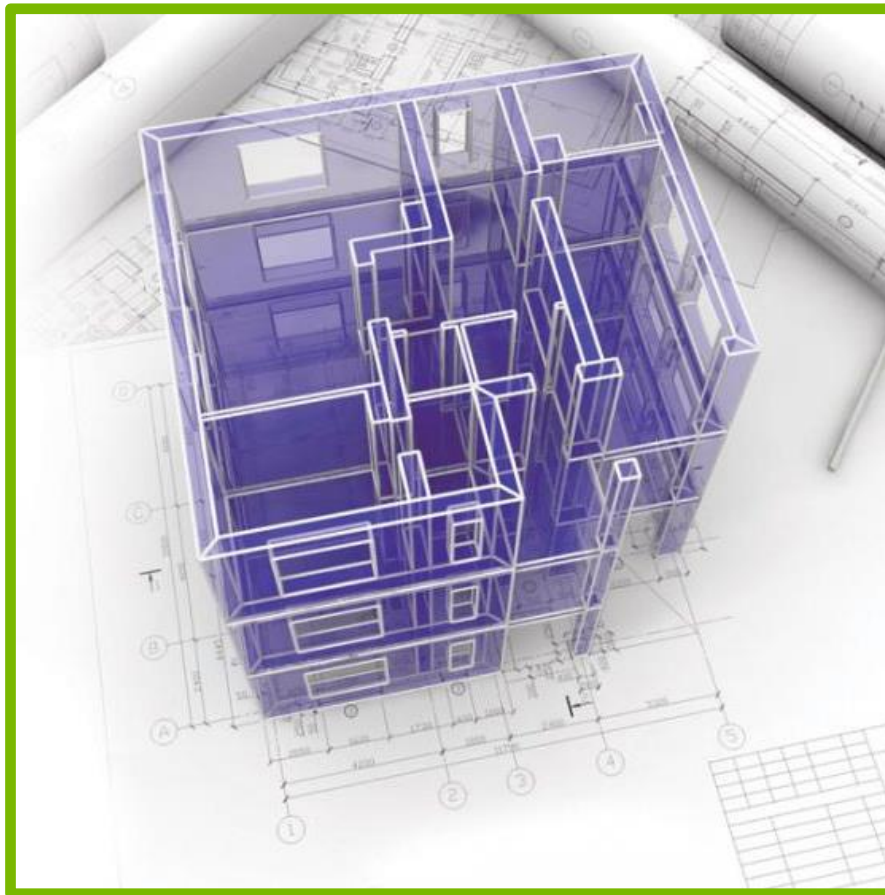

Waste Management Planning Advice for Flatted Properties – Case Studies



LONDON ENVIRONMENT:
THE LONDON ENVIRONMENT DIRECTORS' NETWORK



December 2014

LWARB developed a partnership with LEDNET to commission this report.

The London Waste and Recycling Board (LWARB) was established by the GLA Act 2007 to promote and encourage the production of less waste, an increase in the proportion of waste that is re-used or recycled and the use of methods of collection, treatment and disposal of waste which are more beneficial to the environment in London. LWARB has a fund made up of money from central Government (DEFRA) to achieve these objectives.

Find out more at www.lwarb.gov.uk

The London Environment Directors' Network (LEDNET) is the membership association for London's Environment Directors, with representation from the GLA and London Councils. It provides a forum for Environment Directors to share learning and best practice and develop thinking on emerging policy. A London Environment Director acts as chair and deputy chair on a rotating basis.

Find out more at www.londoncouncils.gov.uk/londonfacts/londonlocalgovernment/a-z/j-1.htm#.VHhJesnravI

Written by: SOENECS Ltd developed a partnership with BPP Consulting LLP to deliver this report.



