RIVERSIDE RESOURCE RECOVERY
Energy from Waste Facility

Insurance Institute of London
Site Visit

Andy Pike
Director, RRR
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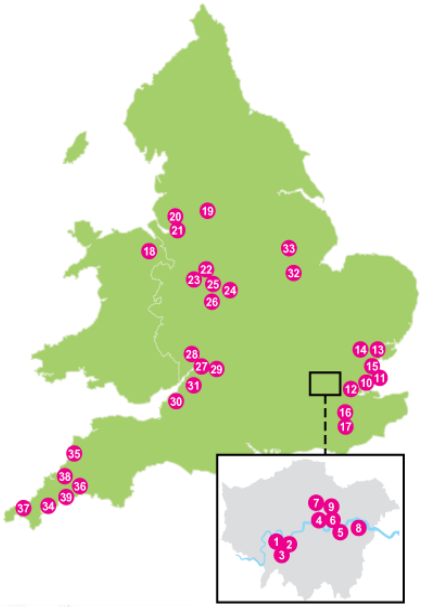
Cory Overview

- Cory Environmental is one of the UK's leading waste management companies with over 1,400 employees in 40 locations
- Established 1896
- Cory manages:
  - Over 3m tonnes of waste each year
  - 16 local authority contracts
  - 12 landfill sites
  - Sole operator on River Thames for the transfer of residual domestic waste for disposal
- Turnover of ~ £240m



www.coryenvironmental.co.uk

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Cory: The early years

Operating on the River Thames for over 100 years since the company was founded by William Cory in 1896

Waste was originally taken out of London as a ‘back load’ on barges bringing coal to power stations and gasworks on the banks of the river

The loaded barges were taken to Essex and Kent where the waste was deposited in worked out sand and gravel workings and marshlands

By 1979 Cory was the largest carrier of waste on the River Thames

Cory's background

• In **1983** Cory wins tender for disposal of Greater London Council's waste (500k tonnes per year) Introduction of the containerised waste transport method to the riparian Mucking landfill site in Essex

• **2002** Cory wins a 30 year contract worth £1.2bn with four London boroughs of Wandsworth, Kensington & Chelsea, Lambeth and Hammersmith & Fulham which make up the Western Riverside Waste Authority (WRWA) - securing the river operations

• Fully integrated contract including: -
  - Waste education programme
  - Provision of recycling infrastructure (Materials Recycling Facility)
  - Provision of modern civic amenity infrastructure
  - EfW at Belvedere site for residual waste

• Innovative approach which addressed the waste hierarchy was important for securing planning for all infrastructure

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River operations

Tilbury
Incinerator Bottom Ash processing facility
7

6
Riverside Resource Recovery
Belvedere
Energy from Waste facility

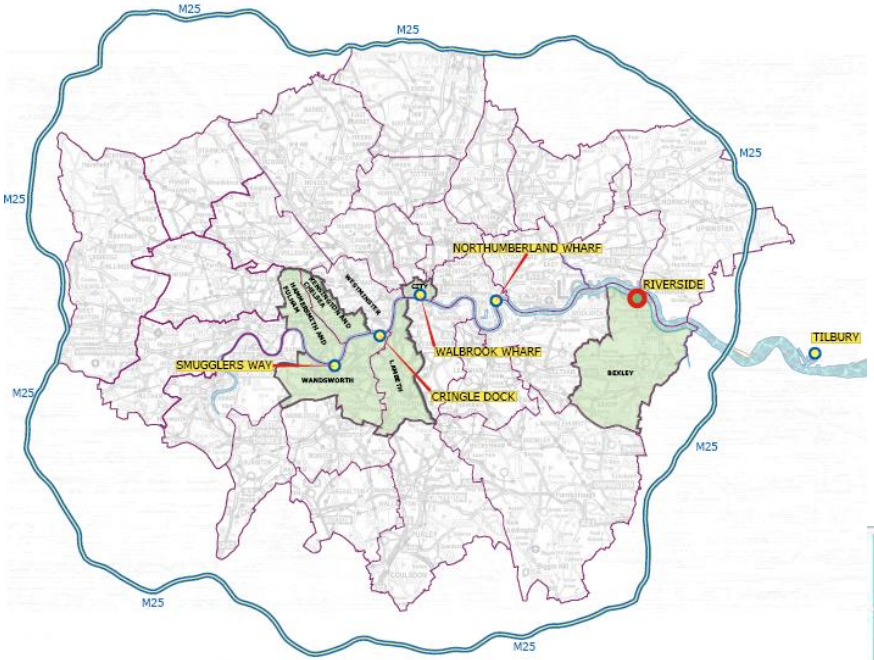
Northumberland Wharf,
Tower Hamlets
transfer station
4

