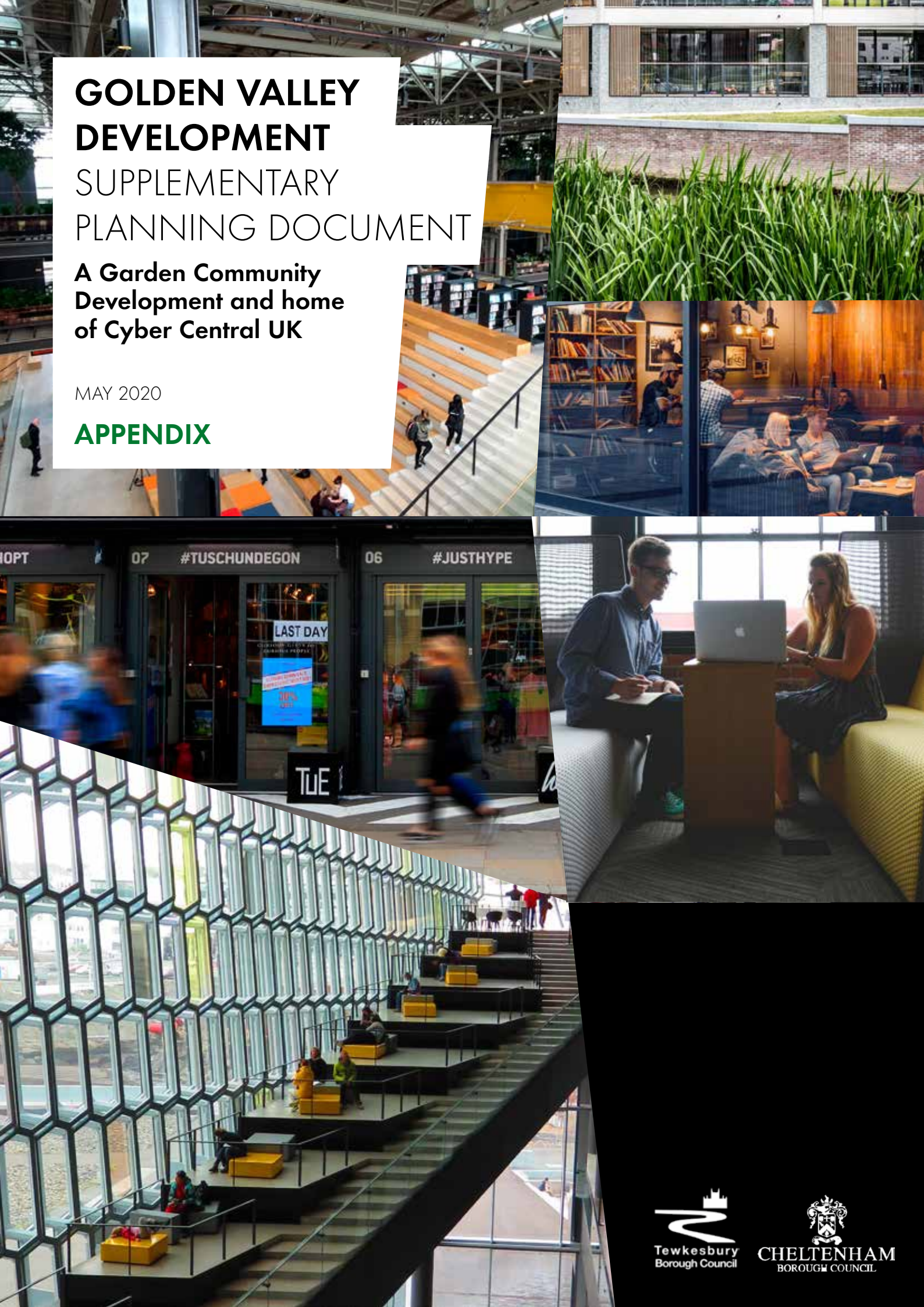


GOLDEN VALLEY DEVELOPMENT

SUPPLEMENTARY PLANNING DOCUMENT

A Garden Community Development and home of Cyber Central UK

MAY 2020

APPENDIX

Tewkesbury Borough Council

CHELTENHAM BOROUGH COUNCIL

AVISON YOUNG WITH Allies and Morrison Hydrock

Appendices

A1 Engagement

A1.1 Purpose

Engagement embedded in the process

A1.1.1 Engaging with the local community and wider stakeholders is an integral part of the masterplanning process. As part of the preparation of the SPD for West Cheltenham, there have been four community drop-in events and an evening workshop session with community representatives, technical stakeholders, officers and members together with an informal session with an elderly persons complex adjacent to the strategic allocation. This informal consultation has helped to identify the key concerns and priorities and shaped the emerging vision and principles for the draft masterplan SPD, as now presented.

A1.1.2 The consultation undertaken so far forms part of a wider engagement programme. A formal consultation on the draft SPD will commence in the new year after the document has been approved by both councils.

Figure 1 **List of events**

A1.2 Engagement activities

Stakeholder workshop

A1.2.1 A stakeholder workshop was held on Wednesday 3rd September 2019 close to the site at Jurys Inn, Gloucester Road. The purpose of the workshop discussion was to distil the key issues and opportunities relating to activities and facilities; natural landscape and public open space; movement and transport; and sustainability and climate change. These issues were discussed via round table engagement. At the end of the session there was an opportunity to feedback to the wider group about the key priorities discussed.

A1.2.2 32 stakeholders attended the event representing: *BAE Systems, Bamboo Technology Group, Boddington Parish Council, Cheltenham Borough Homes, Cheltenham Borough Council, Cheltenham churches, Cheltenham County Council, Church of England, GFirst LEP, Gloucestershire County Council, Gloucestershire Local Nature Partnership, Hester's Way Neighbourhood Plan Forum, Hester's Way Partnership, local residents, police, Stagecoach West, Swindon Parish Council. Tewkesbury Borough Council, Uckington Parish Council, University of Gloucestershire and, Wildfowl and Wetlands Trust.*

Community drop-in events

A1.2.3 In addition to the stakeholder workshop, four drop-in events were held at locations close to the site. The dates and times are shown opposite.

A1.2.4 The events provided the opportunity for local residents to give their thoughts and ideas about the area, and the key opportunities as the masterplan was developed. A large map of the area was tabled alongside information boards introducing the project and key diagrams showing our initial ideas. 210 people attended across the four events. A summary of the feedback is set out on the following pages.

A1.2.5 In addition, a supplementary session was held at an elderly persons complex adjacent to the strategic site to aid engagement with residents unable to attend one of the drop in events.





Figure 2 **Photos of the consultation events**

A1.3 Summary of key messages

Stakeholder workshop summary

1.3.1 Activities and facilities

- GCHQ is an important opportunity for Cheltenham. **Cyber Central needs to be a vibrant environment with a unique offer and a variety of uses to attract employers.** Some felt employment uses might be appropriate in the northern area too.
- There was strong support for employment areas to be mixed-use with **activity in the evenings** for workers, residents and visitors too.
- Ensure the **right amount of social infrastructure** and make it easily accessible to all residents e.g. schools, health services and community spaces. The area currently lacks community gathering spaces and so there is an **opportunity for new facilities that bring people together** across demographics.
- The development must be **integrated well with the existing communities.** This includes physical links e.g. locating facilities by existing communities, as well as the social benefits to the local community e.g. training and development opportunities for local people during the construction period. Occupiers should work with universities to promote education, research and innovation, including opportunities for apprenticeships.

1.3.2 Movement and transport

- There is support for an **integrated walking and cycling network** e.g. to Princess Elizabeth Way, Coronation Square and the station. The station is too far to walk and the cycle route is too convoluted.
- **Improve bus services** which are currently unreliable. Bus routes need to link in with existing communities to improve the services in the area.
- A **parking strategy** will ensure adequate parking for employment as well as some provision for residents (there is a need for access to a car at times). Local employee parking is a major local problem currently.
- **Respect the character of Fiddler's Green Lane.** There is too much traffic here already and the masterplan should address this.
- **Good access to the M5 is needed.** Other ideas for access points were a possible entry via Pheasants Lane; an alternative route along Cheltenham Road East; another connection in from the southern area; and a new road from Gloucester Road.
- The **proposed main route is more than just for access** - it needs to be balanced with the environment being created.
- **Good management of construction traffic** during the building phase is a priority.
- Transport needs to be **embedded in a long-term sustainable transport strategy** which has a link to the Gloucestershire sustainable transport strategy.

1.3.3 Natural landscape and public open space

- **Public open space is important** for employees of Cyber Central (high pressured work) as well as residents and visitors. These should include cafes and other uses so they are actively used.
- Ideas for **types of public open space** include parks and festival space, playgrounds, football pitches and sports centre, formal sports pitches, allotments (could be an extension of existing ones) and an urban forest. Many existing green spaces are tied to schools and not currently accessible.

- There is support for **green links to adjoining communities.** Retaining green spaces close to existing neighbourhoods is a priority.
- The **maintenance and good management of public open spaces** is essential.
- **Existing trees and hedges should be preserved.**
- There is support for SUDS, permeable parking with planting and other sustainability initiatives.

1.3.4 **Sustainability and climate change**

- **Sustainability should be all-encompassing** and goes across all issues. Working towards a **carbon neutral development** is desired. It was recognised that paying for this would be challenging but the masterplan needs to be **ambitious**, incorporating sustainable technologies. Ideas to achieve this include edible orchards, community allotments, home composting, green energy e.g. heat sinks and big enough gardens with growing areas.
- Achieving sustainability is directly linked with **reducing car use** and promoting an attractive, reliable and safe pedestrian and cycling network.
- Empowering the **community to take ownership and steward resources well** is important.

Community drop-in events summary

1.3.5 **Activities and facilities**

- Attendees at the drop-in see the provision of the **necessary social infrastructure** and services as a priority. There was positive feedback regarding the potential for a new school. There is currently a lack of community meeting spaces and there is support for new community facilities.
- The benefits of keeping the cyber industry in West Cheltenham were highlighted. Ensuring these are realised with regards to **training and jobs** for local people is a priority. Setting targets so these are delivered to existing residents is essential. Other opportunities included flagship connectivity projects which are accessible to nearby neighbourhoods.
- What is the future of Coronation Square and how will the masterplan proposals impact on its future? Questions were also raised about the impact of the development on existing businesses, including local farms. This will need to be addressed in future masterplanning work.

1.3.6 **Movement and transport**

- There is support for sustainable travel options, including buses, shuttle buses to serve GCHQ, car sharing and cycling. An integrated, safe pedestrian and cycle network with ample cycle parking and well connected into the existing street network is key to this development coming forward. People do not currently feel safe cycling around Cheltenham and cycle routes often stop or disappear. Pedestrian crossings need to be in sensible places and pavements widened to support disabled access and to improve safety for all.
- There was positive feedback regarding the potential cycle and pedestrian routes through the existing community at West Cheltenham. It was suggested that a single continuous cycle route from Gloucester and Cheltenham would be beneficial.
- Many attendees at the drop-ins were concerned that the existing wider vehicle network around the site is already pressurised and that an increase in people will lead to greater congestion, parking problems and safety issues on routes around the site, especially:

- **Safety of Fiddler's Green Lane**. Crossing this road is unsafe, worsened by parking and congestion. Upgraded crossing facilities could assist with this. Any new junction at Telstar Way could prevent a left turn along Fiddlers Green Lane which was welcomed.
- **On-street car parking** caused by local employee parking and school pickups. This is outside the scope of the SPD but is a clear concern and residents want to understand how this will be managed for new employment and educational facilities. There is support for adequate provision of parking on site.
- The **potential increase in traffic on Hayden Lane** and flooding which already occurs here. A suggestion is that any new homes within the safeguarded area should be accessed from Telstar Way.
- The impact of the development on **traffic and safety along Tewkesbury Road and Old Gloucester Road** was highlighted as a possible issue.
- The junction at **Withy Bridge Lane, Old Gloucester Road and Hayden Lane** is currently unsafe.
- A route through the development could help to ease traffic along Princess Elizabeth Way.

- The M5 Junction 10 proposals seem uncertain. An update on this is required.
- Good air quality is considered a priority.
- There was concern about the construction phase and how HGV traffic and builders car parking would be managed. Farmers are especially concerned about the impact the construction phase (and more widely the development plans) will have on their livestock.

1.3.7 **Natural landscape and public open space**

- Cyber Central should 'still feel green' with open space connected to existing green spaces on the edge of the site. There is support for the retention of areas such as the copse to the north west, as well as hedgerows and trees. Specifically, residents are keen for a landscape buffer zone along Henley Road and Old Gloucester Road. There is concern that the new homes will 'loom over' the existing residential areas.
- There is an opportunity to uncover the waterways e.g. Lyn Brook, to increase the amount of green space and the quality of the environment. New water features should be carefully located.
- Retaining views to the countryside, particularly to the west, was highlighted as a priority.
- Information relating to applications for the extension of the existing network of Public Right of Way routes has been shared. Three slightly different alignments of a route from Springbank to the west to meet the existing network of Public Rights of Way have been put forward. The local community are keen that these routes are taken into consideration in making decisions about development proposals for the site.

1.3.8 **Sustainability and climate change**

- Any plans for the development must meet all sustainability standards. People would like green roofs and solar panels, as well as innovative solutions to address the climate change emergency.

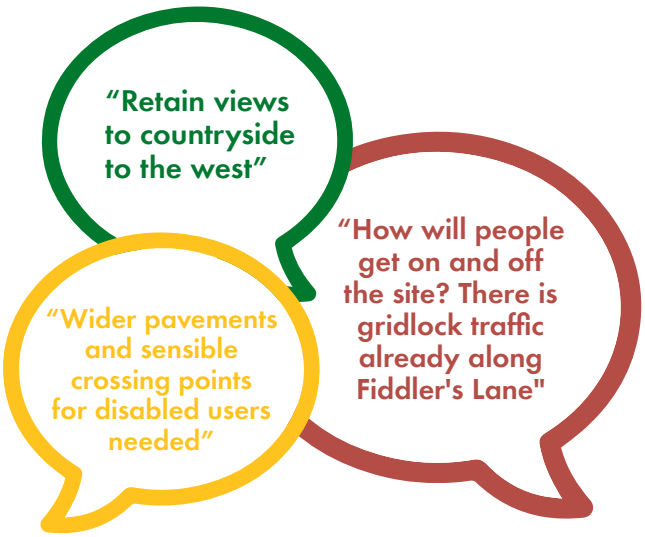
What next?

A1.3.9 Whilst many wider stakeholders and local groups recognise the benefits of Cyber Central and the opportunities it brings for existing and new residents, residents at engagement sessions nearest to the site raised localised issues relating to boundaries, loss of green space and views, and regarding trees and hedgerows. General comments were also made relating to the other planned development in and around Cheltenham. The proposals for these sites should be considered as a whole to ensure an integrated approach to development.

A1.3.10 The feedback from the engagement so far has been invaluable in shaping the design process. From the feedback received during this stage of public engagement, we have amended the masterplan in the following ways:

- Emphasis on green spaces close to the existing community - the plan has been altered following drop-in events with local residents who were supportive of a new park close to the Springbank neighbourhood.
- Impact of traffic and car parking - aiming for the new development to have enough car parking to serve the employment and residential areas. Sustainable transport modes including improved bus networks and cycle networks will also contribute to improving access and reducing the reliance on the private car.
- Spreading the impact of employment - although the focus for the employment area will be to the south of the SPD area, close to GCHQ, conversations have highlighted the opportunity to focus some employment space with good access to the new road to J10 of the M5.
- Integration - comments have strengthened the focus on delivering links and shared facilities for new and existing residents.

A1.3.11 On-going conversations with local residents and stakeholders will continue to shape the emerging masterplan SPD.



A1.4 Formal engagement

Introduction

A1.4.1 The six-week formal consultation ran from 13 January 2020 up until 17 February 2020. The public were able to view and comment on the masterplan at any time during the period, by using the online platform set up through Commonplace. There were also four staffed drop-in events held at local venues for people to come along to, to view the masterplan SPD and to talk through the document with the planning team.

A1.4.2 The drop-in events were:

- Thursday 23 January, 12:30pm - 3:30pm, Springbank Community Centre, GL51 0LG
- Thursday 23 January, 4.30pm – 7.30pm, Hester's Way Community Centre, GL51 7SU
- Saturday 1 February, 10.30am – 1.30pm, Regent Arcade, High St, Cheltenham GL50 1JZ
- Saturday 1 February, 2:30pm - 5:30pm Tewkesbury - Cheltenham West Community Fire Station Tewkesbury Road, GL51 9SN

A1.4.3 People who attended the drop-in events were encouraged to leave feedback using the online engagement platform.

A1.4.4 The events and online platform were publicised extensively on the Council's website and social media channels. Flyers were also delivered to those in the local area. The area of focus for the flyer drop is shown on the map opposite. Regular monitoring during the consultation process enabled communication to be directed towards certain groups that were shown to be underrepresented in the feedback.

Online consultation

A1.4.5 Consultation was carried out using Commonplace, an online engagement platform. Proposals were

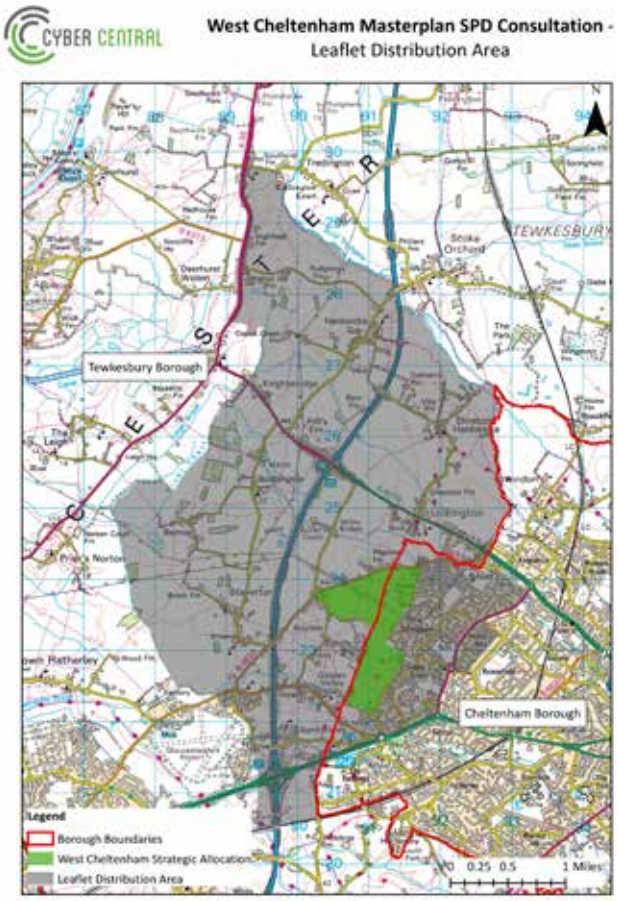


Figure 3 **Formal consultation leaflet distribution area**

Figure 4 **Screenshot of one of the web pages**

split across six pages, five of which included a comment form. The form comprised an 'emoji' sentiment scale and a combination of multiple choice options and free text fields. Respondents were not required to fill in all fields.

A1.4.6 In total, 2979 people visited the website. 157 people gave feedback and 213 comments were made. 191 agreements were made and 78 people subscribed to project news.

A1.4.7 Respondents had the option to give details about their age, ethnicity and postcode. The maps opposite show respondents' postcodes. The number corresponds to the number of respondents from that postcode, and the colour corresponds to the average sentiment of those respondents across all comments they made.

72%
of respondents live in the local area

45-54 yr olds
contributed the biggest % of responses

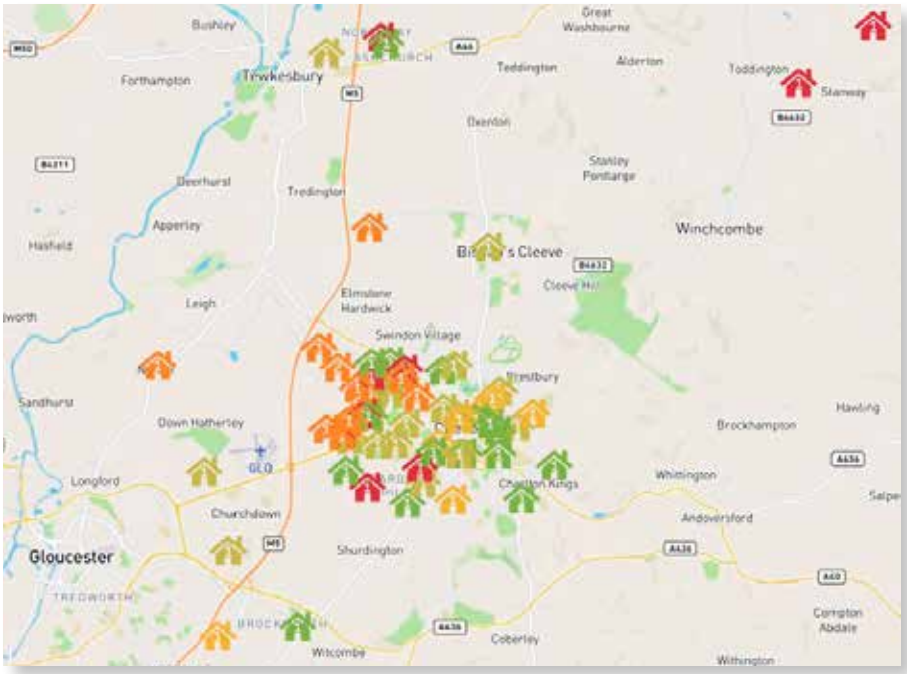


Figure 5 **Respondents' postcodes and sentiments**

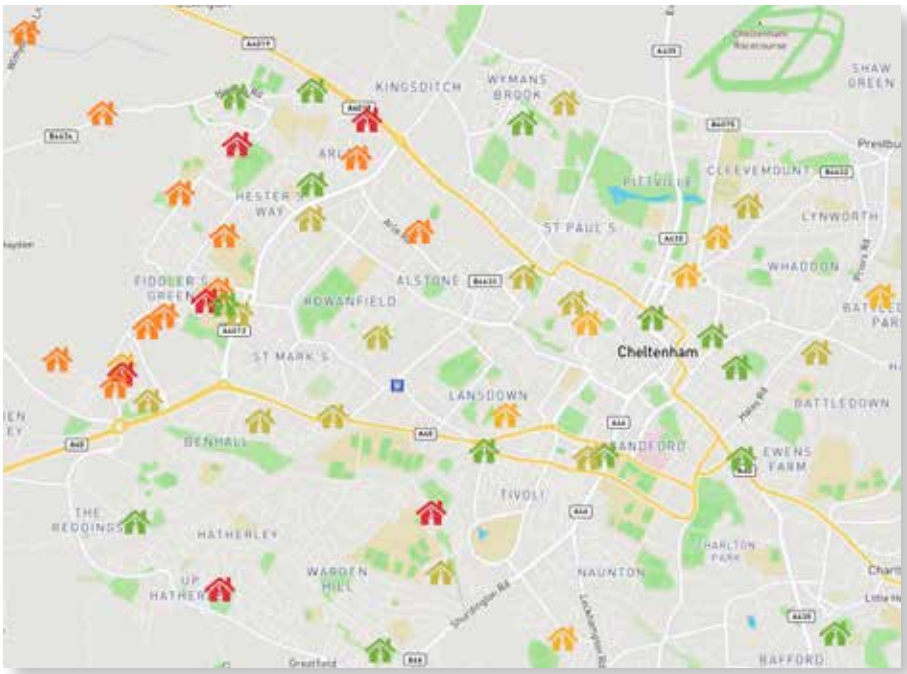


Figure 6 **Zoom in of respondent postcodes and sentiments**

Key findings

A1.4.8 Overall 41.4% are positive or very positive about the masterplan proposals. 41.4% are negative or very negative about the proposals and 17.2% are neutral. People were generally more supportive of the overarching objectives than of more specific area-based proposals.

Vision

- 46.3% either strongly agree or somewhat agree with the vision for The Golden Valley Development. 15.9% of respondents were 'neutral'. 23.2% somewhat disagreed and 14.5% strongly disagreed.
- 26% of people would like to see more emphasis on transport and accessibility in the vision.
- 19% would like to see more emphasis on environmental / design quality, 13% would like to see more emphasis on sustainability, 12% would like to see more emphasis on job creation, and 10% would like to see more emphasis on housing delivery.
- Sustainability was the theme that most people felt should take priority in future decision making as the development comes forward.

Sustainability and land use

- 78.5% strongly or somewhat agree with the sustainability objective.
- 72.7% strongly or somewhat agree with the land use objective.

Landscape and movement

- 75% strongly or somewhat agree with the landscape objective.
- 78.8% strongly or somewhat agree with the movement objective.

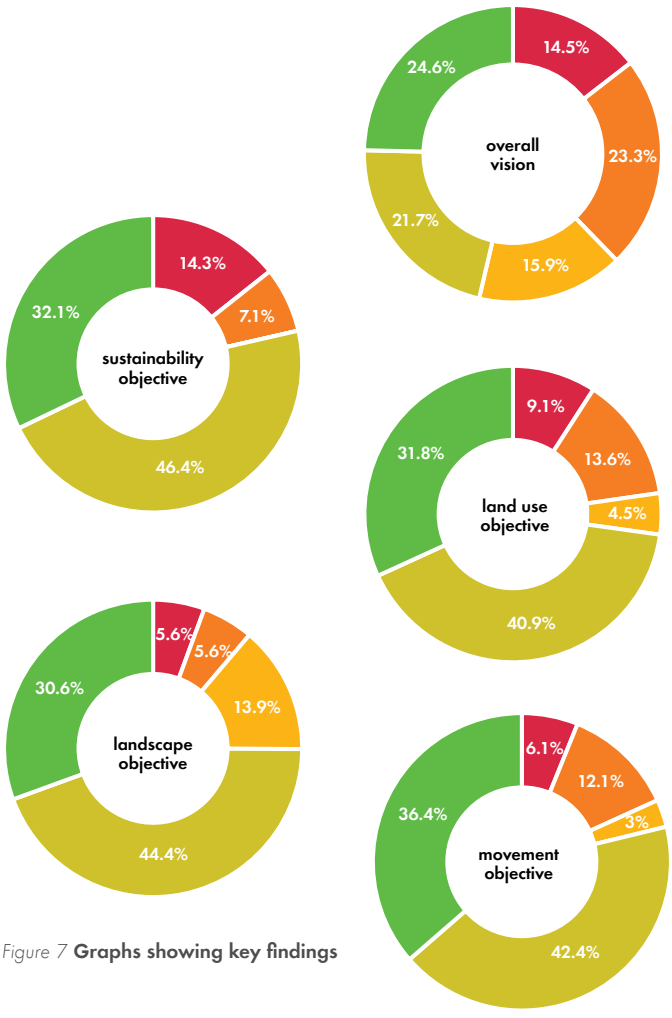


Figure 7 **Graphs showing key findings**

Placemaking and Design Quality

- 54.6% strongly or somewhat agreed with the vision presented for the different places within Cyber Central. 18.2% strongly disagreed.
- People most strongly disagreed with the location for the focus of Cyber Central at the junction with Telstar Way (27.3% of respondents). Although more people strongly agreed than strongly disagreed. In total, 50% strongly or somewhat agreed.
- 57.2% strongly or somewhat agreed with the proposals for the new link road, Main Street. 19% strongly disagreed.
- 65% strongly or somewhat agreed that the northern areas should have a greater focus for housing and neighbourhoods. Only 5% strongly disagreed, although 20% somewhat disagreed.
- 77.3% strongly or somewhat agreed that new development should be fully integrated with existing community.

Figure 9 **Photos of the drop-in events**

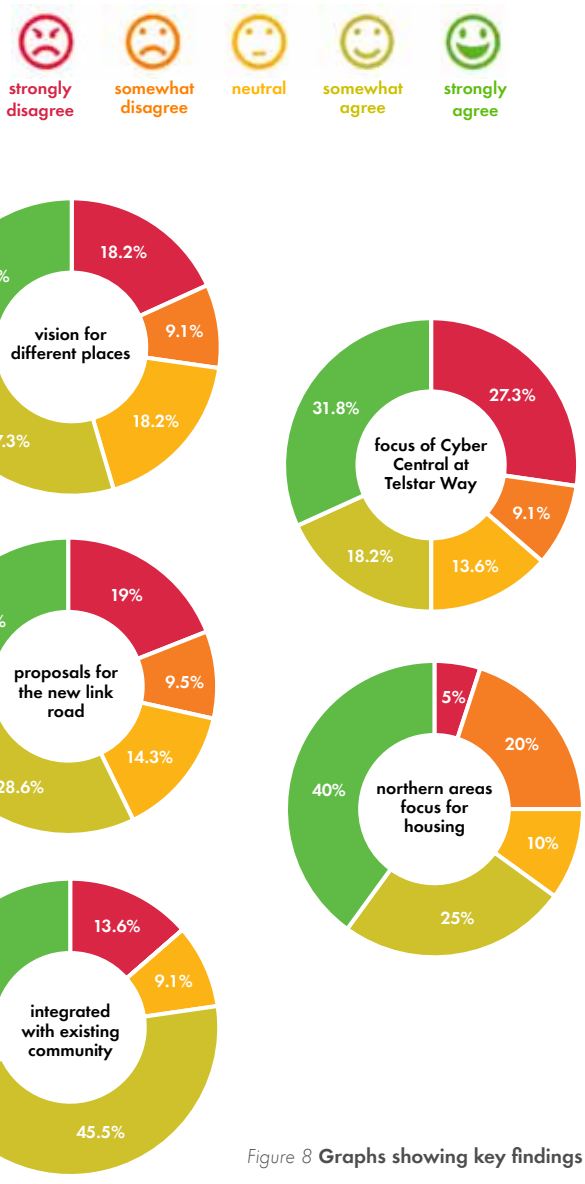


Figure 8 **Graphs showing key findings**

A1.4.9 Respondents were also able to make more general 'free text' comments under each objective and proposal, including identifying missing elements. A comment tracker was created with a summary of each comment and any proposed changes. Below lists the themes most comments related to:

- Traffic concerns on existing network
- Safety concerns on existing network
- Parking provision on site and nearby
- Low traffic neighbourhoods and encouraging sustainable transport
- Provision of good cycling infrastructure
- M5 junction upgrades
- Local facilities and services, including education provision and opportunities for young people
- Affordable housing
- Design / layout of proposals including proximity of buildings to existing homes
- Tall buildings / density concerns
- Environmental protection and wider environmental impact
- Construction concerns

A1.4.10 Representations were also received from professional stakeholders and statutory consultees in the form of letters to the Council. These were compiled into a comments trackers where over 400 individual comments have been reviewed. Updates to the document have been made in response to the online comments and representations. Some comments made were outside the scope of the masterplan SPD but have been noted by the Council and could feed into other related work.

Figure 10 **Photos of the drop-in events**

A2 Site context

A2.1 Funding related growth context

A2.1.1 The scale and ambition of the vision for The Golden Valley Development has allowed the local authorities to bid for and secure significant public funding for planning and infrastructure. This has been possible through a strong working relationship and collaboration between Cheltenham and Tewkesbury councils, Gloucestershire County Council and GFirst LEP. Collectively this relationship with the support of Homes England are driving the vision for exemplar and connected development. The success of securing funding demonstrates the importance with which the government and other agencies are attaching to this project. Key strategic investments secured or are being sought include:

- GFirst LEP has already secured £22m of Growth Deal 3 funding to provide improvements to the transport infrastructure along the A40 corridor which will enable sufficient capacity to open up the first phase of Cyber Park.
- The government has awarded Garden Community status to CBC and TBC for the West Cheltenham site and provided £150,000 of funding towards planning work.
- The local authorities have made a joint bid to Homes England for funding to upgrade junction 10 of the M5 to an 'all-ways' junction through the Housing Infrastructure Fund (HIF). This bid includes additional improvements to the local network in order to future proof it for the anticipated growth to around 2040.
- In October 2018 Cheltenham Borough Council approved up to £100m to finance capital costs for delivery of new housing by Cheltenham Borough Homes. The proposal agreed by Council was to consider development of a complete range of rental homes from social and affordable through to market and premium rents. Cheltenham Borough Homes are investigating options that will make a contribution to the place shaping agenda at Cyber Central.

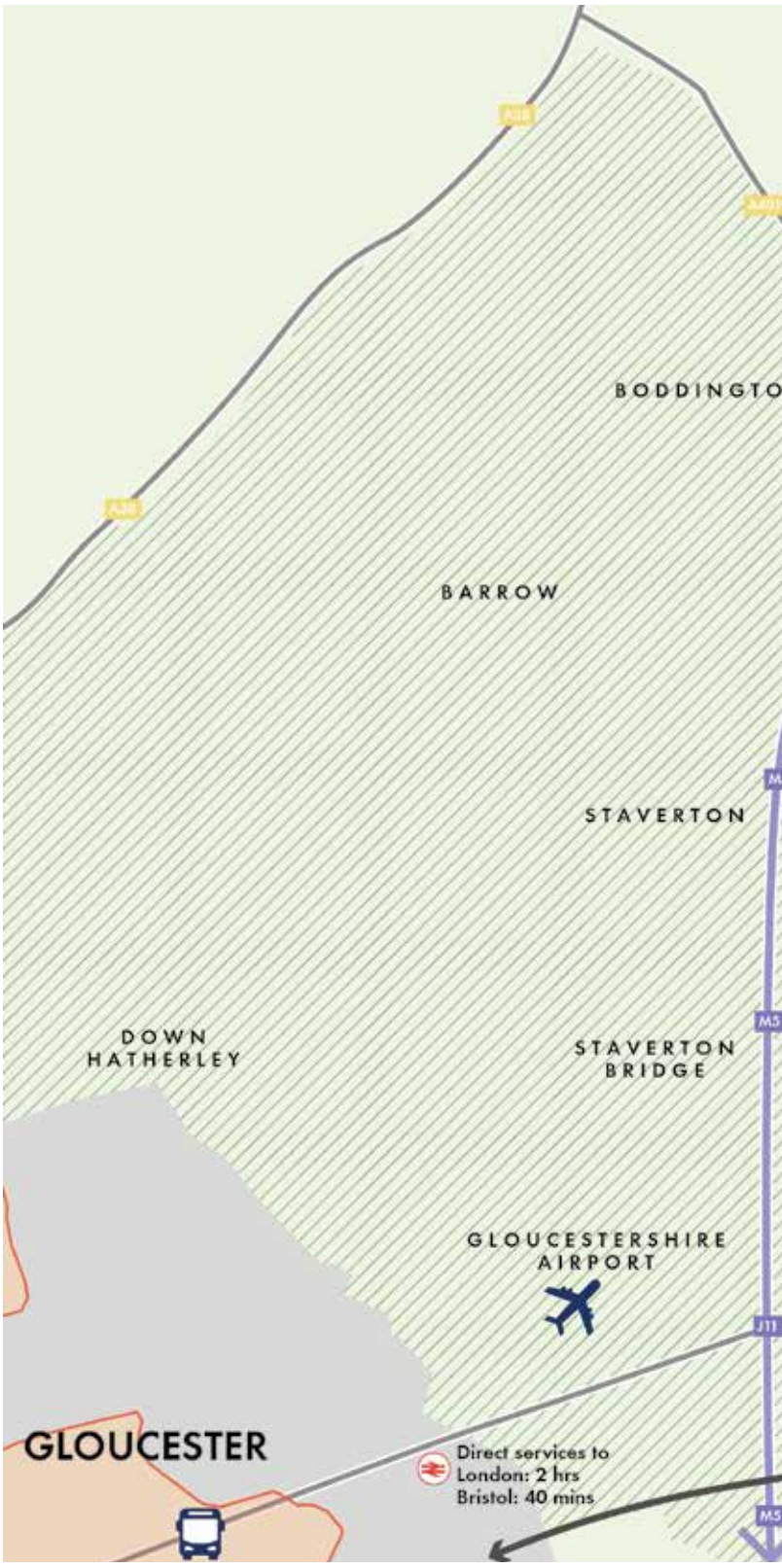
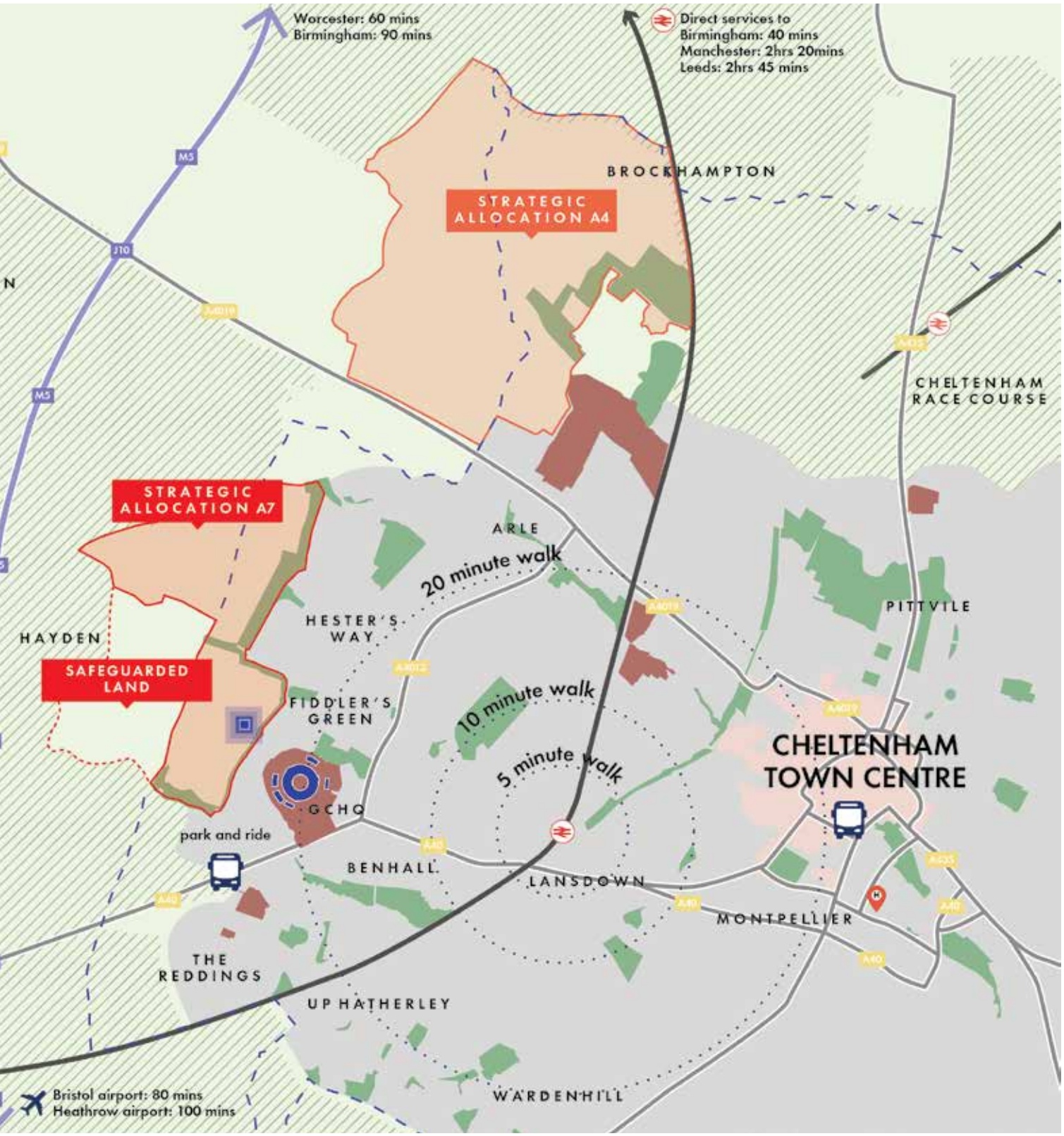


Figure 11 **Location of site in the context of other strategic allocations and transport l**


Worcester: 60 mins
Birmingham: 90 mins
Direct services to
Birmingham: 40 mins
Manchester: 2hrs 20mins
Leeds: 2hrs 45 mins
BROCKHAMPTON
STRATEGIC ALLOCATION A4
STRATEGIC ALLOCATION A7
SAFEGUARDED LAND
CHELTENHAM RACE COURSE
ARLE
20 minute walk
HESTER'S WAY
HAYDEN
FIDDLER'S GREEN
10 minute walk
5 minute walk
PITTVILE
CHELTENHAM TOWN CENTRE
GCHQ
park and ride
BENHALL
LANSDOWN
MONTPELLIER
THE REDDINGS
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WARDENHILL
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Heathrow airport: 100 mins
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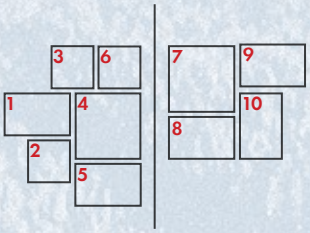


1 View towards the Severn Trent Water's Hayden Sewage Treatment Works on the western fringe of the site

2 Recent residential development at Hope Orchard

3 Part of the cycle network leading off of Henbury Close that borders the site to the east

4 Grazing horses at Holmlea Farm, Fiddler's Green

5 View looking east towards the residential edge condition of the neighbourhoods at Hester's Way

6 Stile and footpath leading into the site from Beverley Croft that borders the site to the east

7 Hatherley Brook running along the south of the site

8 Rural track near Hayden's Green

9 View looking west towards the Vale Hillocks

10 A network of mature hedgerows and trees characterise the field patterns of the site

A2.2 Land ownership

A2.2.1 The Golden Valley Development overall land allocation of 130 Ha (321 acres) falls within a number of different land ownership interests, the majority of which actively worked together through the extensive promotion of the land through the preparation of the Gloucester, Cheltenham and Tewkesbury JCS. At the time of writing there are believed to be numerous main land interests within the site including:

- Cheltenham Borough Council (CBC) has recently completed (August 2019) the purchase of approximately 45 Ha/111 acres of land from the previuous owners (The West Cheltenham Consortium). The CBC land comprises two separate land parcels; the north extends to around 18 Ha (45 acres) whilst the southern land comprises about 27 Ha/67 acres. The two land parcels can be seen on the plan opposite (see Figure 12).
- Midlands Land Portfolio Ltd' (MLPL – a Subsidiary of Severn Trent Water PLC) owns 57 ha / 141 acres within the site allocation. Approximately 23 ha / 58 acres of this forms part of a joint venture between 'Northern Trust Company Ltd' (NT) and 'MLPL.
- Severn Trent Water (STW) also owns the Hayden Sewage Treatment Works (covering 19.3 ha / 48 acres) to the west of the allocation which sits within the 'safeguarded land'. A further 44 ha / 109 acres within the safeguarded land is owned by MLPL.
- A number of further landowners / owner occupier interests control areas within the south, north west and south west corners of the site.

A2.3 Site promotion

A2.3.1 Earlier masterplanning work was undertaken on the SPD site by a consortium formed between Severn Trent Water as principal landowner and developer partner Northern Trust.

A2.3.2 The Consortium promoted the site as a strategic development opportunity during the production of the JCS. A significant amount of technical work to assess the engineering and environmental constraints and development capacity of the site was undertaken. Much of this technical work has informed this SPD.

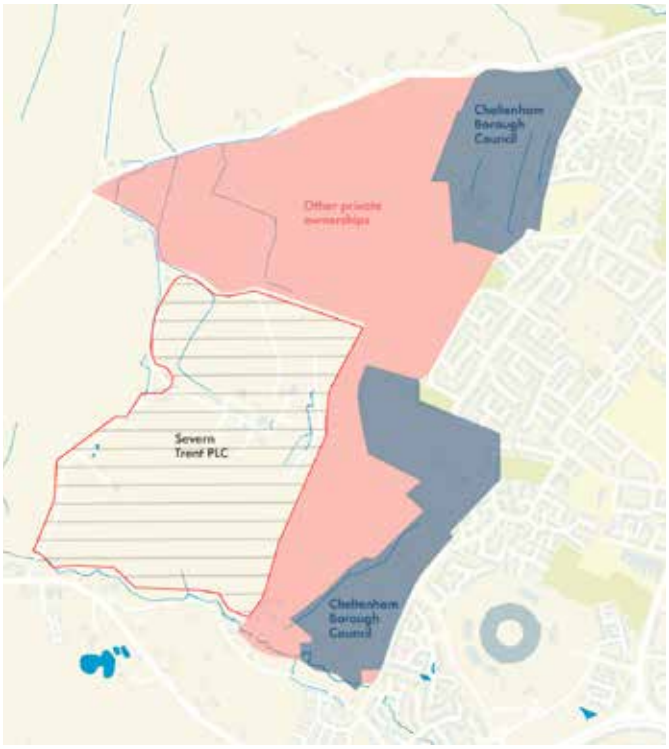


Figure 12 **Land ownership plan**

A2.4Policy context

A2.4.1 This SPD should be read alongside the Development Plan which sets the local and strategic planning policy context for the site allocation. Given the cross boundary nature of the site, the documents forming the Development Plan include Plans covering both Cheltenham Borough and Tewkesbury Borough Council administrative areas. Material planning policy considerations therefore comprise the following documents although the weight to be applied to each will vary depending on the document status at the relevant point in time.

2.4.2 **Joint Planning Documents:**

- The Gloucester, Cheltenham and Tewkesbury Joint Core Strategy (JCS) (adopted December 2017)
- Emerging joint policy documents including the JCS review will also be relevant material planning documents although their material weighting will be dependent on the status at the point in time in which a planning decision is being made.

2.4.3 **Cheltenham Borough Council Planning Documents:**

- Cheltenham Borough Council Local Plan Adopted 2006 (saved policies).
- The emerging new Cheltenham Plan – at main modifications stage with consultation November 2019.

- Supplementary Planning Guidance including:
  - Affordable Housing (2004)
  - Amenity Space (2003)
  - Sustainable Drainage Systems (2003)
  - Landscaping in New Development (2004)
  - Planning Obligations (2003)
  - Planning Obligations – Transport (2004)
  - Play Space (2004)
  - Public Art (2004)
  - Security and Crime Prevention (2003)
  - Sustainable Developments (2003)
  - Travel Plans (2003)
- Supplementary Planning Documents including Waste Minimisation in Development Projects (September 2006)
- Community Infrastructure Levy (charging commenced January 2019)
- Informal guidance on socially sustainable communities[1] 'Welcome to the future A local model for building socially sustainable communities'.

2.4.4 **Tewkesbury Borough Council Planning Documents:**

- The adopted Tewkesbury Borough Local Plan to 2011 (saved policies).
- The emerging Tewkesbury Borough Council Local Plan 2011 to 2031 (Pre-Submission version October 2019).
- Supplementary Planning Documents including:
  - Flood and Water Management SPD (February 2018)
- Community Infrastructure Levy (charging commenced January 2019).

1 https://www.cheltenham.gov.uk/downloads/file/5561/socially_sustainable_communities

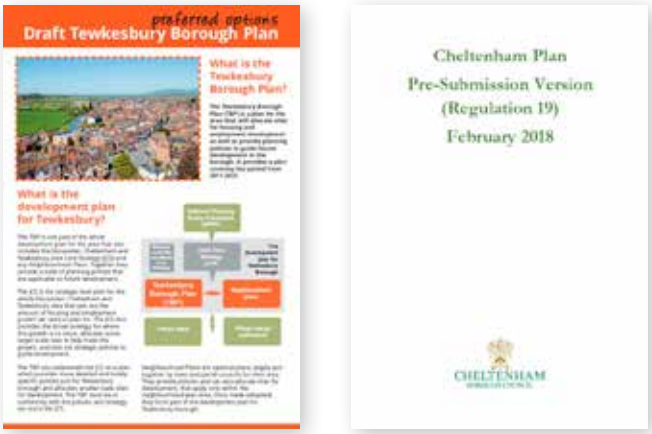


Figure 13 **Front covers of policy documents**

A2.4.5 This SPD does not set out the above mentioned policy requirements as they can be read in conjunction with this document, however key JCS considerations are repeated below for clarity.

A2.4.6 Gloucester, Cheltenham and Tewkesbury Joint Core Strategy (JCS)

A2.4.7 The Golden Valley Development site is allocated under Policy A7 within the Gloucester, Cheltenham and Tewkesbury JCS, adopted in December 2017 which is a co-ordinated strategic development plan that sets out how the area will develop between 2011 and 2031.

A2.4.8 The Allocation A7 proposes approximately 1,100 dwellings and 45 hectares of employment land as listed in the policy text as shown opposite:

A2.4.9 The JCS also sets an affordable housing requirement for the strategic sites through policy SD12 which seeks a 35% provision on site which is below the 40% requirement for proposals on non-strategic sites. This lower proportion takes account of the significant infrastructure investment required to bring the site forward for development.

JCS Review

A2.4.10 Following on from adoption, the JCS authorities have already started the review process. An Issues and Options consultation took place between 12th November 2018 and 11th January 2019. Consensus arising from this consultation is that the review should look to an end date of 2040. This is consistent with the National Planning Policy Framework (2019) which states that strategic policies should look ahead at least 15 years from the point of adoption. This is to anticipate and respond to long-term requirements and opportunities, such as those arising from major improvements in infrastructure. Early consultation on the JCS Review is anticipated to take place early in 2020, with adoption in 2021.

POLICY A7 - WEST CHELTENHAM

The Strategic Allocation identified at West Cheltenham (as shown on Policies Map Plan A7) will be expected to deliver:

1. Approximately 1,100 new homes;
2. Approximately 45 hectares of B-class led employment land to be focussed upon a cyber security hub and other high technology and high 'Gross Value Added' generating development and ancillary employment uses;
3. All development should be employment led, delivery of housing must be in tandem with employment development;
4. A comprehensive masterplan and development strategy for the Strategic Allocation, set within the context of the safeguarded land at West Cheltenham, which includes:
   a) A delivery strategy for employment focussed land release
   b) A positive impact on the regeneration of neighbourhoods in west Cheltenham
   c) Integrates built form and a comprehensive network of accessible green infrastructure, including local green space. The network will incorporate and protect notable natural features, including the Hatherley Brook, the Fiddler's Green Local Wildlife Site and important trees and hedgerows, and contribute to water quality enhancements.
5. Vehicle accesses from Fiddlers Green Lane and B4634 Old Gloucester Road and facilitate links to the M5 J10 for strategic movements to and from the site;
6. Measures necessary to mitigate the traffic impact of the site, including the use of travel plans to encourage the use of sustainable transport modes;
7. High quality public transport facilities and connections within and adjacent to the site.
8. Safe, easy and convenient pedestrian and cycle links within the site, to key centres and with neighbouring existing development and the wider green infrastructure network;
9. A distribution of development that takes account of the proximity of the Hayden sewage treatment works and incorporates appropriate spatial planning arrangements and mitigation measures designed to minimise material impacts on residential properties and commercial premises. Development which is likely to be significantly affected by odours will not be permitted within the Odour Monitoring Zone identified on the policies map;
10. A landscape buffer to the western boundary of the site which will provide screening between the development and the Hayden sewage treatment works;
11. A layout and form that respects landscape character, significance and setting of the heritage assets at Hayden Farmhouse and Barn;
12. A layout and form that reduces the impact of electricity pylons and high voltage lines; with the siting of residential development being a particular consideration.

A2.4.11 The JCS Review Issues and Options document notes that planning over a longer plan period will mean an increased requirement for new homes, employment and infrastructure, and the need to look at further locations for growth. The JCS process pre-empted this requirement through the identification of 'safeguarded land' adjacent to both the West and North West Cheltenham strategic sites that has been removed from the Green Belt in order to meet the longer term development needs beyond the current plan period. In the case of Cyber Central this 'safeguarded land' includes the Hayden Sewerage Treatment Works and land immediately to the west of the Cyber Central site.

A2.4.12 The Review Issues and Options document identifies that areas including the extension of the Cyber Central allocation provide the primary opportunity for helping to meet the growth requirements for Cheltenham but these sites need to be planned through a review in order for them to come forward. The Review Issues and Options also notes that in addition to the safeguarded land, there are potentially other opportunities within the wider West Cheltenham area that are currently within the Green Belt but which could provide further sustainable options for growth. In addition the consultation document recognised that further development in this area would provide the opportunity to build on the development of the existing strategic allocations and take advantage of social and community infrastructure that is to be provided. At Cyber Central, development beyond the current allocation would also help maximise the potential of the cyber security hub. In seeking to demonstrate this proposition, the JCS Review process is supported by a number of background documents including the Cyber Central Vision.

Neighbourhood Plans

A2.4.13 Within Cheltenham Borough, the Springbank Neighbourhood Forum Area (approved by Cheltenham Borough Council June 2017) and Hester's Way Neighbourhood Forum Areas (approved by CBC December 2017) between them include the subject site.. If prepared, Neighbourhood Plans will need to be in general conformity with the development strategy and policies set out in the JCS and other plan documents. Hester's Way Forum is currently in the process of preparing a Neighbourhood Plan that is well advanced. There is currently no plan for preparation of a Neighbourhood Plan by the Springbank Forum. There are no known applications for Neighbourhood Plans within the Tewkesbury Borough area relevant to the site at the time of writing.

Waste and Minerals Plans

A2.4.14 Consideration will also need to be given to the adopted Gloucestershire Waste Core Strategy, particularly policy WCS 2 Waste Reduction, and WCS 11 Safeguarding Sites for Waste Management. The emerging Minerals Local Plan for Gloucestershire has recently been examined and the main modifications consultation has recently ended. If adopted, Policy SR01 is concerned with the delivery of sustainable construction and is focused on maximising the amount of secondary and recycled aggregate being used in development projects throughout the County. If adopted, emerging Policy MS01 Non-mineral developments within MSA should also be acknowledged. Part of the proposed SPD area falls within in a designated Minerals Consultation Area (MCA). Proposed development taking place within the MCA area could potentially require a Minerals Resource Assessment (MRA). Local advice on MRAs is contained in the supporting text to Policy MS01.

Figure 17 **The Royal Wells, Cheltenham or Spasmotic affections from Spa Waters by Isaac Rober Cruikshank (1825)** ©Collection of the Art Fund, Inc. at the Birmingham Museum of Art; Catherine H. Collins Collection, AFI.668.1998

A2.5 Cheltenham's next phase of growth

Site history and local heritage

A2.5.1 The study area was mainly surrounded by farmland up until the late 20th century when Cheltenham rapidly expanded westwards. Many of its historic lanes, footpaths and field boundaries are still evident today and connected Hayden with Hester's Way and Pilgrove farms. The historic maps below (Figure 14 -16) show these features, including some that have since been lost, for example the path from Pilgrove Cottage to Golden Valley. Development of the residential areas on the eastern edge of the site have respected the early field boundaries.

A2.5.2 A Scheduled Monument known as 'Moat House moated site' is located to the north of the site. To the west are three grade II listed buildings - Hayden Farmhouse, a barn, and The Old Forge. To the south is Nesley Croft, a Grade II Listed building.

The growth of Cheltenham

A2.5.3 The development of West Cheltenham continues the town's story of expansion, illustrated in Figure 18. Cheltenham has Saxon origins which centred on the present High Street and adjoining lanes. The town became a prosperous spa resort following the discovery of medicinal waters in 1716. Villas and terraces were built along tree-lined walks.

A2.5.4 The town's population grew rapidly in the 19th century. Cheltenham developed into a major shopping centre and the opening of the railway in 1840 spurred the development of estates. By 1903, Cheltenham was a religious and education centre with several important colleges and schools located to the south. The opening of hospitals, parks, bath-houses, an opera house, library and theatre, supported the growing population, although no firm economic base for the town meant high levels of unemployment and vacant houses. The population declined drastically between 1901 and 1921, and Cheltenham became known as 'the town to let'.

A2.5.5 Its fortunes began to change in the 1930s with the growth of aeronautical industries and pharmaceutical and foodstuffs companies. GCHQ relocated to Cheltenham in the 1950s and housing was built for its employees. Since then, the town has seen continued residential expansion to the west. Cheltenham is the location of several head offices, including UCAS and Rural England, and tourism is playing an increasingly important role. The development of Cyber Central West Cheltenham aims to strengthen the town's reputation as the national leader of cyber technologies.

