

Our Ref: [REDACTED]
Your Ref: [REDACTED]

22 October 2004

[REDACTED]
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Chartered Surveyors
302 St Vincent Street
GLASGOW
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Dear [REDACTED]

Re: Celtic PLC
Potential Housing Site: Westthorn Recreation Ground, Glasgow
Ground Conditions:

Further to your letter of 8 October 2004 we have reviewed the information we have available on the above site and are pleased to advise as follows. This letter report has recognised our in-house information including various reports held by Glasgow City Council archive.

We also enclose a more detailed summary desk study which presents ground conditions in more detail, for general information.

The site is located at approximately 15-20m above ordnance datum (AOD) on a small access road, connecting to London Road, in the Dalmarnock area of Glasgow. Information regarding the exact location of the site is as follows:

Site Name: Westthorn, Glasgow
Council: Glasgow City Council
Grid Reference: NS 626 633
Approximate Area: 8 hectares
Current Address: Westthorn Recreation Ground/Celtic Sports Ground

The site currently comprises an L-shaped area of open ground, with Celtic Sports Ground located in the northern portion and Westthorn Recreation Ground in the southern portion of the area. The immediate area to the south of the site is occupied by allotment gardens, while the area to the east and northeast is occupied by industrial units. London Road is present to the north of the site while undeveloped open ground of the former Belvidere Hospital is present to the west.

Historical maps show that the site was occupied by a waterworks with two associated reservoirs and a well and a brick works with an associated clay pit and a well. The clay pit excavation and the reservoirs are likely to have been infilled prior to the site being adapted as recreational ground from 1955 until present day.

Geological maps show the northern portion of the site to be underlain by fill with the underlying drift material shown as clay and silt. Solid geology consists of strata of Middle Coal Measures. Shallow mineworkings are recorded beneath the site. A single abandoned mineshaft is indicated in the north eastern corner of the Westthorn Recreation Ground

The made ground beneath the site may be a source of contamination and potentially landfill gas, and shallow mining may be a source of mine gas.

Historical maps show the site as agricultural land prior to 1895. Thereafter, the site is shown to be occupied by Westthorn Pumping Station (Glasgow Corporation Water Works), with two associated reservoirs and a well, and Westthorn Brick Works, with an associated clay pit and well. From 1955 the site is shown to have been adapted as recreational ground. Significant industrial activities have also taken place in the vicinity of the site, since the early 1864.

Site investigations have been undertaken previously and made ground was encountered up to a maximum of 2.50 metres below ground level, containing mixed clay, ash, stones and rubble fill at a number of exploratory positions. Alluvial clays and silts up to 20m thick underlie the made ground, which are in turn underlain by up to 5m thick of alluvial sands and gravels resting on glacial till. Groundwater was encountered at depths ranging from 2.30m to 31.00m below ground level.

Bedrock was generally encountered at depths in the order of 25-30 metres below ground level, dipping gently towards the southwest. A number of rotary cored boreholes encountered waste or a cavity at depths between 25.91mbgl and 49.20mbgl within the site boundary. Additionally, mine abandonment plans indicated longwall extraction of the Ell and Main Coal proceeding northwards towards the site, encountering old stoop and room workings beneath the site itself. Additionally it is known that the Ell and the Main Coals have been mined to or near their outcrop, while old workings have been proved in the Humph Coal. In conclusion, areas of recorded and unrecorded shallow mining (within 30m of Rockhead) in 3 coal seams are present beneath the site.

Elevated levels of arsenic, copper, nickel, selenium, lead, zinc, toluene extractable matter and loss on ignition were identified within the shallow soils across the site. Levels of other contaminants were generally low.

The investigation identified relatively low levels of likely contamination impact on the proposed development at the site, in terms of its proposed end use for housing and for soft landscaping.

Development of the site will involve considerable input to what could be described as 'ab normal' works to those on a greenfield development site.

