Attachment D.1

Infrastructure

D.1.a Site Security arrangements including gates and fencing

The site is located within the Port Authority area which has dedicated 24hour/day security with barrier controlled access to the Port Authority area. There are surveillance cameras located throughout the Port Authority area including all access points.

The Greenport Environmental Facility will have swipe access electronic gates and stock proof fencing around the facility which will be of a standard required by ABP regulations. Surveillance cameras with feedback to reception and remotely to Mr Binman Ltd Head Office will be in operation at the facility. Pedestrian access will be controlled through the reception area and all doors will have security access.

D.1.b Design for Site Roads

The site of the proposed development is accessed via the internal roadways of the Shannon Foynes Port Area, which is in turn accessed from two separate junctions with the N69 Limerick to Tralee National Secondary Route. The N69 runs from east to west approximately 630 metres south of the proposed development site, at its nearest point. Entry to the Port Area is restricted by automatic access barriers, which require security passes to open. Security passes are issued only to authorised persons by the Shannon Foynes Port Company. Vehicles entering the site of the proposed development will use the easternmost junction of the Port Area with the N69. This junction is located approximately 830 metres south of the site, whereas the second junction is located approximately 1.16 kilometres west of the site.

The site is accessed via the internal roadway of the Shannon Foynes Port Area, which is in turn accessed from two separate security-controlled junctions with the N69 Limerick to Tralee National Secondary Route. Access to the facility will be from the East Harbour Road Access Gate which will ensure there will be no traffic associated with the facility through the town of Foynes.

D.1.c Design of hardstanding areas

All process operations will take place indoors on an impermeable surface and all process wastewater generated will be held in bunded storage for re-use in the process. There will be no process discharges off-site or to ground or surface water.

External hard standing areas are already provided at the existing facility which consists of poured concrete. Access to the facility will be via a hardstanding concrete area. All operations including delivery of the biodegradable material will be completed within the facility. The delivery area is designed to prevent contamination of wheels of delivery vehicles preventing contamination of external area. The external hard-standing areas will discharge to a Class 1 oil-

interceptor and attenuation system with controlled discharge. Refer to Drawing 061-306-104.

The sources of pollution that could potentially have an effect on surface water during the operational phase of the development will be oil and fuel leaks from vehicles using the roads. The introduction of a Class 1 petrol/oil interceptor will mitigate against this. Class 1 interceptors achieve a concentration of 5 mg/litre of oil under test conditions. The surface water discharge rate from the site will be restricted to the current discharge rate calculated as 209 litres per second based on existing impermeable area of 1.5485 hectares.

Toilets in the office area will discharge to an Envirocare or equivalent type wastewater treatment unit. The treated effluent from the Envirocare wastewater treatment unit will discharge to the existing foul sewer on the Port Road, adjacent to the site.

D.1.d Plant

Two weighbridges will be constructed on-site. The traffic management system for the site includes a one-way system with separate incoming and outgoing weighbridges which will minimise HGV time onsite.

All vehicles entering the facility with feedstock material and exiting the facility with the compost product shall be checked at the incoming and outgoing weighbridges respectively to ensure that trailer coverings are in place.

All incoming and outgoing loads will be logged onto our weighbridge recording system to facilitate the completion of an Annual Environmental Report or any such reports as requested by the Agency.

D.1.e Wheel-wash

The indoor delivery area is designed with a physical barrier to ensure the wheels of the delivery vehicles are not contaminated by the feedstock material, thereby preventing feedstock material from leaving the building. A steam cleaning system will be in place at relevant exit points in line with Dept. of Agriculture conditions for biogas/composting facilities. All vehicles within the building for example wheel loaders will be washed in a dedicated vehicle wash area. All washwater from these areas will be drained to the process wastewater collection system. All washwater will be reused in the composting process. There will be no discharges of washwater from the facility. Refer to Drawing 061-306-121.

D.1.f Laboratory Facilities

In order to assure compliance with the emission limit values of the Licence and with the requirements of ABP regulations, Greenport Environmental Ltd propose to develop a laboratory on-site and employ a full time Environmental Officer. The primary purpose of the laboratory and the Environmental Officer will be to develop and implement an environmental management system including standard operating procedures sampling and monitoring schedules, completion of all relevant analysis on-site or off-site in compliance with the

Licence conditions and the ABP regulations. Process monitoring and abatement equipment monitoring and maintenance will be critical elements of the management system.

D.1.g Design and location of fuel storage areas
All refuelling activities will take place in a designated refuelling area. The refuelling area will be contained and under cover. The fuel storage area will be bunded to 110% of the total volume. Only permanent vehicles on site will be refuelled on site, vehicles delivering/collecting materials will not be refuelled on site.

D.1.h Waste Quarantine Areas
An enclosed segregated waste quarantine area will be provided for composted material in line with ABP regulations. Within the clean area, pasteurised batches will be sampled and held temporarily in dedicated bays until they pass all relevant analysis. If a batch does not pass, it will be rejected isolated and returned to the plant for reprocessing. The clean area will undergo a thorough clean down procedure following such an event.

D.1.i Waste Inspection Areas
Only biodegradable waste suitable for composting will be accepted at the facility. The sources of the waste material will be from pre-determined sources which will be suitably assessed. All loads accepted at the facility will be accompanied by a load docket which will identify the material. The material will be tipped in the waste reception area where it can be visibly inspected. If the material is not as described on the load docket or if it is not suitable for composting, it will be rejected. The material will be transferred to the oversize dispatch area for removal off-site.

D.1.j Traffic Control
A traffic management plan drawing is attached which shows traffic movement on-site. It is estimated that approximately nine articulated lorry loads of raw material will be accepted at the facility daily and approximately five to six articulated lorry loads of processed materials will leave the facility daily. In addition an existing carpark in front of the reception area will be used for parking up to fifteen vehicles for employees and visitors.

Staff car parking facilities are available in front of the existing warehouse.

D.1.k Sewerage and surface water drainage infrastructure
Sewerage and surface water drainage infrastructure drawings are attached. There will be no emissions to sewer or surface water from the process. A foul sewer serving the Office/Administration toilets/canteen will discharge to an upgraded Envirocare wastewater treatment unit suitable for domestic wastewater or equivalent. The treated wastewater will discharge to an existing foul sewer system.

All surface water from hard-standing areas external to the building will discharge off-site via a Class 1 oil interceptor, attenuation tank and controlled

discharge value. Refer to Drawing 061-306-105/106/109 and external and internal map.

