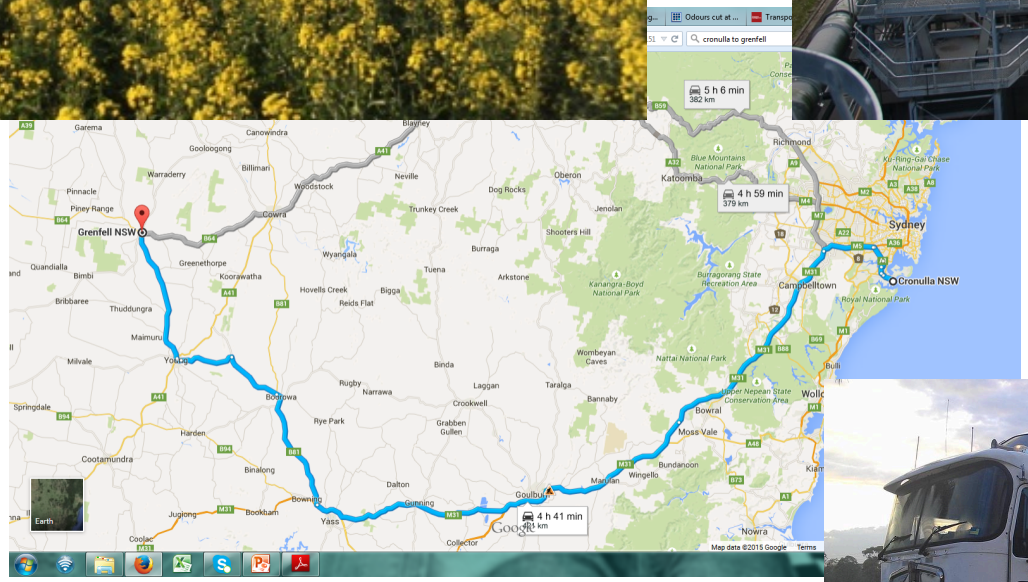
CRC for Low Carbon Living: Project RP2008
Beneficial Re-use of Biosolids

PhD students: Ruth Fisher, James Hayes, Goh Chin How (Norman)

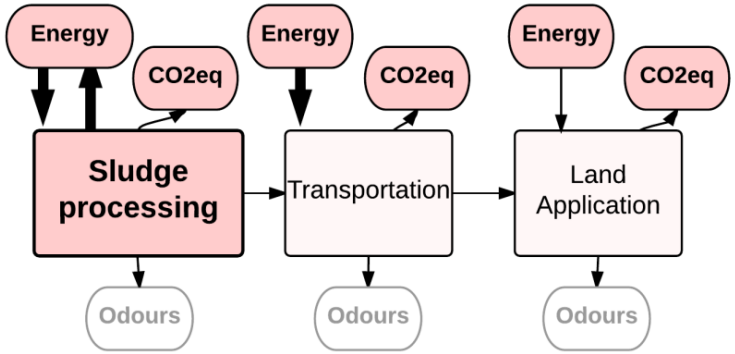
Dr Juan Alvarez Gaitan (JP), Dr Michael Short

Dammika Vitanage, Robert Aurisch (Sydney Water)

