

Stirling Council Web GIS

Waste Route Design and Management

Introduction

Stirling Council Waste Services recently commissioned Forth Valley GIS to develop a Web GIS-based refuse and recycling route design tool. This was required to assist Waste Services meet its strategic and operational objectives in providing an effective waste and recycling service to domestic households and businesses throughout all Stirling communities.

The application was developed as an extension to Stirling Council's existing corporate Web-based GIS solution and provides map-based tools for route design, reporting and performance monitoring.

Requirements

Forth Valley GIS worked closely with Waste Services to establish the requirements. The following considerations were taken into account:

- Routing operations would need to be supported for multiple services requiring different vehicles, routes and working practices. Domestic *grey-bin* mixed waste and *brown-bin* garden waste services are provided on alternative weeks, the domestic kerbside *blue-box* recycling is weekly. The commercial waste service is provided to businesses daily.



One of the new high-efficiency vehicles currently being introduced – requiring new beats and working practices.



The standard domestic 240 litre waste bins and kerbside recycling box.

- The application would have to support multiple versions of beats¹ - for comparing alternative scenarios and enabling beat designs to be created and tested well in advance of their operational implementation. This capability would assist Waste Services in the rollout of a new high-efficiency vehicle fleet that would require revisions in order to achieve maximum operational effect.

¹ An individual beat comprises the households or businesses serviced by one vehicle during a particular day of the working week.

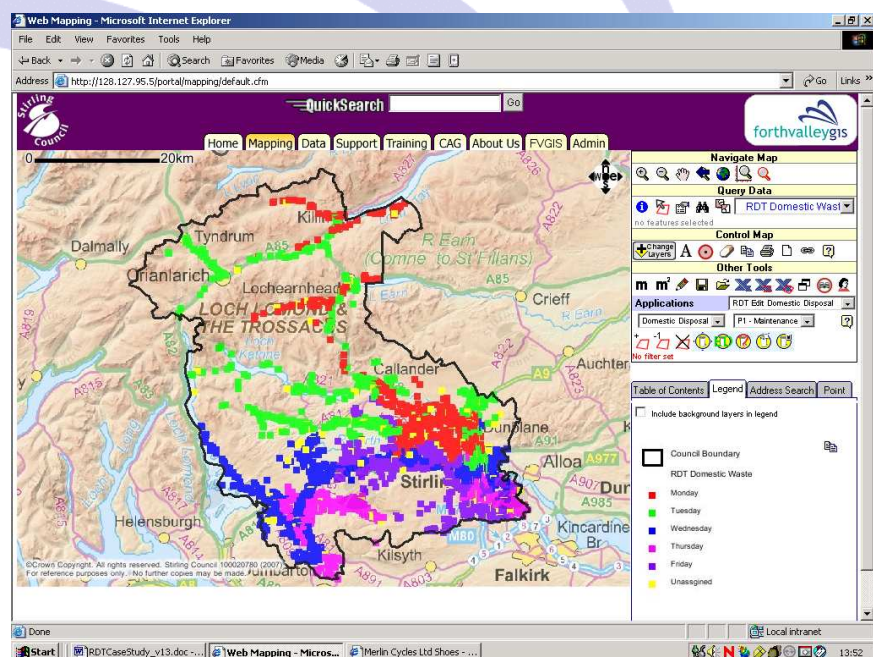
- Specialist reports would be needed – including beat sheets for instructing operational crews², missed-bin performance reports for managers, and beat-based mail lists for effective communications with the public.
- The new system would have to be underpinned by a reliable property and address database. Integration with Stirling Council's Corporate Address Gazetteer would provide an ideal solution.
- The new system would have to integrate with the Stirling Council Customer Contact Centre CRM system – to access customer service requests e.g. assisted bin and box-pullouts for the elderly, and missed-bin performance records.
- The new system would have to operate effectively with records for 38,547 households and up to 4,089 businesses.

map. The beat attributes are selected from pick lists. A broad range of record filtering and reporting tools are also provided to the user. Multiple versions of beats are supported. The application provides the following modules.

Viewer module	<i>Read only access to domestic and commercial beat mapping and reports. This includes missed-bin maps and reports for missed bins aggregated by beat and financial quarter.</i>
Domestic refuse route module	<i>Edit access to domestic refuse routes and advanced reporting.</i>
Domestic recycling module	<i>Edit access to domestic recycling routes and advanced reporting.</i>
Commercial module	<i>Edit access to trade waste routes and advanced reporting.</i>
Route management module	<i>Functions for managing route versions and archives.</i>

Solution

Forth Valley GIS developed a map-enabled system that supports the strategic design and operational maintenance of household waste and recycling routes, and contract trade waste routes. The beat design approach involves the assignment of beat (i.e. route and day) attributes to homes and businesses based on the selection of property points using a



The main map window within the Waste Routing application.

² A beat sheet lists the streets on a beat and identifies properties requiring a special service – such as assisted bin or box pullouts for the elderly.

The technical solution involved integrating application specific functionality into the Council's existing corporate Web-based GIS and centrally managed spatial data storage architecture. This was augmented by the integration of a purpose-built waste routing database with the Council's CAG and CRM.

developed for the corporate Web-based GIS solution.

