



**BLACK SWANS AND
BARRAGE BALLOONS:
MANAGING UNEXPLODED
ORDNANCE RISK IN
CONSTRUCTION PROJECTS**

Russell Bowman



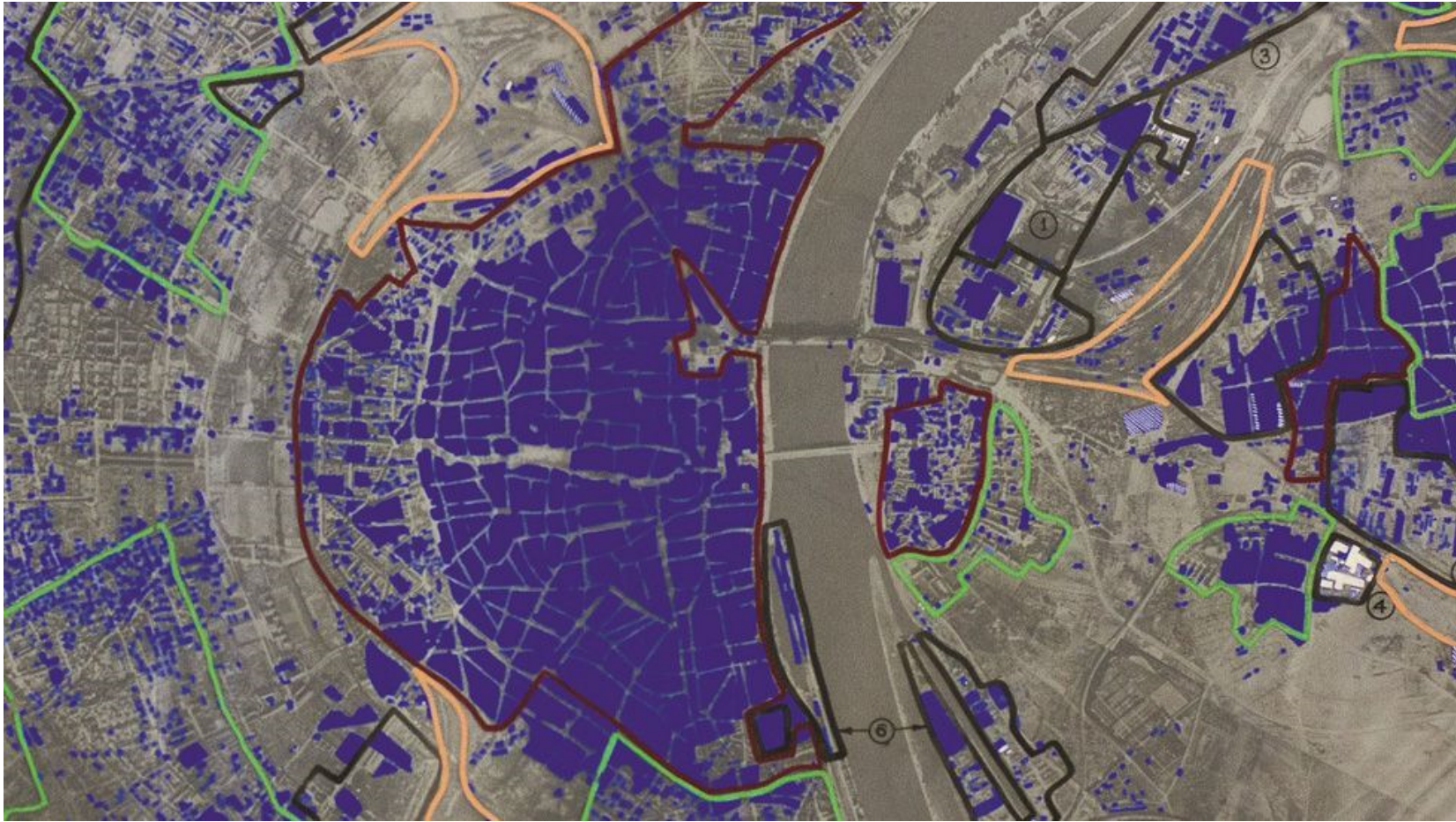
