WATER MONITORING MANAGEMENT PLAN

Project Name: Energy from Waste CHP Facility

Project Number: C1005
Document Reference: C1005/WWP/014
Location: Devonport, Plymouth

Approved by: D. Primmer	Dated: 10/11/11
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Prepared by: Eleanor Mason	Dated: 30/09/10
Signed: Kier Environmental Adviser	
Accepted by:	Dated:
Signed: Supervising Engineer	

Issue and Amendment Record

Revision Number	Date	Description of Change	Produced / Amended by
01	30/09/10	For Approval	E Mason
02	28/10/11	Site Specific Amendments	T Wallis
03	01/11/11	Reviewed by Consultants – Scott Wilson	T Wallis
04	01/11/11	Reviewed by Consultants – Scott Wilson Monitoring Locations	T Wallis
05	01/11/11	Reviewed by Consultants – Scott Wilson	T Wallis
06	10/11/11	Updated drawing PA19E to PA19E-A	D Primmer

Contents

1. Introduction

This Water Monitoring Plan forms part of the Construction Environmental Management Plan (C1005-005-PEfW-Rev 04) for the contract and has been produced to ensure that the watercourses adjacent to the site are adequately monitored throughout the construction works. All measurements will be logged in an agreed format and formally sent to the Client and any appropriate bodies. The Water Monitoring Plan will also run alongside the Pollution Prevention Plan to ensure all management processes are followed.

General Environmental Monitoring will be completed on a weekly basis (using KCL form KGSHE029) and will include any results found within the following plan.

A fully trained member of staff will be appointed to undertake the monitoring required.

The site team will advise the client's on site representatives at the earliest opportunity if any results are shown to be elevated.

Any water monitoring will be completed and agreed with the client and any Parameters and control measures set by the Environment Agency (EA).

1.1 Scope of Works

The *works* are as follows:

Phase 1
Access Road and Associated Fencing along Weston Mill Creek
Access Road @ Bull Point
Provision of contractor's compound and access on Table Top

Phase 2
Construction of EfW facility
- Piling
- Earthworks
- Underground services (including Drainage/Foul Systems)
- Reinforced Concrete Slab/Walls
- Structural Steelwork
- Cladding
- Perimeter Security Fencing
- Access Roads
- Access Bridge – Abutments and Bridge Deck
- Landscaping

1.2 Environmental Management

The management systems in place conform to BS EN ISO14001 and it is expected that all sites comply with these systems. Details of the management system are clearly defined within the management system process maps, which should be followed from tender and prequalification stages, through to project close down. The process maps are available on site through Kiernet to all personnel.
The Water Monitoring Management Plan will be regularly monitored and audited by appropriate personnel, throughout the duration of the works. It is the responsibility of the Project Manager to ensure development, approval and effective implementation of the Water Monitoring Management Plan. This should be undertaken with the support of environmental manager, specialists and other suitably qualified personnel. It must also be made clear to all site personnel that each individual has a responsibility to ensure no environmental incidents occur.

The following outlines the processes and plans to be implemented on site to ensure all environmental aspects and impacts are identified and sufficient measure put in place to reduce risks associated with the works.

There are two main watercourses located adjacent to the site boundaries detailed in table below; (additionally there is also the Swale to the base of Blackies Wood).

Name	Location	Discharge Point
Barne Brake	Located to the East of the site.	Flows into Western Mill Creek
Western Mill Creek	Located to the Southern edge of Phase 2 works and North of Phase 1 works	Flows into the Plymouth Estuary
Blackies Wood Swale	Located at the bottom of Blackies Wood – Runs approximately South to North	Flows adjacent to site, just outside site boundaries.

2. Site Drainage Layout

2.1 Existing Site Drainage

The MOD site has an existing surface water Drainage system. There are 3 areas in which the new access roads will be constructed:

- Camels Head Car Park
- Bull Point
- Existing Access Road to Area 4 in North Yard

In these locations the water is collected through road side gullies and channels in the areas above.

The services drawings have been requested but have yet to be received for the areas of work.

It is not known if the surface water goes through a petrol interceptor in Camels Head Car Park.

It appears that the existing drainage at Bull point discharges via a 300mm drainage pipe in the quay wall (Drawing of existing drainage system and proposed drainage attached in appendix B)

2.2 Proposed Site Drainage

The proposed drainage system will all be built to “High Way Specification White Book”.
This will consist of a drainage trenches and filter drains along the new access road as shown on drawing PA19A – B (see Appendix B).

For the access roads, filter grips will be used (these will greatly reduce the amount of road side silts getting into the creek and act as natural filters). See drawing PA19E-A (see Appendix B).

For the drainage works at Bull Point the existing car park/access road drainage will be adapted so that all the new drainage discharges via existing outfalls. There is no increase in catchment areas with the inclusion of the new road.

The Works for Phase 2 are currently in design stage and are shown on drawing PA21E (see Appendix B).

Note the above details are an outline proposal with full design to follow.