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Contents

1. London Case Studies	4
Case Study 1: Wembley City Development, London Borough of Brent	4
Case Study 2: St George's Wharf Tower, London Borough of Lambeth.....	6
Case Study 3: 360 London, 80 Newington Butts, London Borough of Southwark	9
Case Study 4: Strata Building, London Borough of Southwark	11
2. International Case Studies	14
International Case Study 1: Hudson Yard New York, USA.....	14
International Case Study 2: Msheireb Downtown, Doha, Qatar	16
International Case Study 3: Yuhua, Singapore.....	18

1. London Case Studies

'Live' case studies have developed for an up-to-date overview of planned and existing developments. The aim of the case studies was to select examples that could then be explored further following construction and occupation, in order to assess the impact on the local authority waste operational services.

Case Study 1: Wembley City Development, London Borough of Brent

This development is situated in West London and utilises the Envac, underground, vacuum waste and recycling system to transport waste to a bulking station located within the development. Brent Council waste and recycling services are not required to undertake any collections from residents, which reduces the vehicle emissions and fuel use impacts of traditional refuse collections elsewhere.



Location	Wembley City, Brent
Size / units	4,200 mixed use residential units. The development at Wembley City will cover an area of 84 acres, when completed. The Envac system has been installed in phase 1 of the development, outside residential blocks of typically 5 or 6 storeys in height e.g. Quadrant Court and Forum House, situated close to Wembley Stadium.
Date	2006 start – 2008 completion
Developer	Quintain Estates
Waste management system	Envac underground vacuum collection system, with overground deposit 'portals' located outside buildings at ground level throughout the development.
Waste fractions	Residual, food / organic waste, dry recyclables, cardboard
Recycling performance	The development achieves a 45% recycling rate from household waste produced by residents.
Planning	Vacuum system referred to in the Quintain Wembley Masterplan

information	document, (p129, http://brent.gov.uk/media/333266/Wembley%20Masterplan.pdf) 2006.
Reason for inclusion as a case study	This development has been included as a case study due to the use of the Envac innovative system for collection and handling waste, reducing the need for collection vehicles to service the development. The developer, Quintain was instrumental in selecting the Envac system, which was not a requirement or was collection preference proposed by the Council. The Envac system is suitable for installation in other new developments and can be installed directly into the kitchens of units.
Impact on local authority waste operations	Brent Council is not required to collect any household waste from the development, which is solely dealt with through the Envac system and the developer's own contract for the transportation of bulked waste & recycling away from the Envac bulking station, to end processors. Brent Council makes a financial contribution to Quintain, towards the costs of household waste collection in respect of its statutory duty to collect and manage household waste. The Council waste operational services have not been called upon to provide contingent or 'emergency' collection services at any point since the system has been in operation ie since 2006.
Future development phases	Wembley City is still in development and it is understood that Quintain are not committed to using the Envac system in future construction phases due to the cost of installation, particularly the cost of connecting the new phase with the existing Envac waste bulking station infrastructure. If Envac is not utilised, Quintain will seek other arrangements for the collection of waste eg through contracting with a private waste collector. Brent Council will not be expected to undertake this service but will make a financial contribution in respect of its statutory duty to manage household waste.

Case Study 2: St George's Wharf Tower, London Borough of Lambeth

This is a brand new development situated next to the St George's Wharf development in South London on the Thames riverside and utilises a refuse chute collection system to segregate and collect residents' waste arising from within the development.



Location	St George's Wharf Tower, Vauxhall Embankment
Size / units	52 storey residential tower, 212 residential units.
Date	Planning approved July 2005
Developer	Berkeley Group
Waste management system	<p>Pull-out waste bins in each unit with 4 compartments for general and recyclable waste provided within each kitchen. The Tower residents use a Hardall International Ltd refuse chute with chute access located in a small facilities room on each floor. http://www.hardall.co.uk/</p> <p>The chute system has the ability to separate waste into two fractions:</p> <ol style="list-style-type: none"> 1) general waste 2) recycling <p>To operate the chute, residents press one of two buttons on the wall panel, to select either general waste or recycling. Once the 'open door' light on the wall panel is illuminated, the chute door can be opened and materials can be placed in the chute. A refuse storage room in the basement level contains a set of containers to collect waste and recycling fed into the chute. General waste is deposited from the chute, into a hopper, which directs it into a small compactor. This compresses the waste into the side of blue 1100 litre eurobins. Recycling materials are also chute-fed into non-compacted green 1100 litre eurobins. The chute buttons operate the hopper motor in the basement, which directs materials into refuse or recycling containers as requested.</p> <p>Refuse and recycling containers are wheeled underground through the car park and brought out to an area from which the refuse vehicle is able to access them, a distance of no more than 5 meters. Refuse</p>

