CIVIC ENGINEERS

559-01

Coach Road, Whitehaven

Phase 1 Desk Study Report

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1. INTRODUCTION

Civic Engineers have been appointed by Maple Grove Development to undertake a Phase 1 Desk Based Site Investigation to determine the geo-environmental conditions at the proposed development site, to identify any potential constraints, to inform the design of the proposals and to advise as to further investigation which may be required.

The Report is to be submitted in support a full Planning Application for a proposed new residential extra care facility on a site at Coach Road, Whitehaven.

2. SITE DESCRIPTION

The site is located at Coach Road, Whitehaven with nearest postcode CA28 9DF and OS Grid Coordinates 297408, 517416.

The site is bounded by Coach Road to the south, the culverted Pow Beck to the west and a section of the Coast 2 Coast cycle route to the east.

The total site area is approximately 1.039Ha with approximately 0.5Ha covered in hardstanding and buildings and the remaining section, to the east of the site, covered in grassland. None of the buildings at the site are currently occupied. An aerial image of the site can be seen below and further site photographs can be found in Appendix B of this document.

Figure 1; Aerial Image of the site taken from Google Earth (2008)

3. DEVELOPMENT PROPOSALS

The brownfield site will be redeveloped to provide an extra care and dementia facility for people aged 55 and over. The facility will include a three storey apartment building providing 56 units and 4 bungalows which will have access to facilities in the main building.

4. EXECUTIVE SUMMARY

The site is a previously developed industrial site and is expected to be underlain by varying depths of made ground over alluvium drift deposits over sandstone at depths of up to 20m below ground level.

A summary of key risks to be resolved through intrusive investigation and taken account of through the development of the design and appraisal of the proposals are as follows:

Geotechnical
Due to the anticipated ground conditions on site it should be assumed that piled foundations will be required (potentially to depths of 20m unless appropriate skin friction can be achieved within overlying drift deposits).
Coal mining search has identified shallow coal workings as a potential risk beneath the site. The risk will be assessed through intrusive investigations and proposals developed accordingly.
It is expected that the site is underlain by variable depths of made ground, this will impact on pavement construction and at this stage a CBR of 2.5% should be assumed.
Geochemical/Contamination
Japanese Knotweed has previously been identified in the grassland to the eastern edge of the site.
Asbestos within the existing structures; asbestos will pose a risk to human health during demolition of the structures and will need to be disposed of appropriately.
Contaminants within the made ground remnant from previous development could be harmful to human health if made ground was to be exposed. If contaminants are mobile then contaminants may pose a risk to the Pow Beck and the underlying Aquifer.
Ground gas may be present due to the depths of made ground and organic rich alluvium beneath the site.
Fly tipping and localised at surface contamination will need to be treated or disposed of.
Site investigations will confirm the ACEC classification requirements for buried concrete and whether barrier pipe will be required to water supply pipes.

5. GROUND CONDITIONS

5.1 History of Development at the Site

(Refer to Historical Mapping contained in Appendix C of this document)

1840-1879

Review of historical mapping shows that circa 1840 the site was occupied by railway sidings and associated sheds and a crane; the sidings formed part of a wider Railway Station complex focused on the area to the north of the site and which served the surrounding industry. Pow Beck appears to run in open channel as it passes along the western boundary of the site.

At this time the adjacent site to the west was occupied by a building which is identified as "Old Chemical Works" and the site to the east as a "Timber Yard" with associated "Saw Mill". Coach Road is present running approximately along its current alignment.

1899

By 1899 the rail sheds and crane which occupied the site are no longer present although there are still rail tracks entering the site. The site is now annotated as being a "Timber Yard" and is likely associated with the Timber Yard to the east of the railway line which is still present.

The number of railway lines running along the eastern boundary of the site has significantly increased and significant rail infrastructure is now shown to the south of Coach Road. The railway line is annotated as "Furness Railway-Preston Street Goods Branch".

The Chemical Works which was previously shown to the west of the site is no longer present and the map suggests that the section of Pow Beck which runs along the western boundary has now been culverted.

1938

By 1938 the site is shown to be completely cleared of all development including rail tracks.

The railway itself is not shown on this map (although it was still present) and the line is annotated as *"L.M.S.R. Preston Street Goods Line"*

A Saw Mill is still shown to be present to the west of the site.

1962

By 1962 the layout of the site has started to resemble that which is present today with buildings present along the western boundary, although the buildings do not appear to abut the site boundary as they do in the present day.

There is also a building present immediately to the east of the existing access point and adjacent to Coach Road on the site which is currently cleared and used for car parking.

