Water Resources Act 1991
as amended by the Environment Act 1995
Consent to Discharge
Certificate of Holder

ENVIRONMENT AGENCY

Part A

To: AMGEN RHONDDA LTD
COMPANY DIRECTOR
BRYN PICA LANDFILL SITE
LLWYDCOED
ABERDARE CF44 0BX

COPY

NB: For a body corporate the job title is a point of contact.
Holder Start Date: 24/07/01

The **Environment Agency** ("the Agency") hereby confirm that the above named person is a/the registered holder of consent AN0308201 Consent Issued: 24/07/2001

Nature of Discharge(s); TSDR Trade - Site drainage (Contaminated S/W) - Rainfall
at SS9817094170 NANT Y GWYDDON LANDFILL SITE GELLI

Note: This certificate should be kept with the consent document for future reference. If you transfer responsibility for the discharge to somebody else you must pass the consent to them and tell the Agency within 21 days. **Responsibility for the consent cannot be disclaimed by the holder but the registration of holder may be transferred to a successor.** To do this please complete the form below, then tear it off and return it to the address shown. If you fail to transfer the consent, even though you are no longer on the site, you may still be liable for prosecution for pollution. If you transfer the consent but do not tell us, you will be committing an offence. In case of any queries please contact your local Environment Agency office.

Part B **Please complete in block capitals or type.**

To:

Water Resources Act 1991: Notice of transfer of consent to discharge

Consent: AN0308201
Consent Issued: 24/07/2001

Name: AMGEN RHONDDA LTD
Address: COMPANY DIRECTOR
BRYN PICA LANDFILL SITE
LLWYDCOED
ABERDARE CF44 0BX

I/We* hereby serve notice on the Agency that I/we* am/are* no longer a/the* Holder of the above consent which will be/was* transferred to: * delete as appropriate

Name(s) of new holder(s):
Address:

Post Code:

Date of Transfer to new Holder(s); .....

Signed:..... **Dated:**.....

Name (block capitals): ..... **Position:** .....
(to be completed when signing on behalf of corporate bodies)

Deddf Adnoddau Dwr 1991
fel y'i diwygiwyd gan Ddeddf yr Amgylchedd 1995
Caniatâd Gollwng
Tystysgrif Daliwr

ASIANTAETH YR AMGYLCHEDD

Rhan A

At: AMGEN RHONDDA LTD
COMPANY DIRECTOR
BRYN PICA LANDFILL SITE
LLWYDCOED
ABERDARE CF44 0BX

DS: I gorff corfforedig mae teitl y swydd yn bwynt cysylltu.
Dyddiad Cychwyn Daliwr: 24/07/01

Mae **Asiantaeth yr Amgylchedd** ("yr Asiantaeth") yn cadarnhau drwy hyn mai/bod y sawl a enwyd uchod yw/yn ddaliwr cofrestredig uy caniatâd AN0308201 Cyhoeddwyd Caniatâd: 24/07/2001

Natur y gollwng: TSDR Trade - Site drainage (Contaminated S/W) - Rainfall
yn SS9817094170 NANT Y GWYDDON LANDFILL SITE GELLI

Nodyn: Dylid cadw'r dystysgrif hon gyda'r ddogfen ganiatâd i gyfeirio ati yn y dyfodol. Os byddwch yn trosglwyddo cyfrifoldeb y gollwng i rywun arall, rhaid i chi gyflwyno'r caniatâd iddo ef neu hi a dweud wrth yr Asiantaeth cyn pen 21 diwrnod. **Ni all y daliwr wadu cyfrifoldeb y gollwng, ond gall cofrestriad y daliwr gael ei drosglwyddo i olynydd.** I wneud hynny, byddwch cystal â llenwi'r ffurflen isod, ei datgysylltu a'i dychwelyd i'r cyfeiriad a nodir. Os methwch drosglwyddo'r caniatâd, hyd yn oed os nad ydych ar y safle mwyach, gallwch fod yn agored yr un fath i gael eich erlyn am lygru. Os trosglwyddwch y caniatâd ond heb ddweud wrthom, byddwch yn cyflawni trosedd. Os bydd gennych ymholiadau, byddwch cystal â chysylltu â swyddfa Asiantaeth yr Amgylchedd yn lleol.

Rhan B **Llenwch mewn priflythrennau bras neu deipio.**

At:

Deddf Adnoddau Dwr 1991: Hysbysiad am drosglwyddo caniatâd gollwng

Caniatâd: AN0308201

Cyhoeddwyd Caniatâd: 24/07/2001

Enw: AMGEN RHONDDA LTD
Cyfeiriad:
COMPANY DIRECTOR
BRYN PICA LANDFILL SITE
LLWYDCOED
ABERDARE CF44 0BX

Yr wyf fi/Yr ydym ni* drwy hyn yn hysbysu'r Asiantaeth nad fi/ni/nad wyf/ydym mwyach yw/yn* Ddeiliad y caniatâd uchod. Caiff/Cafodd hwnnw ei drosglwyddo i: *dilewch yn ôl yr angen

Enw(au) y Daliwr/Dalwyr newydd:
Cyfeiriad:

Cod Post:

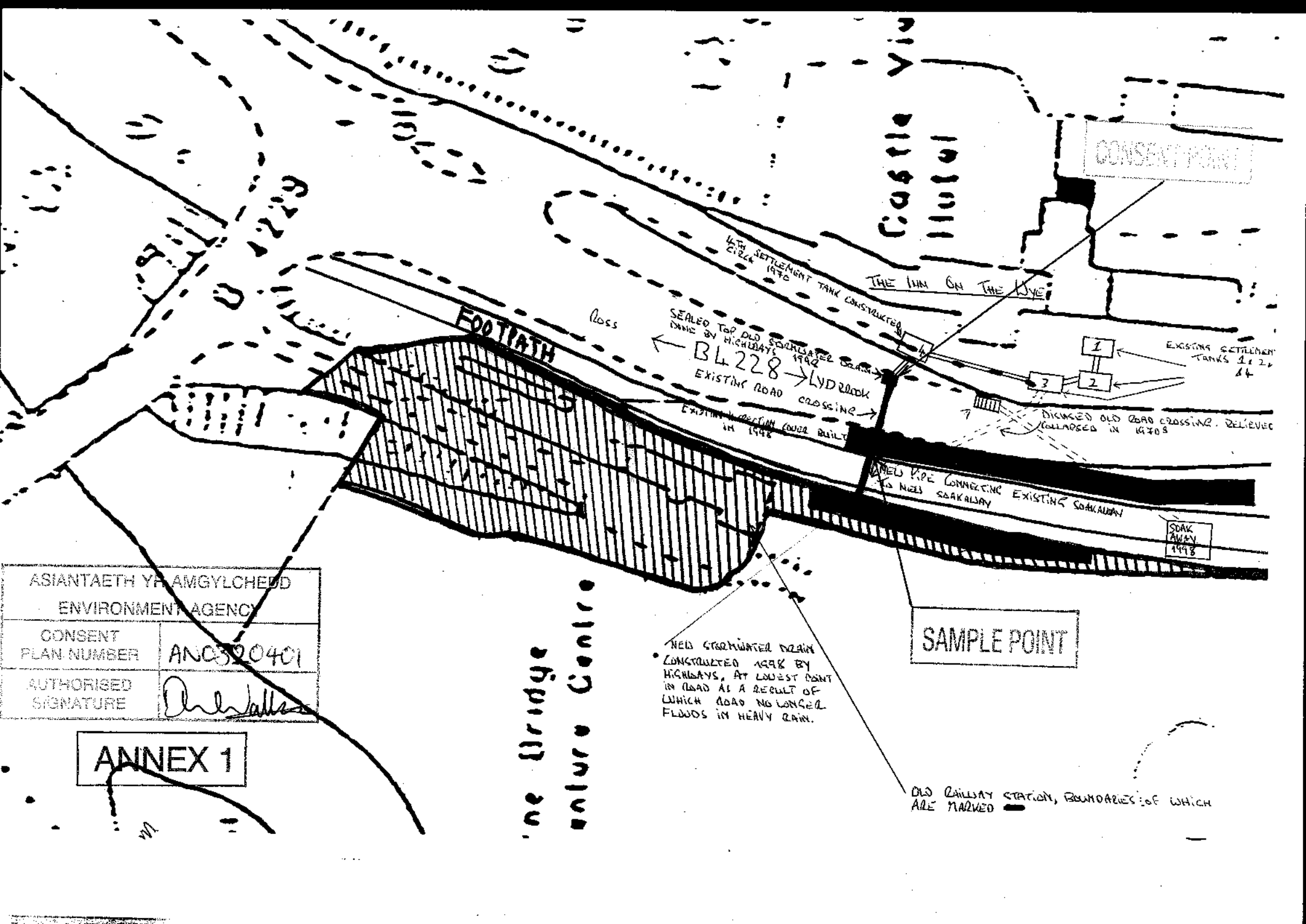
Dyddiad Trosglwyddo i'r Daliwr/Dalwyr newydd: .....

Llofnodwyd:..... **Dyddiedig:** .....

