of between 269 to 281 m <sup>3</sup> /day following the proposed growth at North Wirral (Meols) WwTW. However, a reduced BOD limit to negate any additional loading is theoretically within the limits of conventional treatment.	The Liverpool Bay SPA, Dee Estuary SAC and SPA, Mersey Narrows and North Wirral Foreshore pSPA and pRamsar have the potential to be affected by the increase in flow likely to be required (above consent conditions) at North Wirral (Meols) WwTW.	The area lies within FZ1 and hence flood risk is reasonably low.  Flood Risk assessments considering all sources of flooding should be carried on a site specific basis for proposed development once the precise locations have been established.	The area has permeable underlying geology but there are areas of Groundwater Source Protection Zones 1, 2 and 3.  The suitability for SuDS and surface water management is feasible, but need to be assessed on a site-by-site basis. A strategic approach to surface water management could be a viable option. Early consultation with UU to determine available capacity and strategic solutions to surface water management should be undertaken for new developments.
Transmission – Two of the SHLAA sites in the West Kirby area of Settlement Area 5 are identified as having medium resource availability, with the remaining sites identified as having high resource availability	Transmission – No sewer connection problems, but recorded sewer flooding incidents and the existence of 7 pumping stations, 2 storage tank and 8 CSO suggest that the existing sewer network may not be able to accommodate the significant amount of growth	However, statutory measures for future discharges would ensure no adverse impact on the European sites. The next stage of the Council's HRA should take these findings into consideration.		

### **Development Phasing and Interim Planning Implications**

- 10.2.30 The water supply network surrounding SHLAA sites has been identified as having potential limitations on supplying water. For Settlement Area 6, some constraints have been identified with the transmission of supply and it has therefore been classified as amber. Liaison with UU is therefore recommended prior to development so as to ascertain if additional infrastructure is necessary to supply the site. It is recommended that an informative on any planning application is provided.
- 10.2.31 Similarly, the sewer network may be limited by pumping stations, storage tanks and potential impact on CSO discharges. Therefore, liaison with UU is recommended prior to development to determine available capacity and clarify the need for additional connections. The purpose of the liaison is to allow the developer to demonstrate to the Council and other regulatory bodies (the Environment Agency) that consideration of the impacts of connecting has been taken into account. It is recommended that an informative on any planning application is provided.
- 10.2.32 If all the planned development goes ahead, alternative options for wastewater treatment discharge conditions would be required at North Wirral (Meols) WwTW to meet European legislative requirements and protect hydrologically connected ecological sites. Consultation with UU, by developers, on developments located within the North Wirral (Meols) WwTW catchment prior to the submission of planning applications is recommended.
- 10.2.33 It is recommended that advice on appropriate SuDS should be sought from WC as the SAB (SuDS Approval Body) under the Floods & Water Management Act prior to submission of details (designs and calculations) to support a planning application. For those developments located within an SPZ or where contaminants have been identified on site, there is an increased potential for pollution from inappropriately located and/or designed infiltration SuDS (such as soakaways, unsealed porous pavement systems or infiltration basins) to transport contaminants into vulnerable groundwater resources and controlled waters. Therefore, for these areas, it is recommended that the Environment Agency are consulted early in the development process as a risk assessment may be required to demonstrate that pollution to groundwater would not result and that the proposed SuDS are compatible with the Groundwater Protection Policy<sup>58</sup>.
- 10.2.34 Proposals for runoff management from sites should include mitigation measures to ensure water quality effects do not impact on ecological sites.
- 10.2.35 Developers should seek guidance from WC and the EA on whether a site specific flood risk assessment is required for sites located in Flood Zone 1. If development sites are located in Flood Zones 2 or 3, a Level 2 (and possibly) Level 3 site specific FRA will be required to show that these sites can fulfil the Exception Test under NPPF, depending on the risk of flooding and vulnerability classification of the development.

