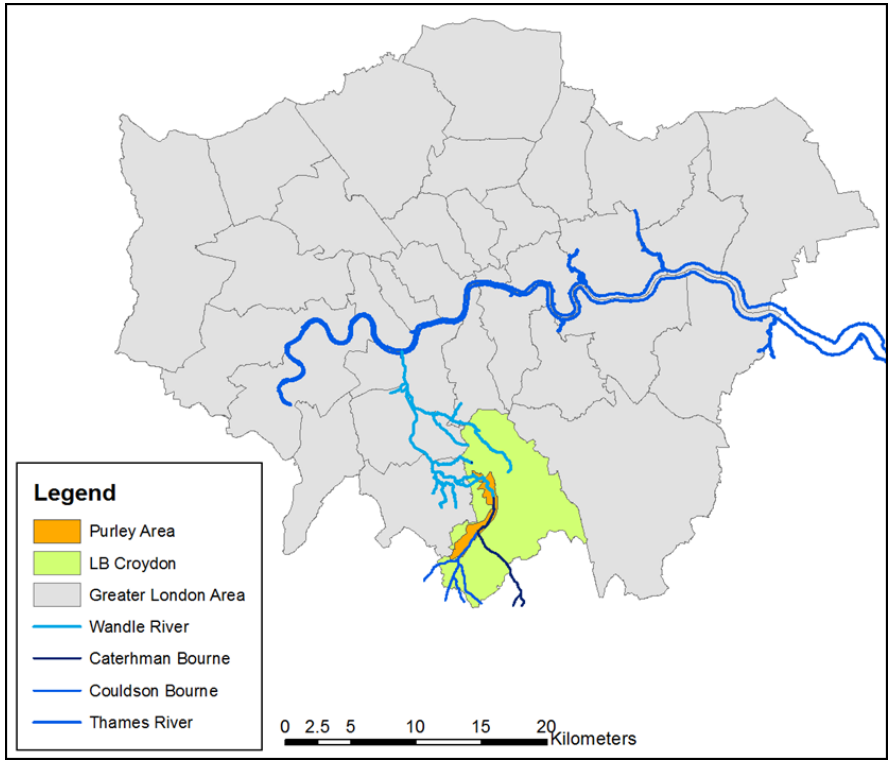
Purley Area,
London Borough of Croydon

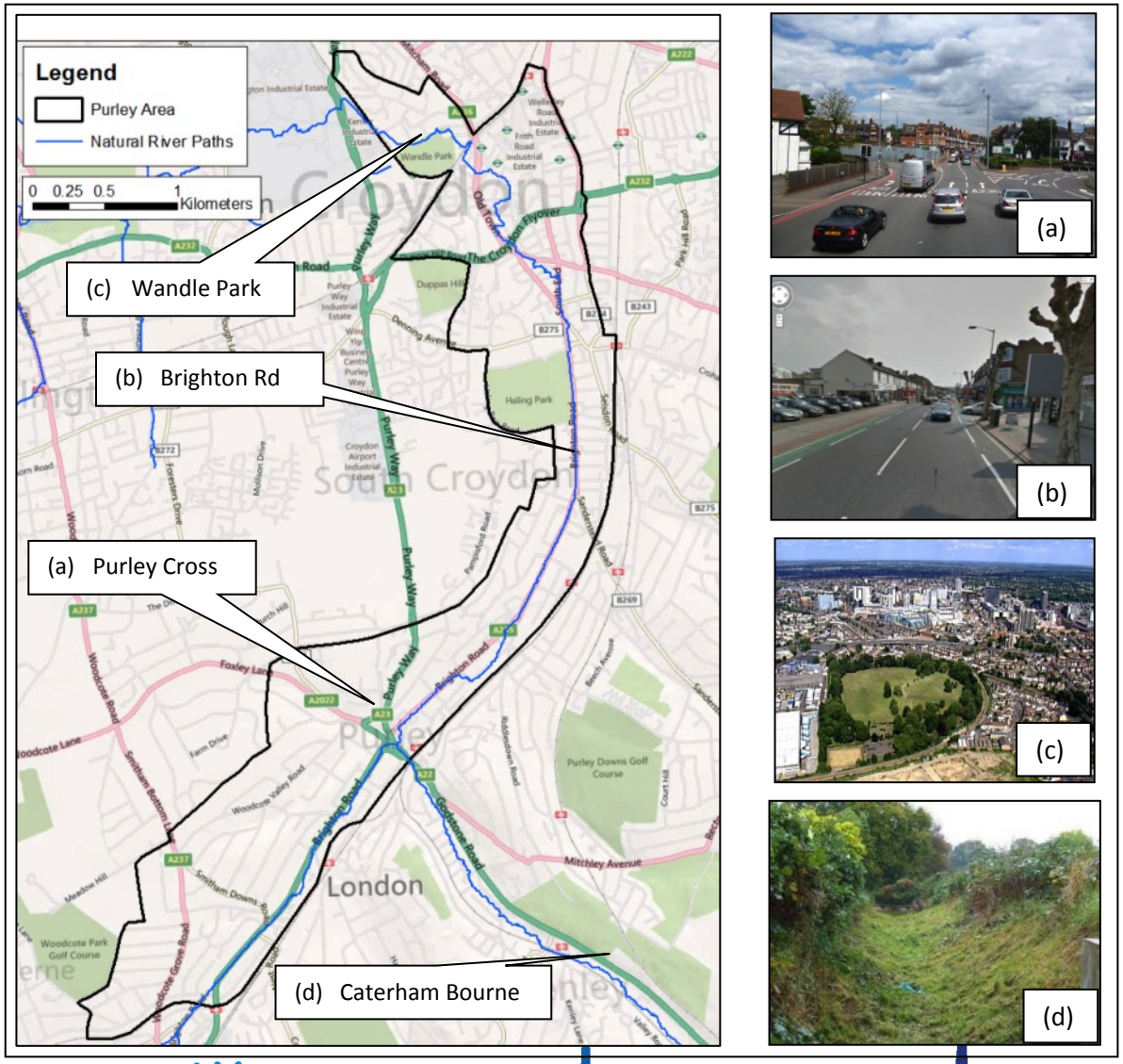
1. Location and Environmental Setting

- **Area:** aprox. 652 ha
- Highly urbanised
- Stretches along depression of former pathway of River Wandle, now culverted
- Croydon is 4th settlement in England most susceptible to surface water flooding



