

**Barclodiad y Gawres
Neolithic Burial Chamber**

MINOR BUILDING WORKS

VOLUME 1

CONTRACT DATA

September 2014

CAPITA

**Capita
Bryn Eirias
Abergele Road
Colwyn Bay
CONWY
LL29 8BY**

**Tel: 01492 510200
Fax: 01492 510201**

**ENW I'R CYNNIGWR
.....NAME OF TENDERER**

neC3 Engineering and Construction

SHORT CONTRACT

A contract between

CADW Welsh Historic Monuments
CADW office, Welsh Government, Plas Carew, Unit 5/7 Cefn Coed,
Parc Nantgarw, Cardiff CF15 7QQ

and

.....
.....
.....

for

**Barclodiad y Gawres
Minor Building Works**

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Prepared by: Jon Stoddard	Date: September 2014
Checked by;	Date: September 2014
Approved by:	Date:

SHORT TITLE OF WORKS:

All Permanent and Temporary Works in connection with the:

**Barclodiad y Gawres
Minor Building Works Contract**

FORM OF TENDER
INCORPORATING ANTI-COLLUSION CERTIFICATE

To CADW Welsh Historic Monuments

Having examined the Drawings, Conditions of Contract, Specification and Price List for the construction of the above mentioned Works (and the matters set out in the Appendix hereto), we offer to construct and complete the whole of the said Works and maintain the Permanent Works in conformity with the said Drawings, Conditions of Contract, Specification and Price List for such sum as may be ascertained in accordance with the said Conditions of Contract.

We undertake to complete and deliver the whole of the Permanent Works comprised in the Contract within the time(s) stated in the Appendix hereto.

Unless and until a formal Agreement by deed is prepared and executed this Tender, together with your written acceptance thereof, shall constitute a binding Contract between us.

We understand that you are not bound to accept the lowest, most economically advantageous or any tender you may receive.

Dated this _____ day of _____ 20 _____

Signature _____

In the capacity of _____

Duly authorised to sign tenders for and on behalf of:

(in BLOCK CAPITALS) _____

Postal Address _____

Tel. No. _____

Fax No. _____

ANTI-COLLUSION CERTIFICATE

- (1) We certify that this tender is made in good faith, and that we have not fixed or adjusted the amount of the tender by or under or in accordance with any agreement or arrangement with any other person. We also certify that we have not and we undertake that we will not before the award of any contract for the work:
- (i) (a) communicate to any person other than the Employer or a person duly authorised by him in that behalf the amount or approximate amount of the tender or proposed tender, except where the disclosure, in confidence, of the approximate amount of the tender was necessary to obtain insurance premium quotations required for the preparation of the tender;
 - (b) enter into any agreement or arrangement with any person that they shall refrain from tendering, that they shall withdraw any tender once offered or vary the amount of any tender to be submitted.
 - (ii) pay, give or offer to pay or give any sum of money or other valuable consideration directly or indirectly to any person for doing or having done or causing or having caused to be done in relation to any other tender or proposed tender for the said work, any act or thing of the sort described at (i) (a) or (b) above.
- (2) We further certify that the principles described in paragraph 1(i) and (ii) above have been, or will be, brought to the attention of all sub-contractors, suppliers and associated companies providing services or materials connected with the tender and any contract entered into with such sub-contractors, suppliers or associated companies will be made on the basis of compliance with the above principles by all parties.
- (3) In this certificate, the word "person" includes any persons and any body or association, corporate or unincorporated; and "any agreement or arrangement" includes any transaction, formal or informal, and whether legally binding or not; and "the work" means the work in relation to which this tender is made.

Dated this _____ day of _____ 20 _____

Signature _____

In the capacity of _____

Duly authorised to sign tenders and acknowledge the contents of the Anti - Collusion Certificate for and on behalf of:

(in BLOCK CAPITALS) _____

Postal Address _____

Tel. No. _____

Fax. No. _____

FORM OF AGREEMENT BY DEED

THIS DEED is made the _____ day of _____ 20____

BETWEEN CADW Welsh Historic Monuments
(hereinafter called "the Employer") of the one part and

_____ of _____

in the County of _____
(hereinafter called "the Contractor") of the other part.

WHEREAS the Employer is desirous that certain Works should be constructed, viz. the Permanent and Temporary Works in connection with:

**Barclodiad y Gawres
Minor Building works**

and has accepted a Tender by the Contractor for the construction and completion of such Works and maintenance of the Permanent Works.

NOW THIS DEED WITNESSETH as follows:-

- (1) In this Deed words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to.
- (2) The following documents shall be deemed to form and be read and construed as part of this Deed, viz:-
 - (a) The said Tender.
 - (b) The Drawings.
 - (c) The Conditions of Contract.
 - (d) The Works Information.
 - (e) The Price List
 - (f) Site Information
- (3) In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned the Contractor hereby covenants with the Employer to construct and complete the Works and maintain the Permanent Works in conformity in all respects with the provisions of the Contract.
- (4) The Employer hereby covenants to pay to the Contractor in consideration of the construction and completion of the Works and maintenance of the Permanent Works the Contract Price at the times and in the manner prescribed by the Contract.

FORM OF AGREEMENT BY DEED

IN WITNESS whereof the parties hereto have caused their respective Common Seals to be hereunto affixed (or have hereunto set their respective hands and seals) the day and year first above written.

EXECUTED AS A DEED BY

_____(Name of Company)

[The Common Seal of _____ Limited was hereunto affixed to this Deed in the presence of:

_____(Director)]

or

[signed:

(1) _____ (Name)

_____ (Address)

(Director)

[signed:

(1) _____ (Name)

_____ (Address)

(Director) (Secretary)

The Common Seal of *CADW Welsh Historic Monuments* was hereunto affixed to this Deed in the presence of:

_____(Name)

A Duly Authorised Officer of the said Council

FORM OF PARENT COMPANY GUARANTEE

1.1 THIS GUARANTEE is made the _____ day of _____ 20____

1.2 BETWEEN

1. Ultimate Parent [_____] (company no [_____])
Company whose registered office is at [_____]]

2. Employer CADW Welsh Historic Monuments

1.3 RECITALS

- A. The Employer has entered into a contract dated [_____] ("the Contract") with [_____] ("the Contractor") whose registered office is at [_____] to carry out and complete [the works] for a price, as defined in the Contract, of [.....] pounds, [£.....] in accordance with the Contract No [.....].
- B. Under the terms of the Contract, the Contractor is required to procure a guarantee to be given by its ultimate parent company for the due performance of all the Contractor's obligations or liabilities under the Contract.

1.4 OPERATIVE PROVISIONS

1. Unless the context otherwise requires words and expressions in this Guarantee have the same meanings as set out in the Contract.
2. We [name of Ultimate Parent Company] as the ultimate parent company and guarantor (hereinafter referred to as "the Guarantor") of [name of Contractor] guarantee unconditionally and irrevocably as a primary obligation to the Employer and not as a surety that the Contractor shall perform all of his obligations or liabilities contained in and in accordance with the Contract.
3. If the Contractor shall fail to so perform any of his obligations under the Contract or any of his liabilities arising out of or in connection with the same, the Guarantor shall forthwith perform such obligations or liabilities on the same terms or conditions as contained in the Contract or cause a third party acceptable to the Employer to so perform such obligations or liabilities on the same terms and conditions, the due or forthwith performance of which the guarantee by virtue of this Guarantee as if such third party were the Contractor.
4. The variation, amendment, extension or suspension of the Contract or the giving of time by the Employer or any negligence or forbearance by the Employer in enforcing its obligations either under the Contract or under this Guarantee or any other indulgence, concession or arrangement granted, made or entered into by the Employer shall not in any way prejudice the Guarantor's obligations under this Guarantee to the Employer, in whole or in part, pursuant to the terms thereof.
5. The Guarantor hereby authorises the Contractor and the Employer to make any amendment or variation to the Contract, the due performance of which amendment or variation shall be likewise guaranteed in accordance with the terms of this Guarantee.
6. The rights and liabilities of the Guarantor under this Guarantee shall be co-extensive with the rights and liabilities of the Contractor under the Contract. For such purposes the terms and conditions of the Contract are deemed to be incorporated within this Guarantee.

7. The Employer may assign the benefit of this Guarantee without the prior written consent of the Guarantor provided that this Guarantee is only assigned as part of the Contract. The Guarantor shall not assign or part with any interest whatsoever.
8. Any notice or other communication required under this Guarantee shall be given in writing and shall be deemed to have been properly given if compliance is made with Section 196 of the Law of Property Act 1925 (as amended by the Recorded Delivery Service Act 1962).
9. No person who is not a party to this Guarantee shall have a right to enforce any term of the Guarantee by virtue of the provisions of the Contracts (Rights of Third Parties) Act 1999.
10. The Guarantee shall come into force on the day it is dated. This Guarantee shall continue in effect until all the obligations and liabilities of the Contractor under or in connection with the Contract have been performed and complied with and notwithstanding any change in the shareholding by the Guarantor in the Contractor but in any event this Guarantee shall expire in full not later than *[insert date - being 12 years after the Completion Date]*.
11. This Guarantee is subject to English law and the jurisdiction of the Courts of England and Wales.

Delivered as a deed on the date of this document.

Executed under the common seal of **[the Parent Company]** in the presence of:

Director

Director/Secretary

The corporate seal of CADW Welsh Historic Monuments
is affixed and is authenticated by:

[.....] (Print name of authorised signatory)
Signature
A Duly Authorised Officer of the said body

CONTRACT DATA

The *Employer* is

Name CADW Welsh Historic Monuments

Address CADW Office, Welsh Government, Plas Carew,
Unit 5/7 Cefn Coed, Parc Nantgarw, Nantgarw,
Cardiff CF15 7QQ

Telephone 01443 336013

E-mail address Kathryn.Roberts@Wales.gsi.gov.uk

The *works* are

Barclodiad y Gawres, Minor Building Works

The *site* is

Barclodiad y Gawres, a Scheduled Ancient Monument (SAM) located on the Anglesey Coastal path between Cable Bay and Rhosneigr on the west coast of the Isle of Anglesey. The site is located on drawing 63944/ENV/SL/01 contained in Appendix B of this document.

The *starting date* is

To be agreed

The *completion date* is

To be agreed

The *period for reply* is

1 Week

The *defects date* is

52 Weeks after Completion

The *defects correction period* is

- **2 weeks for minor defects and defects that do not adversely affect the operation of the *works***
- **24 hours for major defects and defects that have an adverse effect on the operation of the *works*.**

The *delay damages* are

Calculated as follows:
i) **£ 30 per 24 hour delay**

The *assessment day* is the

Last Friday of each month or as otherwise agreed

The *retention* is

5 %

Does the United Kingdom Housing Grants, Construction and Regeneration Act (1996) apply?

No

Name

The *Adjudicator* is
To be agreed, selected from the list maintained by the National Assembly for Wales

Address

Telephone

Fax

E-mail address

The interest rate on late payment is

0.25 % per complete week of delay

The *Contractor* is not liable to the *Employer* for loss of or damage to the *Employer's* property in excess of

Unlimited for any one event

The *Employer* provides this insurance

None

The minimum amount of cover for the third insurance stated in the Insurance Table is

£5,000,000

The minimum amount of cover for the fourth insurance stated in the Insurance Table is

£5,000,000

The *tribunal* is

Arbitration

The arbitration procedure is

The Institution of Civil Engineers Arbitration Procedure

The *conditions of contract* are the NEC3 Engineering and Construction Short Contract (June 2005) and the following additional conditions

A21.4

The *Contractor* shall be prohibited from transferring or assigning directly or indirectly, to any person or persons whatever, any portion of his contract without the written permission of the *Employer*. Sub-letting of any part(s) of the work, except to the extent permitted in writing by the *Employer*, shall be prohibited.

A60.1.(15)

A change in the law is a compensation event if it occurs after the date of the *Contractor's* offer and only to the extent that it has the effect of increasing minimum labour rates.

A90.6

The *Employer* shall be entitled to cancel the contract and to recover from the *Contractor* the amount of any loss resulting from such cancellation if the *Contractor* shall have offered or given or agreed to give any person any gift or consideration of any kind as an inducement or reward for doing or forbearing to do or for having done or forborne to do any action in relation to obtaining or the execution of the contract or any other contract with the *Employer*, or for showing or forbearing to show favour or disfavour to any person in relation to the contract or any other contract with the *Employer*, or if the like acts shall have been done by any person employed by him or acting on his behalf (whether with or without the knowledge of the *Contractor*) or if in relation to any contract with the *Employer* the contractor or any person employed by him or acting on his behalf shall have committed any offence under the Prevention of Corruption Acts 1889 to 1916, or any amendment of them, or shall have given any fee or reward the receipt of which is an offence under the sub-section 2 of Section 117 of the Local Government Act, 1972. (Reason 9)

Parent company guarantee

X4

X4.1

If a parent company owns the *Contractor*, the *Contractor* gives the *Employer* a guarantee by the parent company of

the Contractor's performance in the form set out in the Works Information. If the guarantee was not given by the Contract Date, it is given to the *Employer* within two weeks of the Contract Date.

Special Requirements of Statutory Authorities Z1

The *Contractor* complies at his own cost with all the Special Requirements of Statutory Bodies in respect of Electricity Generating and Distribution Companies, TRANSCO, British Telecommunications plc, Sewage and Water Supply Companies, the Environment Agency as set out in Appendix A.

