

## APPENDIX D

### INFRASTRUCTURE & OPERATION

#### FURTHER INFORMATION

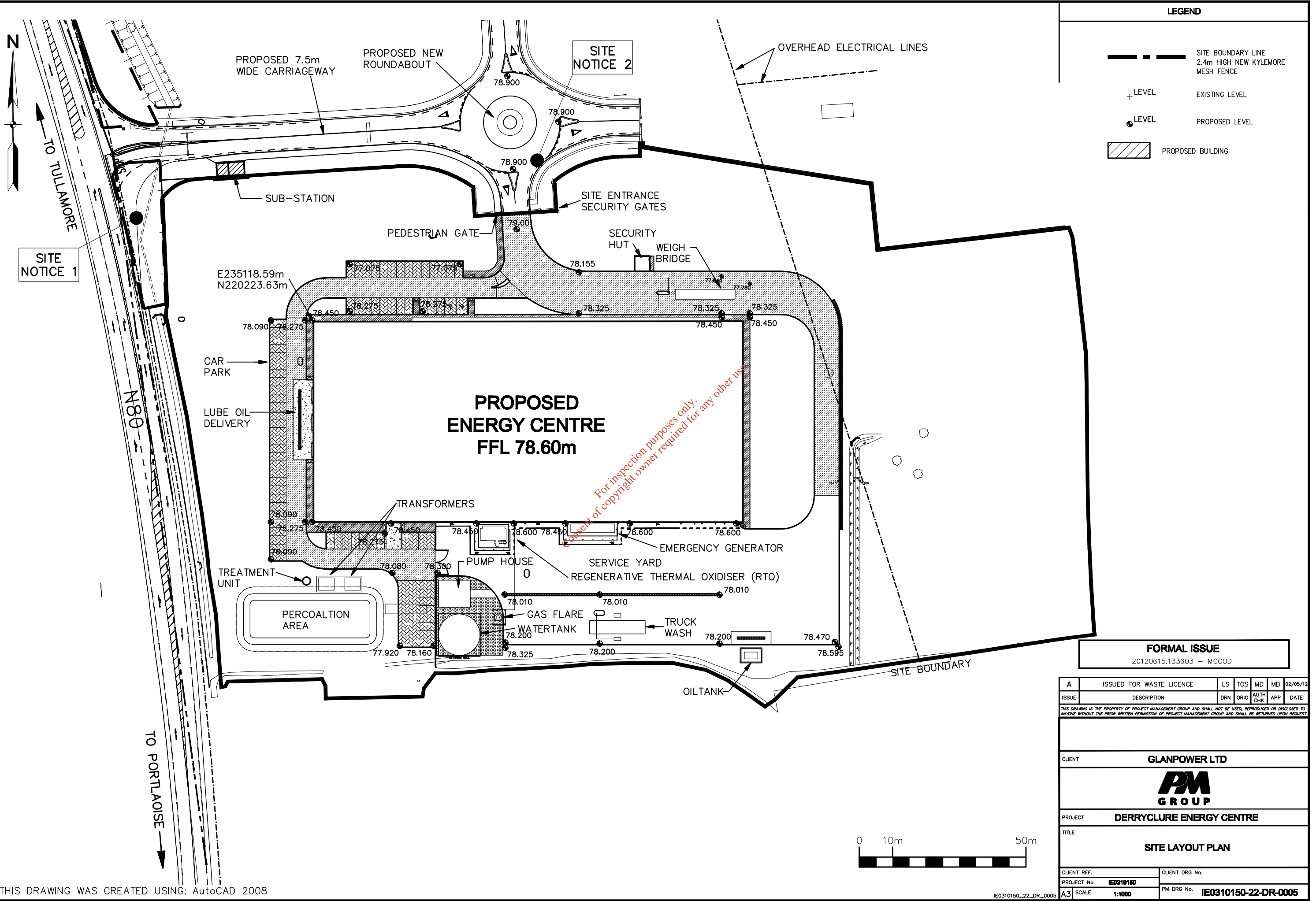
- D.1: Site Layout
- D.2: Site Entrance Details
- D.3: Site Paving Layout
- D.4 Plant Layout
- D.5 WWTP Design Report
- D.6 Site Drainage Layout
- D.7 Site Drainage Detail
- D.8 Internal Layout of Plant
- D.9 Office & Staff Accommodation
- D.10 Cross Sections A-A & B-B
- D.11 Cross Sections C-C & D-D
- D.12 Pre-Shredder
- D.13 Drum Separator
- D.14 Eddy Separator Unit
- D.15 Wind Separator Unit
- D.16 Final Shredder
- D.17 Baling Press
- D.18 Dryer
- D.19 Regenerative Thermal Oxidiser
- D.20 Laboratory Analysis Results - Char
- D.21 Laboratory Analysis Results - Slag

## APPENDIX D.1





### SITE LAYOUT

(1 no. drawing)

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**LEGEND**

-  SITE BOUNDARY LINE  
2.4m HIGH NEW KYLEMORE MESH FENCE
-  LEVEL  
EXISTING LEVEL
-  LEVEL  
PROPOSED LEVEL
-  PROPOSED BUILDING

**FORMAL ISSUE**  
20120615.133603 - MCCOD

A	ISSUED FOR WASTE LICENCE	LS	TOS	MD	MD	02/05/12
ISSUE	DESCRIPTION	DRN	ORIG	AUTH CHK	APP	DATE

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CLIENT	<b>GLANPOWER LTD</b>
	<b>PM GROUP</b>
PROJECT	<b>DERRYCLURE ENERGY CENTRE</b>
TITLE	<b>SITE LAYOUT PLAN</b>

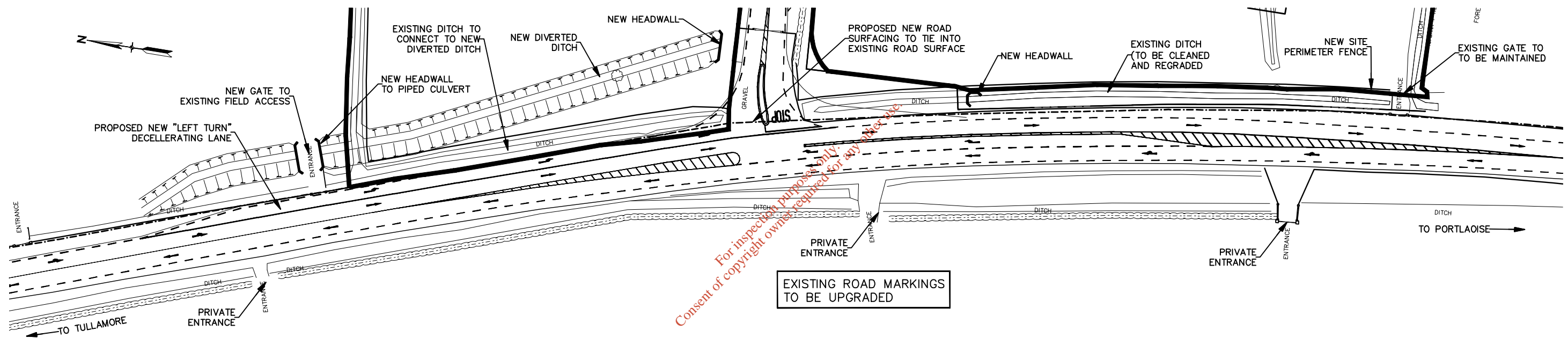
CLIENT REF.	CLIENT DRG No.
PROJECT No. <b>IE0310150</b>	PM DRG No. <b>IE0310150-22-DR-0005</b>
A3 SCALE <b>1:1000</b>	

## APPENDIX D.2

### SITE ENTRANCE DETAILS

(1 no. drawing)

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**PLAN SHOWING N80 ROAD**  
SCALE 1:1000

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**FORMAL ISSUE**  
20120615.133627 - MCCOD

A	ISSUED FOR WASTE LICENCE	LS	TOS	MD	MD	02/05/12
ISSUE	DESCRIPTION	DRN	ORIG	AUTH CHK	APP	DATE

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CLIENT	<b>GLANPOWER LTD</b>					
	<b>PM GROUP</b>					
PROJECT	<b>DERRYCLURE ENERGY CENTRE</b>					
TITLE	<b>SITE ENTRANCE DETAILS</b>					

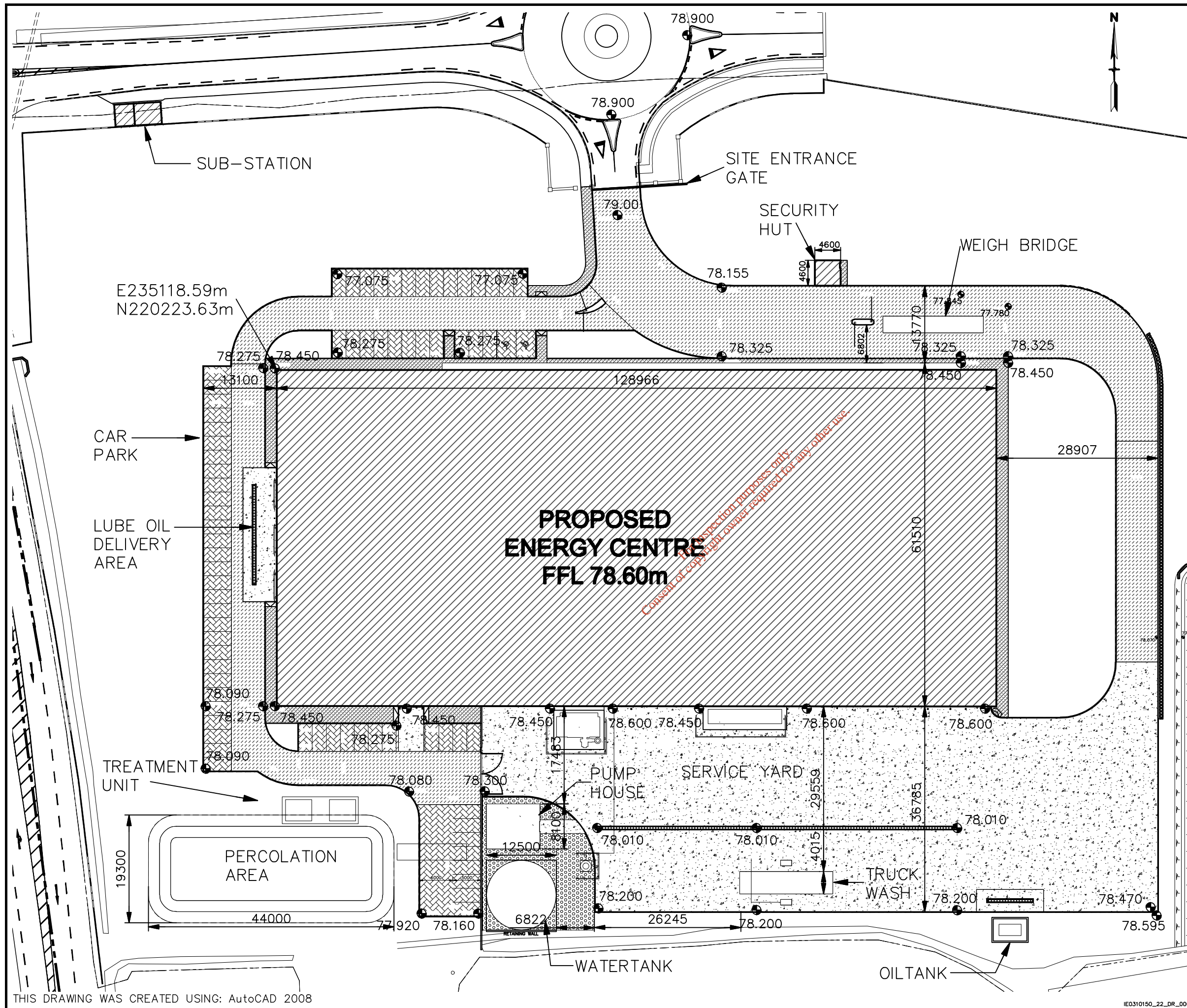
CLIENT REF.	CLIENT DRG No.
PROJECT No. <b>IE0310150</b>	PM DRG No. <b>IE0310150-22-DR-0006</b>
<b>A3</b> SCALE <b>1:1000</b>	

## APPENDIX D.3

### SITE PAVING LAYOUT

(1 no. drawing)

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**LEGEND**

	PROPOSED ASPHALT PAVEMENT SURFACING TYPE 2
	PROPOSED ASPHALT CONCRETE PAVEMENT SURFACING TYPE 4
	PROPOSED CONCRETE PAVEMENT SURFACING TYPE 3
	PROPOSED POROUS PAVEMENT SURFACING TYPE 1
	PROPOSED CONCRETE FOOTPATH SURFACING TYPE 5
	PROPOSED GRAVEL HARDSTANDING

<b>FORMAL ISSUE</b>						
20120615.135303 - MCCOD						
A	ISSUED FOR WASTE LICENCE	LS	TOS	MD	MD	02/05/12
ISSUE	DESCRIPTION	DRN	ORIG	AUTH CHK	APP	DATE
<small>THIS DRAWING IS THE PROPERTY OF PROJECT MANAGEMENT GROUP AND SHALL NOT BE USED, REPRODUCED OR DISCLOSED TO ANYONE WITHOUT THE PRIOR WRITTEN PERMISSION OF PROJECT MANAGEMENT GROUP AND SHALL BE RETURNED UPON REQUEST.</small>						
CLIENT	<b>GLANPOWER LTD</b>					
PROJECT	<b>DERRYCLURE ENERGY CENTRE</b>					
TITLE	<b>SITE PAVING LAYOUT &amp; DETAILS</b>					
CLIENT REF.				CLIENT DRG No.		
PROJECT No.	<b>IE0310150</b>			PM DRG No.		
A3	SCALE	<b>1:750</b>		<b>IE0310150-22-DR-0007</b>		