- Purley is the area at greatest risk of surface flooding within the Borough, comprising the greatest number of receptors and critical infrastructure at risk of surface water flooding. **The area floods almost every year!**

1. Location and Environmental Setting



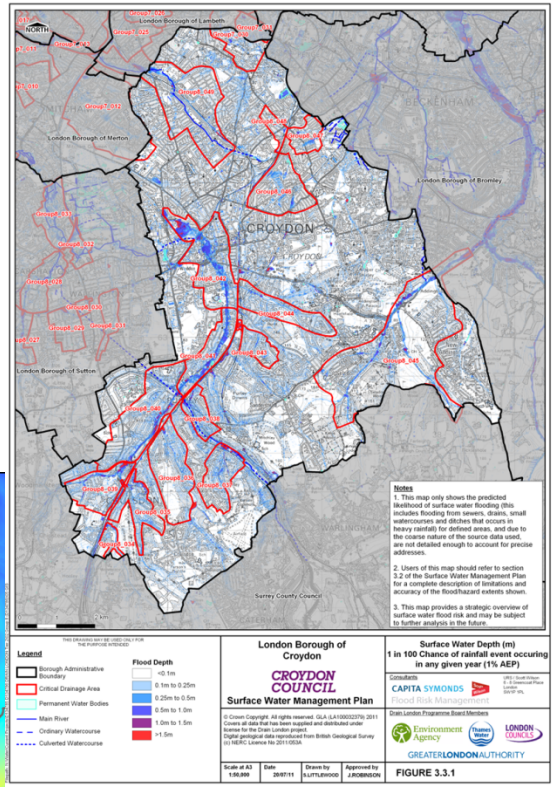
Investing in Opportunities
This project has received European Regional Development Funding through INTERREG IV B.
INTERREG IVB