Z2 The Contractor

- has the right to use the Works Information or any other material relating to the works only for the purpose of providing the works and may make this right available to sub-contractors.
- returns the Works Information or any other material relating to the works to the *Employer* at the *defects date*
- does not disclose information obtained in connection with the works or this contract to any other person without the *Employer's* consent.

Z3 The parties do not intend that any person who is not a party to this contract should have the right under the Contracts (Rights of Third Parties) Act 1999 to enforce any term of this contract.

Z4 The *Contractor* shall comply with all statutory requirements applicable to the employment of staff (including, without limitation, statutory requirements relating to equal opportunities for employees) together with the *Employer's* equal opportunities rules and regulations as notified by the *Employer* to the *Contractor* from time to time.

CONTRACT DATA
THE CONTRACTOR'S OFFER

The *Contractor* is

Name

Address

Telephone

Fax

E-mail address

The percentage for overheads and profit added to the Defined Cost for people is.....%

The percentage for overheads and profit added to other Defined Cost is.....%

The *Contractor* offers to Provide the Works in accordance with the *conditions of contract* for an amount to be determined in accordance with the *conditions of contract*.

The offered total of the Prices is

Signed on behalf of the *Contractor*

Name

Position

Signature Date

THE EMPLOYER'S ACCEPTANCE

The *Employer* accepts the *Contractor's* offer to Provide the Works.

Signed on behalf of the *Employer*

Name

Position

Signature Date

CONTRACT DATA
PRICE LIST

Entries in the first four columns in this Price List are made either by the *Employer* or the tenderer.

If the *Contractor* is to be paid an amount for the item which is not adjusted if the quantity of work in the item changes, the tenderer enters the amount in the Price column only; the Unit, Quantity and Rate columns being left blank.

If the *Contractor* is to be paid an amount for the item of work which is the rate for the work multiplied by the quantity completed, the tenderer enters the rate which is then multiplied by the expected quantity to produce the Price, which is also entered.

Any other items required for completion of the works or subsections of the items in the price list are to be inserted and priced by the tenderer

BARCLODIAD Y GAWRES, MINOR BUILDING WORKS

Item Number	Description	Unit	Quantity	Rate	Price
01	Acting as Principal Contractor		item		
02	Site Health & Safety File		item		
03	Set of Pre-Start, Construction & Completion Photos		item		
04	Site Establishment incl Erection of Offices & Welfare Facilities for the Contractor		Item		
05	Servicing of Offices & Welfare Facilities for the Contractor until completion of the works		item		
06	Removal of Site Establishment		Item		
07	Make access incl. temporary fencing & any reinstatement		Item		
08	Testing and commissioning		Item		
08	As-constructed drawings plus O & M Manuals		Item		
09	All other Preliminary Items as Specification Section A		Item		
10	Works Items in Section B		Item		
11	Works Items in Section C		Item		
12	Works Items in Section D		Item		
13	Works Items in Section E		Item		
14	Works Items in Section F		Item		
	Grand Summary		The total of the Prices £		

CONTRACT DATA – SCHEDULE OF WORKS

SCHEDULE OF WORKS FOR BARCLODIAD Y GAWRES					
Item	Description of Works	Unit	Quantity	Rate	£ . p
A.	PREAMBLES:				
A.1	Note: The Contractor must price the items contained within the Schedule of Works on the site; no claim resulting from failure to do so will be entertained. The Works are described below in reasonable detail, but the Contractor should consider them in conjunction with any drawings, photographs and actual works involved on the site and shall allow for everything necessary for carrying out the work in the best possible manner, whether specifically mentioned or not. The prices are to include for the removal and carting away from time to time as it accumulates all rubbish, debris and old materials not described as for re-use or to be handed over. All dimensions given in the Contract Documentation must be verified by the Contractor on site to ascertain the exact requirements for ordering or putting work in hand. No claims resulting from the Contractor's failure to so will be entertained.	Item			
A.2	The Contractor is to provide and erect all scaffolding, internal/external propping and shoring to allow adequate support/restraint to floors, ceilings, roof, walls and internal joinery during the course of the works. Allow for all temporary boarding/sheeting over (keeping the monument sealed and water proof) and boarding openings so as to protect the monument at all times. Note: The Contractor must ensure that any scaffolding or other temporary works is un-climbable and take all necessary precautions against entry and or vandalism during the course of the works.	Item			

PAGE 1/1					
Item	Description of Works	Unit	Quantity	Rate	£ . p
B.	Site Clearance/Preparation & External Works Refer to Appendix C (Capita Drawings)				
B.1	Set out and remove sufficient areas of turf and soil around oculus and adjacent to wing walls to enable works to progress. Remove turf and soil- set aside for re-use.	Item			
B.2	Clean down ALL internal surfaces using suitable hand held equipment and solution. Standing stones within burial chamber and at entrance to be protected and covered at all times.	Item			
B.3	Remove existing railings using hand held machinery, railings to be cut off flush to existing surfaces and any burrs or sharp edges to be finished. Access to burial chamber to remain secure at all times. Railings to be removed off site.	Item			
B.4	Remove existing curved section of masonry at toe of wing walls, set aside for re-use. Make note of wall construction for re-construction purposes.	Item			
B.5	Erect timber knee rail at base of monument across alignment of 'desire line'	Item			
B.6	Install 100 x 25mm galvanised metal posts with rounded top as sustrans standard detail.	Item			
B7	Supply and install Borderline galvanised steel edging BL30G to define edge of scree area.	Item			
B8	Place excess stone in scree area to recreate natural scree finish.	Item			

PAGE 1/2					
Item	Description of Works	Unit	Quantity	Rate	£ . p

C	Extended Entrance Roof Slab and Wing Walls : Refer to Appendix D (Chris Pike - Conservation Engineering – Drawings & Specification)				
C1	Remove stone headwall masonry across roof of existing entrance by approximately 150mm	Item			
C2	Install extended entrance roof slab as per details contained in Appendix B and drawing titled 'General Arrangement Plan Showing Proposed Extension to Entrance Cover RC Slab including all preparatory work, formwork, reinforcement and masonry repair as described.	Item			
C3	Re-construct wing walls as per existing detail to new alignment as shown on drawing 63944/ENV/LP/01 including preparation of all foundation details as revealed and recorded on site.	Item			
C4	Backfill over extended roof with soil from arisings, rake to fine tilth and cover with turves removed during site clearance operations.	Item			
C5	Re-grade earth behind re-aligned masonry wing walls.	Item			
PAGE 1/3 :					

Item	Description of Works	Unit	Quantity	Rate	£ . p
D	Installation of PV Panel, Railings and Render (Refer to Appendix E – Purcell Conservation Architects and Appendix F Solar Candela)				
D1	Install sawn stone limestone dwarf wall to support PV panel. Stone to be Anglesey Limestone or similar approved.	Item			
D2	Supply install and fix PV panel including all fixings, connections and wiring.	Item			
D3	Supply install and fix new galvanised steel gates and railings as per details 05/201	Item			
D4	Supply and install new suspended ceiling (Provisional)	Item			
D5	Apply render to internal concrete walls using RIW cementflex or similar approved.	Item			
D6	Newly rendered soffit to be painted black using a Keim Royalan paint system or similar approved	Item			

Item	Description of Works	Unit	Quantity	Rate	£ . p
E	Installation and Connection of Lighting (Refer to Appendix E – Purcell Drawing No 201 and Appendix F Solar Candela Specification)				
E.1	Supply, install, fix and commission 3 No 4.7W LED Outdoor Floodlights (to be positioned on site)	Item			
E.2	Supply, install, fix and commission 3 No 4.7W LED Outdoor Floodlights (to be positioned on site).	Item			
E.3	Supply, install, fix and commission 3W LED Tube Lamp Uplight (to be positioned on site)	Item			
E.4	Supply, install, fix and commission Sonnenstein Solar battery and battery enclosure	Item			
E5	Supply, install, fix and commission Steca Solarix MPPT Solar Charge Controller with Maximum Power Point Tracking	Item			
F	ADDITIONAL ITEMS				
F.1	The tenderer may insert any additional items required for the successful completion of the works.	Item			
PAGE 1/4 SUMMARY: TOTAL FOR SITE 1 CARRIED TO GRAND					

WORKS INFORMATION

1. DESCRIPTION OF THE WORKS

- 1.1 The aims of the works are to improve the approach, access and presentation of the Barclodiad y Gawres, a Neolithic burial chamber located on the Anglesey Coastal Path between Cable Bay and Rhosneigr on the west coast of Anglesey. The burial chamber is a Scheduled Ancient Monument (SAM) and is protected under the Ancient Monuments and Archaeological Areas Act 1979. CADW is the Welsh Government historic environment service and are the custodians of the SAM and responsible for the protection and management of the burial chamber.
- 1.2 The proposals for the works have been developed with CADW over a period of time and are designed to be sensitive interventions that will improve and promote public access, appreciation and enjoyment of the Barclodiad y Gawres. The proposals for the works are summarised in a series of bullet points below:-
- Installation of photo-voltaic array to generate sufficient electricity to power lights within the burial chamber that will illuminate the standing stones. Photo-voltaic system to be housed within bespoke frame and sawn stone plinth installed on top of monument.
 - Installation of uplighters and battery system and connection to photo voltaic array described above.
 - Installation of new galvanised steel grilles/railings including removal of existing
 - Extension of covering over entrance, earth profiling and seeding
 - Realignment of wing walls (part only), regrading of banks, creation of scree
 - Installation of timber knee rail
 - Construction of localised footpath improvements/reinstatement following completion of the works
- 1.3 The Contractor is required to act as Principal Contractor in compliance with the CDM Regulations 2007. The Contractor will be provided with the Pre-Construction Information Document and the contract drawings in electronic format (Word/Auto CAD) and shall develop and update these as required and provide the completed Health and Safety File including the "As Constructed" drawings **upon completion of the minor building works.**
- 1.4 Pre-condition surveys of all site areas, means of access, footpaths and the car park where site cabins and welfare facilities will be located are to be undertaken and agreed with the Employer before commencing any works.

General

- 1.5 The burial chamber is closed at all times with access restricted by railings and a locked gate. Access can be arranged by obtaining a key to the padlock by prior agreement with CADW. As a temporary measure a key to the padlock is available from the Wayside Stores in the nearby village of Llanfaelog. The keys should be retained by the *Contractor* during the works and returned to the Employer at the handback meeting once the works have been completed
- 1.6 The *Contractor* will be fully responsible for the security and integrity of the burial chamber during the minor building works period. Access to the burial chamber by the public during the construction period will not be permitted.
- 1.7 Progress photographs shall be taken during the works as follows; prior to commencement of construction, once during construction and at completion, all at locations agreed with the *Employer*. Two CDs of each set of photographs are to be supplied in digital format.

2. DRAWINGS

The drawings are included in the Appendices.

3. SPECIFICATION

The Specification referred to in the tender shall be the 'The National Building Specification' (NBS), Sections A as amended for this contract.

Other specifications are included in the relevant Appendices.

4. CONSTRAINTS ON HOW THE CONTRACTOR PROVIDES THE WORKS

ACCESS AND SECURITY

The *Contractor* shall commence work on the *starting date* unless otherwise agreed. The order of works and the programming of work shall be agreed with the *Employer* prior to the start of *works* and may be revised during the course of the *works*.

Access to the site is to be maintained at all times and Cable Bay Car Park and the Anglesey Coastal Path must not be obstructed by vehicles, plant or materials at any point during the contract period.

The Contractor shall restrict his activities to the areas in the immediate vicinity of the car park and burial chamber, which shall be delineated on site. Compounds and storage areas are to be kept to a minimum. All details are to be agreed with the *Employer*.

RISKS TO HEALTH AND SAFETY FROM MATERIAL AND SUBSTANCES

The *Contractor* shall take appropriate measures with all situations hazardous to health that include:

- i) Working in remote locations
- ii) Inclement weather
- iii) Lone Working
- iv) Cement
- v) Dust
- vi) Paint

Other risks will be included in the Pre-Construction Information Document that will be issued to the successful tenderer.

The *Contractor* shall obtain the *Employer's* approval of the measures he proposes to take to safeguard the general public and owners and occupiers of property adjacent to the works, from the affects of hazardous materials.

Where members of the public are likely to be in the vicinity of the works, the *Contractor* shall take the following measures:

- i dampening at the source of hazardous material to prevent its formation.
- ii provision of screens where the source is a consequence of the construction operations. The screens shall be placed to be effective for the prevailing wind conditions. They shall be repositioned if, and when direction changes.
- iii provision of signs warning that work is taking place which involves hazardous materials.
- iv diversions of pedestrians away from such areas including the provision of greater width Safety Lines for the duration of the operation.
- v any other measures to be included in the Pre-Construction Information Document.

These requirements do not in any way relieve the *Contractor* of his obligations under Health and Safety legislation.

The *Contractor* also shall take note of any hazardous materials identified in the Site Information and shall take appropriate precautions to protect his workforce, the *Employer* and his representatives and the public.

The *Contractor* shall immediately notify the *Employer* of any hazardous materials discovered during the works and shall take appropriate measures as may be approved by the *Employer* and the relevant authorities for the disposal of such materials.