THIS DRAWING WAS CREATED USING: AutoCAD 2008

IE0310150\_22\_DR\_0007

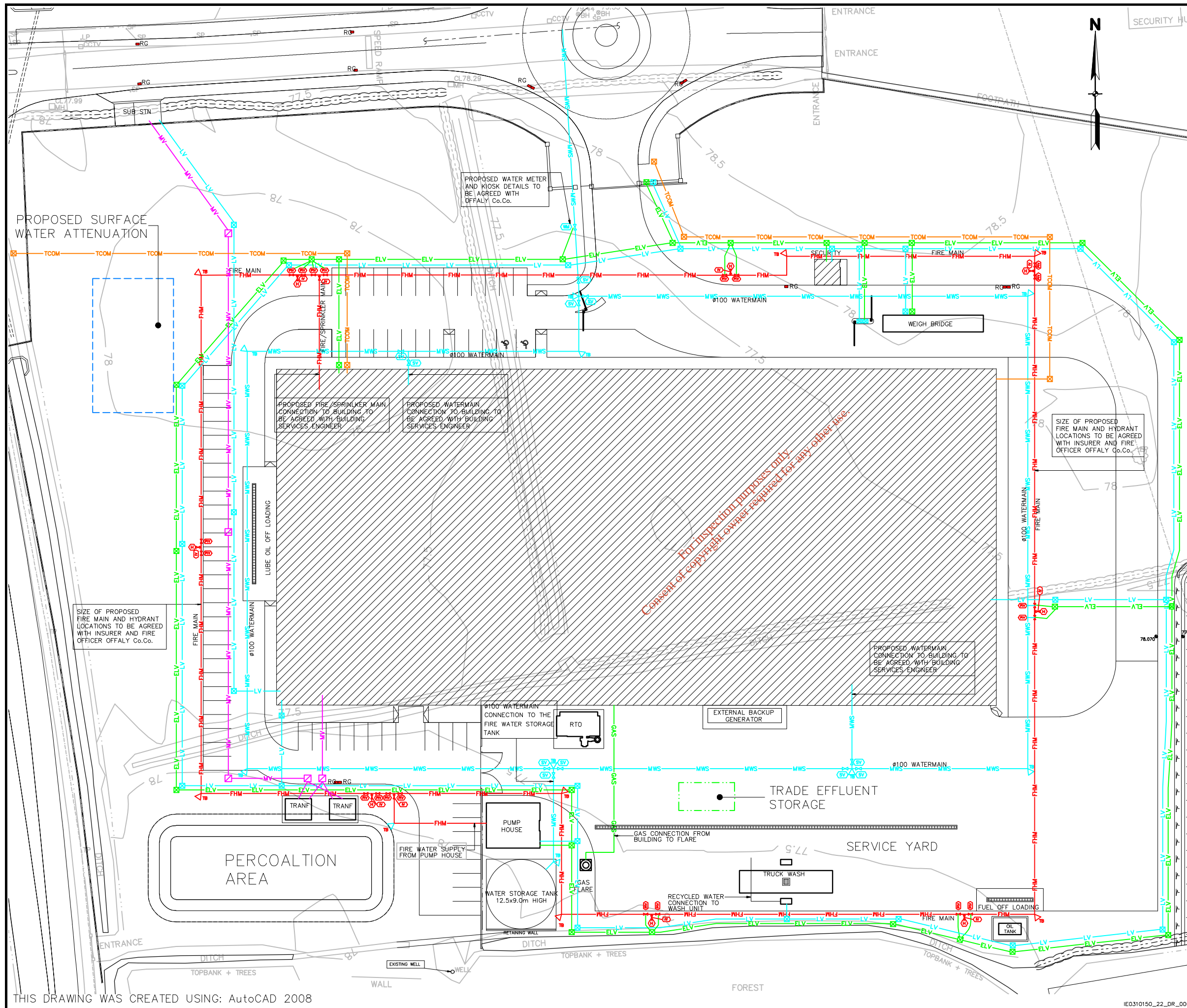
## APPENDIX D.4

### PLANT LAYOUT

(1 no. drawing)

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**LEGEND**

- PROPOSED FIRE HYDRANT MAIN
- PROPOSED POST INDICATOR VALVE
- PROPOSED ISOLATION VALVE
- PROPOSED WATERMAIN
- PROPOSED WATER METER
- PROPOSED SLUICE VALVE
- PROPOSED TRUST BLOCK
- GAS
- PROPOSED RECYCLED WATER CONNECTION TO TRUCK WASH
- PROPOSED MV CABLE ROUTE
- PROPOSED LV CABLE ROUTE
- PROPOSED ELV/COMMS CABLE ROUTE
- PROPOSED TELECOMS CABLE ROUTE
- PROPOSED MV CABLE CHAMBER (SIZE TO ELECTRICAL ENGINEERS REQUIREMENTS)
- PROPOSED CABLE CHAMBER (SIZE TO ELECTRICAL ENGINEERS REQUIREMENTS)

**FORMAL ISSUE**  
20120615.133726 - MCCOD

A	ISSUED FOR WASTE LICENCE	LS	TOS	MD	MD	02/05/12
ISSUE	DESCRIPTION	DRN	ORIG	AUTH CHK	APP	DATE

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CLIENT	<b>GLANPOWER LTD</b>
PROJECT	<b>DERRYCLURE ENERGY CENTRE</b>
TITLE	<b>PLANT LAYOUT</b>
CLIENT REF.	CLIENT DRG No.
PROJECT No. <b>IE0310150</b>	PM DRG No. <b>IE0310150-22-DR-0008</b>
A3 SCALE <b>1:750</b>	

## APPENDIX D.5

### WWTP DESIGN REPORT

(21 pages)

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# Molloy Precast Products Ltd.

## Waste Water Division

Coleraine, Clara Road, Tullamore, Co. Offaly.

Tel: 057 9326000 Fax: 057 9326060

Email: [info@molloyprecast.com](mailto:info@molloyprecast.com) Web: [www.molloyprecast.com](http://www.molloyprecast.com)

Date: 8<sup>th</sup> November 2010

Glanpower, Energy Park,

c/o **AXIS:** architecture

Penthouse, Castle Buildings,

Tara St, Tullamore, Co. Offaly

T: 05793 29628 | F: 05793 29638 | M: 087 1271367

RE: Site specific Information: Planning permission for an industrial unit and proprietary treatment system at: **Derryclure, Tullamore, Co. Offaly.** File ref: **PTT 1526**

Dated: 27/04/2010

### 1.0 Site relevant parameters

The report presents an opinion on the on-site percolation construction based on the percolation test results/relevant information supplied by Offaly County Council. The assumptions though reasonable, are given for guidance only and no liability can be accepted for changes in conditions not revealed by the percolation test results or by any other information provided. The recommendations in this report are based on the following parameters:

**Percolation values: P: 15.46 mon. T 53.93 min.** (Mottling at 1m BGL)

**Water table: at 1.8 meters**

**Bedrock: n/a**

**Proposed total number of workers in the unit : 50 which is equal to 8.33 P.E. Hydraulic load = 1500 lit/d ( 1000gr Organic)**

(Refer to the attached calculation sheet based on Table 3. page 8 from the EPA Waste Water Treatment Manual for Small Communities, Business, Leisure Centres and Hotels. )

**Required minimum EPA required percolation area is 500m<sup>2</sup> of soil polishing filter at a dosing rate of 3 lit/day/m<sup>2</sup>**

(Ref: EPA Code of Practice (CoP) (2009), Wastewater Treatment and Disposal System Serving Single Houses (p.e. ≤10) - Table 10.1, p44. ) [ T values above 51 require a dosing rate of 3 lit/m<sup>2</sup>/day]

**Aquifer category: L1 Vulnerability rating: H Vulnerability response: R2<sup>2</sup>**

Acceptable subject to normal good practice. Where domestic water supplies are located nearby, particular attention should be given to the depth of subsoil over bedrock such that the minimum depths required in Section 6 are met and that the likelihood of microbial pollution is minimised.

The location of the percolation area should be in accordance with the planning permission granted. The following table (EPA 2009 CoP, Section 6, Table 6.1, p14) below details the on the minimum separation distances in meters for the Aswaflo Effluent Treatment System and the percolation area. For minimum separation distances in meters for wells and for Ground Water Protection Response, refer to EPA, 2009 CoP, p. 57 - 62, 2009. In addition, for Heritage features (NHA/SAC), the distances required are dependent on the importance of the feature (contact Local Authorities or Dept. of the Environment and Local Government).

**Table: 6.1** page 14 EPA CoP 2009 minimum separation distances in meters

System	Surface water soakaway	Water-course/stream	Open drain	Lake or foreshore	Dwelling	Site boundary	Trees	Road	Slope breaks
AswafLOW WWTS	5	10	10	50	7	3	3	4	4
Percolation area	5	10	10	50	10	3	3	4	4

**Note:** The soakaway for surface water drainage should be located down gradient of the percolation area or polishing filter and that this distance is maintained from neighbouring storm water disposal areas soakaways.

## 2.0 Secondary treatment system

The proposed *AswafLOW Wastewater Treatment System* (NSAI Agrément (IAB) Approval 02/149, EN 12566-3, No. B 31.06.015.01) is a SBR (Sequencing Batch Reactor) mechanical aeration system designed to cater for **4 – 12 P.E.** in a 7,000 lit. tank (*population equivalent*). The system is inclusive, amongst others, of:

- Dual chambered pre-cast concrete tank for primary treatment (septic tank).
- A single chamber pre-cast concrete tank for secondary treatment [Sequential Batch Reactor (SBR)] tank, (Ref: EPA, CoP, 2009, Fig 9.3, page 39)
- Delivery, installation and commissioning by employees of - MOLLOY PRECAST LTD.
- The AswafLOW Effluent Treatment System is fitted with a comprehensive alarm system. Alarming will occur with overloading or under-loading of the system and if there is a failure/blockage of the pumps or aerator device. In addition, the system has a high water alarm system.

## 3.0 Recommendations

According to the EPA's *Code of Practice (2009) - Wastewater Treatment and Disposal System Serving Single Houses (p.e. ≤ 10)* (Ref: EPA, CoP, 2009, Section 9.0, p.37) a packaged wastewater system uses mechanical parts (e.g. an aeration system) to treat wastewater from a dwelling house where a site is unsuitable for a conventional septic tank system. The resultant treated wastewater requires a polishing filter to allow for further treatment of the wastewater and to convey the treated wastewater to groundwater. The *polishing filter* should be designed in accordance with the procedures outlined in the EPA, CoP, 2009, *Section 10.1 p43*.

**EPA, CoP, 2009: The mean influent concentration and minimum performance standards. [EPA CoP 2009 Table 5.1 p 9]**

Characteristics	Typical mean influent concentration (mg/l) (p58)	On-site domestic treatment minimum effluent performance standards EPA CoP 2009 (p9)
B.O.D <sub>5</sub>	318	<20
C.O.D.	956	N.A.
Total Solids	200	<30
Ammonia (NH <sub>3</sub> -N)	70	<20

Ref: EPA's *Code of Practice - Wastewater Treatment and Disposal System Serving Single Houses (p.e. ≤ 10)* (2009) page 58 and page 9, respectively.

A correctly constructed polishing filter will give final results as follows:

Characteristics	Prior to Treatment	Treated (SBR)	After Polishing Filter (percolation)

Ph	6-8	7 – 7.5	7
B.O.D <sub>5</sub>	>300	< 15	< 5
C.O.D.	>900	< 75	< 35
Total Solids	>200	< 30	< 4
Ammonia (NH <sub>3</sub> -N)	>60	< 10	< 1

*The achievement of these results is not guaranteed as the treatment achieved will depend on the system being properly operated and maintained.*

MOLLOY PRECAST LTD. fully guarantees the *Aswaflow Wastewater Treatment System* as suitable for the development in question when installed according to the manufacturer's specific instructions and commissioned by trained personnel. It is the responsibility of the client to ensure that the percolation area is construction properly in order for the system to operate. To ensure the efficient treatment and disposal of the domestic wastewater, we recommend the following:

- **NO RAINWATER, SURFACE WATER** etc., should be discharged to the treatment system or percolation area.
- Only domestic wastewater, which includes all effluent from the kitchen, toilets, bathroom, showers, appliances, should be discharged to the treatment system.
- A correctly vented percolation area must be constructed to facilitate effective filtration of the treated effluent into the subsoil.
- 

### 3.1 Polishing Filters

The *Aswaflow System* (secondary treatment system) requires a polishing filter. According to the EPA's 2009 *Code of Practice (Section 8 and 10)* a soil filter system may be used in situations where difficult site conditions are encountered, such as a shallow water table, insufficient subsoil depth or insufficient percolation characteristics of native subsoil. A soil filter system may be developed through the use of imported soil with favorable characteristics or may be developed through the use of *in situ* soil where the upper layer has been removed and replaced by a gravel distribution layer or improved soil. These soils should have percolation values in the range of 3–75 for *in situ* material and a P/T-value of 3–30 for imported material. Effluent may be loaded onto a soil-polishing filter by any one of three arrangements (direct discharge, pumped discharge or gravity pipe discharge). All polishing filters should have a minimum thickness of 0.9 m of free-draining unsaturated soil or sand between the point of infiltration of effluent and the water table and bedrock. However, greater depths/thicknesses may be required depending on the ground water protection responses (Ref: EPA CoP, Section 6 p14, Annex B). Polishing filters maybe below, at ground surface or partially or totally above ground surface. It must be constructed to facilitate effective filtration of the treated effluent into the subsoil.

### 3.2 Sizing of the Polishing Filter

The size of the percolation area depends on the hydraulic loading rate and on the treatment that precedes the percolation area. The EPA's *Code of Practice (Section 10.1 Polishing Filters p. 43)*, recommends a shorter trench length of 10m for gravity fed systems for effluent from a secondary treatment system due to its high quality. This allows for effluent from a polishing filter to discharge to ground provide that the subsoil has a T-value <90 and a P-value between 3 and 75.

### 3.3 Type of Polishing Filter - Intermittent Soil Filter

Where the underlying subsoil are within the acceptable range of  $3 \leq T \leq 75$ , an intermittent soil filter (**Ref: EPA CoP, Fig. 8.7, p31-32**) may provide the required solution to the on-site treatment of wastewater. Furthermore, where soil ( $10 < T < 30$ ) has to be imported, it should be placed in lifts in the proposed percolation area such that there is a minimum thickness of 0.9 m of unsaturated permeable subsoil below the base of the polishing filter for secondary treatment systems i.e. minimum depth of unsaturated subsoil to bedrock and the water table (Ref: EPA, CoP, 2009, Table 6.2, p14). The fill should be placed in layers not exceeding 300-mm thick and lightly compacted. Care should be taken not to over-compact the soil as this will lead to ponding. After each lift is placed, percolation tests should be carried out. In the case of a gravity system, it is recommended to pump the effluent to a stilling chamber from where the effluent flows by gravity to a distribution device (Ref: EPA, CoP, 2009, Section 11, p46-50). In this case, the length of gravity pipe from the stilling chamber to the box should be greater than 3 m. Pumping to a sump/stilling chamber, which then discharges to a distribution device allows for even distribution of the effluent.

### 3.4 Construction of the Soil Polishing Filters

The treated wastewater from the secondary treatment unit is pumped to using typically 32mm over a 250-mm layer of gravel. The detail design should conform to best practice as outlined in design manuals. The loading rates should conform to those listed in EPA CoP 2009 (Section 10, Table 10.1, p. 44.).

- To construct the percolation area, clear the vegetation from an area of at least **40m by 15.3m**. Fill this area (see profile, allow for banking and grading of the sides of the high raised mound) with soil to a depth of at least **400mm** (percolation T value 7-20) and ensure that the surface is perfectly level. This will insure a percolation depth of at least 1.2m of unsaturated soil below the invert of the distribution stones and above the Mottling.
- Raising an area with imported soil for percolation requires the services of a competent and experienced drainage contractor. The soil should be layered and tested as it is laid down as recommended by *EPA 2009 CoP part 8.4 page 31*:

*[ In the case of a soil filter, the following procedure should be followed:*

- *Where soil ( $10 < T < 30$ ) has to be imported, it should be placed in lifts in the proposed percolation area such that there is a minimum thickness of 1.2 m of unsaturated soil with drainage over the bedrock. The fill should be placed in layers not exceeding 300-mm thick and lightly compacted. Care should be taken not to over-compact the soil as this will lead to ponding.*
- *After each lift is placed, percolation tests should be carried out. A 150-mm square hole is excavated to a depth of 150 mm in the placed soil. After pre-soaking to completely wet the soil, 0.5 l of water is poured into the hole and the time in minutes for the water to soak away is recorded. This time should be between 10 min and 2 h. ]*
- In the center of this area, place a pad, **38m by 13.3m**, of **very clean** broken stones (sized 15mm to 30mm i.e. 1" chippings) to a thickness of **250mm** and ensure that it is level.
- Place the 32mm diameter pipes on the stones - as indicated on the accompanying drawing and ensure that they are at a gradient of no more than 1:200 away from the manifold. Secure the pipes with more stone as indicated in the drawing.
- **The stone pad must then be covered with a geo-textile membrane before the final covering of soil is applied. A minimum recommended cover depth of soil is 300mm.**
- A percolation area constructed in this manner is equivalent to an area of **500m<sup>2</sup>** allowing a dosing rate of **3 liters** of effluent per m<sup>2</sup> per day for **8.33 P.E.** which complies with EPA CoP (Section 10, Table 10.1, p. 44.).