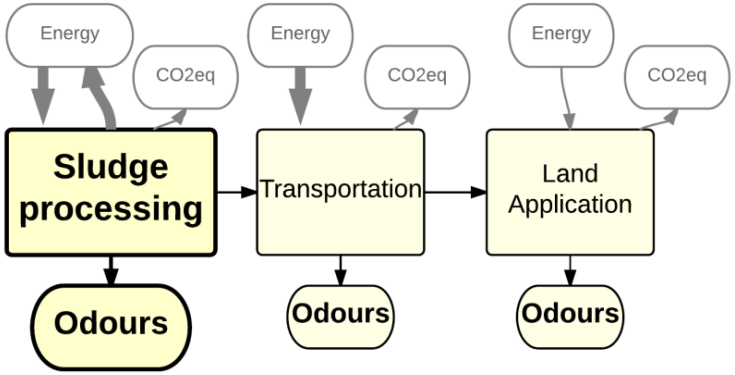
Beneficial Re-use of Biosolids

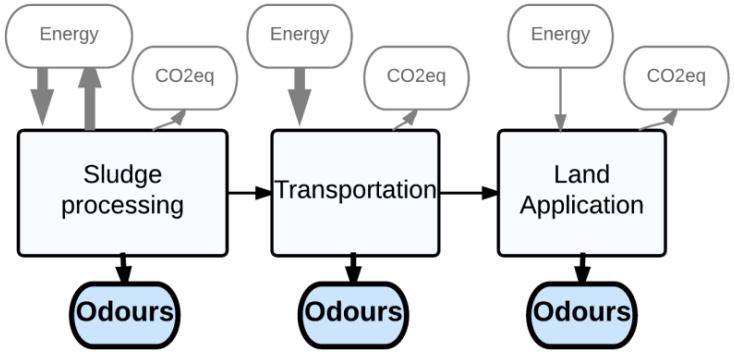


Energy optimisation

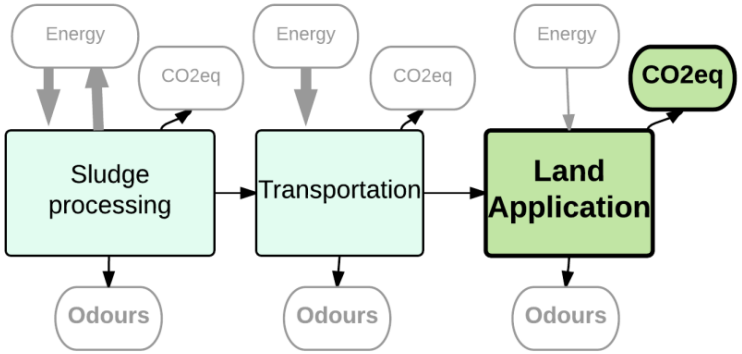


Odour Emissions



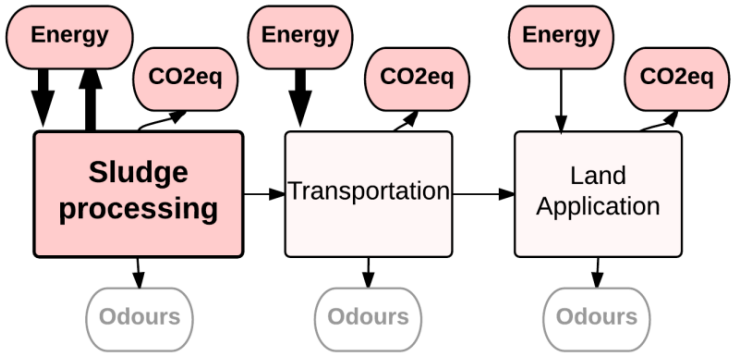


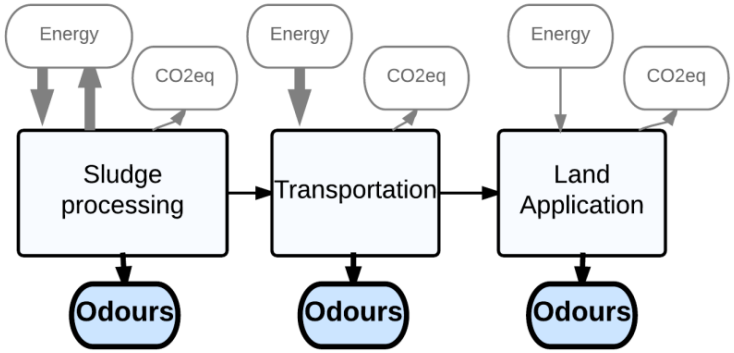
Community Engagement



Land Application

Energy optimisation





Community Engagement

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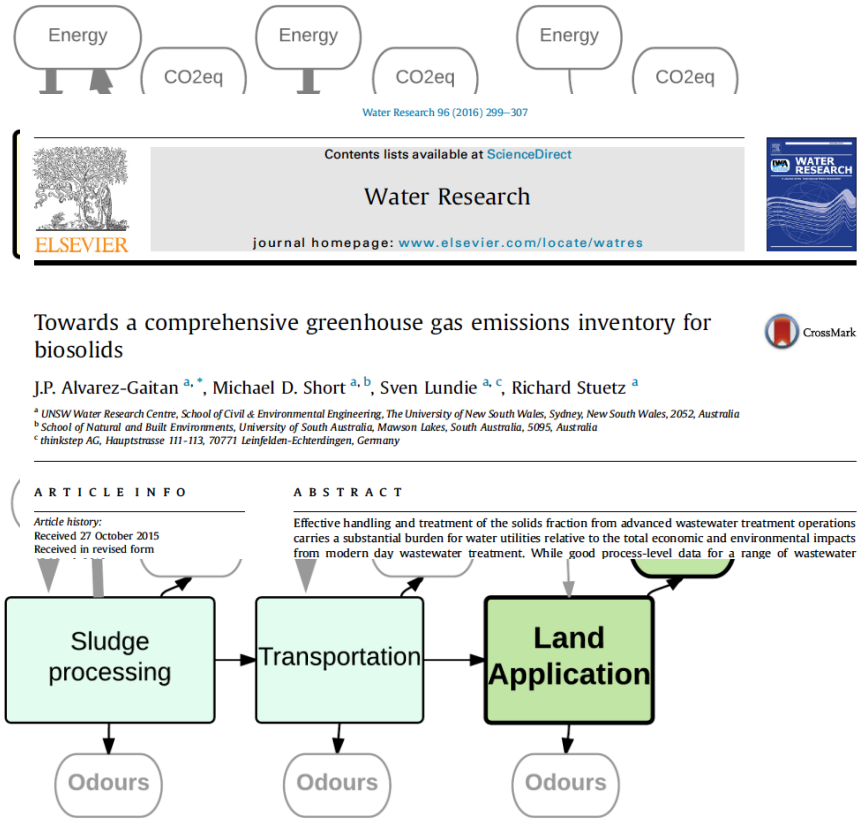
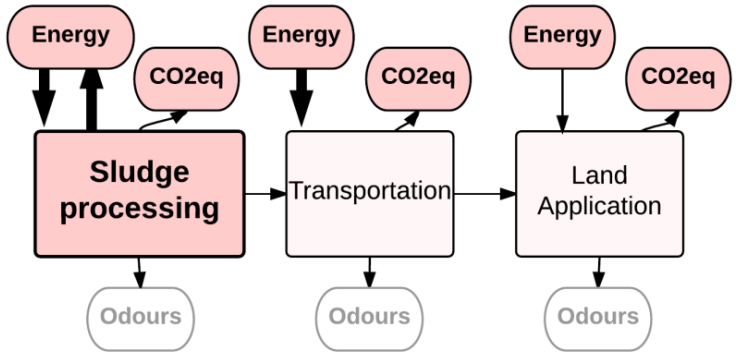


