Nuvu Developments Ltd

Former Jacksons Brickworks, Ten Acres Lane
Temporary Surface Water Drainage Strategy

Rev B

August 2024

Vertase FLI

Contaminated Land, Brownfield & Environmental Contracting

REPORT TITLE:	**Temporary Surface Water Drainage Strategy**
REPORT NUMBER:	**Rev B**
CLIENT NAME:	**Nuvu Developments Ltd**

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Issue 1	Revision A	19/02/2024
Issue 2	Revision B	20/08/2024

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1.0 Introduction

1.1 Appointments

1.1.1 Vertase FLI Ltd (VertaseFLI) was employed by Nuvu Developments Ltd ('the Client') to undertake pre-contract services to address the requirements of outstanding pre-commencement planning conditions associated with proposed land remediation works at the former Jackson's Brickworks, off Ten Acres Lane, Newton Heath, Manchester ('the Site').

1.2 Surface Water

1.2.1 The Site, which covers a total area of approximately 18ha, is located in the Newton Heath area of Greater Manchester, which receives an average precipitation in the region of 830mm per year. In its pre-remediation condition, the Site is open land, and a large proportion of this precipitation undergoes infiltration and evapotranspiration, with only a relatively small proportion forming surface water runoff. As the remediation works progress, there shall be an intentional net reduction in infiltration resulting from the engineered compaction and associated reduction in permeability of surface materials. Consequently, an increasing proportion of the precipitation received by the Site may form surface water runoff requiring appropriate storage, treatment and disposal during the remediation works to manage risks of flooding and pollution.

1.3 Document Purpose

1.3.1 The purpose of this document is to provide sufficient information to satisfy Condition 14 of Planning Permission 129197/FO/2021 granted by Manchester City Council (MCC). The wording of this condition is reproduced in paragraph 1.3.2 below:

1.3.2 No development shall take place until a document highlighting a temporary surface water drainage strategy, designed in accordance with Non-Statutory Technical Standards for Sustainable Drainage Systems (March 2015) or any subsequent replacement national standards, has been submitted to and approved in writing by the Local Planning Authority. The development shall be implemented in

accordance with the approved temporary surface water drainage strategy.

1.3.3 The temporary surface water drainage strategy to address the requirements of this Condition are detailed in Section 2.0.

2.0 Temporary Surface Water Drainage Strategy

2.1 Design Guidance

2.1.1 Condition 14 states that the temporary surface water drainage strategy must be designed in accordance with Non-Statutory Technical Standards for Sustainable Drainage Systems (March 2015), or any subsequent replacement national standards. These non-statutory technical standards address the following design considerations which are adopted herein:

- Flood risk outside the development (Section 2.3).
- Flood risk inside the development (Section 2.4).
- Structural integrity (Section 2.5).
- Maintenance (Section 2.6).
- Construction (Section 2.7).

2.2 Existing Collection Trench System and Discharge Point

2.2.1 The temporary surface water drainage system proposed for use during the remediation works shall involve the enhancement of an existing collection trench that was installed by the Client in December 2022. The components and layout of the existing, and proposed additions, to the temporary surface water drainage system for use during the remediation works are illustrated in Drawing D1932_25 in Appendix A.

2.2.2 The existing collection trench system comprises a 1m deep, 1m wide gravel-filled interception trench containing a 150mm diameter perforated land drain, which conveys intercepted surface water runoff travelling to the south of the Site, along the southern boundary to the lowest point on the Site (in the southwest corner) where there is a water collection sump. The collected water is pumped through a water treatment plant and discharged to private foul sewer on neighbouring private land.

2.2.3 Records indicate that the average volume of intercepted surface water runoff discharged to private foul sewer over the past 12 months is circa 4,750m^3. This represents approximately 3% of the total annual precipitation received by the Site, which supports the assumption that

a large proportion of the precipitation currently undergoes infiltration and evapotranspiration.

2.2.4 It is proposed that the existing system is supplemented by construction of a circa 1000mm high earth bund barrier around the remaining boundaries of the Site coupled with separate surface water runoff interception trenches that are isolated from the southern trench via gravitational flow.

2.2.5 Collected surface water can be pumped into the southern trench from sumps as required to enable treatment prior to discharge to disposal of the treated water.

2.2.6 Treated water shall be transported via tanker to an appropriate facility for further treatment and/or disposal.

2.3 Flood Risk Outside the Development

2.3.1 Standard bulk liquid tanker trucks can transport in the region of 20m^3 per vehicle and there is no stipulation on the number of vehicle movements per day during the remediation. As the treated water is being transported off-site, there is no risk of off-site flooding of the sewer network.