2.3 Potential Risks Associated with site Drainage

The potential risks associated with the site drainage are:

- Contamination of oils into the water system
- Discharging of silt and particles in water courses
- Altering levels of PH in the local courses

3 Monitoring

Monitoring will occur weekly at agreed locations to ensure compliance with any parameters or control measures set by the Client and EA. In addition, monitoring will occur during any excessive movements during the construction programme.

The table in appendix C will be used to collate all monitoring data.

The parameters to be monitored are:

- PH
- Water Clarity (Turbidity)
- Temperature
- Salinity
- Particle Content
- Oil (visual only)

Any elevated results will be reported to the Site Manager and the client; immediate action will be taken to ensure any pollution incident is contained.

3.1 Monitoring Types

Types of monitoring to be used on site are:

- PH monitoring; the collecting of water samples collected from the identified monitoring points and tested using PH paper. (Monitoring sheet attached Appendix C)

- Particle and Oil Monitoring; The particle testing will be done using a IMHOFF cone

3.2 Monitoring Frequency

The Tamar Estuaries Consultative Forum requested short term surveillance monitoring of the adjacent watercourses one month in advance of construction works in order to establish a baseline.

During the construction phase, water monitoring will be carried out once a week from the specified monitoring points (see Appendix C).

3.3 Monitoring Locations

The suggested monitoring locations are shown in Appendix C.

4 Control

ENV01 Risk assessments (Please see appendix A) will be undertaken and the following processes put in place:-

- Monitoring will be carried out as required under this plan. Any particular locations identified will be incorporated into the monitoring programme.
- Any areas in which an exclusion zone is needed will be fenced off under agreement with the client.
- All the processes listed will be integrated into the Pollution Prevention Plan and will be communicated to all staff upon induction.

4.1 Review of Monitoring Results

The results of monitoring will provided to the client within the site monthly report and a hard copy will be available in the site office for review MVV/EA at any time.

Any Elevated results will be reported to the site manager and the client at the earliest opportunity; immediate action will be taken to ensure any pollution incident is contained.

4.2 Action Plan

The action plan for dealing with spillages and contamination of water course etc is contained within the pollution prevention plan Document C1005-PPP-007 Rev 002

Appendix A
ENV01 Risk assessments

Contract Name & Number	C1005
Activity / Operations	Phase 1 – Access Road Phase 2 – Main EfW Facility

Environmental Aspect (delete as necessary)	**Data Sheet (ENV02)**	**Potential Environmental Impact**	**Risk**			**Total**	**Control Measures** (add/delete as necessary)	**Residual Risk**			**Total**	**Method Statement / Procedure Number**	**Associated Toolbox Talk**
			O	**+D**	**x C**			**O**	**+D**	**x C**			
DUST	ENV/ADS/01	Damage to flora/fauna Contamination of water courses Legal Action by Statutory Authorities	4	3	8	56	Pollution incident control plan Damping down Environmental Monitoring	3	2	6	36	Environmental Management Plan C1005-005-PEfW Pollution Prevention Plan C1005-007-PEfW	**03 & 21**
HERITAGE	ENV/ADS/02	Damage to or loss of archaeological site Legal Action by Statutory Authorities	4	3	8	56	Training/Toolbox Talks Archaeological Survey	2	2	4	16	Environmental Management Plan C1005-005-PEfW	**15**
NOISE	ENV/ADS/03	Complaints by residents Legal Action by Statutory Authorities Disruption to wildlife	3	3	8	48	Section 61 Application Environmental Monitoring Low noise plant/ensure no idling engines	2	2	6	24	Environmental Management Plan C1005-005-PEfW	**04 & 21**
WASTE	ENV/ADS/04	Pollution/contaminated land Legal Action by Statutory Authorities	4	3	8	56	Site Waste Management Plan Environmental Monitoring Duty of Care/Transfer Notes Training Segregation of waste	2	2	6	24	Environmental Management Plan C1005-005-PEfW Waste Management Plan C1005-006-PEfW	**08,09 & 24**

WATER	ENV/ADS/05	Contamination of groundwater/surface waters/rivers Damage/Loss of wildlife Potential harm to humans Failure to meet consents Legal Action by Statutory Authorities	3	5	10	80	ENV08 Environmental Monitoring Obtain appropriate licences/consents Spill kits complete and readily available	2	3	6	30	Environmental Management Plan C1005-005-PEfW Water Monitoring Plan C1005-014-PEfW	**01 02 05 06 16 17 18**
TRANSPORTATION	ENV/ADS/06	Air and noise pollution Complaints from public	2	2	6	24	Traffic Management Plans Pollution incident control plan	1	1	4	8	Environmental Management Plan C1005-005-PEfW	**04 & 21**
CONTAMINATED LAND	ENV/ADS/07	Damage/destruction to flora and fauna Damage to visual amenity Legal Action by Statutory Authorities Remediation costs	3	4	8	56	Environmental Monitoring Site Waste Management Training, maintain good standards of site housekeeping Work to Control Pollution (Oil storage) Regulations 2001	2	2	6	24	Environmental Management Plan C1005-005-PEfW	**1 13 23**
ECOLOGY	ENV/ADS/08	Loss, destruction, harm or disturbance of wildlife or habitat Reduction in endangered species Spreading of invasive plants Legal Action by Statutory Authorities	5	3	10	80	Environmental Monitoring Training/Toolbox Talks/Species Identification Information Ecological Assessment Application for appropriate consents/licences Fencing off sensitive areas	3	2	6	30	Environmental Management Plan C1005-005-PEfW	**7 10 11 12 19 20 22**