The *Contractor* shall ensure that all workmen, sub-contractors and supervisors are issued with protective equipment appropriate for the performance of their tasks, in particular for the handling of bituminous inflammable and volatile materials.

Should the *Contractor* identify hazardous materials other than the materials or arisings described elsewhere in the Contract he shall advise the *Employer* who will direct what sampling, testing and remediation is required.

COMMISSIONING AND SETTING TO WORK

The lighting fixtures and fittings shall be set to work at completion and handover/handback to the *Employer*.

WORKING HOURS

The *Contractor* shall limit his operations to the following hours:

Monday to Friday - 8.00am to 6.00pm.

Sundays and Public holidays – working not permitted

The *Employer's* permission in writing will be required for any work outside these hours, which will not generally be given.

MAXIMUM TIME FOR COMPLETION

The overall duration of the project is approximately 1 month but this period of time will be confirmed on appointment and may be subject to inclement weather.

5. REQUIREMENTS FOR THE PROGRAMME

Within a week of the award of the contract, the *Contractor* shall provide a bar chart programme showing the principal activities at each site at the commencement of *works* and shall update this, every week during the contract period. The critical path to completion shall be shown

The programme shall also show the resources that are expected to be used for each activity.

Every two weeks the programme shall be updated and issued to the *Employer* to report on the progress achieved, planned works and changes to the *completion date* as a consequence of any compensation events which may arise.

The *Contractor* shall also submit to the *Employer* weekly returns for plant, labour, materials and disposal records.

6. SERVICES AND OTHER THINGS PROVIDED BY THE EMPLOYER

See Specification.

7. SITE INFORMATION

A Pre-Construction Information Document will be prepared and issued to the successful contractor. However, historic records, drawings and photographs are included in Appendix G for information only.

Information regarding Statutory Undertakers services in the general area is to be contained within the Pre-construction Information Document. However, there are no known services in the near vicinity of the burial chamber. No guarantees are given as to the accuracy or full extent of any services and the Contractor should satisfy himself regarding the location of services before commencing any works.

CONTRACT DATA

APPENDIX A

SPECIAL REQUIREMENTS OF WEFO & STATUTORY AUTHORITIES

The Contractor will comply with the Special Requirements of WEFO and the following Statutory Undertakers.

TRANSCO
Scottish Power
British Telecommunications PLC
Dwr Cymru – Welsh Water
The Environment Agency

WELSH EUROPEAN FUNDING OFFICE'S (WEFO) ENVIRONMENTAL SUSTAINABILITY AND EQUAL OPPORTUNITIES CONDITIONS/RECOMMENDATIONS

Environmental Sustainability

- There must be no inappropriate development in protected areas. (Natura 2000 sites, SSSI's SACs, etc). Without details of where the projects/planning applications are proposed it is difficult to comment specifically on this aspect but close liaison with NRW to ensure no detriment to designated sites must occur in this projects development.
- It is important that relevant environmental licences are identified and obtained for all the activities, e.g. for works in or near watercourses, discharge consents, etc.
- Temporary storage and site compound facilities should look to minimise hard surfaces which exacerbates surface water runoff.
- Site environment management plans may be appropriate at some of the facilities developed.
- The project should promote sustainable recreation and tourism.
- Waste from any project activity must be appropriately managed and removed from site.
- The management team of the project needs to include environmental and coastal experts to ensure the above points are appropriately integrated into project development and delivery.

Equal Opportunities

Marketing / PR & Printed Materials

As well as ensuring all printed materials, marketing and PR is bilingual, the sponsor needs to ensure that all materials, marketing and PR is accessible and available in various formats e.g. large print, Braille, audio, which is best practice.

Signage

Again, as well as ensuring all signage is bilingual, the sponsor should ensure all signage is accessible e.g. large lettering and Braille, makes good use of text fonts/colour and background contrasts and has a combination of text and images.

Accessibility

The sponsor must ensure that access to the car park at Cable bay is not impeded and that the Anglesey Coastal Path is accessible for users at all times. It should be noted that Cable Bay is a popular tourist destination and used frequently by users of Anglesey Coastal Path. The bay is also popular with surfers and kayakers. It should also be noted that the Cable Bay Car Park is in the ownership of Bodorgan Estate and the Contractor should liaise with the owners if required.

SPECIAL REQUIREMENTS IN RELATION TO TRANSCO

1. In these Special Requirements the following terms shall have the meanings assigned to them:-
 - a) 'Company' means Transco.
 - b) 'Company Representative' means the staff of Transco or its Authorised Representatives and Agents.
 - c) 'Apparatus' means all surface or sub-surface equipment and plant including any associated Gas pipeline(s) owned, leased or rented by Transco or its Authorised Representatives and Agents.
2. Before commencing any work or moving heavy plant or equipment over any portion of the Site, the Contractor shall confirm details of the Apparatus owned, leased or rented by the Company, within the Site with the Company Representative, who can be contacted at the following point:

Transco
Wales & West Network
PO Box 502
Malago House
Bedminster
Bristol BS99 5RS
Tel: (01179) 535444
3. Where such details show that the work or the movement of plant or equipment on the Site may endanger any Apparatus, the Contractor shall give the Company Representative at least 7 days written notice of the date on which it is intended to commence such Works or the movement of plant and equipment in order that the presence of any sub-surface Apparatus can be indicated by markers to be supplied by the Company and placed by the Contractor under the supervision of the Company Representative. The Contractor shall ensure that all Apparatus is adequately protected from damage and such protective measures shall be to the satisfaction of the Company Representative.
4. In the event of a Company marker being disturbed for any reason it shall not be replaced other than in the exact position and to its former depth unless the repositioning is carried out at the direction and under the supervision of a Company Representative.
5. The Contractor shall carry out all work in connection with the Contract with reference to the requirements of the following publications:-
 - (i) Institute of Gas Engineers: IGE/SR/18 Part 1 (1990), Communication 1947 - 'Safe Working in The Vicinity of Gas Pipelines, Mains, and Associated Installation' (Part 1: 'Operation at Pressures in excess of 2 Bar').
 - (ii) Health and Safety Executive (HSE): HS(G)47 - 'Avoiding danger from underground services'.
 - (iii) British Gas Engineering Standard: BGC/PS/SSW2 - 'Code of Practice for Safe Working in The Vicinity of Transco Transmission Pipelines and Associated Installations Operating at Pressures in Excess of 7 Bar'.
 - (iv) British Gas Cathodic Protection Standard GBE/ECP1.

6. The Contractor shall avoid the disturbance of Apparatus more than is absolutely necessary for the completion of the Works in accordance with the Contract. In particular 'Thrust Blocks' and other such supports shall NOT be disturbed without the specific written approval of the Company Representative. The Contractor should particularly note that large diameter Gas pipelines may either be:-

- a) Transmission pipelines frequently operate at a pressure exceeding 7 bar.
- b) Low pressure local distribution mains.

For differing reasons either type poses a considerable hazard to safety if damaged. The Contractor should also note that smaller gas distribution pipes may be of yellow plastic, cast iron or other such material and that unless specifically known to the contrary any such services encountered during the course of the works should be assumed to be Gas pipelines and treated as such in accordance with these special requirements until positively identified otherwise and the Engineer so notified in writing.

7. No vehicle plant or machinery shall cross stand operate or travel within 3.0m of any Company Apparatus particularly Gas pipelines except as approved by the Company Representative. The Contractor shall agree his methods of working near any Apparatus with the Company Representative and ensure that any Apparatus is adequately protected from damage by the use of wooden sleeper tracks or reinforced concrete rafts at crossing points as appropriate. Temporary fencing of adequate strength shall be erected to regulate the movement of vehicles plant and machinery in the vicinity of Company Apparatus. All such protective measures shall be to the satisfaction of the Company Representative.
8. Where for the purposes of completing the Works in accordance with the Contract it is necessary to lay a new service across an existing Gas pipeline whether above or below a minimum clearance of 0.6m shall be left between the outside of the Gas pipeline and the new service to be installed. Under no circumstances shall a new service be laid parallel above or below a Gas pipeline. Hydraulic or other form of pressure testing of any new services shall not be permitted within 6.0m of any Gas pipeline unless precautions have been taken involving the use of pre-installation tested pipeline having a design factor of 0.3 for a distance of 6.0m either side of the Gas pipeline and/or such additional precautions including but not limited to sleeving barriers and the like as the Company Representative may require in consultation with the Engineer.
9. The Contractor shall particularly note that Gas pipelines and other Apparatus of the Company is usually cathodically protected to Company standard BGC/PS.ECP1. The Company will require to carry out interaction tests to determine whether its own system will be adversely affected by any new service and/or its protective measures. Any work requiring the removal modification and or movement of Company Apparatus shall only be carried out by the staff of the Company and/or its authorised contractors and Agents. In the event that any cathodic protection posts and/or associated Apparatus require to be removed, replaced and/or moved for the purposes of the Works, the Contractor shall give not less than seven days written notice of the requirement to the Company.
10. When excavating or backfilling around Apparatus, the Company Representative shall be given not less than 3 days written notice of the Contractor's intentions, in order that he may supervise the Works.
11. Backfilling shall be in 150mm layers, or as may otherwise be directed, consolidated layer by layer to the satisfaction of the Company Representative. Fill shall be free from flints stones and carbonaceous material. Where slabbing reduces such depth clean sand filling shall be used.
12. All excavation adjacent to Apparatus is to be carried out by hand until the exact extent and/or location of Apparatus is known. The Contractor shall note the following:-
- 1) Mechanical borers and/or excavators shall not be used within 5.0m of Apparatus.
 - 2) Hand held power assisted tools shall not be used within 1.5m of Apparatus without the supervisory presence of a Company Representative.

To prevent any movement of Apparatus during excavation, complete shuttering shall be used as directed by the Engineer if:-

- a) Excavation is deeper than the depth of cover of adjacent Apparatus.
- b) Excavation is within 3.0m of Apparatus in stable soil.
- c) Excavation is within 6.0m of Apparatus in unstable soil.

Where excavation results in the exposing of Gas pipelines or other Apparatus protective timber cladding shall be applied to the Gas pipelines or Apparatus to the satisfaction of the Company Representative and shall be maintained until such excavation is reinstated and backfilled.

13. If for the completion of the Works the Contractor intends using any of the following:-
- i) Pile driving equipment within 15.0m of Apparatus (or such greater distance as may be required to ensure that the MAXIMUM peak particle velocity as measured at the Apparatus does NOT exceed 25mm per second).
 - ii) Explosives within:-
 - a) 400.0m of exposed Apparatus.
 - b) 100.0m of buried Apparatus.
 - iii) Hot Works welding and the like within 15.0m of Apparatus.
 - iv) Hydraulic testing within 6.0m of Apparatus.

the Contractor shall advise the Company Representative, giving at least 7 days written notice, in order that any special protective measures for Apparatus affected may be arranged. The Contractor SHALL NOT proceed with the use of any of the above without the written consent of the Company Representative.

14. All Apparatus manholes and/or other access points and chambers within the Site shall be kept clear and unobstructed. Access for vehicles, winches and/or further equipment required by the Company for the maintenance of its Apparatus, shall be maintained at all reasonable times and unless otherwise agreed in writing by the Company Representative a clearance of 6.0m shall be allowed for such access.
15. The covers to Apparatus manholes and/or other access points and chambers shall only be lifted under the direct supervision of the Company Representative. No employee of the Contractor or of any sub-contractor employed by the Contractor shall enter any chamber and/or Apparatus of the Company unless under the supervision of the Company Representative and in any case not before a gas check as specified by the Company Representative has been carried out in the presence of the Company Representative and such checks have shown it to be safe to enter the chamber and/or Apparatus. The Company Representative shall be given reasonable access to all Apparatus and chambers when required.
16. In the event of any damage whatsoever even of a minor nature to Apparatus particularly to Gas pipeline coatings and/or test leads the Contractor shall immediately inform the Engineer and report the occurrence by contacting the Company Representative. The Company Representative will arrange for repairs to be carried out.

EMERGENCY ACTION

17. The following actions shall be taken by the Contractor in the event of a gas leak in any Apparatus:-
- a) Evacuate all personnel from the vicinity of the pipeline damage or leak.
 - b) So far as possible remove and/or extinguish all sources of ignition for a distance of at least 200m in all directions from the location of the leak. This precaution shall include a ban on the use of any electrical equipment falling within this limit.
 - c) IMMEDIATELY inform the Company the Engineer (and if required) the Emergency Services in that order.

THE EMERGENCY TELEPHONE NUMBER OF THE COMPANY IS: (01222-) 821555.

- d) Secure the area from the approach of all employees' traffic and/or the general public.
 - e) Render every assistance to the Emergency Services and/or the Company as shall be requested for the purposes of mitigating damage arising from the leak and/or for the purposes of securing public safety.
 - f) **DO NOT ATTEMPT TO SEAL ANY LEAK OF GAS AT THE POINT OF DAMAGE.**
18. Compliance with the above requirements shall not relieve the Contractor of any of his obligations under the Contract.