5
Charlton
lighterage headquarters and barge works

Walbrook Wharf, City of London
transfer station
3

2 **Cringle Dock, Battersea**
transfer station

1 **Smugglers Way, Wandsworth**
transfer station



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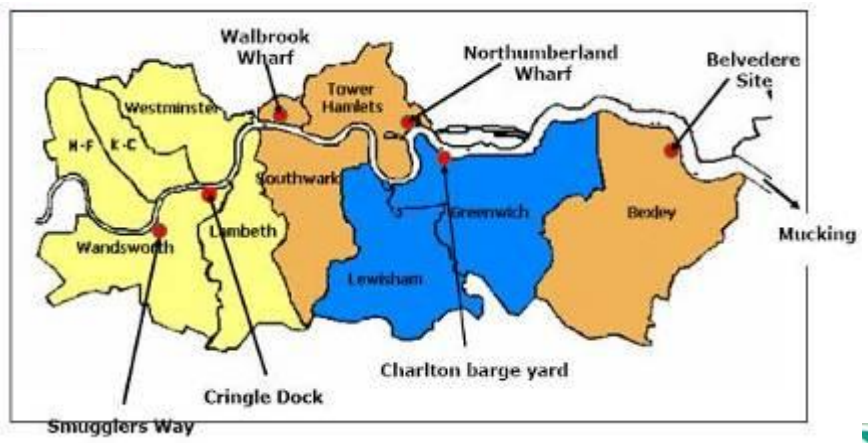
River Operations

- c600,000 tonnes of waste a year by barge
- 4 river-served transfer stations for municipal and C&I waste
- 47 barges, 5 tugs, 1,500 waste containers, 75+ employees
- Basis of long-term contract with Western Riverside Waste Authority (WRWA) for municipal waste treatment
- c. 15 miles from Wandsworth to Riverside Site by River
- Over 100,000 lorry movements saved from Central London roads each year



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Riverside Resource Recovery Facility

Cory's single most significant development project to date

Currently the largest operational Energy from Waste facility in the UK and one of the most efficient

Processes waste from households and businesses in London

Vital strategic waste management facility for the capital

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Riverside development - background

- **1991 -** 1st Planning application submitted and public inquiry refusal based on 1.2m tpa facility size, undeveloped access road and concerns over site
- **2003** and **2005 -** public inquiries held – following refreshed planning application for 670k tpa facility, redeveloped access road and consolidated environmental statement
- PPC (Pollution Prevention and Control) permit granted by the Environment Agency
- Riverworks Licence received from the Port of London Authority for works connected to the provision of the deep water jetty
- Waste will be delivered to the site and ash exported by river
- **June 2006** The Secretary of State for Trade and Industry granted s36 Electricity Act planning consent for the facility
- **Judicial Review** mounted by the Mayor of London
- **February 2007** review rejected
- **January 2008** construction commenced on Norman Road followed by main site in July

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Cory's partners at Riverside

Hitachi Zosen Inova (formerly A E & E Inova) appointed as the Engineer, Procure and Construct (EPC) contractor (Feb 2007)

Costain appointed by HZI as the civil engineering contractor for the project (Dec 2007)

Breheny was awarded the contract for the reconstruction of Norman Road

HZI & Wheelabrator Technologies provide operations and maintenance support to the Cory operation

Construction facts and figures:

39 months construction

1,000 + people employed on site

6,000 employed on project

70 sub contractors used by HZI

One third of employees local

6,000 hotel nights booked

£150k spent on taxis

65,000 m3 tonnes of concrete used

6,000 tonnes of steel

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Plant specification

Generates net 66 Mw of electricity, enough to power circa 100,000 homes

Scope for Combined Heat and Power (CHP)

Average availability of 85.6%

3 streams working at c.30 tonnes per hour to process 670k tpa

Efficiency of 27% making it one of the most efficient plants in Europe

Environment Agency granted “R1” Recovery Facility status

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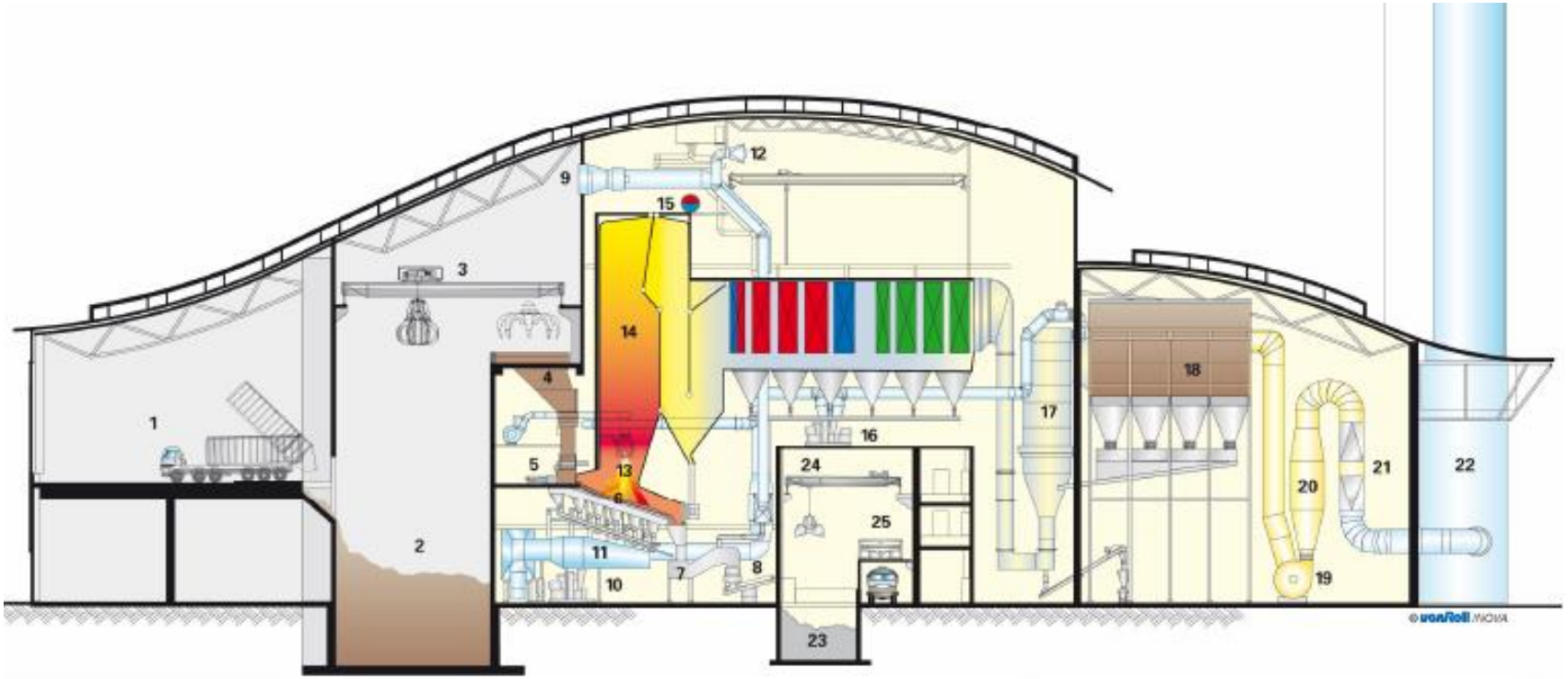
Riverside development – the process



