SETTLED SCREENED STORM BP0015204 378/2/STW

ASIANTAETH YR AMGYLCHEDD
ENVIRONMENT AGENCY

WATER RESOURCES ACT 1991 (schedule 10)

(as amended by the Environment Act 1995)

Application for a variation to an existing consent to discharge

Regional/Area Address:	*Official Use Only*
The Regional Finance Manager Environment Agency Welsh Region PO Box 425 St Mellons Business Park CARDIFF CF3 0LT	*Dist/Area Ref:* 1303 *Application No.* BP0015204 *Date Received:* 04/08/05 *Fee Received:* €772=

Each applicant must complete the main form and may need to complete a separate annexe if appropriate. Please look through the form and read the notes carefully before you complete it. Processing of your application will be aided by full and accurate completion of all relevant sections and provisions of the necessary plans. If you have any queries regarding the form please contact the person given in the notes.

NOTE:
All information contained within this application will be made available on the public register unless there is a request to withhold any of it. Any such request should provide a full justification stating why the information needs to be withheld (see note xiii).

1 SITE ADDRESS

1.1 Address or other sufficient description of land or premises to which this application applies.

Llanfarian WwTW (SETTLED SCREENED STORM)
Aberystwyth

Post Code: SY23 4UH.

E. A. WALES
Rec No 5495
- 4 AUG 2005
PART 2 of 2
PAID

2 DETAILS OF DISCHARGE(S)

2.1 State the nature of the discharge(s) (see note i and ii) - tick one or more boxes as appropriate:

Sewage Effluent - volume of 5 cubic metres per day or less	
Sewage Effluent - volume greater than 5 cubic metres per day (**complete annexe 1**)	
Sewage Effluent discharged under storm or emergency conditions (**complete annexe 2**)	√
Cooling Water (**complete annexe 3**)	
Trade Effluent (*including site drainage*) (**complete annexe 3**)	
Others (*please specify*)	

2.2 Please state the maximum quantity it is proposed to discharge in any one day: 737 m^3/d

Briefly state how this figure was calculated (see note ii).

SOCA (passed through PST) – 3DWF (FFT)
See attached Documentation Supporting Consent Application for Llanfarian WwTW.

2.3 a) Indicate proposed means of discharge - tick as appropriate and show on plan:
(for 1, 2 & 3 please state dimensions below)

1. Pipe	√	4. Borehole		7. Sub-Irrigation System	
2. Channel		5. Well		8. Combination of 6 & 7	
3. Culvert		6. Soakaway		9. Other (*please specify below*)	

225 mm nominal bore pipe

b) National Grid Reference(s) of point(s) of discharge (see note iii).

S	N	5	9	1	7	5	7	7	7	0	0

(please indicate on accompanying plans)

2.4 a) The Agency will normally require adequate provision for the taking of samples of the discharge in a safe and convenient manner at any time. Please indicate the means proposed (see note iv) - tick as appropriate and show on plan:

At the outlet [ ] At a manhole or sampling chamber [√]

Other *(please specify)*

b) National Grid Reference(s) of sampling point(s) (if different from 2.3 b) above).

S	N	5	9	1	2	7	7	7	6	4	6

(please indicate on accompanying plans)

c) What flow measurement facilities will be provided (see note v)?
Please give details.

None

2.5 a) Type of Treatment Plant(s) to be used *(please specify make and model)* - tick as appropriate:

Septic Tank [ ] Package Sewage Treatment Works [ ] Other [√]

Storm flows will be screened (6 mm).

b) Will the treatment process involve the use of any chemicals (eg ferric salts, polyelectrolytes). If yes please give details. [N]

2.6 a) On what date do you anticipate the discharge will commence? 31/12/2005

b) If you require the consent for a limited time period please give dates; from: / /

to: / /

c) If the discharge is not continuous please detail the period/circumstances when it will occur.

Flows in excess of 3DWF will go to storm. 2hrs at 3DWF retention provided in the PST.

2.7 a) Are there any existing consents for discharges from the premises (see note vi)? [Y]

If yes, please give the reference numbers *(Any further information should be given in Section 5.3).*

Existing discharge consent BP0015201 relating to the FE discharge. BP0015202 for the discharge of diluted sewage and emergency discharge from the inlet pumping station. BP0015203 relating to the screened storm and BP0015204 to the screened, settled storm.

b) Has any person had a Prohibition Notice serviced on them in respect of this site? [N]

If yes, please give the reference number.

3 SITE DETAILS

3.1 Please give the name of the relevant Planning Authority.

Ceredigion County Council

3.2 Please give details of the premises - tick as appropriate:

1. Single Dwelling	[ ]	6. Fish Farm	[ ]
2. Multiple Dwellings	[ ]	7. Mineral Workings	[ ]
3. Industrial Premises	[ ]	8. Water Services plc STW	[√]
4. Vehicle Parking Area	[ ]	9. Water Supply	[ ]
5. Commercial Premises *(please specify)*	[ ]	10. Other *(please specify)*	[ ]

3.3 Please indicate source of the water supply - tick as appropriate:

1. Well		5. River *(please give name below)*	
2. Borehole		6. Estuary *(please give name below)*	
3. Precipitation (eg rain or snow)		7. Coastal Water *(please give name below*	
4. Mains *(please state water supply company)*		Not Applicable	

4 DETAILS OF RECEIVING ENVIRONMENT

4.1 Receiving Medium - tick the category(s) to which the proposed discharge(s) is(are) to be made:

1. Estuarial Water (tidal river or stream)		5. Into Land	
2. River or Stream (non-tidal)	√	6. Onto Land	
3. Canal		7. Directly into Groundwater	
4. Lake, Lock or Pond		8. Coastal Water (see note vii)	

State name of receiving water if known:

Afon Ystwyth

4.2 In the case of sub-irrigation systems, soakaways or boreholes: Not applicable

(a) Is any part of the system within 5 metres of the boundary of the premises? Y/N

(b) Is any part of the system within 10 metres of a watercourse? Y/N

(c) Is any part of the system within 50 metres of a borehole or spring? Y/N

(d) For wells and boreholes state dimension(s) in metres. m

(e) For sub-irrigation systems, soakaway pits, wells and boreholes, state maximum depth in metres. m

(f) For boreholes, state details of lining in metres:

(i) Depth of lining m

(ii) Depth of perforated lining m

(iii) Depth of unperforated lining m

(g) A percolation test must be carried out in accordance with British Standard BS6297:1983. Have the results been provided? Y/N

4.3 Is there a foul sewer available to which the discharge(s) could be made (see note viii)? Y/N

If yes, please give the reasons it is not practical to connect to it (eg distance, flow etc).

Not Applicable

5 DETAILS OF APPLICANT AND OTHER INFORMATION

5.1 (See general notes and note ix)

(a) Full name and postal address of applicant. This should be the person who will become the consent holder should consent be issued.

Dwr Cymru Cyf
Pentwyn Road
Nelson
Treharris
Mid Glam

Post Code: CF46 6LY

Daytime Telephone Number:

Company Registration Number (if appropriate): 236677

(b) Agent (if any) - Full name and postal address.
*
*
*
*
*
*
Post Code:

Contact Name and Daytime Telephone Number:

5.2

Please give full name and address to which bills should be sent if different to that given above:
*
*
*
*
*
*
Post Code:

Daytime Telephone Number:

5.3 Are there any other factors to be taken into account? Please continue on a separate sheet if necessary.

DECLARATION

I/We:

1. apply under the Water Resources Act 1991 (as amended by the Environment Act 1995) for consent to discharge, as described in this Application. "This Application" means this page, all the other pages of this form and any attached annexes, the attached plan(s), any other sheets attached, and any other written information supplied to support the application.

2. enclose the required application fee, payable to the Environmental Agency (see note x).

3. enclose 3 copies of the plan(s) and location maps with all relevant information clearly marked (see note xi).

4. will pay required advertising costs (see note xii).

5. confirm that I/we* will notify the Environment Agency of any changes in the information in this application which might be material to the continuation of the consent.

6. confirm that the information given in this application and any questions which the Environment Agency may have about it is/will* be true to the best of my/our* knowledge, information and belief and am/are* not aware of any other facts or information which might affect the granting of a consent, or conditions which might be put on it (see note xiii).

7. confirm that I/we* will pay any annual charges due should a consent be granted YES/NO*. If no please indicate who will be completing section 5.2 above (see note xiv).

(* Delete as appropriate)

SIGNED: Lewis Keil **PRINT NAME:** LEWIS KEIL

ON BEHALF OF: DWR CYMRU CYF **DATED:** 3/8/05

CONFIDENTIALITY

I/we apply for commercial confidentiality and enclose a full written justification (see note xv).

