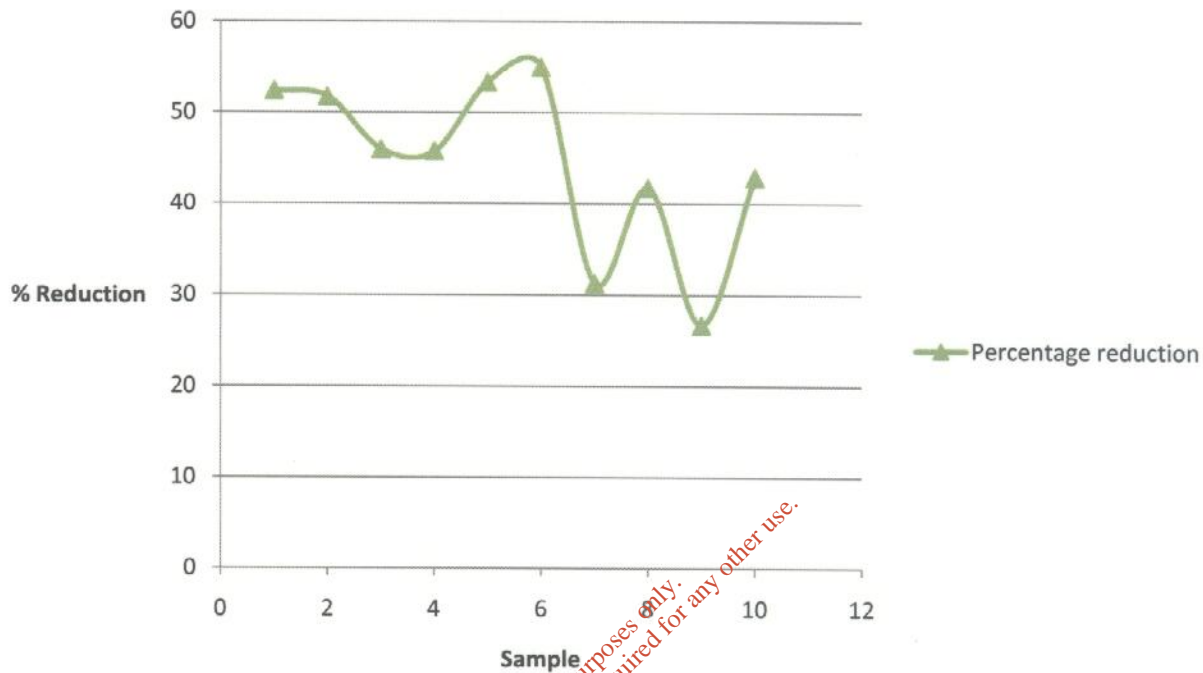


# Appendix 1

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### Suspended solids % reduction via storage tank



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## Appendix 2



ENVIRONMENTAL PROTECTION AGENCY  
CORK REGIONAL INSPECTORATE  
INNISCARRA, Co. CORK

Tel: 021-4875540 Fax: 021-4875545

Page 1 of 1  
Issued: 19/02/2010

**Final Test Report**

**Report No: 300040 / 1**

Client OEE Enforcement Admin (Cork);  
Sample **300040** Location **Mr. Binman (Luddenmore) GW1**  
Licence No. W0061-02 (formerly W 61-2 ) Issued by Env. Protection Agency  
Description: Waste facility groundwater Flow  
Sampled: 20/01/2010 at 1045 by PM Sampled as: Grab sample Split sample Yes  
Received: 20/01/2010  
Remarks

Determination	Result	Units	Spec Limits	Status	Method Description & EPA Method No.	Result Accred
pH	7.42	pH units			Electrometry B3	Y
pH measured at	18.4	°C			Thermometry B3	N
Conductivity @25C (Temp Comp)	534	µS/cm			Electrometry B4	Y
Ammonia - Total (as N)	0.028	mg/l N			Colorimetry (Aquakem) B48	Y
Total Phosphorous	0.074	mg/l P			Digest / Colorimetry B53	Y
Fluoride	0.08	mg/l			Ion Chromatog B8	Y
Chloride	15.1	mg/l			Ion Chromatography B8	Y
Nitrate (as NO3)	7.84	mg/l NO3			Ion Chrom. / Calculated B8 / Calcn	Y
Sulphate	14.3	mg/l			Ion Chromatography B8	Y
Total Nitrogen	1.88	mg/l N			Digest / Colorimetry B36	Y
Total Organic Carbon (as NPOC)	3.86	mg/l C			Digestion / IR B17	Y
Sodium	14.4	mg/l			Ion Chromatography B9	Y
Magnesium	7.83	mg/l			Ion Chromatography B9	Y
Potassium	0.73	mg/l			Ion Chromatography B9	Y
Calcium	84.1	mg/l			Ion Chromatography B9	Y
Alkalinity - total (as CaCO3)	250	mg/l CaCO3			Titrimetry B6	Y
Total Hardness (as CaCO3)	242	mg/l CaCO3			Calculated B9	Y

Signed:

Peter Webster Regional Chemist

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INNISCARRA, Co. CORK

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Page 1 of 1

Issued: 19/02/2010

**Final Test Report**

**Report No: 300041 / 1**

Client OEE Enforcement Admin (Cork)  
 Sample **300041** Location **Mr. Binman (Luddenmore) GW2**  
 Licence No W0061-02 (formerly W 61-2 ) Issued by Env Protection Agency  
 Description Waste facility groundwater Flow  
 Sampled 20/01/2010 at 0940 by PM Sampled as Grab sample Split sample Yes  
 Received: 20/01/2010  
 Remarks

Determination	Result	Units	Spec Limits	Status	Method Description & EPA Method No.	Result Accred
pH	6.95	pH units			Electrometry	B3 Y
pH measured at	18.3	°C			Thermometry	B3 N
Conductivity @25°C (Temp Comp)	881	µS/cm			Electrometry	B4 Y
Ammonia - Total (as N)	0.034	mg/l N			Colorimetry (Aquakem)	B48 Y
Total Phosphorous	0.026	mg/l P			Digest / Colorimetry	B53 Y
Fluoride	0.07	mg/l			Ion Chromatog	B8 Y
Chloride	47.6	mg/l			Ion Chromatography	B8 Y
Nitrate (as NO3)	13.6	mg/l NO3			Ion Chrom / Calculated	B8 / Calcn Y
Sulphate	60.6	mg/l			Ion Chromatography	B8 Y
Total Nitrogen	3.07	mg/l N			Digest / Colorimetry	B36 Y
Total Organic Carbon (as NPOC)	4.35	mg/l C			Digestion / IR	B17 Y
Sodium	23.8	mg/l			Ion Chromatography	B9 Y
Magnesium	10.1	mg/l			Ion Chromatography	B9 Y
Potassium	1.45	mg/l			Ion Chromatography	B9 Y
Calcium	147	mg/l			Ion Chromatography	B9 Y
Alkalinity - total (as CaCO3)	343	mg/l CaCO3			Titrimetry	B6 Y
Total Hardness (as CaCO3)	410	mg/l CaCO3			Calculated	B9 Y

Signed:

Peter Webster Regional Chemist

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Issue 7, Revised 06/02/09



# TEST REPORT

Analysing  
Testing  
Consulting  
Calibrating

**Client: Mr. Binman Ltd**  
**Luddenmore**  
**Grange**  
**Kilmallock**  
**Co.Limerick**

**FTAO: Peter Murphy**

**BHP Ref. No.: 88654.1**  
**Order No:**  
**Date Received: 14/10/09**  
**Date Completed: 21/10/09**  
**Test Specification: Nil**  
**Item :See below**



BHP  
New Road  
Thomondgate  
Limerick  
Ireland  
Tel +353 61 455399  
Fax + 353 61 455447  
E-Mail bnpdem2@bnp.ie

TEST	Client Reference	Units	Results	Standard Reference
	GW1 14/10/2009			
pH		mg/l	7.80	APHA - 4500 - H
Conductivity		µS/cm	528	APHA - 2510 - B
Total Nitrogen (as N)		mg/l		APHA - 4500 - N - C
Ammonia (as N)		mg/l	0.04	APHA - 4500 - NH - D
Total Phosphorus (as P)		mg/l	0.02	APHA - 4500 - P
TOC		mg/l	9.6	APHA - 5310 - C

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**Authorised by:**

**Pat O'Sullivan**

**Date of Issue: 21st October 2009**

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# TEST REPORT

Analysing  
Testing  
Consulting  
Calibrating



**Client: Mr. Binman Ltd**  
**Luddenmore**  
**Grange**  
**Kilmallock**  
**Co.Limerick**

**BHP Ref. No.: 88654.2**  
**Order No:**  
**Date Received: 14/10/09**  
**Date Completed: 21/10/09**  
**Test Specification: Nil**  
**Item :See below**

BHP  
New Road  
Thomondgate  
Limerick  
Ireland  
Tel: +353 61 455399  
Fax: +353 61 455447  
E-Mail: bhpem2@bhp.ie

**FTAO: Peter Murphy**

TEST	Client Reference	Units	Results	Standard Reference
	GW2 14/10/2009			
pH		mg/l	7.09	APHA - 4500 - H
Conductivity		µS/cm <sup>1</sup>	973	APHA - 2510 - B
Total Nitrogen (as N)		mg/l	1	APHA - 4500 - N - C
Ammonia (as N)		mg/l	0.07	APHA - 4500 - NH - D
Total Phosphorus (as P)		mg/l	0.15	APHA - 4500 - P
T.O.C		mg/l	4.7	APHA - 5310 - C

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CORK REGIONAL INSPECTORATE  
INNISCARRA, Co. CORK

Tel: 021-4875540 Fax: 021-4875545

Page 1 of 1

Issued: 06/11/2009

**Final Test Report**

**Report No: 292224 / 1**

Client: OEE Enforcement Admin (Cork)  
 Sample: **292224** Location: **Mr. Binman (Luddenmore) GW1**  
 Licence No: W0061-02 (formerly W 61-2 ) Issued by: Env Protection Agency  
 Description: Waste facility groundwater Flow:  
 Sampled: 13/10/2009 at 1000 by DG Sampled as: Grab sample Split sample: No  
 Received: 13/10/2009  
 Remarks:

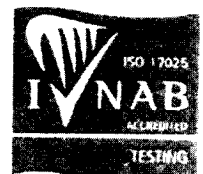
Determination	Result	Units	Spec Limits	Status	Method Description & EPA Method No.	Result Accred
pH	7.62	pH units			Electrometry B3	Y
pH measured at:	19.5	°C			Thermometry B3	N
Conductivity @25C (Temp Comp)	528	µS/cm			Electrometry B4	Y
Ammonia - Total (as N)	0.026	mg/l N			Colorimetry (Aquakem) B48	Y
Total Phosphorous	< 0.010	mg/l P			Digest / Colorimetry B53	Y
Fluoride	0.11	mg/l			Ion Chromatog. B8	Y
Total Nitrogen	2.59	mg/l N			Digest / Colorimetry B36	Y
Chloride	12.2	mg/l			Ion Chromatography B8	Y
Nitrate (as NO3)	9.14	mg/l NO3			Ion Chrom. / Calculated B8 / Calcn	Y
Sulphate	17.9	mg/l			Ion Chromatography B8	Y
Total Organic Carbon (as NPOC)	3.43	mg/l C			Digestion / IR B17	Y
Sodium	15.8	mg/l			Ion Chromatography B9	Y
Magnesium	9.24	mg/l			Ion Chromatography B9	Y
Potassium	0.78	mg/l			Ion Chromatography B9	Y
Calcium	81.0	mg/l			Ion Chromatography B9	Y
Total Hardness (as CaCO3)	240	mg/l CaCO3			Calculated B9	Y
Alkalinity - total (as CaCO3)	248	mg/l CaCO3			Titrimetry B6	Y

Signed:

Peter Webster Regional Chemist

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CORK REGIONAL INSPECTORATE  
INNISCARRA, Co. CORK

Tel: 021-4875540 Fax: 021-4875545

Page 1 of 1

Issued: 06/11/2009

**Final Test Report**

**Report No: 292225 / 1**

Client: OEE Enforcement Admin (Cork)  
 Sample: **292225** Location: **Mr. Binman (Luddenmore) GW2**  
 Licence No. W0061-02 (formerly W 61-2 ) Issued by Env. Protection Agency  
 Description: Waste facility groundwater Flow:  
 Sampled 13/10/2009 at 1025 by DG Sampled as: Grab sample Split sample: No  
 Received: 13/10/2009  
 Remarks:

Determination	Result	Units	Spec Limits	Status	Method Description & EPA Method No.	Result Accred
pH	7.16	pH units			Electrometry B3	Y
pH measured at:	19.7	°C			Thermometry B3	N
Conductivity @25C (Temp Comp)	911	µS/cm			Electrometry B4	Y
Ammonia - Total (as N)	0.032	mg/l N			Colorimetry (Aquakem) B48	Y
Total Phosphorous	0.010	mg/l P			Digest / Colorimetry B53	Y
Fluoride	0.10	mg/l			Ion Chromatog B8	Y
Total Nitrogen	3.49	mg/l N			Digest / Colorimetry B36	Y
Chloride	49.8	mg/l			Ion Chromatography B8	Y
Nitrate (as NO3)	12	mg/l NO3			Ion Chrom. / Calculated B8 / Calcn	Y
Sulphate	59.8	mg/l			Ion Chromatography B8	Y
Total Organic Carbon (as NPOC)	2.17	mg/l C			Digestion / IR B17	Y
Sodium	24.6	mg/l			Ion Chromatography B9	Y
Magnesium	12.1	mg/l			Ion Chromatography B9	Y
Potassium	1.45	mg/l			Ion Chromatography B9	Y
Calcium	153	mg/l			Ion Chromatography B9	Y
Total Hardness (as CaCO3)	432	mg/l CaCO3			Calculated B9	Y
Alkalinity - total (as CaCO3)	360	mg/l CaCO3			Titrimetry B6	Y

Signed:

Peter Webster Regional Chemist

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Issue 7, Revised 06/02/09



# TEST REPORT

Analysing  
Testing  
Consulting  
Calibrating



**Client: Mr. Binman Ltd**  
**Luddenmore**  
**Grange**  
**Kilmallock**  
**Co.Limerick**

**FTAO: Peter Murphy**

**BHP Ref. No.: 87129.1**  
**Order No:**  
**Date Received: 01/07/09**  
**Date Completed: 21/07/09**  
**Test Specification: Nil**  
**Item :See below**

