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WESENSEIT
CITIZEN OBSERVATORIES

A participatory design case study

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Aims of this lecture

- To present an example of a participatory design case study in the context of a European Project
- To highlight methods and techniques used for qualitative and quantitative research
- To present concrete examples and motivations for each example



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The project

WeSenselt

- WeSenselt was a European Research Project FP7 coordinated by The University of Sheffield
 - 2012 to 2016
- Aims
 - Develop citizen observatories of water and flooding
 - Define a new framework in which authorities and citizens cooperate in:
 - sharing collective intelligence about events and places
 - supporting a shared situation awareness

Project plan

- Developing the citizen observatory
 - Identifying the stakeholders
 - Gaining stakeholder support
 - Requirements analysis
 - Sensors/Apps Development
 - Sensors/Apps Long-term evaluation

Case studies

https://en.wikipedia.org/wiki/Case_study

- “A **case study** is a research method involving an up-close, in-depth, and detailed examination of a subject of study (the **case**), as well as its related contextual conditions.”
- To run a case study we use a variety of research methods
 - Qualitative
 - Quantitative

WeSensel Case studies

https://en.wikipedia.org/wiki/Case_study

- Doncaster (UK)
 - River Flooding
- Alto Adriatico (IT)
 - Flood and drought forecasting
- Delft (NL)
 - Water quality and pluvial flooding
- Project setup
 - Requirement and stakeholder Analysis (M0-9)
 - Two cycles of implementation and evaluation

M9-18 (June 2013 - March 2014)

M30-41 (March 2015 - Feb 2016)



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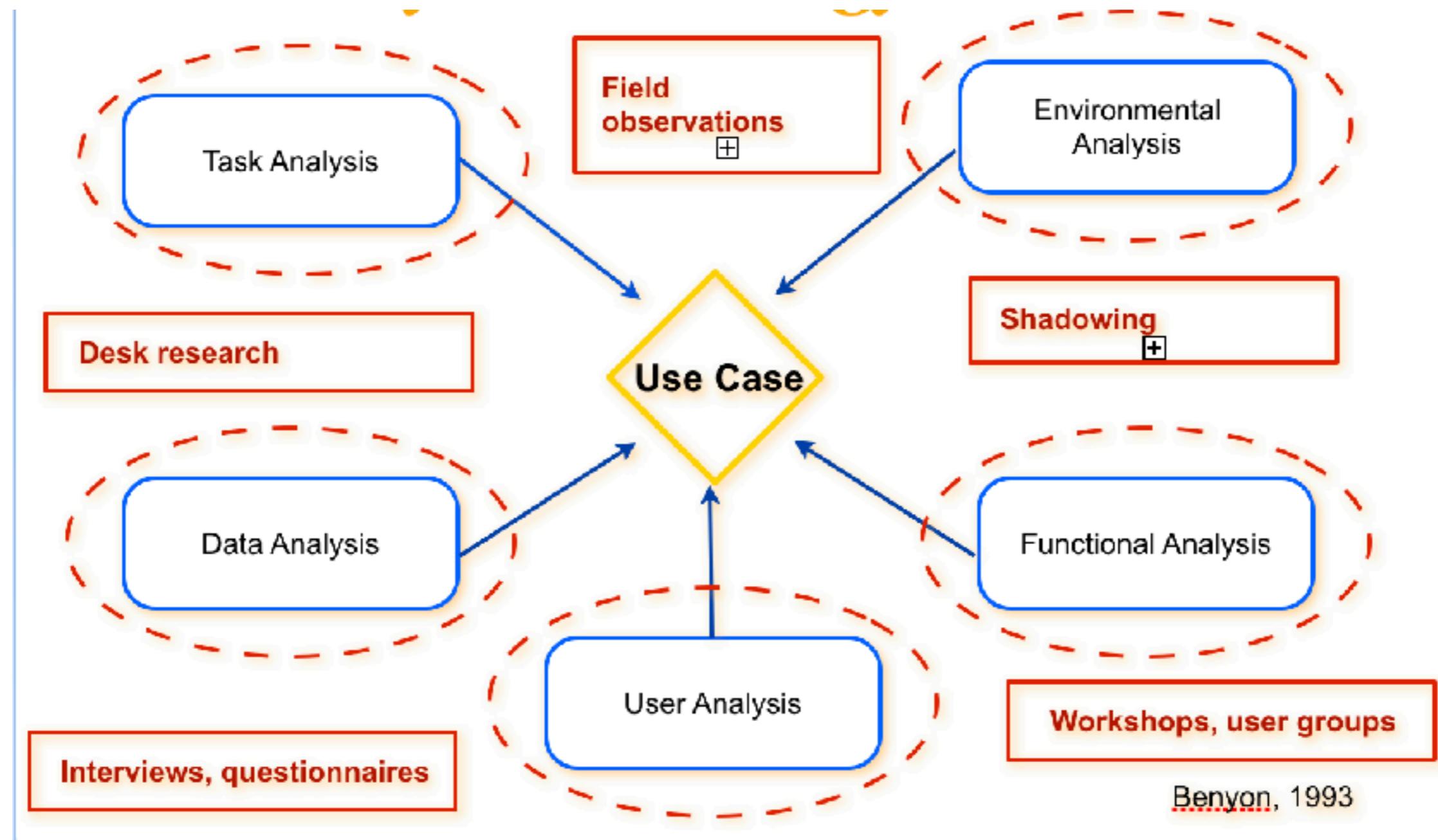