SPECIAL REQUIREMENTS IN RELATION TO ELECTRICITY GENERATING AND DISTRIBUTION COMPANIES

1. In these Special Requirements the following terms shall have the meanings assigned to them:-
 - a) 'Company' means: Scottish Power plc
or its successors and assigns.
 - b) 'Company Representative' means the Chief Civil Engineer of the said 'Company' defined at 1(a) of this Special Requirement or other duly Authorised Engineer Representative and/or Agent appointed for the time being to act on behalf of the said 'Company'.
 - c) 'Plant or Equipment' means any plant equipment gear machinery apparatus or appliance or any part thereof as defined in the Construction (General Provisions) Regulations 1961 and the Construction (Lifting Operations) Regulations 1961 owned, leased or rented by the said 'Company' defined at 1(a) of this Special Requirement.
 - d) 'Electricity Cable(s)' means any cabling including but not limited to 'Overhead Electricity Lines' or 'Buried Electricity Cables' owned, leased or rented for the purposes of electricity transmission and supply by the said 'Company' as defined at 1(a) of this Special Requirement.
2. Before commencing any work or moving heavy plant or equipment over any portion of the Site owned, occupied, leased or rented by the Company, the Contractor shall consult the Company Representative as early as possible and in any event not less than fourteen days before it is proposed to commence work to ascertain whether any Electricity Cable(s) or Plant and Equipment will be affected by the Works and to confirm details of any restrictions or requirements that the Company Representative may consider necessary for the safe carrying out of the Works. The Company Representative can be contacted at the following point:-

Scottish Power plc
No. 1 Narrow Lane
Llandudno Junction
Conwy
LL31 9BB
Tel. (01492) 574855
3. Where such details show that the Works or the movement of plant or equipment may endanger the equipment of the Company, the Contractor must ensure that the presence of any Electricity Cable(s), Plant or Equipment, can be indicated by markers to be supplied by the Company and placed by the Contractor under the supervision of the Company Representative. The Contractor shall ensure that all Company Electricity Cable(s), Plant or Equipment is adequately protected from damage and such protective measures, shall be approved by the Company Representative.
4. The work shall be carried out in conformity with the requirements of the Health and Safety Executive Guidance Notes:-
 - i) No. GS6 'Avoidance of Danger from Overhead Electric Cables'
 - ii) No. GS33 'Avoiding Danger from Buried Electricity Cables'.
5. Except under such restriction as the Company Representative may impose for the safety of persons and the protection of property WORKS SHALL NOT BE CARRIED OUT or cranes or other plant erected operated and/or dismantled or materials stored WITHIN THE 'PROHIBITED SPACE' WHICH IS THAT SPACE WITHIN A RADIUS OF:-
 - a) 15.0M OF LIVE OVERHEAD ELECTRICITY LINES WHERE LINES ARE CARRIED ON STEEL TOWERS
 - b) 9.0M OF LIVE OVERHEAD ELECTRICITY LINES WHERE THE LINES ARE CARRIED ON WOOD POLES

TOGETHER WITH ANYWHERE VERTICALLY ABOVE THIS SPACE. These distances shall be maintained at all times between any Overhead Electricity lines or anything connected to such Overhead Electricity Lines owned, leased or rented by the Company.

6. The Contractor and any sub-contractor employed by him shall particularly note and bring to the attention of their respective employees the danger of 'Flash-over' where as a result of the very high voltages being transmitted potentially lethal shocks can occur in close proximity to live Overhead Electricity Lines WITHOUT ANY CONTACT BEING MADE.
7. Debris produced when trimming or felling trees and/or from demolition MUST NOT fall or be projected into the 'Prohibited Space'. Similarly excavation spoil must not be dumped or accumulated so as to cause infringement of the 'Prohibited Space'.
8. Special care MUST be taken when using material, which shall include but not be limited to, rope wire and/or measuring tape and the like.
9. The Contractor shall exercise particular care when carrying out work which involves the use of water jets or piped slurry. Liquids when being carried or used for the purposes of the Works MUST NOT be allowed to splash, fall or otherwise be projected into the 'Prohibited Space'.
10. If a crane or other equipment is used, crane stops, fencing and warning notices shall be provided by the Contractor to ensure that there can be no encroachment on the 'Prohibited Space' by crane load or other equipment even if the crane load or equipment slips fails or overturns.
11. Portable ladders used in the vicinity of the Overhead Electricity Lines shall be of wood or other non-conducting material and shall not be reinforced by metal attachments running along stiles of the ladders. Even ladders without reinforcement can lead to serious electrical shocks if allowed to come close to live overhead equipment and therefore special precautions must be taken to ensure that the ladder cannot slip and encroach on the 'Prohibited Space'.
12. Any disturbance of or attachment to any Plant or Equipment or Electric Cable(s) of the Company shall ONLY be carried out by staff of the Company or its authorised contractors and/or agents.
13. Long objects, which shall include but not be limited to, pipes, scaffold poles, ladders, and/or long handled tools or any object of such length that if carried vertically could infringe on the 'Prohibited Space' MUST BE CARRIED HORIZONTALLY.
14. Where for the purposes of completing the Works in accordance with the Contract the need arises to work within the 'Prohibited Space' the Contractor shall give the Company Representative not less than twenty eight days written notice of the dates upon which it is intended to operate plant or equipment or carry out any work. The permission of the Company Representative MUST be obtained in writing BEFORE any plant or equipment is operated or work of any kind is carried out WITHIN the above distances. Such operations or work shall only be carried out in the presence of the Company Representatives unless notice shall have been obtained in writing from the Company Representative that such a presence on Site is not required.
15. In the event of the Company requiring emergency and/or maintenance work to be executed on the Electricity Cable(s) whether Overhead Electricity Lines or buried Electricity Cables during the period of the Contract the Contractor shall afford all reasonable facilities and access to the staff of the Company or its authorised contractors and/or agents.
16. Work shall not be carried out in the immediate vicinity of the overhead lines during periods of poor visibility. If this is not reasonably practicable additional precautions MUST be taken including but not limited to the erection of appropriate barriers to ensure maintenance of the appropriate safety clearances.
17. Compliance with the above requirements shall not relieve the Contractor of any of his obligations under the Contract or of the responsibility for taking every precaution to avoid risk to persons and/or damage to property.

SPECIAL REQUIREMENTS IN RELATION TO WATER AND SEWERAGE COMPANIES

1. In these Special Requirements the following terms shall have the meanings assigned to them:-
 - a) 'Company' means: Dwr Cymru Cyfyngedig or its successors and assigns.
 - b) 'Company Representative' means the Chief Civil Engineer of the said 'Company' defined at 1(a) of this Special Requirement or other duly Authorised Engineer Representative and/or Agent appointed for the time being to act on his behalf of the said 'Company'.
 - c) 'Mains and Sewers' means any surface or sub-surface pipeline or construction together with any associated apparatus, appliance, access covers, manholes, shafts, and/or chambers thereto owned, leased or rented by the said 'Company' defined at 1(a) of this Special Requirement.
2. Before commencing any work or moving heavy plant or equipment over any portion of the Site the Contractor shall confirm the details and location of any Mains and Sewers of the Company with the Company Representative, who can be contacted at the following point:-

Dwr Cymru Welsh Water
PO Box 10
Treharris
CF46 6XZ
Tel: 01443 331000
3. Where such details show that the Works or the movement of plant or equipment may endanger any Mains and Sewers, the Contractor shall give the Company Representative at least 7 days written notice of the date on which it is intended to commence such works or the movement of plant and equipment in order that the presence of any Mains and Sewers can be indicated by markers to be supplied by the Company and placed by the Contractor under the supervision of the Company Representative. The Contractor shall ensure that all Mains and Sewers are adequately protected from damage to the satisfaction of the Company Representative.
4. In the event of a Company marker being disturbed for any reason it shall not be replaced other than in the exact position and to its former depth unless the repositioning is carried out at the direction and under the supervision of the Company Representative.
5. All excavation adjacent to Mains and Sewers shall be carried out by hand until the exact extent and/or location of Mains and Sewers is known. Mechanical borers and/or excavators shall not be used within 3.0m of Mains and Sewers without the presence of the Company Representative. To prevent any movement of Mains and Sewers during excavation, complete shuttering shall be used as directed by the Engineer if:-
 - a) Excavation is deeper than the depth of cover of adjacent Mains and Sewers.
 - b) Excavation is within 3.0m of Mains and Sewers in stable soil.
 - c) Excavation is within 6.0m of Mains and Sewers in unstable soil.

If for the completion of the Works the Contractor intends using any of the following:-

- i) Pile driving equipment within 15.0m of Mains and Sewers.
- ii) Explosives within 200.0m of Mains and Sewers.
- iii) Any hot work such as welding and the like within 6.0m of any Mains and Sewers.

the Contractor shall advise the Company Representative, giving at least 7 days written notice, in order that any special protective measures for the Mains and Sewers affected may be arranged.

6. Material of any kind whatsoever comprising part of Mains and Sewers, manholes, shafts, thrust blocks, or any other construction shall not be cut away without the prior written approval of the Company Representative.

7. Any temporary roads or access routes within 5.0m of Mains and Sewers, shall be provided with a load bearing surface to the satisfaction of the Company Representative.
8. The Contractor or any sub-contractor employed by him shall not stack pile and/or store materials of any kind or erect temporary structures and/or notice boards of any sort within 5.0m of any Mains and Sewers.
9. All Mains and Sewers, especially manholes shafts and access points and/or chambers within the Site shall be kept clear and unobstructed. A minimum 3.0m access sufficient for heavy vehicles and/or any further plant and equipment required by the Company for the maintenance of its Mains and Sewers, must be maintained to and around the centre of any Company manholes, shafts, chambers and/or other access points and the Company Representative shall be given access to all Company Mains and Sewers when required at all reasonable times.
10. The covers to Mains and Sewers, particularly manholes, shafts and access points and/or chambers shall only be lifted under the direct supervision of the Company Representative. Employees of the Contractor or of any sub-contractor employed by the Contractor shall NOT enter any Mains and Sewers manholes, shafts, access points and/or chambers unless under the supervision of the Company Representative and in any case not before any safety checks required by the Company Representative have been carried out and such checks have shown it to be safe to enter the Mains and Sewers.
11. In the event of any damage whatsoever to Mains and Sewers, the Contractor shall immediately inform the Engineer and report the occurrence immediately by contacting the Company Representative.
12. The Contractor and/or any sub-contractor employed by the Contractor shall take all necessary precautions to ensure that any Mains and Sewers are fully protected from any accidental falls or flows of liquids and/or materials, which by themselves or in combination with any existing materials and/or liquids could cause or aggravate pollution, create poisonous substances and/or toxic fumes or react with sewer contents to cause toxic substances or fumes and/or could cause harm to persons or property and/or impede any operations of the Company.
13. The Contractor and/or any sub-contractor employed by the Contractor shall not discharge nor cause to be discharged any water or other liquid or tip any condemned or surplus material or waste of any kind whatsoever into Mains and Sewers nor abstract, extract and/or draw water from any Mains and Sewers without the written permission of the Company Representative.
14. The Contractor shall particularly note that the Sewer system can be liable to 'surcharge' in certain circumstances and under these conditions is liable to bursting. Stringent safety precautions as directed by the Company Representative shall be applied in such conditions.

EMERGENCY ACTION

15. The following actions shall be taken by the Contractor in the event of a burst to any of the Mains and Sewers:-
 - a) Immediately inform the Company the Engineer and (if required) the Emergency Services in that order.
 - b) Secure the area from the approach of traffic and/or the general public.
 - c) Render every assistance to the Emergency Services and/or the Company as shall be requested for the purposes of mitigating damage arising from the leak and/or for the purposes of securing public safety.
 - d) With regard to landslope and any apparent flow direction of any leaking sewerage or water, construct if possible and as necessary dams bunds with earth and/or board to prevent flows inundating any adjacent properties, ditches, streams, drains, manholes or other such water courses and ducts.
16. Compliance with the above requirements shall not relieve the Contractor of any of his obligations under the Contract.

SPECIAL REQUIREMENTS IN RELATION TO BRITISH TELECOM PLC

1. In these special requirements the following terms shall have the meanings assigned to them:-
 - (a) 'Company' means British Telecommunications PLC
 - (b) 'Company Representative' means the staff of British Telecommunications PLC or its Authorised Representatives and Agents.
 - (c) 'Apparatus' means all surface or sub-surface equipment and plant including any associated cabling and/or ducting owned, leased or rented by British Telecommunications PLC.
2. Before commencing any work or moving heavy plant or equipment over any portion of the site the contractor shall confirm details of the apparatus, within the site with the company representative, who can be contacted at the following point:

British Telecom plc
PPT 404B
Telecom House
Trinity Street
Hanley
Stoke on Trent
ST1 5ND
Tel: (0800) 318916
3. Where such details show that the works or the movement of plant or equipment may endanger any apparatus, the contractor must give the company representative at least 7 days written notice of the date on which it is intended to commence such works or the movement of plant and equipment in order that the presence of any sub-surface apparatus can be indicated by markers to be supplied by the company and placed by the contractor under the supervision of a company representative. The contractor shall ensure that all apparatus, particularly surface running cabling, is adequately protected from damage and such protective measures shall be approved by the engineer.
4. In the event of a company marker being disturbed for any reason it shall not be replaced other than in the exact position and to its former depth unless the repositioning is carried out at the direction and under the supervision of a company representative.
5. The contractor shall take particular care in relation to the protection of apparatus, where such apparatus includes the presence within the site of optical fibre and/or co-axial cabling. The contractor should particularly note that damage to such apparatus is extremely disruptive to the company network and costly to reinstate. The contractor shall make every effort to avoid the disturbance of apparatus more than is absolutely necessary for the completion of the works in accordance with the contract.
6. When excavating around, moving or backfilling around apparatus, the company representative shall be given adequate notice, which shall not be less than 3 days, of the contractor's intentions in order that he may supervise the works. The contractor should note that the normal depth of cover for apparatus and ducts is as follows:-
 - (a) In carriageways 600mm, which is to be maintained.
 - (b) In footways 450mm, which is to be maintained.
 - (i) Where the 600/450mm depth of cover cannot be maintained the Contractor shall carry out the instructions of the Engineer for the protection of Apparatus and such actions that follow from the Engineer's instruction shall be supervised by a Company Representative. Where the required depth of cover cannot be maintained over
 - (ii) cabling, such cables as are affected shall be enclosed and protected in UPVC duct to be supplied by the Company as directed by the Company Representative.
 - (ii) With regard to excavation in the vicinity of Apparatus and ducts the Contractor should have particular regard to the possibility of reduced cover and the encountering of such Apparatus and ducts at depths of cover less than that given at (a) and (b) above.