Waste Receiving and Storage

1 Tipping hall
2 Waste bunker
3 Waste crane

Combustion and Steam Generator

4 Feed hopper
5 Ram feeder
6 Incineration grate
7 Bottom ash expeller
8 Bottom ash handling
9 Primary air intake
10 Primary air fan
11 Primary air distribution
12 Secondary air intake
13 Auxiliary burner
14 Four-pass steam generator
15 Boiler drum
16 Recirculation fan

Flue gas cleaning

17 Turbosorp® reactor
18 Fabric filter
19 Induced draft fan
20 Silencer
21 Heat exchanger
22 Stack

Consumables and residues

23 Bottom ash bunker
24 Bottom ash crane
25 Bottom ash loading station

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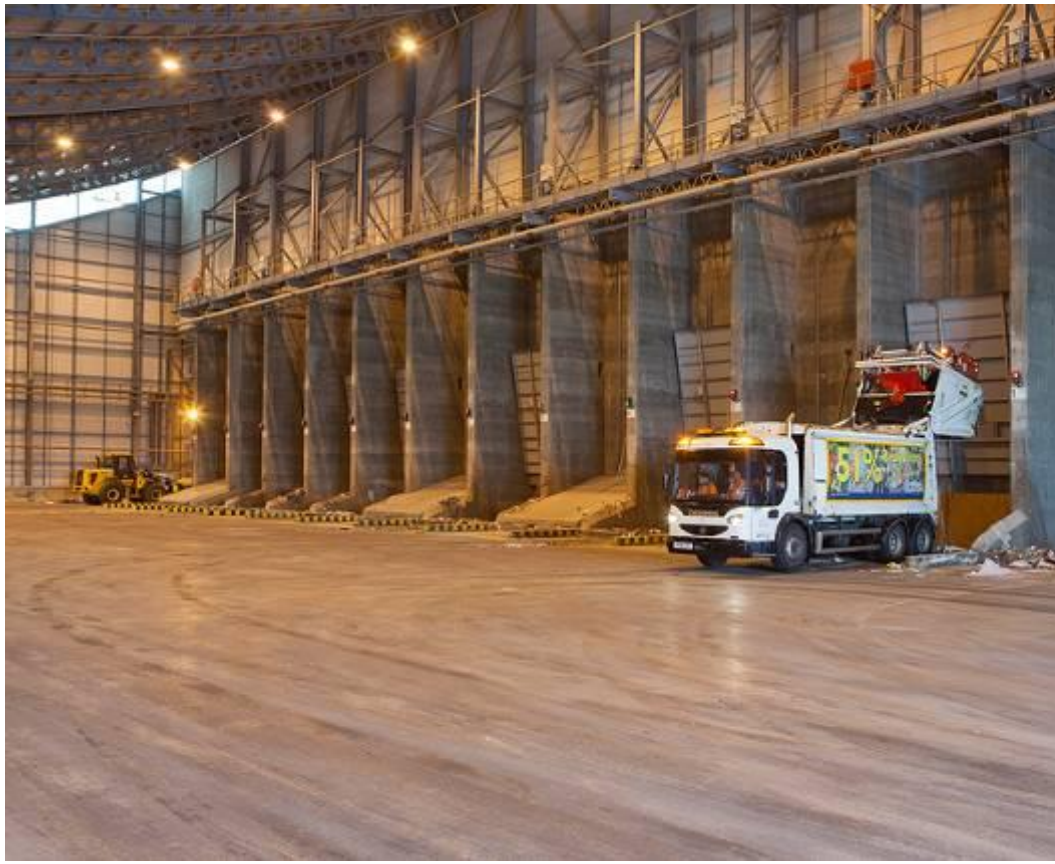
Function and operation

Takes waste from the Western Riverside Waste Authority Boroughs, the City of London, Westminster City Council, the London Borough of Bexley