	collections are carried out 6 times a week (Monday to Saturday) and recycling is carried out three times a week.
Waste fractions	Residual waste, dry recyclables, which includes paper & card, food & drink cartons, glass, cans, plastic pots, tubs & trays.
Recycling performance	According to Lambeth Council's Waste Management Strategy Baseline Report (2011-2031), the recycling collection services on offer to flatted properties have the potential to divert over 46% of dry recyclable waste away from disposal. This assumes that all residents recycle all recyclable material all of the time.
Planning information	Local authority comments: As part of the planning exercise, a suitable waste strategy should be put forward (normally at pre planning), this would address recycling and refuse services, areas for storage of bulky items, any access issues, presentation of waste, and number of collections required. A copy of the plans normally comes over to the waste team to check and allow any issues to be raised.
Reason for inclusion as a case study	This development represents a luxury residential tower that has a dual system for waste collection and storage.
Impact on local authority waste operations	Tower management comments: The Tower is not yet fully occupied, however currently the management team employs one person permanently stationed in the basement storage room, exchanging bins at the bottom of the refuse chute as they become full. Bins are dragged out on a daily basis and taken to a central collection point within the St George's Wharf main development for collection by refuse / recycling crews. Residents are mostly international investors and these properties may be one of many that they own around the world. They come and go and may not have the same understanding of refuse / recycling issues in the UK as others. The development acts like a hotel for residents, who often have little connection to the property. Currently the waste management system works well, however there have already been incidences of the refuse chutes becoming blocked by pizza boxes.
Future development phases	Local authority comments: Ideally, we would like one collection a week for refuse and recycling, however, in developments this large, space for waste is always at a premium and we have to be realistic.

Images from a site visit to St George's Wharf Tower:



Refuse chute wall panel and access door



Chute-fed dry recycling container

Case Study 3: 360 London, 80 Newington Butts, London Borough of Southwark

This development is situated near the Elephant and Castle on the site of the former London Park Hotel. It is not yet constructed but has been included as a case study because of its comprehensive waste strategy submitted at the planning application stage. The building is due for construction in 2015 and will incorporate a central waste storage room in the basement level and interim waste storage rooms on each floor for residents to deposit their waste.



Location	Elephant and Castle, Southwark
Size / units	44 storey residential tower and 7 storey terrace, including a theatre & café, 470 units
Date	Planning approved April 2008, construction due to start January 2015
Developer	Joint venture between the Greater London Authority and Mace
Waste management system	Central waste room on the basement level accessed by lift by building maintenance team. Residents to deposit waste in interim storage rooms situated on each floor, in colour-coded bins.
Waste fractions	Residual, paper, plastics, aluminium & glass by colour-coded bins. No food waste segregation.
Recycling performance	Estimates of waste generation from the tower and terrace have been calculated by volume (m ³). From the tower, it is estimated that 72.16m ³ of waste will be generated each week, of which 33.13m ³ is recoverable, (45.9%). This includes paper, plastics, cardboard, aluminium and glass.
Planning information	Waste Strategy pages here, section 8, p21: http://planningonline.southwark.gov.uk/DocsOnline/Documents/14149_1.pdf
Reason for inclusion as a case study	This development has been selected as a case study due to the strength of the waste strategy document submitted with the planning application. The strategy document sets out:

	<ul style="list-style-type: none"> • recognition of compliance with LB Southwark’s refuse and recycling strategic and operational requirements • recognition of requirements of and compliance with BS 5906 • estimates for the generation of household waste on a 7-day cycle, separated into recoverable and non-recoverable waste streams • detailed description of waste collection, storage and movement: there will be interim waste rooms on each floor in the Tower for residents to deposit their waste; interim containers will be moved to a central basement room by the concierge; the central basement room will act as interim storage for containers from the Tower and the Terrace on the day of collection; residents in the Terrace will have 3 basement storage rooms; containers will be moved by the concierge team to the ground floor on the day of collection • inclusion of a Southwark opinion as evidence of consultation with LB Southwark.
Impact on local authority waste operations	This development has yet to be built, but is included here as an example of good practice with regard to the Waste Strategy provision.