D.1.l All services
The site services are already in place in terms of feed supply of electricity, water, telephone. As part of the power generation associated with the biogas, a connection to the National Grid will be made. Refer to Drawing 061-306-041 in Attachment B.2.

D.1.m Plant Sheds, Garages and equipment compound
The facility will consist of one fully enclosed composting/biogas building which will encompass all elements of the process. External ancillary equipment includes 2 CHP units, biofilters, 2 bunded water/gas storage tanks, 2 bunded scrubber solution storage tanks and 1 bunded fuel storage tank. Refer to Drawing 061-306-117.

D.1.n Site Accommodation
Site accommodation including all reception area, offices, toilets, showers, and canteen is located at the front of the building.

D.1.o A Fire Control system, including water supply
A comprehensive fire control system will be developed and integrated into the facility. Extensive process controls to manage the temperature of the composting process will be in place including automated cool down procedures in the event of an emergency. The facility will be fitted with all necessary fire controls including fire extinguishers, and blankets at designated fire points. The plant has a high pressure fire hydrant system available adjacent to the facility as part of the Port Authority infrastructure. An Emergency response Plan is also in place within the Port Authority and the Local Fire Station is less than one mile away. The firemain associated with this system will be upgraded as part of the project. Refer to Drawing 061-306-108.

D.1.r Composting Infrastructure
See Section 3 of EIS

NOTE:
ALL SURVEY INFORMATION TAKEN FROM EMC SURVEYS, SURVEY OF SITE DEVELOPMENT FOYNES PORT. DWG NO. 04-062-001 DATED 12-07-04 ALL LEVELS SHOWN IN METRES RELATIVE TO STATION EMC3 - VALUE 6.93 METRES ORDNANCE DATUM MALIN HEAD.

LEGEND

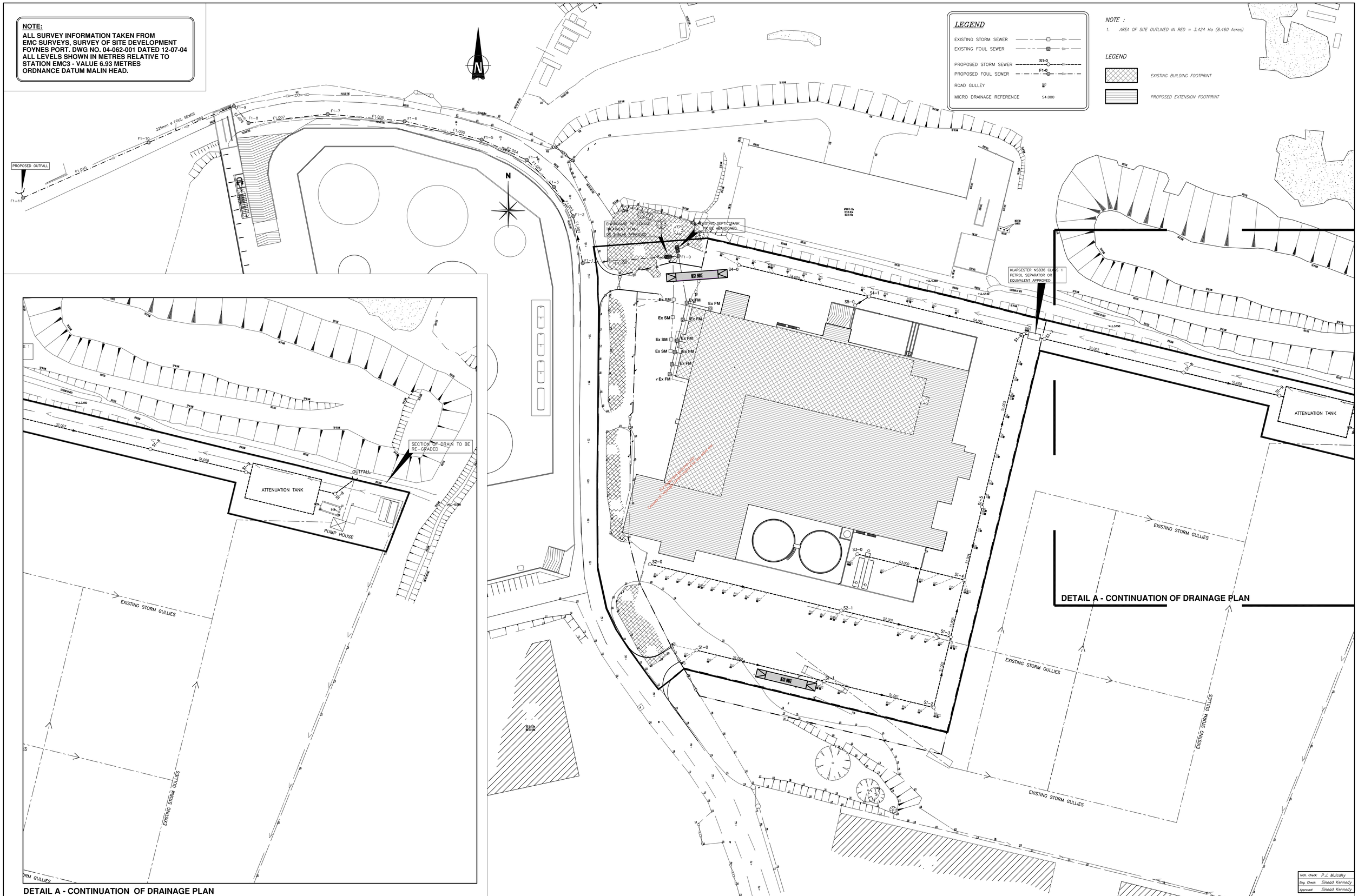
- EXISTING STORM SEWER
- EXISTING FOUL SEWER
- PROPOSED STORM SEWER S1-0
- PROPOSED FOUL SEWER F1-0
- ROAD GULLEY
- MICRO DRAINAGE REFERENCE S4.000

NOTE :