7. All excavation adjacent to apparatus is to be carried out by hand until the exact extent and/or location of apparatus is known. Mechanical borers and/or excavators shall not be used within 1.0m of apparatus without the supervisory presence of a company representative. To prevent any movement of apparatus during excavation, complete shuttering shall be used as directed by the engineer if:-
- (a) Excavation is deeper than the depth of cover of adjacent Apparatus.
 - (b) Excavation is within 1.0m of Apparatus in stable soil.
 - (c) Excavation is within 5.0m of Apparatus in unstable soil.
 - (i) If for the completion of the Works the Contractor intends using any of the following:-
 - (ii) Pile driving equipment within 10.0m of Apparatus
 - (iii) Explosives within 20.0m of Apparatus
 - (iv) Laser equipment within 10.0m of Apparatus

The Contractor shall advise the Company Representative, giving at least 7 days written notice, in order that any special protective measures for the Apparatus affected may be arranged.

8. All company manholes, joint boxes and/or other access points and chambers within the site shall be kept clear and unobstructed. Access for vehicles, winches, cabledrums and/or any further equipment required by the company for the maintenance of its apparatus, must be maintained at all reasonable times. The contractor should particularly note that footway type jointing chambers are not specified for carriageway loadings and will need to be adequately protected and/or demolished and rebuilt under the supervision of a company representative where such chambers are likely to be placed at risk, either temporarily or permanently, from the movement of plant and/or equipment on the site.
9. The covers to company chambers and/or apparatus shall only be lifted by means of appropriate keys obtained from the company representative and under the direct supervision of the company representative. No employee of the contractor or of any sub-contractor employed by the contractor shall enter any chamber and/or apparatus of the company unless under the supervision of the company representative and in any case not before the mandatory gas check has been carried out in the presence of the company representative and such checks have shown it to be safe to enter the chamber and/or apparatus. The company representative shall be given reasonable access to all apparatus and chambers when required.
10. In the event of any damage whatsoever to apparatus the contractor shall immediately inform the engineer and report the occurrence by contacting the company as follows:-
- Telephone:- dial 100 and ask operator for 'Freephone 111/dial before you dig'
11. Compliance with the above requirements shall not relieve the contractor of any of his obligations under the contract.

SPECIAL REQUIREMENTS IN RELATION TO THE NATURAL RESOURCE WALES

SPECIAL REQUIREMENTS FOR DEVELOPERS & CONSTRUCTION CONTRACTORS

1. In these Special Requirements, the following expressions shall have the meanings assigned to them:
 - i. The "Agency" means Natural Resource Wales.
 - ii. "Proper Officer (s)" means the Officer (s) of the Agency having responsibility for specific functions of the Agency in relation to the works or its Authorised Representatives and Agents.
 - iii. "Watercourse" means all rivers, streams, ditches, drains, cuts, culverts, dykes, sluices, lakes, ponds, reservoirs, docks, channels, creeks, bays, estuaries or arms of the sea (Water Resources Act 1991).

GENERAL MATTERS

2. ATTENTION IS DRAWN TO THE FOLLOWING LEGISLATION:

- Water Resources Act 1991
- Land Drainage Act 1991 (as amended 1994)
- Land Drainage Byelaws
- Salmon and Freshwater Fisheries Act 1975
- Wildlife and Countryside Act 1975 (as amended 1985)
- Ancient Monuments and Archaeological Areas Act 1979
- Badgers Act 1991
- The Environmental Protection Act 1990
- Navigation Acts
- Environment Act 1995
- The Control of Pollution (Amendment) Act 1989

and any subsequent amendments to the above legislation.

3. All workmen, agents, or persons, employed by the Contractor whilst in areas in which the powers of the Agency apply, shall be subject to the byelaws, rules and regulations of the Agency to the reasonable orders and requirements of the Proper Officers of the Agency.
4. All necessary consents and licences from the Agency must be obtained before any works commence. Early consultation is advised.
5. Where these requirements are included in Contract Documents they must be read in conjunction with those documents and will not detract from them.
6. The use of explosives for removing obstacles in or near watercourses shall not be permitted, except under exceptional circumstances with the express permission of the Agency and other regulatory bodies as necessary.
7. Fourteen days notification in writing shall be given to the Agency of the Contractor's intention to enter into or commence work within any watercourse within their jurisdiction. Not less than two working days notice shall be given of any change of programme which affects the watercourse.
8. The Agency or an appointed representative shall at all times have access to the Site where work is being carried out in the vicinity of watercourses or on floodplains, or where the Proper Officers consider that water in the underground strata could be adversely affected.

FLOOD DEFENCE REQUIREMENTS

9. The Contractor's attention is drawn to the Land Drainage Act 1991 amended by Land Drainage Act 1994, the Water Resources Act 1991 and Byelaws.
 - i. The proposals for any works, and/or temporary works, to be carried out in, over, under or adjacent to a watercourse may require the formal and prior consent of the Agency. A consent application should be submitted to the Agency with full and detailed information of the proposed works.
 - ii. Any consent issued by the Agency will not relieve the Contractor of his responsibilities regarding Temporary Works and the Agency will not be held liable for any damage resulting from the construction thereof.
10. At all times during the Contract period the Contractor shall, whilst working within a channel of a river or drainage course or floodplain, take all necessary measures for the adequate discharge of flood waters and for the continued operation of all land drainage systems in the area.
11. Any proposal for temporary diversion, obstruction or piping of a watercourse during construction shall be subject to the consent of the Agency as shall be the temporary obstruction of the floodplain by spoil heaps or by any other means.
12. The construction of any access or haul roads in floodplain areas shall be to a finished level no higher than existing ground level. On completion of the works the access road shall be removed and the route reinstated to the original ground levels or other agreed level to the satisfaction of the Agency.
13. No material shall be placed within the channel or floodplain during the construction of the Temporary Works without consent of the Agency and any such material and surplus, however arising shall be removed by the Contractor as soon as its function has been fulfilled. Where the site working area includes floodplain it shall be kept clear at all times of all materials and equipment that will float.
14. The Contractor should ensure that any works do not damage the structural integrity of fluvial, tidal or sea defences.

CONTROL OF POLLUTION REQUIREMENTS

15. The Contractor's attention is drawn to control of pollution provisions in the Water Resources Act 1991. He shall take all necessary precautions to ensure that no polluting discharge either of solid or liquids is made to any watercourse or to the underground strata and that no work carried out in any watercourse is done in such a manner as to cause pollution. Any materials, which may accidentally fall into any watercourse, shall be removed immediately.

In particular, but not by way of derogation from the generality of this Clause, the Contractor shall:

- i. obtain the prior written consent and/or approval of the Agency before making any discharge to any watercourse or to the underground strata;

The Agency's Pollution Prevention Guidelines sheets are attached for the Contractor's attention.
- ii. ensure that all fuel, lubricating oils or chemicals stored in bulk on the site are located as far as reasonably possible, and in no case closer than 10 metres from any watercourse and that such stores are sited on impervious bases and surrounded with an effective and impervious bund capable of holding the full contents of the store plus 10%. All stores shall be kept locked when not in use. All containers must be clearly labelled with their contents. A stock of oil absorbent material should be maintained on site. The drainage system of the bund shall be sealed with no discharge to any watercourse, land or groundwater;
- iii. locate all equipment using fuel oil as far away as reasonably possible from any watercourse and shall surround them with oil-absorbent material to contain spills or leaks. Refuelling of equipment should also be remote from any watercourse or drain.

- iv. ensure leaking or empty oil drums or chemical containers are removed from the site immediately;
 - v. provide for silted or discoloured water pumped from excavations either to be irrigated over grassland or settled in a lagoon prior to any discharge to a watercourse;
 - vi. not use plant in a watercourse or ford the watercourse with vehicles without the prior consent in writing of the Agency and shall ensure plant/vehicles do not leak. Regular river crossings should be by way of temporary bridges or culverts by prior agreement of the Agency;
 - vii. regularly scrape and maintain free from deposits of slurry haul roads on the site and approaches to watercourse. Any slurry so removed must be disposed of in an agreed location avoiding pollution of the watercourse. Precautions should be taken to ensure surface water drains are not contaminated by solids from workings and associated transport;
 - viii. prevent the discharge or seepage of cement slurry from any concreting work, mixing plant or ready-mix vehicle into any watercourse;
 - ix. agree with the Agency his plant, vehicle parking and servicing areas and wheel washing facilities;
 - x. ensure that any imported fill or construction material is free from polluting or toxic substances where drainage from the material can directly enter surface or underground waters;
 - xi. provide suitable sheeting under any structure over a watercourse which is to be cleaned by mechanical or chemical means/and or painted in order to prevent material entering the watercourse.
16. In executing the Works the Contractor shall take all necessary precautions to secure the efficient protection of all rivers, streams and waterways and the like, together with water in underground strata, against silting, erosion and pollution.
17. The Contractor shall not without the written consent of the Agency, remove from any part of the bottom channel or bed of a watercourse, a deposit accumulated by reason of any dam, weir or sluice. And shall not undertake such removal by causing the deposit to be carried away in suspension in the waters. Sediments so removed should be disposed of through an approved route.
18. The Contractor shall provide details to the Agency of any site investigations undertaken on suspected contaminated sites, such as gas works, chemical works.

WASTE MANAGEMENT

19. The contractor and Agency employees shall comply with the requirements of the Environmental Protection Act 1990, the Control of Pollution (Amendment) Act 1989, the Environment Act 1995 and regulations made thereunder and relevant codes of practice.
20. In particular, contractors and employees shall ensure that
- i. all necessary precautions are taken to ensure that no wastes of any type are deposited on land, or caused or allowed to be treated, kept or disposed of except under or in accordance with a Waste Management Licence or exemption registered with the Agency;
 - ii. the production, transport, recovery and disposal of wastes does not cause pollution of the environment, harm to human health or become seriously detrimental to the amenities of the locality;
 - iii. the waste does not escape from his or any other persons control;
 - iv. where waste is transferred to another person an accurate description is provided of the waste as required under the Duty of Care legislation, to ensure that the other person complies with the legislation;

- v. where waste is transferred to another person that person is authorised to receive the waste or authorised to transport the waste (i.e. They hold a Waste Management Licence, registered exemption or waste carrier registration);
 - vi. where waste is transferred to a waste management facility such as a landfill site or a treatment plant, the contractor shall carry out an audit of the facility to ensure that the site is suitable to accept the waste;
 - vii. the contractor shall ensure that all operators claiming to be exempt from the requirement to register as a carrier of waste meet to legislative requirements of the exemptions;
 - viii. the contractor shall ensure that operators of waste management facilities claiming to be exempt from the requirement to hold a Waste Management Licence meet the requirements of the exemption;
 - ix. developers should be aware of the potential hazards from landfill gas when carrying out developments on land within 250 metres of any current or former landfill sites.
21. The contractor should comply with the requirements of the Control of Pollution (Special Waste) Regulations 1980 or the Special Waste Regulations 1996 in relation to the production of consignment notes for the carriage and disposal of special wastes.
- The removal of any material which is special waste as defined by the Special Waste Regulations 1996 shall be notified to the Agency Area offices where the disposal site is located, at least 3 days and no more than 1 month, in advance of the intended removal date. If there is any doubt as to whether the wastes would be special wastes, consultation with the Agency in the area where the wastes are to be produced, will be necessary.
22. Information leaflets on the Duty of Care and Registration of Carriers are available.

WATER RESOURCES REQUIREMENTS

23. The Contractor's attention is drawn to the Water Resources Act 1991. The Contractor shall take all necessary precautions to secure the efficient protection of water abstractions whether licensed or not. A list of licensed abstractions is available on a public register but the Contractor's attention is also drawn to the possible existence of domestic abstractions exempt from licensing.
24. No works shall be carried out by the Contractor that reduces or materially alters the rate of flow passing down a watercourse, whether of a temporary nature or not.
25. Works in a watercourse of a permanent nature which result in impounding of the water may require a licence from the Agency, and the Contractor is urged to contact the Agency as soon as possible to initiate the procedures.
26. The abstraction of water from surface sources or underground sources for use in the works may require an abstraction licence from the Agency and the Contractor is urged to contact the Agency as soon as possible to initiate the procedures.