RESOURCE USE	ENV/ADS/09	Generation of additional waste streams Reduction of fossil fuels Destruction of non-sustainable forests	3	4	4	28	Re-use of materials Prevention of over-ordering Appropriate storage of materials FSC Timber Usage Switch It Off Schemes	2	2	2	8	Environmental Management Plan C1005-005-PEfW	**14**
VISUAL AMENITY	ENV/ADS/10	Negative impact on visual amenity Complaints by public and local authorities	3	2	4	20	Careful use of lighting Hoardings Good site housekeeping	2	1	2	6	002	**21**

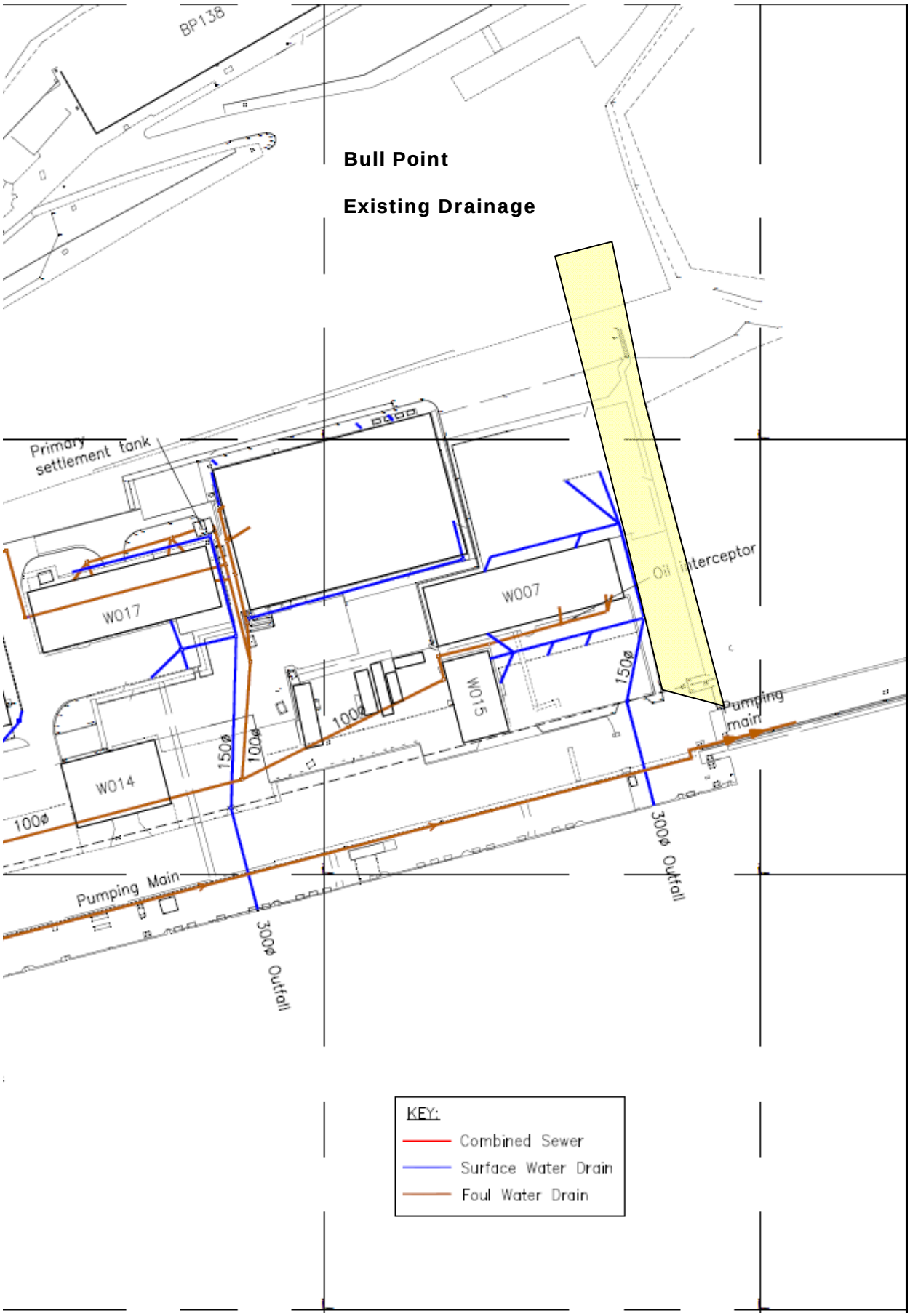
Likelihood of Occurrence (O)		**+ Likelihood of Detection (D)**		**X Severity of Consequence (C)**	
Criteria	**Rank**	**Criteria**	**Rank**	**Criteria**	**Rank**
V High	5	V High	1	V High	10
High	4	High	2	High	8
Moderate	3	Moderate	3	Moderate	6
Low	2	Low	4	Low	4
V Low	1	V Low	5	V Low	2