**BHP**  
New Road  
Thomondgate  
Limerick  
Ireland  
Tel +353 61 455399  
Fax + 353 61 455447  
E Mail bhpccm2@bhp.ie

TEST	Client Reference	Units	Results	Standard Reference
	<b>GW1</b> <b>30.06/2009</b>			
pH		mg/l	7.23	APHA - 4500 - H
Conductivity		µS/cm <sup>2</sup>	547	APHA - 2510 - B
Total Nitrogen (as N)		mg/l	1	APHA - 4500 - N - C
Ammonia (as N)		mg/l	0.01	APHA - 4500-NH - D
Total Phosphorus (as P)		mg/l	0.18	APHA - 4500 - P
T.O.C		mg/l	3.2	APHA - 5310 - C

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**Additional Information:**

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**Authorised by:**

Pat O'Sullivan

**Date of Issue: 21st July 2009**

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21/07/09

# TEST REPORT

Analysing  
Testing  
Consulting  
Calibrating



**Client: Mr. Binman Ltd**  
**Luddenmore**  
**Grange**  
**Kilmallock**  
**Co.Limerick**

**BHP Ref. No.: 87129.2**  
**Order No:**  
**Date Received: 01/07/09**  
**Date Completed: 21/07/09**  
**Test Specification: Nil**  
**Item :See below**

BHP  
New Road  
Thomondgate  
Limerick  
Ireland  
Tel +353 61 455399  
Fax + 353 61 455447  
E Mail bhpccm2@bhp.ie

**FTAO: Peter Murphy**

TEST	Client Reference	Units	Results	Standard Reference
	GW2 30/06/2009			
pH		mg l	7.15	APHA - 4500 - H
Conductivity		uScm <sup>-1</sup>	810	APHA - 2510 - B
Total Nitrogen (as N)		mg l	0.1	APHA - 4500 - N - C
Ammonia (as N)		mg l	0.01	APHA - 4500 - NH - D
Total Phosphorus (as P)		mg l	0.1	APHA - 4500 - P
T.O.C		mg l	4.5	APHA - 5310 - C

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## Appendix 3

# EPA Further Information Request

## Article 12 Compliance Requirements

### Response to Item 3

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## Article 12 Compliance Requirements

- 3 Provide information on the percolation area associated with the waste water treatment plant e.g. design specification. Provide information showing that the percolation area will be appropriately constructed and sized to deal with emissions from the waste water treatment plant.

The proposed filter system for the treated effluent is a sand filter. This has been designed as per the EPA Code of Practice: "Wastewater Treatment and Disposal Systems Serving Single Houses". See Appendix A for sand filter calculation.

Sand polishing filters comprise stratified sand filters (please refer to drawing 091-135-006 and 007). In a typical layout, three layers of sand decreasing in coarseness with depth are separated from each other by thin layers of washed pea-sized gravel. The surface layer comprises a pea-sized gravel, e.g. 10-20 mm gravel aggregate of 100 mm thickness in which pressure distribution pipes are placed overlain by a geotextile and soil cover. The gravel layer serves to distribute the secondary effluent evenly over the underlying sand layer. The top layer of sand is a 200 mm thick layer of 0.4 - 1.4 mm coarse sand. This rests on a 75 mm layer of pea-sized gravel (10-20mm). The middle sand layer is 150 mm of medium-fine sand 0.1-0.5 mm. This layer rests on a 75 mm layer of pea-sized gravel (10-20mm). The bottom sand layer is a 150 mm layer of fine sand 0.1-0.5 mm. This layer rests on a 100 mm layer of pea-sized gravel (5-10mm), which is underlain by a layer of graded gravel (10-20mm). A thin (50 mm) layer of sand below the graded gravel protects the geotextile from damage.

Through a search of the Limerick County Council online planning facility, it was found that an adjacent site had a T value of 7 which would suggest a silty clayey sand that compares with the limestone tills found during site investigation.

Hydraulic loading of 20l/m<sup>2</sup>/day, (suitable for P/T values between 3 and 20) was used for sizing the sand filter as per table 8.2 of the EPA Code of Practice: "Wastewater Treatment and Disposal Systems Serving Single Houses". This results in an area of 961m<sup>2</sup>.

The volume of treated effluent from the treatment plant entering the sand filter is 18.9m<sup>3</sup>.

**Appendix A**  
**Sand Filter Calculation**

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### Sand Filter Calculation

As per table 8.2 of the Code of Practice: Wastewater Treatment and Disposal Systems Serving Single Houses