1. *AREA OF SITE OUTLINED IN RED = 3.424 Ha (8.460 Acres)*

LEGEND

- *EXISTING BUILDING FOOTPRINT*
- *PROPOSED EXTENSION FOOTPRINT*



DETAIL A - CONTINUATION OF DRAINAGE PLAN

DETAIL A - CONTINUATION OF DRAINAGE PLAN

Tech. Check:	P.J. Mulcahy
Eng. Check:	Sinead Kennedy
Approved:	Sinead Kennedy

greenport environmental

REV.	AMENDMENT	BY	DATE

Job: GREENPORT ENVIRONMENTAL COMPOSTING FACILITY FOYNES
Title: DRAINAGE LAYOUT

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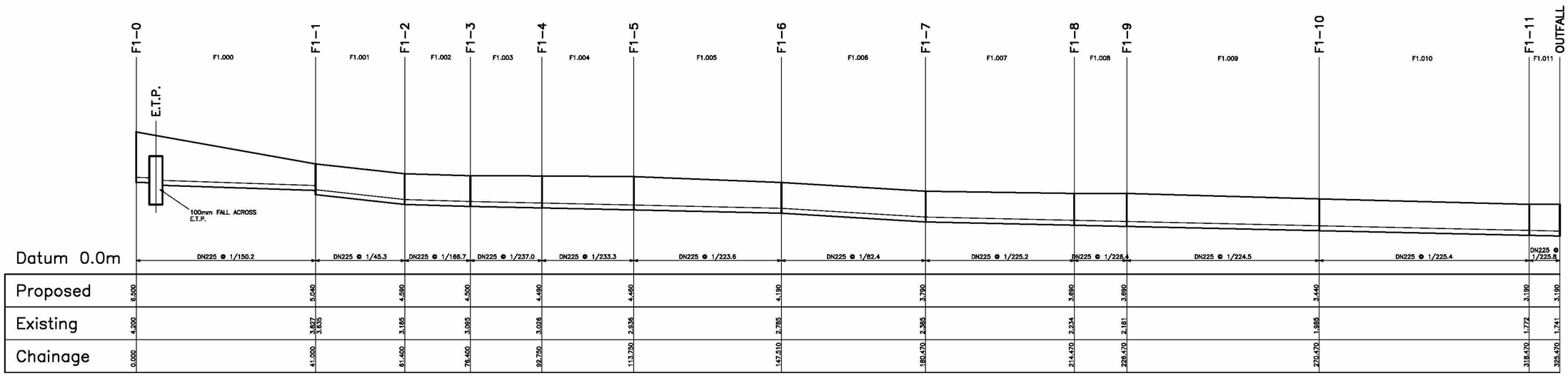
Stage:	Planning
Scale @A0:	1:500
Drawn:	P.J. Mulcahy
Date:	2009-04-28
Drawing No:	061-306-104
Rev:	P0



PIPERUN F1

Scale: Horizontal 1/500, Vertical 1/100

SEWER NOTES

1/ ALL DIMENSIONS ARE IN (mm.) UNLESS OTHERWISE NOTED. CONTRACTOR SHALL BE RESPONSIBLE FOR SETTING OUT JUNCTION BOXES, CHAMBERS, MANHOLES, GULLIES TO ENSURE NO CLASHES WITH SERVICE DUCTS AND PIPES.

2/ ALL LEVELS ARE IN METRES ABOVE DATUM UNLESS OTHERWISE NOTED.

3/ THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECT'S, ENGINEER'S AND MANUFACTURERS' DRAWINGS AND SPECIFICATIONS.

4/ ALL PIPE DIAMETERS ARE NOMINAL.

5/ THE CONTRACTOR MUST CONTACT THE RELEVANT AUTHORITIES PRIOR TO CONSTRUCTION WORK, AND SATISFY HIMSELF IN RESPECT TO THE LOCATION OF ALL EXISTING SERVICES.

6/ ALL SURFACE WATER SEWER TO BE CLASS 'H' SPIGOT & SOCKET CONCRETE PIPES TO I.S. 6 UNLESS OTHERWISE NOTED. ALL SURFACE WATER SEWER PIPES TO BE CLASS 'M' SPIGOT & SOCKET PIPES, UNLESS OTHERWISE NOTED. ALL SURFACE WATER PIPES TO BE uPVC TO I.S. 424. ALL FOUL SEWER PIPES AND CONNECTIONS TO BE CONCRETE PIPES TO IS6 OR VITRIFIED CLAY PIPES TO IS/EN 295.

7/ ALL ROAD GULLY DRAINS ARE 150mm.

8/ 800mm MAX. LENGTH ROCKER PIPES ARE TO BE PROVIDED ON SEWERS WHERE:
(A). A PIPE ENTERS A MANHOLE OR PUMPING STATION.
(B). A PIPE LEAVES A MANHOLE.
(C). A PIPE ENTERS CONCRETE ENCASEMENT.
(D). A PIPE LEAVES CONCRETE ENCASEMENT.
(E). ANY OTHER LOCATION AS DIRECTED BY THE ENGINEER.

9/ ALL SEWER ROCKER PIPES ARE TO BE FORMED BY CUTTING AND TRIMMING A LENGTH OF SPIGOT & SOCKET PIPE TO FORM A SPIGOT AT THE CUT END, THEREBY FORMING SPIGOT & SOCKET JOINTS AT BOTH ENDS OF THE ROCKER PIPE.

10/ ALL PIPE RUNS BETWEEN ACCESS JUNCTIONS TO BE 100ø, 1 IN 40 GRADIENT.

11/ WHERE SEWER PIPES, RISING MAINS OR ROAD GULLY DRAINS CROSS EXISTING ROADS, THE CONTRACTOR IS REQUIRED TO:
(A). CONTACT THE RELEVANT AUTHORITIES PRIOR TO COMMENCING WORK.
(B). MAKE GOOD THE EXISTING ROAD TO ITS ORIGINAL SPECIFICATION AS APPROVED BY THE ENGINEER.

12/ 600mm MAX LENGTH ROCKER PIPES ARE TO BE PROVIDED ON RISING MAINS WHERE:
(A). THE MAIN LEAVES A PUMPING STATION OR VALVE CHAMBER.
(B). THE MAIN ENTERS A MANHOLE OR VALVE CHAMBER.
(C). A PIPE ENTERS CONCRETE ENCASEMENT.
(D). A PIPE LEAVES CONCRETE ENCASEMENT.
(E). ANY OTHER LOCATION AS DIRECTED BY THE ENGINEER.

13/ ABANDONED SEWER RUNS TO BE BROKEN OUT AND TRENCH/MANHOLES TO BE BACKFILLED WITH CLASS 15/20N LEAN MIX CONCRETE.

14/ ALL ROCKER PIPES SHALL BE NO MORE THAN 150mm FROM THEIR ASSOCIATED MANHOLE, PUMPING STATION, CONCRETE ENCASED SECTION OR VALVE CHAMBER.