1975
By 1975 the development takes the same form on plan as can be seen on site today, with the exception being that the building to the east of the access point and adjacent to Coach Road is still present. The arrangement is shown to be largely the same on the 1996 map.

5.2 Geology

Review of BGS Geological plans shows the site to be underlain by drift deposits of Alluvium (Clay, silt sand and gravel) which are expected to be associated with the Beck, over bedrock of the Pennine Middle Coal Measures Formation (Mudstone, Siltstone & Sandstone)

Review of historical borehole data suggests that bedrock may be at depths of greater than 18m below ground level.

5.2.1 **Coal Mining** (Refer to Coal Mining Report in Appendix D).

Coal mining search has been undertaken and states that the site is within the likely zone of influence from workings in 2 seams of coal at shallow to 70m depth which were last worked in 1967.

The Coal Mining Report states that there are no known coal mining entries within, or within 20m of, the site boundary and that the Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres, since 31st October 1994.

Review of the map of Radon Affected Areas in England and Wales shows that the site fall into a low risk area and as such special protection measures are not proposed.

5.3 Hydrology & Hydrogeology

The Pow Beck runs in culvert along the western boundary of the site running from north to south. The bed level of the Beck has been recorded at approximately 5.1mAOD, (around 2-2.5m lower than the existing site level)

The surface water run off from the site is understood to discharge via a network of gullies and pipes into the Beck.

The Site is shown to site within Flood Zone 2 and as such has a medium probability of flooding (1in1000yr) from the Pow Beck.

Maps obtained through Envirocheck search show the site to overlay a Secondary A Aquifer relating to the underlying alluvium and coal measures.

The site does not sit within a Source Protection Zone.

5.4 Site Walkover

Site walkover survey was undertaken on the 9th January 2014. Key observations are as follows:

- Industrial buildings are present at the site although they are no longer occupied. Type of structures include steel frame sheds and traditional masonry structures up to maximum of two storeys high. Structures are known to contain asbestos materials.
- Cracking was observed to the facade of the two storey masonry structure which could be due to localised subsidence.
- The open areas of the site are generally covered in hardstanding (asphalt and concrete) which is laid to falls towards gullies which collet surface water run-off.
- The eastern portion of the site consists of soft landscape, grassland/undergrowth and trees, this area is fenced off.
- Above ground fuel pumps are present in the centre of the site and it is anticipated that below ground tanks will also be present, associated with these pumps.
- Fly tipped material is present in a number of locations across the site on both hardstanding and the area of grassland to the east of the site.

Site photographs can be found in Appendix C of this document.

5.5 Utilities Information

A utilities search has been undertaken and the affected utilities transposed on to Civic Engineers drawing 559-01 SI 002 in Appendix A of this document.

5.6 Possible Sources of Contamination

There are a number of potential sources of contamination at the site, as listed below:

- Asbestos within the existing structures; asbestos will pose a risk to human health during demolition of the structures.
- Contaminants within the made ground remnant from previous development (including fuel tanks) could be harmful to human health if made ground was to be exposed. If contaminants are mobile then contaminants may pose a risk to the Pow Beck and the underlying Aquifer.
- Contaminants at surface level due to spillage or tipping; these could be present both within the hard landscaped areas and the grassland and could be harmful to human health, flora and fauna, and could be carried to the Beck via surface water flows.
- Hydrocarbons could be present within and around any buried fuel tanks; these contaminants could pose a risk to human health and could impact on the Beck and underlying Aquifer.

- Ground gas may be present due to the depths of made ground and organic rich alluvium beneath the site.

6.0 POTENTIAL IMPACTS ON DEVELOPMENT

Subject to further investigation the following items have been identified as key considerations in developing the design and appraisal of the proposals.

- Measures should be put in place to protect site operatives during demolition of the existing buildings and asbestos contaminated materials disposed of to an appropriate facility.
- Any Japanese Knotweed should be treated or disposed of appropriately.
- Due to the anticipated ground conditions on site it should be assumed that piled foundations will be required (potentially to depths of 20m unless appropriate skin friction can be achieved within overlying drift deposits).
- If contamination is identified then foundations will need to be designed in accordance with EA guidance for Piling on Land Affected by Contamination.
- At this stage new pavements and hardstandings should be designed to an assumed CBR of 2.5%
- Fly tipping and localised at surface contamination will need to be treated or disposed of to an appropriate facility.
- Fuel tanks and associated contamination, plus any additional, potentially mobile contamination encountered may need to be removed from site or treated in-situ.
- Ground gas protection measures may be required.
- Clean cover may be required to any areas of soft landscaping.
- The anticipated depths of (potentially contaminated) made ground at the site will mean that infiltration/soakaway techniques for disposal of surface water are unlikely to be feasible.
- Site operatives will require appropriate PPE when working in contaminated ground.