<sup>58</sup> Groundwater protection: Principles and Practice (GP3), LIT 7562, November 2012, V1, Environment Agency

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### **Settlement Area 7 Heswall**

Water Resources	Wastewater Treatment and Transmission	Ecology	Flood Risk Management	Surface Water Management & SuDS Potential
Supply - Settlement Area 7 is located within UU's Integrated Water Resource Zone. This zone has forecasted supply surplus to 2020, with supply matching demand to 2035	Treatment – Birkenhead and Heswall WwTW have the capacity to treat development within the section of Settlement Area 7 within its catchment area, but there would be a capacity shortfall of between 269 to 281 m <sup>3</sup> /day following the proposed growth at North Wirral (Meols) WwTW. However, a reduced BOD limit to negate any additional loading is theoretically within the limits of conventional treatment.	The Liverpool Bay SPA, Dee Estuary SAC and SPA, Mersey Narrows and North Wirral Foreshore pSPA and pRamsar have the potential to be affected by the increase in flow likely to be required (above consent conditions) at North Wirral (Meols) WwTW.	The area lies within FZ1 and hence flood risk is reasonably low.  Flood Risk assessments considering all sources of flooding should be carried on a site specific basis for proposed development once the precise locations have been established.	Most of the area has permeable underlying geology, but a small part of the area is in Groundwater Source Protection Zone 3.  The suitability for SuDS and surface water management is feasible, but needs to be assessed on a site-by-site basis. A strategic approach to surface water management could be a viable option. Early consultation with UU to determine available capacity and strategic solutions to surface water management should be undertaken for new developments.
Transmission – The SHLAA sites identified in Settlement Area 7 are classed as having high resource availability	Transmission – No sewer connection problems, but recorded sewer flooding incidents and the existence of 5 pumping stations, 1 storage tank and 4 CSO suggest that the existing sewer network may not be able to accommodate the significant amount of growth	However, statutory measures for future discharges would ensure no adverse impact on the European sites. The next stage of the Council's HRA should take these findings into consideration.		

### **Development Phasing and Interim Planning Implications**

- 10.2.36 For Settlement Area 7, no significant water supply implications have been identified and it has therefore been classified as green.
- 10.2.37 However, the sewer network may be limited by pumping stations, a storage tank and potential impact on CSO discharges. Therefore, liaison with UU and DCWW is recommended prior to development to determine available capacity and clarify the need for additional connections. The purpose of the liaison is to allow the developer to demonstrate to the Council and other regulatory bodies (the Environment Agency) that consideration of the impacts of connecting has been taken into account. It is recommended that an informative on any planning application is provided.
- 10.2.38 If all the planned development goes ahead, alternative options for wastewater treatment discharge conditions would be required at North Wirral (Meols) WwTW to meet European legislative requirements and protect hydrologically connected ecological sites. Consultation with UU, by developers, on developments located within the Birkenhead and North Wirral (Meols) WwTW catchments prior to the submission of planning applications is recommended.
- 10.2.39 It is recommended that advice on appropriate SuDS should be sought from WC as the SAB (SuDS Approval Body) under the Floods & Water Management Act prior to submission of details (designs and calculations) to support a planning application. For those developments located within an SPZ or where contaminants have been identified on site, there is an increased potential for pollution from inappropriately located and/or designed infiltration SuDS (such as soakaways, unsealed porous pavement systems or infiltration basins) to transport contaminants into vulnerable groundwater resources and controlled waters. Therefore, for these areas, it is recommended that the Environment Agency are consulted early in the development process as a risk assessment may be required to demonstrate that pollution to groundwater would not result and that the proposed SuDS are compatible with the Groundwater Protection Policy<sup>59</sup>.
- 10.2.40 Proposals for runoff management from sites should include mitigation measures to ensure water quality effects do not impact on ecological sites.
- 10.2.41 Developers should seek guidance from WC and the EA on whether a site specific flood risk assessment is required for sites located in Flood Zone 1. If development sites are located in Flood Zones 2 or 3, a Level 2 (and possibly) Level 3 site specific FRA will be required to show that these sites can fulfil the Exception Test under NPPF, depending on the risk of flooding and vulnerability classification of the development.