15/ WHERE PIPE RUNS PASS UNDER FOUNDATIONS, PIPE TRENCH TO BE BACKFILLED TO FORMATION LEVEL WITH CLASS 15/20 CONCRETE.

16/ ALL EXISTING MAIN SEWER RUNS TO BE JETTED TO REMOVE BLOCKAGE/DEBRIS.

17/ CCTV SURVEY TO BE CARRIED OUT ON ALL NEW DRAINAGE RUNS.

18/ FOR ALL INTERNAL DRAINAGE SEE ARCHITECTS DRAWINGS.

● CONTRACTOR TO PROVIDE IL, PIPE DIAMETER AND DIRECTION OF FLOW IN EXISTING MANHOLE ON COMMENCEMENT OF THE WORKS TO DESIGN ENGINEER

19/ MINIMUM COVER TO FLEXIBLE PIPES

ROADWAYS	=	1200mm
OPEN SPACES & FOOTPATHS NOT ADJACENT TO ROADS	=	900mm
GARDENS	=	600mm

WHERE MINIMUM COVER IS NOT ACHIEVED PLEASE REFER TO ENGINEER FOR PIPE PROTECTION DETAIL

Tech. Check:	P.J.Mulcahy
Eng. Check:	Sinead Kennedy
Approved:	Sinead Kennedy

greenport environmental

REV.	AMENDMENT	BY	DATE

Job:	GREENPORT ENVIRONMENTAL COMPOSTING FACILITY FOYNES
Title:	DRAINAGE SECTIONS –SHEET 1

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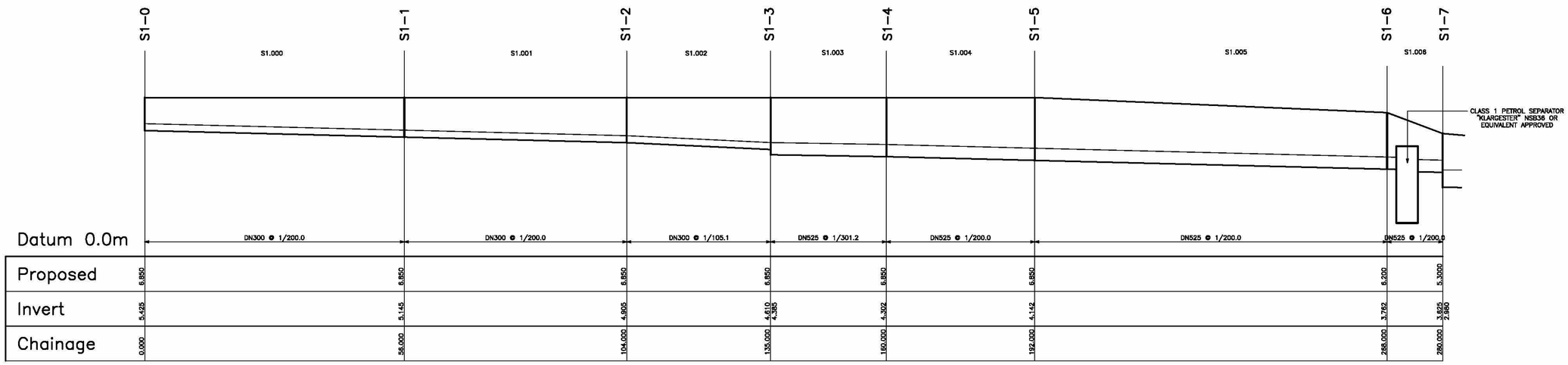
Stage:	Planning
Scale @A1:	As Shown
Drawn:	P.J.Mulcahy
Date:	2009-005-11
Drawing No:	061-306-105
Rev:	P0



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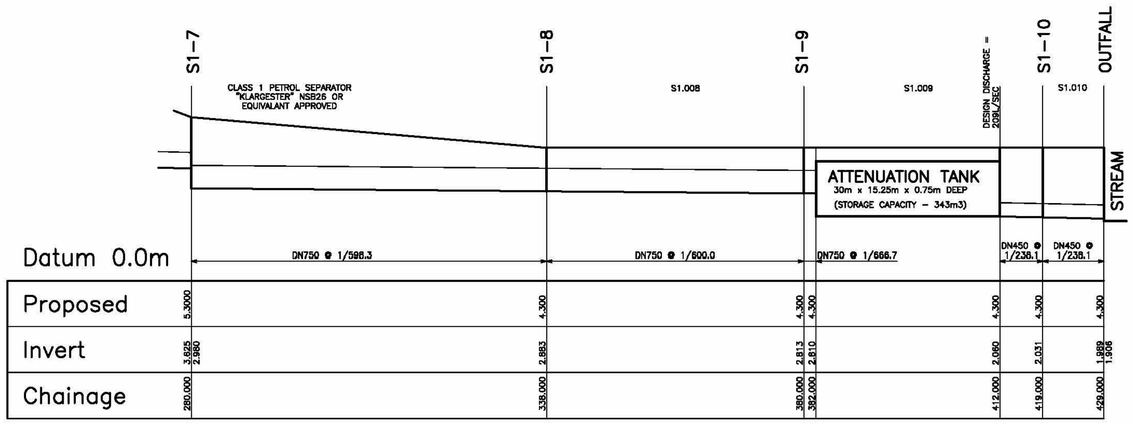
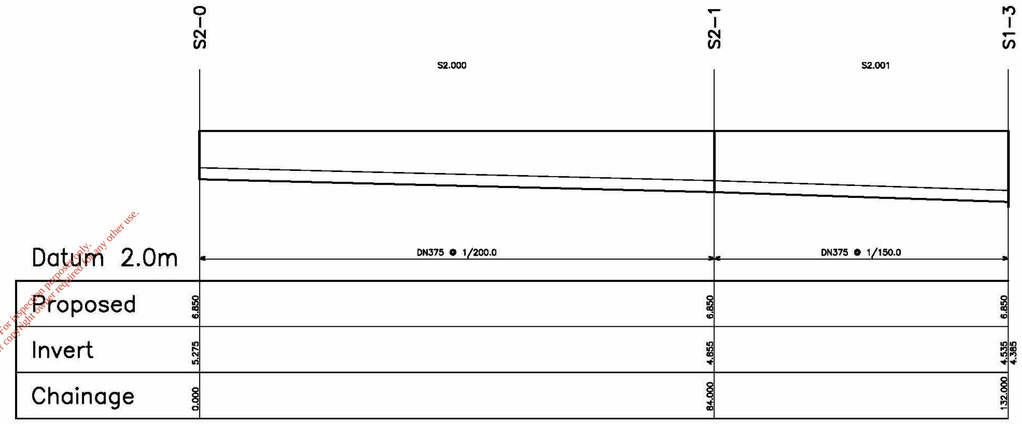


