

Attachments

Attachment 1

EPA Application Form

4. Activity and Capacity

4.6.2 - Raw Materials, Intermediates and Products - Attachment

Organisation Name:

William Connolly & Sons Unlimited Company

Application I.D.:

LA001443 / P1069-01

4. Activity and Capacity

4.6. Raw Materials, Intermediates and Products

Details of Process related Raw Materials, Intermediates, Products, etc., used or generated on the site *

Complete the table below for all process related raw materials, intermediates, products, etc., used or generated on the site **Note 1** - See notes below table for further information

Note: Add additional rows in to this table if required. (Please copy the existing formatting into added rows).

Ref. No. or Code	Material/ Substance ⁽²⁾	CAS Number	Danger Category ⁽³⁾	Amount Stored (tonnes)	Annual Usage (tonnes)	Nature of Use	Hazard Statement ⁽⁴⁾	Odour		
								Odourous Yes/No	Description	Threshold µg/m ³
FZ022	NPK Fertiliser 0:7:30 (500 KGS)	N/A - Mixtures	Not classified - N/A	2.0	varies	Stored onsite resale	H272, H302, H319	No	n/a	n/a
FZ080	NPK Fertiliser 7:6:17 +SULPHATE OF POTASH (50 KGS)	N/A - Mixtures	Not classified - N/A	2.4	varies	Stored onsite resale	H272, H302, H318, H319	No	n/a	n/a
FZ100	NPK Fertiliser 10:10:20 (50KG)	N/A - Mixtures	Not classified - N/A	0.1	varies	Stored onsite resale	H272, H302, H319	No	n/a	n/a
FZ140	NPK Fertiliser 18:6:12 +SULPHUR (50 KGS)	N/A - Mixtures	Not classified - N/A	0.1	varies	Stored onsite resale	H272, H302, H319	No	n/a	n/a
FZ144	NPK Fertiliser 18:6:12 +SULPHUR (500 KGS)	N/A - Mixtures	Not classified - N/A	2.0	varies	Stored onsite resale	H272, H302, H319	No	n/a	n/a
FZ170	NPK Fertiliser 24:2.5:10 (50 KGS)	N/A - Mixtures	Not classified - N/A	0.75	varies	Stored onsite resale	H272, H302, H319	No	n/a	n/a
FZ177	NPK Fertiliser 24:2.2:4.5 (500KGS)	N/A - Mixtures	Not classified - N/A	6.0	varies	Stored onsite resale	H272, H302, H319	No	n/a	n/a
FZ190	NPK Fertiliser 27:2.5:5 (50 KGS)	N/A - Mixtures	Not classified - N/A	1.15	varies	Stored onsite resale	H272, H302, H319	No	n/a	n/a
FZ192	NPK Fertiliser 27:2.5:5 (500 KGS)	N/A - Mixtures	Not classified - N/A	8.0	varies	Stored onsite resale	H272, H302, H319	No	n/a	n/a
FZ220	Fertiliser 21% SULPHATE OF AMMONIA (50 KGS)	7783-20-2	Not Classified	1.35	varies	Stored onsite resale	Not Classified	No	n/a	n/a
FZ252	Fertiliser 26.6% NITROGEN +SULPHUR (500 KGS)	15245-12-2 + 10043-01-0	Not classified - N/A	2.0	varies	Stored onsite resale	H272, H319	No	n/a	n/a
FZ260	Fertiliser 27% NITROGEN (50 KGS)	15245-12-2	Not classified - N/A	0.1	varies	Stored onsite resale	H272, H319	No	n/a	n/a
FZ340	Fertiliser 46% GRANULATED UREA (50 KGS)	57-13-6	Not Classified	2.65	varies	Stored onsite resale	Not Classified	Yes	Ammonia odour	n/a
FZ362	Fertiliser 50% MURIATE OF POTASH (500 KGS)	7447-40-7	None	1.0	varies	Stored onsite resale	N.A.	NO	n/a	n/a

Raw Materials, Intermediates and Products cont...

Ref. No. or Code (repeated)	Pollutants (Tick and specify Group/Family Number)				Controlled Substances REACH SVHC ⁽⁶⁾	Relevant hazardous substance? ⁽⁷⁾ Yes/No
	EC EO (Surface Waters) Regulations 2009		EC EO (Groundwater) Regulations 2010			
	Specific pollutants	Priority (hazardous) substances	Hazardous ⁽⁵⁾	Non- hazardous ⁽⁵⁾		
FZ022	n/a	n/a	n/a	n/a	n/a	No
FZ080	n/a	n/a	n/a	n/a	n/a	No
FZ100	n/a	n/a	n/a	n/a	n/a	No
FZ140	n/a	n/a	n/a	n/a	n/a	No
FZ144	n/a	n/a	n/a	n/a	n/a	No
FZ170	n/a	n/a	n/a	n/a	n/a	No
FZ177	n/a	n/a	n/a	n/a	n/a	No
FZ190	n/a	n/a	n/a	n/a	n/a	No
FZ192	n/a	n/a	n/a	n/a	n/a	No
FZ220	n/a	n/a	n/a	n/a	n/a	No
FZ252	n/a	n/a	n/a	n/a	n/a	No
FZ260	n/a	n/a	n/a	n/a	n/a	No
FZ340	n/a	n/a	n/a	n/a	n/a	No
FZ362	n/a	n/a	n/a	n/a	n/a	No

4.6. Raw Materials, Intermediates and Products

Details of Process related Raw Materials, Intermediates, Products, etc., used or generated on the site *

Complete the table below for all process related raw materials, intermediates, products, etc., used or generated on the site **Note 1** - See notes below table for further information

Note: Add additional rows in to this table if required. (Please copy the existing formatting into added rows).

Ref. No. or Code	Material/ Substance ⁽²⁾	CAS Number	Danger Category ⁽³⁾	Amount Stored (tonnes)	Annual Usage (tonnes)	Nature of Use	Hazard Statement ⁽⁴⁾	Odour		Threshold µg/m3
								Odourous Yes/No	Description	
FZ401	Fertiliser SULPHATE OF IRON (25 KGS)	7782-63-0	Warning	0.10	varies	Stored onsite resale	H290, H302, H315, H317, H319	No	n/a	n/a
LPG	LPG	68476-85-7	Danger (Flammable, Gas under Pressure, Serious Health hazard)	<25	varies	heating of dryers, (soon to be boilers)	H220, H224, H280, H332 H340, H350, H360, H370, H373	Yes	Distinctive when stench	
MGO/Diesel	Marked Gas Oil / Diesel	68814-87-9	Danger (Flammable, Serious Health hazard, Health hazard, Hazardous to the Environment)	<80	varies	heating of boilers, road diesel	H226, H304, H332, H373, H411	Yes	Oil smell	~

The details provided should be very comprehensive, all materials used, fuels, intermediates, laboratory chemicals and product should be included. Particular attention should be paid to materials and product consisting of, or containing, dangerous substances as described in the EU (Classification, Packaging, Labelling and Notification of Dangerous Substances) Regulations 2003 [SI 116/2003] as amended and Regulation (EC) No. 1272/2008. The list must classify these materials in accordance with both of these Regulations, and must specify the designated Hazard Statements. Hazard statements for each substance should be in accordance with Article 21 of the EC Regulation 1272/2008.

The list must identify any Substances of Very High Concern (SVHC) listed in Annex XIV of the REACH Regulations (Regulation (EC) No 1907/2006) as amended and indicate whether the use has been authorised or is exempted in accordance with the Regulation. In the case(s) of exempted use(s) the list must state the basis for each intended exempted use concerned.

2 In cases where a material comprises a number of distinct and available dangerous substances, please give details for each component substance.

3 Article 2(2) of S.I. No. 116/2003.

4 EC Regulation 1272/2008 (Chemicals Act 2008 (13 of 2008) and 2010)

5 The EPA Classification of Hazardous and Non-Hazardous Substances in Groundwater, December 2010.

6 Where relevant, specify whether the substance is on the Authorisation List (Annex XIV Regulation (EC) No 1907/2006 as amended) or

Raw Materials, Intermediates and Products cont...

