



**SITE INVESTIGATION**

**AT WESTCLIFF**

**WESTON**

**PORTLAND**

WPBC
Planning/Development Unit
11 AUG 2006
No
File
Ref to.

**September 01**  
**(Revised August 2006)**

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**06/640/FULMAJ**



## SITE INVESTIGATION

AT

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PORTLAND.

### **Introduction.**

It is proposed to build three blocks of three storey flats on the site at the end of Barclaycroft Road, Westcliff, Portland. The site is quite flat and within 100 metres of the cliff edge.

It is proposed to use light weight volumetric construction with timber walls, partitions and roof structure. Metal sheeting is proposed for the roof covering and masonry for the external cladding.

At the southwest corner of the site there is an electrical substation and a mobile telephone tower. Adjacent to these facilities there is what appears to be an underground military defence installation. Only the access hatches and a ventilation duct can be seen.

The substation and telephone tower are served by services running along the western edge of the site. There are also a number of drains crossing the site some of which may need to be diverted to prevent them being built over.

### **Geology.**

The geological plan shows the site underlain by the Lower Purbeck Beds. These can be seen at the cliff edge overlying the Portland Beds which rise from the shore. The site is on the southern part of the Weymouth anticline and the geological strata dip towards the southeast at about 14 degrees.

### **Historic Plans.**

Historic plans dating back to 1929 show no quarrying on the site. The southwest corner of the site was annexed between 1963 and 1969 and a building appears on the 1969 plan in the location of the underground defence installation. The area of the compound has since been reduced.



## Site Investigation.

Six trial pits were excavated in the approximately square middle area of the site. The location of trial pits was limited by services in the area and current usage of the site.

No trial pits were excavated in the small area at the end of Grangecroft Road or in the parking and turning area at the end of Barleycroft Road as these two areas are paved and used by vehicular traffic and at the time of the investigation no buildings were proposed in these areas. The area at the end of Goldcroft Road is proposed for parking but a block of flats is now proposed in the area at the end of Barleycroft Road. Trial Pits 5 and 6 are within 30 metres of all parts of the proposed block C and the geological plan shows no changes in the underlying measures in this area. It would be expected that soils will be similar.

## Conclusions.

All the trial pits found marl and limestone rubble above solid limestone which the excavator could not penetrate at depths varying between 1.8 metres and 2.5 metres. Some made ground was encountered to a depth of 700 mm at trial pits 5 and 6 near the centre of the site.

Care should be taken that foundations are not made partly on solid rock and partly on granular soils. Foundations can be made in natural soil at a depth of one metre below existing ground levels. At this depth an allowable bearing pressure of  $120 \text{ kN/m}^2$  can be used for design. This should lead to footings about 600 mm wide for the proposed construction. Concrete ground bearing slabs could be used for ground floors.

CBR tests were not carried out. If the road is to be adopted the road authority will do these when formation levels for the road are exposed. This is likely to be in the sandy clay found in TP4 or the gravel and clay in TP5. A CBR value of about 6% should be expected.

Drainage at depths in excess of 1800 mm where rock excavation may be required should be avoided. As both foul and surface water drains already cross the site this is unlikely to be a problem.

The underground defence structure will be under a car park. Access for inspection was not possible but it is likely to be of quite massive construction and unlikely to collapse in the medium term. Health and Safety issues are likely to dictate that the building is filled. This can be most efficiently and economically achieved by using cement slurry. The access and ventilation shafts should be broken down to a level where they will not interfere with the car park construction. If there are partition walls within the building that can be easily knocked down sufficiently to allow free flow of the slurry this should be done.

The building can then be filled with weak 10:1 sand cement slurry poured into one access and allowed to rise up to the top of the next. Stone and other inert waste could be thrown in so long as



it does not inhibit the flow of slurry. The access holes should be topped off with a minimum thickness of 150 mm of concrete grade Gen 3.

The car park can be built over the top, preferably, with a minimum depth of 200 mm of stone subbase over the concrete structure before laying macadam so that the outline of this hard area does not become too apparent in the pavement finish.

There were no signs of contamination but this should be the subject of a separate report if it is considered necessary.

The results of the trial pits can only be certain at the point of excavation; there may be variation in the soil between and beyond the points of excavation.