Enw Enw (priflythrennau bras):..... **Safle:** .....
(i'w lenwi wrth lofnodi ar ran cyrff corfforaethol)

JWE/5/96

RECYCLED

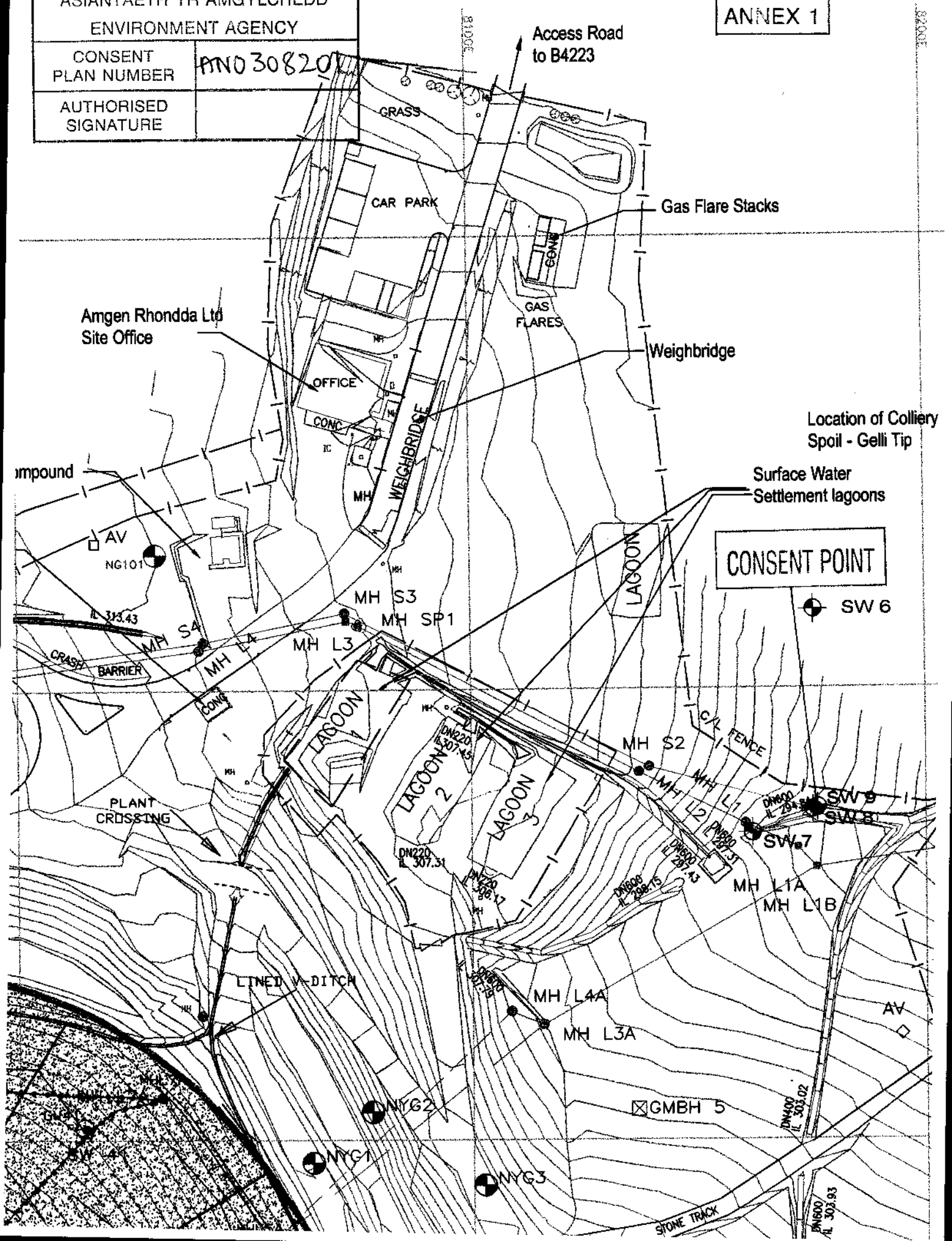


ASIANTAETH YR AMGYLCHEDD ENVIRONMENT AGENCY	
CONSENT PLAN NUMBER	ANC320401
AUTHORISED SIGNATURE	

ANNEX 1

ASIANTAETH YR AMGYLCHEDD ENVIRONMENT AGENCY	
CONSENT PLAN NUMBER	PIN030820
AUTHORISED SIGNATURE	

ANNEX 1



ASIANTAETH YR AMGYLCHEDD CYMRU
ENVIRONMENT AGENCY WALES

Eich cyf/Your ref.

Ein cyf/Our ref. SE/ACSC/MC/AN0308201 & AN0308301

Dyddiad/Date: 2 May 2001

FAO: Morag Aiken
EN1 Ltd
6 Kew Court
Pynes Hill
Rydon Lane
Exeter
EX2 5AZ

Dear Ms Aiken

WATER RESOURCES ACT 1991, SCHEDULE 10 (AS AMENDED BY THE ENVIRONMENT ACT 1995) APPLICATION FOR CONSENT TO DISCHARGE TRADE EFFLUENT AND SPOIL TIP SITE DRAINAGE FROM NANT Y GWYDDON LANDFILL, MYNYDD-Y-GELLI, GELLI, RHONDDA.
APPLICATION NO'S: AN0308201 & AN0308301

We now acknowledge receipt of your full application and application fee. Application AN0308201 is now valid from 23rd March 2001 and application AN0308301 is now valid from 14th March 2001. Please quote the above application number in any communication with us.

We have 4 months, from the date of receipt, to determine your application. You may not start to discharge without our consent. We will do all we can to deal with your application quickly but if by 23rd July 2001 and the 14th July 2001 respectively, you have not been advised of our decision, the application is deemed refused and you are entitled to appeal to the National Assembly for Wales. However, if appropriate, an extension to the 4 month determination period may be agreed between us in writing.

The Agency is required to advertise the application unless it is considered that the proposed discharge is unlikely to have an appreciable effect on the receiving watercourse. This would involve placing an advert and a notice in the London Gazette at your expense. You will be contacted again shortly should advertising be necessary.

If granted, a Consent under Schedule 10 of the Act, cover water quality considerations only. It does not give any right or permission to discharge where land is not owned by the applicant. In addition, for discharges to watercourse, it does not imply the suitability, with regard to volumetric capacity, of the receiving watercourse. It is the responsibility of the applicant to identify and negotiate, with the riparian owners as necessary, any requirement for downstream improvement works. Failure to do so could result in a Common Law action by the riparian owner.

Cont'd/...

Asiantaeth yr Amgylchedd
Ty Abacus, Parc Business Llaneirwg, Llaneirwg, Caerdydd CF3 0EY
Cyfeiriad DX 121375, Ffon 029 20770088, Ffacs 029 20798555, GTN 7-26 X 1000

Environment Agency
Abacus House, St Mellons Business Park, St Mellons, Cardiff, CF3 0EY
DX Address 121375, Tel 029 20770088, Fax 029 20798555, GTN 7-26 X 1000

Details of your application for consent are placed on a public register, kept by the Agency and open for inspection by the public.

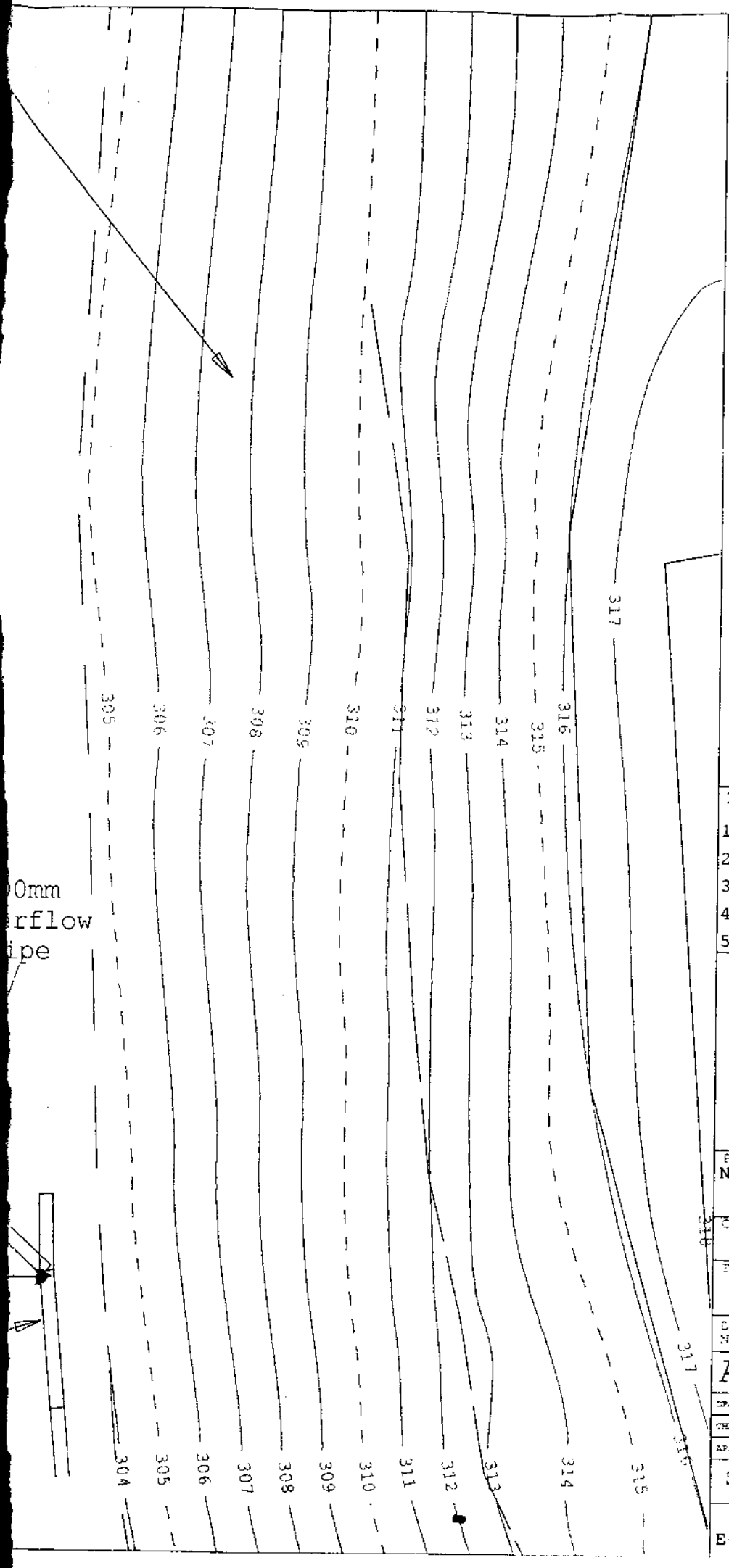
If you have any further quiries please do not hesitate to contact us quoting your application number AN0308201 & AN0308301.