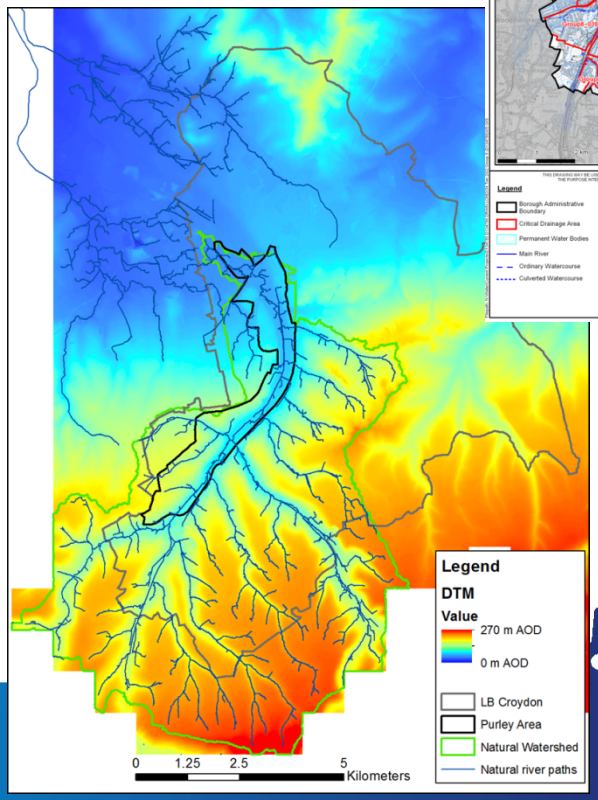
2. Urban pluvial flood risk problems and management objectives

Flooding mechanisms:

- Pluvial flooding is **driven chiefly by the local topography and relatively steep slopes** (including the seasonal watercourse Caterham Bourne) which channel water to the natural depression along Brighton Road, where reported incidents of flooding are concentrated.

- Problem is exacerbated by high degree of urbanisation and presence of London Clay





2. Urban pluvial flood risk problems and management objectives

Properties at risk of surface water flooding

(for a 1% AEP rainfall event)

Type of property	Infrastructure (PPS25 Categories)*			Households		Commercial Properties	
	Essential	Highly Vulnerable	More Vulnerable	All	Basements Only	All	Basements Only
Flood depth > 0.03 m**	16	2	68	8,450	535	1,286	505
Flood depth > 0.50 m***	1	0	10	618	29	95	15

- **Essential infrastructure** includes essential transport and utility infrastructure
- **Highly vulnerable infrastructure** includes police, ambulance and fire stations and command centres, in addition to basement dwellings, caravans, emergency dispersal points and installations requiring hazardous substances consent
- **More vulnerable infrastructure** comprises hospitals, residential care homes, students halls of residence, hotels, drinking establishments, amongst others.

2. Urban pluvial flood risk problems and management objectives

Impacts of flooding in the Cranbrook catchment

- Damage to residential properties, business and open spaces

  = thousands £££ of damage + social impacts

- Area at highest risk is highly commercial and many businesses have been flooded in the past.
- Flood water combined with sewage when surcharging occurs has led to environmental damage.
- Roads have been inundated, causing severe disruption to transport and sport events

2. Urban pluvial flood risk problems and management objectives

Historical flood events in the Purley Area

- **Flood records since 1961**
- **20th July 2007: most noticeable event**
  - Approx. 60 mm of rainfall in 1.5 hours: Tr = 1:130 yr
  - Occurred after wet May and June months
  - Approx. 320 properties and 26 schools reported surface water flooding + main roads
- **Many other surface water flooding events:**
  - Dec 2000 & Jan 2001: Caterham bourne caused flooding
  - 3rd and 5th Jul 2006: heavy rainfall
  - August 2007
  - July 2008: a reported 30 mm of rain fell in 24 hours
  - November 2008: rainfall caused flash floods
  - February 2009: simply heavy rain
  - August 2009: high quantity of rain was reported
  - November 2009: heavy rain was combined with high winds
  - June 2012: surface water flood warnings

