Construction Environmental Management Plan

Proposed Large-Scale Residential Development (LRD) at Old Slane Road, Mell/Tullyallen, Drogheda, Co. Louth

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This document has been prepared and checked in accordance with
Waterman Group's IMS (BS EN ISO 9001: 2015 and BS EN ISO 14001: 2015)

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Comments

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1. Introduction

Waterman Moylan in conjunction with the Project Design Team have prepared the following Construction Environmental Management Plan, which is to accompany the design pack, for the implementation of the construction of the proposed Development of lands located off the Slane Road, east of Drogheda, in Mell/Tullyallen, Drogheda, Co. Louth.

This report outlines details, some of which are included in the reports of the wider project design team including the Project Ecologist, Project Archaeologist; Archer Heritage Planning, and Project Arborist; Arbor Care. This report should be read in conjunction with their work and should not be construed as a full amalgamation of other specialists' reports.

This document sets out the typical and site/project specific arrangements and measures that are required to be implemented during the construction stage of the project for environmental protection. The measures recorded in this report will be fully incorporated by the Contractor, whom will be required to develop and implement the Construction Environmental Management Plan on site.

This management plan should not be construed as representing the exact method or sequence in which the construction works shall be carried out.

In advance of work starting on site, the works Contractor will prepare a detailed Construction Environmental Management Plan (CEMP). The detailed CEMP will set out the overarching vision of how the construction of the proposed development will be managed in a safe and organised manner by the Contractor. The CEMP will be a live document and it will go through a number of iterations before works commence and during the works, and all planned works by the Contractor will be in compliance with the CEMP. It will set out requirements and standards which must be met during the construction stage and will include the relevant methods and mitigation measures outlined in this report, the reports of other specialists, and any subsequent planning conditions relevant to the proposed development.

As a minimum, the CEMP will be formulated in accordance with best international practice including but not limited to:

- CIRIA, (2001), Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors;
- Construction Industry Research and Information Association (CIRIA) Environmental Good Practice on Site (C650), 2005;
- BPGCS005, Oil Storage Guidelines;
- Eastern Regional Fisheries Board, (2006), Fisheries Protection Guidelines: Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites;
- CIRIA 697, The SUDS Manual, 2007; and
- UK pollution Prevention Guidelines (PPG) UK Environment Agency, 2004

This CEMP is submitted to outline the mitigation measures and construction methodologies which will be implemented during the construction period. The CEMP is, of course, a live document and will be updated by the Main Contractor, once appointed, prior to and during the course of construction to take account of any conditions imposed as part of the consent received as well as conditions on-site as the construction progresses.

The Main Contractor will also prepare the project's Environmental Emergency Response Procedures (or incorporate this as part of the Construction Environmental Management Plan or Construction Management Plan). While this is a separate document to the Construction Environmental Management Plan, there is a considerable subject overlap between the documents.

2. Surrounding Environs and the Proposed Site

The site is located in Mell/Tullyallen, Drogheda, Co. Louth. The site location is indicated in Figure 1 below and is approx. 1.41 hectares.

Topographic survey indicates that the site falls generally from north-west to south-east, with a high point of approximately 21.48m OD Malin at the north-west corner of the site of the site and a low point of approximately 17.37m OD Malin at the south-east of the site. There is a stream flowing in a southerly direction approximately 126m from the eastern boundary of the site, draining land to the north and crossing under the R168 Road. The stream crosses the Slane Road at Dry Bridge, discharging into the Boyne River approximately 650m south of the site.

***Figure 1** | Site Location (Source: Google Earth)*

2.1 Proposed Development

Lagan Homes Tullyallen Ltd intend to make a planning application for planning permission to modify a permitted Strategic Housing Development (SHD) ABP-311678-21 (as amended by P.A.Ref. 2360368 and P.A.Ref. 2460266) known as Gort Mell by way of a planning application for a large scale residential development (LRD) permission at Old Slane Road and R168, Mell/Tullyallen, Drogheda, Co.Louth.