Yours sincerely

S. Wilkes

PP **RUTH TIPPING**
Customer Contact Team Leader

Please ask for Michelle Coles



Survey Legend

- Top of Batter
- Bottom of Batter
- Wall
- Boundary
- Verge
- Footpath
- Watercourse
- Culvert
- Edge
- Channel
- Concrete
- Hedge
- Gas (live)
- Gas (dead)
- Electric (live)
- Electric (dead)
- Water (live)
- Water (dead)
- Telephone (live)
- Telephone (dead)
- Overhead line (live)
- Overhead line (dead)
- Pallisade Fence
- Chainlink Fence
- Track
- Post & Wire Fence
- Temporary Fence
- Post & Rail Fence
- Stock Fence
- Dyke
- 80mm Land Drain
- 100mm Land Drain
- 25 contour

NOTES

1
2
3
4
5

VHE CONSTRUCTION plc
ENGINE LANE, SHAFTON
BARNSLEY, S/YORKS, S72 8SP
Tel/Fax (01226) 715888/717080

PROJECT:
Nant-y-Gwyddon Landfill Capping Contract,Cell 1,Areas A,B & D

CLIENT:
AMGEN RHONDDA LTD

TITLE:
GELLI PHASE 1 LAGOON

DRAWING NUMBER : NYG-AB\010

REVISION A

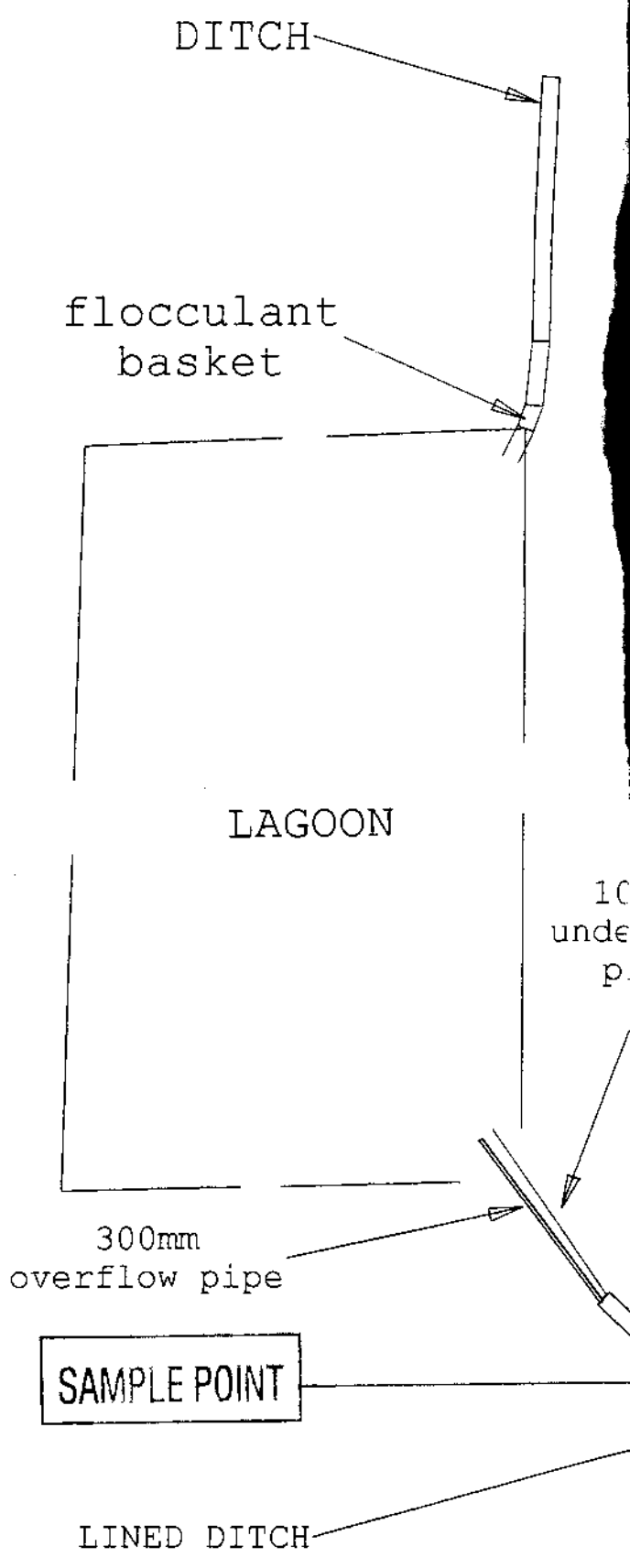
A3	NAME	DATE	ISSUED TO	
DRAWN	CJF	24.11.00	1	EN1
CHECKED			2	
APPROVED			3	
SCALE 1:200			4	
			5	

VHE WEBSITE : www.vhe.co.uk
E-Mail:vhe@vhecons2.demon.co.uk

ASIANTAETH YR AMGYLCHEDD ENVIRONMENT AGENCY	
CONSENT PLAN NUMBER	AN03082O1
AUTHORISED SIGNATURE	

ANNEX 2

GELLI SPOIL HEAPS



Assent to
D. Williams
19/8/98

INTERIM PROGRAMME AND SCHEMES 1998

Nant y Gwyddon Remediation

Rhondda Waste Disposal Ltd

August 1998

Report No : 3077-4

SURFACE WATER DRAINAGE SCHEME

RUN-OFF CALCULATIONS

Addressing the problems of gas emission and volume of leachate production by extensive capping will increase the volume of surface run off produced by the site and the speed of response to a rainfall event.

The newly capped landform will shed water in two catchments. The first and larger will shed water towards the site access road. The area of the catchment will vary according to the level of progress on permanent capping in 1998. The permanent capping will shed relatively less volume when compared with the temporary capping. The smaller catchment will collect water from the southern side of the site. The catchments are shown on drawing no 3077/4/10. There is another catchment on the site which lies to the west of those assessed. This collects water upgrade of the tipped wastes against a bund and discharges via a pump into the site underdrainage system at manhole L21. The underdrainage system discharges direct to the Nant y Gwyddon stream and has not caused a problem to date.

The volume of rainwater developed by a moderate rainfall event at the site will be far in excess of the capacity of a simple lagoon system to treat effectively. Consideration has therefore been given to designing a system incorporating a flow balancing facility which will accept surges on demand and avoid major rainfall events scouring the treatment lagoons. Initially consideration has been given to a system that can be readily accommodated in the area available. The arrangement of this system is shown drawing 3077/4/1. As the drift cover on the site is thin it would require some trial pitting to establish the feasibility of lagoon construction in the locations proposed. If there is insufficient drift material available then imported colliery shale will be needed to construct suitable settling ponds.

The system proposed would comprise a 20 m x 10 m nominal flow balancing lagoon with a 2 metre active depth for the southern system and a 30m x 15 m nominal flow balancing lagoon with a 2 metre active depth for the northern system. The northern flow balancing lagoon would feed two 30 m x 15 m nominal settlement lagoons capable of being arranged in parallel or series. These lagoons would be capable of treating 9 litres/second of run off. The southern flow balancing lagoon would be served by a single 30 m x 15 m nominal settlement lagoon and this would be capable of treating 4.5 litres/second. The arrangement of the lagoons is shown in drawings 3077/4/7 and 3077/4/8

The systems have been assessed against various storm events on the following pages. The catchments are shown on drawing no 3077/4/10. In summary the catchment systems will address the following storms:-

Return Period	Northern Catchment Duration (hrs)	Southern Catchment Duration (hrs)
M2	1.4	1.0
M1	1.9	1.5
M0.5	3.2	2.5

As the vegetative cover on the restoration increases and the area of temporary capping which (as a worse case) it has been assumed sheds 100% of rainfall is reduced the systems will serve progressively longer events. An initial tabulation has been included for the restored site once vegetation has been established. It indicates that both systems will be adequate to deal with a one hour M0.5 storm without further modification. In the shorter term the quality of the output of the settlement system and the frequency of operation of the storm by pass should be monitored to check the performance of the system. The use of polyelectrolyte flocculant may be considered if the quality of the effluent from the treatment lagoons proves unsatisfactory.

Nant y Gwyddon
Flow Balacing Lagoons

Requirement for immediate use 1998

Northern Catchment	45300	Run off %	
Temporary Capping sqm	32500	100	32500
Restored Soils on 1 in 3 slope sqm	2800	68	1904
General Site Area (including roadway)	10000	90	9000
			0

Catchment		sqm	43404	43404	43404	43404	43404	43404	43404	43404	43404	43404
Storm			M0.5	M0.5	M0.5	M0.5	M0.5	M0.5	M0.5	M0.5	M0.5	M0.5
Duration		hr	0.5	1	2	4	6	12	24	48	120	168
Rainfall		mm	8.4	12.8	18.3	25.9	31.9	45.8	62.9	84.8	131.8	153.9
Rainfall Intensity		mm/hr	16.80	12.80	9.15	6.48	5.32	3.82	2.62	1.77	1.10	0.92
Volume produced during storm		cum	365	556	794	1124	1385	1988	2730	3681	5721	6680
Discharge to settlement ponds		l/s	9	9	9	9	9	9	9	9	9	9
Discharge to settlement ponds		cum/hr	32.4	32.4	32.4	32.4	32.4	32.4	32.4	32.4	32.4	32.4
Discharge during storm		cum	16	32	65	130	194	389	778	1555	3888	5443
Accumulated Balance			348	523	729	995	1190	1599	1953	2125	1833	1237
Capacity of flow balance		cum	900	900	900	900	900	900	900	900	900	900

Southern Catchment	32750		
Temporary Capping sqm	0	100	0
Restored Soils on 1 in 3 slope sqm	17500	68	11900
Restored Soils on 1 in 10 slope sqm	3500	63	2205
Rough Grassland/Quarry area Area	11750	65	7637.5
			0