Figure 14 **1888 Ordnance Survey ©NLS**

Figure 15 **1901 Ordnance Survey ©NLS**

Figure 16 **1954 Ordnance Survey ©NLS**

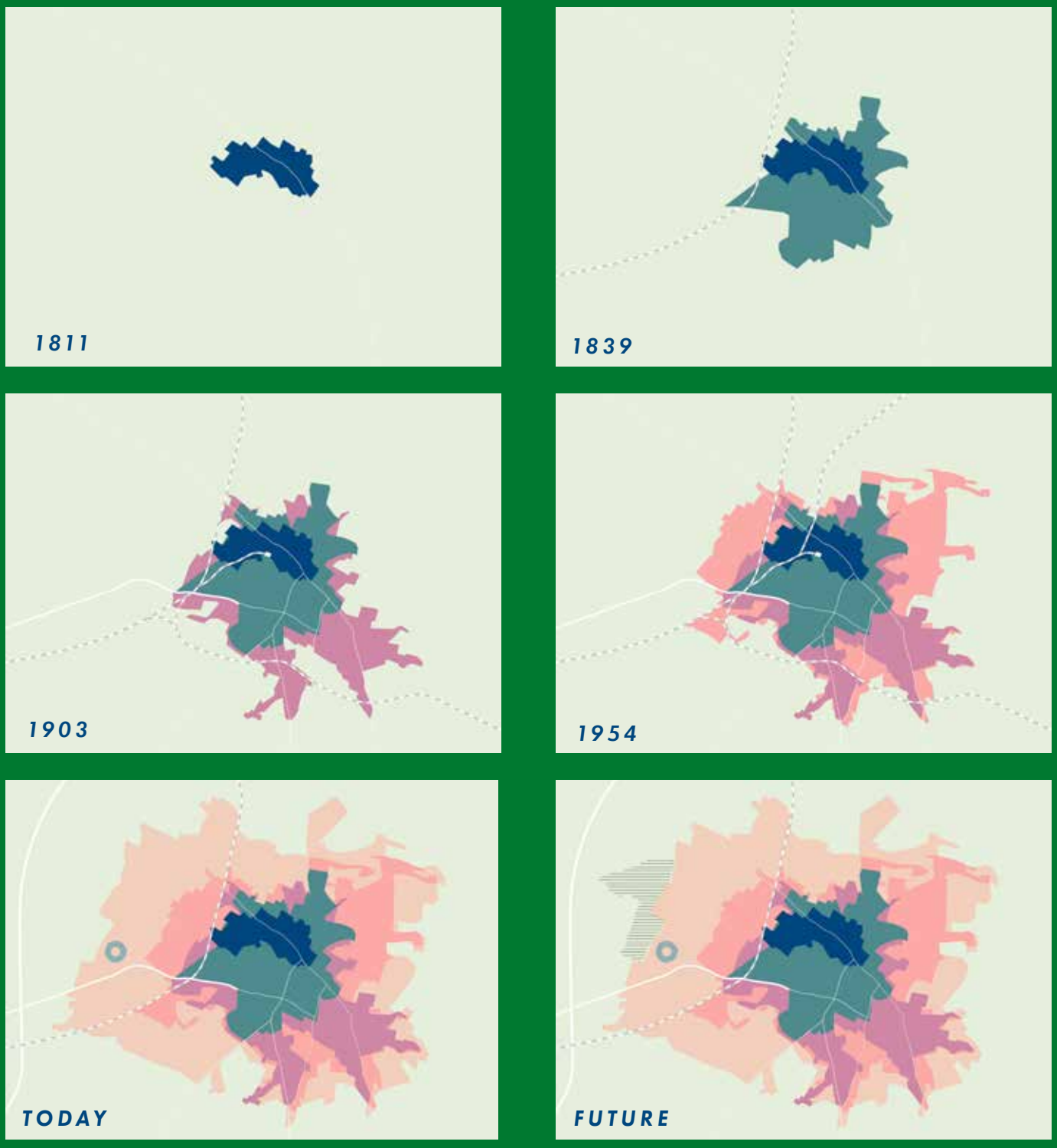


Figure 18 **Historic evolution of Cheltenham Town Centre**


Key
Primary road
Secondary road
Tertiary road
Distributor
National cycleway
Local cycleway
J10
A4019
Tewksbury Road
M5
Potential new link to improved J10
Uckington
B4634
Old Gloucester Road
Springbank
Springfield Park
Hayden Village
Hayden Sewage Treatment Works
Hester's Way
Hester's Way Park
Princess Elizabeth Way
GCHQ
M5
B4036
A40 Gloucester Road
Benhall
Arle Court Park & Ride
J11

A2.6 Transport context

A2.6.1 During the preparation of this SPD the Cabinet of Cheltenham Borough Council has approved 'Connecting Cheltenham', a transport strategy for the borough. This strategy sets clear ambitions for modal shift and provides context for this SPD. The following section makes commentary on the current transport context, opportunities for delivery through new development is set out in Part B of this SPD.

Walking and cycling

A2.6.2 There is a footway / cycleway provided adjacent to the carriageway on Telstar Way to the south of the site which links to an off-carriageway walking / cycling route adjacent to the A40. This route ceases to the east of Telstar Way and commences again from Princess Elizabeth Way. As such, there is the potential for extending the route adjacent to the missing section along the A40.

A2.6.3 To the north of the site, there are no footways on Old Gloucester Road adjacent to the site boundary, although a footway is provided which links from Pilgrove Way. To the east of the site, within the existing residential areas, footways are provided on all local residential streets providing a highly permeable environment for pedestrians.

A2.6.4 There is limited cycling infrastructure or routes linking through the existing Springbank and Rowanfield residential areas, however most of the routes are considered to be quiet roads and therefore suitable for cycling. This supports the wider ambition of Cheltenham Borough Council to double cycle trips, as set out in the Connecting Cheltenham transport strategy. The site has the potential to connect to a number of cycle routes via Telstar Way, along Princess Elizabeth Way and the A40 as well as further afield along the Honeybourne Line. These could be linked through the existing residential areas in Springbank via a number of connection points and include signage and road markings, as appropriate.

Figure 19 **(facing page) Road hierarchy in West Cheltenham**

A2.6.5 National Cycle Route 41 runs directly to the southern boundary of the site and provides a cycling link between Gloucester and Cheltenham. This is a mixture of an on and off-carriageway route and offers the potential for travel to and from the site via cycle.

A2.6.6 There is a good network of walking and cycling routes linking to the site which the masterplan can connect into and enhance. Improvements could be made along Old Gloucester Road to provide a footway linking to the northeast, where needed.

Public Rights of Way (PRoW)

A2.6.7 Figure 2020 shows the existing PRoW within and around the West Cheltenham allocation site. Some routes traverse the site and should be taken into consideration in any masterplanning for the site as a whole and particularly in the green infrastructure strategy.

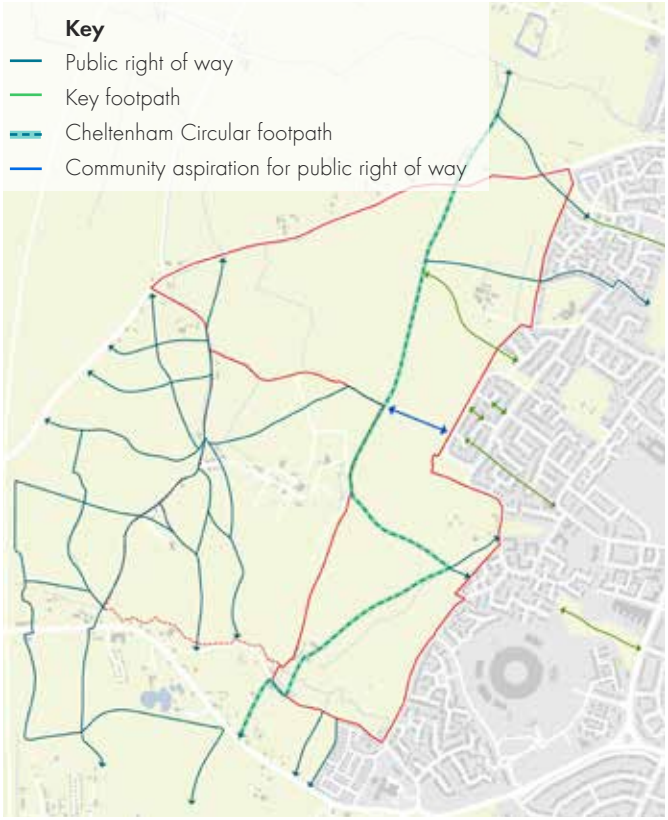


Figure 20 **Public Rights of Way in West Cheltenham**

A2.6.8 Early informal consultation with the local community has also highlighted an aspiration to improve the PRoW network between Springbank and the existing cross-site network. These potential extensions to the PRoW network are also shown in Figure 200.

Public transport

A2.6.9 The closest bus routes operating within the vicinity of the site are the 94 Gold, Service H, C and A, as shown in Figure 2121 and as follows:

- The 94 Gold provides a 10 minute frequency of service between Cheltenham and Gloucester and stops within a reasonable proximity of the Cheltenham Rail Station and passes to the south of the site.
- Service H connects the Town Centre to Swindon Village and Arle Farm to the north of the site. This runs with a 30 minute frequency.
- Service C connects the Town Centre to Kingsditch and Springbank to the east of the site. This runs with a 15 minute frequency of service.

A2.6.10 Gloucestershire County Council has made a bid to Homes England to fund a multi-million pound investment in transport infrastructure. The funding would provide an upgrade of M5 junction 10 with the new junction giving access from the motorway both northbound and southbound to a new link road into Cheltenham which would link to The Golden Valley Development site. The link road would be dual carriageway in nature and connect to the northern end of The Golden Valley Development site and need to tie into the main access road.

A2.6.11 The junction may also offer some capacity benefits at Junction 11 as vehicles would not need to divert to J11 to travel to and from the M5 south. There will be significant improvements for Princess Elizabeth Way as vehicles currently using this route to access junction 11 from the north of the town, (notably HGV's from Kingsditch), will be removed.

Strategic development and movement context

Elms Park

A2.6.12 The Elms Park development is located to the north of the SPD site, on the north side of the Tewkesbury Road. The principal roads within the site are proposed to have carriageways widths of 7.3 metres, with anticipated traffic levels to be c. 2,200 movements per hour across the four access points.

A2.6.13 The Elms Park development at North West Cheltenham also proposes significant improvements along the Tewkesbury Road corridor for buses and cyclist access. There are minimal opportunities for improving the operational capacity of junctions and as such, the key focus of their transport strategy is to encourage sustainable travel and a modal shift to alternative modes for existing users. The majority of mitigation proposals are therefore for sustainable transport improvements.

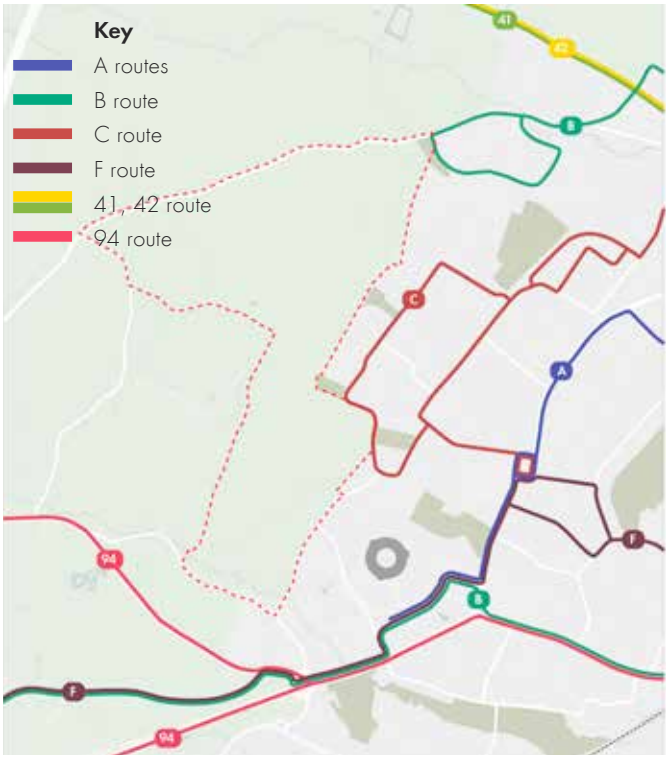


Figure 21 **Existing bus routes serving West Cheltenham**

West Cheltenham - JCS evidence

A2.6.14 A considerable amount of transport work was done in order to promote the site through the JCS process. Modelling was undertaken, junctions designed, and a network of roads was envisaged to provide access across the site a s whole. Transport constraints and highways capacity considerations will play an important role in the design of development proposals coming forward and the approval of the highway authority will be required.

A2.6.15 However, the scale of the site presents a unique opportunity to ensure priority is given to both improving public transport connections to surrounding stations and centres, and putting infrastructure in place to support more sustainable patterns of travel for those who live in, work in, and visit the area.

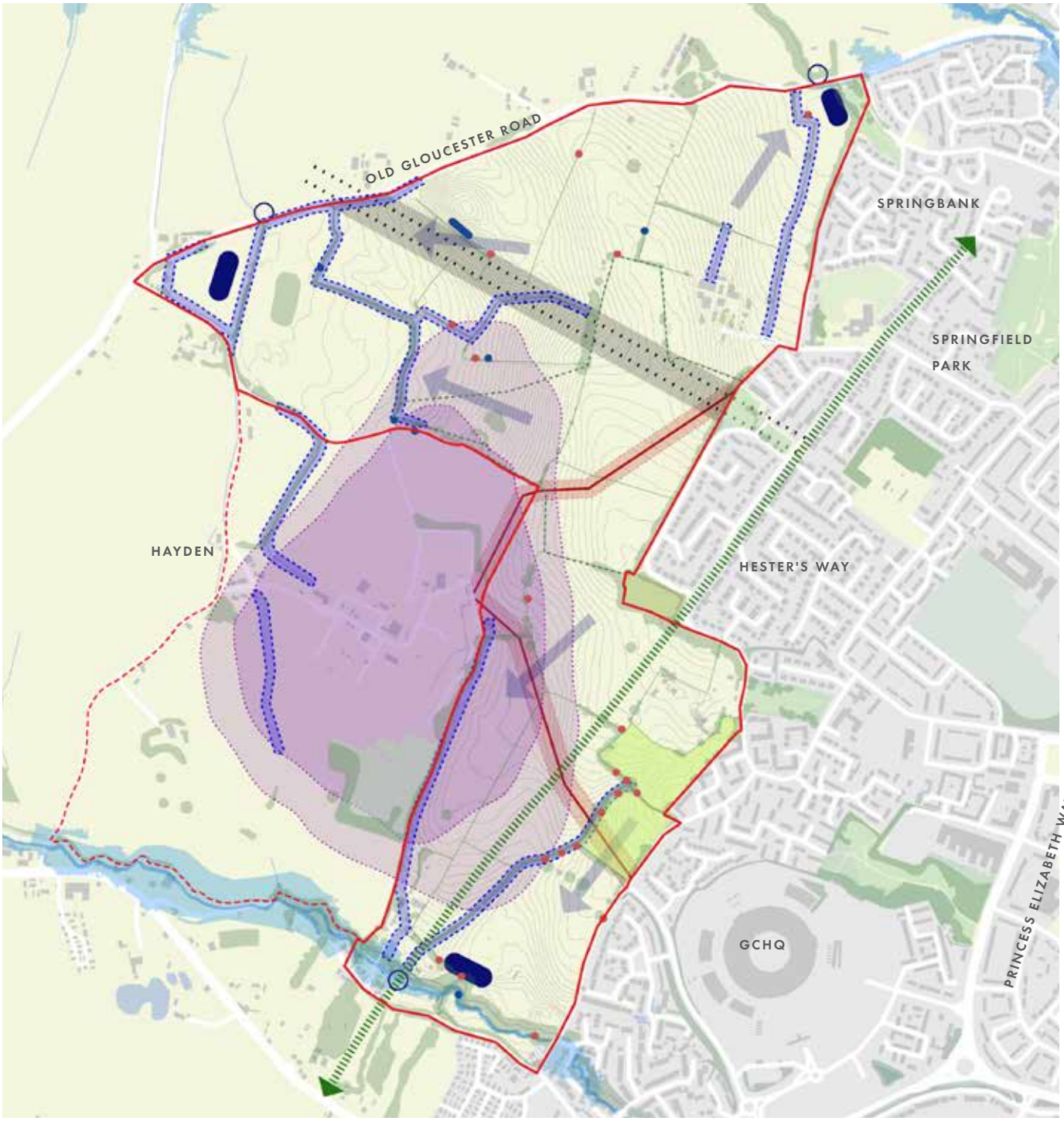


Figure 22 **Summary constraints plan**

Key

- Badgers
- Bats
- Mature trees
- Community space allocation
- Hedgerows
- Allotments
- Grassland habitat
- waterways
- water attenuation areas
- catchment drainage direction
- fluvial / surface flood zones
- Trunk main
- 20m easement to surface water outfall
- Power lines
- Cordon sanitair
- Foul sewer

A2.7 Opportunities and Constraints

A2.7.1 Technical due diligence, across the site for a range of disciplines, has underpinned the preparation of this SPD. This has shown that generally the site has very few abnormal constraints. A brief non-technical summary of each discipline is presented below. See Appendix A3 for more information.

A2.7.2 Detailed information to support a HRA (Habitat Regulations Assessment) will be required as part of the planning application process. The main potential impacts on European Sites are increased recreational disturbance, plus reduced water and air quality.

Acoustics

A2.7.3 As expected for a greenfield site the noise constraints are fairly limited. It is worth noting that there may be some noise associated with the M5 running to the west of the site and particularly apparent in the north western corner of the site where the M5 is at its closet. Standard mitigation measures such as noise barriers or earth bunds may be required locally.

Air quality

A2.7.4 Around the site average background NO2 concentrations are low and the locations of the planned residential plots are set back from the roads, so likely NO2 concentrations will remain low. We know that there are elevated concentrations of NO2 locally to the site and therefore, dwellings near B4634 may need to be set back from the road slightly to reduce air quality impacts from road traffic. There is an opportunity for a site wide Green Infrastructure Strategy to consider air quality issues.

Ecology

A2.7.5 Despite being a greenfield site, ecological constraints are fairly limited. There are European statutory sites within 10km and two National Statutory sites within 2km.

A2.7.6 In 2017 the Cheltenham Borough Council scoping opinion notes the requirements needed for assessing impacts on statutory and non-statutory sites. It also highlights the requirement to demonstrate that there is no deterioration in terms of water quality or ecological value of known watercourses.

A2.7.7 There are numerous opportunities to improve the current ecological baseline and provide biodiversity net gain at this development. There is also an opportunity for ecological connectivity to be improved and integrated as part of the site wide Green Infrastructure Strategy.

Flood and drainage

A2.7.8 The proposed site forms three drainage basins, with the highest ground in the centre of the site.

A2.7.9 Almost all of the site is in Flood Zone 1, which is the lowest risk in relation to rivers and sea. There is a narrow floodplain at the southern boundary near Hatherly Brook which is recommended to stay undeveloped.

A2.7.10 With regards to surface water flooding, the north western corner of the site is considered to be highest risk, however does not consider culverts so is a worst-case scenario.

A2.7.11 As it stands, there is no physical conflict with sewage works and proximity to pipes exist, however there may need to be discussions with Severn Trent Water to check if the capacity of the existing sewers is enough to support a new development of this size.

A2.7.12 Due to mudstone geology, runoff via infiltration will not be feasible, therefore the site should discharge to local watercourses at the pre-development 'greenfield' rate. Space for this should be allocated within the layout, downslope of development.

A2.7.13 Areas of low-lying ground provide opportunity to create marsh or wetland areas especially when combined with onsite attenuation requirements. This could be integrated as part of the site wide Green Infrastructure Strategy.

Geoenvironmental and geotechnical

A2.7.14 There are considered to be limited risk areas for contaminated ground to be suspected. Areas most likely to have elevated risks are at the old farmhouses around site. Given the scale of the site it is likely that ground conditions will vary across the developable area. Low-lying areas may also present a risk of soft soils leading to deeper foundations and consideration given to the stability of excavations.

A2.7.15 A phased approach for geoenvironmental and geotechnical work is required, focusing on two stages of planning application and then a master planning and development stage. This would include a full phase 1 desk study, and then a phase 2 ground investigation. UXO risk is moderate.

A2.7.16 Further work will be needed, including trial pits in order to determine the soil resource across the site. This will inform appropriate SuDS and planting design for planning, and latterly to understand the potential for re-use in the landscape, and subsequent soil protection measures. Alternatively there could be a stand alone soil survey.

Odour

A2.7.17 This is one of the more influential constraints. As stated at para 4.5.28 of the JCS, the designation of the Odour Monitoring Zone in the JCS at West Cheltenham does not prevent development at the West Cheltenham Strategic Allocation except where such development would be significantly affected by odours. Further work through the master planning of the development along with appropriate mitigation will facilitate the development of the site. Decision takers should weigh the evidence presented as to the impact of odour on a particular proposal in this area, taking into account Policy SD14 Health and Environmental Quality of the JCS, and relevant advice from the Environment Agency or other expert body.

A2.7.18 There is a requirement that commercial buildings within close proximity to the sewage treatment plant will need some form of mitigation. However, further work would be required to support any forthcoming planning application as this constraint is likely to have a direct impact on any masterplan for the site and, in particular, the location of residential and mixed-use development.

Utilities

A2.7.19 Severn Trent Water 21 inch trunk main runs through the south of the site. Assuming this is not diverted, there will be a requirement for appropriate easement. The masterplan for the site will need to respect the alignment of the HV overheads which traverse the northern part of the site.

A2.7.20 Services around the proposed north and south accesses will be impacted. However due to there being infrastructure in the area there is no issue with connecting the new development up to local networks.

Archaeology

A2.7.21 The JCS Historic Environment Assessment (Addendum - Additional Site Assessments, ECUS September 2016) and previous EIA scoping advice for the allocated area (17/00967/SCOPE) have stressed the need for a programme of archaeological assessment and field evaluation, which describes the significance of any archaeological remains present on the site and how these would be affected by the construction of proposed development, in accordance with the NPPF, paragraph 189, and JCS Policy SD8: Historic Environment.

A3 Longer term phases of growth - Hayden Works site

A3.1 Introduction

A3.1.1 Through the adoption in December 2017 of the JCS, the Hayden Sewage Treatment Works (HSTW) site, whilst not forming part of the West Cheltenham strategic allocation under Policy A7, was removed from the Green Belt and earmarked as 'safeguarded land'. This policy shift was made in view of the longer-term opportunity to bring the works site forward for redevelopment as part of The Golden Valley Development. This site will be tested through the JCS review as a site allocation.

A3.1.2 To bring forward the Hayden Works site as a strategic allocation the existing operational treatment works would need to be suitably relocated. This would be an expensive and complex operation, but if a suitable and a viable alternative location can be agreed and the replacement facility is made operational in advance, the release of this site for redevelopment would potentially deliver significant benefits. Further technical assessments (such as Odour Modelling and Contamination Assessments) will be required to aid the delivery of the allocated land. It is accepted that the delivery of homes and employment space on the allocated land will come forward well in advance of that on the safeguarded land. Appropriate provision of infrastructure must therefore be considered at a wider strategic level. Any development that does come forward whilst HSTW is still operational must take proper account of the operational needs of Hayden Works and the impact of associated odour on proposed new development.

A3.1.3 Principles set out in Part B of the SPD shall inform the delivery of development on the 'wider site' should the safeguarded land be released for development, potentially delivering circa 3,000 homes and 50ha employment land over both the strategic allocation and the safeguarded land as a whole.

A3.1.4 Redevelopment of the works site at Hayden would contribute positively to many of the key objectives for The Golden Valley Development. Reflecting on each the key objectives outlined in the SPD, this Appendix provides an overview of the positive contribution redevelopment of the HSTW site could make to The Golden Valley Development. Should this site opportunity come forward for development earlier than expected, any new development must be fully considered and tested against the context of the policy requirements set for the wider existing allocation including the SPD. Furthermore, at whichever time the HSTW site does come forward, new development is expected to conform to the design principles set out in the SPD.

The adjacent plan is numbered to highlight some of the key points relating to the longer term phases of growth for the Golden Valley Development, as follows:

1. A natural extension of The Golden Valley Development, with one principal road but two access points. This principal vehicular route would be suitable for bus services.
2. Landscape features will provide high quality landscape setting between different phases of development and help to reduce the impact of the redevelopment of the Hayden Works site on adjacent residents.
3. A permeable network of routes will provide access to all parts of the development and help to shorten walking distances between destinations thereby helping to encourage active and sustainable travel choices.
4. Access for pedestrian and cycles only will be possible via Hayden Lane. There will be no car access to the redevelopment via Hayden Lane.
5. New development should respect the rural character and scale of Hayden Village.
6. Hayden Knoll farm house is retained, with development to respect the setting and amenity of this existing building.

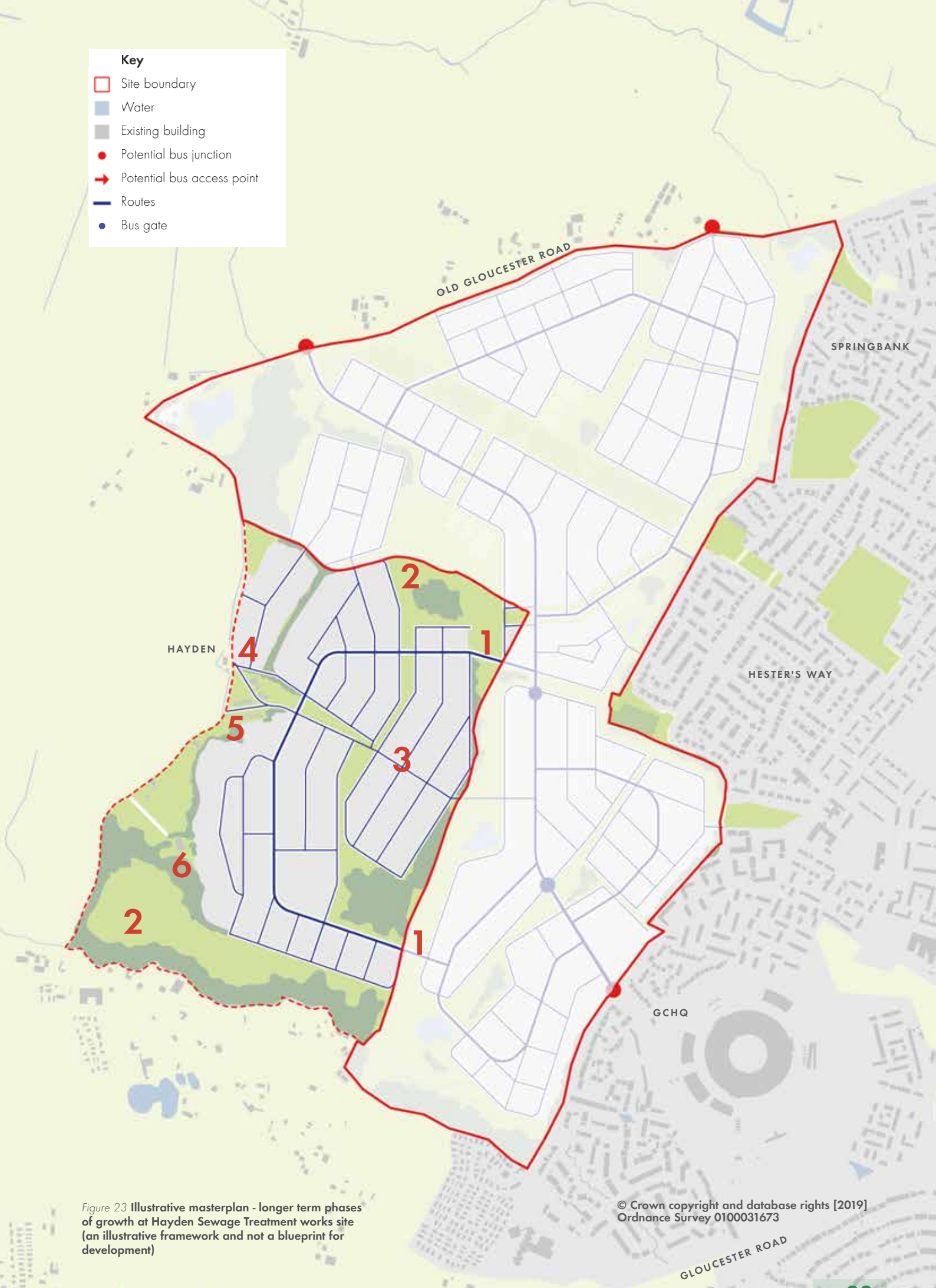


Figure 23 **Illustrative masterplan - longer term phases of growth at Hayden Sewage Treatment works site (an illustrative framework and not a blueprint for development)**

A3.2 Key principles for Hayden Sewage Treatment Works site

SUSTAINABILITY - Embracing the highest standards of environmental sustainability

A3.2.1 Redevelopment of the HSTW site does present exciting opportunities to continue a further phase of growth within The Golden Valley. The latest technologies should be employed to reduce water and energy consumption of new development and deliver net carbon neutral development, and the Smart Cities objectives within this SPD should be considered incorporated for the HSTW site.

A3.2.2 ### LANDSCAPE - Working with the natural landscape and its features

A3.2.3 Earlier phases of development are likely to have put a landscape structure in place which forms the basis of the establishment of a country park on the western side of the site. The availability of the HSTW site will underpin the establishment of a country park. Existing landscape assets and features will be retained where possible to help influence the form of development. In particular, existing hedgerows, trees and the mature features along the Hatherley Brook should be retained to help ensure new development is appropriately integrated with existing communities.

MOVEMENT - An integrated and connected extension of West Cheltenham

A3.2.4 A permeable and connected network of streets and lanes will allow the later development of the HSTW site to be fully integrated with the development at The Golden Valley Development. Key vehicular routes and cycle connections will extend from the existing network of routes within phase 1 of the development. New communities within the site will benefit from infrastructure which supports active and sustainable travel choices. New dwellings will be supported by vehicle charging points, which will be designed to have dedicated space for bicycle storage and will have access to the use of environmentally friendly vehicle hire schemes. The area will also be served by appropriate extensions to the local bus services.

LAND USES - A vibrant and diverse range of uses and activities, serving existing and new communities

A3.2.5 This objective is not directly relevant to the HSTW site and it is acknowledged that the relocation of the HSTW will be of significant cost and therefore any alternative uses are likely to be residential led in order to generate the required land values. The cluster of cyber-tech uses will be concentrated on The Golden Valley Development allocated site. Street design will incorporate sustainable drainage features to ensure flood resilience. New development will be designed to high energy and efficiency standards.

A3.2.6 The design quality of both the houses and the public realm and landscape context of development across the HSTW site will be of paramount importance to its long-term environment, social and economic success and sustainability. Garden communities principles, which have underpinned the development of the core Golden Valley Development SPD site, will be applied to the design of new housing neighbourhoods across the HSTW site. Fundamental to this is the application of good urban design principles which include creating safe and accessible streets and neighbourhoods, a clear distinction between public and private land, developments which create strong street edges which ensure public spaces are overlooked, and a mix of dwelling types and tenure to meet local needs.

A3.2.7 The plan opposite highlights the distinction between shorter and longer term phases of development. Shorter term phases are likely to be able to be brought forward ahead of any prospective HSTW relocation. The later phases of development - some of which fall wihin the already allocated site - are likely to be dependant on relocation of this facility.

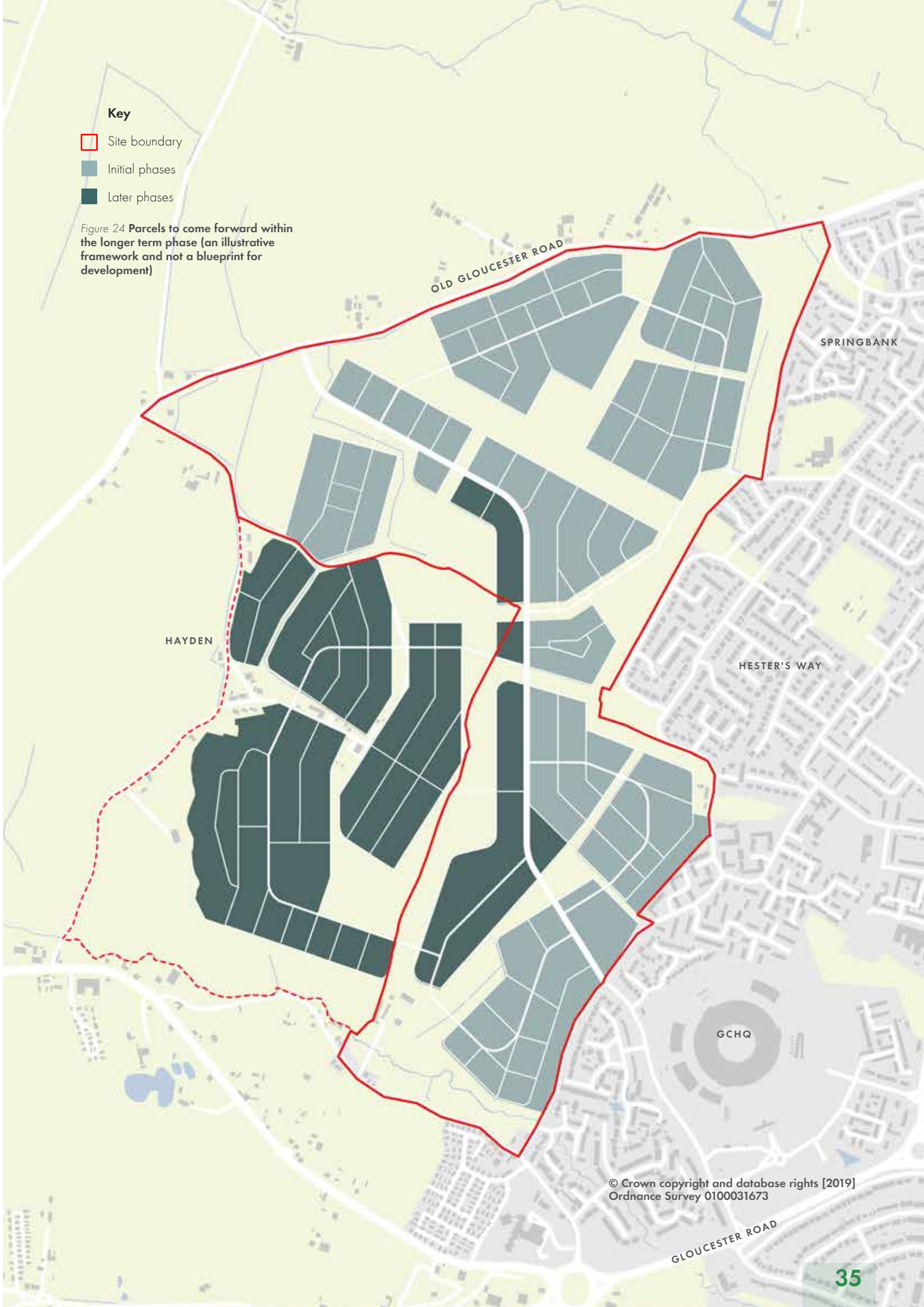


Figure 24 **Parcels to come forward within the longer term phase (an illustrative framework and not a blueprint for development)**

A4 Site capacity study

A4.1 Estaimting housing capacity

A4.1.1 The Adopted JCS, under Policy A7, allocated the site for a mixed use development involving approximately 1,100 new dwellings and approximately 45 ha of employment land.

A4.1.2 This number of homes was a high level estimate of the site's housing capacity. The Strategic Assessment Land Availability (SALA) methodology is that for sites above 2ha a discount of 37% of the overall land area is made to take account of the land take required for infrastructure. The total size area of allocation Site A7 (not including safeguarded land) is approximately 132 ha, of which 45 ha is earmarked fro employment uses under the provisions on the adopted policy. Once the land required for employment and infrastructure to taken from the 132 ha area, the residual area of land is 55 Ha. An assumed and conservative housing density of 20 dph was assigned to this 55 ha of housing land which accounts for the approximate policy provision of 1,100 dewllings.

A4.1.3 The preparation of The Golden Valley SPD provided the opportunity of this approximate housing capacity to be assessed in more detail. The masterplan framework presented in the main SPD document presents an illustrative street and green infrastructure network which define a network of development land parcels.

A4.1.4 These parcels have been measured and land uses and development densities can be applied to them in order to provide an indicative development capacity.

A4.1.5 The plan opposite provides a summary of the capacity testing exercise undertaken during the preparation of the Golden Valley Development SPD. The assessment looks across both the allocated and safeguarded land.

A4.1.6 The assessment finds the allocated site to have an indicative approximate housing capacity of 2,370 dwellings. Over 45 Ha of land is earmarked for mixed use development in the capacity study presenred opposite. This mixed use land, particularly that located closest to GCHQ, takes account of the policy requirement of 45 Ha of employment land.

A4.1.7 This is a high level assessment, based on the assignment of potential housing densities to defined parcels of land across the SPD area. Given that it takes account of potential road and green infrastructure as outlined within the SPD masterplan framework, it is considered to be a more accurate assessment of potential capacity than that undertaken to determine the approximate capacities included in the adopted JCS Policy A7. However, the assessment supplements rather than updates the provisions of this adopted policy and has been undertaken to help promote the development of the site in the context of the policy requirement for a comprehensive masterplan and development strategy for the site, set in the context of the safeguarded land as West Cheltenham (criteria iv(c) under Policy A7).

A4.1.8 In so doing, the study also extends to and includes the adjacent safeguarded Hayden Sewage Treatment Works (HSTW) site.

WEST CHELTENHAM UK CYBER CENTRAL
INDICATIVE DEVELOPMENT SCHEDULE

Neighbourhood	Land use	Parcel #	Area Ha	Density dph	Capacity dwellings
Old Gloucester	Residential	A1	2.09	40	84
	Residential	A2	5.12	35	179
	Education	A3	2.72		
	Residential	A4	4.04	35	141
	Residential	A5	1.62	40	65
	Residential	A6	4.88	40	195
	Residential	A7	1.30	35	46
	Residential	A8	1.23	40	49
Subtotal			**20.28**		**759**
Main street neighbourhood	Residential	B1	1.41	35	49
	Residential	B2	3.21	35	112
	Mixed-use	B3	3.21	40	128
	Mixed-use	B4	0.57	40	23
	Mixed-use	B5	0.91	40	36
	Mixed-use	B6	3.78	40	151
	Residential	B7	3.15	35	110
	Mixed-use	B8	2.24	35	78
Subtotal			**18.48**		**689**
Cyber Central 1 (local centre)	Mixed-use	C1	2.79	75	69
	Mixed-use	C2	2.08	75	51
	Mixed-use	C3	3.13	75	77
	Mixed-use	C4	2.18	75	54
Subtotal			**10.18**		**252**
Cyber Central 2 (employment zone)	Mixed-use	D1	2.14	40	86
	Mixed-use	D2	1.73	40	69
	Mixed-use	D3	1.78	40	71
	Mixed-use	D4	1.36	35	48
	Mixed-use	D5	2.69	35	94
	Mixed-use	D6	1.48	35	52
	Mixed-use	D7	0.40	50	20
Subtotal			**11.58**		**440**
Cyber Central 3 (phase 2)	Mixed-use	E1	0.83	50	42
	Mixed-use	E2	1.34	50	67
	Mixed-use	E3	0.84	50	42
	Mixed-use	E4	0.65	40	26
	Mixed-use	E5	1.55	35	54
Subtotal			**5.21**		**231**
The Works	Residential	F1	4.27	35	149
	Residential	F2	2.91	50	146
	Residential	F3	0.70	35	25
	Residential	F4	6.07	50	304
	Residential	F5	2.18	35	76
	Residential	F6	3.99	50	200
	Education	F7			0
	Residential	F8	3.40	35	119
	Residential	F9	2.17	35	76
	Residential	F10	4.06	35	142
	Residential	F11	3.00	35	105
Subtotal			**32.75**		**1,341**

	Residential Phase #	Capacity dwellings			Employment Ha		
ALLOCATED							
Old Gloucester	1	759					
Main street	1	689					
Cyber Central 1	1	252			18.53		
Cyber Central 2	1	440			20.24		
Cyber Central 3	2	231	Target	Difference	12.82	Target	Difference
Subtotal		**2,370**	**1,100**	**1,270**	**51.59**	**45.00**	**6.59**

	Phase #	Capacity dwellings			Employment Ha		
SAFEGUARDED							
The Works	2	1,341	Target	Difference	5.58	Target	Difference
Subtotal		**1,341**	**1,324**	**17**	**5.58**	**5.00**	**0.58**

	Phase #	Capacity dwellings			Employment Ha		
Phase 1	1	2,140			38.77		
Phase 2	2	1,572	Target	Difference	18.40	Target	Difference
All phases		**3,711**	**2,424**	**1,287**	**57.17**	**50.00**	**7.17**

	Capacity dwellings	Employment Ha
Within CBC	1,047	18.15
All phases	**1,047**	**18.15**

no residenial component
35 dph
40 dph
50 dph
75 dph across 33% of area

Notes and assumptions

1. Housing densities are applied to each entire parcel.
2. Densities are attributed by multiplying the assigned housing density with the area of the host parcel.
3. The area taken by indicative routes between parcels are excluded from the area measures.
4. Lower housing densities of 35 and 40 dph are likely to be predominently houses.
5. Higher densites of 50 and 75 dph are likely to include a mix of dwelling types including appartments.
6. The 'Cyber Central' zones nearest GCHQ are envisaged to be the area with the most diverse mix of uses and the majority of the cyber-tech oriented floorspace.
7. In the highest density mixed use area within Cybe Central 1, higher densitiy housing development is only attributed to one third of the total land area in light of the anticipated employment-led nature of new development in this part of the site.
8. Mixed uses are also anticipated along the length of the main street traversing the site.
9. The three Cyber Central zones notionally account for the required 45 Ha of employment land as set out in Adopted Policy A7.
10. However, in view of the guidance outlined in the Golden Valley Masterplan SPD, this land would be developed for a mix of uses so will still contribute to the overall level of housing provision.
11. It is assumed that significant areas of green infrastrucutre will also be delivered with these Cyber Central zones.
12. This study finds the allocated site to have an indicative approximate housing development capacity of 2,370.
13. This is significantly more than the policy allocation housing capacity of approximately 1,100 dwellings, but is considered to be a more accurate estimate.

Figure 25 **High level development capaicty study for the allocated and safeguarded land at West Cheltenham (an illustrative framework and not a blueprint for development)**

A5 Technical Due Diligence Reports

A5.1.1 The following reports are the collated due diligence reports prepare by Hydrock during the preparation of the SPD. Generally, these reports present desktops reviews of available evidence and an overview of the tachnical baseline studies which were undertaken in support of the allocation of the site for mixed use development through in the JCS. It is important to understand that no new site specific survey work was undertaken during the preparation of the SPD.

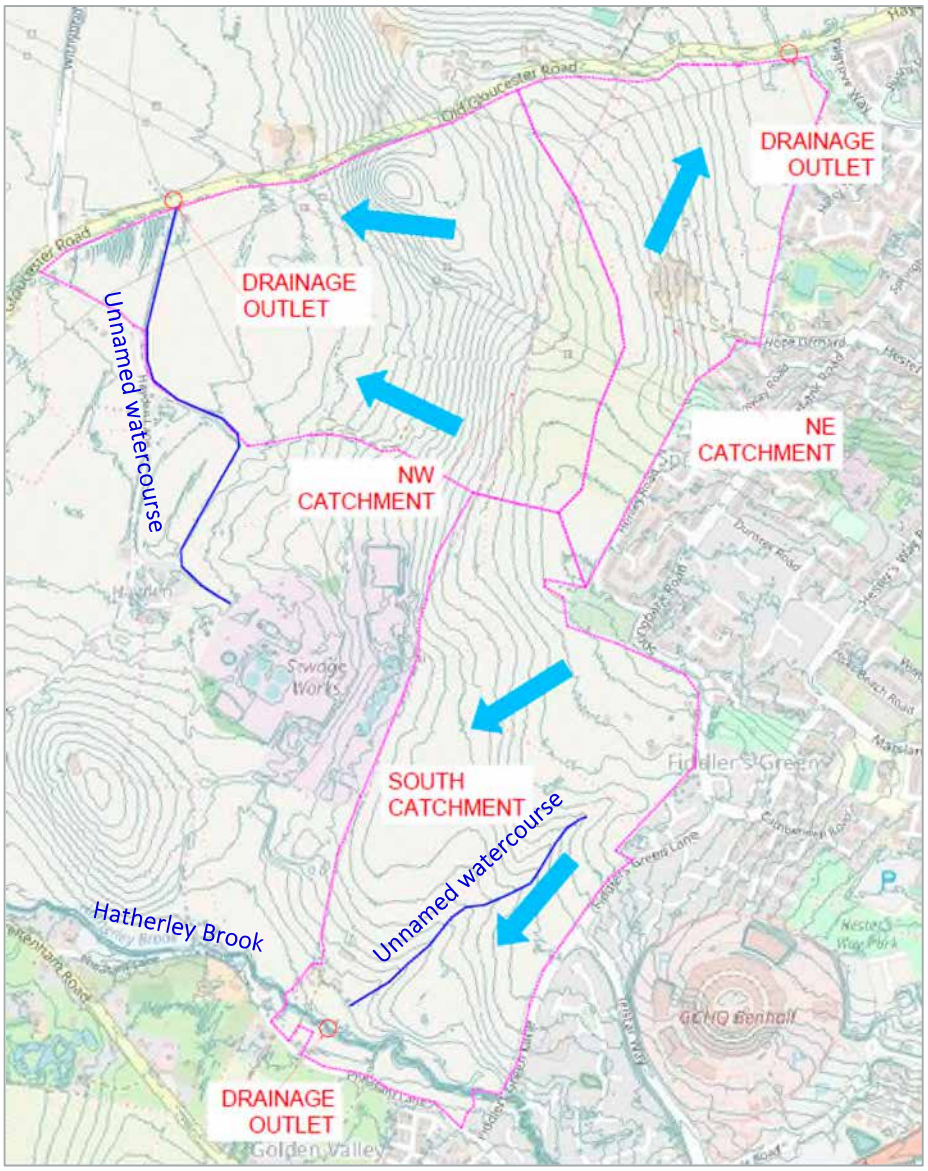
A5.1.2 The reports have been important in identifying envieonmental constraints relevent to redevelopment of the allocated site.

A5.1.3 This appendix prepared by Hydrock covers the following issues:

FLOOD RISK AND DRAINAGE – 12619-HYD-XX-XX-RP-D-5001-P02

Revision	P03 – Updated on receipt of Masterplan, Constraints Plan and topographic survey 25/03/20
Existing and Proposed Development	The site is approximately 130 ha and predominantly 'greenfield' agricultural land with some scattered farm buildings. It is located on the western fringe of Cheltenham between the B4634 to the north and B4063 to the south. The proposal is for a residential-led mixed-use development, part of which will accommodate the Cyber Central development. Reference is made to an un-numbered CAD drawing with the file reference '19123_Masterplan and constraints_190827'. There is no key attached to the drawing and therefore various elements of details shown on the drawing have been inferred. It is noted that proposed development is shown to the adjacent Severn Trent Water sewage treatment works (STW) to the west of the site however, these are outside of the 'red line' and therefore have been ignored for the purposes of this Technical Note.
Geology / Groundwater	The British Geological Survey (BGS) Geology of Britain Viewer indicates the site is underlain by the mudstone bedrock 'Charmouth Mudstone Formation' which is of a low permeability with little groundwater storage capacity.
Hydrology and Drainage Catchments	Hatherley Brook runs westwards through the southern section of the site and the River Chelt runs westwards to the north of the site (approximately 500m from the northern site boundary). There are also minor drainage ditches which originate within, or just outside, the site boundary. Hatherley Brook and the River Chelt are classified as 'main rivers' which are significant watercourses under the jurisdiction of the Environment Agency (EA). Figure 1 shows the site falls into three drainage catchments; the approximate catchment boundaries were identified from LiDAR and are defined in pink. The direction of overland flow is shown by the blue arrows. The high ground is located in the centre of the site, with the north of the site draining to the north-east and north-west towards the River Chelt and the south draining towards the Hatherley Brook. The drawing also indicates the outlets where the existing drainage ditches / minor watercourses currently drain from the site. The main watercourses to be respected in the development layout are identified by blue lines. These are watercourses which either originate offsite or have a defined catchment from review of LiDAR.

Figure 1 – Watercourses and Drainage Flow Paths



Flood Risk – Opportunities and Constraints

The EA's Flood Map for Planning shows that almost the entire redline site is within Flood Zone 1 which is the zone of lowest risk (in relation to fluvial / tidal / coastal risk), considered suitable for all types of development. There is a narrow floodplain associated with the Hatherley Brook in the southern section of the site allocated as fluvial Flood Zone 2 which is land assessed as having a between a 1 in 100 and 1 in 1000 chance of flooding annually. This should remain undeveloped, which is respected in the current masterplan. It should be noted that the EA's flood outlines do not include any allowance for climate change and this is likely to be required as the scheme progresses in line with policy requirements.

Figure 1 shows there are two minor unnamed watercourses on site which have an associated fluvial floodplain which have not been modelled by the EA (the EA generally only model watercourses with a contributing area in excess of 3km^2). However, in the absence of detailed fluvial modelling, the surface water mapping shown in Figure 3 can

be used as an indication of the floodplain extent at this stage. Hydraulic modelling could be undertaken to determine the exact floodplain or an easement from the top of the bank could be agreed with the Lead Local Flood Authority (LLFA). This is likely to be in the order of 5-8m and would create a 'blue corridor' through the site whilst also maintaining suitable access for watercourse management and maintenance. Should the watercourses require diversion / culverting as part of the layout requirements, hydraulic modelling will be required to demonstrate no adverse effect to the development or elsewhere. Any requirement for modelling would be confirmed with the EA and/or LLFA as the scheme progresses.

The field drainage ditches, which do not follow natural contours, do not need to be considered in the masterplan constraints as they would be infilled post-development.

Figure 2 – Flood Map for Planning

The surface water flood map (Figure 3) identifies areas of low lying ground and dry valleys which would be more susceptible to flooding. This shows the north-western corner of the site, where the ground flattens out, is considered to be at 'high risk' of surface water flooding during the 1 in 30 year storm event or greater. However, it is noted that this is only an indicative risk and as surface water flows would be generated from within the site boundary, this can be mitigated by formal management of flows in the surface water drainage system. This means built development and attenuation features can be considered within this area, as long as they meet policy requirements (i.e. no detrimental impact to third party land). However, from a surface water drainage and ecological perspective, it is recommended that at least part of this area is allocated as public open space / wetland which can serve as a green surface water attenuation feature serving the wider development, as well as maintaining the naturally wet habitat for ecology. This would also aid in improving water quality and therefore could be

included within any Water Framework Directive Assessment being progressed from the site (undertaken by others).

The current Masterplan appears to respect this 'high risk'.

The dry valley in the north-eastern catchmen is only at risk of surface water flooding in the 1 in 1000 year storm. This area is still suitable for development, but a continuous pathway needs to be provided for surface water around buildings (e.g. by local ground re-profiling). This also applies to the south-eastern part of the site, where there is an overland flow route into the unnamed watercourse in the 1 in 1000 year event.

The flow paths shown in the north-western catchment in Figure 3 are not picked up in the LiDAR or the topographic survey, which indicates there are no significant valleys where surface water would be expected to collect and therefore this is not considered a constraint to development.

Figure 3 – Surface Water Flood Risk Map

The risk of groundwater flooding at the site is considered to be low based on the low permeability mudstone bedrock indicated on the British Geological Survey website, and based on the site topography.

There are strategic sewers within the site boundary which could pose a risk of flooding if a blockage occurred. However, provided the development is suitably designed to direct exceeded flows away from vulnerable infrastructure, as is best-practice, this risk is concluded to be low. The risk from other artificial infrastructure failure, such as canals and reservoirs is concluded to be negligible from a review of upstream infrastructure and the EA's reservoir flood maps.

Foul Drainage – Opportunities and Constraints

Copies of Severn Trent Water sewer record plans have been obtained (see Appendix A). The records provided were incomplete and a further request has been made to cover the whole site.

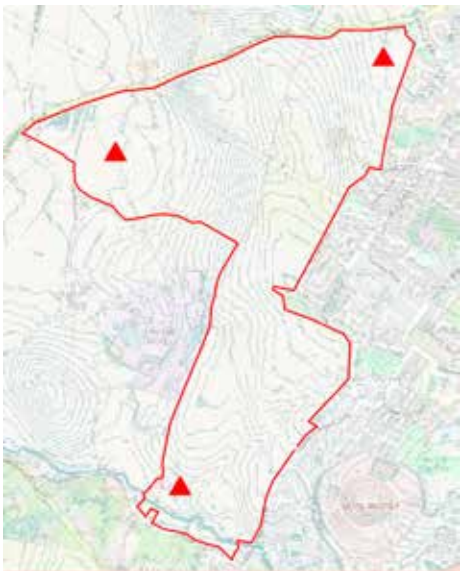
There are two strategic sewers crossing the southern section of the site, entering by the junction of Fiddler's Green Lane and Telstar Way. One is a 600mm diameter gravity foul sewer and the other is a 1050mm diameter combined sewer, as shown on the drawings attached in Appendix A. These sewers will have an associated easement where no buildings will be permitted. Severn Trent Water have confirmed that these easement widths will be 5.0m and 7.5 m respectively measured either side of the pipe centreline. It is noted that the topographic survey only records two manholes along the sewer route where at least six would be expected. It is not known therefore which sewer the manholes shown refer to and hence where the easement widths should be measured from therefore some doubt as to the exact extent of any 'no-build' zone exists. Notwithstanding this, the current Masterplan still appears to have provided sufficient space such that there is no conflict.

The Severn Trent Water plans also indicate two combined sewers entering the upper eastern site boundary from Hope Orchard and crossing the central part of the site in a north-east to south-west direction heading towards the sewage treatment works. The sewers are recorded as being 750mm and 1500mm diameter. Severn Trent Water have confirmed that each sewer will have an easement width associated with it of 7.5m measured from the centreline each side of the pipe. As for the previous description, the topographic survey does not appear to record all of the manholes shown on the sewer record plans and therefore there is some doubt as to the exact alignment. Of more concern is the fact that the survey indicates an additional set of manholes near the boundary with the treatment works indicating that the western part of the sewer route takes a different alignment to that shown on the record plans. This is shown on drawing no. 12619-HYD-XX-XX-DR-D-2001 attached in Appendix A. Notwithstanding this, the current Masterplan appears to avoid built development in either of the possible sewer routes and therefore, at present, there should be no conflict.

There are no foul sewers evident on Old Gloucester Road to the north nor Pheasant Lane to the south. Therefore, given the fall of the site to the north and south, it is expected that the site will need to be served by a pumping station in each drainage catchment (i.e. 3 pumping stations), in order to pump flows to the existing sewers running through the site. The approximate locations of the pumping stations are shown as red triangles in Figure 4 below. There are existing Severn Trent Water pumping stations very close to the site boundary ion the north-west and north-east corners and an option may be to connect to these stations and upgrade accordingly. This would however require significant works to the stations and it may be easier and more economic to build new stations solely for the proposed development.

Discussions will also need to be undertaken with Severn Trent Water to confirm whether there is capacity in the sewers and sewage treatment works to serve a development of this size, or whether upgrade works will be required. The cost of upgrades is expected to be covered under the new infrastructure charge which is a standard per-plot connection charge.

Figure 4 – Proposed Foul pumping Stations



Surface Water Drainage – Opportunities and Constraints

In accordance with Building Regulations Part H and Paragraph 080 of NPPG, rainfall run-off should be infiltrated to ground, discharged to local watercourses or discharged to a local sewer network (in that order of priority). The preferred method of managing runoff by infiltration is not likely to be feasible based on the mudstone bedrock but this is subject to confirmation through site specific tests. If infiltration is not feasible, the drainage strategy would involve a positive discharge into the watercourses on site.

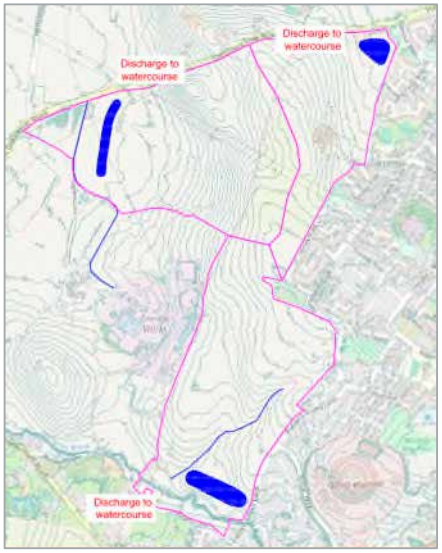
The LLFA will require the restriction of post-development flows to the undeveloped, 'greenfield' rates and storage for the runoff will need to be provided for the 1 in 100 year plus 40% climate change storm event. There is a strong desire by the LLFA to see the provision of above ground green storage features which provide both attenuation and water quality benefits (e.g. swales, ponds, basins, permeable paving etc.). It will be important to allow for the inclusion of such features within the development layout proposals.

Table 1 below shows the estimated impermeable areas within each drainage catchment based on the previous draft layout of the scheme issued by Turley (reference number: BELU3001_10_20). The greenfield QBAR runoff rate for this site was calculated in MicroDrainage as 3.4 l/s/ha (see Appendix A) and equivalent runoff rates and storage requirements were calculated for the estimated impermeable areas as shown in Table 1. The estimated plan areas of attenuation basins were then calculated based on an assumed maximum basin depth of 1.5m and side slopes of 1:4. These have been plotted on Figure 5 to give a rough estimate of the land take of storage features for each catchment but the size and location of these is indicative only and subject to change as the scheme progresses. In reality, it is expected that the storage will be divided between a number of ponds or other green storage features throughout the catchment, but allowance should be made for the main storage feature at the lower levels of the site to allow the development to drain by gravity.

Table 1 – Runoff Rates and Storage Requirements

Drainage Catchment	Total Area	Estimated Impermeable Area	Runoff Rate @ Greenfield QBAR	Storage Requirement	Estimated plan area of basin
North-west	52 ha	15.9 ha	54.1 l/s	11,270 m^3	14,143 m^2
North-east	28 ha	9.4 ha	31.8 l/s	6,666 m^3	10,045 m^2
South	51 ha	11.6 ha	40.7 l/s	8,508 m^3	17,880 m^2

Figure 5 – Indicative Attenuation Ponds



Summary

Based on this preliminary assessment, is considered that a large proportion of the site can be safely developed as it is at a low risk of flooding and does not increase flood risk elsewhere. Residential units and their main access and egress routes should be located outside of the floodplain and a corridor free from structures will need to be provided along all valleys within the site.

There are sewers running through the site which will have an associated easement where no buildings / structures are permitted. It is recommended that further survey work is carried out to accurately determine the locations of the sewers as there appears to be incomplete and inconsistent information when comparing the sewer record plans and the topographic survey. The site will require a number of foul pumping stations to reach the existing foul sewers.

The preferred method of managing runoff via infiltration is not considered to be feasible at this site due to the mudstone geology. Therefore, the site should discharge to the local watercourses at the pre-development 'greenfield' rate, with storage provided within green storage features. Space is to be allocated for such features within the layout, downslope of the proposed development.

