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CORRIEYAIRACK PASS

RESTORATION AND MANAGEMENT STUDY

DECEMBER 1997

This study was commissioned by Highland Council

with joint funding from

Historic Scotland and Scottish Natural Heritage.

Additional facilities were provided by

The Association for the Protection of Rural Scotland

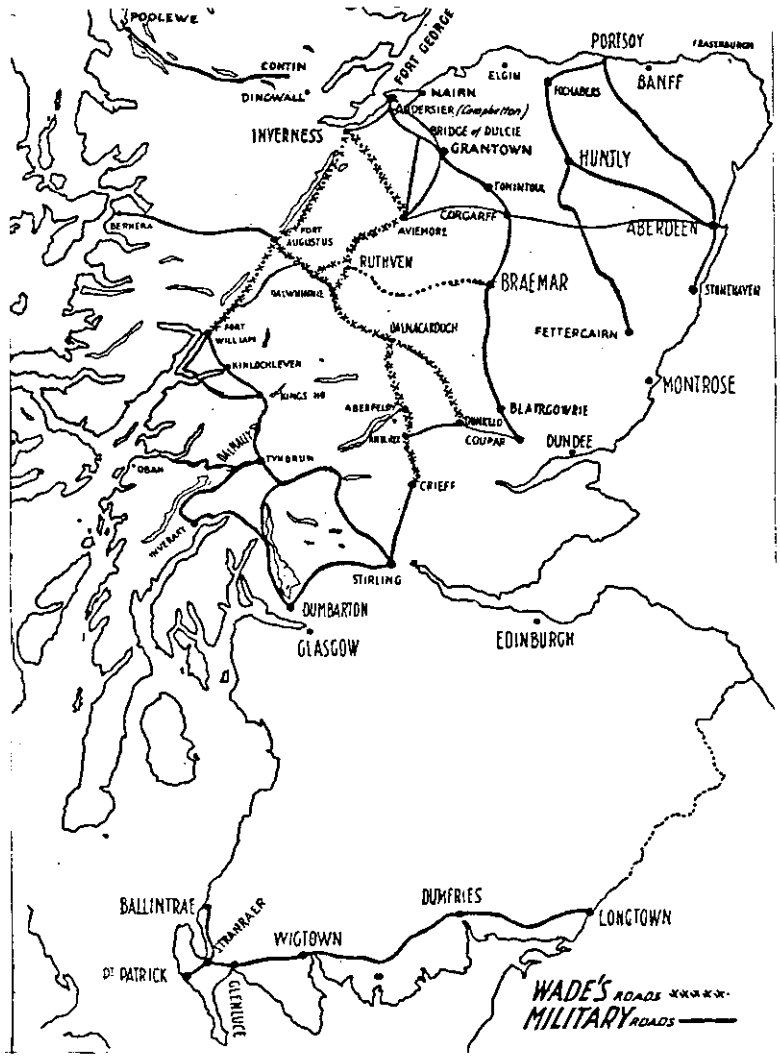
and Mr Graham Biggs.

CONTENTS

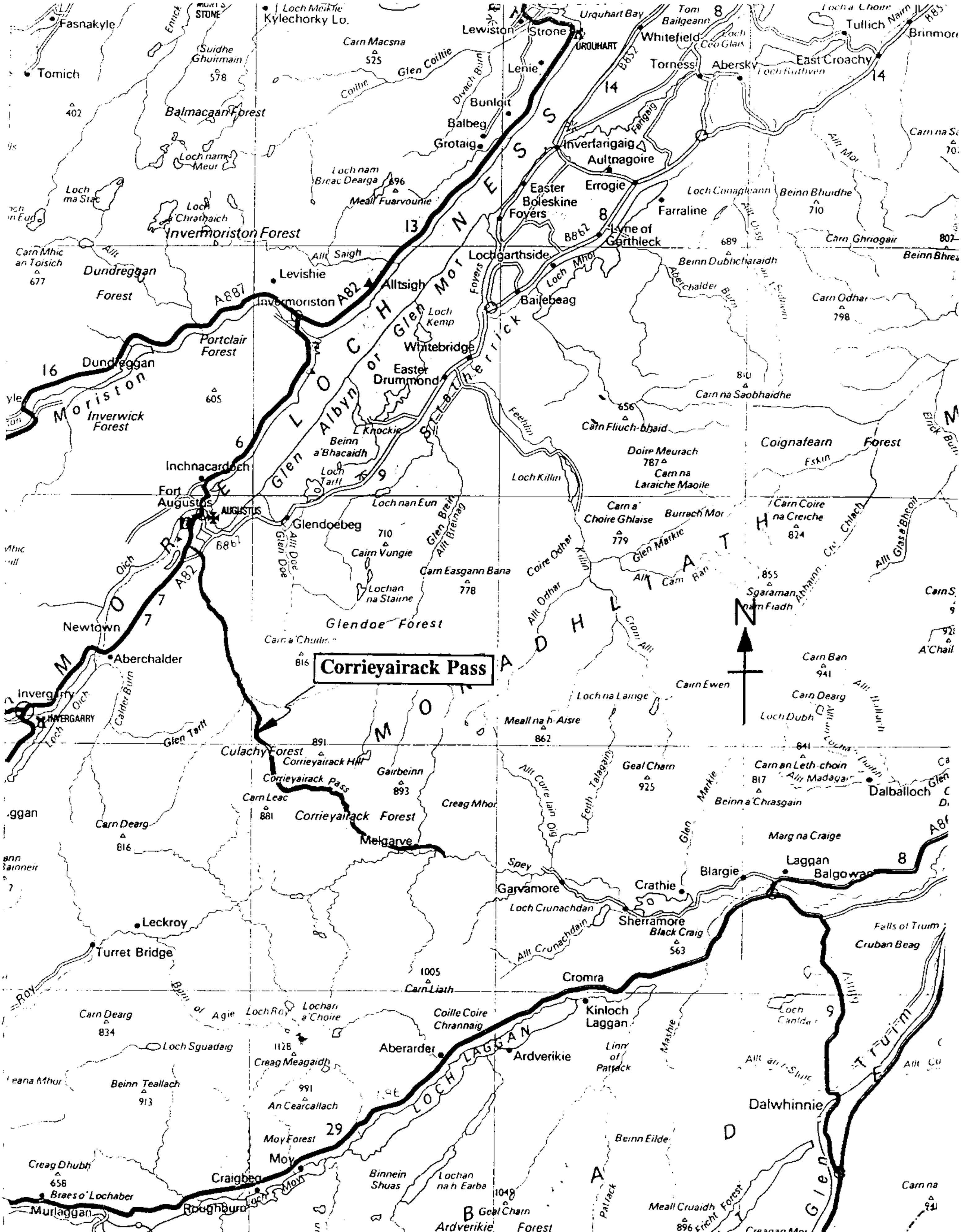
REPORT

APPENDIX

FIG. 1


POOLEWE
CONTIN
DINGWALL
FORT GEORGE
ELGIN
NAIRN
FORRES
BANFF
INVERNESS
GRANTOWN
HUNTLY
TOMINTOUL
CORGARFF
ABERDEEN
BERNERA
FORT AUGUSTUS
AVIEMORE
RUTHVEN
BRAEMAR
STONEHAVEN
FORT WILLIAM
DALNACARDOCH
FETTERCAIRN
MONTROSE
BLAIRGOWRIE
DUNDEE
OBAN
CRIEFF
STIRLING
DUMBARTON
GLASGOW
EDINBURGH
BALLINTRAE
STRANRAER
WIGTOWN
DUMFRIES
LONGTOWN
ST PATRICK
GLENLUCE
WADE'S ROADS
MILITARY ROADS

LOCATION PLAN (Scale 1:200,000) **FIG.2**



1. PURPOSE OF SURVEY

The survey was commissioned by Highland Council in order to determine the present state of the Pass and to establish proposals with costs for the conservation of the Pass.

2. THE SURVEY

The survey extends from the public road at Culachy to the tar road at Melgarve. The route is shown on the Key Plan. The total length is approximately 12.15 miles (19.6 km). It took place in several visits between May and July 1997. Notes were made of the condition of the road surface. The location of back drains was recorded although this required judgement since, in many parts, they have virtually disappeared. The location of water crossings was noted, including positions where crossings have been lost. The road condition, location of back drains (or evidence of) and water crossings are recorded in the survey plans. (E1 to E14). The archaeological features are not included, but are the subject of a separate report (B-1 Highland Council). The bridges were inspected to check condition.

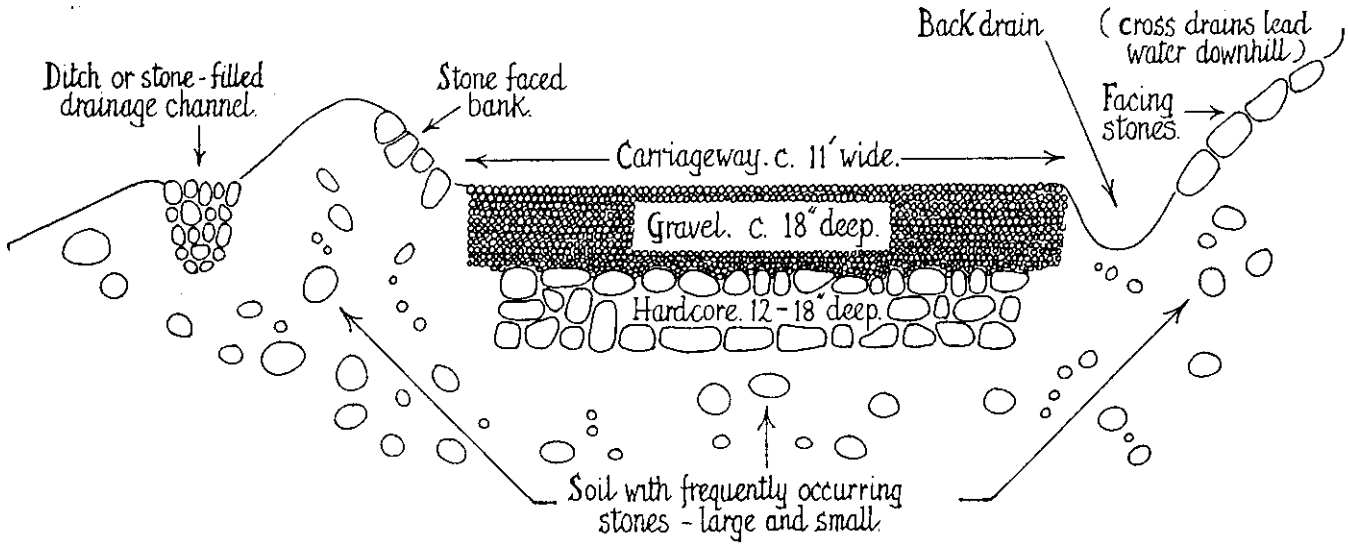
In 1991/92 a survey was carried out by this firm for The Association for the Protection of Rural Scotland. On the basis of that report the Pass was subsequently scheduled as an Ancient Monument. The present survey is essentially an update of the earlier survey with the additional information required for forward planning. The survey extends from the point where the Pass meets the public road at the west end to Melgarve at the east end to the point at where the tarmac begins. The location of the back drains was recorded as far as practicable. The condition of the road was also checked in order to compare it with the previous survey. This information is contained on survey plans E1-E14. The bridges were inspected to check their current condition. Notes were made on the position at which new water crossings would be advantageous and for the restoration and repairs to bridges.

3. GENERAL DESCRIPTION OF ROAD

The road rises to a height of over 2500 feet and is somewhat tortuous, particularly on the east side of the summit where it descends in a series of zig zag bends in order to accommodate the steep slope. It is often snowbound in the winter. There must originally have been at least six bridges over the principal waterways. Only two of the original bridges now remain, which are the bridge across the Uchdachan Burn (Bridge No. 3), restored by APRS in 1996, and the bridge at Melgarve across the Caochan Riabhach (Bridge No. 6), which was repaired by the APRS in 1985. This latter bridge is not within the scheduled section and neither bridge is used to carry traffic. Six replacement bridges have been built over a period of time although only five of these are presently serviceable.

The road is about 2.4 metres (8 feet wide) but may originally have been wider (about 11 feet) and over time has become overgrown. The road would have been constructed of locally available materials, i.e. broken rock, stone paving and gravel (see Fig 4) and there is evidence of borrow pits along its length. The road may have been surfaced with gravel which would have required regular maintenance. Regular maintenance would have been necessary due to the high rainfall, particularly on steep sections. Ditches would have been constructed on one or both sides of the road but particularly on the uphill slope to cut off water from the hillside (see Fig 4). The water would then have been taken across the road either in stone cross drains or in shallow stone channels. Most of these features have now disappeared and some have been replaced by piped culverts. (The quality of the road when first completed can be judged from a claim by Edmund Burt that the Corrieyairack Pass "is rendered everywhere more easy for wheel carriages than Highgate Hill" - a far cry from the present state of affairs.) The scheduled section of the route is just passable from end to end by four-wheel drive 'off road' vehicles, weather permitting, but in general the road surface is badly deteriorated. Diversions have been created to bypass collapsed bridges. The unscheduled section at the west end has effectively been washed out within the last few years and is barely passable.

TYPICAL CROSS SECTIONS OF MILITARY ROAD **FIG.4**



Cross-section of Wade's road near Dalwhinnie

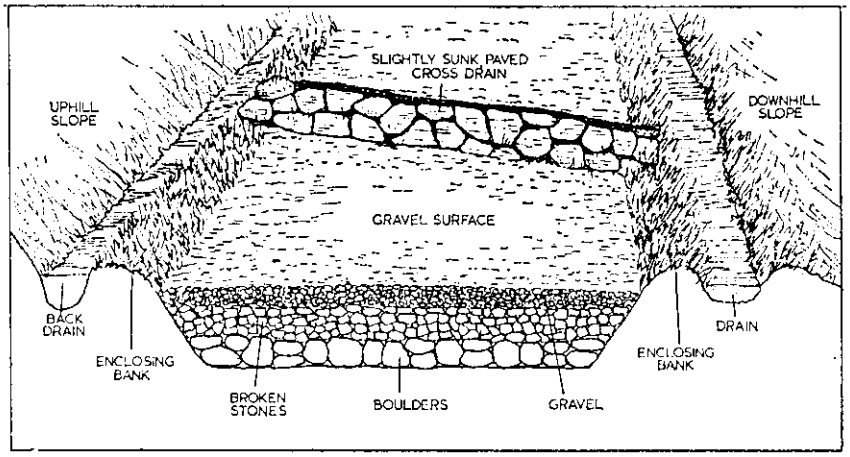


Fig 4 A cross drain. Until the use of culverts later in the eighteenth century, water was taken across the military roads by open-paved drains. This example is on the Devil's Staircase road half-way between Altnafeadh and Kinlochleven

4. CONDITION OF ROAD

a) Road Surface

The route of the road is still clearly defined. The condition of the road varies considerably from place to place. Erosion of the surface has been severe and is continuing as a result of water damage and over-use by vehicles. It is difficult to establish exactly what is original and what is new on the road surface. There are, however, a few areas where the original construction can be clearly identified (short section of cobble construction - see photo). In the main it appears that the surface has been made up from time to time in an ad hoc manner to keep the road passable. While originally the road will have been constructed from local materials, as time has passed some material has been imported to make good defects. It is worth noting that the deterioration of the road has continued since our first traverse in 1991, at which time it was still possible to drive the west half of the road in a four wheel drive estate car. This is no longer possible. There are now areas where it has become difficult to negotiate even with a four-wheel drive 'off-road' vehicle. The reason for this is the continuing erosion due to water and inevitable damage which has being caused by vehicles. The vehicle damage is worst on the steep winding sections where wheel spin occurs (see photo). But damage is inevitable on all sections where the surface is loose. The best preserved sections are those which have been bypassed and have become grassed over (i.e. approaches to Bridge No. 3 and original road at chainage 8.64 to 8.84). This is the clearest evidence that much of the damage is being caused by traffic.

There are sections of the road which are much worse than others. The water erosion is caused by the velocity of water leeching out the fine material and, in some instances, the larger stones from the road. Consequently, the areas of the Pass which are most at risk are those which are at the steepest. Erosion tends to increase at gradients greater than 6%. The steeper sections are also most at risk from vehicles because of wheel spin. Those sections correspond closely with the areas of road marked black on the plans which are usually in the steeper areas. Where the road is flat, although water ponds on the surface, it does not in itself constitute a major erosion problem except insofar as frost damage can be caused.

Traces only of the original cross drains can now be observed. They are few in number and have not been specifically recorded in this report. If, however, repair works were carried out, then clearly care would be taken in the restoration works to retain the original features.

The road has been classified as fair, rough and very rough. These are visual interpretations of the condition but have been also related to the speed at which a four-wheel drive vehicle can reasonably be driven over the road. 'Fair' means speeds in excess of 10mph are achievable. 'Rough' means below 10 but above 5mph. 'Very rough' means passable only with difficulty. On the original survey the classification of the road surface was as follows:

Fair	36%	
Rough	33%	] 64%
Very Rough	31%	

The revised percentages are as follows:

Fair	29%	
Rough	45%	] 71%
Very Rough	26%	

The 4% reduction in 'very rough' is due to interim improvements and minor re-assessment. There has been an increase in the 'rough' and 'very rough' total percentage of 7%.

b) **Drainage**

The drainage of the Pass depends on the effectiveness of the back drains which are constructed on the upper side of the road. The water from the back drains is then taken across the road, either by culvert or surface channel drain. In addition, shedding bars are advantageous to remove the surface water from the road at frequent intervals. The back drains, as noted before, have become silted up over the years. There has been very little maintenance and in most situations they are only evident as a very shallow depression in the moorland (see photo). They are situated anything from a metre to four metres from the road. Because the drainage system has collapsed, the water now has free access on to the road. The removal of the water from the road is also impeded by blockage of the original drainage system exits. This means that the Pass itself becomes the main water carrier. It has been noted on the original survey that sections can at times effectively become a river bed.

5. COMPARISON WITH PREVIOUS SURVEY

Deterioration has been noted since the report of 1991/92. The principal areas of change are as follows:

a) **Chainage 0-140 (Sheet E1)**

Wash-out of this section has occurred, apparently due to the collapse of a local dam.

b) **Chainage 2.3-2.5 (Sheet E3)**

This section contains a steep section of road with a sharp left-hand corner marked 'barely passable'. In this area there is major washout of material on to the grass below the road. Consequently, although the length over which the deterioration has taken place may not have changed significantly, it has certainly changed in degree and for the worse.

c) **Chainage 6-6.2 (Sheet E4)**

The section of road here has deteriorated further due to both water and vehicle erosion.

d) **Chainage 8.75-9 (Sheet E6)**

This section occurs shortly after Bridge No. 2 (the Bailie Bridge) and includes a sharp left-hand corner followed by a right-hand corner. The erosion at the sharp corners has markedly worsened. Wheel spin has been noted and the road has virtually been washed down in many places to bare rock. To negotiate this section often requires the hand movement of material to allow safe vehicle passage.

e) **Chainage 9.7-9.98 (Sheet E7)**

This section is definitely rougher than before. Since the water erosion does not appear to be significant here, it has to be concluded that most of this is due to traffic.

f) **Chainage 17.55-17.98 (Sheet E13)**

There has been significant deterioration here, particularly at the ford which by-passes Bridge No. 5. This has to be negotiated with great care and often requires the moving of material to get a vehicle across.