The proposed development will consist of alterations to the permitted SHD known as Gort Mell including change of house types, relocation of permitted ESB substation, relocation of public copen space, alterations to drainage network design and levels and the construction of 47no. additional dwellings (5no. 1-bed, 16no.

2-bed, 23no. 3-bed and 3no. 4-bed) with a new vehicular entrance onto Old Slane Road together with all associated site development works, public lighting, public open space, car parking, roads and footpaths. Works proposed on Old Slane Road include the provision of a roundabout for future bus turning and a bus stop. The proposed modifications to the permitted SHD will increase the number of units from 237no. as permitted (21no. 1-bed, 49no. 2-bed, 142no. 3-bed and 25no. 4-bed) to 284no. in total (26no. 1-bed, 65no. 2-bed, 165no. 3-bed, 28no. 4-bed).

The schedule of accommodation is set out in the Table below:

Description	1-Bed Houses	2-Bed Duplexes	2-Bed Houses	3-Bed Houses	4-Bed Houses	Total No. of Residential Units
Proposed Development	5	5	11	23	3	47
Total	**5**	**5**	**11**	**23**	**3**	**47**

Table 1 | *Schedule of Accommodation*

It is proposed to redirect surface water and foul water from 28 no. units within the permitted Phase 2, to drain through Phase 3 – this route better aligns with the existing topography, reducing the required depth of drainage.

The site will accommodate car parking spaces, bicycle parking spaces, storage, services and plant areas, and landscaping. The proposed application includes all site landscaping works, substations, boundary treatments, lighting, servicing, signage, and associated and ancillary works, including site development works and services above and below ground. The application site also includes part of the Old Slane Road to facilitate a roundabout on the west-end of Old Slane Road for future bus turning and terminus, as requested by Louth County Council (LCC) during the Stage 1 Pre-planning meeting and the construction of a 225mm storm water sewer and 225mm foul water sewer which will connect to existing manholes to the east built under Phase 1.

The application site also incorporates feedback from the Stage 2 pre-planning meeting, and a response to the engineering items in Louth County Council's Stage 2 Opinion Report accompanies this submission under separate cover.

3. General Site Set Up and Pre-Commencement Measures

The following measures will be carried out by the Main Contractor:

- A general condition survey of the roads and infrastructure in the area prior to any work being carried out on the site.
- A site compound including offices and welfare facilities will be set up by the Main Contractor.
- Prior to any site works commencing, the Main Contractor will investigate/identify the exact location of and tag all existing services and utilities around and through the site with the assistance of the relevant DCC technical divisions and utility companies.
- The operational hours for the site shall be 08:00 to 17:00 Mondays to Fridays and 08:00 to 14:00 Saturdays. No work is permitted on Sundays or public holidays. Deviation from these hours will only be allowed in exceptional circumstance with prior written approval from the planning authority.
- Hoarding lines and site security will be set up within the development site as required, including around the perimeter of the construction zone and at access to the public road network.
- Fencing will be set up in order to keep construction activity separated from the existing bodies of water.

Access gates will be provided at all site and compound access points. The construction access will be from the site entrance located on Slane Road. A detailed traffic management plan will be prepared and implemented by the Main Contractor and agreed with the Local Authority prior to commencing works.

4. Site Security and Hoarding Lines

Hoarding lines and site security will be set up within the development site as required.

Internal fencing will protect Arboricultural/Environmental features as discussed in the following chapter. This fencing is also specified to extend to include root protection zones or areas (RPZ/RPA). It should also be further noted that there may be the requirement to trim some hedges/trees prior to protective fencing being erected, this is to be coordinated with the arborist.

5. Environmental Management for Site Preparation and Construction

The following chapter notes some of the issues, actions, and mitigation measures to be undertaken by the Main Contractor as part of site preparation and during construction works.