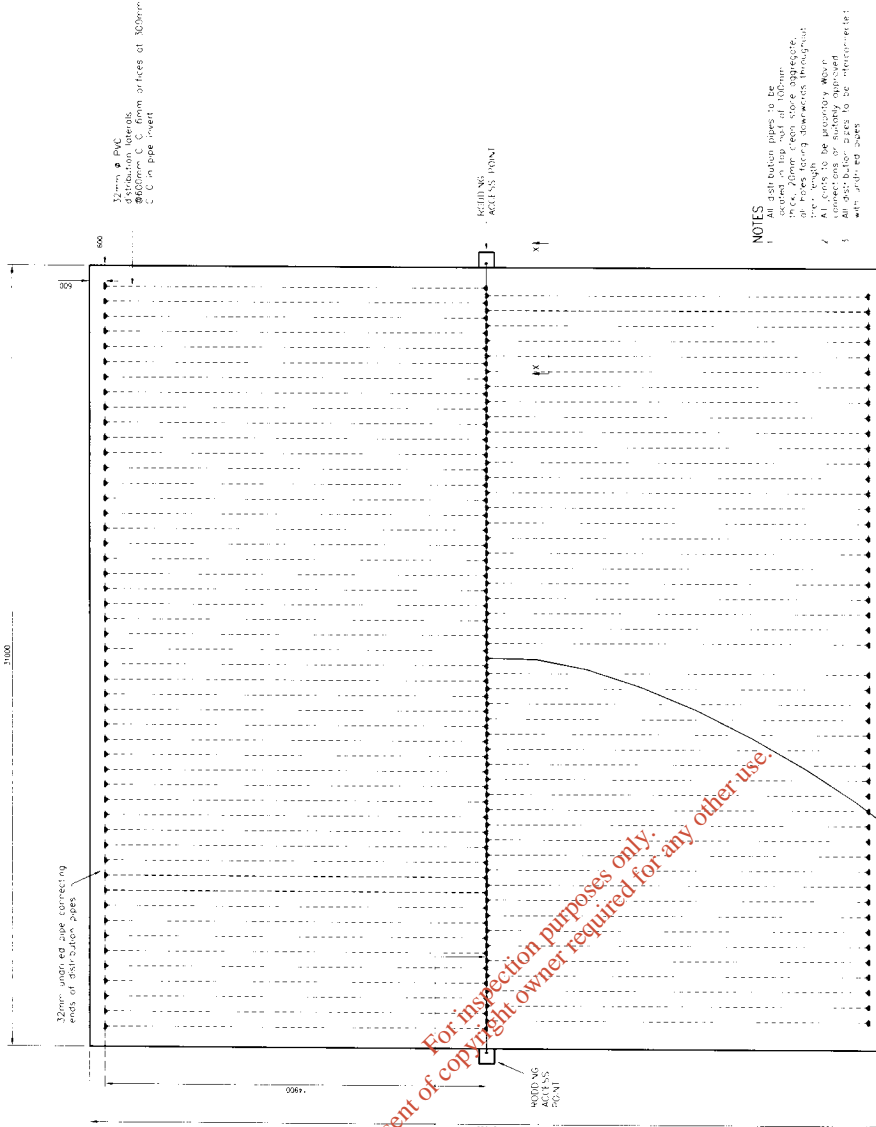
Hydraulic Loading =  $20\text{l/m}^2\cdot\text{d}$  (suitable for P/T values between 3 and 20)

Loading Rate from Treatment Plant =  $18.9\text{m}^3/\text{day} \Rightarrow 18,900\text{l/day}$

Sand Filter Area =  $18,900\text{l/day} / 20\text{l/m}^2\cdot\text{d}$   
=  $945\text{m}^2$   
 $\Rightarrow$  Plan area =  $31\text{m} \times 31\text{m}$

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**NOTES**

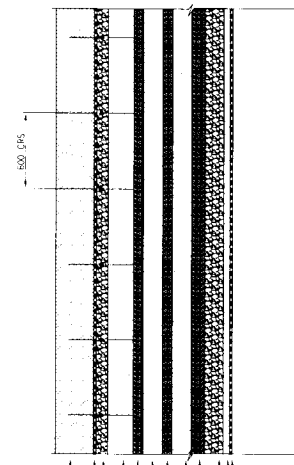
- All distribution pipes to be corrected in respect of 12mm undrain pipe.
- 12mm undrain pipes to be corrected by PVC distribution laterals.
- 12mm undrain pipes to be corrected by PVC distribution laterals.
- All distribution pipes to be interconnected with undrain pipes.

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**SAND FILTER**  
SCALE 1:100