Ref. No. or Code (repeated)	Pollutants (Tick and specify Group/Family Number)				Controlled Substances REACH SVHC ⁽⁶⁾	Relevant hazardous substance? ⁽⁷⁾ Yes/No
	EC EO (Surface Waters) Regulations 2009		EC EO (Groundwater) Regulations 2010			
	Specific pollutants	Priority (hazardous) substances	Hazardous ⁽⁵⁾	Non- hazardous ⁽⁵⁾		
FZ401						No
LPG			Petroleum Distillate		Gases (Petroleum)	Yes
MGO/Diesel		PAHs	Diesel, Petroleum Distillate		Petroleum Distillate	Yes

4. Activity and Capacity

4.6. Raw Materials, Intermediates and Products

Details of Process related Raw Materials, Intermediates, Products, etc., used or generated on the site

Complete the table below for all process related raw materials, intermediates, products, etc., used or generated on the site **Note 1** - See notes below table for further information

Note: Add additional rows in to this table if required. (Please copy the existing formatting into added rows).

Ref. No. or Code	Material/ Substance ⁽²⁾	CAS Number	Danger Category ⁽³⁾	Amount Stored (tonnes)	Annual Usage (tonnes)	Nature of Use	Hazard Statement ⁽⁴⁾	Odour		
								Odourous Yes/No	Description	Threshold µg/m3
HS1	Nitrogen Gas	N/A	N/A	Varies	Varies	Packaging	N/A	No	N/A	N/A
HS2	Sunflower Extractions	N/A	N/A	Varies	Varies	Animal Feed	N/A	No	N/A	N/A
HS3	Lubricant Oil	91745-46-9	Flammable, Harmful,	Varies	Varies	Gear Lubricant	H226, H302	Yes	Mineral Oil	None
HS4	Silicone Neutral Transparent	68855-24-3 22984-54-9 96-29-7 1760-24-3 2224-33-1	Irritant	Varies	Varies	Sealant	H318, H317, H351, H413	Yes	Sharp Vinegar Smell	None
HS5	Gas Oil - Diesel	68814-87-9	Harmful, Irritant,	Varies	Varies	Fuel	H226, H304	No	Light Fuel Oil Smell	None
HS6	Grease	8052-42-4	Corrosive	Varies	Varies	Automotive and Industrial Grease	N/A	No	Light Fuel Oil Smell	None
HS7	Hydraulic Oil	N/A	Hazardous to aquatic organisms	Varies	Varies	Hydraulic Fluid	N/A	No	Light Fuel Oil Smell	None
HS8	Wheat Gluten Feed Meal	N/A	N/A	Varies	Varies	Animal Feed	N/A	No	N/A	None
HS9	Citrus Pulp, Dried Pellets	N/A	N/A	Varies	Varies	Animal Feed	N/A	Yes	Pleasant , Sweet Odour	None
HS10	Feed Barley	N/A	N/A	Varies	Varies	Animal Feed	N/A	No	N/A	None
HS11	Feed Wheat	N/A	N/A	Varies	Varies	Animal Feed	N/A	Yes	Pleasant , Grainy Odour	None
HS12	Maize	N/A	N/A	Varies	Varies	Animal Feed	N/A	Yes	Pleasant , Grainy Odour	None

Raw Materials, Intermediates and Products cont...

Ref. No. or Code (repeated)	Pollutants (Tick and specify Group/Family Number)				Controlled Substances REACH SVHC ⁽⁶⁾	Relevant hazardous substance? ⁽⁷⁾ Yes/No
	EC EO (Surface Waters) Regulations 2009		EC EO (Groundwater) Regulations 2010			
	Specific pollutants	Priority (hazardous) substances	Hazardous ⁽⁵⁾	Non- hazardous ⁽⁵⁾		
HS1	N/A	N/A	N/A	N/A	N/A	No
HS2	N/A	N/A	N/A	N/A	N/A	No
HS3	N/A	N/A	✓		N/A	Yes
HS4	N/A	N/A	✓		N/A	Yes
HS5	N/A	N/A	✓		N/A	Yes
HS6	N/A	N/A	✓		N/A	Yes
HS7	N/A	N/A	✓		N/A	Yes
HS8	N/A	N/A	N/A	N/A	N/A	No
HS9	N/A	N/A	N/A	N/A	N/A	No
HS10	N/A	N/A	N/A	N/A	N/A	No
HS11	N/A	N/A	N/A	N/A	N/A	No
HS12	N/A	N/A	N/A	N/A	N/A	No

4.6. Raw Materials, Intermediates and Products

Details of Process related Raw Materials, Intermediates, Products, etc., used or generated on the site

Complete the table below for all process related raw materials, intermediates, products, etc., used or generated on the site **Note 1** - See notes below table for further information

Note: Add additional rows in to this table if required. (Please copy the existing formatting into added rows).

Ref. No. or Code	Material/ Substance ⁽²⁾	CAS Number	Danger Category ⁽³⁾	Amount Stored (tonnes)	Annual Usage (tonnes)	Nature of Use	Hazard Statement ⁽⁴⁾	Odour		
								Odourous Yes/No	Description	Threshold µg/m3
HS13	Soya meal dehulled	N/A	N/A	Varies	Varies	Animal Feed	N/A	Yes	Earthy, Natural Odour	None
HS14	Maize Gluten Meal Feed	N/A	N/A	Varies	Varies	Animal Feed	N/A	Yes	Pleasant , Grainy Odour	None
HS15	Maize Distillers	N/A	N/A	Varies	Varies	Animal Feed	N/A	Yes	Pleasant , Grainy Odour	None
HS16	Rapeseed meal extractions	N/A	N/A	Varies	Varies	Animal Feed	N/A	No	N/A	N/A
HS17	Soya (bean) Hulls	N/A	N/A	Varies	Varies	Animal Feed	N/A	Yes	Earthy, Natural Odour	None
HS18	Dried (sugar) Beet Pulp Pellets	N/A	N/A	Varies	Varies	Animal Feed	N/A	No	N/A	N/A
HS19	Molashine	N/A	N/A	Varies	Varies	Animal Feed	N/A	Yes	Pleasant , Grainy Odour	None
HS20	Standard Molasses	N/A	N/A	Varies	Varies	Sugars	N/A	Yes	Sweet, Pleasant Odour	None
HS21	Vegetable Oil Blend	N/A	N/A	Varies	Varies	Animal Feed	N/A	No	N/A	N/A
HS22	Calcium Carbonate	N/A	N/A	Varies	Varies	Animal Feed	N/A	No	N/A	N/A
HS23	Whole Linseed	N/A	N/A	Varies	Varies	Animal Feed	N/A	Yes	Pleasant, Earthy Odour	None
HS24	Pollard–WheatFeed	N/A	N/A	Varies	Varies	Animal Feed	N/A	Yes	Pleasant, Grainy Odour	None
HS25	Beet Pulp	N/A	N/A	Varies	Varies	Animal Feed	N/A	Yes	Pleasant, Grainy Odour	None
HS26	Dicalphos	7757-93-9	N/A	Varies	Varies	Animal Feed	N/A	No	N/A	N/A

Raw Materials, Intermediates and Products cont...

Ref. No. or Code (repeated)	Pollutants (Tick and specify Group/Family Number)				Controlled Substances REACH SVHC ⁽⁶⁾	Relevant hazardous substance? ⁽⁷⁾ Yes/No
	EC EO (Surface Waters) Regulations 2009		EC EO (Groundwater) Regulations 2010			
	Specific pollutants	Priority (hazardous) substances	Hazardous ⁽⁵⁾	Non- hazardous ⁽⁵⁾		
HS13	N/A	N/A	N/A	N/A	N/A	No
HS14	N/A	N/A	N/A	N/A	N/A	No
HS15	N/A	N/A	N/A	N/A	N/A	No
HS16	N/A	N/A	N/A	N/A	N/A	No
HS17	N/A	N/A	N/A	N/A	N/A	No
HS18	N/A	N/A	N/A	N/A	N/A	No
HS19	N/A	N/A	N/A	N/A	N/A	No
HS20	N/A	N/A	N/A	N/A	N/A	No
HS21	N/A	N/A	N/A	N/A	N/A	No
HS22	N/A	N/A	N/A	N/A	N/A	No
HS23	N/A	N/A	N/A	N/A	N/A	No
HS24	N/A	N/A	N/A	N/A	N/A	No
HS25	N/A	N/A	N/A	N/A	N/A	No
HS26	N/A	N/A	N/A	N/A	N/A	No

4.6. Raw Materials, Intermediates and Products

Details of Process related Raw Materials, Intermediates, Products, etc., used or generated on the site

Complete the table below for all process related raw materials, intermediates, products, etc., used or generated on the site **Note 1** - See notes below table for further information

Note: Add additional rows in to this table if required. (Please copy the existing formatting into added rows).