<sup>59</sup> Groundwater protection: Principles and Practice (GP3), LIT 7562, November 2012, V1, Environment Agency

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## Settlement Area 8 Rural Area

Water Resources	Wastewater Treatment and Transmission	Ecology	Flood Risk Management	Surface Water Management & SuDS Potential
Supply - Settlement Area 8 is located within UU's Integrated Water Resource Zone. This zone has forecasted supply surplus to 2020, with supply matching demand to 2035	Treatment – Birkenhead, Bromborough and Heswall WwTW have the capacity to treat development within the sections of Settlement Area 8 within their catchment areas, but there would be a capacity shortfall of between 269 to 281 m³/day following the proposed growth at North Wirral (Meols) WwTW. However, a reduced BOD limit to negate any additional loading is theoretically within the limits of conventional treatment.	The Liverpool Bay SPA, Dee Estuary SAC and SPA, Mersey Narrows and North Wirral Foreshore pSPA and pRamsar have the potential to be affected by the increase in flow likely to be required (above consent conditions) at North Wirral (Meols) WwTW. However, statutory measures for future discharges would ensure no adverse impact on the European sites. The next stage of the Council's HRA should take these findings into consideration.	The vast majority of the area lies within FZ1 and hence flood risk is overall reasonably low. The northern part of the area near Hoylake has areas in Flood Zone 2 and 3 and areas benefiting from flood defences, but no development is planned in this area Flood Risk assessments considering all sources of flooding should be carried on a site specific basis for proposed development once the precise locations have been established.	Most of the area has permeable underlying geology, but part of the area lies in Groundwater Source Protection Zones 1, 2 and 3. The suitability for SuDS and surface water management is feasible, but need to be assessed on a site-by-site basis. A strategic approach to surface water management could be a viable option. Early consultation with UU to determine available capacity and strategic solutions to surface water management should be undertaken for new developments.
Transmission – The few SHLAA sites identified in Settlement Area 8 are classed as having high resource availability with the exception of one SHLAA site. However, the assessment is classified as amber due to the rural nature of the area and the fact that significant infrastructure is likely to be required to support new development.	Transmission – The sewer network coverage in this area is sparse, but the amount of development is also small and SHLAA sites are located in areas with sewers close by. Although the number of flooding incidents recorded in the area is low the area drains into WwTW catchments with sewer network constraints. This is supported by the fact that 1 pumping stations and 4 storage tanks are located in the area.			

### Development Phasing and Interim Planning Implications

- 10.2.42 The water supply network surrounding SHLAA sites has been identified as having potential limitations on supplying water. For Settlement Area 8, some constraints have been identified with the transmission of supply and it has therefore been classified as amber. Liaison with UU is therefore recommended prior to development so as to ascertain if additional infrastructure is necessary to supply the site. It is recommended that an informative on any planning application is provided.
- 10.2.43 Similarly, the sewer network may be limited by capacity, a pumping station, storage tanks and potential impact on CSO discharges, especially if sites that have not been assessed come forward. Therefore, liaison with UU and DCWW is recommended prior to development to determine available capacity and clarify the need for additional connections. The purpose of the liaison is to allow the developer to demonstrate to the Council and other regulatory bodies (the Environment Agency) that consideration of the impacts of connecting has been taken into account. It is recommended that an informative on any planning application is provided.
- 10.2.44 If all the planned development goes ahead, alternative options for wastewater treatment discharge conditions would be required at North Wirral (Meols) WwTW to meet European legislative requirements and protect hydrologically connected ecological sites. Consultation with UU, by developers, on developments located within the Birkenhead and North Wirral (Meols) WwTW catchments prior to the submission of planning applications is recommended.
- 10.2.45 Alternative options for wastewater treatment discharge conditions are required at North Wirral (Meols) WwTW and hence process upgrades may be required before all proposed development can be accommodated.
- 10.2.46 It is recommended that advice on appropriate SuDS should be sought from WC as the SAB (SuDS Approval Body) under the Floods & Water Management Act prior to submission of details (designs and calculations) to support a planning application. For those developments located within an SPZ or where contaminants have been identified on site, there is an increased potential for pollution from inappropriately located and/or designed infiltration SuDS (such as soakaways, unsealed porous pavement systems or infiltration basins) to transport contaminants into vulnerable groundwater resources and controlled waters. Therefore, for these areas, it is recommended that the Environment Agency are consulted early in the development process as a risk assessment may be required to demonstrate that pollution to groundwater would not result and that the proposed SuDS are compatible with the Groundwater Protection Policy<sup>60</sup>.
- 10.2.47 Proposals for runoff management from sites should include mitigation measures to ensure water quality effects do not impact on ecological sites.
- 10.2.48 Developers should seek guidance from WC and the EA on whether a site specific flood risk assessment is required for sites located in Flood Zone 1. If development sites are located in Flood Zones 2 or 3, a Level 2 (and possibly) Level 3 site specific FRA will be required to show that these sites can fulfil the Exception Test under NPPF, depending on the risk of flooding and vulnerability classification of the development.