Land Application

Energy optimisation



Science of the Total Environment 599–600 (2017) 663–670

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Distribution and sensorial relevance of volatile organic compounds emitted throughout wastewater biosolids processing

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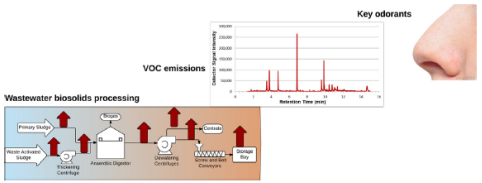
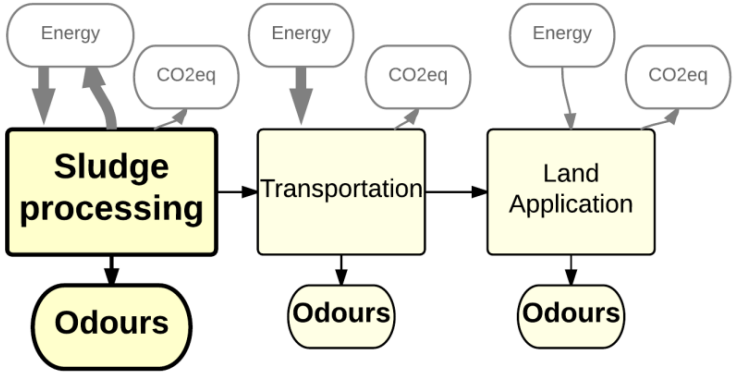
HIGHLIGHTS

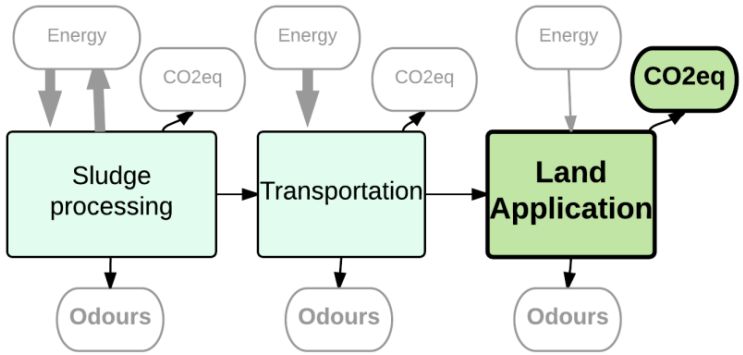
- Non-sulfur VOCs can contribute to odour characters, yet are rarely monitored.
- Comprehensive analysis of biosolids emissions and composition at 6 sites conducted.
- Detected VOCs result from organic matter degradation and sewer catchment inputs.
- Sensorially-relevant VOCs were *p*-cresol, trimethylamine, indole and VFAs.
- VOC emission variations throughout sites and can inform management approaches.