Identified risks, mitigation measures, requirements for further investigation and residual risks are described in Table 1 below.

Table 6.1 Schedule of Impacts, Proposed Mitigation & Further Investigation Required.

Risk/constraint	Mitigation through design	Further Investigation Req'd	Residual Impact
Due to the presence of asbestos within building structures, measures should be put in place to protect site operatives during demolition of the existing buildings and asbestos contaminated materials disposed of to an appropriate facility.	Appropriate measures will be taken during demolition and disposal of asbestos materials and Clearance Certificate provided prior to demolition of the existing buildings.		None
Due to the anticipated ground conditions on site it should be assumed that piled foundations will be required (potentially to depths of 20m unless appropriate skin friction can be achieved within overlying drift deposits).	It is anticipated that piled foundations will be required at the development.	Intrusive Investigations will be designed to confirm properties and depth of made ground, drift and bedrock strata in order to inform the design of foundations.	None
If contamination is identified then foundations will need to be designed in accordance with EA guidance for Piling on Land Affected by Contamination.	Piled foundations will be designed to meet with all relevant Guidance.	Intrusive Investigations will be designed to confirm presence and nature of contaminants.	None
Shallow coal mining has been identified as a risk and could impact on foundation design.	Foundations will be designed to suit confirmed ground conditions.	Intrusive investigations will be designed to extend into the bedrock beneath the site to assess on a statistical basis the likelihood of workings being present beneath the site.	If shallow coal workings are identified beneath the site then appropriate treatment of the workings may be required.
New pavements and hardstandings should be designed to an assumed CBR of 2.5%	It is proposed that existing hardstanding will be reused where possible. New pavements will be designed to suit subgrade properties.	CBR testing will be undertaken as necessary in advance of new pavement construction.	None
Fly tipping and localised at surface contamination will need to be treated or disposed of.	Visible material and contamination will be disposed of to an appropriate facility.	Chemical testing will be undertaken on any visible contaminants and appropriate strategy developed for remediation/disposal.	None
Fuel tanks may need to be removed along with any associated hydrocarbon contamination.	The proposals have been designed to maintain as much of the existing hardstanding as possible so as to limit infiltration and additional groundwater flow which may mobilise contaminants.	Investigations will be designed to determine the presence, type, extents and concentrations of any contaminants and make recommendations as to whether material can remain in-situ.	There is the potential that localised contaminants will not be identified through site investigations. If such contaminants are identified during the works then they will be remediated on a case by case basis in accordance with the site remediation strategy.

Ground gas protection measures may be required.	The building as designed is elevated above the prevailing ground level meaning that any ground gas has a clear flow path beneath the building without the requirement for specific ventilation. Gas protection measures will be provided as necessary.	Intrusive Investigations will be designed to assess the presence, concentration and flows of ground gases to allow the risk at the site to be suitably assessed and Characterised.	None
Clean cover is likely to be required to any areas of soft landscaping.	The amount of new soft landscaping will be limited to avoid the creation of flow paths between potentially contaminated made ground and the Beck and Aquifer. Where soft landscaping is provided a clean capping layer can be provided as deemed necessary.	Intrusive Investigations will be designed to determine the nature of any contaminated materials in areas where soft landscaping is proposed.	None
The anticipated depths of (potentially contaminated) made ground at the site will mean that infiltration/soakaway techniques for disposal of surface water are unlikely to be feasible.	It is proposed that the post development drainage regime will reflect the existing with discharge to the Beck.	The presence and nature of the shallow ground will be determined through site investigations.	None

7.0 CONCLUSION

The conditions at the site have been assessed through a combination of review of publicly available data, historical borehole logs and site walkover.

Potential hazards or items that may impact on the development proposals have been identified and requirements for additional site investigation have been established.

Prior to the commencement of development, intrusive investigations will be undertaken, to enable appropriate foundations to be designed and to allow the development of a remediation strategy as may be necessary to address any contamination issues that become evident.

Appendix A: Civic Engineers Existing Site Drawings

559-01 SI 001 Existing Site Plan
559-01 SI 002 Existing Utilities Plan
559-01 SI 005 Existing Site Sections (Sheet 1of2)
559-01 SI 006 Existing Site Sections (Sheet 2of2)

Appendix B: Site Photographs

Appendix C Envirocheck Mapping & Data