Appendix A

Sewer Records

Greenfield Runoff Calculations

Preliminary Surface Water Attenuation Calculations

Existing Public Sewers on Topographic Survey

SO9024NE

SO9024SW

SO9124SW

SO9023NE

Sewer Node **Sewer Pipe Data**

REFERENCE	COVER LEVEL	INV LEVEL UPSTR	INV LEVEL DOWNSTR	PUMP	MATL	SHAPE	MAX SIZE	MIN SIZE	GRADIENT	YEAR LAID
SO91240201	40.86	nil	nil	F	VC	C	150	nil	0.00	nil
SO91240101	nil	nil	39.48	F	nil	nil	nil	nil	0.00	nil
SO91240103	nil	nil	39.48	F	VC	C	nil	nil	0.00	nil

Abandoned Sewer
Private Combined Gravity Sewer
Private Foul Gravity Sewer
Private Surface Water Gravity Sewer
Public Combined Gravity Sewer
Public Foul Gravity Sewer
Public Surface Water Gravity Sewer
Trunk Combined Gravity Sewer
Trunk Foul Use Gravity Sewer
Trunk Surface Water Gravity Sewer
Combined Use Pressurised Sewer
Foul Use Pressurised Sewer
Surface Water Pressurised Sewer
Hig way Drain
Combined Lateral ! rain #SS$
Foul Lateral ! rain #SS$
Surface Water Lateral ! rain #SS$

Cable, &arthing
Cable ' unction
Cable, Optical Fibre*Instrumentation
Cable, Low , oltage
Cable, High , oltage
Cable, (ther
Housing, - ulding
Housing, . iosk
! is) osal Site
Sewage Treatment Works
Housing, (ther
Pipe Support Structure
Sewage Pum) ing Facility
Sewer Facility Connection +nlet *(utlet

- lind S aft
Combined Use / anhole
Flushing Chamber
Foul Use / anhole
Grease Trap
Head 0 ode
Hydrobrake
Lamphole
(utfall
Overflow
Penstock
Petrol +nterceptor
Sewer Blockage
Sewer Collapse

Sewer Chemical +njection Point
Sewer ' unction
Sewerage Air , alve
Sewerage Hatch - ox Point
Sewerage +solation , alve
Soakaway
Surface Water / anhole
, ent Column
Waste Water Storage
Culverted Watercourse
Pre-1937 Properties

MATERIALS

AC	3ASBESTI S C&/ &0T
-B	3- B+CK
CC	3CI, NC&T&- (9 CUL, &RT
CI	3CAST+I&0
CO	3CI, NC&T&
CS-	3CI, 0 CBETE SIEGI &0 TS #K *T&/ $
CSU	3CI, 0 CBETE SIEGI &0 TS #J0-(*T&1 $
I+	3DUCTI*& IR)0
GRC	3GLASS B& +0P)9 C&/ C)0 CI &T&
MAC	3MAS)0 8 : +0 R&GU* A8 COUR S&S
MAB	3/ AS(0B: RA0! (/ *: C(URS&/
PE	3PO*: E TH* &0&
PF	3PITCH
PP	3PO*: P R(P/*.&0 &
PSC	3PLAST+C ST&& * C(/ P(SIT&
PVC	3PI* : , +0 * CH* (8 +'&
RP/	3B& #F(RC&D P*AST+C / AT8+9
SI	3SPU0 (GR& $IR)0
999	3OTH&8

CATEGORIES

W	3W&+9
C	3CASCAD&
I-	3! A-(A8 !
SE	3SI' E &0T8 :
FV	3F*AP , A*. &
-!	3- ACK !8 (P
S	3SIPH(0
HD	3HIGHWA D&A+0
St<	3SMCT+)0 1; <

SHAPE

C	3CIRCULA8
&	3EGG SHAPE!
(	3(TI'&8
8	3B& CTA0 G*&
S	3S= UA&
T	3T8APE>(+ AL
U	3UD. 0(W0

TABULAR KEY

A. Sewer pipe data refers to downstream sewer pipe.

B. Where the node bifurcates (splits) X and Y indicates downstream sewer pipe.

C. Gradient is stated a 1 in...

PURPOSE

C	3C(/ - +0&!
&	3F+0*' E'FP U&0 T
F	3FOU'
*	3S* U' GE
S	3SUBFACE WAT& 8

All Private Sewers are shown in magenta
All section 104 sewers are shown in green
All Sewers that have been transferred to Severn Trent Water after the 4th (ctober 7:4 4%but have not been surveyed and confirmed by Severn Trent Water are shown in orange

N W E S

Severn Trent Water Limited
Asset Data Management
PO Box 5344
Coventry
CV3 9FT
Telephone: 0845 601 6616

SEWER RECORD (TABULAR)

O/S Map scale: 1:1250
Date of issue: 02.08.19
Sheet No. 1 of 1

This map is centred upon:
O / S Tile reference:
SO9024SE

Disclaimer Statement:
1. Do not scale off this Map.
I)@his map and any information supplied with it is furnished as a general guide, is only valid at the date of issue and no warranty as to its correctness is given or implied. +n particular this / ap and any information shown on it must not be relied upon in the event of any development or works #including but not limited to excavations) in the vicinity of Severn Trent Water's assets or for the purposes of determining the suitability of a point of connection to the sewerage or distribution systems.
2. On **1 October 2011** most private sewers and private lateral drains in Severn Trent Water's sewerage area, which were connected to a public sewer as at 1 July 7:4 #Wtransferred to the ownership of Severn Trent Water and became public sewers and public lateral drains. A further transfer takes place on 1 (ctober 7:4 2 #date to be confirmed)@
Private pumping stations, w ich form part of these sewers or lateral drains, will transfer to the ownership of Severn Trent Water on or before 1 (ctober 7:4G@
Severn Trent Water does not possess com) lete records of these assets.
These assets may not be displayed on this Map.
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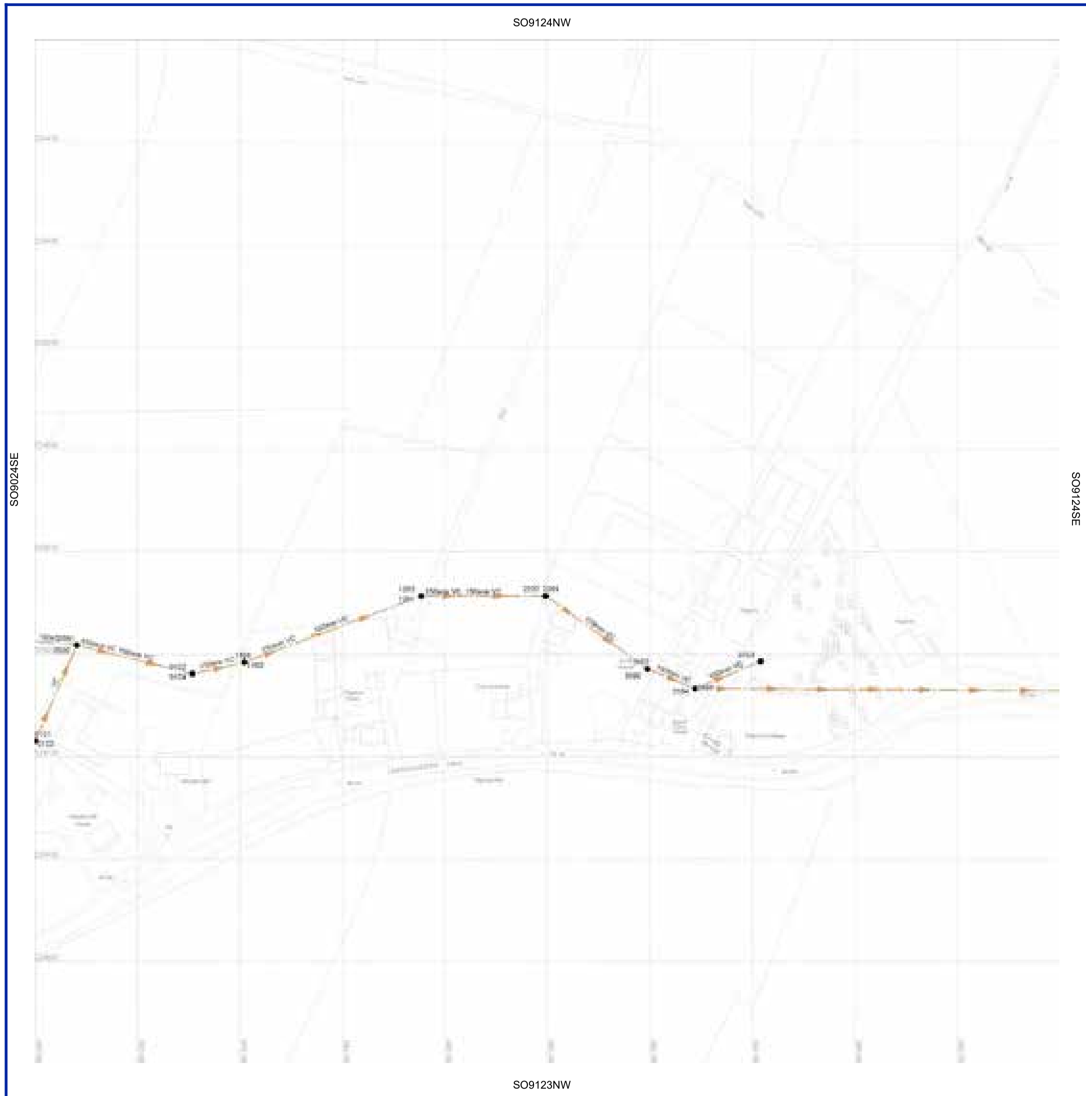


Sewer Node / Sewer Pipe Data

REFERENCE	COVER LEVEL	INV LEVEL UPSTR	INV LEVEL DOWNSTR	PURP	MATL	SHAPE	MAX SIZE	MIN SIZE	GRADIENT	YEAR LAID
SO91240102	41.34	39.27	39.25	F	VC	C	150	nil	1285.50	nill
SO91240104	41.34	39.27	39.25	F	VC	C	150	nil	1285.50	nill
SO91240201	41.16	39.48	39.28	F	VC	C	150	nil	288.60	nill
SO91240202	41.16	39.48	39.28	F	VC	C	150	nil	288.60	nill
SO91241101	41.31	39.22	37.60	F	VC	C	150	nil	57.09	nill
SO91241102	41.31	39.22	37.60	F	VC	C	150	nil	57.09	nill
SO91241201	38.88	37.54	nil	F	VC	C	150	nil	0.00	nill
SO91241202	38.88	37.54	36.80	F	VC	C	150	nil	82.45	nill
SO91242201	nil	nil	nil	F	nil	nil	nil	nil	0.00	nill
SO91242202	38.21	36.79	36.44	F	VC	C	150	nil	176.03	nill
SO91243101	nil	nil	33.12	F	nil	nil	nil	nil	0.00	nill
SO91243102	nil	nil	nil	F	nil	nil	nil	nil	0.00	nill
SO91243104	38.65	36.23	36.11	F	VC	C	150	nil	287.83	nill
SO91243105	38.24	36.44	36.25	F	VC	C	150	nil	132.00	nill

Abandoned Sewer
Private Combined Gravity Sewer
Private Foul Gravity Sewer
Private Surface Water Gravity Sewer
Public Combined Gravity Sewer
Public Foul Gravity Sewer
Public Surface Water Gravity Sewer
Trunk Combined Gravity Sewer
Trunk Foul Use Gravity Sewer
Trunk Surface Water Gravity Sewer
Combined Use Pressurised Sewer
Foul Use Pressurised Sewer
Surface Water Pressurised Sewer
Hig way Drain
Combined Lateral ! rain #S$S
Foul Lateral ! rain #S$S
Surface Water Lateral ! rain #S$S

Cable, &arthing
Cable ' unction
Cable, Optical Fibre*Instrumentation
Cable, Low , oltage
Cable, High , oltage
Cable, (ther
Housing, - uilding
Housing, . iosk
! is) osal Site
Sewage Treatment Works
Housing, (ther
Pipe Support Structure
Sewage Pum) ing Facility
Sewer Facility Connection +nlet * (utlet

- lind S aft
Combined Use / anhole
Flushing Chamber
Foul Use / anhole
Grease Trap
Head 0 ode
Hydrobrake
Lamphole
(utfall
Overflow
Penstock
Petrol +nterceptor
Sewer Blockage
Sewer Collapse

Sewer Chemical +njection Point
Sewer ' unction
Sewerage Air , alve
Sewerage Hatch - ox Point
Sewerage +solation , alve
Soakaway
Surface Water / anhole
, ent Column
Waste Water Storage
Culverted Watercourse
Pre-1937 Properties

MATERIALS

AC 3ASBEST(S C&/ &0 T
-8 3- 8+CK
CC 3C(NC8& T& - (9 CUL, &RT
CI 3CAST +8(0
CO 3C(NC8& T&
CS- 3C(0 C8 ETE SEG/ &0 TS #("T&! $
CSU 3C(0 C8 ETE SEG/ &0 TS #U0 -("T&! $
!+ 3DUCT+"& IR(0
GRC 3GLASS 8 &+0F(8 C&! C(0 C8 &T&
MAC 3MAS(0 8: +0 R&GU" A8 COU8 S&S
MA8 3/ AS(08: RA0! (/ ": C(URS&!
PE 3PO": ETH" &0 &
PF 3PITCH
PP 3PO": PR(PY" &0 &
PSC 3PLAST+C ST&&" C(/ P(SIT&
PVC 3P(" : , +0: " CH" (8 +! &
RP/ 38& +NF(RC&D P" AST+C / AT8+9
SI 3SPU0 (GR&: $IR(0
99 9 3OTH&8

All Private Sewers are shown in magenta
All section 104 sewers are shown in green
All Sewers that have been transferred to Severn Trent Water after the 4st (ctober ?;4 4%but have not been surveyed and confirmed by Severn Trent Water are shown in orange

CATEGORIES

W 3W&+8
C 3CASCAD&
!- 3! A/- (A8!
SE 3SI! E &0 T8 :
FV 3F" AP , A", &
-! 3- ACK !8 (P
S 3SIPH(0
HD 3HIGHWA: D8 A+0
S4;< 3S&CT+(0 1; <

SHAPE

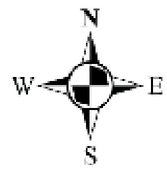
C 3CIRCULA8
& 3EGG SHAPE!
(3(TH&8
8 38& CTA0 G" &
S 3S= UA8&
T 3T8 APE>(+ AL
U 3U0. 0(W0

TABULAR KEY

A. Sewer pipe data refers to downstream sewer pipe.
B. Where the node bifurcates (splits) X and Y indicates downstream sewer pipe.
C. Gradient is stated a 1 in...

PURPOSE

C 3C(/ - +0&!
& 3F+0A" EFF" U&0 T
F 3FOU"
" 3S" U! GE
S 3SU8 FACE WAT&8



Severn Trent Water Limited
Asset Data Management
PO Box 5344
Coventry
CV3 9FT
Telephone: 0845 601 6616

SEWER RECORD (TABULAR)

O/S Map scale: 1:1250
Date of issue: 02.08.19
Sheet No. 1 of 1

This map is centred upon:
O / S Tile reference: SO9124SW

Disclaimer Statement:
1. Do not scale off this Map.
?@This map and any information supplied with it is furnished as a general guide, is only valid at the date of issue and no warranty as to its correctness is given or implied. +n particular this / ap and any information shown on it must not be relied upon in the event of any development or works #including but not limited to excavations) in the vicinity of Severn Trent Water's assets or for the purposes of determining the suitability of a point of connection to the sewerage or distribution systems.
6. On **1 October 2011** most private sewers and private lateral drains in Severn Trent Water's sewerage area, which were connected to a public sewer as at 1 July ?;4 4%transferred to the ownership of Severn Trent Water and became public sewers and public lateral drains. A further transfer takes place on 1 (ctober ?;4 2 #date to be confirmed)@
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Sewer Node | **Sewer Pipe Data**

REFERENCE	COVER LEVEL	INV LEVEL UPSTR	INV LEVEL DOWNSTR	PURP	MATL	SHAPE	MAX SIZE	MIN SIZE	GRADIENT	YEAR LAID
SO91245101	34.84	33.11	nl	F	VC	C	150	nl	0.00	nl
SO91246102	nl	nl	30.07	F	ul	ul	nl	nl	0.00	nl
SO91247001	34.15	32.49	32.19	S	CO	C	600	nl	10.4.13	nl
SO91247002	34.09	33.27	33.07	S	VC	C	225	nl	16.0.35	nl
SO91247003	34.13	32.36	32.02	F	VC	C	150	nl	11.2.36	nl
SO91247004	34.18	33.06	32.99	S	VC	C	300	nl	49.9.14	nl
SO91247005	34.16	32.00	31.78	F	VC	C	150	nl	12.4.14	nl
SO91247006	34.32	31.77	31.57	F	VC	C	150	nl	18.0.30	nl
SO91247007	34.35	32.96	32.89	S	VC	C	300	nl	10.6.29	nl
SO91247008	34.76	30.60	28.96	F	VC	C	225	nl	99.36	nl
SO91247009	34.91	30.87	30.62	F	VC	C	225	nl	1 60.96	nl
SO91247101	34.25	32.47	32.04	F	VC	C	150	nl	8 0.35	nl
SO91247102	34.29	33.18	33.06	S	VC	C	225	nl	5 03.33	nl
SO91247103	34.29	33.46	33.28	S	VC	C	225	nl	1 75.67	nl
SO91247104	34.27	32.81	32.74	F	VC	C	225	nl	4 33.71	nl
SO91247105	34.25	32.17	32.16	S	CO	C	600	nl	3 16.00	nl
SO91247106	34.08	32.67	32.45	S	VC	C	300	nl	2 28.00	nl
SO91247107	33.80	33.00	32.68	S	VC	C	225	nl	1 40.34	nl
SO91247108	33.67	31.51	31.48	S	CO	C	1350	nl	1 49.33	nl
SO91247109	33.84	28.61	28.60	C	CO	C	600	nl	9 49.00	nl
SO91247110	34.43	31.80	31.55	S	CO	C	1350	nl	425.88	nl
SO91247201	33.81	32.53	32.28	S	VC	C	225	nl	137.92	nl
SO91247202	33.69	32.21	32.11	S	CO	C	300	nl	150.00	nl
SO91247203	33.92	30.06	29.05	F	VC	C	150	nl	27.04	nl
SO91248001	34.73	32.80	32.64	S	CO	C	525	nl	267.19	nl
SO91 248002	34.69	31.82	31.30	F	VC	C	225	nl	107.63	nl
SO91 248003	34.79	33.47	33.33	F	VC	C	225	nl	76.93	nl
SO91 248004	34.85	33.66	33.41	S	VC	C	225	nl	85.86	nl
SO91 248005	34.82	32.64	32.52	S	CO	C	600	nl	291.58	nl
SO91 248006	34.57	31.29	30.89	F	VC	C	225	nl	100.00	nl
SO91 248007	34.57	32.95	32.81	S	VC	C	300	nl	481.00	nl
SO91 248008	34.78	33.08	32.86	S	VC	C	300	nl	158.77	nl
SO91 248009	34.65	32.85	32.73	S	VC	C	300	nl	316.76	nl
SO91 248010	34.83	31.24	30.88	F	VC	C	225	nl	147.89	nl
SO91 248011	34.79	32.13	31.83	S	CO	C	1350	nl	305.70	nl
SO91248101	34.42	32.93	32.83	S	VC	C	300	nl	283.00	nl
SO91248102	34.37	32.03	31.75	F	VC	C	150	nl	10.0.07	nl
SO91248103	34.80	32.67	32.64	S	CO	C	450	nl	41 7.67	nl
SO91248104	34.76	31.74	31.64	F	VC	C	225	nl	13 0.40	nl
SO91248105	34.72	33.30	32.43	F	VC	C	225	nl	14.94	nl
SO91248106	34.78	33.39	33.00	S	VC	C	225	nl	41.44	nl
SO91248107	34.69	32.08	31.74	F	VC	C	225	nl	1 01.41	nl
SO91248108	34.68	32.97	32.89	S	CO	C	450	nl	34 7.25	nl
SO91248109	34.46	32.33	32.20	F	VC	C	225	nl	36 4.85	nl
SO91248110	34.48	33.21	33.02	S	CO	C	375	nl	27 9.69	nl
SO91248111	34.36	32.74	32.34	F	VC	C	225	nl	8 0.45	nl
SO91248112	34.38	33.28	33.21	S	VC	C	300	nl	4 30.71	nl
SO91248113	34.55	33.14	33.01	S	CO	C	375	nl	2 20.38	nl
SO91248114	34.55	33.36	33.08	F	VC	C	225	nl	8 3.07	nl
SO91248201	34.85	29.07	28.61	C	CO	C	600	nl	2 36.48	nl
SO91248202	34.52	33.12	33.01	S	VC	C	225	nl	1 09.45	nl
SO91248203	35.01	29.36	29.09	C	CO	C	600	nl	2 07.26	nl
SO91248204	34.34	32.99	32.69	S	VC	C	225	nl	2 65.70	nl
SO91249001	35.03	33.89	33.84	S	VC	C	225	nl	4 65.20	nl
SO91249002	35.07	33.77	33.55	F	VC	C	225	nl	1 10.66	nl
SO91249003	35.12	33.99	33.81	S	VC	C	225	nl	2 87.75	nl
SO91249004	35.18	33.90	33.53	F	VC	C	225	nl	70.16	nl
SO91249005	34.97	33.24	33.09	S	VC	C	225	nl	2 73.67	nl
SO91249006	35.20	33.52	33.25	S	VC	C	225	nl	2 37.79	nl
SO91249007	nl	nl	nl	F	nl	nl	nl	nl	0.00	nl
SO91 249008	nl	nl	nl	S	nl	nl	nl	nl	0.00	nl
SO91 249101	34.70	32.60	32.40	F	VC	C	225	nl	118.85	nl
SO91 249102	34.71	33.27	33.17	S	VC	C	300	nl	250.80	nl
SO91 249103	34.90	33.81	33.34	S	VC	C	225	nl	150.00	nl
SO91 249104	34.89	33.20	32.60	F	VC	C	225	nl	65.00	nl
SO91 249105	35.03	33.53	33.25	F	VC	C	225	nl	75.93	nl
SO91 249106	35.05	33.75	33.64	S	VC	C	225	nl	196.05	nl
SO91 249107	35.21	33.99	33.75	S	VC	C	225	nl	145.71	nl
SO91 249108	35.01	34.45	34.21	S	VC	C	225	nl	134.38	nl
SO91 249109	34.70	31.41	31.23	F	VC	C	225	nl	95.03	nl
SO9 1249110	34.70	33.32	33.28	S	VC	C	300	nl	237.25	nl
SO9 1249111	34.52	31.20	30.95	F	VC	C	225	nl	198.28	nl
SO91249112	34.52	33.38	33.32	S	VC	C	300	nl	554.00	nl
SO91249113	34.63	33.57	33.28	S	VC	C	225	nl	1 01.79	nl
SO91249116	35.97	32.39	31.03	F	U	C	150	nl	40.81	2006
SO91249117	35.94	33.95	33.88	S	U	C	225	nl	14.8.71	2006
SO91249118	35.90	33.88	33.65	S	U	C	225	nl	53.70	2006
SO91249201	34.53	30.93	30.59	F	VC	C	225	nl	51.29	nl
SO91249202	34.64	32.89	32.83	F	VC	C	150	nl	11.7.83	nl
SO91249203	34.54	33.48	33.39	S	VC	C	300	nl	27.8.67	nl
SO91249204	35.17	29.50	29.37	C	CO	C	600	nl	2 6.1.62	nl
SO91249205	34.90	33.66	33.15	S	VC	C	225	nl	1 90.31	nl
SO91249207	35.11	30.13	29.50	C	CO	C	600	nl	4 9.11	nl
SO91249208	35.05	nl	nl	F	U	C	150	nl	0.00	2006
SO91249209	35.59	31.03	30.77	F	U	C	150	nl	4 0.38	2006
SO91249210	35.01	34.28	33.95	S	U	C	225	nl	1 63.88	2006
SO91249211	35.09	29.77	29.61	C	CO	C	900	nl	5 3.44	2003
SO91249301	34.78	31.39	30.90	F	VC	C	150	nl	1 96.13	nl
SO922 40112	35.86	32.46	32.38	F	U	C	150	nl	1 08.25	2006
ul	nl	nl	nl	C	VC	nl	nl	nl	0.00	nl
ul	nl	nl	nl	C	VC	nl	nl	nl	0.00	nl

Sewer Node | **Sewer Pipe Data**

REFERENCE	COVER LEVEL	INV LEVEL UPSTR	INV LEVEL DOWNSTR	PURP	MATL	SHAPE	MAX SIZE	MIN SIZE	GRADIENT	YEAR LAID
ul	nl	nl	nl	F	VC	nl	nl	nl	0.00	nl

Abandoned Sewer
Private Combined Gravity Sewer
Private Foul Gravity Sewer
Private Surface Water Gravity Sewer
Public Combined Gravity Sewer
Public Foul Gravity Sewer
Public Surface Water Gravity Sewer
Trunk Combined Gravity Sewer
Trunk Foul Use Gravity Sewer
Trunk Surface Water Gravity Sewer
Combined Use Pressurised Sewer
Foul Use Pressurised Sewer
Surface Water Pressurised Sewer
Hig way Drain
Combined Lateral ! rain #SS$
Foul Lateral ! rain #SS$
Surface Water Lateral ! rain #SS$

Cable, &arthing
Cable ' unction
Cable, Optical Fibre*Instrumentation
Cable, Low , oltage
Cable, High , oltage
Cable, (ther
Housing, - uilding
Housing, . iosk
! is) osal Site
Sewage Treatment Works
Housing, (ther
Pipe Support Structure
Sewage Pum) ing Facility
Sewer Facility Connection +let * (utlet

- lind S aft
Combined Use / anhole
Flushing Chamber
Foul Use / anhole
Grease Trap
Head 0 ode
Hydrobrake
Lamphole
(utfall
Overflow
Penstock
Petrol +nterceptor
Sewer Blockage
Sewer Collapse

Sewer Chemical +njection Point
Sewer ' unction
Sewerage Air , alve
Sewerage Hatch - ox Point
Sewerage -solation , alve
Soakaway
Surface Water / anhole
, ent Column
Waste Water Storage
Culverted Watercourse
Pre-1937 Properties

MATERIALS

AC	3ASBEST(S C&/ &0 T
-ll	3 - 8+OK
CC	3C(NC&&TA - (9 CUL, &RT
CI	3CAST +ll0
CO	3C(NC&&TA
CS-	3C(OC8 ETE SEG/ &0 TS #\(*T&/ $
CSU	3C(OC8 ETE SEG/ &0 TS #U0 -(*T&/ $
>-	3DUCT+% IRU0
GRC	3GLASS 8 &+9R(8 C&/ C(0 C8 &TA
MAC	3MAS(0 8 : +0R&GU*A8 COUB S&S
MA8	3/ AS(08 RA0 (/ * : C(URS&/
PE	3PO* : ETH*&0 &
PF	3PITCH
PP	3PO* : PR(PI* &0 &
PSC	3PLASTIC ST&&* C(/ P(SIT&
PVC	3P(* : +0 * CH* (8 +I &
RPV	38& +9F(RC&O P*AS*IC / AT8+9
SI	3SPU0 (GR& : $IR)0
99 9	3OTH&8

CATEGORIES

W	3W&+9
C	3CASCAD&
\-	3! A/- (A8!
SE	3SI! E &0T8 :
PV	3P* AP , A*, &
-!	3- AGK !8 (P
S	3SIPH(0
HD	3HIGHWA D8 A+0
S4:<	3S&CT+0 1: <

SHAPE

C	3C(/ - +0&
&	3F+0A* EFF* U&0T
F	3FOU*
*	3S*U! :GE
S	3SUBFACE WAT&8

PURPOSE

TABULAR KEY

A. Sewer pipe data refers to downstream sewer pipe.

B. Where the node bifurcates (splits) X and Y indicates downstream sewer pipe.

C. Gradient is stated a 1 in...

All Private Sewers are shown in magenta
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N
W E
S

Severn Trent Water Limited
Asset Data Management
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Telephone: 0845 601 6616

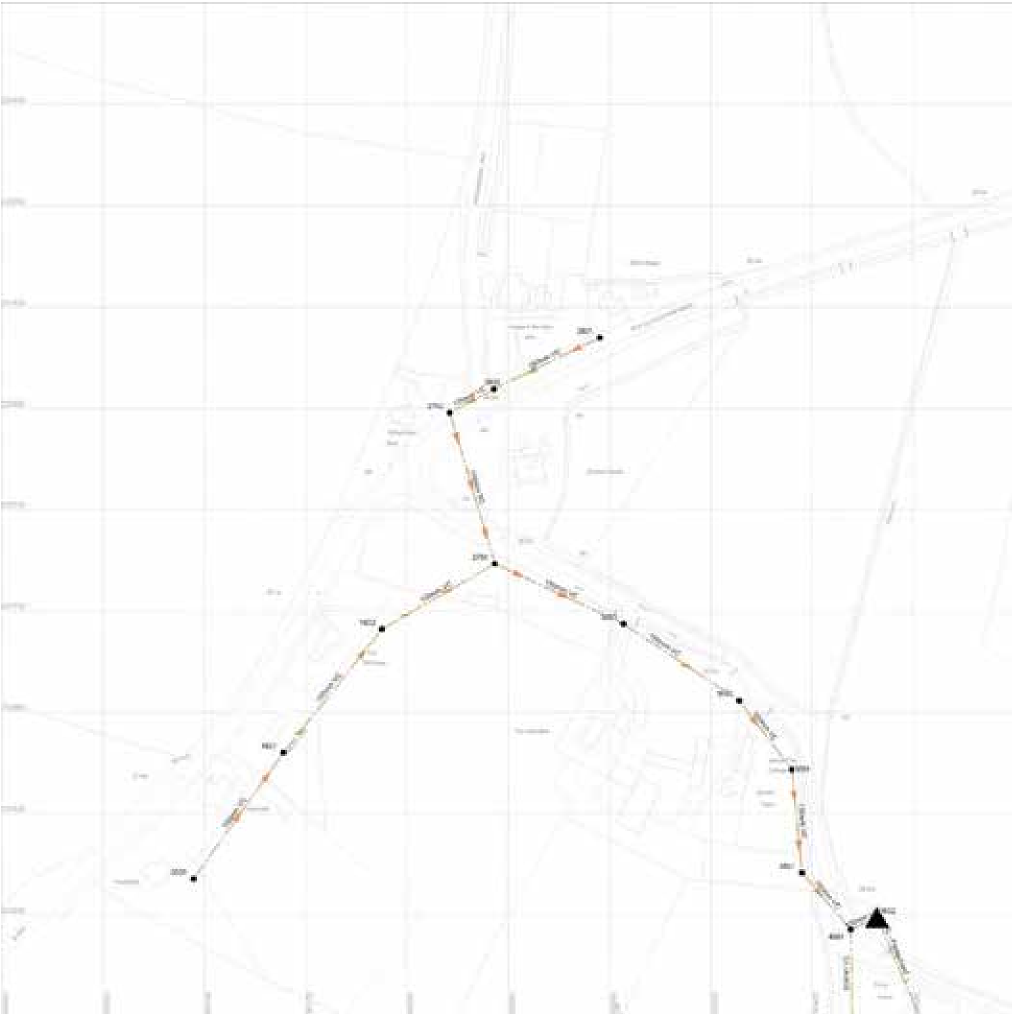
SEWER RECORD (TABULAR)

O/S Map scale: 1:1250
Date of issue: 02.08.19
Sheet No. 1 of 1

This map is centred upon:
O / S Tile reference:
SO9124SE

SO9024SW

SO9023NE



SO9123NE

SO9023SW

Sewer Node / Sewer Pipe Data

REFERENCE	COVER LEVEL	INV LEVEL UPSTR	INV LEVEL DOWNSTR	PURP	MATL	SHAPE	MAX SIZE	MIN SIZE	GRADIENT	YEAR LAID
SO90230501	28.31	27.12	26.31	F	VC	C	150	nil	92.85	nill
SO90231601	27.87	26.31	25.59	F	VC	C	150	nil	108.26	nill
SO90231602	27.24	25.57	24.05	F	VC	C	150	nil	41.80	nill
SO90232701	26.91	24.04	23.68	F	VC	C	150	nil	187.43	nill
SO90232702	26.81	24.52	24.07	F	VC	C	150	nil	174.33	nill
SO90232801	26.42	25.09	24.69	F	VC	C	150	nil	144.25	nill
SO90232802	26.73	24.68	24.56	F	VC	C	150	nil	212.92	nill
SO90233501	26.62	22.85	22.64	F	VC	C	150	nil	175.62	nill
SO90233601	26.56	23.11	22.85	F	VC	C	150	nil	197.08	nill
SO90233602	26.71	23.28	23.13	F	VC	C	150	nil	290.67	nill
SO90233603	26.58	23.66	23.28	F	VC	C	150	nil	185.16	nill
SO90234501	26.90	22.60	22.54	F	VC	C	150	nil	238.67	nill

Abandoned Sewer
Private Combined Gravity Sewer
Private Foul Gravity Sewer
Private Surface Water Gravity Sewer
Public Combined Gravity Sewer
Public Foul Gravity Sewer
Public Surface Water Gravity Sewer
Trunk Combined Gravity Sewer
Trunk Foul Use Gravity Sewer
Trunk Surface Water Gravity Sewer
Combined Use Pressurised Sewer
Foul Use Pressurised Sewer
Surface Water Pressurised Sewer
Hig way Drain
Combined Lateral ! rain #SS$
Foul Lateral ! rain #SS$
Surface Water Lateral ! rain #SS$

Cable, &arthing
Cable ' unction
Cable, Optical Fibre*Instrumentation
Cable, Low , oltage
Cable, High , oltage
Cable, (ther
Housing, - uilding
Housing, . iosk
! is) osal Site
Sewage Treatment Works
Housing, (ther
Pipe Support Structure
Sewage Pum) ing Facility
Sewer Facility Connection +nlet * (utlet

- lind S aft
Combined Use / anhole
Flushing Chamber
Foul Use / anhole
Grease Trap
Head 0 ode
Hydrobrake
Lamphole
(utfall
Overflow
Penstock
Petrol +nterceptor
Sewer Blockage
Sewer Collapse

Sewer Chemical +njection Point
Sewer ' unction
Sewerage Air , alve
Sewerage Hatch - ox Point
Sewerage +solation , alve
Soakaway
Surface Water / anhole
, ent Column
Waste Water Storage
Culverted Watercourse
Pre-1937 Properties

MATERIALS

AC 3ASBEST(S C&/ &0 T
-8 3- 8+CK
CC 3C(NC8&T& - (9 CUL, &RT
CI 3CAST +8(0
CO 3C(NC8&T&
CS- 3C(0 C8 ETE SEG/ &0 TS #("T&! $
CSU 3C(0 C8 ETE SEG/ &0 TS #U0 -("T&! $
!+ 3DUCT+"& IR(0
GRC 3GLASS 8 &+0F(8 C&! C(0 C8 &T&
MAC 3MAS(0 8: +0 R&GU" A8 COU8 S&S
MA8 3/ AS(08: RA0! (/ ": C(URS&!
PE 3PO": ETH" &0 &
PF 3PITCH
PP 3PO": PR(PY" &0 &
PSC 3PLAST+C ST&&" C(/ P(SIT&
PVC 3P(" : , +0: " CH" (8 +!&
RP/ 38&+NF(RC&D P" AST+C / AT8+9
SI 3SPU0 (GR&: $IR(0
99 9 3OTH&8

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All Sewers that have been transferred to Severn Trent Water after the 4st (ctober ?;4 4%but have not been surveyed and confirmed by Severn Trent Water are shown in orange

CATEGORIES

W 3W&+8
C 3CASCAD&
!- 3! A/- (A8 !
SE 3SI! E &0 T8 :
FV 3F" AP , A", &
-! 3- ACK !8 (P
S 3SIPH(0
HD 3HIGHWA: D8 A+0
S4;< 3S&CT+(0 1; <

SHAPE

C 3CIRCULA8
& 3EGG SHAPE!
(3(TH&8
8 38& CTA0 G" &
S 3S=UA8&
T 3T8 APE>(+ AL
U 3U0. 0(W0

TABULAR KEY

A. **Sewer pipe data refers to downstream sewer pipe.**
B. **Where the node bifurcates (splits) X and Y indicates downstream sewer pipe.**
C. **Gradient is stated a 1 in...**

PURPOSE

C 3C(/ - +0&!
& 3F+0A" EFF" U&0 T
F 3FOU"
" 3S" U! GE
S 3SU8 FACE WAT&8

N
W E
S

Severn Trent Water Limited
Asset Data Management
PO Box 5344
Coventry
CV3 9FT
Telephone: 0845 601 6616

SEWER RECORD (TABULAR)

O/S Map scale: 1:1250
Date of issue: 02.08.19
Sheet No. 1 of 1

This map is centred upon:
O / S Tile reference:
SO9023NW

Disclaimer Statement:
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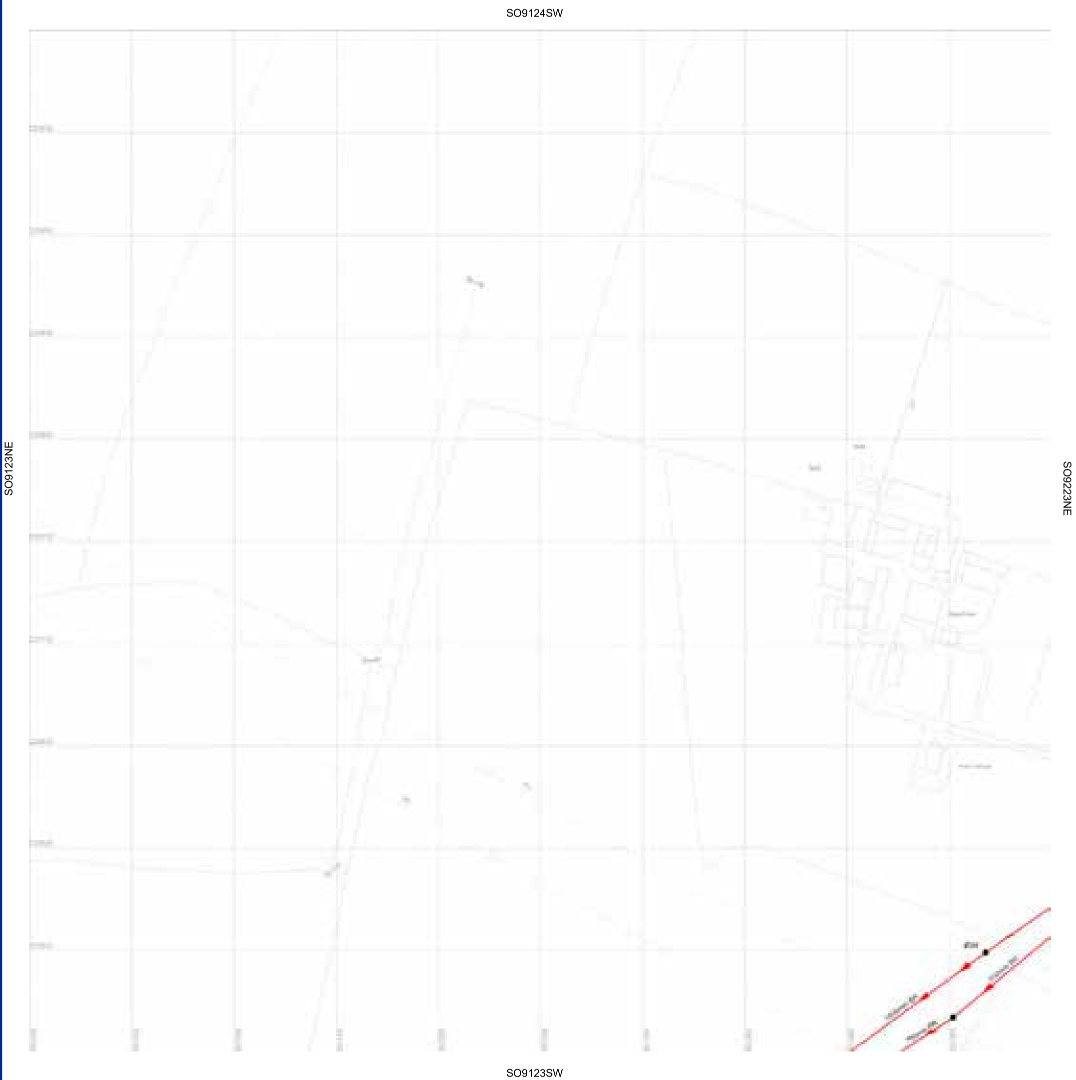
6. On **1 October 2011** most private sewers and private lateral drains in Severn Trent Water's sewerage area, which were connected to a public sewer as at 1 July ?;4 4%transferred to the ownership of Severn Trent Water and became public sewers and public lateral drains. A further transfer takes place on 1 (ctober ?;4 2 #date to be confirmed)@
Private pumping stations, w ich form part of these sewers or lateral drains, will transfer to the ownership of Severn Trent Water on or before 1 (ctober ?;4C@
Severn Trent Water does not possess com) lete records of these assets.
These assets may not be displayed on this Map.



Sewer Node — **Sewer Pipe Data**

REFERENCE	COVER LEVEL	INV LEVEL UPSTR	INV LEVEL DOWNSTR	PURP	MATL	SHAPE	MAX SIZE	MIN SIZE	GRADIENT	YEAR LAID
SO91234501	43.20	37.04	36.81	C	BR	C	1500	nil	948.74	nill
SO91234502	43.37	37.19	36.93	C	BR	C	750	nil	661.42	nill

Abandoned Sewer
Private Combined Gravity Sewer
Private Foul Gravity Sewer
Private Surface Water Gravity Sewer
Public Combined Gravity Sewer
Public Foul Gravity Sewer
Public Surface Water Gravity Sewer
Trunk Combined Gravity Sewer
Trunk Foul Use Gravity Sewer
Trunk Surface Water Gravity Sewer
Combined Use Pressurised Sewer
Foul Use Pressurised Sewer
Surface Water Pressurised Sewer
Hig way Drain
Combined Lateral ! rain #SS$
Foul Lateral ! rain #SS$
Surface Water Lateral ! rain #SS$

Cable, &arthing
Cable ' unction
Cable, Optical Fibre*Instrumentation
Cable, Low , oltage
Cable, High , oltage
Cable, (ther
Housing, - uilding
Housing, . iosk
! is) osal Site
Sewage Treatment Works
Housing, (ther
Pipe Support Structure
Sewage Pum) ing Facility
Sewer Facility Connection +nlet * (utlet

- lind S aft
Combined Use / anhole
Flushing Chamber
Foul Use / anhole
Grease Trap
Head 0 ode
Hydrobrake
Lamphole
(utfall
Overflow
Penstock
Petrol +nterceptor
Sewer Blockage
Sewer Collapse

Sewer Chemical +njection Point
Sewer ' unction
Sewerage Air , alve
Sewerage Hatch - ox Point
Sewerage +solation , alve
Soakaway
Surface Water / anhole
, ent Column
Waste Water Storage
Culverted Watercourse
Pre-1937 Properties

MATERIALS

AC	3ASBEST(S C&/ &0 T
-8	3- 8+CK
CC	3C(NC8& T& - (9 CUL, &RT
CI	3CAST +8(0
CO	3C(NC8& T&
CS-	3C(0 C8 ETE SEG/ &0 TS #("T&! $
CSU	3C(0 C8 ETE SEG/ &0 TS #U0 -("T&! $
!+	3DUCT+"& IR(0
GRC	3GLASS 8 &+0F(8 C&! C(0 C8 &T&
MAC	3MAS(0 8: +0 R&GU" A8 COU8 S&S
MA8	3/ AS(08: RA0! (/ ": C(URS&!
PE	3PO": ETH" &0 &
PF	3PITCH
PP	3PO": PR(PY" &0 &
PSC	3PLAST+C ST&&" C(/ P(SIT&
PVC	3P(" : , +0: " CH" (8 +! &
RP/	38& +NF(RC&D P" AST+C / AT8+9
SI	3SPU0 (GR&: $IR(0
99 9	3OTH&8

All Private Sewers are shown in magenta
All section 104 sewers are shown in green
All Sewers that have been transferred to Severn Trent Water after the 4st (ctober ?;4 4%but have not been surveyed and confirmed by Severn Trent Water are shown in orange

CATEGORIES

W	3W&+8
C	3CASCAD&
!-	3! A/- (A8!
SE	3SI! E &0 T8:
FV	3F" AP , A", &
-!	3- ACK !8 (P
S	3SIPH(0
HD	3HIGHWA: D8 A+0
S4;<	3S&CT+(0 1; <

SHAPE

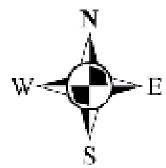
C	3CIRCULA8
&	3EGG SHAPE!
(	3(TH&8
8	38& CTA0 G" &
S	3S= UA8&
T	3T8 APE>(+ AL
U	3U0. 0(W0

TABULAR KEY

A. Sewer pipe data refers to downstream sewer pipe.
B. Where the node bifurcates (splits) X and Y indicates downstream sewer pipe.
C. Gradient is stated a 1 in...

PURPOSE

C	3C(/ - +0&!
&	3F+0A" EFF" U&0 T
F	3FOU"
"	3S" U! GE
S	3SU8 FACE WAT&8



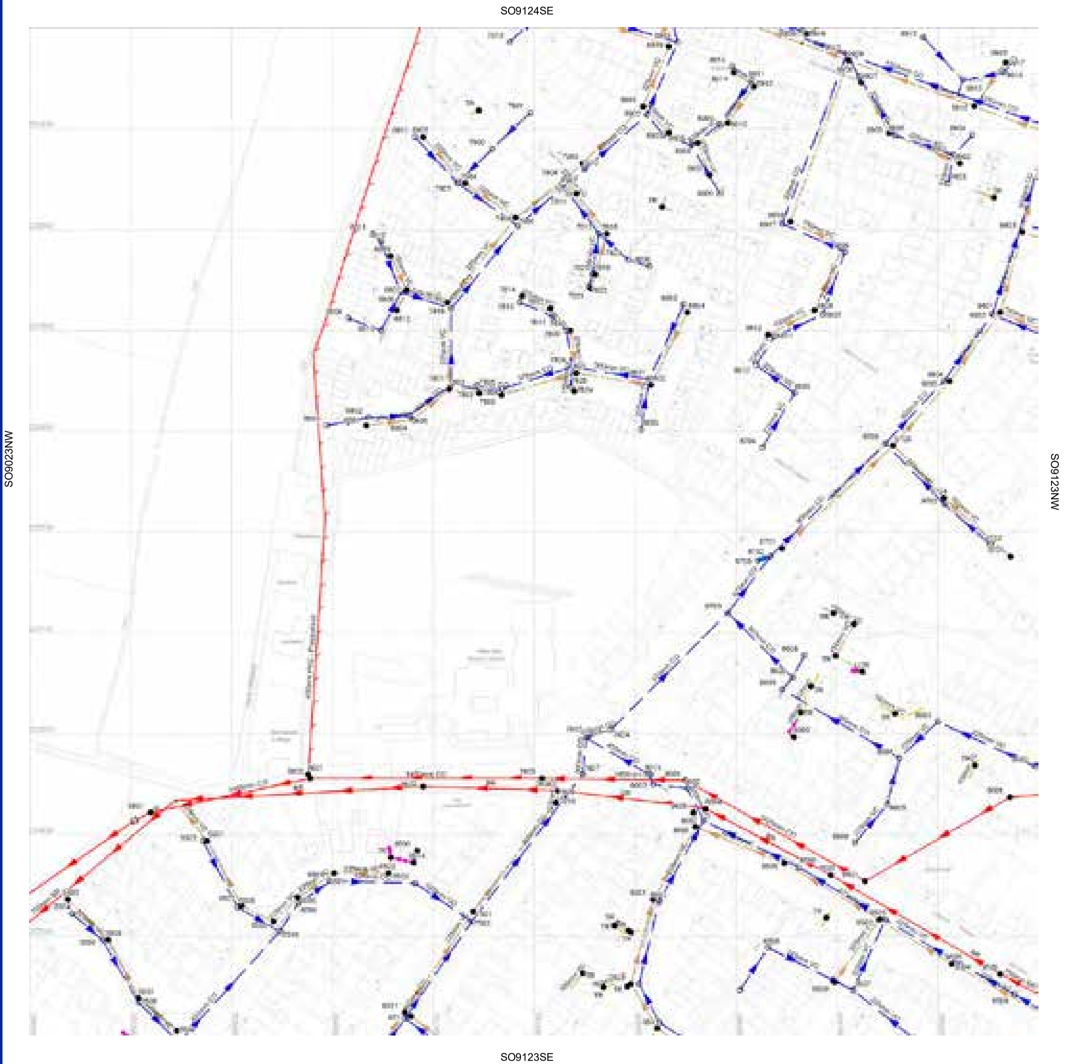
Severn Trent Water Limited
Asset Data Management
PO Box 5344
Coventry
CV3 9FT
Telephone: 0845 601 6616

SEWER RECORD (TABULAR)

O/S Map scale: 1:1250
Date of issue: 02.08.19
Sheet No. 1 of 1

This map is centred upon:
O / S Tile reference:
SO9123NW

Disclaimer Statement:
1. Do not scale off this Map.
?@This map and any information supplied with it is furnished as a general guide, is only valid at the date of issue and no warranty as to its correctness is given or implied. +n particular this / ap and any information shown on it must not be relied upon in the event of any development or works #including but not limited to excavations) in the vicinity of Severn Trent WaterÂ assets or for the purposes of determining the suitability of a point of connection to the sewerage or distribution systems.
6. On **1 October 2011** most private sewers and private lateral drains in Severn Trent WaterÂ sewerage area, which were connected to a public sewer as at 1 July ?;4 4%transferred to the ownership of Severn Trent Water and became public sewers and public lateral drains. A further transfer takes place on 1 (ctober ?;4 2 #date to be confirmed)@
Private pumping stations, w ich form part of these sewers or lateral drains, will transfer to the ownership of Severn Trent Water on or before 1 (ctober ?;4C@
Severn Trent Water does not possess com) lete records of these assets.
These assets may not be displayed on this Map.



Sewer Node	Sewer Pipe Data									
REFERENCE	COVER LEVEL	INV LEVEL UPSTR	INV LEVEL DOWNSTR	PURP	MATL	SHAPE	MAX SIZE	MIN SIZE	GRADIENT	YEAR LAID
SO91235501	40.28	38.95	nil	F	VC	C	225	nil	0.00	nill
SO91235502	40.31	39.62	39.44	S	VC	C	nil	nil	206.22	nill
SO91235503	41.59	39.55	nil	F	VC	C	225	nil	0.00	nill
SO91235504	41.55	40.68	40.59	S	VC	C	225	nil	220.56	nill
SO91235505	41.76	39.85	39.56	F	VC	C	225	nil	97.52	nill
SO91235506	41.77	40.57	40.41	S	VC	C	225	nil	224.06	nill
SO91235507	42.27	40.09	39.89	F	VC	C	225	nil	163.25	nill
SO91235508	42.29	40.39	40.21	S	VC	C	225	nil	157.11	nill
SO91235509	42.46	40.90	40.11	F	VC	C	225	nil	31.44	nill
SO91235601	39.94	37.09	nil	C	CO	C	1450	nil	0.00	nill
SO91236500	nil	nil	nil	F	VC	C	100	nil	0.00	nill
SO91236501	40.86	39.75	39.59	F	VC	C	225	nil	135.19	nill
SO91236502	40.77	39.98	39.76	F	VC	C	225	nil	122.73	nill
SO91236503	41.06	38.87	38.64	S	CO	C	525	nil	147.13	nill
SO91236504	40.90	38.96	38.88	S	CO	C	525	nil	525.13	nill
SO91236505	41.13	39.57	39.46	F	VC	C	225	nil	154.27	nill
SO91236506	41.17	39.03	38.96	S	CO	C	525	nil	277.43	nill
SO91236507	40.65	39.20	38.98	F	VC	C	225	nil	164.73	nill
SO91236508	40.68	39.42	39.20	S	VC	C	225	nil	109.95	nill
SO91236509	41.25	39.45	39.23	F	VC	C	225	nil	81.32	nill
SO91236510	41.37	39.10	39.04	S	CO	C	525	nil	277.33	nill
SO91236511	43.61	41.43	39.88	F	VC	C	225	nil	39.01	nill
SO91236512	43.67	41.80	40.54	S	CO	C	600	nil	46.23	nill
SO91236513	43.62	41.48	41.47	F	VC	C	225	nil	361.00	nill
SO91236514	nil	nil	nil	F	VC	C	100	nil	0.00	nill
SO91236601	39.58	37.62	37.61	C	BR	C	375	nil	224.00	nill
SO91236602	39.61	37.15	37.14	C	CO	C	1450	nil	8081.00	nill
SO91236603	39.85	37.44	nil	C	BR	E	1190	760	0.00	nill
SO91236801	36.19	34.11	33.60	F	VC	C	150	nil	45.47	nill
SO91236802	36.14	34.45	34.13	S	VC	C	150	nil	62.56	nill
SO91236803	36.06	34.90	34.50	S	PVC	C	150	nil	53.45	nill
SO91236804	35.88	33.56	33.13	F	VC	C	150	nil	54.49	nill
SO91236805	35.95	34.08	33.72	S	VC	C	225	nil	71.69	nill
SO91236806	35.49	33.83	33.64	S	VC	C	225	nil	138.16	nill
SO91236807	35.48	33.41	32.76	F	VC	C	150	nil	32.12	nill
SO91236808	nil	nil	34.19	S	nil	nil	nil	nil	0.00	nill
SO91236809	35.57	34.31	33.44	F	VC	C	100	nil	21.60	nill
SO91236810	35.38	34.11	33.98	S	VC	C	150	nil	207.15	nill
SO91236811	35.25	34.23	34.14	S	VC	C	150	nil	62.89	nill
SO91236812	35.56	34.44	33.44	F	VC	C	150	nil	11.18	nill
SO91236813	35.70	34.15	33.86	S	VC	C	150	nil	74.03	nill
SO91236901	34.57	33.57	33.40	S	VC	C	225	nil	183.18	nill
SO91236902	34.55	32.75	32.39	F	VC	C	225	nil	86.50	nill
SO91237501	41.72	39.87	38.76	F	VC	C	225	nil	61.08	nill
SO91237502	41.85	38.30	37.77	S	CO	C	900	nil	144.15	nill
SO91237503	42.50	41.46	39.83	F	VC	C	225	nil	26.64	nill
SO91237602	39.04	35.15	34.92	S	CO	C	975	nil	49.57	nill
SO91237603	39.09	35.16	35.15	S	CO	C	975	nil	141.00	nill
SO91237604	38.82	34.92	34.91	S	CO	C	975	nil	8202.00	nill
SO91237605	39.39	37.29	37.18	C	CO	C	1450	nil	1045.45	nill
SO91237607	39.59	35.22	35.16	S	CO	C	900	nil	301.83	nill
SO91237608	39.90	37.50	37.45	C	BR	E	1150	780	1340.60	nill
SO91237609	39.95	35.29	35.24	S	CO	C	900	nil	300.00	nill
SO91237610	40.02	38.76	38.68	F	VC	C	225	nil	76.00	nill
SO91237801	35.58	33.49	33.46	S	CO	C	450	nil	1266.67	nill
SO91237802	35.61	32.97	32.69	F	VC	C	225	nil	153.61	nill
SO91237803	35.59	33.52	33.51	S	CO	C	450	nil	1414.00	nill
SO91237804	35.58	33.00	32.99	F	VC	C	225	nil	1513.00	nill
SO91237805	35.47	33.60	33.52	S	CO	C	450	nil	137.50	nill
SO91237806	35.49	33.18	33.01	F	VC	C	225	nil	65.00	nill
SO91237807	35.49	33.52	33.20	F	VC	C	225	nil	120.63	nill
SO91237808	35.47	33.85	33.65	S	CO	C	375	nil	183.45	nill
SO91237809	35.10	34.09	33.85	S	VC	C	300	nil	76.04	nill
SO91237810	35.10	33.78	33.57	F	VC	C	225	nil	101.00	nill
SO91237811	35.03	34.22	34.11	S	VC	C	225	nil	90.00	nill
SO91237812	35.04	33.97	33.80	F	VC	C	225	nil	87.47	nill
SO91237813	35.14	34.35	34.25	S	VC	C	225	nil	174.60	nill
SO91237814	35.12	34.12	34.00	F	VC	C	225	nil	126.92	nill
SO91237815	35.26	33.46	33.29	S	CO	C	450	nil	309.59	nill
SO91237816	35.21	32.69	32.20	F	VC	C	225	nil	110.29	nill
SO91237817	34.94	33.37	33.31	S	VC	C	300	nil	416.67	nill
SO91237818	34.93	32.99	32.36	F	VC	C	225	nil	39.68	nill
SO91237819	35.11	34.36	33.42	S	VC	C	100	nil	21.51	nill
SO91237820	35.11	34.09	33.18	F	VC	C	100	nil	23.73	nill
SO91237821	35.12	34.58	34.10	F	VC	C	100	nil	13.98	nill
SO91237822	35.11	34.64	34.38	S	PVC	C	100	nil	24.31	nill
SO91237823	35.11	33.93	33.42	S	VC	C	100	nil	37.67	nill
SO91237824	35.60	33.88	33.71	F	VC	C	150	nil	53.29	nill
SO91237825	35.60	34.07	33.95	S	VC	C	150	nil	83.75	nill
SO91237901	34.40	33.52	33.46	S	VC	C	225	nil	436.17	nill
SO91237902	34.36	33.46	33.40	S	VC	C	225	nil	400.67	nill
SO91237903	34.54	33.40	33.28	S	VC	C	300	nil	305.17	nill
SO91237904	34.58	32.38	32.19	F	VC	C	225	nil	159.11	nill
SO91237905	34.74	32.19	32.06	F	VC	C	225	nil	235.46	nill
SO91237906	34.73	33.27	33.21	S	CO	C	450	nil	484.50	nill
SO91237907	34.58	33.20	33.19	S	CO	C	450	nil	1421.00	nill
SO91237908	34.58	32.04	31.97	F	VC	C	225	nil	172.00	nill
SO91237909	34.52	31.97	31.77	F	VC	C	225	nil	205.20	nill
SO91237910	34.53	33.17	33.00	S	CO	C	450	nil	241.82	nill
SO91237911	34.62	33.29	33.22	S	VC	C	300	nil	60.57	nill
SO91237912	34.56	32.32	32.19	F	VC	C	225	nil	70.92	nill

