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Environmental Management and Innovation at Airports

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Airport Environmental Management Issues

- Noise
- Emissions – GHG and Local Air Quality
- Water Use
- Waste Water
- Solid Waste



Innovation on Noise

- Aircraft noise technology
- Performance Based Navigation (PBN)
- Land use planning
- Sound insulation
- Community engagement and communications
 - Improving community understanding, attitudes and acceptance of airport activity

Managing Noise

AMS Schiphol

- Noise abatement procedures
- Runway use
- Tracks to avoid urban areas
- Modern aircraft fleet



Innovation on Communicating about Noise

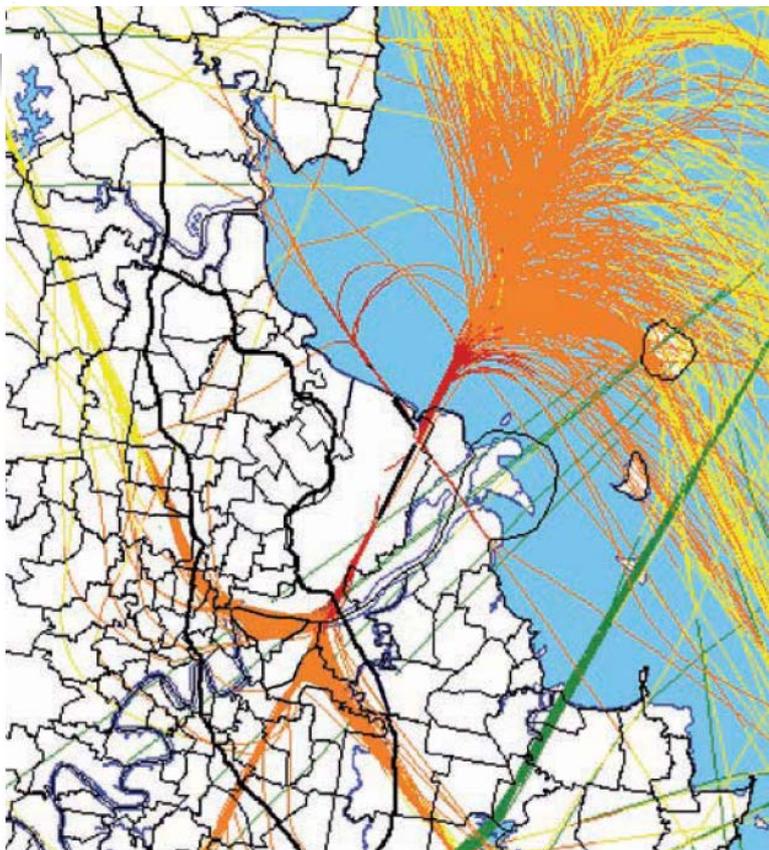
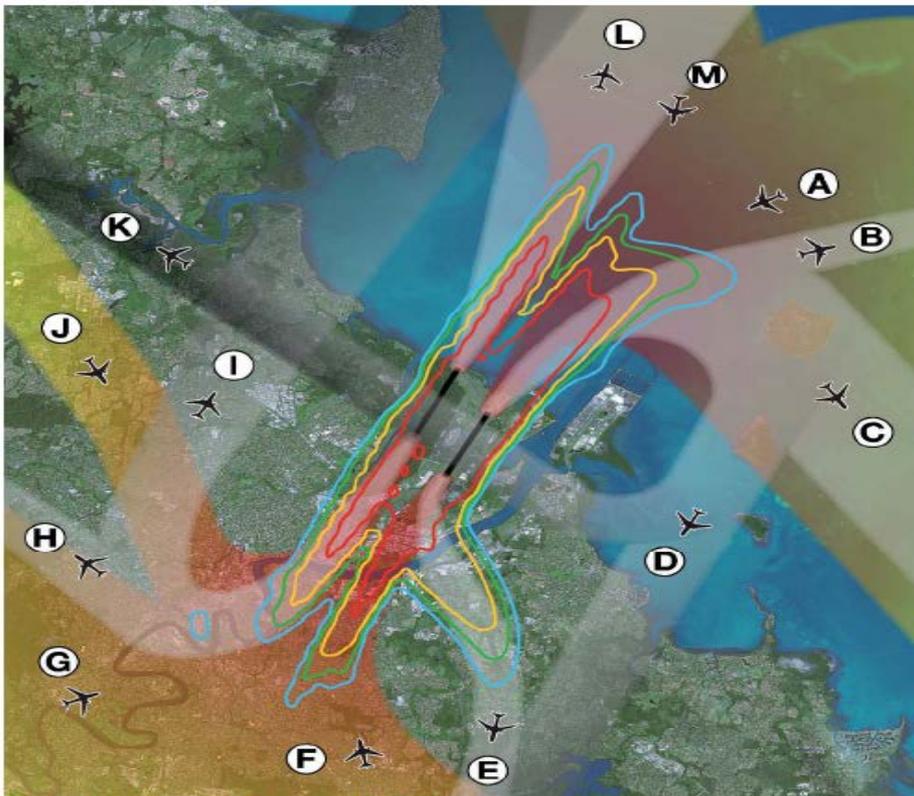