SIGNED: ..... **DATED:** .....

PLEASE RETURN THIS FORM TO THE ADDRESS GIVEN ON THE FRONT PAGE

ASIANTAETH YR AMGYLCHEDD
ENVIRONMENT AGENCY

ANNEXE 2
SEWAGE EFFLUENT DISCHARGED IN STORM OR EMERGENCY CONDITIONS

Please complete this annexe if you are proposing to make a discharge of sewage in emergency or storm conditions (if the effluent is to contain a trade component Annexe 3 should also be completed).

Official Use Only
Application No.

1. Site Name.

Llanfarian WwTW

2. State the type of discharge - tick as appropriate:

Storm tanks	
Combined Sewer Overflow from sewerage system	
Combined Sewer Overflow from pumping station	
Emergency overflow from sewerage system	
Emergency overflow from pumping station	
Other *(please specify)*	√

Screened, settled sewage flows in excess of 3DWF

3. For effluents discharging from sewage treatment works, is the storm/emergency effluent discharged via the same outlet as the treated effluent? Y

If no please give: a) the National Grid Reference of the treated effluent outlet.

b) the consent or application number covering the treated effluent discharge

If yes please give the National Grid Reference of the storm/emergency sampling point (see notes)

S	N	5	9	1	2	7	7	7	6	4	6

4. For effluents discharging from combined sewer overflows, is the discharge via a dedicated pipe? Y/N

If no please give the National Grid Reference of the overflow into the sewer.

5. Overflow settings

a)	Overflow setting to storm tanks	Not applicable l/s
b)	Maximum flow to storm tanks	Not Applicable l/s
c)	Overflow setting to storm sewage overflow	> 5.7 l/s
d)	Maximum flow to storm sewage overflow (SOCA – 3DWF)	8.6 l/s

6. Storage capacity

a)	Volume of Storm tanks	109 m^3
b)	Retention time of storm tanks at maximum flow	4.5 hours
c)	Storage capacity of sewer/wet well	Not Applicable m^3

7. Please provide full details of the design criteria that have been used to support this application.

See attached Documentation supporting consent application for Llanfarian WwTW

8. Will facilities be provided to raise alarms (eg telemetry)? N/A
If yes, please give details.

9. Will facilities be provided to prevent the discharge of gross solids? Y
If yes, please give details (for screens give bar spacing or aperture).

6 x 6 mm mechanical screen

10. What provisions will be made to deal with:

a) power failure (eg standby generators)?

N/A

b) mechanical breakdown (eg standby pumps)?

N/A

c) rising main failure?

Not Applicable

d) tanker access?

Access is available

Notes (see also the notes on the main form):

Full details of the design criteria must be provided in order for the application to be determined. If you have any queries about what information is required please contact the person given in notes attached to the main form.

ASIANTAETH YR AMGYLCHEDD
ENVIRONMENT AGENCY

ANNEXE 4
WELSH REGION SUPPLEMENTARY INFORMATION ANNEXE

Please complete this annexe for <u>every</u> proposed discharge.

<u>Official Use Only</u>
Application No.

<u>For all proposed discharges:</u>

1. Site Name.

   Llanfarian WwTW

2. Is this application being made to reinstate a lapsed Consent? N

   If so, please state the Number of the lapsed Consent:

   IMPORTANT: If you are in need of advice on either part of Question 2, please contact the Agency Regional Consents Section on 01222 770088.

3. If the proposed discharge is to be made down a pipe, channel or culvert (as given in Section 2.3 of the main application form), please state the <u>diameter</u> (including units):

   225 mm nominal bore pipe

4. Please indicate the anticipated cost of the proposed scheme, including any alternatives which may have been considered:

   Anticipated cost of total scheme £ 340 k.

5. Is there any trade effluent component in the proposed discharge? N

   If yes, please confirm here that you have completed and enclosed Annexe 3: *Tick*

6. Will the proposed discharge be pumped or made under gravity? (please circle) ~~Pumped~~ / Gravity

If pumped, please state the maximum pump rate in l/sec: l/s

For proposed discharges of sewer in storm or emergency conditions:

7. Please confirm here that you have completed and enclosed both Annexes 1 and 2: *Tick* √

8. Please state:

Population served (head)	757
Consumption (l/head/day) default = 180	180
Infiltration (m^3/day)	74.9
Industrial effluent flow (m^3/day)	0
Dry Weather Flow (m^3/day)	215
Soc A (l/sec)	14.3
Predicted spill frequency (per annum)	13

IMPORTANT NOTES FOR ALL CONSENT APPLICATIONS:

1. **Whoever signs the declaration on the main application form takes responsibility for the discharge, and will become the registered consent holder, if consent is given. In the case of a 'body corporate' (eg a public limited company ('plc'), limited, company, local authority), the 'body corporate' will be the registered consent holder, and the person with the delegated authority to sign on behalf of the 'body corporate' should give their job title.**

2. **Agents making an application on behalf of a client, must attach their clients written authority.**

3. **If the name and/or address of the applicant changes after submission of this application to the Environment Agency, the applicant must inform the Agency in writing.**

Michelle

DŴR CYMRU
WELSH WATER

Gwaith Trin Dŵr Gwastraff Tregŵr
Heol Victoria
Tre Gŵyr
Abertawe SA4 3AB

Gowerton Waste Water Treatment Works
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Mrs Lynne Lewis
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'Maes Newydd'
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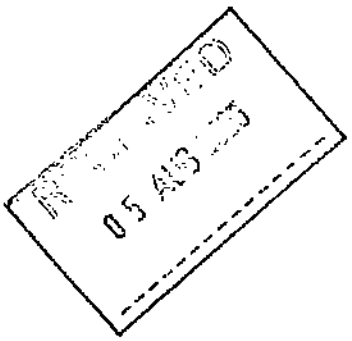
Neath and Port Talbot
SA10 6JQ



3rd August 2005

Tel 01792 511828

Dear Mrs Lewis,

Llanfarian WwTW and inlet pumping station

Please find enclosed applications for variation of

2

BP0015201 Llanfarian WwTW final effluent
BP0015201 Llanfarian WwTW inlet pumping station storm and emergency } Rec No 5494
BP0015203 Llanfarian WwTW screened storm } Rec No 5495
BP0015204 Llanfarian WwTW settled screened storm

I enclose cheque nos. 406054 and 406058 totalling £3088.

Yours sincerely,

Lewis Keil

Dr Lewis Keil
Scientist - Wastewater

Documentation Supporting Consent Application for Llanfarian WwTW

CONTENTS

Introduction

The Llanfarian catchment comprises a pumped flow from the north of the catchment and 2 gravity flows from the south of the catchment. The works treats SOCA flows up to the Primary Settlement Tank and further biologically treats 3DWF. The existing PST also provides storm storage.

The preferred solution for Llanfarian WwTW comprises the rationalisation of the inlet flows and storm discharges, and a FE pump set.

The advantages of this Option include the following;

- Ensuring the works treats FFT
- Breaking the hydraulic link between the river and the FST when the Afon Ystwyth is running high

Llanfarian WwTW Consents to Discharge

Existing	This Application
BP0015201, FE	variation to flows
BP0015202, CSO and emergency	variation to flows + 6 mm Copa sack
BP0015203, Settled storm	change to screened storm, variation to flows
BP0015204, Screened settled storm	variation to flows

Llanfarian WwTW Flow and Load and Population Justification

1) Flow and Load Survey

Survey carried out 1st Febraury to the 2nd March 2005

Flows from flow survey

	m^3/d	l/s
DWF	99.37	1.2
Infiltration	74.9	0.9

Population equivalent based on loads from survey

Determinand	allowance (kg/person.d)	average load (kg/d)	Current PE
BOD	0.06	17.02	284
TSS	0.06	25.53	426
Ammonia	0.008	1.54	193

Assumed Population Contributions

	Flow (L/person.d)	BOD (kg/person.d)	TSS (kg/person.d)	Ammonia (kg/person.d)
Resident	180	0.06	0.06	0.008
Tourist	120	0.04	0.05	0.004
Day visitor	25	0.02	0.02	0.003

