KSI Ltd.

Consulting Structural And Geotechnical Engineers

55 Broadmead Road
Folkestone
Kent CT19 5AW

Telephone :- 01303-250005
Fax :- 01303-244911

A REPORT

To satisfy

PLANNING CONDITION

Relating to

SLOPE STABILITY ISSUES

In relation to

PROPOSED DEVELOPMENT OF

The site occupied by

HILLBORO AND A TENNIS COURT

SUNNYSIDE ROAD

SANDGATE

KENT

For

COAST PRO LTD

Date :- November 2021

Job No.:- 8799

A REPORT TO SATISFY THE LOCAL AUTHORITY CONDITION OF PLANNING APPROVAL REGARDING SLOPE STABILITY ETC. AT THE PROPOSED DEVELOPMENT OF HILLBORO AND ADJOINING TENNIS COURT BY COAST PRO LTD.

1. Introduction

The Clients, Coast Pro Ltd. wish to demolish the property known as Hillboro together with an adjoining tennis court and construct four detached dwellings. Given the location of the property a Planning Condition, known locally as a Latchgate Condition, has been imposed by the Planning Department of the Local Authority, as part of the Planning Consent. The Planning Condition relates to slope stability issues and requires comment upon the proposals, temporary works and drainage, by a specialist.

The Clients, via Mr A Thorpe, have therefore instructed Mr A Mills of KSI Ltd. to prepare the necessary Report sufficient to satisfy this condition..

This Report is prepared for the sole use of the Clients, and/or their agents in connection with the works. It is not transferable to others or to be used in any way by others without written consent by KSI Ltd. It has been prepared following consideration of Planning Drawings by Hollaway Architects, Project No. 18.070 ; 106, 111 & 116, copies of which have been included in this Report for reference purposes.

Any revisions to the proposals which are shown on these drawings will require further consideration by KSI and may invalidate the conclusions reached.

Whilst we have exercised all possible care, ground conditions can vary from those revealed in recorded documentation and in ground investigation work and in particular ground water levels. We can accept no liability for unforeseen ground conditions that have not been revealed by documentation searches or ground investigations.

2. Description and Geology of the Site

The site is located upon the hillside to the north of The Esplanade at Sandgate. It was in nearby Castle Bay that the term “Latchgate” originated in the early 1970’s. when ground movement caused excavated foundation trenches to close up overnight, affecting adjoining land.

The original “Latchgate” map showed two areas; one where a full report was required and another where consideration as to the necessity for a Report was required. In recent years the areas where “Latchgate” Reports are required has been extended although the reason for this is not known but the site is within the first area.

Sandgate has suffered two major landslips. The first in 1827 extended from the centre of Sandgate, roughly at the western end of Gough Road to the western side of Encombe. It did not reach as far as Sunnyside Road. Apparently movements continued until 1850 when deep drainage was installed at the back of the landslip to stabilise the Undercliff area.

In 1893 following a period of prolonged heavy rainfall, severe depletion of gravel on the beach and a low tide, a further landslip occurred. This started at the eastern side of Encombe and extended as far west as the wall around Battery Point.

The second slip did encompass Sunnyside Road. Fig 2 from " **Ground Movements of the Encombe landslip at Sandgate, Kent**" by M J Palmer suggests that the backscar to the landslip ran along the northern side of the top section of Sunnyside Road, immediately below the development side.

A walk over survey of the site, completed on the 21st August 2020 revealed a steep bank to the rear of the development, as shown on the drawings by Hollaway. Immediately above the steep bank is the road known as the Corniche. It seems likely that the steep bank is associated with the 1893 landslip, although levels may have been increased to allow the formation of the road known as the Corniche.

Following the movement which occurred during the second landslip, land drains were installed along the length of the landslip and they appeared to have arrested the ground movement. In 1951 cracks were noted in Encombe House and in 1966 the terrace at Encombe House dropped about 0.6 metres..

A base line survey to the Esplanade was commenced in 1983 between Brewers Hill and Beach Court. The major movement occurred immediately in front of the Encombe Estate.

Eventually in 1998 piles were installed in the beach in front of Encombe with beach renourishment, which continues to this day, and the movement of the Esplanade ceased.

According to Palmer, movement at the Esplanade was matched at the same time by movement to the top of the Encombe Estate. When the movement ceased, following the 1998 works, at the Esplanade, the movement at the top of the Encombe Estate also ceased.

The geological map for the area, Sheets 305 & 306 issued by the British Geological Survey, does show that the slope on which Sunnyside Road is located is designated as being landslipped. At the top of the slope forming the plateau formerly on which the military barracks were situated, the subsoil is shown as Folkestone Beds underlain by Sandgate Beds, Hythe Beds and Atherfield Clay. It is the upturned Hythe Beds, from landslipping, that form the reef seen at low tide in front of the Esplanade, .but the main slip occurred on a basal bed in the underlying Atherfield Clay

The designation of landslipped slopes should not be confused with the relatively localised landslips which occurred as mentioned above. The coastal slopes from Aldington to Sandgate were formerly coastal; cliffs, following the time approximately 10,000 years ago when Britain became detached from Europe. The sea eroded the base of the cliffs, much as is encountered with rock falls at the nearby chalk cliffs and the ground receded to the slopes encountered nowadays. Thus the underlying solid geological deposits remain pretty much as they were thousands of years ago. The present day movement is generally restricted to the landslip debris which has built up on the slopes.