Ref. No. or Code	Material/ Substance ⁽²⁾	CAS Number	Danger Category ⁽³⁾	Amount Stored (tonnes)	Annual Usage (tonnes)	Nature of Use	Hazard Statement ⁽⁴⁾	Odour		
								Odourous Yes/No	Description	Threshold µg/m3
HS27	Horse premixes, Dairy, Beef, poultry, and Pig Minerals – Pre-mixes	471-34-1, 67-97-0, 7695-91-2, 204-844-2/ 202-075-7/ 200-673-2, 68- 19-9, 513-79-1, 10102-18-8, 7789- 80-2, 7439-96-5, 1314-13-2, 7758- 99-8	N/A	Varies	Varies	Premix for inclusion into animal feed	N/A	Yes	Pleasant , Grainy Odour	None
HS28	Alfalfa	N/A	N/A	Varies	Varies	Animal Feed	N/A	Yes	Earthy, Natural Odour	None
HS29	Soyabean, dehulled, extracted, toasted & treated	N/A	N/A	Varies	Varies	Animal Feed	N/A	No	N/A	N/A
HS30	Sodium Chloride	7647-14-5	N/A	Varies	Varies	Animal Feed	N/A	No	N/A	N/A
HS31	Soya bean oil	N/A	N/A	Varies	Varies	Animal Feed	N/A	Yes	Earthy, Natural Odour	None
HS32	Soyabeans	N/A	N/A	Varies	Varies	Animal Feed	N/A	Yes	Pleasant, Grainy Odour	None
HS33	Oats	N/A	N/A	Varies	Varies	Animal Feed	N/A	No	N/A	N/A
HS34	Lime Flour – Calcined Magnesium	N/A	N/A	Varies	Varies	Animal Feed	N/A	Yes	Pleasant, Citrus Odour	None
HS35	Myco Curb	79-09-4	Irritant	<5	<20	Grain Additive	N/A	Yes	Earthy, Natural Odour	None
HS36	Whey	N/A	N/A	Varies	Varies	Animal Feed	N/A	Yes	Detergent Odour	None

Raw Materials, Intermediates and Products cont...

Ref. No. or Code (repeated)	Pollutants (Tick and specify Group/Family Number)				Controlled Substances REACH SVHC ⁽⁶⁾	Relevant hazardous substance? ⁽⁷⁾ Yes/No
	EC EO (Surface Waters) Regulations 2009		EC EO (Groundwater) Regulations 2010			
	Specific pollutants	Priority (hazardous) substances	Hazardous ⁽⁵⁾	Non- hazardous ⁽⁵⁾		
HS27	N/A	N/A	N/A	N/A	N/A	No
HS28	N/A	N/A	N/A	N/A	N/A	No
HS29	N/A	N/A	N/A	N/A	N/A	No
HS30	N/A	N/A	N/A	N/A	N/A	No
HS31	N/A	N/A	N/A	N/A	N/A	No
HS32	N/A	N/A	N/A	N/A	N/A	No
HS33	N/A	N/A	N/A	N/A	N/A	No
HS34	N/A	N/A		✓	N/A	No
HS35	N/A	N/A		✓	N/A	No
HS36	N/A	N/A	N/A	N/A	N/A	No

4.6. Raw Materials, Intermediates and Products

Details of Process related Raw Materials, Intermediates, Products, etc., used or generated on the site

Complete the table below for all process related raw materials, intermediates, products, etc., used or generated on the site **Note 1** - See notes below table for further information

Note: Add additional rows in to this table if required. (Please copy the existing formatting into added rows).

Ref. No. or Code	Material/ Substance ⁽²⁾	CAS Number	Danger Category ⁽³⁾	Amount Stored (tonnes)	Annual Usage (tonnes)	Nature of Use	Hazard Statement ⁽⁴⁾	Odour		
								Odourous Yes/No	Description	Threshold µg/m3
HS37	Locust Bean Meal	N/A	N/A	Varies	Varies	Animal Feed	N/A	Yes	Earthy, Natural Odour	None
HS38	Ad-Blue	57-13-6	N/A	Varies	Varies	Fuel Additive	H220, H280	Yes	Pungent Odour Resembling Rotting Vegetation	None
HS39	Flo-Gas	68476-85-7	Flammable	Varies	Varies	Fuel	N/A	Yes	Natural Gas Odour	None
HS40	Peas	N/A	N/A	Varies	Varies	Animal Feed	N/A	No	N/A	N/A
HS41	Field Beans	N/A	N/A	Varies	Varies	Animal Feed	N/A	No	N/A	N/A
HS42	Barley Distillers	N/A	N/A	Varies	Varies	Animal Feed	N/A	No	N/A	N/A

Raw Materials, Intermediates and Products cont...

Ref. No. or Code (repeated)	Pollutants (Tick and specify Group/Family Number)				Controlled Substances REACH SVHC ⁽⁶⁾	Relevant hazardous substance? ⁽⁷⁾ Yes/No
	EC EO (Surface Waters) Regulations 2009		EC EO (Groundwater) Regulations 2010			
	Specific pollutants	Priority (hazardous) substances	Hazardous ⁽⁵⁾	Non-hazardous ⁽⁵⁾		
HS37	N/A	N/A	N/A	N/A	N/A	No
HS38	N/A	N/A	✓		N/A	No
HS39	N/A	N/A	✓		N/A	Yes
HS40	N/A	N/A	N/A	N/A	N/A	Yes
HS41	N/A	N/A	N/A	N/A	N/A	No
HS42	N/A	N/A	N/A	N/A	N/A	No

4.6. Raw Materials, Intermediates and Products

Details of Process related Raw Materials, Intermediates, Products, etc., used or generated on the site

Complete the table below for all process related raw materials, intermediates, products, etc., used or generated on the site **Note 1** - See notes below table for further information

Note: Add additional rows in to this table if required. (Please copy the existing formatting into added rows).

Ref. No. or Code	Material/ Substance ⁽²⁾	CAS Number	Danger Category ⁽³⁾	Amount Stored (tonnes)	Annual Usage (tonnes)	Nature of Use	Hazard Statement ⁽⁴⁾	Odour		Threshold µg/m3
								Odourous Yes/No	Description	

- Notes:**
- 1** The details provided should be very comprehensive, all materials used, fuels, intermediates, laboratory chemicals and product should be included. Particular attention should be paid to materials and product consisting of, or containing, dangerous substances as described in the EU (Classification, Packaging, Labelling and Notification of Dangerous Substances) Regulations 2003 [SI 116/2003] as amended and Regulation (EC) No. 1272/2008. The list must classify these materials in accordance with both of these Regulations, and must specify the designated Hazard Statements. Hazard statements for each substance should be in accordance with Article 21 of the EC Regulation 1272/2008. The list must identify any Substances of Very High Concern (SVHC) listed in Annex XIV of the REACH Regulations (Regulation (EC) No 1907/2006) as amended and indicate whether the use has been authorised or is exempted in accordance with the Regulation. In the case(s) of exempted use(s) the list must state the basis for each intended exempted use concerned.
 - 2** In cases where a material comprises a number of distinct and available dangerous substances, please give details for each component substance.
 - 3** Article 2(2) of S.I. No. 116/2003.
 - 4** EC Regulation 1272/2008 (Chemicals Act 2008 (13 of 2008) and 2010)
 - 5** The EPA Classification of Hazardous and Non-Hazardous Substances in Groundwater, December 2010.
 - 6** Where relevant, specify whether the substance is on the Authorisation List (Annex XIV Regulation (EC) No 1907/2006 as amended) or Restriction List (Annex XVII Regulation (EC) No 1907/2006 as amended). Also, indicate whether the use has been authorised or exempted in accordance with Regulation (EC) No 1907/2006 as amended.