Catchment		sqm	21742.5	21742.5	21742.5	21742.5	21742.5	21742.5	21742.5	21742.5	21742.5	21742.5
Storm			M0.5	M0.5	M0.5	M0.5	M0.5	M0.5	M0.5	M0.5	M0.5	M0.5
Duration		hr	0.5	1	2	4	6	12	24	48	120	168
Rainfall		mm	8.4	12.8	18.3	25.9	31.9	45.8	62.9	84.8	131.8	153.9
Rainfall Intensity		mm/hr	16.80	12.80	9.15	6.48	5.32	3.82	2.62	1.77	1.10	0.92
Volume produced during storm		cum	183	278	398	563	694	996	1368	1844	2866	3348
Discharge to settlement ponds		l/s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Discharge to settlement ponds		cum/hr	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2
Discharge during storm		cum	8	16	32	65	97	194	389	778	1944	2722
Accumulated Balance			175	262	365	498	596	801	979	1066	922	625
Capacity of flow balance		cum	400	400	400	400	400	400	400	400	400	400

Nant y Gwyddon
Flow Balacing Lagoons

Requirement for immediate use 1998

Northern Catchment	45300	Run off %	
Temporary Capping sqm	32500	100	32500
Restored Soils on 1 in 3 slope sqm	2800	68	1904
General Site Area (including roadway)	10000	90	9000
			0

Catchment		sqm	43404	43404	43404	43404	43404	43404	43404	43404	43404	43404
Storm			M1	M1	M1	M1	M1	M1	M1	M1	M1	M1
Duration		hr	0.5	1	2	4	6	12	24	48	120	168
Rainfall		mm	11	16	23	32.3	39.4	55.3	76.6	103.3	160.7	187.4
Rainfall Intensity		mm/hr	22.00	16.00	11.50	8.08	6.57	4.61	3.19	2.15	1.34	1.12
Volume produced during storm		cum	477	694	998	1402	1710	2400	3325	4484	6975	8134
Discharge to settlement ponds		l/s	9	9	9	9	9	9	9	9	9	9
Discharge to settlement ponds		cum/hr	32.4	32.4	32.4	32.4	32.4	32.4	32.4	32.4	32.4	32.4
Discharge during storm		cum	16	32	65	130	194	389	778	1555	3888	5443
Accumulated Balance			461	662	933	1272	1516	2011	2547	2928	3087	2691
Capacity of flow balance		cum	900	900	900	900	900	900	900	900	900	900

Southern Catchment	32750		
Temporary Capping sqm	0	100	0
Restored Soils on 1 in 3 slope sqm	17500	68	11900
Restored Soils on 1 in 10 slope sqm	3500	63	2205
Rough Grassland/Quarry area Area	11750	65	7637.5
			0

Catchment		sqm	21742.5	21742.5	21742.5	21742.5	21742.5	21742.5	21742.5	21742.5	21742.5	21742.5
Storm			M1	M1	M1	M1	M1	M1	M1	M1	M1	M1
Duration		hr	0.5	1	2	4	6	12	24	48	120	168
Rainfall		mm	11	16	23	32.3	39.4	55.3	76.6	103.3	160.7	187.4
Rainfall Intensity		mm/hr	22.00	16.00	11.50	8.08	6.57	4.61	3.19	2.15	1.34	1.12
Volume produced during storm		cum	239	348	500	702	857	1202	1665	2246	3494	4075
Discharge to settlement ponds		l/s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Discharge to settlement ponds		cum/hr	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2
Discharge during storm		cum	8	16	32	65	97	194	389	778	1944	2722
Accumulated Balance			231	332	468	637	759	1008	1277	1468	1550	1353
Capacity of flow balance		cum	400	400	400	400	400	400	400	400	400	400

Nant y Gwyddon
Flow Balacing Lagoons

Requirement for immediate use 1998

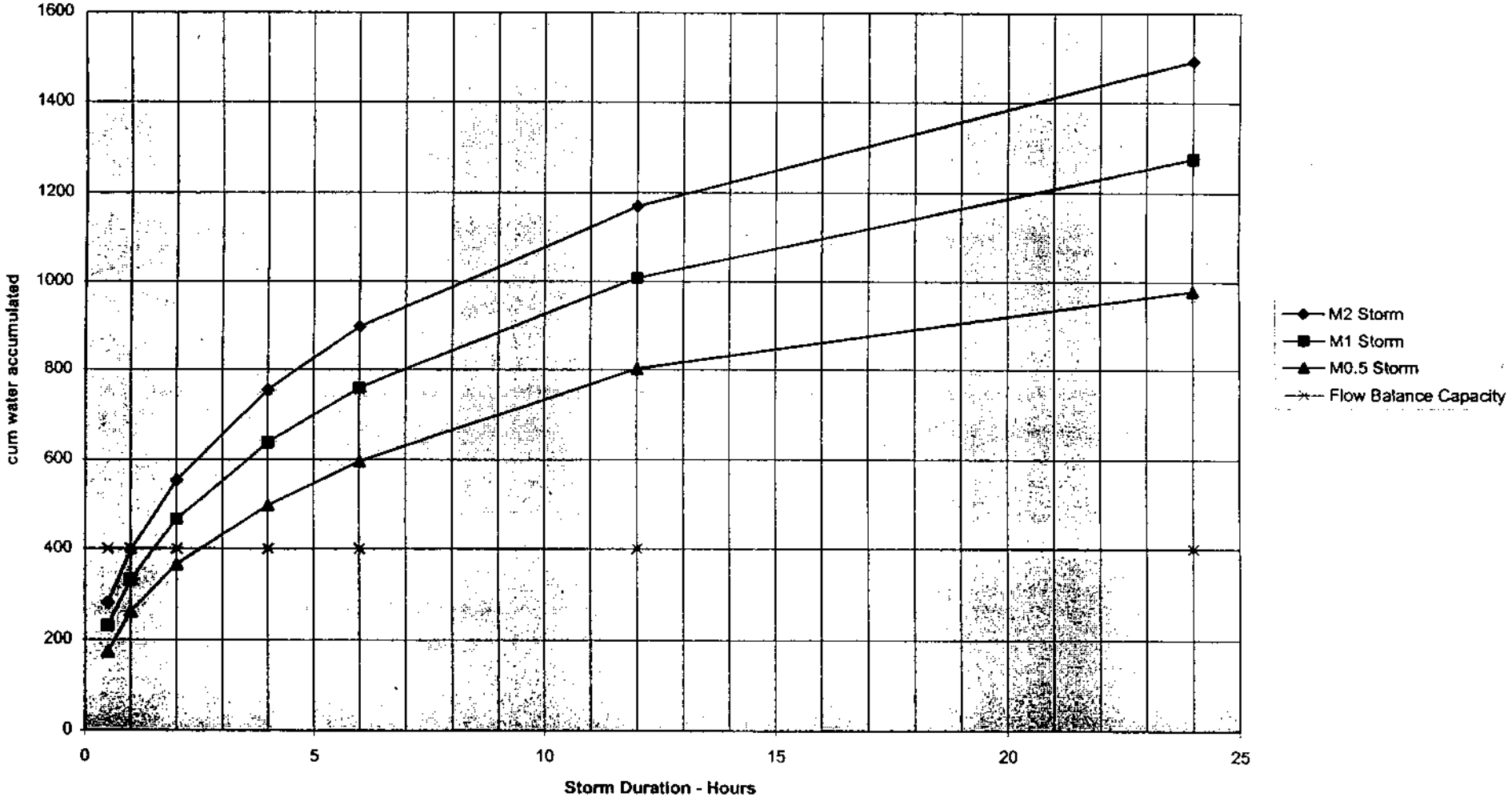
Northern Catchment	45300	Run off %	
Temporary Capping sqm	32500	100	32500
Restored Soils on 1 in 3 slope sqm	2800	68	1904
General Site Area (including roadway)	10000	90	9000
			0

Catchment		sqm	43404	43404	43404	43404	43404	43404	43404	43404	43404	43404
Storm			M2	M2	M2	M2	M2	M2	M2	M2	M2	M2
Duration		hr	0.5	1	2	4	6	12	24	48	120	168
Rainfall		mm	13.3	19	27	37.7	45.7	62.7	86.5	117.5	183.3	213.8
Rainfall Intensity		mm/hr	26.60	19.00	13.50	9.43	7.62	5.23	3.60	2.45	1.53	1.27
Volume produced during storm		**cum**	**577**	**825**	**1172**	**1636**	**1984**	**2721**	**3754**	**5100**	**7956**	**9280**
Discharge to settlement ponds		l/s	9	9	9	9	9	9	9	9	9	9
Discharge to settlement ponds		cum/hr	32.4	32.4	32.4	32.4	32.4	32.4	32.4	32.4	32.4	32.4
Discharge during storm		cum	**16**	**32**	**65**	**130**	**194**	**389**	778	1555	**3888**	**5443**
Accumulated Balance			**561**	**792**	1107	**1507**	**1789**	**2333**	2977	3545	**4068**	**3837**
Capacity of flow balance		cum	900	900	900	900	900	900	900	900	900	900