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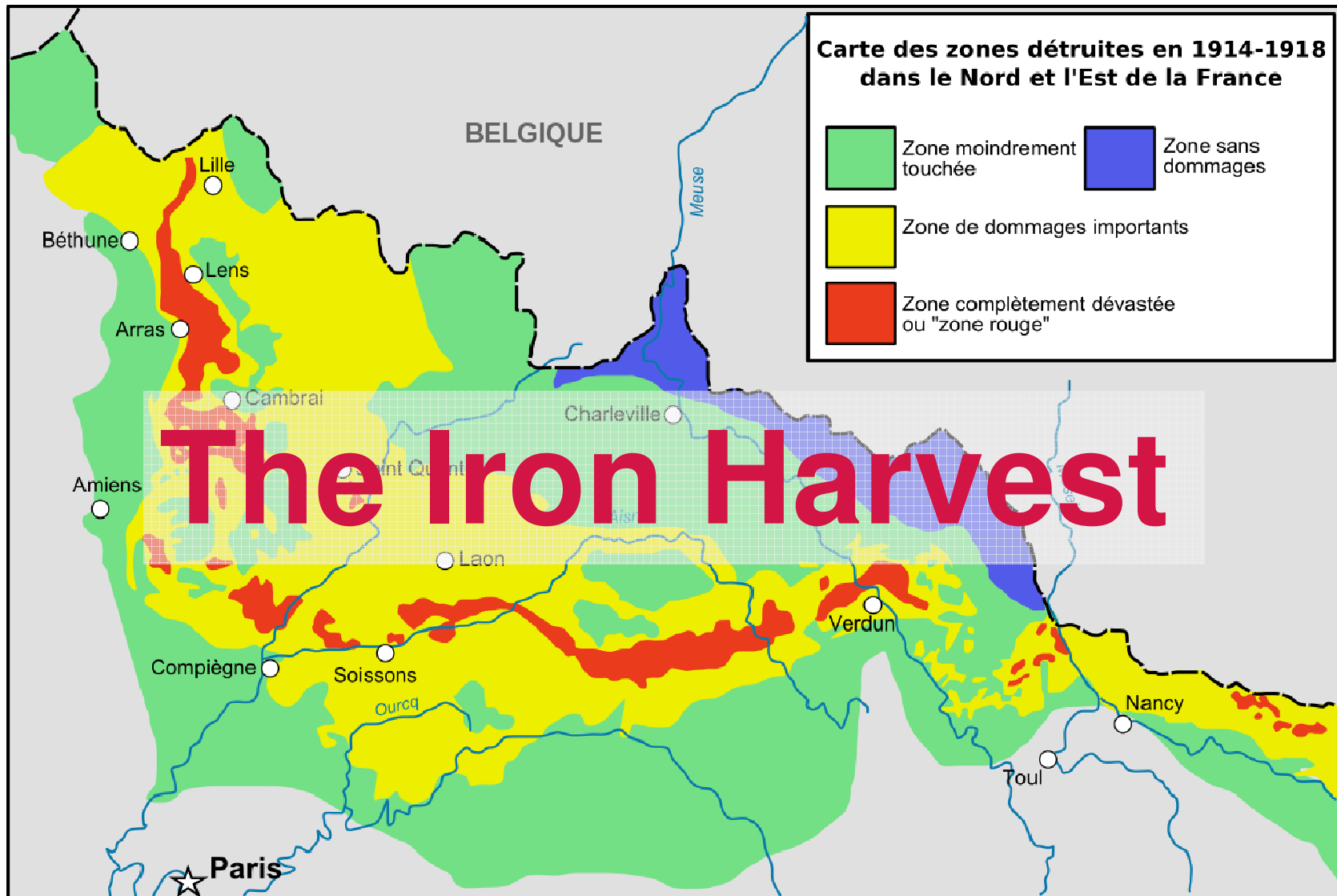
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Germany