2.4 Flood Risk Inside the Development

2.4.1 During the remediation works, there shall be relatively little hardstanding present on the Site. The ground conditions are well characterised at the Site and the surface materials are likely to have a high permeability (albeit decreasing permeability as the remediation works progress). In the context of runoff calculation methodologies set out in Environment Agency guidance (Report SC030219), this would mean that the ground has a low 'standard percentage runoff' (SPR) during remediation.

2.4.2 No attempt has been made to quantify the surface water runoff during the remediation works due to the dynamic nature of the Site topography (as the cut and fill earthworks progress) and the variability of the surface materials (albeit the surface materials are expected to have a consistently relatively low SPR as the works proceed in comparison to hardstanding).

2.4.3 However, application of a ten-fold uncertainty factor to the annual volume of surface water runoff intercepted on the Site in its pre-remediation state by the existing surface water collection system (see Section 2.2) yields a worst-case daily volume of surface water runoff (equating to 130m^3/day). This worst-case daily volume is well within the capacity that could be transported off-site by tanker truck if required.

2.4.4 Notwithstanding this, care shall be taken during the remediation works to ensure that the surface water interception trenches are not overwhelmed during intense rainfall events. This shall be achieved by regular collections of the treated water via tanker truck for off-site disposal.

2.5 Structural Integrity

2.5.1 Components of the temporary surface water drainage system comprise:

- Earth bund barrier
- Interceptor trenches and sumps
- Mobile diesel pumps
- Water treatment plant (sedimentation tank, oil/water separator, carbon filtration units, interconnecting pipework, and discharge pipework)
- Collection chambers (e.g., IBCs or storage lagoon) for collection via tanker truck.

2.5.2 The remediation works are anticipated to take circa 12 months and thus the design life of the temporary surface water drainage system shall be of an equivalent minimum duration. Design considerations to ensure the structural integrity of the components of the drainage system over the design life are summarised in Table 2-1.

Table 2-1. Design considerations to ensure structural integrity

Component	Design Considerations
Earth bund barrier	Constructed using acceptable earthworks materials and appropriate methods of compaction to maximise density and minimise permeability. The slopes of the bund shall be shallow (1 in 2) to maximise slope stability and minimise the likelihood of erosion/gullying. Where necessary, the barrier shall be seeded to further enhance stability
Interceptor trenches and sumps	Constructed with appropriate falls for drainage (e.g. ~1 in 40 or steeper) towards accessible sumps constructed from perforated Polypipe installed vertically with a gravel surround. Areas of open water are to be avoided where possible to manage risks to health and safety
Mobile diesel pumps	To be positioned on flat surfaces accessible by vehicles and excavators, but secured to minimise risk of theft
Water treatment plant	To be constructed on a stable lined and bunded area of the site to manage risks of pollution associated with unforeseen equipment failure
Treated water storage chamber	Constructed in a lined and bunded area to facilitate the storage of treated water for collection via tanker truck

2.6 Maintenance

2.6.1 All components of the temporary surface water drainage system shall require periodic maintenance. The need for maintenance shall be evaluated during regular inspections and monitoring, which form part of the requirements of the Environmental Permit for conducting treatment operations using mobile plant. The inspections shall incorporate the components of the temporary surface water drainage system to assess for blockages to flow, bund integrity and water pump functionality.

2.6.2 The performance of the water treatment plant shall be monitored by testing of treated water samples to confirm compliance with any limits imposed by the off-site disposal facility. Maintenance of the water treatment plant may involve changing of the granular activated carbon or cleaning of the pipework.

2.7 Construction

2.7.1 Within the non-statutory technical standards for sustainable drainage systems (March 2015), construction considerations relate primarily to potential damage to the temporary drainage system resulting from construction activities (in this case remediation). This shall be managed by a combination of risk assessments, method statements and toolbox talks.

2.8 Groundwater Pollution

2.8.1 At present (pre-remediation), infiltration is understood to provide a significant sink for precipitation at the Site, thus minimising surface water runoff. During the remediation works, there is unlikely to be a net increase in infiltration across the Site. Therefore, there is unlikely to be a net increase in the mass of contaminants entering the shallow perched groundwater beneath the Site via infiltration during the remediation works.

2.8.2 Furthermore, as part of the VertaseFLI remediation strategy, water present within the Made Ground (termed 'leachate') shall undergo pump and treat, which shall reduce the contaminant mass already present in the groundwater.

2.8.3 Notwithstanding this, a network of sentinel groundwater monitoring wells located along the northern perimeter of the Site shall be retained during the remediation works to enable ongoing sampling and analysis of groundwater. As discussed in the VertaseFLI remediation strategy, these wells are primarily intended to facilitate measurement of PFAS concentrations, but the analytical suite will also include heavy metals and total petroleum hydrocarbon fractions to confirm no significant mobilisation of contaminant mass into groundwater is occurring during the works.

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