CONSERVATION AND FISHERIES REQUIREMENTS

27. The Contractor's attention is drawn to the Salmon and Freshwater Fisheries Act 1975; Water Resources Act 1991; Wildlife and Countryside Act 1981 (as amended); Ancient Monuments and Archaeological Areas Act 1979; Badgers Act 1999 and he shall take all precautions to ensure that no work in any watercourse corridor is done in such a manner as to cause damage to flora and fauna.

In particular, but not by way of derogation from the generality of this Clause, the Contractor shall

- i. not remove any bed or bank-side material for use in construction or temporary bunds;
- ii. stockpile, remote from the watercourse and keep clean any bed material necessarily removed in the course of construction and replace on completion of works, or as otherwise agreed with the Agency;

- iii. not remove vegetation other than fallen trees from or adjacent to any watercourse unless previously agreed with the Agency;
- iv. submit to the Agency for prior approval, his proposals for maintaining at all times the free passage of fish;
- v. take all necessary measures in the preparation of his programme of works to ensure that the disturbance of the channel is avoided where significant populations of salmonid fish are present in the period from the beginning of October to the end of March, unless otherwise agreed with the Agency. Similarly where significant coarse fish populations are present in river works should be avoided in the period 31 March to 30 June inclusive.
- vi. not without prior consent of the Agency,
 - (a) remove aquatic weeds in the period from the beginning of May to the end of August;
 - (b) spray aquatic weeds at any time.
- vii. not allow cut vegetation from approved clearance works to enter any watercourse;
- viii. take all necessary precautions to prevent the spread of Japanese Knotweed and Giant Hogweed. In particular, any spoil contaminated with the rhizomes or roots of these species should not be spread to areas where the plants are not currently growing.

NAVIGATION REQUIREMENTS

28. The Contractors attention is drawn to several Navigation Acts (generally specific to individual watercourses) which regulate the use of navigable waters.

In particular, but not by way of derogation from the generality of this Clause, the Contractor shall

- i) provide and maintain a permanent marker in both banks of the watercourse to indicate the presence of concealed works;
- ii) not reduce the width of any watercourse by any means without prior written approval of the Agency;
- iii) obtain written approval of the Agency as to the timing and method of working to include clearance above the navigation.

All enquiries are to be addressed to:

R.C.Carter
Team Leader Planning Liaison
Environment Agency Wales
Llwyn Brain
Ffordd Penlan
Parc Menai
Bangor
LL57 4DE
Tel: 08708 506506

In the event of an Emergency e.g. Fish Kill, Pollution or Flood, please telephone

0800 807 060 IMMEDIATELY

ENVIRONMENT AGENCY WALES

Special Requirements Supplement

Special requirements for Fisheries and Conservation

Many Welsh rivers support important and valuable fisheries for salmon, sea trout and brown trout. This information sheet provides additional guidance for individuals and organisations intending to work in or near rivers in respect of Section 23 of the "Special Requirements in Relation to the Environment Agency", which deals with Conservation and Fisheries Requirements.

- (1) The Environment Agency (the Agency) has duties and powers in respect of the protection and management of fisheries within Wales and England. All inland fisheries are privately owned and most coastal fisheries are public fisheries vested in the Crown. It is important therefore that both the Agency and the fishery owner are consulted prior to carrying out work in or near to a watercourse. In addition to the fishery protection requirements enforced by the Agency it should be noted that private fishery owners also have legal rights under Civil and Common Law.
- (2) If migratory fish are present in the river, then their passage upstream must not be impeded by work in the river. The Environment Manager (Conwy, Anglesey & Gwynedd) will be pleased to provide specific advice on this legal requirement, particularly with regard to the design of culverts and diversions, both permanent and temporary. Such specific advice is also available in respect of the requirements for protection of spawning areas and seasons (Section 23v).
- (3) Section 11 of "Special Requirements in Relation to the Agency" specifies the consenting requirement in relation to temporary diversion, obstruction or piping of a watercourse. All work in the watercourse should be carried out so as to minimise the risk of trapping fish. The Agency will organise fish rescues, where required, on a planned basis. This work is recharged at a fixed rate per man-hour (£25 per man-hour in February 1994). A fish rescue implemented by any other organisation requires the formal consent of the Agency.
- (4) The Agency has a duty to promote conservation, which applies to the approval of any formal consent. Consents may therefore be withheld unless conservation requirements are adequately satisfied. The Environment Manager (Conwy, Anglesey & Gwynedd) will be pleased to advise on conservation matters.

All enquiries are to be addressed to:

Environment Manager
Environment Agency Wales
Llwyn Brain
Ffordd Penlan
Parc Menai
Bangor
LL57 4DE

Tel: 08708 506506

CONTRACT DATA

APPENDIX B

SPECIFICATION

APPENDIX B

SPECIFICATION

The Specification referred to in the tender shall be the 'The National Building Specification' (NBS), Sections A as shown below.

PRELIMINARIES

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A10 PROJECT PARTICULARS

110 THE PROJECT

- Name: Barclodiad y Gawres Minor Building Works
- Nature: Improvements to the presentation of Barclodiad y Gawres Neolithic Burial Chamber
- Location: Headland west of Cable Bay, Rhosneigr, Isle of Anglesey
- Length of contract: see Contract Data

120 EMPLOYER (CLIENT)

- Name: CADW Welsh Historic Monuments
- Address: CADW Office, Welsh Government, Plas Carew, Unit 5/7, Cefn Coed, Parc Nantgarw, Cardiff CF15 7QQ
- Telephone: (01443) 336015

130 PRINCIPAL CONTRACTOR

- Name: to be confirmed
- Address: to be confirmed
- Telephone: to be confirmed

140 CONTRACT ADMINISTRATOR (CA)

- Name: To be Confirmed
- Address: To be Confirmed
- Telephone: To be Confirmed

150 CDM COORDINATOR

- As contract administrator

160 QUANTITY SURVEYOR

- As contract administrator

170 STRUCTURAL ENGINEER

- As contract administrator

175 MECHANICAL ENGINEER

- To be advised

178 ELECTRICAL ENGINEER

- To be advised

190A CLERK OF WORKS

- To be advised

A11 TENDER AND CONTRACT DOCUMENTS

110 TENDER DRAWINGS:

- The tender drawings are as follows:-

Capita Property and Infrastructure

Refer to Appendix B

63944/ENV/SL/01 – Site Location and Access

63944/ENV/LP/01 – Landscape Proposals Plan

Purcell Architects

Refer to Appendix C

234054/201 Rev A – Plans and Sections as Proposed

Chris Pike Associates

Refer to Appendix D

General Arrangement Plan Showing Proposed Extension to Entrance Cover RC Slab

Longitudinal and Typical Section Through Wingwall Slab Bearing

Detail A and B

Solar Candela Ltd

Refer to Appendix E

120 CONTRACT DRAWINGS

- The Contract Drawings: The same as the tender drawings.

132 SCHEDULE OF WORKS

- See Contract Data Price List

160A PRE-CONSTRUCTION INFORMATION

- Format: A separate Pre-Construction Information Plan is included with the Tender Documents

180A OTHER DOCUMENTS

- Inspection: Drawings and other documents relating to the Contract but not included in the tender documents may be seen by appointment during normal office hours at Capita Property and Infrastructure, Bryn Eirias, Abergele road, Colwyn Bay, LL29 8BY

A12 THE SITE/ EXISTING BUILDINGS

120 THE SITE

- Description: Barclodiad y Gawres Neolithic Burial Chamber

130 EXISTING BUILDINGS ON/ ADJACENT TO THE SITE

- See Contract Drawings and Pre-Construction Information

Throughout the period of the contract the conduct of all workpeople on the site must be regulated accordingly.

Work people must be strictly confined to the site and the Contractor must ensure that all tools, plant, materials etc. are kept secure and locked away when not in use.

The Contractor shall take all measures necessary to ensure the safety of the public and staff during the contract period and shall adequately segregate the site at all times to prevent access by unauthorized persons.

140 EXISTING MAINS AND SERVICES

- The Contractor is responsible for ascertaining the location and nature of existing services, before commencement of the works, coordination with the Employer to facilitate, undertake and commission all necessary works to ensure a working facility both during and after completion of the works.

- 170 SITE INVESTIGATION
 - N/A
- 180A HEALTH AND SAFETY FILE
 - Not available
- 200 ACCESS TO THE SITE
 - Description: To be agreed with the CA
- 210 PARKING
 - Restrictions on parking of the Contractor's and employers vehicles: within compounds
- 220 USE OF THE SITE
 - General: Do not use the site for any purpose other than carrying out the works.
 - Limitations: Note that the Burial Chamber is locked at all time and access to the internal area of the Burial Chamber can be arranged via prior agreement with Menter Mon Cyf, Llangefni Town Hall, Bulkeley Square, Llangefni, Ynys Mon LL77 7LR. Tel (01248) 725700
 - Contractors Compound locations to be agreed with the CA
- 230 SURROUNDING LAND/ BUILDING USES

General: The area surrounding the burial chamber is rugged coastline
- 240 HEALTH AND SAFETY HAZARDS
 - General: See designers risk assessment & Pre-Construction Information Document
- 250 SITE VISIT
 - Before tendering: Ascertain the nature of the site, access thereto and all local conditions and restrictions likely to affect the execution of the Works.
 - Arrangements for visit: Via Menter Mon, see Works information

A13 DESCRIPTION OF THE WORK

- 120 THE WORKS
 - Description: Minor building works to improve the presentation of the Neolithic Burial Chamber, see Contract data Price List for description of the works

A30 TENDERING/ SUBLETTING/ SUPPLY

MAIN CONTRACT TENDERING

- 110 • Scope: See Instructions for Tendering

- 630 DOMESTIC SUBCONTRACTS
 - General: Comply with the Construction Industry Board 'Code of Practice for the selection of subcontractors'.

A31 PROVISION, CONTENT AND USE OF DOCUMENTS

DEFINITIONS AND INTERPRETATIONS

- 110 DEFINITIONS
 - Meaning: Terms, derived terms and synonyms used in the preliminaries/general conditions and specification are as stated therein or in the appropriate British Standard or British Standard glossary.
- 120 COMMUNICATION

- Definition: Includes advise, inform, submit, give notice, instruct, agree, confirm, seek or obtain information, consent or instructions, or make arrangements.
 - Format: In writing to the person named in clause A10/140 unless specified otherwise.
 - Response: Do not proceed until response has been received.
- 130 PRODUCTS
- Definition: Materials, both manufactured and naturally occurring, and goods, including components, equipment and accessories, intended for the permanent incorporation in the Works.
 - Includes: Goods, plant, materials, site materials and things for incorporation into the Works.
- 135 SITE EQUIPMENT
- Definition: All appliances or things of whatsoever nature required in or about the construction for completion of the Works but not materials or other things intended to form or forming part of the Permanent Works.
 - Includes: Construction appliances, vehicles, consumables and tools, also temporary works, scaffolding, cabins and other site facilities.
- 140 DRAWINGS:
- Definitions: To BSRIA BG 6/2009 A design framework for building services. Design activities and drawing definitions.
- CAD data: In accordance with BS 1192
- 160 TERMS USED IN SPECIFICATION
- Remove: Disconnect, dismantle as necessary and take out the designated products or work and associated accessories, fastenings, supports, linings and bedding materials. Dispose of unwanted materials off site to licensed tip.
 - Fix: Unload, handle, store, place and fasten in position including all labours and use of site equipment.
 - Supply and fix: Includes all labour and site equipment for unloading, handling, storing and execution. All products to be supplied and fixed unless stated otherwise.
 - Keep for reuse: Do not damage designated products or work. Clean off bedding and jointing materials. Stack neatly, adequately protect and store until required by the Employer or for use in the Works as instructed.
 - Make good: Execute local remedial work to designated work. Make secure, sound and neat. Excludes redecoration and/ or replacement.
 - Replace: Supply and fix new products matching those removed. Execute work to match original new state of that removed.
 - Repair: Execute remedial work to designated products. Make secure, sound and neat. Excludes redecoration and/ or replacement.
 - Refix: Fix removed products.
 - Ease: Adjust moving parts of designated and bespoke products or work to achieve free movement and good fit in open and closed positions.
 - Match existing: Provide products and work of the same appearance and features as the original, excluding ageing and weathering. Make joints between existing and new work as inconspicuous as possible.
 - System: Equipment, accessories, controls, supports and ancillary items, including installation, necessary for that section of the work to function.
- 170 MANUFACTURER AND PRODUCT REFERENCE:
- Definition: When used in this combination:
 - Manufacturer: The firm under whose name the particular product is marked.
 - Product reference: The proprietary brand name and/or reference by which the particular product is identified.
 - Currency: References are to the particular product as specified in the manufacturer's technical literature current on the date of the invitation to tender.
- 210 CROSS REFERENCES:
- Accuracy: Check remainder of the annotation or item description against the terminology used in the section or clause referred to.
 - Related terminology: Where a numerical cross-reference is not given the relevant sections and clauses of the specification will apply.
 - Relevant clauses: Clauses in the referred to specification dealing with general matters, ancillary products and execution also apply.
 - Discrepancy or ambiguity: Before proceeding, obtain clarification or instructions.

220 REFERENCED DOCUMENTS:

- Conflicts: Specifications within the appendices or notes on associated drawings prevails over referenced documents.