First questions

- Who are our users?
 - Stakeholders analysis
- What is the context in which they operate?
 - Environment analysis
- What data/information they use?
 - Data analysis
- What tasks they perform
 - Task analysis
- What functions are performed
 - Functional analysis



First questions





Research Approach

Stakeholder Analysis

Identify the most engaged stakeholder groups in relation to local flooding

Arrange to meet each group at their convenience

Secure their support

Ask them about the local issues

Questionnaire: profile, technological abilities, baseline attitudes,
willingness to participate & contact details

Develop the professional and citizen requirements

Who are our users

- Emergency Services, Existing Volunteer Communities, Citizen Scientists and Concerned Citizens
- Citizens identity across different cultures:
 - UK: Normal people (old lady living on the riverbanks, flood wardens...)
 - Italy: A mixture of civil protection volunteers (preferred) and normal citizens \
- **Risks:** politically, ideologically or personally motivated groups and individuals highjacking the observatory

Stakeholders analysis

- Emergency Services, Existing Volunteer Communities, Citizen Scientists and Concerned Citizens
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- **Risks:** politically, ideologically or personally motivated groups and individuals highjacking the observatory

- Identify stakeholders groups
- First at the scale of the issue for the use case:

Flood risk

Water quality

- We asked users to write down all the stakeholders from different perspectives taking each category in turn:

Sector: *Private, Public, Voluntary, Community*

Socio-economic: *gender, age, life-stage, ethnicity, income*

Function: *user, service provider, landowner, regulator, decision maker*

Geography: *location to issues, permanent or transitory*

Information: *Users, Gatherers, Enthusiasts*

- We reminded them to not forget disability groups

- Analyse list of stakeholders by
 - **Influence** - the level of influence they will have on the project
 - now and in the future
 - **Affected** - how they will be affected by the project now and in the future
 - **Interest** - what is their current and future interest in the project issues?