2. Urban pluvial flood risk problems and management objectives

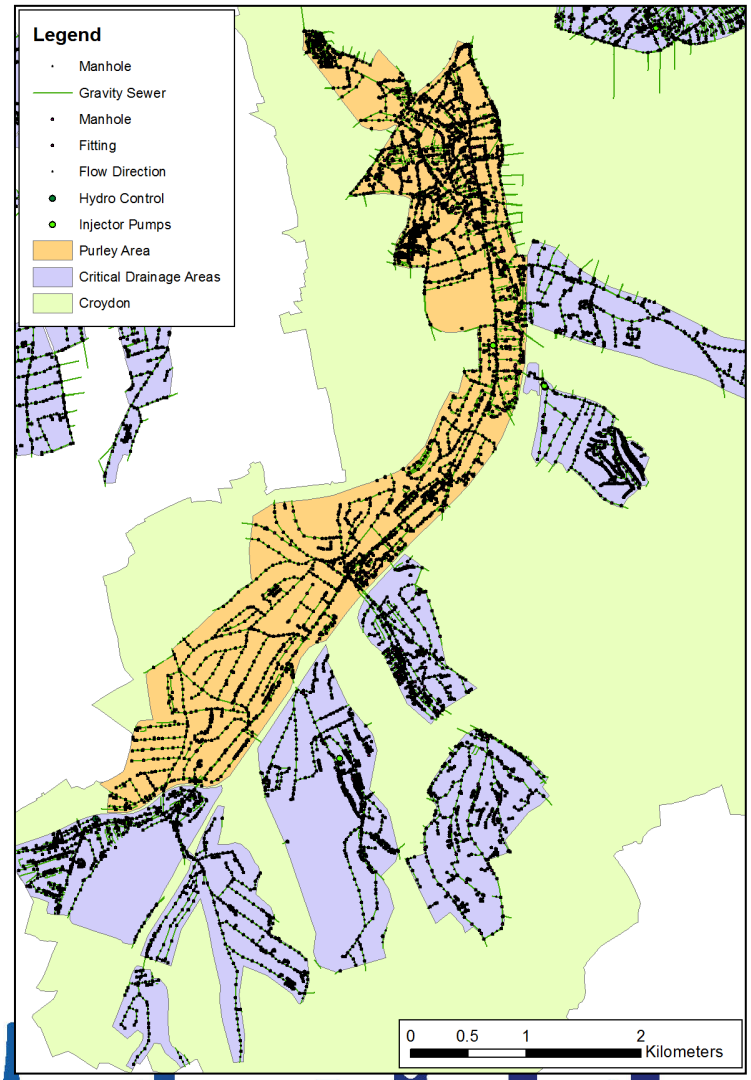
Potential SWFR mitigation alternatives

1. **Big interceptor along Brighton Road** to increase capacity of sewer system
2. **Storage in parks along Brighton Road**
3. **A section of the Wandle River which falls within Wandle Park has been recently de-culverted and is being regenerated**
4. **SuDS at property level**
5. **Continue ongoing improvements to maintenance of drainage network**
6. **Raise community awareness, property level flood protection**
7. **Improved event management – forecasting**

3. Characteristics of drainage and monitoring system

Sewer system:

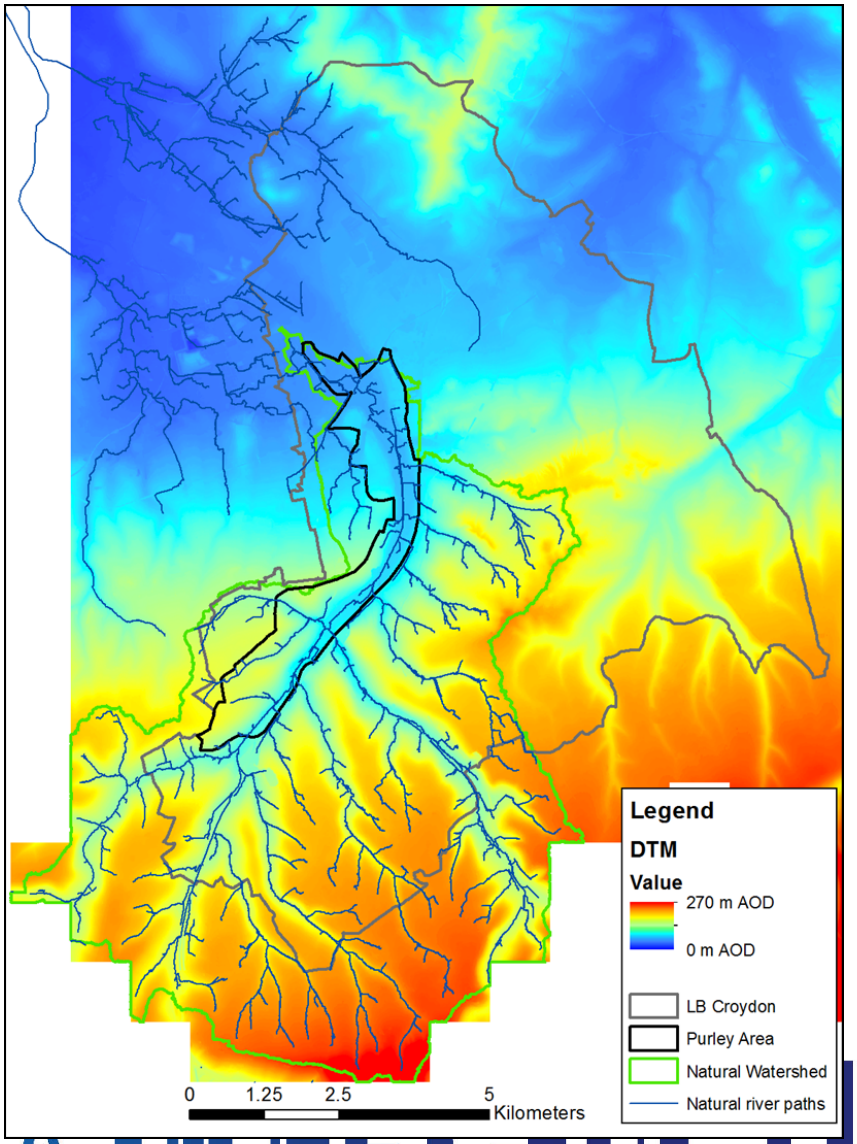
- Combination of combined and separate
- Different owners: Local Council, Thames Water, Environment Agency -> not easy to agree on actions!
- I have received asset database, but no model of the sewer system exists



3. Characteristics of drainage and monitoring system

DTM:

- 1 m horizontal resolution LiDAR-generated DTM (2011)
- Stated vertical accuracy of ±0.15 m and horizontal accuracy smaller than the pixel size
- Composite generated by merging data from different, overlapping surveys, at different resolutions
- Was used to delineate the natural catchment and assess the extent of the area which must be modelled
- For this area sewer data has been requested