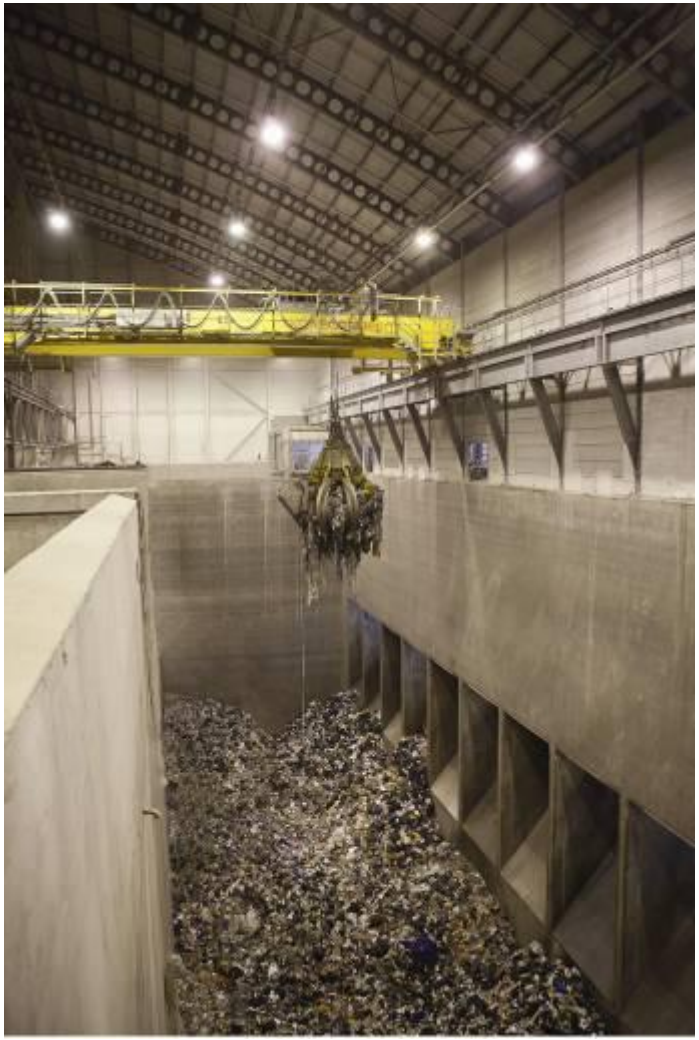
River-borne waste is loaded into sealed containers at the riparian transfer stations

This waste is unloaded at the jetty and transferred on dock tractors and trailers to the tipping hall

Waste from the London Borough of Bexley and commercial customers arrives by road



Function and operation



From the waste bunker, grab cranes transfer the waste into hoppers to be fed into the three combustion lines

The waste is incinerated at temperatures greater than 850 degrees C

Function and operation

Uses highly efficient moving grate combustion technology

Heat from the incineration converts the water in the boilers into steam which drives a steam turbine to produce electricity

Flue gas goes through extensive cleaning processes to ensure it meets the requirements of the permit

Heat energy is recovered from flue gases through specialist highly efficient boilers

Steam is re-circulated to further improve the plant's efficiency

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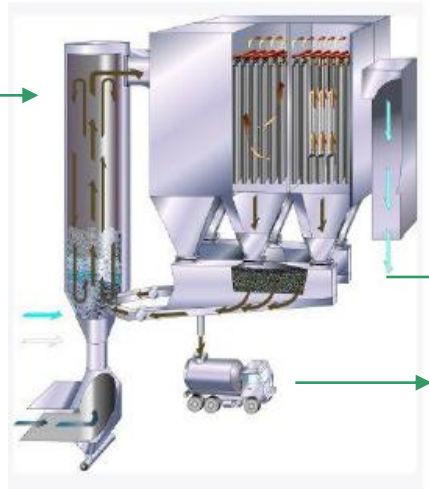
Residue

Air Pollution Control Residue (fly ash) accounts for approximately 3-4% of the facility's throughput

Currently approximately 55% of the material is recycled

Bag house Filter



Residue

The principal residue is Incineration Bottom Ash (IBA) accounts for approximately 28% of the facility's waste throughput.