<sup>60</sup> Groundwater protection: Principles and Practice (GP3), LIT 7562, November 2012, V1, Environment Agency

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## 11 Climate Change

### 11.1 Introduction

- 11.1.1 The Outline WCS incorporates the recently published 2009 UK Climate Projections (UKCP09) and identifies the potential impacts on the flood risk, surface water management, water supply, wastewater management and water environment elements of the water cycle.
- 11.1.2 Specifically, the assessment identifies:
- the impact of projected changes on water cycle elements and infrastructure;
  - the impact of climate change on flood risk; and
  - the planning considerations required as a result of these.

#### ***Climate Change Projections and Impacts on the Water Cycle Elements and Infrastructure***

- 11.1.3 Table 11-1 shows the potential effects of climate change on key parameters affecting the water environment in the North West of England from the latest UKCP09 projections

#### ***Climate Change Projections and Impacts on Flood Risk***

- 11.1.4 It is widely accepted that Climate Change is likely to have a large impact on all sources of flood risk. UKCP09 suggests that the risk of inland flooding (fluvial, surface water, sewer and groundwater) is likely to increase as a result of a greater number of rain days throughout winter months and an increase in heavy and convective storms during both winter and summer months. Similarly, tidal and coastal flood risk is set to increase as a result of sea level rise. The potential result is that areas that are currently classed as having a lower flood risk (Flood Zone 1) may have an increased risk of flooding in the future and be classed as a medium to high risk (Flood Zones 2/3) in the future. Furthermore defences currently considered to be at an acceptable standard of defence might require further works in the future as a result of climate change.

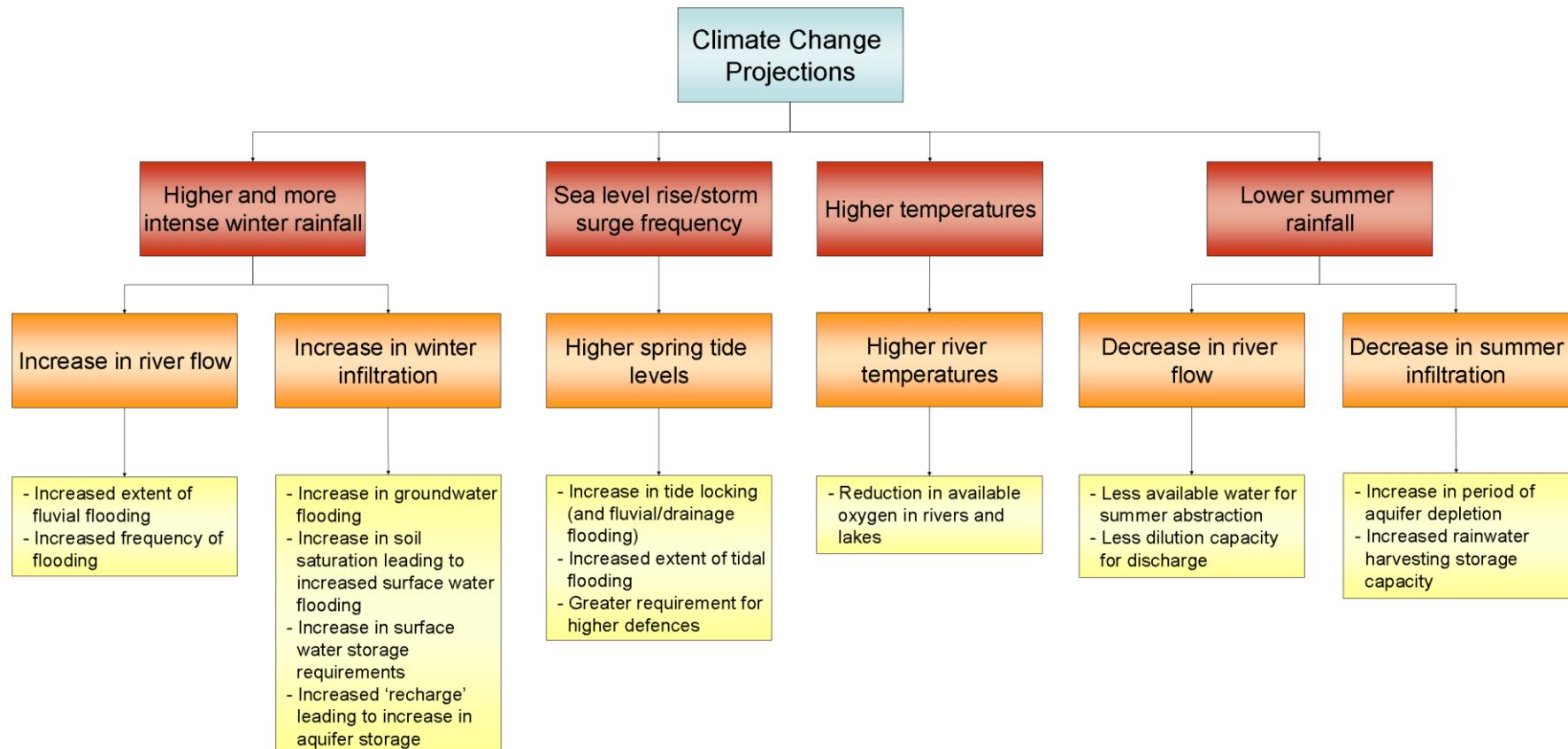
#### ***Planning for Climate Change Projections***