A programme will be agreed between the Main Contractor, Project Ecologist & Project Arborist, for undertaking the works specific to their expertise, and implementation of mitigations measures, and arranging of supervision if required, before commencement of any works on site.

5.1 Arborist Exclusion Zone & Site Preparation

The tree survey report will be undertaken by the Project Arborist and will be submitted under a separate cover.

5.2 Ecologist Exclusion Zone & Site Preparation

The project ecologist will provide a Natura Impact Statement, which will be submitted under a separate cover.

5.3 Archaeological Environment

The project Archaeologists will provide the Archaeological Testing Report which shall be submitted under a separate cover.

5.3.1 Demolition Phase

None expected.

5.3.2 Topsoil

In the case of topsoil careful planning and on-site storage can ensure that this resource is reused on-site as much as possible. Any surplus of soil not reused on site can be sold. However, topsoil is quite sensitive and can be rendered useless if not stored and cared for properly.

- It is important that topsoil is kept completely separate from all other construction waste as any cross-contamination of the topsoil can render it useless for reuse.
- It is important to ensure that topsoil is protected from all kinds of vehicle damage and kept away from site-track, delivery vehicle turning areas and site plant and vehicle storage areas.

If topsoil is stored in piles of greater than two metres in height the soil matrix (internal structure) can be damaged beyond repair. It should also be kept as dry as possible and used as soon as possible to reduce any deterioration through lengthy storage and excess moving around the site.

Records of topsoil storage, movements and transfer from site will be kept by the C&D Waste Manager.

5.3.3 Subsoil and excavations

The Main Contractor will ensure that the excavation works are carried out in accordance with best standard practice and excavation materials are well segregated to minimize any potential cross-contamination.

The Main Contractor shall carry out appropriate environmental chemistry testing in order to determine the waste classification of the soils that are to be excavated and that shall include Waste Acceptance Criteria testing. The test regime shall be agreed with the receiving landfill operator and the testing shall be carried out by an accredited laboratory.

Should excavation materials be assessed to be hazardous, the Main Contractor shall carry out pre-treatment of the waste soils to a methodology that is agreed with the receiving landfill operator and in accordance with Environmental Protection Agency guidance.

The Main Contractor is encouraged to reuse and recycle any waste materials as far as is reasonably practicable.

In respect of any liquid disposal including underground water, the Main Contractor shall carry out appropriate environmental chemistry testing in order to determine whether the liquid is contaminated or not. The test regime shall be agreed with the receiving disposal facility and the testing shall be carried out by an accredited laboratory.

The Main Contractor shall manage and carry out the works in accordance with best environmental practice and in accordance with the requirements of Local Authority, EPA and all requirements as specified in this document.

6. Watercourse Management

There is potential for an indirect hydrological connectivity to the local surface water drainage network, whereby during heavy rainfall events, surface water from the sites flows over the site boundary to the road gullies on the adjacent streets.

The most likely potential sources of contamination to the local surface water network are from silt and suspended particles, and from chemical compounds entering these networks as surface water runoff.

Silt and suspended particles may arise from surface runoff from stockpiled materials or from the pumping of water volumes in excavations.

Chemical contamination can result due to fuel/chemical leaks and spills.

Spoil heap/stockpiles will not be located within 20m of the existing surface water networks. Spoil heaps/stockpiles will be considered for seeding if their storage is likely to be longer than a few seasons. Drainage diversion ditches will be constructed between the stockpile area and local surface water networks. This drainage ditch will flow to a sedimentation/settlement pond prior to outfalling to the surface water network. A Discharge Licence will be obtained from the local Authority by the Main Contractor. If topography doesn't allow for a gravity outfall from the sedimentation/settlement pond, a commercially available modular settlement tank will be utilised for the project, or outfall volumes may instead be pumped. Untreated surface water will not be permitted to flow to any natural or piped surface water network.