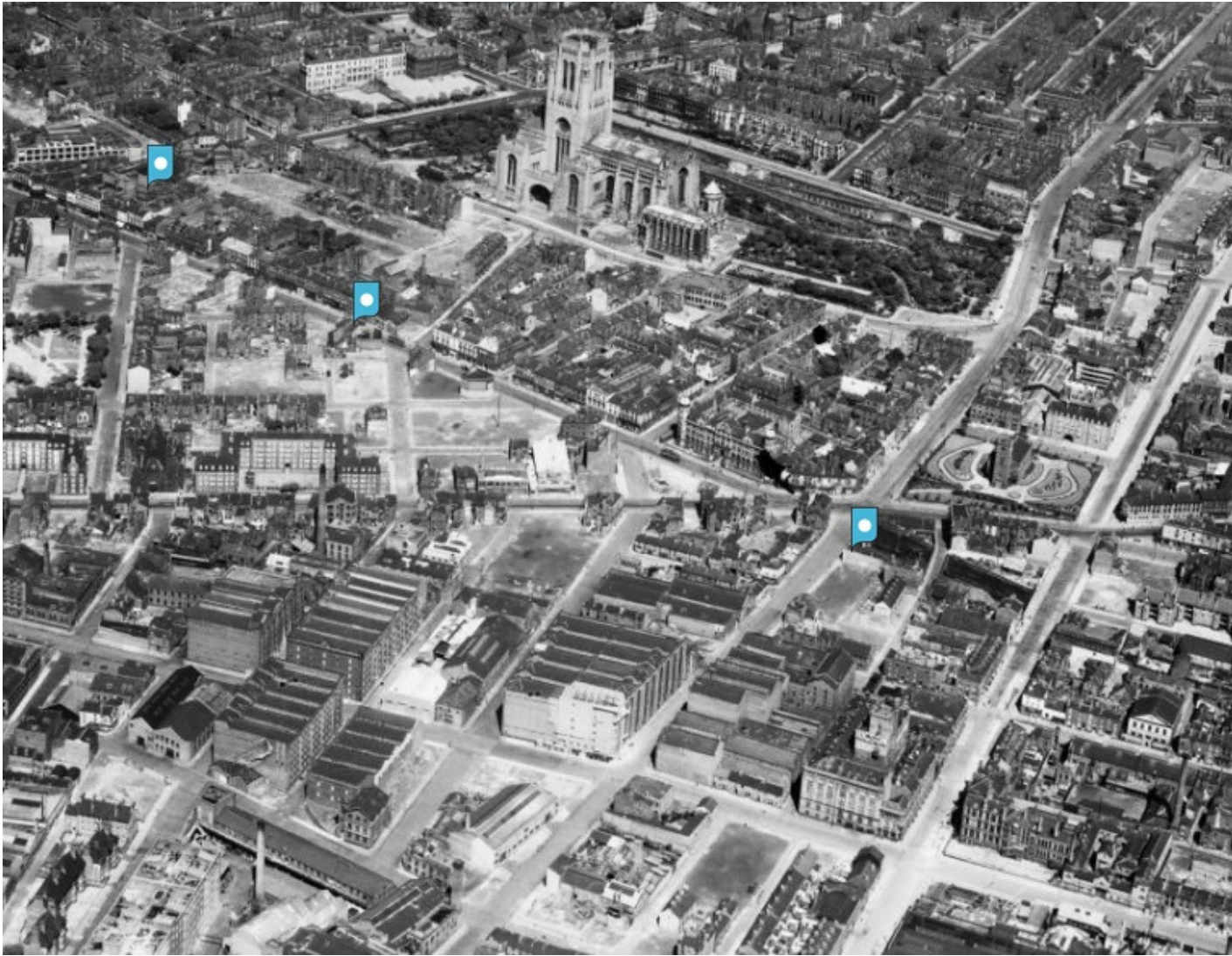




United Kingdom







	Germany	UK
Bombing Intensity	>1.35 million tonnes ¹	0.07 million tonnes ³
Clearance Activities	Responsive	Proactive (Falklands)
Political / Legal Involvement	Direct (federal & provincial)	Indirect (umbrella of H&S Law)
Fatalities	~1 per year ²	No known
Hazard Assessment	Standard practice	Patchy
Risk Assessment	Standard practice	Patchy

1. <https://www.thelocal.de/20170831/what-you-need-to-know-about-wwii-bomb-disposals-in-germany>

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Relative difference in bombing intensity.



Relative difference in bombing intensity.

Fuse types.



Relative difference in bombing intensity.

Fuse types.

Luck.



