Summary – July 2020
The Hertfordshire and North London Area received 51 mm of rainfall in July, 101% of the long term average. Average effective rainfall occurred in the chalk catchments, however the Area’s soil moisture deficits deepened, ending the month greater than the long term average. Monthly mean river flows were normal in most of the Chalk rivers but were below normal or worse in the clay catchments. Groundwater levels declined in all of our monitored indicator sites but the majority remained within the normal range for July.

Rainfall
The Hertfordshire and North London Area (the Area) received 51 mm of rainfall in July, 101% of the long term average (LTA). The majority of rain was recorded in the first half of the month with the most widespread rainfall occurring on the 7th. The highest daily rainfall total (29 mm) was recorded on the 2nd of the month at Takeley STW (Roding) during a localised storm event. Only 71% of the LTA rainfall for the summer period fell, due to a very dry spring. As a result much of the Area recorded below normal or lower rainfall for the previous three months (May to July).

Soil Moisture Deficit/Recharge
The Area’s soil moisture deficit (SMD) increased in July and ended the month greater than the long term average. The Area’s highest SMD occurred in the North London catchment (131 mm), which recorded notably low rainfall over the previous three months. The Lee Chalk and Chilterns-East-Colne catchments both received average effective rainfall in July, but the Area as a whole only received 28% of LTA effective rainfall for the summer period (April to July).

River Flows
There was a stark contrast in river flows during July, continuing the pattern seen so far this summer across Hertfordshire and North London. The Area’s clay rivers recorded below normal or lower monthly mean flows, with the River Crane recording exceptionally low flow for July. However, the majority of the Area’s Chalk rivers recorded normal monthly mean flows. The only exceptions to this where upper reaches of the River Lee and the River Ash, both of which recorded below normal monthly mean flows.

Groundwater Levels
Groundwater levels declined at all of our indicator sites in July (Cave Gate was not monitored for operational reasons). All of our indicator sites ended the month within normal levels, except Hixham Hall (below normal).

Environmental Impact
The table below shows the abstraction licence flow constraints that were in force in July, out of a summer maximum of 29:

<table>
<thead>
<tr>
<th>Week Commencing</th>
<th>6 July</th>
<th>13 July</th>
<th>20 July</th>
<th>27 July</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Constraints</td>
<td>6</td>
<td>5</td>
<td>10</td>
<td>7</td>
</tr>
</tbody>
</table>

In the Upper Lee catchment the source of the River Mimram moved slightly downstream to Nine Wells spring and the River Ash and River Rib had visually reduced flows throughout the survey length. In the Colne catchment the source of the River Chess moved downstream to the Chesham Tennis Courts in July. The seasonal heads of the River Bulbourne and Misbourne also moved downstream to Northchurch and to the Chiltern Hospital respectively.

Author: Groundwater, Hydrology and Contaminated Land
Contact details: 03708 506 506

All data are provisional and may be subject to revision. The views expressed in this document are not necessarily those of the Environment Agency. Its officers, servants or agents accept no liability for any loss or damage arising from the interpretation or use of the information, or reliance upon views contained herein.
Rainfall Map

Total rainfall for hydrological areas across the Hertfordshire and North London Area for the current month, classed relative to an analysis of respective historic totals.

Data source: Rainfall calculated using the Environment Agency, South East Soil Moisture Model.

Some features of this map are based on digital spatial data licensed from the Centre for Ecology and Hydrology, (© CEH) and the Ordnance Survey (© Crown Copyright).

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Rainfall Map

Total rainfall for hydrological areas across the Hertfordshire and North London Area for the current month, the last three months, the last six months, and the last 12 months, classed relative to an analysis of respective historic totals.

Data source: Rainfall calculated using the Environment Agency, South East Soil Moisture Model.

Some features of this map are based on digital spatial data licensed from the Centre for Ecology and Hydrology, (© CEH) and the Ordnance Survey (© Crown Copyright).
River Flow and Groundwater Status Map

Groundwater site status based on end of month level. Surface water site status based on mean monthly flow.