PIPERUN S1 (Continued)

Scale: Horizontal 1/500, Vertical 1/100



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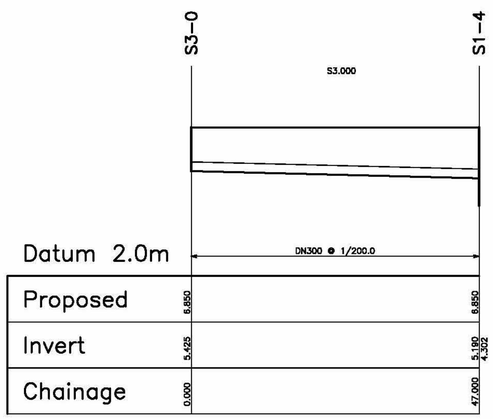
Scale: Horizontal 1/500, Vertical 1/100



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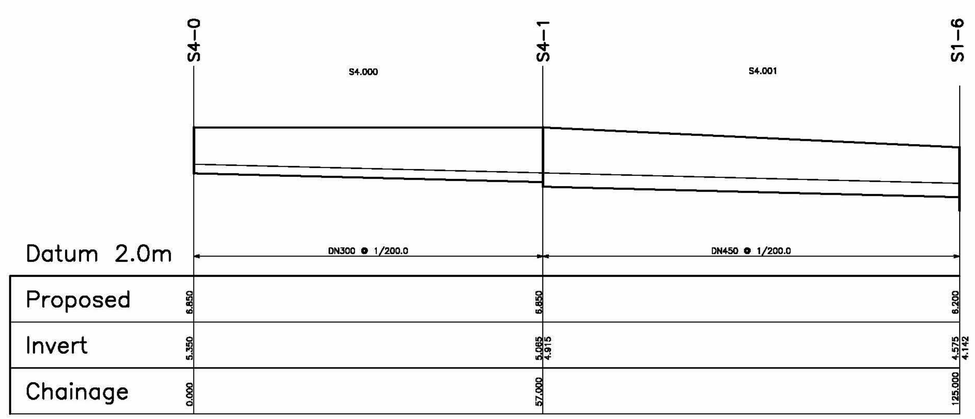
Scale: Horizontal 1/500, Vertical 1/100



PIPERUN S4

Scale: Horizontal 1/500, Vertical 1/100

SEWER NOTES

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(D). A PIPE LEAVES CONCRETE ENCASEMENT.
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OPEN SPACES & FOOTPATHS NOT ADJACENT TO ROADS	= 900mm
GARDENS	= 600mm

WHERE MINIMUM COVER IS NOT ACHIEVED PLEASE REFER TO ENGINEER FOR PIPE PROTECTION DETAIL

Tech. Check:	P.J.Mulcahy
Eng. Check:	Sinead Kennedy
Approved:	Sinead Kennedy

greenport environmental

REV.	AMENDMENT	BY	DATE
P1	SEWER SECTIONS REVISED	P.J.M.	2009-05-20

Job: GREENPORT ENVIRONMENTAL COMPOSTING FACILITY FOYNES
Title: DRAINAGE SECTIONS – SHEET 2
Stage: Planning
Scale @A1: As Shown
Drawn: P.J.Mulcahy
Date: 2009-005-11
Drawing No: 061-306-106
Rev: P1

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TIE IN TO EXISTING

EXISTING POTABLE WATER CONNECTION TO BE MAINTAINED.
EXACT LOCATION OF WATERMAIN ON SITE TO BE DETERMINED BY SLIT TRENCHING.
BOUNDARY BOX METER TO BE FITTED TO POTABLE WATER SUPPLY

STUB CONNECTION FOR FUTURE SERVICE OF ADJOINING LANDS

TIE IN TO EXISTING

N

LEGEND

- = EXISTING FOYNES HARBOUR POTABLE WATERMAIN
- = EXISTING FOYNES HARBOUR FIREMAIN
- = EXISTING OVERGROUND FIREMAIN
- = EXISTING OVERGROUND FIREMAIN (TO BE ABANDONED)
- = PROPOSED DN150 FIREMAIN
- WM = WATERMAIN WITH WATER METER
- SV = WATERMAIN WITH SLUICE VALVE
- H = WATERMAIN WITH HYDRANT
- BF = WATERMAIN WITH BLANK FLANGE

greenport environmental

REV.	AMENDMENT	BY	DATE

Job: GREENPORT ENVIRONMENTAL COMPOSTING FACILITY FOYNES
Title: WATERMAIN LAYOUT

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Tech. Check: P.J. Mulcahy
Eng. Check: Sinead Kennedy
Approved: Sinead Kennedy

Stage: Planning
Scale @A1: 1:250
Drawn: P.J. Mulcahy
Date: 19.05.2009
Drawing No: 061-306-108
Rev: PL0

NOTE :

1. AREA OF SITE OUTLINED IN RED = 1.424 Ha (3.480 Acres)

LEGEND

EXISTING BUILDING FOOTPRINT

PROPOSED EXTENSION FOOTPRINT

N

HARDCORE

HARDCORE

INDUSTRIAL UNIT

APPROX FFL=4.40m

Figured dimension only to be taken from this drawing. All dimensions to be checked on site. Consultants to be informed immediately of any discrepancies before work proceeds.

greenport environmental

REV.	AMENDMENT	BY	DATE

Job: GREENPORT ENVIRONMENTAL COMPOSTING FACILITY FOYNES

Title: YARD LEVELS AND GULLY LAYOUT

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• 1 University Technology Centre, Curraheen Road, Bishopstown, Cork, Ireland. T: +353 (0)21 438 6100, F: +353 (0)21 438 6101, E: cork@mpp.ie

Tech. Check:	P.J. Mulcahy
Eng. Check:	Sinead Kennedy
Approved:	Sinead Kennedy
Stage:	Planning
Scale @A1:	1:500
Drawn:	P.J. Mulcahy
Date:	2009-04-30
Drawing No:	061-306-109
Rev:	P0

Figured dimension only to be taken from this drawing.
All dimensions to be checked on site.
Consultants to be informed immediately of any discrepancies before work proceeds.

greenport environmental

REV.	AMENDMENT	BY	DATE
PL1	DISPATCH AREA DOOR RE-LOCATED ON SOUTH ELEVATION.	T.G.	22-07-2009.

