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Note

HASKONING UK LTD.
WATER

To	:	Paul Knight
From	:	Rachel Brown
Date	:	19 September 2011
Copy	:	
Our reference	:	9W5572/N/303924/Newc

Subject : Sandsend Desk Study Addendum

Introduction

This note has been produced as an addendum to the Geotechnical Desk Study (Royal Haskoning, July 2011) to address the potential risks and constraints associated with potential contaminated land along a stretch of coastline approximately 1 km in length located to the east of Sandsend (***Figure 1***). This work, being undertaken as part of the Sandsend Project Appraisal Report (PAR) under the Whitby Strategy Review for Scarborough Borough Council, aims to develop options to manage the slope stability of the cliffs to the south of Sandsend Road as well as developing options for the seawall and revetment to the north of Sandsend Road. The approximate NGR of the site is NZ 8676 1232.

The addendum comprises a review of available historic maps of the site and surrounding area to identify any former land use with the potential to result in contamination of soil or controlled waters (such as groundwater and surface water streams). At this site, the following risks need to be considered:

- the potential risk to workers during the construction phase; and
- the potential for re-use of excavated material off-site and the potential impact to human health of future site users and controlled waters.

If a potential risk is identified and soil sampling and testing is required, a site investigation and sampling regime will be designed on the basis of the findings of this desk study. The chemicals of concern, to be analysed at a laboratory, will be based on the historic land use.

All work will be undertaken in accordance with The Model Procedures for the Management of Land Contamination (CLR11), Defra and Environment Agency, 2004. This desk study and the results of any future site investigation will inform the options appraisal for the Sandsend PAR.

It should be noted that the geology of the site is presented in detail in the Geotechnical Desk Study (Royal Haskoning, July 2011). In summary, the drift geology of the cliffs comprises glacial till deposits of Pleistocene age, which is described as clay with pebbles and lenses of gravel. A site visit identified lenses or layers of red-brown medium to coarse sand in places in the lower cliff to the north of Sandsend Road. The bedrock of this stretch of coastline comprises Whitby Mudstone Formation of Lower Jurassic age.

Site Walkover

A site visit was carried out by an Environmental Consultant from Royal Haskoning on 13 July 2011. During the site walkover, it was noted that the cliff at Sandsend approx NGR: NZ 8676 1232 appeared to consist of natural glacial till. Sandsend Road located at the toe of the

slope was identified as a potential source of contamination. On the beach there is a revetment comprising a concrete apron overlying rock armour, which consists of blast furnace slag. The concrete apron has been weathered in places, exposing the rock armour beneath.

Photo 1 – View looking north from the top of the cliff down to Sandsend Road

Photo 2 – Spring source at top of cliff at approximate NGR NZ 8678 1211 (near to Raven Hill). The spring was dry; there was no flow in the stream.

Site History

Available historic Ordnance Survey maps were reviewed in order to identify any potential sources of historic contamination. The following maps were available for review:

- 1853 – 1856 at 1:10,560 scale;
- 1894 at 1:2,500 scale;
- 1895 at 1:10,560 scale;
- 1913 at 1:2,500 scale;

- 1914 – 1918 at 1:10,560 scale;
- 1928 at 1:2,500 scale;
- 1938 at 1:2,500 scale;
- 1958 at 1:10,560 scale;
- 1969 at 1:2,500 scale; and
- 1974 at 1:10,000 scale.

Pertinent information includes, the Saltburn and Whitby Branch North Eastern Railway evident on the 1894 mapping. A viaduct, associated with the railway line, crossed Raithwaite Gill, where Sandsend station was also situated. The railway line and associated infrastructure was present until 1969 mapping (records available on the internet (www.disused-stations.org.uk) suggest that the railway line closed in 1958). It should be noted that there is no visual evidence now that a railway track existed in the area of Sandsend Road.