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THE FACTS:

UXO remains a **legacy of military activity**
in the UK

UXO remains a **hazard** in the UK



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London City Airport shut as WW2 bomb found near Thames

12 February 2018

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QUESTIONS:

1. When is the **hazard** a **risk**?
2. When do you need to **assess** the risk?





Unexploded ordnance (UXO)

A guide for the construction industry





Unexploded ordnance (UXO)
A guide for the construction industry



ANSWERS:

1. UXO remains a **risk**.
2. UXO **risk assessment** should be conducted for ALL construction projects.



Geo-Environmental Contaminated Land Quality Regeneration Risk Assessment Ground Remediation Project Engineers



Geo-Environmental Contaminated Land Quality Regeneration Risk Assessment Ground Remediation Project Engineers

What we do: **Land Quality Assessments**

- Assess risk.
- Employ specialists where appropriate.
- Communicate risk.
- **DESIGN** ground investigation, remediation, earthworks.
- **SUPERVISE** ground investigation, remediation,



Geo-Environmental Contaminated Land Quality Regeneration Risk Assessment Ground Remediation Project Engineers

What we control: **CDM 2015**

- **DESIGN** - Duties to clients.
- **SUPERVISION** - Duties to contractors.

How much do we know about the project?



The Risk



Uncontrolled detonation of UXO

1. Incident will be a **surprise**
2. Incident will have a **major effect**
3. Rationalisation will take place **after** the incident



We should not forget - expect the unexpected

1. Incident is a **surprise**
2. Incident has a **major effect**
3. Rationalisation **after** the incident



Be prepared



The Risk Assessments

Trigger for C681

“There is concern within the construction industry that advice relating to UXO risks can vary widely depending on the advisor.”

2009





UXO risk is reducing

- Repeat building on land (sifting the soil)
- Building into the ground (basements more common)
- You can't find the same bomb twice

BUT...

- Hazard remains.
- Data availability.
- Data recording.



Plymouth – Former NAAFI

- Demolition operative finds one UXB in backfill to retaining structure.
- Son... of operative finds second UXB bound into ground floor slab.



Plymouth – Former NAAFI

- SD70 (70kg)



Unexploded German WWII bomb found in Plymouth made safe

🕒 12 November 2010 | Devon

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A German World War II bomb found in Plymouth City Centre has been moved and a 300m exclusion zone lifted.

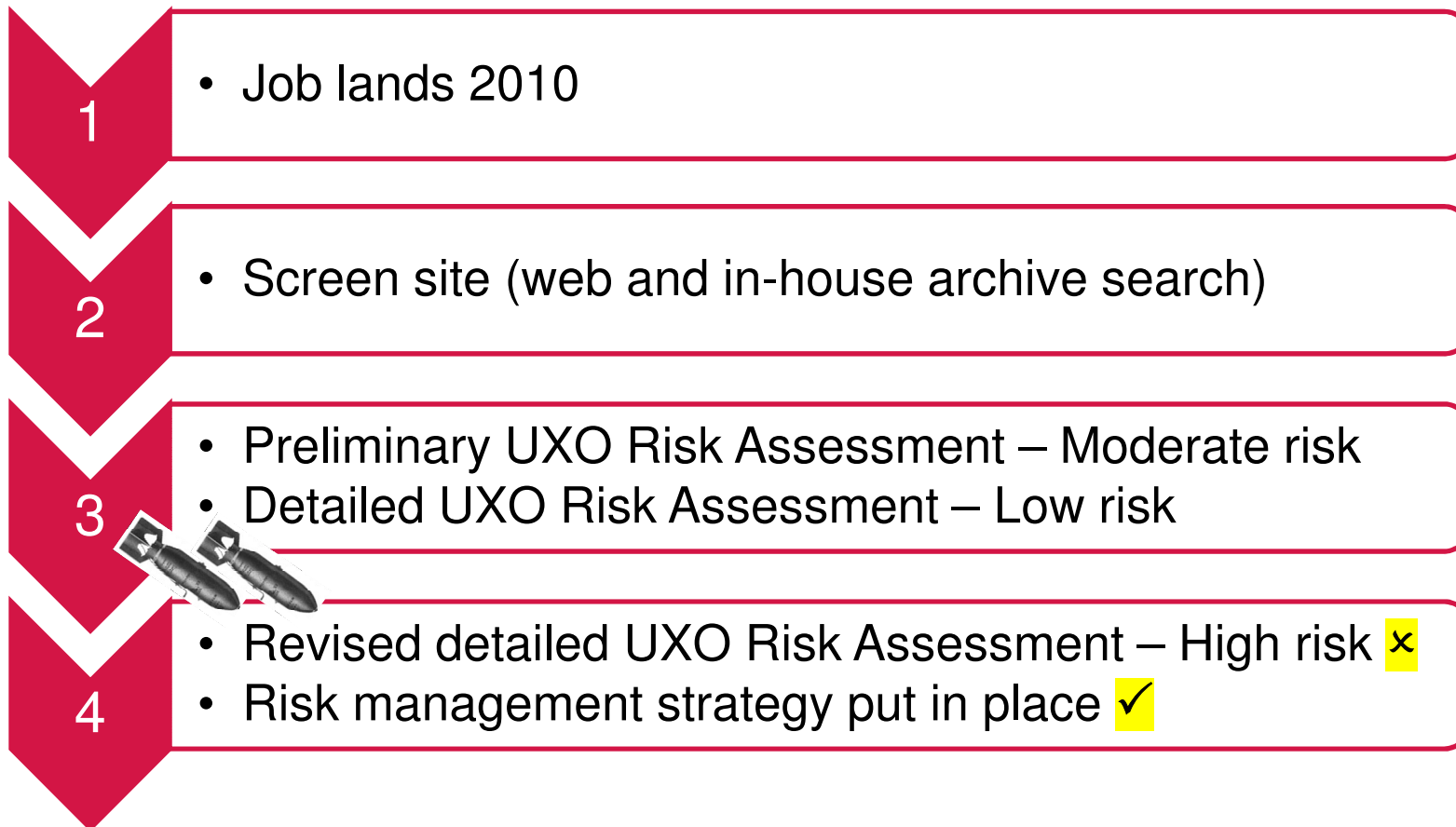
Workmen discovered the partially-buried device at a building site in Notte Street at about 1540 GMT.

