

Indicative – Best Practice and Mitigation

WATER RESOURCES, DRAINAGE AND FLOOD RISK: MITIGATION MEASURES

The following best practice demolition and construction methods, and management controls once the Proposed Development is complete and occupied can be considered as embedded mitigation which will reduce the risk and hence the likelihood for potential impacts on water resources or flood risk.

Best practice construction methods and mitigation measures will be developed and presented in a Construction Environmental Management Plan (CEMP) for the Proposed Development, which is proposed to be agreed with the local planning authority in advance of construction commencing.

Sediment in Runoff

The following mitigation measures for sediment in runoff will be implemented during the works:

- Site access points will be regularly cleaned to prevent build-up of dust and mud;
- Earth movement will be controlled to reduce the risk of construction silt combining with the site surface water runoff;
- Properly contained wheel wash facilities will be used where required, to isolate sediment rich runoff; and
- Drainage of surface runoff and de-watering effluents to settling tanks to remove suspended solids prior to discharge to sewer or removal by a suitably licensed waste operator.

Leaks and Spillages of Contaminants

The following measures will be implemented, where possible:

- Implementing control procedures during delivery or movement of service materials;
- The drainage system will have cut-off measures that will allow a spill to be contained within the site, so that it can be effectively controlled and managed without leading to off-site effects;
- An Emergency Response Plan will be put in place;
- Education / information on waste treatment / emergency events/spills etc. can be provided to the building servicing staff and building occupants as appropriate; and
- Oil interceptors would be used in association with the drainage network in high-risk areas to reduce the potential risk for contamination.
- The appropriate utility company would be consulted on the potential requirement for an oil interceptor at the point where site surface water runoff enters the combined sewer.

The following mitigation measures will be implemented during the works:

- Spillages and leakages will be immediately contained in line with an emergency response plan and managed through the use of geotextile bunding of adequate capacity (110%) to isolate and minimise the ingress of surface water runoff to non-decommissioned boreholes or exposed surface water drainage pipes. Valves and trigger guns will be protected from vandalism and kept locked when not in use;
- An emergency spillage action plan will be produced, which site staff will have read and understood. On-site provisions will be made to contain a serious spill or leak through the use of booms, bunding and absorbent material;
- Wherever possible, plant and machinery will be kept away from the drainage system and will have drip trays beneath oil tanks/engines/gearboxes/hydraulics which will be checked and emptied regularly via a licensed waste disposal operator;
- Following the discharge of surface runoff and de-watering effluents to settling tanks the drainage would be routed to oil interceptors prior to discharge to sewer;
- The majority of concrete used will be pre-mixed and delivered from an off-site source, thereby negating the need to mix concrete on-site and reducing the creation of alkaline wastewater. Any mixing and handling of wet concrete on-site will be undertaken in designated impermeable areas, away from any drainage channels or surface water;
- A designated impermeable area will be used for any washing down or equipment cleaning associated with concrete or cementing processes and wastewater will be discharged to the foul drainage system (with approval from TWUL) or contained and removed by tanker to a suitable discharge location by a suitably licensed waste operator; and
- The proposed drainage/service runs will be surrounded by appropriate granular bedding materials and located above the static level of any shallow groundwater. The drainage network installed as part of the Proposed Development will be constructed to meet with Building Regulations 2000, Part H.

- All liquids and solids of a potentially hazardous nature (e.g. diesel fuel, oils and solvents) are to be stored in designated locations with specific measures to prevent leakage and release of their contents, include the siting of storage area away from surface water drains, on an impermeable base with an impermeable bund that has no outflow and is of adequate capacity to contain 110% of the contents, in accordance with the EA's requirements. Any tanks storing more than 200 litres of oil on-site, would have secondary bunding.
- All storage will be protected from vandalism and kept locked up when not in use.

- Wherever possible, plant and machinery will have drip trays beneath oil tanks/engines/gearboxes/hydraulics, which will be checked and emptied regularly via a licensed waste disposal operator.
- On-site provisions will be made to contain a serious spill or leak through the use of booms, bunding and absorbent material in accordance with an Emergency Response Plan (ERP).

- Refueling and delivery areas will be located away from the local sewer network drains.

Disturbance of Existing Drainage Systems and Water Supply Network

The following mitigation measures will be implemented during the works:

- All existing utilities will be identified and marked prior to works commencing;
- Signs will be used to warn of the presence of utility infrastructure; and
- Any damage to the drainage network will be immediately repaired.

Groundwater Flow and Quality

The preparation of a Piling Method Statement which will detail the depth and type of piling to be undertaken and the methodology by which such piling will be carried out, including measures to prevent and minimise the potential for damage to subsurface sewerage and water infrastructure and to demonstrate appropriate design and piling methods to avoid linking shallow and deep groundwater.