Sandsend Road first appeared on the 1928 mapping (to the south of the Saltburn and Whitby Branch North Eastern Railway).

At the time that the viaduct was demolished and the railway line out of service, there is the potential that the slopes were regarded, especially in the area of the former viaduct at Raithwaite Gill.

On the 1853 mapping a spring well is marked in the location of current Ravenhill Reservoir (approximate NGR NY 8646 1216). Properties are shown on the 1853 mapping at East Row. There was further development of houses in the area of East Row by the time the 1914 – 1919 mapping was published. A plantation was shown in the Raithwaite Gill valley in the 1914 – 1919 mapping.

Conceptual Model

This site comprises two distinct areas; i.e. the slope to the south of Sandsend Road and the revetment on the beach front. Conceptual models have been developed for each of the areas separately and are described below.

1. Slope

On the basis of the review of historic maps, the area of greatest concern is the slope adjacent to the current road; in the region of the former railway line. The soils present on the lower slopes may have become contaminated by current and former land use and therefore should be investigated further. The current proposal is that the slope will be regraded to achieve a more stable slope gradient and soil to a depth of approximately 1.5 m is likely to be removed and taken off site. As such, there is a requirement to undertake sampling and chemical testing of the topsoil and underlying clay to determine the risk to construction workers as well as the suitability of the material for re-use at a nearby site. It is proposed that soil testing as well as leachate testing should be carried out on the soil samples. The following chemicals of concern should be tested for; these have been identified on the basis of the historic land use using CLR8:

Chemicals of Concern:

- PCBs (7 Congeners);
- PAHs (16 Speciated);
- Herbicides, including atrazine, simazine, 2,4,5-trichlorophenoxyacetic acid, sodium chlorate, dalapon, diuron, borax, paraquat, picloram, 2,4-dichloropehnoxyacetic acid;

- Metals – aluminium, arsenic, boron, barium, cadmium, cobalt, chromium, copper, manganese, nickel, lead, zinc, selenium, iron, magnesium, mercury, vanadium;
- Sulphate;
- pH;
- TOC;
- Speciated TPH (USEPA Banding);
- GRO/BTEX/MTBE;
- Asbestos; and
- Cyanide.

2. Beach Revetment

The work to stabilise the beach revetment will not involve any disposal of waste material and any new material that is brought on site to be used in the construction of the revetment will be assumed to be suitable for use. The proposed revetment is thought to comprise the blast furnace slag overlain by a geotextile layer and then a concrete apron, which will be designed to withstand weathering. As the same material will remain in-situ (the angle of the slope may change), the risk to the health of construction workers; future site users; and controlled waters has been assessed as being low. As such, there is no requirement for a site investigation or chemical testing at this stage. It should be noted, however, that if there are changes to the revetment design, which include exposure of previously unexposed material; or disposal of excavated material, further testing is likely to be required.