3. Characteristics of drainage and monitoring system

Monitoring system

- **Environment Agency raingauges**

  Data must be requested to the EA after observed rainfall events

- **London Grid for Learning raingauges**

  Quality is not very good, although work has been done to improve it

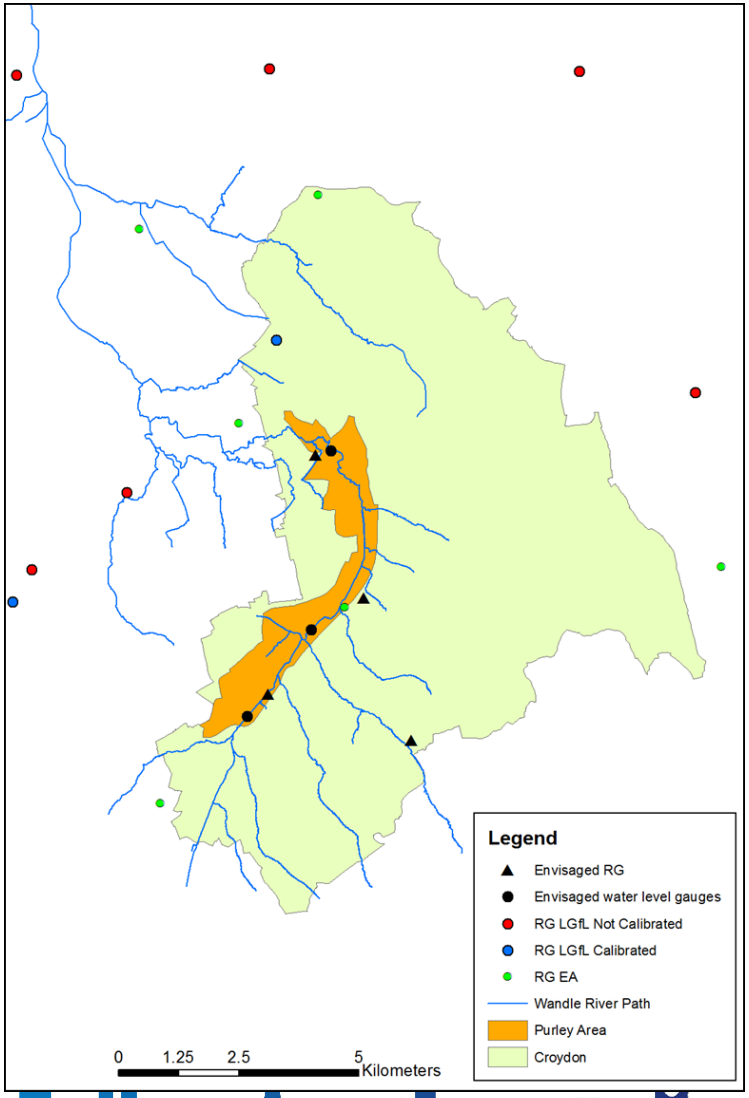
- **4 tipping bucket raingauges will be installed in November**

  These will be equipped with a data logger and data will be retrieved manually

- **Funding is being sought for purchasing and installing flow and/or level gauges**