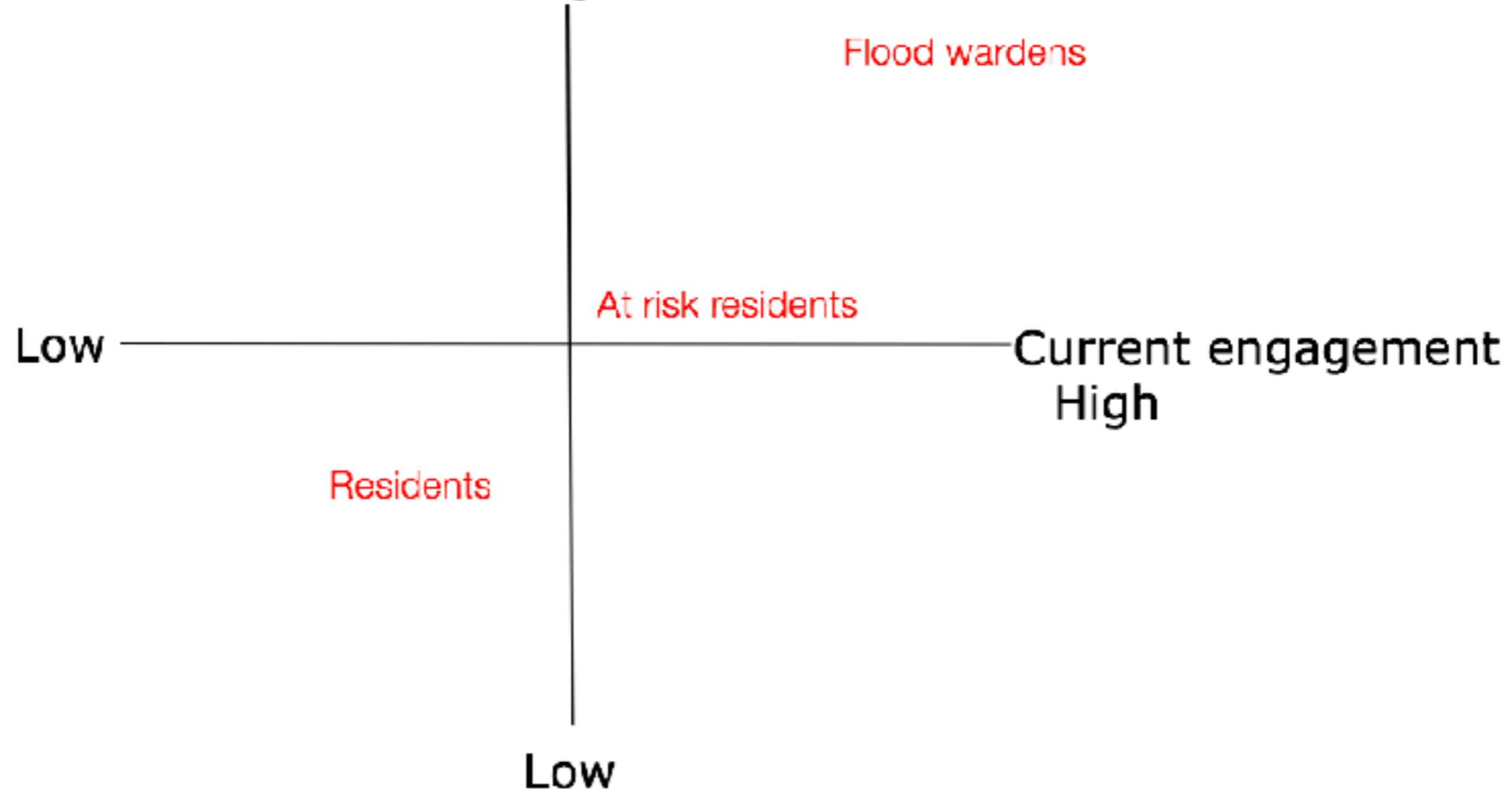


Mapping stakeholders

Mapping technique example for the stakeholders

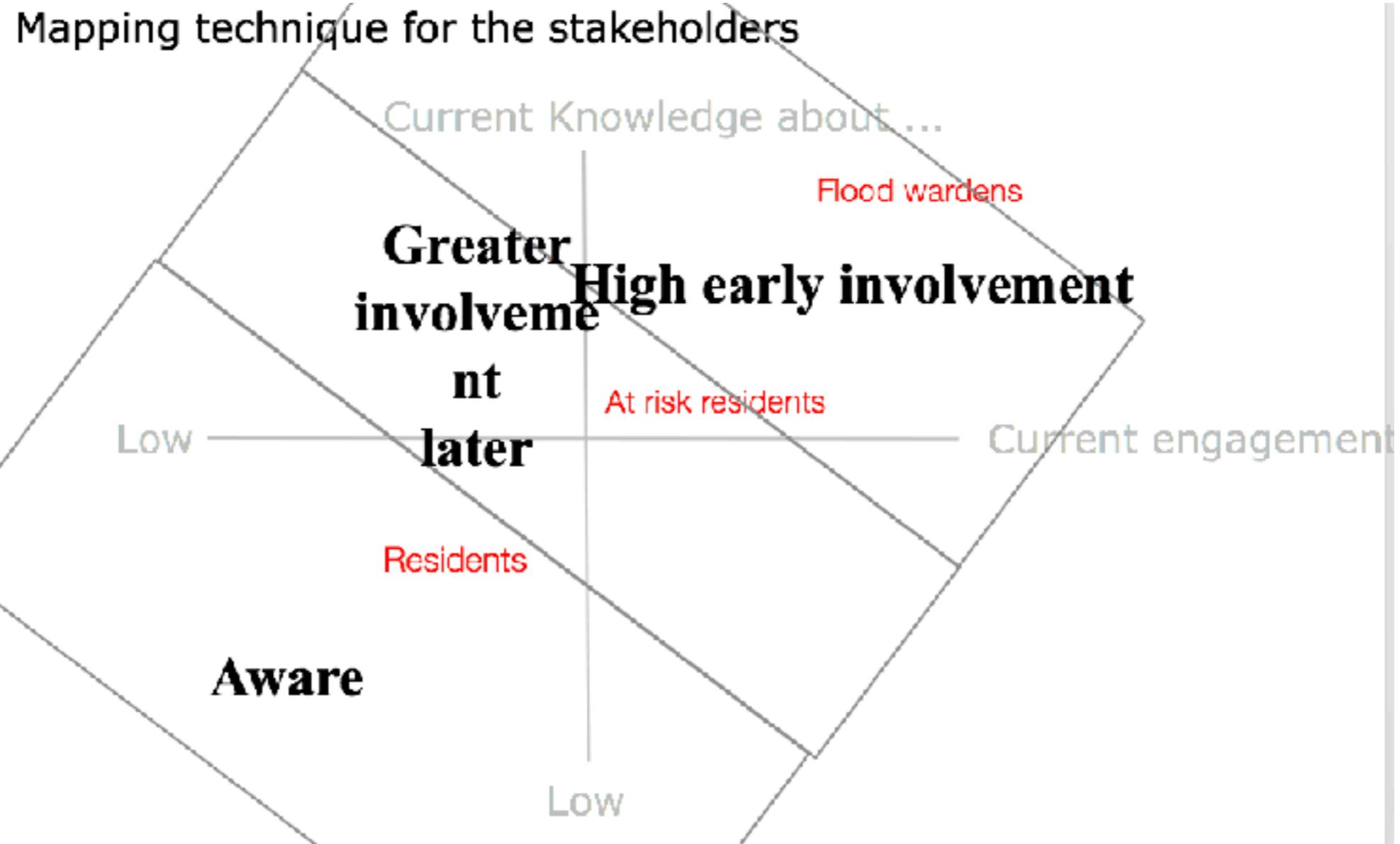
Current Knowledge about ...