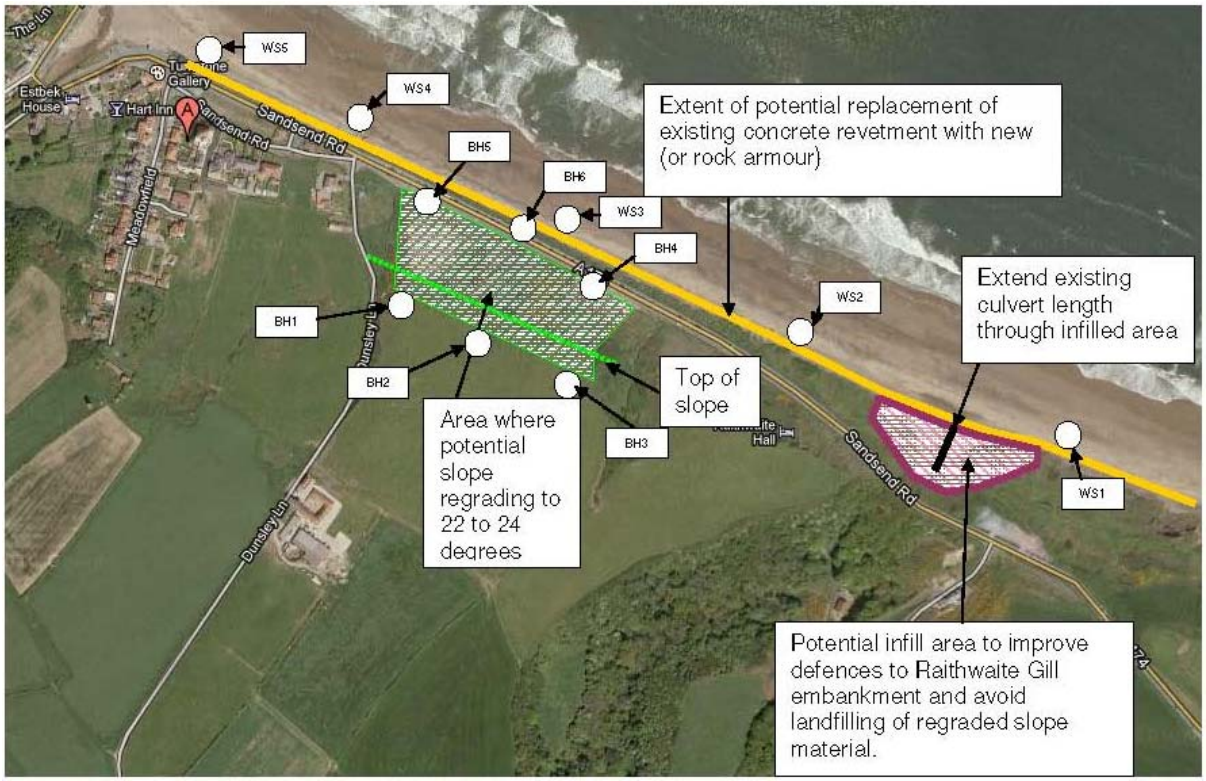
Site Investigation

The soil sampling and chemical testing will be carried out in conjunction with the geotechnical investigation. It is proposed that soil samples are collected from BH1, 2 and 3 at the top of the slope and BH4, 5 and 6 at the toe of the slope, adjacent to the road (***Figure 2***). Samples should be collected in appropriate containers at each borehole by the contractors as follows:

- 1 soil sample of topsoil;
- 1 soil sample at each change of strata;
- Samples should only be collected to a depth of 2 m;
- Additional samples should be collected where there is visual or olfactory evidence of contamination; and
- Bulk bag samples at each sampling location to be reserved for potential Waste Acceptance Criteria testing.