**Appendix**

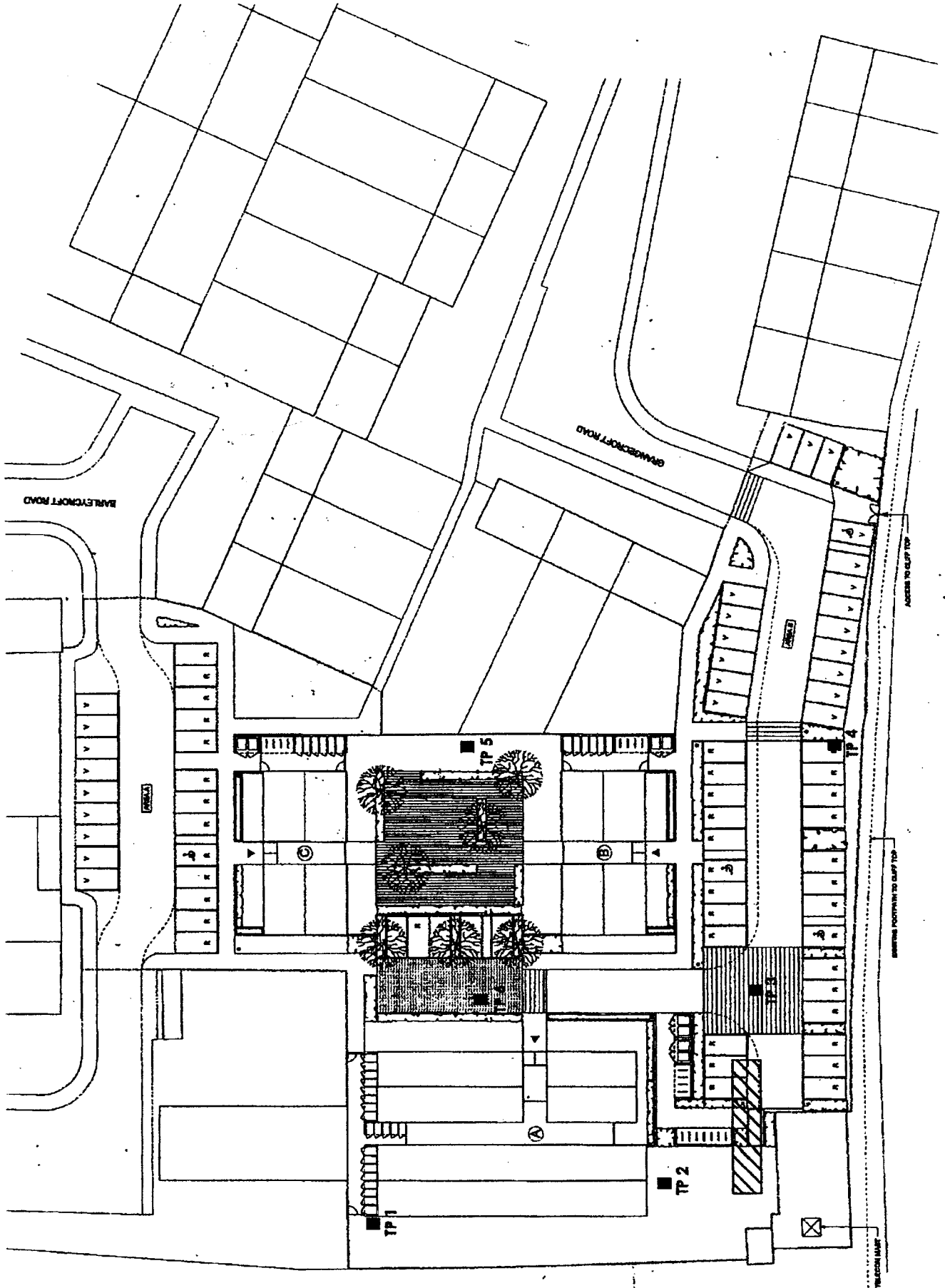
**T.P. Location Plan**

**T.P. Records**

**1-2500 plan 1929**

**1-10560 plan 1963**

**1-2500 plan 1969**



WESTCLIFF, WESTON, PORTLAND SITE INVESTIGATION  
TRIAL PITS LOCATION

# CALCULATION SHEET



**Roger Locke Consulting**

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PROJECT	SHT No.	ENG	DATE	CHKD
SUBJECT	ORIGINAL		9.01	
JOB No. 0130/001	A.			
	B.			
	C.			