Method of Treatment

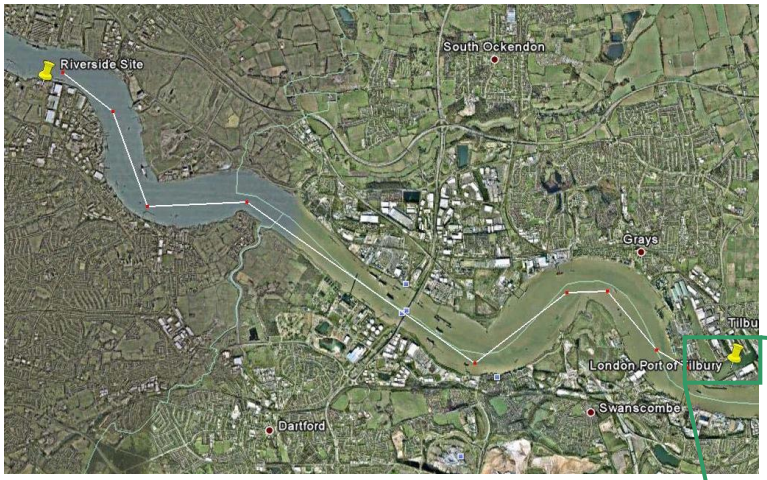
- Metals removed & recycled
- Ageing and washing
- Screening
- Crushing and scrubbing

Recycled into aggregate for use in construction – IBA from Riverside used in M25 widening scheme

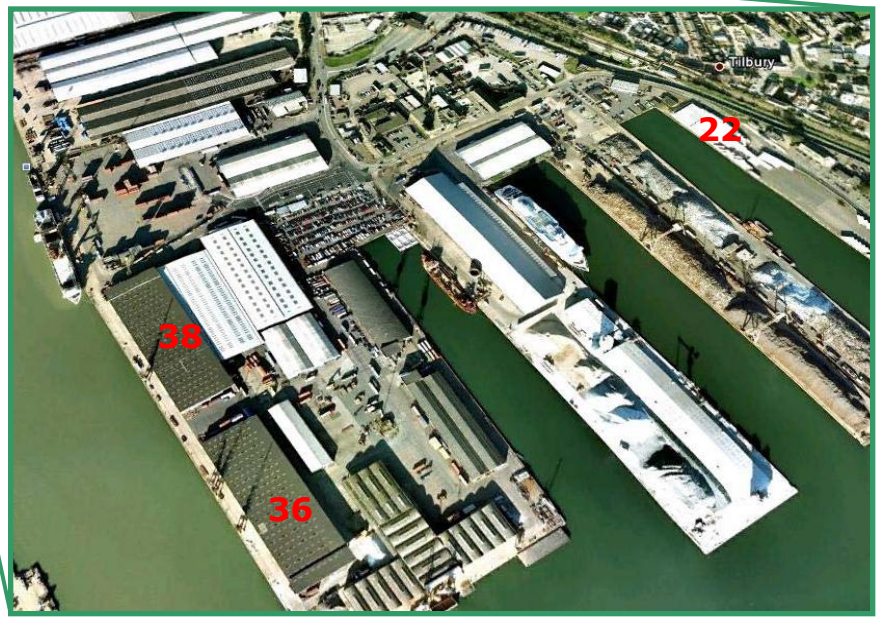
Other Uses: Fill materials; Asphalt; Foamed asphalt; Cement bound materials; Lightweight blocks; Concrete

Figure 2: Examples of raw incinerator bottom ash (left) and the ash after the ferrous metal has been removed (right)

IBA Processing Site- Tilbury Docks



- Located 10 miles down river from The Riverside Facility
- Berth 22 (RRRL's Crane)
- Berth's 36/38 (IBA Site)



- 180,000 tns / annum
- 200 Bespoke Ash Containers
- Up to two barges a day

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IBA Processing Site

Original Site - Belvedere

Belvedere Site 1991

RRRL Site


CORY
riverside