Revised from Building Station

SAND FILTER TO BE CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE EPA



**SECTION X-X : SAND FILTER**  
SCALE 1:20

**NOTE:**  
Impermeable liner required on each side of the sand filter

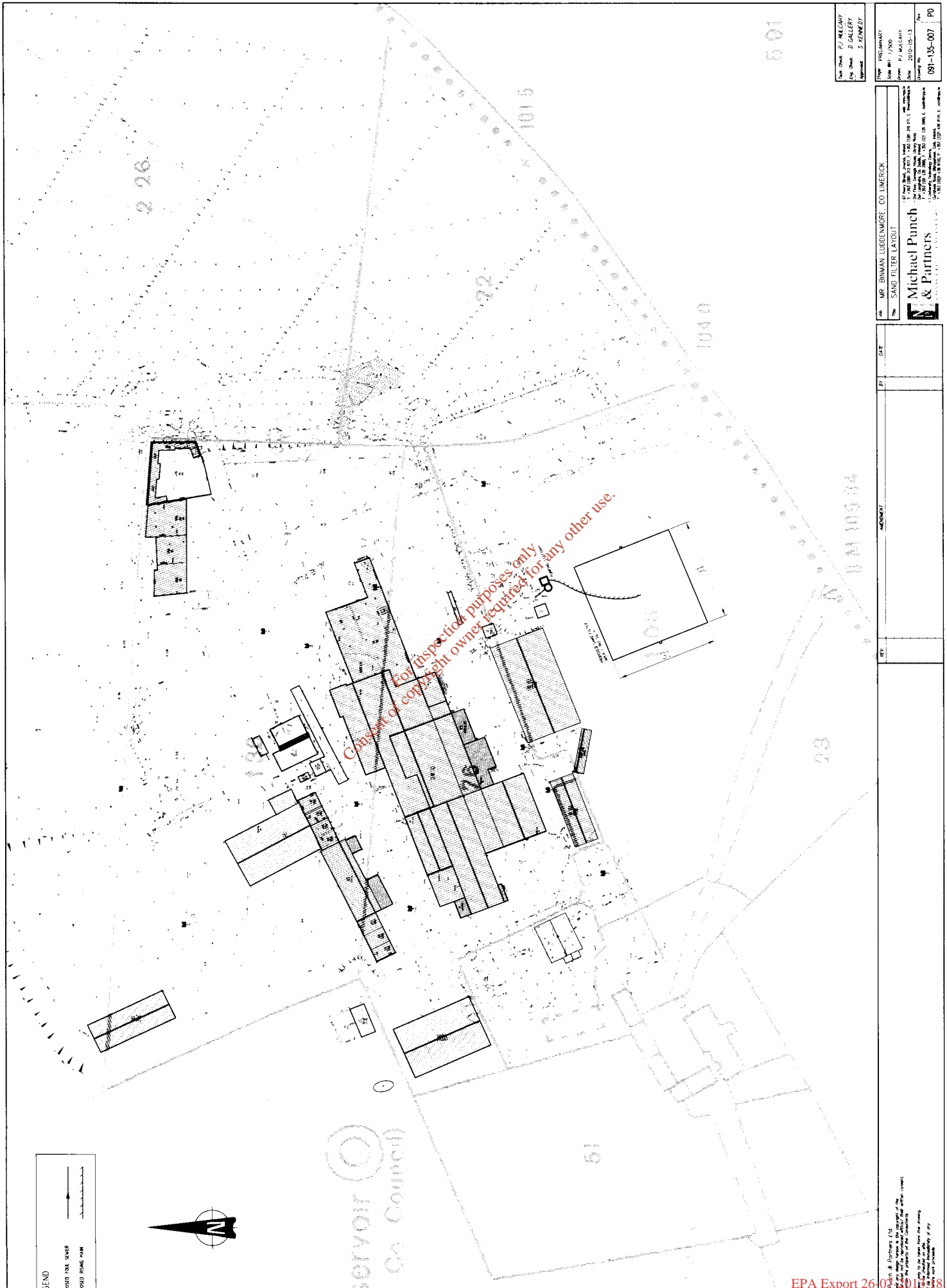
- Notes:**
- 1. 150mm SAND (0.4 - 1.4 mm)
  - 2. 75mm SAND (0.075 - 0.25 mm)
  - 3. 15mm FINE GRADE (0.075 - 0.25 mm)
  - 4. 15mm FINE GRADE (0.075 - 0.25 mm)
  - 5. 15mm FINE GRADE (0.075 - 0.25 mm)
  - 6. 15mm FINE GRADE (0.075 - 0.25 mm)
  - 7. 15mm FINE GRADE (0.075 - 0.25 mm)
  - 8. 15mm FINE GRADE (0.075 - 0.25 mm)
  - 9. 15mm FINE GRADE (0.075 - 0.25 mm)
  - 10. 15mm FINE GRADE (0.075 - 0.25 mm)

Site: 091-135-006 P0  
 Date: 2010-05-12  
 Drawn: P. J. Mully  
 Checked: S. J. Mully  
 Approved: S. J. Mully

MR. BINMAN LUDDENRICE, CO. LIMERIC  
 SAND FILTER DETAILS

**Michael Punch & Partners**  
 CONSULTANTS

1. 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000



LEGEND	
PROPERTY LINE	---
SEWER	—●—
ROCK PILING	—x—x—



Date: 05/11/2010  
 Drawn: P.J. WALSH  
 Title: SAND FILTER LAYOUT  
 Project: 091-135-007  
 Sheet: P0

MICHAEL PUNCH & PARTNERS  
 1000 WEST 10TH STREET, SUITE 200  
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DATE	BY	DESCRIPTION

# Appendix 4

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LOCATION OF ABSTRACTION BOREHOLES ARE TAKEN FROM E-PLAN MAPPING ON LIMERICK COUNTY COUNCIL WEBSITE