230 EQUIVALENT PRODUCTS

- Inadvertent omission: Wherever products are specified by proprietary name the phrase 'or equivalent' is to be deemed included.

250 CURRENCY OF DOCUMENTS

- Currency: References to published documents are to the editions, including amendments and revisions, current on the date of the Invitation to tender.

260 SIZES

- General dimensions: Products are specified by their coordinating sizes or on the drawings within the Appendices.

410 ADDITIONAL COPIES OF DRAWINGS/ DOCUMENTS

- Copies: Two (2) of each relevant drawings and contract documents will be issued free of charge (not counting any certified copies).
Additional copies: Issued on request and charged to The Contractor

440 DIMENSIONS

- Scaled dimensions: Do not rely on. Confirm dimensions on site are appropriate to ensure successful fitting and installation of materials and fixtures

450 MEASURED QUANTITIES

- Ordering products and constructing the Works: The accuracy and sufficiency of the measured quantities is not guaranteed.
- Precedence: The specification and drawings shall over-ride the measured quantities.

460 THE SPECIFICATION

- Coordination: All sections must be read in conjunction with Main Contract Preliminaries/ General conditions.

630 TECHNICAL LITERATURE

- Information: Keep on site for reference by all supervisory personnel:
 - Manufacturers' current literature relating to all products to be used in the Works.
 - Relevant British, EN or ISO Standards.

640 MAINTENANCE INSTRUCTION AND GUARANTEES

- Components and equipment: Obtain or retain copies, register with manufacturer and hand over on or before Practical Completion of the Works.
Information handed over shall include manufacturer's instructions, operating manuals and guarantees in respect of The Works. Include details of the make and manufacture of all main components of the extensions e.g. photo voltaic, lighting fixtures, and other fixtures and fittings, together with the contact details and manufacturer's instructions. The guarantees for the manufacture and installation of photo-voltaic array and lighting.

All guarantees shall be transferable with any changes of ownership of the property during the guarantee period.

A32 MANAGEMENT OF THE WORKS

GENERALLY

110 SUPERVISION

- General: Accept responsibility for coordination, supervision and administration of the Works, including subcontracts.
- Coordination: Arrange and monitor a programme with each subcontractor, supplier, local authority and statutory undertaker, and obtain and supply information as necessary for co-ordination of the work.

120 INSURANCE

- Documentary evidence: Before starting work on site submit details, and/ or policies and receipts for the insurances required by the Conditions of Contract.

130 INSURANCE CLAIMS

- Notice: If any event occurs which may give rise to any claim or proceeding in respect of loss or damage to the Works or injury or damage to persons or property arising out of the Works, immediately give notice to the Employer, the person named in clause A10/140 and the Insurers.
- Failure to notify: Indemnify the Employer against any loss, which may be caused by failure to give such notice.

140 CLIMATIC CONDITIONS

- Information: Record accurately and retain:
 - Daily maximum and minimum air temperatures (including overnight).
 - Delays due to adverse weather, including description of the weather, types of work affected and number of hours lost.

150 OWNERSHIP

- Alteration/ clearance work: Materials arising become the property of the Contractor except where otherwise stated. Remove from site as work proceeds.

210 PROGRAMME

- Master programme: Immediately when requested and before starting work on site submit in an approved format master programme for the Works, which must include details of:
 - Planning and mobilization by the Contractor
 - Subcontractor's work
 - Running in, adjustment, commissioning and testing of all engineering services and installations
 - Work resulting from instructions issued in regard to the expenditure of provisional sums.
 - Work by others concurrent with the Contract.
- Submit two copies.

245 START OF WORK ON SITE

- Notice: Before the proposed date for start of work on site give minimum notice of one (1) week.

250 MONITORING

- Progress: Record on a copy of the programme kept on site.
- Avoiding delays: If any circumstances arise which may affect the progress of the Works submit proposals or take other action as appropriate to minimize any delay and to recover any lost time.

260 SITE MEETINGS:

General: Site meetings will be held to review progress and other matters arising from administration on the Contract.

Frequency: to be agreed.

Location: On site or at Menter Mon Cyf Offices, Llangefni Town Hall, Bulkeley Square Llangefni, Anglesey LL77 7LR.

Accommodation: Ensure availability at the time of such meetings.

290 NOTICE OF COMPLETION

- Requirement: Give notice of the anticipated dates of completion of the whole or parts of the Works.
- Associated works: Ensure necessary access, services and facilities are complete.
- Period of notice (minimum): one (1) week.

- 310 EXTENSIONS OF TIME
 - Refer to Conditions of Contract
- 420 REMOVAL/ REPLACEMENT OF EXISTING WORK
 - Extent and location: Agree before commencement.
 - Execution: Carry out in ways that minimize the extent of work.
- 430 PROPOSED INSTRUCTIONS
 - Estimates: Refer to Conditions of Contract
- 440 MEASUREMENT
 - Covered work: Give notice before covering work required to be measured.
- 460 INTERIM VALUATIONS
 - Applications: Include details of amounts due under the Contract together with all necessary supporting information.
 - Submission: See Conditions of Contract.
- 461 FINAL ACCOUNTS
 - See Conditions of Contract
- 470 PRODUCTS NOT INCORPORATED INTO THE WORKS
 - Not used

A33 QUALITY STANDARDS/ CONTROL

STANDARDS OF PRODUCTS AND EXECUTIONS

- 110 INCOMPLETE DOCUMENTATION
 - General: Where and to the extent that products or work are not fully documented, they are to be:
 - Of a kind and standard appropriate to the nature and character of that part of the Works where they will be used.
 - Suitable for the purposes stated or reasonably to be inferred from the project documents.
 - Contract documents: Omissions or errors in description and/ or quantity shall not vitiate the Contract nor release the Contractor from any obligations or liabilities under the Contract.
- 120 WORKMANSHIP SKILLS
 - Operatives: Appropriately skilled and experienced for the type and quality of work.
 - Registration: With Construction Skills Certification Scheme.
 - Evidence: Operatives must produce evidence of skills/ qualifications when requested.
- 130 QUALITY OF PRODUCTS
 - Generally: New. (Proposals for recycled products may be considered).
 - Supply of each product: From the same source or manufacturer.
 - Whole quantity of each product required to complete the Works: Consistent kind, size, quality and overall appearance.
 - Tolerances: Where critical, measures a sufficient quantity to determine compliance.
 - Deterioration: Prevent. Order in suitable quantities to a programme and use in appropriate sequence.
- 135 QUALITY OF EXECUTION
 - Generally: Fix, apply, install or lay products securely, accurately, plumb, neatly and in alignment.
 - Colour batching: Do not use different colour batches where they can be seen together.
 - Dimensions: Check on-site dimensions.
 - Finished work: Without defects, e.g. not damaged, disfigured, dirty, faulty, or out of tolerance.
 - Location and fixing of products: Adjust joints open to view so they are even and regular.
- 140 COMPLIANCE
 - Compliance with proprietary specifications: Retain on site/within site compound evidence that the proprietary product specified has been supplied.

150 INSPECTIONS

- Products and executions: Inspection or any other action must not be taken as approval unless confirmed in writing referring to:
 - Date of inspection.
 - Part of the work inspected.
 - Respects or characteristics, which are approved.
 - Extent and purpose of the approval.
 - Any associated conditions.

160 RELATED WORK

- Details: Provide all trades with necessary details of related types of work. Before starting each new type or section of work ensure previous related work is:
 - Appropriately complete.
 - In accordance with the project documents.
 - To a suitable standard.
 - In a suitable condition to receive the new work.
- Preparatory work: Ensure all necessary preparatory work has been carried out.

170 MANUFACTURER'S RECOMMENDATIONS/ INSTRUCTIONS

- General: Comply with manufacturer's printed recommendations and instructions current on the date of the Invitation to tender.
- Changes to recommendations or instructions: Submit details.
- Ancillary products and accessories: Use those supplied or recommended by main product manufacturer.
- Agrément certified products: Comply with limitations, recommendations and requirements of relevant valid certificates.

180 WATER FOR THE WORKS

- Mains supply: Clean and uncontaminated.
- Contractor to make arrangements with the Employer to utilize existing supplies with meter readings taken and water usage to be charged to the Contractor and paid by the Contractor as an adjustment to the interim applications for payment.
- Other: Do not use until:
 - Evidence of suitability is provided.
 - Tested to BS EN 1008 if instructed.

210 SAMPLES

- Products or executions: Comply with all other specification requirements and in respect of the stated or implied characteristics either:
 - To an express approval.
 - To match a sample expressly approved as a standard for the purpose.

220 APPROVAL OF PRODUCTS

- Submissions, samples, inspections and tests: Undertake or arrange to suit the Works programme.
- Approval: Relates to a sample of the product and not to the product as used in the Works. Do not confirm orders or use the product until approval of the sample has been obtained.
- Complying sample: Retain in good, clean condition on site. Remove when no longer required.

- 230 APPROVAL OF EXECUTION
- Submissions, samples, inspections and tests: undertake or arrange to suit the Works programme.
 - Approval: relates to the stated characteristics of the sample. (If approval of the finished works as a whole is required this is specified separately). Do not conceal, or process with affected work until compliance with requirements is confirmed.
 - Complying sample: Retain in good, clean condition on site. Remove when no longer required.
- 320 SETTING OUT
- General: Submit details of methods and equipment to be used in setting out the Works.
 - Levels and dimensions: Check and record the results on a copy of drawings. Notify discrepancies and obtain instructions before proceeding.
 - Inform: When complete and before commencing construction.
- 330 APPEARANCES AND FIT
- Tolerances and dimensions: If likely to be critical to execution or difficult to achieve, as early as possible either:
 - Submit proposals; or
 - Arrange for inspection of appearance of relevant aspects of partially finished work.
 - General tolerances (maximum): To BS 5606, tables 1 and 2.
- 340 CRITICAL DIMENSIONS:
- Critical dimensions: Set out and construct the works to ensure compliance with the tolerances stated.
 - Location: Detailed on tender drawing.
- 350 LEVELS OF STRUCTURAL FLOORS
- Not used
- 370 SERVICES GENERALLY
- 410 SERVICES REGULATIONS
- New or existing services: Comply with the Byelaws or Regulations of the relevant Statutory Authority.
- 420 WATER REGULATIONS/ BYELAWS NOTIFICATION
- Requirements: Notify Water Undertaker of any work carried out to or which affects new or existing services and submit any required plans, diagrams and details.
 - Consent: Allow adequate time to receive Undertaker's consent before starting work. Inform immediately if consent is withheld or is granted subject to significant conditions.
- 430 WATER REGULATIONS/ BYELAWS CONTRACTOR'S CERTIFICATE
- On completion of the Works: Submit (comply where also required to the Water Undertaker) a certificate including:
 - The address of the premises.
 - A brief description of the new installation and/or work carried out to an existing installation.
 - The Contractor's name and address.
 - A statement that the installation complies with the relevant Water Regulations or Byelaws.
 - The name and signature of the individual responsible for checking compliance.
 - The date on which the installation was checked.
- 435 ELECTRICAL INSTALLATION CERTIFICATE:
- Submit: When relevant electrical work is completed.
 - Original certificate: To be lodged in Building Manual.
- 445 SERVICE RUNS
- General: Provide adequate space and support for services, including unobstructed routes and fixings.
 - Ducts, chases and holes: Form during construction rather than cut.
 - Coordination with other works: Submit details of locations, types/ methods for fixing of the services to fabric and identification of runs and fittings.
- 450 MECHANICAL AND ELECTRICAL SERVICES
- Final tests and commissioning: Carry out so that services are in full working order at completion of the Works.

SUPERVISION/ INSPECTION/ DEFECTIVE WORK

525 ACCESS

- Extent: Provide at all reasonable times access to the Works and to other places of the Contractor or subcontractors where work is being prepared for the Contract.
- Designate: Contract Administrator.

540 DEFECTS IN EXISTING WORK

- Undocumented defects: When discovered, immediately give notice. Do not proceed with affected related work until response has been received.
- Documented remedial work: Do not execute work which may:
 - Hinder access to defective products or work; or
 - Be rendered abortive by remedial work.

560 TESTS AND INSPECTIONS

- Timing: Agree and record dates and times of tests and inspections to enable all affected parties to be represented.
- Confirmation: One working day prior to each such test or inspection. If sample or test is not ready, agree a new date and time.
- Records: Submit a copy of test certificates and retain copies on site.

610 DEFECTIVE PRODUCTS/ EXECUTIONS

- Proposals: Immediately any work or product is known, or appears, to be not in accordance with the Contract, submit proposals for opening up, inspection, testing, making good, adjustment of the Contract Sum, or removal and re-execution.
- Acceptability: Such proposals may be unacceptable and contrary instructions may be issued.

620 WORK AT OR AFTER COMPLETION

Wrappings: Remove unless otherwise instructed.

- Cleaning: Clean the Works thoroughly inside and out, including all accessible ducts and voids. Remove all splashes, deposits, efflorescence, rubbish and surplus materials.
- Cleaning materials and methods: As recommended by manufacturers of products being cleaned, and must not damage or disfigure other materials or construction.
- COSHH dated data sheets: Obtain for all materials used for cleaning and ensure they are used only as recommended by their manufacturers.
- Minor faults: Touch up in newly painted work, carefully matching colour and brushing out edges. Repaint badly marked areas back to suitable breaks or junctions.
- Moving parts of new work: Adjust, ease and lubricate as necessary to ensure easy and efficient operation, including, ironmongery, appliances, switches and controls.