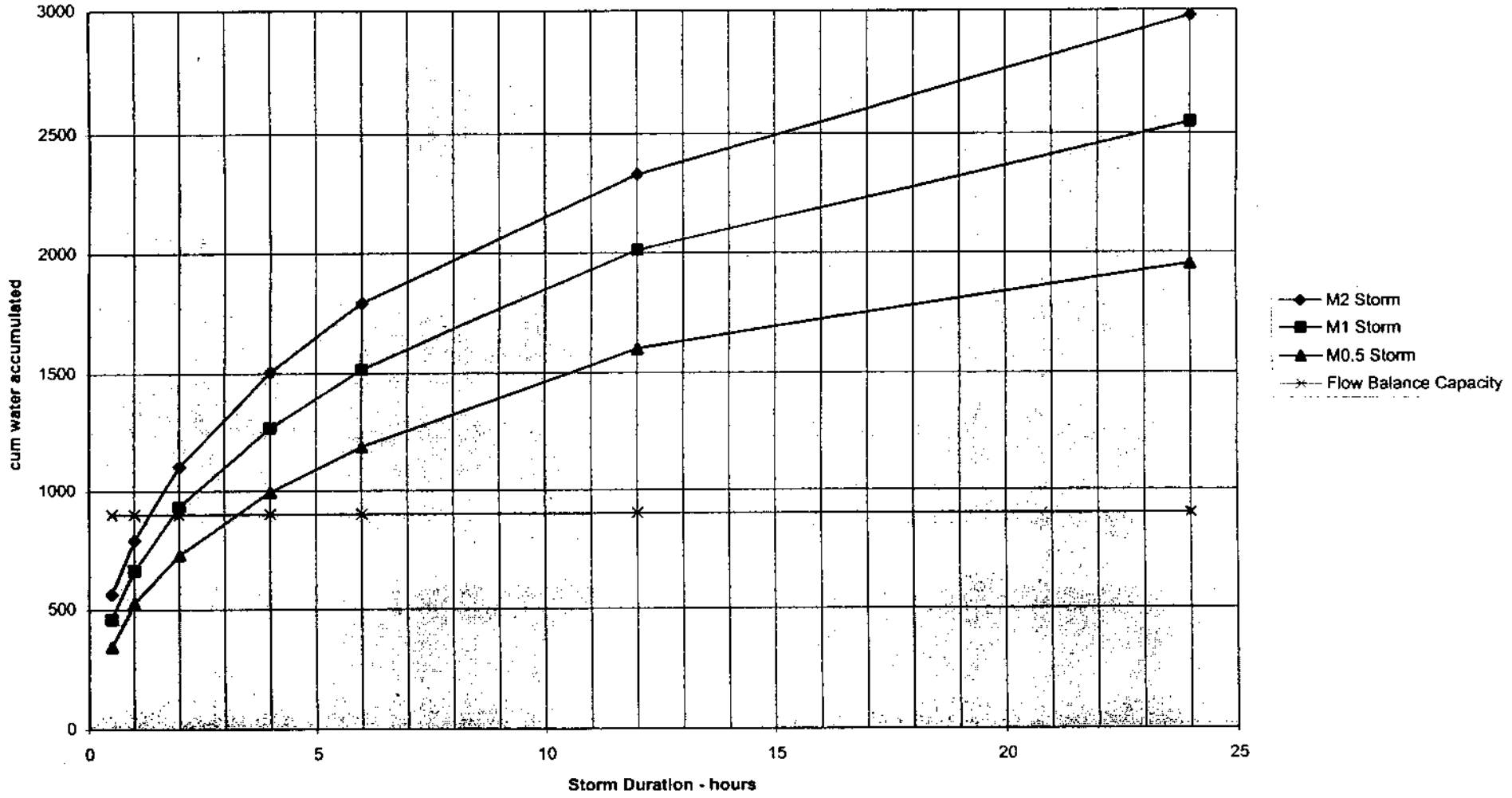
Southern Catchment	32750		
Temporary Capping sqm	0	100	0
Restored Soils on 1 in 3 slope sqm	17500	68	11900
Restored Soils on 1 in 10 slope sqm	3500	63	2205
Rough Grassland/Quarry area Area	11750	65	7637.5
			0

Catchment		sqm	21742.5	21742.5	21742.5	21742.5	21742.5	21742.5	21742.5	21742.5	21742.5	21742.5
Storm			M2	M2	M2	M2	M2	M2	M2	M2	M2	M2
Duration		hr	0.5	1	2	4	6	12	24	48	120	168
Rainfall		mm	13.3	19	27	37.7	45.7	62.7	86.5	117.5	183.3	213.8
Rainfall Intensity		mm/hr	26.60	19.00	13.50	9.43	7.62	5.23	3.60	2.45	1.53	1.27
Volume produced during storm		**cum**	**289**	**413**	**587**	**820**	**994**	**1363**	**1881**	**2555**	**3985**	**4649**
Discharge to settlement ponds		l/s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Discharge to settlement ponds		cum/hr	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2
Discharge during storm		cum	8	16	32	65	97	194	389	778	**1944**	**2722**
Accumulated Balance			281	397	555	755	896	1169	1492	1777	**2041**	**1927**
Capacity of flow balance		cum	400	400	400	400	400	400	400	400	400	400

Nant y Gwyddon - Southern Catchment



Nant y Gwyddon - Northern Catchment



Nant y Gwyddon
Flow Balacing Lagoons

Final Restoration

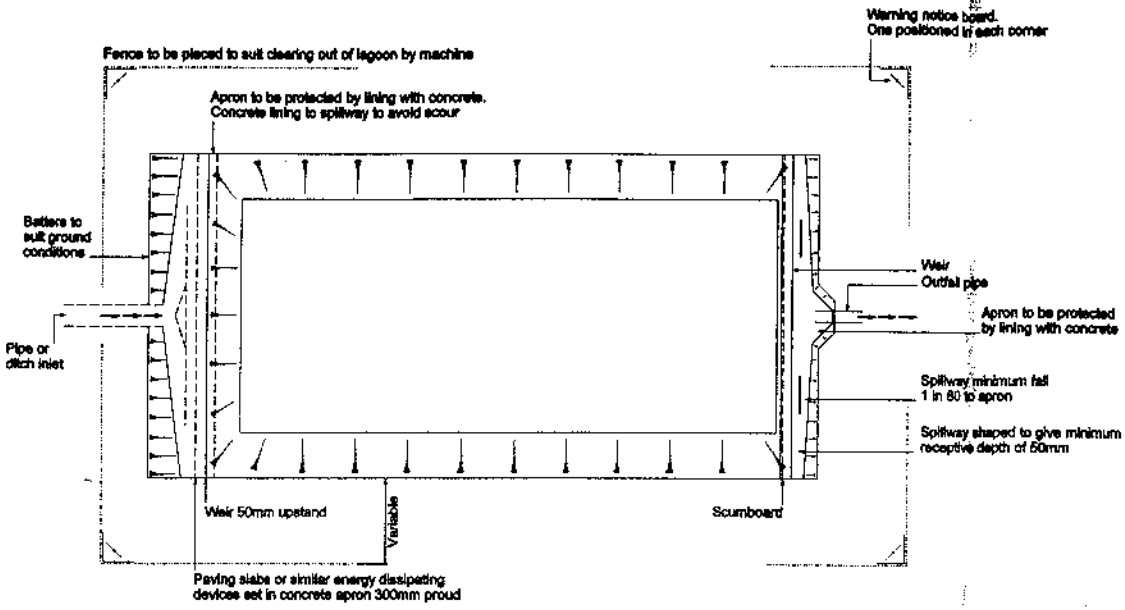
Northern Catchment	117500	Run off %	
Temporary Capping sqm	0	100	0
Grassed Restored Soils on 1 in 3 slope sqm	33500	58	19430
Grassed Restored Soils on 1 in 10 slope sqm	84000	55	46200
General Site Area (including roadway)	0	90	0
			0

Catchment		sqm	65630	65630	65630	65630	65630	65630	65630	65630	65630	65630
Storm			M0.5	M0.5	M0.5	M0.5	M0.5	M0.5	M0.5	M0.5	M0.5	M0.5
Duration		hr	0.5	1	2	4	6	12	24	48	120	168
Rainfall		mm	8.4	12.8	18.3	25.9	31.9	45.8	62.9	84.8	131.8	153.9
Rainfall Intensity		mm/hr	16.80	12.80	9.15	6.48	5.32	3.82	2.62	1.77	1.10	0.92
Volume produced during storm		cum	**551**	**840**	**1201**	**1700**	**2094**	**3006**	**4128**	**5565**	**8650**	**10100**
Discharge to settlement ponds		l/s	9	9	9	9	9	9	9	9	9	9
Discharge to settlement ponds		cum/hr	32.4	32.4	32.4	32.4	32.4	32.4	32.4	32.4	32.4	32.4
Discharge during storm		cum	**16**	**32**	**65**	**130**	**194**	**389**	**778**	**1555**	**3888**	**5443**
Accumulated Balance			**535**	**808**	**1136**	**1570**	**1899**	**2617**	**3351**	**4010**	**4762**	**4657**
Capacity of flow balance		cum	900	900	900	900	900	900	900	900	900	900

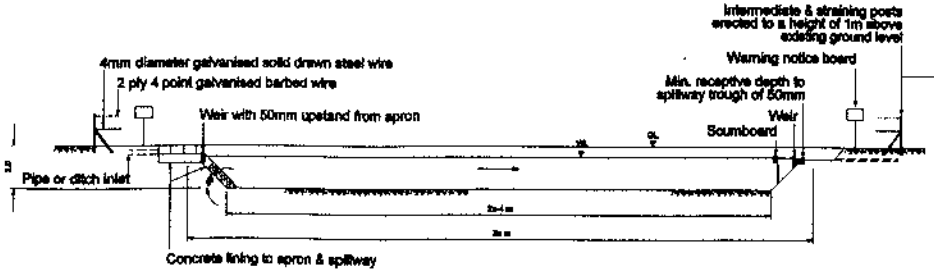
Southern Catchment	57375		
Temporary Capping sqm	0	100	0
Grassed Restored Soils on 1 in 3 slope sqm	21125	58	12252.5
Grassed Restored Soils on 1 in 10 slope sqm	24500	55	13475
Rough Grassland/Quarry area Area	11750	65	7637.5
			0

Catchment		sqm	33365	33365	33365	33365	33365	33365	33365	33365	33365	33365
Storm			M0.5	M0.5	M0.5	M0.5	M0.5	M0.5	M0.5	M0.5	M0.5	M0.5
Duration		hr	0.5	1	2	4	6	12	24	48	120	168
Rainfall		mm	8.4	12.8	18.3	25.9	31.9	45.8	62.9	84.8	131.8	153.9
Rainfall Intensity		mm/hr	16.80	12.80	9.15	6.48	5.32	3.82	2.62	1.77	1.10	0.92
Volume produced during storm		cum	**280**	**427**	**611**	**864**	**1064**	**1528**	**2099**	**2829**	**4398**	**5135**
Discharge to settlement ponds		l/s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Discharge to settlement ponds		cum/hr	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2
Discharge during storm		cum	**8**	**16**	**32**	**65**	**97**	**194**	**389**	**778**	**1944**	**2722**
Accumulated Balance			**272**	**411**	**578**	**799**	**967**	**1334**	**1710**	**2052**	**2454**	**2413**
Capacity of flow balance		cum	400	400	400	400	400	400	400	400	400	

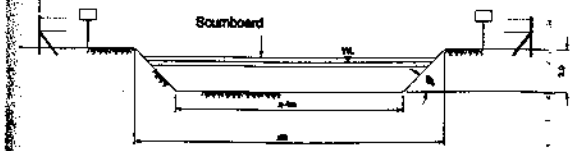
PLAN



LONGITUDINAL SECTION



CROSS-SECTION



Notes

1) The lagoon inlet shall be a wooden plank weir minimum dimension 300mm deep & 50mm thick extending across the full width of the apron. The top of the weir should be positioned 150mm above the top of the outlet weir discharge level.