2) SAP Database

Population (PE)	not available
DWF	

3) UDP growth

Domestic

No. of development sites	50	from UDP
PE	125	

Industrial

Hectares	0
PE	0

Basis: to 2016

Population density per house	2.5
No. of jobs created per hectare	20

4) House Count Data

No. of houses in catchment	249	Current
PE	623	

Population density per house 2.5

Future population equivalent and flows based on house counts, tourist info & UDP

	PE	Flow (m3/d)	BOD (kg/d)	TSS (kg/d)	Ammonia (kg/d)
Resident	748	135	44.85	44.85	5.98
Tourist	0	0	0.00	0.00	0.00
Day visitor	70	1.8	1.40	1.40	0.21
Total	757	136	46.25	46.25	6.19
Industrial		0			
Infiltration		35.88			
DWF	172.2	m3/d	2.0	l/s	
FFT (3DWF)	444.8	m3/d	5.1	l/s	
FFT (SOCA)	1189	m3/d	13.8	l/s	

Infiltration based on 120 l/house/d

Industrial based on 10 m3/hectare/d

5) Design Basis

	PE	Flow (m3/d)	BOD (kg/d)	TSS (kg/d)	Ammonia (kg/d)
Total PE	757	136	46.25	46.25	6.19
Industrial		0			
Infiltration		74.9			
DWF	215	m3/d	2.5	l/s	
3DWF	495	m3/d	5.7	l/s	
SOC A	1232	m3/d	14.3	l/s	

Notes:

1. PE Based on House Count Data + UDP
2. Infiltration based on maximum value (flow & load data)

6) House Count Data - North of Catchment

No. of houses in catchment	109
PE	273

Current

Population density per house 2.5

Future population equivalent and flows based on house counts, tourist info & UDP

	PE	Flow (m3/d)	BOD (kg/d)	TSS (kg/d)	Ammonia (kg/d)
Resident	273	49	16.35	16.35	2.18
Tourist	0	0	0.00	0.00	0.00
Day visitor	0	0.0	0.00	0.00	0.00
Total	273	49	16.35	16.35	2.18
Industrial		0			
Infiltration		26.2			
DWF	75.3	m3/d	0.9	l/s	
FFT (3DWF)	173.4	m3/d	2.0	l/s	
FFT (SOCA)	446	m3/d	5.2	l/s	

Infiltration based on flow & load survey

7) House Count Data - South of Catchment

No. of houses in catchment	140
PE	350

Current

Population density per house 2.5

Future population equivalent and flows based on house counts, tourist info & UDP

	PE	Flow (m3/d)	BOD (kg/d)	TSS (kg/d)	Ammonia (kg/d)
Resident	475	86	28.50	28.50	3.80
Tourist	0	0	0.00	0.00	0.00
Day visitor	70	1.8	1.40	1.40	0.21
Total	485	87	29.90	29.90	4.01
Industrial		0			
Infiltration		48.7			
DWF	136.0	m3/d	1.6	l/s	
FFT (3DWF)	310.5	m3/d	3.6	l/s	
FFT (SOCA)	782	m3/d	9.1	l/s	

Infiltration based on flow & load survey

SPILL FREQUENCY ANALYSIS LLANFARIAN WwTW - Inlet Pumping Station CSO (BP0015202)
Results of Annual Time Series Rainfall Assessment

Event No	Date	Total intensity	Rainfall duration	Average Intensity	Maximum Intensity	peak storm flow $Q = 2.78.C_v.C_R.I.A$	Total storm Inflow	DWF (l/s) 0.90	Total foul flow	Total Inflow	Peak sewer flow	FFT (l/s) 5.20	Spill to Storm Tank	Storm tank volume (m3) 22	Overflow to watercourse	spill time
		(mm)	(hr)	(mm/hr)	(mm/hr)	(l/s)	(m^3)	(l/s)	(m^3)	(m^3)	(l/s)	(m^3)	(m^3)		(m3)	hrs
1	08/10/1964	1287.4	8.15	2.63	34.2	4.1	121.7	0.9	26.4	148.1	5.0	152.6	0.0	22.0	0.0	0.0
2	20/07/1973	903.0	5.65	2.66	23.4	4.2	85.4	0.9	18.3	103.7	5.1	105.8	0.0	22.0	0.0	0.0
3	25/09/1963	876.4	5.32	2.75	28.8	4.3	82.9	0.9	17.2	100.1	5.2	99.6	0.5	22.0	0.0	0.0
4	20/01/1960	864.6	10.32	1.40	16.2	2.2	81.7	0.9	33.4	115.2	3.1	193.2	0.0	22.0	0.0	0.0
5	09/12/1961	879.6	9.32	1.57	28.2	2.5	83.2	0.9	30.2	113.4	3.4	174.5	0.0	22.0	0.0	0.0
6	20/11/1974	937.2	7.15	2.18	22.8	3.4	88.6	0.9	23.2	111.8	4.3	133.8	0.0	22.0	0.0	0.0
7	23/09/1963	969.0	8.15	1.98	34.8	3.1	91.6	0.9	26.4	118.0	4.0	152.6	0.0	22.0	0.0	0.0
8	25/07/1973	632.4	1.65	6.39	51.0	10.1	59.8	0.9	5.3	65.1	11.0	30.9	34.2	22.0	12.2	0.3
9	23/01/1960	1074.0	8.32	2.15	15.0	3.4	101.5	0.9	27.0	128.5	4.3	155.8	0.0	22.0	0.0	0.0
10	11/12/1961	1098.6	14.48	1.26	32.4	2.0	103.9	0.9	46.9	150.8	2.9	271.1	0.0	22.0	0.0	0.0
11	10/11/1974	902.4	10.48	1.44	42.6	2.3	85.3	0.9	34.0	119.3	3.2	196.2	0.0	22.0	0.0	0.0
12	05/06/1964	875.4	10.15	1.44	36.0	2.3	82.8	0.9	32.9	115.6	3.2	190.0	0.0	22.0	0.0	0.0
13	26/08/1956	783.6	13.15	0.99	39.0	1.6	74.1	0.9	42.6	116.7	2.5	246.2	0.0	22.0	0.0	0.0
14	10/09/1963	460.2	8.65	0.89	73.2	1.4	43.5	0.9	28.0	71.5	2.3	161.9	0.0	22.0	0.0	0.0
15	22/03/1970	747.0	7.32	1.70	49.8	2.7	70.6	0.9	23.7	94.3	3.6	137.0	0.0	22.0	0.0	0.0
16	11/02/1973	1232.4	14.82	1.39	36.0	2.2	116.5	0.9	48.0	164.5	3.1	277.4	0.0	22.0	0.0	0.0
17	06/06/1964	675.0	10.50	1.07	9.6	1.7	63.8	0.9	34.0	97.8	2.6	196.6	0.0	22.0	0.0	0.0
18	08/09/1963	416.8	4.32	1.60	38.4	2.5	39.2	0.9	14.0	53.2	3.4	80.9	0.0	22.0	0.0	0.0
19	07/10/1964	481.2	11.32	0.71	45.0	1.1	45.6	0.9	36.7	82.3	2.0	211.9	0.0	22.0	0.0	0.0
20	24/09/1963	423.6	4.65	1.52	23.4	2.4	40.0	0.9	15.1	55.1	3.3	87.0	0.0	22.0	0.0	0.0
21	13/12/1961	285.6	4.00	1.19	53.4	1.9	27.0	0.9	13.0	40.0	2.8	74.9	0.0	22.0	0.0	0.0
22	12/06/1964	567.6	6.32	1.46	19.2	2.3	52.3	0.9	20.5	72.8	3.2	118.3	0.0	22.0	0.0	0.0
23	01/12/1961	728.4	13.32	0.91	18.6	1.4	68.9	0.9	43.2	112.0	2.3	249.4	0.0	22.0	0.0	0.0
24	06/10/1964	640.8	5.32	2.00	15.0	3.2	60.4	0.9	17.2	77.6	4.1	99.6	0.0	22.0	0.0	0.0
25	04/05/1962	798.6	8.93	1.48	8.4	2.3	75.0	0.9	28.9	103.9	3.2	167.2	0.0	22.0	0.0	0.0
26	03/09/1963	964.2	15.15	1.06	19.8	1.7	91.1	0.9	49.1	140.2	2.6	283.6	0.0	22.0	0.0	0.0
27	30/04/1963	866.4	11.15	1.29	10.8	2.0	81.6	0.9	36.1	117.7	2.9	208.7	0.0	22.0	0.0	0.0
28	07/12/1961	771.0	16.32	0.79	10.2	1.2	73.1	0.9	52.9	126.0	2.1	305.5	0.0	22.0	0.0	0.0
29	12/12/1961	388.8	5.00	1.30	18.6	2.0	36.8	0.9	16.2	53.0	2.9	93.6	0.0	22.0	0.0	0.0
30	11/11/1974	316.8	6.48	0.81	39.0	1.3	29.8	0.9	21.0	50.8	2.2	121.3	0.0	22.0	0.0	0.0
31	23/01/1960	602.4	12.33	0.81	10.8	1.3	57.0	0.9	39.9	96.9	2.2	230.8	0.0	22.0	0.0	0.0
32	25/08/1956	319.8	3.32	1.59	23.4	2.5	29.9	0.9	10.8	40.7	3.4	62.2	0.0	22.0	0.0	0.0
33	15/07/1973	382.2	2.65	2.39	11.4	3.8	35.9	0.9	8.6	44.5	4.7	49.6	0.0	22.0	0.0	0.0
34	20/04/1963	387.4	6.00	0.80	18.0	1.3	27.2	0.9	19.4	46.7	2.2	112.3	0.0	22.0	0.0	0.0
35	01/08/1956	486.0	5.00	1.62	7.2	2.6	45.9	0.9	16.2	62.1	3.5	93.6	0.0	22.0	0.0	0.0
36	30/03/1970	315.6	5.00	1.05	11.4	1.7	29.8	0.9	16.2	46.0	2.6	93.6	0.0	22.0	0.0	0.0
37	14/07/1973	769.2	14.65	0.87	16.2	1.4	72.3	0.9	47.5	119.8	2.3	274.2	0.0	22.0	0.0	0.0
38	18/07/1973	547.2	6.15	1.48	11.4	2.3	51.6	0.9	19.9	71.6	3.2	115.1	0.0	22.0	0.0	0.0
39	03/03/1970	442.8	6.65	1.11	9.0	1.7	41.9	0.9	21.5	63.4	2.6	124.5	0.0	22.0	0.0	0.0
40	21/01/1960	382.2	6.15	1.03	9.0	1.6	35.9	0.9	19.9	55.9	2.5	115.1	0.0	22.0	0.0	0.0
41	19/03/1970	256.8	3.48	1.22	8.4	1.9	24.1	0.9	11.3	35.4	2.8	65.1	0.0	22.0	0.0	0.0
42	08/05/1962	220.2	3.15	1.16	8.4	1.8	20.7	0.9	10.2	30.9	2.7	59.0	0.0	22.0	0.0	0.0