Sewer Node	Sewer Pipe Data									
REFERENCE	COVER LEVEL	INV LEVEL UPSTR	INV LEVEL DOWNSTR	PURP	MATL	SHAPE	MAX SIZE	MIN SIZE	GRADIENT	YEAR LAID
SO91237913	34.33	33.32	33.07	S	VC	C	225	nil	127.32	nill
SO91238501	40.73	39.81	38.81	F	VC	C	225	nil	41.68	nill
SO91238502	40.76	39.41	38.48	S	VC	C	225	nil	49.09	nill
SO91238503	42.52	41.13	39.44	S	VC	C	225	nil	24.97	nill
SO91238504	43.19	42.08	41.15	S	VC	C	225	nil	23.09	nill
SO91238505	40.04	39.32	38.84	F	VC	C	225	nil	99.04	nill
SO91238506	40.09	38.62	38.30	S	CO	C	300	nil	163.53	nill
SO91238507	40.15	37.67	37.61	C	BR	E	1150	760	1170.67	nill
SO91238508	41.33	40.35	40.22	S	VC	C	225	nil	361.23	nill
SO91238509	41.96	40.60	39.78	F	VC	C	225	nil	46.35	nill
SO91238510	42.46	41.49	40.42	S	VC	C	225	nil	23.59	nill
SO91238511	43.17	42.39	41.47	F	VC	C	225	nil	27.77	nill
SO91238600	nil	nil	nil	F	VC	C	100	nil	0.00	nill
SO91238601	39.83	37.36	37.34	C	CO	C	1450	nil	3550.50	nill
SO91238602	39.84	36.65	36.19	S	CO	C	450	nil	37.22	nill
SO91238603	39.51	36.16	36.04	S	CO	C	450	nil	44.92	nill
SO91238604	39.78	37.61	nil	C	BR	E	1100	810	0.00	nill
SO91238605	39.86	38.43	nil	F	VC	C	225	nil	0.00	nill
SO91238606	39.92	38.79	38.45	F	VC	C	225	nil	20.79	nill
SO91238607	39.85	36.82	36.66	S	CO	C	450	nil	111.81	nill
SO91238608	37.31	36.40	36.31	S	VC	C	225	nil	139.22	nill
SO91238609	37.52	36.29	35.95	S	CO	C	300	nil	133.09	nill
SO91238610	37.58	36.39	36.30	S	CO	C	300	nil	86.78	nill
SO91238611	39.43	36.02	35.37	S	CO	C	450	nil	55.15	nill
SO91238700	nil	nil	nil	S	P	C	100	nil	0.00	nill
SO91238700	nil	nil	nil	S	P	C	100	nil	0.00	nill
SO91238701	36.92	34.05	33.25	F	VC	C	225	nil	93.76	nill
SO91238702	36.96	34.77	34.23	S	CO	C	900	nil	147.98	nill
SO91238703	37.46	34.91	34.90	S	CO	C	975	nil	3500.00	nill
SO91238704	35.77	34.97	34.84	S	VC	C	225	nil	241.38	nill
SO91238801	35.72	34.12	33.88	S	VC	C	300	nil	160.29	nill
SO91238802	35.77	33.75	33.57	F	VC	C	225	nil	208.22	nill
SO91238803	35.24	34.40	34.13	S	VC	C	225	nil	150.81	nill
SO91238804	35.26	34.05	33.80	F	VC	C	225	nil	161.00	nill
SO91238805	35.69	34.47	34.15	S	VC	C	225	nil	79.13	nill
SO91238806	35.13	34.18	33.95	S	VC	C	100	nil	46.83	nill
SO91238807	35.59	34.46	34.29	S	VC	C	225	nil	193.47	nill
SO91238808	35.60	34.04	33.81	F	VC	C	150	nil	151.87	nill
SO91238809	35.92	34.82	34.73	S	VC	C	225	nil	262.22	nill
SO91238810	35.86	34.71	34.62	S	VC	C	225	nil	184.89	nill
SO91238811	35.82	34.61	34.47	S	VC	C	225	nil	188.57	nill
SO91238812	35.84	34.40	34.05	F	VC	C	150	nil	74.11	nill
SO91238901	34.35	31.77	31.57	F	VC	C	225	nil	163.50	nill
SO91238902	34.33	32.93	32.87	S	CO	C	525	nil	650.00	nill
SO91238903	34.64	32.44	31.88	F	VC	C	225	nil	32.82	nill
SO91238904	34.60	33.22	33.05	S	CO	C	375	nil	75.35	nill
SO91238905	34.83	33.43	33.27	S	CO	C	375	nil	92.94	nill
SO91238906	34.85	32.67	32.48	F	VC	C	225	nil	78.26	nill
SO91238907	35.02	33.24	32.68	F	VC	C	225	nil	30.52	nill
SO91238908	35.14	33.77	33.45	S	VC	C	225	nil	86.81	nill
SO91238909	34.97	33.61	33.46	S	VC	C	300	nil	114.67	nill
SO91238910	34.99	32.90	32.70	F	VC	C	225	nil	90.15	nill
SO91238911	35.07	33.80	33.64	S	VC	C	300	nil	170.00	nill
SO91238912	35.07	33.19	32.94	F	VC	C	225	nil	88.80	nill
SO91238913	34.89	34.05	33.91	S	VC	C	225	nil	87.21	nill
SO91238914	34.94	33.47	33.28	F	VC	C	150	nil	64.26	nill
SO91238915	34.36	32.86	32.82	S	CO	C	525	nil	721.50	nill
SO91238916	34.40	31.57	31.27	F	VC	C	225	nil	97.07	nill
SO91238917	35.60	33.97	33.63	S	CO	C	300	nil	264.38	nill
SO91238918	35.49	33.29	31.76	F	VC	C	150	nil	55.61	nill
SO91238919	nil	nil	nil	F	nil	nil	nil	nil	0.00	nill
SO91238920	nil	nil	nil	S	nil	nil	nil	nil	0.00	nill
SO91239501	40.37	37.49	37.40	C	CO	C	1425	nil	1134.22	nill
SO91239502	40.44	39.76	39.32	F	VC	C	225	nil	124.34	nill
SO91239503	40.47	39.25	38.62	S	CO	C	300	nil	79.76	nill
SO91239504	41.36	40.64	39.76	F	VC	C	225	nil	47.94	nill
SO91239505	41.42	40.32	39.31	S	VC	C	225	nil	42.62	nill
SO91239506	41.95	37.81	37.68	C	BR	E	1200	760	748.08	nill
SO91239507	42.65	40.05	39.44	S	VC	C	225	nil	63.08	nill
SO91239508	38.94	37.85	37.36	S	VC	C	225	nil	50.69	nill
SO91239509	42.32	40.94	40.32	S	VC	C	225	nil	49.82	nill
SO91239601	40.10	nil	37.49	C	nil	nil	nil	nil	0.00	nill
SO91239602	38.98	37.81	37.28	S	VC	C	225	nil	99.62	nill
SO91239603	38.13	37.22	36.92	S	VC	C	225	nil	87.23	nill
SO91239604	37.95	36.84	36.40	S	CO	C	300	nil	152.80	nill
SO91239605	38.30	37.36	36.90	S	VC	C	225	nil	51.67	nill
SO91239701	36.99	35.04	34.65	F	VC	C	150	nil	112.64	nill
SO91239702	36.85	35.86	35.69	S	VC	C	225	nil	179.29	nill
SO91239703	36.65	35.68	35.36	S	VC	C	225	nil	130.41	nill
SO91239704	36.63	34.60	33.35	F	VC	C	150	nil	28.86	nill
SO91239705	36.52	33.24	32.96	F	VC	C	225	nil	151.86	nill
SO91239706	36.48	34.21	34.01	S	CO	C	900	nil	212.25	nill
SO91239801	36.02	32.63	32.54	F	VC	C	225	nil	460.89	nill
SO91239802	36.08	33.80	nil	S	CO	C	900	nil	0.00	nill
SO91239803	35.70	32.51	32.31	F	VC	C	225	nil	252.25	nill
SO91239804	36.30	32.94	32.65	F	VC	C	225	nil	145.52	nill
SO91239805	36.27	34.01	33.83	S	CO	C	900	nil	226.67	nill
SO91239806	35.38	34.25	34.06	S	VC	C	225	nil	179.00	nill
SO91239807	35.36	33.78	33.33	F	VC	C	150	nil	63.64	nill
SO91239901	35.99	34.48	34.17	S	VC	C	225	nil	98.97	nill
SO91239902	36.01	34.08	33.79	F	VC	C	225	nil	131.31	nill

Abandoned Sewer
Private Combined Gravity Sewer
Private Foul Gravity Sewer
Private Surface Water Gravity Sewer
Public Combined Gravity Sewer
Public Foul Gravity Sewer
Public Surface Water Gravity Sewer
Trunk Combined Gravity Sewer
Trunk Foul Use Gravity Sewer
Trunk Surface Water Gravity Sewer
Combined Use Pressurised Sewer
Foul Use Pressurised Sewer
Surface Water Pressurised Sewer
Hig way Drain
Combined Lateral ! rain #SS$
Foul Lateral ! rain #SS$
Surface Water Lateral ! rain #SS$

Cable, &arthing
Cable ' unction
Cable, Optical Fibre'Instrumentation
Cable, Low , oltage
Cable, High , oltage
Cable, (ther
Housing, - uilding
Housing, . iosk
! is) osal Site
Sewage Treatment Works
Housing, (ther
Pipe Support Structure
Sewage Pum) ing Facility
Sewer Facility Connection +nlet * (utlet

- lind S aft
Combined Use / anhole
Flushing Chamber
Foul Use / anhole
Grease Trap
Head 0 ode
Hydrobrake
Lamphole
(utfall
Overflow
Penstock
Petrol +nterceptor
Sewer Blockage
Sewer Collapse

Sewer Chemical +njection Point
Sewer ' unction
Sewerage Air , alve
Sewerage Hatch - ox Point
Sewerage +solation , alve
Soakaway
Surface Water / anhole
, ent Column
Waste Water Storage
Culverted Watercourse
Pre-1937 Properties

MATERIALS

AC, -8, CC, CI, CO, CS, CSU, GRC, MAC, MAB, PE, PF, PP, PSC, PVC, RPI, SI, 999

All Private Sewers are shown in magenta
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CATEGORIES

W, C, SE, FV, S, HD

SHAPE

C, E, U

PURPOSE

C 3C(/ - +0&!
& 3F+0A" EFF" U&0 T
F 3FOU"
" 3S"U! GE
S 3SU8 FACE WAT&8

TABULAR KEY

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N W E S

Severn Trent Water Limited
Asset Data Management
PO Box 5344
Coventry
CV3 9FT
Telephone: 0845 601 6616

SEWER RECORD (TABULAR)

O/S Map scale: 1:1250
Date of issue: 02.08.19
Sheet No. 1 of 2

This map is centred upon:
O / S Tile reference: SO9123NE

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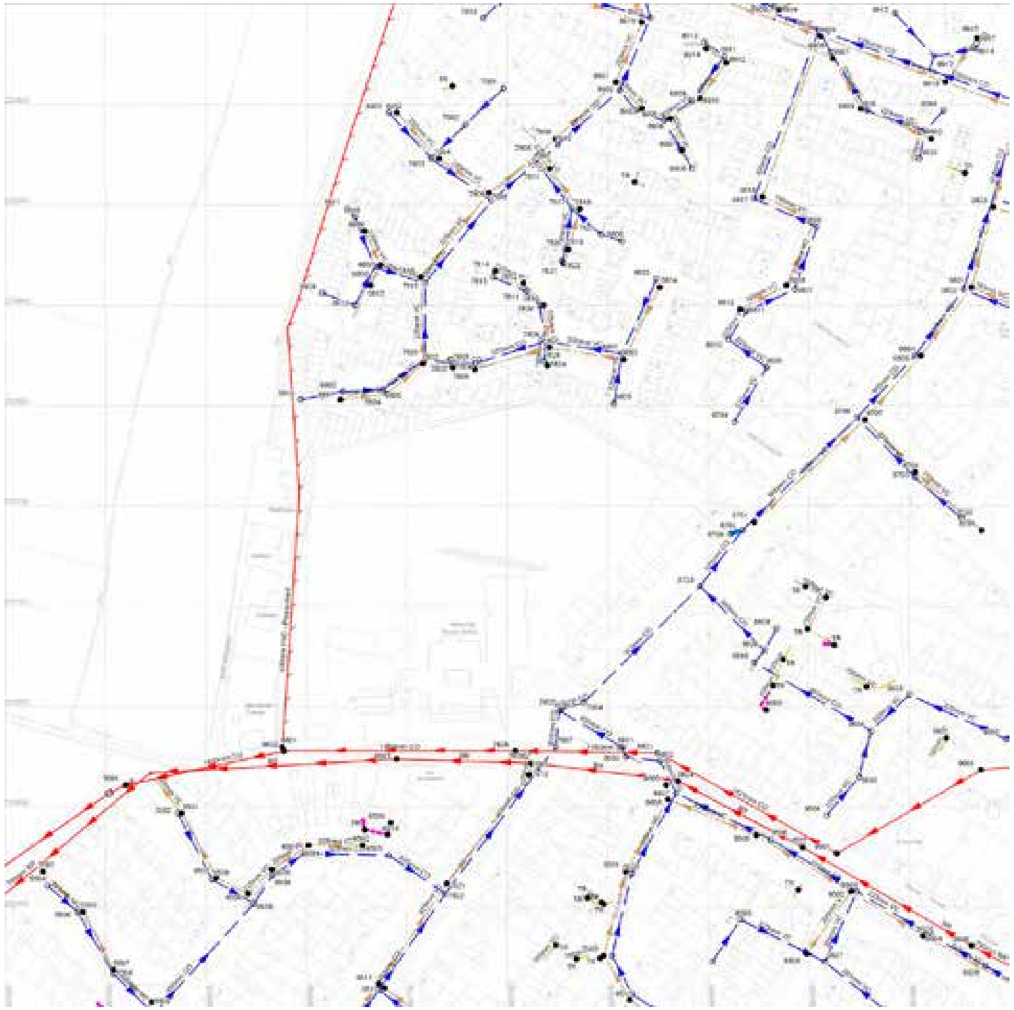

Sewer Node / Sewer Pipe Data

REFERENCE	COVER LEVEL	INV LEVEL UPSTR	INV LEVEL DOWNSTR	PURP	MATL	SHAPE	MAX SIZE	MIN SIZE	GRADIENT	YEAR LAID
SO91239903	36.03	34.67	34.51	S	VC	C	225	nil	89.50	nill
SO91239904	36.10	34.70	34.51	S	VC	C	225	nil	70.79	nill
SO91239905	35.73	33.76	33.28	F	VC	C	225	nil	59.69	nill
SO91239906	35.73	34.15	33.54	S	CO	C	375	nil	55.95	nill
SO91239907	35.52	33.20	31.88	F	VC	C	225	nil	9.49	nill
SO91239908	35.48	33.52	33.20	S	CO	C	375	nil	39.16	nill
SO91239909	35.58	31.68	31.24	F	VC	C	225	nil	234.36	nill
SO91239910	35.61	32.57	32.16	S	CO	C	1350	nil	236.93	nill
SO91239912	nil	nil	nil	S	nil	nil	nil	nil	0.00	nill
SO91239913	nil	nil	nil	S	nil	nil	nil	nil	0.00	nill
SO91239914	nil	nil	nil	S	nil	nil	nil	nil	0.00	nill
SO91239915	nil	nil	nil	S	nil	nil	nil	nil	0.00	nill
SO91239916	nil	32.30	31.71	F	VC	C	225	nil	112.24	nill
SO91239917	nil	nil	nil	F	nil	nil	nil	nil	0.00	nill
nil	nil	nil	nil	F	VC	nil	nil	nil	0.00	nill
nil	nil	nil	nil	F	VC	nil	nil	nil	0.00	nill
nil	nil	nil	nil	F	VC	nil	nil	nil	0.00	nill
nil	nil	nil	nil	F	VC	nil	nil	nil	0.00	nill
nil	nil	nil	nil	F	VC	nil	nil	nil	0.00	nill
nil	nil	nil	nil	F	VC	nil	nil	nil	0.00	nill
nil	nil	nil	nil	F	VC	nil	nil	nil	0.00	nill
nil	nil	nil	nil	F	VC	nil	nil	nil	0.00	nill
nil	nil	nil	nil	F	nil	nil	nil	nil	0.00	nill
nil	nil	nil	nil	F	nil	nil	nil	nil	0.00	nill
nil	nil	nil	nil	F	VC	nil	nil	nil	0.00	nill
nil	nil	nil	nil	F	VC	nil	nil	nil	0.00	nill
nil	nil	nil	nil	F	VC	nil	nil	nil	0.00	nill
nil	nil	nil	nil	F	VC	nil	nil	nil	0.00	nill

Abandoned Sewer
Private Combined Gravity Sewer
Private Foul Gravity Sewer
Private Surface Water Gravity Sewer
Public Combined Gravity Sewer
Public Foul Gravity Sewer
Public Surface Water Gravity Sewer
Trunk Combined Gravity Sewer
Trunk Foul Use Gravity Sewer
Trunk Surface Water Gravity Sewer
Combined Use Pressurised Sewer
Foul Use Pressurised Sewer
Surface Water Pressurised Sewer
Hig way Drain
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Surface Water Lateral ! rain #S$$

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Cable, Optical Fibre'Instrumentation
Cable, Low , oltage
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Hydrobrake
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(utfall
Overflow
Penstock
Petrol +nterceptor
Sewer Blockage
Sewer Collapse

Sewer Chemical +njection Point
Sewer ' unction
Sewerage Air , alve
Sewerage Hatch - ox Point
Sewerage +solation , alve
Soakaway
Surface Water / anhole
, ent Column
Waste Water Storage
Culverted Watercourse
Pre-1937 Properties

MATERIALS

AC	3ASBEST(S C&/ &0 T
-8	3- 8+CK
CC	3C(NC8&T& - (9 CUL, &RT
CI	3CAST +8(0
CO	3C(NC8&T&
CS-	3C(0 C8 ETE SEG/ &0 TS #("T&! $
CSU	3C(0 C8 ETE SEG/ &0 TS #U0 -("T&! $
!+	3DUCT+"& IR(0
GRC	3GLASS 8 &+0F(8 C&! C(0 C8 &T&
MAC	3MAS(0 8: +0 R&GU"A8 COU8 S&S
MA8	3/ AS(08: RA0! (/ ": C(URS&!
PE	3PO": ETH" &0 &
PF	3PITCH
PP	3PO": PR(PY" &0 &
PSC	3PLAST+C ST&&" C(/ P(SIT&
PVC	3P(" : , +0: " CH" (8 +! &
RP/	38& +NF(RC&D P" AST+C / AT8+9
SI	3SPU0 (GR&: $IR(0
99 9	3OTH&8

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CATEGORIES

W	3W&+8
C	3CASCAD&
!-	3! A/- (A8 !
SE	3SI! E &0 T8:
FV	3F" AP , A", &
-!	3- ACK !8 (P
S	3SIPH(0
HD	3HIGHWA: D8 A+0
S4;<	3S&CT+(0 1; <

SHAPE

C	3CIRCULA8
&	3EGG SHAPE!
(	3(TH&8
8	38& CTA0 G" &
S	3S= UA8&
T	3T8 APE>(+ AL
U	3U0. 0(W0

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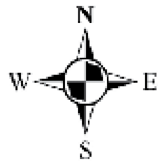
PURPOSE

C	3C(/ - +0&!
&	3F+0A" EFF" U&0 T
F	3FOU"
"	3S" U! GE
S	3SU8 FACE WAT&8



Severn Trent Water Limited
Asset Data Management
PO Box 5344
Coventry
CV3 9FT
Telephone: 0845 601 6616

SEWER RECORD (TABULAR)

O/S Map scale:
Date of issue: 02.08.19
Sheet No. 2 of 2

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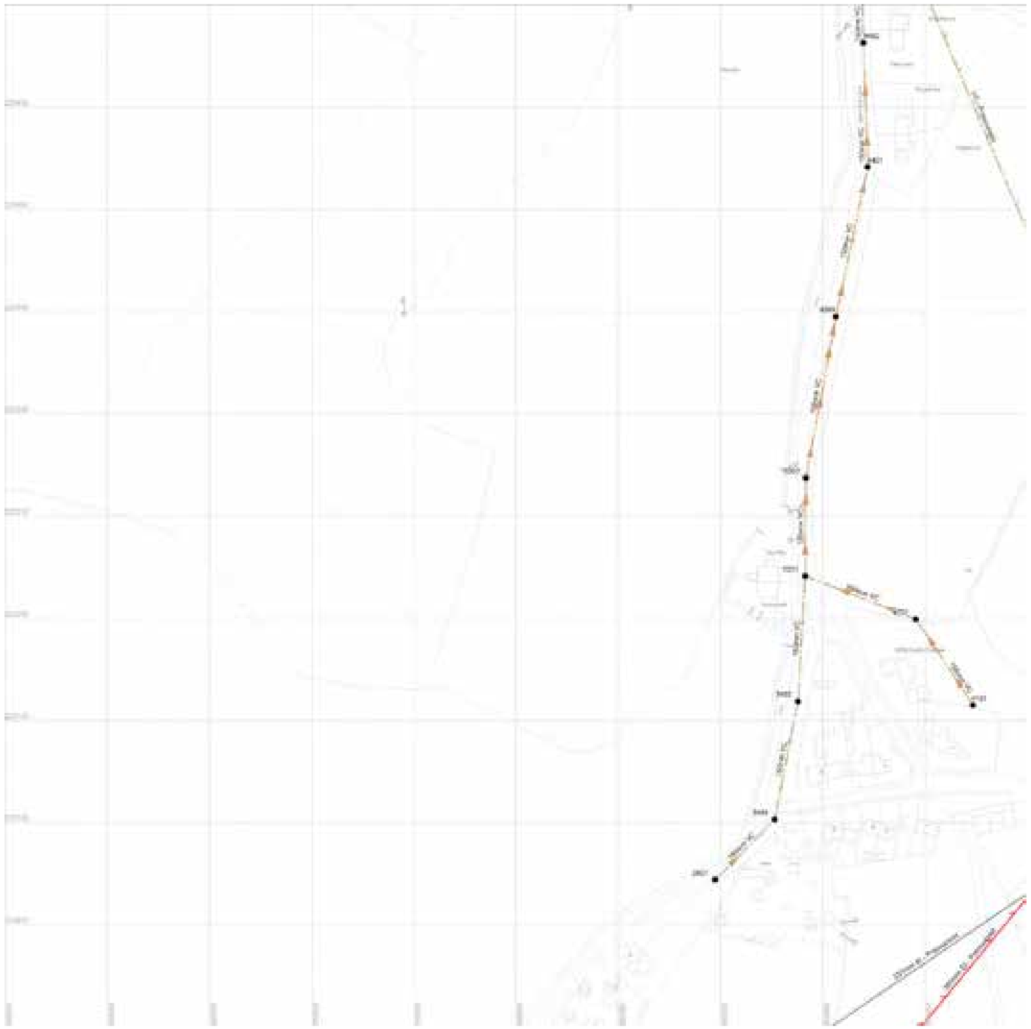
SO9023NW

SO8923SE



SO9023SE

SO9022NW

Sewer Node / Sewer Pipe Data

REFERENCE	COVER LEVEL	INV LEVEL UPSTR	INV LEVEL DOWNSTR	PURP	MATL	SHAPE	MAX SIZE	MIN SIZE	GRADIENT	YEAR LAID
SO90233001	28.10	26.95	26.16	F	VC	C	150	nil	51.03	nill
SO90233101	27.70	26.12	25.52	F	VC	C	150	nil	98.38	nill
SO90233102	27.58	25.51	25.23	F	VC	C	150	nil	218.32	nill
SO90233201	27.51	25.22	25.02	F	VC	C	150	nil	219.24	nill
SO90233202	27.32	25.00	24.52	F	VC	C	150	nil	165.76	nill
SO90234101	28.15	26.89	26.10	F	VC	C	150	nil	63.10	nill
SO90234201	27.58	26.08	25.23	F	VC	C	150	nil	68.16	nill
SO90234301	27.31	24.51	24.14	F	VC	C	150	nil	204.89	nill
SO90234401	26.78	24.14	23.95	F	VC	C	150	nil	305.15	nill
SO90234402	26.82	23.93	23.57	F	VC	C	150	nil	169.47	nill

Abandoned Sewer
Private Combined Gravity Sewer
Private Foul Gravity Sewer
Private Surface Water Gravity Sewer
Public Combined Gravity Sewer
Public Foul Gravity Sewer
Public Surface Water Gravity Sewer
Trunk Combined Gravity Sewer
Trunk Foul Use Gravity Sewer
Trunk Surface Water Gravity Sewer
Combined Use Pressurised Sewer
Foul Use Pressurised Sewer
Surface Water Pressurised Sewer
Hig way Drain
Combined Lateral ! rain #S$
Foul Lateral ! rain #S$
Surface Water Lateral ! rain #S$

Cable, &arthing
Cable ' unction
Cable, Optical Fibre'Instrumentation
Cable, Low , oltage
Cable, High , oltage
Cable, (ther
Housing, - uilding
Housing, . iosk
! is) osal Site
Sewage Treatment Works
Housing, (ther
Pipe Support Structure
Sewage Pum) ing Facility
Sewer Facility Connection +nlet * (utlet

- lind S aft
Combined Use / anhole
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Grease Trap
Head 0 ode
Hydrobrake
Lamphole
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Overflow
Penstock
Petrol +nterceptor
Sewer Blockage
Sewer Collapse

Sewer Chemical +njection Point
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Sewerage Air , alve
Sewerage Hatch - ox Point
Sewerage +solation , alve
Soakaway
Surface Water / anhole
, ent Column
Waste Water Storage
Culverted Watercourse
Pre-1937 Properties

MATERIALS

AC	3ASBEST(S C&/ &0 T
-8	3- 8+CK
CC	3C(NC8&T& - (9 CUL, &RT
CI	3CAST +8(0
CO	3C(NC8&T&
CS-	3C(0 C8 ETE SEG/ &0 TS #("T&! $
CSU	3C(0 C8 ETE SEG/ &0 TS #U0 -("T&! $
!+	3DUCT+"& IR(0
GRC	3GLASS 8 &+0F(8 C&! C(0 C8 &T&
MAC	3MAS(0 8: +0 R&GU" A8 COU8 S&S
MA8	3/ AS(08: RA0! (/ ": C(URS&!
PE	3PO": ETH" &0 &
PF	3PITCH
PP	3PO": PR(PY" &0 &
PSC	3PLAST+C ST&&" C(/ P(SIT&
PVC	3P(" : , +0: " CH" (8 +! &
RP/	38& +NF(RC&D P" AST+C / AT8+9
SI	3SPU0 (GR&: $IR(0
99 9	3OTH&8

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CATEGORIES

W	3W&+8
C	3CASCAD&
!-	3! A/- (A8 !
SE	3S!! E &0 T8:
FV	3F" AP , A", &
-!	3- ACK !8 (P
S	3SIPH(0
HD	3HIGHWA: D8 A+0
S4;<	3S&CT+(0 1; <

SHAPE

C	3CIRCULA8
&	3EGG SHAPE!
(	3(TH&8
8	38& CTA0 G" &
S	3S=UA8&
T	3T8 APE>(+! AL
U	3U0. 0(W0

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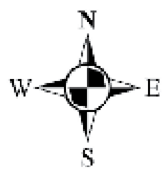
PURPOSE

C	3C(/ - +0&!
&	3F+0A" EFF" U&0 T
F	3FOU"
"	3S" U! GE
S	3SU8 FACE WAT&8



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SEWER RECORD (TABULAR)

O/S Map scale: 1:1250
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Sheet No. 1 of 1

This map is centred upon:
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SO9023SW

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Sewer Node / Sewer Pipe Data

REFERENCE	COVER LEVEL	INV LEVEL UPSTR	INV LEVEL DOWNSTR	PURP	MATL	SHAPE	MAX SIZE	MIN SIZE	GRADIENT	YEAR LAID
SO90235102	nil	21.26	38.83	C	DI		nil	nil	-32.50	2002
SO90239001	40.63	37.11	37.08	C	CO	C	1050	nil	2551.33	nill

Abandoned Sewer
Private Combined Gravity Sewer
Private Foul Gravity Sewer
Private Surface Water Gravity Sewer
Public Combined Gravity Sewer
Public Foul Gravity Sewer
Public Surface Water Gravity Sewer
Trunk Combined Gravity Sewer
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Combined Lateral ! rain #SS$
Foul Lateral ! rain #SS$
Surface Water Lateral ! rain #SS$

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Cable ' unction
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Cable, High , oltage
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Sewage Treatment Works
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Sewerage Air , alve
Sewerage Hatch - ox Point
Sewerage +solation , alve
Soakaway
Surface Water / anhole
, ent Column
Waste Water Storage
Culverted Watercourse
Pre-1937 Properties

MATERIALS

AC 3ASBEST(S C&/ &0 T
-8 3- 8+CK
CC 3C(NC8&T&- (9 CUL &RT
CI 3CAST +8(0
CO 3C(NC8&T&
CS- 3C(0 C8ETE SEG/ &0 TS #("T&! $
CSU 3C(0 C8ETE SEG/ &0 TS #U0 -("T&! $
!+ 3DUCT+"& IR(0
GRC 3GLASS 8 &+0F(8 C&! C(0 C8&T&
MAC 3MAS(0 8 : +0 R&GU" A8 COU8 S&S
MA8 3/ AS(08 : RA0! (/ ": C(URS&!
PE 3PO": ETH" &0 &
PF 3PITCH
PP 3PO": PR(PY" &0 &
PSC 3PLAST+C ST&&" C(/ P(SIT&
PVC 3P(" : , +0 " CH"(8 +! &
RP! 3!& +NF(RC&D P"AST+C / AT&+8
S! 3SPU0 (GR& $IR(0
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CATEGORIES

W 3W&+8
C 3CASCAD&
!- 3! A- (A8!
SE 3S! E &0 T8 :
FV 3F" AP , A" , &
-! 3- ACK !8 (P
S 3SIPH(0
HD 3HIGHWA: D8 A+0
S4;< 3S&CT+0 1; <

SHAPE

C 3CIRCULA8
& 3EGG SHAPE!
(3(TH&8
8 3& CTA0 G"&
S 3S= UA8&
T 3T8 APE=(+! AL
U 3U0 . 0(W0

PURPOSE

C 3C(/ - +0&!
& 3F+0A" EFF"U&0 T
F 3FOU"
* 3S"U! GE
S 3SU8 FACE WAT&8

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N W E S

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SEWER RECORD (TABULAR)

O/S Map scale: 1:1250
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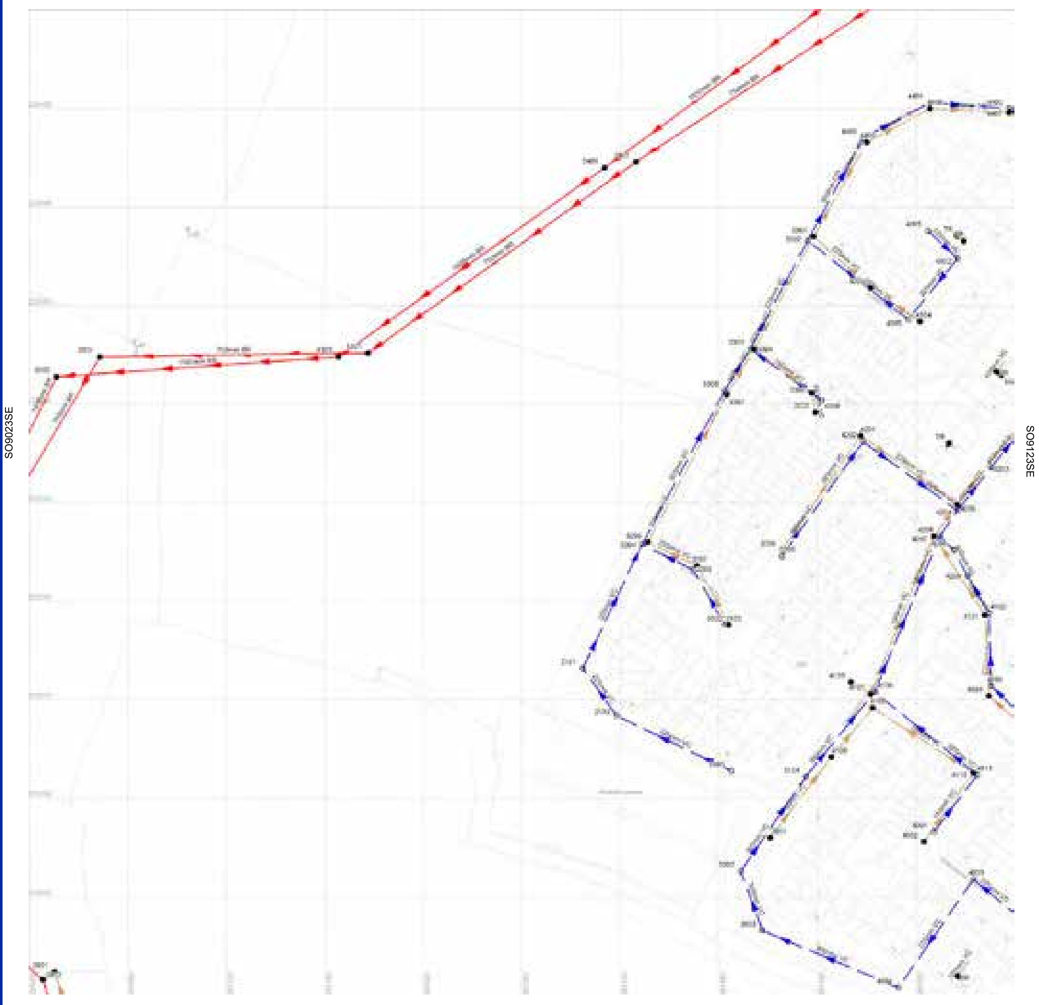

Sewer Node / Sewer Pipe Data

REFERENCE	COVER LEVEL	INV LEVEL UPSTR	INV LEVEL DOWNSTR	PURP	MATL	SHAPE	MAX SIZE	MIN SIZE	GRADIENT	YEAR LAID
SO91230001	40.94	38.55	37.57	F	CO	C	1050	nil	7.36	nill
SO91230002	40.72	37.17	37.11	C	CO	C	1050	nil	1735.67	nill
SO91230301	44.71	36.50	36.82	C	BR	C	750	nil	0.00	nill
SO91230302	44.25	36.34	36.35	C	BR	C	1500	nil	0.00	nill
SO91231301	48.79	36.87	36.50	C	BR	C	750	nil	367.59	nill
SO91231302	48.89	36.69	36.34	C	BR	C	1500	nil	409.57	nill
SO91232101	50.17	48.40	47.72	S	VC	C	225	nil	102.62	nill
SO91232102	50.03	48.73	48.42	S	VC	C	225	nil	94.87	nill
SO91232401	48.42	36.80	36.69	C	BR	C	1500	nil	1505.91	nill
SO91233001	50.75	50.17	49.66	F	VC	C	150	nil	100.78	nill
SO91233002	50.48	49.36	48.90	S	VC	C	300	nil	126.63	nill
SO91233003	50.51	49.44	49.36	S	VC	C	300	nil	399.38	nill
SO91233101	50.49	49.63	49.22	S	VC	C	225	nil	78.66	nill
SO91233102	50.52	49.25	48.98	F	VC	C	225	nil	125.93	nill
SO91233103	50.46	49.38	48.77	S	VC	C	225	nil	105.57	nill
SO91233104	50.90	48.89	48.78	S	VC	C	300	nil	504.00	nill
SO91233202	49.56	48.02	47.82	F	VC	C	150	nil	51.00	nill
SO91233203	50.01	48.57	47.46	F	VC	C	225	nil	76.58	nill
SO91233204	49.99	47.71	46.89	S	VC	C	225	nil	108.04	nill
SO91233205	50.17	49.13	48.42	F	VC	C	225	nil	99.24	nill
SO91233206	50.15	49.42	48.89	S	VC	C	225	nil	134.02	nill
SO91233207	50.20	48.96	48.59	F	VC	C	225	nil	74.95	nill
SO91233208	50.25	49.20	47.81	S	VC	C	225	nil	20.91	nill
SO91233301	47.87	45.21	44.57	F	VC	C	225	nil	86.05	nill
SO91233302	47.83	45.99	44.94	S	CO	C	300	nil	56.25	nill
SO91233303	48.81	46.68	46.07	S	VC	C	225	nil	101.93	nill
SO91233304	48.79	47.05	46.30	F	VC	C	225	nil	85.88	nill
SO91233305	49.16	46.88	46.71	S	VC	C	225	nil	145.29	nill
SO91233306	49.10	47.80	47.12	F	VC	C	150	nil	53.53	nill
SO91233307	49.17	47.45	47.07	F	VC	C	225	nil	70.87	nill
SO91233401	47.71	36.93	36.87	C	BR	C	750	nil	2784.17	nill
SO91234001	51.09	50.12	49.73	S	VC	C	225	nil	93.33	nill
SO91234002	51.13	50.29	49.90	F	VC	C	nil	nil	110.28	nill
SO91234003	51.37	50.23	49.79	S	VC	C	225	nil	151.93	nill
SO91234004	50.92	49.79	49.45	S	VC	C	300	nil	220.15	nill
SO91234101	51.19	48.64	48.16	F	VC	C	nil	nil	99.40	nill
SO91234102	51.16	49.62	49.54	S	VC	C	300	nil	274.38	nill
SO91234103	51.02	49.40	49.23	F	VC	C	100	nil	68.59	nill
SO91234104	50.96	48.92	48.64	F	VC	C	150	nil	146.61	nill
SO91234105	50.99	49.81	49.63	S	VC	C	300	nil	205.61	nill
SO91234106	50.83	48.77	48.38	S	VC	C	375	nil	219.54	nill
SO91234107	50.89	49.13	48.11	F	VC	C	150	nil	84.47	nill
SO91234108	50.96	49.27	49.16	F	VC	C	150	nil	64.27	nill
SO91234109	51.02	49.64	49.28	F	VC	C	150	nil	90.69	nill
SO91234110	51.37	49.89	49.28	F	VC	C	150	nil	99.59	nill
SO91234111	51.38	49.73	49.07	S	VC	C	225	nil	101.27	nill
SO91234201	50.08	48.41	48.07	F	VC	C	225	nil	177.12	nill
SO91234202	50.04	48.85	48.45	S	VC	C	225	nil	148.53	nill
SO91234203	50.57	48.07	47.43	S	CO	C	450	nil	117.64	nill
SO91234204	50.78	47.91	47.17	F	VC	C	225	nil	97.31	nill
SO91234205	50.81	48.29	48.08	S	CO	C	450	nil	132.38	nill
SO91234206	50.98	48.38	48.30	S	CO	C	450	nil	197.63	nill
SO91234207	50.94	48.10	47.93	F	VC	C	225	nil	117.65	nill
SO91234208	50.98	49.33	49.30	S	VC	C	300	nil	330.00	nill
SO91234209	51.14	49.52	49.36	S	VC	C	300	nil	92.25	nill
SO91234301	47.88	47.04	46.80	S	VC	C	225	nil	85.50	nill
SO91234302	48.12	46.78	46.51	S	VC	C	225	nil	147.48	nill
SO91234303	48.33	45.77	45.36	F	VC	C	225	nil	95.00	nill
SO91234304	48.77	47.67	47.07	F	VC	C	225	nil	50.38	nill
SO91234305	48.59	46.50	46.03	S	VC	C	225	nil	137.91	nill
SO91234306	49.30	47.47	46.78	S	VC	C	150	nil	64.36	nill
SO91234401	45.73	44.28	43.82	S	CO	C	300	nil	87.20	nill
SO91234402	45.27	43.81	43.59	S	CO	C	375	nil	104.45	nill
SO91234403	46.41	44.91	44.29	S	CO	C	300	nil	62.05	nill
SO91234405	46.44	44.54	44.03	F	VC	C	225	nil	71.06	nill
SO91234406	45.74	44.02	43.55	F	VC	C	225	nil	85.21	nill
SO91234407	45.31	43.52	43.30	F	VC	C	225	nil	86.82	nill
nil	nil	nil	nil	F	VC	nil	nil	nil	0.00	nill

Abandoned Sewer
Private Combined Gravity Sewer
Private Foul Gravity Sewer
Private Surface Water Gravity Sewer
Public Combined Gravity Sewer
Public Foul Gravity Sewer
Public Surface Water Gravity Sewer
Trunk Combined Gravity Sewer
Trunk Foul Use Gravity Sewer
Trunk Surface Water Gravity Sewer
Combined Use Pressurised Sewer
Foul Use Pressurised Sewer
Surface Water Pressurised Sewer
Hig way Drain
Combined Lateral ! rain #SS$
Foul Lateral ! rain #SS$
Surface Water Lateral ! rain #SS$

Cable, &arthing
Cable ' unction
Cable, Optical Fibre*Instrumentation
Cable, Low , oltage
Cable, High , oltage
Cable, (ther
Housing, - uilding
Housing, . iosk
! is) osal Site
Sewage Treatment Works
Housing, (ther
Pipe Support Structure
Sewage Pum) ing Facility
Sewer Facility Connection +nlet * (utlet

- lind S aft
Combined Use / anhole
Flushing Chamber
Foul Use / anhole
Grease Trap
Head 0ode
Hydrobrake
Lamphole
(utfall
Overflow
Penstock
Petrol +nterceptor
Sewer Blockage
Sewer Collapse

Sewer Chemical +njection Point
Sewer ' unction
Sewerage Air , alve
Sewerage Hatch - ox Point
Sewerage +solation , alve
Soakaway
Surface Water / anhole
, ent Column
Waste Water Storage
Culverted Watercourse
Pre-1937 Properties

MATERIALS

AC	3ASBEST(S C&/ &0 T
-8	3- 8+CK
CC	3C(NC8& T& - (9 CUL, &RT
CI	3CAST +8(0
CO	3C(NC8& T&
CS-	3C(0 C8ETE SEG/ &0 TS #("T&! $
CSU	3C(0 C8ETE SEG/ &0 TS #U0 -("T&! $
!+	3DUCT+"& IR(0
GRC	3GLASS 8&+0F(8 C&! C(0 C8 &T&
MAC	3MAS(0 8: +0 R&GU" A8 COU8 S&S
MA8	3/ AS(08: RA0! (/ ": C(URS&!
PE	3PO": ETH" &0 &
PF	3PITCH
PP	3PO": PR(PY" &0 &
PSC	3PLAST+C ST&&" C(/ P(SIT&
PVC	3P(" : , +0: " CH" (8 +! &
RP/	38& +NF(RC&D P"AST+C / AT8+9
SI	3SPU0 (GR&: $IR(0
99 9	3OTH&8

All Private Sewers are shown in magenta
All section 104 sewers are shown in green
All Sewers that have been transferred to Severn Trent Water after the 4st (ctober ?;4 4%but have not been surveyed and confirmed by Severn Trent Water are shown in orange

CATEGORIES

W	3W&+8
C	3CASCAD&
!-	3! A/- (A8 !
SE	3SI! E &0 T8:
FV	3F" AP , A", &
-!	3- ACK !8 (P
S	3SIPH(0
HD	3HIGHWA: D8 A+0
S4;<	3S&CT+(0 1; <

SHAPE

C	3CIRCULA8
&	3EGG SHAPE!
(	3(TH&8
8	38& CTA0 G" &
S	3S= UA8&
T	3T8 APE>(+ AL
U	3U0. 0(W0

TABULAR KEY

A. **Sewer pipe data refers to downstream sewer pipe.**
B. **Where the node bifurcates (splits) X and Y indicates downstream sewer pipe.**
C. **Gradient is stated a 1 in...**

PURPOSE

C	3C(/ - +0&!
&	3F+0A" EFF" U&0 T
F	3FOU"
"	3S" U! GE
S	3SU8 FACE WAT&8

Severn Trent Water Limited
Asset Data Management
PO Box 5344
Coventry
CV3 9FT
Telephone: 0845 601 6616

SEWER RECORD (TABULAR)

O/S Map scale: 1:1250
Date of issue: 02.08.19
Sheet No. 1 of 1

This map is centred upon:
O / S Tile reference:
SO9123SW

Disclaimer Statement:
1. Do not scale off this Map.
?@This map and any information supplied with it is furnished as a general guide, is only valid at the date of issue and no warranty as to its correctness is given or implied. +n particular this / ap and any information shown on it must not be relied upon in the event of any development or works #including but not limited to excavations) in the vicinity of Severn Trent Water$s assets or for the purposes of determining the suitability of a point of connection to the sewerage or distribution systems.
6. On **1 October 2011** most private sewers and private lateral drains in Severn Trent Water$s sewerage area, which were connected to a public sewer as at 1 July ?;4 4%transferred to the ownership of Severn Trent Water and became public sewers and public lateral drains. A further transfer takes place on 1 (ctober ?;4 2 #date to be confirmed)@
Private pumping stations, w ich form part of these sewers or lateral drains, will transfer to the ownership of Severn Trent Water on or before 1 (ctober ?;4C@
Severn Trent Water does not possess com) lete records of these assets.
These assets may not be displayed on this Map.

SO9023SW

SO9022NE

SO9122NE

SO9022SW

Sewer Node

REFERENCE	COVER LEVEL	INV LEVEL UPSTR	INV LEVEL DOWNSTR	PURP	MATL	SHAPE	MAX SIZE	MIN SIZE	GRADIENT	YEAR LAID
SO90221601	39.10	37.39	37.13	F	VC	C	150	nil	159.38	nil
SO90221602	39.13	37.13	36.83	F	VC	C	150	nil	97.50	nil

Sewer Pipe Data

Abandoned Sewer
Private Combined Gravity Sewer
Private Foul Gravity Sewer
Private Surface Water Gravity Sewer
Public Combined Gravity Sewer
Public Foul Gravity Sewer
Public Surface Water Gravity Sewer
Trunk Combined Gravity Sewer
Trunk Foul Use Gravity Sewer
Trunk Surface Water Gravity Sewer
Combined Use Pressurised Sewer
Foul Use Pressurised Sewer
Surface Water Pressurised Sewer
Hig way Drain
Combined Lateral ! rain #SS$
Foul Lateral ! rain #SS$
Surface Water Lateral ! rain #SS$

Cable, &arthing
Cable ' unction
Cable, Optical Fibre*Instrumentation
Cable, Low , oltage
Cable, High , oltage
Cable, (ther
Housing, - uilding
Housing, . iosk
! is) osal Site
Sewage Treatment Works
Housing, (ther
Pipe Support Structure
Sewage Pum) ing Facility
Sewer Facility Connection +let *(utlet

- lind S aft
Combined Use / anhole
Flushing Chamber
Foul Use / anhole
Grease Trap
Head 0 ode
Hydrobrake
Lamphole
(utfall
Overflow
Penstock
Petrol +nterceptor
Sewer Blockage
Sewer Collapse

Sewer Chemical +njection Point
Sewer ' unction
Sewerage Air , alve
Sewerage Hatch - ox Point
Sewerage +solation , alve
Soakaway
Surface Water / anhole
, ent Column
Waste Water Storage
Culverted Watercourse
Pre-1937 Properties

MATERIALS

AC	3ASBESTI S C&/ &0T
-ll	3- 8+CK
CC	3C(NC8&T& - (9 CUL, &RT
CI	3CAST +ll(l
CO	3C(NC8&T&
CS-	3C(0C8ETE SEG/ &0TS &(*1&1 $
CSU	3C(0C8ETE SEG/ &0TS &J0 -(* T&/ $
I+	3DUCT+*& R(0
GRC	3GLASS 8&+0R)8 C&/ C(0 CI&T&
MAC	3MAS(0 8 : +0R&QL* A8 COU8S&S
MA8	3/ AS(0B: RA0l (/ *: C(URS&/
PE	3PO*: ETH*&0 &
PF	3PITCH
PP	3PO*: PR(PI*: &0&
PSC	3PLAST*C ST&&* C(/ P(SIT&
PVC	3P(* : , +0. * CH*(8 +!&
RP/	38&+#F(RC&D P* AST*C / ATR+9
SI	3SPU0 (GRA: $IR(0
999	3OTH&8

CATEGORIES

W	3W&8
C	3CASCAD&
I-	3! A/- (A8 !
SE	3SI! E &0T8:
FV	3F*AP , A", &
-!	3- ADK !8 (P
S	3SIPH(0
HD	3HIGHWA D8 A+0
S4:<	3S&CT+0 !; <

SHAPE

C	3CIRCULA8
&	3EGG SHAPE!
(	3(TH&8
8	38&CTAG G* &
S	3S+ UA8&
T	3TRAPE!+(+ AL
U	3U0. 0(W0

PURPOSE

C	3C(/ - +8/
&	3F+0A* EP*"U&0T
F	3FOU*
*	3S*U! GE
S	3SUBFACE WAT&8

TABULAR KEY

A. **Sewer pipe data refers to downstream sewer pipe.**

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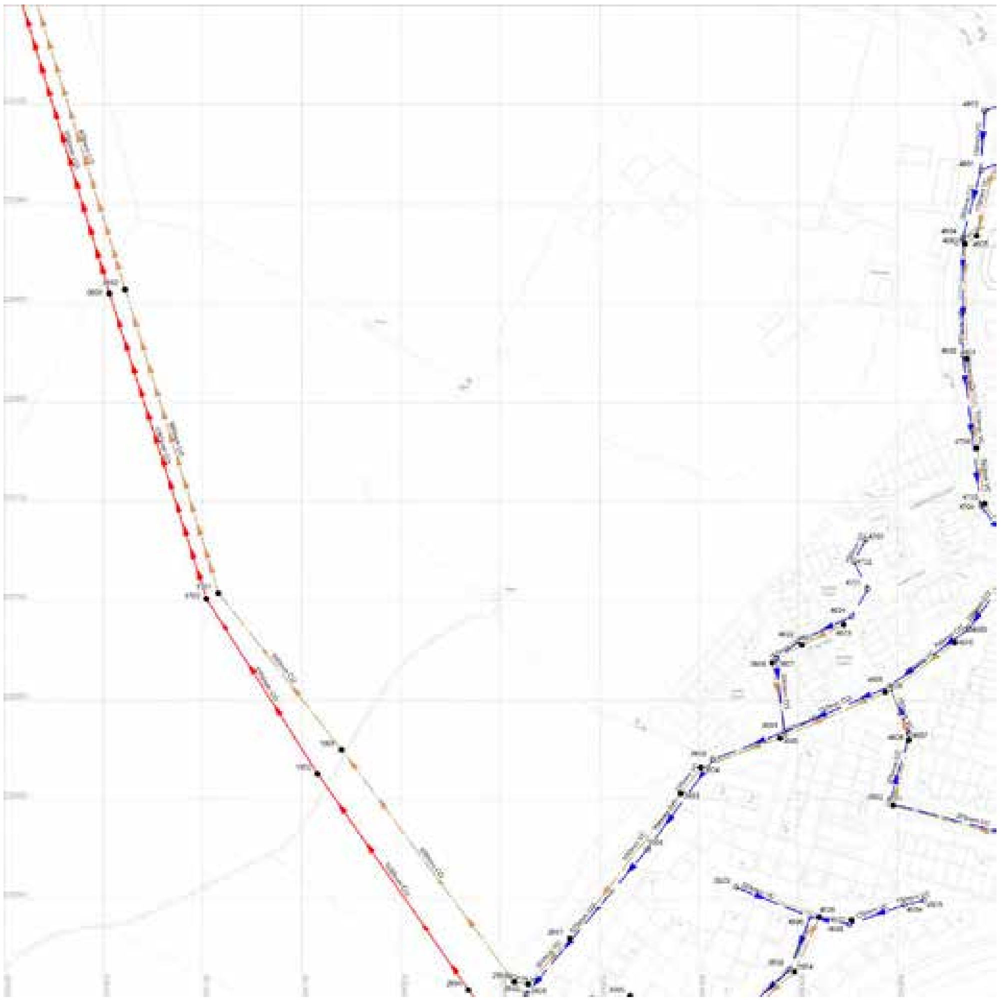
SEWER RECORD (TABULAR)

O/S Map scale: 1:1250
Date of issue: 02.08.19
Sheet No. 1 of 1

This map is centred upon:
O / S Tile reference:
SO9022NW

SO9123SW



SO9122NE

SO9222NE

SO9122SW

Sewer Node / Sewer Pipe Data

REFERENCE	COVER LEVEL	INV LEVEL UPSTR	INV LEVEL DOWNSTR	PURP	MATL	SHAPE	MAX SIZE	MIN SIZE	GRADIENT	YEAR LAID
SO91220801	41.45	37.22	37.17	C	CO	C	1050	nil	3195.40	nill
SO91220802	41.60	38.86	38.60	F	CO	C	600	nil	624.08	nill
SO91221601	40.64	39.41	39.21	F	CO	C	600	nil	502.10	nill
SO91221602	40.24	37.59	37.57	C	CO	C	1050	nil	5215.50	nill
SO91221701	41.74	39.21	38.87	F	CO	C	600	nil	470.76	nill
SO91221702	41.22	37.55	37.26	C	CO	C	1050	nil	557.28	nill
SO91222501	44.37	41.91	41.13	F	VC	C	300	nil	39.92	nill
SO91222502	42.15	40.68	38.16	S	CO	C	675	nil	24.45	nill
SO91222503	42.29	39.69	39.41	F	CO	C	600	nil	520.71	nill
SO91222504	41.83	37.61	37.60	C	CO	C	1050	nil	13288.00	nill
SO91222505	42.33	41.08	40.78	F	VC	C	300	nil	23.57	nill
SO91223501	45.21	42.75	40.70	S	CO	C	675	nil	46.40	nill
SO91223502	47.75	43.55	43.30	S	VC	C	225	nil	100.72	2005
SO91223503	46.48	44.00	43.71	S	VC	C	225	nil	141.21	2005
SO91223504	47.78	45.68	45.47	F	VC	C	150	nil	126.10	2005
SO91223505	43.47	41.98	41.13	F	VC	C	150	nil	17.94	2005
SO91223601	46.67	43.75	43.56	S	CO	C	750	nil	203.32	nill
SO91223602	46.14	43.54	42.78	S	CO	C	750	nil	73.42	nill
SO91223603	45.89	42.92	41.91	F	VC	C	300	nil	91.10	nill
SO91223604	46.00	43.13	42.93	F	VC	C	225	nil	82.00	nill
SO91223605	46.67	43.38	43.13	F	VC	C	225	nil	170.88	nill
SO91223606	46.11	44.05	nil	F	VC	C	150	nil	0.00	nill
SO91223607	46.11	44.45	43.90	S	CO	C	300	nil	67.67	nill
SO91224501	48.08	45.52	44.76	F	VC	C	150	nil	44.68	nill
SO91224502	48.06	45.86	45.04	S	CO	C	375	nil	44.39	nill
SO91224503	49.09	47.34	47.18	S	VC	C	150	nil	70.00	2005
SO91224504	49.05	47.18	46.59	S	VC	C	150	nil	48.19	2005
SO91224505	48.45	46.59	43.71	S	VC	C	150	nil	7.38	2005
SO91224506	47.92	43.71	43.55	S	VC	C	225	nil	172.31	2005
SO91224507	48.43	46.51	46.27	F	VC	C	150	nil	75.96	2005
SO91224508	48.05	46.27	45.68	F	VC	C	150	nil	49.76	2005
SO91224601	45.97	44.17	44.07	F	VC	C	150	nil	174.90	nill
SO91224602	46.01	44.58	44.48	S	CO	C	300	nil	150.00	nill
SO91224603	46.08	44.30	44.18	F	VC	C	150	nil	193.83	nill
SO91224604	46.16	44.74	44.60	S	CO	C	300	nil	204.57	nill
SO91224605	47.38	43.57	nil	F	VC	C	225	nil	0.00	nill
SO91224606	47.39	43.89	43.80	S	CO	C	750	nil	642.00	nill
SO91224607	47.66	44.75	nil	F	VC	C	150	nil	0.00	nill
SO91224608	47.65	45.01	44.03	S	CO	C	375	nil	26.53	nill
SO91224609	47.13	44.18	43.91	S	CO	C	750	nil	183.00	nill
SO91224610	47.16	43.70	nil	F	VC	C	225	nil	0.00	nill
SO91224701	46.21	44.79	44.74	S	VC	C	225	nil	322.40	nill
SO91224702	46.31	44.87	44.84	S	VC	C	150	nil	521.67	nill
SO91224703	46.40	44.94	44.87	S	VC	C	150	nil	179.00	nill
SO91224704	46.78	45.04	44.62	S	CO	C	450	nil	78.10	nill
SO91224705	46.79	44.86	44.12	F	VC	C	150	nil	40.31	nill
SO91224706	46.61	45.25	44.87	F	VC	C	150	nil	74.42	nill
SO91224801	47.27	46.02	45.27	F	VC	C	150	nil	60.37	nill
SO91224802	47.21	45.29	45.04	S	CO	C	450	nil	306.12	nill
SO91224803	48.19	46.96	46.06	F	VC	C	150	nil	64.46	nill
SO91224804	48.17	45.66	45.32	S	CO	C	375	nil	173.53	nill
SO91224805	48.36	47.11	47.01	F	VC	C	150	nil	72.10	nill
SO91224901	48.94	46.22	45.66	S	CO	C	300	nil	62.80	nill
SO91224902	50.09	48.16	46.27	S	VC	C	150	nil	15.91	nill

Abandoned Sewer
Private Combined Gravity Sewer
Private Foul Gravity Sewer
Private Surface Water Gravity Sewer
Public Combined Gravity Sewer
Public Foul Gravity Sewer
Public Surface Water Gravity Sewer
Trunk Combined Gravity Sewer
Trunk Foul Use Gravity Sewer
Trunk Surface Water Gravity Sewer
Combined Use Pressurised Sewer
Foul Use Pressurised Sewer
Surface Water Pressurised Sewer
Hig way Drain
Combined Lateral ! rain #S$S
Foul Lateral ! rain #S$S
Surface Water Lateral ! rain #S$S

Cable, &arthing
Cable ' unction
Cable, Optical Fibre'Instrumentation
Cable, Low , oltage
Cable, High , oltage
Cable, (ther
Housing, - uilding
Housing, . iosk
! is) osal Site
Sewage Treatment Works
Housing, (ther
Pipe Support Structure
Sewage Pum) ing Facility
Sewer Facility Connection +nlet * (utlet

- lind S aft
Combined Use / anhole
Flushing Chamber
Foul Use / anhole
Grease Trap
Head 0 ode
Hydrobrake
Lamphole
(utfall
Overflow
Penstock
Petrol +nterceptor
Sewer Blockage
Sewer Collapse

Sewer Chemical +njection Point
Sewer ' unction
Sewerage Air , alve
Sewerage Hatch - ox Point
Sewerage +solation , alve
Soakaway
Surface Water / anhole
, ent Column
Waste Water Storage
Culverted Watercourse
Pre-1937 Properties

MATERIALS

AC 3ASBEST(S C&/ &0 T
-8 3- 8+CK
CC 3C(NC8&T& - (9 CUL, &RT
CI 3CAST +8(0
CO 3C(NC8&T&
CS- 3C(0C8ETE SEG/ &0TS #("T&! $
CSU 3C(0C8ETE SEG/ &0TS #U0 -("T&! $
!+ 3DUCT+"& IR(0
GRC 3GLASS 8&+0F(8 C&! C(0 C8&T&
MAC 3MAS(0 8: +0R&GU" A8 COU8S&S
MA8 3/ AS(08: RA0! (/ ": C(URS&!
PE 3PO": ETH" &0 &
PF 3PITCH
PP 3PO": PR(PY" &0 &
PSC 3PLAST+C ST&&" C(/ P(SIT&
PVC 3P(" : , +0: " CH" (8 +!&
RP/ 38& +NF(RC&D P" AST+C / AT8+9
SI 3SPU0 (GR&: $IR(0
99 9 3OTH&8

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CATEGORIES

W 3W&+8
C 3CASCAD&
!- 3! A/- (A8!
SE 3SI! E &0T8:
FV 3F" AP , A", &
-! 3- ACK !8 (P
S 3SIPH(0
HD 3HIGHWA: D8 A+0
S4;< 3S&CT+(0 1; <

SHAPE

C 3CIRCULA8
& 3EGG SHAPE!
(3(TH&8
8 38& CTA0 G" &
S 3S= UA8&
T 3T8 APE>(+! AL
U 3U0. 0(W0

TABULAR KEY

A. Sewer pipe data refers to downstream sewer pipe.
B. Where the node bifurcates (splits) X and Y indicates downstream sewer pipe.
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PURPOSE

C 3C(/ - +0&!
& 3F+0A" EFF" U&0 T
F 3FOU"
" 3S" U! GE
S 3SU8 FACE WAT&8

N
W E
S

Severn Trent Water Limited
Asset Data Management
PO Box 5344
Coventry
CV3 9FT
Telephone: 0845 601 6616

SEWER RECORD (TABULAR)

O/S Map scale: 1:1250
Date of issue: 02.08.19
Sheet No. 1 of 1

This map is centred upon:
O / S Tile reference:
SO9122NW

SO9022NW

SO8922SE

SO9022SE

SO9021NW

Sewer Node **Sewer Pipe Data**

REFERENCE	COVER LEVEL	INV LEVEL UPSTR	INV LEVEL DOWNSTR	PURP	MATL	SHAPE	MAX SIZE	MIN SIZE	GRADIENT	YEAR LAID
SO90220401	28.79	26.65	26.12	F	CO	C	300	nil	200.19	nill
SO90221401	28.98	27.12	26.65	F	CO	C	300	nil	115.25	nill
SO90221402	nil	nil	27.14	F	CO	C	300	nil	0.00	nill
SO90222301	nil	nil	nil	F	CO	C	300	nil	0.00	nill
SO90222401	29.92	27.82	nil	F	CO	C	300	nil	0.00	nill
SO90222402	29.98	28.28	nil	F	VC	C	150	nil	0.00	nill
SO90223201	32.11	29.54	nil	F	CO	C	300	nil	0.00	nill
SO90223202	32.57	29.82	29.54	F	CO	C	300	nil	124.39	nill
SO90223301	30.60	nil	nil	F	CO	C	300	nil	0.00	nill
SO90223302	nil	nil	28.87	F	CO	C	300	nil	0.00	nill
SO90224101	32.34	30.72	nil	F	CO	C	300	nil	0.00	nill
SO90224201	nil	nil	29.82	F	CO	C	300	nil	0.00	nill

Abandoned Sewer
Private Combined Gravity Sewer
Private Foul Gravity Sewer
Private Surface Water Gravity Sewer
Public Combined Gravity Sewer
Public Foul Gravity Sewer
Public Surface Water Gravity Sewer
Trunk Combined Gravity Sewer
Trunk Foul Use Gravity Sewer
Trunk Surface Water Gravity Sewer
Combined Use Pressurised Sewer
Foul Use Pressurised Sewer
Surface Water Pressurised Sewer
Hig way Drain
Combined Lateral ! rain #SS$
Foul Lateral ! rain #SS$
Surface Water Lateral ! rain #SS$

Cable, &arthing
Cable ' unction
Cable, Optical Fibre'Instrumentation
Cable, Low , oltage
Cable, High , oltage
Cable, (ther
Housing, - uilding
Housing, . iosk
! is) osal Site
Sewage Treatment Works
Housing, (ther
Pipe Support Structure
Sewage Pum) ing Facility
Sewer Facility Connection +nlet * (utlet

- lind S aft
Combined Use / anhole
Flushing Chamber
Foul Use / anhole
Grease Trap
Head 0 ode
Hydrobrake
Lamphole
(utfall
Overflow
Penstock
Petrol +nterceptor
Sewer Blockage
Sewer Collapse

Sewer Chemical +njection Point
Sewer ' unction
Sewerage Air , alve
Sewerage Hatch - ox Point
Sewerage +solation , alve
Soakaway
Surface Water / anhole
, ent Column
Waste Water Storage
Culverted Watercourse
Pre-1937 Properties

MATERIALS

AC	3ASBEST(S C&/ &0 T
-8	3- 8+CK
CC	3C(NC8&T& - (9 CUL, &RT
CI	3CAST +8(0
CO	3C(NC8&T&
CS-	3C(0C8ETE SEG/ &0TS #("T&! $
CSU	3C(0C8ETE SEG/ &0TS #U0 -("T&! $
!+	3DUCT+"& IR(0
GRC	3GLASS 8&+0F(8 C&! C(0 C8&T&
MAC	3MAS(0 8: +0 R&GU" A8 COU8S&S
MA8	3/ AS(08: RA0! (/ ": C(URS&!
PE	3PO": ETH" &0 &
PF	3PITCH
PP	3PO": PR(PY" &0 &
PSC	3PLAST+C ST&&" C(/ P(SIT&
PVC	3P(" : , +0: " CH" (8 +! &
RP/	38& +NF(RC&D P" AST+C / AT8+9
SI	3SPU0 (GR&: $IR(0
99 9	3OTH&8

All Private Sewers are shown in magenta
All section 104 sewers are shown in green
All Sewers that have been transferred to Severn Trent Water after the 4st (ctober ?;4 4%but have not been surveyed and confirmed by Severn Trent Water are shown in orange

CATEGORIES

W	3W&+8
C	3CASCAD&
!-	3! A/- (A8!
SE	3SI! E &0T8 :
FV	3F" AP , A", &
-!	3- ACK !8 (P
S	3SIPH(0
HD	3HIGHWA: D8 A+0
S4;<	3S&CT+(0 1; <

SHAPE

C	3CIRCULA8
&	3EGG SHAPE!
(	3(TH&8
8	38& CTA0 G" &
S	3S= UA8&
T	3T8 APE>(+! AL
U	3U0. 0(W0

TABULAR KEY

A. **Sewer pipe data refers to downstream sewer pipe.**

B. **Where the node bifurcates (splits) X and Y indicates downstream sewer pipe.**

C. **Gradient is stated a 1 in...**

PURPOSE

C	3C(/ - +0&!
&	3F+0A" EFF" U&0 T
F	3FOU"
"	3S" U! GE
S	3SU8 FACE WAT&8

N
W E
S

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SEWER RECORD (TABULAR)

O/S Map scale: 1:1250

Date of issue: 02.08.19

Sheet No. 1 of 1

This map is centred upon:
O / S Tile reference:

SO9022SW

Disclaimer Statement:

1. Do not scale off this Map.

?@This map and any information supplied with it is furnished as a general guide, is only valid at the date of issue and no warranty as to its correctness is given or implied. +n particular this / ap and any information shown on it must not be relied upon in the event of any development or works #including but not limited to excavations) in the vicinity of Severn Trent WaterÆs assets or for the purposes of determining the suitability of a point of connection to the sewerage or distribution systems.