TP1	TP2	TP3	TP4	TP5	TP6
Depth (mm)	Depth	Depth	Depth	Depth	Depth.
150	150	150	300	600	150
400	750	750	1250	1000	700
600	1150	1000	1500	1100	1100
800	1600	1200	1700	1500	1400
1000	1800	1950	2500	2000	1600
1200		2050		2100	1700
1400		2150		2200	
1600				2400	
1800					
2000					
2200					
2400					
2600					
2800					
3000					
3200					
3400					
3600					
3800					
4000					
4200					
4400					
4600					
4800					
5000					

Notes  
 1. Holes excavated by J.C.B.  
 2. Sides of holes stood near vertical.  
 3. No water.

Further excavation very difficult.

Further excavation very difficult.

Stiff brown sandy gravelly CLAY.

Further excavation very difficult.

1929

Mutton Cove

High Water Mark of Ordinary Tides

354 4.115

351  
521

The site

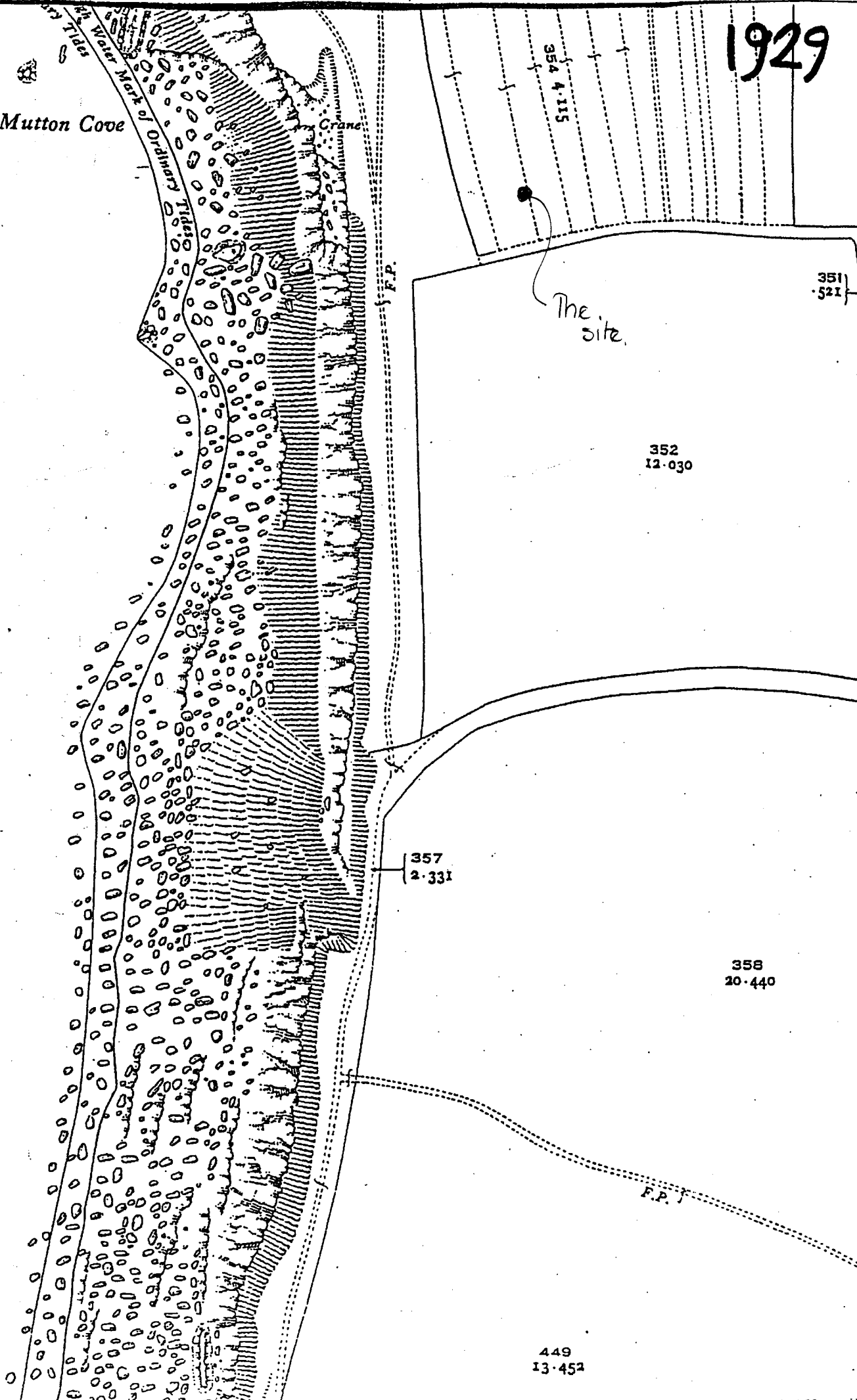
352  
12.030

357  
2.331

358  
20.440

F.P.