SPILL FREQUENCY ANALYSIS LLANFARIAN WwTW - Inlet Pumping Station CSO (BP0015202)
Results of Annual Time Series Rainfall Assessment

Event No	Date	Total Intensity	Rainfall duration	Average intensity	Maximum intensity	peak storm flow $Q = 2.78.C_v.C_R.I.A$	Total storm inflow	DWF (l/s) 0.90	Total foul flow	Total Inflow	Peak sewer flow	FFT (l/s) 5.20	Spill to Storm Tank	Storm tank volume (m3)	Overflow to watercourse	spill time
		(mm)	(hr)	(mm/hr)	(mm/hr)	(l/s)	(m^3)	(l/s)	(m^3)	(m^3)	(l/s)	(m^3)	(m^3)	22	(m3)	hrs
43	10/05/1962	166.2	0.65	4.15	12.0	6.5	15.3	0.9	2.1	17.4	7.4	12.2	5.2	22.0	0.0	0.0
44	19/11/1974	803.4	11.32	1.18	10.8	1.9	75.8	0.9	36.7	112.4	2.8	211.9	0.0	22.0	0.0	0.0
45	05/10/1964	467.4	7.32	1.06	25.8	1.7	44.0	0.9	23.7	67.7	2.6	137.0	0.0	22.0	0.0	0.0
46	02/01/1960	357.6	8.82	0.70	11.4	1.1	35.0	0.9	28.6	63.6	2.0	165.1	0.0	22.0	0.0	0.0
47	05/06/1964	327.0	3.65	1.50	5.4	2.4	31.1	0.9	11.8	42.9	3.3	68.3	0.0	22.0	0.0	0.0
48	13/07/1973	328.8	6.00	0.90	17.4	1.4	30.6	0.9	19.4	50.1	2.3	112.3	0.0	22.0	0.0	0.0
49	29/08/1956	352.8	6.15	0.95	15.0	1.5	33.1	0.9	19.9	53.1	2.4	115.1	0.0	22.0	0.0	0.0
50	10/12/1961	394.2	5.50	1.19	10.8	1.9	37.3	0.9	17.8	55.1	2.8	103.0	0.0	22.0	0.0	0.0
51	01/01/1960	250.2	11.32	0.37	8.4	0.6	23.7	0.9	36.7	60.3	1.5	211.9	0.0	22.0	0.0	0.0
52	11/03/1970	211.8	3.48	1.01	10.2	1.6	20.0	0.9	11.3	31.3	2.5	65.1	0.0	22.0	0.0	0.0
53	04/12/1961	180.0	2.15	1.40	9.6	2.2	17.0	0.9	7.0	24.0	3.1	40.2	0.0	22.0	0.0	0.0
54	09/10/1964	305.4	7.48	0.68	13.2	1.1	28.9	0.9	24.2	53.1	2.0	140.0	0.0	22.0	0.0	0.0
55	02/11/1974	201.6	2.15	1.56	11.4	2.5	19.1	0.9	7.0	26.0	3.4	40.2	0.0	22.0	0.0	0.0
56	03/12/1961	288.6	11.82	0.41	9.6	0.6	27.3	0.9	38.3	65.6	1.5	221.3	0.0	22.0	0.0	0.0
57	11/11/1974	285.0	6.65	0.71	18.6	1.1	26.9	0.9	21.5	48.5	2.0	124.5	0.0	22.0	0.0	0.0
58	19/07/1973	252.0	3.32	1.27	8.4	2.0	23.8	0.9	10.8	34.6	2.9	62.2	0.0	22.0	0.0	0.0
59	10/03/1970	157.8	2.15	1.22	9.0	1.9	14.9	0.9	7.0	21.9	2.8	40.2	0.0	22.0	0.0	0.0
60	30/03/1970	171.0	1.98	1.44	11.4	2.3	16.2	0.9	6.4	22.6	3.2	37.1	0.0	22.0	0.0	0.0

Summary

Total number of spills to watercourse = 1 per annum			0.3
Total number of spills > 50 m3	= 0 per annum		
Total hours spilling/annum		0.3	0.004%

Notes

1. Rainfall events are the Annual Time Series Rainfall for the South-West region.
2. Due to the low number of spills, only the first 60 storms have been assessed.
3. Peak storm flow has been calculated using the Wallingford Procedure, Modified Rational Method, with impermeable area of 50 m2/house
4. Total storm inflow = peak storm flow x storm duration
5. DWF = dry weather flow from calculations
6. Total foul flow = DWF x storm duration
7. Total inflow = total storm inflow + total foul flow
8. FFT = flow to treatment, maximum rate x storm duration
9. When Inflow > FFT spill to to watercourse will only occur
10. Total number of properties in catchment = 109
11. No. of hours per annum = 8760

SPILL FREQUENCY ANALYSIS Llanfarian WwTW - Pre PST (BP0015204)
Results of Annual Time Series Rainfall Assessment