High





Mapping stakeholders





Stakeholders analysis template

A. Stakeholder Analysis: Flood Risk

	Stakeholder Name	Brief description of stakeholder main activities	Legal responsibility in relation to the risk	Interest in the risk (not legal responsibility)	Approx. Number of staff / members If relevant	Level of Influence on the WeSenseIt Case	Level of Interest In the WeSenseIt Case	How affected by the WeSenseIt Case	Location	Key Contact Name/Tele/email
Private Sector						Current: Future:	Current: Future:	Current: Future:		
						Current: Future:	Current: Future:	Current: Future:		
						Current: Future:	Current: Future:	Current: Future:		
						Current: Future:	Current: Future:	Current: Future:		
						Current: Future:	Current: Future:	Current: Future:		
Public Sector						Current: Future:	Current: Future:	Current: Future:		
						Current: Future:	Current: Future:	Current: Future:		
						Current: Future:	Current: Future:	Current: Future:		
						Current: Future:	Current: Future:	Current: Future:		
						Current: Future:	Current: Future:	Current: Future:		
Voluntary						Current: Future:	Current: Future:	Current: Future:		
						Current: Future:	Current: Future:	Current: Future:		
						Current: Future:	Current: Future:	Current: Future:		
						Current: Future:	Current: Future:	Current: Future:		
						Current: Future:	Current: Future:	Current: Future:		
Community						Current: Future:	Current: Future:	Current: Future:		
						Current: Future:	Current: Future:	Current: Future:		
						Current: Future:	Current: Future:	Current: Future:		
						Current: Future:	Current: Future:	Current: Future:		
						Current: Future:	Current: Future:	Current: Future:		