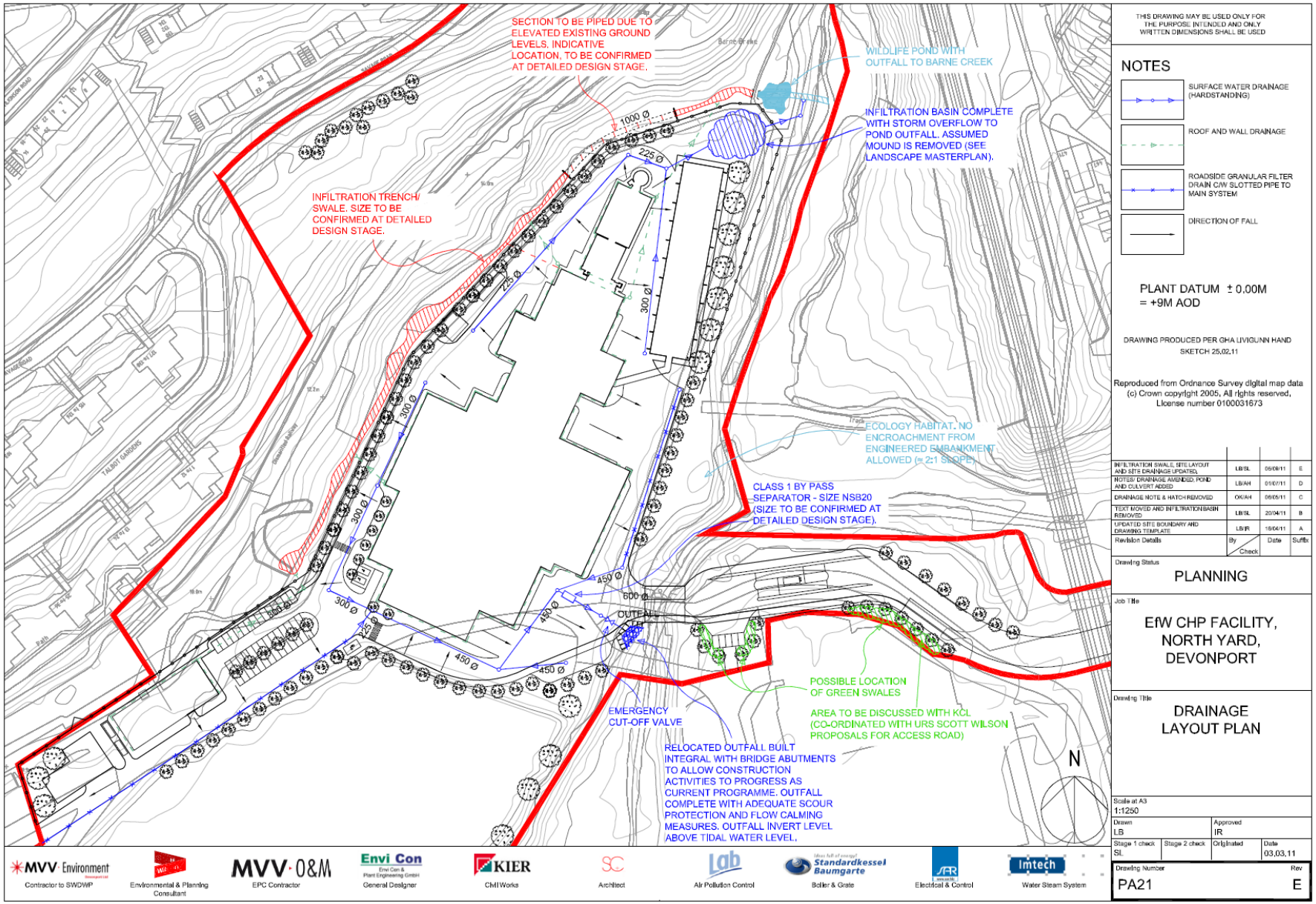
Originator: 