Case Study 4: Strata Building, London Borough of Southwark

This development is situated near the Elephant and Castle on the site of the former Castle House, a 1960's office building. It has been included as a case study because although the development is promoted as an exemplar sustainable development, it lacked information relating to how waste would be managed and recycling promoted at the planning application stage. Close scrutiny of the building's drawings revealed that it has a central bin storage area located on the ground level. This has been checked during a site visit, which revealed that there is one central storage room located on the ground floor for all residents refuse, recycling and bulky waste.



Location	Elephant & Castle, Southwark
Size / units	43 storey residential tower with mixed use at the ground level. 408 residential units.
Date	Planning approved March 2006
Developer	BFLS (Hamiltons)
Waste management system	One central bin storage room located on the ground floor to the rear of the building. The storage room has a set of residual waste eurobins and a set of recycling eurobins for residents to deposit their waste and recycling as needed. Residents must bring their waste down in the lift themselves to the central storage room, which is accessed by a security swipe card. Bulky waste is also stored in the same room and residents are required to arrange their own collections with the Council.
Waste fractions	Residual waste, dry recyclables including glass, bulky waste.
Recycling performance	The development has a set of general waste and recycling containers situated on the ground floor offering residents the same dry

	recyclables collection service as the kerbside properties in the Borough. According to the waste composition analysis carried out for Southwark's Waste Management Strategy 2003-2021, of the waste arisings from high-rise properties, just over 40% is recyclable using the Council's dry recycling collection scheme.
Planning information	No separate waste management information submitted with planning application.
Reason for inclusion as a case study	This development has been included as a case study to provide an example of a planning application with very little detail on practical waste management in the planning application documents. The development is also located in Southwark, the same planning authority as Case Study 3.
Impact on local authority waste operations	Strata management comments: Refuse and recycling is collected every other day from a private rear access road. The concierge keep an eye on over-flowing bins and call the Council if extra collections are needed. They system generally works well.
Future development phases	Request sent to LB Southwark for further information – awaiting reply.

Images from a site visit to the Strata Building:



Residual waste containers



Dry recycling containers



Image showing the external access doors to the waste storage room

2. International Case Studies

It was felt that restricting case studies in the UK would be too narrow to understand what some of the world's developed cities are doing to manage recycling and waste issues. The case studies focus on cities of a similar status and nature to London and were chosen from across Europe, America, Asia and Australia. The information focussed mainly on new developments of a large size. In almost all cases, the new developments are looking to avoid traditional waste management methods of refuse trucks and instead develop vacuum systems. The four case studies all focus on vacuum systems.

International Case Study 1: Hudson Yard New York, USA

In January 2005, the New York City Council approved the rezoning of about 60 blocks from 28th to 43rd Streets; in 2009, after the stadium failed to win state approval, the West Side Yard was similarly rezoned. As rezoned, the Hudson Yards area will have 25,800,000 square feet (2,400,000 m²) of Class A office space, 20,000 housing units, two million square feet (190,000 m²) of hotel space, a 750-seat public school, one million square feet (93,000 m²) of retail and more than 20 acres (8 ha) of public open space.

In May 2010, the MTA leased the air rights over the railyard for 99 years to a joint venture of Related Companies and Oxford Properties Group, which will build a platform above both the eastern and western portions of the yard on which to construct the buildings. In April 2013, the Related/Oxford joint venture obtained a \$475 million construction loan from parties including Barry Sternlicht's Starwood Capital Group and luxury retailer Coach. The financing deal was unique in several aspects, including the fact that it included a construction mezzanine loan, that Coach was a lender on both the debt and equity sides, and that the MTA helped create the "severable lease" structure that allowed for the loans.