- **Constructed mounds can be surrounded and protected by interceptor drains. These interceptor drains should be constructed at a distance of 2 m from the percolation pad** (Ref: EPA, CoP, 2009, Section 11.2, p48.)
- A minimum recommended cover depth of soil is 100-300 mm. The quality of the soil used for the percolation area is crucial in order to achieve good water percolation and tertiary treatment. However, the quality of the covering soil is only a consideration for planting purposes i.e. grass and/or shrubs. Planting of large trees is not recommended.
- It is essential that the mound is sealed around the edges with at least 1 m of soil to prevent side bleeding.
- During construction, compaction of any kind is to be avoided by ensuring machinery does not cross the area.
- **Note: Notwithstanding the percolation test results, or the recommendations based on the percolation test results given above, it is essential that the client, or prospective site occupier, is fully satisfied that the position chosen on the site, for percolation, is capable of soaking away the full amount of treated water that the household will produce each day and insure that any imported soil is suitable.**
- **Note:** The distance between the Aswaflo Systems secondary tank and the periphery of the raised percolation area should be a minimum of 5m.
- Soakaways for rain water and surface water should not be located in the vicinity of the treatment system or percolation area (min. 10 m), if possible.
- It is essential that the Aswaflo wastewater tanks are properly located on site so as to ensure no ingress of rain or surface water to the tanks. Tanks should not be installed on sites where the highest wet weather water table reaches more than 1m above the base of the tanks. If there is a high water table, precautions need to be taken so as to ensure that the tanks are anchored and sealed. It is the client's responsibility to contact Molloy Precast Ltd for details of remedial action that may be required.
- Backfilling of the tanks should be done with soil. It is the responsibility of the client to ensure that risers are installed where required and manhole covers are properly sealed. Molloy Precast Products Ltd. cannot take responsibility for incorrectly located tanks or deep installations that Molloy Precast Ltd have not recommended and failure to backfill appropriately.
- It is essential that the drainage contractor constructs the percolation area according to the recommendations cited in this report as Molloy Precast Products Ltd. cannot take responsibility for incorrectly constructed percolation areas.
- See attached cross section drawing for recommended installation and percolation construction.
- Refer to included details for specifications and operation of the treatment system.

Please contact me should you require any additional information.

Yours sincerely,

Michael F. Cahill.  
Technical manager.

Wastewater Treatment Products.



# Molloy Precast Products Ltd.

## Waste Water Division

Coleraine, Clara Road, Tullamore, Co. Offaly.

Tel: 057 9326000 Fax: 057 9326060

Email: [info@molloyprecast.com](mailto:info@molloyprecast.com) Web: [www.molloyprecast.com](http://www.molloyprecast.com)

### Maintenance Contract Agreement for

Site ID: t.b.a.

### Aswaflow Wastewater Treatment System for Single Houses

**For: Glanpower, Energy Park**

**At: ... Derryclure, Tullamore, Co. Offaly** (Check Correct Postal Address)

**Contact phone numbers:** .....

MOLLOY PRECAST LTD. undertakes to service the system as follows:

- Visual inspection and servicing off all components of the Aswaflow system
- Efficiency testing of the system on the following core parameters:
  - Sludge level in the primary settlement tank (to determine de-sludging frequency)
  - Sequential batch reactor(SBR) sludge volume check (Settled Sludge Volume – SSV<sub>30</sub>)
  - System test run through the control panel and check alarm log
  - Adjustment of system settings on the control panel where necessary
  - Issue a maintenance report of tests when completed

**Annual charge:** € 190.00 per annum including VAT for one call.

Payable in advance. Renewable yearly. Call out charges are at our standard rates plus parts and mileage. Equipment under warranty is dependent on Molloy Precast Ltd. servicing the system as advised. As a minimum the system should be serviced annually.

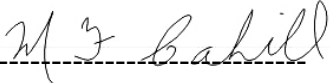
First Service Call due after : .....

Second Service call due after : ... ..

### Optional Laboratory testing of effluent on request.

*It is advisable to avoid excessive use of detergents and household cleaning agents and to use the phosphate free alternative products.*

**Disclaimer:** Molloy Precast Ltd. cannot take responsibility for the effluent quality as the treatment achieved will depend on household input, good system operation and maintenance. Molloy Precast Ltd cannot take responsibility for equipment damage owing to flooding/unfavourable site conditions.

Signed:   
(for - MOLLOY PRECAST LTD. Ltd.)

Signed: -----  
(for Customer/Client)

Position: ----- Tec. Mgr. -----

Date:--- 08/11/2010 -----

Date: -----

(Prices Valid 2009 – VAT @ 13.5% - See terms & conditions)

MOLLOY PRECAST PRODUCTS LTD. 057 9326000



# Molloy Precast Products Ltd.

## Waste Water Division

Coleraine, Clara Road, Tullamore, Co. Offaly.

Tel: 05793 26000 Fax: 05793 26060 Email: [info@molloyprecast.com](mailto:info@molloyprecast.com)

### Maintenance Contract Terms & Conditions

- **Molloy Precast Products Ltd.** trained service personnel will conduct the servicing of the designated Sewage Treatment System in a safe and efficient manner in accordance with Molloy Precast Products Ltd. Safety Statement.
  - The site Occupier / Owner will insure that the site is accessible and safe.
  - This contract does not bind Molloy Precast Products Ltd. to effluent quality, however every effort will be made to advise the occupier and to make any adjustments to the plant that will ensure the best possible effluent quality.
1. The occupier should insure that all manholes pertaining to the sewage treatment system are accessible.
  2. Access to the control panel is also required. (If access to the control panel is not available at the time of a service call, the service will proceed without that component of the service.)
  3. Access to a water tap is needed to clean components during servicing.
  4. It is advisable that children and pets are not present in the vicinity of the sewage treatment tanks during servicing. (Open manholes present a significant risk of injury or drowning in the deep tanks.)
- The Service visit includes the items and visits that are paid for and indicated on the maintenance contract only.
  - Replacement, broken or unserviceable parts will be charged for at cost.
  - Breakdowns, alarms, etc. requiring **call out**, are subject to the charges below.
  - Note: This maintenance contract only covers the treatment system. It does not extend to any fowl sewer pipe work or blockages or house fittings external to the treatment system. It does not cover any problems relating to percolation or soak-aways.
  - A call out request, that occurs close to a due service call date, may be combined with the service by mutual agreement.

Failure to have the system serviced, on an annual basis, will invalidate any current warranty after the first 12 months of operation.

**Call out costs are:** €100 per visit plus mileage @ €1.20 per mile from Tullamore and €40 per hour for every hour after the first hour, all plus VAT at 13.5%.

Access and mutually acceptable times must be arranged beforehand. No access at the time of an arranged call will incur the full callout charge.

Please mark the services required on the signed document and return to Molloy Precast with payment & VAT for the required services. The counter-signed document will be returned with a receipt.

(Prices Valid 2009– VAT @ 13.5% )

# Molloy Precast Products Ltd.

## Waste Water Division

Coleraine, Clara Road, Tullamore, Co. Offaly.

Tel: 057 9326000 Fax: 057 9326060

Email: [info@molloyprecast.com](mailto:info@molloyprecast.com) Web: [www.molloyprecast.com](http://www.molloyprecast.com)

Thank you for your request for Site Specific Information with regard to planning permission for dwelling and proprietary treatment system at **Site Location**.

A full system for a single house, inclusive of all tanks, delivery and commissioning costs €4,140 (Plus VAT at 13.5 %). Price is valid for 3 months.

**However, this price does not include the civil works i.e. digging the hole for the tanks, construction of the percolation area or percolation pipes.** However, Molloy Precast Product Ltd can provide percolation kits (Wavin pipes split 5 and 7 o'clock, T pipes, elbows, connecting pipes, vent riser, air vent, distribution box and geotextile membrane).

Please contact me should you require any further information.

Yours sincerely,  
Michael F. Cahill,  
Technical manager,

### Sewage Treatment Systems

Single house - Commercial - small Communities.

### Interceptors

A range of sizes for Oil & for Grease.

All systems based on Pre-cast Concrete Tanks

For all construction pre-cast products

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# MOLLOY PRECAST PRODUCTS LTD.,

Coleraine, Clara Road, Tullamore, Co. Offaly.

Tel: 05793 26000 Fax: 05793 26061

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## Commercial, Industrial & Leisure Premises (wastewater loading rates)

Situation	Source	Litres/day person	BOD <sub>5</sub> g/d person	PE Organic loading	Number of Persons	Population (organic)	Hydraulic loading Lit.	Organic loading gr.	Population (hydraulic)
<b>Domestic</b>	Normal residential	180	60	1.00		0.00	0.00	0.00	0.00
<b>Industrial</b>	Office and/or factory without canteen	30	20	0.33	50	16.67	1500.00	1000.00	8.33
(Urinals must	Office and/or factory with canteen	60	30	0.50		0.00	0.00	0.00	0.00
be economy type)	Open industrial site, e.g. quarry - canteen	40	25	0.42		0.00	0.00	0.00	0.00
<b>Schools</b>	Non-residential with cooking on-site. Students	60	30	0.50		0.00	0.00	0.00	0.00
( 6Hr. shock load)	Non-residential with no canteen. Students	35	20	0.33		0.00	0.00	0.00	0.00
(Urinals must	Boarding school residents	180	60	1.00		0.00	0.00	0.00	0.00
be economy type)	School day staff	60	30	0.50		0.00	0.00	0.00	0.00
<b>Hotels</b>	Guests (including meals)	250	75	1.25		0.00	0.00	0.00	0.00
(Urinals must	Guests (no meals)	180	45	0.75		0.00	0.00	0.00	0.00
be economy type)	Resident staff	180	60	1.00		0.00	0.00	0.00	0.00
	Day staff	60	30	0.50		0.00	0.00	0.00	0.00
	Conference	40	20	0.33		0.00	0.00	0.00	0.00
<b>Restaurants</b>	luxury catering (Meals)	25	25	0.42		0.00	0.00	0.00	0.00
(Urinals must	prepared catering (Meals)	15	15	0.25		0.00	0.00	0.00	0.00
be economy type)	snack bar (Meals)	10	10	0.17		0.00	0.00	0.00	0.00
	Function rooms incl. buffets	10	10	0.17		0.00	0.00	0.00	0.00
	fast food (Meals)	10	10	0.17		0.00	0.00	0.00	0.00
<b>Pubs and clubs</b>	Residents	200	60	1.00		0.00	0.00	0.00	0.00
(Urinals must	Day staff	60	30	0.50		0.00	0.00	0.00	0.00
be economy type)	Bar drinkers	10	10	0.17		0.00	0.00	0.00	0.00
	Bar meals	10	10	0.17		0.00	0.00	0.00	0.00
<b>Football Clubs</b>	Players inc showers	30	20	0.33		0.00	0.00	0.00	0.00
(Urinals eco only)	Spectators - Toilet blocks (per use)	8	10	0.17		0.00	0.00	0.00	0.00
<b>Amenity sites</b>	Restaurants	15	15	0.25		0.00	0.00	0.00	0.00
	Function rooms	10	10	0.17		0.00	0.00	0.00	0.00
(Urinals must	Toilet blocks (per use)	8	10	0.17		0.00	0.00	0.00	0.00
be economy type)	Toilet blocks (long stay car park)	10	15	0.25		0.00	0.00	0.00	0.00
	Golf clubs (Players inc. showers)	25	15	0.25		0.00	0.00	0.00	0.00
	Squash, with club house	25	15	0.25		0.00	0.00	0.00	0.00
	Swimming	10	10	0.17		0.00	0.00	0.00	0.00
<b>Caravan sites</b>	Touring	50	35	0.58		0.00	0.00	0.00	0.00
(Urinals must	Static not serviced	75	35	0.58		0.00	0.00	0.00	0.00
be economy type)	Static fully serviced	150	55	0.92		0.00	0.00	0.00	0.00
	Tent sites	50	35	0.58		0.00	0.00	0.00	0.00
<b>Hospitals</b>	Residential elderly people	250	60	1.00		0.00	0.00	0.00	0.00
	Residential elderly people plus nursing	300	65	1.08		0.00	0.00	0.00	0.00
	Nursing homes (convalescent)	350	75	1.25		0.00	0.00	0.00	0.00

**Planned commercial peak usage calculation for -**

**Glanpower Energy Park**

**Industrial Unit**

**50 Workers.**

Total organic loading per day in gr.

1000.00

Total Hydraulic load, litres per day

1500.00

Total PE at normal organic load BOD<sub>5</sub>

16.67

Total PE at normal hydraulic output

8.33

Percolation area required @ 50 lit. per m<sup>2</sup>. T <20  
Percolation area required @ 20 lit. per m<sup>2</sup>. T >20

30 m<sup>2</sup>

75 m<sup>2</sup>

Stone & pipe trench, 450mm wide ( T <20 )  
Stone & pipe trench, 450mm wide ( T >20 )

67 m

167 m

Number of rows 18m long ( T <20 )  
Number of rows 18m long ( T >20 )

4 Rows

9 Rows

**Direct discharge Polishing Filters**

Stone Pads percolation area design, size each pad.  
Dosing rate < 20 lit. per m<sup>2</sup> per 24 hours.

1 of 14m X 6.25

1 of 18m X 4.86

2 of 18m X 2.43

m<sup>3</sup> stone

26

26

26

**Dosing rate 10 lit. per m<sup>2</sup> per 24 hours.**

1 of 14m X 10.71

1 of 18m X 8.33

4 of 18m X

45

45

0

Recommended minimum .... pads for this site.

Open Sand filter @ 3m<sup>2</sup> per PE

25.00 m<sup>2</sup>

Open Sand filter @ 5m<sup>2</sup> per PE

41.67 m<sup>2</sup>

**Recommended System :**

**Aswaflo 4-12PE in 7,000 lit S+ tank.**



**SITE CHARACTERISATION FORM**

<b>File Ref</b>	PTT1526	<b>Date Ready</b>	27/04/2010	<b>GPS Co-ordinates</b>	235103 220148
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**1.0 GENERAL DETAILS**

**Applicant**

**Applicant Address**

**Site Location and Townland**  **Site Area**

**Phone No**

<b>Max no. Residents</b>	<input type="text" value="N/A"/>	<b>No. Double bedrooms</b>	<input type="text" value="N/A"/>	<b>No. Single bedrooms</b>	<input type="text" value="N/A"/>
--------------------------	----------------------------------	----------------------------	----------------------------------	----------------------------	----------------------------------

**Proposed Water Supply:** Mains  Private Well/Borehole  Group Well/Borehole

**Soil Type**

**Aquifer Category:** Regionally Important  Locally important  Poor

**Vulnerability**

**Bedrock Type**

**Public/Group water scheme within 1km**

<b>Groundwater Protection Scheme</b>	<input type="text" value="Yes"/>	<b>Groundwater Protection Response</b>	<input type="text" value="R1"/>	<b>Source Protection Area</b>	<input type="text" value="N/A"/>
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**Flood Risk**

**Presence of Significant Sites (Architectural, Natural and Historical)**

**Previous Experience in the Area**

**Comments**

## 2.0 ON SITE ASSESSMENT

**Landscape Position** Relatively flat topography. Proposed treatment area located in slightly elevated area.

**Slope** Steep (>1:5)  Shallow (1:5 – 1:20)  Relatively Flat (<1:20)

**Surface Features within a minimum of 250m (distance to features should be noted in metres)**

**Houses** No dwelling within 250m of proposed site. Landfill is located approx 220m to the NE of proposed site.

**Existing Land use** Pasture Land.

**Vegetation Indicators** Vegetative indicators in certain areas of the 10.05 acres suggest poor percolation characteristics however this is not the case in vicinity of proposed percolation area.