Figure 2: This image depicts the spread of actual arrival flight paths. (Source: Airservices Australia)



Figure 3: This image shows how arrival and departure flight paths are depicted in this booklet.



Flight path	Flight path type	Average number of jet flights on flight path	Expected minimum and maximum numbers of jet flights on path	Percentage of days with no jet flights on path	Percentage of days with jet flights on path
A	Arrival	57	0 - 135	16%	22%
B	Departure	11	0 - 22	3%	7%
C	Departure	7	0 - 13	2%	9%
D	Departure	64	0 - 110	17%	7%
E	Departure	53	0 - 125	14%	22%
F	Arrival	62	0 - 125	17%	23%
G	Arrival	7	0 - 69	2%	23%
H	Departure	7	0 - 17	2%	23%
I	Departure	18	0 - 46	5%	23%
J	Arrival	22	0 - 53	6%	27%
K	Departure	5	0 - 10	1%	8%
L	Departure	22	0 - 42	6%	23%
M	Arrival	35	0 - 92	9%	17%

Altitude Key

Arrivals
Mean Altitude
4,500 ft
0 ft

Departures
Mean Altitude
12,000 ft
0 ft

Contour Key
The number of overflights of 70dB(A) and above during the indicated time period

- 5 to 9 overflights
- 10 to 19 overflights
- 20 to 49 overflights
- 50 or more overflights

Altitude Key

Contour Key

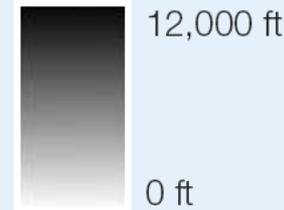
Arrivals

Mean Altitude



Departures

Mean Altitude



The number of overflights of 70dB(A) and above during the indicated time period



N70 Noise contours



Innovation on LAQ and GHG Emissions

Emissions Reduction

- Aircraft
- Ground equipment
- Ground access

Energy Management – Electricity, Heating and Cooling

- Generation and sourcing
- Building design
- Operational efficiency



Electric recharge station (DFW)



Compressed air vehicles (AMS)





La Palma (SPC)

- First airport in Spain with wind generator for terminal's needs
- 2 x 660 kW wind generators
- Annual reduction of 1800 tonnes CO₂





Solar Hot Water at Vancouver (YVR)

- 100 panels 3200 litres/hour
- Meets summer demand
- 30% reduction in annual natural gas use upon installation





Driver education in Sweden

- Training heavy vehicle drivers in Heavy Eco driving at Umeå (and other) airports
- Reduced fuel consumption by 18%





Plume management at Montreal Trudeau (YUL)