GRAPHICAL ABSTRACT



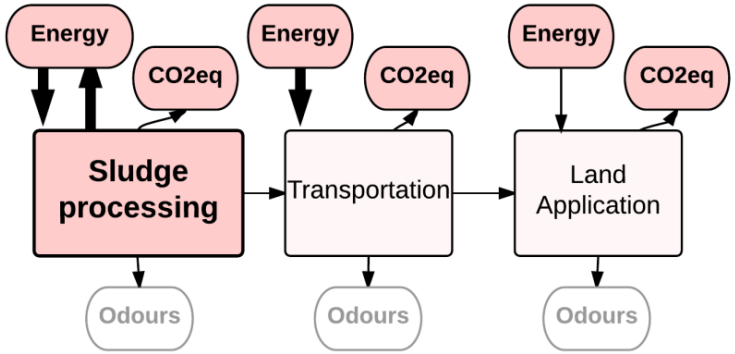
Odour Emissions





Land Application

Energy optimisation



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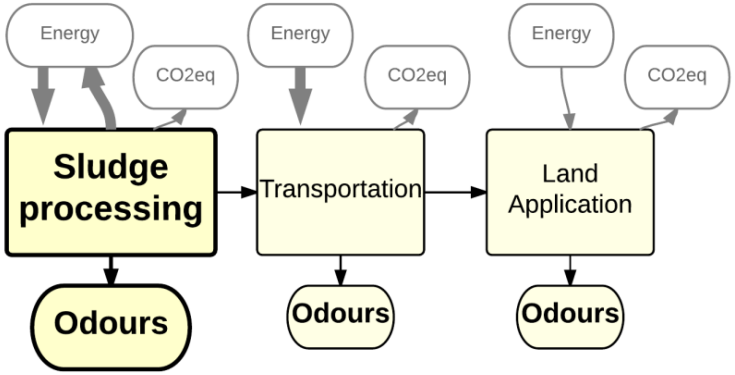
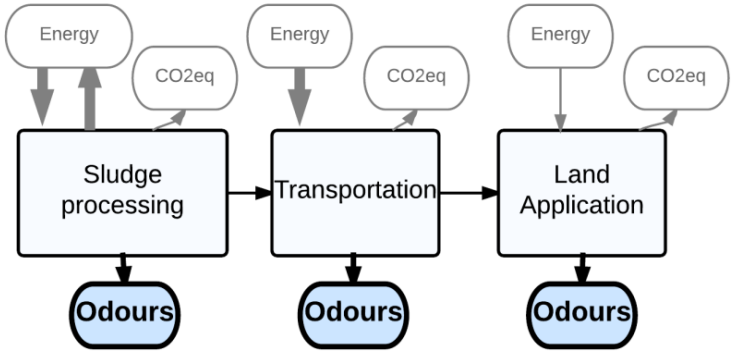
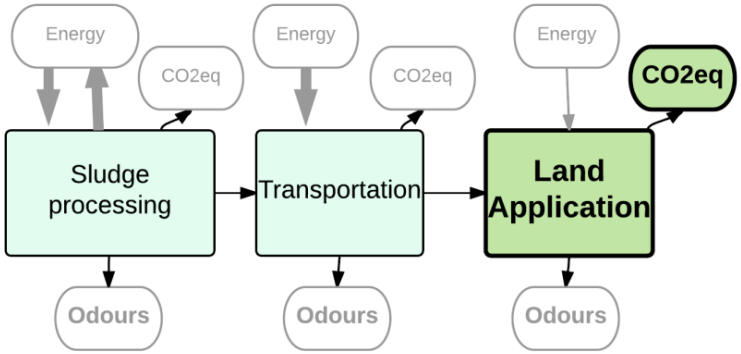




Community Engagement



Land Application

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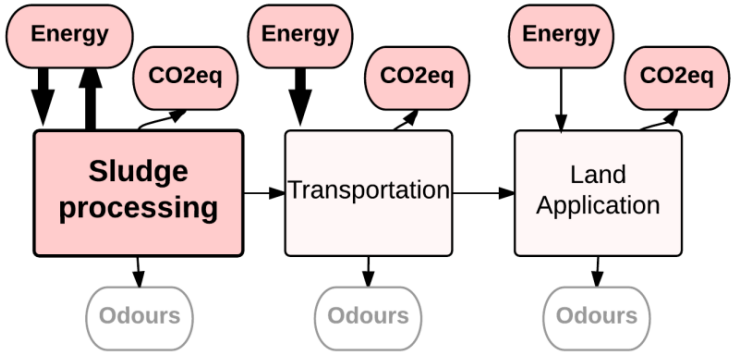

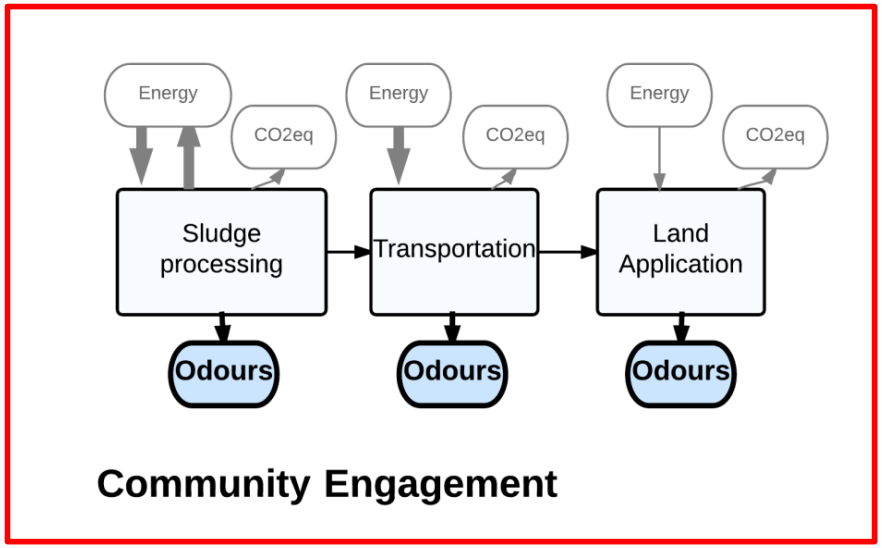

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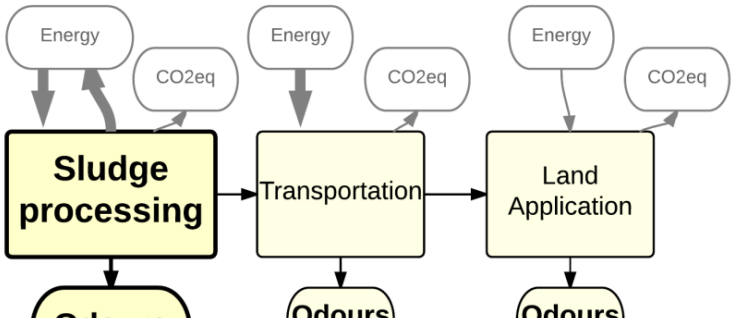

Science of the Total Environment 609 (2017) 1650–1658

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Unrepresented community odour impact: Improving engagement strategies

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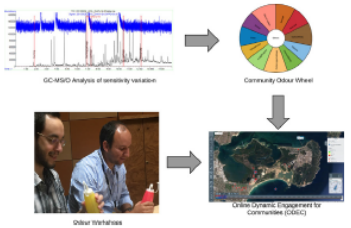
[c] Olfasense GmbH, Kiel 241 18, Germany

HIGHLIGHTS

- GC–MS/O methodologies are broadened to improve ecological validity.
- A Community Odour Wheel for untrained individuals is implemented.
- A combined online and workshop based community engagement structure is proposed.
- Common language between all stakeholders in environmental malodour provides many advantages.