Further details on method statements and mitigation measures against pollutant run-off is located in Chapter 9 of this report.

7. Construction Stage

The following method statements and mitigation measures, as well as those discussed previously, will be subject to frequent reviews and inspections to ensure they are working or will work as intended.

Further methods to reduce and eliminate environmental risks at construction phase, post site preparation phase, are discussed in the following chapters of this report. As noted previously, these details are compiled from various reports and drawings of the wider design team. Full consideration will be given to these other documents by the main contractor when preparing their Construction Environmental Management Plan.

7.1 Earthworks and Dust Suppression

Nuisance dust emissions from construction activities are a common and well recognised problem. Fine particles from these sources are recognised as a potential significant cause of pollution.

The main contractor will be required to demonstrate that both nuisance dust and fine particle emissions from the site are adequately controlled and are within acceptable limits.

Dust and fine particle generation from construction and demolition activities on the site can be substantially reduced through carefully selected mitigation techniques and effective management. Once particles are airborne it is very difficult to prevent them from dispersing into the surrounding area. The most effective technique is to control dust at source and prevent it from becoming airborne, since suppression is virtually impossible once it has become airborne.

The following are techniques and methods which are widely used currently throughout the construction industry, and which will be used in the development.

1. The roads around the site are all surfaced, and no dust is anticipated arising from unsealed surfaces.
2. A regime of ‘wet’ road sweeping will be set up to ensure the roads around the immediate site are as clean and free from dirt / dust arising from the site, as is reasonably practicable. This cleaning will be carried out by approved mechanical sweepers.
3. Footpaths immediately around the site will be cleaned by hand regularly, with damping, as necessary.
4. High level walkways and surfaces such as scaffolding will be cleaned regularly using safe ‘wet’ methods, as opposed to dry methods.
5. Vehicle waiting areas or hard standings will be regularly inspected and kept clean by brushing or vacuum sweeping and will be regularly sprayed to keep moist, if necessary.
6. Vehicle and wheel washing facilities will be provided at the site exit(s). If necessary, vehicles will be washed down before exiting the site.
7. Netting will be provided to enclose scaffolding in order to mitigate escape of airborne dust from the new buildings.
8. Vehicles and equipment will not emit black smoke from exhaust system, except during ignition at start up.
9. Engines and exhaust systems will be maintained so that exhaust emissions do not breach stationary emission limits set for the vehicle / equipment type and mode of operation.
10. Servicing of vehicles and plant will be carried out regularly, rather than just following breakdowns.
11. Internal combustion plant will not be left running unnecessarily.

12. Exhaust direction and heights will be such as not to disturb dust on the ground and to ensure adequate local dispersal of emissions.
13. Fixed plant such as generators will be located away from residential areas.
14. The number of handling operations for materials will be kept to a minimum in order to ensure that dusty material is not moved or handled unnecessarily.
15. The transport of dusty materials and aggregates will be carried out using covered / sheeted lorries.
16. Material handling areas will be clean, tidy, and free from dust.
17. Vehicle loading will be dampened down and drop heights for material to be kept to a minimum.
18. Drop heights for chutes / skips will be kept to a minimum.
19. Dust dispersal over the site boundary will be minimised using static sprinklers or other watering methods, as necessary.
20. Stockpiles of materials will be kept to a minimum and if necessary, they will be kept away from sensitive receptors such as residential areas etc.
21. Stockpiles where necessary, will be sheeted or watered down.
22. Methods and equipment will be in place for immediate clean-up of spillages of dusty material.
23. No burning of materials will be permitted on site.
24. Earthworks excavations will be kept damp where necessary and where reasonably practicable.
25. Cutting on site will be avoided where possible by using pre-fabrication methods.
26. Equipment and techniques for cutting / grinding / drilling / sawing / sanding etc, which minimise dust emissions and which have the best available dust suppression measures, will be employed.
27. Where scabbling is to be employed, tools will be fitted with dust bags, residual dust will be vacuumed up rather than swept away, and areas to be scabbled will be screened off.
28. Wet processes will be used to clean building facades if possible. If dry grit blasting is unavoidable, then areas of work will be sealed off and dust extraction systems used.
29. Where possible pre-mixed plasters and masonry compounds will be used to minimise dust arising from on-site mixing.
30. Prior to commencement, the main contractor will identify the construction operations which are likely to generate dust and to draw up action plans to minimise emissions. Furthermore, the main contractor will prepare environmental risk assessments for all dust generating processes, which are envisaged.
31. The main contractor will allocate suitably qualified personnel to be responsible for ensuring the generation of dust is minimised and effectively controlled.
32. Vehicles using site roads will have their speed restricted, and this speed restriction must be enforced rigidly. On any un-surfaced road, the limit shall be 20 kph, and on surfaced roads as site management dictates.