Data analysis

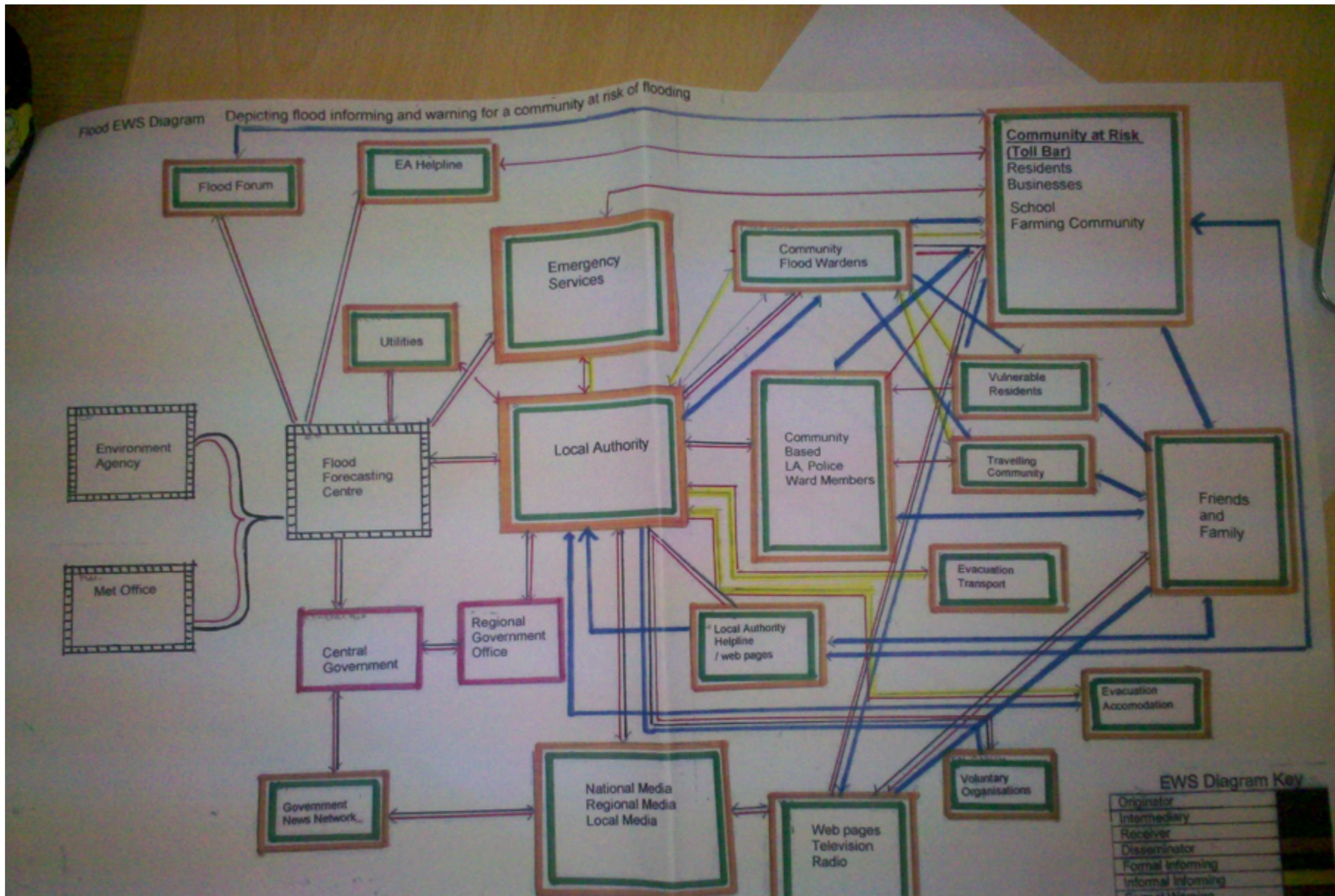
- Analysis of historic flood data
 - To pinpoint sensitive locations
 - i.e. bridges
 - To support choosing representative
 - Citizens from involved communities

Table 4-1 - Locations of Surface Water Flooding which are classed as "Significant" during the June 2007 Floods

Number	General Location including description	Neighbourhood Area	Grid Reference	Location	Date of Flood Event	Flood Duration	Main Source of Flooding	Additional source of flooding
1	Brookland Road and Askern Road, Carcroft. Floods road and factories in heavy rain and YW pump trip out	Carcroft	SE454555,409315	Brookland Road, Carcroft	Jun-07	2 days	Surface runoff	In heavy rainstorm and when pumps trip outflowing
2	Church Lane/Village Street, Adwick Le Street. Properties flood during heavy rainstorm	Adwick Le Street	SE454152,408641	Village Street	Jun-07	1 - 2 days	Surface runoff	Properties flood during heavy rainstorm, caused
3	Low Road/Willow Street, Road and houses flooded	Conisbrough	SK451453,398646	A6023	Jun-07	2 weeks	Main rivers	Kearsley Brook unable to cope with exceedance
4	Low Road - Windsor Road to junction of station road, not passable o/s railway station	Denaby Main	SK450916,399415	A6023	Jun-07	2 days	Surface runoff	System unable to cope
5	Askern Road junction Daw Lane, Bentley. Road and properties flood during heavy rainstorm and when YW surface water	Bentley	SE456614,406559	Askern Road junction Daw Lane	Jun-07	3 - 4 days	Surface runoff	YW Pumping Station which discharges into Mill
6	Lindrick, Tickhill Paper Mill Dyke overtopping	Tickhill	SK459158,392710	Lindrick, Tickhill	Jun-07	2 days	Surface runoff	Paper Mill Dyke Natural exceedance