Assessments can be made as to the extent of these 'abnormals' but you will appreciate that at this stage there is limited information available on the site and it will be necessary therefore to carry out further site investigation works before any abnormal works and associated costs can be more definitive. The following report on the extent of abnormal and associated costs must be read and understood to be given on that basis

The site is underlain by shallow mine workings to the Ell, Main and Humph Coal Seam and treatment of these worked seam adopting cement : PFA grout injection techniques will be necessary. The workings affect the majority of the site.

If development is to be taken to the boundaries of the site, treatment of the mineral workings a distance beyond the site boundary will be necessary – this can be accommodated by adopting raking boreholes from within the site if access to area outwith the site boundaries cannot be obtained

An abandoned mineshaft is recorded as lying within the northeastern corner of Westthorn Recreation Ground close to the site boundary. Treatment of this mineshaft has not been allowed for within the abnormal works costings, however, investigation works will be required to locate the mineshaft to allow any potential impact on the proposed development to be assessed.

It is expected that there will be contamination on the site which will require to be dealt with by removal off site and by capping using inert clay material. It is expected that in areas of building development, roads, hardstandings etc. capping will not be necessary, but capping layers up to 1m thick will be expected in garden and soft landscape areas. Gas generation arising from the fill material over the site is possible and gas protection measures below buildings may be necessary together with venting in capped open areas.

Owing to the ground conditions prevailing on the site special foundation works will be required to some structures. Ground treatment to accommodate low rise buildings will be required but for buildings greater than 3 storeys piled foundations are anticipated.

Given our experience on other sites in the area, attenuation of drainage is a likely requirement of the Drainage Authority and this will require to be accommodated within the site area.

The costs prepared and detailed below relate to the Westthorn Recreation Ground extending to approximately 6 hectares bounded on the north by sports ground and to the south by the allotment gardens.

Access/egress to the site is severely restricted and formation of new access roads probably with a traffic light controlled junction on London Road will be necessary. This could be achieved either by taking a connection through the Barrowfield sports ground or via the new residential development proposed by Keir Homes to the west. Either arrangement will require negotiations with third party land owners. Similarly, there may be an opportunity to make a connection to London Road further to the east.

There is little information on services available to assess if they can accommodate the development requirements but it could be anticipated given the site location and previous developments in the area that such connections will be available relatively close to the site.

The costs associated with the abnormal works have been prepared on the basis of our desk study and information available at this time.

Abnormal Work Discipline	Estimated costs
Consolidation of mineral workings	£2,500,000
Dealing with contamination:-	
Removal	£150,000
Capping layer/break layer	£800,000
Gas protection	Not required
Special foundations:-	
Ground treatment	} £1,100,000
Piled foundations	

Access roads and junctions with existing roads	£300,000
Drainage attenuation	£200,000
Utilities provision	£250,000
Preliminaries	<u>£500,000</u>
Contingencies	£5,300,000
	<u>£200,000</u>
Professional Fees on abnormal works	£3,500,000
	<u>£500,000</u>
	<u>£6,000,000</u>

The above costs have assumed the following:-

1. Housing density 35% of site area
Roads and hardstandings 35% of site area
Soft landscape 30% of site area
2. 40% housing is > 3 storey buildings
60% housing is 2 storey buildings
3. Prices are based on rates ruling at 18 October 2004.

The above costs exclude:

- Value added tax
- Land acquisition
- Site investigation/topographic survey costs.
- Fees for planning/building control or any other statutory fees due in respect of the development.
- Inflation costs from 18 October 2004.

You will note the estimate of abnormal costs associated with development has been assessed at £6,000,000 and the basis on which these costs have been calculated.

A more accurate assessment will not be possible until further investigation of the site has been undertaken and information on the proposed development layout is available

Whilst the information provided above refers specifically to the Westthorn site extending to approx. 6 hectares, there appears to be a general willingness by Glasgow City Council to encourage residential development on the areas of ground adjacent which would be worthy of consideration.

It is not expected that there would be any significant contamination issues on those sites but they would require mineral stabilization works and involve abnormal foundations. It is estimated that the costs for these abnormal works would be in the order of £4 million excluding VAT.

We trust all of the above meets with your present requirements and enable you to progress your discussions and should you wish to discuss any matters arising we would be pleased to do so.

Yours faithfully
URS Corporation Ltd