Where landslips have occurred such as in Sandgate the solid geological deposits are different from those at Hythe and westward to Aldington .where the Sandgate Beds are on top of the Plateau rather than within the slope. Ground water does however, remain the main cause of ground movement.

The walk over survey revealed a retaining wall to the rear of Hillboro the land around which has been levelled with

many garden retaining walls. Around the down slope side of the tennis court, which forms part of the development area, a gabion retaining wall has been formed to allow the formation of a level surface.

A modern retaining wall has been formed in front of a property to the east of the development site to provide more parking spaces and many properties are at least partially cut into the slope.

3. Proposals

The proposals as shown on the Hollaway drawings consist of the construction of four detached dwelling units. Following a rejected Planning Application, the proposed properties have been reduced in height and are now two stories in height however, the lower storey does not occupy the full area of the upper storey. This is to ensure that any cutting into the ground is sufficient distance away from the steep bank behind the plots. This is shown on the Hollaway drawings attached.

Some works involving relatively shallow changes to level by cut and fill are shown but similar has occurred on much of the hillside over the years, with no detrimental effect.

The formation of a tennis court, in the area of Plots 1 & 2 clearly involved a build-up in ground level with a retaining wall formed downslope to retain the fill material.

4. CONCLUSIONS

The proposed construction of four dwellings will have no significant adverse effect on the general stability of the site and surrounding land, extending down to the beach. The slight cutting into the slope will actually reduce head weighting at the backscar of the 1983 landslip. The risk is to movement of landslip debris, formed on top of the solid geology with the level of excavation indicated by the Hollaway drawings.

It is highly likely that the ground conditions will be quite variable within the development site. A balanced raft foundation might be suitable but this could involve a considerable amount of excavation and should be avoided. To prevent excessive excavation into the slope the only sensible foundation solution is to use piled solution..

With respect to retaining walls a temporary wall could be formed using gabion baskets, to a suitable design. These should be cut into the slope and constructed in 1.5 metre lengths thereby allowing piling and formation of ground beams which should include a permanent retaining wall where necessary .without the risk of any slope movement to the north.

All foul drainage should be as existing and all surface water disposal should also use positive drainage. The use of soakaways is not suitable at this site as it could reduce slope stability.

SUMMARY

Excavate and form temporary retaining walls in 1.5 metre lengths using suitably designed gabion baskets

Form piled foundations incorporating permanent concrete retaining walls as required. A piled slab would appear to be the most suitable solution.

Foul drainage as existing.

Surface water disposal via positive drainage – no soakaways.

Provided the summary recommendations above are followed, it is considered that the proposed development works will not have an adverse effect on the site, surrounding land or property.

The hillside does no doubt suffer from ground water seeping through the ground, with similar occurring on the slopes at Hythe. The geological memoir states that much of the town of Hythe is built on a land slipped slope, but according to the Borough Surveyor, in 1955, only one building, a house near the crest of the slope, has shown signs of slipping in living memory. Probably the slope has become stabilised by efficient drainage.

Thus the development of the hillside around Sandgate has helped to deal with ground water problems. More of the land is now covered with hardstanding or buildings and surface water is discharged to positive drainage systems. The amount of water which has fallen on soft landscaping thus reduces as the area of soft landscaping reduces leading to a reduction in the quantity of ground water.

It is know that in quite a few areas, due to back tilting caused by ground movement, there are what is known as hung water tables. A relatively impermeable clayey layer tilts down into the sloping ground trapping water until it overtops the downslope crest of the clayey layer. There are no known hung water tables in the proposed development area.

The general dip of the geology in south east Kent is north north east, however, the ancient ground movements along the coast between Aldington and Sandgate have caused localised dips to the south, leading to the emergence of springs where the relatively permeable upper soils meet less permeable lower soil types. There are minor springs within and close to the development site.

The use of piled slab foundations which are shallow, means that no barrier to ground water running down the slope is introduced. If a spring were to be encountered during the slight reduction in ground levels, this can easily be lead beneath the foundations, thus not changing the situation that exists at present.

It is therefore considered that the proposed development work will have negligible effect on the ground water within the slope and therefore will not cause any concentrations of ground water within the slope which could have an adverse effect on slope stability.

