

Appendix 6

Technical summary of proposals submitted at each stage of the PFI Process

Invitation to Submit Outline Solutions

Outline solutions were received from 10 consortia on the 18th December 2007.

1	<p>Proposed solution is MBT with single line moving grate EfW but includes pre-treatment of some incoming organic waste through Anaerobic Digestion. Front end sort of metals and plastics.</p> <p>Compliant bid has excess capacity for C&I waste. Variant bid takes HWRC residual and restricts C&I waste to minimal input to compensate, increases MBT capacity through additional operating shift.</p> <p>MBT capacity: 225ktpa compliant bid, 263ktpa variant bid EfW capacity: 250ktpa compliant bid, 254ktpa variant bid AD capacity: 40ktpa compliant and variant bid</p> <p>MSW Diversion: 78% if IBA to landfill, 98% if used in aggregates. Same % given for compliant and variant bids</p> <p>BMW Diversion: 99% compliant bid, 97% variant bid</p> <p>Recycling: 5%. Same % given for compliant and variant bids</p>
2	<p>Upfront segregation of metals by overhead magnets and eddy current separation, followed by input to a 400,000tpa EfW (twin stream), [225,000tpa contract waste and 175,000tpa C&I waste].</p> <p>MSW Diversion: 96%</p> <p>BMW Diversion: 100%</p> <p>Recycling: ~4-6% (dependent on the quantity of metals within the residual waste)</p> <p>Residues: IBA, FGTR</p> <p>Recyclables: Metals</p>
3	<p>MBT (270,000tpa) to segregate BMW into Anaerobic Digestion plant (65,000tpa) for energy recovery. Non-BMW waste to undergo recovery of metals and plastics for recycling. Remaining material to EfW plant (218,000tpa) for energy recovery. Solution able to deal with 225,000 contract waste, HWRC residual waste and 40,000tpa C&I waste.</p> <p>MSW Diversion: 91%</p> <p>BMW Diversion: 97%</p> <p>Recycling: 5.1%</p> <p>Residues: IBA (~54,000tpa), FGTR (~8,000tpa)</p>

	Recyclables: Metals + plastics (~11500tpa)
4	<p>Combination of MBT and incineration technologies. The MBT facility incorporates GRL's UR-3R Process with a capacity of 225,000tpa of contract waste. It includes the initial separation of recyclables. Percolation and digestion provide the biological component the MBT. An AD component produces a biogas for electricity generation and heat is also recovered. These elements are followed by dewatering and biodrying processes from which a Solid Recovered Fuel (SRF) is produced.</p> <p>The SRF is to be sent to the on-site Recovered Fuel Power Facility (RFPF) for combustion. The RFPF has a capacity of 145,000tpa and includes bubbling fluidised bed technology and the generation of electricity for export to the grid.</p>
	Landfill Diversion: 90%
	BMW Diversion: 94%
	Recycling: 11.5%
5	<p>Proposed solution is for MBT facilities (with front end sorting of recyclates) at two sites, producing SRF for gasification - also at one of the sites. In addition Shanks propose use of a merchant autoclave facility at South Tees.</p> <p>MBT capacity 210ktpa (140ktpa facility plus a 70ktpa facility)</p> <p>Gasification capacity 125ktpa</p> <p>Autoclave capacity 40ktpa</p>
	MSW Diversion: 82%
	BMW Diversion: 91%
	Recycling: 9%
	<p>Proposed solution is as for standard bid plus a HWRC residual waste treatment facility providing additional feedstock to MBT.</p> <p>Capacities are as for the standard bid plus 40ktpa HWRC treatment plant capacity</p>
	MSW Diversion: 75%
	BMW Diversion: 92%
	Recycling: 12%

6	<p>Development of two sites:</p> <ul style="list-style-type: none"> • a recycling plant with the capacity of 220,000tpa; and • further development of an existing EfW site, out of County with new EfW capacity (256,00tpa). <p>The majority of residual household waste from the WCAs will be transported, via WTSs, to the recycling plant where various mechanical processes will be used to separate recyclables from the residual waste stream.</p> <p>The RDF to be transported via a rail network 70miles to the EfW facility.</p> <p>MSW Diversion: 95%</p> <p>BMW Diversion: 100%</p> <p>Recycling: 9%</p>
7	<p>Proposed a combination of autoclave, MRF and incineration technologies.</p> <p>The proposed autoclave facility will have a capacity of 260,000tpa, across four autoclave units.</p> <p>Recyclables will be removed after the autoclave process and the 'Sterefibre' product will then be sent for combustion at the on-site 114,000tpa CHP facility. The high pressure steam produced in the CHP facility will be re-circulated into the autoclave and associated processes.</p> <p>MSW Diversion: 71%</p> <p>BMW Diversion: 81%</p> <p>Recycling: 27%</p>
8	<p>65k tpa MTB - Entsorga Heboit process – biodrying.</p> <p>192k tpa of Energos gasification plant. Modular, 4 plant @ 48k tpa.</p> <p>65k tpa first delivered to MBT, biodried then sent to gasification where it is mixed with other MSW.</p> <p>MSW Diversion: 77.5% - 84%</p> <p>BMW Diversion: 98%</p> <p>Recycling: 5.3 – 9%</p> <p>Residues: IBA, FGTR.</p> <p>Recyclables: Metals 4%, Bulky & plastics 1.1% (RDF from MBT to gasification)</p>
9	<p>Compliant Bid: 225,000tpa EfW plant to take only contract waste. No upfront recycling.</p> <p>Variant Bid: 300,000tpa EfW plant to take contract waste and 75,000tpa C&I waste. No upfront recycling.</p>

