

# The Benefits of Consolidating Spatial Data Using Oracle Technology

## Hull City Council's Experience

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- Options
- Implementation
- Benefits

# Background

# General Background

- Saving money – reduced duplication, easier access
- Improving customer service
- Evidence-based resource targeting
- Modernisation
- Seamless data sharing
- Data quality



# Drivers

- Remove data duplication
  - At least 50 datasets, separately maintained
- Reduce licence costs
  - ~ 60 pro GIS licences = £1.5k each + maint + training
- Make access easy
  - < 6 GIS/spatial data technicians in 14,000 staff
- Improve visibility, decision making, accountability
  - Areas with devolved budgets but not line mngr
- Specifics
  - Priority Service Transformation Outcomes G14, G5

# Spatial Data Store (SDS)

## Data Sources

CORE  
INTERNAL  
D'BASES

**BASE 'SPATIAL' DATA -  
LABELS**

INTERNAL  
MAPPING  
DATA

**BASE SPATIAL DATA,  
SUPPLEMENTARY  
SPATIAL DATA**

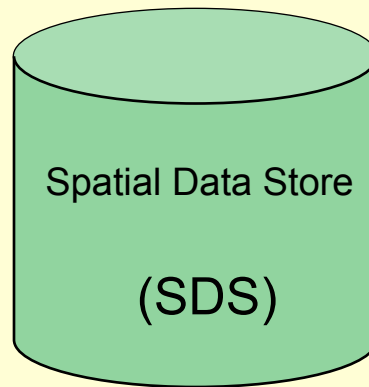
INTERNAL  
SYSTEMS  
D'BASES

**SUPPLEMENTARY  
DATA THAT CAN  
BE SHOWN  
SPATIALLY**

PARTNERS  
DATA

**DATABASE-  
SOURCED OR  
MAP-SOURCED  
FROM EXTERNAL**

Data Storage &  
Distribution  
Management



**ADDRESS & SERVICE  
LOCATOR, REPORT  
VISUALISER**

**ADDRESS & SERVICE  
SEARCH, REPORTS**

**MULTI-SOURCE DATA,  
INC NOT FROM MAPS**

**MULTI-SOURCE  
DATA**

**ENRICHED / RE-  
PROFILED DATA**

## Data Destination

BROWSER  
MAPPING

BROWSER TEXT  
RESULTS

INTERNAL  
GIS USERS

INTERNAL  
SYSTEMS

PARTNERS

# Spatial Data Store (SDS)

## Data Sources

GMS HULL  
GMS OOT

LLPG ,NSG  
HULL AND EXTERNAL

CRM

GRAFFITI INCIDENTS,  
MISSED BINS,  
FLYTIPPING INCIDENTS

IN HOUSE  
MAPPING  
DATA

POLITICAL AREAS  
SCHOOLS,  
ENVIRONMENTAL  
OPERATIONALMAPS

IN HOUSE  
SYSTEMS

EXOR, FLARE,  
SLITS, HITS,  
I-WORLD, IBS,  
COMMIT, EMS

PARTNERS  
DATA

POLICE,  
DTZ

## Data Storage & Distribution Management

Spatial Data Store  
(SDS)

## Data Destination

CRM  
APPOINTMENTS

BROWSER TEXT  
RESULTS

BROWSER  
MAPPING

IN HOUSE  
GIS USERS

IN HOUSE  
SYSTEMS

PARTNERS

# Options

# Network File Storage

## Advantages

- Cheap
- Easy to provide

## Disadvantages

- Relies on manual enforcement of procedures to operate effectively
- Data sharing is more difficult especially across organisations
- Few of the advantages of a database approach

# Central Database With Spatial Middleware

## Advantages

- All the advantages of a database approach

## Disadvantages

- Expensive as it requires an additional server for the middleware
- All GIS functionality has to go through the middleware
- Spatial data is stored as binary objects so data sharing is difficult and access is restricted to a single GIS

# Oracle Spatial Database

## Advantages

- All the advantages of a database approach
- Spatial component is inside the database and not middleware
- Oracle Spatial is a mature, reliable and functionality-rich product
- Few data modelling restrictions
- Oracle's open-standards approach makes data sharing easier
- Seamless integration with other Oracle products

## Disadvantages

- Expensive (if a license doesn't already exist) – but can use Locator for many functions