Raw Materials, Intermediates and Products cont...

Ref. No. or Code (repeated)	Pollutants (Tick and specify Group/Family Number)				Controlled Substances REACH SVHC ⁽⁶⁾	Relevant hazardous substance? ⁽⁷⁾ Yes/No
	EC EO (Surface Waters) Regulations 2009		EC EO (Groundwater) Regulations 2010			
	Specific pollutants	Priority (hazardous) substances	Hazardous ⁽⁵⁾	Non- hazardous ⁽⁵⁾		

Attachment 2

EPA Application Form

8.1 - Waste Generated and Animal By-Products Generated - Attachment

Organisation Name: *

William Connolly & Sons Unlimited Company

Application I.D.: *

LA001443 / P1069-01

Authorisation Application Form

Amendments to this Application Form Attachment

Version No.	Date	Amendment since previous version	Reason
V.1.0	July 2017	N/A	Online application form attachment
As above	Mar 2018	Identification of required fields	Assist correct completion of attachment

Authorisation Application Form

Waste Generated (See **Note i** at the end of this attachment)

Attach evidence that demonstrates, in accordance with Articles 11(3) and 12(1)(h) of the Industrial Emissions Directive (for IE licence applications) and Article 4(1) of the Waste Framework Directive (for all applications), how the waste hierarchy (see **Note ii** at the end of this attachment) has been taken into account in the prevention and management of waste generated at the installation/facility (select Document Type: '**Waste Hierarchy**').

Waste Hierarchy evidence filename: *

Complete the table below in relation to waste generated at the installation or facility

Describe, by completing the table below, the arrangements for the recovery or disposal of solid and liquid wastes generated. Use one row (at least) for each waste generated (*the following are examples: e.g., production waste, office waste, canteen waste, vehicle servicing waste, workshop waste, landfill leachate, liquid waste, yard sweepings, ash*). Where appropriate, attach analysis of the waste (include test methods and Q.C.) and period or periods of generation of the waste.

Note: This table is for waste generated as a result of the licensable and associated activities.

This table **is not** for waste accepted at the installation or facility (these details are required to be included elsewhere (in the Waste Activities Tab (4.3))).

List of Waste (LoW) Code entry *	Applicant's description of waste generated at the facility or installation *	Estimate or, for a licence review, actual tonnes generated per annum *	Is the waste recovered or disposed on-site or is it dispatched off-site to a waste facility? ^{1*}	Describe the disposal or recovery treatment technique *	Disposal / Recovery Code *
13 05 07	Interceptor Waste	68	Offsite	This waste is suctioned from the tank by a permitted contractor and removed offsite for disposal or recovery	D9, R13
13 02 08	Waste Oil	1	Offsite	This waste is suctioned from the tank by a permitted contractor and	R9

¹ Options: '**On-site**' or '**Off-site**'



Authorisation Application Form

List of Waste (LoW) Code entry *	Applicant's description of waste generated at the facility or installation *	Estimate or, for a licence review, actual tonnes generated per annum *	Is the waste recovered or disposed on-site or is it dispatched off-site to a waste facility? ¹ *	Describe the disposal or recovery treatment technique *	Disposal / Recovery Code *
				removed offsite for disposal or recovery	
20 03 01	Mixed Municipal Waste	303	Offsite	Collected by an appropriate licensed waste contractor for incineration or disposal.	R13

*add rows to the table as necessary



Authorisation Application Form

The following should be provided where appropriate:

1. Analysis of the waste (include test methods and Q.C.)
2. Its location of storage and the manner by which the integrity/impermeability of storage areas is maintained
3. Period or periods of generation of the waste.

Animal By-Products

Complete this table for any animal by-products generated whether classified as waste or not.

Description of material	Estimate <u>or</u> for licence reviews, actual tonnes generated per annum	Is the animal by-product used on-site <u>or</u> is it dispatched off-site to another facility? ²	Describe the disposal or recovery treatment technique	Disposal / Recovery Code	Describe off-site uses (where applicable)

*add rows to the table as necessary

² Options: 'On-site' or 'Off-site' or 'not classified as waste'.

Authorisation Application Form

Note i **Waste Generated**

This part of the form collects data and information on the management of waste generated at the facility or installation. (Do not repeat information already provided in Tab 4 on Waste Activities, where applicable).

Waste must be managed without endangering human health and harming the environment, and in particular without risk to water, air, soil, plants or animals, without causing a nuisance through noise or odours, and without adversely affecting the countryside or places of special interest. Measures must be taken to ensure that waste generation is avoided in accordance with the waste hierarchy in Council Directive 98/2008/EC on waste and section 21A of the Waste Management Act 1996, as amended. Where waste is generated, it must be prepared for re-use, recycled or recovered or, where that is technically and economically impossible, it can be disposed of while avoiding or reducing any impact on the environment (applicants should provide this information in the context of the Waste Management Act 1996 as amended).

Note ii **Waste Hierarchy**

Describe what measures will be taken to prevent the generation of waste to the extent possible. State whether the operator of the installation or facility has participated in any projects under the National Waste Prevention Programme.

Where waste is generated at the installation or facility, describe how it will be, in order of priority in accordance with section 21A of the Waste Management Act 1996, as amended, prepared for re-use, recycling, recovery or where that is not technically or economically possible, disposed of in a manner which will prevent or minimise any impact on the environment.

Section 29(2A) of the Waste Management Act 1996, as amended states that it shall be the duty of waste producers and holders to ensure that waste undergoes recovery operations in accordance with sections 21A and 32(1) of the Acts.

For waste whose generation cannot be prevented, describe what measures will be in place to ensure that waste is collected separately (if technically, environmentally and economically practicable) and will not be mixed with other waste or other material with different properties.

Attachment 3



Ger Murphy Plant Hire & Civil Engineering Works



Contact Ger – 087 2523407



16/12/2014

To Whom it may concern,

The four cell Integrated Constructed wetlands constructed at Connolly's Red Mills is in line with the IE Consultants specifications.

Regards,

Julianna Dunne,

Gerard Murphy Plant Hire Ltd.

Attachment 4

Connolly's RED MILLS

WILLIAM CONNOLLY & SONS

REDMILLS,

GORESBRIDGE, CO KILKENNY

INTEGRATED CONSTRUCTED WETLAND (ICW) SYSTEM

AS-BUILT PERMEABILITY ASSESSMENT



Innovation Centre
Green Road
Carlow

Tel:- 059 91 33084
Fax:- 059 91 40499
Email:- info@iece.ie

WILLIAM CONNOLLY & SONS
REDMILLS,
GORESBRIDGE, CO KILKENNY

INTEGRATED CONSTRUCTED WETLAND (ICW) SYSTEM

AS-BUILT PERMEABILITY ASSESSMENT

Client :-
William Connolly & Sons
Redmills,
Gorebridge,
Co. Kilkenny.

IE Consulting
Innovation Centre
Green Road
Carlow

Document No:	IE771/1107
Issue No:	01-ISSUE
Project No:	IE7771
Date:	22 nd November 2014
Revision:	1.0
Prepared By:	P McShane BEng (Hons) MIEI,
Checked By:	J Keohane MSc BSc CGeol FCIWEM

Copyright © IE Consulting 2014

This report or its contents must not be reproduced for any purpose without written permission.
It is to be used only for the purpose for which it is supplied

Table of Contents

1. INTRODUCTION.....	4
2. DESCRIPTION OF PERMEABILITY TESTING PROCEDURE.....	4
3. PERMEABILITY TEST RESULTS	6

Appendix A ICW Earthworks Specification

Appendix B Contractors Correspondence

1. INTRODUCTION

An assessment of the as-built permeability of the basal layer of the Integrated Constructed Wetlands (ICW) system at Connolly's Redmills has been undertaken in order to assess the basal permeability prior to final planting out of the ICW system and prior to connection of the ICW system to the surface water drainage system from the area of the Redmills facility site that shall drain to the system.