Neighbouring buildings were evacuated and a cordon was put in place but residents have been



Emergency services and Ministry of Defence officials are at Notte Street

Plymouth – Former NAAFI

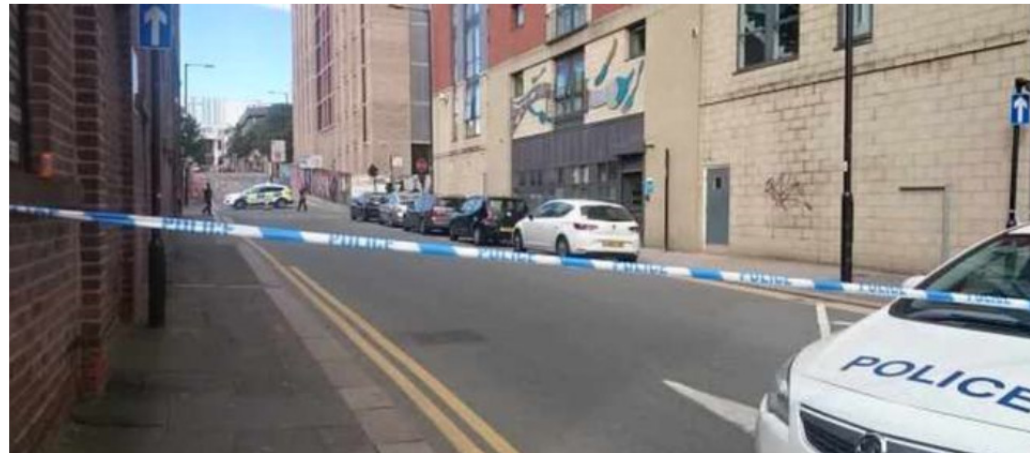


Matilda Street, Sheffield

Three unexploded WW2 bombs close part of Sheffield city centre

🕒 28 September 2016 | Sheffield & South Yorkshire

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To be continued...

Trigger for New Guidance

“The UXO risk assessment sector is established but... awareness, engagement and understanding of UXO risk is patchy.”

2019



New CIRIA Guidance

A site guide.

A short guide.

Pictures.

Plain English.

- Emergency response procedure on Page 2 and in back.
- Risk assessments demystified.
- Risk mitigation techniques introduced.



Take Homes

Be prepared:

- Include UXO on **hazard registers** and;
- Establish an appropriate **emergency response procedure**.

Be diligent:

- **Assess UXO risk** on all your projects.
- Develop a UXO **risk assessment protocol/policy**.
- Involve UXO specialists when the risk is high.
- Interrogate reports – advice should be plainly stated.



UK has a ZERO causality record –
let's keep it



Please help direct the **new guidance**
and complete the **survey**.