# What About Data Dissemination?

- Thick-client (desktop) GIS has traditionally been used for the map data
- Desktop GIS is functionality rich but often requires customisation as a result
- Licenses are expensive
- Performance can be poor when accessing network or database data
- You have to install it
- Not easy to serve data to the public using Desktop GIS
- But now it is treated like any other data which makes it easy to disseminate in other ways e.g. via a browser, web services etc



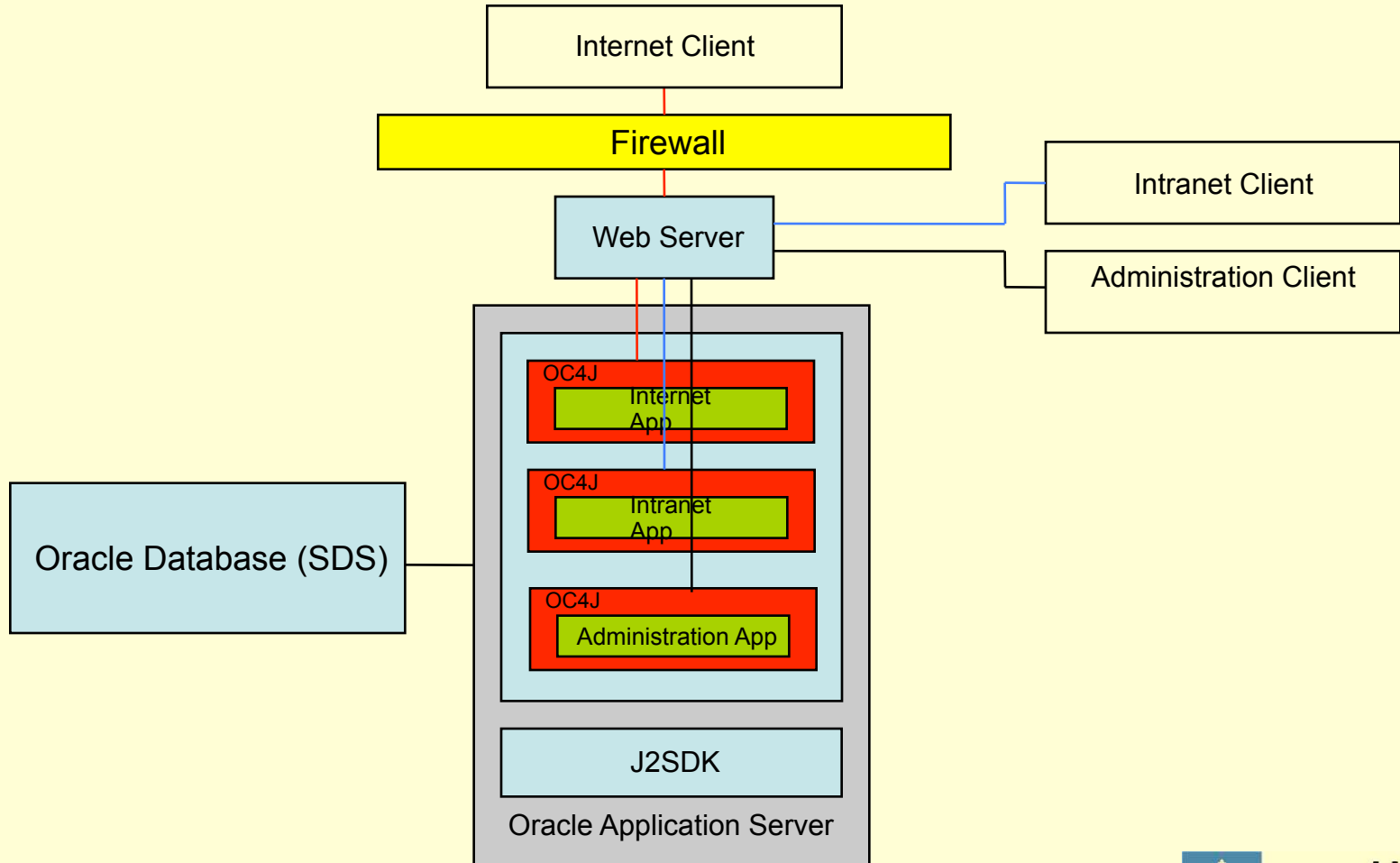
# Implementation

# The Solution

Spatial Data Store + MyMaps (browser-based mapping)