An earthworks specification has been developed in respect to the construction of the basal layer and embankments of the ICW system. The earthworks specification has been developed so as to ensure that the basal layer of the ICW system achieves a minimum permeability of 1×10^{-8} m/s in accordance with the Integrated Constructed Wetlands Guidance Document – DoEHLG, 2010. A copy of the earthworks specification is included in *Appendix A*.

The contractor has confirmed in writing that the ICW system has been constructed in accordance with the earthworks specification contained in *Appendix A*. A copy of the contractor's correspondence in this regard is contained in *Appendix B*.

2. DESCRIPTION OF PERMEABILITY TESTING PROCEDURE

The as-built permeability of the ICW basal layer was assessed by undertaking a number of falling head permeability tests within each cell of the ICW system.

1m long, 100mm diameter uPVC test pipes (labelled as TP1, TP2, TP3, etc) were placed within each cell of the ICW system at the locations illustrated in *Figure 1* below. Each pipe was driven approximately 100mm within the 300mm thick constructed basal layer.

Following placing of pipes within each ICW cell each pipe was filled with water and allowed to stabilise for a period of 24 hours. The top of each test pipe was capped so as to ensure the water levels in each pipe were not affected by any rainfall amounts or by natural evaporation.

Figure 2 below illustrates the typical location of test pipes within ICW Cell No. 2.

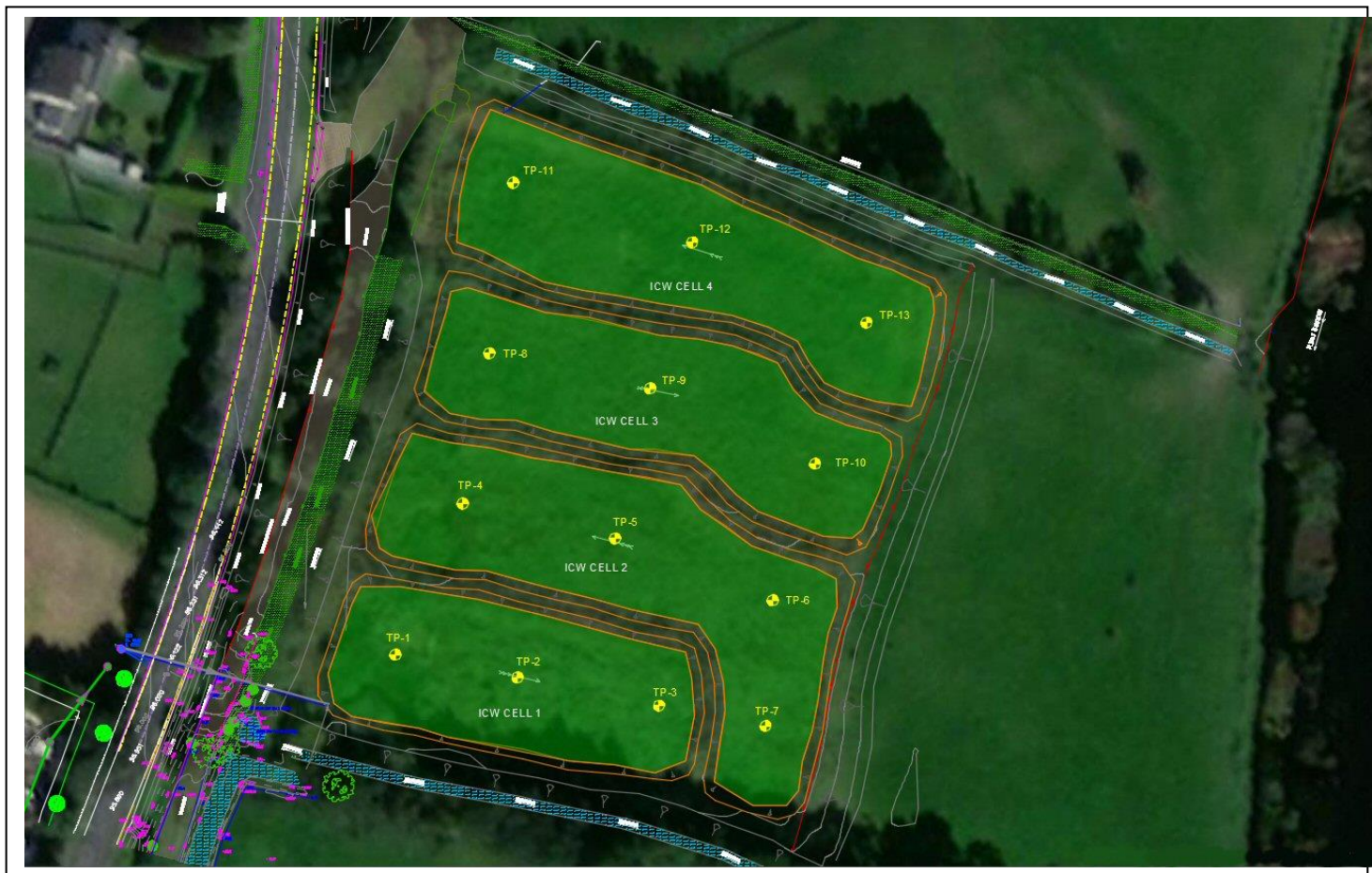


Figure 1 – ICW Cell Test Pipe Locations

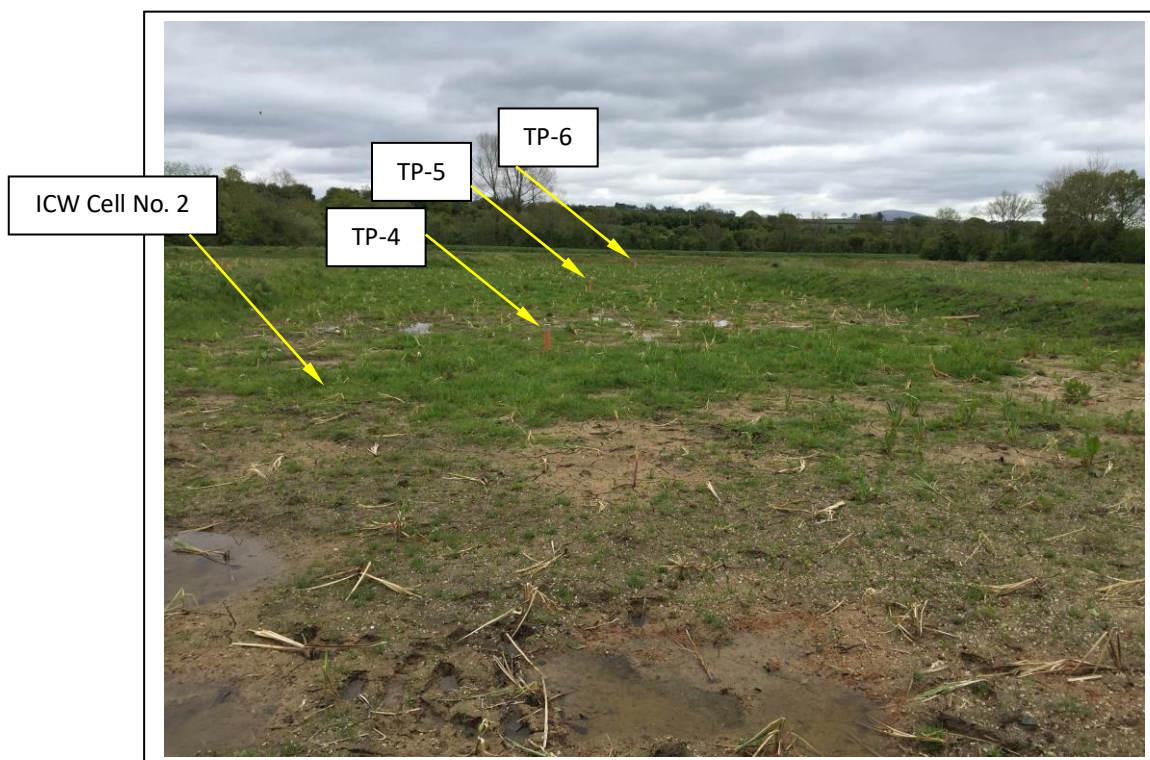


Figure 2 – ICW Cell 2 Test Pipes

3. PERMEABILITY TEST RESULTS

Following the initial 24 hour stabilisation period each test pipe was filled with water where required so that a 1m head of water was applied to the basal layer at each test location.