GRAPHICAL ABSTRACT



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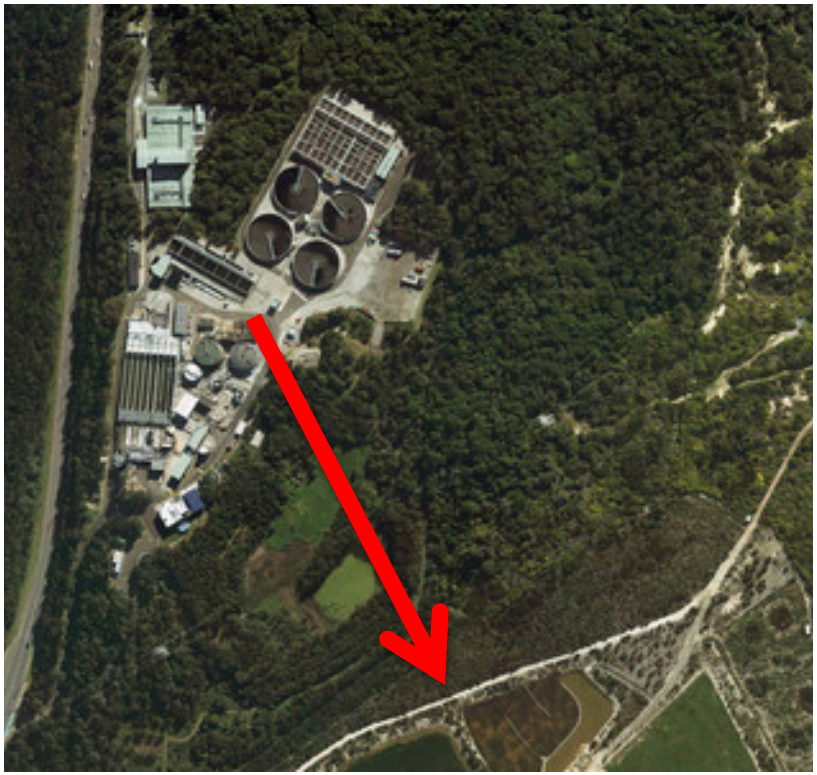
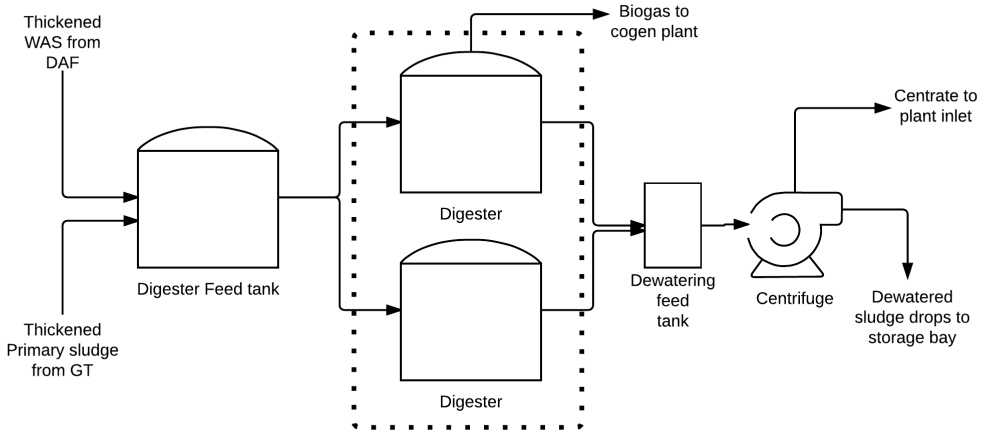
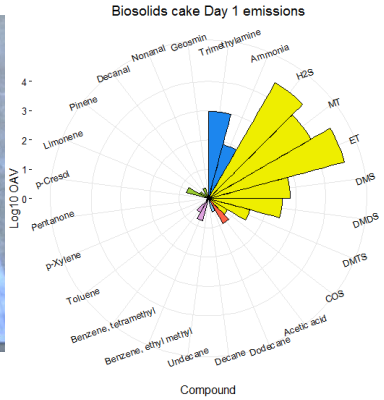
Changing the Conversation about Biosolid Odour Management