- The SDS is about effective data management
- Browser-based mapping is about consuming (viewing) the data easily

# Chosen Architecture



# Data Centralisation – How Was It Done?

- Oracle database was installed
- The data was loaded which included metadata and index creation
- The Address-point data was partitioned
- The data was validated, any errors rectified and re-loaded
- Materialised views were used to create daily snapshots of the LLPG and LSG data
- ISO-19115 compliant metadata was created for the spatial data

# Data Delivery – How Was It Done?

- Oracle Application Server was installed
- A custom application was developed using HTML, JSP, AJAX, Java and iSMART for the mapping engine
- Permissions were implemented using JAZN
- Access to spatial layers and functionality controlled by permissions that provided for two flavours of the application, one for the Internet and for the Intranet
- Internet flavour enabled the public to locate to their address and view road works (and other useful) information
- Intranet flavour provided staff with improved access to more, better quality information and the means to query it online thus improving decision-making

# The Internet Version

The screenshot shows a Mozilla browser window titled "KuHCC Intranet - Mozilla". The address bar displays the URL: `http://localhost:8888/ismart/HullIntranet/ismw/mapPage.jsp?rand=0.35788082499348683`. The browser's menu bar includes File, Edit, View, Go, Bookmarks, Tools, Window, and Help. The toolbar contains buttons for Back, Forward, Reload, Stop, a search icon, and a Print icon. Below the browser window, the website header features the Hull City Council logo, navigation links for "Access Guide", "Services A - Z", "Contact Us", and "Listen to our website", and a "Quick Links" section with links for "Report", "Apply", "Pay", and "Book". A search bar labeled "accessing your council" is also present. The main content area is divided into two sections. On the left is a map of Hull City Council with a pop-up window for "PATRINGTON GARTH" providing details such as location, description, proposed start and end dates, reference, and operator. On the right is a search interface titled "Enter a full or partial address." with fields for "Building Name/No:", "Street:", and "Postcode:". Below these fields is a list of "Properties found (76)" for "Kestrel Avenue", showing addresses from 1 to 9. The bottom of the browser window shows a status bar with "All Information © Hull City Council", "Terms & Conditions", "Disclaimer", and a progress bar indicating "Transferring data from localhost...".

**KuHCC Intranet - Mozilla**

File Edit View Go Bookmarks Tools Window Help

Back Forward Reload Stop `http://localhost:8888/ismart/HullIntranet/ismw/mapPage.jsp?rand=0.35788082499348683` Search Print

Home Bookmarks mozilla.org mozillaZine mozdev.org

Access Guide Services A - Z Contact Us Listen to our website

Hull City Council

Quick Links: [ Report | Apply | Pay | Book ]

accessing your council Search this site

Legend Address Search Notices Help Attribute Details Property

Enter a full or partial address.

Building Name/No:

Street:

Postcode: HU   Find Clear

Use + or street name to expand results  
Select the property to show its location on the map

Properties found (76)

Kestrel Avenue

- 1, Kestrel Avenue, , HU7 4ST
- 2, Kestrel Avenue, , HU7 4SN
- 3, Kestrel Avenue, , HU7 4ST
- 4, Kestrel Avenue, , HU7 4SN
- 5, Kestrel Avenue, , HU7 4ST
- 6, Kestrel Avenue, , HU7 4SN
- 7, Kestrel Avenue, , HU7 4ST
- 8, Kestrel Avenue, , HU7 4SN
- 9, Kestrel Avenue, , HU7 4ST

Powered by eSpatial's iSMART

Zoom in Zoom out

All Information © Hull City Council Terms & Conditions Disclaimer

Transferring data from localhost...