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Colne Groundwater

AMERSHAM ROAD OBH
Ranking derived from data for the period Nov-1991 to Dec-2017

ASHLEY GREEN STW OBH
Ranking derived from data for the period Sep-1987 to Dec-2017

BALLINGDON FARM
Ranking derived from data for the period Jan-1975 to Dec-2017

WAPSEYS WOOD OBH
Ranking derived from data for the period Mar-1988 to Dec-2017

exceptionally high
notably high
above normal
normal
notably low
exceptionally low
below normal
latest data

Level (mAOD)

Upper Lee

Monthly total rainfall (mm)

Long term average rainfall (mm)

Lee Chalk - Rainfall

Lee Chalk - Effective Rainfall

RIVER MIMRAM AT PANSHANGER
Ranking used data from 01/12/1952 to 31/12/2017

RIVER ASH AT WARESIDE (MARDOCK)
Ranking used data from 03/06/1980 to 31/12/2017

RIVER LEE AT HOWE GREEN (WATER HALL)
Ranking used data from 01/04/1959 to 31/12/2017

RIVER LEE AT FEILDERS WEIR (NATURALISED)
Ranking used data from 01/10/1883 to 31/12/2017
Upper Lee Groundwater

LILLEY BOTTOM OBH
Ranking derived from data for the period Jul-1979 to Dec-2017

THERFIELD RECTORY
Ranking derived from data for the period Jan-1883 to Dec-2017

HIXHAM HALL
Ranking derived from data for the period Jun-1964 to Dec-2017

CAVE GATE
Ranking derived from data for the period Jun-1966 to Dec-2017

---

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Lower Lee

**Monthly total rainfall (mm)**

**Long term average rainfall (mm)**

---

**LEE FLOOD CHANNEL AT WALTHAMSTOW (LOW HALL)**

Ranking used data from 01/01/1980 to 31/12/2017

---

**RIVER LEE AT LEA BRIDGE**

Ranking used data from 22/07/1992 to 31/12/2017

---

- Exceptionally high
- Below normal
- Notably high
- Notably low
- Above normal
- Exceptionally low
- Normal
- Latest data
North London

Monthly total rainfall (mm)

Long term average rainfall (mm)

North London - Rainfall

Rainfall (mm)

North London - Effective Rainfall

Effective Rainfall (mm)

Daily Mean Flow (cumecs)

RIVER CRANE AT CRANFORD PARK

Ranking used data from 01/05/1987 to 31/12/2017

Daily Mean Flow (cumecs)

RIVER BRENT AT MONKS PARK

Ranking used data from 01/12/1978 to 31/12/2017

Legend:
- Exceptionally high
- Notably high
- Above normal
- Notably low
- Exceptionally low
- Normal
- Latest data

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Roding

Monthly total rainfall (mm)

Long term average rainfall (mm)

Exceptionally high
Notably high
Above normal
Normal
Below normal
Notably low
Exceptionally low

Roding - Rainfall

Roding - Effective Rainfall

RIVER RODING AT REDBRIDGE
Ranking used data from 19/01/1950 to 31/12/2017

RIVER INGREBOURNE AT UPMINSTER (GAYNES PARK)
Ranking used data from 01/11/1970 to 31/12/2017

Reservoir Storage

Thames Water - Lower Thames Reservoirs - Lower Thames

Thames Water - Lee Valley Reservoirs - Lower Lee

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Summary of rainfall, effective rainfall and soil moisture deficit

Rainfall and Effective Rainfall – July 2020

<table>
<thead>
<tr>
<th>Area</th>
<th>Total (mm)</th>
<th>LTA (mm)</th>
<th>% of LTA</th>
<th>Total (mm)</th>
<th>LTA (mm)</th>
<th>% of LTA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chilterns- East - Colne</td>
<td>62</td>
<td>51</td>
<td>121</td>
<td>5</td>
<td>4</td>
<td>108</td>
</tr>
<tr>
<td>Lee - Chalk</td>
<td>61</td>
<td>52</td>
<td>118</td>
<td>5</td>
<td>4</td>
<td>115</td>
</tr>
<tr>
<td>North London</td>
<td>40</td>
<td>48</td>
<td>83</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Lower Lee</td>
<td>44</td>
<td>51</td>
<td>86</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Roding Catchment</td>
<td>46</td>
<td>49</td>
<td>94</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Hertfordshire and North London Area Average</td>
<td>51</td>
<td>50</td>
<td>101</td>
<td>2</td>
<td>2</td>
<td>112</td>
</tr>
</tbody>
</table>

Soil Moisture Deficit (SMD) - July 2020

<table>
<thead>
<tr>
<th>Area</th>
<th>End of Month SMD (mm)</th>
<th>End of Month SMD LTA (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chilterns- East - Colne</td>
<td>110</td>
<td>95</td>
</tr>
<tr>
<td>Lee - Chalk</td>
<td>117</td>
<td>97</td>
</tr>
<tr>
<td>North London</td>
<td>131</td>
<td>104</td>
</tr>
<tr>
<td>Lower Lee</td>
<td>125</td>
<td>101</td>
</tr>
<tr>
<td>Roding Catchment</td>
<td>120</td>
<td>99</td>
</tr>
<tr>
<td>Hertfordshire and North London Area Average</td>
<td>120</td>
<td>99</td>
</tr>
</tbody>
</table>