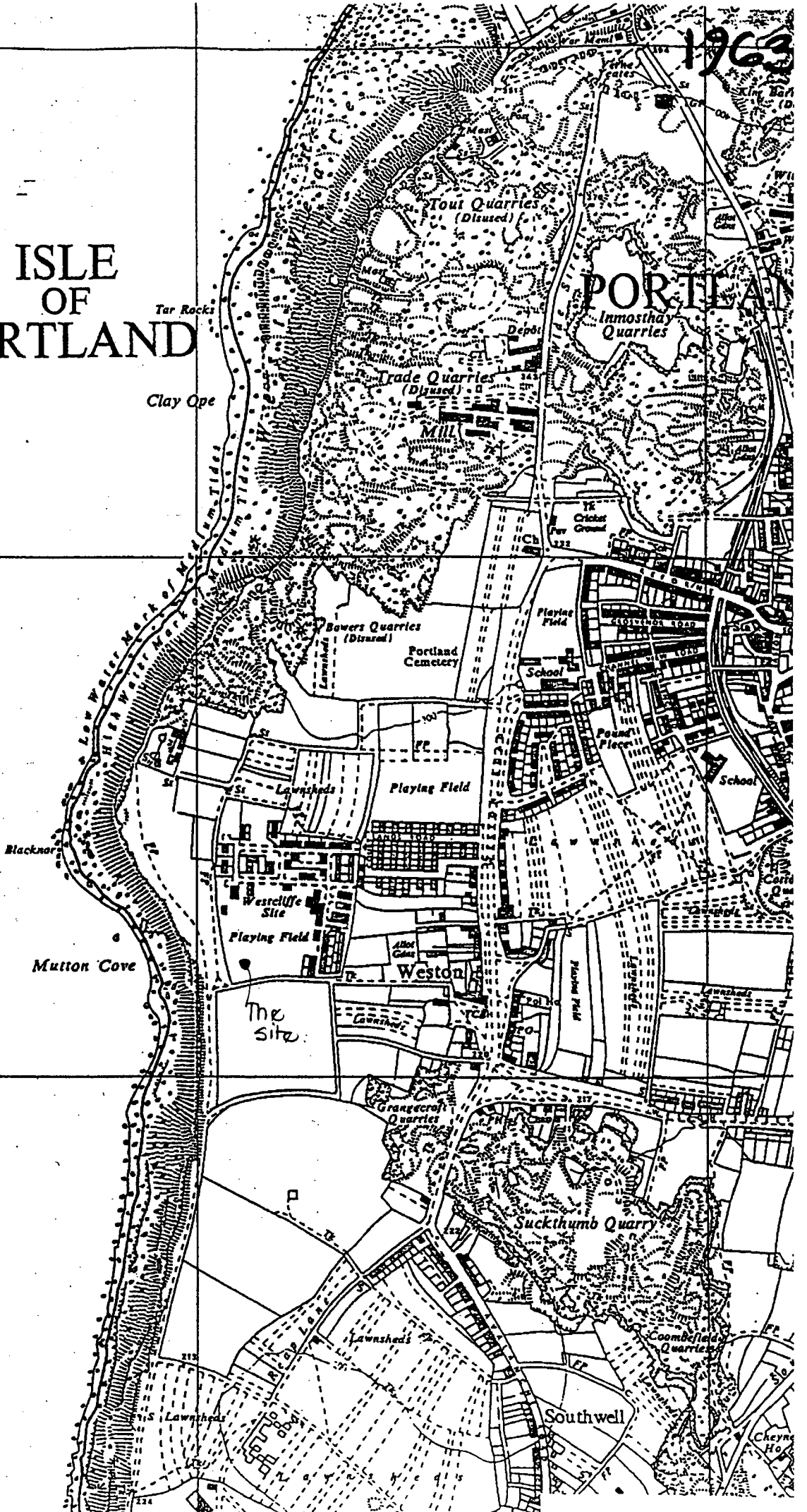
449  
13.452





# ISLE OF PORTLAND

1963



Tar Rocks  
Clay Ope

PORTLAND  
Inmosthay  
Quarries

Trade Quarries  
(Disused)  
MILL

Bowers Quarries  
(Disused)  
Portland  
Cemetery

Blacknor  
Mutton Cove

Lawnsheds  
Playing Field

Westcliffe  
Site  
Playing Field

The Site

Weston

Grangecroft  
Quarries

Suckthumb  
Quarry

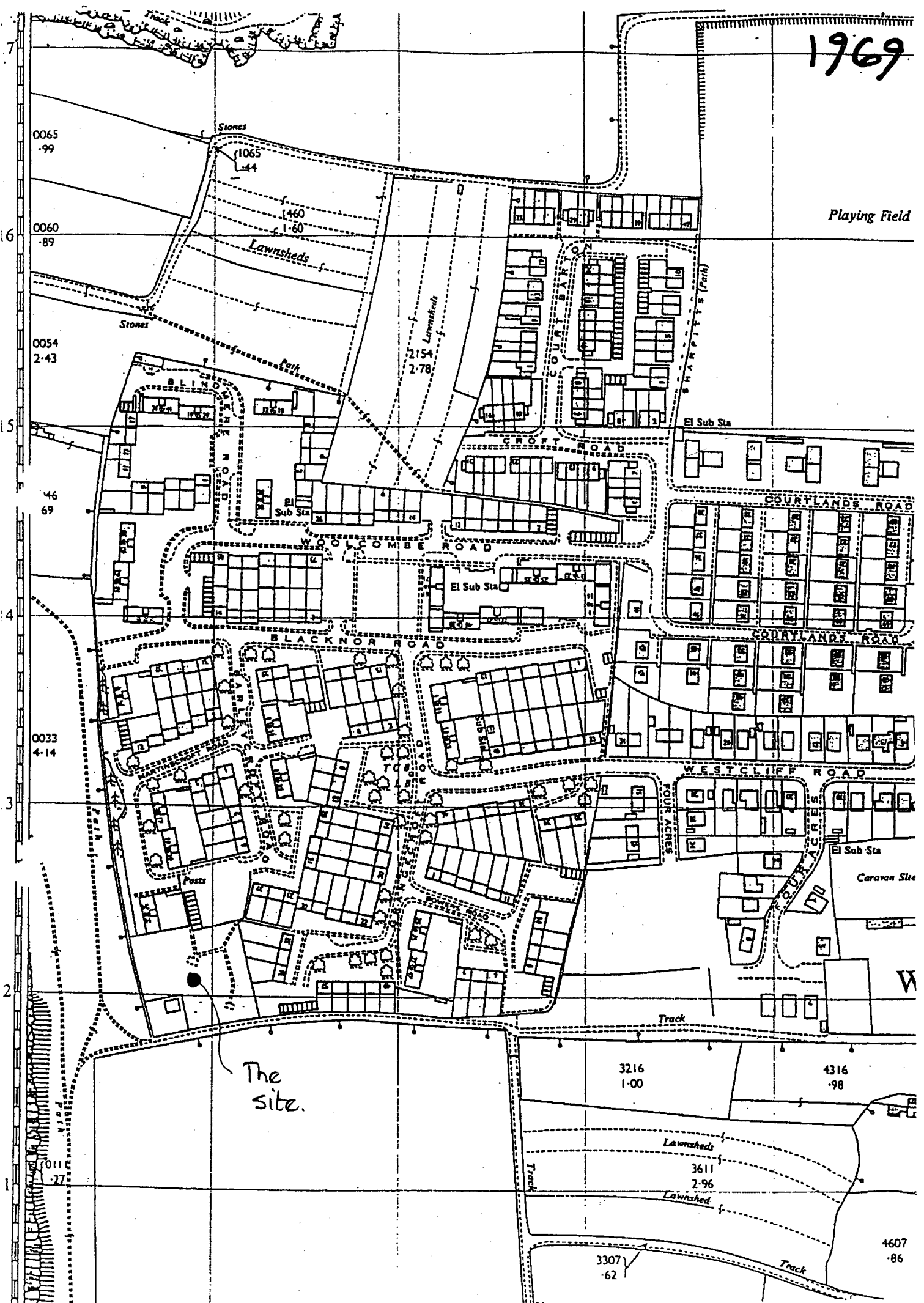
Lawnsheds

Coombesfield  
Quarries

Southwell

Cheyn  
Ho

1969





# Roger Locke Consulting

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29 August 2006

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Mr P Webb  
Senior Associate  
PCKO Ltd  
Middlesex House  
130 College Road  
Harrow HA1 1 BQ

Dear Paul

**Re: Development Site at the end of Barleycroft Road and Grangecroft Road, Weston, Portland.**

We are pleased to write regarding the stability of the above site in relation to the nearby cliff. We have not carried out any mathematical analysis of the cliff but made an assessment on visual inspection and brief studies of the geology and possible mechanisms of instability.

We have visited the site in the past and more recently. The nearest boundary of the site proposed for development is in excess of 50 metres from the cliff edge.

The site is underlain by the basement beds of The Lower Purbeck measures, which overlie the Portland Stone and Portland Sand.