Testing commenced at 9:30am on 04th November 2014 for a duration of 120 hours (5 days). At each 24 hour interval the water level in each test pipe was observed and any drop in water level was measured accordingly.

The results of the falling head permeability test are summarised in *Table 1* below.

Test Pipe Location	Water Level Measurements (mm Below Top of Test Pipe)				
	04/11/14	05/11/14	06/11/14	07/11/14	08/11/14
TP-1	0.0	0.0	1.0	1.0	1.5
TP-2	0.0	0.5	1.0	1.0	1.0
TP-3	0.0	0.0	0.0	0.0	1.5
TP-4	0.0	0.0	1.0	1.5	2.5
TP-5	0.0	0.5	0.5	0.5	1.0
TP-6	0.5	0.5	1.0	1.5	2.0
TP-7	0.0	0.0	0.5	0.5	0.5
TP-8	0.0	0.5	0.5	1.0	1.5
TP-9	0.0	0.0	0.0	1.0	1.0
TP-10	0.5	0.5	1.0	1.0	1.0
TP-11	0.5	1.0	1.5	2.0	2.5
TP-12	0.0	0.5	1.5	2.0	2.5
TP-13	0.0	1.0	1.5	2.0	2.0

Table 1: Falling Head Permeability Test Results

The ICW system has been constructed to an earthworks specification in order to achieve a minimum basal permeability of 1×10^{-8} m/s.

In consideration of a minimum basal permeability of 1×10^{-8} m/s and a 1m head of test water, this equates to a maximum permitted drop in test water level of 0.864mm after 24 hours, 1.73mm after 48 hours, 2.59mm after 72 hours, 3.45mm after 96 hours and 4.32mm after 120 hours.

As presented in *Table 1* above, the results of the falling head permeability testing fall within the maximum permitted drop in test water levels as presented above.

In this regard the as-constructed basal layer of the ICW system has been constructed to the minimum required permeability of 1×10^{-8} m/s in accordance with the Integrated Constructed Wetlands Guidance Document – DoEHLG, 2010.

Attachment 5

APPENDIX A

Earthworks Specification

1.0 GENERAL

1.1 Scope

This specification covers the requirements for earthworks in relation to the construction of the proposed integrated constructed wetland system and pond system to provide tertiary treatment for the proposed primary and secondary wastewater treatment system at Redmills, Goresbridge, Co Kilkenny. The works shall be in general accordance with B.S. 6031 "Code of Practice for Earthworks" and in accordance with '*Integrated Constructed Wetlands – Guidance Document for Domestic Wastewater Applications – DoEHLG, November 2010*'.

1.2 Definitions

1.2.1 Engineer

The Engineer referred to in this specification means the Civil/Structural Engineer appointed by the Employer or the Architect for the purposes of the construction contract.

1.2.2 Contractor

The Contractor (including sub-contractors) referred to in this specification means the person or persons responsible for the physical undertaking of construction of the proposed wetlands system and pond areas.

3.0 Subsoil Liner Construction

3.1 General

It is imperative that the subsoil liner in the floor and inner bank surfaces of each wetland cell and the pond areas and the core of the embankments are thoroughly compacted. If the subsoil liner is stony or has a relatively high gravel content the proportion of these materials present shall be such that they are embedded in the dense matrix of the subsoil liner itself and do not create any air-filled porosity by bridging or result in the liner subsoil losing any of its overall plasticity. If these conditions are met the overall hydraulic conductivity will be reduced rather than increased. A 20+ tonne (at minimum) tracked excavator shall be used to construct the store and effect optimum compaction. Floors and banks shall be built in layers/lifts of 150 mm and compacted until the desired density and sealing has been achieved.

A minimum of four runs (two each in cross directions) per lift should give adequate compaction in normal conditions. On sites susceptible to groundwater pollution a minimum of six runs or its equivalent with compacting machinery shall be used. Alternative compaction plant may be used if it can be clearly demonstrated that **at least** equivalent compaction will be achieved.

3.2 Compaction of Subsoils

The design and construction of compacted subsoil liners is governed by the strength and degree of compaction required to ensure low permeability. The geotechnical component of a subsoil liner is determined by the nature of the subsoil being utilised. The base and part slopes of the wetland system shall consist of a mineral layer which satisfies permeability and thickness requirements with a combined effect in terms of protection of soil, groundwater and surface water at least equivalent to a permeability of 1×10^{-8} m/s over a thickness of 0.3 m. Achieving the required permeability may require compaction of a minimum thickness of subsoil, resulting in a compacted subsoil liner.

3.3 Compactive Energy

Compactive energy is a function of the weight of the machine used to effect compaction, the thickness of the lift and the number of passes of the machine over each lift. Additional passes cannot be used to compensate for machines that are too light for the construction of the liner. Machine size is usually specified in terms of contact pressure exerted by the machine. For a hydraulic excavator, the contact pressure is determined based on the operating weight of the machine and the contact area of the machine on the ground. (e.g. Hydraulic excavator 20000 kg operating weight, track width 600 mm, tumbler length 2.5 m. Therefore the contact pressure = $(20000 / (2.5 \times 2 \times 0.6)) = 65.4$ kPa).

Weight is important to ensure that penetration of the specified loose lift is attained. A lift thickness of 150 mm is suitable for most compaction procedures and coupled with a 20000 kg hydraulic excavator capable of exerting a ground pressure greater than 40 kPa and a minimum of four passes per lift, effective compaction should be achieved.

Table 1 below lists typical ground pressure values for various types of tracked excavators. If tracked excavators are to be used for compaction at this facility then the 'Track Length on Ground' should comply with *Table 1* below:-

Track length on ground	Track width	Machine weight	Ground pressure		
			(kg.m ⁻²)	(kPa)	(psi)
(m)	(m)	(kg)			
3.00	0.6	13950	3875.0	38.0	5.5
3.27	0.6	19700	5028.1	49.3	7.2
3.28	0.6	20575	5235.4	51.3	7.4
3.37	0.6	18070	4468.3	43.8	6.4
3.37	0.6	19300	4772.5	46.8	6.8
3.37	0.6	20095	4969.1	48.7	7.1
3.37	0.6	19021	4703.5	46.1	6.7
3.45	0.6	19650	4746.4	46.5	6.8
3.66	0.6	23069	5252.5	51.5	7.5
3.66	0.6	21340	4858.8	47.6	6.9
3.83	0.6	24200	5265.4	51.6	7.5

Table 1 - Ground pressure values for a sample of hydraulic excavators

If the contractor proposes to employ a non-vibrating or vibrating roller for this facility contract he shall comply with the compaction requirements listed in *Table 2* below.

The table below is adapted from the NRA specification for roadworks and gives guidance on the required construction requirements for different types of compaction plant to ensure an impermeable compacted subsoil liner.

Type of compaction plant	Category	Max. depth of compacted layer	Minimum number of passes
		(mm)	(No.)
Smooth wheeled roller (mass per metre width of roll):	over 2100 kg to 2700 kg	125	8
	over 2700 kg to 5400 kg	125	6
	over 5400 kg	150	4
Grid roller (mass per metre width of roll):	over 2700 kg to 5400 kg	150	10
	over 5400 kg to 8000 kg	150	8
	over 8000 kg	150	4
Tamping roller (mass per metre width of roll):	over 4000 kg	225	4
Vibratory roller (mass per metre width of a vibratory roll):	less than 700 kg	100	Unsuitable
	over 700 kg to 1300 kg	125	12
	over 1300 kg to 1800 kg	150	8
	over 1800 kg to 2300 kg	175	4
	over 2300 kg to 2900 kg	200	4
	over 2900 kg to 3600 kg	225	4
	over 3600 kg to 4300 kg	250	4
	over 4300 kg to 5000 kg	275	4
over 5000 kg		4	

Table 2 – Compaction Guidance for Roller Plant

3.4 Construction of Liner to Achieve Required Impermeability

Constructed liners for the proposed wetland system and pond areas at this facility shall have, on completion, a permeability of less than 1×10^{-8} m/s and shall be at least 0.3 m thick, over at least 0.75m of undisturbed subsoil.