It is noted above that there are sections of the road which have become 'grassed over'. The principal of these is the section from Chainage 8.64 to 8.84. The existing route over this section is not the original. The original road was to the west and across at least two bridges. These two bridges have now collapsed with the consequent re-routing. The original road has, however, simply reverted to nature and become grassed over. There is consequently no significant erosion except where there are collapsed bridges. It is, however, perfectly walkable. Another example is on the approaches to the Uchdachan Bridge which, again, have been by-passed. It seems clear that if a road has no traffic and the surface is reasonable, it will eventually grass over. This provides a high degree of protection to the construction.

6. STRUCTURES

There are seven main bridges and two small sleeper bridges on the route. There are notes on the structures contained in the bridge survey sheets. To summarise:

Bridge 1

The deck comprises three steel (railway track) beams with three layer timber grillage over. The abutments are constructed in random stonework. The abutments and training walls are serviceable. The deck is badly deteriorated. The timbers of the deck are rotted, the sub-structure main supporting railway lines are deflected and rusty. The abutments are substantially intact although pointing is defective and the odd stone missing.

Bridge 2

Bridge 2 is a relatively recent Bailie bridge which has been constructed within the last fifty years. The condition of the basic structure is sound but the paintwork is badly deteriorated. The main running surface is a series of timber slats. About 40 of these are rotted. The abutments are concrete and in sound condition.

Bridge 3

The original Uchdachan Bridge. This is the masonry arch bridge over Coire Uchdachan which was restored in 1996. It is blocked by boulders and is not suitable for vehicular traffic.

Bridge 4

This is a timber-decked replacement bridge with stone abutments to remove the traffic from the original bridge. There are four timber beams which are rotted at the east end and there is deterioration in the timber decking system and the railings have collapsed. There is a central prop comprising timber posts on a stone base. Temporary propping has been installed recently at the east end. The abutments and wing walls are constructed in random stone and have been pointed with cement mortar. Erosion is evident at the base of the west abutment. The abutments are repairable. The deck is no longer sound.

Bridge 5

Bridge 5 is a timber bridge spanning between stone abutments. The light timber deck is badly deteriorated. The stone abutments are serviceable. The deck comprises three timber beams which are rotted. On top of these there are timber slats which are also in poor condition. The abutments are intact but pointing is defective.

Bridge 6

Bridge 6 is an original masonry arch Wade Bridge restored recently by APRS. Condition is fair but some erosion at base of wing walls noted.

Bridge 7

Bridge 7 is a timber beam bridge with slated deck and concrete abutments. Condition fair.

Sleeper Bridges

There are two sleeper bridges, both of which are in an advanced state of deterioration and are no longer serviceable.

7. PROPOSALS

The objective is to conserve the pass. The main thrust of the restoration work should be directed to restoring the drainage. It is assumed that the route will continue to be used by pedestrians, therefore some improvement to the surface may be beneficial in the roughest areas. This would encourage pedestrian users to stay on the road and avoid damage to verges. For public safety, bridges should be made safe.

a) Drainage

In order to conserve the pass it is of primary importance to repair the drainage system. There are two problems. The first is water from the upper slopes running onto the road with no provision for removing it on the lower side. (When heavy rain falls on the road it is running along the road causing erosion.) The water erosion tends to be most severe on the steeper gradients where the velocity of the surface water increases creating washout and channels. This has occurred in a major way at the west end where the road has been washed out and to the east of Bridge No. 1 (at chainage 2.45).

The measures proposed are as follows (shown on plans P1 to P13):

i) Re-establishment of back drains to control the water on the uphill side of the road. There are options on the positioning of new back drains. The original back drains can be re-excavated and brought back into use or new back drains could be constructed on a different line. It is our opinion that it would be better to use the original drain lines since they are probably in the best position. Digging out drains would always have been part and parcel of the maintenance of the road and there is, therefore, no departure from the principles which General Wade would have envisaged. The drains could be dug by hand or by machine. There are certain sections which would probably have to be dug by hand where terrain or the relationship between the drain and the road would not permit machine use. Excavated material should be placed on the low side of the drain with channels at intervals to water crossing points on the road. Machine use would inevitably cause some damage to vegetation but if care were taken, the ground would recover quite quickly.

Machine excavation is, obviously, much cheaper and quicker. Both methods have been extended in the cost section.

ii) Provision of stone channel crossings to take the water from the back drains to the lower side of the road. New stone channels would be constructed at positions indicated on the drawings using locally collected material. It would be beneficial to protect the channels by stone pitching on either side .

iii) Provision of stone shedding bars to divert surface water off the road to the downhill side. The shedding bars should be protected by pitching like the channel drains.

iv) Clearance of existing culverts.

v) Improvement of fords. This is an optional item since it only affects vehicle traffic and could be dealt with by the owners. They should, however, be serviceable for safety reasons.

The following is worth noting:

When the road was first constructed it would appear that back drains were constructed where possible. There are, however, sections (for example, where uphill side slopes are steep or the terrain too rocky) where back drains were not constructed. Consequently, the only option available would have been shedding bars to removed the water at frequent intervals. It is possible, but speculative, that some sections of the road would have been pitched to provide a stable base, particularly on steeper sections where back drains could not be provided in order to create a stable pavement.

Proposed construction details for back drains, crossings and stone shedding bars are shown on plans (P15 and P17).

The total length of back drain is approximately	16,560m
Length of lateral outlet ditches:	1,200m
No. of channel crossings:	105
No. of shedding bars:	108

These are the best estimates that can be made but some adjustments would doubtless be necessary.

b) **Road Surface**

The treatment of the road surface is dependent on the objectives. Of primary importance is the conservation of the road. Secondly, is the question of surface condition for pedestrian users. The proposals deal with these issues separately.

i) **Conservation works**

In order to make the cross drains and shedding bars work effectively it would be advisable to repair the road surface on the upstream side for a short distance. This would control the flow of water to the channels and shedding bars while protecting them from erosion and wheel damage from essential traffic. It would be advantageous to raise the surface level in some areas where the road has become depressed and water cannot easily be channelled off. It is, however, recognised that this would involve the introduction of new material, some of which may have to be imported due to lack of local stone. The new can be separated from the original by Terram or equivalent membrane. The drainage proposals are shown on Fig. E1 to E14.

ii) **Surface Improvement Works**

As noted before, there are sections of the road which are too rough for walking. These are indicated in the survey sheets Nos. E1-14. If there is an intention to improve the surface of these sections a considerable amount of work would be required. It would not be practicable to restore the original surface construction. The best way of achieving a good walking surface would be to lay imported crushed rock on a separating membrane. It is recognised that this would be expensive; however, indicative costs are included. Another option would be to regrade locally using the existing material. The only other option would be to create a separate footway where the road is too rough and leave the existing road as it is. In our opinion, the first option is the most desirable. It is likely that approximately 10km of road might require some improvement.

c) **Structures**

It is important for reasons of public safety that any bridges on the Pass should be in safe and serviceable condition. To achieve this the proposals are set out below:

Bridge 1

Construct new bridge deck comprising steel beams with timber decking, abutments, training walls and wing walls to be repaired by hard pinning and pointing where necessary.

Bridge 2

Replace 40 timber slats to deck. Shot blast and repaint bridge to prevent further deterioration of the steelwork.

Bridge 3

Having been recently restored, it is not anticipated that immediate works are required. However, regular inspections and minor associated repairs are advisable.

Bridge 4

The abutments are in serviceable condition. The west abutment, however, requires to be made good at the burn bed level where erosion is taking place. This would be done by insertion of new stone which would be hard pinned and grouted into position. The pointing of the stonework should be made good generally by removing existing cement mortar and replacing with lime mortar. The bridge deck was originally single span with no intermediate props. The present deck is, in our opinion, unsound and no longer repairable. It is therefore recommended that a new bridge deck be constructed using steel beams with timber decking. The existing propping system to be removed completely from the bed of the burn. This will help to improve the water flow and reduce the potential for erosion on the abutment.

Bridge 5

The stone abutments are in serviceable condition. Local repairs, pinning and pointing should be carried out. The deck is no longer serviceable. It is therefore recommended that a new pedestrian bridge be erected on the existing abutments.

This could be constructed similar to the other decks, steel beams, timber decking with handrails. Alternatively, standard SNH pedestrian deck could be used.

Bridge 6

Repair erosion to wing walls.

Bridge 7

Make good cracks in concrete abutments and wing walls.

Sleeper Bridges

These are no longer serviceable and are in a deteriorated condition. They would require to be replaced with similar construction in timber.

d) **Other works**

There are some other issues which should be considered as part of the restoration process.

i) The west end of the Pass from chainage 0.27km was washed out (see sheet E1 & P1). With it the drainage. While it should be possible to reconstitute an open drain, this could encroach on the road at the bottom section which is very narrow. However, walking width would be maintained.

ii) There is severe erosion of the down-side bank at chainage 8.9km (sheet E6 & P6). A dry stone retaining wall about 6m long should be built to protect the road at this point.

iii) Short cuts have been taken by vehicles on the east side to by-pass twisting sections of the route (see sheets E3 & P3). Boulders should be placed strategically to prevent this.

iv) If the access to the Pass is to be controlled effectively, then protective measures will be required at each end. At the east end the present chain gate can easily be by-passed (see photo). To prevent this, boulders could be placed at close intervals to the next impassable point (a burn on the north side

and a bog to the south). In our opinion it would be best to control the access to the Pass at Bridge 7. This would be cheaper and more effective. Better signing is required. At the west end the present gate should be replaced with a new gate with steel posts securely concreted into the ground.

8. COSTS

The scope of the drainage works and the structural repairs to the structures have been established. The question of improvements to the road surface remains open and is shown separately. We note below the costs of the proposed works based on 1997 rates.

It is clear that the cost of the necessary drainage to arrest the deterioration is heavily dependent on the mode of execution. If, for example, the drainage works were undertaken largely by machine, there could be considerable savings. At present we have taken the view that much of the work may have to be done by hand and, on this basis, the overall cost of the works is in the order of £300,000 excluding fees and VAT.

DRAINAGE

Item	Number	Cost	Total
Back Drain - Machine dig	16,500	£1.80 per metre	£29,700
Channel Crossing	105	£320 per channel	£33,600
Shedding Bars	108	£290 each	£31,320
Fords	19	£500 each	£9,500
Items 7(d) i, ii, iii			£10,000
Road repairs associated with drainage		Provisional sum	£40,000
Protection to ends			£10,000
Sub-Total			**£164,120**
Extra sum for Back Drain done by hand	16,500	£5.5 per metre	£90,750
Total			**£254,870**

BRIDGES

Bridge No.	Cost
1	£5,000
2	£12,000
3	£1,000
4	£15,000
5	£7,000
6	£2,000
7	£1,000
Sleeper Bridges (2 no.)	£2,000
	£45,000

TOTAL (Machine excavated ditches) **£209,120**

TOTAL (Hand excavated ditches) **£299,870**

Road Improvements (not in total) £180,000

9. PHASING OF WORKS

The total length of the Pass from Culachy to Bridge 7 at Melgarve is approximately 19.6km long. It would be impracticable to undertake this amount of restoration in any one year. It is therefore recommended that the work be phased over five years, particularly since there is a constrained summer work period. The restoration work could be tackled in a number of different ways:

1) Work progressively from each end of the Pass, completing the works to one section at a time.
2) Carry out work on a piecemeal basis depending on the degree of the decay which has already taken place, i.e. tackle the worst sections first.

We have considered these options and recommend that (1), i.e. working progressively from each end, would be the most cost-effective system and would consolidate each section. The phasing programme is therefore based on this option.

Year 1

Chainage 19.6 to 16.4. Length 3.2km. This section contains all the different surface qualities, i.e. very rough, rough and fair. It will allow the establishment of the various restoration techniques and confirm cost base for future works. Repair Bridges 4 and 5 and install new control gate on Bridge 7 (extreme end).

Approximate cost: £64,000. Optional road improvements: £25,000.

Year 2

Chainage 16.4 to 12.0. Length 4.4km. This effectively completes the east end of the Pass to the summit. It does, however, contain some of the more difficult sections at the zig zags. Repair Bridges 1 and 2 and Sleeper Bridges.

Approximate cost: £74,000. Optional road improvements: £35,000.

Year 3

Chainage 0 to 3.93. Length 3.93km. This section starts at the main road at Culachy. Repair Bridges 6 and 7 and install new control gate at west end (chainage 0).

Approximate cost: £54,000. Optional road improvements: £40,000.

Year 4

Chainage 3.93 to 8.0. Length 4.07km. Maintain Bridge 3.

Approximate cost: £56,000. Optional road improvements: £40,000.

Year 5

Chainage 8.0 to 12.0. Length 4km. This would link up with the end of the restored road carried out in year 2.

Approximate cost: £52,000. Optional road improvements: £40,000.

10. FUTURE MANAGEMENT

There are two aspects to the future management:

a) Control of the use of the Pass. This will involve securing both ends of the Pass to prevent unauthorised use. The closure points should be at the extreme west end (chainage 0) and at Bridge 7 at the east end (chainage 19.6). It is our recommendation, as far as vehicular use is concerned, that it should be closed to all except essential users, this being the only way in which the damage to the fabric of the Pass can be minimised.

b) There would necessarily be some maintenance costs attached to the Pass simply because there will inevitably be some deterioration over time. It may be that this may not start immediately, but on completion of the restoration a regular maintenance programme should be set up. It is envisaged that the maintenance would be carried out by an existing management structure. Highland Council or other existing at the time, if more appropriate. It is essential that the drainage system is fully maintained, also structures and road surface as required. Indicative cost £20,000 p.a.

11. SUMMARY

Noted below are the salient features regarding the current condition of the Corrieyairack Pass and proposals for its restoration:

a) The Pass continues to deteriorate due to the combined effects of weather and traffic.

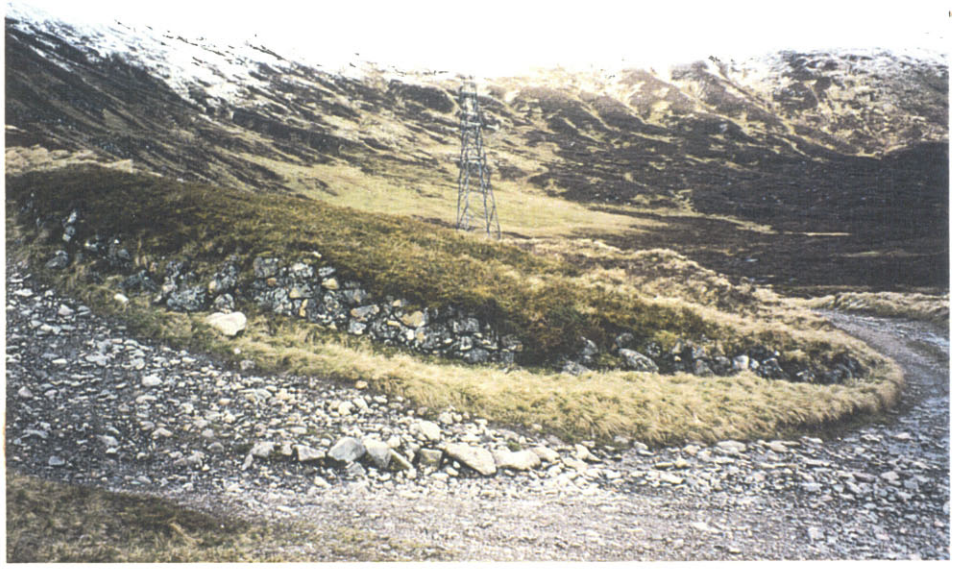
b) The restoration proposals are set out in the previous sections of this report. Essentially, they consist of drainage improvements coupled with limited local improvements to the road surface consistent with the drainage working.

c) The cost of restoration work is in the order of £300,000, excluding fees and VAT. Additional costs for surface improvement could add a further £180,000.

d) It is considered that the continued use of the Pass by non-essential vehicular traffic is deleterious to the Pass and is wholly inconsistent with the conservation objective.

e) It is considered that if the restoration works are implemented now, then the Pass can be conserved effectively for future generations.