Location	Hudson Yard, New York, USA
Size / units	1.6 million square meters on the island of Manhattan.
Date	To be completed in 2015
Developer	The Hudson Yards Redevelopment Project is a joint venture by the New York City Department of City Planning and Metropolitan Transportation Authority to encourage development on Manhattan's far West Side along the Hudson River in Manhattan, New York City.
Waste management system	Envac underground vacuum collection system. The system will process 24 tonnes of waste every day, broken down into three separate fractions.
Waste fractions	Residual, food / organic waste, dry recyclables to be collected in a 3-stream system similar to the Wembley City vacuum waste collection system. The Wembley development is currently achieving a household waste recycling rate of around 45%.
Future development phases	This project is the largest private real estate development in the United States at an expected cost of \$20 billion. According to its master plan, created by master planner Kohn Pedersen Fox Associates, Hudson Yards is expected to consist of 16 skyscrapers containing more than 12,700,000 square feet (1,180,000 m ²) of new office, residential, and retail space. Among its components will be six million square feet (560,000 m ²) of commercial office space, a 750,000-square-foot (70,000 m ²) retail centre with two levels of restaurants, cafes, markets and bars, a hotel, a cultural space, about 5,000 residences, a 750-seat school, and 14 acres (5.7 ha) of public open space. ^[3] Hudson Yards officially broke ground on December 4, 2012, with the first tower, an 895-foot (273 m) office building in the southeast corner of the site, expected to be complete in 2015.

International Case Study 2: Msheireb Downtown, Doha, Qatar

Msheireb is aiming to be the world's first sustainable downtown regeneration project. It is designed to revive the old commercial district with a new architectural language that is modern, yet inspired by traditional Qatari heritage and architecture – its proportion, simplicity, space, light, layering, ornament and response to climate. Utilising the latest in sustainable technologies, Msheireb will adhere to the highest standards in green building. The strategic objective of the Msheireb project is to reverse the pattern of development in Doha, which has tended towards isolated land use, reliance on car transportation and energy hungry structures. Msheireb Downtown Doha will become a new social and civic hub in the city centre – a place where it is enjoyable to live, work, shop, visit, and spend time with family and friends. - See more at:

<http://mdd.msheireb.com/exploreproject/projectoverview.aspx#sthash.2glbe7m9.dpuf>



Location	Msheireb Downtown, Doha, Qatar
Size / units	31 hectare mixed use urban regeneration project
Date	2015
Developer	Msheireb Properties
Waste management system	Envac underground vacuum collection system.
Waste fractions	Three vertical chutes for organic waste, dry waste and mixed recyclables will be installed in every residential building, with three waste inlets located on each floor. Each is designed to handle organic waste, 'dry' mixed recyclables such as paper, glass, plastic, metal etc, and residual waste such as wet paper, clothes, and other refuse.
Future development phases	<ul style="list-style-type: none"> ▪ This project is the largest private real estate development in the Qatar at an expected cost of QR20 billion project to redevelop, regenerate and conserve the historical downtown of Doha. The development consist of: ▪ Commercial and governmental offices: 289,150 square metres (38.2%)

- Retail: 104,000 sq. m (13.7%)
- Hotels: 115,400 sq. m (15.2%)
- Residences: 196,270 sq. m (25.9%)
- Community and cultural areas, school, mosque, museum: 52,560 sq. m (6.9%)

Parks and open spaces will cover an area of more than 120,000 square metres

Mohammed Al-Marri, projects director for Msheireb Properties:

"With this system from combined with an education campaign for all residents, we can ensure Msheireb Downtown is at the forefront of the world's 'Green cities' movement"

International Case Study 3: Yuhua, Singapore

Yuhua is a precinct located at Jurong, Singapore. The area's HDB flats are under the management of Jurong Town Council and the people of this precinct is represented in parliament by Grace Fu. The Singapore Housing Department will test-bed the The Pneumatic Waste Conveyance System (PWCS) at 38 residential blocks in Yuhua.