The liner on the banks and floor shall be constructed of suitable excavated dense plastic subsoil material only. It is imperative that the subsoil liner in the base of the ponds, the inner bank surfaces and the core of the banks are thoroughly compacted, as listed in this specification.

The liner on the pond base and banks shall be built in layers/lifts of 150 mm and each layer/lift compacted until the desired permeability has been achieved. The excavator shall make a minimum of 4 passes per lift (two each in cross directions) over the liner soil so as to compact the material for 0.3 m thick liners. Each layer comprising the compacted subsoil liner shall be fully compacted prior to placement of the next layer.

Once the full depth of liner has been constructed, the inside floor and bank slopes shall be smoothed off and compacted (plastered) with the track machine using a remoulded subsoil. This is particularly necessary when the liner is constructed in dry conditions.

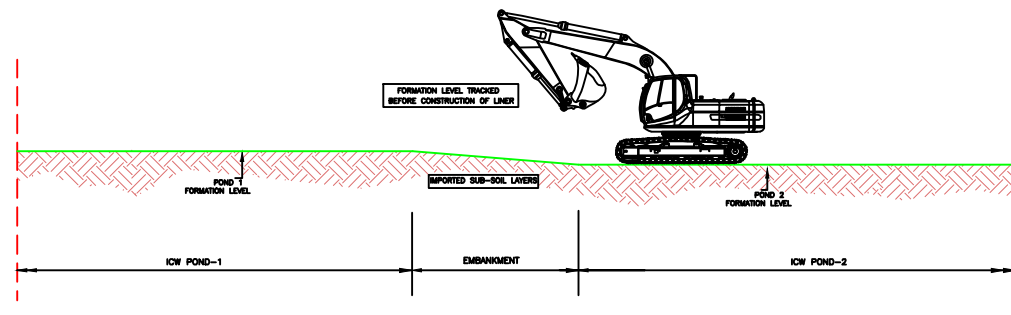
Compaction shall be effected by means of a hydraulic excavator with a minimum weight of 20 tonne capable of exerting a ground pressure of at least 40 kPa (40 kN.m^{-2}) (e.g. a 20 tonne excavator with tumbler length 3.7 m and track width 0.6 m shall exert a ground pressure of 44.17 kPa). Alternative suitable compaction plant may be used if it can be demonstrated that **at least** equivalent compaction can be effected.

4.0 Construction of Embankments

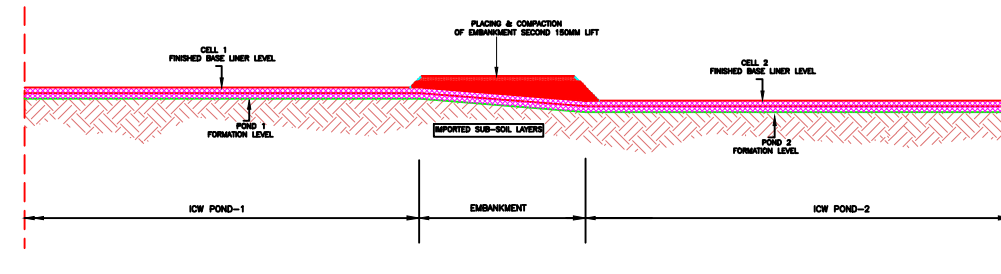
Embankments should be constructed from firm sub-soil material with at least a 10-13% clay content. An impermeable liner should be provided to embankments for a minimum face height of 0.45m on the pond side only. The liner should be constructed as per *Section 3.0* above. Top-soil material can be used to landscape the embankments prior to any seeding.