**Groundwater Flow Direction** Westerly direction across the site given topography.

**Ground Condition** Dry and firm underfoot during testing period.

**Site Boundaries** N80 to the West. Woodland boundary/bog to the South. Bogland to the East. Mature hedge North. **Roads** N80 runs beside the proposed site to the West.

**Outcrops (Bedrock and/or subsoil)** None visible within 250m.

**Surface water ponding** None visible within 250m. **Lakes** None visible within 250m.

**Beaches /Shellfish** N/A **Areas/ Wetlands** None visible within 250m.

**Karst Features** None visible within 250m. **Water-courses** No major water courses.

**Drainage ditches** Drainage ditches prevalent in locality. **Springs /Wells** None visible within 250m.

**Comments** Visual assessment suggests percolation may be poor due to high water table/slow percolation through visiting . This is indicated by vegetation in some parts of field and also by density of drains in the area. Extensive drainage network has been carried out on the site/field and may have lowered water table therefore the mottled layer will not be the true winter high water table. SW rather than groundwater is the more likely sensitive receptor in this case.

**3.1 TRIAL HOLE (Should be a minimum of 2.1m deep (3m for regionally important aquifers)**

To avoid any accidental damage, a trial hole assessment or percolation tests should not be undertaken in areas which are at or adjacent to significant sites (e.g. NHA's SAC's SPA's and/or Archaeological etc.) without prior advice from National Parks and Wildlife Service or the Heritage Service.

Depth of Trial hole (m)       Depth of water ingress:       Rock Type

Depth from Ground Surface to Bedrock (m)       Depth from Ground Surface to water table (m)

Date and Time of excavation       Date and Time of Examination

Depth of P/T Test*	Soil/Subsoil texture and Classification**	Plasticity and dilatancy***	Soil Structure	Density /Compactness	Colour ****	Preferential Flowpaths
0.1 m	Black CLAY	Dilatant	Crumb	Uncompact	Black	N/A
0.2 m	Topsoil	4 ribbons				
0.3 m						
0.4 m						
0.5 m						
0.6 m	Boulder CLAY	4 ribbons	Structureless	Soft	Brown	N/A
0.7 m	Dilatant					
0.8 m						
0.9 m	Mottling - - - - -					
1.0 m						
1.1 m						
1.2 m	SILT	Dilatant 2 ribbons	Structureless	Firm	Grey	N/A
1.3 m						
1.4 m						
1.5 m						
1.6 m						
1.7 m						
1.8 m	Water table present here.					
1.9 m						
2.0 m						
2.1 m						
2.2 m						
2.3 m						
2.4 m						
2.5 m						
2.6 m						
2.7 m						
2.8 m						
2.9 m						
3.0 m						

**Evaluation**

**Likely T Value**

### 3.2 (a) PERCOLATION ("T") TEST FOR DEEP SUBSOILS AND/OR WATER TABLE

#### STEP 1: Test Hole Preparation

Percolation Test Hole	1	2	3
Depth from ground surface to top of hole (mm) (A)	900	900	900
Depth from ground surface to base of hole (mm) (B)	1300	1300	1300
Depth of hole (mm) [B-A]	400	400	400
Dimensions of hole [length x breadth (mm)]	300 x 300	300 x 300	300 x 300

#### STEP 2: Pre-soaking Test holes

Date and Time Pre-soaking Started	12/05/2010 13.00	12/05/2010 13.00	12/05/2010 13.00

Each hole should be pre-soaked twice before the test is carried out.  
Each hole should be empty before re-filling.

#### STEP 3: Measuring $T_{100}$

Percolation Test Hole	1	2	3
Date of Test	13/05/2010	13/05/2010	13/05/2010
Time filled to 400mm	0	0	0
Time water level at 300mm	231	230	245
Time to drop 100mm ( $T_{100}$ )	231	230	245
Average $T_{100}$	235.3		

If  $T_{100} > 300$  minutes then T value  $>90$  – site is unsuitable for discharge to ground  
 If  $T_{100} \leq 210$  minutes then go to STEP 4  
 If  $T_{100} \geq 210$  minutes then go to STEP 5

**STEP 4: Standard method where  $T_{100} \leq 210$  minutes**

Percolation Test Hole No	1			2			3		
	Start Time	Finish Time	$\Delta t$ (min)	Start Time	Finish Time	$\Delta t$ (min)	Start Time	Finish Time	$\Delta t$ (min)
1									
2									
3									
Average $\Delta t$ Value									
	Average $\Delta t/4 =$ Hole No. 1		<input type="text"/>	Average $\Delta t/4 =$ Hole No. 2		<input type="text"/>	Average $\Delta t/4 =$ Hole No. 3		<input type="text"/>

Result of Test T =  (min/25mm)

Comments

**STEP 5: Modified Method where  $T_{100} > 210$  minutes**

Percolation Test Hole No	1				2				3			
	Time Factor = $T_F$	Time of Fall (mins) = $T_m$	$K_{fg} = T_F / T_m$	T-Value = $4.45 \cdot K_{fg}$	Time Factor = $T_F$	Time of Fall (mins) = $T_m$	$K_{fg} = T_F / T_m$	T-Value = $4.45 \cdot K_{fg}$	Time Factor = $T_F$	Time of Fall (mins) = $T_m$	$K_{fg} = T_F / T_m$	T-Value = $4.45 \cdot K_{fg}$
300 – 250	8.1	120	0.0675	65.9	8.1	125	0.0648	68.67	8.1	127	0.0637	69.9
250 – 200	9.7	125	0.0776	57.34	9.7	127	0.0763	58.32	9.7	127	0.0764	58.25
200 – 150	11.9	127	0.0937	47.49	11.9	129	0.0922	48.26	11.9	131	0.0908	49.00
150 - 100	14.1	129	0.1093	40.71	14.1	131	0.1076	41.35	14.1	133	0.1060	41.98
Average T Value	T – Value Hole 1= ( $t_1$ )		52.86	T – Value Hole 2= ( $t_2$ )		54.15	T – Value Hole 3= ( $t_3$ )		54.78			

Result of Test T =  53.93 (min/25mm)

Comments  Relatively slow percolation rate achieved.



### 3.2 (b) PERCOLATION ("P") TEST FOR SHALLOW SUBSOILS AND/OR WATER TABLE

#### STEP 1: Test Hole Preparation

Percolation Test Hole	1	2	3
Depth from ground surface to top of hole (mm) (A)	0	0	0
Depth from ground surface to base of hole (mm) (B)	400	400	400
Depth of hole (mm) [B-A]	400	400	400
Dimensions of hole [length x breadth (mm)]	300 x 320	310 x 310	350 x 340

#### STEP 2: Pre-soaking Test holes

Date and Time Pre-soaking Started	12/05/2010 13.00	12/05/2010 13.00	12/05/2010 13.00

Each hole should be pre-soaked twice before the test is carried out.  
Each hole should be empty before re-filling.

#### STEP 3: Measuring P<sub>100</sub>

Percolation Test Hole	1	2	3
Date of Test	13/05/2010	13/05/2010	13/05/2010
Time filled to 400mm	0	0	0
Time water level at 300mm	55	50	49
Time to drop 100mm (P <sub>100</sub> )	55	50	49
Average P <sub>100</sub>			51.3

If P<sub>100</sub> > 300 minutes then T value >90 – site is unsuitable for discharge to ground  
 If P<sub>100</sub> ≤ 210 minutes then go to STEP 4  
 If P<sub>100</sub> ≥ 210 minutes then go to STEP 5

**STEP 4: Standard method where  $P_{100} \leq 210$  minutes**

Percolation Test Hole No	1			2			3		
	Start Time	Finish Time	$\Delta p$ (min)	Start Time	Finish Time	$\Delta p$ (min)	Start Time	Finish Time	$\Delta p$ (min)
Fill No. 1	0	60	60	0	60	60	0	49	49
2	0	68	68	0	61	61	0	55	55
3	0	72	72	0	68	68	0	63	63
Average $\Delta p$ Value			66.7			63			13.93
	Average $\Delta p/4 =$ Hole No. 1		16.7	Average $\Delta p/4 =$ Hole No. 2		15.75	Average $\Delta p/4 =$ Hole No. 3		13.93

Result of Test P =  (min/25mm)

Comments    
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**STEP 5: Modified Method where  $P_{100} > 210$  minutes**

Percolation Test Hole No	1				2				3			
	Time Factor = $T_F$	Time of Fall (mins) = $T_m$	$K_{f8} = T_F / T_m$	P-Value = $4.45 K_{f8}$	Time Factor	Time of Fall (mins) = $T_m$	$K_{f8} = T_F / T_m$	P-Value = $4.45 K_{f8}$	Time Factor	Time of Fall (mins) = $T_m$	$K_{f8} = T_F / T_m$	P-Value = $4.45 K_{f8}$
300 – 250	8.1											
250 – 200	9.7											
200 – 150	11.9											
150 - 100	14.1											
Average P Value	P-Value Hole 1 = ( $p_1$ )				P-Value Hole 2 = ( $pt_2$ )				P-Value Hole 3 = ( $p_3$ )			

Result of Test P =  (min/25mm)

Comments



#### 4. CONCLUSION OF SITE CHARACTERISATION

Integrate the information from the desk study and on site assessment above and conclude the type of system(s) that is (are) appropriate. The information to choose the optimum final disposal route of the treated wastewater.

Not suitable for development

Suitable for <sup>1</sup>

1. Septic tank system (septic tank and percolation area)

2. Secondary Treatment System

a. septic tank and filter system constructed on-site and polishing filter; or

b. packaged wastewater treatment system and polishing filter

Discharge Route

Via Ground

#### 5. RECOMMENDATION

Propose to install

Packaged effluent treatment system followed by an intermittent above ground soil filter.

and discharge to

Ground.

Trench Invert level (m)

Above ground level as per fig. 8.7 Page 32 EPA CoP 2009. Trench invert level shall be 0.5m above ground level.

#### Site specific conditions

Packaged effluent treatment system followed by intermittent soil filter above ground as per fig 8.7. Intermittent soil filter page 32 EPA CoP 2009 having trench invert level 0.5m above ground level. All imported material to be of appropriate T value and installed in line with CoP 2009. All material to be as EPA CoP 2009. Setback distances are achievable on site.

BM  
13/05/2010

<sup>1</sup> note: more than one option may be suitable for a site and this should be recorded

**6. TREATMENT SYSTEM DETAILS**

PRIOR TO SUBMISSION TO THE PLANNING SECTION OF OFFALY COUNTY COUNCIL THE TREATMENT SYSTEM DESIGN DETAILS, INCLUDING DESIGN DETAILS OF THE INFILTRATION SYSTEM PROPOSED FOR THE SITE, MUST BE COMPLETED BY A COMPETENT, SUITABLY QUALIFIED AND PROFESSIONALLY INDEMNIFIED PERSON AND IN ACCORDANCE WITH THE CODE OF PRACTICE: WASTEWATER TREATMENT & DISPOSAL SYSTEMS SERVING SINGLE HOUSES (P.E. < 10).

**System Type:** Secondary Treatment System

Filter Systems				Package Treatment Systems	
Media Type	Area (m <sup>2</sup> )	Depth of Filter	Invert Level	Type	
Sand/soil	<input type="text"/>	<input type="text"/>	<input type="text"/>	<b>Aswaflo 4-12 PE S+</b>	
	<input type="text"/>	<input type="text"/>	<input type="text"/>	Capacity PE	<b>4 – 12 PE</b>
	<input type="text"/>	<input type="text"/>	<input type="text"/>	Sizing of Primary Compartment (m <sup>3</sup> )	
	<input type="text"/>	<input type="text"/>	<input type="text"/>	<b>3m<sup>3</sup></b>	

**System Type:** Tertiary Treatment System

<b>Polishing Filter:</b> Surface Area (m <sup>2</sup> )*	<input type="text" value="500"/>	<b>Package treatment System:</b> Capacity (pe)	<input type="text"/>
<b>Or Gravity Fed:</b>		<b>Constructed Wetland:</b> Surface Area (m <sup>2</sup> )	<input type="text"/>
No. of Trenches	<input type="text"/>		
Length of Trenches	<input type="text"/>		
Invert Level	<input type="text" value="Ground"/>		

**DISCHARGE ROUTE**

Groundwater	<input checked="" type="checkbox"/>	Hydraulic Loading Rate* (l/m <sup>2</sup> )	<input type="text" value="3"/>	Surface Water	<input type="checkbox"/>	Discharge Rate (m <sup>3</sup> /hr)	<input type="text"/>
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**TREATMENT STANDARDS**

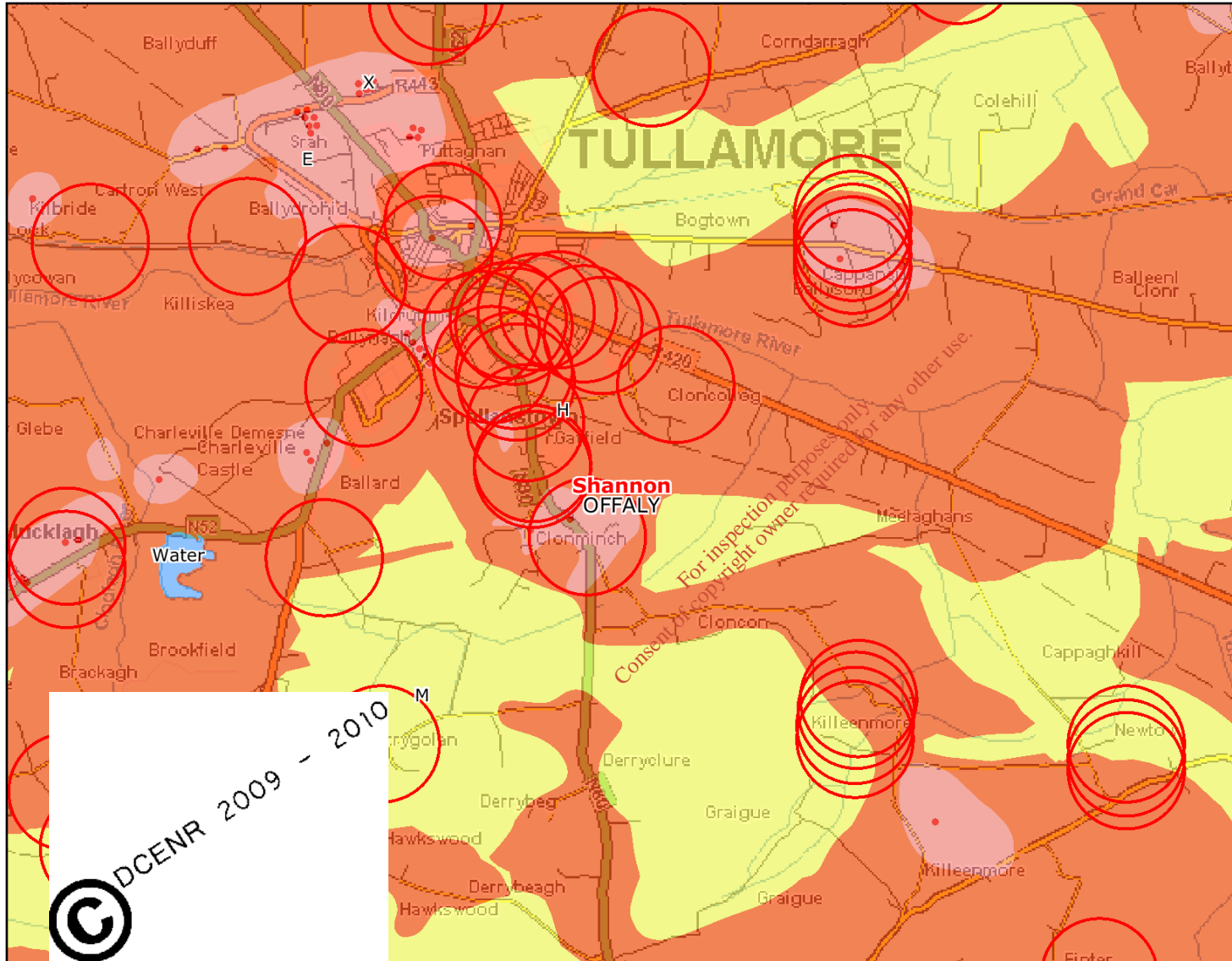
Treatment System Performance Standards	BOD	SS	NH <sub>3</sub>	Total N	Total P
EPA CoP 2009 Table 5.1 page 9	<input type="text" value="20mg/l"/>	<input type="text" value="30mg/l"/>	<input type="text" value="20mg/l"/>	<input type="text"/>	<input type="text"/>