# The Intranet Version

The screenshot displays a Mozilla browser window titled "KuHCC Intranet - Mozilla". The address bar shows the URL: `http://localhost:8888/ismart/HullIntranet/isw/mapPage.jsp?rand=0.42397553165408963`. The browser's menu bar includes File, Edit, View, Go, Bookmarks, Tools, Window, and Help. The toolbar contains Back, Forward, Reload, Stop, a search icon, and a Print icon. Below the browser window, the intranet interface is visible. It features a navigation bar with links: Home, Search, Staff Directory, Latest Additions, A to Z, Forums, On-Line Service Desk, Feedback, and Help. The main header area includes the "INTRANET" logo, the Hull City Council crest, and the text "the online resource for employees of Hull City Council". A "Choose a section" dropdown menu is present. The central content area is divided into two main sections. On the left is a map of a residential area in Hull, showing streets like Sutton Ct, Alsetter Rise, and Dunbar. The map is overlaid with numerous red square markers. On the right is a query builder interface. It includes tabs for Legend, Address Search, Notices, Help, Query, Attribute Details, Property, and Metadata. The "Query" tab is active. The interface prompts the user to "Select where column" (set to GEOM), "Select condition" (set to WITHIN DISTANCE), "Enter distance" (set to 1500), and "Enter comparison" (set to METRE). It also has a "Select logical condition" dropdown set to None. Below these fields are buttons for "Show SQL", "Run SQL", "Back", and "Next". The "SQL" field displays the generated query: `SELECT ID,SECONDARY_SDOGID FROM PUBLIC_THEME.SECONDARY_LOCATION WHERE SDO_WITHIN_DISTANCE(GEOM,?, 'DISTANCE=1500 UNIT=METER') = 'TRUE'`. The "Error" field is empty. The interface indicates "Step 2 of 3". At the bottom of the map area, it says "Powered by eSpatial's iSMART". The footer of the browser window shows "Back", "Top", "All Information © Hull City Council 2006", "Back", "Top", and a "Done" button.

# Where we have got to



# Spatial Data Store (SDS)

## Data Sources

CORE  
INTERNAL  
D'BASES

INTERNAL  
MAPPING  
DATA

INTERNAL  
SYSTEMS  
D'BASES

PARTNERS  
DATA

Data Storage &  
Distribution  
Management

Spatial Data Store  
(SDS)

## Data Destination

BROWSER  
MAPPING

BROWSER TEXT  
RESULTS

INTERNAL  
GIS USERS

INTERNAL  
SYSTEMS

PARTNERS

# Spatial Data Store (SDS)

## Data Sources

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GMS OOT

CRM

IN HOUSE  
MAPPING  
DATA

IN HOUSE  
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Data Storage &  
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## Data Destination

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GIS USERS

IN HOUSE  
SYSTEMS

PARTNERS

Spatial Data Store  
(SDS)

# Benefits

# The Solution

## **SDS (Spatial Data Store) – Oracle Spatial**

*The SDS is about effectively managing the spatial data we have*

- reduce duplication
- minimise manual updating
- standardise formats to make it possible to share
- utilise open formats
- de-specialise for use by non-GIS experts
- pool in one place for ease of access, inc. partners

# The Solution

## **MyMaps Internet&Intranet (browser-based mapping) eSpatial's iSmart product**

*browser-based mapping is about consuming (viewing) the data easily*

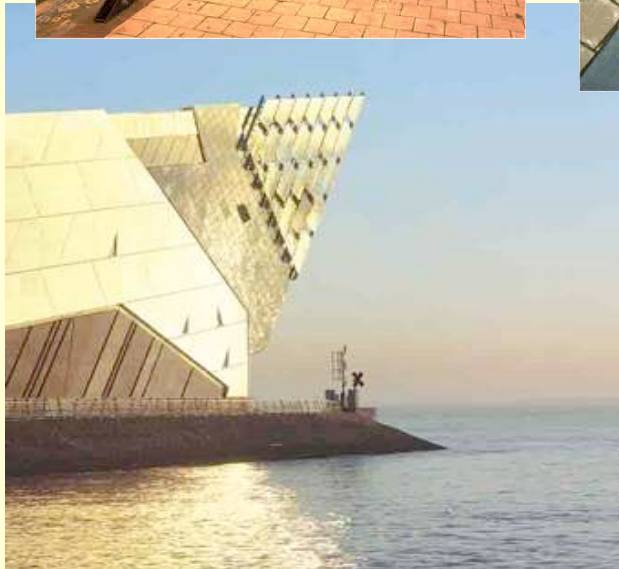
- reduce licence costs and need for GIS specialists
- simple look-ups
- proliferate (area) management information
- show pooled in one place for ease of access



# General Benefits

- Saving money
- Evidence-based resource targeting
- Seamless data sharing
- Data quality
- Potential for advanced functionality
- Responsiveness