Tech. Check:	P.J. Mulcahy
Eng. Check:	Sinead Kennedy
Approved:	Sinead Kennedy

Job: GREENPORT ENVIRONMENTAL COMPOSTING FACILITY FOYNES

Title: PROPOSED COMPOSTING FACILITY LAYOUT

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• 1 University Technology Centre, Curraheen Road, Bishopstown, Cork.
T: 021 438 6100, F: 021 438 6101, E: cork@mpp.ie

Stage:	PLANNING
Scale @A0:	1:250
Drawn:	P.J. Mulcahy
Date:	2009-05-13
Drawing No: 061-306-117	Rev: PL1


WEIGH BRIDGE
STORM MANHOLE
SUMP WITH ISOLATION VALVE
Ammonium Sulfate tank 20 m3, height = 4,5 m
Acid proof wall height = 0,7 m
H2SO4 Tank 10 m3, height = 3,5 m
BIO FILTER 2 365 m2
BIO FILTER 1 365 m2
Discharge for condensate biofilter HDPE PN10 DN125
CANOPY (OVER)
DRAINAGE CHANNEL
CLEANING UNIT (STEAM WASHER)
AEROBIC TUNNELS
COLLECTION PIT / PUMPING STATION TO OVERPUMP TO PROCESS WATER DRAINAGE NETWORK
INTAKE PIT AREA
sedimentation buffer tank
FFL 4.450
CONCRETE BUND
Concrete wall 0,25 m high
COMPOSTING TUNNEL 1
COMPOSTING TUNNEL 2
COMPOSTING TUNNEL 3
COMPOSTING TUNNEL 4
COMPOSTING TUNNEL 5
COMPOSTING TUNNEL 6
COMPOSTING TUNNEL 7
COMPOSTING TUNNEL 8
COMPOSTING TUNNEL 9
COMPOSTING TUNNEL 10
COMPOSTING TUNNEL 11
COMPOSTING TUNNEL 12
COMPOSTING TUNNEL 13
COMPOSTING TUNNEL 14
TO PROCESS CLEANING UNIT
Air flush system
Manhole
Central discharge HDPE PN10 DN 200
RAINWATER STORAGE TANK
Floor discharge HDPE PN10 DN125
Above ground pipe to water storage tanks
LOADING SHOVEL ACCESS CORRIDOR
ANAEROBIC TUNNEL 1
ANAEROBIC TUNNEL 2
ANAEROBIC TUNNEL 3
ANAEROBIC TUNNEL 4
ANAEROBIC TUNNEL 5
ANAEROBIC TUNNEL 6
ANAEROBIC TUNNEL 7
ANAEROBIC TUNNEL 8
ANAEROBIC TUNNEL 9
ANAEROBIC TUNNEL 10
TECHNICAL AREA
TECHNICAL INSTALLATION CORRIDOR
FUEL TANK
GAS WASHER
Potential Emission Point
WATER/GAS STORAGE Max fluid volume = 1400 m3
WATER/GAS STORAGE Max fluid volume = 1400 m3
40ft container CHP UNIT 2
40ft container CHP UNIT 1
Emission Point
DISPATCH AREA - CLEAN
DISPATCH AREA - OVERSIZE
CONCRETE WALL HEIGHT = 1.9m
PUMP SUMP
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Figured dimension only to be taken from this drawing.
All dimensions to be checked on site.
Consultants to be informed immediately of any discrepancies before work proceeds.

greenport environmental

REV.	AMENDMENT	BY	DATE

Tech. Check:	P.J. Mulcahy
Eng. Check:	Sinead Kennedy
Approved:	Sinead Kennedy

Job: GREENPORT ENVIRONMENTAL COMPOSTING FACILITY FOYNES

Title: INTERNAL DRAINAGE LAYOUT

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Scale @A1:	1:250
Drawn:	P.J. Mulcahy
Date:	2009-05-13
Drawing No: 061-306-121	Rev: P0

Attachment D.2 Facility Operation

Waste receiving and preparation

After entering the facility gate, the waste transportation trucks are weighed and then directed to the tipping floor of the receiving building to unload the waste, refer to Drawing 061-306-117 in Attachment D.1.
Non-processable waste, if any, can be sorted by the wheel loader operating at the tipping floor and segregated.
This facility shall receive the following waste categories:

- under-screened fraction from mixed MSW
- brown bin waste (household source separated organic waste)
- organic food sludge from commercial activities

The loader retrieves the materials from the floor and feeds them to the provided mixing unit in suitable proportions. From this unit, the mix is dropped into a concrete bunker provided with push walls from which the wheel loader can collect it and load the Anaerobic Digestion (AD) tunnels.

Anaerobic Digestion

Each Anaerobic Digestion (AD) tunnel will consist of a sealed concrete structure equipped with a specifically designed door that is provided with a pressurised rubber seal. The concrete floor will house a series of parallel PVC pipes that are incorporated lengthwise into the floor. These pipes are provided with tapered plastic nozzles (spigots) and are connected via pneumatic valves to a high-pressure blower serving a series of tunnels. This will be used to blow air or re-circulate gas through the material during the different phases of the process. The tunnels will also be equipped with a sprinkling system, which will re-circulate the water contained in the storage tanks. The sprinkling system will be used in the beginning of the process in order to activate the anaerobic process by inoculating the fresh material with the bacterial activity present in the water. As soon as the material is fed to the AD tunnels and the door is closed, the high-pressure fan will start to re-circulate the tunnel air through the spigot floor. This will induce a preliminary aerobic process, which raises the temperature quickly to the mesophilic level required in the AD process. (Mesophilic temperatures typically range between 25 and 40º Celsius.) Furthermore the oxygen level in the air will be dropping, leading the process rapidly to anaerobic conditions. The gas will be collected from each AD tunnel in the gas storage tank located on top of the wastewater tank, providing the suitable mixture for the generators. When the anaerobic digestion process is complete, the tunnel will be purged with fresh air to the air abatement system, prior to opening the tunnel. The material will be retrieved from the AD tunnels with the wheel loader and transferred to the mixing section.