Functional analysis





Stakeholders analysis outcome

Community volunteer flood wardens

Toll Bar

Deprived/engaged

Bentley

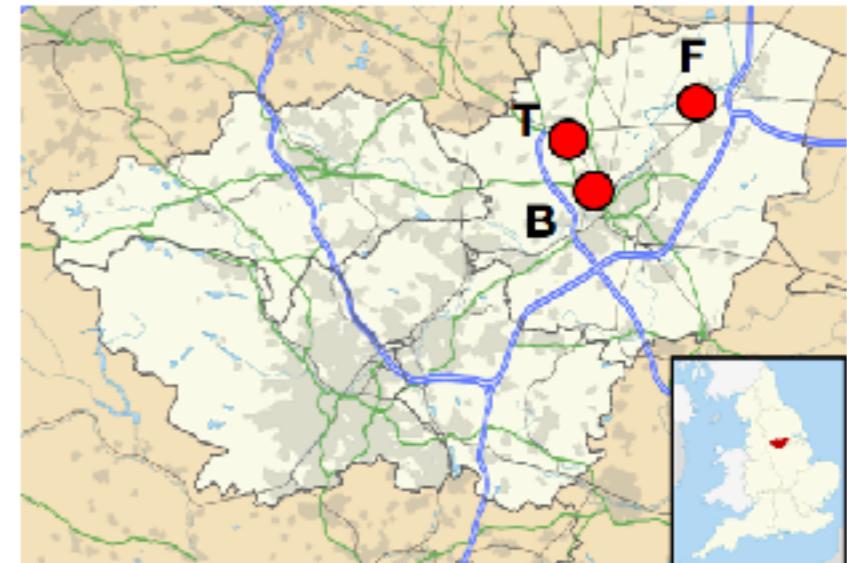
Mixed income/interested

Fishlake

Wealthy retired/engaged

Council Professionals

Environment Agency



Bridge engineers
Asset engineers
Road engineers
Surface water experts

Emergency management
Flood risk management
Stakeholder engagement
Modelling



Research Approach

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Identify the most engaged stakeholder groups in relation to local flooding

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Develop the professional and citizen requirements



Meeting users face to face

Mixture of qualitative and quantitative approaches:

- 3 meetings with citizens communities
7-8 participants each
At their local meetings where possible
- 3 meetings with professional users
At emergency centre and DBMC venue
Environment Agency 3 participants
Council 12 participants

Mixture of presentation, discussion and questionnaires

Toll Bar Flood Wardens - Minutes of Joint Meeting held at Toll Bar Community Hall on Tues 17.12.13.45

Present: J. Drysdale, R. Smith ex, S. Hickson, A. Reedham, S. Shelbourne, S. Shallowne, S. Baugher ex, S. Moran, M. Wood, K. Wilburn, P. Sutton, R. Kirby
Apologies: A. Burrough, E.R., R. McDoneagh, C.P.

Minutes of last meeting given out with matters arising as follows: the TBA now have a new notice board situated on the corner of Hall Villa Lane, near the bus stop, and it was agreed to put our poster up to try and get people interested in group and hopefully attract new members.
Review of Flood Alert 6-7 is. The communication was good but it was felt that the information on the EA site was too much jargon for public, too technical

Rotation 2

Community	1	2	3
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WeSenseIt Doncaster Public Background questionnaire

Thank you for taking part in this survey which should take no more than 10 minutes.

First of all in order to protect your information when we store it at our office we need to give you a code rather than use your name so that your comments remain anonymous. Please answer A, B and C below to make your code.

Q.A. Please write down your date of birth (only date and month only)

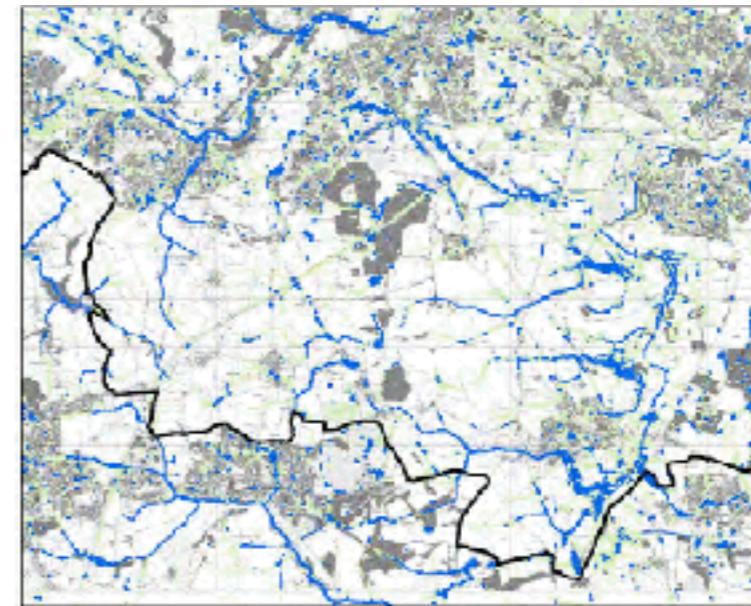
Date

Month



Environmental analysis

- Analysis of existing sensors
 - Location
 - Usage
 - Data access
 - Limitations



- Limitations
 - Low number of sensors
 - Low pulling rate
 - Some sensors can be pulled only by ringing an operator
 - Some sensors provide just reading and not forecasting



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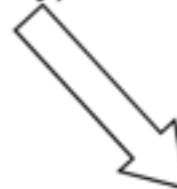
Interviews template