View east from summit



Original retaining wall on zig-zag

Original paving

Bridge (remains of) at chainage 15.00

Grass stabilised road

Erosion at west end

East end showing lack of access control

Severe erosion on hair-pin bend

Damage by wheel spin

Sleeper bridge

Old shedding bar

Typical back drain

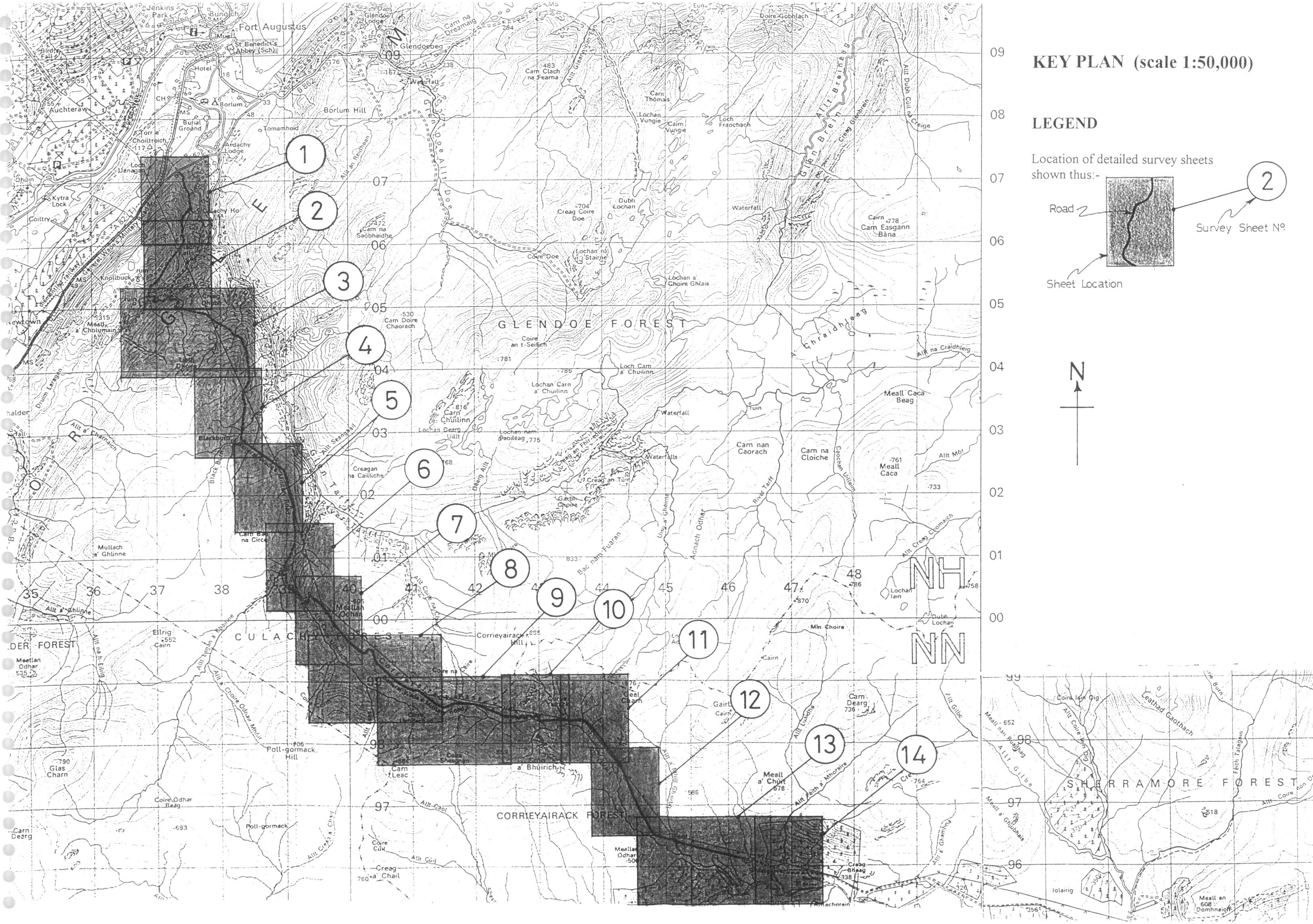
Damage caused by vehicles taking shortcuts

Wash out of material from road

Pass in wet conditions

KEY PLAN

CONDITIONAL SURVEY PLANS: E1 - E14



KEY PLAN (scale 1:50,000)
LEGEND
Location of detailed survey sheets shown thus:-
Road
Survey Sheet Nº
Sheet Location
N
NH
NN
1
2
3
4
5
6
7
8
9
10
11
12
13
14
Fort Augustus
GLENDOE FOREST
CULACHY FOREST
CORRIEYAIRACK FOREST
SHERRAMORE FOREST
Borlum Hill
Poll-gormack Hill
Corrieyairack Hill
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48

LEGEND

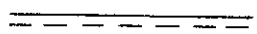
Existing drawings denoted E1 to E14. Scale 1:5000

Road Condition

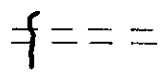
Fair:- 

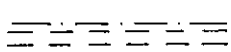
Rough:- 

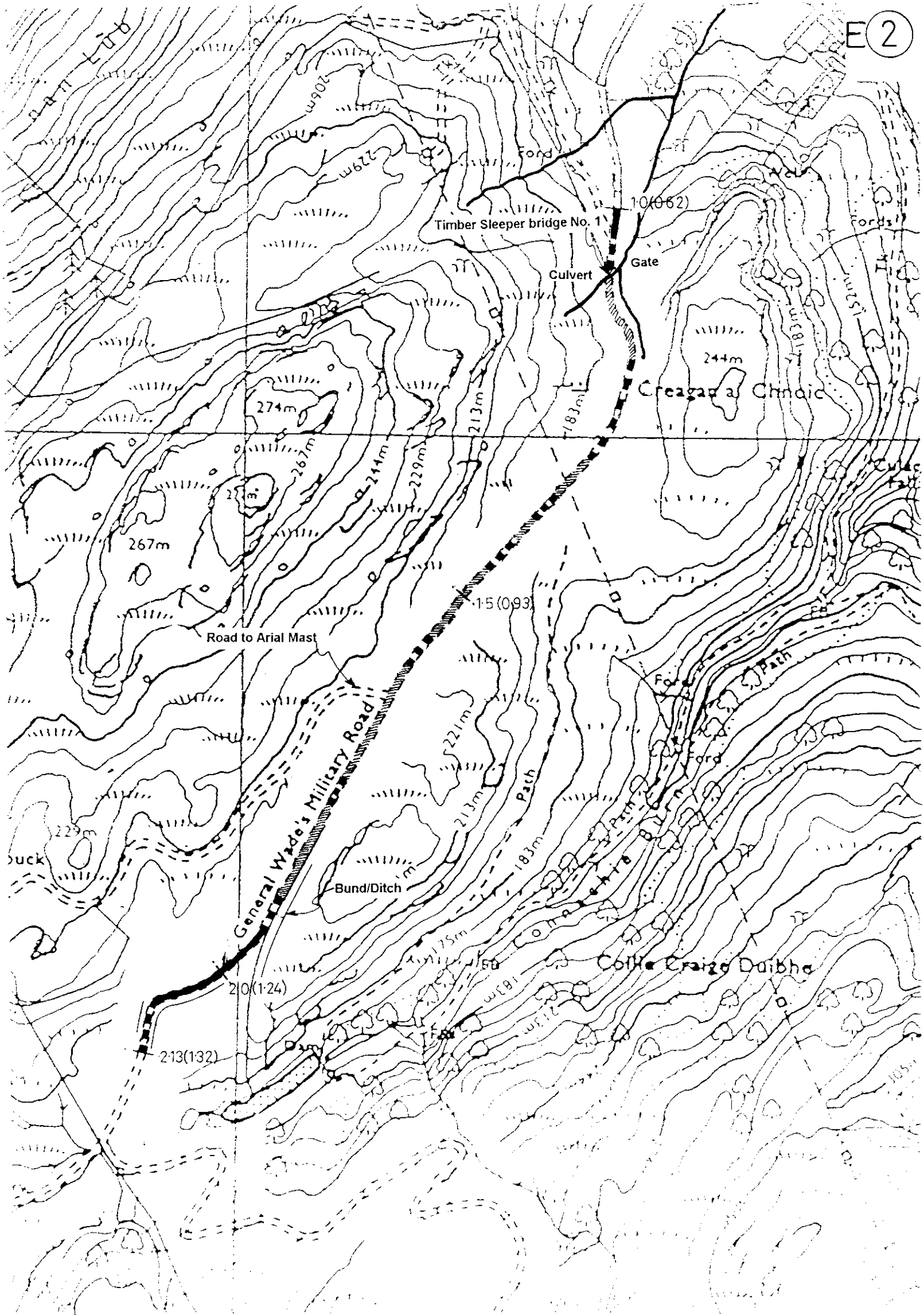
Very Rough:- 

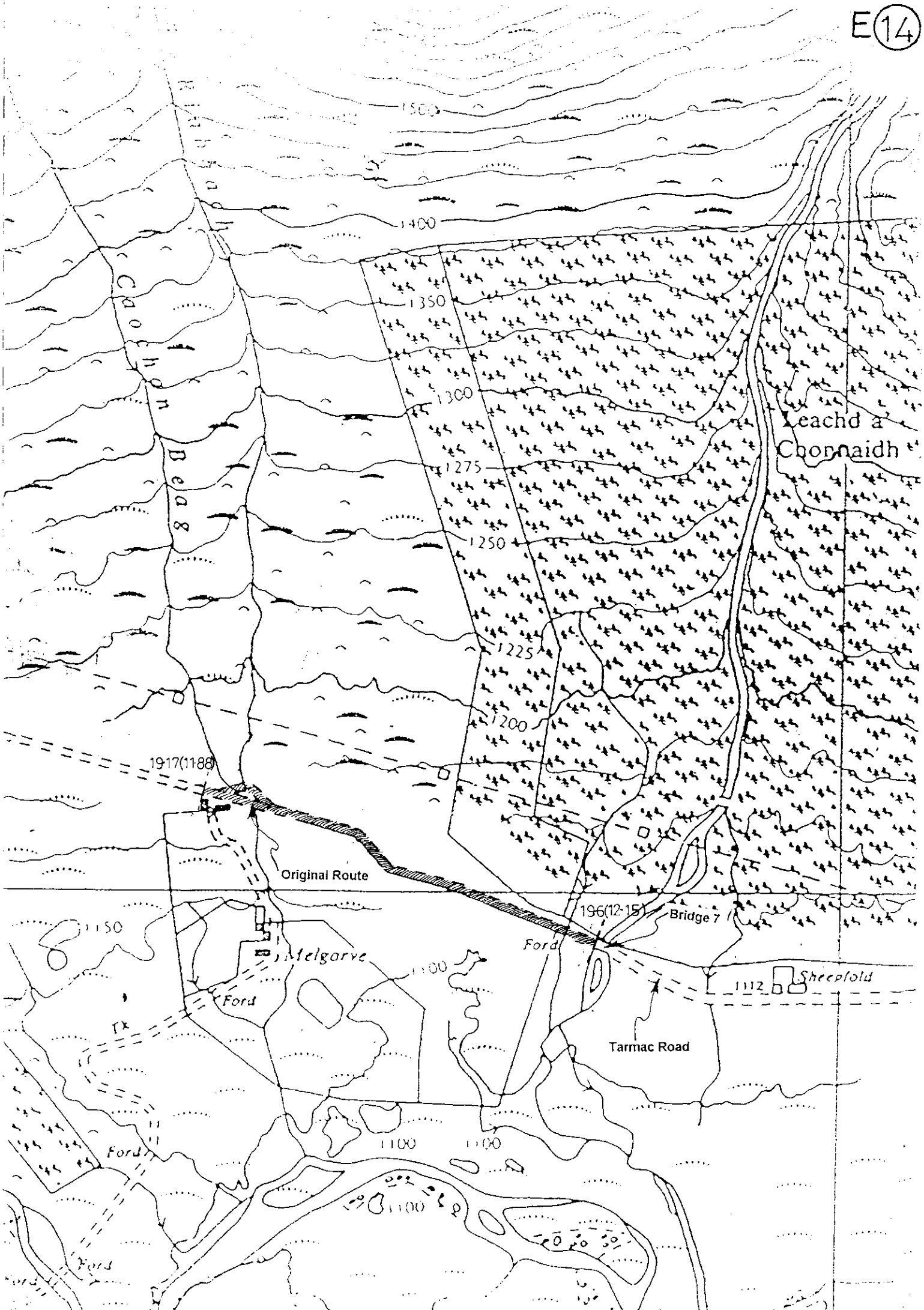
Ditches:- 

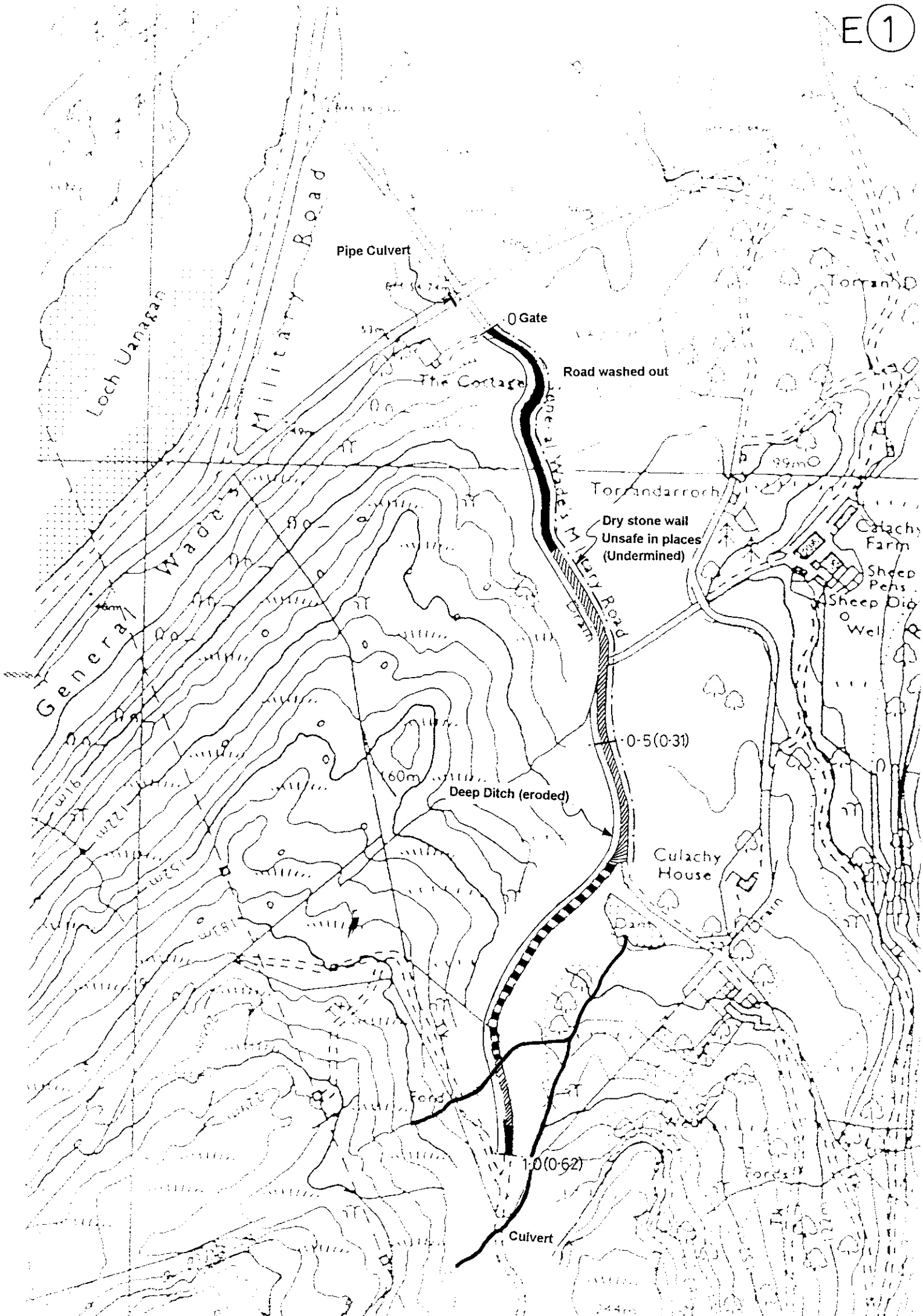
Possible Ditch:-

Ford:- 

Walls:- 


E2
Timber Sleeper bridge No. 1
1·0(0·62)
Gate
Culvert
Creagan a' Chnoic
274m
267m
244m
213m
183m
229m
Road to Arial Mast
1·5(0·93)
General Wade's Military Road
Bund/Ditch
Path
Ford
Fords
Coire Craig Duibhe
2·0(1·24)
2·13(1·32)


1500
1400
1350
1300
1275
1250
1225
1200
Leachd a Chonnaidh
Caoruinn Beag
1917(1188)
Original Route
196(12-15)
Bridge 7
Ford
Melgarve
1150
1100
Ford
Sheepfold
1112
Tarmac Road
Ford
Ford


Pipe Culvert
0 Gate
Road washed out
Loch Uanagan
Military Road
The Cottage
General Wades Military Road
Torrandarroch
Dry stone wall
Unsafe in places
(Undermined)
Culachy Farm
Sheep Pens
Sheep Dip
Well
0·5(0·31)
160m
Deep Ditch (eroded)
Culachy House
1·0(0·62)
Culvert

Bridge No. 1

2·13(1·32)

Connachie Burn

wash out

30(1·86)

barely passable

2·5 (1·55)

Erosion from Shortcut

Ford on rock base (eroded)

3·5(2·17)

wash out

Ford

Gate

Allt Ceum Me Gaibhre

Fence line

4·0(2·48)

450 dia concrete pipe

Ford

Ford on stone base
(Eroded)

4·5(2·79)