- 11.1.5 Figure 11-1 illustrates the potential climate change impacts on Wirral's water cycle elements based on the projected climate change for the region. Table 11-2 provides a summary of the potential adaptation and mitigations options that should be considered for the Wirral WCS. This list is not exhaustive and should be expanded in further investigations once development locations have been confirmed to enable location specific adaptation/mitigation considerations.

**Table 11-1: UKCP09 Projections for North West of England (High Emissions Scenario)**

Climatic Variable	Year	Projected Change (compared to 1961-1990 baseline under high emissions scenario)		
		10% (very unlikely to be less than)	50% (central estimate)	90% (very unlikely to be greater than)
Winter Mean Temperature	2020s	0.3°C	1.2°C	2.0°C
	2050s	1.2°C	2.1°C	3.3°C
	2080s	1.9°C	3.1 °C	4.8°C
Summer Mean Temperature	2020s	0.6°C	1.5°C	2.5°C
	2050s	1.5°C	3.0°C	4.7°C
	2080s	2.5°C	4.7°C	7.3 °C
Annual Mean Precipitation	2020s	-6%	0%	6%
	2050s	-7%	0%	8%
	2080s	-10%	1%	12%
Winter Mean Precipitation	2020s	-4%	4%	13%
	2050s	3%	13%	27%
	2080s	9%	26%	50%
Summer Mean Precipitation	2020s	-19%	-5%	10%
	2050s	-37%	-18%	2%
	2080s	-51%	-28%	-2%

**Figure 11-1 : Potential Climate Change Impacts on Wirral's Water Cycle Elements**



**Table 11-2: Summary of adaptation/mitigation considerations for Wirral WCS**

Water Cycle Element	Impact of Climate Change	Adaptation and Mitigation Measures
Water Resources & Supply	Hotter, drier summers will affect water supply and demand	Ensure regional drought plans take into account the impacts of climate change  UU WRMP has predicted a potential deficit in the integrated WRZ by 2022-23. Wirral should contribute to managing water demand through encouraging increased water efficiency in homes, businesses, industry and agriculture
	Low river flows and groundwater levels will increase water pollution	Ensure that water abstraction is sustainable through monitoring  Improve river basin management plans through the Water Framework Directive
Flood Risk	Increased flood risk will pose a greater threat to property and infrastructure	Regional flood risk strategies to account for rising sea levels and climate change  Ensure WC planners are aware of appropriate locations for new development  Engage communities in managing flood risk
	Sea level rise could lead to longer pumping times and larger area requirements for attenuation as a result of longer tide-locking and runoff rates and volumes will increase	Ensure that adequate strategic approach to surface water management is in place and encourage dialogue and involve UU and DCWW in search for solutions at an early stage
Wastewater Collection & Treatment	Greater volume of surface water runoff entering combined sewer systems and WwTW as a consequence of more intense storms	With a significant part of Wirral discharging into combined sewers, it is essential to manage surface water runoff from new developments to reduce the volume entering combined sewers; Separating drainage into foul and surface water and maximising use of SuDS
Water Quality, Ecology & Biodiversity	Changes in temperature, rainfall and sea level rise will affect species and habitats	Ensure climate change mitigation strategies are in place for species and habitats at risk, e.g. Biodiversity Action plans
	Warmer summer temperatures may increase tourism	Continually monitor water quality
	Hotter, drier summers and extreme weather events may increase soil erosion and therefore cause increased runoff/pollution from agricultural runoff to receiving watercourses	