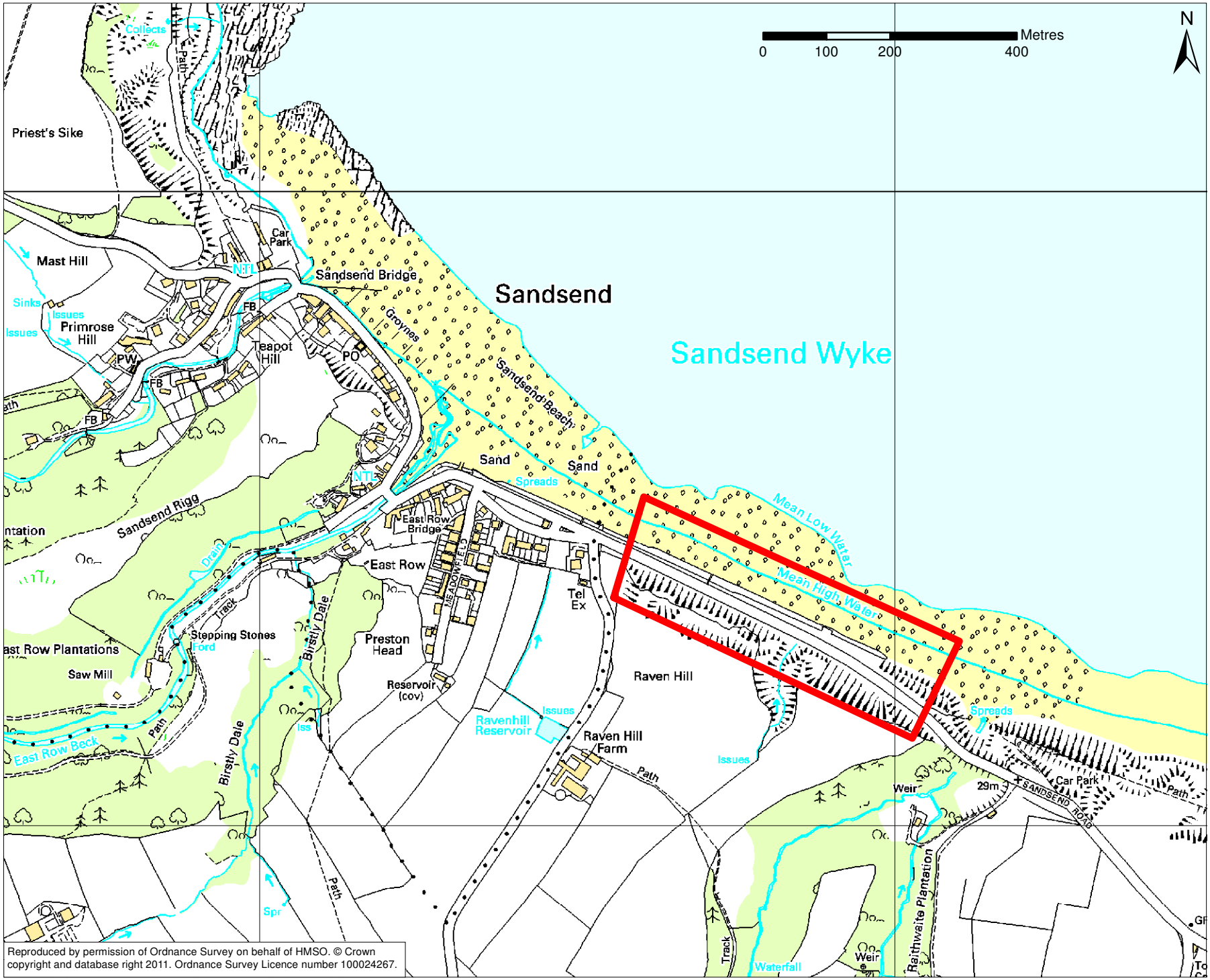
An Environmental Consultant from Royal Haskoning will schedule the laboratory testing for leachate or total soil analysis on the basis of the Engineer's draft logs. The chemical testing suites will comprise the chemicals of concern listed above. It is estimated that approximately 14 soil samples will be analysed, either for total or leachable contaminants.

Figure 2 Sandsend PAR Site Investigation - Proposed Borehole and Window Sample Locations



Interpretation of Site Investigation Data

Once the final borehole logs and the results of the laboratory testing are available, the data will be interpreted to determine the soils suitability for re-use at an adjacent site and the appropriate level of PPE required to be used on site by the contractors during the construction phase. If the material is not suitable for re-use, based on it's geotechnical properties or concentrations of contaminants; or there is surplus material, a waste classification assessment will be required. If there is a requirement to dispose the soil to landfill, a Waste Acceptance Criteria (WAC) test would be required to determine which landfill can accept the material (wastes can only be accepted at a landfill if they meet the WAC class for that landfill).



Title:
Site Location Plan

Project:
Sandsend PAR

Client:
Scarborough Borough Council

Date:	Scale on A4:
September 2011	1 : 20,000

Figure:	Drawn:	Checked:
1	TC	RMB

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