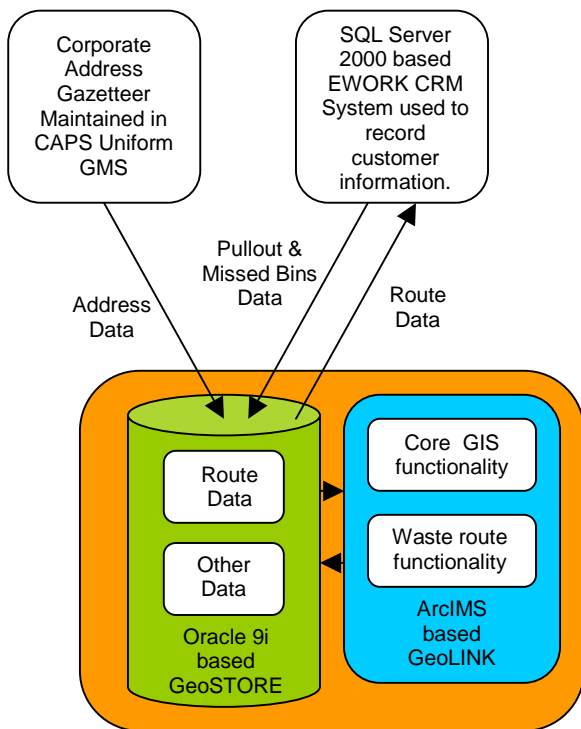
Benefits

The new software has helped move Waste Services forward in meeting strategic objectives and in making significant improvements to operational practices and to customer service.

In particular, the new Web-GIS application helps to achieve: improved route efficiency, missed bin monitoring, and effective communications. The ability to rapidly re-model routes and test scenarios, underpinned by a highly accurate address database, offers significant benefits. Furthermore, the link with the Customer Contact Centre CRM system has moved Waste Services forwards with regard to the automated generation of beat sheets with potential for savings of officer time.

The system is assisting Waste Services make the transition to a new vehicle fleet, the introduction of new working practices, and improving recycling uptake through generating mail lists for public education campaigns.

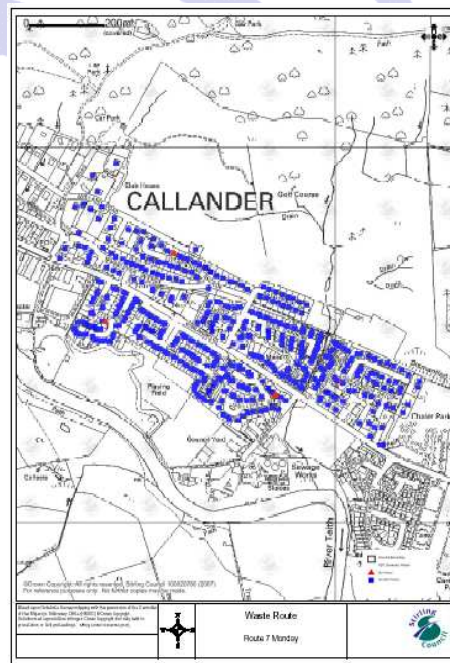
This diagram summaries the technical solution.



GeoLINK is the corporate Web-based GIS solution built on ESRI ArcIMS® using Coldfusion®. GeoSTORE is the corporate spatial data warehouse built using the Oracle 9i® RDBMS. EWORK® is the Customer Contact Centre CRM system.

The resulting technical solution was efficient to develop and is robust in operation.

- All the data is stored within the Council's geographic data warehouse - based on the Oracle® 9i Relational Database Management System (RDBMS).
- User access to the modules is controlled by user names and passwords and administered using functions previously



A typical beat map – these are issued to crews in combination with a beat sheet..

The technical solution builds on the core corporate investment in centralised GIS and associated spatial data warehouse infrastructure, and inherits associated benefits.

“Because of the waste routing application, the collection service operates with high confidence in that the route data capture is correct. Linking the routing software to the CAG has also revolutionised the fullness of capture. This has undoubtedly led to considerably better control and significantly reduced the amount of missed bins and complaints. The routing application has been an essential component in delivering a modern and effective collection service.”

David Hopper, Waste Services Manager, Stirling Council.

Future Development

Encouraged by the success of the project, Waste Services are considering the continued development of the waste routing application to provide further functionality to meet evolving requirements.

- A tool has been prototyped for generating time and distance optimised trade waste routes using Travelling Sales Person Analysis (TSP) – based on RouteWare Netserver software and the Ordnance Survey Integrated Transport Network (ITN) ® dataset. Cumulative totals of distance and waste can be provided at each customer location on the optimised route.
- The potential work programme proposes establishing further integration with the contact centre system – to access additional information including records for: 360litre bins; medical waste bins; partial assisted pullouts etc. This level of integration will facilitate an enhanced specification for beat sheets and enable full automation of their creation.

Project type: Service-based Web GIS development and Corporate Address Gazetteer Integration

Software: Oracle® 9i, SQL Server™ 2000, ArcIMS®, Coldfusion® and Routeware Netserver

Customers: Stirling Council Waste Services

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