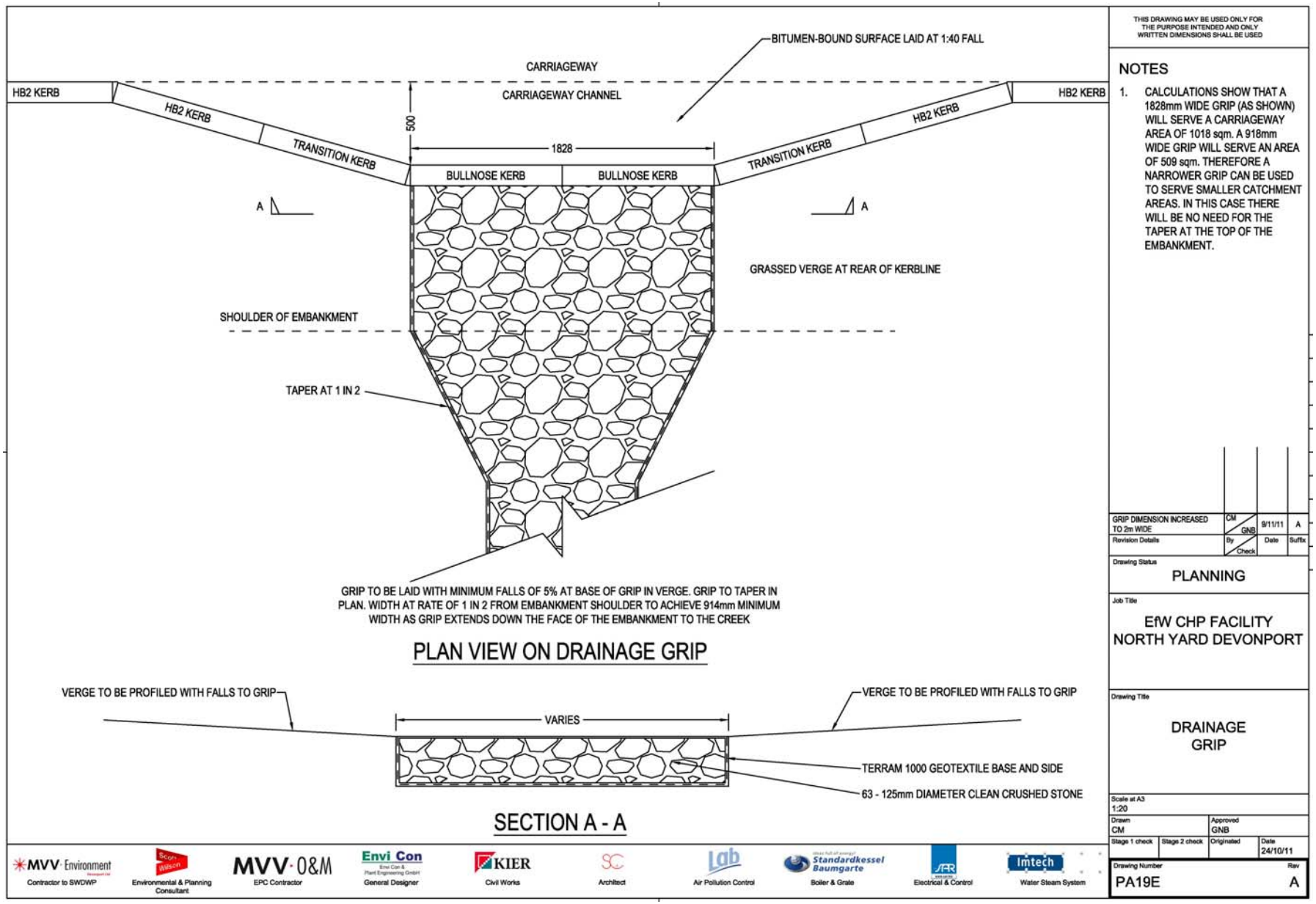
Dated: **27/08/10**

APPENDIX B

Drainage Layout Existing & Proposed


Bull Point
Existing Drainage
BP138
Primary settlement tank
W017
W007
W015
W014
Oil interceptor
Pumping main
150ø
100ø
100ø
100ø
300ø Outfall
Pumping Main
300ø Outfall
KEY:
Combined Sewer
Surface Water Drain
Foul Water Drain