# Kingston upon Hull





# Flood Response



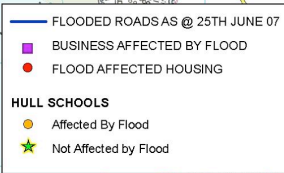




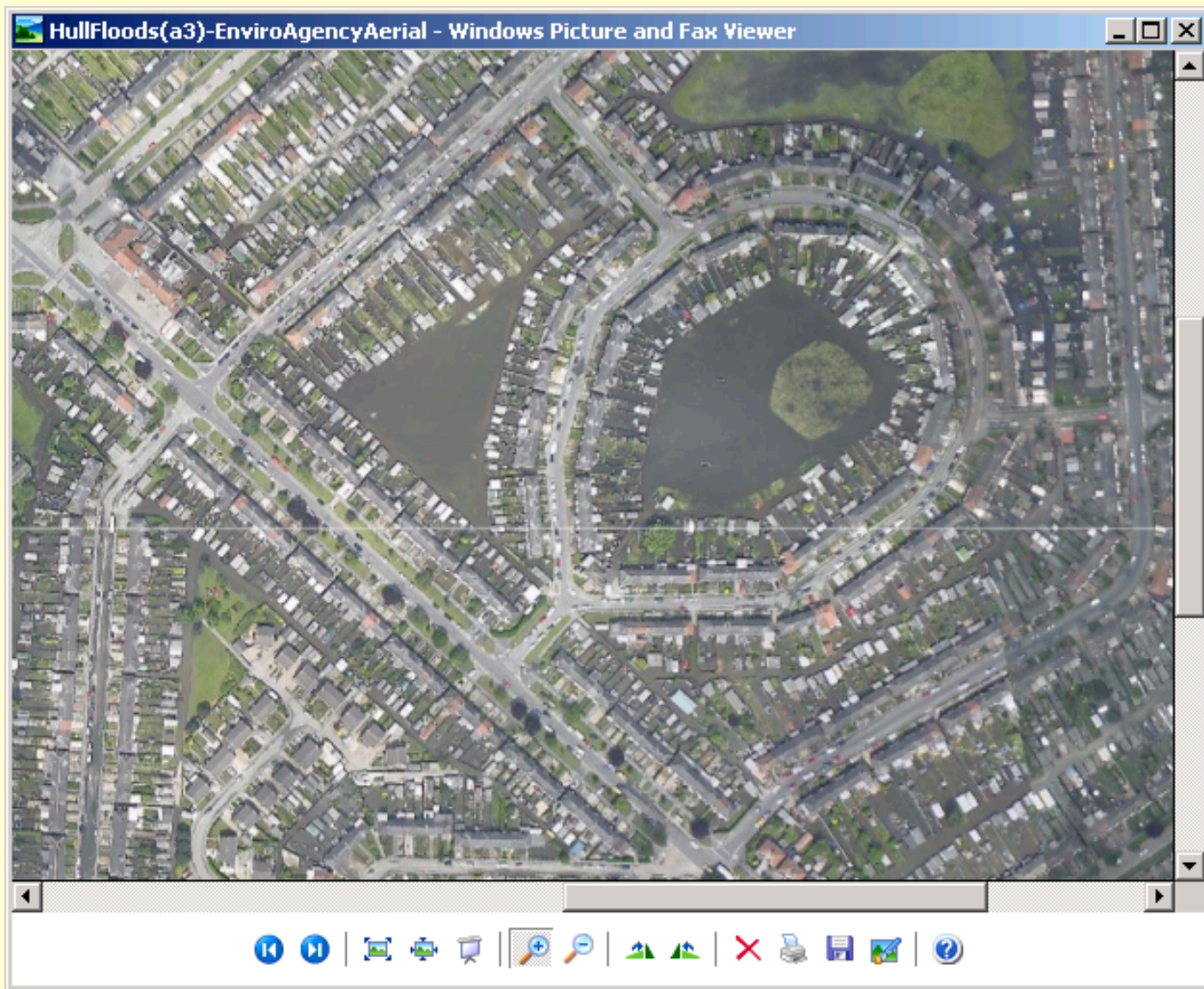
# Hull Floods

- Almost 9,000 homes with water ingress
- Over 90% schools closed
- 100s of streets affected
- Around 2,000 calls taken to 300300  
(1.5 x avg Mon, 2 x avg Fri)