Event No	Date	Total Intensity	Rainfall duration	Average intensity	Maximum Intensity	peak storm flow $Q = 2.78.C_v.C_R.i.A$	Total storm inflow	DWF (l/s) 2.50	Total foul flow	Total Inflow	Peak sewer flow	FFT (l/s) 14.30	Spill to Storm Tank	Storm tank volume (m3)	Overflow to watercourse	spill time
		(mm)	(hr)	(mm/hr)	(mm/hr)	(l/s)	(m^3)	(l/s)	(m^3)	(m^3)	(l/s)	(m^3)	(m^3)	0	(m3)	hrs
1	08/10/1964	1287.4	8.15	2.63	34.2	11.4	333.9	2.5	73.4	407.2	13.9	419.6	0.0	0.0	0.0	0.0
2	20/07/1973	903.0	5.65	2.66	23.4	11.5	234.2	2.5	50.9	285.0	14.0	290.9	0.0	0.0	0.0	0.0
3	25/09/1963	876.4	5.32	2.75	28.8	11.9	227.3	2.5	47.9	275.2	14.4	273.9	1.3	0.0	1.3	0.0
4	20/01/1960	864.6	10.32	1.40	16.2	6.0	224.2	2.5	92.9	317.1	8.5	531.3	0.0	0.0	0.0	0.0
5	09/12/1961	879.6	9.32	1.57	28.2	6.8	228.1	2.5	83.9	312.0	9.3	479.8	0.0	0.0	0.0	0.0
6	20/11/1974	937.2	7.15	2.18	22.8	9.4	243.1	2.5	64.4	307.4	11.9	368.1	0.0	0.0	0.0	0.0
7	23/09/1963	969.0	8.15	1.98	34.8	8.6	251.3	2.5	73.4	324.7	11.1	419.6	0.0	0.0	0.0	0.0
8	25/07/1973	632.4	1.65	6.39	51.0	27.6	164.0	2.5	14.9	178.9	30.1	84.9	93.9	0.0	93.9	0.9
9	23/01/1960	1074.0	8.32	2.15	15.0	9.3	278.5	2.5	74.9	353.4	11.8	428.3	0.0	0.0	0.0	0.0
10	11/12/1961	1098.6	14.48	1.26	32.4	5.5	284.9	2.5	130.3	415.2	8.0	745.4	0.0	0.0	0.0	0.0
11	10/11/1974	902.4	10.48	1.44	42.6	6.2	234.0	2.5	94.3	328.3	8.7	539.5	0.0	0.0	0.0	0.0
12	05/06/1964	875.4	10.15	1.44	36.0	6.2	227.0	2.5	91.4	318.4	8.7	522.5	0.0	0.0	0.0	0.0
13	26/08/1956	783.6	13.15	0.99	39.0	4.3	203.2	2.5	118.4	321.6	6.8	677.0	0.0	0.0	0.0	0.0
14	10/09/1963	460.2	8.65	0.89	73.2	3.8	119.3	2.5	77.9	197.2	6.3	445.3	0.0	0.0	0.0	0.0
15	22/03/1970	747.0	7.32	1.70	49.8	7.4	193.7	2.5	65.9	259.6	9.9	376.8	0.0	0.0	0.0	0.0
16	11/02/1973	1232.4	14.82	1.39	36.0	6.0	319.6	2.5	133.4	453.0	8.5	762.9	0.0	0.0	0.0	0.0
17	06/06/1964	675.0	10.50	1.07	9.6	4.6	175.1	2.5	94.5	269.6	7.1	540.5	0.0	0.0	0.0	0.0
18	08/09/1963	416.8	4.32	1.60	38.4	6.9	107.6	2.5	38.9	146.4	9.4	222.4	0.0	0.0	0.0	0.0
19	07/10/1964	481.2	11.32	0.71	45.0	3.1	125.1	2.5	101.9	226.9	5.6	582.8	0.0	0.0	0.0	0.0
20	24/09/1963	423.6	4.65	1.52	23.4	6.6	109.9	2.5	41.9	151.7	9.1	239.4	0.0	0.0	0.0	0.0
21	13/12/1961	285.6	4.00	1.19	53.4	5.1	74.1	2.5	36.0	110.1	7.6	205.9	0.0	0.0	0.0	0.0
22	12/06/1964	567.6	6.32	1.46	19.2	6.3	143.6	2.5	56.9	200.5	8.8	325.4	0.0	0.0	0.0	0.0
23	01/12/1961	728.4	13.32	0.91	18.6	3.9	188.9	2.5	119.9	308.8	6.4	685.7	0.0	0.0	0.0	0.0
24	06/10/1964	640.8	5.32	2.00	15.0	8.6	165.6	2.5	47.9	213.4	11.1	273.9	0.0	0.0	0.0	0.0
25	04/05/1962	798.6	8.93	1.48	8.4	6.4	205.7	2.5	80.4	286.0	8.9	459.7	0.0	0.0	0.0	0.0
26	03/09/1963	964.2	15.15	1.06	19.8	4.6	249.9	2.5	136.4	386.2	7.1	779.9	0.0	0.0	0.0	0.0
27	30/04/1963	866.4	11.15	1.29	10.8	5.6	223.8	2.5	100.4	324.2	8.1	574.0	0.0	0.0	0.0	0.0
28	07/12/1961	771.0	16.32	0.79	10.2	3.4	200.6	2.5	146.9	347.5	5.9	840.2	0.0	0.0	0.0	0.0
29	12/12/1961	388.8	5.00	1.30	18.6	5.6	100.8	2.5	45.0	145.8	8.1	257.4	0.0	0.0	0.0	0.0
30	11/11/1974	316.8	6.48	0.81	39.0	3.5	81.7	2.5	58.3	140.0	6.0	333.6	0.0	0.0	0.0	0.0
31	23/01/1960	602.4	12.33	0.81	10.8	3.5	156.2	2.5	111.0	267.2	6.0	634.7	0.0	0.0	0.0	0.0
32	25/08/1956	319.8	3.32	1.59	23.4	6.9	82.1	2.5	29.9	112.0	9.4	170.9	0.0	0.0	0.0	0.0
33	15/07/1973	382.2	2.65	2.39	11.4	10.3	98.6	2.5	23.9	122.4	12.8	136.4	0.0	0.0	0.0	0.0
34	20/04/1963	387.4	6.00	0.80	18.0	3.5	74.7	2.5	54.0	128.7	6.0	308.9	0.0	0.0	0.0	0.0
35	01/08/1956	486.0	5.00	1.62	7.2	7.0	126.0	2.5	45.0	171.0	9.5	257.4	0.0	0.0	0.0	0.0
36	30/03/1970	315.6	5.00	1.05	11.4	4.5	81.7	2.5	45.0	126.7	7.0	257.4	0.0	0.0	0.0	0.0
37	14/07/1973	769.2	14.65	0.87	16.2	3.8	198.3	2.5	131.9	330.2	6.3	754.2	0.0	0.0	0.0	0.0
38	18/07/1973	547.2	6.15	1.48	11.4	6.4	141.6	2.5	55.4	197.0	8.9	316.6	0.0	0.0	0.0	0.0
39	03/03/1970	442.8	6.65	1.11	9.0	4.8	114.9	2.5	59.9	174.7	7.3	342.3	0.0	0.0	0.0	0.0
40	21/01/1960	382.2	6.15	1.03	9.0	4.5	98.6	2.5	55.4	153.9	7.0	316.6	0.0	0.0	0.0	0.0
41	19/03/1970	256.8	3.48	1.22	8.4	5.3	66.1	2.5	31.3	97.4	7.8	179.2	0.0	0.0	0.0	0.0
42	08/05/1962	220.2	3.15	1.16	8.4	5.0	56.9	2.5	28.4	85.2	7.5	162.2	0.0	0.0	0.0	0.0

SPILL FREQUENCY ANALYSIS Llanfarian WwTW - Pre PST (BP0015204)
Results of Annual Time Series Rainfall Assessment

Event No	Date	Total intensity	Rainfall duration	Average intensity	Maximum Intensity	peak storm flow $Q = 2.78.C_v.C_R.i.A$	Total storm Inflow	DWF (l/s) 2.50	Total foul flow	Total Inflow	Peak sewer flow	FFT (l/s) 14.30	Spill to Storm Tank	Storm tank volume (m3)	Overflow to watercourse	spill time
		(mm)	(hr)	(mm/hr)	(mm/hr)	(l/s)	(m^3)	(l/s)	(m^3)	(m^3)	(l/s)	(m^3)	(m^3)	0	(m3)	hrs
43	10/05/1962	166.2	0.65	4.15	12.0	17.9	42.0	2.5	5.9	47.8	20.4	33.5	14.4	0.0	14.4	0.2
44	19/11/1974	803.4	11.32	1.18	10.8	5.1	207.9	2.5	101.9	309.7	7.6	582.8	0.0	0.0	0.0	0.0
45	05/10/1964	467.4	7.32	1.06	25.8	4.6	120.7	2.5	65.9	186.6	7.1	376.8	0.0	0.0	0.0	0.0
46	02/01/1960	357.6	8.82	0.70	11.4	3.0	96.1	2.5	79.4	175.5	5.5	454.1	0.0	0.0	0.0	0.0
47	05/06/1964	327.0	3.65	1.50	5.4	6.5	85.2	2.5	32.9	118.0	9.0	187.9	0.0	0.0	0.0	0.0
48	13/07/1973	328.8	6.00	0.90	17.4	3.9	84.0	2.5	54.0	138.0	6.4	308.9	0.0	0.0	0.0	0.0
49	29/08/1956	352.8	6.15	0.95	15.0	4.1	90.9	2.5	55.4	146.3	6.6	316.6	0.0	0.0	0.0	0.0
50	10/12/1961	394.2	5.50	1.19	10.8	5.2	102.2	2.5	49.5	151.7	7.7	283.1	0.0	0.0	0.0	0.0
51	01/01/1960	250.2	11.32	0.37	8.4	1.6	64.9	2.5	101.9	166.8	4.1	582.8	0.0	0.0	0.0	0.0
52	11/03/1970	211.8	3.48	1.01	10.2	4.4	54.9	2.5	31.3	86.2	6.9	179.2	0.0	0.0	0.0	0.0
53	04/12/1961	180.0	2.15	1.40	9.6	6.0	46.7	2.5	19.4	66.0	8.5	110.7	0.0	0.0	0.0	0.0
54	09/10/1964	305.4	7.48	0.68	13.2	2.9	79.2	2.5	67.3	146.5	5.4	385.1	0.0	0.0	0.0	0.0
55	02/11/1974	201.6	2.15	1.56	11.4	6.8	52.3	2.5	19.4	71.6	9.3	110.7	0.0	0.0	0.0	0.0
56	03/12/1961	288.6	11.82	0.41	9.6	1.8	74.8	2.5	106.4	181.2	4.3	608.5	0.0	0.0	0.0	0.0
57	11/11/1974	285.0	6.65	0.71	18.6	3.1	73.9	2.5	59.9	133.8	5.6	342.3	0.0	0.0	0.0	0.0
58	19/07/1973	252.0	3.32	1.27	8.4	5.5	65.4	2.5	29.9	95.2	8.0	170.9	0.0	0.0	0.0	0.0
59	10/03/1970	157.8	2.15	1.22	9.0	5.3	40.9	2.5	19.4	60.3	7.8	110.7	0.0	0.0	0.0	0.0
60	30/03/1970	171.0	1.98	1.44	11.4	6.2	44.3	2.5	17.8	62.2	8.7	101.9	0.0	0.0	0.0	0.0