Mixing

The material exiting the AD section will be de-compacted and mixed with the remaining fresh feedstock that has been diverted from the AD process to provide suitable material for the composting stage. This will be performed in a dedicated area equipped with another mixing unit. The digestate and the fresh feedstock will be fed to the machine in suitable proportions and then collected

into a concrete bunker. From this bunker, the wheel loader will retrieve the material mixture and feed the composting/drying tunnels.

Composting and Drying

The composting process will take place in the aerobic tunnels, which will be virtually divided into two sets (Tunnel 1-7 and Tunnel 8-14). Each tunnel will be dedicated either to source separated waste to produce Grade 1 compost or to mechanically separated organic fines to produce a lower grade stabilised biowaste. The material will initially be fed to the first set of tunnels for Phase I intensive composting. This phase, also called high-rate phase or Active Composting Phase or Intensive Phase, is characterised by a rapid decomposition of the organic matter under optimum conditions of temperature, oxygen and moisture. The intense metabolic activity provides a high rate temperature increase in the material. The duration of this process will in the range of two to three weeks and the resulting product can be defined as freshly composted material.
After Phase I, the material will be unloaded from the tunnels and fed to the second series of tunnels for Phase II where the process is repeated. Depending on the material characteristics, during the transition between Phase I and Phase II, the material may need to be de-compacted in the mixing unit. Another intermediate de-compaction might be required within Phase II, depending on the process.
The composting tunnel will consist of a sealed concrete structure provided with a specially designed door, equipped with a seal. Each tunnel will have its own centrifugal fan that blows air via the air plenum through the composting material in a controlled manner, thereby providing optimum aerobic conditions within the vessel. Each tunnel will also be equipped with a sprinkling system that is used to balance the material moisture.
An advanced automated monitoring and control system under the control of the plant supervisor will continuously monitor and maintain temperature, oxygen and moisture at optimum conditions. The process will be maintained under negative air pressure within the tunnels. Negative pressure refers to a situation in which an enclosed area has a lower pressure than the area around it. The air from the tunnels will flow through a scrubber, humidifier and a biofilter system prior to leaving the system. The building will also be maintained under negative air pressure, and all air within the building will also flow through the humidifier and biofilter abatement system prior to discharge. The air extraction system is designed with sufficient air changes to protect employees. Negative pressure will also be created in the buildings themselves to ensure odorous and polluted air is treated in this system without escaping uncontrolled from the plant. All air within the building will also flow through the humidifier and biofilter abatement system prior to discharge. The air extraction system is designed with sufficient air changes to protect employees.

Central air system

The combination of abatement systems used in the design of the proposed facility is the best available technology for biogas/composting facilities.

Building Ventilation

Air will be continuously drawn from the facility buildings in order to keep them under negative pressure at all times. The air from these areas will generally be discharged using axial flow fans. The main entrance doors for the trucks will be equipped with an air curtain, to prevent odours leaving the building when the doors are opened. This system will only be activated when the doors are open.

Biofilter Fans
All air will flow through the input ductwork of the biofilter fans. The fans' capacity will be controlled by a frequency transformer based on the defined negative pressure level at the suction side of the biofilter fans. The negative pressure will be measured in the tunnels process air discharge ductwork. The two biofilter fans will be parallel and will blow the air through the air humidifier. A non-return valve will be installed behind the biofilter fans in order to allow the system to continue when one of the fans is out of operation.

Air Scrubber
The exhaust air exiting the tunnels will be conveyed initially to a scrubber to neutralise any basic gases prior to discharge to the humidifier. The scrubber will also reduce any dust and bioaerosols that may be present in the air. The scrubber will use sulphuric acid (H_2SO_4) as a reagent. This reagent will be dosed by a dosing pump, which is monitored continuously and controlled automatically. The water discharge will be automatically controlled by conductivity measurement whereas level sensors will control the water make-up in the scrubber. The scrubber and associated storage tanks will be bunded to 110% capacity and under cover to protect from rain ingress.

Air Humidifier
Before the collected exhaust air flows through the biofilter, it will be moistened with water using the air humidifier. A high air humidity level is essential for the correct operation of the biofilter. The air humidifier will consist of a chamber with spray nozzles. The air will flow through this chamber horizontally while the spray nozzles sprinkle the process water.
In the air humidifier, dust, bioaerosols and any water-soluble gases will be reduced from the air. After the air humidifying process, the air will flow to the biofilter. Electronic pressure recording instruments will be mounted before and after the air humidifier and send their measurement signals to the computer.

Biofilter
The biofilter consists of a concrete basin divided into different fields, according to size. The biofilter floor will consist of perforated concrete slabs supported by walls that allow the air to flow evenly under the complete field. The air will be blown into an air plenum, flow under the biofilter floor and from here through the biofilter media. The biofilter media will be selected in order to optimise purification capacities, life, limited pressure losses and a good moisture holding capacity. The selected biofilter material (e.g. woodchip/peat/artificial) will support environmentally friendly microorganisms that naturally purify the air passing through the biofilter, producing carbon dioxide, water and heat.

Leachate and condensate Collection From AD Tunnels
Condensate and wastewater collected from the tunnels floor and from other drainage points will be collected and conveyed to the wastewater collecting sumps. Three sumps in total will be provided for liquid collection. The liquid will be held in the tanks for re-use within the process. Following treatment in the fermentation tanks to remove solids, the water will be re-circulated to the tunnels via a sprinkling system.

Leachate and condensate Collection From Composting/Drying Tunnels
Condensate and wastewater collected from the tunnel floors and from other drainage points will be collected and conveyed to collection sumps. From here, a submersible pump will transfer the liquid to a rotating sieve where coarse particles can be separated from the stream and be re-circulated to the composting material or sent to the water holding tanks. All sumps will be equipped with level sensors and level switches. Fresh water collected from the roof will be used as make-up in the system, when needed.

Condensation in the central air treatment system
The biofilter fans, the humidifier, the scrubbers/coolers and the complete air suction ductwork will be provided with condensation/discharge connections. The water will be discharged to the collecting sumps.

Compost refining and hygienisation

Following maturation, the material will be fed by the wheel loader to the buffering and dosing hopper feeding the refining line. The hopper will dose the material on a conveyor belt, which will transfer it to a star screen. The screen will produce two size fractions:

- <12 millimetres (mm)
- >12 mm

The underscreened fraction will be transferred by belt conveyors to a de-stoner to separate the organic fraction from heavy materials like stones and glass. The heavy rejects will be conveyed to a concrete storage bunker whereas the composted material will be fed to the hygienisation cell.