SECTION TO BE PIPED DUE TO ELEVATED EXISTING GROUND LEVELS. INDICATIVE LOCATION, TO BE CONFIRMED AT DETAILED DESIGN STAGE.
WILDLIFE POND WITH OUTFALL TO BARNE CREEK
INFILTRATION BASIN COMPLETE WITH STORM OVERFLOW TO POND OUTFALL. ASSUMED MOUND IS REMOVED (SEE LANDSCAPE MASTERPLAN).
INFILTRATION TRENCH/ SWALE. SIZE TO BE CONFIRMED AT DETAILED DESIGN STAGE.
ECOLOGY HABITAT. NO ENCROACHMENT FROM ENGINEERED EMBANKMENT ALLOWED (= 2:1 SLOPE)
CLASS 1 BY PASS SEPARATOR - SIZE NSB20 (SIZE TO BE CONFIRMED AT DETAILED DESIGN STAGE).
OUTFALL
POSSIBLE LOCATION OF GREEN SWALES
AREA TO BE DISCUSSED WITH KCL (CO-ORDINATED WITH URS SCOTT WILSON PROPOSALS FOR ACCESS ROAD)
EMERGENCY CUT-OFF VALVE
RELOCATED OUTFALL BUILT INTEGRAL WITH BRIDGE ABUTMENTS TO ALLOW CONSTRUCTION ACTIVITIES TO PROGRESS AS CURRENT PROGRAMME. OUTFALL COMPLETE WITH ADEQUATE SCOUR PROTECTION AND FLOW CALMING MEASURES. OUTFALL INVERT LEVEL ABOVE TIDAL WATER LEVEL.
N
THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED
NOTES
SURFACE WATER DRAINAGE (HARDSTANDING)
ROOF AND WALL DRAINAGE
ROADSIDE GRANULAR FILTER DRAIN C/W SLOTTED PIPE TO MAIN SYSTEM
DIRECTION OF FALL
PLANT DATUM ± 0.00M = +9M AOD
DRAWING PRODUCED PER GHA LIVIGUNN HAND SKETCH 25.02.11
Reproduced from Ordnance Survey digital map data (c) Crown copyright 2005, All rights reserved, License number 0100031673
INFILTRATION SWALE, SITE LAYOUT AND SITE DRAINAGE UPDATED. LB/SL 06/08/11 E
NOTES/ DRAINAGE AMENDED, POND AND CULVERT ADDED LB/AH 01/07/11 D
DRAINAGE NOTE & HATCH REMOVED OK/AH 06/05/11 C
TEXT MOVED AND INFILTRATION BASIN REMOVED LB/SL 20/04/11 B
UPDATED SITE BOUNDARY AND DRAWING TEMPLATE LB/IR 18/04/11 A
Revision Details By / Check Date Suffix
Drawing Status
PLANNING
Job Title
EfW CHP FACILITY, NORTH YARD, DEVONPORT
Drawing Title
DRAINAGE LAYOUT PLAN
Scale at A3
1:1250
Drawn LB
Approved IR
Stage 1 check SL
Stage 2 check
Originated
Date 03.03.11
Drawing Number PA21
Rev E
MVV Environment Contractor to SWDWP
Environmental & Planning Consultant
MVV O&M EPC Contractor
Envi Con General Designer
KIER Civil Works
Architect
Lab Air Pollution Control
Standardkessel Baumgarte Boiler & Grate
Electrical & Control
Imtech Water Steam System



THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED

NOTES

1. CALCULATIONS SHOW THAT A 1828mm WIDE GRIP (AS SHOWN) WILL SERVE A CARRIAGEWAY AREA OF 1018 sqm. A 918mm WIDE GRIP WILL SERVE AN AREA OF 509 sqm. THEREFORE A NARROWER GRIP CAN BE USED TO SERVE SMALLER CATCHMENT AREAS. IN THIS CASE THERE WILL BE NO NEED FOR THE TAPER AT THE TOP OF THE EMBANKMENT.

Revision Details	By / Check	Date	Suffix
GRIP DIMENSION INCREASED TO 2m WIDE	CM / GNB	9/11/11	A