2) The discharge from the lagoons shall be by means of a wooden plank weir a minimum of of 300mm deep & 50mm thick extending across the full width of the spillway. The outfall shall be two 225mm diameter pipes & shall be set above the flood level of the receiving watercourse to facilitate sampling.

3) Both weir aprons shall be lined with 30/20 concrete to protect them from scour.

4) The outlet weir shall be a minimum of 0.5m back from the scum board.

5) The scumboard shall extend across the full width of the lagoon such that flotsam cannot enter the outfall. The scumboards shall be firmly fixed by stakes driven into the lagoon bed brackets & bracing planks.

All dimensions shown in metres (m)

Rev	Date	Modifications

SETTLEMENT LAGOON

Project

NANT-Y-GWYDDON REMEDIATION

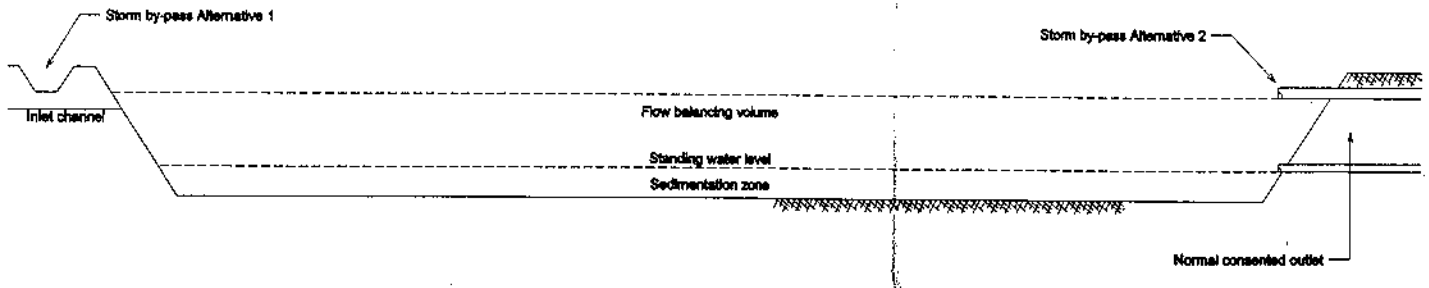
Client

RHONDDA WASTE DISPOSAL

CL Associates

Prepared By	Approved By
RCL	PCT
Scale	**Date**
1: 250	JULY 1998

Project No	Drawing No	Rev
3077/4	3077/4/7	0



Notes

Rev	Date	Modifications

SECTION THROUGH FLOW BALANCING LAGOON

Project

NANT-Y-GWYDDON REMEDIATION

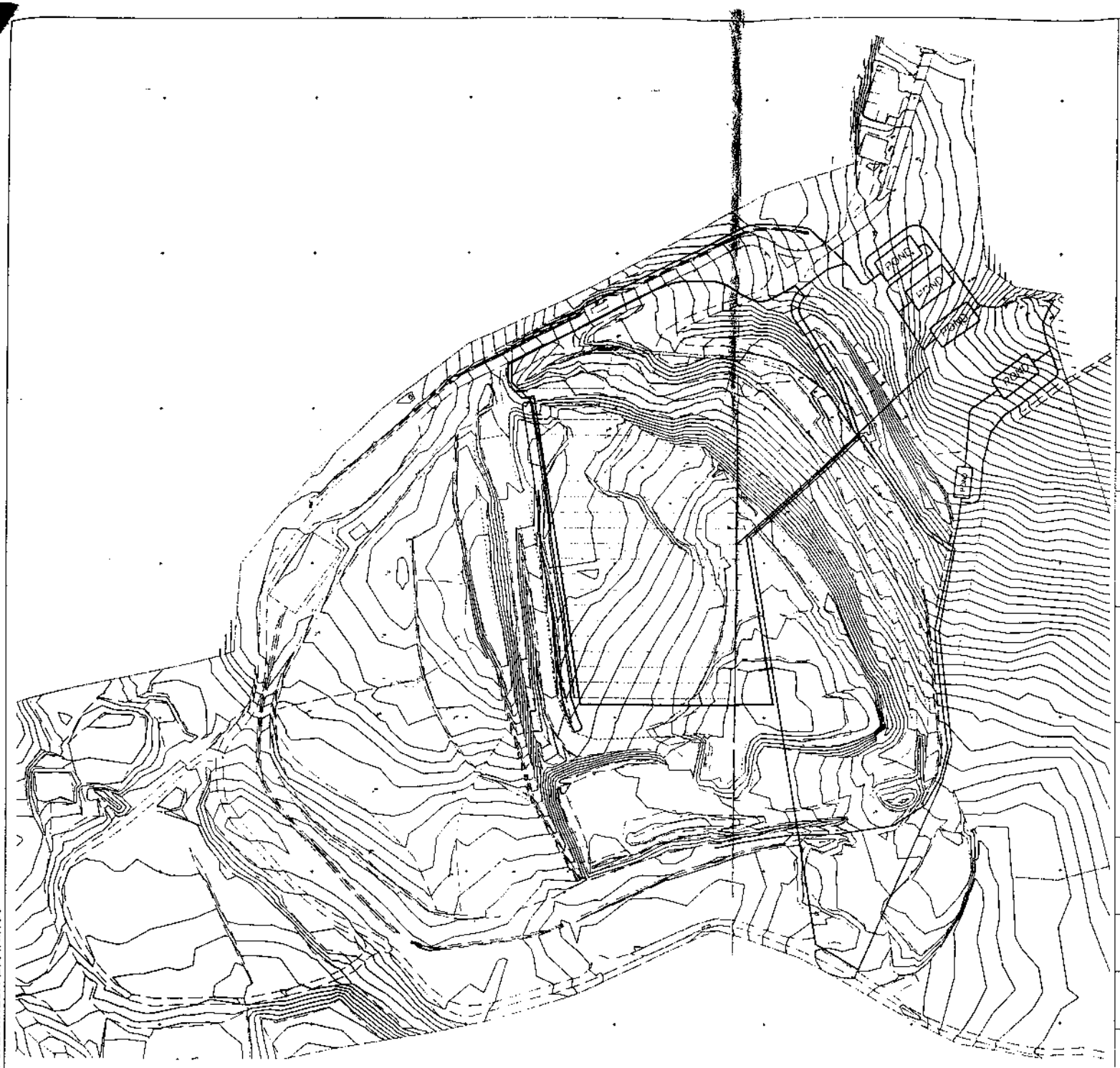
Client

RHONDDA WASTE DISPOSAL

CL Associates

Prepared By	Approved By
RCL	PCT
Scale	**Date**
NOT TO SCALE	JULY 1998

Project No	Drawing No	Rev
3077/4	3077/4/8	0



Notes

- LIMIT OF LINED AREA
- SURFACE WATER SYSTEM
- BUND
- TEMPORARY CAPPING
- SOUTHERN CATCHMENT
- NORTHERN CATCHMENT
- CONTAMINATED WATER SYSTEM
- LINE OF SECTION 3077/4/5

Rev	Date	Modifications

APPROX. DRAINAGE CATCHMENTS 1988

Project

NANT Y GWYDDON REMEDIATION

Client

RHONDDA WASTE DISPOSAL

CL Associates

Prepared By	Approved By
RCL	PCT
Scale	**Date**
1: 2500	JULY 1998

Project No	Drawing No	Rev
3077/4	3077/4/10	0

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method approved by the Engineer, and similarly joined to the perforated pipes from the downslope section. Both ends shall be capped.

12. SURFACE WATER DRAINAGE

12.1 General

12.1.1 The areas of permanent and temporary capping will create a significant volume of surface drainage during rainfall events. The Contractor shall install the following drainage infrastructure to enable the increased volumes of water to be discharged to the Nant y Gwyddon watercourse:-

- * A headwall, manhole and pipework to carry water caught on the temporary capping to the trapezoidal section watercourse near the wheel bath
- A ramp and lined watercourse to carry water caught on the temporary capping to the southern perimeter ditch
- Refurbishment of the southern perimeter ditch
- * Replacement of the 250mm pipework adjacent to the wheel bath with 600mm pipework
- Connection of the southern perimeter ditch with the eastern perimeter ditch
- Connection of the run off from the permanent capping to the eastern perimeter ditch

12.1.2 The excavation for the construction of the surface water treatment area will be carried out under contractual arrangements not part of this document which will be still in progress whilst the Contract works are being undertaken The Contractor shall not interfere with these and shall agree a progranne of execution from the works outlined in this Contract such that no delays are caused to the lagoon excavation works. The Contractor shall construct the following drainage channels and infrastructure for the lagoons:-

- * Balancing lagoon underflow pipe and valve and associated concrete installation including trash screen (excavation not part of this document)
- Valve chamber

- Underflow splitting channel
- Underflow ditch connections to the settlement lagoons
- * Balancing lagoon discharge ditch
- Settlement lagoon discharge ditches
- * Storm Water Channel, Balance Lagoon inlet and weir
- * Balance lagoon inlet sluice
- * Stilling pond

12.1.3 Unless otherwise described in the Contract or agreed by the Engineer, all pipes to be used shall be black twin walled polypropylene or HDPE. The Contractor shall ensure that pipes are not subject to deterioration due to sunlight during the period between manufacture and installation in the Works. All pipes delivered to Site shall be stored in a compound and off the ground by means of pallets or similar.

