Using Web GIS to provide public safety land use planning advice in the UK

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Introduction

- Who are HSE?
- Why does it provide planning advice?
- How did planning advice work previously?
- How does the new GIS-based system work?
- Conclusions
Introduction to HSE

1972  Robens Report
“The primary responsibility for doing something about the present levels of occupational accidents and disease lies with those who create the risks and those who work with them.”

1974  Health and Safety at Work etc. Act
• Goal setting legislation
• Supported by guidance and codes of practice
• Encouraging a culture of continuous improvement

1975  Health and Safety Executive formed
A single body with responsibility to enforce health and safety legislation in all work places
Introduction to HSE

- An enabling regulator
- Policies are based on evidence and up-to-date knowledge (Science Division)
- Links to legislators
- ALARP principle
- Involve stakeholders
- Transparency: published intervention plans, information on website
- Support those responsible to develop competencies

www.hse.gov.uk
Why does HSE provide planning advice?

- Flixborough 1974
- 28 people killed
- Extensive damage to housing
Why does HSE provide planning advice?

Enschede, N’lands, 2000

Buncefield, UK, 2005

West, Texas, 2013
Major Hazard Strategy

• The 3 part strategy
  – Identification; Control; Mitigation

• Seveso III – article 13 (EU)

• In the UK
  – COMAH regulations
  – Land use planning
  – Emergency planning
Land use planning advice

• Advisory Committee on Major Hazards
  ".........common sense suggests that it is wise, if possible, to keep major hazard plants away from centres of population; similarly, it is wise to avoid a substantial growth in population near an existing installation......."

• HSE’s planning methodology:
  http://www.hse.gov.uk/landuseplanning/methodology.htm
Mapping and spatial data

- Maps have played a part in HSE’s planning advice for a long time
- 3,500 fixed sites in GB
- Over 28,000km of major hazard pipelines
- (17,000 miles)
The previous system - PADHI

- The previous system was known as PADHI (Planning Advice for Developments near Hazardous Installations).
- Old paper maps had been digitised and new maps were created directly using GIS.
- The users (local government) could download the GIS files for the zones.
- They followed an online decision tool...
- ... but all GIS analysis was done offline.
PADHI: consultation zone library

- A local government could download the GIS files for their geographical region
- Zipped shapefiles and a PDF
## PADHI: development types

<table>
<thead>
<tr>
<th>Sensitivity Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Workplaces, Parking Areas</td>
</tr>
<tr>
<td>2</td>
<td>Housing, Hotels, Transport Links, Recreational Uses</td>
</tr>
<tr>
<td>3</td>
<td>Small hospitals or care homes and Education</td>
</tr>
<tr>
<td></td>
<td>Large (dense) examples of 2</td>
</tr>
<tr>
<td>4</td>
<td>Institutional Accommodation &amp; Large Outdoor Use by Public</td>
</tr>
</tbody>
</table>
# PADHI: decision matrix

<table>
<thead>
<tr>
<th>Level</th>
<th>Inner</th>
<th>Middle</th>
<th>Outer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Level 2</td>
<td>×</td>
<td>✓</td>
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<tr>
<td>Level 3</td>
<td>×</td>
<td>×</td>
<td>✓</td>
</tr>
<tr>
<td>Level 4</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
</tbody>
</table>
PADHI: spatial intersect

- The user had to answer this question based on a query they had done in their own GIS system.
- They would sometimes misinterpret the rules resulting in inaccurate advice.
Drivers for change

• The PADHI system was designed in early 2000s and technology had moved on meaning a better system was achievable in 2014-15

• The users of PADHI also expected more in 2014 than in 2000

• Wider agenda within HSE and UK Government:
  – An assumption in favour of sustainable development (‘growth’ & ‘localism’ agendas)
  – Red Tape Challenge
  – Commercialisation of HSE / Scope for Cost Recovery
  – The ‘Digital by Default’ agenda
The challenge

• To create a web application that was a streamlined, all-in-one mapping and advice system
• That can contain sensitive information
• That is available to existing users (local government)
• And new users from the private sector for a fee
• Expecting somewhere between 8,000-20,000 queries a year
New system: location search
New system: draw/edit functionality
New system: initial advice

HSE’s Advice

HSE Planning Advice has an interest in your enquiry, please download or print your report. This does NOT mean your planning application has been rejected, but further information is required. For HSE’s Planning Advice based on the type of development being proposed please continue your enquiry by clicking the Continue Application link below.

Your enquiry crosses an Explosive Safeguarding Zone, HSE Explosives Inspectorate has an interest in the development, please download or print your report.

Our Reference : HSL.170614101945.391
Your Reference : PA/0001/2017/FUL
Development Name : New Development
Date Created : 14/06/2017 10:19:49
Description/Comments : n/a
Created By : exampleuser@HSL.GSI.GOV.UK

Please download documents:
- Hazard/Pipeline Report
- Explosives Report

Please check all mapping details, including the drawn planning boundary and background mapping, are correct.

Continue Application >>
New system: provide more information
New system: full advice
Software tools

- ESRI Javascript API
- ESRI ArcGIS Server
- 3rd party mapping tile server
- MS SQL Server
- C#
- MVC .NET
- jQuery
- jQuery UI
- Bootstrap
Improved advice system

• More user friendly system built on ESRI technology
• All users access the current versions of zones
• Spatial intersect query now fully integrated – no ambiguities
• Consistent advice
• Majority of queries received by advice team are now advice related rather than how to use the system
Improved technology base

- The system is accessible on all modern browsers
- Improvements are made on a continual basis
- The advice system is in a better position to adapt to policy changes
Better stakeholder interaction

- The web app is helping HSE engage with property developers at an earlier stage
- Previously, developers could find out HSE advises against their development after significant investment
- The new web app allows them to consult early
- Improved the perception that HSE is working with rather than against property developers
- Shortlisted for the 2017 Planning Awards “stakeholder engagement in planning” category
The End

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http://www.hsl.gov.uk/what-we-do/better-decisions/geoanalytics