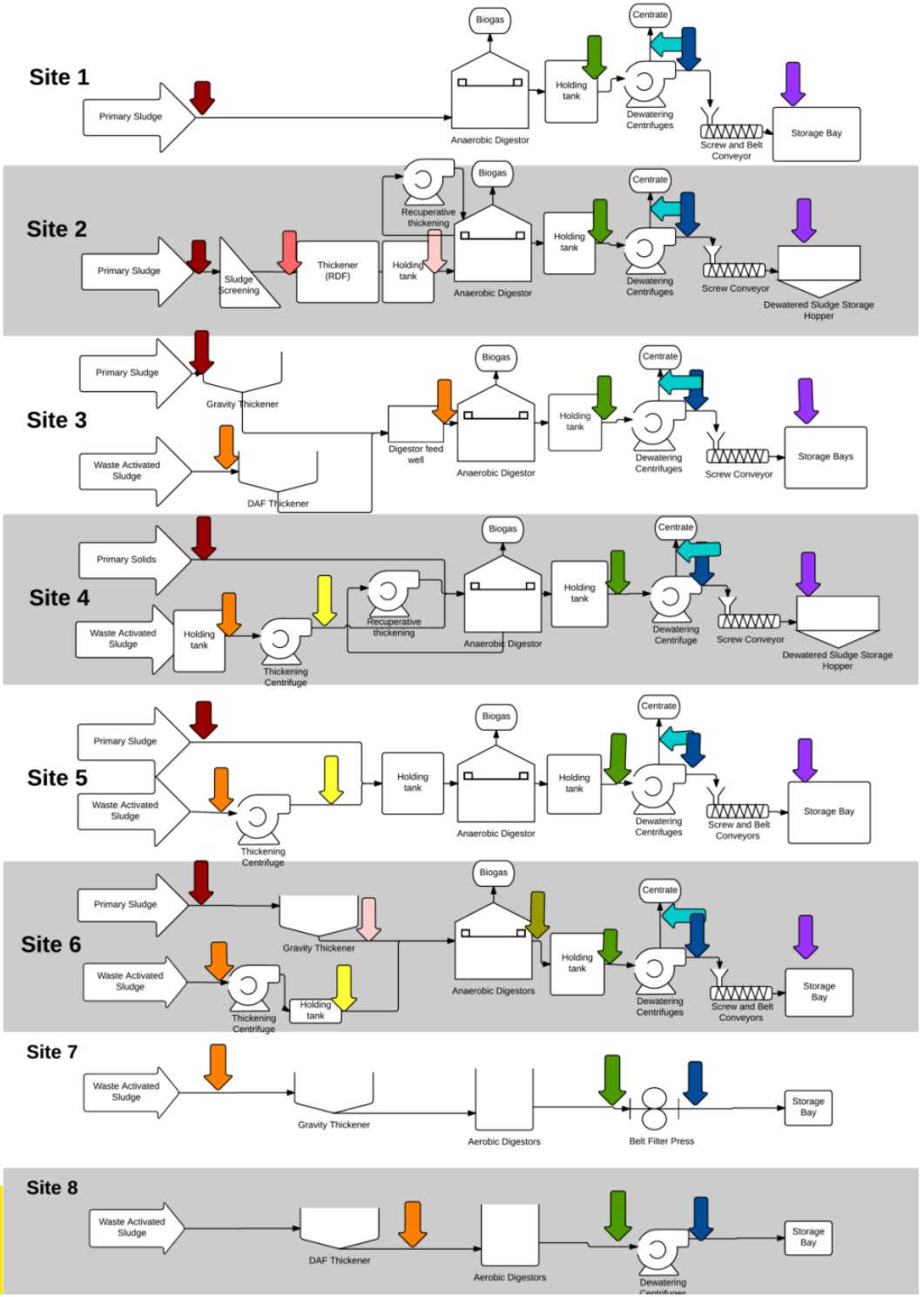




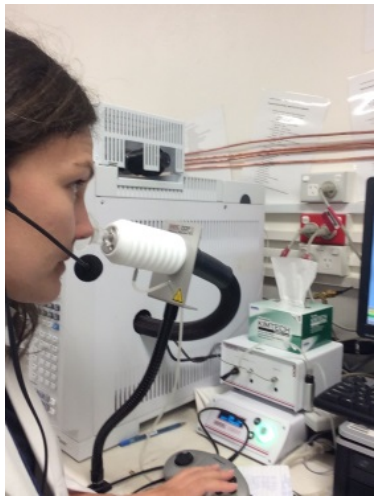
How are odours affected by biosolids processing configurations and operation?