12.1.4 The Contractor shall construct and commission the flow balance lagoon infrastructure at the earliest possible point in the contract (bulk excavations by others). Thereafter whilst the settling lagoons are being prepared the Contractor shall maintain the underflow pipe closed and the balance lagoon shall be used as a settling lagoon. Relief from the effects of a storm event shall be achieved by using a 100 mm weir in the base of the storm water channel to divert water into the flow balance lagoon. The weir will be overtopped in heavy rainfall events allowing excess rainfall to be discharged to the Nant y Gwyddon stream. Once the full water treatment system is commissioned the height of the weir shall be increased to 400mm to divert water from all but the most extreme events to be treated.

12.1.5 Items marked with an asterik in clauses 12.1.1 and 12.1.2 above are on the critical path of items that should be completed before the temporary capping is laid.

12.2 Culvert from Temporary Capping to Trapezoidal Channel

12.2.1. The Contractor shall construct a culvert between the temporary capping area at points A and the trapezoidal channel at point B as shown on Drawing No. 3077/5/1. The culvert shall be a 600mm ID black twin walled polypropylene or HDPE to a manhole adjacent to the main haul road and a 600mm Class M concrete pipe for the road

crossing. The layout of the culvert shall be as shown on Drawing No. 3077/5/5B. The inlet end of the culvert shall be installed in a headwall as shown on Drawing No. 3077/5/5C. The pipe shall be connected to the temporary cap by the use of the seam sealing tape used to connect the sheets of capping or other product approved by the Engineer. The culvert shall be laid through the bund of waste on a bedding of Screened Gelli Fill at least 300mm thick. The bend to the west of the bund shall be constructed using slow (22.5°) bends. Once the culvert is placed it shall be surrounded by further Screened Gelli Fill and the whole of the bund filled to its original profile. The front edge of the tip shall be profiled to a smooth gradation between floor and bund. The temporary capping shall be carried to a minimum of 1200mm above the invert of the culvert. The temporary capping shall be held in place by a layer of 40 mm down fill placed carefully at least 300 mm thick as shown on Drawing No. 3077/5/5C and 2 metres either side of the culvert.

12.2.2 The culvert shall be connected to a 1500mm internal diameter shallow manhole located adjacent to the haul road. The manhole shall be constructed to the detail shown on Drawing No. 3077/5/5A. The Contractor shall import selected fill to support the pipe where it crosses the small valley feature near the site of the manhole.

12.2.3 A Class M 600mm Internal Diameter Concrete Culvert shall be installed in a trench from the manhole across the main haul road as shown on Drawing No. 3077/5/5D. All arisings shall be removed to the active tipping area on site. The trench shall be at least 1000mm wide and 1000mm deep. The culvert shall be surrounded and the trench filled with with C30/20 rapid hardening concrete. The Contractor shall carefully break out the side of the trapezoidal channel so that the pipe invert can be arranged to match the channel floor The Contractor shall ensure that the traffic using the tip is not obstructed by his operations and provide steel plates 25mm thick of sufficient size to bridge the trench for at least 7 days after placement to protect the concrete. The Contractor shall make good any damage caused to the flexible road surface during the installation and trim the pipe to match the side of the channel and reinstate the any overbreak that has taken place in trimming the channel.

12.2.4 The Contractor shall note that the at least three services run in the road verges. The electricity supply for the lamp standards and the rising and falling water mains. The

Contractor shall locate these services before any work takes place and arrange for their reinstatement with the minimum of down time after they have been severed.

12.2.5 The Contractor shall lay the culvert in a trench 1 metre wide. The base of the trench shall correspond to the invert levels shown on drawing 3077/5/5B plus an allowance for 150mm of colliery shale bedding for the culvert on along its full length. The pipe trench shall be backfilled (and surcharged if necessary) to provide at least 500mm cover to the top of the pipe. The Contractor shall provide Screened Gelli Fill placed in 300mm layers and rolled to provide support for the pipe between the site haul road and the road to the active area on the tip. The Contractor shall also provide Screened Gelli Fill to ensure that there is at least 1 metre cover over the pipe where it crosses the road to the active tipping area and extend the fill either side of the pipe as necessary to grade the road to the satisfaction of the Engineer.

12.3 Ramp and Ditch from Temporary Capping Area to Southern Perimeter Ditch

12.3.1 The Contractor shall provide and lay Screened Gelli Fill in the location marked C on the Site Plan Drawing No. 3077/5/1 to form a ramp and ditch to convey run off from the temporary capping to the southern perimeter ditch. The fill material shall be laid in 300mm layers and compacted with 4 passes of a Bomag BW6 towed roller or similar approved by the Engineer to an even grade between the low point on the corner of the temporary cap and the southern perimeter ditch. The surface of the ramp shall be 3 metres wide and the sides shall be no steeper than 1 in 2.5. The ditch shall be 600 mm deep with a 600mm base and 1 in 1 sides and shall be cut in the surface of the ramp. A three metre wide strip of EnviroCover shall be laid into the ditch course and weighed down either side of the ditch to line the watercourse. The centre line shall be weighed down with 40 mm aggregate in the base of the ditch.

12.4 Refurbishment of the Southern Perimeter Ditch

12.4.1 The Contractor shall excavate the southern perimeter ditch from the ramp constructed in clause 9.3 above to the Fire Lagoon in the north eastern corner of the site. The ditch shall be 600 mm deep with a 600mm base and 1 in 1 sides. All arisings shall be distributed to the outside of the ditch.

12.5 Replacement of the 250mm Pipe near the Wheel Bath

12.5.1 The trapezoidal channel adjacent to the main haul road runs into a 250mm culvert adjacent to the wheel bath for a distance of approximately 50 metres. The Contractor shall replace the culvert with a 600 mm Class M concrete pipe laid to a specification and to a line to be agreed with the Engineer complete with headwalls at each end and any necessary connections to the wheel bath infrastructure. The Contractor shall repair any damage done to the wheel bath infrastructure in carrying out the works as expeditiously as possible.

12.6 Connection of the Southern Perimeter Ditch with the Eastern Perimeter Ditch

12.6.1 The Contractor shall excavate the southern perimeter ditch from the ramp constructed in clause 9.3 above to the eastern perimeter ditch running from the entrance to the cover quarry. The ditch shall be 600 mm deep with a 600mm base and 1 in 1 sides. All arisings shall be distributed to the outside of the ditch. The Contractor shall ensure that this connection does not provide a route for water from the Temporary Capping to flow to the east at the point where it joins the southern perimeter ditch. The Contractor shall carry out any regrading necessary to achieve an even grade either by regrading in situ material or by the use of Screened Gelli Fill. Where regrading would result in significant loss of topsoil or vegetation the Contractor shall strip this first, carry out the regrading and replace the soil/vegetation on the regraded surface.

12.7 Connection for Run-off from the Permanent Capping to the Eastern Perimeter Ditch

12.7.1 Run off from the Permanent Capping will be collected in a lined ditch at the base of the slope. At the lower end of this ditch the contractor shall construct a headwall from 2m x 1m x 1m gabion baskets as shown on drawing no. 3077/5/5G. A 2 metre length of 600mm twin wall HDPE or polypropylene pipe shall be connected to a shallow manhole as shown on Drawing No. 3077/5/5A and this shall in turn be connected to a run of 600mm twin wall HDPE or polypropylene pipe which shall be placed along the line shown on drawing no 3077/5/5H. The pipe shall be installed in a trench 1.0 metre wide by 1.2 metres deep and surrounded by a minimum of 150mm of Screened Gelli Fill on all sides. Where the pipe crosses the service road the cover on the pipe shall be increased to 1 metre

12.8 Balancing Lagoon Underflow Pipe and Associated Infrastructure

12.8.1 The Contractor shall construct the headwall structure shown on drawing no. 3077/5/2A in the outlet channel to the flow balancing lagoon. The Contractor shall supply the pipe to carry the underflow which shall be a 100mm ID Galvanised heavy duty steel pipe. It shall be fitted with a flange at the point where it emerges into the valve chamber. The Contrctor shall supply a 100 mm flanged heavy duty brass gate valve which shall be fitted to the end of the galvanised steel pipe. The pipe shall be laid on a bed of Type 1 Granular Sub Base minimum thickness 150mm whilst the concrete headwall is cast and shall be covered to a depth of 150mm with the same material once the concrete is cured. The remainder of the pipe trench shall be filled with selected imported material compacted in layers not exceeding 300mm.

12.9 Valve Chamber

12.9.1 The contractor shall install a 1200mm shallow manhole to the specification shown on Drawing No. 3077/5/5A at the position marked valve chamber on Drawing No. 3077/5/2. The manhole shall be constructed to an internal height of 1.5 metres with the surface of the manhole approximating to 309m AOD. The Contractor shall arrange for the outfall from the manhole to be a single length of 200mm ID concrete pipe which shall be connected to the underflow splitting channnel. The valve shall be fitted with a

baffle plate to reduce the velocity of the flow into the manhole as shown on Drawing No. 3077/5/2E.

12.10 Underflow Splitting Channel

12.10.1 The channel from the valve chamber shall be excavated as an open ditch 500mm wide and 300mm deep and lined with a thickness of 100mm of C20/20 concrete for a distance of 4 metre as shown on Drawing No. 3077/5/2B. At a distance of approximately 1 metre from the valve chamber the floor of the channel shall be raised in the centre to divide the flow into two equal parts. The flows will be separated completely by setting a line of engineering bricks in the centre of the channel commencing at 2 metres from the valve chamber.