7.2 Lighting During Construction (and Operational Phase)

- Construction phase lighting will be controlled to minimise light pollution as a matter of good practice. Controls will include implementations of lights out hours when construction is not active on site.

- Operational phase lighting at night will only be used when necessary and will be directed/cowled and at a low level where possible. Illumination of surrounding tree canopies will be avoided wherever practicable.

7.3 Noise/Vibration

The contractor is to meet the requirements of the Air Quality Monitoring and Noise Control Unit's Good Practice Guide for Construction and Demolition.

This Guide has been produced with reference to the Noise Guidelines for the European Region produced by the World Health Organization 2018.

7.4 Environmental Noise Mitigation Measures:

General Considerations:

1. All site staff will be briefed on noise mitigation measures and the application of best practicable means to be employed to control noise.
2. Site hoarding will be erected to maximise the reduction in noise levels.
3. The contact details of the Main Contractor and site manager will be displayed to the public, together with the permitted operating hours, including any special permissions given for out of hours work.
4. In the event that the Main Contractor gets a complaint about noise from a neighbour he or she will act immediately to remedy the situation.
5. The site entrance will be located to minimise disturbance to noise sensitive receptors.
6. Internal haul routes will be maintained, and steep gradients will be avoided.
7. Material and plant loading and unloading will only take place during normal working hours unless the requirement for extended hours is for traffic management (i.e. road closure) or health and safety reasons (advance notification, or possibly an application to the local council would be required if proposing to work outside non-typical hours).
8. Use rubber linings in chutes, dumpers, and hoppers to reduce impact noise.
9. Minimise opening and shutting of gates through good coordination of deliveries and vehicle movements.

Plant:

1. Ensure that each item of plant and equipment complies with the noise limits quoted in the relevant European Commission Directive 2000/14/EC.
2. Fit all plant and equipment with appropriate mufflers or silencers of the type recommended by the manufacturer.
3. Use all plant and equipment only for the tasks for which it has been designed.
4. Shut down all plant and equipment in intermittent use in the intervening periods between work or throttle down to a minimum.
5. Power all plant by mains electricity where possible rather than generators.
6. Maximise screening from existing features or structures and employ the use of partial or full enclosures for fixed plant.
7. Locate movable plant away from noise sensitive receptors where possible.

8. All plant operators will be qualified in their specific piece of plant.
9. Compressors and generators will be sited in areas least likely to give rise to nuisance where practicable.

Vehicle activity:

1. Ensure all vehicle movement (on site) occur within normal working hours. (Other than where extension of work requiring such movements has been granted in cases of required road closures or for health and safety reasons).
2. Plan deliveries and vehicle movements so that vehicles are not waiting or queuing on the public highway, if unavoidable engines should be turned off.
3. Plan the site layout to ensure that reversing is kept to a minimum.
4. Where reversing is required use broadband reverse sirens or where it is safe to do so disengage all sirens and use banks-men.
5. Rubber/neoprene or similar non-metal lining material matting to line the inside of material transportation vehicles to avoid first drop high noise levels.
6. Wheel washing of vehicles prior to exiting the site will take place to ensure that adjoining roads are kept clean of dirt and debris. Regular washing of adjoining streets will also take place as required by road sweepers.