Andrew Mills
BSc(Hons) MSc CEng MIStructE
For
KSI Ltd- Consulting Engineers

DOCUMENTS STUDIED

Geological Map, **Folkestone and Dover**, Sheets 305 & 306 issued by the British Geological Survey

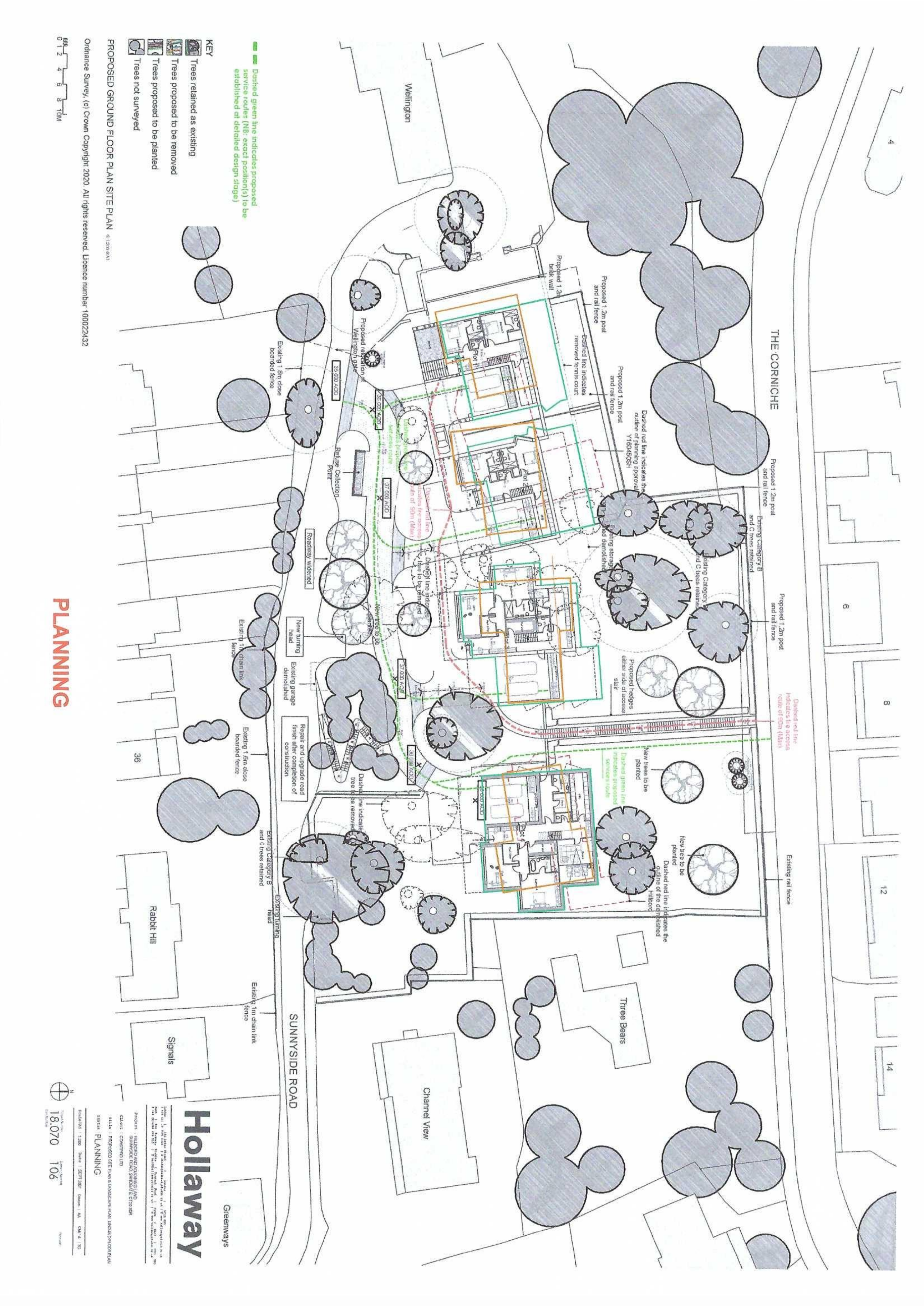
'The Geology of the Country around Canterbury and Folkestone', issued by the British Geological Survey

"Combined Archaeological and Geotechnical Investigations of the Roman Fort at Lympne, Kent" by J N Hutchinson, Cynthia Poole, N Lambert and E N Bromhead

"Landslides in the Lower Greensand escarpment in south Kent" by E N Bromhead. A C Hopper, M L Ibsen

"Ground movements of the Encombe landslip at Sandgate, Kent" by M J Palmer, Sir William Halcrow and Partners.

Unpublished ground investigation work and construction work in the area involving KSI Ltd.


KEY
Trees retained as existing
Trees proposed to be removed
Trees proposed to be planted
Trees not surveyed
PROPOSED GROUND FLOOR PLAN SITE PLAN
THE CORNICHE
SUNNYSIDE ROAD
PLANNING
Hollaway
Wellington
Rabbit Hill
Signals
Channel View
Three Bears
Greenways
18.070 106

KEY PLAN (Plot 1)
KEY PLAN (Plot 2)
PLOT 1 SECTION
Sunnyside Road
Plot 1
The Combe
PLOT 2 SECTION
Sunnyside Road
Proposed access road
Plot 2
The Combe
DRAFT
Hollaway
PLANNING
18.070
P0

KEY PLAN (Plot 3)
KEY PLAN (Plot 4)
PLOT 3 SECTION
Burnside Road
Proposed access road
Plot 3
PLOT 4 SECTION
Plot 4
The Cornicle
DRAFT
Hollaway
PLANNING
18.070
116
P5