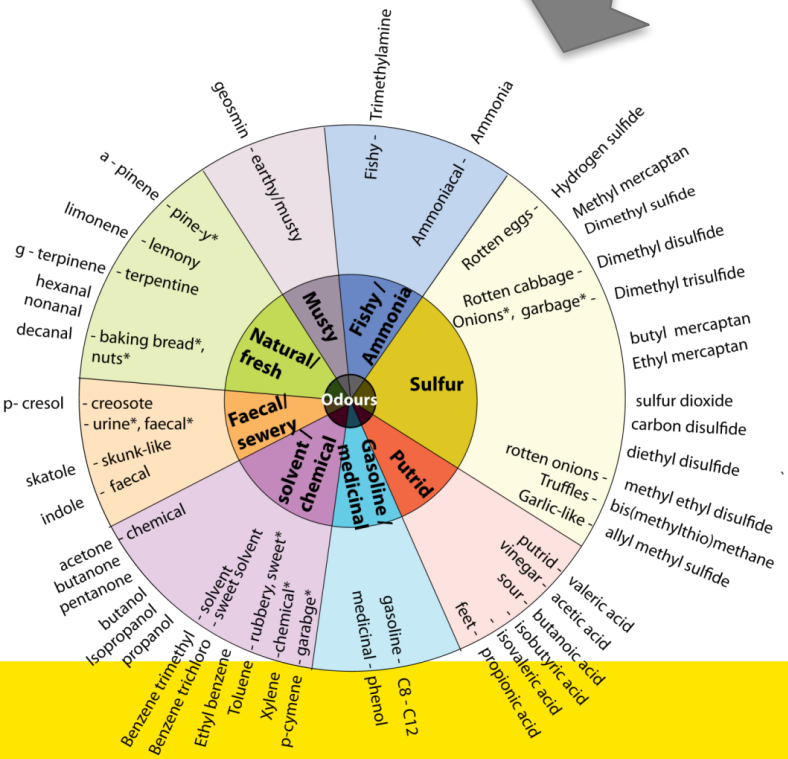


- Sewer catchment
- Thickening
- Digestion
- Dewatering
- Storage

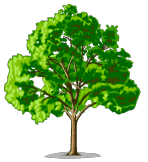


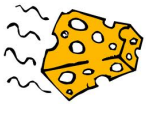
Biosolid processing - Odour Wheel





Primary odours	Species - origin
Natural/fresh	Terpenes – plant material or cleaning products from households or industry
Gasoline/ medicinal	Alkanes – industrial chemicals or degradation by-products
Solvent/ chemical	Ketones, aromatics and alcohols - industrial or degradation by-products
Sulfur	Volatile sulfur compounds- from protein and sulfate reduction
Rancid/Putrid	Volatile fatty acids- organic matter hydrolysis by-products
Ammonia /Fishy	Ammonia and trimethylamine– protein degradation
Faecal/Sewery	Indole, p-cresol – protein degradation
Musty	geosmin - other microbial signalling products

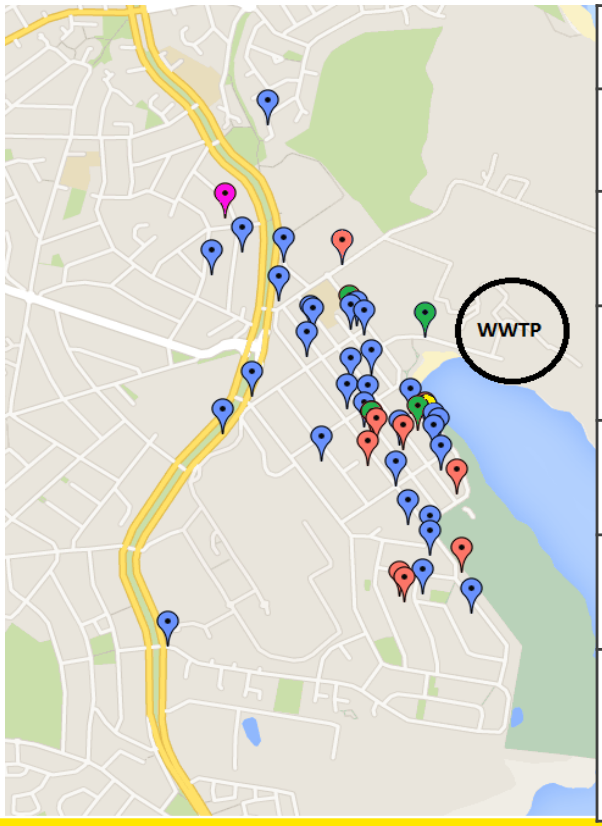




Community Surveys

Complaint information

- Problem or opportunity?



Marker	Key
	1 complaint
	2-10 complaints
	11-15 complaints
	16-25 complaints
	42 complaints
WWTP	Approximate location of Site's WWTP