**QUALITY ASSURANCE**

Installation and Commissioning	Ongoing Maintenance
Molloy Precast Products Ltd., Coleraine, Clara Rd., Tullamore, Co. Offaly. Tel : 05793 26000	Molloy Precast Products Ltd., Coleraine, Clara Rd., Tullamore, Co. Offaly. Tel : 05793 26000



# Glanpower, Derryclure



### Legend

- Waste Assessment within 1km
- Interim waterheraldage
- F1 (Rock near Dunleek or Tullaco)
- F2 - To be done
- F3 - High
- M - Moderate
- L - Low
- F1 - High for areas which are interim study
- Water
- RMR Boundaries
- County Boundaries



Map center: 235225, 223186

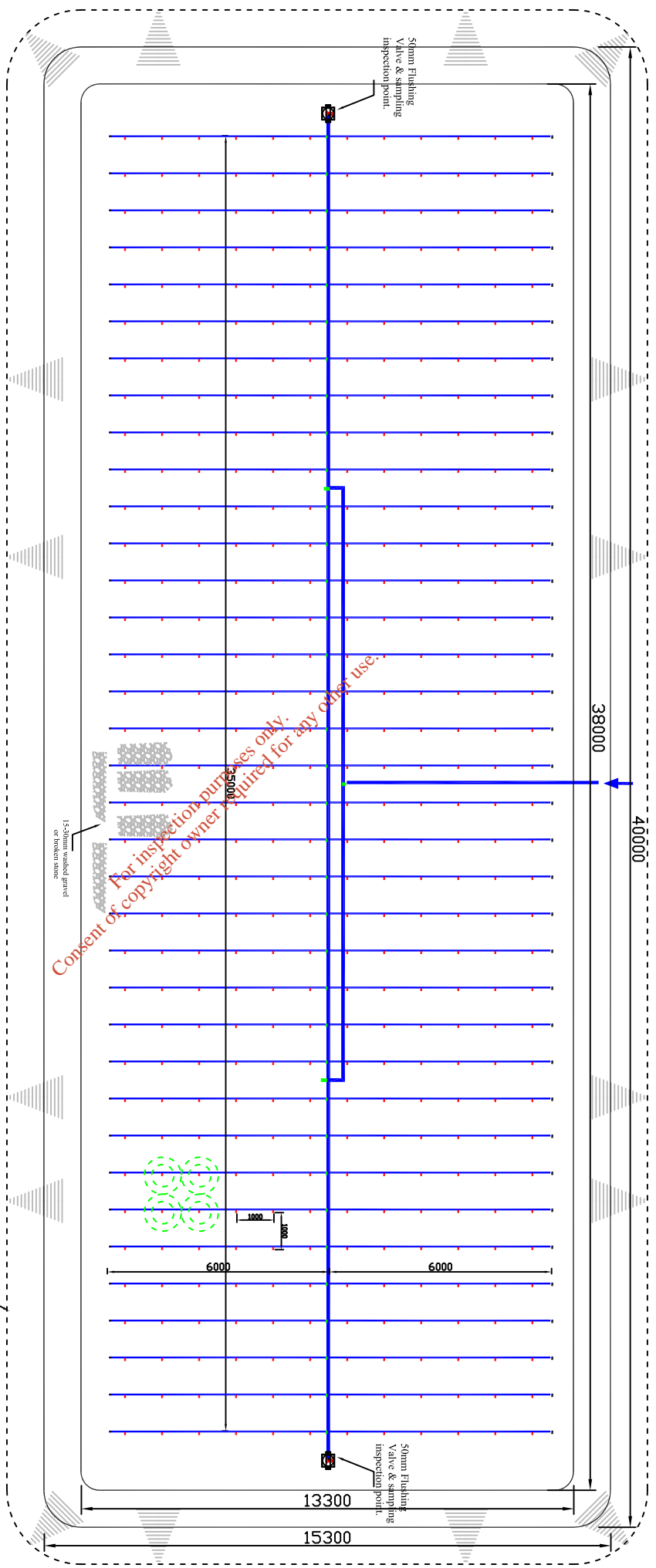


Scale: 1:55,024

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Snapshot Date: 05-Aug-2010

Minimum 612m sq. mound with 500m sq stone pad with spray pipe layout for intermittent Soil Polishing Filter



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### Design criteria.

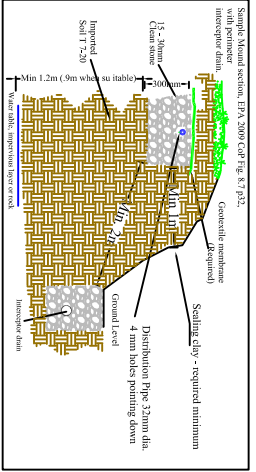
The number of 432 holes of 4mm diameter is specifically chosen to suit a delivery pump with an offshoot discharge rate of 450 l/min against a dynamic minimum head of 4m (+ rising main)

Any deviation from this design must take into account the proposed pump capabilities. 4mm holes are chosen to insure that clogging will remain at a minimum. The holes should be facing down and all burr should be removed after drilling. (Upward facing holes require orifice shields & frost protection.)

Pipes should have a very small gradient for drain down.

50mm manifold (50m total) Rising main must be a minimum of 75mm I.D.  
Liquid velocity in 50mm 1.875 m/s @ (400 l/min)/2  
25mm laterals (432m total)  
liquid velocity in 25mm .17 m/s @ 5.38 l/min  
Design head at each hole .2m for above flow rates  
Pipe network volume .243m<sup>3</sup>  
Pipe network recommended min. 5Xvol. flush per dose.  
As per US EPA/625/R-008 manual - Chapter 4.27

$Q = C_d A \sqrt{2gh}$     $V = C_v \sqrt{2gh}$     $h = \frac{f L V^2}{2g D}$   
Pipe friction - Darcy Weisbach formula



Grade back to blend into the surrounding site without compromising the 1m edge seal at stone pad level.

Local Authority and EPA 2009 Cop Table 6.1 p14 details should be complied with at planning and installation stage. (001 up to 100 days for more than 1000 litres of EPA Soil Contaminants Table 4 p12)

Minimum separation distances in metres

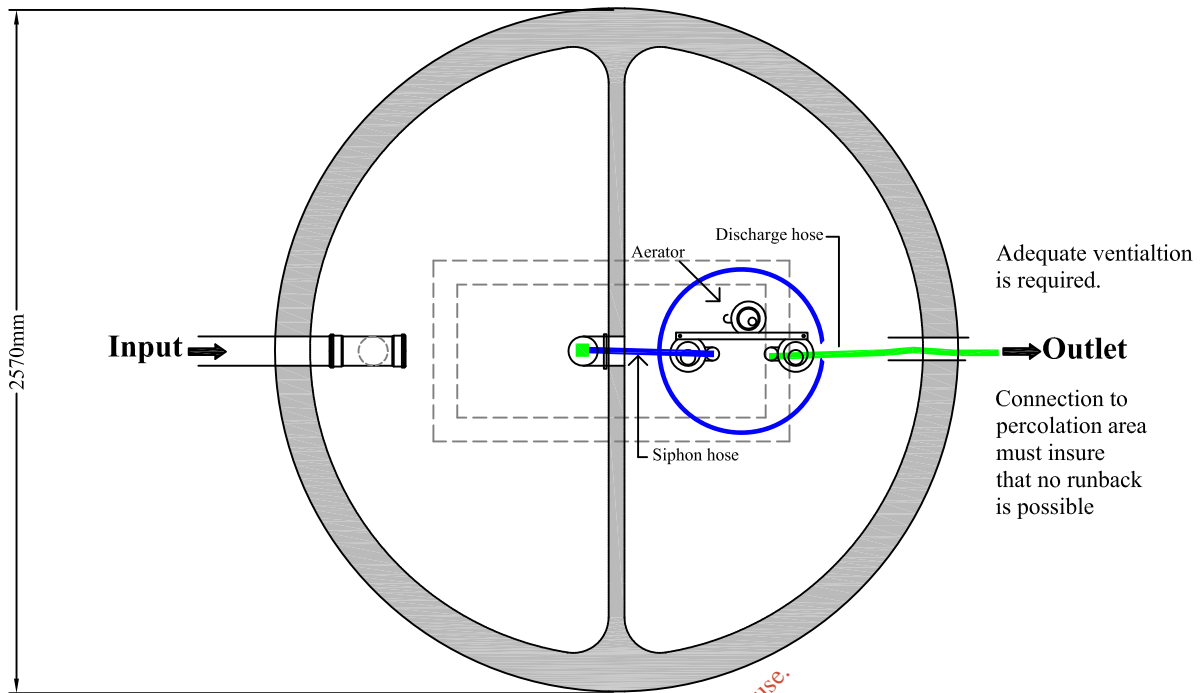
Water Course	Well	Lake	Boundary	Road	House
Tanks:	10	10	50	3	4
Percolator:	10	30	50	3	4
					10

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Molloy Precast Products Ltd.  
Caldwell, Carr Road,  
141 05791 20069  
Tel: 05793 20069

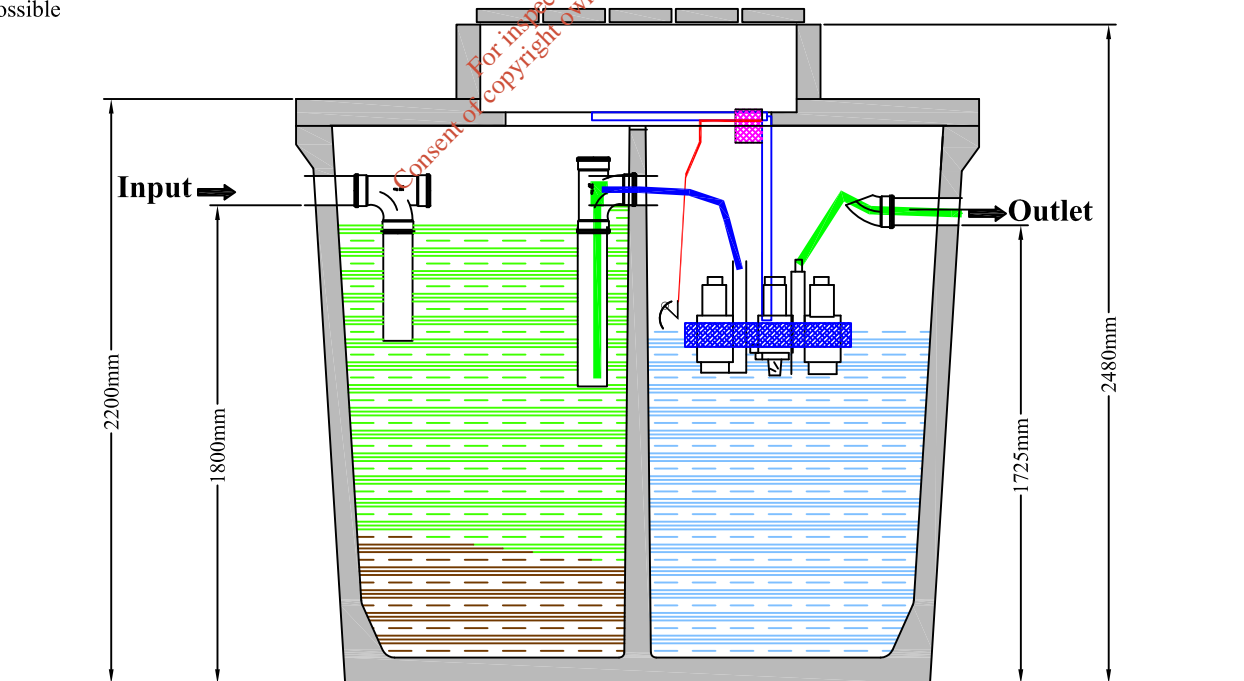
# Aswaflow® 4-12 PE, S+ tank, (7,000 Lit).



Connection to percolation area must insure that no runback is possible


## Primary & Sludge

## SBR Reactor



A good firm, rock free, level base is required.