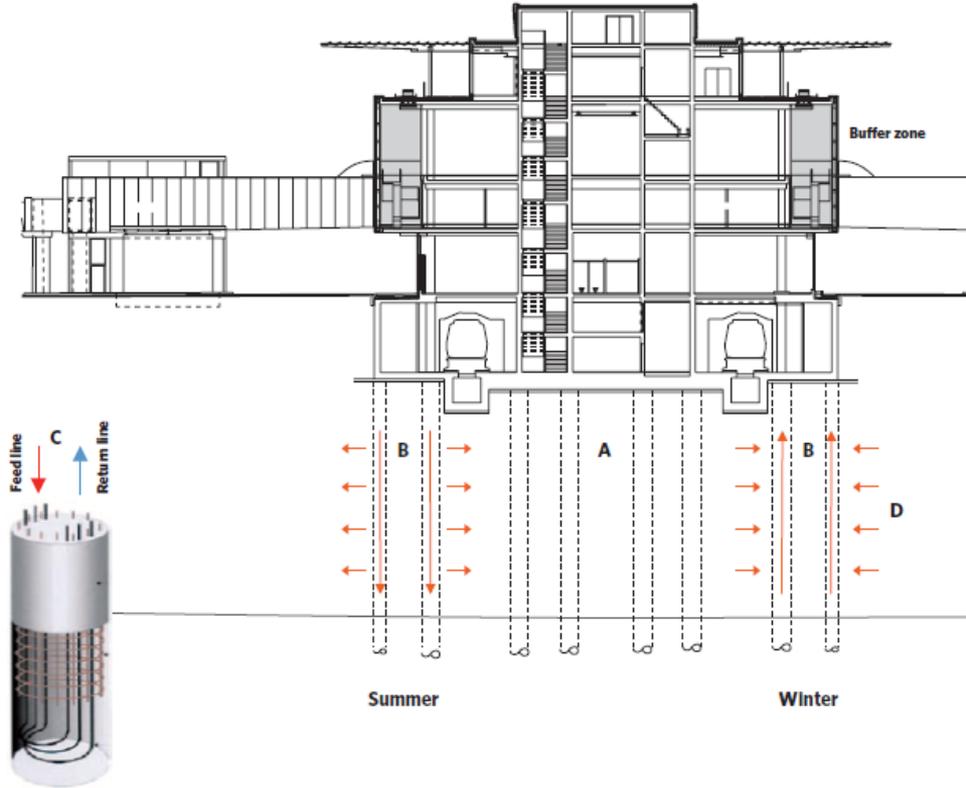
- New condensation process to eliminate steam plume from new high efficiency heating plant.
- Plant now located in main building near control tower.
- Old plant was 2 km away. Heat loss due to piping virtually eliminated.
- Won ASHRAE innovation design award.





Energy piles in Zurich (ZRH)

- Piles 30 m deep contain pipes that circulate a water-glycol mixture. This provides a heat sink in summer and a heat source in winter.
- Provide 70% of building heating and cooling.





Thermal stratification in Bangkok (BKK)

- Cooling provided by under-floor piped water.
- Higher unoccupied space above allowed to heat to outside ambient (35C)
- See Symposium on Improving Building Systems in Hot and Humid Climates (Dallas 2004)