- Identify multiple complainants

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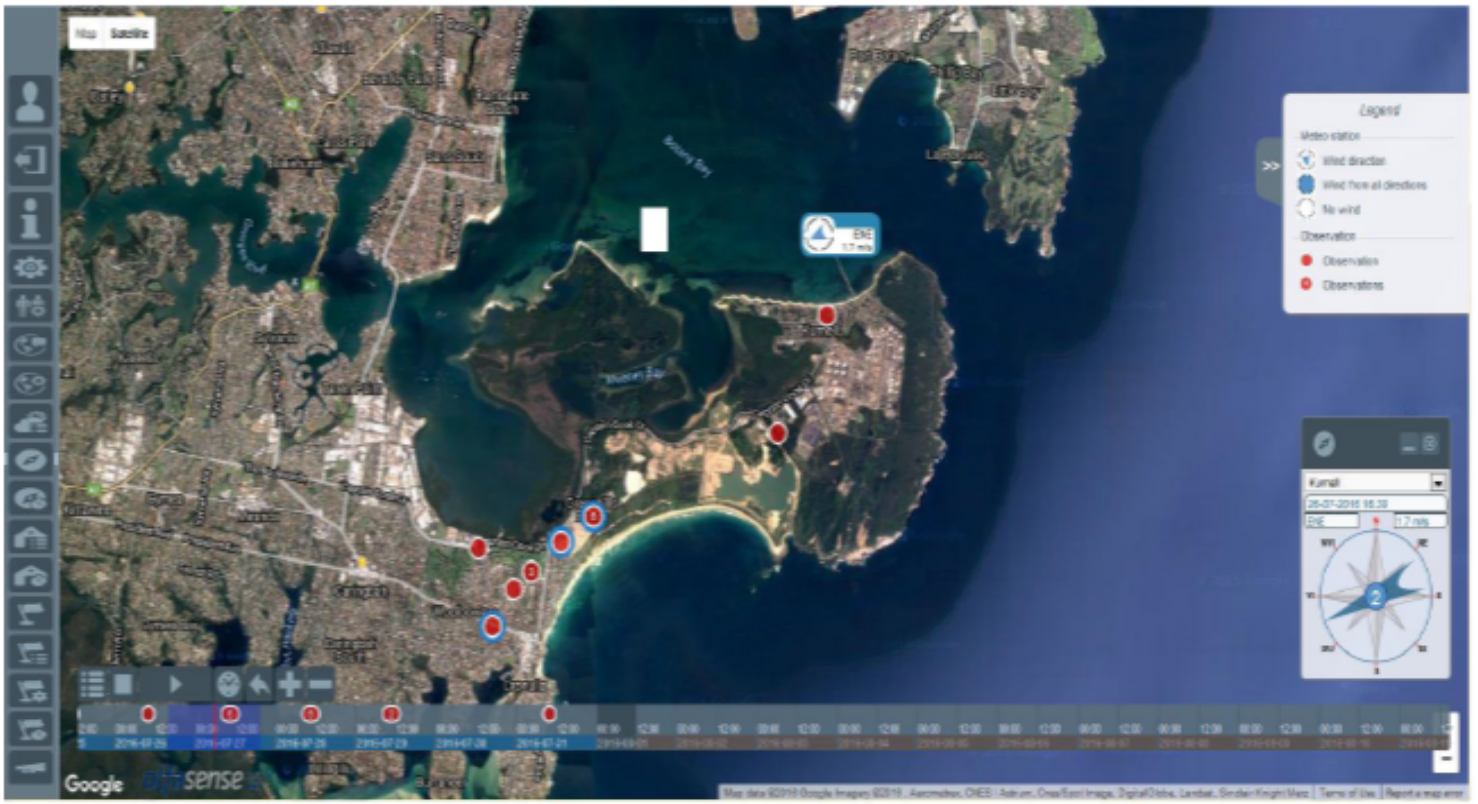
Community Application of Odour Wheel

- Development of simple common language
- Tool to engage with community concerns

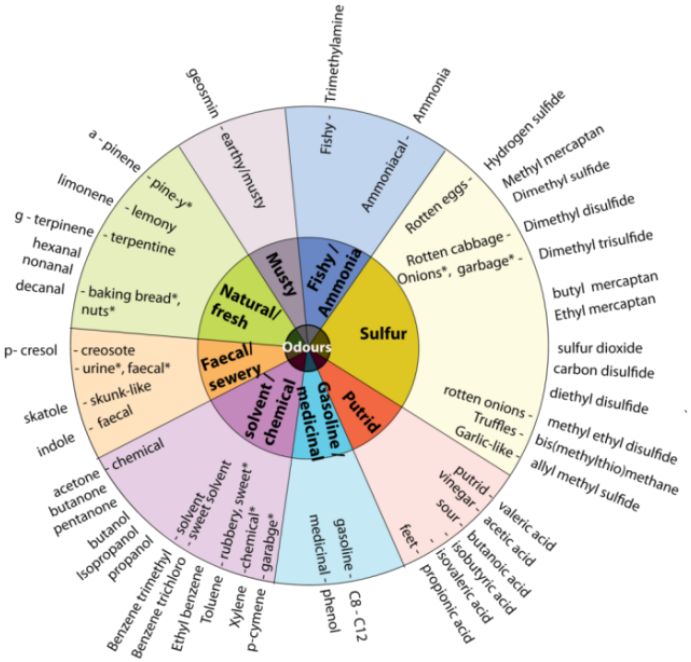
Online Engagement for Communities

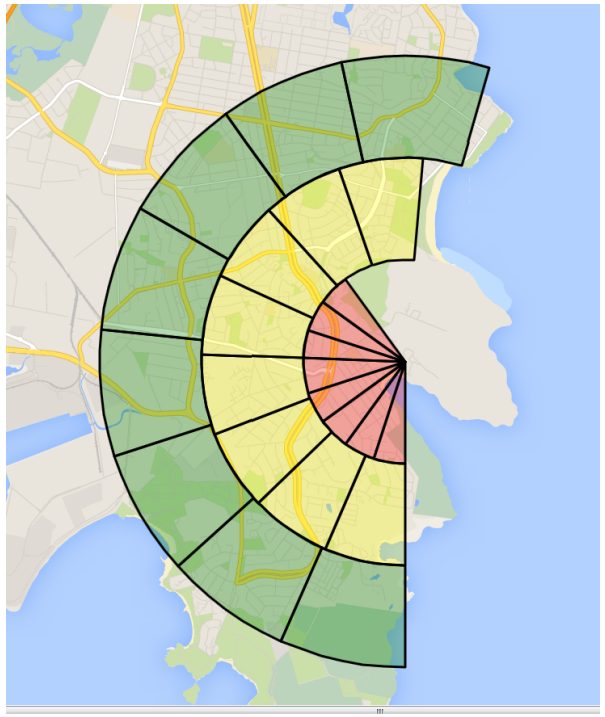
- Train community and site operators with common language
- Multiple complainants become odour observer providing meaningful information
- Common line of communication
- Site



Summary

- Framework for complaint management
- Positive engagement with community
- Tools for training and real time engagement





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