1.2

Summary

Total number of spills to watercourse = 1 per annum		
Total number of spills > 50 m3	= 0 per annum	
Total hours spilling/annum	1.2	0.014%

Notes

1. Rainfall events are the Annual Time Series Rainfall for the South-West region.
2. Due to the low number of spills, only the first 60 storms have been assessed.
3. Peak storm flow has been calculated using the Wallingford Procedure, Modified Rational Method, with impermeable area of 50 m2/house
4. Total storm inflow = peak storm flow x storm duration
5. DWF = dry weather flow from calculations
6. Total foul flow = DWF x storm duration
7. Total inflow = total storm inflow + total foul flow
8. FFT = flow to treatment, maximum rate x storm duration
9. When Inflow > FFT spill to to watercourse will only occur
10. Total number of properties in catchment = 299
11. No. of hours per annum = 8760

SPILL FREQUENCY ANALYSIS Llanfarian WwTW - Post PST (BP0015204)
Results of Annual Time Series Rainfall Assessment

Event No	Date	Total Intensity	Rainfall duration	Average intensity	Maximum intensity	peak storm flow $Q = 2.78.C_v.C_R.I.A$	Total storm inflow	DWF (l/s) 2.50	Total foul flow	Total inflow	Peak sewer flow	FFT (l/s) 5.70	Spill to Storm Tank	Storm tank volume (m3)	Overflow to watercourse	spill time
		(mm)	(hr)	(mm/hr)	(mm/hr)	(l/s)	(m^3)	(l/s)	(m^3)	(m^3)	(l/s)	(m^3)	(m^3)	109	(m3)	hrs
1	08/10/1964	1287.4	8.15	2.63	34.2	11.4	333.9	2.5	73.4	407.2	13.9	167.2	240.0	109.0	131.0	3.2
2	20/07/1973	903.0	5.65	2.66	23.4	11.5	234.2	2.5	50.9	285.0	14.0	115.9	169.1	109.0	60.1	1.4
3	25/09/1963	876.4	5.32	2.75	28.8	11.9	227.3	2.5	47.9	275.2	14.4	109.2	166.0	109.0	57.0	1.3
4	20/01/1960	864.6	10.32	1.40	16.2	6.0	224.2	2.5	92.9	317.1	8.5	211.8	105.3	109.0	0.0	0.0
5	09/12/1961	879.6	9.32	1.57	28.2	6.8	228.1	2.5	83.9	312.0	9.3	191.2	120.7	109.0	11.7	0.5
6	20/11/1974	937.2	7.15	2.18	22.8	9.4	243.1	2.5	64.4	307.4	11.9	146.7	160.7	109.0	51.7	1.5
7	23/09/1963	969.0	8.15	1.98	34.8	8.6	251.3	2.5	73.4	324.7	11.1	167.2	157.4	109.0	48.4	1.6
8	25/07/1973	632.4	1.65	6.39	51.0	27.6	164.0	2.5	14.9	178.9	30.1	33.9	145.0	109.0	36.0	0.4
9	23/01/1960	1074.0	8.32	2.15	15.0	9.3	278.5	2.5	74.9	353.4	11.8	170.7	182.7	109.0	73.7	2.2
10	11/12/1961	1098.6	14.48	1.26	32.4	5.5	284.9	2.5	130.3	415.2	8.0	297.1	118.1	109.0	9.1	0.5
11	10/11/1974	902.4	10.48	1.44	42.6	6.2	234.0	2.5	94.3	328.3	8.7	215.0	113.3	109.0	4.3	0.2
12	05/06/1964	875.4	10.15	1.44	36.0	6.2	227.0	2.5	91.4	318.4	8.7	208.3	110.1	109.0	1.1	0.0
13	26/08/1956	783.6	13.15	0.99	39.0	4.3	203.2	2.5	118.4	321.6	6.8	269.8	51.7	109.0	0.0	0.0
14	10/09/1963	460.2	8.65	0.89	73.2	3.8	119.3	2.5	77.9	197.2	6.3	177.5	19.7	109.0	0.0	0.0
15	22/03/1970	747.0	7.32	1.70	49.8	7.4	193.7	2.5	65.9	259.6	9.9	150.2	109.4	109.0	0.4	0.0
16	11/02/1973	1232.4	14.82	1.39	36.0	6.0	319.6	2.5	133.4	453.0	8.5	304.1	148.9	109.0	39.9	1.8
17	06/06/1964	675.0	10.50	1.07	9.6	4.6	175.1	2.5	94.5	269.6	7.1	215.5	54.1	109.0	0.0	0.0
18	08/09/1963	416.8	4.32	1.60	38.4	6.9	107.6	2.5	38.9	146.4	9.4	88.6	57.8	109.0	0.0	0.0
19	07/10/1964	481.2	11.32	0.71	45.0	3.1	125.1	2.5	101.9	226.9	5.6	232.3	0.0	109.0	0.0	0.0
20	24/09/1963	423.6	4.65	1.52	23.4	6.6	109.9	2.5	41.9	151.7	9.1	95.4	56.3	109.0	0.0	0.0
21	13/12/1961	285.6	4.00	1.19	53.4	5.1	74.1	2.5	36.0	110.1	7.6	82.1	28.0	109.0	0.0	0.0
22	12/06/1964	567.6	6.32	1.46	19.2	6.3	143.6	2.5	56.9	200.5	8.8	129.7	70.8	109.0	0.0	0.0
23	01/12/1961	728.4	13.32	0.91	18.6	3.9	188.9	2.5	119.9	308.8	6.4	273.3	35.5	109.0	0.0	0.0
24	06/10/1964	640.8	5.32	2.00	15.0	8.6	165.6	2.5	47.9	213.4	11.1	109.2	104.3	109.0	0.0	0.0
25	04/05/1962	798.6	8.93	1.48	8.4	6.4	205.7	2.5	80.4	286.0	8.9	183.2	102.8	109.0	0.0	0.0
26	03/09/1963	964.2	15.15	1.06	19.8	4.6	249.9	2.5	136.4	386.2	7.1	310.9	75.4	109.0	0.0	0.0
27	30/04/1963	866.4	11.15	1.29	10.8	5.6	223.8	2.5	100.4	324.2	8.1	228.8	95.4	109.0	0.0	0.0
28	07/12/1961	771.0	16.32	0.79	10.2	3.4	200.6	2.5	146.9	347.5	5.9	334.9	12.6	109.0	0.0	0.0
29	12/12/1961	388.8	5.00	1.30	18.6	5.6	100.8	2.5	45.0	145.8	8.1	102.6	43.2	109.0	0.0	0.0
30	11/11/1974	316.8	6.48	0.81	39.0	3.5	81.7	2.5	58.3	140.0	6.0	133.0	7.0	109.0	0.0	0.0
31	23/01/1960	602.4	12.33	0.81	10.8	3.5	156.2	2.5	111.0	267.2	6.0	253.0	14.2	109.0	0.0	0.0
32	25/08/1956	319.8	3.32	1.59	23.4	6.9	82.1	2.5	29.9	112.0	9.4	68.1	43.9	109.0	0.0	0.0
33	15/07/1973	382.2	2.65	2.39	11.4	10.3	98.6	2.5	23.9	122.4	12.8	54.4	68.0	109.0	0.0	0.0
34	20/04/1963	387.4	6.00	0.80	18.0	3.5	74.7	2.5	54.0	128.7	6.0	123.1	5.6	109.0	0.0	0.0
35	01/08/1956	486.0	5.00	1.62	7.2	7.0	126.0	2.5	45.0	171.0	9.5	102.6	68.4	109.0	0.0	0.0
36	30/03/1970	315.6	5.00	1.05	11.4	4.5	81.7	2.5	45.0	126.7	7.0	102.6	24.1	109.0	0.0	0.0
37	14/07/1973	769.2	14.65	0.87	16.2	3.8	198.3	2.5	131.9	330.2	6.3	300.6	29.6	109.0	0.0	0.0
38	18/07/1973	547.2	6.15	1.48	11.4	6.4	141.6	2.5	55.4	197.0	8.9	126.2	70.8	109.0	0.0	0.0
39	03/03/1970	442.8	6.65	1.11	9.0	4.8	114.9	2.5	59.9	174.7	7.3	136.5	38.3	109.0	0.0	0.0
40	21/01/1960	382.2	6.15	1.03	9.0	4.5	98.6	2.5	55.4	153.9	7.0	126.2	27.7	109.0	0.0	0.0
41	19/03/1970	256.8	3.48	1.22	8.4	5.3	66.1	2.5	31.3	97.4	7.8	71.4	26.0	109.0	0.0	0.0
42	08/05/1962	220.2	3.15	1.16	8.4	5.0	56.9	2.5	28.4	85.2	7.5	64.6	20.6	109.0	0.0	0.0