Demolition Phase (not expected):

1. Employ the use of acoustic screening; this can include planning the demolition sequence to utilise screening afforded by buildings to be demolished.
2. If working out of hours for Health and Safety reasons (following approval by council) limit demolition activities to low level noise activity (unless absolutely unavoidable).
3. Use low impact demolition methods such as non-percussive plant where practicable.
4. Use rotary drills and ‘bursters’ activated by hydraulic or electrical power or chemically based expansion compounds to facilitate fragmentation and excavation of hard material.
5. Avoid the transfer of noise and vibration from demolition activities to adjoining occupied buildings through cutting any vibration transmission path or by structural separation of buildings.
6. Consider the removal of larger sections by lifting them out and breaking them down either in an area away from sensitive receptors or off site.

Ground Works and Piling Phase:

1. The following hierarchy of groundwork/piling methods will be used if ground conditions, design and safety allow;
    - Pressed in methods, e.g., hydraulic jacking
    - Auger/bored piling
    - Diaphragm walling
    - Vibratory piling or vibro-replacement
    - Driven Piling or dynamic consolidation
2. The location and layout of the piling plant will be designed to minimise potential noise impact of generators and motors.

3. Where impact piling is the only option, utilise a non-metallic dolly between the hammer and driving helmet or enclose the hammer and helmet with an acoustic shroud.
4. Consider concrete pour sizes and pump locations. Plan the start of concrete pours as early as possible to avoid overruns.
5. Where obstructions are encountered, work will be stopped, and a review undertaken to ensure that work methods that minimise noise are used.
6. When using an auger piling rig do not dislodge material from the auger by rotating it back and forth. Use alternate methods where safe to do so.
7. Prepare pile caps using methods which minimise the use of breakers, e.g., use hydraulic splitters to crack the top of the pile.

Monitoring:

1. Carry out regular on-site observation monitoring and checks/audits to ensure that BPM is being used at all times. Such checks will include;
    - Hours of work
    - Presence of mitigation measures
    - Number and type of plant
    - Construction methods
2. In the event that the Main Contractor gets a complaint about noise from a neighbour he or she will act immediately to remedy the situation.
3. A sound level digital meter will be employed as necessary to monitor noise, with results recorded to inform the contractor of noise level.
4. Site reviews must be recorded and made available for inspection.
5. Appraise and review working methods, processes, and procedures on a regular basis to ensure continuous development of BPM.

Communication and Liaison:

1. A Community Liaison Strategy will be developed by the developer in consultation with local residents/businesses and a single point of contact nominated to engage with Meath County Council and the residents/businesses and to handle complaints and communication of site information.
2. All site staff will be briefed on the complaints procedure and mitigation requirements and their responsibilities to register and escalate complaints received.

    Where appropriate, a resident monitoring committee will be established for the duration of the project in order to promote best construction management and considered construction practices to protect the amenities of adjacent properties as provided in Section 15.18.1 of the Development Plan.

Section 15.18.1.2 of the same documents advise that': "Considered Construction seeks to improve the image of the construction industry which requires registered contractors to commit to care about appearance, respect the community, protect the environment, secure everyone's safety and value their workforce. Meath County Council will support the provision of considered construction in all design pack. Commitment to the scheme should be identified as part of the Construction Management Plan submitted with design pack."

7.5 Spills and Leaks

Spills and leaks may contaminate soil, groundwater, and surface water networks via surface run-off. Method statements and mitigation measures reduce the potential for leaks and spills and limit their impact should they occur. As any potential leaks and spills are likely to be from storage containers to the surface of the ground, the associated methods and measures are discussed in Chapter 11 of this report however, these measures nonetheless also provide protection to the soils and groundwater.