LUDDENMORE GROUPWATER SUPPLY SCHEME ABSTRACTION BOREHOLE GWSS1

LUDDENMORE GROUPWATER SUPPLY SCHEME ABSTRACTION BOREHOLE GWSS2

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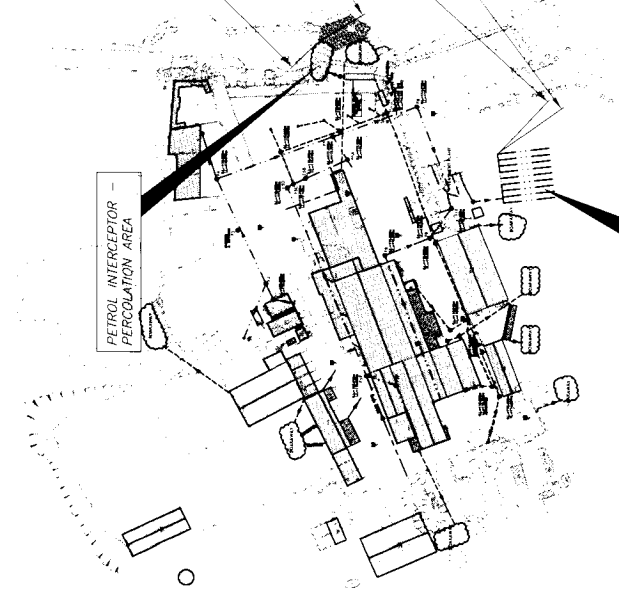
4.19m

5.00m

3.00m

PETROL INTERCEPTOR - PERCOLATION AREA

WASTEWATER TREATMENT PLANT - PERCOLATION AREA



Prepared by: P.J. Murphy  
 Checked by: Francis Judge  
 Approved: Gerald Kennedy

MR BIRMAN DRAINAGE STUDY: LUDDENMORE BRANICE CO LINE  
 LOCATION OF GWS ABSTRACTION BOREHOLES

Michael Punch & Partners  
 Environmental Engineers  
 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100

REF	DESCRIPTION	DATE

Michael Punch & Partners, Ltd  
 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100

# Appendix 5

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## Capacity Assessment

### Introduction

As part of the response to the further information request from the Agency dated 27<sup>th</sup> April 2010, this section was revised to address Item 5 follows:

*“5. Assess the capacity of the facility to process the requested waste tonnages(200,000 tonnes per annum). Assess the capacity to process waste with regard to the current and requested site hours of operation.”*

As part of the original application the duty and standby capacities were requested to be calculated for the facility with the proposed changes to demonstrate that the facility is capable of processing or transferring up to 200,000 tonnes of waste.

In line with the further information requested, the capacities of the different areas of the facility were reviewed in this report and the assessment takes account of continuous improvement projects implemented on-site since the original application was submitted.

Operations are divided into the following main areas:

- MBT Recovery Plant/Transfer Station
- Dry Recyclables Sorting/Transfer
- Glass Recycling
- Commercial Waste Recycling
- C&D Recycling
- Timber Recycling

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## **MBT Plant / Transfer Station**

Domestic and Commercial Municipal solid waste from kerbside collections is processed in the Mechanical Biological Treatment Plant (MBT). The MBT plant mechanically separates waste into three fractions which are suitable for recovery.

- 0 - 60 mm - the organic waste fines; mainly organic material suitable for biostabilisation in an AD/composting facility.
- 60 - 180 mm – the undersize fraction; contains ferrous and non-ferrous metal which are removed via magnets and eddy current separators
- > 180 mm – the oversize fraction; contains light papers and plastics removed via wind shifters and baled for export as Refuse Derived Fuel.

The residual waste from the mechanical separation process is sent to landfill via refuse compactors in the transfer station. The refuse compactors in the transfer station can accept waste independently i.e. directly via transfer shed floor.

### **Capacity of MBT Plant**

<b><u>Current Capacity</u></b>	<b><u>Proposed Capacity</u></b>
67.5 hrs per week	72 hrs per week
50t/h	50 t/h
95% processing up-time	95% processing up-time
3,206t/week	3,420t/week
166,725t/annum	177,840t/annum

In 2009 this section of the facility processed approximately 83,000 tonnes of waste but it has the capacity to treat a greater quantity should the waste become available. There is ample standby capacity for maintenance purposes.

With respect to the requested 200,000t/annum, it is anticipated that, with no other changes, this part of the plant may process up to 145,000t/a of the 200,000t/a. However, with the increase in source separated collections of organic waste, the proposed tonnage of waste for processing through this part of the facility is likely to be reduced over time.

The extensions to the hours of waste acceptance and to the hours of operation were requested to facilitate the collection and return of waste to the facility.

### **Transfer Station**

In the event of the MBT Plant not being available, waste may be transferred from the facility through the transfer station. The MBT plant can be bypassed and waste will be loaded into the compactors. Both the MBT Plant and Transfer Station may be operated independently, if required. There are two compactors available at any given time to compact all residual waste from the MBT processing and the transfer station floor.

It is anticipated that the quantity of source separated organic waste will increase over time and there is a dedicated bay available in the transfer area for source separated organic waste.

## Capacity of Transfer Station

<u>Current Capacity</u>	<u>Proposed Capacity</u>
67.5 hrs per week	72 hrs per week
100t/h	100 t/h
95% processing up-time	95% processing up-time
6,412t/week	6,840t/week
333,450t/annum	355,680t/annum

Each compactor in the transfer station has the duty capacity to process 50 tonnes per hour providing a capacity of up to 333,450t/a for the current operating hours or 355,680t/a for the requested operating hours.