Ford
Cross Drain

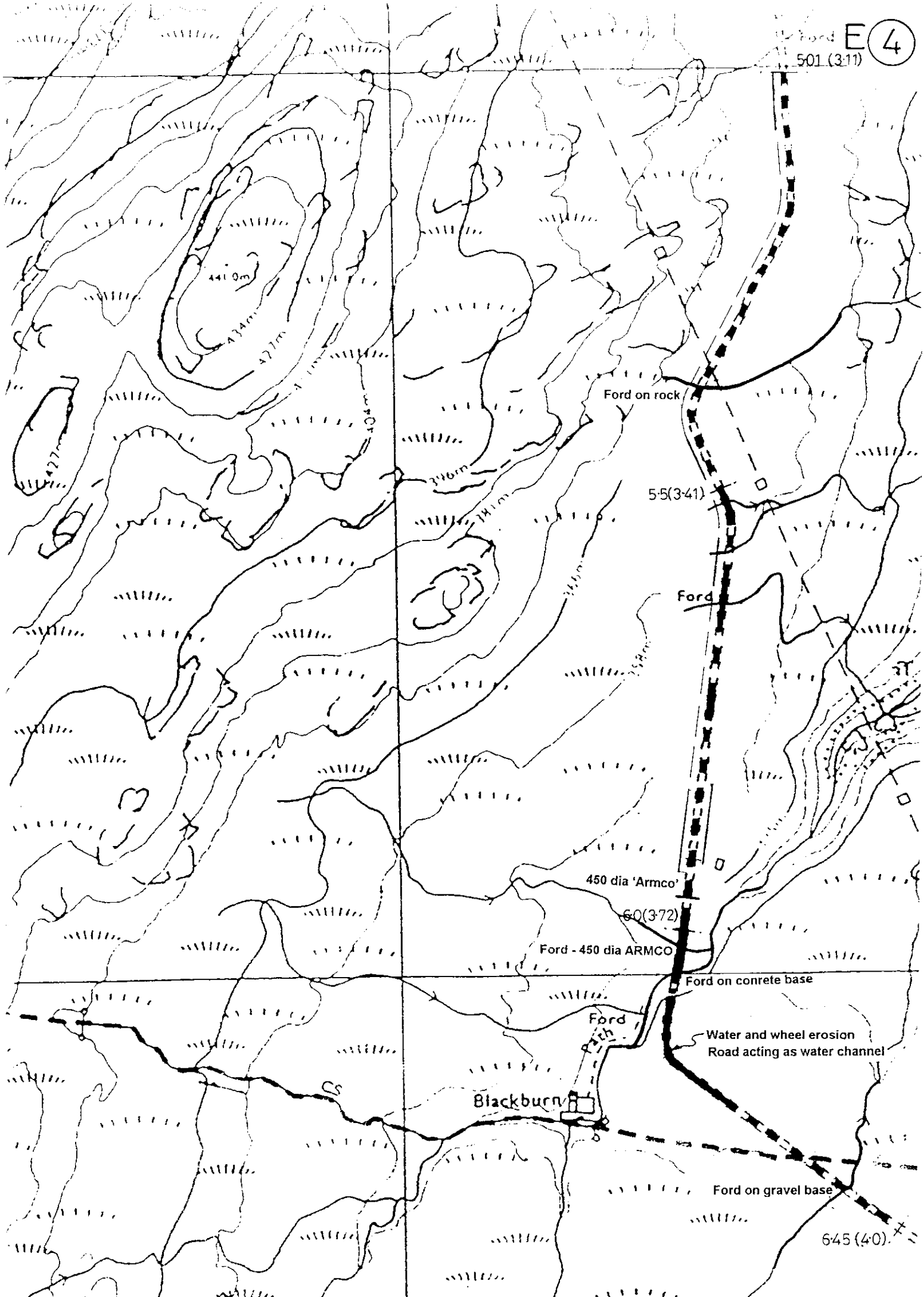
Allt Ceum da Gaibhre

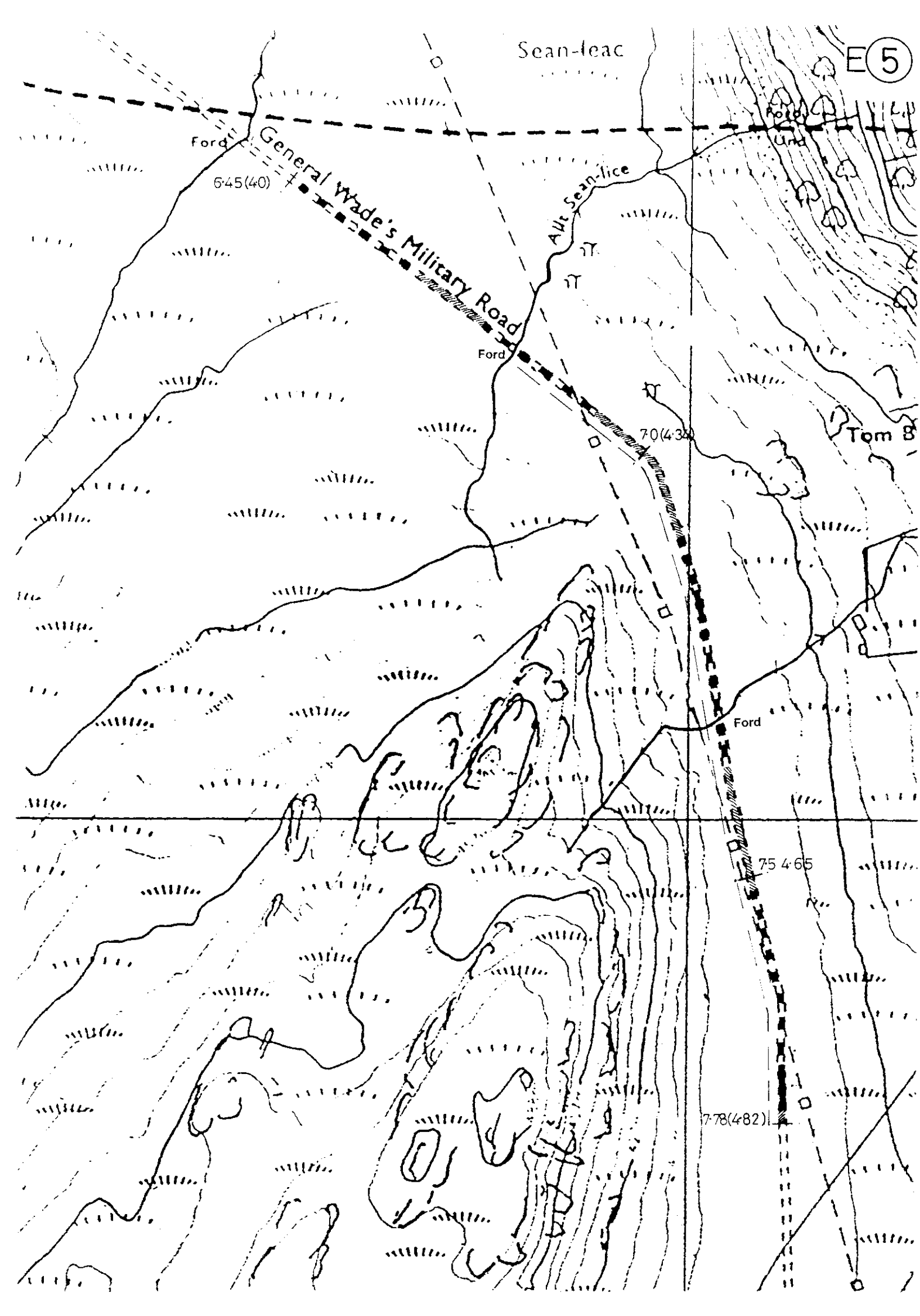
Allt a' Leitire

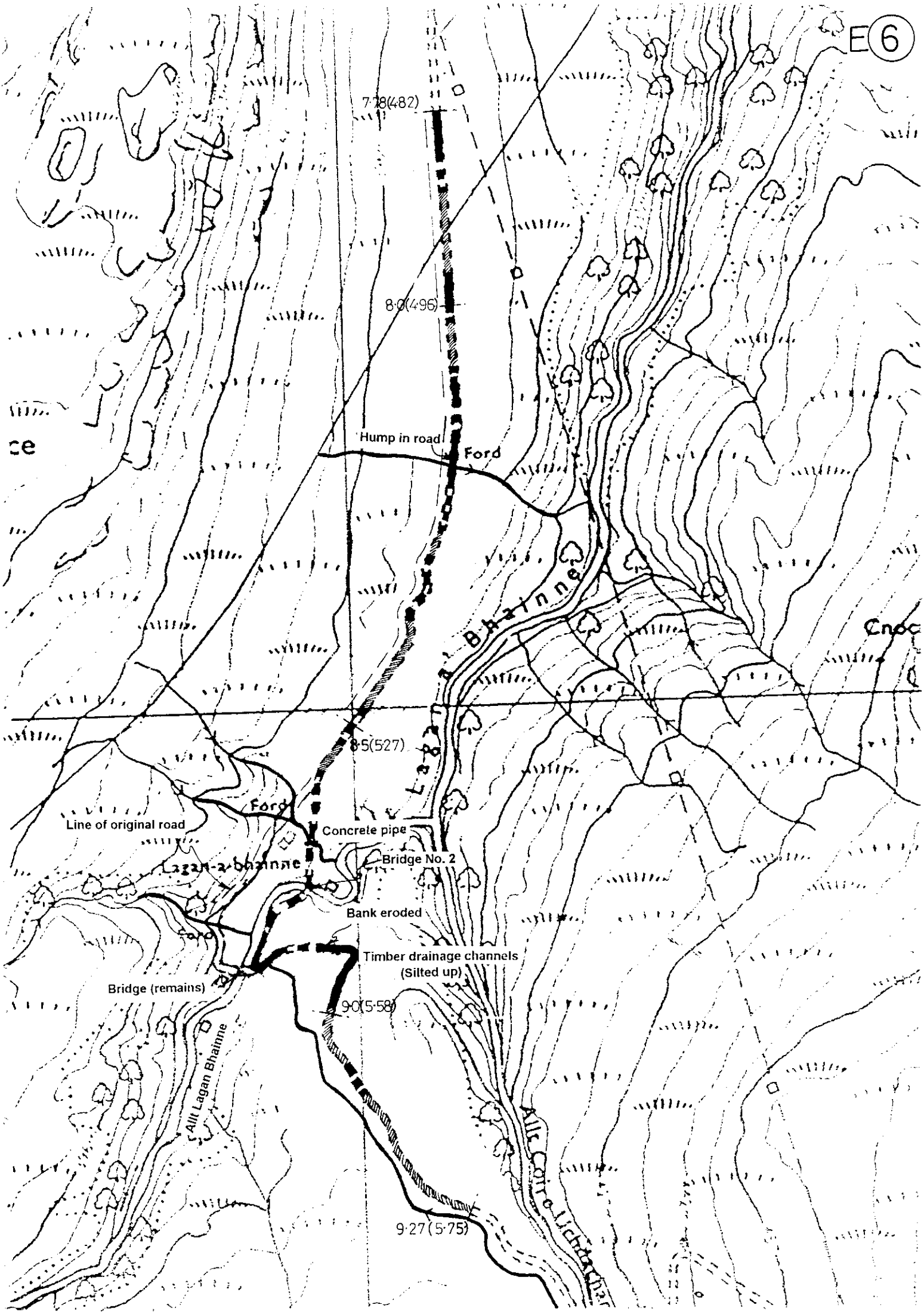
Path

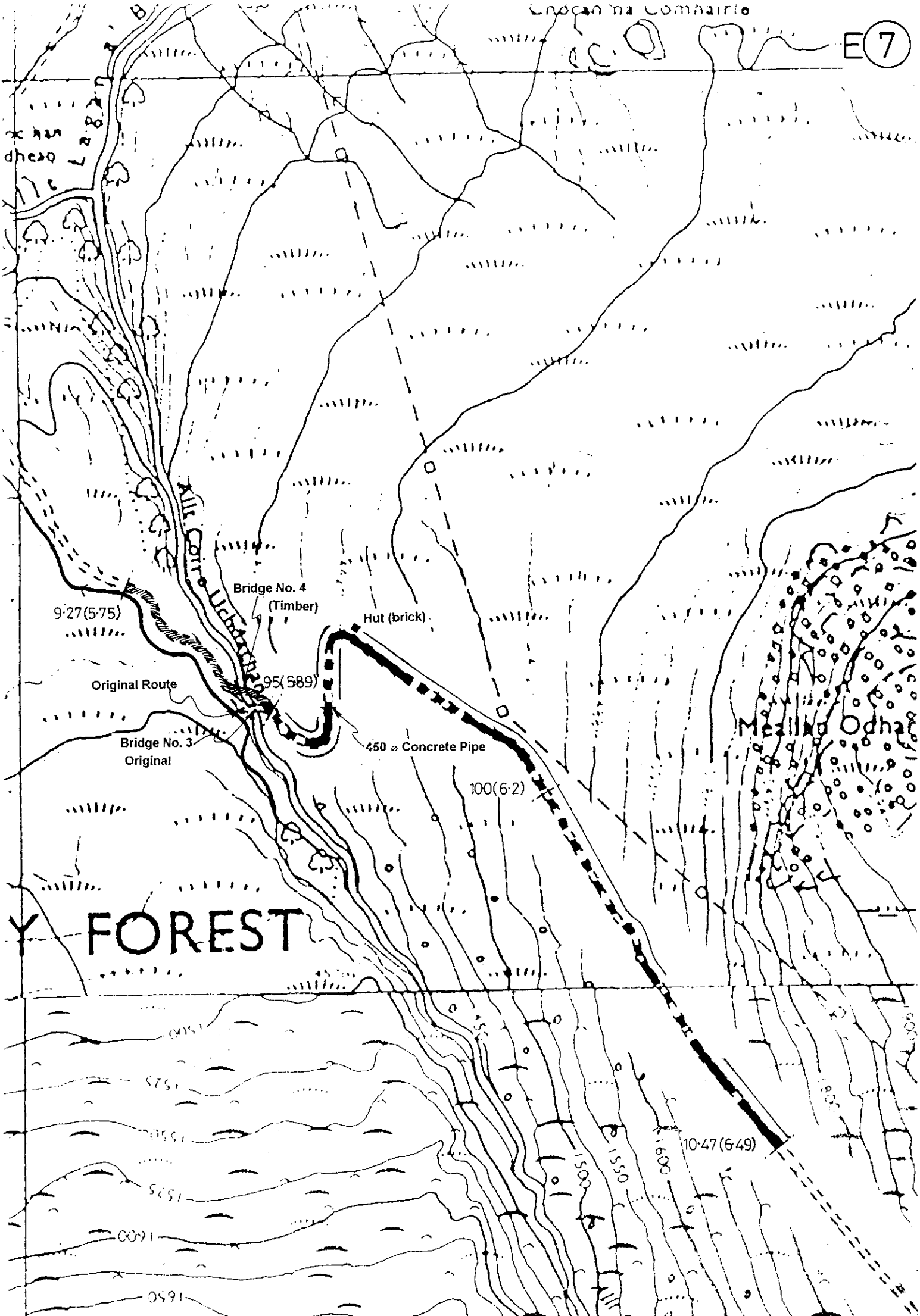
Ford

Allt Dhoire


E 4
501 (3·11)
Ford on rock
5·5(3·41)
Ford
450 dia 'Armco'
6·0(3·72)
Ford - 450 dia ARMCO
Ford on conrete base
Ford
Path
Water and wheel erosion
Road acting as water channel
Blackburn
Ford on gravel base
6·45 (4·0)


Sean-leac
E5
Ford
General Wade's Military Road
6·45(40)
Alt Sean-lice
Ford
7·0(430)
Tom
Ford
7·5 4·65
7·78(482)


E6
7·78(482)
8·0(496)
Hump in road
Ford
Lagan a Bhainne
8·5(527)
Ford
Line of original road
Concrete pipe
Bridge No. 2
Lagan-a-bhainne
Bank eroded
Timber drainage channels
(Silted up)
Bridge (remains)
9·0(5·58)
Allt Lagan Bhainne
9·27(5·75)


E7
Bridge No. 4
(Timber)
Hut (brick)
9·27(5·75)
Original Route
95(589)
Bridge No. 3
Original
450 ⌀ Concrete Pipe
100(6·2)
Meall a' Odhar
FOREST
10·47(6·49)

E8

Meallan Odhar

Culvert

11-5(713)

Culvert

11-97(742)

Culvert

1H0(682)

Culvert

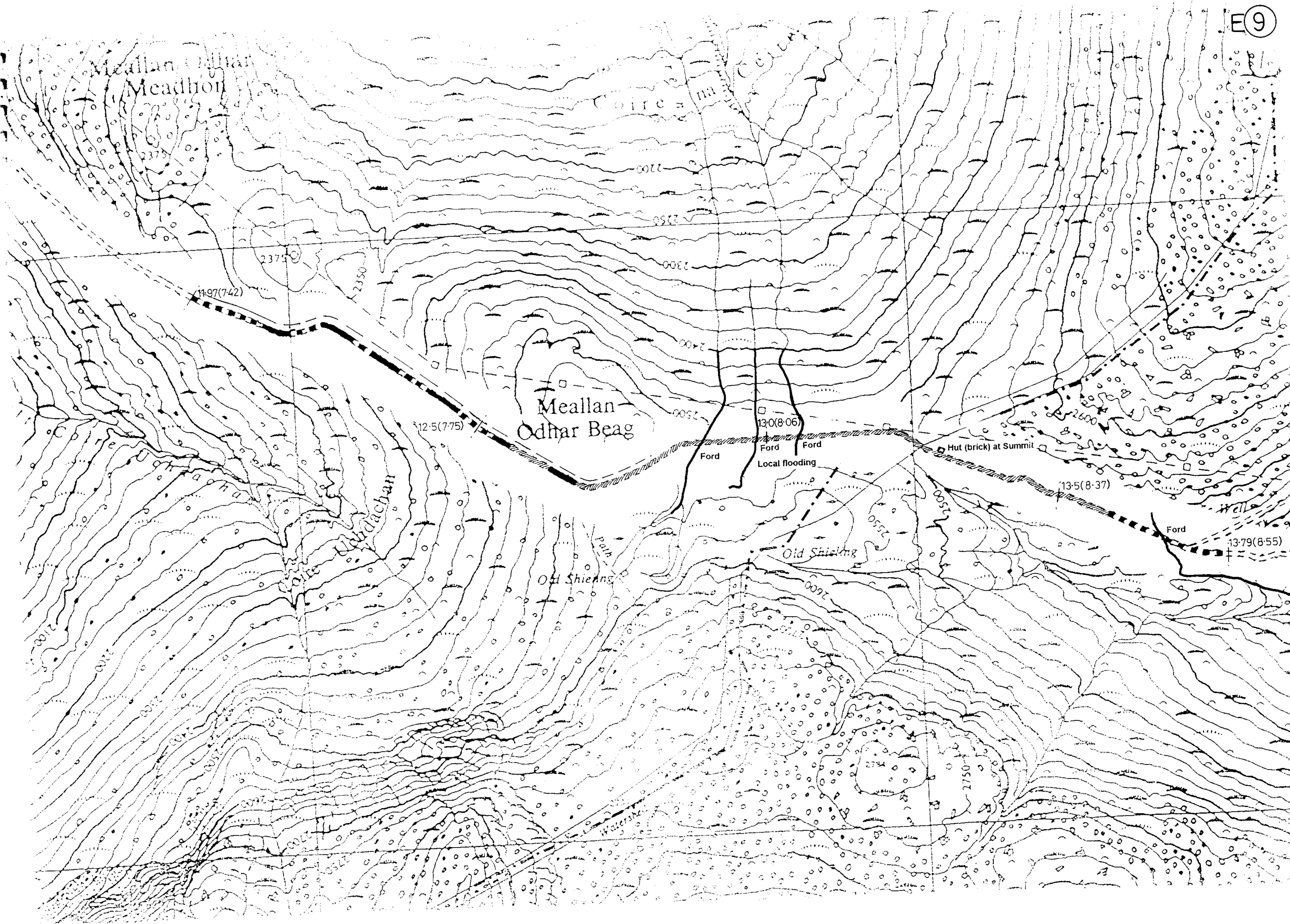
10-47(649)