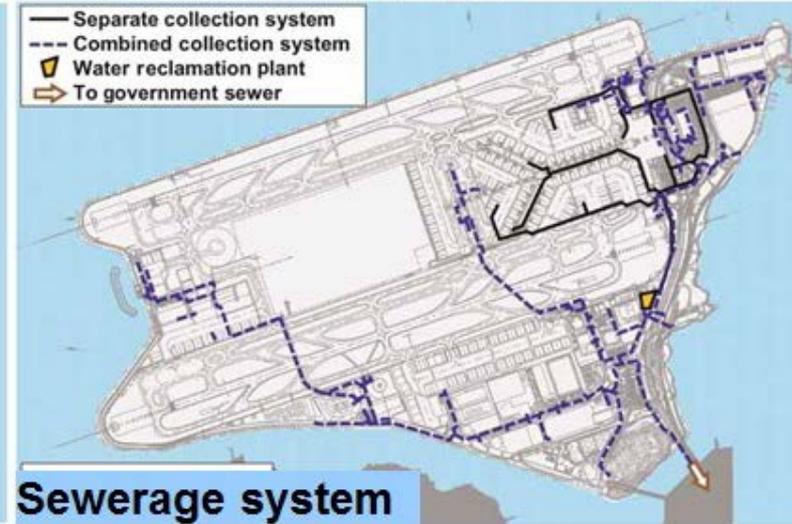
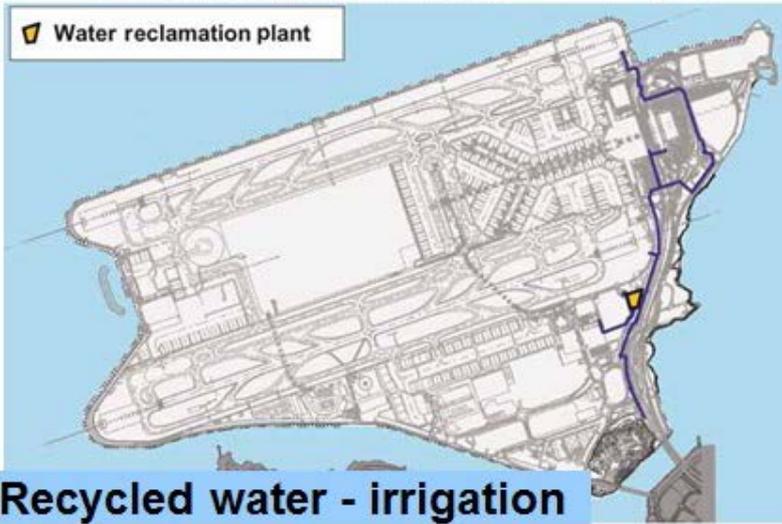
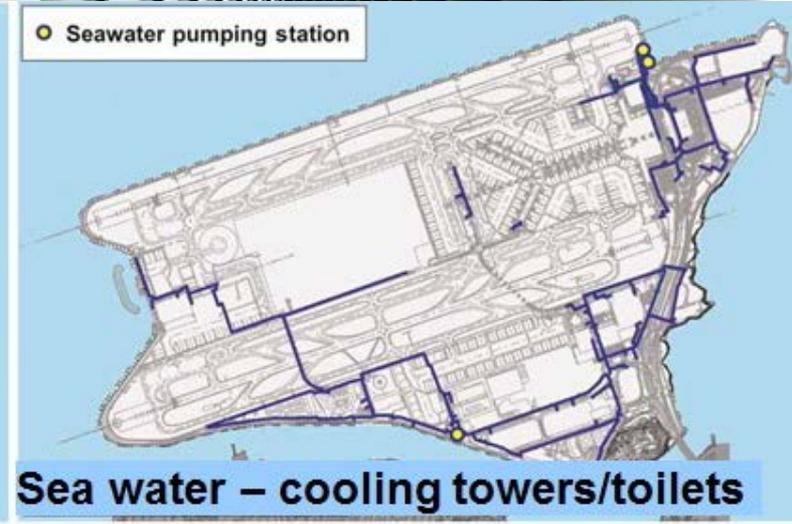
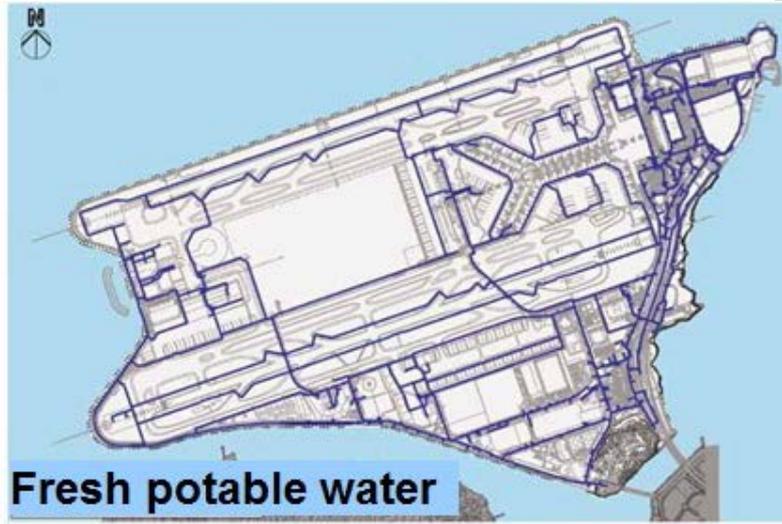


Innovation on Water Management

- Low flow plumbing fixtures
- Non-flushing urinals
- Rain water harvesting
- Water treatment
- Native and arid zone planting
- Sea water toilet flushing and HVAC cooling towers