	MSW Diversion: 96%
	BMW Diversion: 97.8%
	Recycling: 0%
10	EfW plant of 240,900 tpa capacity. Supplier yet to be chosen from 3 (Keppel Seghers, Von Roll and Takuma). Technology likely to be moving grate, multiple line with sufficient spare capacity to cover HHWRC waste. No up-front processing. Metals recycled from ash if ash not recycled.
	MSW Diversion: 89% (NB this relies on ash recycling)
	BMW Diversion: 89%
	Recycling: >20% if ash recycled, if not recycled metals recycling will be <5%

Invitation to Submit Detailed Solutions

Detailed solutions were received from four short listed consortia on the 30th May 2008.

1	Proposed solution is MBT with twin line moving grate EfW but includes pre-treatment of some incoming organic waste through Anaerobic Digester. Front end sort of metals and plastics. MBT capacity: MT is 275ktpa (operating normal shift patterns). AD capacity is 40ktpa EfW capacity: 310ktpa
	MSW Diversion: 79% (guaranteed)
	BMW Diversion: 95% (guaranteed)
2	400 ktpa EfW (twin stream), to take circa 273-305 ktpa contract waste and remaining capacity filled by C&I waste. Will include shredder/breaker for elements of HWRC waste stream. Variant includes upfront segregation of metals (and glass in waste flow model) by overhead magnets and eddy current separation.
	MSW Diversion: 90% (reported as 'typical')
	BMW Diversion: 94% (reported as 'typical')
	Recycling: No 'NPI' recycling in base bid. Variant Bid offers to exceed 5% recycling however waste flow modelling based on wrong composition and preliminary analysis suggest 5% will not be achieved.

3	Overall 325,000 tpa plant capacity. MBT (260ktpa) to segregate organic rich (high in BMW) fraction of kerbside Contract Waste into AD plant (69ktpa) for energy recovery. Combustible rich fraction to undergo recovery of metals for recycling. ~45ktpa Shredded HWRC residual waste and ~188ktpa Mechanical Treatment residues plus 20ktpa dried AD digestate to go into single line EfW plant (260,000tpa) for energy recovery. Commercial waste input to EfW ranges from 30ktpa – 52ktpa depending on how much Contract Waste there is sent to the plant.
	MSW Diversion: 85%
	BMW Diversion: 92%
	Recycling: 3.1% based on metals recovery from kerbside collected material only.
4	311ktpa EfW (calculated at 89% availability), two lines – no up-front recycling. 3 rd party capacity as required to ensure the plant inputs are to the plant capacity.
	MSW Diversion: ~95% (guaranteed)
	BMW Diversion: ~95% (guaranteed)
	Recycling: 0% (potential to recover metals from IBA both at the facility and through additional reprocessing)

Call for Final Tender

The final two consortia submitted final tenders on the 2nd October 2009.

Company Consortium /	1
Description of Solution / Capacities (inc merchant/spare capacity)	<p>Proposed solution is MBT with twin line moving grate EfW but includes separation of the organic fraction of the residual kerbside waste through AD 'Dranco' process. Front end sort of metals, plastics and paper.</p> <p>MBT capacity: maximum design capacity is 408 ktpa., though typically will process 264 ktpa in 2 shifts.</p> <p>AD capacity is 40 ktpa</p> <p>EfW capacity: maximum design capacity is 310 ktpa (during typical operation (2014/15) based on NCV of 9.0 MJ/kg, dropping to 294 ktpa (2037/38)).</p> <p>Spare EfW capacity to be used for C&I waste.</p>
Performance	<p>MSW Diversion: 90% (guaranteed)</p> <p>BMW Diversion: 95% (guaranteed)</p> <p>Recycling: 5% (guaranteed) based on kerbside collected</p>

	material only.
Sites/Locations	Allerton Park for whole process

Company Consortium	2
Description of Solution / Capacities (inc merchant/spare capacity)	Overall 325,000 tpa plant capacity. MBT (260ktpa) to segregate organic rich (high in BMW) fraction of kerbside Contract Waste into AD plant (69ktpa) for energy recovery. Combustible rich fraction to undergo recovery of metals for recycling. 45ktpa Shredded HWRC residual waste and 140ktpa to 170ktpa Mechanical Treatment residues plus 20ktpa dried AD digestate to go into single line EfW plant (260,000tpa) for energy recovery. Commercial waste input to EfW ranges from 34ktpa – 81ktpa depending on how much Contract Waste there is sent to the plant.
Performance	MSW Diversion: 84% (guaranteed)
	BMW Diversion: 92% (guaranteed)
	Recycling: 2.7% (guaranteed) based on metals recovery from kerbside collected material only.
Sites/Locations	Allerton Park