12.11 Underflow Ditch Connections to Settling Lagoons

12.11.1 The channels to the settlement lagoons shall be constructed as a simple unlined channel in the bedrock approximately 300mm wide and 200mm deep. The inlet to the lagoon shall be arranged as an apron as shown on Drawing No. 3077/5/2F. The inlet wier shall be formed in concrete rather than the timber specified.

12.12 Balancing Lagoon Discharge Ditch

12.12.1 The Contractor shall form a channel of finished trapezoidal section 800mm base, 1500mm top and 800mm high from the outlet of the balancing lagoon to the to the Discharge Ditch. The Channel shall either be formed from precast concrete sections or by casting the length in situ. If in situ concrete is used the minimum allowable thickness of placed concrete shall be 150mm. If precast trapezoidal section units are used these shall be bedded according to the manufacturer's recommendations. The Contractor shall submit his proposals for approval by the Engineer.

12.13 Settlement Lagoon Discharge Ditches

12.13.1 The discharge channels from the settlement lagoons shall be constructed as a simple unlined channel in the bedrock approximately 300mm wide and 200mm deep. The outlet from the lagoon shall be arranged as an apron as shown on Drawing No. 3077/5/2F. Where the channel is formed in superficial material it shall be formed as a ditch. The ditch shall be 500 mm deep with a 500mm base and 1 in 1 sides. The ditch shall be connected to the stilling pond.

12.14 Storm Water Channel, Balance Lagoon Inlet and Weir

12.14.1 The Contractor shall construct a lined ditch from the outfall of the crossing point outside the fitting shop to the stilling pond. The dimensions of the channel shall be 500mm base and 800mm deep. The channel shall be installed to the line and invert levels shown on Drawing No. 3077/5/2. The Contractor shall incorporate a branch channel to the balance lagoon into the construction. Diversion of the water shall be achieved by installing an oblique (45° to the direction of flow) 100mm wier in the base of the main channel. This will divert low to medium flows to the balance lagoon whilst allowing storm events to by pass the balance lagoon whilst the remaining lagoons are under construction. Once the full water treatment system is commissioned the height of the wier shall be increased to 400mm to divert water from all but the most extreme events to be treated. The section of the channel which connects to the outfall of the crossing point culvert shall be formed in situ using C30/20 concrete a minimum of 200mm thick and shall incorporate a transition curve to divert the water into the standard units. The layout of the transitional curve shall be agreed with the Engineer on site.

12.14.2 The Contractor shall construct the final 4 metres of lined ditch before the stilling pond with a minimum thickness of 200mm of C30/20 concrete supporting the slabs. A393 reinforcing fabric shall be placed in the concrete on the base and sides as specified for the sluice gate (drawing no 3077/5/2D) over the last 4 metres and shall provide shuttering if necessary to support the concrete as it sets. The cover on the reinforcing fabric shall be a minimum of 75mm.

12.15 Balance Lagoon Inlet Sluice

12.15.1 The inlet channel to the Balance Lagoon shall be fitted with a sluice gate which may be used if it is necessary to divert flow away from the balance lagoon. The sluice gate shall be 500mm high and shall be installed in a slot created on each side of the lined ditch as shown on Drawing No. 3077/5/2D. The slot shall be 75 mm deep in all directions. The lined ditch either side of the sluice gate shall be laid on a full bed and side support of 150mm thickness of C30/20 concrete incorporating a layer of A393 reinforcing mesh as shown on Drawing No. 3077/5/2D. The sluice gate shall be a 75 mm thick piece of timber cut to the profile of the slot. The sluice shall be arranged so that when it is in place all of the water is confined to the main channel.

12.16 Stilling Pond

12.16.1 The Contractor shall construct a stilling pond in the location shown in Drawing No. 3077/5/2. The Contractor shall excavate a level area 5 metres by 6 metres to at least 0.5 metres into bedrock or 295.5 m AOD whichever is the lower. Material arising from this excavation shall be stored nearby for later use. The resulting excavation shall be lined with two lengths of 1mm LLDPE at right angles followed by two lengths of wicking geotextile at right angles. The entire base shall be covered with gabion baskets wired together. The remainder of the structure shall be installed as shown on drawing no 3077/5/2G. All baskets shall be constructed from heavy duty plastic coated wire and shall be mutually wired together in accordance with the manufacturers recommendations. The arisings from the original excavation and sufficient Screened Gelli Fill to provide a bund width of 3 metres at the top of the structure and a batter of 1 in 3 to existing ground shall be compacted against the sides of the structure to provide a containment. The stilling pond shall be joined to the short length of channel over the leachate service line using precast concrete channels as specified in clause 12.15 above.

12.17 Removal of Manhole L16

12.17.1 The Contractor shall remove leachate manhole L16, located in the western edge of the waste in its entirety. A cross section of the manhole is shown on drawing no. 3077/5/7. The Contractor shall excavate in waste to expose the liner and create a working area sufficient to remove the manhole and install bunding to exclude leachate from the working area. The connections to the above liner and below liner drainage system shall be severed and the manhole concrete structure removed. Extreme care shall be taken that this operation does not damage the adjacent liner. Notwithstanding this, should any damage occur it shall be fully repaired to the Specification. The Contractor shall reinstate the below liner drainage pipe with a section of similar size and strength and backfill with a similar material to that used for the existing pipe bedding compacted to the satisfaction of the Engineer. A new section of 2.5mm HDPE smooth liner to a similar specification to that used on the existing basal liner shall be installed to full CQA procedure. The liner shall be covered with a layer of 40mm down material screened from Gelli Tip or imported. The above liner drainage shall be reinstated with an HDPE pipe to match the existing and covered with a prism of 40mm down material screened from Gelli Tip or imported as elsewhere on the site.

drawing no. 3077/5/4B as necessary. The disconnected ends shall be temporarily capped using polythene whilst they are disconnected.

14) Correction Section 4 clause 9.4.4. Replace Drawing No 3077/5/4C with Drawing No 3077/5/4D&E.

15) Add to Section 4 Clause 10.3. "Before any fill material is placed at the toe of the permanent capping, all accumulated litter at the base of the slope shall be transported to the active tipping area."

16) Correction Section 4, clause 12.2.3, 3rd sentence. The trench shall be at least 1200 mm wide and there shall be at least 150 mm of concrete below the pipe and 300 mm above it.

17) Amend Section 4 clause 12.2.3. Replace "1000 mm wide and 1000 mm deep" with "1200 mm wide and 1200 mm deep."

18) Amend Section 4 clause 12.5.1. Add a new 2nd sentence:

"It is considered possible that the 250 mm pipe may be left in place and an alternative pipe installed immediately north of it."

Replace 2nd sentence with "The Contractor shall either replace the culvert with a 600 mm ID Class M concrete pipe or augment it by installation of a 600 mm ID Class M concrete pipe." Add new sentence "In either case it shall be installed to a line and specification to be agreed by the Engineer complete with headwalls at each end and any necessary connections to the wheel bath structure or the upstream and downstream trapezoidal channels."

19) Correction Section 4, clause 12.6.1. Replace "clause 9.3" with "clause 12.3".

20) Correction Section 4, clause 12.7.1. Replace entire clause as follows:-

Run off from the Permanent Capping will be collected in a lined ditch at the base of the slope. At the lower end of this ditch the Contractor shall construct a headwall as shown on drawing no. 3077/5/5G. A 2 metre length of 450 m twin wall HDPE or polypropylene pipe shall be connected to a shallow manhole as shown on Drawing No. 3077/5/5A and this shall in turn be connected to a run of 450 mm twin wall HDPE or polypropylene pipe which shall be placed along the line shown on drawing no. 3077/5/5H. The pipe shall be installed in a trench 1.0 metre wide by 1.2 metres deep and surrounded by a minimum of 150 mm Screened Gelli Fill on all sides. Where the pipe crosses the service road the cover on the pipe shall be increased to 1 metre. The pipe shall terminate in a headwall constructed by setting it between two gabion baskets (2m x 1m x 1m each), at the eastern perimeter ditch at point D on the site plan 3077/5/1. The opposite bank (on the eastern side of the ditch) shall be protected by the installation of three gabion baskets (2m x 1m x 1m) set on a geotextile base to replace the existing bank material. The location of the manhole may be altered by the Engineer to suit conditions prevailing as a result of any regrading necessary to accomodate the installation of the permanent

capping material. The gabion baskets shall be filled with 100 mm - 150 mm stone. Any soil excavated shall be distributed around the structures as directed by the Engineer.

21) Amend Section 4 clause 12.12.1, second sentence. Delete the words "either" and "from precast concrete sections or".
Delete the 4th sentence in its entirety.
Add to the end of the 3rd sentence .....150 mm , "in line with Drawing No 3077/5/5A."

22) Amend Section 4 clause 12.14.1 as follows:

Add in first sentence after ....lined ditch "in accordance with drawing 3077/5/5J."
Amend penultimate sentence, replace "divert" with "guide" and replace "standard units" with "storm water channel."

23) Amend Section 4 clause 12.14.2, 2nd sentence after "...4 metres and" add "the Contractor"

24) Amend Section 4 clause 12.16.1, last sentence to read "The stilling pond shall be joined to the short length of channel over the leachate service line using a lined ditch 0.5.metres wide and 1.0 metre deep with sides angled to match the trapezoidal channel. The lined ditch to be as specified in clause 12.14 above."

25) Amend Section 4 clause 12.17.1 13th line. Before "layer" add the words "300 mm."

26) Add to Section 4 a new clause 12.18

12.18 Safety Measures

12.18.1 Incrementally upon completion of bulk excavation for each of the lagoons in the Water Treatment Area the Contractor shall erect and maintain a temporary high visibility safety barrier fence and a lifebuoy around the excavations.

27) Add new clause. Section 4 Clause 12.19

"Power Cable Duct from New Gas Flare Plinth to Eductor Tank

The Contractor shall install a 100 mm diameter PVC cable duct between the new gas flare plinth and the Eductor Tank. The duct will generally run ooverground and be secured to the gas vent pipe by suitable metal straps or bands."