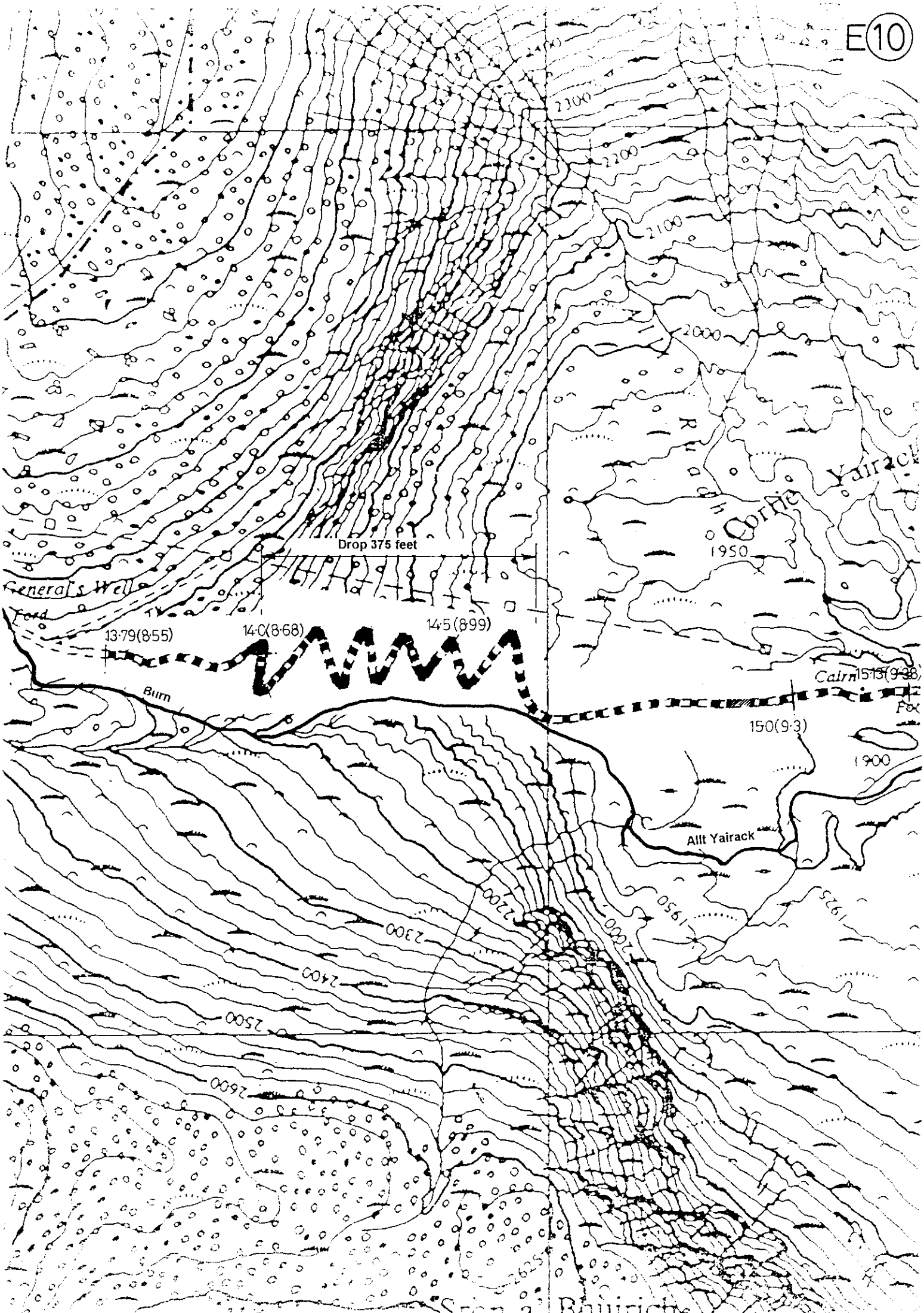
Allt Coire Herdachan

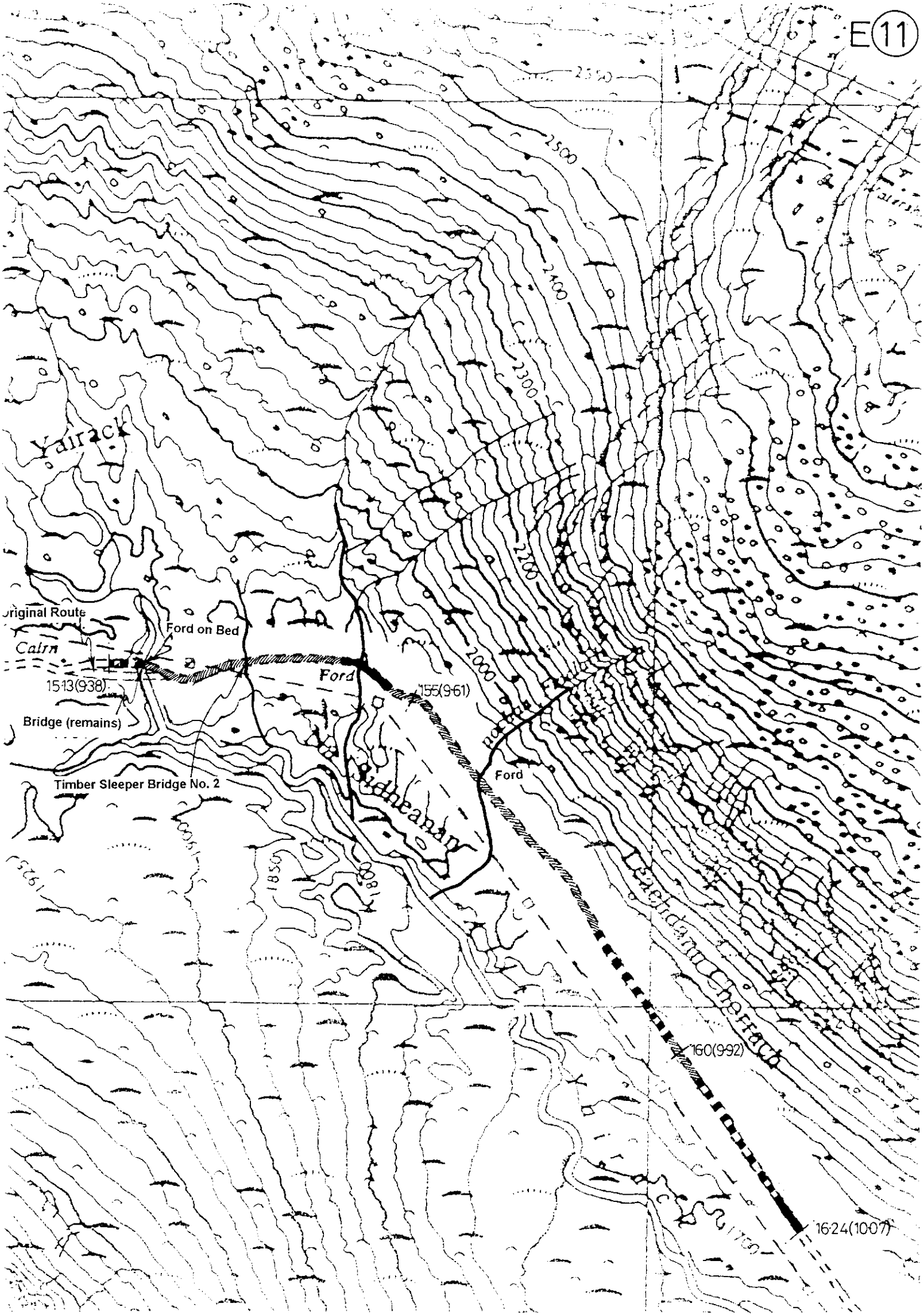
Allt a' Choire Dhuirich

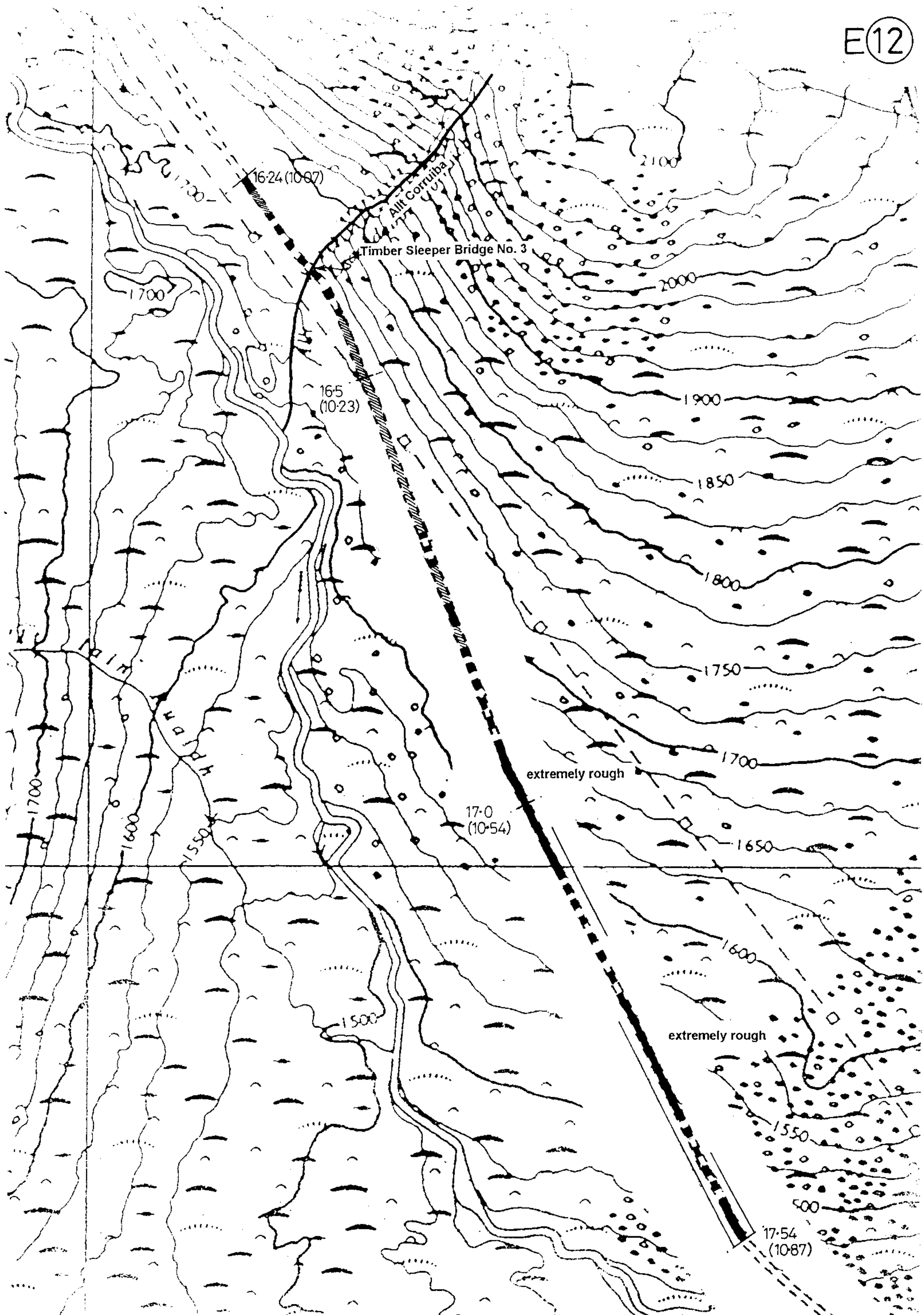
Coire Gorm

E9


Meallan Odhar Meadhon
Coire na Ceile
Meallan Odhar Beag
11·97(7·42)
12·5(7·75)
13·0(8·06)
Ford
Ford
Ford
Local flooding
Hut (brick) at Summit
13·5(8·37)
Ford
13·79(8·55)
Well
Old Shieling
Old Shieling
Path
Watershed
Coire Uchdachan


Drop 375 feet
General's Well
Ford
13·79(8·55)
14·0(8·68)
14·5(8·99)
Burn
Corrie Yairack
1950
Cairn
15·15(9·38)
150(9·3)
1900
Allt Yairack
2300
2200
2100
2000
2400
2500
2600


2500
2400
2300
2200
2000
1850
1808
Yairack
Original Route
Ford on Bed
Cairn
1513(938)
Bridge (remains)
Timber Sleeper Bridge No. 2
Ford
155(9·61)
Ford
160(9·92)
16·24(10·07)


E12
16·24 (10·07)
Allt Corruiba
Timber Sleeper Bridge No. 3
2100
2000
1900
1850
1800
1750
1700
1650
1600
1550
1500
16·5
(10·23)
17·0
(10·54)
17·54
(10·87)
extremely rough
extremely rough

E13

Alt Muill Guarbh

17·54 (10·87)

Ford on bed - impassable at times

18·0 (11·16)

Bridge 5 (Footbridge)

Original Route

18·5 (11·47)

Ford

End of scheduled section

19·0 (11·78)

19·12 (11·88)

Road Restored (50m)

Bridge No. 6 (Original restored)

New culvert

Coire Bhea

Allt Yairack

Creagan Breaca

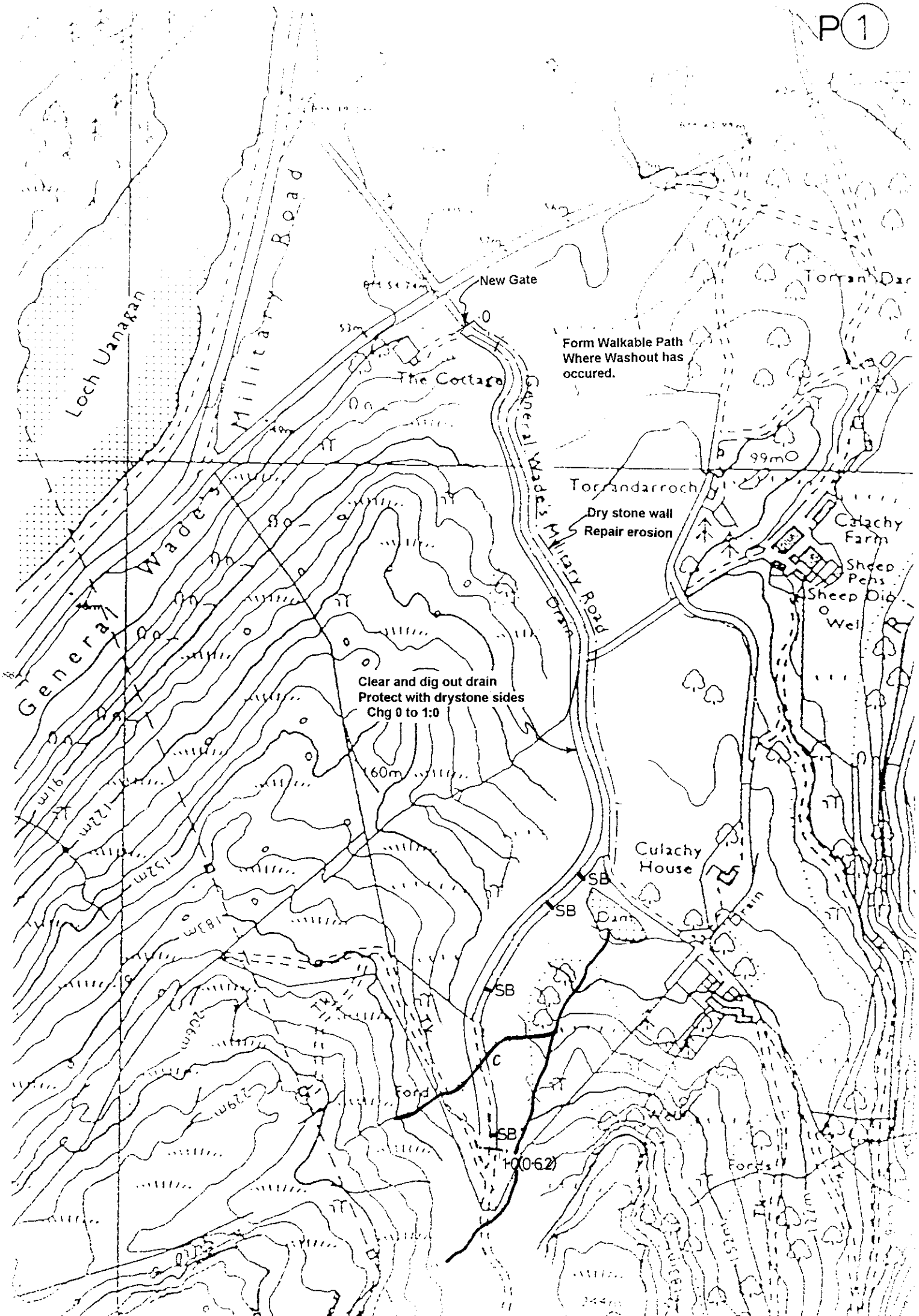
Creagan na Searmoin

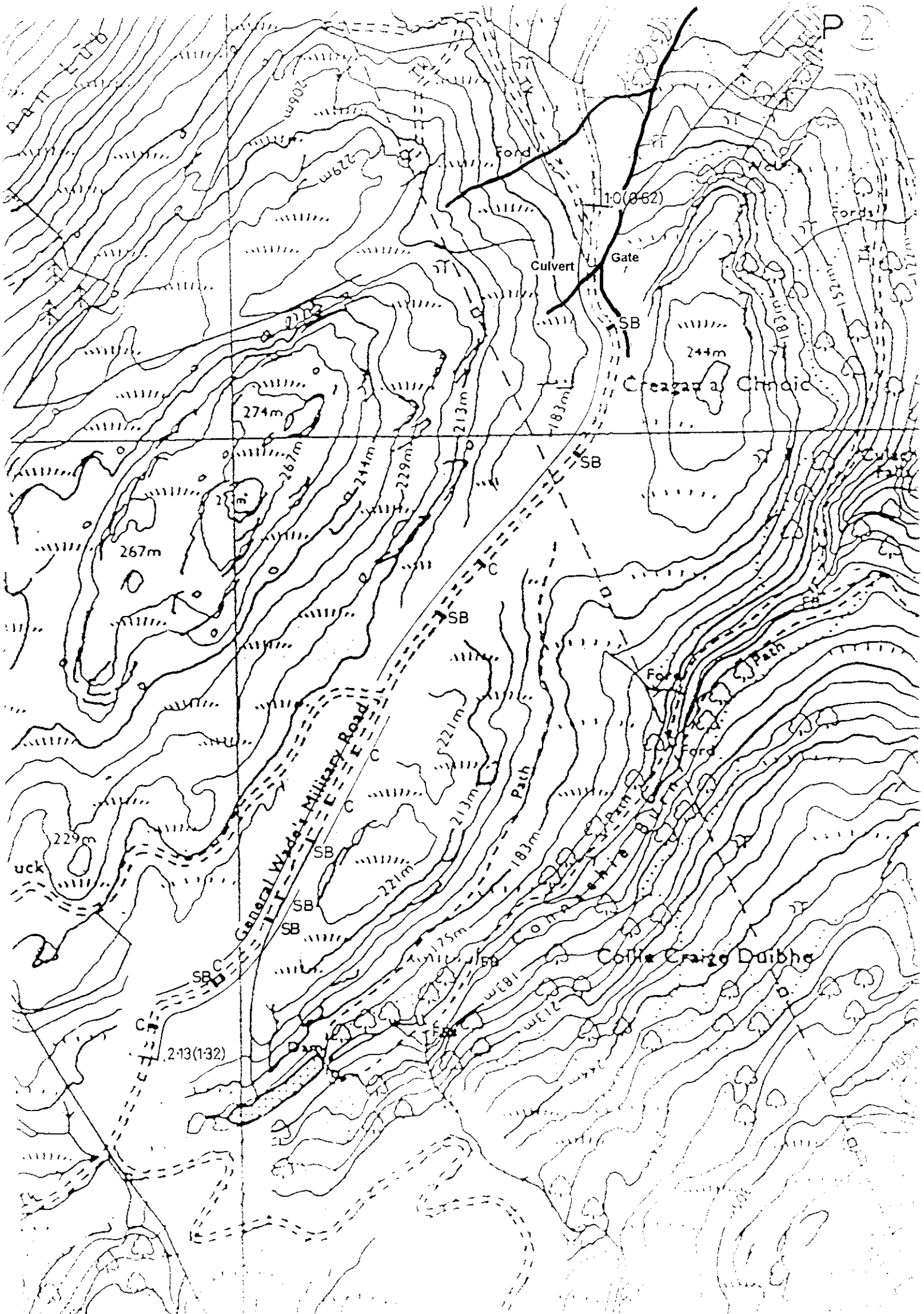
Melgarve

Ford

FB

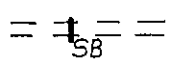
PROPOSED WORKS PLANS: P1 - P16

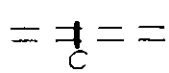

Loch Uanagan
General Wade's Military Road
New Gate
The Cottage
Form Walkable Path
Where Washout has
occured.
Torrandarroch
Dry stone wall
Repair erosion
Calachy
Farm
Sheep
Pens
Sheep Dip
Well
Clear and dig out drain
Protect with drystone sides
Chg 0 to 1:0
Culachy
House
SB
Ford
+00·62