- 1) To better understand your background and therefore contextualize your answers, could you please tell us what is your position in your organization/department and what are your main responsibilities?
- 2) What is the main aim and what are the main responsibilities of your organization/department?
- 3) Could you please tell us about your experiences with flooding?
- 4) Could you please elaborate on what was positive during recent flooding episodes or alerts? Could you provide any example?
- 5) Could you please elaborate on what went wrong during recent flooding episodes or alerts? Could you provide any example?
- 6) What are the main issues you encounter in your everyday job when dealing with flood issues?
- 7) What are the main issues you encounter during a flooding alert or episode?
- 8) Who are the main actors you interact with?
- 9) Are the communication lines efficient?
- 10) Is there any communication line that you would like to activate and cannot? Is this



Questionnaire

Q1. Do you own a mobile phone with a camera? (Please tick one box only)



Yes	
No Go straight to Q3	

Q2. Do you own a smartphone? (Tick one box only).

Yes: iPhone	
Yes: Android (i.e. HTC, Samsung)	
Yes: Blackberry	
No	

Q3. Can you use your smartphone for work purposes? (Tick one box only).

Yes	
No	

Q4. Do you use the internet?



Questionnaire

Q12. Thinking about both preparing for and coping with a flood in your *local area*, what level of useful information do you think you currently have that helps you make good decisions? (On the scale below please circle one number between 'none at all' and 'all required').

None at all	0	1	2	3	4	5	6	All require d
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Q13. Now thinking about how the flood risk is managed in your *local area*, how much influence do you feel you have in decisions that are made? (On the scale below please circle one number between 'no influence' to 'strong influence').

No influenc e	0	1	2	3	4	5	6	Strong influenc e
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Q14. What types of flooding have been experienced in your *local area* which your job or role has responsibility for? (Please tick all that apply. If your answer is **none** please go to Q16.)

Water entered homes	
Water almost entered homes	

Why a questionnaire?

- the questionnaires developed in this project were designed to be self completion
 - this enabled all those attending meetings or group discussions to fill in all at once rather than wait to be interviewed
 - allowed questionnaires to be distributed in a number of ways either at the time of a meeting, by email or via an electronic survey
 - overcame the language barrier with questionnaires translated into Dutch and Italian as appropriate and easily analysed by non speakers of any of the languages.

Why a questionnaire?

- the survey also asked individuals if they were interested in joining the project and obtained their permission for them to be recontacted by us
- the database acts as a record of participants and baseline data to measure change in attitudes and behaviour



Questionnaire outcome

Questionnaire highlights

Flood Wardens

All experienced local flooding

Mixed concern

60+ years, white, mostly male

Mobile with camera 13/17

Smartphone 4/17

Internet at home 12/17

Facebook 4/17

Blogs/ forums 5/17

Flickr 4/17

Willing to take part YES



Citizen map of flooding



Citizen Pictures given to the Council

Council Professionals

Mobile with camera 11/12

Smartphone (6Android, 1BB) 7/12

Internet at home 12/12

Willing to take part YES

Qualitative vs. Quantitative

- Quantitative results were analysed using SPSS
- however, sample sizes were not large enough to allow for statistical analysis

?



Environmental analysis

- Field visits

Example from discussion:



Citizen



Professional



Citizen requirements sometimes might not make scientific sense but sensor inclusion is important for citizen engagement and learning



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Outcome: requirements

No	Sensor type	Potential Application	Additional Considerations
	Water - velocity	Kirk Bramwith Bridge Jubilee Bridge Stainforth Bridge Grey Bridge Norwood Spillway	Could use velocity data coupled with depth data to calculate the discharge on a particular point on a river.
	Water - temp		Maybe any of the 3 monitors below could be used on the Thorne and Hatfield WLMP (need to speak to NE and JBA) to test for water quality?
	Water Level	Fordstead lane Tickhill Dam (new telemetry etc due to installed shortly although paper mill dyke may benefit upstream) Toll Bar Rugby Pitch Pickburn Kearsley Brook (possibly 2 either on low road or further upstream would give early warning to residents)	