Drawing Status: PLANNING

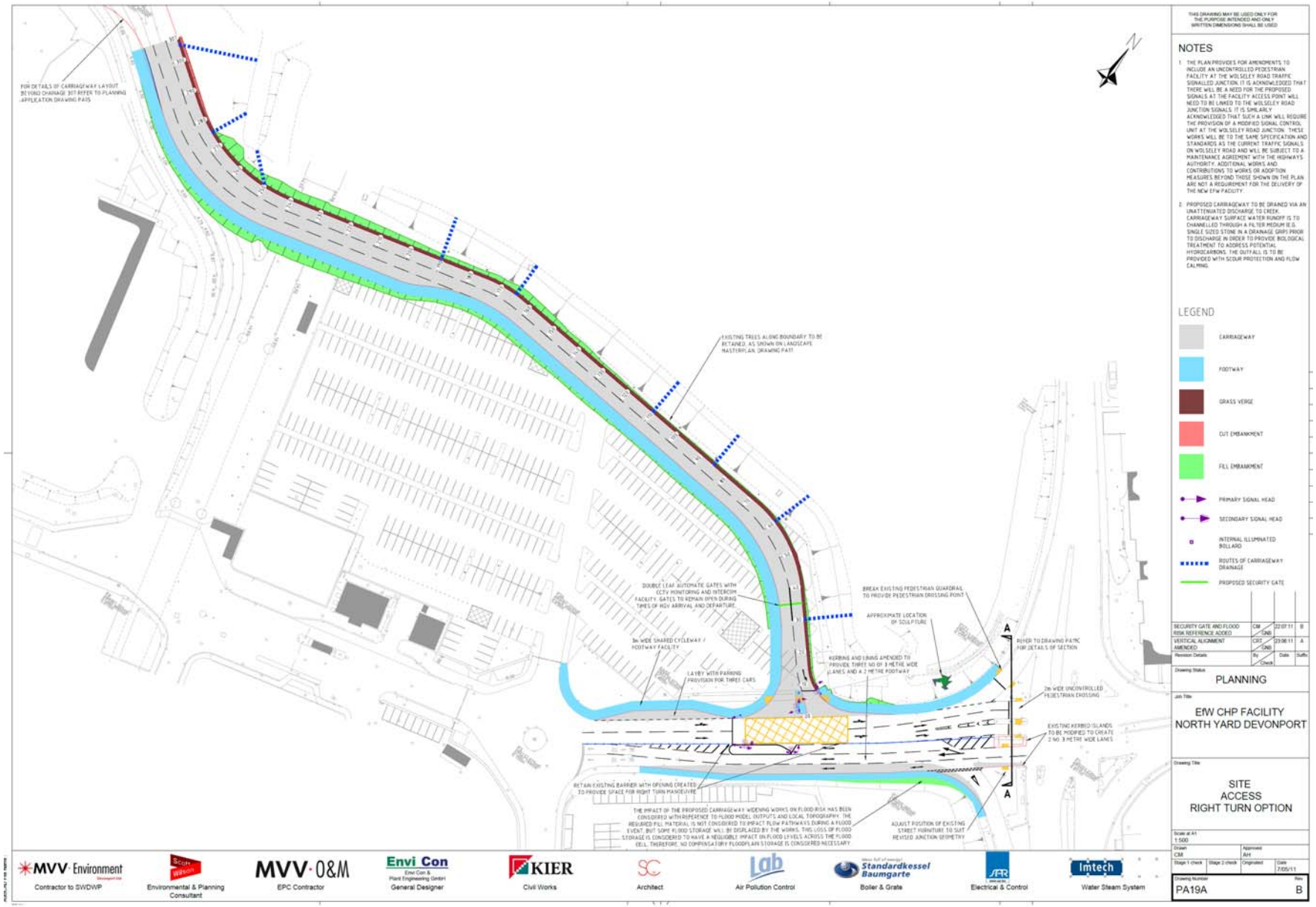
Job Title: EfW CHP FACILITY NORTH YARD DEVONPORT

Drawing Title: DRAINAGE GRIP

Scale at A3: 1:20

Drawn	Approved		
CM	GNB		
Stage 1 check	Stage 2 check	Originated	Date
			24/10/11

Drawing Number: PA19E Rev: A


NOTES
1. THE PLAN PROVIDES FOR AMENDMENTS TO INCLUDE AN UNCONTROLLED PEDESTRIAN FACILITY AT THE WOLSELEY ROAD TRAFFIC SIGNALLED JUNCTION. IT IS ACKNOWLEDGED THAT THERE WILL BE A NEED FOR THE PROPOSED SIGNALS AT THE FACILITY ACCESS POINT WILL NEED TO BE LINKED TO THE WOLSELEY ROAD JUNCTION SIGNALS. IT IS SIMILARLY ACKNOWLEDGED THAT SUCH A LINK WILL REQUIRE THE PROVISION OF A MODIFIED SIGNAL CONTROL UNIT AT THE WOLSELEY ROAD JUNCTION. THESE WORKS WILL BE TO THE SAME SPECIFICATION AND STANDARDS AS THE CURRENT TRAFFIC SIGNALS ON WOLSELEY ROAD AND WILL BE SUBJECT TO A MAINTENANCE AGREEMENT WITH THE HIGHWAYS AUTHORITY. ADDITIONAL WORKS AND CONTRIBUTIONS TO WORKS OR ADOPTION MEASURES BEYOND THOSE SHOWN ON THE PLAN ARE NOT A REQUIREMENT FOR THE DELIVERY OF THE NEW EfW FACILITY.
2. PROPOSED CARRIAGEWAY TO BE DRAINED VIA AN UNATTENUATED DISCHARGE TO CREEK. CARRIAGEWAY SURFACE WATER RUNOFF IS TO CHANNELLED THROUGH A FILTER MEDIUM IE.G. SINGLE SIZED STONE IN A DRAINAGE GRIP) PRIOR TO DISCHARGE IN ORDER TO PROVIDE BIOLOGICAL TREATMENT TO ADDRESS POTENTIAL HYDROCARBONS. THE OUTFALL IS TO BE PROVIDED WITH SCOUR PROTECTION AND FLOW CALMING.
LEGEND
CARRIAGEWAY
FOOTWAY
GRASS VERGE
CUT EMBANKMENT
FILL EMBANKMENT
PRIMARY SIGNAL HEAD
SECONDARY SIGNAL HEAD
INTERNAL ILLUMINATED BOLLARD
ROUTES OF CARRIAGEWAY DRAINAGE
PROPOSED SECURITY GATE
PLANNING
EfW CHP FACILITY
NORTH YARD DEVONPORT
SITE ACCESS RIGHT TURN OPTION
PA19A
B
MVV Environment
Contractor to SWDWP
Scott Wilson
Environmental & Planning Consultant
MVV O&M
EPC Contractor
Envi Con
General Designer
KIER
Civil Works
SC
Architect
Lab
Air Pollution Control
Standardkessel Baumgarte
Boiler & Grate
Imtech
Water Steam System