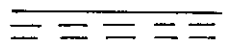

Culvert
Gate
SB
244m
Creagan a' Chnaic
274m
267m
229m
213m
183m
221m
175m
152m
Ford
Path
General Wade's Military Road
Coire Craig Duibhe
1:0(0·62)
2·13(1·32)

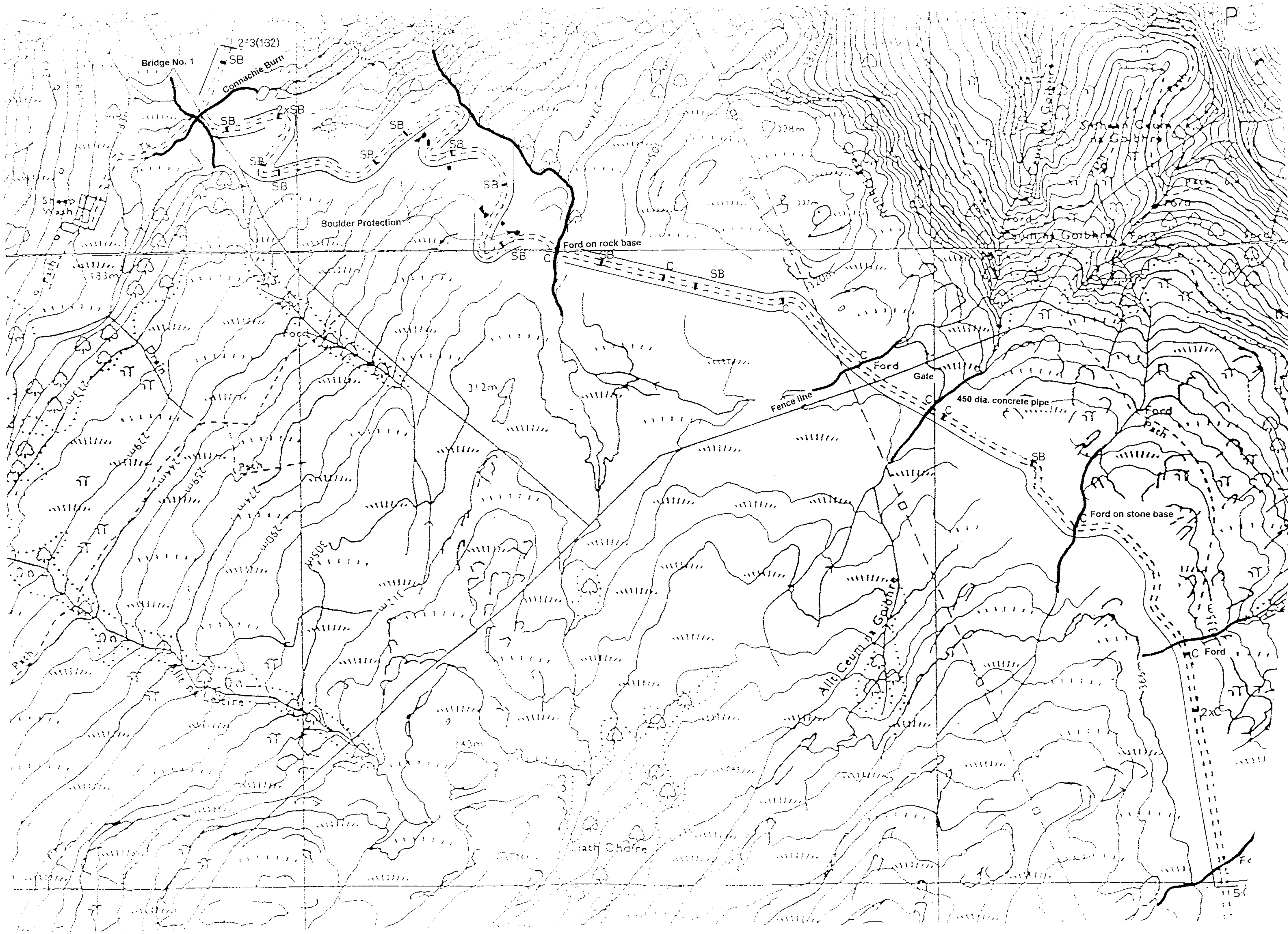
LEGEND

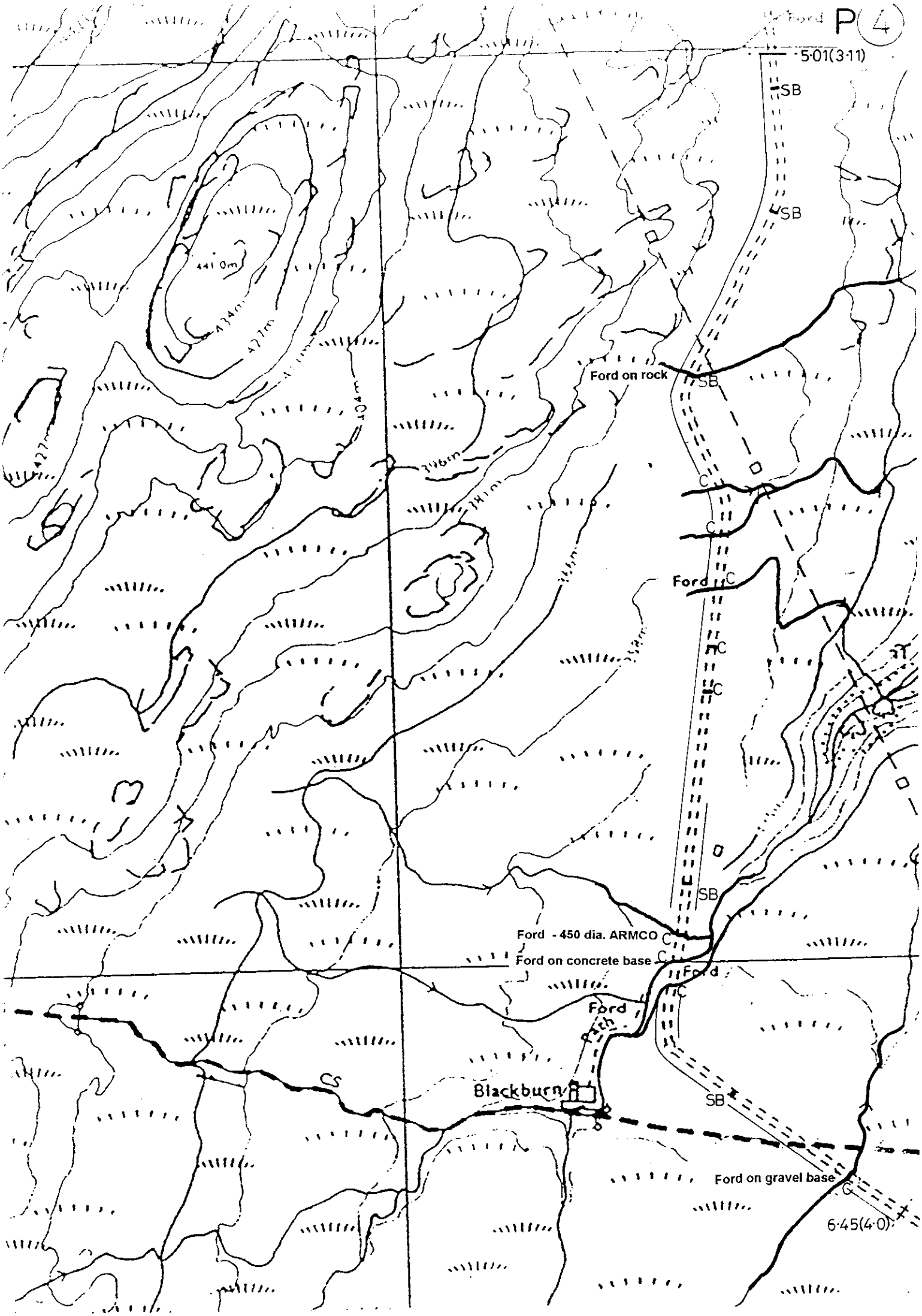
Proposed drawings denoted P1 to P16. Scale 1:5000