6. On **1 October 2011** most private sewers and private lateral drains in Severn Trent WaterÆs sewerage area, which were connected to a public sewer as at 1 July ?;4 4%transferred to the ownership of Severn Trent Water and became public sewers and public lateral drains. A further transfer takes place on 1 (ctober ?;4 2 #date to be confirmed)@

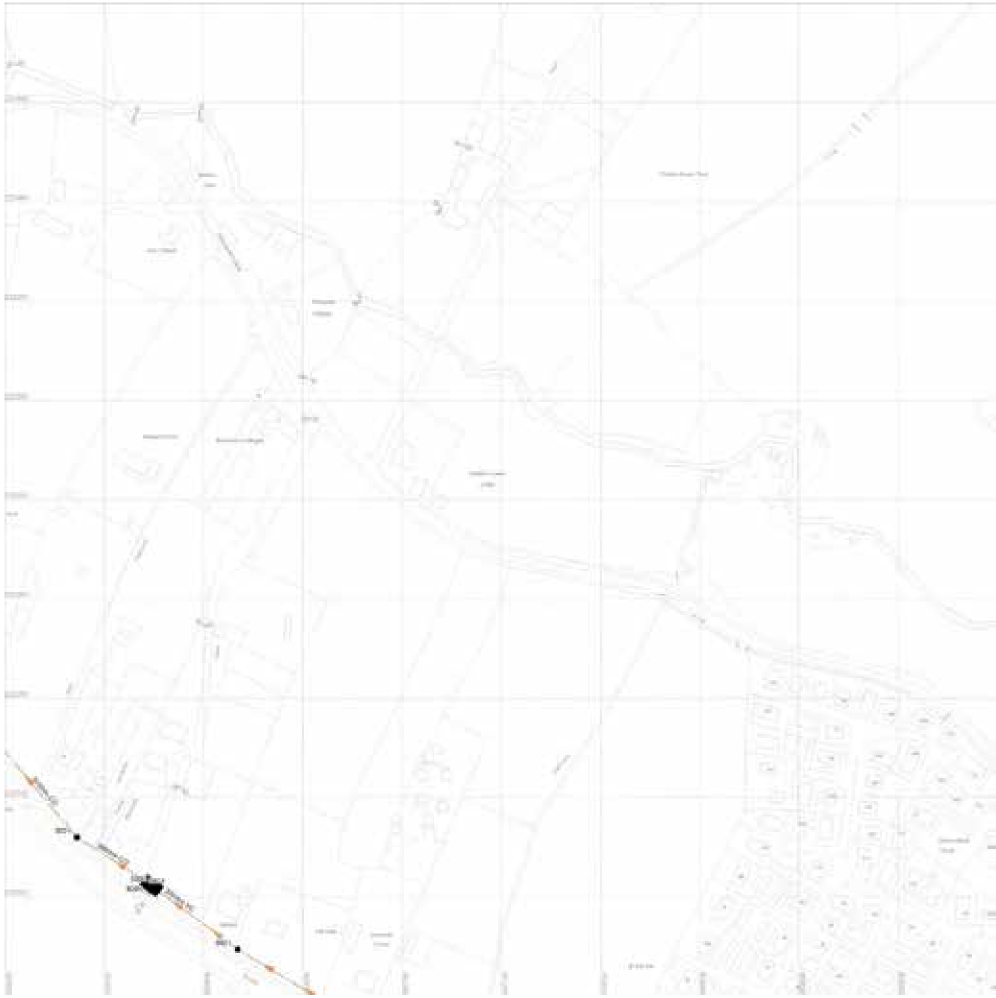
Private pumping stations, w ich form part of these sewers or lateral drains, will transfer to the ownership of Severn Trent Water on or before 1 (ctober ?;4C@

Severn Trent Water does not possess com) lete records of these assets.

These assets may not be displayed on this Map.

SO9022NE

SO9022SW



SO9122SW

SO9021NE

Sewer Node **Sewer Pipe Data**

REFERENCE	COVER LEVEL	INV LEVEL UPSTR	INV LEVEL DOWNSTR	PURP	MATL	SHAPE	MAX SIZE	MIN SIZE	GRADIENT	YEAR LAID
SO90225001	32.83	31.38	30.72	F	CO	C	300	nil	117.54	nill
SO90225002	33.34	nil	31.39	F	CO	C	300	nil	0.00	nill
SO90225003	nil	nil	nil	F	VC	C	300	nil	0.00	nill
SO90225004	nil	nil	nil	F	VC	C	300	nil	0.00	nill
SO90226001	33.58	32.03	nil	F	VC	C	300	nil	0.00	nill

Abandoned Sewer
Private Combined Gravity Sewer
Private Foul Gravity Sewer
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Public Combined Gravity Sewer
Public Foul Gravity Sewer
Public Surface Water Gravity Sewer
Trunk Combined Gravity Sewer
Trunk Foul Use Gravity Sewer
Trunk Surface Water Gravity Sewer
Combined Use Pressurised Sewer
Foul Use Pressurised Sewer
Surface Water Pressurised Sewer
Hig way Drain
Combined Lateral ! rain #SS$
Foul Lateral ! rain #SS$
Surface Water Lateral ! rain #SS$

Cable, &arthing
Cable ' unction
Cable, Optical Fibre"Instrumentation
Cable, Low , oltage
Cable, High , oltage
Cable, (ther
Housing, - uilding
Housing, . iosk
! is) osal Site
Sewage Treatment Works
Housing, (ther
Pipe Support Structure
Sewage Pum) ing Facility
Sewer Facility Connection +nlet * (utlet

- lind S aft
Combined Use / anhole
Flushing Chamber
Foul Use / anhole
Grease Trap
Head 0 ode
Hydrobrake
Lamphole
(utfall
Overflow
Penstock
Petrol +nterceptor
Sewer Blockage
Sewer Collapse

Sewer Chemical +njection Point
Sewer ' unction
Sewerage Air , alve
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Sewerage +solation , alve
Soakaway
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, ent Column
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Culverted Watercourse
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CI	3CAST +8(0
CO	3C(NC8& T&
CS-	3C(0 C8ETE SEG/ &0 TS #("T&! $
CSU	3C(0 C8ETE SEG/ &0 TS #U0 -("T&! $
!+	3DUCT+"& IR(0
GRC	3GLASS 8 &+0F(8 C&! C(0 C8 &T&
MAC	3MAS(0 8 : +0 R&GU" A8 COU8 S&S
MA8	3/ AS(08: RA0! (/ ": C(URS&!
PE	3PO": ETH" &0 &
PF	3PITCH
PP	3PO": PR(PY" &0 &
PSC	3PLAST+C ST&&" C(/ P(SIT&
PVC	3P(" : , +0: " CH" (8 +! &
RP/	38& +NF(RC&D P" AST+C / AT8+9
SI	3SPU0 (GR&: $IR(0
99 9	3OTH&8

CATEGORIES

W	3W&+8
C	3CASCAD&
!-	3! A/- (A8 !
SE	3SI! E &0 T8 :
FV	3F" AP , A", &
-!	3- ACK !8 (P
S	3SIPH(0
HD	3HIGHWA: D8 A+0
S4;<	3S&CT+(0 1; <

SHAPE

C	3CIRCULA8
&	3EGG SHAPE!
(	3(TH&8
8	38& CTA0 G" &
S	3S= UA8&
T	3T8 APE>(+ AL
U	3U0. 0(W0

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PURPOSE

C	3C(/ - +0&!
&	3F+0A" EFF" U&0 T
F	3FOU"
"	3S" U! GE
S	3SU8 FACE WAT&8

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N
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E
S

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SEWER RECORD (TABULAR)

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Sheet No. 1 of 1

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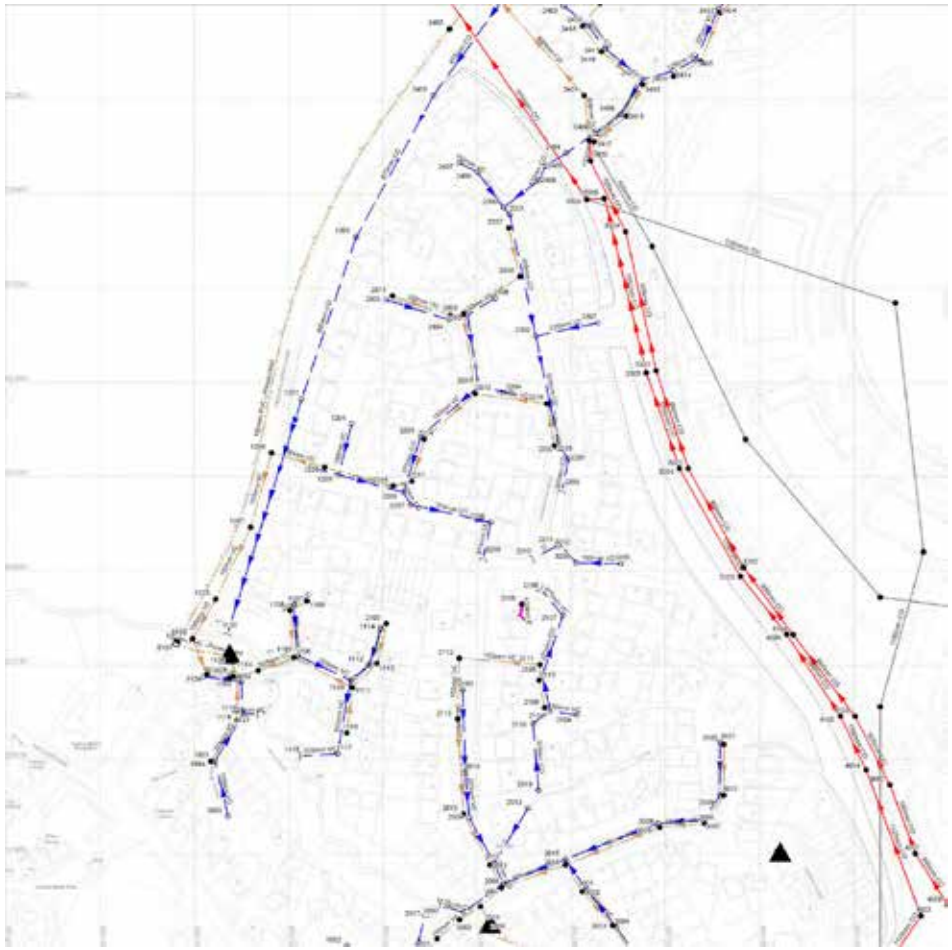

Sewer Node		Sewer Pipe Data									
REFERENCE	COVER LEVEL	INV LEVEL UPSTR	INV LEVEL DOWNSTR	PURP	MATL	SHAPE	MAX SIZE	MIN SIZE	GRADIENT	YEAR LAID
0.00E220102	53.72	52.84	52.56	F	VC	C	150	nil	42.67	2005
0.00E221014	55.09	54.00	53.80	S	VC	C	150	nil	29.63	nil
0.00E221002	56.98	55.31	54.71	S	VC	C	225	nil	53.05	nil
0.00E221003	54.40	52.66	52.20	S	VC	C	225	nil	37.37	nil
0.00E221004	54.47	53.17	52.60	F	VC	C	150	nil	43.75	nil
0.00E221101	53.67	52.74	52.53	S	VC	C	150	nil	66.29	nil
0.00E221102	53.66	52.48	52.27	S	VC	C	150	nil	61.10	nil
0.00E221103	53.65	52.16	51.66	F	VC	C	225	nil	59.00	nil
0.00E221104	54.08	52.59	52.20	F	VC	C	225	nil	29.23	nil
0.00E221105	54.57	52.93	52.63	S	VC	C	225	nil	102.90	nil
0.00E221106	54.51	52.83	52.59	F	VC	C	225	nil	94.38	nil
0.00E221107	55.93	53.66	53.47	S	VC	C	150	nil	59.81	nil
0.00E221108	56.74	54.37	53.98	F	VC	C	225	nil	17.42	nil
0.00E221109	56.30	54.44	54.39	F	VC	C	225	nil	206.00	nil
0.00E221110	54.61	52.53	52.34	S	VC	C	300	nil	208.53	nil
0.00E221111	54.65	53.06	52.86	F	VC	C	225	nil	174.45	nil
0.00E221112	55.07	53.49	53.12	S	VC	C	150	nil	16.64	nil
0.00E221113	55.24	53.78	53.25	F	VC	C	150	nil	53.42	nil
0.00E221114	55.57	54.16	53.93	S	VC	C	150	nil	55.57	nil
0.00E221116	54.46	53.33	53.20	F	VC	C	150	nil	166.66	nil
0.00E221117	54.20	52.54	53.72	S	VC	C	300	nil	11.13	nil
0.00E221118	53.94	52.56	52.36	F	VC	C	150	nil	134.55	nil
0.00E221119	53.87	52.15	51.45	S	VC	C	225	nil	9.57	nil
0.00E221123	54.41	53.14	53.04	F	VC	C	150	nil	50.70	2005
0.00E221124	55.70	53.36	53.28	F	VC	C	150	nil	101.67	2005
0.00E221125	55.86	53.24	53.16	F	VC	C	150	nil	42.67	2005
0.00E221126	55.97	53.18	53.01	F	VC	C	150	nil	59.94	2005
0.00E221201	56.97	nil	4.1	S	nil	nil	nil	nil	0.00	nil
0.00E221202	57.56	56.61	56.42	S	VC	C	150	nil	62.79	2005
0.00E221203	57.56	56.42	55.18	S	VC	C	225	nil	70.00	2005
0.00E221204	56.80	57.15	56.42	S	VC	C	150	nil	56.16	2005
0.00E221205	56.04	55.29	54.55	F	VC	C	150	nil	56.76	2005
0.00E221206	57.37	54.53	54.17	F	VC	C	150	nil	113.50	2005
0.00E221207	56.02	54.17	53.14	F	VC	C	150	nil	41.03	2005
0.00E221301	56.06	57.61	56.37	S	CO	C	600	nil	73.19	nil
0.00E222001	55.63	53.46	53.29	F	VC	C	150	nil	60.21	nil
0.00E222003	56.44	53.26	53.14	F	VC	C	150	nil	106.67	nil
0.00E222004	55.31	51.19	51.20	S	CO	C	1.05	nil	0.00	nil
0.00E222005	55.32	52.53	52.42	F	VC	C	150	nil	73.27	nil
0.00E222006	55.23	52.42	52.34	F	CI	C	150	nil	26.00	nil
0.00E222007	55.50	51.20	51.19	S	CO	C	1.05	nil	2588.00	nil
0.00E222008	56.46	52.72	52.56	F	VC	C	150	nil	92.64	nil
0.00E222009	56.71	52.71	52.60	S	VC	C	225	nil	129.95	nil
0.00E222010	56.00	53.41	53.06	F	VC	C	150	nil	64.47	nil
0.00E222011	55.24	52.98	52.74	F	VC	C	150	nil	55.92	nil
0.00E222012	55.28	51.21	51.20	S	CO	C	1.05	nil	1208.00	nil
0.00E222013	55.38	53.38	51.21	S	VC	C	1.05	nil	15.73	nil
0.00E222014	56.62	54.15	53.16	S	VC	C	225	nil	17.08	nil
0.00E222015	56.24	55.75	55.32	S	CO	C	375	nil	99.02	nil
0.00E222016	56.24	53.40	53.16	F	VC	C	150	nil	64.64	nil
0.00E222019	nil	55.00	54.36	S	CO	C	375	nil	58.77	2005
0.00E222100	nil	nil	nil	F	P	C	100	nil	0.00	nil
0.00E222102	56.66	55.24	54.20	S	VC	C	225	nil	42.40	nil
0.00E222103	56.77	54.27	53.79	F	VC	C	150	nil	64.98	nil
0.00E222104	57.97	56.28	55.14	S	CO	C	375	nil	136.50	2005
0.00E222105	56.09	55.33	55.28	S	CO	C	375	nil	668.20	2005
0.00E222106	57.42	55.14	55.00	S	CO	C	375	nil	62.79	2005
0.00E222107	57.95	56.71	56.35	S	VC	C	375	nil	42.29	2005
0.00E222109	57.76	56.61	55.56	F	VC	C	150	nil	297.00	2005
0.00E222110	56.02	55.56	55.46	F	VC	C	150	nil	107.87	2005
0.00E222111	56.14	55.48	54.90	F	VC	C	150	nil	65.31	2005
0.00E222112	57.28	54.80	54.18	F	VC	C	150	nil	111.90	2005
0.00E222113	56.92	54.87	53.45	F	VC	C	150	nil	34.75	nil
0.00E222200	56.37	56.03	55.88	S	CO	C	300	nil	123.43	2005
0.00E222201	56.36	56.66	56.10	S	CO	C	300	nil	20.11	2005
0.00E222203	56.89	56.65	56.09	S	VC	C	150	nil	49.35	2005
0.00E222204	56.68	57.20	56.88	S	VC	C	150	nil	51.23	2005
0.00E222205	57.65	56.03	55.94	S	CO	C	375	nil	266.58	2005
0.00E222206	57.41	56.01	55.87	S	CO	C	375	nil	201.50	2005
0.00E222207	57.30	56.87	55.82	S	CO	C	375	nil	870.80	2005
0.00E222208	57.96	55.82	55.75	S	CO	C	375	nil	343.43	2005
0.00E222213	58.45	56.18	55.66	F	VC	C	150	nil	113.72	2005
0.00E222214	57.60	55.66	55.70	F	VC	C	150	nil	149.13	2005
0.00E222215	56.29	56.71	56.47	F	VC	C	150	nil	94.96	2005
0.00E222216	59.48	56.47	56.18	F	VC	C	150	nil	153.21	2005
0.00E222217	57.40	56.70	56.59	F	VC	C	150	nil	61.55	2005
0.00E222218	57.50	56.59	56.29	F	VC	C	150	nil	125.47	2005
0.00E222300	60.61	56.38	56.36	S	CO	C	300	nil	242.00	2005
0.00E222301	60.04	56.36	57.67	S	CO	C	300	nil	69.16	2005
0.00E222302	59.66	57.67	56.63	S	CO	C	300	nil	92.67	2005
0.00E222303	59.62	57.91	57.53	S	VC	C	150	nil	92.16	2005
0.00E222304	59.13	57.53	57.43	S	VC	C	150	nil	122.13	2005
0.00E222305	58.25	57.45	56.85	S	VC	C	150	nil	94.05	2005
0.00E222306	59.65	57.89	57.45	S	VC	C	150	nil	58.59	2005
0.00E222307	60.39	58.45	58.08	F	VC	C	150	nil	70.43	2005
0.00E222308	60.16	58.08	57.98	F	VC	C	150	nil	56.89	2005
0.00E222309	59.27	57.98	56.18	F	VC	C	150	nil	47.71	2005
0.00E222310	59.20	57.36	57.06	F	VC	C	150	nil	24.50	2005
0.00E222311	59.58	57.73	57.36	F	VC	C	150	nil	66.54	2005
0.00E224001	40.95	38.16	37.68	S	CO	C	675	nil	155.42	nil
0.00E224002	41.72	40.47	nil	F	VC	C	150	nil	0.00	nil

Sewer Node		Sewer Pipe Data									
REFERENCE	COVER LEVEL	INV LEVEL UPSTR	INV LEVEL DOWNSTR	PURP	MATL	SHAPE	MAX SIZE	MIN SIZE	GRADIENT	YEAR LAID
0.00E222403	42.66	41.62	41.48	S	VC	C	150	nil	51.44	2005
0.00E222404	42.61	39.54	39.28	S	CO	C	300	nil	44.39	2005
0.00E222405	40.66	39.28	38.85	S	CO	C	300	nil	19.56	2005
0.00E222406	40.69	38.85	38.30	S	CO	C	300	nil	42.56	2005
0.00E222407	40.23	38.79	38.66	S	VC	C	150	nil	58.64	2005
0.00E222408	40.53	38.66	38.38	S	VC	C	150	nil	77.73	2005
0.00E223001	56.29	53.90	53.75	S	CO	C	375	nil	129.47	nil
0.00E223002	56.32	53.56	53.48	F	VC	C	150	nil	166.40	nil
0.00E223003	56.68	53.78	53.69	F	VC	C	150	nil	135.74	nil
0.00E223004	56.61	54.27	53.92	S	CO	C	375	nil	73.17	nil
0.00E223005	57.85	54.03	53.68	S	CO	C	225	nil	50.05	nil
0.00E223006	57.84	54.68	53.46	F	VC	C	150	nil	64.14	nil
0.00E223007	56.29	55.54	54.97	S	VC	C	225	nil	42.25	nil
0.00E223008	56.32	55.25	54.72	F	VC	C	150	nil	45.43	nil
0.00E223009	56.39	55.65	55.57	S	VC	C	225	nil	56.46	nil
0.00E223010	56.56	55.66	55.51	F	VC	C	150	nil	51.51	nil
0.00E223011	56.61	57.36	55.66	S	VC	C	225	nil	18.67	nil
0.00E223012	58.49	57.30	55.68	F	VC	C	150	nil	18.67	nil
0.00E223103	43.19	57.54	57.52	C	CO	C	1.05	nil	5498.17	2004
0.00E223104	57.61	55.71	55.14	S	VC	C	150	nil	25.32	2005
0.00E223202	43.06	40.30	40.19	S	CO	C	600	nil	600.70	2004
0.00E223203	42.50	40.19	40.12	S	CO	C	600	nil	760.43	2004
0.00E223204	42.60	37.69	37.69	C	CO	C	1.05	nil	1448.00	2004
0.00E223205	58.65	57.19	56.62	S	VC	C	150	nil	64.41	2005
0.00E223206	57.94	56.62	56.75	S	VC	C	150	nil	139.00	2005
0.00E223301	42.75	37.72	nil	C	CO	C	1.05	nil	0.00	nil
0.00E223303	42.12	40.12	39.99	C	CO	C	600	nil	540.84	2004
0.00E223304	42.66	39.99	39.69	C	CO	C	600	nil	419.50	2004
0.00E223305	42.25	37.75	37.75	C	CO	C	1.05	nil	671.34	2004
0.00E223306	42.66	37.75	37.63	C	CO	C	1.05	nil	0.00	2004
0.00E223307	41.52	40.19	37.67	S	CO	C	225	nil	12.86	2005
0.00E223401	42.07	39.62	39.69	F	CO	C	600	nil	577.46	nil
0.00E223403	42.67	39.68	39.64	F	CO	C	600	nil	173.86	nil
0.00E223404	41.44	43.30	43.15	S	VC	C	225	nil	181.20	2005
0.00E223405	46.35	43.15	43.07	S	VC	C	225	nil	152.13	2005
0.00E223406	45.51	43.30	41.29	S	VC	C	225	nil	10.66	2005
0.00E223407	44.41	41.29	41.22	S	CO	C	300	nil	372.43	2005
0.00E223408	45.53	41.22	41.02	S	CO	C	300	nil	119.60	2005
0.00E223409	43.82	41.02	39.66	S	CO	C	300	nil	13.67	2005
0.00E223410	43.20	41.45	41.43	C	CO	C	300	nil	296.00	2005
0.00E223411	43.61	41.43	41.29	S	CO	C	300	nil	186.57	2005
0.00E223412	47.46	45.47	45.12	F	VC	C	150	nil	74.31	2005
0.00E223413	46.47	45.12	44.28	F	VC	C	150	nil	117.77	2005
0.00E223414	45.66	44.28	43.74	F	VC	C	150	nil	51.42	2005
0.00E223415	44.44	43.74	43.57	F	VC	C	150	nil	126.76	2005
0.00E223416	43.67	43.57	43.41	F	VC	C	150	nil	122.56	2005
0.00E223417	43.69	43.41	43.20	F	VC	C	150	nil	47.76	2005
0.00E223418	43.06	43.13	43.06	F	VC	C	150	nil	100.04	2005
0.00E223419	43.42	43.06	43.74	F	VC	C	150	nil	132.50	2005
0.00E223420	43.51	39.69	39.66	C	CO	C	600	nil	529.50	2004
0.00E224001	42.91	40.64	40.45	C	CO	C	600	nil	464.88	2004
0.00E224002	42.80	40.45	40.46	C	CO	C	600	nil	0.00	2004
0.00E224003	42.00	37.96	37.96	C	CO	C	1.35	nil	4131.00	2004
0.00E224004	42.66	37.96	38.05	C	CO	C	1.35	nil	0.00	2004
0.00E224005	43.10	40.56	40.54	C	CO	C	600	nil	1016.00	2004
0.00E224105	43.15	40.46	40.34	C	CO	C	600	nil	452.93	2004
0.00E224104	43.53	40.34	40.30	C	CO	C	600	nil	1037.37	2004
0.00E224105	43.03	38.05	37.68	C	CO	C	1.35	nil	710.27	2004
0.00E224106	43.47	37.96	37.94	C	CO	C	1.35	nil	852.95	2004

Abandoned Sewer
Private Combined Gravity Sewer
Private Foul Gravity Sewer
Private Surface Water Gravity Sewer
Public Combined Gravity Sewer
Public Foul Gravity Sewer
Public Surface Water Gravity Sewer
Trunk Combined Gravity Sewer
Trunk Foul Use Gravity Sewer
Trunk Surface Water Gravity Sewer
Combined Use Pressurised Sewer
Foul Use Pressurised Sewer
Surface Water Pressurised Sewer
Hig way Drain
Combined Lateral ! rain ßSS$
Foul Lateral ! rain ßSS$
Surface Water Lateral ! rain ßSS$

Cable, &arthing
Cable ' unction
Cable, Optical Fibre*Instrumentation
Cable, Low , oltage
Cable, High , oltage
Cable, (ther
Housing, - uilding
Housing, . iosk
! is) osal Site
Sewage Treatment Works
Housing, (ther
Pipe Support Structure
Sewage Pum) ing Facility
Sewer Facility Connection •let *(utlet

- lind S aft
Combined Use / anhole
Flushing Chamber
Foul Use / anhole
Grease Trap
Head 0 ode
Hydrobrake
Lamphole
(utfall
Overflow
Penstock
Petrol •nterceptor
Sewer Blockage
Sewer Collapse

Sewer Chemical •njection Point
Sewer ' unction
Sewerage Air , alve
Sewerage Hatch - ox Point
Sewerage •solation , alve
Soakaway
Surface Water / anhole
, ent Column
Waste Water Storage
Culverted Watercourse
Pre-1937 Properties

MATERIALS

AC	3ASBESTOS CA/ 80 T	W	3W&48
-8	3- 8•CK	C	3CASCADE
CC	3C(NC8&T& - (9 CUL, &RT	I-	3I A\- (A8T
CI	3CAST •80	SE	3SI E &0T8:
CO	3C(NC8&T&	PV	3P^ AP^ A^, &
CS-	3C(OC8 ETE SEG/ &0 TS #\ ^T&I $	/	3- ACK!8 (P
CSU	3C(OC8 ETE SEG/ &0 TS &J0-(^T&I $	S	3SPH(8
I+	3OUCH^% IR@	HD	3!HIGHWA D8A•0
GRC	3GLASS 8&•IF(8 C/8 C(0 C8 &T&	St.<	3S&CT•0 1; <
MAC	3MAS(0 8: •0R&QUF A8 COU8S&S		
MA8	3/ AS(0 8: RA@ (/ ^ : C(URS&/	C	3CIRCULA8
PE	3PO^ ETH^&0 &	&	3EGG SHAPE!
PF	3PITCH	(	3(TH&8
PP	3PO^ PR(PY^&0 & /	8	38&CTAG^&
PSC	3PLAST IC ST&X^ C(/ P(SIT&	S	3S•UA8&
PVC	3P^ : . •0 ^ CH^(8 H &	T	3T8APE•(# AL
RPV	38&•#F(RC.8D P^AST•C / AT8•9	U	3UO. 0(W0
SI	3SPU0 (GR& SIR(0		
99 8	3OTH&8		

CATEGORIES

SHAPE	
C	3CIRCULA8
&	3EGG SHAPE!
F	3FOU^
^	3S^U^ GE
S	3SURFACE WAT&8
PURPOSE	
C	3C(/ -•0&
&	3F•0K^ EFF^U&0T

TABULAR KEY

A. Sewer pipe data refers to downstream sewer pipe.
B. Where the node bifurcates (splits) X and Y indicates downstream sewer pipe.
C. Gradient is stated a 1 in...

All Private Sewers are shown in magenta
All section 104 sewers are shown in green
All Sewers that have been transferred to Severn Trent Water after the 4^1 (ctober 7:4 4^8but have not been surveyed and confirmed by Severn Trent Water are shown in orange

Severn Trent Water Limited
Asset Data Management
PO Box 5344
Coventry
CV3 9FT
Telephone: 0845 601 6616

SEWER RECORD (TABULAR)

O/S Map scale: 1:1250
Date of issue: 02.08.19
Sheet No. 1 of 1

This map is centred upon:
O / S Tile reference:
SO9122SW

Disclaimer Statement:
1. **Do not scale off this Map.**
W@ this map and any information supplied with it is furnished as a general guide, is only valid at the date of issue and no warranty as to its correctness is given or implied, in particular this / ap and any information shown on it must not be relied upon in the event of any development or works ifincluding but not limited to excavations) in the vicinity of Severn Trent Water's assets or for the purposes of determining the suitability of a point of connection to the sewerage or distribution systems.
3. On **1 October 2011** most private sewers and private lateral drains in Severn Trent Water's sewerage area, which were connected to a public sewer as at 1 July 7:4 4^8transferred to the ownership of Severn Trent Water and became public sewers and public lateral drains. A further transfer takes place on 1 (ctober 7:4 2 ß date to be confirmed@.
Private pumping stations, w ich form part of these sewers or lateral drains, will transfer to the ownership of Severn Trent Water on or before 1 (ctober 7:4C@.
Severn Trent Water does not possess comp lete records of these assets.
These assets may not be displayed on this Map.
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ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.400
Area (ha)	1.000	Urban	0.000
SAAR (mm)	700	Region Number	Region 4

Results l/s

QBAR Rural	3.4
QBAR Urban	3.4
Q100 years	8.7
Q1 year	2.8
Q30 years	6.7
Q100 years	8.7

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	0.749	0.249	31.8	2006.4	O K
30 min Summer	0.832	0.332	31.8	2693.1	O K
60 min Summer	0.920	0.420	31.8	3433.8	O K
120 min Summer	1.011	0.511	31.8	4204.1	O K
180 min Summer	1.062	0.562	31.8	4640.8	O K
240 min Summer	1.094	0.594	31.8	4922.4	O K
360 min Summer	1.133	0.633	31.8	5259.3	O K
480 min Summer	1.158	0.658	31.8	5472.4	O K
600 min Summer	1.173	0.673	31.8	5604.9	O K
720 min Summer	1.182	0.682	31.8	5684.0	O K
960 min Summer	1.188	0.688	31.8	5738.1	O K
1440 min Summer	1.173	0.673	31.8	5608.1	O K
2160 min Summer	1.139	0.639	31.8	5311.0	O K
2880 min Summer	1.112	0.612	31.8	5076.5	O K
4320 min Summer	1.064	0.564	31.8	4655.8	O K
5760 min Summer	1.013	0.513	31.8	4217.5	O K
7200 min Summer	0.960	0.460	31.8	3767.4	O K
8640 min Summer	0.909	0.409	31.8	3335.0	O K
10080 min Summer	0.861	0.361	31.8	2938.0	O K
15 min Winter	0.779	0.279	31.8	2254.2	O K
30 min Winter	0.872	0.372	31.8	3027.5	O K
60 min Winter	0.971	0.471	31.8	3866.2	O K
120 min Winter	1.074	0.574	31.8	4744.6	O K
180 min Winter	1.132	0.632	31.8	5245.5	O K
240 min Winter	1.169	0.669	31.8	5575.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	117.448	0.0	2056.5	27
30 min Summer	79.010	0.0	2681.8	42
60 min Summer	50.812	0.0	3563.2	72
120 min Summer	31.621	0.0	4434.6	130
180 min Summer	23.637	0.0	4973.1	190
240 min Summer	19.105	0.0	5099.4	250
360 min Summer	14.037	0.0	5036.1	368
480 min Summer	11.286	0.0	4999.1	488
600 min Summer	9.522	0.0	4976.4	606
720 min Summer	8.282	0.0	4962.2	726
960 min Summer	6.640	0.0	4948.2	964
1440 min Summer	4.854	0.0	4949.9	1440
2160 min Summer	3.541	0.0	8942.7	1844
2880 min Summer	2.828	0.0	9523.2	2224
4320 min Summer	2.055	0.0	9056.3	3028
5760 min Summer	1.637	0.0	11020.6	3856
7200 min Summer	1.371	0.0	11540.1	4616
8640 min Summer	1.186	0.0	11975.1	5368
10080 min Summer	1.049	0.0	12368.4	6152
15 min Winter	117.448	0.0	2304.1	28
30 min Winter	79.010	0.0	2659.7	42
60 min Winter	50.812	0.0	3989.7	70
120 min Winter	31.621	0.0	4969.1	128
180 min Winter	23.637	0.0	5057.1	188
240 min Winter	19.105	0.0	5008.5	246

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
360 min Winter	1.215	0.715	31.8	5980.9	Flood Risk
480 min Winter	1.246	0.746	31.8	6248.4	Flood Risk
600 min Winter	1.266	0.766	31.8	6425.9	Flood Risk
720 min Winter	1.279	0.779	31.8	6544.1	Flood Risk
960 min Winter	1.293	0.793	31.8	6666.4	Flood Risk
1440 min Winter	1.291	0.791	31.8	6653.6	Flood Risk
2160 min Winter	1.256	0.756	31.8	6338.4	Flood Risk
2880 min Winter	1.216	0.716	31.8	5988.0	Flood Risk
4320 min Winter	1.152	0.652	31.8	5424.6	O K
5760 min Winter	1.081	0.581	31.8	4810.1	O K
7200 min Winter	1.002	0.502	31.8	4129.8	O K
8640 min Winter	0.920	0.420	31.8	3430.9	O K
10080 min Winter	0.845	0.345	31.8	2803.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
360 min Winter	14.037	0.0	4958.3	362
480 min Winter	11.286	0.0	4933.1	480
600 min Winter	9.522	0.0	4920.5	596
720 min Winter	8.282	0.0	4915.8	712
960 min Winter	6.640	0.0	4919.4	942
1440 min Winter	4.854	0.0	4955.4	1394
2160 min Winter	3.541	0.0	10018.9	2036
2880 min Winter	2.828	0.0	9884.7	2340
4320 min Winter	2.055	0.0	9262.8	3248
5760 min Winter	1.637	0.0	12343.6	4160
7200 min Winter	1.371	0.0	12931.1	5048
8640 min Winter	1.186	0.0	13424.3	5808
10080 min Winter	1.049	0.0	13855.0	6568

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Shortest Storm (mins)	15
Ratio R	0.350	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 9.359

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	3.000	4	8	3.000	8	12	3.000	12	16	0.359

Time Area Diagram

Total Area (ha) 0.000

Time From:	(mins) To:	Area (ha)
0	4	0.000

Model Details

Storage is Online Cover Level (m) 1.500

Tank or Pond Structure

Invert Level (m) 0.500

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	7900.0	1.000	9210.6

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0236-3180-1500-3180
Design Head (m)	1.500
Design Flow (l/s)	31.8
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	236
Invert Level (m)	0.000
Minimum Outlet Pipe Diameter (mm)	300
Suggested Manhole Diameter (mm)	1800

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	31.8	Kick-Flo®	1.021	26.5
Flush-Flo™	0.466	31.8	Mean Flow over Head Range	-	27.2

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	7.8	0.800	30.3	2.000	36.5	4.000	51.0	7.000	66.9
0.200	23.9	1.000	27.1	2.200	38.2	4.500	54.0	7.500	69.2
0.300	30.8	1.200	28.6	2.400	39.8	5.000	56.8	8.000	71.4
0.400	31.7	1.400	30.8	2.600	41.4	5.500	59.5	8.500	73.5
0.500	31.8	1.600	32.8	3.000	44.4	6.000	62.1	9.000	75.6
0.600	31.5	1.800	34.7	3.500	47.8	6.500	64.5	9.500	77.6

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	0.831	0.331	54.1	3386.5	O K
30 min Summer	0.941	0.441	54.1	4554.5	O K
60 min Summer	1.059	0.559	54.1	5817.3	O K
120 min Summer	1.180	0.680	54.1	7129.2	O K
180 min Summer	1.246	0.746	54.1	7866.0	O K
240 min Summer	1.289	0.789	54.1	8342.0	O K
360 min Summer	1.340	0.840	54.1	8908.1	O K
480 min Summer	1.371	0.871	54.1	9264.4	O K
600 min Summer	1.391	0.891	54.1	9483.1	O K
720 min Summer	1.402	0.902	54.1	9611.7	O K
960 min Summer	1.409	0.909	54.1	9691.6	O K
1440 min Summer	1.388	0.888	54.1	9448.9	O K
2160 min Summer	1.344	0.844	54.1	8953.3	O K
2880 min Summer	1.309	0.809	54.1	8564.4	O K
4320 min Summer	1.247	0.747	54.1	7868.9	O K
5760 min Summer	1.184	0.684	54.1	7171.9	O K
7200 min Summer	1.116	0.616	54.1	6434.0	O K
8640 min Summer	1.046	0.546	54.1	5674.0	O K
10080 min Summer	0.982	0.482	54.1	4985.3	O K
15 min Winter	0.871	0.371	54.1	3808.2	O K
30 min Winter	0.995	0.495	54.1	5123.1	O K
60 min Winter	1.127	0.627	54.1	6554.0	O K
120 min Winter	1.263	0.763	54.1	8044.8	O K
180 min Winter	1.339	0.839	54.1	8894.2	O K
240 min Winter	1.388	0.888	54.1	9452.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	117.448	0.0	3500.4	36
30 min Summer	79.010	0.0	4578.1	50
60 min Summer	50.812	0.0	6062.8	80
120 min Summer	31.621	0.0	7546.7	138
180 min Summer	23.637	0.0	8460.4	198
240 min Summer	19.105	0.0	8730.5	256
360 min Summer	14.037	0.0	8656.8	374
480 min Summer	11.286	0.0	8616.6	492
600 min Summer	9.522	0.0	8594.4	610
720 min Summer	8.282	0.0	8582.1	730
960 min Summer	6.640	0.0	8573.8	966
1440 min Summer	4.854	0.0	8588.0	1440
2160 min Summer	3.541	0.0	15219.3	1808
2880 min Summer	2.828	0.0	16205.8	2176
4320 min Summer	2.055	0.0	15542.0	2988
5760 min Summer	1.637	0.0	18759.1	3816
7200 min Summer	1.371	0.0	19636.0	4624
8640 min Summer	1.186	0.0	20377.1	5376
10080 min Summer	1.049	0.0	21041.8	6160
15 min Winter	117.448	0.0	3922.6	37
30 min Winter	79.010	0.0	4537.2	50
60 min Winter	50.812	0.0	6787.6	78
120 min Winter	31.621	0.0	8454.0	136
180 min Winter	23.637	0.0	8683.6	194
240 min Winter	19.105	0.0	8631.0	252

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
360 min Winter	1.449	0.949	54.1	10137.5	O K
480 min Winter	1.488	0.988	54.1	10587.3	O K
600 min Winter	1.514	1.014	54.1	10883.1	O K
720 min Winter	1.531	1.031	54.1	11077.4	O K
960 min Winter	1.547	1.047	54.1	11270.3	O K
1440 min Winter	1.543	1.043	54.1	11219.6	O K
2160 min Winter	1.494	0.994	54.1	10652.9	O K
2880 min Winter	1.444	0.944	54.1	10084.9	O K
4320 min Winter	1.360	0.860	54.1	9131.1	O K
5760 min Winter	1.268	0.768	54.1	8108.8	O K
7200 min Winter	1.172	0.672	54.1	7041.3	O K
8640 min Winter	1.061	0.561	54.1	5840.9	O K
10080 min Winter	0.959	0.459	54.1	4744.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
360 min Winter	14.037	0.0	8584.1	368
480 min Winter	11.286	0.0	8568.8	484
600 min Winter	9.522	0.0	8568.5	600
720 min Winter	8.282	0.0	8576.8	716
960 min Winter	6.640	0.0	8608.6	944
1440 min Winter	4.854	0.0	8705.4	1394
2160 min Winter	3.541	0.0	17046.7	2024
2880 min Winter	2.828	0.0	17121.1	2296
4320 min Winter	2.055	0.0	16015.8	3216
5760 min Winter	1.637	0.0	21016.2	4152
7200 min Winter	1.371	0.0	21988.3	5048
8640 min Winter	1.186	0.0	22831.2	5880
10080 min Winter	1.049	0.0	23570.8	6576

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Shortest Storm (mins)	15
Ratio R	0.350	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 15.920

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	3.000	8	12	3.000	16	20	3.000
4	8	3.000	12	16	3.000	20	24	0.920

Time Area Diagram

Total Area (ha) 0.000

Time From:	(mins) To:	Area (ha)
0	4	0.000

Model Details

Storage is Online Cover Level (m) 2.000

Tank or Pond Structure

Invert Level (m) 0.500

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	10000.0	1.000	11468.2	1.500	12000.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0297-5410-1600-5410
Design Head (m)	1.600
Design Flow (l/s)	54.1
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	297
Invert Level (m)	0.000
Minimum Outlet Pipe Diameter (mm)	375
Suggested Manhole Diameter (mm)	2100

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.600	54.1	Kick-Flo®	1.131	45.8
Flush-Flo™	0.530	54.1	Mean Flow over Head Range	-	45.8

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	9.1	0.800	52.7	2.000	60.2	4.000	84.3	7.000	110.7
0.200	30.6	1.000	50.0	2.200	63.1	4.500	89.3	7.500	114.5
0.300	51.2	1.200	47.1	2.400	65.8	5.000	93.9	8.000	118.1
0.400	53.3	1.400	50.7	2.600	68.4	5.500	98.4	8.500	121.7
0.500	54.0	1.600	54.1	3.000	73.3	6.000	102.7	9.000	125.1
0.600	53.9	1.800	57.2	3.500	79.0	6.500	106.8	9.500	128.5

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	0.664	0.164	40.7	2559.5	O K
30 min Summer	0.719	0.219	40.7	3434.6	O K
60 min Summer	0.778	0.278	40.7	4378.1	O K
120 min Summer	0.839	0.339	40.7	5353.4	O K
180 min Summer	0.873	0.373	40.7	5900.9	O K
240 min Summer	0.895	0.395	40.7	6256.1	O K
360 min Summer	0.921	0.421	40.7	6677.8	O K
480 min Summer	0.937	0.437	40.7	6944.5	O K
600 min Summer	0.947	0.447	40.7	7109.3	O K
720 min Summer	0.953	0.453	40.7	7205.8	O K
960 min Summer	0.957	0.457	40.7	7264.8	O K
1440 min Summer	0.945	0.445	40.7	7065.7	O K
2160 min Summer	0.919	0.419	40.7	6653.7	O K
2880 min Summer	0.899	0.399	40.7	6333.4	O K
4320 min Summer	0.864	0.364	40.7	5765.7	O K
5760 min Summer	0.830	0.330	40.7	5209.9	O K
7200 min Summer	0.796	0.296	40.7	4671.1	O K
8640 min Summer	0.763	0.263	40.7	4145.6	O K
10080 min Summer	0.733	0.233	40.7	3656.1	O K
15 min Winter	0.684	0.184	40.7	2876.4	O K
30 min Winter	0.746	0.246	40.7	3861.9	O K
60 min Winter	0.812	0.312	40.7	4929.7	O K
120 min Winter	0.882	0.382	40.7	6043.5	O K
180 min Winter	0.921	0.421	40.7	6679.6	O K
240 min Winter	0.947	0.447	40.7	7098.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	117.448	0.0	2625.8	30
30 min Summer	79.010	0.0	3482.3	45
60 min Summer	50.812	0.0	4547.1	74
120 min Summer	31.621	0.0	5663.4	134
180 min Summer	23.637	0.0	6350.3	192
240 min Summer	19.105	0.0	6848.7	252
360 min Summer	14.037	0.0	6814.5	370
480 min Summer	11.286	0.0	6780.0	490
600 min Summer	9.522	0.0	6753.9	608
720 min Summer	8.282	0.0	6734.5	728
960 min Summer	6.640	0.0	6710.8	964
1440 min Summer	4.854	0.0	6703.4	1440
2160 min Summer	3.541	0.0	11424.0	1796
2880 min Summer	2.828	0.0	12163.1	2160
4320 min Summer	2.055	0.0	12268.3	2944
5760 min Summer	1.637	0.0	14095.0	3752
7200 min Summer	1.371	0.0	14755.9	4544
8640 min Summer	1.186	0.0	15298.6	5360
10080 min Summer	1.049	0.0	15797.7	6144
15 min Winter	117.448	0.0	2942.7	30
30 min Winter	79.010	0.0	3469.9	45
60 min Winter	50.812	0.0	5094.7	74
120 min Winter	31.621	0.0	6346.6	132
180 min Winter	23.637	0.0	6824.2	190
240 min Winter	19.105	0.0	6779.0	248

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
360 min Winter	0.978	0.478	40.7	7616.0	O K
480 min Winter	0.999	0.499	40.7	7960.1	O K
600 min Winter	1.013	0.513	40.7	8190.4	O K
720 min Winter	1.023	0.523	40.7	8345.3	O K
960 min Winter	1.033	0.533	40.7	8508.4	O K
1440 min Winter	1.032	0.532	40.7	8494.3	O K
2160 min Winter	1.005	0.505	40.7	8053.4	O K
2880 min Winter	0.974	0.474	40.7	7541.2	O K
4320 min Winter	0.924	0.424	40.7	6728.8	O K
5760 min Winter	0.871	0.371	40.7	5874.5	O K
7200 min Winter	0.819	0.319	40.7	5027.3	O K
8640 min Winter	0.768	0.268	40.7	4213.9	O K
10080 min Winter	0.720	0.220	40.7	3459.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
360 min Winter	14.037	0.0	6708.9	364
480 min Winter	11.286	0.0	6651.1	482
600 min Winter	9.522	0.0	6604.5	598
720 min Winter	8.282	0.0	6567.0	714
960 min Winter	6.640	0.0	6512.5	946
1440 min Winter	4.854	0.0	6459.7	1400
2160 min Winter	3.541	0.0	12802.5	2052
2880 min Winter	2.828	0.0	13113.9	2344
4320 min Winter	2.055	0.0	12469.7	3212
5760 min Winter	1.637	0.0	15777.6	4096
7200 min Winter	1.371	0.0	16526.8	4968
8640 min Winter	1.186	0.0	17150.9	5792
10080 min Winter	1.049	0.0	17698.0	6560

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Shortest Storm (mins)	15
Ratio R	0.350	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 11.959

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	3.000	4	8	3.000	8	12	3.000	12	16	2.959

Time Area Diagram

Total Area (ha) 0.000

Time From:	(mins) To:	Area (ha)
0	4	0.000

Model Details

Storage is Online Cover Level (m) 1.500

Tank or Pond Structure

Invert Level (m) 0.500

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	15500.0	1.000	17315.6

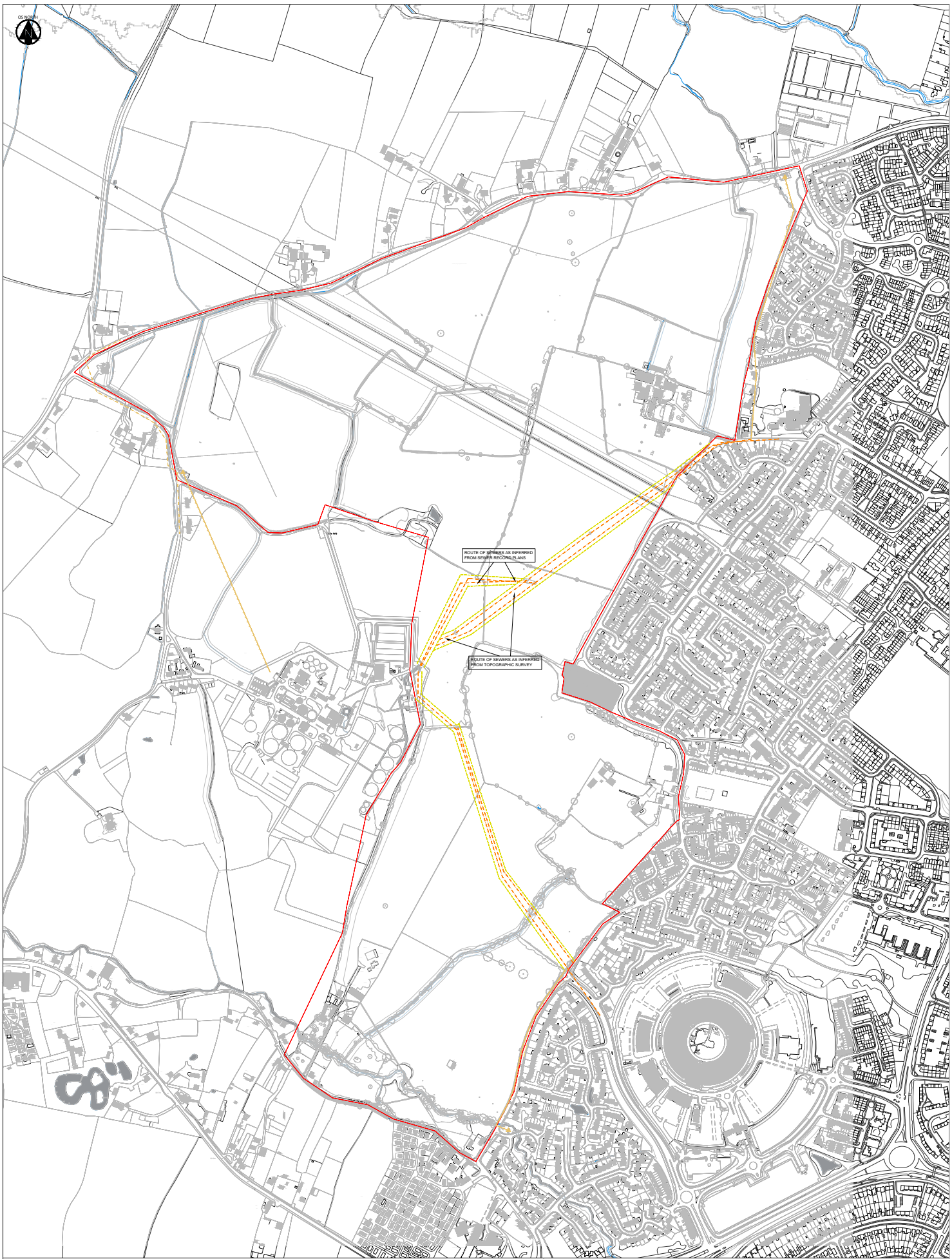
Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0264-4070-1500-4070
Design Head (m)	1.500
Design Flow (l/s)	40.7
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	264
Invert Level (m)	0.000
Minimum Outlet Pipe Diameter (mm)	300
Suggested Manhole Diameter (mm)	1800

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	40.7	Kick-Flo®	1.049	34.3
Flush-Flo™	0.485	40.7	Mean Flow over Head Range	-	34.6

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	8.4	0.800	39.1	2.000	46.7	4.000	65.3	7.000	85.8
0.200	27.1	1.000	35.9	2.200	48.9	4.500	69.2	7.500	88.7
0.300	39.2	1.200	36.6	2.400	51.0	5.000	72.8	8.000	91.5
0.400	40.4	1.400	39.4	2.600	53.0	5.500	76.3	8.500	94.3
0.500	40.7	1.600	42.0	3.000	56.8	6.000	79.6	9.000	96.9
0.600	40.4	1.800	44.4	3.500	61.2	6.500	82.7	9.500	99.5



Key

- Existing combined sewer
- Existing foul sewer
- Existing foul rising main
- Extent of sewer easement
- Existing foul pumping station

REVISIONS

Rev	Date	Description	Rv	Ckd	Aut
P01	10/09/19	First Issue.			