KuHCC Intranet - Microsoft Internet Explorer provided by ICT & E-Government

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Media Mail Print Address http://hcc-097.hullcc.gov.uk:7777/HullIntranet/isw/mapPage.jsp?rand=0.9483498496321513# Go Links

Google Go Bookmarks Check AutoLink AutoFill Send to Settings

Home Search Staff Directory Latest Additions A to Z Forums On-Line Service Desk Feedback Help

**INTRANET** Hull City Council *the online resource for employees of Hull City Council* INTRANET

Choose a section Go Print

North

West East

South

Zoom in Zoom out

Legend Address Search Notices Help  
Query Attribute Details Property Metadata

Refresh Map

- ☐ AREA COMMITTEE BOUNDARIES
- ☐ PARLIAMENTARY BOUNDARIES
- ☐ CITY BOUNDARY
- ☒ SAND BAGS
- ☒ EMERGENCY EVACUATIONS
- ☒ RISING WATER
- ☐ ROAD CLOSURES
- ☐ MANHOLE COVERS
- ☐ ROAD DAMAGE
- ☐ REGULAR BULKIES
- ☐ EXPRESS BULKIES
- ☐ FLOOD BULKIES
- ☐ FLOOD BLACK BINS

Select all Deselect all

Powered by eSpatial's iSMART

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KuHCC Intranet - Microsoft Internet Explorer provided by ICT & E-Government

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Media Mail Print Address Bar

Address <http://hcc-097.hullcc.gov.uk:7777/HullIntranet/isw/mapPage.jsp?rand=0.9483498496321513#> Go Links

Google G Go Bookmarks Check AutoLink AutoFill Send to Settings

Home Search Staff Directory Latest Additions A to Z Forums On-Line Service Desk Feedback Help

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Choose a section Go Print

North

West East

South

Zoom in Zoom out

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Legend Address Search Notices Help

Query Attribute Details Property Metadata

Refresh Map

- ☒ FLOOD BULKIES
- ☐ FLOOD BLACK BINS
- ☐ GOLD FLOOD VICTIMS
- ☐ SILVER FLOOD VICTIMS
- ☐ BRONZE FLOOD VICTIMS
- ☐ NO ASSISTANCE REQUIRED
- ☐ REQUIRING CLASSIFICATION
- ☐ NO RETURN
- ☒ FLOODED ROADS JUNE07
- ☐ PRIMARY SCHOOLS
- ☐ SECONDARY SCHOOLS
- ☐ SPECIAL SCHOOLS
- ☐ YOUTH CENTRES

Select all Deselect all

Powered by eSpatial's ISMART

KuHCC Intranet - Microsoft Internet Explorer provided by ICT & E-Government

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Media Mail Print Address Bar

Address <http://hcc-097.hullcc.gov.uk:7777/HullIntranet/isw/mapPage.jsp?rand=0.9483498496321513#> Go Links

Google Go Bookmarks Check AutoLink AutoFill Send to Settings

Home Search Staff Directory Latest Additions A to Z Forums On-Line Service Desk Feedback Help

**INTRANET** Hull City Council *the online resource for employees of Hull City Council* INTRANET

Choose a section Go Print

North

West East South

200 Meters

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Legend Address Search Notices Help

Query Attribute Details Property Metadata

**Layer: FLOOD BULKIES**

SRN: 4093747

CREATION\_DATE: 2007-07-05

UPRN: 000021016856

CUST\_ADDRESS: Road

CUST\_CITY: Kingston Upon Hull

CUST\_COUNTY: null

CUST\_POSTCODE: HU5 5XP

NOTES:

Location\* = Front Garden  
Description Of Items\* = carpets and underlay, laminate flooring  
White Goods = chest freezer  
Additional Information = adv 48 hours adv needs to sign a disclaimer form  
Service Failure = n Outbound Attempts = 0

SR\_TYPE: ENV-Bulky Items Coll-Damag Fld

EASTING: 505196

NORTHING: 430032

Powered by eSpatial's iSMART

Zoom in Zoom out

# Summary

- Spatially enabling data enriches it
- Oracle Spatial is a good choice for an open system that can handle big volumes
- Browser-based mapping makes spatial data easily accessible and understandable
- This might save your business money – what % of your transactions have a spatial element?



# Questions?