The following mitigation measures will be implemented during the works:

- Pile casing will be used during piling and the area around the piling will be isolated from surface water until piling is complete;
- Any existing boreholes found on-site would be decommissioned;
- If perched groundwater is encountered during establishment of core foundations dewatering may be required. The most appropriate methods to dewater excavations will be selected, for example, prior to dewatering the perimeter of the excavation could be enclosed with either sheet-pile or a diaphragm wall. Piezometers (standpipes) could then be placed outside the sheet pile wall to monitor groundwater levels;
- In the event that ground contamination is discovered, work will stop immediately and measures will be taken to prevent disturbance and mobilization of contaminants, until the contamination has been treated in-situ or removed for off-site disposal or treatment;
- If contaminated soils are encountered at the position where piling is due to be undertaken, then these materials should be removed prior to piling in order to prevent the dragging of contaminated soils with the piles to depth;
- Contaminated soil requiring disposal will be excavated and kept separate from other soil and waste materials in protected temporary stockpiles prior to disposal;
- Water arising from excavations from piling will be disposed of to the local sewer network (subject to agreement with the appropriate authority) if uncontaminated and following the removal of silt via settlement ponds or alternative measures. All existing utilities will be identified and marked prior to works commencing; and
- Damp-proof membranes will be incorporated into the construction. These membranes will prevent the ingress of groundwater and reduce the risk of contaminants from reaching underground strata or groundwater. The watertight nature will therefore prevent any interior leaks or spillages from freely percolating into the shallow groundwater

Appropriate methods to dewater excavations for piling are to be selected to ensure that groundwater does not drop below the critical level. Groundwater level monitoring will be undertaken as necessary to assess deformation and stability of surrounding structures, including neighboring property.

Seepage analysis and groundwater level monitoring will be carried out as appropriate to assess deformation and stability of surrounding structures, including neighboring property, as considered necessary.

Temporary Settlement and Surface Water Drainage

Temporary drainage facilities will be provided during the demolition and construction phases, where necessary, to ensure controlled discharge of surface water runoff.

It will be a requirement to ensure that runoff from the site does not cause pollution or flooding. Measures that will be considered for implementation for temporary drainage through the construction design and/ or CEMP include:

- Site access points will be regularly cleaned to prevent build-up of dust and mud;
- Oil interceptors to be installed (notably the outflow from the settlement pond/ tank) to reduce the potential risk for contamination of groundwater and surface water; and
- All potentially polluted waters (including washdown areas, stockpiles and other areas of risk for water pollution) to have separate drainage and to be tankered away from the site.

In addition, if monitoring demonstrates unsatisfactory levels of solids or other pollutants, measures will be implemented to control suspended solids or other polluted discharge to watercourses (e.g. changes to site drainage and settlement facilities and/or use of flocculants).

Foul Drainage

A connection to the foul sewer will be needed for sanitary connection from offices/admin/welfare facilities. It is possible this connection may also be licensed for discharge of process effluent in abnormal circumstances if required.

Flood Risk

The CEMP will incorporate measures to prevent an increase in flood risk or pollution during the construction works (consistent with the measures / requirements considered within the Flood Risk Assessment), in addition to the provision of temporary settlement and drainage measures (where required).

SuDS will be used where appropriate – the following hierarchy of techniques will be adopted when designing / managing surface water with SuDS, as follows:

- Store rainwater for later use;
- Use infiltration techniques, such as porous surfaces in non-clay areas;
- Attenuate rainwater in ponds or open water features for gradual release;
- Attenuate rainwater by storing in tanks or sealed water features for gradual release;
- Discharge rainwater direct to a watercourse;
- Discharge rainwater to a surface water sewer/drain;
- Discharge rainwater to the combined sewer.

Standard practice flood resilient construction techniques will be adopted in areas potentially susceptible to flooding.

Water Demand

The following measures will be implemented:

- Selection and specification of equipment to reduce the amount of water required;
- Implementation of staff-based initiatives such as turning off taps, plant and equipment when not in use both on-site and within Site offices;
- Use of recycling water systems such as wheel washes, Site toilets hand wash; and
- Use of a rainwater harvesting system for use in equipment and vehicle washing.

The water consumption throughout the demolition and construction works will be monitored, either through sub-metering or reading of utility bills, to allow comparison against best practice benchmarks and improvements to be made.

Wastewater Generation

The installation of water efficient fixtures and fittings can help further reduce the volume of foul water generated on-site.

Any waste effluent will be tested and any water that may have come into contact with contaminated materials or be identified as being contaminated, will be disposed of appropriately and, to the satisfaction of the EA and/or TWUL; and where necessary, disposed of at the correctly licensed facility by a licensed specialist contractor/s.