8. Ground Water

The excavations for the drainage pipes, water supply, utilities, and foundations have been designed to be as shallow as possible in order to reduce excavation depths. Careful attention will be required to maintain the excavations clear of ground water.

A discharge licence will be required for all water pumped from the excavations to any public water course or sewer.

All water pumped from the excavations will require to be treated for silt and deleterious matter. During any discharge of surface water from the excavations, the quality of the water will be regularly monitored visually for hydrocarbon sheen and suspended solids. Periodic laboratory testing of discharge water samples will be carried out in accordance with the requirements of the discharge licence obtained from the Local Authority. Further details on Pollution and Sediment control are contained in the following chapter.

Method statements and mitigation measures against groundwater contamination are discussed in the following Chapter.

9. Runoff Pollution and Sediment Control

9.1 Runoff Pollution Control

Significant quantities of waste and potential pollutants can be generated during construction. Controls will be put in place to prevent these pollutants from washing into the local watercourse network during storm events.

The recommendations as outlined in the Eastern Regional Fisheries Board document outline the following seven items to be considered for the protection of adjacent water courses during the construction stage:

1. Fuels, oils, greases, and hydraulic fluids must be stored in bunded compounds well away from the watercourse/ditches. Refuelling of machinery, etc., will be carried out in bunded areas.

2. Runoff from machine service and concrete mixing areas must not enter the watercourse.

3. Stockpile areas for sands and gravel will be kept to minimum size, well away from the watercourse.

4. Runoff from the above should only be routed to the watercourse via suitably designed and sited settlement ponds/filter channels. If topography doesn't allow for this, commercially available modular settlement tanks will be utilised. Untreated runoff will not be permitted to enter the natural watercourse.

5. Settlement ponds will be inspected daily and maintained regularly.

6. Temporary crossings will be designed to the criteria laid down for permanent works.

7. Watercourse banks will be left intact if possible. If they have to be disturbed, all practicable measures should be taken to prevent soils from entering the watercourses.

The main pollutants of site water are silt, fuel/oil, concrete, and chemicals. See *Table 2* below for a list and brief description of pollution prevention measures.

Source	**Action**
Detergents	Use of detergents will be carried out in designated areas draining to the construction stage foul sewer.
Fuel/Oil	Fuel/oil stores must be located away from the site drainage system and the edge of watercourses.
Fuel/Oil	Ensure adequate measures are identified to prevent or contain any spillage such as creating a fall away from any drainage grid or blocking drainage points.
	Prevent oil pollution by • Suitable bunded storage of fuel/oil (roofed to exclude rainwater), and use of drip trays under plant, and • An oil separator, and/or • On-site spill-kit • Commercially available absorbent granules, pads, or booms. • Refuel plant in designated bunded areas only
Material Storage	Store drums, oil, and chemicals on an impervious base and within a secured bund.

Source	Action
	Ensure topsoil and/or spoil heaps are located at least 20m away from water courses. Consider seeding them or covering with a tarpaulin to prevent silty runoff and losses due to wind.
Leaks and Spills	Storage facilities will be checked on a regular basis to ensure any leaks or drips are fixed to prevent loss and pollution.
	Ensure appropriate spill response equipment is located near to the material in case of containment failure or material spills and ensure site staff know how to use it.
	Adequate stocks of absorbent materials, such as sand or commercially available spill kits and booms will be available at all times.
Litter	Provide waste bins on-site as appropriate.
Construction Vehicles	Provide vehicle wheel washing.
Concrete, Cement, and Bentonite	Washout of these materials will be carried out in a designated, impermeable contained area. The washout water itself should be disposed of off-site, or discharged to the construction stage foul sewer if authorised.

***Table 2** | Pollution Protection Measures*

Guidelines such as “Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors” (CIRIA 532, 2001) will be complied with.

Where feasible all ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil. Wash down and washout of concrete transporting vehicles will take place at an appropriate facility offsite.