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CLIENT
CHELTENHAM BOROUGH COUNCIL

PROJECT
CYBER PARK
WEST OF CHELTENHAM

TITLE
EXISTING PUBLIC SEWERS

HYDROCK PROJECT NO.	SCALE @ A2
C-12619-C	1 : 2,500

STATUS DESCRIPTION	STATUS
INFORMATION	S2

DRAWING NO. - PROJECT CODE-ORIGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER	REVISION
12619-HYD-XX-XX-DR-D-2001	P01

Project name	Cyber Park, Cheltenham		
Design note title	Geotechnical and Geo-environmental Review and Masterplan Validation		
Document reference	12619-HYD-XX-XX-GE-TDN-0002		
Author	Claire Moreira		
Checked	Allan Bell		
Revision	Rev 1		
Date	6 September 2019	Approved	✓

1. INTRODUCTION

This technical note summarises the results of a preliminary desk based geotechnical and geo-environmental review, utilising freely available open source data, updated with historical Desk Study Information for a site known as Cyber Park, Cheltenham. No walkover has been undertaken at the current time and this Technical Note should be considered for preliminary use only.

This Technical Note is a high-level review of updated project information received on the 5th September 2019 and updates the previous preliminary desk based geotechnical and geo-environmental review (Hydrock document C-12619-TDN001, dated 5th August 2019).

2. INFORMATION

Reference is made to an un-numbered CAD drawing with the file reference '19123_Masterplan and constraints_190827'. There is no key attached to the drawing and therefore various elements of details shown on the drawing have been inferred. It is noted that proposed development is shown on the adjacent Severn Trent Water sewage treatment works (STW) to the west of the site however, these are outside of the 'red line' and therefore have been generally ignored for the purposes of this Technical Note. If this assumption is not correct, this note will require updating.

An historical Desk Study has been provided since the previous version of this review. This provides Information, for the eastern part of the site (as indicated by the red line) and is reported in: Wardell Armstrong LLP. December 2015. 'Land at Hayden, Cheltenham. Phase 1 Desk Study Report'; Ref LE13253: Report Number: 001. Undertaken for the Northern Trust Company Ltd and Barberry Cheltenham. Hydrock are not aware of the status with regards to assignment of this report, and have assumed there is no reliance upon it. As such, and due to the fact, the report only covers part of the current site, the above report has been used as background information.

3. MASTERPLAN VALIDATION

With reference to the provided masterplan CAD drawing ('19123_Masterplan and constraints_190827), and working on the assumption that the site boundary does not extend beyond the 'red line' and does not include the Severn Trent Water sewage treatment works, whilst there are significant further assessment works to be undertaken (and likely localised remediation works and engineering solutions required with regards to foundations etc., there are no geotechnical and geo-environmental constraints which need addressing further as part of the masterplan.

Please see preliminary recommendations and further works later in this TDN.

4. LOCATION

The site is 78 hectares in area and is located to the west of Cheltenham, between the B4634 to the north and the B4063 to the south. The nearest postcode is GL51 0XP, and the National Grid Reference for the approximate centre of the site is 391252E,223568N.

Proposed Development

As detailed in the Deloitte *'Cyber Central: The emerging proposition and occupier brief'* April 2019 and shown on the preliminary masterplan (Figure 1), the proposed site will comprise a sustainable mixed-use urban extension for Cheltenham, providing:

- up to 1, 100 new homes;
- 45 acres of employment land (in the southern extent) including a cyber related business park; together with
- areas of open space.

Figure 1: Preliminary Masterplan (subject to ongoing assessment)

5. BACKGROUND DATA

Site Setting

As indicated on Figure 2 and Figure 3, the site currently comprises a number of hedge lined open fields, used for arable crops and grazing, is generally flat and slopes gently down to the west and south-west from approximately 50m OD to approximately 35m OD.

There are a number of recognised footpaths crossing the site (predominantly in the eastern half of the site.

Hope Farm is located in the north-eastern part of the site, accessed via a track off Hope Orchard (road) from the east. Hayden Farm is present in the north-west corner of the site. Fiddlers Green Farm is present in the south-west corner of the site. In addition to the above noted farm houses and farm yards, there are a small number of small buildings scattered across the site.

Existing residential development is present to the immediate east of the site, together with a school (Springbank Primary Academy) to the northeast. GCHQ is present to the south-east of the site.

A gas installation compound is present to the north-west of the site.

A sewage treatment works is present to the immediate west of the southern central part of the site.

High voltage overhead powerlines cross the northern part of the site.

Figure 2: Aerial photograph of the site

Figure 3: Extract of the Ordnance Survey Map of the site

Geology and Hydrogeology

The geology (as indicated by the British Geological Survey mapping) comprises:

- Cheltenham Sand & Gravel, present as an isolated pocket in the central north-eastern part of the site; comprising fine to medium sand with quartz and limestone gravel; or
- Alluvium, present as an isolated band on the southern extent of the site, following the course of Hatherley Brook, comprising clay, silt sand and gravel, with possible layers of peat; over
- Charmouth Mudstone Formation (Lias Group), present across the vast majority of the site, comprising dark grey laminated shales and blue grey mudstone (weathers to clay) and local limestones.

There are data in the BGS archives relating to historical boreholes in the site, including a borehole located in the northwest (SO925W83), in the west (S092SW82) and several in the central area of the site (S092WS100). These indicate the ground conditions to comprise:

- Made Ground to approximately 0.60m; over
- Charmouth Mudstone Formation, to a depth of approximately 4.5m bgl (15 feet), comprising firm becoming stiff blue grey or brown clay, with shale bands and becoming hard blue clay.

Groundwater was not encountered in the historical boreholes.

The Cheltenham Sand & Gravel and Alluvium are classified by the Environment Agency as Secondary Aquifers and the Charmouth Mudstone Formation is classified as a secondary (undifferentiated) aquifer.

The site is not within a Groundwater Source Protection Zone.

There are two historical landfills within 250m of the site. Both appear to be small scale operations. However, the nature of wastes accepted are not given:

- The first is located at approximately 250m to the east of the north-eastern part of the site, identified as Swanbrook Grill, operating from 1980 to 1993.
- The second is located at approximately 200m to the west of the south-western extent, identified as Market Garden, land at Violet Villa, however no further information is provided regarding this landfill.

Mining and Shale Gas

The site lies outside the Coal Mining Reporting Area and consequently the risk associated with coal mining can be discounted.

The historical plans do not identify potential surface excavation features and as such, significant and ongoing surface mining is discounted. Such features were not recorded within the site area.

The site has been identified as not being in a licenced or prospective area of onshore oil and gas activity according to the Department of Energy and Climate Change website. However, the geology of the site does have the potential for shale gas resources.

Hydrology

There is a water course (Hatherley Brook) present in the south of the site which runs broadly east to west and a small pond is present in the central-western part of the site. A small ditch / stream flows to the south-west across the southern part of the site and joins Hatherley Brook in the south-west corner of the site.

History

The previous review has been updated based on the historical maps presented in the Wardell Armstrong Desk Study, (2015), which covers part of the site.

This review indicates that the site has generally been open fields, from as early as 1884. Farm buildings, identified as Whitehall are present in the central-western area of the northern part of the site. At this time, a brick works, including pits and ponds was located at approximately 250m to the east of the north-eastern part of the site (this brick works site is later noted as a landfill). A spring is noted in the north-western extent. Fiddlers Green farm buildings are present in the south-western corner.

By 1903, Woodbine Cottage was constructed in the central-northern area.

By 1924, a sewage works was constructed to the southwest of the site (Cheltenham Corporation), including tanks and filter beds.

During the 1930s, several drains are noted running along field boundaries.

By 1960, a footpath is shown running from Fiddlers Green Farm in the southwest heading south-west to north-east towards extensive residential development located to the immediate north-east and east of the site.

Whitehall farm and Woodbine cottage appear to have been demolished at some time post 1960.

Review of detailed (and better-quality maps) is required to finalise the historic review of the site.

Off-site, the major historical development is the construction of the Sewage Works (Cheltenham Corporation) to the west of the site by 1924. These continued to expand through the 20th century until the late 1970s. In addition, significant residential development has occurred to the east of the site.

Unexploded Ordnance (UXO)

The site lies in an area where the potential risk of is moderate according to Zetica.com.

6. POTENTIAL RISKS

Based on the above preliminary review, the following potential risks, requiring further investigation and assessment, are identified.

With regard to geo-environmental risks, there is the potential for:

- Made Ground (along with the potentially containing elevated concentrations of metals, metalloids, asbestos, PAH and petroleum hydrocarbons) to be present at the location of the former, now demolished farmyards or buildings (e.g. Whitehall farm buildings and Woodbine cottage), or at the location of current farmyards or buildings (e.g. Hope Farm, Hayden Farm, Fiddlers Green Farm and the small buildings scattered across the site).
- Hydrocarbon fuels, lubricants, and solvents (including leakage from USTs, the pipework between tanks and pumps, and general spillage, together with uncontrolled disposal and spillage from waste receptacles), from use at the location of the former, now demolished farmyards or buildings (e.g. Whitehall farm buildings and Woodbine cottage), or at the location of current farmyards or buildings (e.g. Hope Farm, Hayden Farm, Fiddlers Green Farm and the small buildings scattered across the site).
- Hydrocarbon fuels, lubricants, and solvents due to leaks from farm machinery.
- Use of agricultural pesticides and herbicides in the fields. Whilst generally considered a low risk, this will require confirmation.
- Asbestos from current and former building and structures;
- Heavy metals (arsenic, cadmium, chromium and mercury), dioxins and to a lesser extent PCBs, PAHs and asbestos from sewage sludge;
- Potential for ground gases from localised Made Ground, natural Alluvium (present at the south of the site) and off-site Made Ground (landfills).
- Moderate UXO risk. Therefore, a full UXO Desk Study screening assessment is required ahead of any intrusive works, to confirm the level of risk and precautions necessary during any intrusive works.

Whilst the site is anticipated to generally be a low risk overall, there ill be areas of the site with more significant risks and through investigation and assessment will be required.

With regard to geotechnical risks, the following are potentially present:

- Uncontrolled Made Ground (variable strength and compressibility), associated with the area of the former and current farm yards and buildings. Whilst Made Ground is likely to be present, the extent of the Made Ground is likely to be relatively limited in the context of the total site.
- Soft / loose compressible ground (low strength and high settlement potential) possibly within the Cheltenham Sand & Gravel and more likely in the Alluvium. Given the distribution of these deposits, this risk is likely to low (due to limited presence).
- Shrink / swell of the clay fraction of soils under the influence of vegetation. The Charmouth Mudstone Formation is generally of moderate heave potential (but may sometimes be of high heave potential). The

Alluvium is likely to be low to medium heave potential and the Cheltenham Sand & Gravel is likely to be low heave potential and / or non-plastic soils.

- Lateral and vertical changes in ground conditions. Where superficial deposits are present, these may vary significantly, with soils changing from clay to sand and gravel (in the limited Cheltenham Sand & Gravel and Alluvium) or from clay to limestone (in the Charmouth Mudstone Formation), across relatively short distances.
- Attack of buried concrete by aggressive ground conditions. Generally low risk in the Cheltenham Sand & Gravel Deposits and the Alluvium. However, the Charmouth Mudstone Formation may contain elevated sulphates and the presence of pyrite.
- Obstructions are generally not anticipated. However, foundations and obstructions will be present in the areas of the of the former and current farm yards and buildings.
- Loose Made Ground, leading to difficulty with excavation and collapse of side walls, may occur in the areas of the former and current farm yards and buildings.
- Shallow groundwater is expected in the Alluvium and Cheltenham Sand & Gravel. This may lead to groundwater flooding, excavation collapse and difficult excavation. Given the distribution of these deposits, this risk is likely to low (due to limited presence).

7. PRELIMINARY RECOMMENDATIONS

Based on the above review, preliminary recommendations are listed in Table 1. It should be noted that these recommendations are based on freely available desk study data and experience only; without the benefit of site-specific investigation data. The preliminary recommendations presented below are subject to review and change in light of the investigation, assessment and design.

Table 1: Preliminary Recommendations

Site Preparation, Groundworks, Excavation and Earthworks,	Topsoil should be removed from beneath all earthworks, buildings and hardstanding areas. This will generate significant volumes of Topsoil. Excavations should be readily achievable using standard plant, although hard digging may be encountered where mudstone or shale bands are present in the Charmouth Mudstone Formation. Obstructions are likely in the area of the former and current farm yards and buildings and may require breaking equipment or heavy-duty plant to remove them. Excavations in the Charmouth Mudstone Formation are likely to be stable in the short to medium term. However, excavations in the Cheltenham Sand & Gravel, the Alluvium and any Made Ground, may be prone to collapse. Water seepages into excavations are likely in the Alluvium and Cheltenham Sand & Gravel and may require specialist dewatering (especially in Winter and Spring). Significant water seepages into excavations are unlikely in the Charmouth Mudstone Formation and should be adequately controlled by sump pumping. Excavated soils generally should be suitable for reuse. However, the soils are likely to require drying to allow placement to a formal Earthworks Specification: • Soils of the Charmouth Mudstone Formation (the vast majority of the soils expected to be excavated) are unlikely to be suitable for modification due to the risk of sulphate heave and should only be air dried. • The sandy and gravelly parts of the Alluvium and Cheltenham Sand & Gravel deposits may only require excavation and free draining and air drying to allow placement. Although the volume of these soils excavated are likely to be low. • Areas of Alluvium with a notable amount of clay present would likely require modification to allow placement. Although the volume of these soils excavated are likely to be low.

	• If modification is proposed, care will be needed to ensure that modified soils do not come into contact with the sulphate bearing parts of the Charmouth Mudstone Formation.
Foundations	A minimum foundation depth of 1.0m bgl is considered appropriate at this stage, although this is subject to the proven heave/volume change potential of the soils. Assuming levels remain at approximately existing ground level, foundations are likely to vary across the site and are likely to comprise: • Strip/trench fill foundations in the granular Cheltenham Sand & Gravel (where medium dense or better) and the Charmouth Mudstone Formation (where tree influence is <2.5m bgl); • The southern part of the site is proposed for employment end use and therefore pad foundations bearing into the Charmouth Mudstone Formation or cut to fill earthworks (when placed to a suitable Specification) are likely to be suitable. • Piled foundations, where soils are proven to be soft, or loose and unsuitable for improvement by vibro-stone column placement, or deepening due to trees is >2.5m bgl. • It is anticipated, based on the preliminary Masterplan and the limited distribution of the Alluvium, that foundations will not be required within the zone of Alluvium present at the southern extent of the site. Deepening of foundations/heave protection is likely to be required to allow for the effects of trees.
Floor Slabs	Suspended floor slabs are recommended for residential dwellings due to the likely presence of medium/high volume change potential clay soils. Ground bearing may be possible locally where granular (non-shrinkable) soils are proven. Suspended floor slabs are recommended for office and small-scale commercial units because of the likely presence of medium/high volume change potential clay soils. Ground bearing floor slabs on cut to fill earthworks (when placed to a suitable Specification) are likely to be suitable for any large scale 'shed' type buildings.
Roads	A design CBR of 2.5% is recommended at this stage, although this may reduce (<2.5%) in areas of Made Ground or where soft soils are encountered at formation level.
Soakaways	Soakaway drainage may be considered potentially is considered unsuitable due to the likely presence of low permeability clays and mudstones associated with the Charmouth Mudstone Formation. At this stage, Hydrock would recommend that soakaway drainage is not included as a water management methodology.
Buried Concrete	Assume a Design Sulfate Class - DS- 3 and ACEC Class AC-3. Equivalent to Design Chemical Class DC-3 for a 50-year design. However, this will depend upon the results of testing.
Water Supply Pipework	Likely, based on existing data, to be standard pipework as long as Made Ground is managed during the earthworks, but confirmation should be sought from the water supply company, following completion of intrusive works.
Remediation	Remediation is likely to be required in the area the former and current buildings and farm yards. However, Hydrock believe this will predominantly be dealt with as an earthworks and materials management process, with possibly some bio-remediation or excavation and off-site disposal of hydrocarbons. Any Asbestos Containing Materials encountered will need to be disposed of off-site.
Protection from Ground Gases	Radon protective measures are unlikely to be required. The requirement for ground gas protection measures will be confirmed following the site investigation and monitoring. However, based on the available data, it is considered unlikely that gas protection measures will be required.

8. FURTHER WORKS

Based on this preliminary assessment, Hydrock would recommend a tiered approach to the geotechnical and geo-environmental assessment of the site, comprising:

- *To support the Planning Application*: A full Phase 1 Desk study, inclusive of a UXO Desk Study, to assess the risk of Unexploded Ordnance at the site and to formulate a formalised Preliminary Conceptual Ground Model of the site to determine geo-environmental and geotechnical site conditions, and identify key risks to development. Potentially, the Local Planning Authority may require preliminary intrusive data at this stage, however, Hydrock consider this unlikely.
- *To support the Master Planning and Development Stage*: A preliminary, reconnaissance Phase 2 Ground Investigation to refine the Preliminary Conceptual Site Model, quantify the geo-environmental risks to identified receptors and provide a preliminary geotechnical assessment of the site. The Preliminary intrusive site investigation would need to include soil infiltration testing at selected locations across the site to confirm that infiltration drainage is unlikely. It is envisaged that the intrusive works will comprise trial pits broadly spaced across the site to enable confirmation of geological boundaries, together with a number of trial pits and boreholes to target the former farm and other buildings. Samples will be collected for outline geotechnical and contamination testing.

Following the above preliminary assessment, further stages of detailed investigation and or risk assessment will be necessary as the project advances through the development process.

TECHNICAL DESIGN NOTE

Hydrock

Project name	Cyber Central Vision
Design note title	Air Quality Due Diligence
Document reference	C-12619
Author	Adam Dawson
Revision	P04
Date	24 April 2019

Overview

Cyber Central Vision

1. INTRODUCTION

This Hydrock Technical Design Note has been produced in support of a potential development (Cyber Central Vision) to the west of Cheltenham.

This technical design note summarises Hydrock's proposed assessment protocol and provides an initial desktop site appraisal suitable for assessment of air quality related site constraints.

The proposal is to redevelop areas of arable land and green space, into a mixed-use Cyber Park, which is proposed to contain residential, leisure & retail, business & industry and R&D plots. The site is under the jurisdiction of both Cheltenham Borough Council (CBC) and Tewkesbury Borough Council (TBC). With the site being partially located within CBC's borough wide Air Quality Management Area (AQMA) for the annual NO_2 objective.

2. INITIAL DESKTOP SITE APPRAISAL

2.1 Preliminary Assessment

The proposed development site is located to the west of Cheltenham, in the area of Fiddlers Green. The development is in an area that is urban in nature with the surrounding areas used primarily for residential and the GCHQ complex.

Worst case air quality concentrations within the residential developments are likely to be equal to the background for the area with the addition of local traffic from the Old Gloucester Road. According to the Defra background maps, the annual average NO_2 concentration at the development is approximately 14.0 $\mu g/m^3$; which is below the UK limit of 40 $\mu g/m^3$. Whilst there is no data to estimate the concentrations at the site or at nearby roadside locations, the residential plots, where the air quality objectives apply, are set back from the road and therefore are likely to have concentrations similar to the background NO_2 and are unlikely to be a significant barrier to development.

The nearest diffusion tube monitoring site within the area is located on Princess Elizabeth Way, approximately 10 km away from the development. This tube has been classified as roadside and has been installed to assess pollution on the heavily used Princess Elizabeth Way.

A summary of the diffusion tube monitoring is presented in Table 1. In 2018, the last available year of monitoring data, none of the sites exceeded the annual NO_2 objective.

Table 1 – Cheltenham Borough Council air quality monitoring in the area of the proposed development

Location	Distance to Kerb (m)	2013	2014	2015	2016	2017	2018
Diffusion Tubes: Annual Mean Concentration (µg/m^3)							
340 Gloucester Road (Roadside)	2	37.6	36.3	38.7	35.9	38.6	35.3
Princess Elizabeth Way North (Roadside)	1.2	n/a	n/a	n/a	n/a	n/a	38.4[1]
Princess Elizabeth Way South (Roadside)	1.3	n/a	n/a	n/a	n/a	n/a	31.2[2]

Further to the above, a dispersion modelling report[3] undertaken for CBC and finalised on the 31st October 2019 concludes:

> *"As expected, all discrete receptor locations which report annual mean NO_2 concentrations to be above or within 10% of the AQS objective, are located within the existing borough-wide AQMA, limited to roadside locations of junctions where key arterial roads meet. Notable roads include: A40 Gloucester Road, A4013 Princess Elizabeth Way."*

The above diffusion tubes are not likely to be representative of the development site but is an indication that NO_2 concentrations are elevated on major roads where the development will impact. This is significant as the indicative site plan suggests that access to the site will utilise the main roads entering the west of Cheltenham (A40, Princess Elizabeth Way and the B4634/A4019). Given the above diffusion tube results and evidence from recent dispersion modelling study, the impacts are likely to be assessed assuming a high background concentration. Increases of around 0.2-0.4 ug/m^3, due to the development, have the potential to trigger a Moderate/Major effect within the Environmental Impact Assessment process. This will need to be determined however at the modelling stage once traffic data is available.

Due to the nature of the development (residential/retail/business), it is anticipated that emissions from energy/hot water generation should be considered for assessment. If these emissions are found to present an adverse impact, suitable mitigation could be installed to mitigation these impacts. Therefore, any emissions are unlikely to serve as a barrier to development.

There are nearby local habitat sites (Griffiths Avenue LNR and Badgeworth SSSI), given their distance from the development site (approximately 1.5km) and the likely traffic distribution, it is not thought air quality impacts at local habitat sites are thought to be a barrier to development.

[1] Data has been annualised due to less than 75% data capture
[2] Data has been annualised due to less than 75% data capture
[3] Bureau Veritas.2019. Cheltenham Borough Council Cheltenham Detailed Modelling Study

2.2 Constraints

The following constraints for the development of this site, relating to air quality have been identified below:

- Residential plots near Old Gloucester Road (B4634) maybe required to be set back slightly from the road, to reduce impacts from road traffic.
- There are anticipated to be a large number of vehicle movements associated with the development site, therefore a full air quality assessment will be required. With the greater impacts anticipated to be at current receptors near the A40, Princess Elizabeth Way and B4634/A4019. A compliance by design approach is recommended in order to set in place measures that improve air quality in the area and prevent further declarations of AQMAs. This will involve additional modelling work to assess the best options, which will be done in consultation with CBC. This is key to ensuring that current measures to reduce pollution in this area are not hindered.
- Additional monitoring is already being undertaken by CBC and will be used in conjunction with their detailed modelling assessment carried out in 2019 to establish a robust baseline.
- Odour from the nearby Hayden Sewage Treatment works has the potential to be a constraint on plots that will expect a higher level of amenity (residential/offices etc). This is covered in more detail in the document the Hydrock document (CBP-HYD-XX-ZZ-RP-Y-3002_P03 -Odour).

3. AIR QUALITY ASSESSMENT FOR PLANNING

The development site currently has no vehicle trips associated with it. It is anticipated that traffic movements will be greater than 100 AADTs, the Institute for Air Quality Managements (IAQM) recommended threshold to trigger an air quality assessment, within an AQMA. Therefore, an assessment of the effects of the development on the local area will be required. As residential units are to be incorporated within the scheme an assessment of local air quality on these units will be required. Any assessment would include a construction dust assessment which complies with IAQM Guidance on the assessment of dust for demolition and construction.

If it is anticipated that emissions from a single energy/hot water generation stack will be greater than 5mg/NOx/s an assessment of these emissions will need to be assessed within any air quality assessment.

The above is deemed accordance with best practice and would involve a dispersion modelling study of the impacted area. Where applicable, sensitivity analysis should be undertaken to the emissions from the UK vehicle fleet and any proposed mitigation. However, the level of detail of the assessment would be defined and set out at Environmental Impact Assessment scoping stage, in consultation with CBC.

4. LEGISLATION

Any assessment undertaken need to consider the impacts of NO_2, PM_{10} and $PM_{2.5}$ and it is recommended that the following guidance be consulted:

- The Air Quality Standards regulations[4]
- The revised National Planning Policy Framework, released in February 2019[5]

[4] Air Quality Standards Regulations 2010.
[5] Department for Communities and Local Government, "National Planning Policy Framework," 2019, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf.

- Cheltenham 2019 Air Quality Annual Status Report[6]
- Defra Local Authority Technical Guidance TG16[7]
- IAQM Guidance on the assessment of dust for demolition and construction[8]
- IAQM Land use Planning and Development Control: Planning for Air Quality[9]

[6] Cheltenham Borough Council.2019. Air Quality Annual Status Report.
[7] Defra, "LAQM Technical Guidance LAQM.TG16," 16.
[8] IAQM, "Guidance on the Assessment of Dust from Demolition and Construction" (Institute of Air Quality Management (IAQM)), February 2014), http://www.iaqm.co.uk/text/guidance/construction-dust-2014.pdf.
[9] IAQM, "Land-Use Planning & Development Control: Planning for Air Quality."

DUE DILIGENCE

Project name	Cyber Park, Cheltenham
Design note title	Odour Due Diligence
Document reference	CPC-HYD-XX-ZZ-RP-Y-3002_P03
Author	Adam Dawson MIAQM
Revision	P03
Date	21 October 2019

1. INTRODUCTION

This Hydrock Technical Design Note has been produced in support of a potential development (Cyber Central Vision) to the west of Cheltenham.

This technical design note summarises Hydrock proposed assessment protocol and provides an initial desktop site appraisal suitable for assessment of odour related site constraints.

The proposal is to redevelop areas of arable land and green space, into a mixed use "Cyber Park" which is proposed to contain residential, leisure & retail, business & industry and R&D plots. The site is under the jurisdiction of Cheltenham Borough Council and is within 100m of Hayden Sewage Treatment works which has a population equivalent of 130,562.

2. INITIAL DESKTOP SITE APPRAISAL

2.1 Preliminary Assessment

The proposed development site is located to the West of Cheltenham, in the area of Fiddlers Green. The development is in an area that is urban in nature with the surrounding areas used primarily for residential use and the GCHQ complex.

The development site boundary is within 100m of Hayden Sewage Treatment works (STW), operated by Severn Trent Water. This STW is medium in size, has a population equivalent of 130,562 and contains preliminary, primary and secondary treatments stages with storm water and sludge handling facilities; including open air cake drying pads.

As of writing, three previous assessments are available to contribute towards a desktop site appraisal. As only two reports utilise site specific data, the report written by WSP[1] has not been considered further.

Two reports, which have been produced by MWH[2,3] use site specific data to estimate the odour exposure surround Hayden STW. They utilise onsite sampling data from 2009, 2013 and 2016. Data was primarily used from the 2016 survey, which was conducted during winter conditions, consequently odour emission rates were

[1] WSP.2017. Hayden Sewage Treatment works odour assessment.
[2]MWH. 2016.Hayden WwTW Odour Impact Assessment.
[3]MWH. 2018.Hayden WwTW Odour Impact Assessment. [Addendum Report]

lower than previous surveys. To allow the model to account for seasonal variation in odour emission rates the following approaches has been adopted.

- *"Where there is no significant difference between summer measured data and measured winter data, a typical summer multiplier of 2 will be utilised to provide a conservative basis of assessment.*
- *With respect to ASP anoxic tank and the storm tank residues previous historical measured data is much higher (16 times and 67 times greater respectively) than expected. Based on knowledge of other sites a conservative summer multiplier of 5 will be utilised."*

It appears that the corrected emission rates are in line or greater than the few summer sampled emission rates available, with the exception of the inlet works, ASP anoxic tank and the storm tank. The uncertainty around the inlet emission rates will be addressed by the proposed upgrades to the works, as discussed below. Based on the reports the contribution to overall site emissions from the storm tanks and ASP anoxic tank is currently 2.5% of overall site emissions and on balance unlikely to significantly effect conclusions.

The report utilises the accepted AERMOD dispersion model and certain modelling techniques to derive its conclusions: summer peaking emission rates, utilisation of terrain data, building effects and worst case of 5 years of meteorological data from an appropriate met station.

As part of these reports' mitigation options were explored to reduce this impact. The current setback distances (cordon sanitaire) on the masterplan appears to be based on scenario 8 within the latest MWH report[3]. Scenario 8 assumes that the following upgrade works have been undertaken to Hayden STW:

- covering of the inlet pipework;
- operation changes to the return liquor tanks;
- replacement of the covers on the imported PFT tanks;
- the removal of the current sludge OCU and combined with a new imported sludge OCU (odour concentration of 1000 OUE/m^3 at the outlet);
- covering of the west inlet works and extracted to OCU (odour concentration of 1000 OUE/m^3 at outlet);
- covering of the PST distribution chamber and Centrate Balancing tanks an extracting to OCU (odour concentration of 1000 OUE/m^3 at outlet);
- sludge cake stored in original bays and not a new cake silo.

Therefore, the cordon sanitaire within the current masterplan Is only applicable if the above upgrades have been completed, otherwise there is a greater risk of an adverse odour impact.

3. CONSTRAINTS

The following constraints for the development of this site, relating to odour have been identified below:

- At this early stage it is not recommended that blocks B1 and B5 be used for commercial plots that are expecting amenity that is near residential level, without mitigation. This is due to predications of greater than 3 OUE/m^3 covering these plots. Onsite odour assessment work and future work my change these recommendations.

- High-level short-term odour events, such as plant breakdown are not represented by the model and may give rise to increased levels of odour. Depending on the frequency these may or may not give rise to complaints.

4. FURTHER WORK RECOMMENDATIONS

It advised that further work is undertaken to negate any residual risk associated with uncertainty in odour modelling. At this stage it is recommended that in addition to further assessment during the planning stage, an onsite odour assessment is undertaken to assess real world conditions.

5. LEGISLATION

Any assessment undertaken need to consider the impacts of odour on the development and it is recommended that the following guidance be consulted:

- The revised National Planning Policy Framework, released in February 2019[4]
- Defra Local Authority Technical Guidance TG16[5]
- Guidance on the assessment of odour for planning 2018 v1.1
- IAQM Land use Planning and Development Control: Planning for Air Quality[6]
- Odour Control in Wastewater Treatment – A technical Reference Document – UKWIR
- Odour Guidance for Local Authorities, withdrawn by Defra in 2017

[4] Department for Communities and Local Government, "National Planning Policy Framework," 2018, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf.
[5] Defra, "LAQM Technical Guidance LAQM.TG16," 16.
[6] IAQM, "Land-Use Planning & Development Control: Planning for Air Quality."

Project name	Cyber Park, Cheltenham		
Design note title	Noise and Vibration Due Diligence Report		
Document reference	CPC-HYD-XX-XX-RP-Y-1001-P02		
Author	Vince Taylor		
Revision	P02		
Date	11 December 2019	Approved	✓

1. INTRODUCTION

1.1.1 This document provides a review of the key noise and vibration issues associated with the proposed development of the Cheltenham Cyber Park scheme.

1.1.2 The scheme comprises a mixed-use technology park and residential development. The development is proposed on an area of greenfield broadly adjacent to GCHQ in Cheltenham.

1.1.3 This document sets out areas for consideration in relation to noise issues relating to the development site (existing conditions) and considerations for assessment of the construction and operational phases should development proceed.

1.1.4 A noise survey will be required in order to identify and characterise existing noise sources (i.e. water treatment works). This will allow us to establish potential building fabric design parameters and ventilation/glazing strategies, and to set fixed service plant noise limits.

1.1.5 The commercial traffic generated via the access road, and the noise generated impacting the new residential, will also need to be understood and included in the assessment.

2. SITE LOCATION

2.1.1 The site area is located around immediately west and north of GCHQ,

2.1.2 The location of the site overlaid with current masterplan proposals is shown in Figure 2.1

` *Figure 2.1: Site Location Plan*

2.1.3 Initial observations of the site suggest that likely sensitive receptors will include built up residential areas the east as well as retained rural/agricultural properties to the north of the site.

2.1.4 External sensitive receptors may include public footpaths or bridleways and areas of historic significance.

2.2 Existing Noise Maps

2.2.1 Defra maintain noise maps in the vicinity of most major roads including the M5, this allows an initial indicative assessment of existing noise levels in the vicinity of the site.

2.2.2 Defra noise maps are modelled on a 10 m grid at a receptor height of 4 m above ground. This data is a product of the strategic noise mapping exercise undertaken by Defra in 2012 to meet the requirements of the Environmental Noise Directive (Directive 2002/49/EC) and the Environmental Noise (England) Regulations 2006 (as amended). Results are shown for two noise level indicators:

- LAeq,16h - the annual average noise level (in dB) for the 16-hour period between 0700-2300.
- Lnight - the night time annual average noise level (in dB) where night is defined as 2300-0700.

2.2.3 Figure 2.2 below outlines the wider area LAeq, 16h 16-hour average day noise level data as exists for the site.

Figure 2.2 Defra LAeq, 16h day noise levels parameter map.

2.2.4 Figure 2.3 outlines a closer view of the key area identified for development.

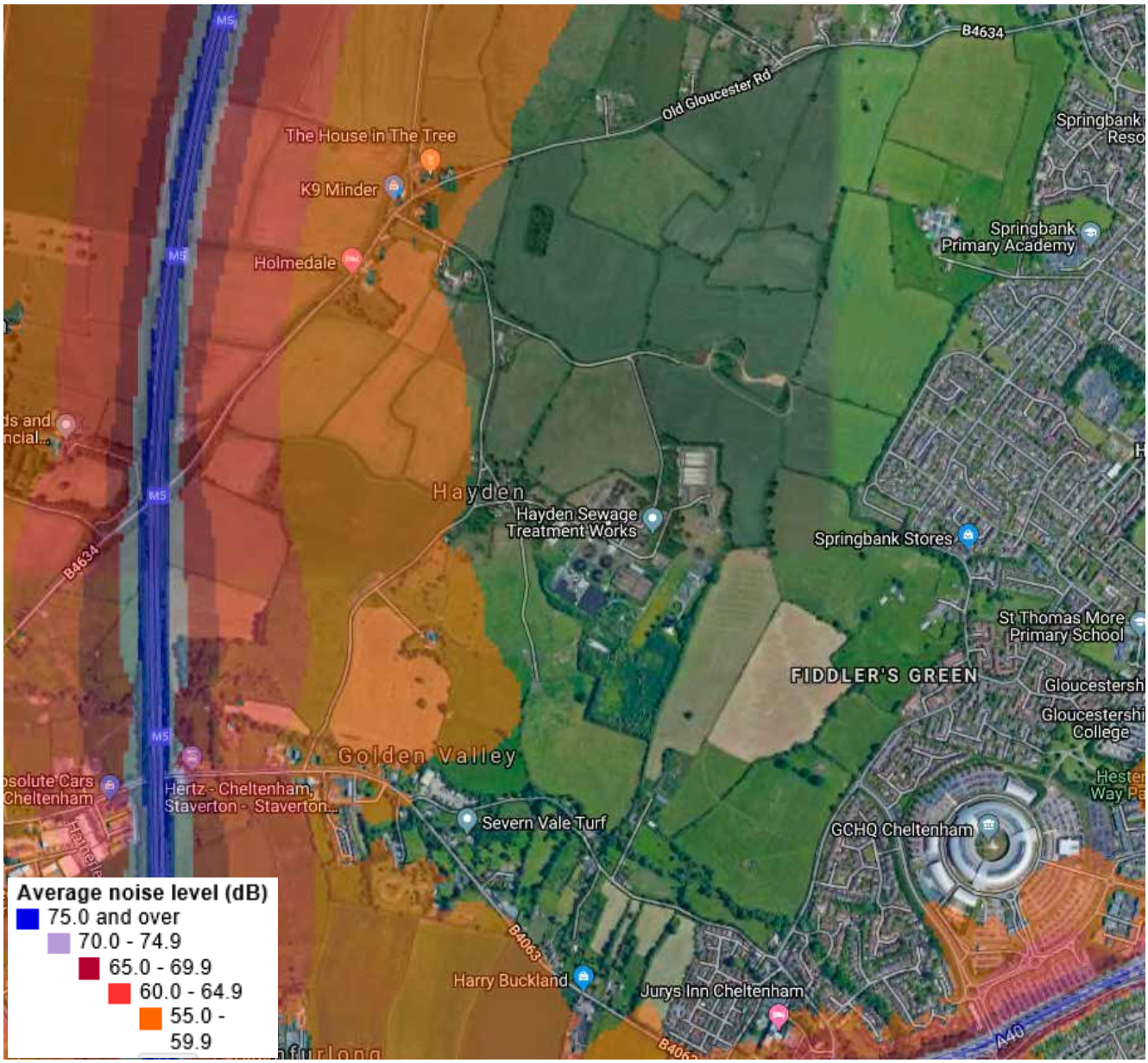


Figure 2.3 Focused Defra LAeq, 16h day noise levels parameter map

2.2.5 Figure 2.4 outlines the Lnight parameter noise map for the vicinity of the site.

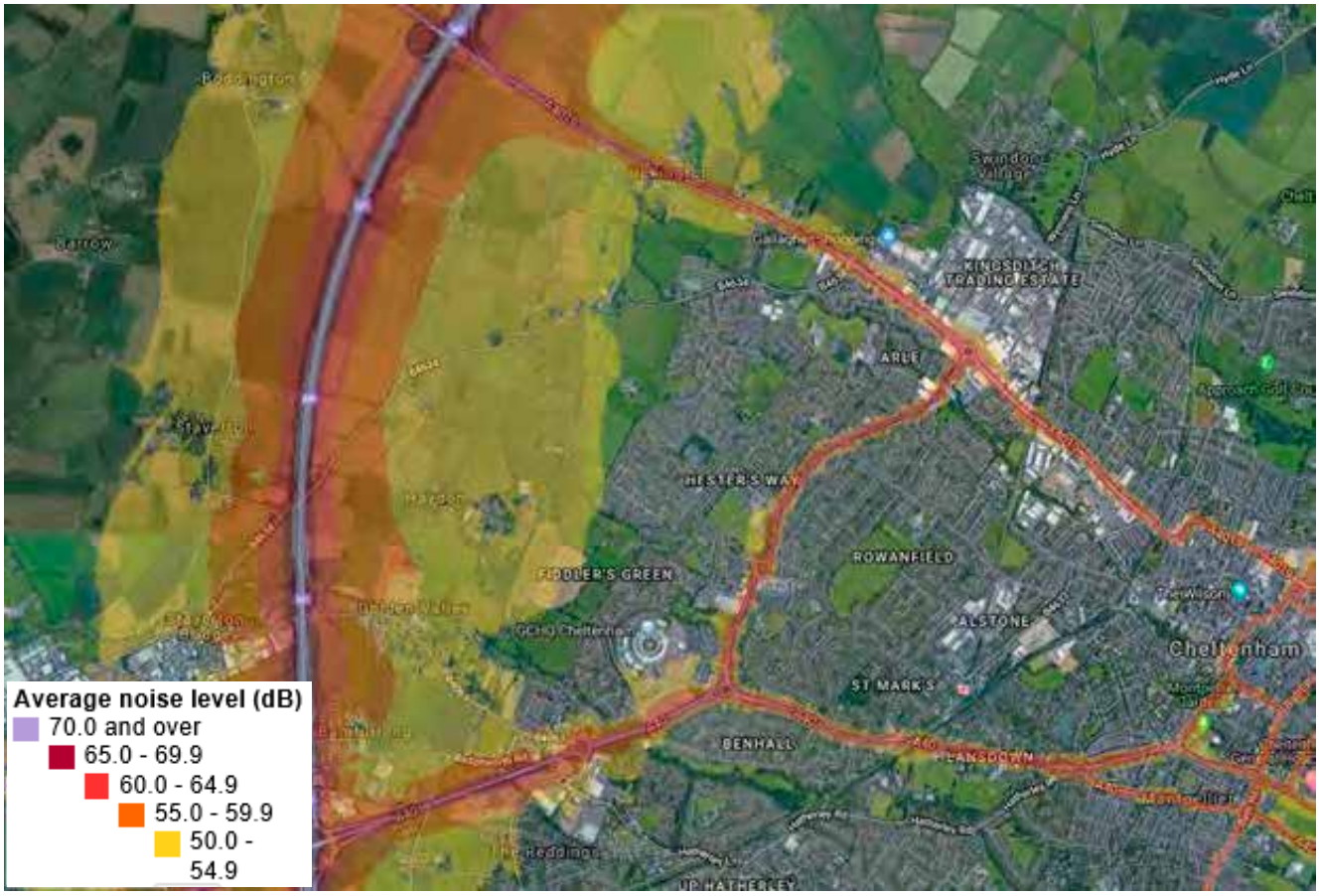


Figure 2.4 Defra LNight Parameter Map

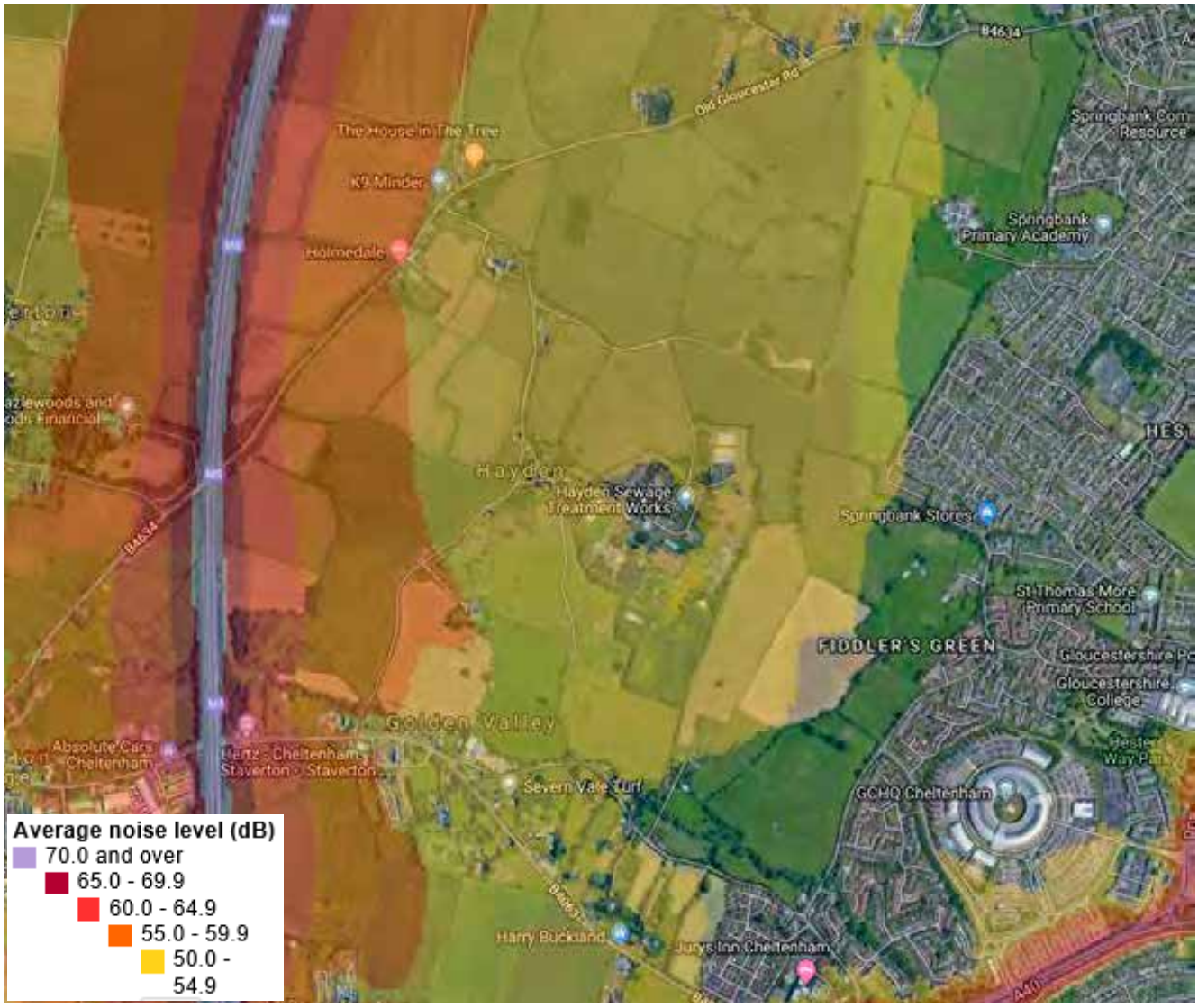


Figure 2.5 Focused Defra LNight Parameter Map

2.2.6 The above maps indicate that during the daytime the majority of the site is expected to be exposed to noise levels <55dB LAeq, T. Some areas to the north west may be exposed to noise levels in the region of 55-59dB Leq,T.

2.2.7 During the night time period noise levels across the site can be expected to be in the range 50-55dB LAeq, T with some areas to the north west being in the range 55-59dB LAeq, T.

2.2.8 In principle design guidance for internal spaces is provided in Section 5 of this document.

3. POTENTIAL NOISE IMPACTS

3.1 Summary

3.1.1 The site is likely to be the source of noise and vibration impacts during both the construction and operational phases.

3.1.2 Given the potential scale of the development it may be appropriate to establish a screening opinion from the Local Authority with regards to the likelihood of being requested to undertake a formal Environmental Impact Assessment (EIA).

3.1.3 As part of this process (or a more traditional planning stage submission) an assessment of noise and vibration impacts and any mitigation is likely to be required to achieve permission, it is anticipated conditions will be associated with this permission.

3.2 Construction Phase

3.2.1 An assessment will likely be required to determine the impact of noise and vibration associated with construction activities on nearby noise sensitive receptors.

3.2.2 Construction noise generally comprises:

- Moving plant and equipment servicing groundworks and activities such as piling and the ongoing construction works.
- Temporary fixed power sources such as generators (large and small) for onsite and welfare facilities power provision.
- Hand and power tools used within the construction process.

3.2.3 The assessment is being carried out in accordance with guidance provided within BS 5228:2009.

3.2.4 The significance of construction noise and vibration effects will then be determined through application of the guidance from BS 5228 Part 1 Annex E and BS 5228 Part 2. 'Code of practice for noise and vibration control on construction and open sites.

3.2.5 The assessment of noise levels due to construction activity and their significance will be dependent on the prevailing ambient and construction noise levels, as well as the level, duration, time of occurrence and frequency of the activity.

3.2.6 It may also be feasible to apply for a Section 61 Construction Noise Permit. Under Section 61 of the Control of Pollution Act 1974 a developer may apply to the local authority for prior consent to carry out noise generating construction or demolition works.

3.2.7 A Section 61 application would contain details of the construction activities and phasing to be carried out, the time of the works and also details any "best practicable means" mitigation measures to reduce the noise from the works.

3.3 Road Traffic/HGV Noise

3.3.1 The site is expected to give rise to road traffic associated with residents and employees within the proposed development.

3.3.2 Such road traffic will typically include transport movement to and from the site and the UK motorway network.

3.3.3 An assessment of road traffic noise including that identified above is likely to affect the site and surrounding receivers will be undertaken using baseline and future road traffic volume data obtained from the transport engineers and input into Datakustik CadnaA Version 4.5.151 (CadnaA) noise modelling software.

3.3.4 The assessment would predict the likely impact of future traffic associated with the proposed development on nearby noise sensitive receptors.

3.3.5 The impact would be assessed using the methodology provided in the Design Manual for Roads and Bridges (DMRB) or any other relevant guidance such as Department of Transport 'Calculation of Road Traffic Noise' (CRTN).

3.3.6 It should be considered that for noise levels to increase by 3dB road traffic feeding the site form existing roads would have to effectively increase to 200% of current. As such acoustic impacts may not be a primary driver in a planning application. Nonetheless an acoustic assessment of transport modelling for the site should be undertaken to verify the magnitude and significance of impacts anticipated.

3.4 Operational Phase

3.4.1 During operation the site will have fixed equipment and plant which could potentially be a source of noise, such items which require consideration include:

- Fresh and dirty air provision and extract equipment.
- Refrigeration plant.
- The site may also have independent or emergency power generation equipment.
- Substations associated with its connection to the national power grid.
- Operational noise sources such as those outlined above, which can be described as either:
- External fixed plant.
- Internal plant which generates noise to atmosphere
- Commercial operations
- Any other equipment

3.4.2 An assessment of the impact should be undertaken using Datakustik CadnaA Version 4.5.151 (CadnaA) noise modelling software and measurement data collected during field studies.

3.4.3 Where specific data is available to allow prediction of noise levels from plant and equipment associated with the Proposed Development, measurement data collected during field studies would be used for the setting of suitable noise limits at sensitive receptors.

4. PLANNING POLICY

4.1 National Planning Policy Framework

4.1.1 The 'National Planning Policy Framework, July 2018, Ministry of Housing, Communities and Local Government' (NPPF) sets out the United Kingdom Government's planning policies for adoption in England and how they should be applied.

4.1.2 The main aims of the NPPF are set out in section 11, as stated below.

4.1.3 'Planning policies and decisions should:

- a) encourage multiple benefits from both urban and rural land, including through mixed use schemes and taking opportunities to achieve net environmental gains – such as developments that would enable new habitat creation or improve public access to the countryside;
- b) recognise that some undeveloped land can perform many functions, such as for wildlife, recreation, flood risk mitigation, cooling/shading, carbon storage or food production;
- c) give substantial weight to the value of using suitable brownfield land within settlements for homes and other identified needs, and support appropriate opportunities to remediate despoiled, degraded, derelict, contaminated or unstable land;
- d) promote and support the development of under-utilised land and buildings, especially if this would help to meet identified needs for housing where land supply is constrained and available sites could be used more effectively (for example converting space above shops, and building on or above service yards, car parks, lock-ups and railway infrastructure); and
- e) support opportunities to use the airspace above existing residential and commercial premises for new homes. In particular, they should allow upward extensions where the development would be consistent with the prevailing height and form of neighbouring properties and the overall street scene, is well designed (including complying with any local design policies and standards), and can maintain safe access and egress for occupiers.'

4.1.4 The NPPF makes reference to guidance contained in 'Noise Policy Statement for England (NPSE), March 2010, Department for Environmental, Food and Rural Affairs' (NPSE). The NPSE is intended to apply to all forms of noise, other than noise occurring in the workplace and includes environmental noise and neighbourhood noise of all forms.

4.1.5 The NPSE provides advice regarding the impact of noise which should be assessed on the basis of adverse and significant adverse effect. However, the NPSE does not provide any specific guidance on assessment methods or the noise levels at which different effects would be applicable. Moreover, the document advises that it is not possible to have 'a single objective noise-based measure…that is applicable to all sources of noise in all situations. It further advises that the sound level at which an adverse effect occurs is 'likely to be different for different noise sources, for different receptors and at different times.

4.2 Planning Practice Guidance

4.2.1 The Ministry of Housing, Communities and Local Government publishes guidance on the internet in the form of the 'Planning Practice Guidance' (PPG). The guidance of PPG provides greater level of details in relation to the relevance of noise for planning following the introduction of the NPPF and NPSE.

4.2.2 It is stated under the heading 'How to Determine the Noise Impact' that the following should be considered by local authorities:

- 'whether or not a significant adverse effect is occurring or likely to occur;
- whether or not an adverse effect is occurring or likely to occur; and
- whether or not a good standard of amenity can be achieved.'

4.2.3 The assessed noise should include the overall effect of the development, inclusive of the construction stage once completed.

4.2.4 The guidance process includes identifying where noise exposure is above or below the significant observed adverse effect level and the lowest observed adverse effect level for a given situation as required by the NPSE.

4.2.5 The observed effects are defined in Table 4.1 which is taken from the section headed 'How to Recognise when Noise could be a concern?'

Perception	Examples of Outcome	Increasing Effect Level	Action
Not noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
		Lowest Observed Adverse Effect Level	
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; closing windows for some of the time because of the noise. Potential for non-awakening sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
		Significant Observed Adverse Effect Level	
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. having to keep windows closed most of the time, avoiding certain activities during periods of intrusion. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid

Table 4.1: PPG

4.2.6 Under the section heading 'What factors influence whether noise could be a Concern?' the subjective nature of noise is discussed. It is stated that there is no simple relationship between noise levels and the impact on those affected. It is all dependent on how various factors combine in particular situations, which include:

- 'The source and absolute level of the noise together with the time of day it occurs. Some types and level of noise will cause a greater adverse effect at night than if they occurred during the day – this is because people tend to be more sensitive to noise at night as they are trying to sleep. The adverse effect can also be greater simply because there is less background noise at night;
- For non-continuous sources of noise, the number of noise events, and the frequency and pattern of occurrence of the noise;
- The spectral content of the noise (i.e. whether or not the noise contained particular high or low frequency content) and the general character of the noise (i.e. whether or not the noise contains particular tonal characteristics or other particular features). The local topology and topography should also be taken into account along with the existing and, where appropriate, the planned character of the area.'
- 'Consideration should also be given to whether adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time. In both cases a suitable alternative means of ventilation can be found in the Building Regulations;
- In cases where existing noise sensitive locations already experience high noise levels, a development that is expected to cause even a small increase in noise may result in a significant adverse effect occurring even though little to no change in behaviour would be likely to occur.
- If external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces should be considered so that they can be enjoyed as intended.'

4.2.7 Similarly, to the NPSE, no specific noise parameters are defined in the guidance or target noise levels established for comparison.

4.3 Local Noise Policy- Cheltenham Borough Council

The Joint Core Strategy- Gloucester, Cheltenham and Tewkesbury provides policy items related to noise control or impact.

4.3.1 Policy Item SD4 -Design Requirements

1.1.1 iii. Amenity and space;

"New development should enhance comfort, convenience and enjoyment through assessment of the opportunities for light, privacy and external space, and the avoidance or mitigation of potential disturbances, including visual intrusion, noise, smell and pollution."

4.3.2 Policy Item SD14-Health & Environmental Quality

"New development must:

1. Cause no unacceptable harm to local amenity including the amenity of neighbouring occupants;
2. Result in no unacceptable levels of air, noise, water, light or soil pollution or odour, either alone or cumulatively, with respect to relevant national and EU limit values;"

4.3.3 *Policy INF 1: Transport Network*

Planning permission will be granted only where the impact of development is not considered to be severe. Where severe impacts that are attributable to the development are considered likely, including as a consequence of cumulative impacts, they must be mitigated to the satisfaction of the Local Planning Authority in consultation with the Highway Authorities and in line with the Local Transport Plan

Developers will be required to assess the impact of proposals on the transport network through a Transport Assessment. The assessment will demonstrate the impact, including cumulative impacts, of the prospective development on:

3. Congestion on the transport network;
4. Travel safety within the zone of influence of the development;
5. Noise and / or atmospheric pollution within the zone of influence of the development;

4.3.4 *Policy INF5: Renewable Energy/Low Carbon Energy Development*

Proposals for the generation of energy from renewable resources, or low carbon energy development (with the exception of wind turbines), will be supported, provided the wider environmental, social or economic benefits of the installation would not be outweighed by a significant adverse impact on the local environment, taking into account the following factors:

6. The impact (or cumulative impact) of the scheme, including any associated transmission lines, buildings and access roads, on landscape character, local amenity, heritage assets or biodiversity;
7. Any effect on a protected area such as The Cotswolds AONB or other designated areas such as the Green Belt;
8. Any unacceptable adverse impacts on users and residents of the local area, including emissions, noise, odour and visual amenity;

4.4 Policy Comments

4.4.1 It is noted Policy Item SD14 supersedes prior Policy Items associated with noise:

- RCN9- NOISE NUISANCE CAUSED BY SPORTS IN THE COUNTRYSIDE
- EVT3-NOISE POLLUTION

5. DESIGN GUIDANCE

5.1 Overview

5.1.1 Assessment and design of the development will need to consider the below design standards, as well as giving consideration to additional noise assessment and modelling guidance outside the scope of this document.

5.1.2 However, based on the available noise maps it is expected the site will broadly fall into a medium noise exposure category.

5.1.3 The sound insulation requirements for building envelopes will ultimately depend upon the external noise levels incident at each façade.

5.2 British Standard 8233:2014

5.2.1 To address noise control in and around different types of buildings, appropriate guidance and criteria can be taken from:

5.2.2 'BS 8233:2014 Guidance on sound insulation and noise reduction for buildings (British Standards Institution)' (BS 8233:2014).

5.2.3 The criteria are primarily intended to guide the design of new buildings and are flexible depending on the situational circumstances.

5.2.4 Table 5.1 provides the BS 8233:2014 guidance criteria for indoor ambient noise levels in residential dwellings when they are unoccupied.