### ***Recommendations for Further Studies***

11.1.6 It is recommended that further studies are undertaken to determine the following, once preferred development sites are known:

- Sensitivity assessment of the predicted climate change impacts including the impact of different rates of sea level rises on flood risk (where feasible).
- Guidance on Mitigation and Adaptation measures for new development (to effects of climate change), including.
  - design of water management systems (e.g. larger storage volumes for rainwater harvesting during lower rainfall periods in the summer);
  - design of SuDS and drainage systems to manage surface water; and
  - consider impact of infrastructure solutions on CC (as part of Sustainability Analysis).
- Climate Change Impacts Timeline and impacts/considerations for water cycle elements.

## 12 Outline Policy Guidance

### 12.1 Introduction

- 12.1.1 The following policy recommendations are made to ensure that the emerging Core Strategy and the Site Allocations Development Plan Documents for Wirral considers potential limitations (and opportunities) presented by the water environment and water infrastructure on growth, and phasing of growth.

### 12.2 Water Cycle Policy

- 12.2.1 This section draws on the various assessments undertaken in this Outline WCS study. It summarises the key issues and opportunities and suggests direction for policies to be included in Wirral's Local Plan, to help to ensure that the aims of this WCS and a sustainable water environment are achieved. Flood risk policies relating to the sequential approach to site allocation have not been included as these are already covered by existing Local Plan policies.

### 12.3 General

#### **Policy Recommendation 1: Development Phasing**

- 12.3.1 New homes should not be built until agreement has been reached with the water and wastewater utility providers that sufficient capacity in existing or future water services infrastructure is available in accordance with the Wirral Outline WCS, or measures are taken to mitigate any concerns or objections.
- 12.3.2 *Reason: The WCS has demonstrated some capacity within existing infrastructure; however this capacity is limited and upgrades (or new) infrastructure may be required at certain locations to deliver full housing requirements up to 2027. Developments must not be permitted to proceed until the water services infrastructure is in place to service them.*

#### ***Wastewater Treatment and Transmission***

#### **Policy Recommendation 2: Wastewater Network**

- 12.3.3 Recognition is given to the fact that solutions to remedy limitations in the existing wastewater network will be required in several locations to connect new development areas and transfer the wastewater generated to the WwTW for treatment.
- 12.3.4 *Reason: The Local Plans need to ensure that the transfer of wastewater from developments to WwTW is fully supported.*

**Policy Recommendation 3: Strategic Wastewater Treatment**

- 12.3.5 Recognition is given to the fact that expansion of wastewater treatment facilities at North Wirral (Meols) WwTW or improvement of the quality of treated effluent may be required in order for demands of future growth to be met without breaching the WFD and consent conditions.
- 12.3.6 **Reason:** *The WCS has demonstrated that North Wirral (Meols) WwTW may need to add process streams or expand the capacity of processes in order to treat the additional flow or to higher standards to meet current and future water legislation (WFD and HD standards). The Local Plan needs to ensure that, if the expansion of WwTWs is required, it is fully supported to enable growth.*

**Water Resources & Supply****Policy Recommendation 4: Protection of Water Resources**

- 12.3.7 Any new development should not adversely affect source protection zone 1. In source protection zones 2 and 3 adequate source control measures should be provided to prevent ground water contamination to satisfy the EA that the risk is acceptable. SuDS design should follow the national SuDS standards currently being developed as and when they become available or the SuDS Manual (C697).
- 12.3.8 **Reason:** *The WCS has highlighted that water supply in the study area is highly dependent on groundwater abstraction and as such, it is important to continue to protect the areas that recharge the groundwater through suitable management of surface activities. Several development locations are likely to be over or close to source protection zones around abstraction boreholes and hence EA agreement will need to be achieved for some development types in these areas.*