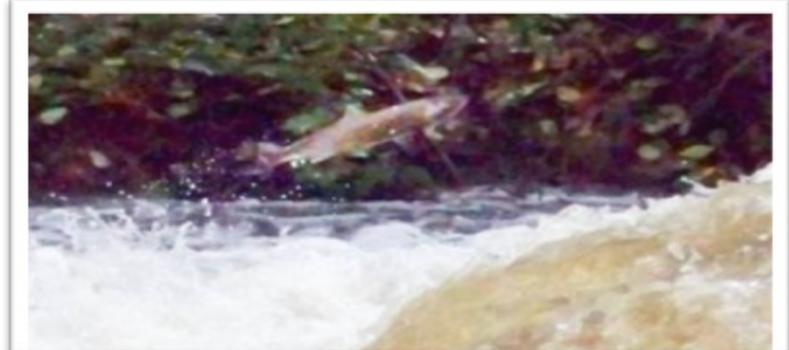
Triple supply system at Hong Kong (HKG)





Storm Water Management – SeaTac (SEA)

- Capture
- Storage
- Treatment
- Outflow control





Glycol Run-off Management – Zurich (ZRH)

- Low contamination – release to water course
- High contamination – distillation recycling
- Medium contamination – spray irrigation

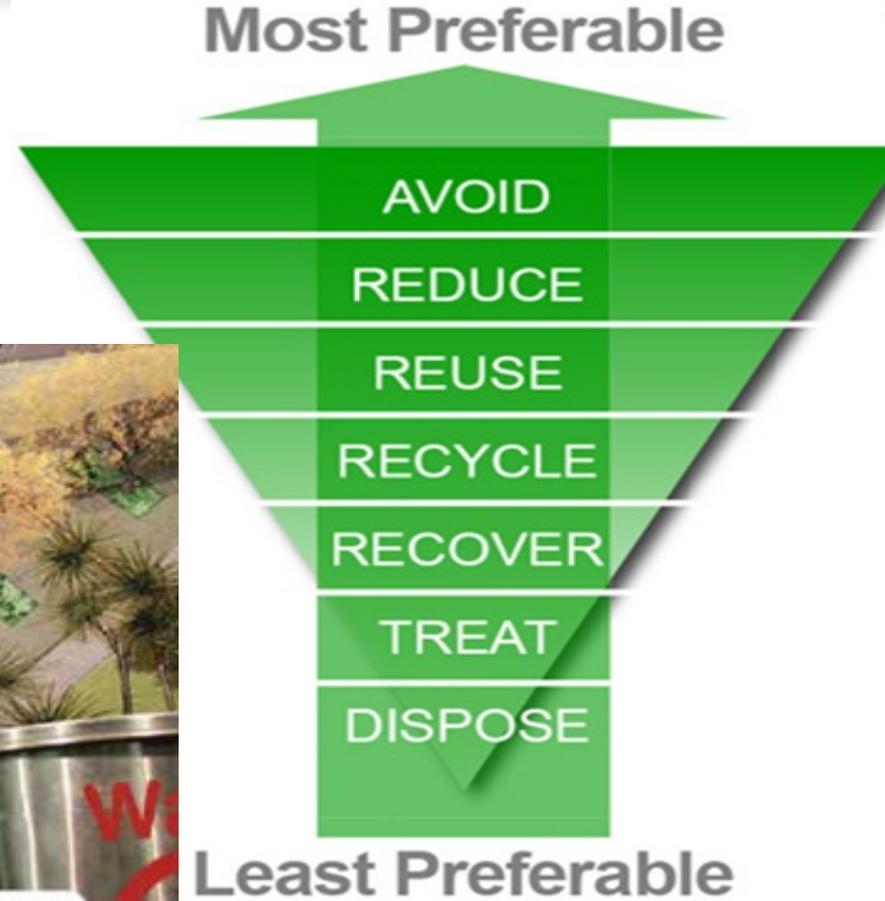




Waste Management

Reuse Recycling

- Paper, cardboard, aluminium, composting





Innovation on Waste Management

- Forestry waste pellet incineration for heating
- Municipal waste to biofuel project
- On-site recycling demolition and excavation materials including pavement





Innovation Overview

Technology and Architecture

- Low emissions
- Energy efficiency
- Alternative renewable energy sources

Operations

- Efficiency
- Education

Communications and community engagement

- Permission to grow



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Thanks

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