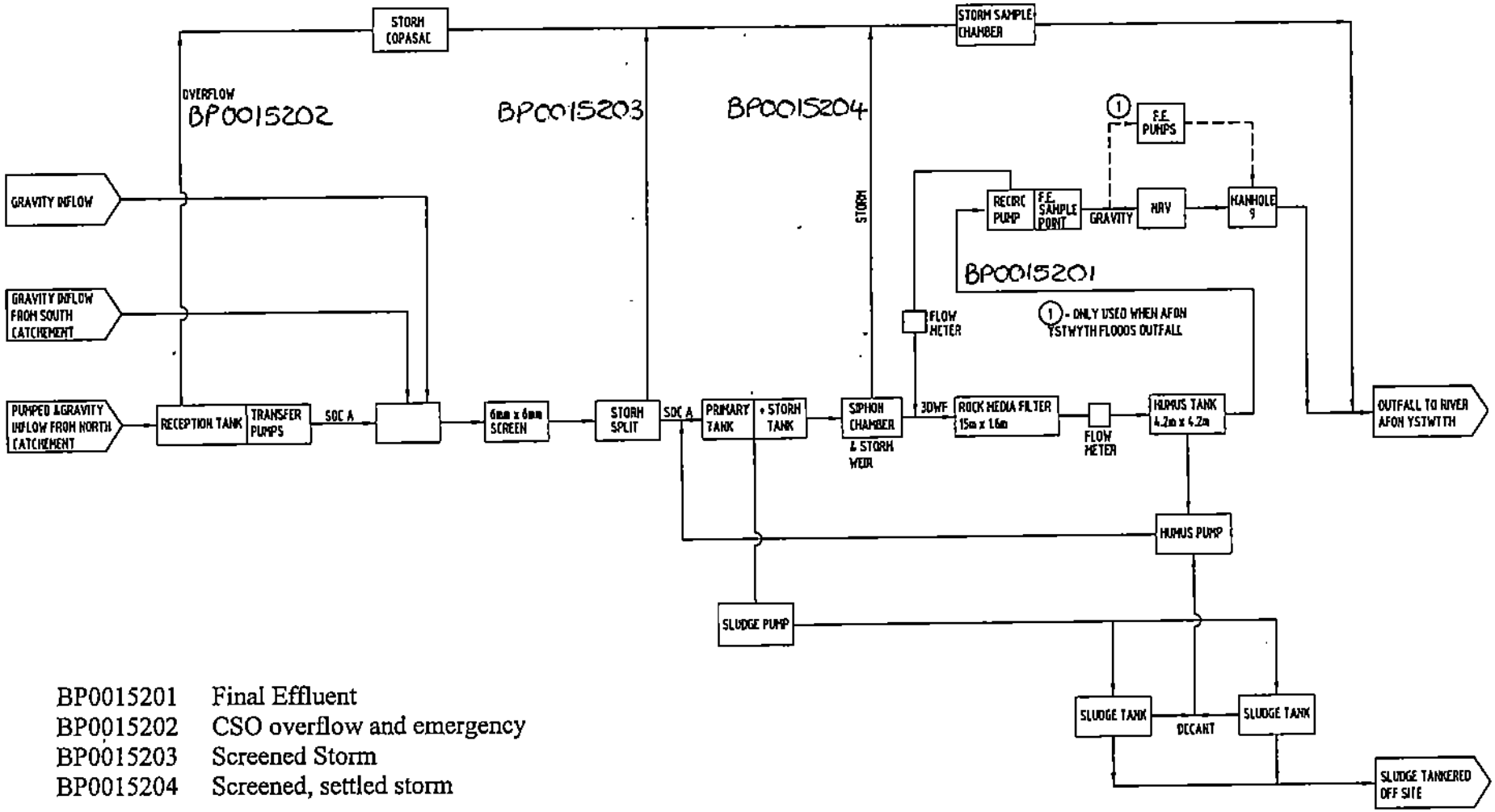
SPILL FREQUENCY ANALYSIS Llanfarian WwTW - Post PST (BP0015204)
Results of Annual Time Series Rainfall Assessment

Event No	Date	Total Intensity	Rainfall duration	Average intensity	Maximum intensity	peak storm flow $Q = 2.78.C_v.C_R.I.A$	Total storm inflow	DWF (l/s) 2.50	Total foul flow	Total inflow	Peak sewer flow	FFT (l/s) 5.70	Spill to Storm Tank	Storm tank volume (m3)	Overflow to watercourse	spill time
		(mm)	(hr)	(mm/hr)	(mm/hr)	(l/s)	(m^3)	(l/s)	(m^3)	(m^3)	(l/s)	(m^3)	(m^3)	109	(m3)	hrs
43	10/05/1962	166.2	0.65	4.15	12.0	17.9	42.0	2.5	5.9	47.8	20.4	13.3	34.5	109.0	0.0	0.0
44	19/11/1974	803.4	11.32	1.18	10.8	5.1	207.9	2.5	101.9	309.7	7.6	232.3	77.4	109.0	0.0	0.0
45	05/10/1964	467.4	7.32	1.06	25.8	4.6	120.7	2.5	65.9	186.6	7.1	150.2	36.4	109.0	0.0	0.0
46	02/01/1960	357.6	8.82	0.70	11.4	3.0	96.1	2.5	79.4	175.5	5.5	181.0	0.0	109.0	0.0	0.0
47	05/06/1964	327.0	3.65	1.50	5.4	6.5	85.2	2.5	32.9	118.0	9.0	74.9	43.1	109.0	0.0	0.0
48	13/07/1973	328.8	6.00	0.90	17.4	3.9	84.0	2.5	54.0	138.0	6.4	123.1	14.9	109.0	0.0	0.0
49	29/08/1956	352.8	6.15	0.95	15.0	4.1	90.9	2.5	55.4	146.3	6.6	126.2	20.1	109.0	0.0	0.0
50	10/12/1961	394.2	5.50	1.19	10.8	5.2	102.2	2.5	49.5	151.7	7.7	112.9	38.9	109.0	0.0	0.0
51	01/01/1960	250.2	11.32	0.37	8.4	1.6	64.9	2.5	101.9	166.8	4.1	232.3	0.0	109.0	0.0	0.0
52	11/03/1970	211.8	3.48	1.01	10.2	4.4	54.9	2.5	31.3	86.2	6.9	71.4	14.8	109.0	0.0	0.0
53	04/12/1961	180.0	2.15	1.40	9.6	6.0	46.7	2.5	19.4	66.0	8.5	44.1	21.9	109.0	0.0	0.0
54	09/10/1964	305.4	7.48	0.68	13.2	2.9	79.2	2.5	67.3	146.5	5.4	153.5	0.0	109.0	0.0	0.0
55	02/11/1974	201.6	2.15	1.56	11.4	6.8	52.3	2.5	19.4	71.6	9.3	44.1	27.5	109.0	0.0	0.0
56	03/12/1961	288.6	11.82	0.41	9.6	1.8	74.8	2.5	106.4	181.2	4.3	242.5	0.0	109.0	0.0	0.0
57	11/11/1974	285.0	6.65	0.71	18.6	3.1	73.9	2.5	59.9	133.8	5.6	136.5	0.0	109.0	0.0	0.0
58	19/07/1973	252.0	3.32	1.27	8.4	5.5	65.4	2.5	29.9	95.2	8.0	68.1	27.1	109.0	0.0	0.0
59	10/03/1970	157.8	2.15	1.22	9.0	5.3	40.9	2.5	19.4	60.3	7.8	44.1	16.2	109.0	0.0	0.0
60	30/03/1970	171.0	1.98	1.44	11.4	6.2	44.3	2.5	17.8	62.2	8.7	40.6	21.5	109.0	0.0	0.0

