

**CWL90**

**UNIT 7, INDURENT PARK, NEWPORT**

**NP19 4RG**

**Foundation Works Risk Assessment**

10<sup>th</sup> January 2025

## 1. INTRODUCTION

TSL Projects have appointed Skeletal Consulting Engineers (SCE) for civil and structural consultancy advice in relation to a proposed tenant fit out of the speculatively built Unit 7, Indurent Park, Newport.

This note is written to describe proposed foundation works associated with the fit out. The only proposed new foundation is associated with a new sprinkler tank base to the South East corner of the building.

The ground conditions and loading are likely to dictate the use of deep foundations to limit settlement to suitable levels. The report sets out the proposed works and how these works mitigate any impact on the environment and groundwater. Circa 6-10No. piles are anticipated for the proposed sprinkler tank base.

## 2. GROUND CONDITIONS

Published geological information, available from the BGS, indicates that the site is underlain by superficial Tidal Flat deposits which are described as comprising 'consolidated soft silty clay with layers of sand, gravel and peat'. Mercia Mudstone Group deposits are reported as underlying the tidal flat deposits and are described as comprising 'dominantly red, less commonly green-grey, mudstones and subordinate siltstones with thick halite bearing units in some basinal areas. Thin beds of gypsum/anhydrite are widespread, sandstones are also present'.

Ground investigations carried out for the original building of unit 7 and the nearby structures are understood to have confirmed the geology beneath the wider site as typically comprising Made Ground overlying superficial deposits of tidal clay, peat and superficial red clay with basal sand deposits. Beneath the superficial deposits, bedrock of the Mercia Mudstone Group was encountered. The depth to the Mercia Mudstone Group was typically between 9m and 11.2m below ground level (bgl).

## 3. GROUNDWATER

Reference to Defra's MAGIC website indicates that the underlying Tidal Flat Deposits are classified as Unproductive Strata, which are defined by the Environment Agency as 'deposits with low permeability that have negligible significance to water supply base flow'. The Mercia Mudstone Group is classified as a Secondary B Aquifer, which is defined as comprising 'predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of former non-aquifers'.

The MMG bedrock recorded beneath the site is recorded to be mudstone with only lenses of fine sand and, therefore, would be better described as Unproductive Strata (i.e. locally, there are no water-bearing horizons of significance). It should also be noted that the site does not lie within a groundwater Source Protection Zone. Furthermore, the local groundwater is likely to be impacted by intrusion from estuarine water and potentially by the industrial legacy of the wider surrounding area.

It is understood that the Controlled Waters Risk Assessment for the original building of the wider site concluded that the regional groundwater beneath the site was considered to be a pathway with the Severn Estuary as the nearest receptor. Shallow/perched groundwater is reported as flowing towards a rhine that runs through the wider site away from unit 7.

In summary, it is not believed that there is a viable groundwater resource below the site.

Groundwater within the site area is understood to exist as follows:

- Shallow perched groundwater – sporadic across the site within the Made Ground, perched above the cohesive Tidal Flat Deposits;
- Regional groundwater – within the basal sand and Mercia Mudstone.

#### **4. RISK ASSESSMENT**

Human health risks for end-users will be mitigated through the presence of construction materials overlying the Made Ground (i.e. concrete sprinkler tank base and sub-base).

Due to the soft, compressible nature of the underlying Superficial Deposits, it is considered that concrete continuous flight auger (CFA) piles are required as part of the development. The benefit of these piles is that the existing ground will be undisturbed around the pile, as the auger cuts out the ground and replaces it with concrete as the auger extracts, creating no vertical pathway for contaminants. This method will limit the risk of damage to the adjacent slabs and buildings during construction. The generated spoil will be assessed for contaminants and treated accordingly. Concrete piles will not act as a pathway themselves. CFA piles are preferred to driven piles as they will be lower risk in terms of transferring contaminants downward when installing.

It is understood that driven piles, which remain in place, were used during the construction of the former steelworks and they have been used throughout recent developments within the surrounding area, so there are numerous historical and recent precedents of this construction. Unit 7 is founded on ground improved by controlled modulus columns (CMCs) which are similar in construction technique to CFA piling.

With respect to risks from ground-borne gas, which is known to occur in the peaty layers of the Tidal Flat Deposits, we do not believe that piles will act as a pathway for the reasons provided (i.e. the augered hole will be filled with concrete as it extracts plugging any potential pathway).

#### **5. CONCLUSION**

A summary of the discussion is as below:

- Piling will be required due to the significant depth to competent strata and the associated load of the sprinkler tank.
- CFA piling is the most viable method of piling to the required depth, due to nearby existing buildings and slabs (c.10-14m in total, largely through Tidal Flat Deposits). The CFA piles will require sleeving through the softer material.
- The CFA pile holes will be filled with concrete from the bottom up as the auger extracts, blocking any pathway for contaminants as they are constructed.
- Perched water volumes will reduce as further infiltration is prevented by the construction of hardstanding, resulting in an overall reduction in the mobilisation of contamination from the Made Ground.
- Whilst groundwater is present within the Tidal Flat Deposits (and possibly locally in the Mercia Mudstone Group), there are no known potable abstraction wells in the vicinity of the site and industrial abstractions are all listed as 'historical', the site is not within a groundwater Source Protection Zone and the shallow geology is classed as Unproductive Strata. The Mercia Mudstone underlying the site is not thought to contain water-

bearing strata in its uppermost layers (i.e. where the piles will penetrate) and may also be considered Unproductive Strata.

- There is a long history of using driven piles within the previous site use as a steelworks and for the recent construction of the warehouse units. The prior use of piles has not been found to cause harm to groundwater. CFA piles are lower risk than the previously utilised driven piles for creation of contamination pathways.

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