3. Characteristics of drainage and monitoring system

Existing and envisaged sensors

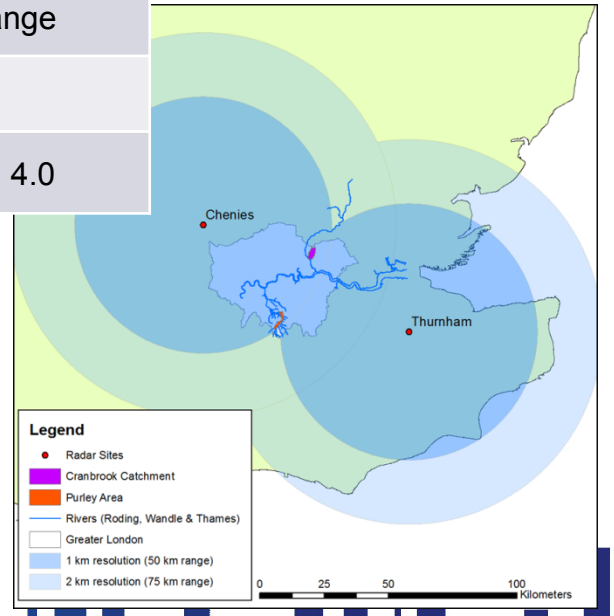


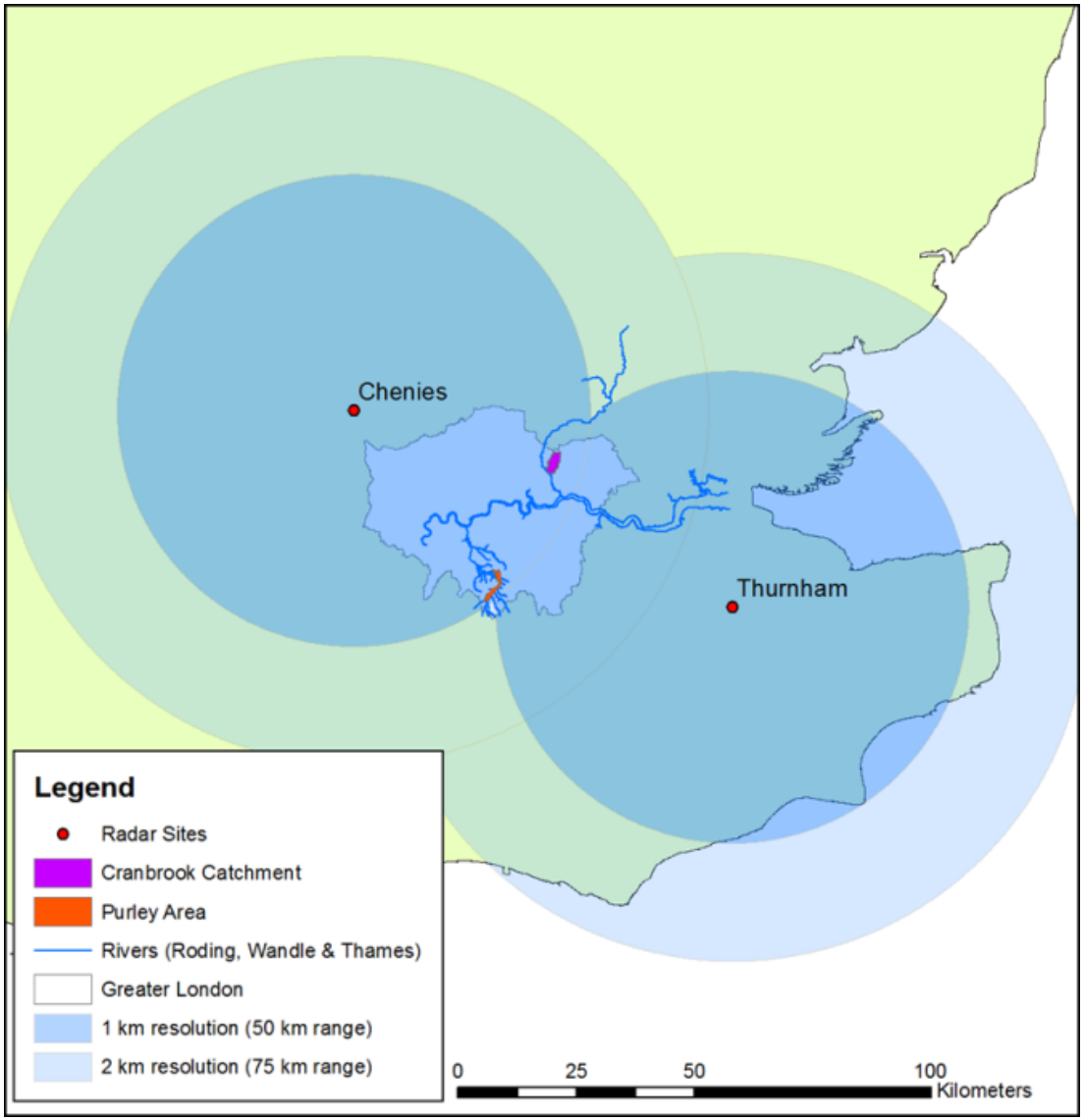
3. Characteristics of drainage and monitoring system

UKMO C-band Radars:

	Chenies	Thurnham
Radar type	C-band	C-band
Polarisation	Single-polarisation*	Dual-polarisation
Doppler (yes/no)	No*	Yes
Antenna	Parabolic 3.6 m diameter, 43 dB gain	
Beamwidth	1^{o}	
Frequency range	5.4 – 5.8 GHz	
Range resolution	1 km up to 50 km range / 2 km up to 75 km range	
Temporal resolution	5 min scan repeat cycle**	
Elevations (^{o})	0.5, 1.5, 2.5, 4.0, 5.0	0.5, 1.0, 1.5, 2.5, 4.0

*Currently being upgraded to dual-pol and doppler
**Within the RainGain project the potential benefits of reducing the repetition cycle to 2-3 min will be tested.




Chenies
Thurnham
Legend
Radar Sites
Cranbrook Catchment
Purley Area
Rivers (Roding, Wandle & Thames)
Greater London
1 km resolution (50 km range)
2 km resolution (75 km range)
0
25
50
100
Kilometers