**Policy Recommendation 5: Water demand management**

- 12.3.9 New development should aim to achieve the water use target under Code Levels 3 & 4 of the Code for Sustainable Homes.
- 12.3.10 **Reason:** *The WCS has highlighted that higher levels of growth will require new development to use less water than current policy or legislative requirements and in order to achieve the aspiration of water neutrality and protect the environment, all new development must aspire to be as water efficient as possible.*

## Flood Risk and Drainage

### Policy Recommendation 6: Site drainage

- 12.3.11 All new developments, including those that are on Brownfield sites, should be served by separate surface water and wastewater drainage. No new development will be permitted to discharge surface runoff directly into foul drainage connections.
- 12.3.12 **Reason:** *The WCS has highlighted that sewer flooding and Combined Sewer Overflows are an existing concern in several areas and that with climate change, capacity will be limited. Therefore further discharges of surface water to foul or combined drainage should not be permitted, unless approved by UU or DCWW, to prevent exacerbation of existing problems.*

### Policy Recommendation 7: Surface Water Management

- 12.3.13 All new developments, including those on Brownfield sites, should provide sufficient surface water management and attenuation to ensure that flood risk from the development as a result of surface water runoff can be managed in line with the requirements of the Flood and Water Management Act 2010 and the NPPF both during construction and during the design life of the development. The design and adoption of SuDS should be discussed and agreed with WC and UU.
- 12.3.14 **Reason:** *The WCS has determined that management of surface water is key to preventing exacerbation of surface water or downstream flood risk as a result of development. Therefore, design of runoff attenuation (through SuDS design) needs to be built into developments as part of the master plan and as part of the Environmental Management Plan for construction for major developments.*

### Policy Recommendation 8: SuDS and Water Quality

- 12.3.15 Development should not have a detrimental impact on the water environment through changes to water chemistry or resource and this should be ensured through the use of drainage systems which limit pollution to the water environment.
- 12.3.16 **Reason:** *Management of surface water drainage needs to consider quality of discharge in addition to quantity. Several hydrologically linked statutory and non statutory ecological sites have been identified in the study area, which need to be protected from deterioration in water quality as a minimum requirement of the water framework directive.*

## 13 Recommendations for Further Work

- 13.1.1 This Outline WCS has identified the key constraints to growth in the Borough of Wirral for three different growth scenarios. It has identified:
- where there are solutions to utilise existing infrastructure;
  - where more detailed solutions will need to be investigated;
  - where there are potential phasing implications;
  - the feasibility of achieving water neutrality and what measures might be needed; and
  - the outline implications of climate change impacts and adaptation.
- 13.1.2 The study has demonstrated that there are some potential limitations to achieving growth as proposed, largely focused on the sewer network and wastewater treatment works and their potential impacts on future designated sites that need to be investigated further. No show-stoppers have been identified in the Outline WCS and a detailed WCS is not required at this stage.
- 13.1.3 This Outline assessment has been undertaken at a strategic level based on best estimates of where growth is likely to occur in the borough. At the time of undertaking the study, WC's planning process had not yet reached a stage where a preferred list of development sites could be provided to allow a more detailed site specific assessment. Although a Detailed WCS is not required, further investigations in the following areas are therefore recommended when a preferred list of development sites is produced.

### 13.2 Wastewater

- 13.2.1 The proposed growth in the catchment of the North Wirral (Meols) WwTW will lead to a DWF volume that exceeds the existing consent. To accommodate the planned growth within the Meols WwTW drainage area it is recommended that UU, the EA and WC should discuss the possibility of increasing consented volumes of discharge (but treated to a higher quality to achieve no-deterioration) as a solution for Meols WwTW.
- 13.2.2 If an agreement between UU and the EA can be reached to increase consented flows to Meols WwTW and the scale of development lies within the limit considered in the three scenarios assessed in the Outline WCS then no further investigations of wastewater solutions would be required. However, the growth scenarios and associated flow calculations for Meols need to be revised when the preferred development locations are confirmed.
- 13.2.3 In the absence of an agreement further investigation may be required when a preferred list of development sites becomes available, depending on the scale of development within the WwTW drainage area, to determine whether:
- a) the increase in flow is likely to affect water quality;
  - b) there are likely to be adverse ecological impacts as a result of increases in discharges;
  - c) if the outcome of stages a) and b) concludes a detrimental impact, alternative discharge location options are available in conjunction with the EA;