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 <b>Aswaflow® from MOLLOY PRECAST</b>	E-mail: info@molloyprecast.com Web: www.molloyprecast.com	Molloy Precast Products Ltd. Coleraine, Clara Road, Tullamore, Co.Offaly. Tel: 05793 26000 Fax: 05793 26060	<b>Tank Type</b> Aswaflow® 4-12 PE,S tank <b>Tank Size:</b> 2570 Ø (Overall) <b>Height:</b> 2480mm (Overall) <b>Height:</b> 2200mm <b>Volume:</b> 7000 liters <b>Weight:</b> 6400 Kg. <b>(Tank Dim: ± 25mm. Weight: ± 30Kg.)</b>
	<p><b>Note:</b> Observe all safety regulations in regard to excavation and lifting requirements. Never leave opening uncovered or unattended at any time.</p> <p><b>Note:</b> Specify any specific requirements prior to ordering. All civil works by customer.</p> <p><b>Note:</b> Do NOT scale from drawings. Drawings for illustration purposes only.</p>		

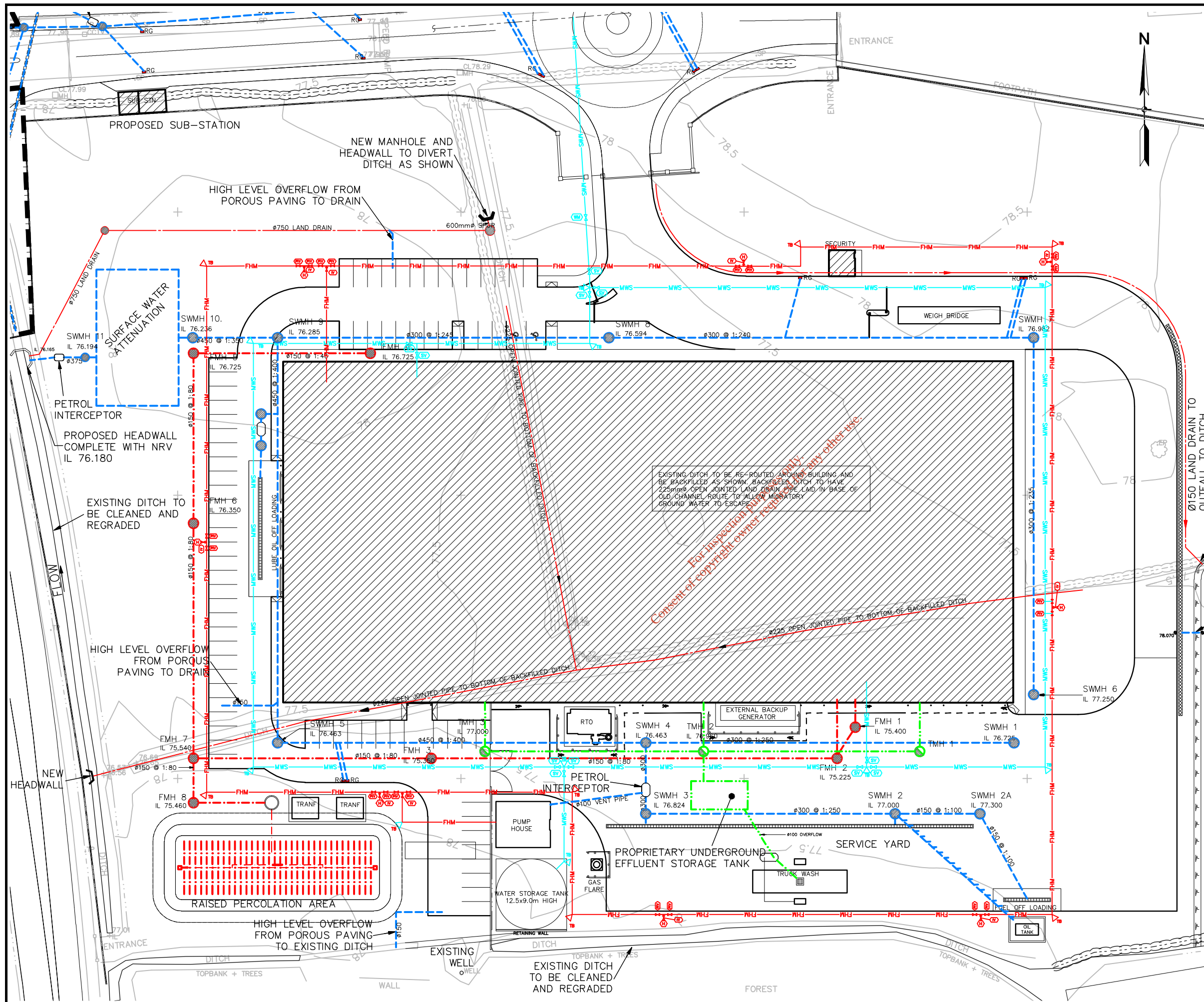
## APPENDIX D.6

### SITE DRAINAGE LAYOUT

(1 no. drawing)

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**LEGEND**

- SWMH 1.0 PROPOSED SURFACE WATER DRAIN/MANHOLE
- FMH 1.0 PROPOSED FOUL DRAIN/MANHOLE
- PROPOSED TRADE EFFLUENT DRAIN/MANHOLE
- PROPOSED INFILTRATION TRENCH
- PROPOSED LAND DRAIN
- PROPOSED DRAINAGE CHANNEL
- RG PROPOSED ROAD GULLY
- FMH PROPOSED FIRE HYDRANT MAIN
- (PV) PROPOSED POST INDICATOR VALVE
- (IV) PROPOSED ISOLATION VALVE
- MWS PROPOSED WATERMAIN
- (M) PROPOSED WATER METER
- (SV) PROPOSED SLUICE VALVE
- (TB) PROPOSED TRUST BLOCK

EXISTING DITCH TO BE RE-ROUTED AROUND BUILDING AND BE BACKFILLED AS SHOWN. BACKFILLED DITCH TO HAVE 225mm OPEN JOINTED LAND DRAIN PIPE Laid IN BASE OF OLD CHANNEL ROUTE TO ALLOW MISADVENTUROUS GROUND WATER TO ESCAPE FROM SITE.

Top inspection pipe required. Consent of competent engineer required.

**FORMAL ISSUE**  
20120615.133753 - MCCOD

A	ISSUED FOR WASTE LICENCE	LS	TOS	MD	MD	02/05/12
ISSUE	DESCRIPTION	DRN	ORIG	AUTH	APP	DATE

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CLIENT	<b>GLANPOWER LTD</b>
CLIENT	<b>PM GROUP</b>
PROJECT	<b>DERRYCLURE ENERGY CENTRE</b>
TITLE	<b>SITE DRAINAGE LAYOUT</b>

CLIENT REF.	CLIENT DRG No.
PROJECT No. <b>IE0310150</b>	PM DRG No. <b>IE0310150-22-DR-0009</b>
A3 SCALE <b>1:750</b>	

THIS DRAWING WAS CREATED USING: AutoCAD 2008

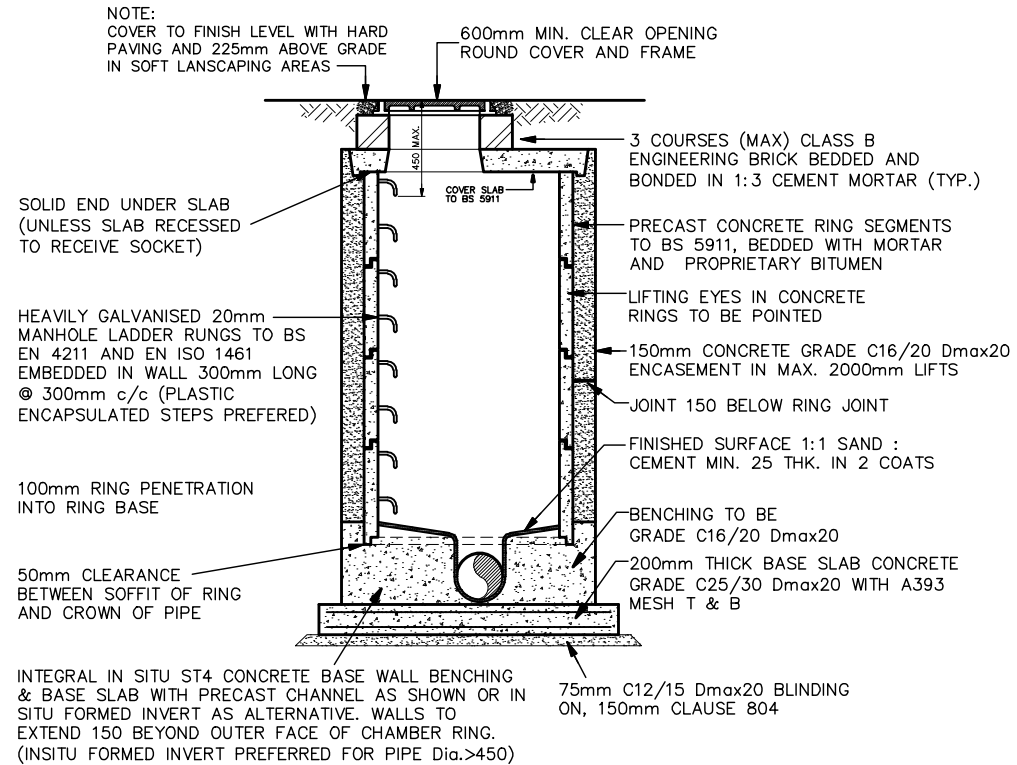
IE0310150\_22\_DR\_0009

## APPENDIX D.7

### SITE DRAINAGE DETAIL

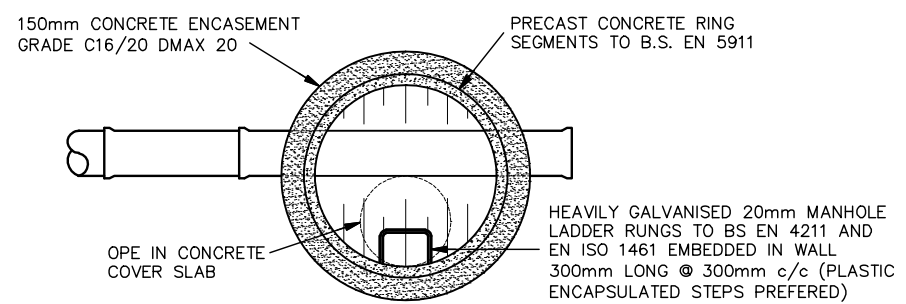
(1 no. drawing)

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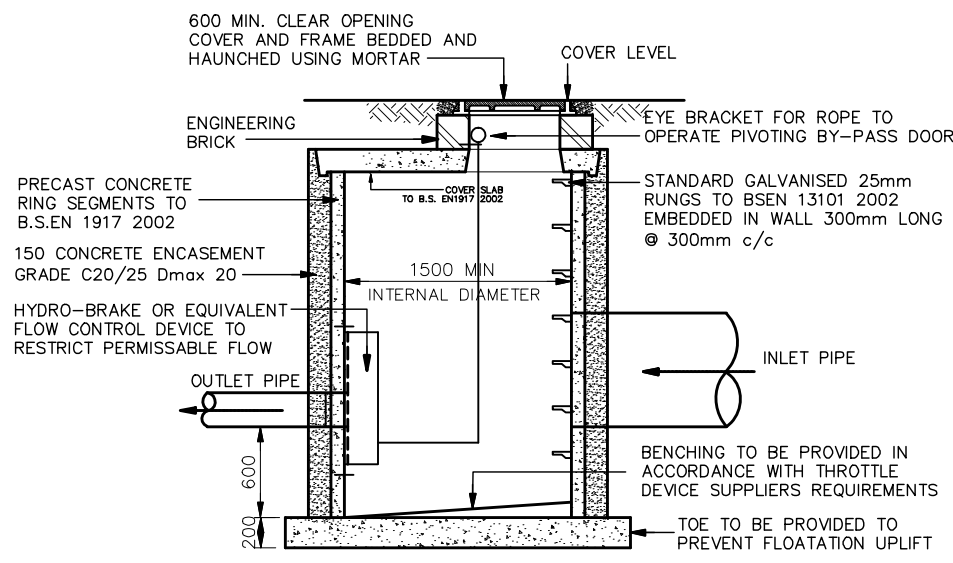


NOTE: IF BENCHING NOT FORMED WITH INTEGRAL IN - IN CONCRETE IT WILL BE FORMED USING GRANOLITHIC RENDER

**PRECAST CONCRETE MANHOLE**  
**< 3000 DEEP, < 525mm PIPES DIAMETER**

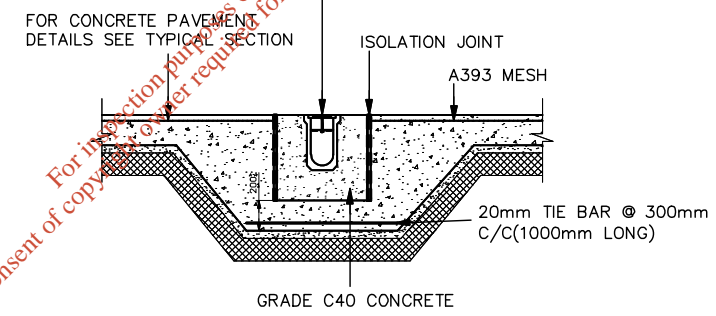


**TYPICAL STRAIGHT THROUGH PRECAST CONCRETE MANHOLE**

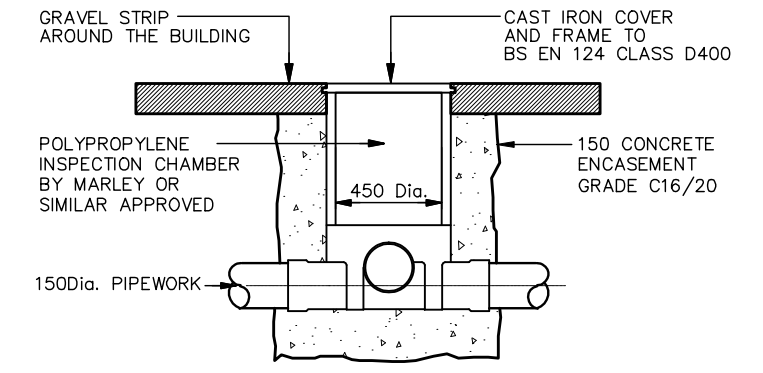


**MANHOLE CHAMBER FITTED WITH HYDRO-BRAKE**  
SCALE 1:50

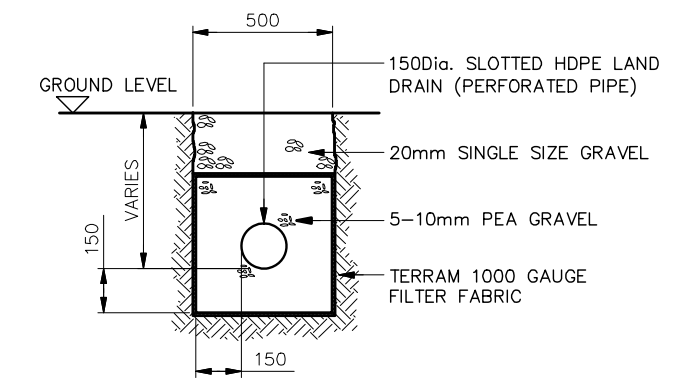
200mm WIDE POLYMER HEAVY DUTY CONCRETE DRAINAGE CHANNEL TO BS EN 1433. CONSTANT DEPTH TYPE C/W LOCKABLE CAST DUCTILE IRON GRATINGS TO LOAD CLASS E 600 TO BS EN 124 PROPRIETARY SUMP OUTLET TO BE TRAPPED AND RODDABLE OR EQUIVILANT APPROVED



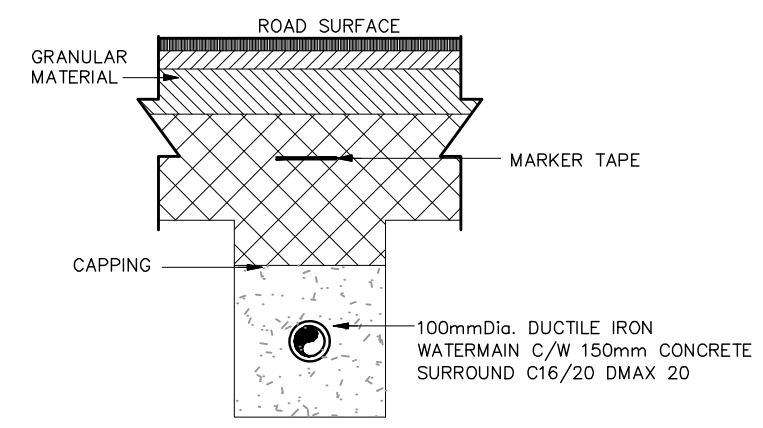
**TYPICAL SECTION THROUGH ACO CHANNEL AT CONCRETE YARD**  
SCALE 1:50



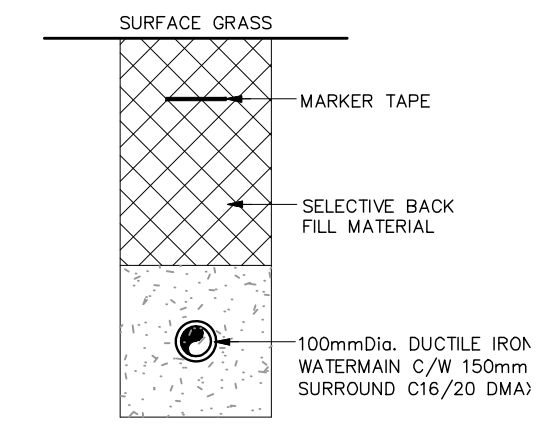
**AJ TYPICAL DETAIL**  
SCALE 1:25



**TYPICAL INFILTRATION TRENCH/FILTER DRAIN**



**TYPICAL WATER MAIN TRENCH IN ROAD DETAIL**  
SCALE 1:25



**TYPICAL WATER MAIN TRENCH IN GRASS DETAIL**  
SCALE 1:25

**FORMAL ISSUE**  
20120615.133818 - MCCOD

A	ISSUED FOR WASTE LICENCE	LS	TOS	MD	MD	02/05/12
ISSUE	DESCRIPTION	DRN	ORIG	AUTH CHK	APP	DATE

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	<b>PM GROUP</b>					
PROJECT	<b>DERRYCLURE ENERGY CENTRE</b>					
TITLE	<b>SITE DRAINAGE DETAIL</b>					
CLIENT REF.				CLIENT DRG No.		
PROJECT No.	<b>IE0310180</b>			PM DRG No.	<b>IE0310150-22-DR-0010</b>	
A3	SCALE	<b>As Shown</b>				

## APPENDIX D.8

### INTERNAL LAYOUT OF PLANT

(1 no. drawing)

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5. Proprietary items shall be fixed in strict accordance with manufacturers instructions.
6. Size of proprietary items shall be checked with manufacturer.
7. The contractor shall be responsible for the coordination of structure, finishes and services.