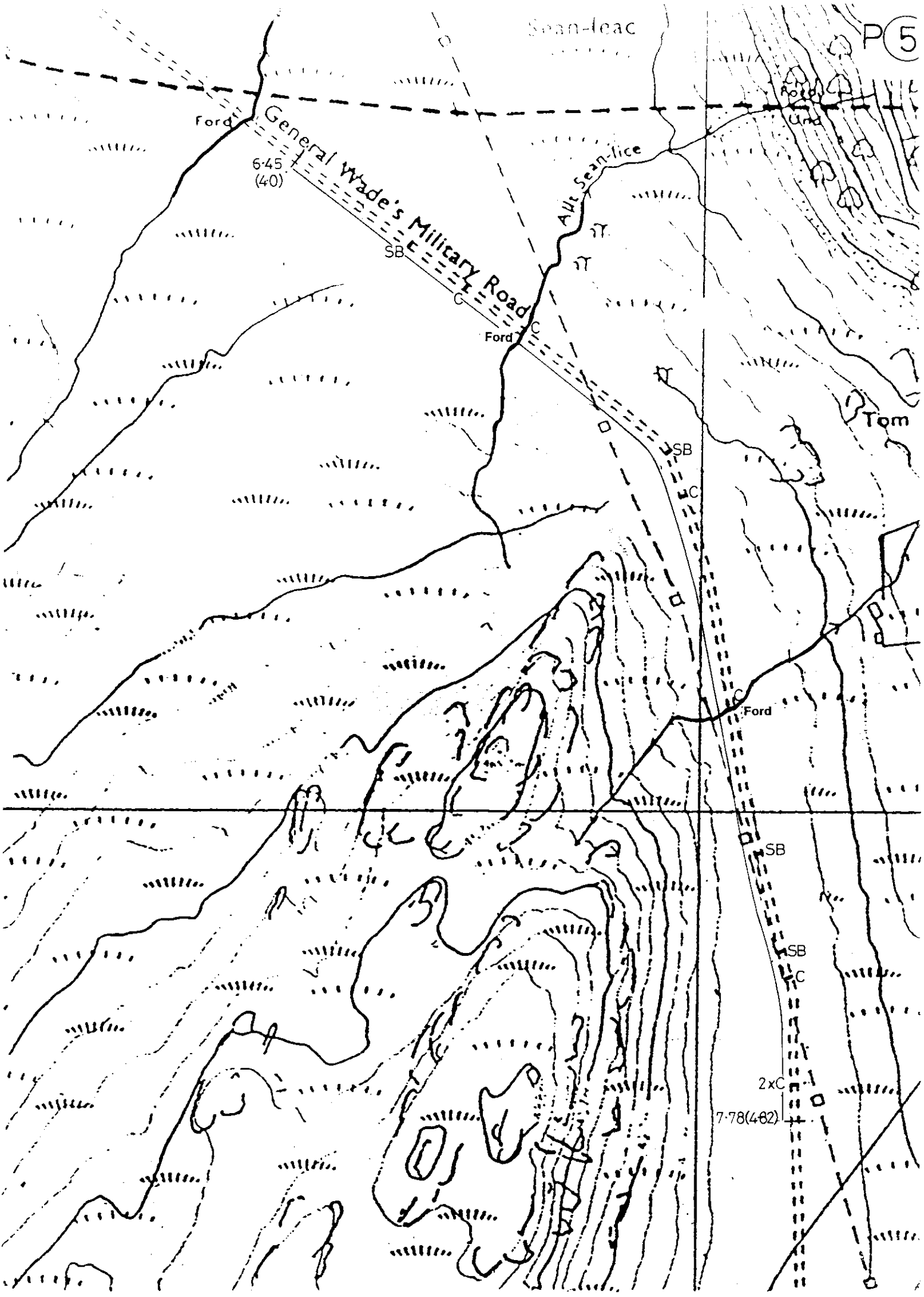
Shedding Bars:- 

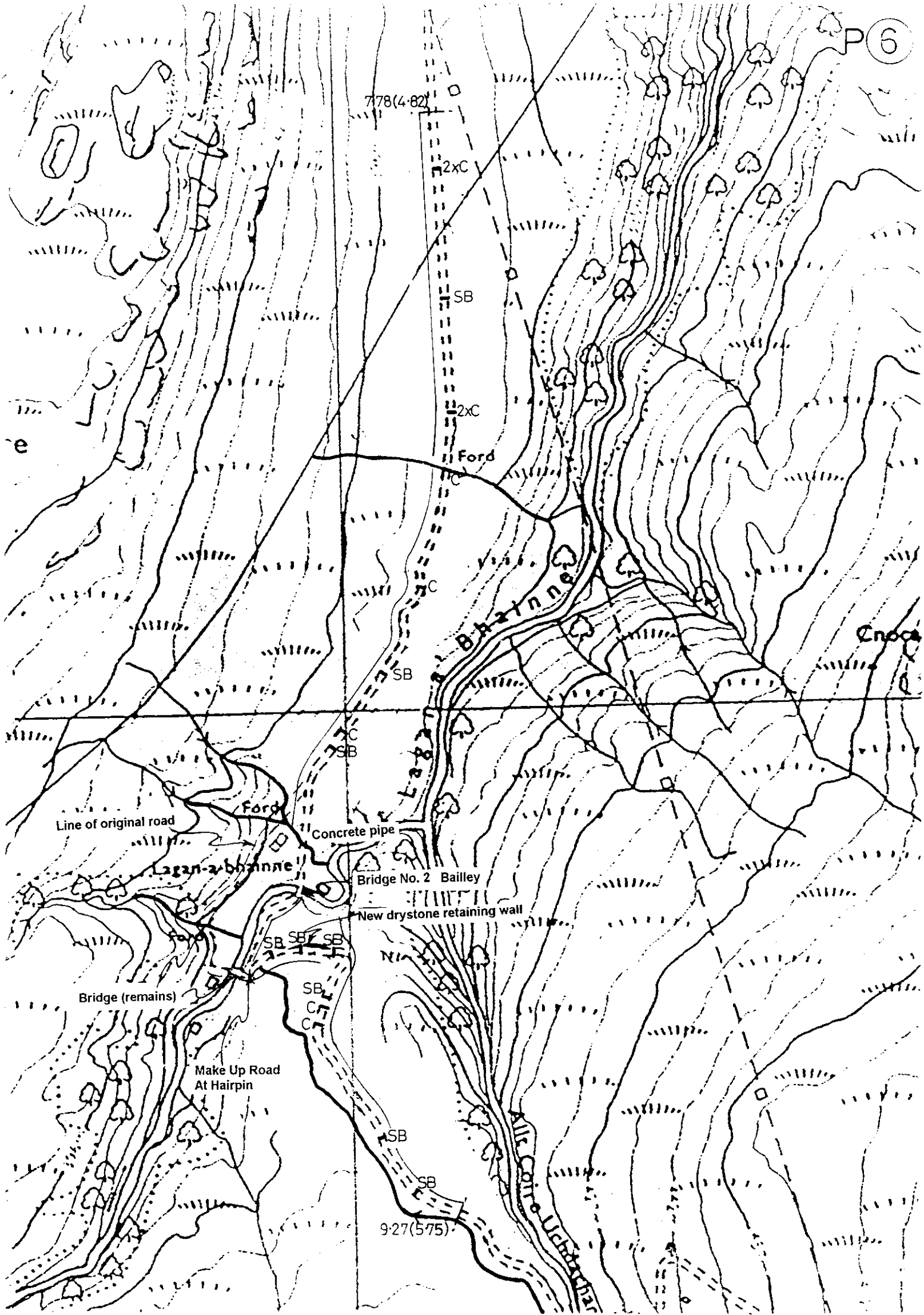
Crossings:- 

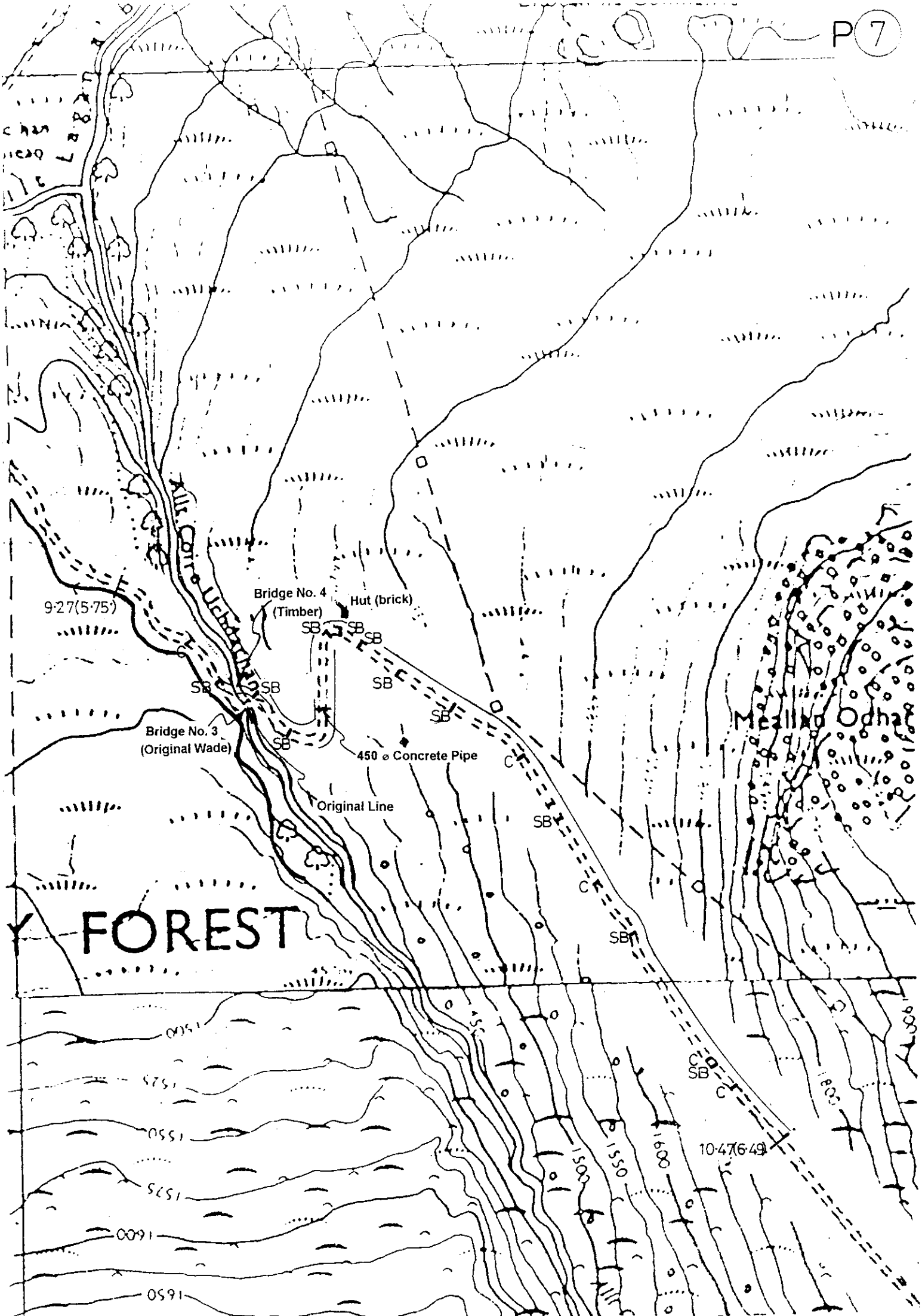
Ditches:- 

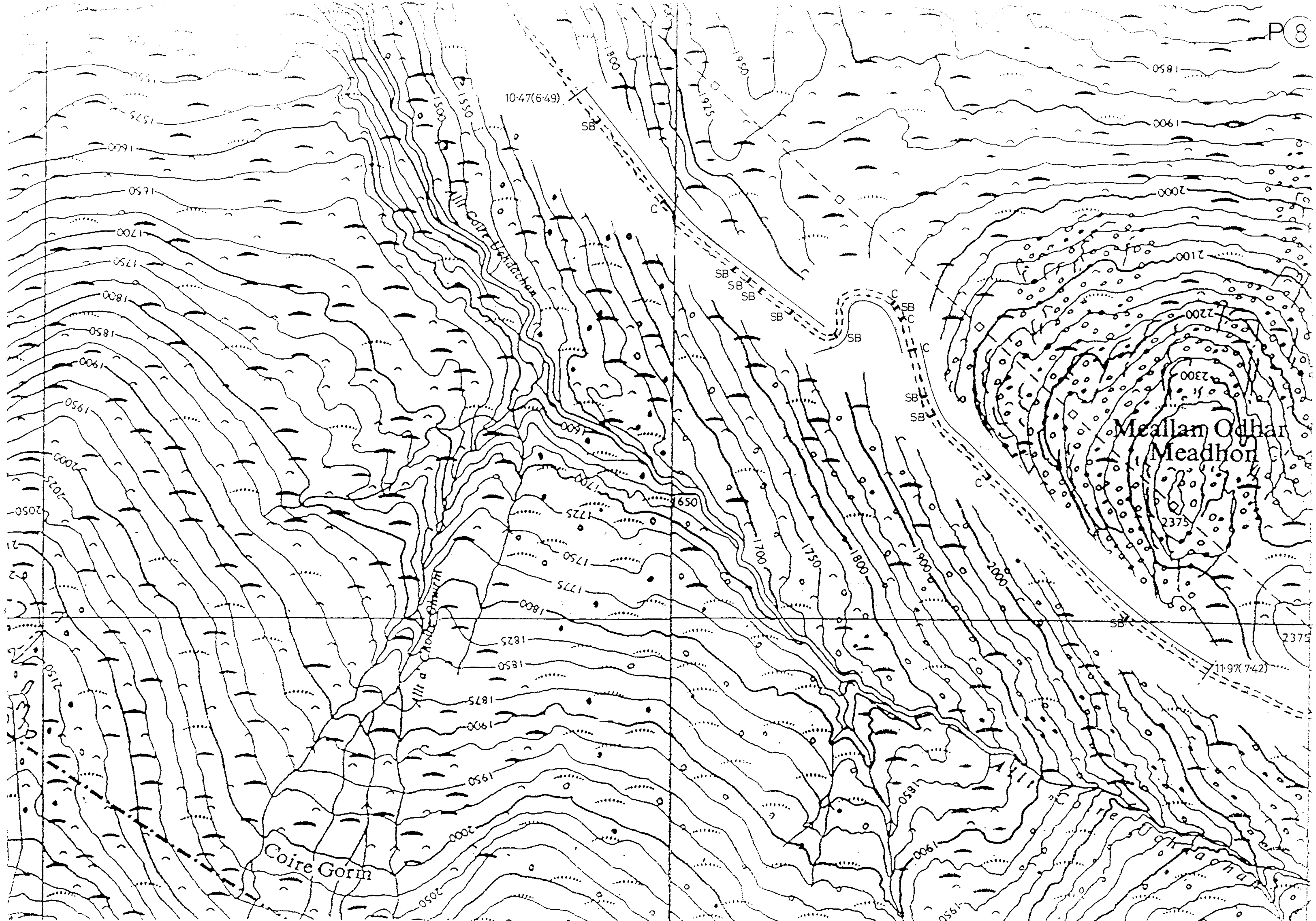

P3
Bridge No. 1
213(132)
SB
Connachie Burn
2xSB
Boulder Protection
Ford on rock base
C
Ford
Gate
Fence line
450 dia. concrete pipe
Ford on stone base
2xC
Drain
Path
312m
343m


Ford P 4
5·01(3·11)
SB
SB
441·0m
Ford on rock
SB
C
C
Ford
C
C
C
SB
Ford - 450 dia. ARMCO
Ford on concrete base
C
C
Ford
Ford
Blackburn
SB
Ford on gravel base
C
6·45(4·0)


Sean-leac
P5
Ford
General Wade's Military Road
6·45
(40)
SB
C
Ford
C
Ault Sean-lice
Tom
SB
C
Ford
SB
SB
C
2xC
7·78(482)


P6
778(4·82)
2xC
SB
2xC
Ford
C
C
SB
2C
SB
Ford
Line of original road
Concrete pipe
Lagan-a-bhainne
Bridge No. 2 Bailley
New drystone retaining wall
SB
SB
SB
Bridge (remains)
SB
C
C
Make Up Road
At Hairpin
SB
SB
9·27(575)
Allt Coire Uchdachar


Allt Corr Uchdarach
Bridge No. 4
(Timber)
Hut (brick)
9·27(5·75')
SB
Bridge No. 3
(Original Wade)
450 ø Concrete Pipe
Original Line
C
Meall na Odhar
FOREST
10·47(6·49')
1500
1550
1600


P8
Coire Gorm
Meallan Odhar Meadhon
2375
10·47(6·49)
11·97(7·42)
SB
C

Meallan Odhar
Meadhon

Coire na Ceardaich

2375

2350

2200

2250

2300

2400

2500

2600

2550

2750

1197(742)

SB

C

Meallan
Odhar Beag

Ford

Hut (brick) at Summit

Well

Ford

1379(855)

Coire Uaidachan

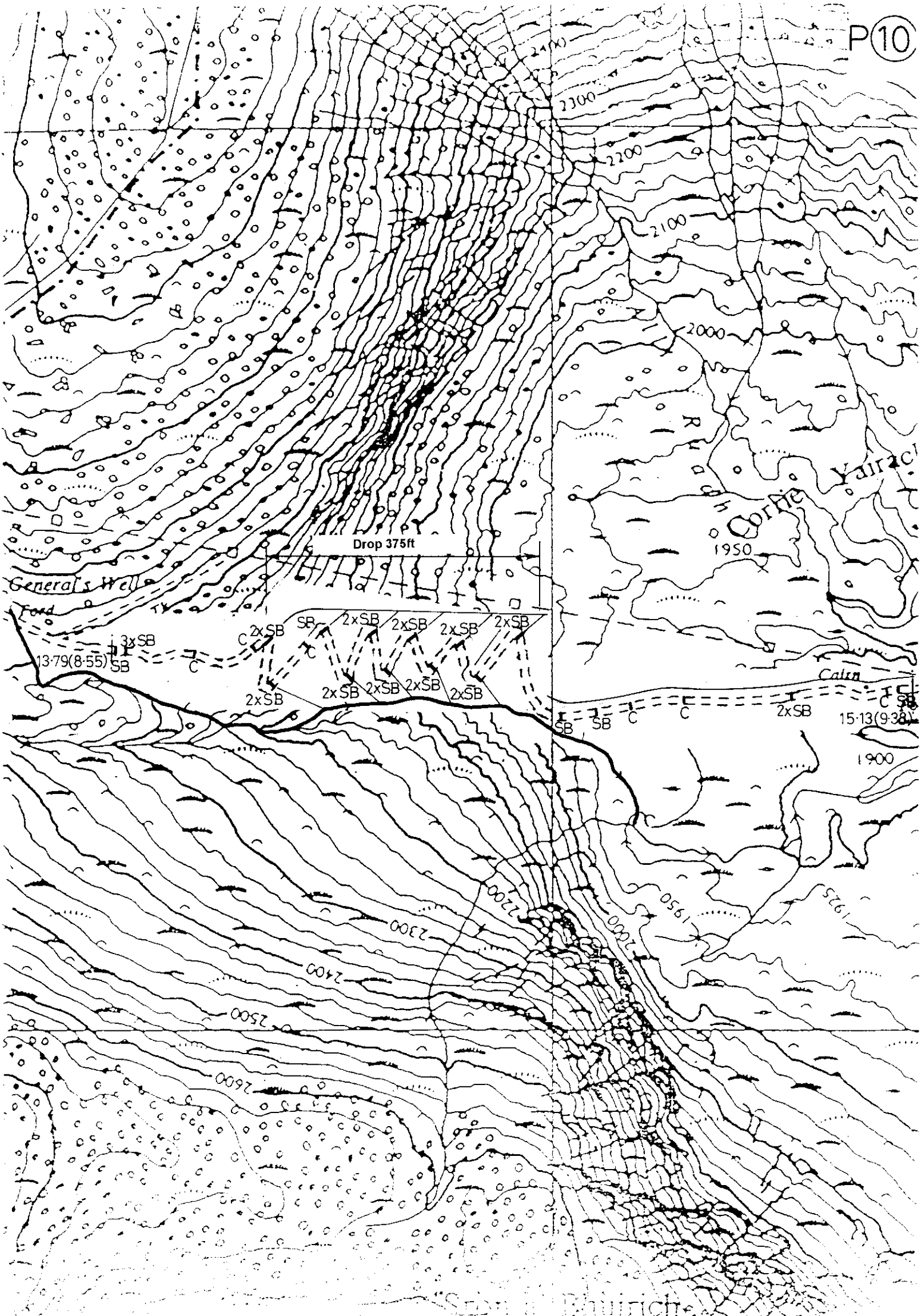
Old Shieling

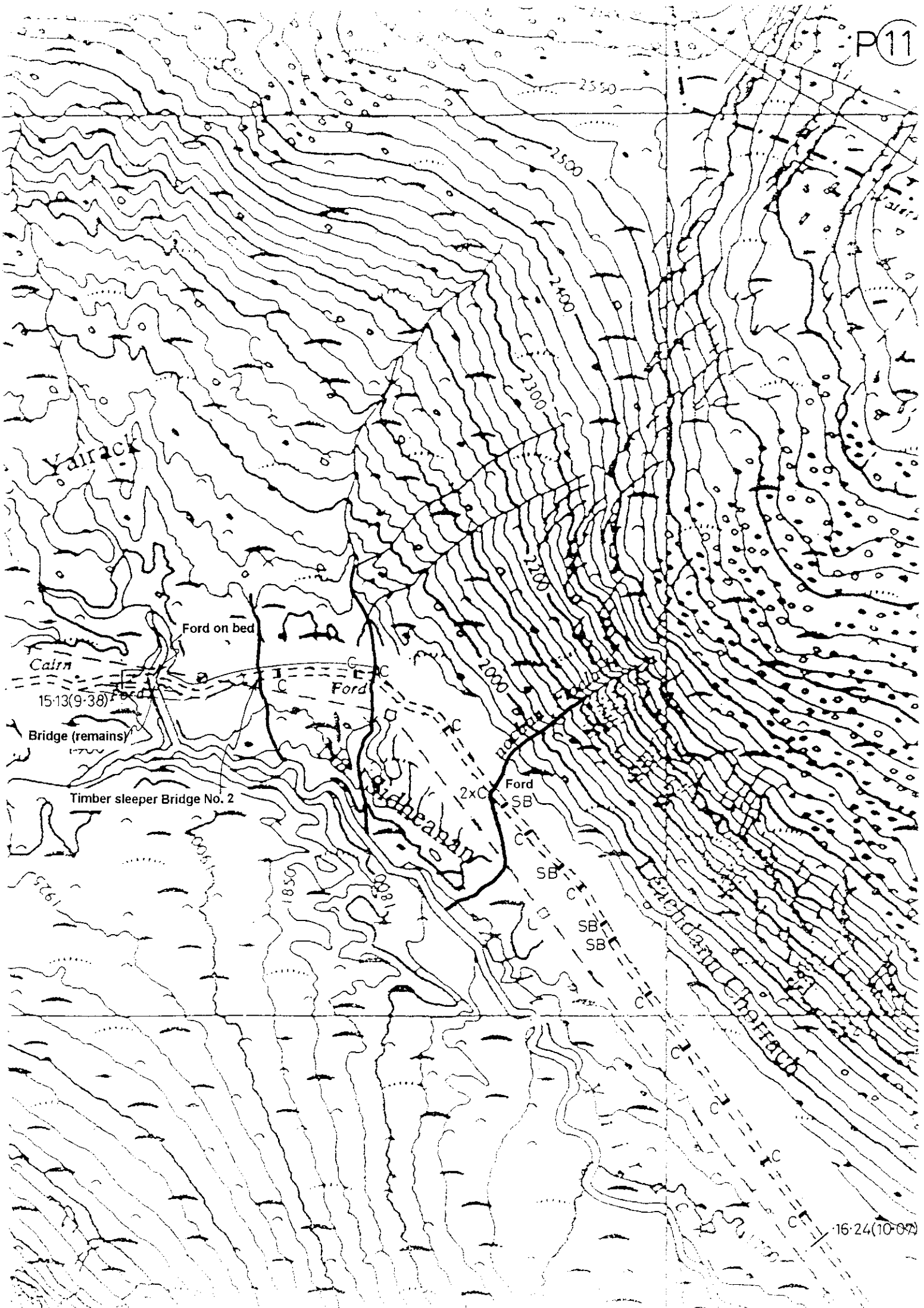
Path

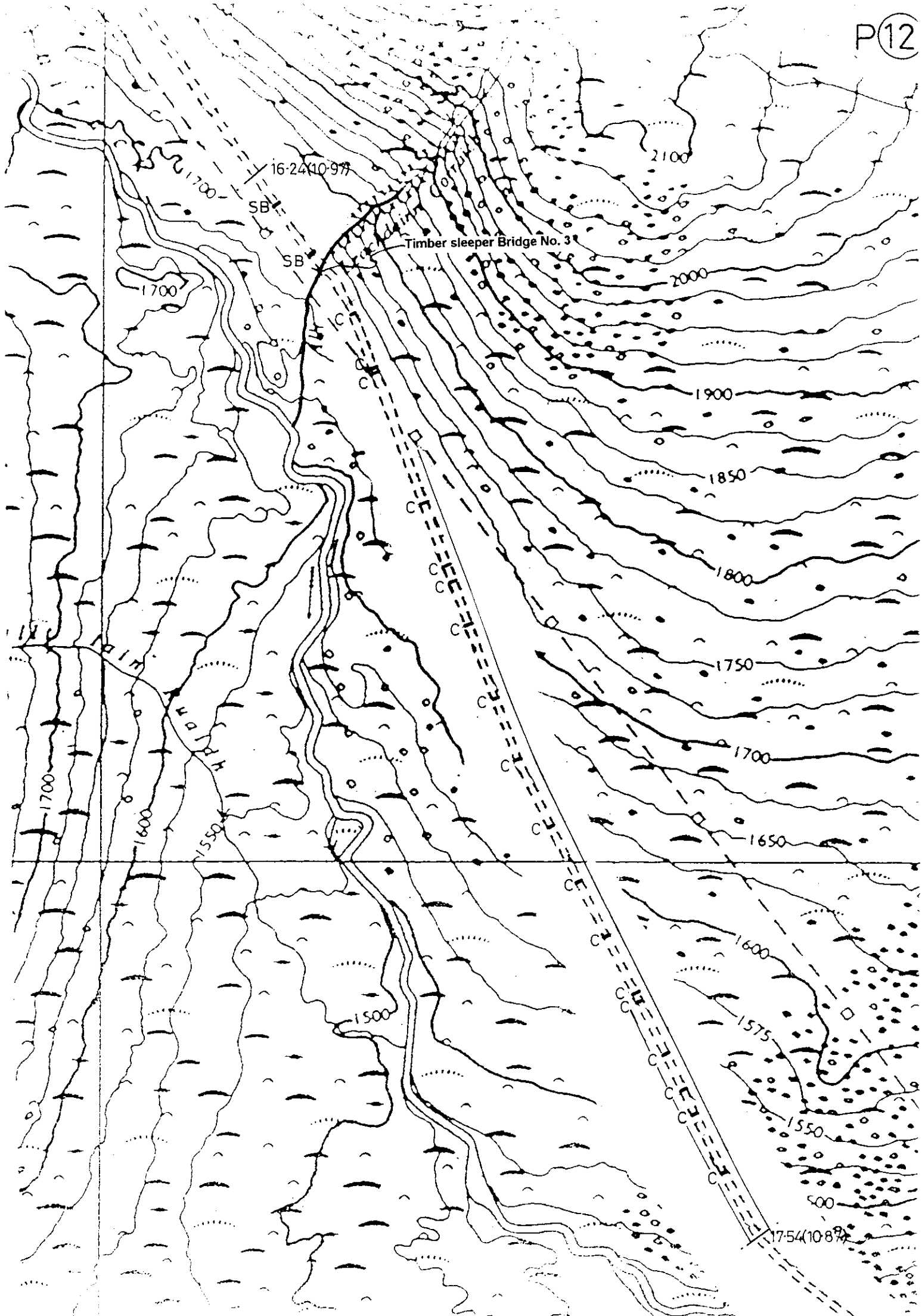
Old Shieling

Waterfall

COLT


P10
2400
2300
2200
2100
2000
1950
1900
Drop 375ft
General's Well
Ford
3xSB
13·79(8·55)
2xSB
SB
C
Corrie Yairack
Calin
15·13(9·38)
2300
2400
2500
2600
2200
2100
1950
1925


P11
2550
2500
2400
2300
2200
2000
1850
1925
Yairack
Ford on bed
Cairn
15·13(9·38)
Ford
Bridge (remains)
Timber sleeper Bridge No. 2
Ford
Ford
2xC
SB
SB
SB
SB
16·24(10·07)


P12
16-24(10-97)
SB
SB
Timber sleeper Bridge No. 3
17-54(10-87)
2100
2000
1900
1850
1800
1750
1700
1650
1600
1575
1550
1500
1700
1700
1600
1550

1575
1550
1500
1800
1700
1600
1500
1450
1400
1400
1350
1325
1250
1400
1350
1300
1275
1450
1400
1350
1300
1200
1150
1100
1100
1100

17·54 (10·87)

Ford on bed - impassable at times

Bridge No. 5
Original Line

2x SB
SB
SB

Ford

Scheduled Section Ends

19·17 (11·88)