With continuous improvements to the MBT treatment process, it is anticipated that the residual waste for disposal to landfill via the transfer station will be less than 15% or 30,000t/a. In addition, waste streams for recovery can be transferred through the transfer station such as source separated organic waste, which is likely to increase over time. This is a fraction of the total waste capacity of the transfer station.

In the worst case scenario that the MBT process equipment or other recovery plant is not available on-site the transfer station has the capacity to handle more the requested 200,000t/a, if required, with ample spare capacity to allow for down-time operations.

During normal operation of the facility, both the transfer area, MBT equipment and the compactors operate as a unit for all residual waste. Therefore the formulae provided in the USEPA document "Waste Transfer Stations: A Manual for Decision Making" cannot be applied directly.

However, reference is made in this document to estimating the tipping floor space required to store a full days waste in the unlikely event of a complete failure of all equipment. Since the original submission additional enclosed waste storage capacity has been provided(e.g. recyclable waste storage area). Based on the requested hours of operation and the requested waste tonnage for up to 200,000t/a, it can be assumed that, worst case scenario, storage space may be required for 464 tonnes (based on 145,000t/a mixed waste). Based on the formula referenced in the USEPA document, and assuming the waste is piled 12 feet high, the required floor space is calculated to be 6640 sq. feet. The available storage space currently available is approximately 7,670 sq. feet.



## **Dry Recyclables Sorting/Transfer**

The site has a capability to process dry recyclables through a sorting station or picking line. Since the application was submitted this equipment was modified to provide further flexibility for this equipment in order to optimise recovery of materials. In addition, since the application, a fully enclosed storage area was developed for storage and transfer of materials suitable for recycling/recovery.

### **Capacity for Dry Recyclables**

<b><u>Current Capacity</u></b>	<b><u>Proposed Capacity</u></b>
67.5 hrs per week	72 hrs per week
4.5t/h	4.5 t/h
95% processing up-time	95% processing up-time
289t/week	308t/week
15,005t/annum	16,006t/annum

The sorting station has a current capacity of approximately 15,005t/annum based on existing operating hours and this will increase to 16,006t/a for the requested operating hours. It is anticipated that the facility will accept approximately 21,398t/annum of loose dry recyclables at full capacity (200,000t/annum). The storage area is designed to allow transfer dry recyclable materials through the on-site sorting station or off-site for further processing.

It is anticipated that at the requested capacity of 200,000t/annum, the facility will accept approximately 68.58t/day of dry recyclable waste. Based on the USEPA formula for calculating tipping/holding areas, the floor space required is 5,371sq. feet, assuming waste is piled 6 feet high. The floor space available is approximately 5,595sq. feet providing adequate capacity for the storage/transfer area.

## **Glass Recycling**

Since the original review application was made the capacity of the glass equipment in the glass plant was optimised. This is reflected in the current capacity based on current operating hours and proposed operating hours below.

<b><u>Current Capacity</u></b>	<b><u>Proposed Capacity</u></b>
67.5 hrs per week	72 hrs per week
7t/h	7t/h
95% processing up-time	95% processing up-time
449t/week	479t/week
23,341t/annum	24,898t/annum

With respect to the requested 200,000t/a for the site, the glass equipment has ample capacity to process at least 20,000t/a of glass into high quality colour separated cullet for reuse back in the glass bottle manufacturing industry.

### **Commercial Waste Processing Area**

This area consists of two balers with a waste acceptance area which was recently expanded to facilitate acceptance of segregated commercial waste such as cardboard, paper, etc.

<b><u>Current Capacity</u></b>	<b><u>Proposed Capacity</u></b>
67.5 hrs per week	72 hrs per week
10 t/h	10t/h
95% processing up-time	95% processing up-time
641t/week	684t/week
33,345t/annum	35,568t/annum

At the requested 200,000t/a, there is ample spare capacity available in this part of the facility to handle the proposed quantities of segregated commercial waste.

### **C&D/Timber Waste Recycling Area**

#### **C&D Recycling Plant Capacity**

<b><u>Current Capacity</u></b>	<b><u>Proposed Capacity</u></b>
67.5 hrs per week	72 hrs per week
30t/h	30t/h
95% processing up-time	95% processing up time
1,924t/week	2,052t/week
100,035t/annum	106,704t/annum

With respect to the requested 200,000t/a, the quantities of C&D material for recycling to be accepted at the facility is relatively small at approximately 6,000t/a compared with the available capacity with regard to the proposed hours of operation.

#### **Timber Recycling Plant Capacity**

<b><u>Current Capacity</u></b>	<b><u>Proposed Capacity</u></b>
67.5 hrs per week	72 hrs per week
10t/h	10t/h
95% processing up-time	95% processing up-time
1,924t/week	684t/week
33,345t/annum	35,568t/annum

With respect to the requested 200,000t/a, the quantities of timber for recycling to be processed at the facility is anticipated to be relatively small compared with the available capacity with regard to the proposed hours of operation.