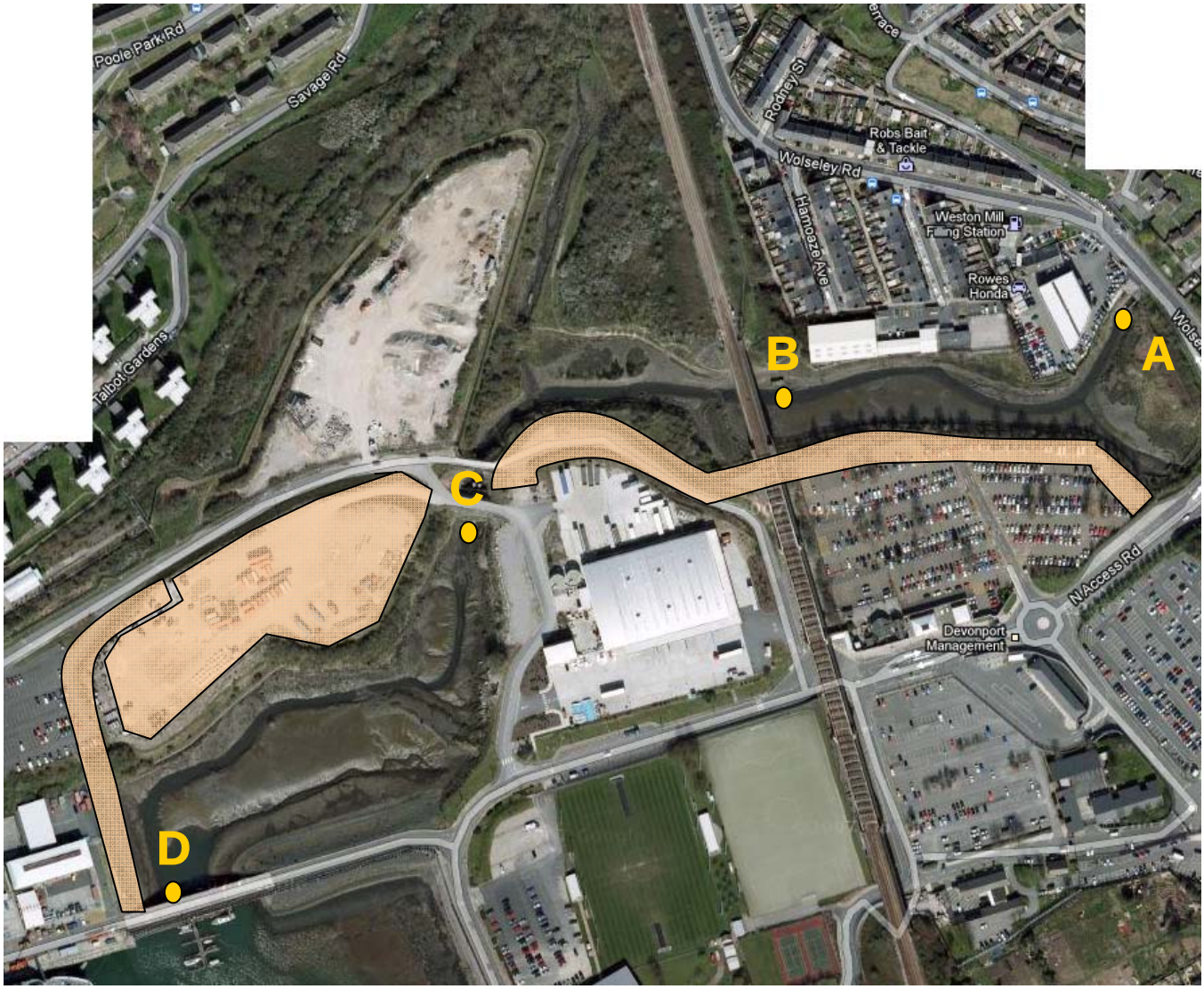
Appendix C
Location of Monitoring Points
&
Monitoring Tables

WATER MONITORING TABLE

Results of water monitoring									
Date	Time	Tide – Incoming/Outgoing	Monitoring Point	Location	pH	Temperature	Salinity	Turbidity	Signature

Monitoring Sheet Particle Content & Oil

Monitoring Point	Results of Inspection (Particle content)	Visible signs of Oils (yes/no)	Action required	Action Proposed or Taken	Date	Signature



Phase 1 Works Jan 2012 – Apr 2012

- Bull Point Access Road and Table Top Access
- Right Turn Access Road and Weighbridge
- Site Establishment and security fencing on Table Top Mountain

Monitoring Locations

- A1
- B1
- C1
- D1

Phase 2 Works Apr 2012 – Aug 2014

- EfW Energy from Waste Facility

Monitoring Locations

- A2
- B2
- C2
- D2