New Gate & Boulder Protection

Bridge No. 6
Original Line

Coolhan Burn

Caolhan Beag

Yairack

Creagan Breaca

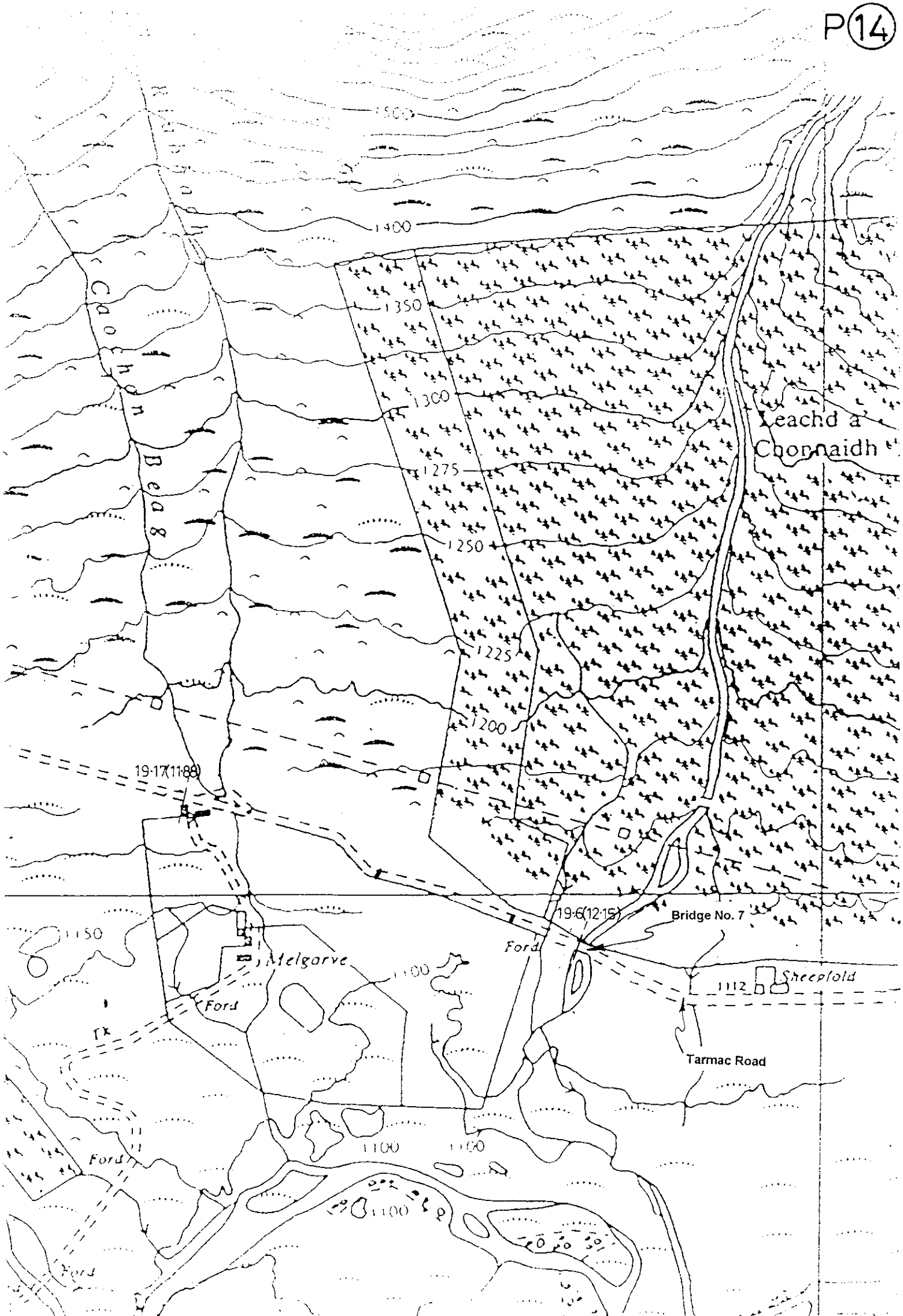
Creagan na Searmoin

Melgarve

Ford
Ford
Ford
Ford
Ford
Ford
Ford

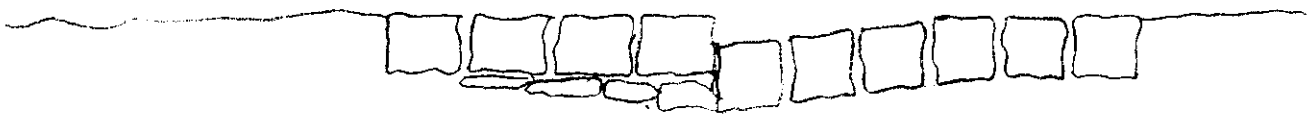
Tk

FB
FB


1500
1400
1350
1300
1275
1250
1225
1200
Coire Beag
Leachd a Chornaidh
19·17(1188)
19·6(12·15)
Bridge No. 7
Melgorve
Ford
Ford
Ford
Ford
Sheepfold
1112
Tarmac Road
1150
1100
1100
1100
1100

Typical Sections

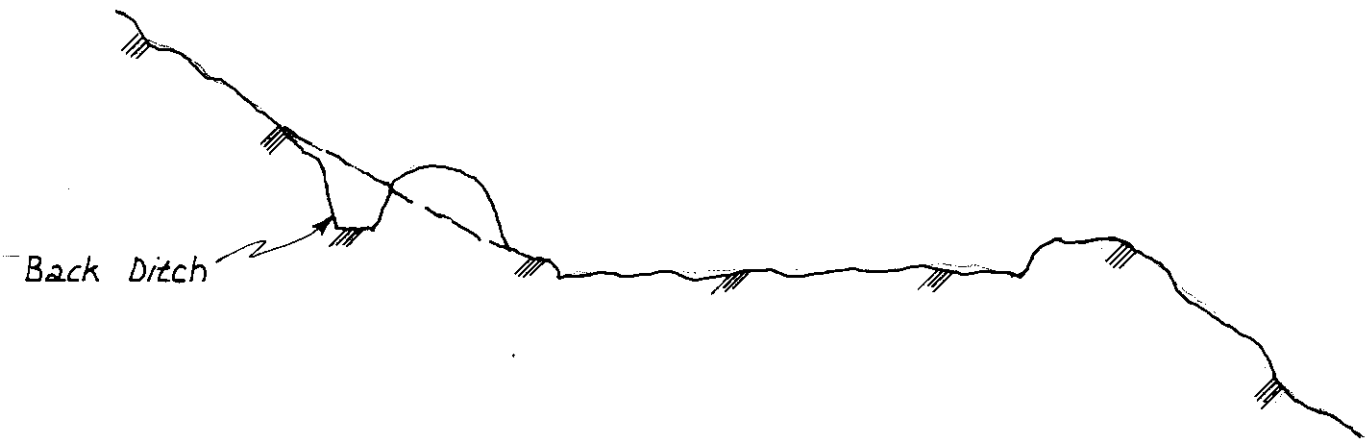
Typical Crossing



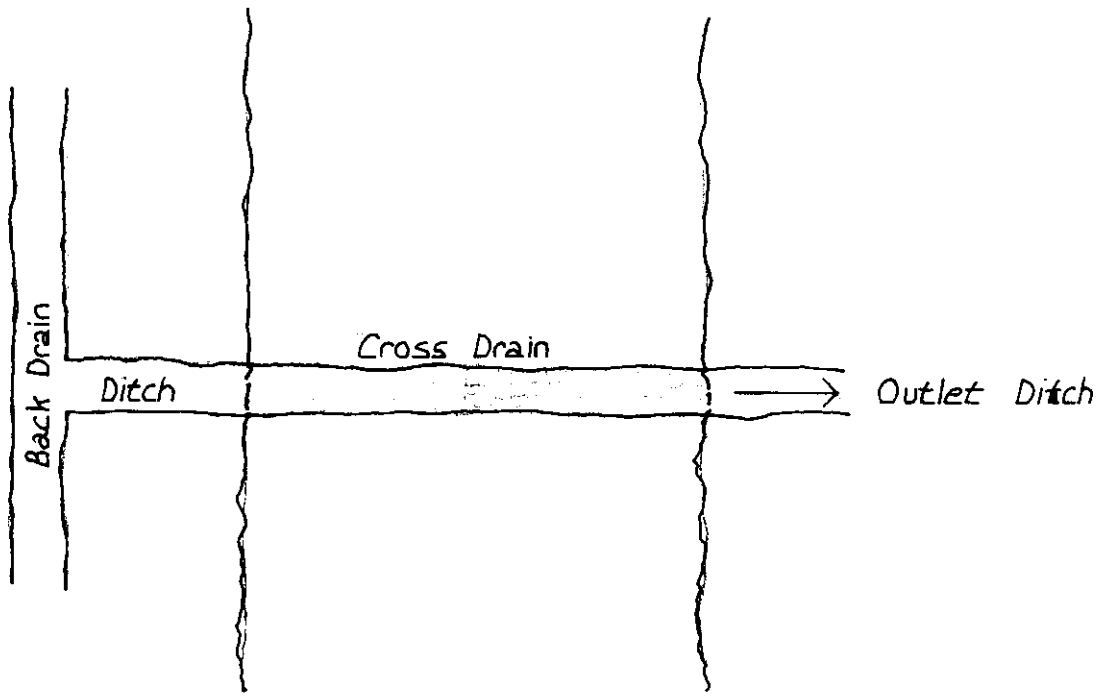
Typical Shedding Bar

Typical Ford

Back Drain Details



Typical Section



Plan

BRIDGE SURVEY SHEETS: 1 - 7

BRIDGE SURVEY SHEET

Bridge No.: 1 Bridge Type: BEAM Survey Sheet No. 3

	Description
Span	2200
Width overall	3100
Width road	3100
Height from burn bed	1900
Depth of water	200 (VARIES)
Flood level (assessed)	NOT KNOWN
Bed	BOULDERS & GRAVEL

Deck	Construction/ Materials	Condition	Repairs
STEEL & TIMBER GRILLAGE	SLEEPERS ON SLEEPERS ON SLEEPERS ON 3 STEEL RAILS	TIMBERS ROTTING STEEL RAILS WEAK	REPLACE WITH NEW TIMBER DECK ON GALVANISED STEEL BEAMS

Abutments	Construction/ Materials	Condition	Repairs
VERTICAL MASONRY	RANDOM STONE	FAIR	HARD PIN & POINT

Spandrel & Wing Walls	Construction/ Materials	Condition	Repairs
MASONRY	RANDOM RUBBLE	FAIR	HARD PIN & POINT

Training Walls	Construction/ Materials	Condition	Repairs
MASONRY	RANDOM RUBBLE	FAIR	HARD PIN & POINT

BRIDGE SURVEY SHEET

Bridge No.: 2 Bridge Type: BAILEY Survey Sheet No. 6

	Description
Span	18 400
Width overall	4 100
Width road	3 300
Height from burn bed	2 750
Depth of water	200 (VARIES)
Flood level (assessed)	NOT KNOWN
Bed	BOULDERS & GRAVEL

Deck	Construction/ Materials	Condition	Repairs
BEAM	STEEL BAILEY BRIDGE WITH TIMBER DECK 225 x 75	STEEL WORK RUSTING & CORRODING NO TIMBER DECK BATONS ROTTED	REMOVE RUST BY SHOT BLASTING APPLY FOUR COAT PAINT SYSTEM RENEW DEFECTIVE TIMBERS

Abutments	Construction/ Materials	Condition	Repairs
	MASS CONCRETE	FAIR	NONE

Spandrel & Wing Walls	Construction/ Materials	Condition	Repairs
WING WALLS	RANDOM RUBBLE	FAIR	PIN & POINT

Training Walls	Construction/ Materials	Condition	Repairs
NONE			

BRIDGE SURVEY SHEET

Bridge No.: 3 Bridge Type: MASONRY ARCH (ORIGINAL) Survey Sheet No. 7

	Description
Span	6000
Width overall	4200
Width road	3600
Height from burn bed	
Depth of water	
Flood level (assessed)	
Bed	

Deck	Construction/ Materials	Condition	Repairs
	MASONRY SCHIST VOUSSOIR ARCH WITH TEMPERED SAND FILL OVER	DISTORTED BUT FAIR RECENTLY RESTORED	NONE BUT SUBJECT TO ANNUAL INSPECTION

Abutments	Construction/ Materials	Condition	Repairs
	RANDOM MASONRY	FAIR RECENTLY RESTORED	NONE BUT SUBJECT TO ANNUAL INSPECTION

Spandrel & Wing Walls	Construction/ Materials	Condition	Repairs
	RANDOM MASONRY (SCHIST) CROSS TIED BY 12 MO 20φ 5.5 BARS	OUT OF PLUMB BUT STABILISED BY THE BARS	PERIODIC ATTENTION TO COPINGS

Training Walls	Construction/ Materials	Condition	Repairs
NONE			

BRIDGE SURVEY SHEET

Bridge No.: ....4..... Bridge Type: TIMBER...BEAM..... Survey Sheet No.....7.....
WITH CENTRAL DROP RELATIVELY NEW

	Description
Span	7400
Width overall	3600
Width road	3300
Height from burn bed	3500
Depth of water	200 (VARIES)
Flood level (assessed)	+ 1 METRE
Bed	BOULDERS & GRAVEL

Deck	Construction/ Materials	Condition	Repairs
	4 X 300 X 300 TIMBER BEAMS WITH TIMBER BATTONS OVER TIMBER RAIL EACH SIDE	POOR. TIMBER BEAMS ROTTED TEMPORARY PROPPING INSTALLED	RENEW DECK WITH 4 MO STEEL BEAMS WITH TIMBER OVER SPANNING FULL LENGTH

Abutments	Construction/ Materials	Condition	Repairs
FULL HEIGHT AT WEST END ON ROCK OUTCROP AT EAST END	RANDOM SCHIST BEDDED & POINTED IN CEMENT MORTAR	WEST ERODED AT BASE. OPEN JOINTED EAST FAIR	UNDER PIN & PACK WEST ABUTMENT GENERALLY REMOVE EXCESS POINTING. RAKE OUT JOINT. HARD PIN & POINT WITH LIME MORTAR

Spandrel & Wing Walls	Construction/ Materials	Condition	Repairs
	RANDOM SCHIST	FAIR	AS ABOVE

Training Walls	Construction/ Materials	Condition	Repairs
NONE CENTRAL PIER	TIMBER POST FRAME ON MASONRY BASE	POOR	REMOVE

BRIDGE SURVEY SHEET

Bridge No.: 5 Bridge Type: TIMBER BEAM Survey Sheet No. 13

	Description
Span	5 600
Width overall	4 600
Width road	2 100
Height from burn bed	2 350
Depth of water	100 (VARIES)
Flood level (assessed)	+ 600
Bed	BOULDERS

Deck	Construction/ Materials	Condition	Repairs
3 TIMBER BEAMS SUPPORTING TIMBER PLANKS	3 TIMBER BEAMS SUPPORTING TIMBER BATTON DECK	POOR	RENEW WITH STEEL BEAMS & TIMBER DECK WITH RAILINGS

Abutments	Construction/ Materials	Condition	Repairs
	RANDOM RUBBLE	FAIR SOME JOINTS OPEN	RAKE OUT JOINTS & POINTS WITH LIME MORTAR

Spandrel & Wing Walls	Construction/ Materials	Condition	Repairs
	RANDOM RUBBLE	SOME STONES MISSING POINTING DEFECTIVE	HARD PIN & POINT

Training Walls	Construction/ Materials	Condition	Repairs
NONE			

BRIDGE SURVEY SHEET

Bridge No.: 6 Bridge Type: MASONRY ARCH Survey Sheet No. 14

	Description
Span	5 700
Width overall	4 700
Width road	3 700
Height from burn bed	2 500
Depth of water	2 000
Flood level (assessed)	+ 900
Bed	STONES & BOULDERS

Deck	Construction/ Materials	Condition	Repairs
STONE ARCH	STONE	FAIR	NONE

Abutments	Construction/ Materials	Condition	Repairs
STONE & MORTAR	STONE	FAIR	NONE

Spandrel & Wing Walls	Construction/ Materials	Condition	Repairs
STONE 350 HIGH	STONE	FAIR, BUT ERODED AT SOUTH EAST END	UNDERPIN HARD PIN & POINT WHERE LATER DAMAGE HAS OCCURED

Training Walls	Construction/ Materials	Condition	Repairs

BRIDGE SURVEY SHEET

Bridge No.: ....7..... Bridge Type: ...BEAM..... Survey Sheet No....14.....

	Description
Span	3 840
Width overall	3 260
Width road	3 260
Height from burn bed	1 250
Depth of water	300
Flood level (assessed)	+ 700
Bed	STONES & BOULDERS

Deck	Construction/ Materials	Condition	Repairs
4 TIMBER BEAMS 230 x 230 WITH 18 NO. 225 x 75 TIMBER PLANKS	TIMBER	FAIR (SOME DETERIORATION OF TIMBER PLANKS) RAILING DEFECTIVE	REPLACE 4 NO TIMBER PLANKS TREAT WITH CREOSOTE OR EQUIVALENT RENEW RAILINGS.

Abutments	Construction/ Materials	Condition	Repairs
VERTICAL	CONCRETE	FAIR (SOME MINOR CRACKS)	SEAL CRACKS

Spandrel & Wing Walls	Construction/ Materials	Condition	Repairs
	CONCRETE WITH STONE COPINGS	FAIR BUT EROSION AT BASE JUNCTION WITH ABUTMENTS	REPAIR ERODED AREAS WITH CONCRETE

Training Walls	Construction/ Materials	Condition	Repairs
SEE ABOVE			

BRIDGE SURVEY SHEET

Bridge No.: 7..... Bridge Type: TIMBER BEAM & DECK. Survey Sheet No.....15.....

	Description
Span	3 840
Width overall	3 260
Width road	3 260
Height from burn bed	1 250
Depth of water	250
Flood level (assessed)	TO SOFFIT
Bed	

Deck	Construction/ Materials	Condition	Repairs
4 No 230Sq TIMBER BEAMS 18 No 225 x 70 THK TIMBER PLANKS		SOUND 6 OF THE 18 PLANKS ROTTING	

Abutments	Construction/ Materials	Condition	Repairs
LEFT RIGHT	MASS CONCRETE	CRACKING & ERODING ROTATING FORWARD & ERODING	

Spandrel & Wing Walls	Construction/ Materials	Condition	Repairs
	CONCRETE	EROSION AT BASE & JUNCTION WITH ABUTMENTS	

Training Walls	Construction/ Materials	Condition	Repairs
UPSTREAM DOWNSTREAM	TIMBER RAILING NONE	INSUBSTANTIAL	

Bridge 1

Bridge 2

Bridge 3

Bridges 3 & 4

STRUCTURE No. 7 Bridge Over The Allt Feith A'Mhoraire

Bridge 7

Bridge 5

Bridge 7 'est

Bridge 6