The top of the cliff at about 80 metres above ordinance datum. The top 3 or 4 metres are battered back at about 45 degrees. These are the marl and slatt beds: clays and broken limestone. Below standing almost vertical are the solid limestone of the Hard Slat, Bacon Tier, Aish, Soft Burr, Hard Cap and Skull Cap beds of overall thickness about 3 metres. Weathering has opened the weaker bedding planes and thin layers of clay between the harder beds. The extent of weathering suggests that there has been no cliff collapse for a very long time.

The solid limestone of the Skull Cap and the uppermost beds of the Portland Stone form the main vertical cliff face. Below this solid very durable face, ancient landscaping forms a batter down to the shore. Some quarrying of stone has been carried out at the cliff face creating a ledge where cut stone has been stacked. Apart from this quarrying, the cliff face has not moved for many hundreds of years.

The ancient land slipping overlies the lower Portland Stone Beds, the Portland Sands and the Kimmeridge Clay. The geological boundary between the Portland Sand and Kimmeridge Clay is at about sea level at this point on the island. On the shore the sea has washed away the softer materials leaving large rocks which provide protection.

A possible mechanism of serious erosion of the cliff face would be by undermining of the Portland Beds by the action of the sea. A very large quantity of material would need to be eroded before this can occur. The shore is well protected by stone and any cliff fall will renew the protection. There is no evidence of this taking place and on past performance it will be a very

long time beyond the life of the proposed development before such erosion reaches the boundary of the site. The cliffs nearer to the north of the island are likely to be more vulnerable to this type of erosion because the level of the soft Kimmeridge Clay rises towards the north and is above sea level. This has not caused any instability of the solid measures for a very long time and there are no signs of it doing so.

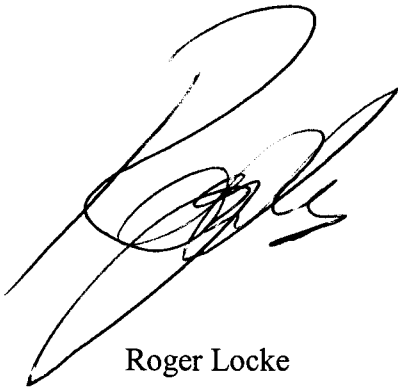
A second mechanism of cliff instability may occur by weathering of vertical joints in the Purbeck and Portland Stone causing toppling failure but this also will take many hundreds of years to reach the site boundary.

There has in recent years been ground instability at the old hairpin bend at the top of new road. This area is underlain by ancient landslip and quite a different situation to the one found at the subject site which is underlain by solid limestone measures.

Instability of the cliff, by normal erosion processes, does not threaten the proposed development.

We trust this answers your query.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Roger Locke', written in a cursive style.

Roger Locke

COPY