Location	Yuhua, Singapore
Size / units	38 residential blocks
Date	Finished in 2016
Developer	Singapore Housing Department
Waste management system	Pneumatic Waste Conveyance System (PWCS) - ST Environment Services & Technologies Ltd (STE&T) - the Chinese subsidiary of Singapore based ST Engineering
Waste fractions	Using both vacuum and pressure to transport waste from disposal points to the collection station, the underground pipeline system offers a clean and odourless living environment as the air in the system is re-circulated with minimal exhaust. The company claims that its system's collection pipeline design - of pipe elbows and bends - allows better conveyance of glass and metal waste. In addition, the system has an automatic air flushing and drying mechanism which works by forcing air at a higher air speed through the pipes, thereby cleaning and drying them at the same time with each waste stream.
Future development phases	<p>The company suggests that the pneumatic waste collection system provides single, circle, gravity type pipeline conveying systems with final collection system using partial vacuum, central stationary modules or mobile suction systems.</p> <p>Other features are:</p> <ul style="list-style-type: none"> - “Enclosed system” improves hygiene standards - Automated Processing System improves efficiency - Flexi location for collection point

- Aesthetically designed for next generation township
- Safe and space friendly
- Eliminates indiscriminate and illegal waste disposal

It is designed to bring about the following benefits:

Reduced manpower

- Automates entire refuse collection process
- Reduces the need for manual labour

Improved living environment

- Eliminates foul odours emitted from refuse chutes
- Reduces spills during refuse collection
- Promotes hygienic and cleaner environment
- Enhances ambience of estate

Environmentally friendly

- Reduces the need for washing of chutes
- Reduces infestation of pests
- Minimises decomposition of waste

Recycling

- Supports separation of waste for recycling

International Case Study 4: 300 George Street, Brisbane, Australia

The site known as 300 George Street is situated at 272 to 318 George Street, Brisbane. It is a development opportunity site encompassing the former Supreme and District Court Building and is the largest single development site in Brisbane’s recent history. When completed, the development will consist of three buildings, comprising an 84-storey residential block, a 34-storey hotel complex and a 42-level office tower with retail and leisure facilities. A comprehensive waste management strategy has been devised (October 2013) as part of the development’s planning process, which details estimates of waste arisings from each element of the development and the collection systems proposed for each building.



Location	272-318 George Street, Brisbane, Australia
Size / units	428 residential units, 305 hotel rooms plus commercial and retail space
Date	Not yet built
Developer	Bao Jia Developments Shayer Group
Waste management system	Elephant’s Foot eDiverter waste chute system with an impact hopper and discharge system into 1100 litre eurobins situated in the basement level.
Waste fractions	Waste will be separated into two fractions: residual waste and dry recyclables, Recycling includes: glass bottles & jars; PET, HDPE & PVC plastics; aluminium & steel cans; milk & juice cartons; soft drink, milk & shampoo containers; mixed papers & cardboard.
Future development phases	The developer has commissioned Elephant’s Foot Recycling Solutions to provide a comprehensive waste management strategy for this landmark development. The waste strategy sets out estimates of waste arisings, waste separation and collection systems for: <ul style="list-style-type: none"> 1. the residential tower 2. the hotel

3. the office, leisure and retail tower

Residents will be provided with sufficient waste storage capacity in the kitchen units, suitable for 1 days' storage of waste and recycling. A chute outlet door will be provided on each level of the residential tower, for household waste and recycling. Residents will select one of two buttons on the chute panel for either recycling or waste and when the 'open door' light is illuminated, the door can be opened. The function buttons move a mechanism in the basement storage room that directs waste through the hopper into the correct bin at the bottom of the chute. Materials fed into the chute will be discharged into 1100 litre eurobins, which presented on a 'linear track' to allow them to be easily replaced when full. Refuse will be compacted, however recycling will be loose and not bagged. Separate food waste collections are not included.

Bulky waste will be managed through a separate store or caged area located in the waste and recycling room. The strategy proposes that large cardboard boxes / packaging are not fed through the chute, but deposited in the bulky waste storage area. A vertical baler will be supplied to bale cardboard to be used by the building management team. Using Brisbane Council's own guidance, the waste strategy estimates that 33% of total waste is recyclable using this system.

London Waste and Recycling Board (LWARB)



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