Summary			
Total number of spills to watercourse = 13 per annum			14.7
Total number of spills > 50 m3	= 5 per annum		
Total hours spilling/annum		14.7	0.168%

Notes

1. Rainfall events are the Annual Time Series Rainfall for the South-West region.
2. Due to the low number of spills, only the first 60 storms have been assessed.
3. Peak storm flow has been calculated using the Wallingford Procedure, Modified Rational Method, with impermeable area of 50 m2/house
4. Total storm inflow = peak storm flow x storm duration
5. DWF = dry weather flow from calculations
6. Total foul flow = DWF x storm duration
7. Total inflow = total storm inflow + total foul flow
8. FFT = flow to treatment, maximum rate x storm duration
9. When Inflow > FFT spill to to watercourse will only occur
10. Total number of properties in catchment = 299
11. No. of hours per annum = 8760



BP0015201 Final Effluent
BP0015202 CSO overflow and emergency
BP0015203 Screened Storm
BP0015204 Screened, settled storm

P	FOR APPROVAL	AGH	AB	AB	13.07.05	Client: DWR CYMRU WELSH WATER	Project: LLANFARIAN W.W.T.W	Welsh Water Capital Alliance / Cynghrair Cyfalaf Dŵr Cymru	MEICA PROCESS LTD
Issue	Description	Auth.	Chk.	Appd.	Date	Scale A1 / Datum LOCAL	Title: PROPOSED P.F.D. OPTION A	DWR CYMRU WELSH WATER	Project Code: P1020 / Drawing No.: P1020-1003 / Issue: P1

CAD Ref:0/01/A3-HP

4. Description of flow management and discharge locations

Flows up to 3DWF are biologically treated, hence Llanfarian is classified as a 3DWF works. Incoming flows arrive via 3 separate sewers to the works.

Discharge 1: Inlet CSO Storm and Emergency (BP0015202)
The sewer delivering flows from the north of the catchment enters the inlet pump sump. SOCA flow for the sewer is passed forward to treatment by duty/standby pumps. The inlet pump sump meets the requirements for a CSO as the sump provides storage at 2hr @ 3DWF, has a spill frequency of < 1% and has a 6 mm Copa sack on the overflow.
There is a facility for a plug-in generator on-site.

Discharge 2: Screened storm (BP0015203)
The other sewers join at the end of the rising main from the inlet pump sump and pass through a 6 x 6 mm mechanical screen.
The PST is able to accept the combined SOCA flow. In order to control the flow into the PST a storm split is required for peak flows from the sewers from the south of the catchment.

Discharge 3: Settled, screened storm (BP0015204)
Once the flows have gone through primary settlement, only 3DWF goes on for biological treatment.
The settled and screened flows going to storm are, at peak flows, SOCA – 3DWF.

Discharge 4: FE (BP0015201)
After biological treatment and settlement, the flows pass through a sample point to the outfall by gravity.
However, when the Afon Ystwyth is running high, a FE pump will be used to discharge FE to the outfall.

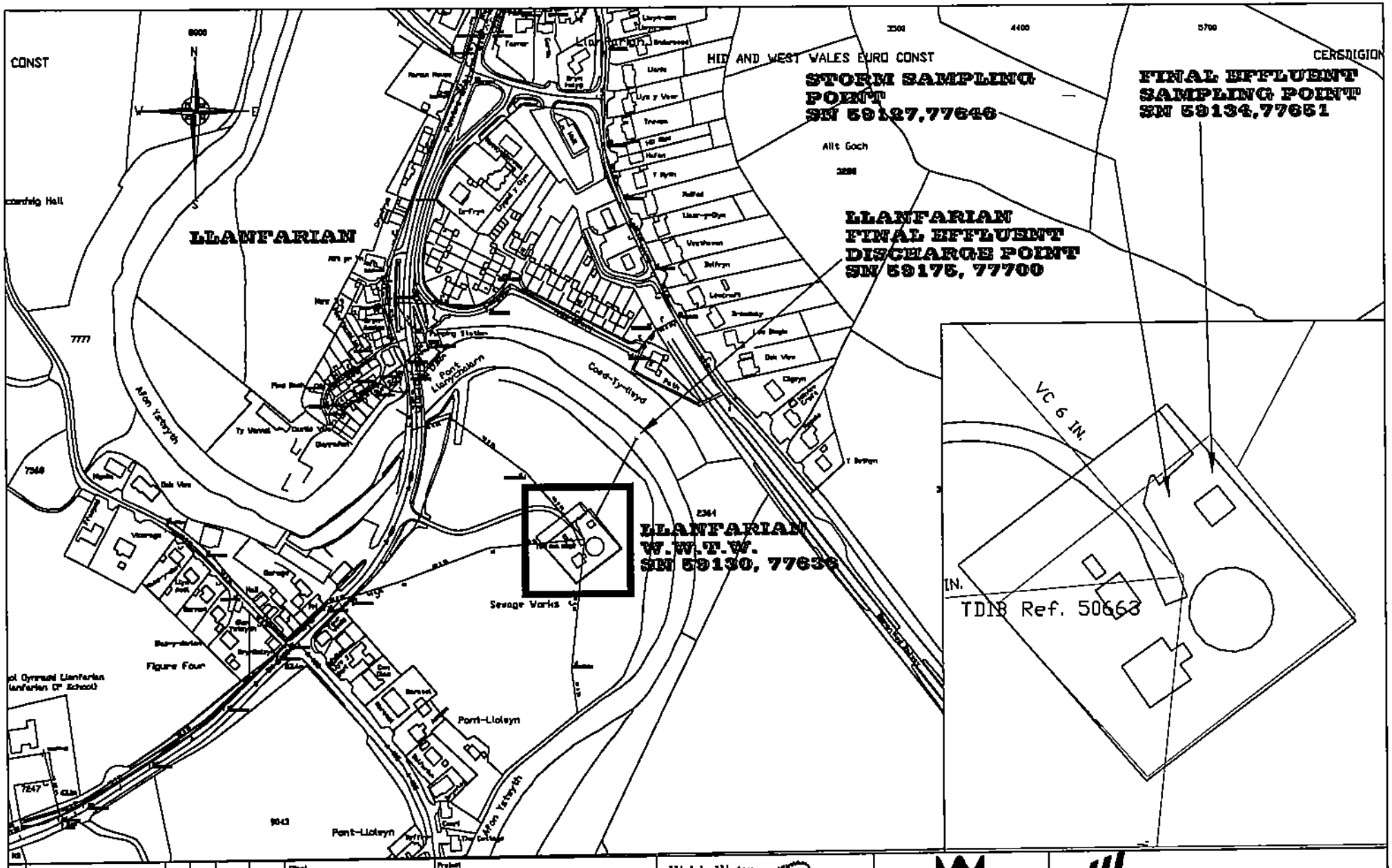
Flows up to 3DWF
The plant will be set up so that in dry weather, all flows up to 3 DWF will undergo biological treatment and no flows will go to storm.

Flows up to SOCA
Once flows go beyond 3DWF, a storm discharge will occur at discharge point 3. The required storm retention time (at least 2hrs @ 3DWF) is provided by the PST.

Flows in excess of SOCA
If flows in excess of SOCA are presented at discharge point 2, then a storm discharge will occur.

If flows in excess of SOCA occur from the North of the catchment and the inlet pump sump is filled, a storm event will occur at discharge point 1.

All flows from Llanfarian works will have been screened to 6 mm.



A	FOR APPROVAL	ADK	AB	AB	28.07.05	
Issue	Description	Auth.	Chd.	Appd.	Date	

Client: DWR CYMRU WELSH WATER

Project: LLANFARIAN W.W.T.W.

Title: SITE LOCATION PLAN DISCHARGE & SAMPLING POINTS

Scale A3: 1:2500

Datum: LOCAL

Welsh Water Capital Alliance

Cynghrair Cyfalaf Dŵr Cymru

DVR CYMRU WELSH WATER

MEICA PROCESS LTD
Parc Y Splott, Llanstaffan Road, Johnstown, Carmarthen, SA31 3BU
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Project Code	Drawing No.	Issue
P1020	P1020-2000	A

CAD Ref:0/01/A3-HP