**NOTES:**

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**Client:**  
GLANPOWER LIMITED

**Project:**  
DERRYCLURE ENERGY PARK

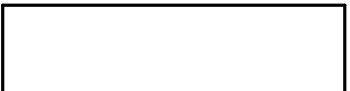
**Address:**  
DERRYCLURE, TULLAMORE, CO OFFALY.

**Sheet Name:**  
Internal Layout of Plant

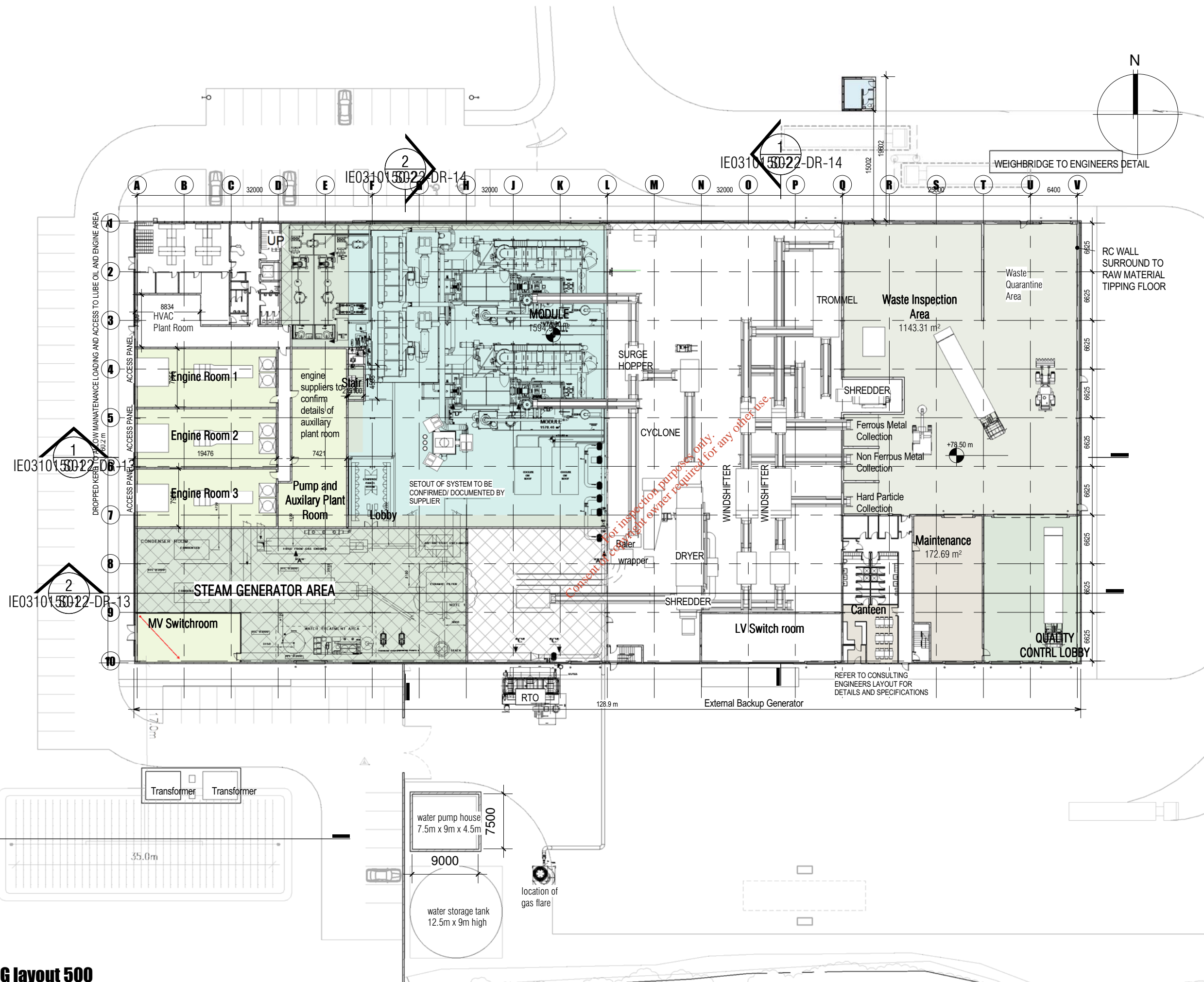
**Drawing No:** IE0310150-22-DR-0011 **Revision**

**Scale:** 1 : 500 **Date:** Feb 2011

**Prepared:** **Author** **Job No:** 0906



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**1 Level G layout 500**  
1 : 500

## APPENDIX D.9

### OFFICE & STAFF ACCOMMODATION

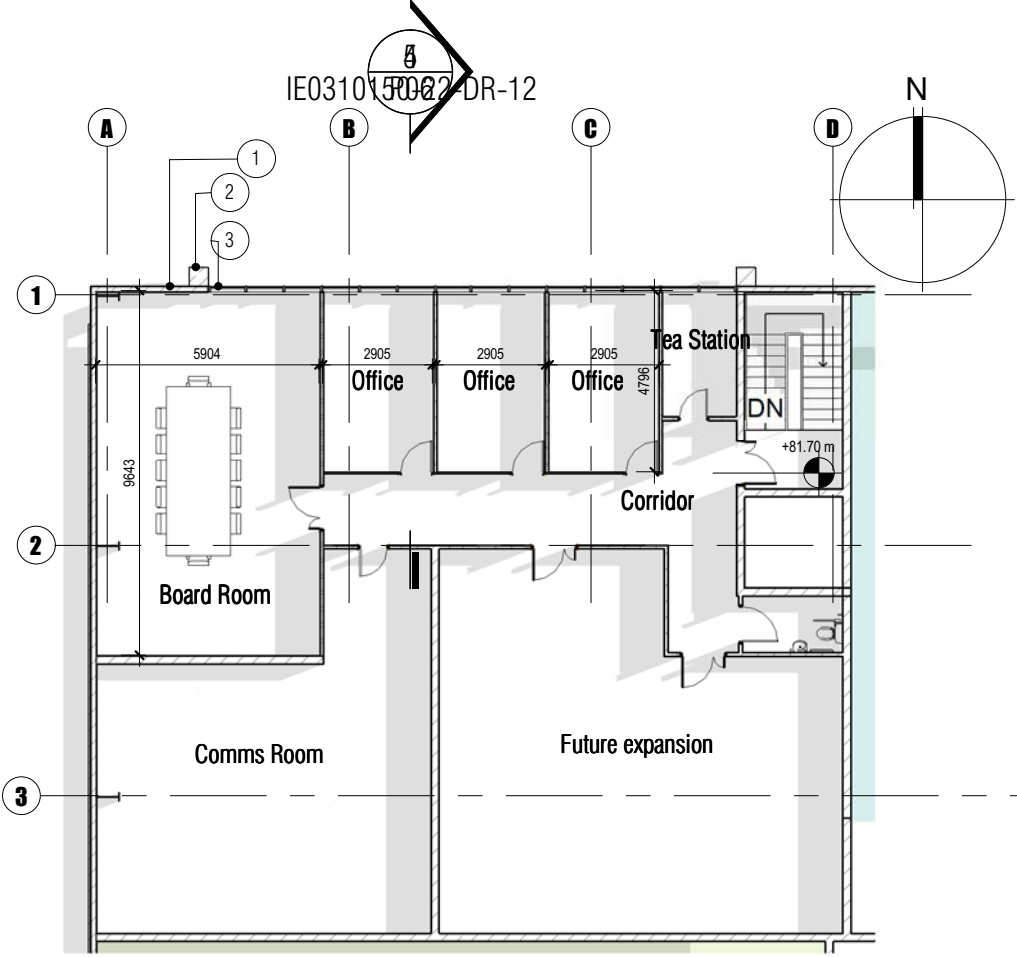
(1 no. drawing)

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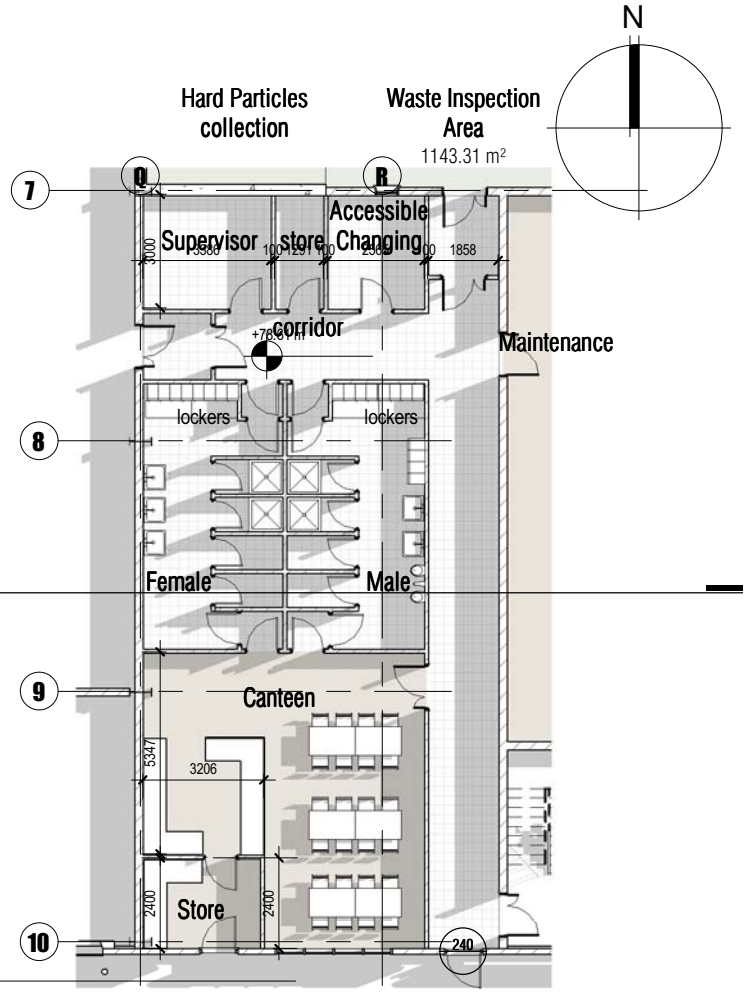
1. Copyright © 2012 Axis Architecture  
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 4. Where appropriate, for details of r.c. structure, or mechanical and electrical details, see Engineer drawings.  
 5. Proprietary items shall be fixed in strict accordance with manufacturers instructions.  
 6. Size of proprietary items shall be checked with manufacturer.  
 7. The contractor shall be responsible for the coordination of structure, finishes and services.

**Finishes Legend**

- NOTES:**
- Selected coloured microline surface with polyester coated 150mm BRUCHA insulated cladding panel laid vertically installed to manufacturers instructions and details.
  - Selected colour BRUCHA architectural panel to dims indicated installed to manufacturers instructions and details.
  - Aluminium framed thermally broken curtain walling with powder coated finish to selected colour.
  - Selected approved signage.
  - Opaque polycarbonate sheeting to create daylight provision to main areas.
  - Selected coloured microline surface with polyester coated 150mm BRUCHA insulated cladding panel laid horizontally installed to manufacturers instructions and details.
  - Steel doors powdercoated to colours to match cladding.
  - Insulated roller shutter door.
  - Rendered blockwork.
  - Extruded aluminium blade louvre system to selected colour.
  - Selected colour BRUCHA roof sheeting installed to manufacturers instructions and details.
  - Cast in situ concrete roof to substation.
  - Substation steel doors (Refer to ESB specification and details)
- Ordnance survey Ireland Licence No AR 0045810  
 © Ordnance survey Ireland Government of Ireland