The latter consists of two special containers (or concrete boxes, depending on final engineering) equipped with an air heating system able to increase the material temperature above the required 70°C for at least 1 hour. The containers are alternatively fed by an automated filling system. As soon as one container is full, the system switches the material flow to the other container and in the meantime the heating system starts to heat the full container. The air is heated in a heat exchanger receiving hot water from the CHP units. The heated air then flows in the material thereby increasing its temperature. As soon as one container is hygienised, the material is removed and stored in the adjacent building.

The overs (> 12 mm) coming from the star screen are conveyed to a ballistic separator which further splits the flow into three fractions:

- One 2-dimension (2-D)

- One 3-dimension (3-D)
- One fine fraction

The 2-D, soft, flat, slender fraction consists mainly of, soft, flat or slender-shaped non bouncing material that are cleaned on it‘s way over the screening elements by the shaking, bouncing and turning motion created in the machine. It can consist of paper, film plastic, textiles, etc.

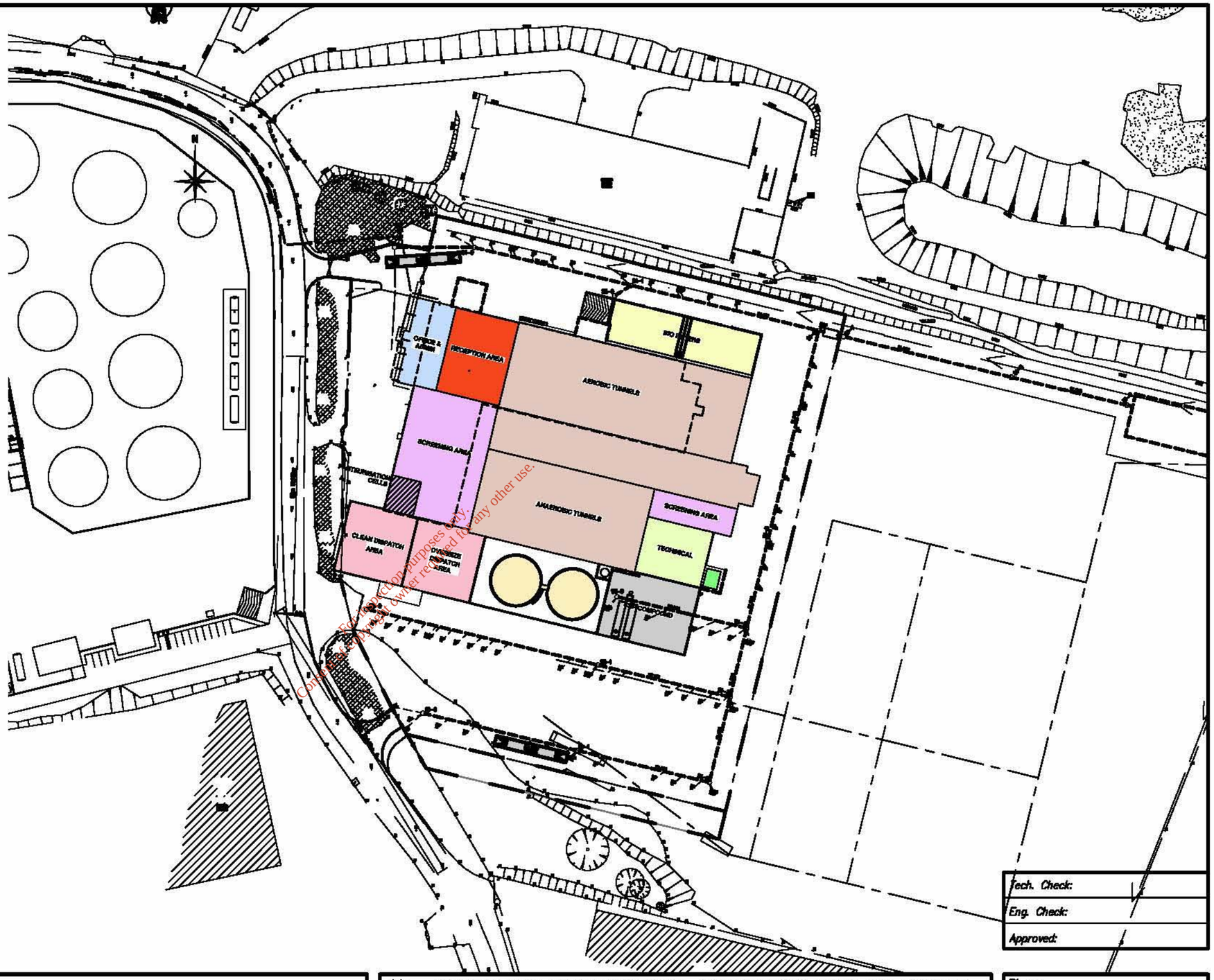
The 3-D, rigid, cubic, round, hollow fraction consists mainly of solid, rigid, stiff or cube-shaped bouncing, rolling material such as: metals, stiff plastics, bottles, batteries, electric apparatus/parts, stones, glass, foam rubber and foam plastic etc.

The Screened fraction consists of material falling through the inclined table, formed by the screening elements. The screened fraction contains more organic material which was not screened in the star screen because attached to other waste and now released by the shaking action of the screening elements. Fines are collected together with the fines of the star screen and therefore follow the same process.

The refining system will also be provided with a dedicated dust collection and filtering unit, which collects dust from the main sources (star screen, ballistic separator and destoner).The dust will be filtered by means of a pulse-jet fabric filter before conveying the flow to the main suction system heading to the biofilter. Any remaining dust will be removed by the humidifier before the air is treated by the biofilter.

KEY LEGEND

- OFFICE & ADMINISTRATION -
- AEROBIC/ANAEROBIC COMPOSTING TUNNELS -
- SCREENING -
- CHP COMPOUND -
- TECHNICAL AREA -
- WATER & GAS STORAGE -
- FUEL TANK -
- BIO FLITERS -
- OVERSIZE & CLEAN DISPATCH AREA -
- RECEPTION -



Tech. Check:	
Eng. Check:	
Approved:	

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Job: GREENPORT ENVIRONMENTAL COMPOSTING FACILITY FOYNES

Title: LAYOUT WITH SITE ACTIVITIES SHOWN

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