In the case of drummed fuel or other chemicals which may be used during construction, containers will be stored in a dedicated internally bunded chemical storage cabinet and labelled clearly to allow appropriate remedial action in the event of a spillage.

Emergency response procedures will be outlined in the detailed CEMP. All personnel working on the site will be suitably trained in the implementation of the procedures.

9.2 Sediment Control

Construction runoff can be heavily laden with silt which can block road gullies and reduce the hydraulic capacity in pipes and watercourses, contributing to ponding and flooding. Continued development without appropriate controls will ultimately keep maintenance costs elevated, whether that be in cleaning gullies, jetting pipes, or dredging. Sediment control plans will be implemented on-site to mitigate these issues.

Sediment basins and traps will be installed before any major site grading takes place. Should topography not permit for this, commercially available modular settlement tanks will be employed. Untreated surface runoff will not be permitted to enter the natural watercourses. Additional sediment traps and silt fences will be installed as grading takes place to keep sediment contained on site at appropriate locations.

Key runoff-control measures will be located in conjunction with sediment traps to divert water from planned undisturbed areas away from the traps and sediment-laden water into the traps. Diversions will be installed above the areas to be disturbed before any grading operations. Any perimeter drains will be installed with stable outlets before opening major areas for development. Any additional facilities needed for runoff control will be installed as grading takes place.

During grading operations temporary diversions, slope drains, and inlet and outlet protection installed in a timely manner can be very effective in controlling erosion and sediment build up.

The main run-off conveyance system with inlet and outlet protection measures will be installed early and used to convey stormwater run-off through the development site without creating gullies or channels. Inlet protection for storm drains will be installed as soon as the drain is functional to trap sediment on site in shallow pools and to allow the flood flows to enter the storm drainage system safely. Outlet protection will be installed at the same time as the conveyance system to prevent damage to the receiving watercourse.

During the final stages of construction unstable sediment from sediment basins and traps will be removed and if possible incorporated into the topsoil, not just spread on the surface.

9.2.1 Sediment Control Measures

Sediment entrapment facilities are necessary to reduce sediment discharges to downstream properties and receiving waters. All run-off leaving a disturbed area will pass through a sediment entrapment facility before it exits the site and flows downstream.

Straw Bales:

Straw bales can be placed at the base of a slope to act as a sediment barrier. These are not recommended for use within a swale or channel. Straw bales are temporary in nature and may perform for only a period of weeks or months. Proper installation and maintenance is necessary to ensure their performance.

Silt Fencing

A silt fence is made of a woven synthetic material, geotextile, and acts to filter run-off. Silt fencing can be placed as a temporary barrier along the contour at the base of a disturbed area but is not recommended for use in a channel or swale. The material is durable and will last for more than one season if properly installed and maintained. Silt fencing is not intended to be used as a perimeter fence or in area of concentrated flow. If concentrated flow conditions exist, a more robust filter should be considered.

Silt Barriers

Silt barriers can also be temporarily installed in any road gullies of partially constructed roads to prevent sediment movement into downstream drainage systems or SUDS components.

When the catchment area is greater than that allowed for straw bale barriers or silt fences, runoff should be collected in diversion drains and routed through temporary sediment basins.

Diversion Drains

Diversion drains are simple linear ditches, often with an earth bund, for channelling water to a desired location. If the drains are being eroded, they can be lined with geotextile fabric or large stones or boulders.

Settlement tank

Commercially available settlement tanks, also known as sediment tanks, have compartments that allow suspended solid contents such as sand and silts to precipitate and sink to the bottom, falling out of suspension. The settlement tank has an inlet for the runoff which enters a chamber where it is held before flowing to the next compartment or tank for further treatment, prior to outfall.

10. Reinstatement

Details of the site reinstatement after completion of construction works (Landscaping) can be found in the Landscape Architects reports and drawings.

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