Activity	Location	Daytime (07:00-23:00) LAeq(16hour) dB	Night-time (23:00-07:00) LAeq(8hour) dB
Resting	Living room	35	-
Dining	Dining room / area	40	-
Sleeping (daytime resting)	Bedroom	35	30

Table 5.1: BS 8233 Noise Limits – Residential

5.2.5 The indoor ambient noise level guidance of BS 8233:2014 is qualified by various notes, of which applicable ones are given in Table 5.2.

Qualifying Note	Description
Note 1	The table above provides recommended levels for overall noise in the design of a building. These are the sum total of structure-borne and airborne noise sources. Groundborne noise is assessed separately and is not included as part of these targets, as human response to groundborne noise varies with many factors such as level, character, timing, occupant expectation and sensitivity.
Note 2	The levels shown in the table above are based on the existing guidelines issued by the WHO and assume normal diurnal fluctuations in external noise. In cases where local conditions do not follow a typical diurnal pattern, for example on a road serving a port with high levels of traffic at certain times of the night, an appropriate alternative period, e.g. 1 hour, may be used, but the level should be selected to ensure consistency with the levels recommended in the table above.
Note 3	These levels are based on annual average data and do not have to be achieved in all circumstances. For example, it is normal to exclude occasional events, such as fireworks night or New Year's Eve.
Note 4	Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or LAmax,F depending on the character and number of events per night. Sporadic noise events could require separate values.
Note 5	If relying on closed windows to meet the guide values, there needs to be appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level.
Note 7	Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable conditions still achieved.

Table 5.2: BS 8233 qualifying Notes

5.2.6 BS 8233:2014 also provides guidance on external noise levels for protection of private amenity spaces for residential demises.

5.2.7 It is desirable that the external noise level does not exceed 50dB LAeq,T. 55dB LAeq,T should be regarded as the upper guideline value.

5.2.8 However, it is recognised that these guideline values are not achievable in all circumstances where development might be desirable. For higher noise areas, such as city centres or urban areas adjoining a strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted.

5.2.9 Under such circumstances, the development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited on this basis.

5.3 Residential Design Commentary-DEFRA Noise Maps

5.3.1 We would advise in the first instance that residential development be designed to ensure internal noise levels in compliance with the guidance in BS 8233:2014.

5.3.2 Table 5.3 below assumes compliance with BS 8233:2014's internal noise criterion and shows the level differences for varying residential spaces within the proposed development.

5.3.3 The assessment should consider noise levels from all identified sources. The examples shown represent the highest-level differences required for each façade. The formal assessment will be based on the predicted data from the noise maps, environmental noise survey and manual noise measurements.

5.3.4 It should be noted that the highest-level difference (D) shown for bedrooms within Table 5.3 takes precedence.

5.3.5 Simple natural ventilation through the use of opening windows will provide a level difference (D) in the order of 10-15 dB. As shown in Figures 10 and 11, facades will be colour-coded to demonstrate the level of noise exposure and required ventilation strategy. The defining exposure level and relevant ventilation strategies can be defined as follows:

1.1.2 'Low Noise Exposure' – Suitable for natural ventilation, e.g. windows may remain open

1.1.3 'Medium Noise Exposure' – Suitable ventilation strategies may include; passive acoustic ventilation, acoustically treated ventilation with constantly running extract fans or whole house ventilation (MVHR).

1.1.4 'High Noise Exposure' - Suitable ventilation strategies are likely to be restricted to mechanical whole house ventilation (MVHR).

Façade	Room Use	Predicted External ('free-field' corrected)	Proposed Internal (Maximum)	Minimum Level Difference (D)
High Noise Exposure	Living Room1	60 +	35	25+
	Bedroom2	55 +	30	25+
	Bedroom3	70 +	45	25+
Medium Noise Exposure	Living Room1	50-60	35	15-25
	Bedroom2	45-55	30	15-25
	Bedroom3	60-70	45	15-25
Low Noise Exposure	Living Room1	35-50	35	0-15
	Bedroom2	30-45	30	0-15
	Bedroom3	45-60	45	0-15

Table 5.3: Façade Noise Assessment Criteria

Note 1: Living rooms (0700 to 2300);

Note 2: Bedrooms LAeq,8hr (2300 to 0700).

Note 3: Bedrooms LAmax,T (2300 to 0700)

5.3.6 Ultimately comprehensive baseline site survey assessments of noise should consider and capture data regarding day and night time noise levels across the site such that a noise model with all buildings proposed and the noise exposure categories properly established. This should be undertaken to inform glazing, ventilation and facade design proposals.

5.4 Commercial Design Commentary-DEFRA Noise Maps

5.4.1 It will be feasible to explore hybrid natural and mechanical ventilation design strategies for commercial development within the site, particularly where internal ambient noise level design criteria may be less onerous than for residential development.

5.4.2 The following best practice guidance will be used as reference to inform the acoustic design strategy for commercial development

- BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings'

» British Council for Offices Guide to Specification 2014

5.4.3 To address noise control in and around different types of buildings, appropriate guidance and criteria can be taken from:

5.4.4 'BS 8233:2014 Guidance on sound insulation and noise reduction for buildings (British Standards Institution)' (BS 8233:2014).

5.4.5 The criteria are primarily intended to guide the design of new buildings and are flexible depending on the specific project circumstances.

5.4.6 The British council for Offices provides a range of best practice guidelines for the commercial property sector. The BCO guide to specification 2009, includes guidance in Section 8 regarding the acoustic environment of offices including guidance on finishes, external noise intrusion, internal sound insulation, building services noise, emergency plant noise, and vibration.

5.4.7 Guidance is based on existing guidelines taken from relevant British, European and International standards including BS 8233:2014, BS EN ISO 140-18:2006, BS 6472-1:2008 and the Association of Noise Consultants Guidelines ANC 9701:1997-Part 1: Noise from building services and ANC 9801:1998 -Part 2: Noise from external sources within buildings.

5.4.8 BS 8233:2014 proposes design ranges with regards to acceptable noise levels in various office space types. The measurement is a combination of external noise intrusion and noise from continuous internal noise sources such as building services and mechanical plant. The measurements should not include internally generated noise from occupational noise sources.

5.4.9 Internal noise levels should be measured in terms of LAeq,T where T refers to a normal working day e.g. 8hrs (0900-1700hrs).

5.4.10 The internal ambient noise level (IANL) design ranges outlined in BS 8233:2014 are outlined in Table 5.4 below.

Room Type	Criteria dB LAeq, T
Executive Office	35-40
Corridor / Circulation Space	45-55

Table 5.4: IANL Criteria BS8233:2014 Noise Reduction in Buildings

5.4.11 Noise from building services should be designed and controlled to meet the noise criteria outlined in Table 5.5 below.

Room Type	Criteria dB LAeq, T
Cellular Offices	NR35
Speculative Offices	NR38
Open Plan Offices	NR40
Entrance Lobbies	NR40
Circulation Spaces	NR40
Toilets	NR45

Table 5.5: Building Services Noise Criteria BCO Guide

5.4.12 Maximum noise levels form external events should also be controlled to ≤55dB LAMax in open plan/speculative offices or ≤50dB LAMax in cellular offices.

6. TECHNICAL CONSTRAINTS & MITIGATION

6.1 Constraints

6.1.1 Common noise considerations that present themselves with such a scheme would include:

- » Fixed plant and services associated with commercial/residential areas of the development
- » Provision of car parking or new traffic routes through the site, which must be modelled to establish potential new road traffic noise impacts, as these will not be accounted for in the baseline assessment.
- » If an energy centre, or localised power generation facility is afforded to the site this may be a source of noise egress.
- » The existing water/sewage treatment works may be a source of noise egress which should be assessed.

6.1.2 Generally existing water treatment works and new energy provision installations can be assessed in accordance with BS4142:2014 provided suitable noise data can be captured, either via manufacturers data for new installations, or via thorough site assessment in the case of existing installations.

6.2 Mitigation Considerations

6.2.1 Construction Phase

- Implementation of a construction noise management plan, including implementation of site hoardings, and consideration for the type of construction plant, phasing and activity periods (day/night) for construction implemented.
- Potential application for a Section 61 construction noise permit, to avoid or mitigate risk of noise nuisance site operations cessation notices.

6.2.2 Operational Phase

- Implementation of careful design to new mechanical plant, services and energy provision to ensure compliance with suitable design criteria and Local Policy.
- Capture of noise levels from existing water treatment/sewage treatment installation to ensure suitable control of noise ingress into surrounding new development.
- Mitigation measures including noise barriers and earth bunds (topography dependant).
- Site massing can also provide effective noise barrier effects, for example when parking bays are orientated between large commercial buildings, the buildings will act as physical screens without the need for additional barrier provision, thereby protecting residential development inherently.
- On the basis of the receptor sensitivities identified it may be prudent to consider orientating the rear of parking bays away from the most sensitive residential receptors (predominantly existing residential development to the north, south and east). Using the proposed structures as physical screens as discussed above (subject to noise survey assessment findings)

7. MASTERPLAN ACOUSTIC COMMENTARY

7.1.1 The current masterplan is reproduced below for comment.

Figure 7.1: Initial Masterplan

7.1.2 The site comprises multiple uses, there are already separate transport links proposed for commercial and residential accesses which is considered appropriate to mitigate commercial traffic noise ingress into residential areas.

7.1.3 Residential areas are already well spaced form the existing sewage/water treatment works, this will aid in mitigating noise impact from this source.

7.1.4 It is noted that communal external sports facilities will have incident noise levels due to the M5 of circa 55-60dB LAeq, T landscaping or bunding may need to be considered to reduce external noise levels depending on the findings of a detailed noise assessment.

7.1.5 External residential gardens or external amenity spaces ay also require careful consideration on the same basis. Localised garden fencing and screening provided by surrounding structures will likely reduce noise levels in the immediate vicinity of residential units.

7.1.6 The proposed primary school is broadly located on the boundary of noise levels currently expected to be between 55-60 and 60-65 dB externally. It is considered the school site will be shielded to some extent by surrounding buildings and may still be suitable for natural ventilation. At present however, it is considered either hybrid natural or mechanical ventilation may need to be considered.

7.1.7 This will need to be verified by detailed assessment of existing noise levels. The excerpt below indicates this region of the site from existing noise maps:

Figure 7.2: School Site-Daytime LAeq, 16-hour daytime DEFRA Noise Map

8. ADDITITONAL CONSIDERATIONS

8.1 Air Traffic

8.1.1 The site is not currently considered to have significant incident air traffic noise; however, this will be captured within baseline surveys if present, the significance can then be established and incorporated into site design needs.

8.2 Rail Traffic

8.2.1 Rail traffic is not expected to significantly impact the site, as rail links are not in close proximity to the proposed site. Figure 8.1 below provides DEFRA daytime noise maps of the local rail network for the wider site locale for information and context purposes:

Figure 8.1 Local Rail Network Daytime LAeq, T 16 hour DEFRA noise mapping

8.3 Noise Impact from Commercial on Residential

8.3.1 Road traffic modelling will be needed to establish and clarify potential commercial traffic movements which may enter residential areas to the north of the site. There is potential that if this road link is used as a thoroughfare by HVGs this will need to further assessment.

9. PROJECT PROGRESSION ACOUSTIC CONSULTANCY RECOMMENDATIONS

9.1.1 It would be appropriate to undertake the following works with a view to achieving planning permission.

9.2 Site Surveying

9.2.1 Site survey assessment of existing noise sources should include:

- Road traffic from key roads (A40, M5 and surrounding residential roads).
- Noise impact assessment of the water/sewage treatment works to establish noise impacts on proposed development.

9.3 Noise Modelling

- Assessment of new roads through the development to establish potential noise impacts resulting.
- Modelling of the findings from the noise impact assessment of the sewage treatment works on the surrounding development.
- Modelling of existing and road traffic noise sources impacting on the development and the surrounding existing residential areas.

9.4 Masterplan Development

- Iterative development of the masterplan to mitigate potential noise impacts as they emerge/are established.

9.5 Design Development and Reporting

- Production of a noise planning report to establish acoustic design parameters for key areas of the development (residential, commercial and education).
- If required upon scoping with the Local Authority production of an EIA/ES Chapter to establish noise impact of the development on its surroundings.

10. SUMMARY

10.1.1 Available relevant acoustics, noise and vibration information within the public domain has been reviewed.

10.1.2 Comments on the potential noise impacts of the development have been reviewed and summarised.

10.1.3 The most likely statutory bodies, authorities and agencies that will require future stakeholder engagement on noise and vibration associated with the proposed development have been discussed.

10.1.4 Engineering/technical constraints which could impact on or would influence the development of the site relating primarily to noise have been summarised.

10.1.5 Outline mitigation and design solutions to be considered for implementation into the masterplan have been submitted.

10.1.6 An in-principle process has been provided to progress the project with consideration for noise and vibration.

DUE DILIGENCE

Project name	Cheltenham Cyber Park		
Design note title	Utilities Due Diligence Report		
Document reference	CCP-HYD-XX-XX-RP-Y-3000		
Author	Linzie Brown		
Revision	P02		
Date	23 October 2019	Approved	✓

EXECUTIVE SUMMARY

Upon review of the existing utilities networks and infrastructure within and surrounding the site, the following has been identified which will require consideration and assessment throughout the design stages.

The 2 x 132kV transmission lines, which have been incorporated into the masterplan, should continue to be considered within the designs and the clearance distances adhered to.

There is a Severn Trent Water 21" trunk main running through the south of the site, which has been incorporated into the masterplan design with a no-build easement strip. The distances of the easement from the centre of the pipe are to be determined by STW, however it will be a minimum of 6m either side of pipe.

A number of HV (11kV) overhead lines run through the site which will require diverting, either to more suitable routes or underground. There are also a number of existing pole-mounted substations that will require relocating, or grounding and re-purposing. 2 x buried HV cables run through the centre of the site which will require diverting.

Services will need to be diverted at the locations of both new entrances as the changes to the highways will impact any buried services that currently run in these carriageways. Old Gloucester Road junction is expected to impact LV cables, a water main, Openreach cables and fibre ducts belonging to Gigaclear and Zayo. Telstar Way Junction is expected to impact LV cables, Openreach cables and fibre ducts belonging to Instalcom, and may potentially impact a water main and MP gas mains.

The presence of utility infrastructure within and surrounding the site has confirmed that there will not be a constraint with regards to connecting the new development to the local networks.

The site is in close proximity to Cheltenham Primary Substation, which has been established to have capacity for electricity exporting, if required.

1. TERMS OF REFERENCE & OBJECTIVES

Hydrock Consultants has been appointed by Cheltenham Borough Council to provide Masterplanning stage advisory services in relation to providing new utility infrastructure to the proposed development in Cheltenham.

Hydrock were tasked to investigate whether the existing nearby utility infrastructure could support the new residential development as described below. This document is provided to give an overview of existing utility services, provision for new connections and establish any underlying requirements for diversionary works.

2. SITE INFORMATION

2.1 Site Location:

The full address and Ordnance Survey Grid Reference are given in Table 1 below.

Table 1 - Site referencing information

Site referencing information	
Site address	Site grid reference
Old Gloucester Road, West Cheltenham, Cheltenham, GL51 0XP	X: 391126 Y:223023

Figure 1 – Site location plan with redline boundary

2.2 Proposed Development:

The scheme proposes to build a mixed-use commercial-led development comprising a new cyber park and residential area with associated highways infrastructure and green space.

Access into the site will be provided via 2 new entrances on Old Gloucester Road (north of site) and Telstar Way (south of site).

The proposed site layout is shown in Figure 2 below.

Figure 2 - Cheltenham Cyber Park Masterplan

3. EXISTING SERVICES

This Utilities Statement is based upon utility information that has been provided by the respective utility providers in relation to the services within the vicinity of the development site. Hydrock has taken all reasonable steps, within the available timescales, to obtain the information from the respective utility companies. The information received has been summarised within this report. In the event that the information is relied upon and is subsequently found to be incorrect, Hydrock Consultants Ltd accepts no responsibility for any direct and/or consequential loss that may occur as a result.

The utility services that exist either within the site or its immediate surrounds are detailed below.

3.1 Gas – Wales and West Utilities

Wales and West Utilities (WWU) are the incumbent gas transporter for this service area.

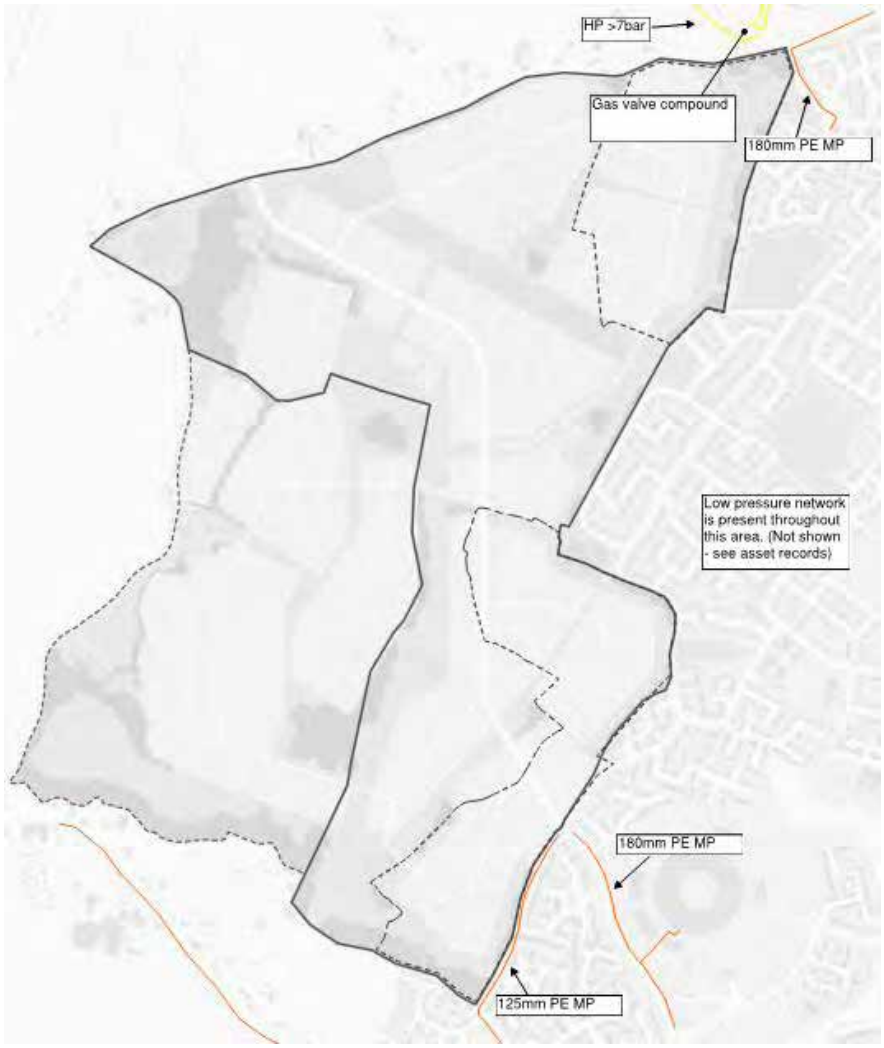


Figure 3 - Existing Wales and West Utilities HP and MP gas apparatus

High pressure gas main >7bar

Medium pressure gas main

Recommended Minimum Depths	
Footway/Verge	Carriageway
600mm footway 750mm verge	750mm

3.1.1 Existing infrastructure

Records received from WWU indicate that there is no gas infrastructure located within the site boundary. On the outside of the south-east boundary of the site, a 125mm diameter polyethylene (PE) medium pressure (MP) main is shown to run in Fiddler's Green Lane, terminating at a capped end at the Telstar Way junction. A 180mm PE MP main runs in the footpath of Telstar Way also terminating at a capped end on the east side of the roundabout.

Outside the north-east boundary, a 180mm diameter MP main runs along old Gloucester Road and down Pilgrove Way.

There is also shown a gas valve compound on the north side of Old Gloucester Road connecting a number of high pressure (HP) mains that extend northwards away from the site.

A low pressure (LP) network runs throughout the residential area to the east of the site. No apparatus is shown to exist to the west.

3.1.2 Constraints

Due to the location of WWU assets outside of the site boundary, it is expected that diversionary work will not be required. However, there is a potential conflict with the proposed new entrance on the southern side. Any significant highways alterations and/or ground level changes may affect the 2 MP gas mains that terminate at the existing roundabout and minor diversions may be required to accommodate the new layout.

3.1.3 New connections

In terms of establishing a point of connection to the site, the size and locality of existing gas apparatus will not cause a constraint.

It is anticipated that in order to supply the site with gas, new MP mains will need to be installed from the existing infrastructure to the north and/or south of the site. It is expected that the new mains would be installed along the spine road of the development, creating a central main to serve the new network and supplies.

With regards to capacity, an enquiry will need to be raised with Wales and West Utilities to establish whether there is sufficient capacity in the existing local network to support the new load, and what, if any, reinforcements may be required.

3.2 Power – Western Power Distribution

Western Power Distribution (WPD) are the incumbent distribution network operator for this service area.

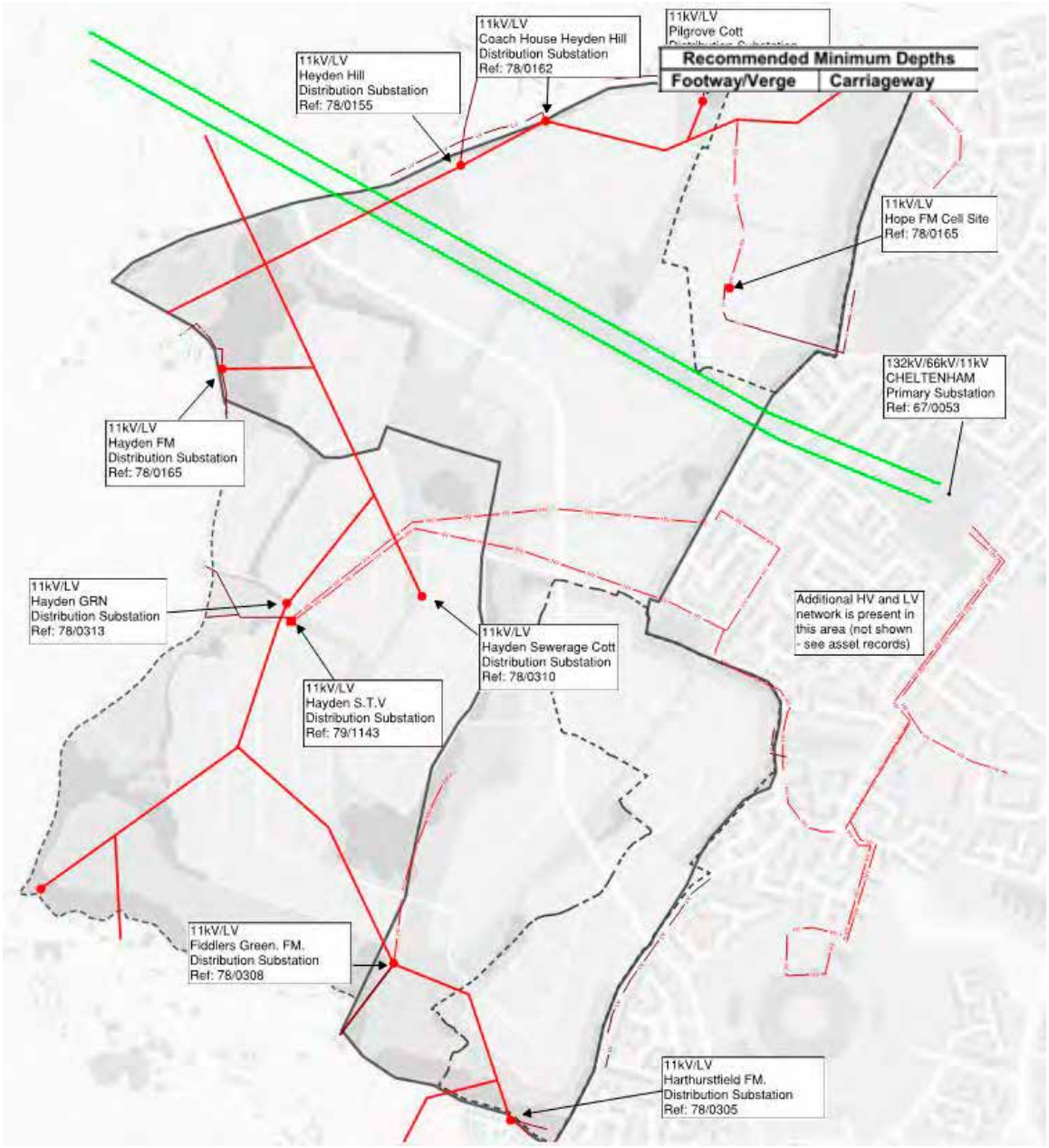


Figure 4 - Existing WPD electricity apparatus

Recommended Minimum Depths	
Footway/Verge	Carriageway
450-1200mm	750-1200mm

132kV transmission cable(s)

11kV Overhead cable(s)

11kV Underground cable(s)

LV Overhead cable(s)

LV Underground cable(s)

Pole mounted transformer

3.2.1 Existing Infrastructure

Records received from WPD show 2 parallel 132kV electricity transmission lines and associated pylons running in a south-easterly direction through the northern half of the site, terminating at WPD's Primary Substation, Cheltenham (ref: 67/0053). Cheltenham Primary is located on Hester's Way Road, approximately 350m straight line distance from the site.

A number of high voltage (HV) 11kV overhead lines and associated poles are shown to run through the site and within the boundary, predominantly near the north, west and southern edges of the site.

With regards to buried apparatus, 2 x HV 11kV underground cables run west to east through the central area of the site and a buried line also runs from the overhead network in the north down to reach Hope Farm, providing a service to the existing buildings associated with the farm.

Other WPD infrastructure residing within the site boundary includes a number of 11kV/LV secondary substations, one of which is a ground-mounted substation with the rest are pole-mounted transformers (PMT). Figure 4 above indicates their locations and substation references.

A low voltage network also exists within the residential area bounding the east of the site.

3.2.2 Constraints

The masterplan currently includes a strip along the route of the 132kV transmission lines within which there are no buildings, which is a design element that should be retained throughout the development of the site layout.

Safety clearances must be maintained from buildings constructed under or adjacent to overhead lines as well as other structures such as street lighting, objects on which a person may stand and new roads and new ground levels (where these will be altered by civil engineering operations) and where planting takes place.

The following tables have been taken from the Energy Networks Association's Engineering Directorate: Overhead Line Clearances, which stipulates the clearance distances required from grounds, roads, objects, buildings and structures.

The clearances below shall not be infringed at the specified maximum with the conducting hanging vertical in still air or deflected at any angle up to 45° from the vertical.

Table 2 - Clearances to Ground and Roads

Item	Description of Clearance	Nominal System Voltage (kV) Minimum Clearance (m)				
		≤ 33	66	132	275	400
6.1.1	Line conductor at any point not over road. (Note 1)	*5.2*	*6.0*	*6.7*	*7.0*	7.6
6.1.2	Line conductor to road surface other than as specified in 6.1.3, 6.1.4, and 6.1.5. (Note 2)	*5.8*	*6.0*	*6.7*	7.4	8.1
6.1.3	Line conductor to road surface of designated '6.1m high load' routes. (Note 3)	6.9	7.1	7.5	8.5	9.2
6.1.4	Line conductor to motorway or other road surface where 'Skycradle' can be used. (Note 4 & 6)	8.2	8.4	8.8	9.8	10.5
6.1.5	Line conductor to motorway road surface where scaffolding is to be used on: (i) Normal 3 lane motorways. (ii) Elevated 2 lane motorways (Note 5 & 6)	 14.0 11.0	 14.2 11.2	 14.6 11.6	 15.6 12.6	 16.3 13.3
6.1.6	Bare live metalwork, e.g. transformer terminals, jumper connections, etc. (Note 7)	*4.3*	*4.3*	Controlled Zone Safety Rules Apply		

Table 3 - Clearances to Objects

Item	Description of Clearance	Nominal System Voltage (kV) Minimum Clearance (m)				
		≤ 33	66	132	275	400
6.2.1	Line conductor to any object which is normally accessible (including permanently mounted ladders and access platforms) or to any surface of a building. (Note 1 and Fig. 1)	3.0	3.2	3.6	4.6	5.3
6.2.2	Line conductor to any object to which access is not required AND on which a person cannot stand or lean a ladder. (Note 2)	0.8	1.0	1.4	2.4	3.1

Table 4 - Clearances to Objects continued

Item	Description of Clearance	Nominal System Voltage (kV) Minimum Clearance (m)				
		≤ 33	66	132	275	400
6.2.3	Line conductors to that part of a tree under / adjacent to line and:					
	(i) Unable to support ladder / climber.	0.8	1.0	1.4	2.4	3.1
	(ii) Capable of supporting ladder / climber.	3.0	3.2	3.6	4.6	5.3
	(iii) Trees falling towards line with conductors hanging vertically only. (Note 3 and Fig. 2(a))	0.8	1.0	1.4	2.4	3.1
6.2.4	Line conductors to trees in Orchards and Hop Gardens. (Note 4 and Fig.2(b))	3.0	3.2	3.6	4.6	5.3
6.2.5	Line conductors to irrigators, slurry guns and high pressure hoses (Note 5)	30.0	30.0	30.0	30.0	30.0
6.2.6	Line conductor to street lighting standards with:					
	(i) Standard in normal upright position.	1.7	1.9	2.3	3.3	4.0
	(ii) Standard falling towards line with conductor hanging vertically only.	1.7	1.9	2.3	3.3	4.0
	(iii) Standard falling towards line. (Note 6, Fig. 3 and 4)	0.4	0.7	0.8	1.4	1.9

Table 5 - Ground clearances

Location	Minimum Clearance (m)
Along the line of hedgerows, fences and boundary walls etc.	4.0
Domestic driveways with an access width of 2.5 m or less which is defined by gateposts, hedges or other fixed features.	4.3
Between buildings where there is no vehicular access.	3.5

Table 6 - Clearance to Buildings and Structures

Location	Minimum Clearance (m)
Vertical clearance to any surface or structure that is accessible without access equipment (see Fig. 5).	3.0
Horizontal distance to any surface of a building or structure which is accessible without access equipment (see Fig. 5).	1.0
Clearance to parts of a building or structure not normally accessible (see Fig. 5). See note 1.	0.5
Clearance to free-standing apparatus such as street lighting columns, traffic signs, British Telecom poles or columns (see Fig. 5).	0.3

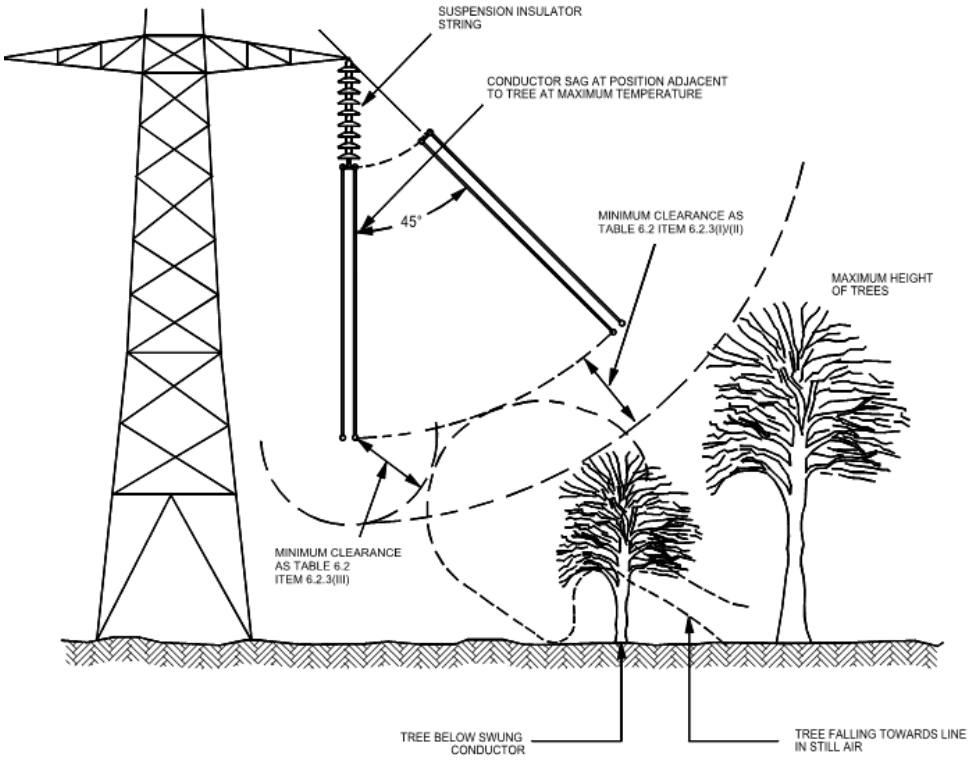


Figure 5 - Clearance to trees

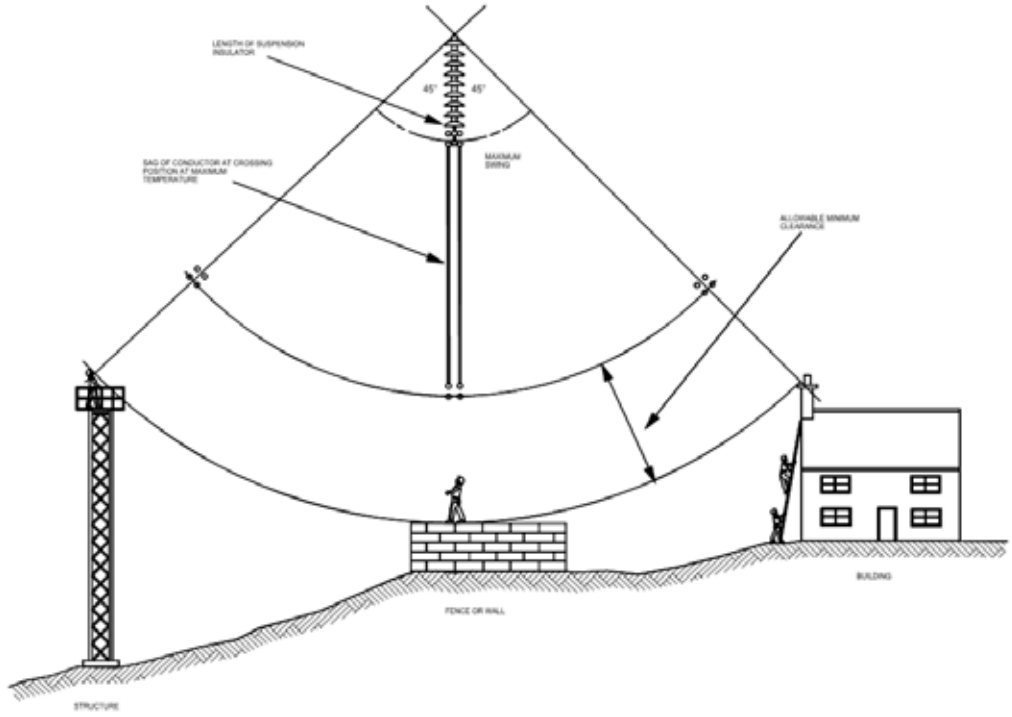


Figure 6- Clearance to objects (on which a person can stand)

In addition to the 132kV transmission lines, the 11kV overhead and buried cables also cause a constraint with the masterplan, however, this network can be diverted to accommodate the site layout, if required.

It is anticipated that the buried cables that run though the centre of the site will need to be diverted via the new road network, so that they do not conflict with the proposed buildings.

It should be noted that the asset records are only indicative of the location of the buried apparatus and therefore, it is recommended that at the next stage of design a survey is undertaken to establish the accurate position in order to inform the designs.

The overhead 11kV network in the north, east and south of the site will also require diversionary works to accommodate the current layout. It is anticipated that the overhead lines and poles that currently run over the areas of proposed buildings will require dismantling and diverting underground to run through the proposed new road network, or around the edge of the site. It is also anticipated that a couple of the substations will require relocating, grounding and/or re-purposing.

An application will be made to WPD at the next stage of design to assess the necessity for diversions, potential diversion routes and the likely cost implications for the works.

3.2.3 New connections

In terms of establishing a point of connection to the site, the size (voltage) and locality of existing electricity apparatus will not cause a constraint.

It is anticipated that in order to supply the site with electricity, new HV mains cables will need to be installed from the existing infrastructure around the site or from the Cheltenham Primary Substation. It is expected that the new mains would be installed along the spine road of the development, creating a central main to serve the new network and supplies.

A number of secondary substations will also be required throughout the site and will need space provision of approximately 5m x 5m.

With regards to capacity, a desktop investigation has confirmed that Cheltenham Primary Substation, which is a 132kV/66kV/11kV transformer, has a total capacity of 65MVA, of which circa 41MVA peak load is currently being used, leaving a spare capacity of 24MVA. A load assessment as not yet been completed for the development, however, it is anticipated to require less than 24MVA, and therefore, it can be assumed that there will be sufficient capacity at the Primary Substation to support the development. Reinforcements may be required however to the local HV infrastructure, such as additional cabling and circuits.

Upon completion of a load assessment, an enquiry will need to be raised with WPD to confirm whether there is sufficient capacity in the existing local network to support the new load, and what, if any, reinforcements may be required.

Figure 7 below indicates the location of Cheltenham Primary Substation and the network area that it supplies.

Figure 7 - Cheltenham Primary Substation network area

3.2.4 Opportunities

A desktop study was undertaken to establish whether there is any opportunity for exporting power to the Cheltenham Primary Substation. The investigation confirmed that the primary has an incoming capacity of 32.5MVA, with only 1.2MVA connected currently.

It also confirmed that there are no fault level issues, meaning that the risks associated with overheating and faults when exporting electricity to this substation are low.

This concludes that there is a good opportunity for export to Cheltenham Primary. The opportunity will be explored further within Hydrock's Smart Energy assessment at the next stage of design.

3.3 Water – Severn Trent Water

Severn Trent Water (STW) are the incumbent water board for this service area.

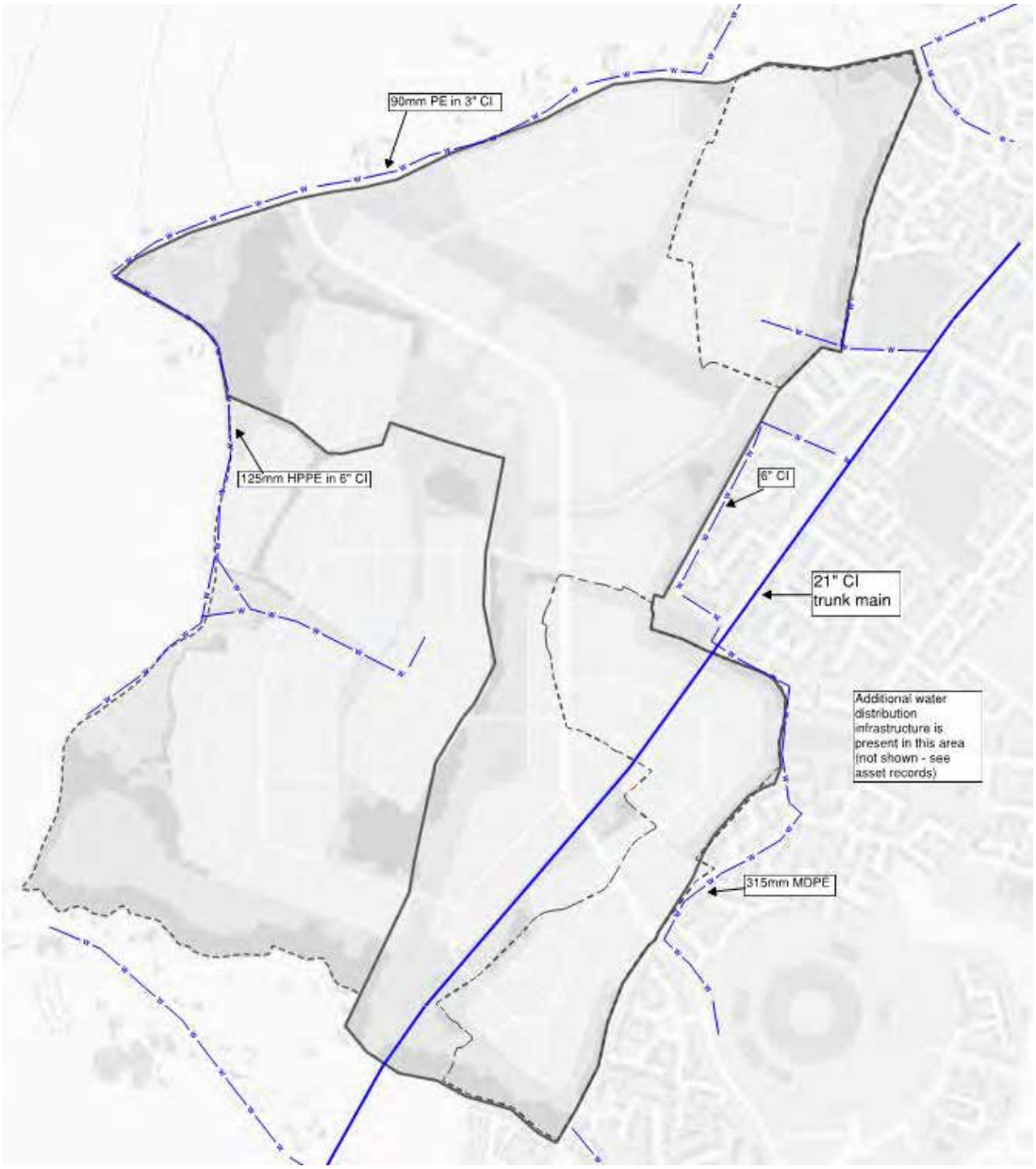


Figure 8 - Existing Severn Trent Water apparatus

Recommended Minimum Depths	
Footway/Verge	Carriageway
600 – 750mm	600 – 750mm

Trunk Main

Distribution Main

3.3.1 Existing Infrastructure

Records received from Severn Trent Water show a 21" cast iron (CI) trunk main running through a large portion of land in the southern section of the site.

A 4" CI main providing a service and hydrant to Hope Farm exists within the boundary, as well as a distribution network entering the site from the west to supply the Hayden Sewage Works. The remainder of the distribution

network bounds the north and east edges and runs throughout the residential areas that surround the site, but do not encroach into the boundary.

The key infrastructure around the site includes a 90mm polyethylene in a 3" CI main in Old Gloucester Road to the north, a 6" CI main in Henley Road to the east and a 315mm medium-density PE (MDPE) pipe around the south east boundary of the site, running in Telstar Way.

3.3.2 Constraints

The 21" trunk main has been considered within the masterplan with a strip of green space over the location of the main and therefore is not anticipated to pose a constraint.

A trunk main is a strategic pipeline that carries water from a source of supply to a treatment plant or reservoir, or from one treatment plant or reservoir to another. It is also used for transferring water in bulk to smaller water mains used for supplying individual customers.

Due to the strategic nature of such a main, a diversion is not always a viable option as the costs and works involved can be extensive. The preferred option from the water companies tends to be to stipulate a no-build easement strip within which there are no kinds of permanent structures or trees with large root structures. The easement distances can be specific to each main, however for a main larger than 12" the standard minimum is 6m either side of the pipe. It is expected that, due to the size of the main in this area (21"), a larger easement strip could be required. An enquiry has been made with STW to determine what the easement distance is likely to be.

It is recommended that the accurate position of the main is confirmed at an early stage with an onsite investigations (such as a GPR survey) so that it may inform more developed designs.

Any existing connections within the site will require disconnecting prior demolition.

3.3.3 New connections

In terms of establishing a point of connection to the site, the size and locality of existing potable water apparatus will not cause a constraint.

It is anticipated that in order to supply the site with clean water, new distribution mains will need to be installed from the existing infrastructure to the north and/or south of the site. It is expected that the new mains would be installed along the spine road of the development, creating a central main to serve the new distribution network and supplies.

With regards to capacity, an enquiry will need to be raised with STW to establish whether there is sufficient capacity in the existing local network to support the new load, and what, if any, reinforcements may be required.

3.4 Telecommunications – Openreach (BT)

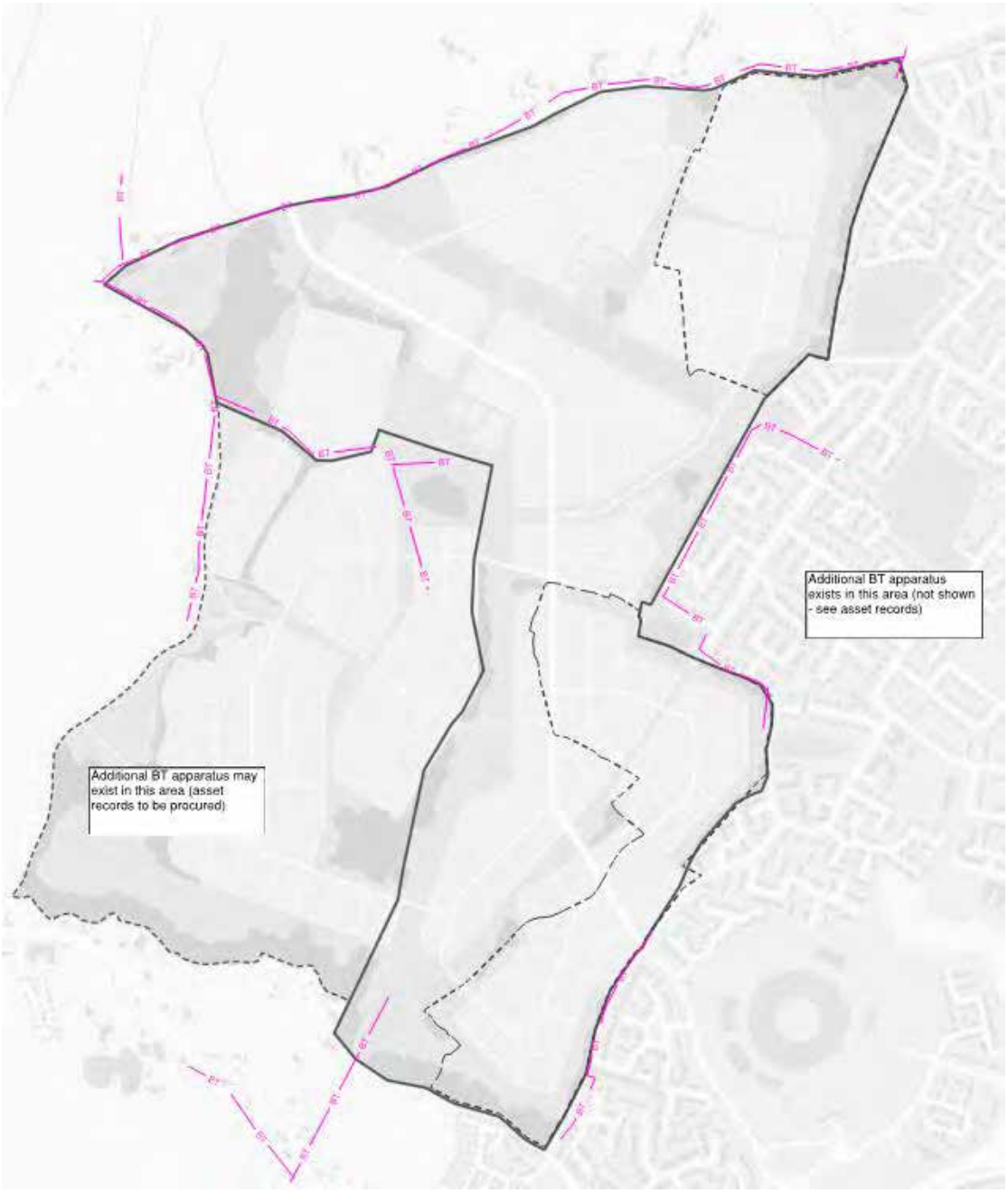


Figure 9 - Existing Openreach (BT) apparatus

Recommended Minimum Depths	
Footway/Verge	Carriageway
250 – 350mm	450 - 600mm

3.4.1 Existing Infrastructure

Openreach provides the telecommunications infrastructure in the UK. British Telecoms (BT) provide the telecommunication services.

Records received from Openreach show existing buried apparatus and associated chambers running in the nearside verge of Old Gloucester Road, as well as throughout the residential area that bounds the site to the east. A further buried and overhead network exists to the west of the site along Hayden Lane which continues southwards to provide a service to Hayden Sewage Works.

An "inferred" network is shown to run in the nearside verge of Fiddler's Green Lane. Inferred network typically is recently laid apparatus that has not yet been checked/confirmed by an Openreach engineer and therefore shows as a purple line on the asset records. Therefore, the location and route is only assumed.

With regards to existing connections on site, an overhead line is shown to extend into the site from Pheasant Lane at the south, terminating at a pole at the edge of the existing buildings north of Hatherley Brook. An overhead line also provides a connection inside the boundary to the buildings off Springback Road.

All existing connections will require disconnecting prior to any demolition.

3.4.2 Constraints

A couple of conflicts have been identified at the locations of the new site access roads where the BT apparatus runs in the verge and carriageway.

The typical depth of buried telecoms cables is 250mm-350mm when in a verge, however a 450mm level of cover should be retained when buried in a carriageway. Due to the change in highway layout, it is anticipated that the telecoms apparatus in Old Gloucester Road and Fiddler's Green Lane will require diversions beneath or into the new bellmouths.

Openreach charge a diversion application fee (specific to each site) to conduct a site survey and subsequently produce a specification of works and a detailed estimate. An application will be made at the next stage to understand costs and works required for the diversions.

It is expected that the overhead apparatus connecting any existing buildings will be dismantled and removed as part of the disconnection process.

3.4.3 New Connections

In terms of establishing a point of connection, the locality of existing Openreach apparatus will not cause a constraint. It is anticipated that a new Openreach network will be established from existing buried infrastructure that surrounds the site.

3.5 Data/Fibre

3.5.1 Existing Infrastructure

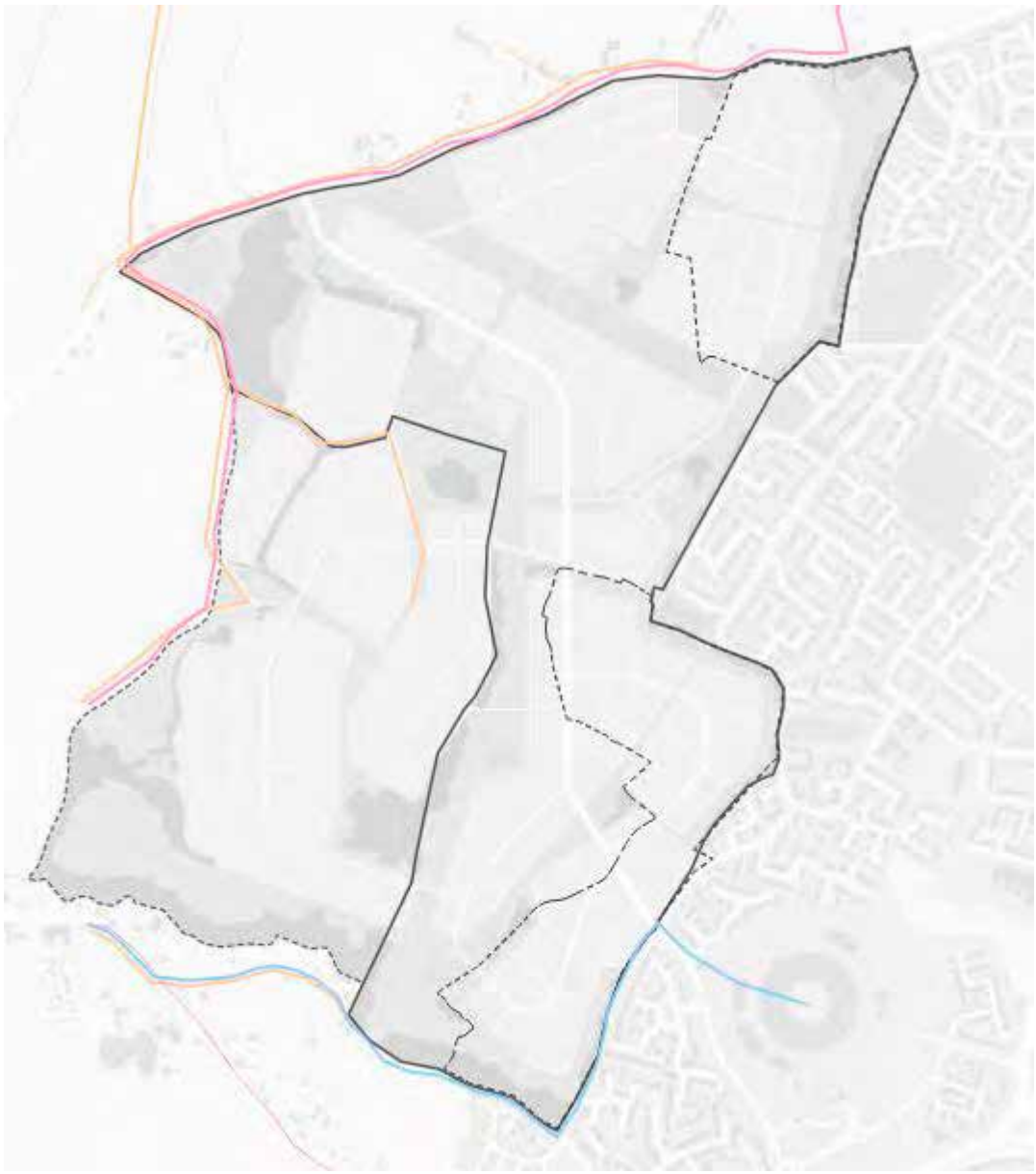


Figure 10 - Existing fibre apparatus

3.5.2 Existing Infrastructure

Records received from both Zayo and Gigaclear show existing buried fibre apparatus running in Old Gloucester Road along the northern boundary of the site and Hayden Lane to the northwest.

Records received from Instalcom show a fibre network running along Telstar Way, and down Fiddler's Green Lane along the sites south-east boundary. It then continues along Pheasant Lane at the site's southern boundary.

3.5.3 Constraints

Conflicts have been identified at the locations of the new site access entrances at Old Gloucester Road Junction and Telstar Way junction. Due to the change in highway layout, it is anticipated that the fibre apparatus at both locations will require diverting beneath or into the new bellmouths.

It is recommended that the accurate location depths of the fibre ducts are established at an early stage in order to inform designs and determine the extent of the diversionary works required. This can be done either with a GPR survey (for an indication of position/location) or trial holes (for confirmation of depths).

Applications to Gigaclear, Instalcom and Zayo will be made at the next stage to determine likely costs for the diversionary works.

3.6 Other Independent Utility Companies

Hydrock has undertaken a utility enquiry search using the Linesearch.org website. The results of the search conclude that the following companies do not have plant and equipment in 'zone of interest.'