- d) consider whether changes in per capita consumption (water efficiency and achieving water neutrality), occupancy rate and changing population may free up headroom at the WwTW to allow development to proceed without the need to increase consented flow.
- 13.2.4 The sensitivity of growth distribution in the catchments of Heswall and Bromborough WwTWs should be tested further, because the calculated DWF as a consequence of growth has been shown to be within 10% of the consented DWF. Consultations with WC has highlighted that the actual growth figures may be less than the numbers tested in the three scenarios, which means that the capacity in both WwTWs is likely to be more than shown in the assessment. However, this should be investigated when more robust information on site distribution becomes available.
- 13.2.5 Further investigations will also be required to determine the impact of growth and phasing of development on the wastewater transmission infrastructure, as outlined below:
- in conjunction with UU, determine whether process capacity upgrades are technically and physically possible at site, determine quick feasible solutions and what impact the timing of upgrades have on phasing of development; and the impact that delivering such solutions will have on:
    - phasing for key growth areas; and
    - deliverability of sites and infrastructure (cost and practicality).
  - Modelling of network capacity may be required at several key locations (once development locations are known) to determine if upgrades to sewer mains, pumping stations or storage tanks is necessary. It is recommended that this is carried out by UU using their existing models for Wirral.
  - A sensitivity assessment of capacity and likely requirement for upgrades and new sewers should be undertaken in conjunction with UU to determine the impact on pumping station and storage capacity and required upgrades once development locations are known.

### 13.3 Water Supply

- 13.3.1 Once preferred development locations are known, it is recommended that further investigations are undertaken to assess the resilience in water supply trunk mains, pumping stations and WTWs in key locations in collaboration with UU, to determine when upgrades need to be phased in and what impact this will have on development phasing.
- 13.3.2 Water Neutrality is not absolutely necessary within the Integrated WRZ, however, it is recommended as a worthy aspiration. A detailed pathway to neutrality should be developed in conjunction with WC and UU to determine the exact requirements for achieving neutrality in terms of policy, developer contributions, funding implications, community involvement and what is technically required from new developments.

## 13.4 Flood Risk Management

- 13.4.1 More detailed assessment of SuDS requirements should be provided for preferred development sites when known, including deriving values for permitted runoff rates and options for linkage with green infrastructure;
- 13.4.2 Policy recommendations need to be provided in the study to set out how sustainable drainage will be achieved by developers, and how the strategic aspiration to move to 100% separation of surface water runoff and foul water drainage can be achieved through collaboration between the relevant stakeholders; and
- 13.4.3 Further studies are recommended to build on Wirral's PFRA and the Wirral Local Strategy for Flood Risk Management to investigate the risk and management of flooding from Ordinary Watercourses and the potential consequences of sewer flooding in collaboration with UU and WC.

## 13.5 Infrastructure Solutions and Phasing

- 13.5.1 Measures to achieve water neutrality should be investigated further and costed as an option for reducing water demand and potential solutions to wastewater treatment and provision of sustainable water supply in collaboration with UU.
- 13.5.2 Infrastructure phasing timelines should be produced for each settlement area to determine impact of infrastructure and mitigation provision on housing delivery in collaboration with UU.

## 13.6 Climate Change Assessment

- 13.6.1 It is recommended that, once preferred development sites are known, further studies should be undertaken to build on the work undertaken in the Outline WCS to provide:
  - Sensitivity assessment of the predicted climate change impacts, including Impact of different rates of sea level rises on flood risk (where feasible);
  - Guidance on Mitigation and Adaptation measures for new development (to effects of climate change), e.g.
    - design of water management systems (e.g. larger storage volumes for rainwater harvesting during lower rainfall periods in the summer);
    - design of SuDS and drainage systems; and
    - consider impact of infrastructure solutions on CC (as part of Sustainability Analysis).
  - Climate Change Impacts Timeline and impacts/considerations for water cycle elements.