NOTES:-

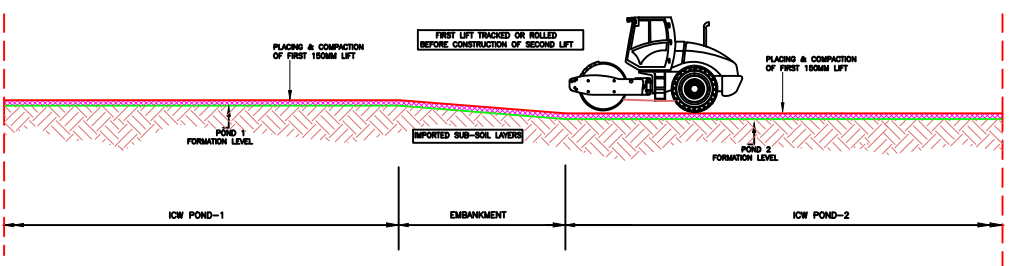
1. DO NOT SCALE FROM THIS DRAWING



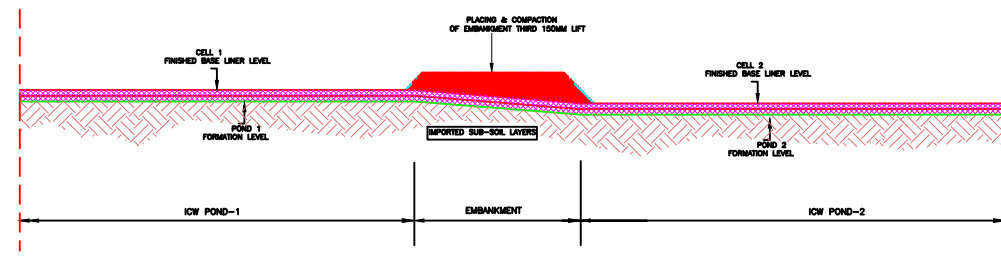
STAGE 1



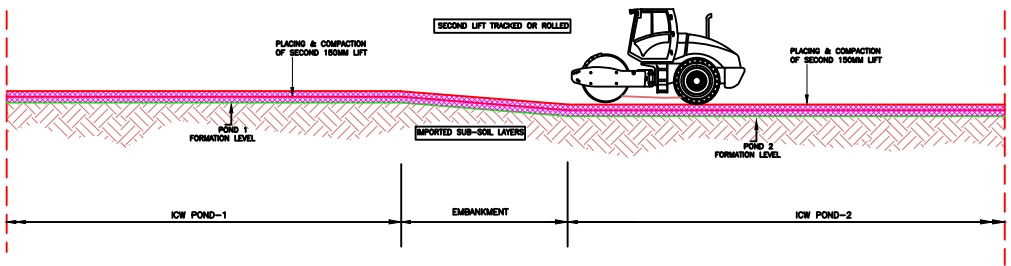
STAGE 5



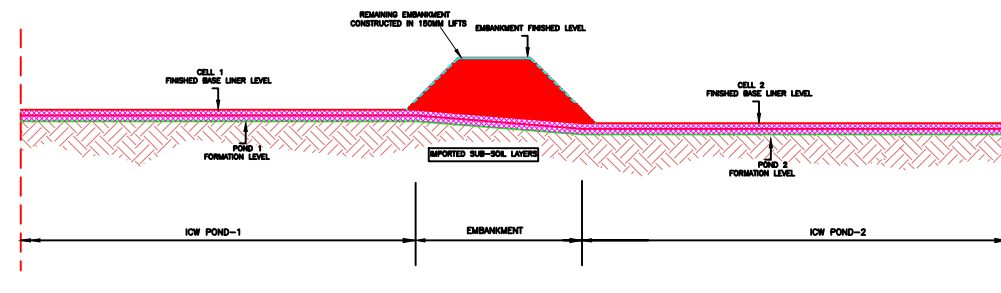
STAGE 2



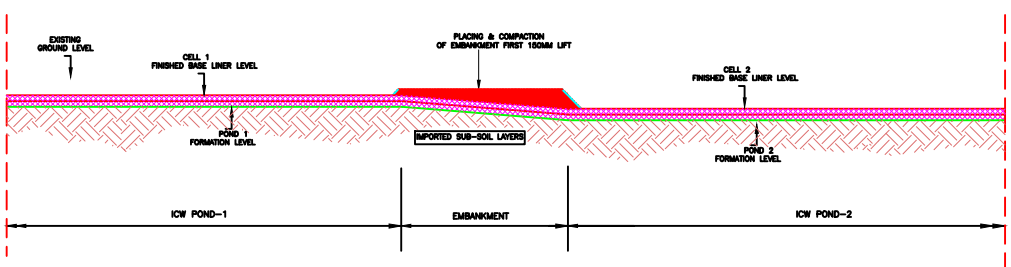
STAGE 6



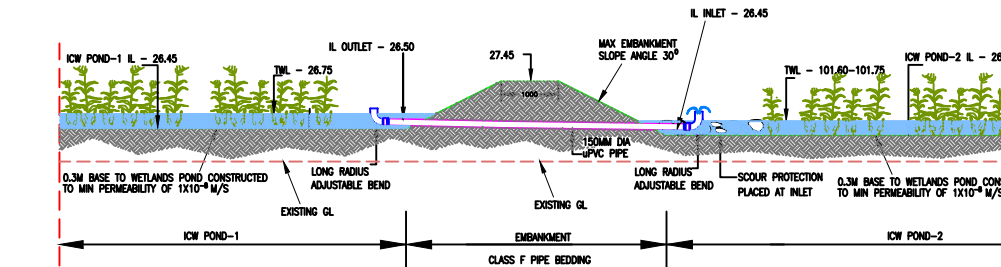
STAGE 3



STAGE 7



STAGE 4



SEQUENCE OF LINER & EMBANKMENT CONSTRUCTION
TYPICAL SECTIONAL ELEVATION DETAILS
SCALE - NTS @ A3

A	06.03.13	ISSUED FOR PLANNING	TP	PMS
rev.	date	amendment	drm	ckd

Connolly's RED MILLS

WILLIAM CONNOLLY & SONS
LOWER GRANGE, GORESBRIDGE, CO KILKENNY

PROPOSED INTEGRATED CONSTRUCTED WETLANDS (ICW) SYSTEM

SEQUENCE OF LINER & EMBANKMENT CONSTRUCTION
TYPICAL SECTIONAL ELEVATION DETAILS

ie
IE CONSULTING
WATER-ENVIRONMENTAL-CIVIL

INNOVATION CENTRE TELEPHONE: 059 91 33084
GREEN ROAD FAX: 059 91 40499
CARLOW EMAIL: info@iece.ie

DRAWING STATUS:	PLANNING	SCALE:	AS_SHOWN A3
DRAWING NUMBER:	IE771-004	DATUM:	ORDNANCE
REV	A	DRAWN:	LM
CHECKED:	PMS	APPROVED:	-
DATE:	11.02.13		

ALL MODIFICATIONS TO BE CARRIED OUT USING THE AUTOCAD SYSTEM ONLY
FILE NO 1:- N\VE771-002.DWG
AND BE PLOTTED USING THE FOLLOWING CTR FILE 1:- N\VE39-001.CTR

© IE Consulting. This drawing or its contents must not be reproduced for any purpose without written permission. It is to be used only for the purpose for which it is supplied.

APPENDIX B

Planting Specification

1 Table of Contents

1	Table of Contents	1
2	Introduction	2
3	Consideration.....	2
4	Proposed Planting Specification.....	3
4.1	The Role of Plants Within the System.....	3
4.2	Suitable Plants for the Constructed Wetland & Reed Bed Areas	3
4.3	Planting Density	4
4.4	Size & Maturity of Plants	4
5	Planting Procedure	5
6	Maintenance	5

2 Introduction

This planting specification has been prepared for a proposed Integrated Constructed Wetlands system (ICW) at Connolly's Redmills, Goresbridge, Co Kilkenny.

To ensure the successful treatment of the effluent waters each constructed wetland area will be densely vegetated with suitable emergent plant species.

The proposed planting specification is in accordance with '*Integrated Constructed Wetlands – Guidance Document for Domestic Wastewater Applications – DoEHLG, November 2010*'.

3 Consideration

Plant establishment of the wetland areas require the following considerations.

- Plant species selection and density
- Sourcing – native and non-native species
- Water levels – variable- different plants for varying depths
- Setting – wind direction/exposure, sun or shade
- Liner protection

4 Proposed Planting Specification

4.1 The Role of Plants Within the System

Vegetation, emergent, marginal and aquatic, play an essential role in the functioning of an integrated constructed wetland system.

The emergent plant species within the system provide the following functions:

- Provide support structure for microbial colonies to develop
- Facilitate aerobic microbial activity (principal cleansing process)
- Absorption of nutrients
- Bind nutrients in the accumulating organic matter
- Reduce the flow of water → improves settlement
- Reduce preferential flow and increase residence time
- Reduce final volumetric discharge through plant transpiration and interception

4.2 Suitable Plants for the Integrated Constructed Wetland Areas

There are a number of different plant species that are recommended for the proposed constructed wetland areas.

The constructed wetland areas are suitable for range of different plants species. The list below gives a selection of plants that are tolerant of varying water depths. Plants which prefer shallower waters will be established along the waters edge (0-5cm), with deeper living plants planted in 5-35cm.

<i>Alisma plantago-aquatica</i>	Water plantain	0-30 cm
<i>Acorus calamus</i>	Sweet flag	0-20cm
<i>Carex pendula</i>	Drooping sedge	0-35cm
<i>Carex elata</i>	Sedge	0-10cm
<i>Carex rostrata</i>	Lesser sedge	0-20cm

<i>Cladium mariscus</i>	Saw sedge	0-30cm
<i>Glyceria maxima</i>	Water grass	0-20cm
<i>Juncus effuses 'Spiralis'</i>	Spiral rush	0-5cm
<i>Phalaris arundinacea</i>	Canary reed	0-15cm
<i>Phalaris arundinacea 'varigata'</i>	Variegated canary reed	0-15cm

The plant species below are non-native, but also suitable for planting within the wetland areas.

Cyperus spp.

Zantedeschia aethiopica

Zizania latifolia

Gunnera manicata

There are many other plants also suitable.

Several bog or moisture loving plants that prefer saturated soils can be planted in areas along the edge of the proposed surface water pond areas, e.g. *Lysimachia punctata*, *Astilbe*, *hostas*.

4.3 *Planting Density*

To provide a dense plant cover as quickly as possible, depending on the species and maturity of the plants, it is recommended that the constructed wetlands are planted at a rate of 1-2 plants/m²

4.4 *Size & Maturity of Plants*

The size and maturity of the plants to be used in the constructed wetlands will have to consider at least the following;

- Availability and sourcing
- How quickly cover is needed
- Planting conditions
- Costs

Physiologically mature plants from nursery stock (1-3 litre) will provide establishment of plants within the shortest period of time. The use of seedlings may be used if plant cover and establishment are not required within the first 1-2 years; however greater management will be required to ensure their success.

5 Planting Procedure

Plants are easiest to establish when water levels are minimal and just sufficient to keep the soil wet. Following construction of each wetland pond base, at least 100mm of topsoil shall be placed with each ICW area to provide a suitable medium for planting. Once plants are established, ranging from weeks to months with physiological mature plants with good root systems, to months to a year for bare rooted and a year for seedlings. Ideally water levels in the wetland should be gradually increased.

The following should also be considered during planting;

Planting should be carried out manually to avoid damage to plants and liner.

Planting should be carried out mainly in groups of similar species type, but some mixing is encouraged.

Planting should ideally be carried out in late winter/early spring or early summer to avail of the full growing season (March-September for most species).

6 Maintenance

A permanent water depth of 0.35m will be maintained within the ICW system, however during heavy rainfall events the surface area of the ICW may increase and the water level would rise by a further 0.2-0.25m. The plants selected will cope with periods of being submerged during storm events once the plants are established. Likewise they are adapted to periods of drying out for periods of time.

The plants within the wetlands will require little maintenance. However, a visual inspection should be carried out regularly especially for the first growing season.

Replanting may be necessary if storm event occurs within the first twelve months, as plants may not be fully established and may be uprooted, due to heavy rain or winds.

The majority of emergent plant species are deciduous and die back during the winter, leading to an accumulation of dead plant material, most of which will be embedded in the soils.