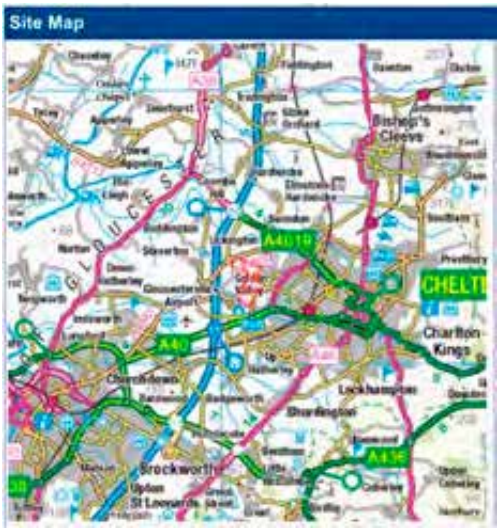


Figure 12 - LSBUD search area 1

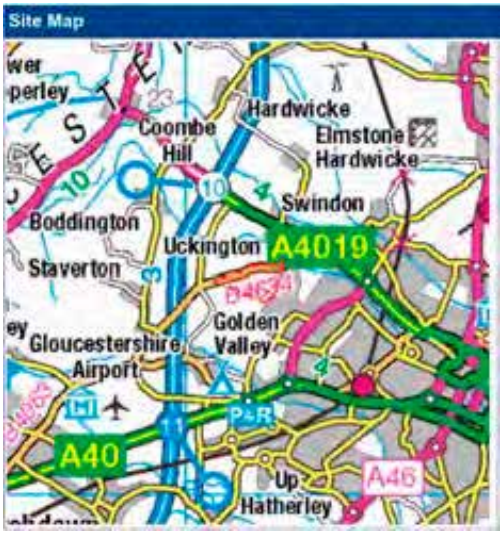


Figure 11 - LSBUD search area 2

List of not affected LSBUD members		
AWE Pipeline	Balfour Beatty Investments Limited	BOC Limited (A Member of the Linde Group)
BP Exploration Operating Company Limited	BPA	Carrington Gas Pipeline
CATS Pipeline c/o Wood Group PSN	Cemex	Centrica Storage Ltd
CLH Pipeline System Ltd	Concept Solutions People Ltd	ConocoPhillips (UK) Ltd
DIO (MOD Abandoned Pipelines)	Drax Group	E.ON UK CHP Limited
EirGrid	Electricity North West Limited	ENI & Himor c/o Penspen Ltd
EnQuest NNS Limited	EP Langage Limited	ESP Utilities Group
ESSAR	Esso Petroleum Company Limited	Fulcrum Pipelines Limited
Gamma	Gateshead Energy Company	Gtt
Hafren Dyfrdwy	Heathrow Airport LTD	Humbly Grove Energy
IGas Energy	INEOS FPS Pipelines	INEOS Manufacturing (Scotland and TSEP)
INOVYN Enterprises Limited	Intergen (Coryton Energy or Spalding Energy)	Mainline Pipelines Limited
Manchester Jetline Limited	Manx Cable Company	Marchwood Power Ltd (Gas Pipeline)
Melbourn Solar Limited	Murphy Utility Assets	National Grid Gas (Above 7 bar), National Grid Gas Distribution Limited (Above 2 bar) and National Grid Electricity Transmission
Northumbrian Water Group	NPower CHP Pipelines	Oikos Storage Limited
Ørsted	Perenco UK Limited (Purbeck Southampton Pipeline)	Perenco UK Limited (Purbeck Southampton Pipeline)
Petroineos	Phillips 66	Premier Transmission Ltd (SNIP)
Prysmian Cables & Systems Ltd (c/o Western Link)	Redundant Pipelines - LPDA	RWE - Great Yarmouth Pipeline (Bacton to Great Yarmouth Power Station)
RWEnpower (Little Barford and South Haven)	SABIC UK Petrochemicals	Scottish Power Generation
Seabank Power Ltd	Severn Trent (Chester area only)	SGN
Shell (St Fergus to Mossmorran)	Shell Pipelines	SSE (Peterhead Power Station)
Tata Communications (c/o JSM Construction Ltd)	Total (Colnbrook & Colwick Pipelines)	Total Finaline Pipelines
Transmission Capital	UK Power Networks	Uniper UK Ltd
Vattenfall	Veolia ES SELCHP Limited	Westminster City Council

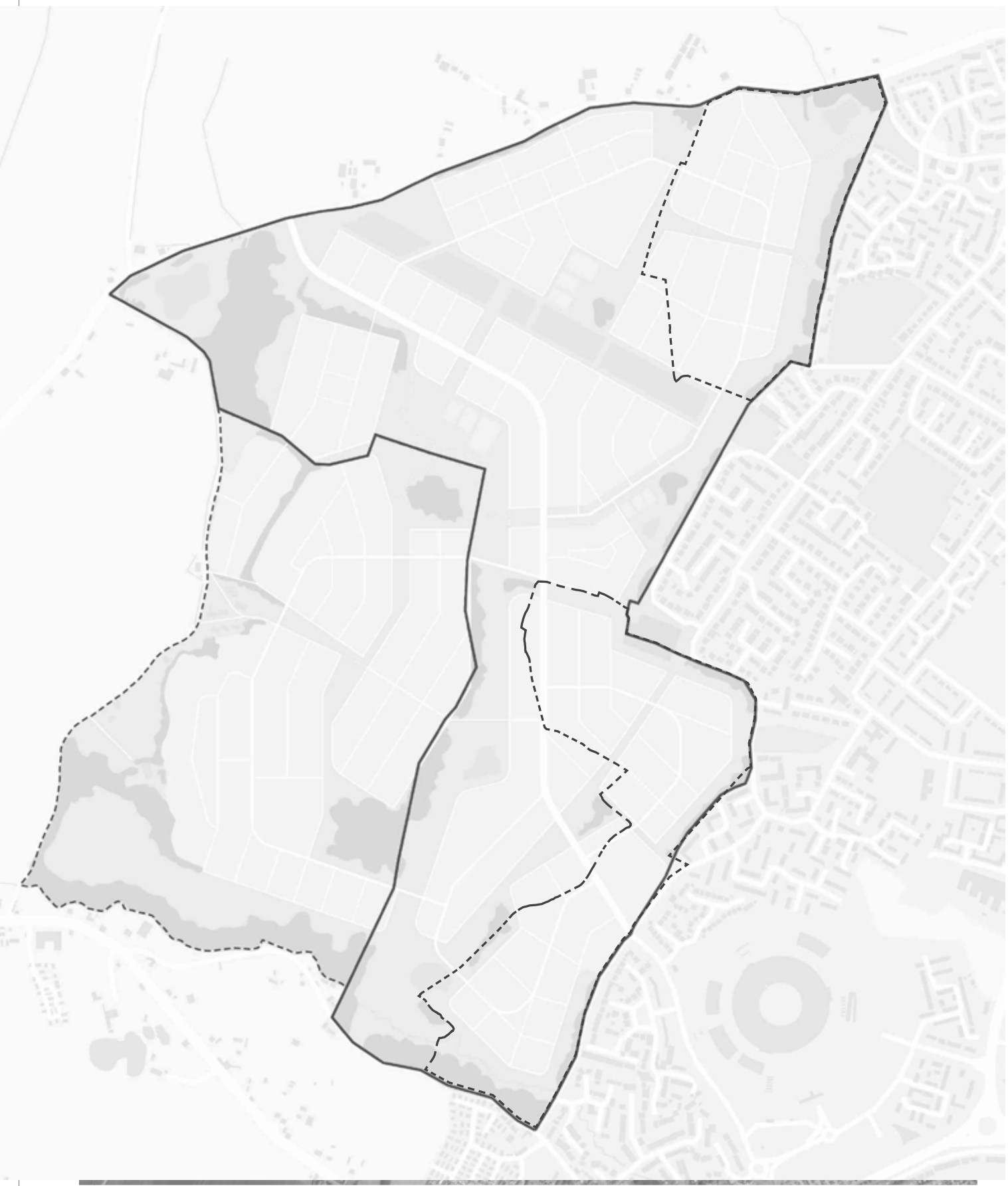
The following companies, not registered to Linesearch, were independently contacted by Hydrock and subsequently responded to confirm they have no assets in the zone of interest:

- CityFibre
- Energetics
- Engie
- KPN
- Sky Telecommunications Services
- SOTA
- Teliasonera
- Verizon
- Vodafone

The asset records of the following companies have been requested, however, at the time of reporting, no response had been received. It is therefore recommended that the potential presence of assets should be considered:

- Colt Technology Services
- Virgin Media

Please note that Hydrock Consulting is unable to guarantee the accuracy of information provided by others. This report is based on information available at the time.



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CONTENTS

Figures

Transport and Access

1. INTRODUCTION

This Technical Note (TN) has been produced to consider transport and access opportunities and issues in relation to the Cyber Park masterplan and SPD.

The TN considers the connectivity, layout and constraints and the wider strategic position of significant development sites and infrastructure and has been informed by the high volume of work that has been undertaken across Cheltenham and surrounds.

The TN informs the background position in relation to the development which assists in ensuring that the Cyber Park site ties in and facilitates wider improvements, encourages sustainable travel, integrates into existing areas and minimises the impact on the highway network.

In summary, a review has been undertaken of key documents which have been produced in relation to transport strategies in and around Cheltenham as follows:

1. Elms Park application – Transport Assessment and accompanying mitigation proposals (PJA)
2. Cheltenham Plan Transport Assessment (Arup)
3. Joint Core Strategy (JCS)
4. Gloucestershire County Council M5 J10 Housing Infrastructure Fund (HIF) bid
5. West Cheltenham Transport Improvements (LEP Growth Deal Funding)
6. Connecting Cheltenham (Systra)
7. Work in progress for the planning application at Land at West Cheltenham (TPA) (this is the same site as Cyber Park and as such progress on this has provided a key input to this transport analysis)

2. EXISTING SITUATION

2.1 Overview

The site is situated to the east of the M5 and north of the A40. Both of these form part of the Strategic Road Network (SRN) which is maintained by Highways England (HE) – albeit within the vicinity of Cyber Park the A40 is maintained by Gloucestershire County Council. The site is contiguous with Old Gloucester Road to the north and Telstar Way / Fiddlers Green Lane to the south, which will likely form the two key vehicular access points into the site.

The site also has a boundary connecting with Henley Road / Springbank Road to the east and Pheasant Way to the southwest.

The site is also situated approximately 1km to the north of the Bristol-Birmingham railway line and the nearest station is Cheltenham Spa approximately 2km to the southeast of the site.

A summary of the site location in the context of the key highways surrounding the site is shown in Figure 2.1.

Figure 2.1: Indicative Site Location and Context

2.2 Public Transport

The closest bus routes operating within the vicinity of the site are the A, C, H and 94 Gold.

The 94 Gold provides a 10 minute frequency of service and as such would be an attractive option for travelling to the site from Cheltenham and Gloucester and also stops within a reasonable proximity of the Cheltenham Rail Station.

Service H connects the Town Centre to Swindon Village and Arle Farm to the north of the site. This runs with a 30 minute frequency.

Service C connects the Town Centre to Kingsditch and Springbank to the east of the site. This runs with a 15 minute frequency of service.

Service A connects Benhall and GCHQ to Prestbury via Cheltenham Town Centre. This stops to the south east of the site and operates with a 12 minute frequency.

As such, the site could benefit from connecting to a number of high frequency existing services. The latest route map from Stagecoach which shows these routes has been reproduced in Figure 2.2. There is a lack of services linking the site to the Cheltenham Rail Station directly and as such, this should be considered as part of any future public transport strategy.

The Arle Court Park and Ride (P&R) is situated approximately 1km to the south of the Telstar Way access point. This is located to intercept vehicles travelling into Cheltenham, however the 94 bus service serves the P&R and as such there may be some potential for linking this to the site.

Figure 2.2: Existing Bus Routes

2.3 Walking and Cycling

There is a footway / cycleway provided adjacent to the carriageway on Telstar Way to the south of the site which links to an off-carriageway walking / cycling route adjacent to the A40. This route ceases to the east of Telstar Way and commences again from Princess Elizabeth Way. As such, there Is the potential for extending the route adjacent to the missing section along the A40. To the north of the site, there are no footways on Old Gloucester Road adjacent to the site boundary, although a footway is provided which links from Pilgrove Way. To the east of the site, within the existing residential areas, footways are provided on all local residential streets providing a highly permeable environment for pedestrians.

The cycle routes within the vicinity of the site and linking to Cheltenham are shown in Figure 2.3. This is taken from a Cheltenham Borough Council cycling map and shows quiet streets and off-carriageway cycling routes. There is limited cycling infrastructure or routes linking through the existing Springbank and Rowanfield residential areas, however most of the routes are considered to be quiet roads and therefore suitable for cycling. The site has the potential to connect to a number of cycle routes via Telstar Way, along Princess Elizabeth Way and the A40 as well as further afield along the Honeybourne Line. These could be linked through the existing residential areas in Springbank via a number of connection points and include signage and road markings, as appropriate.

Figure 2.3: Cheltenham Cycle Routes

National Cycle Route 41 runs directly to the southern boundary of the site and provides a cycling link between Gloucester and Cheltenham. This is a mixture of an on and off-carriageway route and offers the potential for travel to and from the site via cycle. The route is shown in Figure 2.4.

Figure 2.4: National Cycle Route 41

In summary, the site is well connected by public transport from existing services which could be extended through the site. There is a good network of walking and cycling routes linking to the site which the masterplan can connect into and enhance. Improvements could be made along Old Gloucester Road to provide a footway linking to the northeast, where needed.

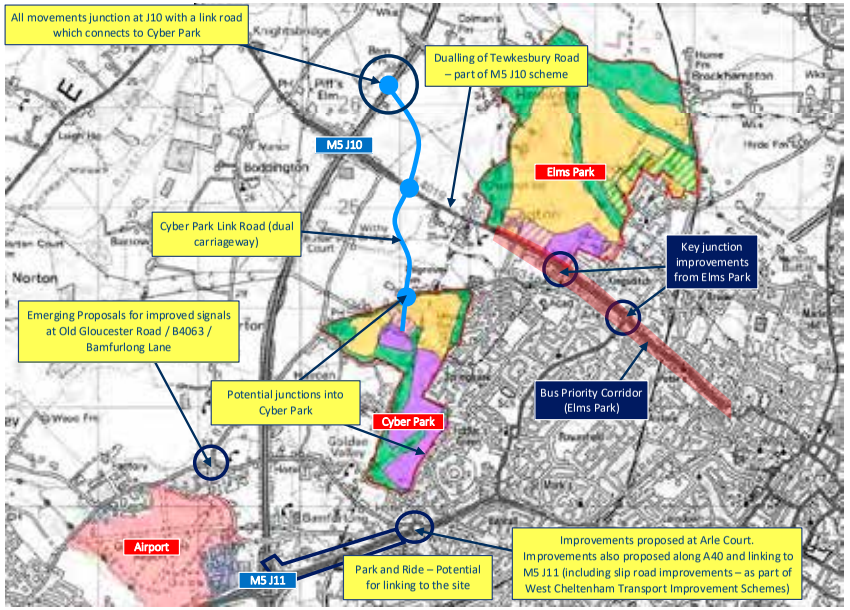
3. STRATEGIC IMPROVEMENTS AND EXISTING ANALYSIS

3.1 Overview

A review of the work undertaken in the surrounding area as summarised in Section 1 has informed the wider strategic context of the site and how this could tie in to the surrounding area. A summary of the strategic improvements being proposed by GCC, CBC, HE and Elms Park within the vicinity of the site and potential opportunities for improvements are shown in Figure 3.1.

A summary of the work undertaken for each study has then been set out. Hydrock have also discussed the Elms Park site with PJA and the land at West Cheltenham site with TPA (this is the Cyber Park site). These consultants have undertaken a significant amount of work supporting planning applications on these sites and understanding this work, particularly the TPA analysis will inform the constraints and opportunities for the Cyber Park site. As the TPA work relates to the Cyber Park site, this has been analysed separately in Section 4.

Figure 3.1: Strategic Improvements within the vicinity of the site



3.2 Growth Deal Fund

Gloucestershire County Council (GCC) announced a Growth Deal 3 allocation of £22m for infrastructure associated with the delivery of the Cyber Park site in Cheltenham (West Cheltenham). The funding is for the delivery of four phased improved schemes[1], related to improvements at Arle Court roundabout, M5 J11 and the A40. It also includes improvements to the Benhall roundabout and improved cycling links connecting to Cheltenham, which could tie in with the Cyber Park site via Telstar Way.

The Arle Court roundabout scheme does not provide any improvement in capacity on Fiddlers Green Lane and as such, how the site ties in with this street should be considered within the access strategy. It may be preferable to stop up this route to the site to ensure that all vehicles route via Telstar Way, however this may have implications on the capacity at the Telstar Way / A40 junction. The Arle Court improvement scheme is shown in Figure 3.2

Separately (but in the vicinity) there are extensive improvements proposed to increase capacity and usage of the Park and Ride.

[1] https://www.gloucestershire.gov.uk/highways/major-projects-list/west-cheltenham-transport-improvement-schemes-uk-cyber-business-park/

Figure 3.2: Arle Court Improvement Scheme

3.3 Junction 10 Improvements

Gloucestershire County Council has made a bid to Homes England to fund a multi-million pound investment in transport infrastructure. The funding would provide an upgrade of M5 junction 10 with the new junction giving access from the motorway both northbound and southbound to a new link road into Cheltenham which would link to the Cyber Park. The link road would be dual carriageway in nature and connect to the northern end of Cyber Park and need to tie in to the main access road. An indicative alignment of this route and the new junction location have been shown in Figure 3.1.

The junction may also offer some capacity benefits at Junction 11 as vehicles would not need to divert to J11 to travel to and from the M5 south. There may also be some diversion of vehicle movements through the Cyber Park to access J10, although it is considered that the level of this diverted traffic would be minimal.

As part of the bid an extensive traffic modelling exercise has been undertaken and a VISSIM model produced which covers significant parts of Cheltenham.

Highways England provided a letter of support to Homes England regarding the HIF bid following review of the traffic modelling work that was undertaken specifically for that submission.

3.4 PJA work on Elms Park

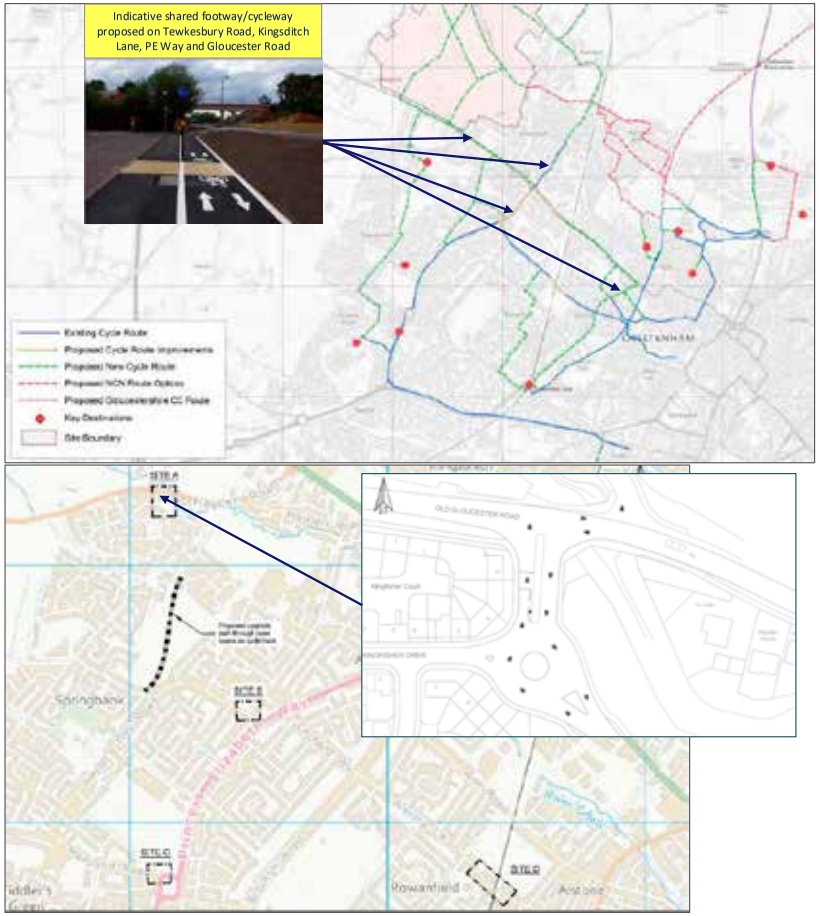
We have discussed the background to Elms Park with Phil Jones Associates (PJA) who provided detailed information on the transport modelling position. In summary, PJA have a Paramics model which covers Tewkesbury Road, although Highways England have a more extensive Vissim model.

PJA are currently paused with inputs and awaiting the land West of Cheltenham site to bring forwards proposals so that development impacts can be assessed considering all cumulative development.

The drawings for the Elms Park site accesses show that the spine roads within the site would have 7.3 metre wide carriageway widths. The Elms Park Transport Assessment shows that the access roads accommodate c. 2,200 movements per hour across the four access points.

The Elms Park development also proposes significant improvements along the Tewkesbury Road corridor for buses and cyclist access. There are minimal opportunities for improving the operational capacity of junctions and as such, the key focus of their transport strategy is to encourage sustainable travel and a modal shift to alternative modes for existing users. The majority of mitigation proposals are therefore for sustainable transport improvements. A plan showing the extent of cycle route improvements has been reproduced in Figure 3.3.

Figure 3.3: Cycle Improvements – from PJA Elms Park TA



4. SUMMARY OF TPA WORK ON WEST CHELTENHAM AND HYDROCK COMMENTS

TPA were appointed in 2015 to provide transport support for the land at West Cheltenham site (which is the Cyber Park). Hydrock subsequently met with TPA to chat through the site, transport modelling, public transport and walking / cycling strategies and access strategies. These were discussed in the context that the Transport Assessment and traffic modelling is still a work in progress and Hydrock have not had sight of of the technical documents/assessments or any draft reports.

Hydrock's understanding of that ongoing work is summarised below, along with our own commentary. It reflects a moment in time and is subject to change as the assessments progress.

Spine Road Design and Traffic Flows

The spine road is designed within the TPA scheme (the masterplanning is being undertaken by Turley) to minimise the level of through movements from diverted traffic. It has been designed as a single carriageway route, but they have safeguarded an extra lane in each direction, so a dual carriageway can be provided, if needed. This is more likely to be used as a bus lane, if needed.

The site proposals are forecast to generate c. 2,500 vehicle movements in the peak hours. These will not all be on the access road at the same location and as such, a Spine Road design to accommodate this level of traffic should be appropriate. The majority of movements access to/from the southern access via Telstar Way. All analysis to date has assumed that a minimal level of movements divert through the site, although modelling is still ongoing.

Based on discussions, Hydrock considers that a single carriageway road of 7.3m width would be appropriate for the Spine Road and this could have bus priority sections, as required. Bus priority could be provided as a loop from Springbank Road / Henley Road via bus gates and diverting existing services. Keeping this road to 30mph and providing frontage activity will reduce speeds and discourage through movements. Although there can be frontage activity, this road will carry significant levels of traffic and as such frontage accesses (i.e. driveways and parking spaces) may need to be kept to a minimum.

Northern Access

The northern access location has been informed by the GCC / HE M5 J10 link road proposals. The HE link road is proposed as a dual carriageway and the TPA proposals are for a roundabout junction to tie into this link road from the main Spine Road. The internal spine road is a single carriageway and the roundabout allows for a transition from single to dual carriageway, as well as acting as a traffic calming measure to slow vehicle speeds entering the Cyber Park site from the dual carriageway link. The location is broadly fixed in the north west section of the site based on the M5 J10 link road alignment. There is the potential for a minor amendment to this location, although it has been positioned considering constraints, including utilities (overhead cables), visibility and gradient. The indicative location and layout of this roundabout junction is shown on the latest TPA masterplan with the northern access section reproduced in Figure 4.1.

Figure 4.1: Northern Access – TPA / Turley scheme

Within this northwestern section of the site, there is little development shown on the Turley masterplan, which could relate to constraints such as utilities and drainage requirements. As such, the roundabout does not take up much / any developable area.

The roundabout was chosen as the most appropriate option considering the flows through the junction based on the traffic modelling and it also assists with reducing speeds entering and exiting the site, particularly when moving from a dual to a single carriageway.

TPA saw no reason why a signal junction could not replace the roundabout, although they considered a roundabout more appropriate in both traffic flow and landscaping terms. They also considered that a signal junction would take a significant amount of room so the saving in developable area would be minimal and that the site is constrained in this location anyway (i.e. by overhead cables).

Hydrock would consider that a roundabout in this location seems like a reasonable option, as there is likely to be a lower development density at the northern end of the site and it will not require the same level of frontage activity or links to surrounding uses (i.e. GCHQ) as at the southern end of the site. A signal junction could also encourage vehicles to and from the dual carriageway to speed through the junction and increase speeds on the Spine Road. There are likely to be less pedestrian and cyclist movements in this location than elsewhere within the site and therefore a roundabout is considered to form an appropriate access junction.

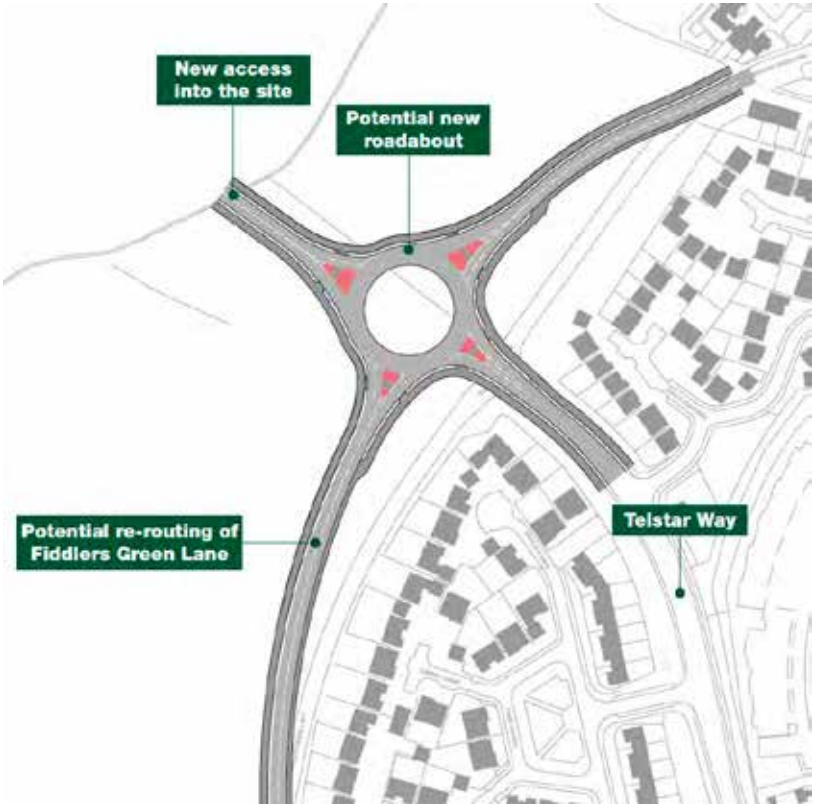
The TPA access strategy also proposes a second access to the north east of the site onto Old Gloucester Road. This is proposed to be a ghost island right turn lane priority junction. Due to the location of the link road and main site access junction to the northwestern edge of the site, a second access to the northeast of the site is considered preferable.

Southern Access

The southern access was designed as a roundabout to accommodate the traffic flows appropriately and based on the traffic modelling results and analysis to date. A roundabout junction has been designed with pedestrians and cyclists in mind and appropriate crossing provision is provided on each arm of the roundabout. The roundabout is positioned in its location to minimise the impact on the Tree Protection Order (TPO) as well as considering other site constraints.

The roundabout is also shown indicatively on the Turley masterplan and the drawing from the exhibition stands used in 2018 is reproduced in Figure 4.2. The final size and scale of the roundabout may change as the traffic modelling progresses but provides a useful indicator of the site access strategy at this stage.

Figure 4.2: Southern Access – TPA / Turley scheme



TPA also sketched a signal design, but the roundabout was considered preferable from an operational perspective. The signal junction also had to be pushed into the site at a similar distance to the roundabout junction due to the TPO's along the site boundary.

TPA also confirmed that the proposed access strategy considers a dualling along the length of Telstar Way linking into the site.

The majority of traffic is forecast to use this access and TPA are testing a scenario where Fiddlers Green Lane to the west of the site access is stopped up to reduce 'rat-running', although a design for this has not been produced. Fiddlers Green Lane is a minor single carriageway road with on-street parking, and may be unattractive to site traffic, but requires further consideration.

Hydrock consider that there may be some potential for a three arm signal junction at this location to restrict all vehicle movements to and from Fiddlers Green Lane. This is to minimise the impact on Fiddlers Green Lane at the Arle Court roundabout and divert all site traffic on the more appropriate route via Telstar Way. A three arm junction may also minimise or avoid any impact on the TPO on the south western side of this junction. It could allow an improved frontage activity and sense of arrival at this key access point and provide enhanced walking and cycling priority and access. It would also minimise the land take required for the junction and the loss of developable land area. This type of junction would require design and modelling to ensure that it is feasible as stopping-up Fiddlers Green Lane will have a significant impact on the routing of background traffic flows, in addition to accommodating the site traffic. A potential option

Connectivity to the existing residential areas to the east

Vehicular access to the east was ruled out very quickly by TPA and the project team due to the potential adverse impacts from rat running movements through residential areas. This was also the view of GCC. There was also an aspiration to maintain low levels of vehicular traffic on the existing streets within these areas to encourage walking and cycling movements to and from the site and within these areas, particularly given the low level of cycling infrastructure in these areas. Part of the cycling strategy for movements towards Cheltenham Rail Station is for cyclists to use these quiet streets, therefore increasing vehicle movements would detract from this as an option.

The masterplan shows multiple walking / cycling connections through to the existing local area. The masterplan shows development separated from the existing urban area, but there isn't necessarily a transport related reason for this.

There is also a bus connection onto Henley Road shown on the TPA / Turley masterplan.

Walking and Cycling

The TPA masterplan proposes eight walking and cycling connections to the east. These link into Grist Mill Close, Somergate Road, Hope Orchard, Henley Road, Springbank Road and Beverley Croft.

The key cycling connection to the Cheltenham Rail Station would be from the south, along Telstar Way, then along the A40. TPA advised that a new cycle link is being provided from the A40 to the station as part of an overall cycle strategy. A cycle connection onto Telstar Way would therefore create a full off-carriageway cycling route between the site and the Rail Station (and beyond). For those that may wish to travel more directly (particularly those in the centre and northern parts of the site), they could use the quiet streets through Hesters Way / Rowanfield and St Marks. Key routes have been drawn up by TPA. Minimising traffic through these areas would therefore be important for encouraging cycling on-road.

TPA have no proposals for significant infrastructure improvements for cycling within the residential areas, other than signage and on-street markings for cycle routes along quiet roads. This would be similar to that proposed by Elms Park at Kingfisher Drive / Blaisdon Way / Appleyard Court (shown in Section 6).

The TPA proposals also allowed for a connection to the south west via Pheasant Lane which in turn links to the B4063.

Hydrock consider that maximising the walking and cycling connections to the local areas will enable a permeable and connected development and encourage sustainable travel.

Public Transport

TPA have held extensive discussions with operators on services but have not provided detailed diversion plans on existing bus routes, as by the time the site is operational, these are likely to have significantly changed. They have allowed for a bus gate linking to Henley Road and bus priority within the site.

Hydrock consider that there are a number of options for bus diversions into the site and a bus gate and loop road arrangement to and from Henley Road would provide a good option for encouraging travel by bus and connecting the existing residential areas to the Cyber Park. Further details on bus diversions and connections are shown in Section 6.

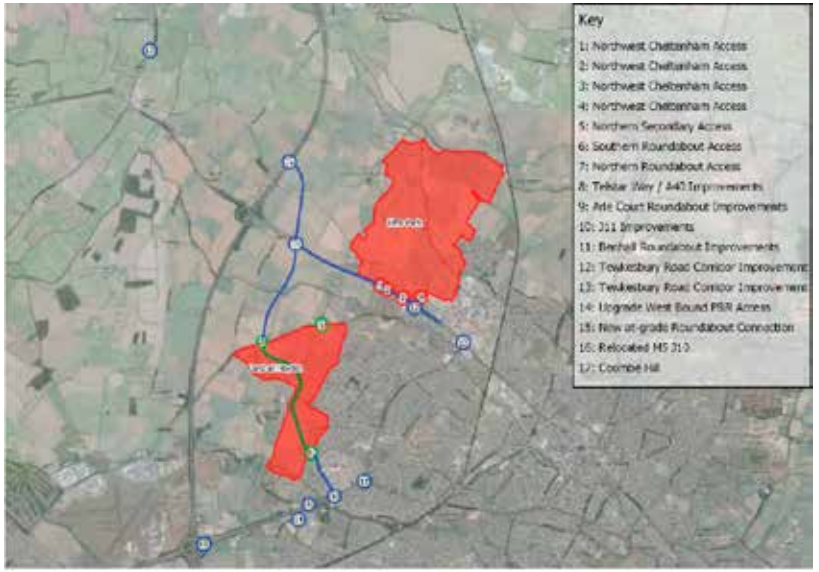
Junction Modelling / Highways

The TPA junction modelling is ongoing and interim results were not available. However, the Staverton Bridge junction is likely to be over capacity and require mitigation. TPA are considering an improved signals arrangement.

TPA also further confirmed that they are considering options on Fiddlers Green Lane to encourage traffic to use Telstar Way, including a stopping up and these are being assessed as a separate scenario within the traffic modelling.

The extent of traffic modelling on the network surrounding the site has been shown on a TPA figure reproduced in Figure 4.3.

Figure 4.3: Extent of TPA modelling



5. POTENTIAL VEHICULAR ACCESS AND SPINE ROAD

5.1 Spine Road

A single carriageway spine road of 7.3m width should be acceptable in traffic flow terms. Based on DMRB guidance contained in TA79/99 (Table 2) a single carriageway road (UAP2) with a width of 7.3m can accommodate c.2,450 two-way movements. It seems unlikely that the flows will exceed this level based on the information provided by TPA.

The Spine Road would encourage frontage activity and promote walking, cycling and public transport but due to the forecast traffic flows it would be unlikely to have, for example, driveway accesses.

5.2 Northern Access

At the northern access point, the TPA proposals for a roundabout to tie in with the J10 link road appear appropriate and acceptable based on the flows, minimising vehicle speeds entering and exiting the site and working with the site constraints. A signal controlled junction may be viable, but this would still require a significant land take and may encourage speeding between the spine road and the M5 J10 link road. A roundabout allows a key visual change between a dual carriageway and single carriageway environment.

5.3 Southern Access

The southern roundabout has been designed as TPA have advised it provides the best operational performance and the location of this set back into the site minimises the impacts on the TPO and considers other constraints.

Hydrock consider that a signal junction may be possible to provide here, but this would be of a significant scale if all four arms remained as the majority of traffic into the site would use this access. A four armed junction would likely be on a similar scale to the A40 junction to the south, particularly given that Telstar Way is proposed by TPA to be a dual carriageway.

The land take and size of the junction could be minimised, if Fiddlers Green Lane to the west of the access was stopped up and a three arm junction was provided. This would improve the efficiency of the junction significantly and reduce land take and maximise development space on the site. It could also minimise the impact on the TPO. The initial section of the access road into the site may need to be a dual carriageway to tie in with Telstar Way as this will improve the capacity of the junction and potentially safeguard a bus lane, if this is needed. A potential junction location, stopping up on Fiddlers Green Lane (which could become a walking and cycling route) and indicative scale of potential junction are shown in Figure 5.1. This is subject to detailed design and modelling, which have not been undertaken of this design option.

Figure 5.1: Indicative Southern Access Extents

6. CONNECTIVITY

6.1 Vehicular Connections

It is considered unlikely that GCC will agree to additional vehicle connections to the existing areas to the east based on maintaining these roads for walking and cycling and encouraging sustainable travel. They are also not appropriate for carrying high volumes of traffic or diverted 'rat-running' movement, albeit Hydrock have not seen any detailed modelling or analysis of what the potential impacts of this could be. Details of the suitability of each street where a vehicle access could be provided have been summarised as follows:

Henley Road

This has one footway and driveway access along its length. It also accommodates on-street parking and does not have road markings. In its current form, it is not considered suitable to accommodate a significant increase in traffic flows, although it does have appropriate geometry to accommodate bus movements. The location of Henley Road in relation to the site and an image of the street are shown in Figure 6.1.

Figure 6.1: Henley Road

Figure 6.2: Springbank Road

Springbank Road

This has one footway and driveway access along its length as for Henley Road. However, it is wider and has centre line markings. It also has less on-street parking and the footway is set back from the carriageway via a verge. It would be more suitable for accommodating an increase in traffic movements. It also has appropriate geometry to accommodate bus movements. The location of Springbank Road in relation to the site and an image of the street are shown in Figure 6.1.

Wider Routes

The routes to the site would travel via either Fiddlers Green Lane, which is where the main site access is located in any case, Marsland Road – which is not really suitable for increases in vehicle traffic or via Hesters Way Lane / Road which also has on-street parking, traffic calming and driveway access. None of these routes are ideal for increases in traffic flow, although they do currently accommodate vehicle movements associated with residential development. The location of the overall route to the site is shown in Figure 6.3.

Figure 6.3: Wider Connections

It may be that these local residential roads, by their nature do not attract a high volume of traffic as vehicles will be delayed on convoluted, slow speed streets which accommodate on-street parking and driveway accesses. Mitigation measures such as one-way give-way points and build-outs could reduce traffic speeds and further discourage vehicles from travelling through these routes. The shortcuts would only also be attractive for vehicles from local residential areas and may be less attractive for those to the east of Princess Elizabeth Way or south of the A40 as it may be quicker to travel via the main site accesses or via existing routes.

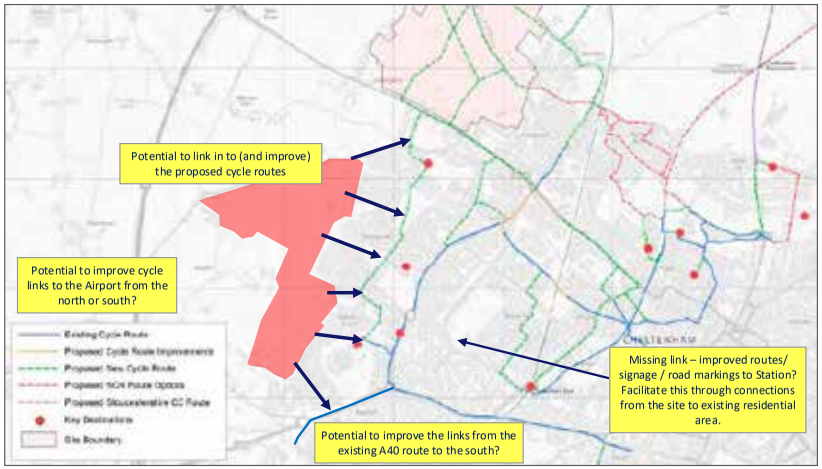
6.2 Walking and Cycle Connections

The site would need to maintain existing public rights of way and minimise diversions wherever possible. Cyber park would also enhance walking and cycling routes through the site with a network of footways, cycleways and greenways. Encouraging sustainable travel will be a key aspect of the Cyber Park development and the masterplan will need to facilitate travel by these modes.

As set out within the TPA / Turley masterplan, the site would need to connect to the existing residential areas to the east and a number of points of access for walking and cycling would need to be provided. The potential connections from the site to the wider area, to link in with the PJA proposed cycle improvements are shown in Figure 6.4.

The key cycling route would be via Telstar Way and then via existing off-carriageway routes along the A40. The plan shows this route, although it is also considered that routes to the south and Gloucestershire Airport could be improved.

Figure 6.4: Potential Connections to Cycle Routes (Based on PJA plan for Elms Park)



7. POTENTIAL BUS CONNECTIONS AND DIVERSIONS

Existing bus services should, where feasible and appropriate, be directed through the West Cheltenham development to serve new residents and employees as well as provide access to the employment areas for existing residents. The following services offer potential for rerouting to ensure Cyber Park, once fully developed, will benefit from good access to local bus services and connections. These have considered the routes as set out within the

- Route C – Town centre to Kingsditch and Springbank where a route extension could be provided into the site, through the proposed new local centre location, via Henley Road.
- Route A – GCHQ and Coronation Square to Cheltenham town centre where the route could be extended to run along the length of the proposed principal site spine road via Telstar Way and turn right along Old Gloucester Road to re-join the existing route via Village Road.
- Route H – Cheltenham town centre to Wymans Brook, Swindon Village and Arle Farm which could serve the northern part of the allocation site via an extended route using Village Road, Hester's Way Road, Springbank Road, Henley Road and across the site to join the Old Gloucester Road.
- Route 94 – Cheltenham to Churchdown and Gloucester which could be diverted through the heart of the site, then via Old Gloucester Road linking back to the existing route on the B4063.

To mitigate against potential rat running via existing residential roads, bus gates are likely to be required, particularly if a bus access is provided onto Henley Road. A loop road within the site could be provided so the bus gate accesses are restricted to one-way movements to minimise the number of buses passing on existing narrow residential roads.

A central bus interchange station could be provided within the site, where feasible, to fully integrate and engrain bus travel into the behaviour of users of the site. This could link up with an electric cycle/scooter hire facility to enable users to access wider areas across the Cyber Park.

The potential bus diversions and loop road within the site are shown in Figure 7.1.

Figure 7.1: Potential Bus Diversions

S Penberthy
Hydrock
Ash House
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Taunton
United Kingdom
TA2 6BJ
Email: stuartpenberthy@hydrock.com

Our Ref: 12430_C002_CGS_HM
2nd October 2019

Dear Stuart

Re: West Cheltenham Cyber Park – Update Ecology Gap Analysis

Emma Norton at Avison Young has provided us with a link to further information regarding this site, including several ecological reports that we were not aware of. As such, I have reviewed this additional ecological information and have revisited the gap analysis previously provided.

Summary of Existing Ecological Data

Our previous gap analysis (August 2019) was only informed by the documents made available to us at the time namely:

- The 'Details of ES Project Team, March 2017' note; and
- Phase I habitat survey notes from a survey of some of the site conducted by Wild Service (part of Gloucestershire Wildlife Trust) in 2012.

Additional ecological information has now been made available and includes:

- A 'Baseline Ecology Report' produced in 2016 by EDP to inform promotion of the site;
- A Key Wildlife Site (KWS) assessment of the locally designated site Fiddlers Green, including National Vegetation Classification (NVC) survey and assessment against the Gloucestershire qualifying criteria, conducted by Ecology Solutions (report dated 2018 but surveys referred to were conducted in 2016);
- A draft Ecological Assessment (dated December 2016) including details of botanical and protected species surveys conducted in 2016 by Ecology Solutions
- An Ecology Constraints Plan (produced by Ecology Solutions but not dated);
- An ecological summary for the Design and Access Statement (which refers to habitat surveys conducted in 2016 and protected species surveys conducted in 2017 and 2018) and associated, Protected Species plan and Ecological Features plan (produced by Ecology Solutions but not dated); and
- A draft Ecology ES chapter (excluding appendices) dated April 2018 and referring to habitat and protected species surveys conducted in 2016 and 2017 respectively and a Habitat Regulations Screening Assessment in 2018, details of which have not been seen.

In the information available and provided none of the raw data or detailed survey reporting has been provided.

Internet Desk Study 2019

We have conducted an internet only desk study in August 2019. This has reconfirmed or identified (see enclosed Figures 1 and 2):

- Two European statutory sites within 10km, namely Cotswold Beechwoods Special Area of Conservation (SAC) designated for the woodland habitats present and Dixton Wood SAC, designated for the presence of violet click beetle *Limoniscus violaceus*;
- Two national statutory sites within 2km, namely Badgeworth Site of Special Scientific Interest (SSSI) designated for the presence of the rare plant adders tongue spearwort *Ranunculus ophioglossifolius.* and Griffiths Avenue Local Nature Reserve (LNR) which is a Victorian stable building and walled garden in over two and a half acres of land including wildflower meadows;
- Priority habitat woodland in the west of the site (identified by MAGIC but requiring verification);
- Priority habitat traditional orchard in the east of the site (identified by MAGIC but surveys in 2016 concluded it does not qualify); and
- Priority habitat Lowland Meadows (in the location of Fiddler's Green KWS).

ES Scoping Opinion

The 2017 Cheltenham Borough Council (CBC) Scoping Opinion notes the requirement for the assessment of impacts on statutory (notably the Cotswold Beechwoods SAC) and non-statutory sites and protected and priority species. In addition it highlights the requirement to demonstrate no deterioration in terms of water quality or ecological value of known watercourses on the site in light of their status under the Water Framework Directive (WFD), which are moderate (the Hatherley Brook), Poor (River Chelt downstream of the M5 motorway) and Moderate (River Chelt upstream of the M5). This specifically requires consideration of impacts on otters, water vole, fish and eels.

Gap Analysis and Proposed Scope of Work

To inform the emerging masterplan, an Ecology Chapter for Environmental Impact Assessment and, in due course, a planning application, the scope of work set out in the enclosed Ecology Scoping Table is likely to be required. It is suggested that the scope of such work is agreed in advance with the local authority given in some cases the intention may be to rely on historical data.

Reliance on historical data also requires the full data set/reports for the surveys conducted to allow verification. Although the descriptions within the ES Chapter are particularly detailed for an ES, there are no specific dates, weather conditions or surveyor competencies provided in the chapter to allow data described to be verified and relied upon.

As identified in our original fee proposal and highlighted since instruction, ecological surveys are seasonally constrained and these are illustrated in the enclosed Table. It should be noted that the exact scope of any update detailed Phase II surveys will need to be identified on completion of the update extended Phase I habitat survey of the site to ensure an accurate scope is identified, which will then need to be agreed with CBC.

I hope this letter is helpful in providing a new update and I will be happy to discuss should you have any queries.

Yours sincerely

Carly Goodman-Smith
Director
Enc. Ecology Scoping Table
Fig. 1
Fig. 2

Ecology Scoping Table

Item	Description / Age of existing data	Seasonal Restrictions	Likely Requirement for update
Initial Scoping			
Extended Phase I Habitat Survey/Site Walkover	Existing data 3 years old. Update needed to verify the mapping and description of habitats and identify evidence of/potential for protected and priority species.	None but suggested as soon as possible to inform any need for update Phase II surveys	Definite.
Desk Study	Existing data 3 years old. Purchase records from local record centre on protected sites and protected and priority species for site and vicinity.	None but suggested as soon as possible to inform any need for update Phase II surveys	
Habitat Regulations Assessment (HRA) and Appropriate Assessment (AA)			
Natural England Discretionary Advice Service	Consult with NE on requirements for the Appropriate Assessment in relation to potential for significant effects on Cotswold Beechwoods SAC as a result of recreation and likely requirements for mitigation[1].Although HRA screening mentioned in the draft ES chapter by Ecology Solutions concluded no likely significant effect (LSE), this is reliant on historic data and this is an emerging field within the local area. In addition, since 2018, the People over Wind case now requires that specific mitigation is not considered at the screening stage and requires Appropriate Assessment where there are likely significant effects identified in the absence of	None	Definite.

[1] The Joint Core Strategy councils and Stroud District are working together to determine the requirement for an avoidance strategy in relation to recreational effects on the SAC. The outcomes of a visitors' survey are awaited in September 2019. In the interim, NE have advised CBC on the need to consider the distance from the SAC, route to the SAC, type of development and availability of other on and offsite recreation resources. It has advised that all residential sites within 10-15km are subject to Appropriate Assessment.

Item	Description / Age of existing data	Seasonal Restrictions	Likely Requirement for update
	mitigation. No LSE are likely on Dixton Wood – the site is more than 9km away and there is no public access.		
Shadow HRA and AA	Gather baseline data and determine likely significant effects and devise avoidance strategy, if required.	None – following agreement of approach with NE/LPA	Likely – scope to be agreed through DAS.
Phase II Surveys			
Consultation	Consultation with CBC to agree proposed scope of works	ASAP after Initial scoping	Definite.
Botanical Surveys of Grassland and Hedgerows (National Vegetation Classification)	Existing survey data 3 years old. Update to surveys - necessity may depend on outcome of Phase I habitat survey.	April to August inclusive (June/July for grassland)	Likely.
Badger Survey	Existing survey data 3 years old. Record locations of setts and evidence of use of the site and within 30m.	February to May inclusive or September/October	Definite.
Bat Surveys	Existing survey data 3 years old. Roost identification surveys of trees and buildings within the site.	April to September inclusive (one or two surveys needed in core period May to August)	Likely depending on anticipated impacts to these features.
	Existing survey data 1 year old. Monthly activity surveys using manned transects and static detectors.	April to October, inclusive	Possible – depending on availability and reliability of data from 2018.
Breeding Birds	Existing surveys 3 years old. Monthly surveys to assess use of site and identify breeding pairs.	April to June, inclusive	Possible – outcome of Phase I survey and desk study will inform need for an update.
Dormouse	Existing surveys 2 to 3 years old. Bi-monthly surveys to identify presence of dormice in pre-erected nest tubes.	April to November, inclusive	Possible – outcome of Phase I survey and desk study will inform need for an update.
Great Crested Newt	Existing surveys 2 years old. Update eDNA survey to identify presence/absence.	15 April to 30 June, inclusive	Likely given age of data.

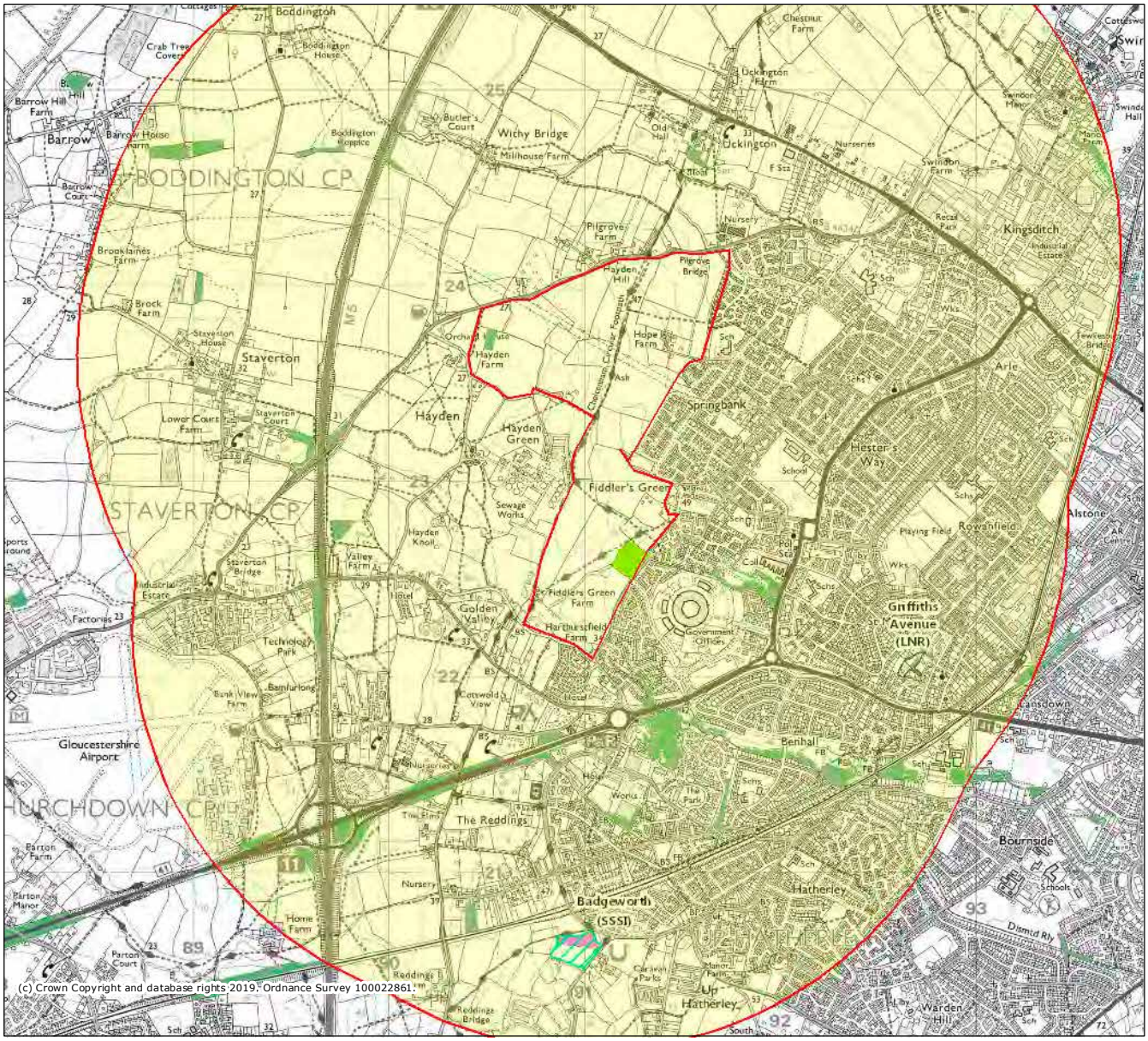
Item	Description / Age of existing data	Seasonal Restrictions	Likely Requirement for update
	If GCN found - four to six survey visits to trap/torch and search ponds and identify presence/absence and population size respectively.	Mid-March to mid-June (two or three surveys in core period mid-April to mid-May)	Unlikely as GCN not previously recorded.
Terrestrial Invertebrates	Existing data 3 years old. Scoping to assess habitats and likely presence of notable species with further surveys to identify presence/absence if necessary.	Mid-April to October, inclusive	Likely for scoping survey.
Otter	Existing data 3 years old. Assess use of waterbodies/watercourses on site.	None	Likely given age of data - outcome of Phase I survey and desk study will inform need for an update.
Reptiles	Existing surveys 2 to 3 years old. Update surveys to establish presence/absence and indication of population size by use of artificial refugia in suitable habitats.	April to June, inclusive or September	Possible – outcome of Phase I survey and desk study will inform need for an update.
Water Vole	Existing data 3 years old. Assess use of waterbodies/watercourses on site. Early and late season survey visits needed.	Early season = mid-April to end of June Late season = July to September, inclusive	Likely given age of data - outcome of Phase I survey and desk study will inform need for an update.
White Clawed Crayfish	No pre-existing data. Presence/absence surveys of watercourses.	July to October inclusive	Definite.
Fish and Eel Surveys	No pre-existing survey data – scoped out based on records. Data search and WFD compliant surveys of watercourses.	June-Dec, inclusive (Eels) September to March, inclusive (salmonids and coarse fish)	Possible – outcome of Phase I survey and desk study will inform need for surveys.
Biodiversity Net Gain (BNG)			
Consultation	Consult with CBC to agree approach and use of metric to determine BNG and anticipated level of BNG to be delivered[2].	None	Definite.

[2] The upcoming Environment Bill is anticipated to make a minimum 10% net gain mandatory for all development

Item	Description / Age of existing data	Seasonal Restrictions	Likely Requirement for update
Metric	Completion of BNG metric calculations and associated reporting to identify level of BNG delivered, shortfalls and offsetting requirements or proposals (if relevant).	None	
Design Advice and Green Infrastructure			
Consultation	Consult with design team throughout project to advice on masterplanning and provide design advice.	None – throughout project	Definite.
Building with Nature Accreditation	Registration with Building with Nature[3] benchmark to ensure delivery of high-quality Green Infrastructure to deliver wellbeing, water and wildlife standards.	None	Definite.
Reporting Requirements			
Ecology ES Chapter	ES chapter to assess impacts in light of proposals (including in combination effects), significance, mitigation and residual effects. Assessment in line with Chartered Institute of Ecology and Environmental Management (CIEEM) methods[4].	None	Definite.
Technical Appendices	Baseline survey data and other appendices likely to include calculation of BNG, Appropriate Assessment, Mitigation and Enhancement Strategies and Heads of Terms Landscape and Ecological Management Plan.	None	Definite.

[3] https://www.buildingwithnature.org.uk/how-it-works
[4] CIEEM (2018) *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal*, CIEEM, Winchester

MAGIC 1: Priority Habitats and Statutory Sites within 2km



Legend

- Local Nature Reserves (England)
- National Nature Reserves (England)
- Ramsar Sites (England)
- Proposed Ramsar Sites (England)
- Sites of Special Scientific Interest (England)
- Special Areas of Conservation (England)
- Possible Special Areas of Conservation (England)
- Special Protection Areas (England)
- Potential Special Protection Areas (England)
- Priority Habitat Inventory - Good quality semi-improved grassland (Non Priority) (England)
- Priority Habitat Inventory - Lowland Meadows (England)

Ancient Woodland (England)

- Ancient and Semi-Natural Woodland
- Ancient Replanted Woodland
- Priority Habitat Inventory - Deciduous Woodland (England)

Projection = OSGB36
xmin = 386800
ymin = 221000
xmax = 395100
ymax = 224600

Map produced by MAGIC on 5 August, 2019.
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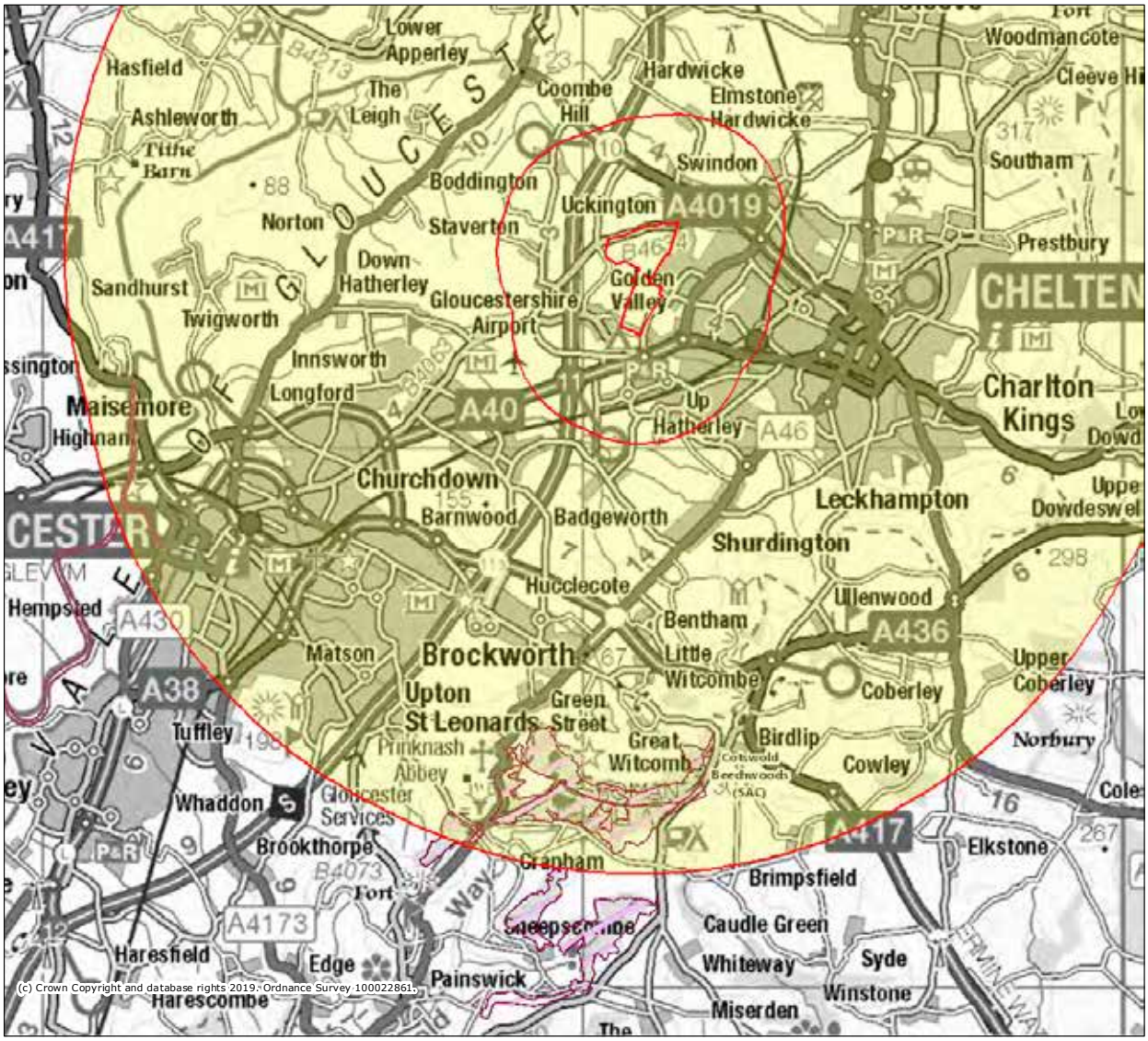
0 0.5 1 km

Fig 2: European Protected Sites within 10km



Legend

- Ramsar Sites (England)
- Proposed Ramsar Sites (England)
- Special Areas of Conservation (England)
- Possible Special Areas of Conservation (England)
- Special Protection Areas (England)
- Potential Special Protection Areas (England)

Projection = OSGB36
xmin = 374700
ymin = 212100
xmax = 405000
ymax = 225300

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0 1.5 3
km

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Allies and Morrison Urban Practitioners accepts no responsibility for comments made by members of the community which have been reflected in this report.

AVISON YOUNG WITH Allies and Morrison Hydrock