Rainfall and Effective Rainfall – summer total for period 1 April 2020 to 31 July 2020

<table>
<thead>
<tr>
<th>Area</th>
<th>Total (mm)</th>
<th>LTA (mm)</th>
<th>% of LTA</th>
<th>Total (mm)</th>
<th>LTA (mm)</th>
<th>% of LTA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chilterns- East - Colne</td>
<td>176</td>
<td>222</td>
<td>79</td>
<td>14</td>
<td>34</td>
<td>43</td>
</tr>
<tr>
<td>Lee - Chalk</td>
<td>149</td>
<td>205</td>
<td>73</td>
<td>12</td>
<td>27</td>
<td>45</td>
</tr>
<tr>
<td>North London</td>
<td>137</td>
<td>203</td>
<td>67</td>
<td>0</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td>Lower Lee</td>
<td>132</td>
<td>203</td>
<td>65</td>
<td>0</td>
<td>11</td>
<td>0</td>
</tr>
<tr>
<td>Roding Catchment</td>
<td>138</td>
<td>194</td>
<td>71</td>
<td>0</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Hertfordshire and North London Area Average</td>
<td>146</td>
<td>206</td>
<td>71</td>
<td>5</td>
<td>19</td>
<td>28</td>
</tr>
</tbody>
</table>
## Glossary

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aquifer</td>
<td>A geological formation able to store and transmit water.</td>
</tr>
<tr>
<td>Areal average rainfall</td>
<td>The estimated average depth of rainfall over a defined area. Expressed in depth of water (mm).</td>
</tr>
<tr>
<td>Artesian</td>
<td>The condition where the groundwater level is above ground surface but is prevented from rising to this level by an overlying continuous low permeability layer, such as clay.</td>
</tr>
<tr>
<td>Artesian borehole</td>
<td>Borehole where the level of groundwater is above the top of the borehole and groundwater flows out of the borehole when unsealed.</td>
</tr>
<tr>
<td>Cumecs</td>
<td>Cubic metres per second ($m^3 s^{-1}$)</td>
</tr>
<tr>
<td>Effective rainfall</td>
<td>The rainfall available to percolate into the soil or produce river flow. Expressed in depth of water (mm).</td>
</tr>
<tr>
<td>Flood Alert/Flood Warning</td>
<td>Three levels of warnings may be issued by the Environment Agency. Flood Alerts indicate flooding is possible. Flood Warnings indicate severe flooding.</td>
</tr>
<tr>
<td>Groundwater</td>
<td>The water found in an aquifer.</td>
</tr>
<tr>
<td>Long term average (LTA)</td>
<td>The arithmetic mean calculated from the historic record, usually based on the period 1961-1990. However, the period used may vary by parameter being reported on (see figure captions for details).</td>
</tr>
<tr>
<td>mAOD</td>
<td>Metres Above Ordnance Datum (mean sea level at Newlyn Cornwall).</td>
</tr>
<tr>
<td>Naturalised flow</td>
<td>River flow with the impacts of artificial influences removed. Artificial influences may include abstractions, discharges, transfers, augmentation and impoundments.</td>
</tr>
<tr>
<td>Recharge</td>
<td>The process of increasing the water stored in the saturated zone of an aquifer. Expressed in depth of water (mm).</td>
</tr>
<tr>
<td>Reservoir gross capacity</td>
<td>The total capacity of a reservoir.</td>
</tr>
<tr>
<td>Reservoir live capacity</td>
<td>The capacity of the reservoir that is normally usable for storage to meet established reservoir operating requirements. This excludes any capacity not available for use (e.g. storage held back for emergency services, operating agreements or physical restrictions). May also be referred to as ‘net’ or ‘deployable’ capacity.</td>
</tr>
<tr>
<td>Soil moisture deficit (SMD)</td>
<td>The difference between the amount of water actually in the soil and the amount of water the soil can hold. Expressed in depth of water (mm).</td>
</tr>
</tbody>
</table>

### Categories

- **Exceptionally high**: Value likely to fall within this band 5% of the time
- **Notably high**: Value likely to fall within this band 8% of the time
- **Above normal**: Value likely to fall within this band 15% of the time
- **Normal**: Value likely to fall within this band 44% of the time
- **Below normal**: Value likely to fall within this band 15% of the time
- **Notably low**: Value likely to fall within this band 8% of the time
- **Exceptionally low**: Value likely to fall within this band 5% of the time