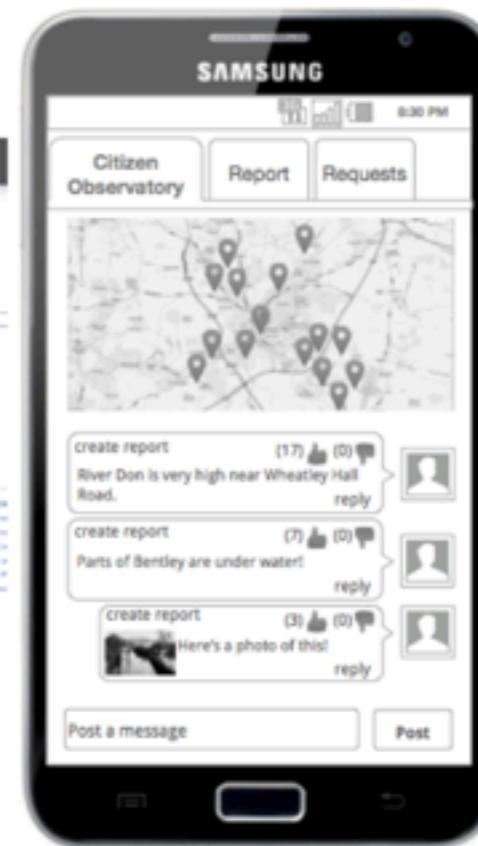
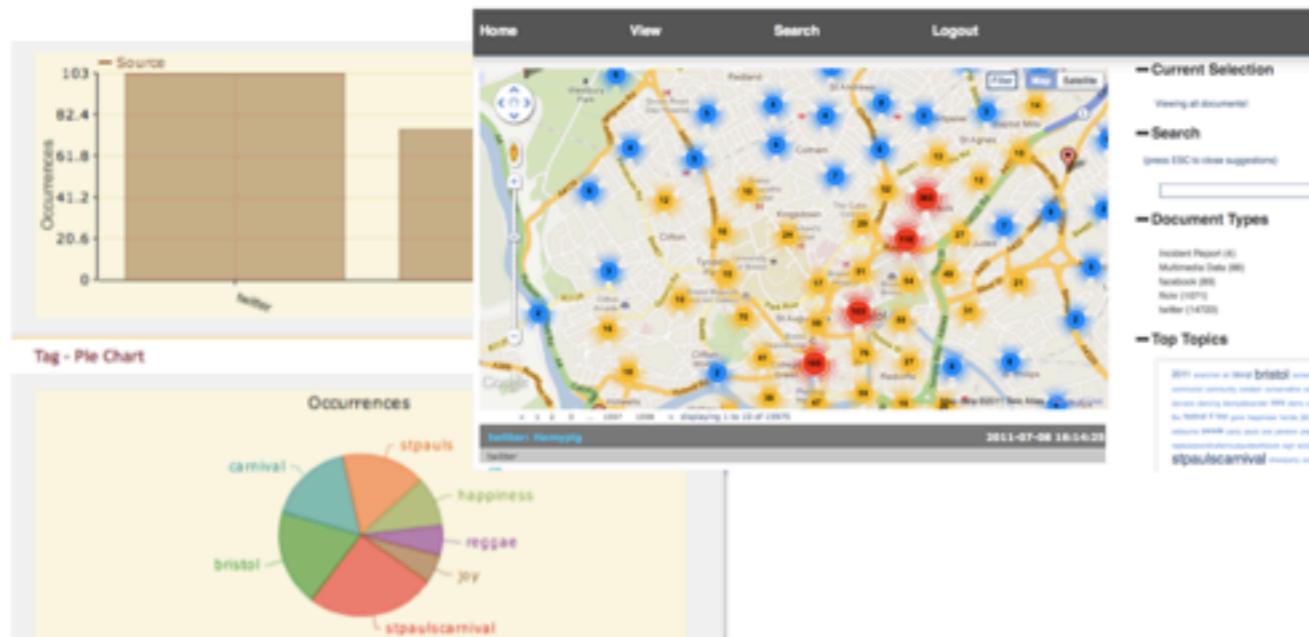
Outcome: requirements

	about a place or an event. Again for the web app		
UR-F15	<i>Key contacts address book</i> The system should store and give access to key contact details in emergency situations - e.g. who are most capable of helping and supporting.	L	CC
UR-F15	<i>Support for user roles</i> The system must support data access policies.	H	EP
UR-F16	<i>Real-time Information Filtering and Analysis</i> The system must support dynamic filtering of large-scale data using a level of details methodology.	H	EP, CC
UR-F17	<i>Multiple viewpoints and correlation displays</i> The system must offer means to explore the information space from multiple viewpoints and use displays that highlight correlation between heterogeneous data.	M	EP, CC
UR-F18	<i>Access to checklist statistics</i> The system should provide EP with near real-time information about the flood checklist, to increase their situation awareness	H	EP
UR-F19	<i>Access to Model results</i> The system should provide access to the results of the system modelling in real time, through interactive visualisations. In Italy modelling is done by Amico.	H	EP, CC
UR-F20	<i>Access to data overview and statistics</i> The system should provide access to aggregated information about a place or an event Merge with 17	H	EP, CC
UR-F19	<i>Information Searching and Analysis</i> The system should provide simple and advanced searches over the data	H	EP, CC
UR-F20	<i>Geographical search</i>	M	EP



Outcome: mockups

- Use of low-fidelity techniques to elicit discussion during focus groups
 - Digital or paper mock-up



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Questions

?