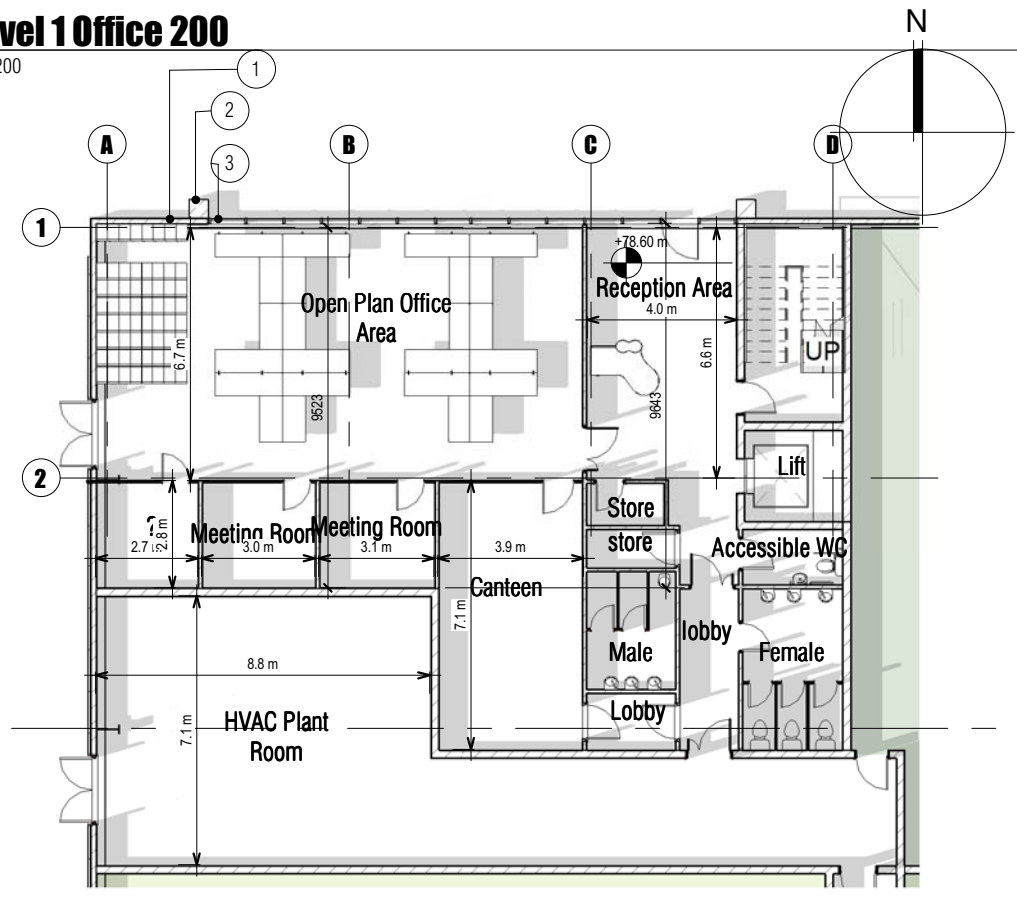
2  
 IE0310150-22-DR-13



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1 **Level 1 Office 200**

1: 200

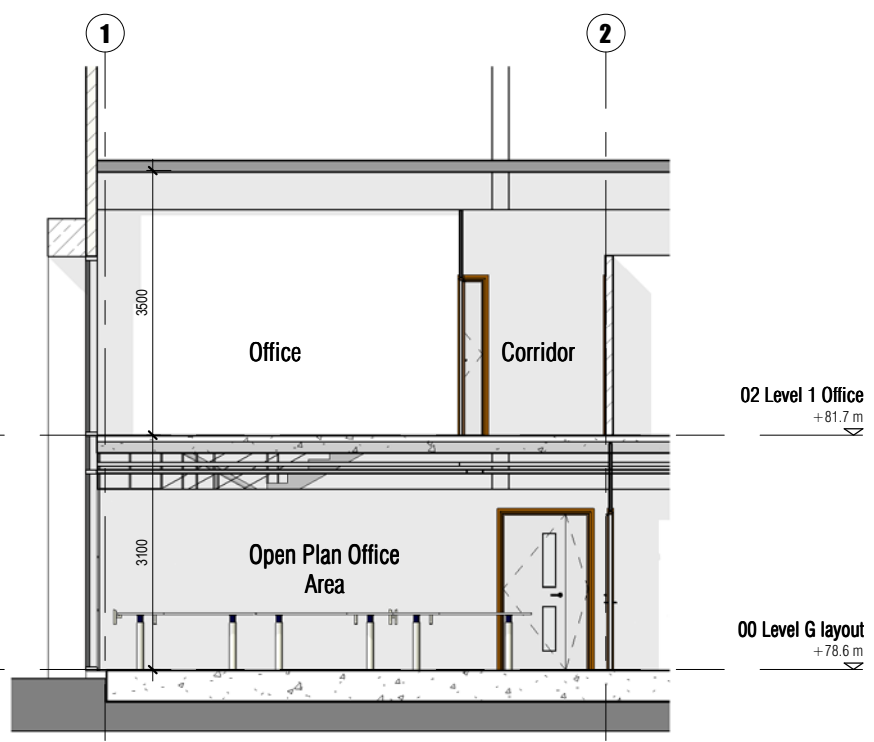


2 **Level G Office 200**

1: 200

3 **Staff Facilities (200)**

1: 200



4 **Building Section E (100)**

1: 100

**Client:**  
 GLANPOWER LIMITED

**Project:**  
 DERRYCLURE ENERGY PARK

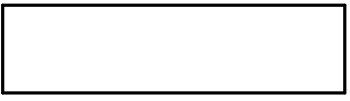
**Address:**  
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**Sheet Name:**  
 Office & Staff accommodation

**Drawing No:** IE0310150-22-DR-12 **Revision**

**Scale:** As indicated **Date:** Feb 2011

**Prepared:** Author **Job No:** 0906



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## APPENDIX D.10

### CROSS SECTIONS (A-A & B-B)

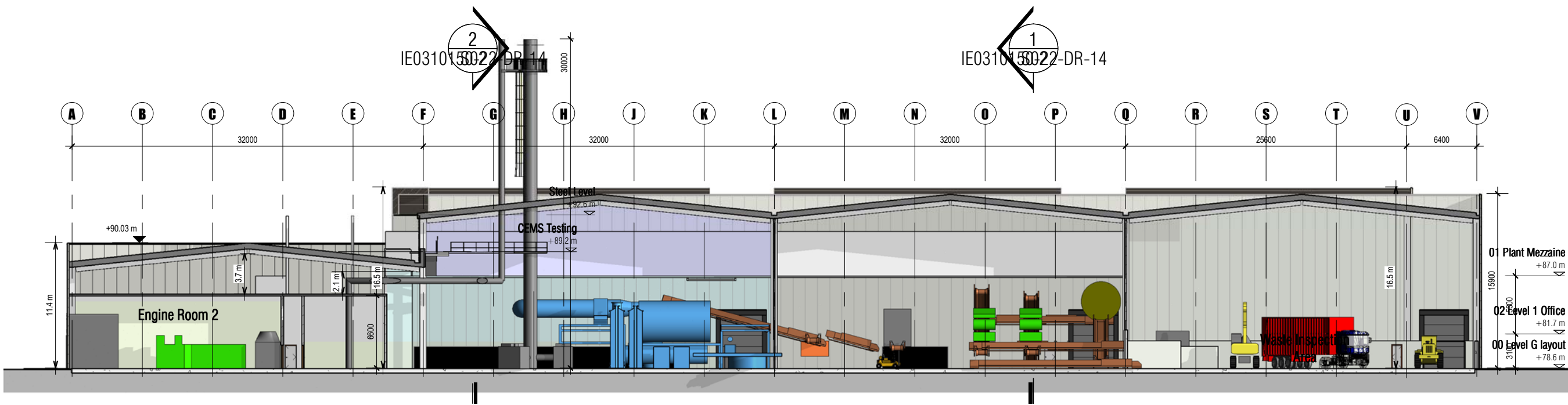
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6. Size of proprietary items shall be checked with manufacturer.
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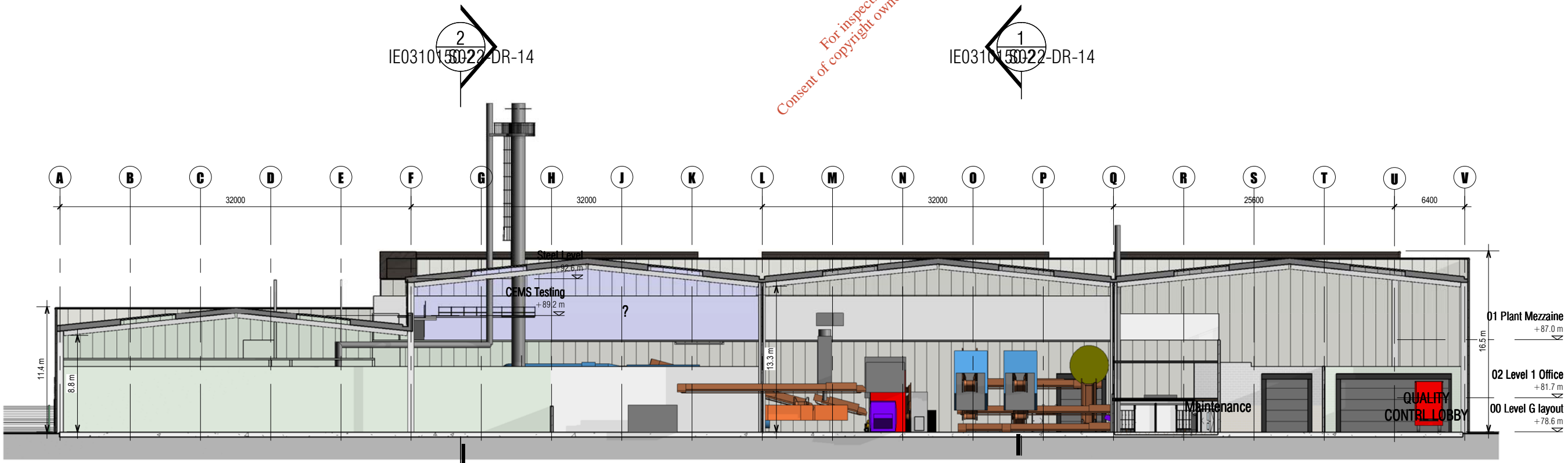
**NOTES:**



**Building Section A (400)**

1 : 400

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**Building Section B (400)**

1 : 400

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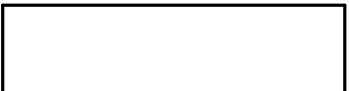
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DERRYCLURE, TULLAMORE, CO OFFALY.

**Sheet Name:**  
Cross Sections A-A & B-B

**Drawing No:** IE0310150-22-DR-13  
**Revision**

**Scale:** 1 : 400  
**Date:** Feb 2011

**Prepared:** Author  
**Job No:** 0906



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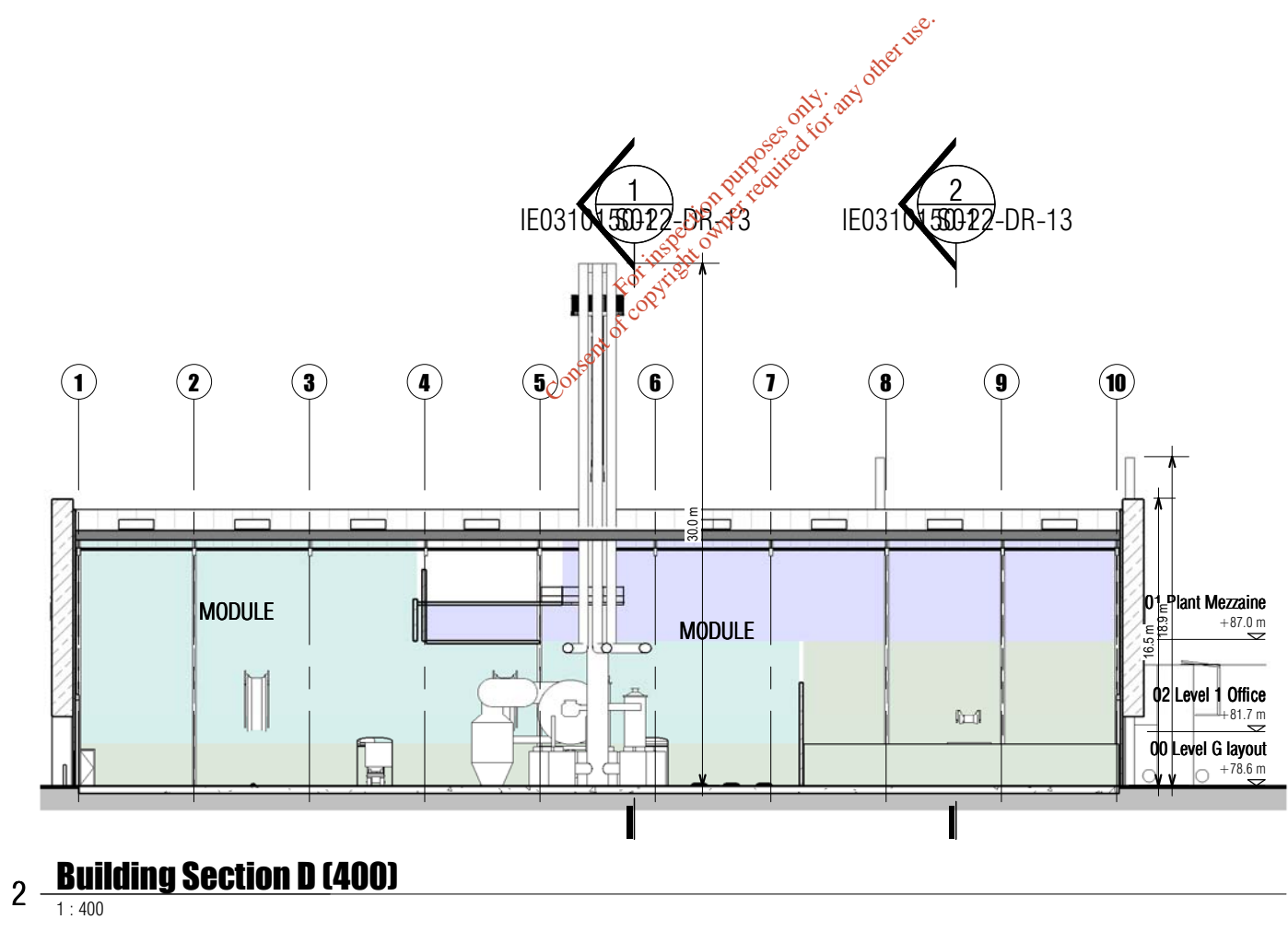
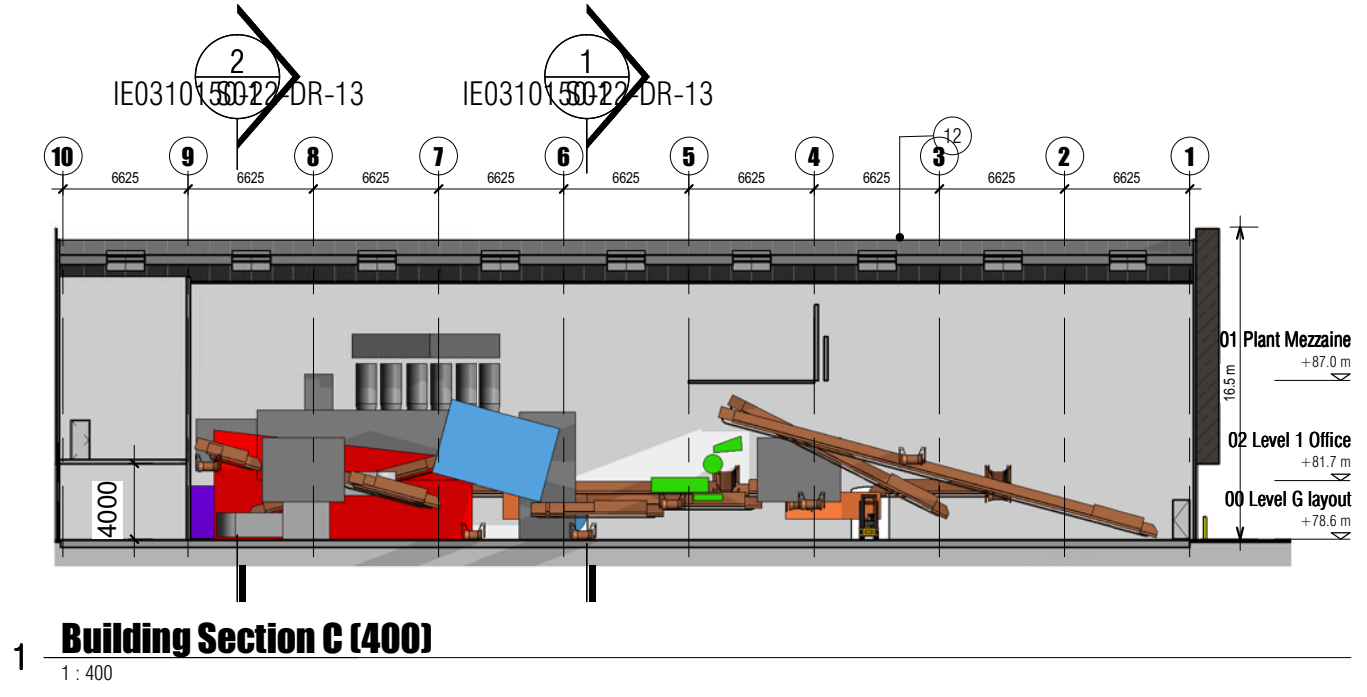
## APPENDIX D.11

### CROSS SECTIONS (C-C & D-D)

(1 no. drawing)

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5. Proprietary items shall be fixed in strict accordance with manufacturers instructions.
6. Size of proprietary items shall be checked with manufacturer.
7. The contractor shall be responsible for the coordination of structure, finishes and services.



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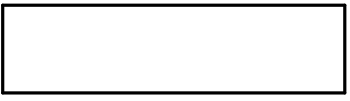
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**Sheet Name:**  
Cross Sections C-C & D-D

Drawing No: IE0310150-22-DR-14  
Revision

Scale: 1 : 400  
Date: Feb 2011

Prepared: Author  
Job No: 0906



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