710 WORK BEFORE COMPLETION

- General: Make good all damage consequent upon the Works.
- Temporary markings, coverings and protective wrappings: Remove unless otherwise instructed
- Cleaning: Clean the Works thoroughly inside and out, including all accessible ducts and voids. Remove all splashes, deposits, efflorescence, rubbish and surplus materials.
- Cleaning materials and methods: As recommended by manufacturers or products being cleaned and must not damage or disfigure other materials or construction.
- COSHH dated data sheets. Obtain for all materials used for cleaning and ensure they are used only as recommended by their manufacturers.
- Minor faults. Touch up in newly painted work, carefully matching colour and brushing out edges. Repaint badly marked areas back to suitable breaks or junctions.
- Moving parts of new work. Adjust, ease and lubricate as necessary to ensure easy and efficient operation, including doors, appliances, fittings, valves and controls.

720 SECURITY AT COMPLETION

- General: Leave the Works secure with, where appropriate, all accesses closed and locked.
- Keys: Account for and adequately label all keys and hand over to Employer with itemised schedule, retaining duplicate schedule signed by Employer as a receipt.

730 MAKING GOOD DEFECTS

- Remedial work: Arrange access with Contract Administrator or Clerk of Works.
- Rectification: Give reasonable notice for access to the various parts of the Works.
- Completion: Notify when remedial works have been completed.

A34 SECURITY/ SAFETY/ PROTECTION

SECURITY, HEALTH AND SAFETY

110 PRE CONSTRUCTION INFORMATION:

- Location: Integral with the Project Preliminaries, Tender Documentation and Pre Construction Information Documentation.

150 SECURITY

- Protection: Safeguard the site, the Works, products, materials, and any existing buildings affected by the Works from damage and theft.
- Access: Take all reasonable precautions to prevent unauthorized access to the site, the Works and adjoining property.
- Special requirements: Prevent access to any ladders, towers, scaffolding or lifting gear.

160 STABILITY

- Responsibility: Maintain the stability and structural integrity of the Works during the Contract.
- Design loads: Obtain details, support as necessary and prevent overloading.

PROTECT AGAINST THE FOLLOWING

330 NOISE CONTROL

- Standard: Comply generally with the recommendations of BS 5228 – 1, clause 9.3 to minimize noise levels during the execution of the Works.
- Noise levels from the works: Maximum level:48dB(A) when measured from site boundaries.
- Equipment: Fit compressors, percussion tools and vehicles with effective silencers of a type recommended by manufacturers of the compressors, tools or vehicles.
- Restrictions: Do not use:
 - Pneumatic drills and other noisy appliances without consent during the hours of 09:00 to Noon and 13:30 to 15:30.
 - Radios or other audio equipment will not be permitted on the site or within its boundaries.

340 POLLUTION

- Prevention: Protect the site, the Works and the general environment including heathland, minor streams and pathways against pollution.
- Contamination: If pollution occurs inform immediately, including to the appropriate Authorities and provide relevant information.

350 PESTICIDES

- Use: Not permitted.

360 NUISANCE

- Duty: Prevent nuisance from smoke, dust, rubbish, vermin and other causes.
- Surface water: Prevent hazardous build-up on site, in excavations and to surrounding areas and roads.

370 ASBESTOS CONTAINING MATERIALS

- Duty: Report immediately any suspected materials discovered during execution of the Works.
 - Do not disturb.
 - Agree methods for safe removal or encapsulation.

380 FIRE PREVENTION

- Duty: Prevent personal injury or death, and damage to the Works or other property from fire.
- Standard: Comply with Joint Code of Practice 'Fire Prevention on Construction Sites', published by the

Construction Confederation and The Fire Protection Association (The 'Joint Fire Code').

390 SMOKING ON SITE

- Smoking on site: Not permitted

400 BURNING ON SITE: BURNING ON SITE: NOT PERMITTED.

410 MOISTURE

- Wetness or dampness: Prevent, where this may cause damage to the Works.
- Drying out: Control humidity and the application of heat to prevent:
 - Blistering and failure of adhesion.
 - Damage due to trapped moisture.
 - Excessive movement.

420 INFECTED TIMBER

- Removal: Where instructed to remove timber affected by fungal/ insect attack from the building, minimize the risk of infecting other parts of the building.

430 WASTE

- Includes: Rubbish, debris, spoil, containers and surplus material.
- Minimize: Keep the site and Works clean and tidy.
- Remove: Frequently and dispose off site in a safe and competent manner:
 - Non-hazardous material: In a manner approved by the Waste Regulation Authority.
 - Hazardous material: As directed by the Waste Regulation Authority and in accordance with relevant regulations.
- Voids and cavities in the construction: Remove rubbish, dirt and residues before closing in.
- Waste transfer documentation: Retain on site.

PROTECT THE FOLLOWING:

510 EXISTING SERVICES

- Confirmation: Notify all service authorities, statutory undertakers and/ or adjacent owners of proposed works not less than one week before commencing site operations.
- Identification: Before starting work, check and mark positions of mains/ services. Where positions are not shown on drawings obtain relevant details from service authorities, statutory undertakers or other owners.
- Work adjacent to services:
 - Comply with service authority's/ statutory undertaker's recommendations.
 - Adequately protect, and prevent damage to services: Do not interfere with their operation without consent of service authorities/ statutory undertakers or other owners.
- Identifying services:- Below ground: Use signboards, giving type and depth;
 - Overhead: Use headroom markers.
- Damage to services: If any results from execution of the Works:
 - Immediately give notice and notify appropriate service authority/ statutory undertaker.
 - Make arrangements for the work to be made good without delay to the satisfaction of service authority/statutory undertaker or other owner as appropriate.Any measures taken to deal with an emergency will not affect the extent of the Contractor's liability.
- Marker tapes or protective covers: Replace, if disturbed during site operations, to service authority's/ statutory undertakers recommendations.

560 EXISTING FEATURES

- Protection: Prevent damage to existing structure, any adjacent fences, gates, walls, roads, paved areas and other site features, which are to remain in position during execution of the Works.

570 EXISTING WORK

- Protection: Prevent damage to existing property undergoing alteration or extension.
- Removal: Minimum amount necessary.
- Replacement work: To match existing or as specified .

580 BUILDING INTERIORS

- Protection: Prevent exposure to weather during course of alteration work include for temporary enclosures of sufficient size to permit execution of the work and which will remain watertight in severe weather conditions.

- 600 EXISTING FURNITURE, FITTINGS AND EQUIPMENT
 - Protection: Prevent damage or move as necessary to enable the Works to be executed. Reinstall in original positions
- 610 ESPECIALLY VALUABLE/VULNERABLE ITEMS:
 - Not used
- 620 ADJOINING PROPERTY
 - Permission: Obtain as necessary from owners if required- note the Cable Bay Car Park is owned by Bodorgan Estate
- 625 ADJOINING PROPERTY
 - Precautions:
 - Prevent trespass of workpeople and take precautions to prevent damage to adjoining property.
 - Pay all charges.
 - Remove and make good on completion or when directed.
 - Damage: Bear cost of repairing damage arising from execution of the Works.
- 630 EXISTING STRUCTURES
 - Duty: Check proposed methods of work for effects on adjacent structures inside and outside the site boundary.
 - Supports: During execution of the Works:
 - Provide and maintain all incidental shoring, strutting, needling and other supports as may be necessary to preserve stability of existing structures on the site or adjoining, that may be endangered or affected by the Works.
 - Do not remove until new work is strong enough to support existing structure.
 - Prevent overstressing of completed work when removing supports.
 - Adjacent structures: Monitor and immediately report excessive movement.
 - Standard: Comply with BS 5975.
- TIMING
- 170 WORKING HOURS
 - See Works Information

A36 FACILITIES/TEMPORARY WORK/SERVICES

GENERALLY

- 110 SPOIL HEAPS, TEMPORARY WORKS AND SERVICES
 - Location: Give notice of intended siting.
 - Maintenance: Alter, adapt and move as necessary. Remove when no longer required and make good.
- 230 TEMPORARY ACCOMMODATION
 - Proposals for temporary accommodation and storage for the Works: Submit five days prior to the Commencement Date.
 - Details to be included: Type of accommodation and storage, its siting and the programme for site installation and removal.

Facilities: Sanitary accommodation will be provided for the duration of the Contract as follows: The Contractor or any Member of their staff will not be permitted to use any part of the existing property as a meeting or mess area including the use of the toilet facilities.
The Contract will supply for their use, Temporary Conveniences and Mess/Drying room.
- 340 NAME BOARDS/ ADVERTISEMENTS
 - Name boards/ advertisements: At the CA's discretion.
- 350 SERVICES AND FACILITIES
- 440 TELEPHONES
 - Direct communication: As soon as practicable after the Date of Possession provide the Contractor's

person in charge with a mobile telephone.

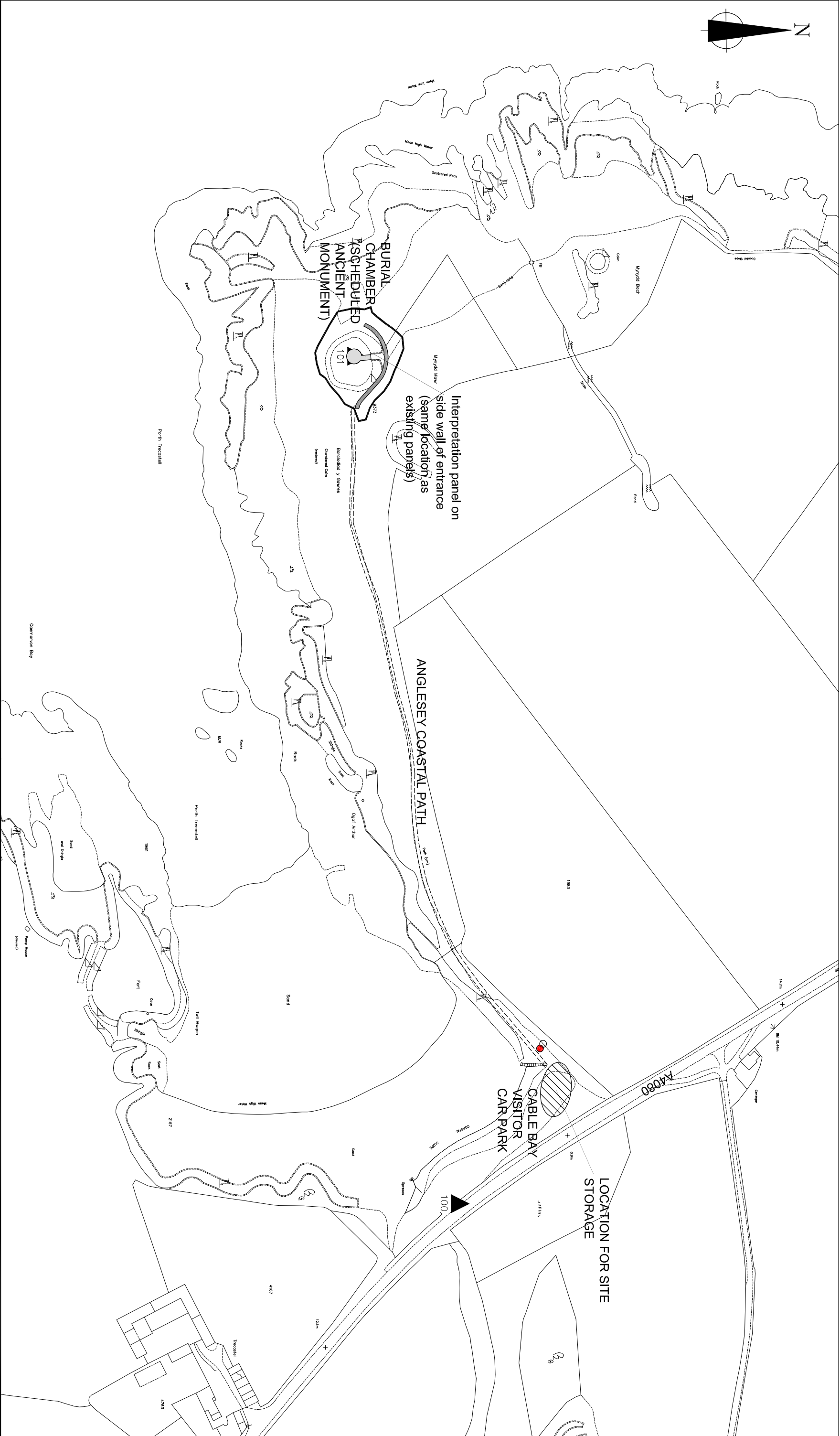
550 THERMOMETERS

- General: Provide on site and maintain in accurate condition a maximum and minimum thermometer for measuring atmospheric shade temperature, in an approved location.

A37 OPERATION/MAINTENANCE OF THE FINISHED WORKS

110 THE BUILDING MANUAL

- Responsibility: Contractor to provide data for inclusion in Operating & Maintenance Manual & Health & Safety File



Path Length = 55 Lin m

● Stone Monolith Panel
(Marion Blockley)

Path Area = 113m2



Barclodiad y Gawres

Site Location & Access

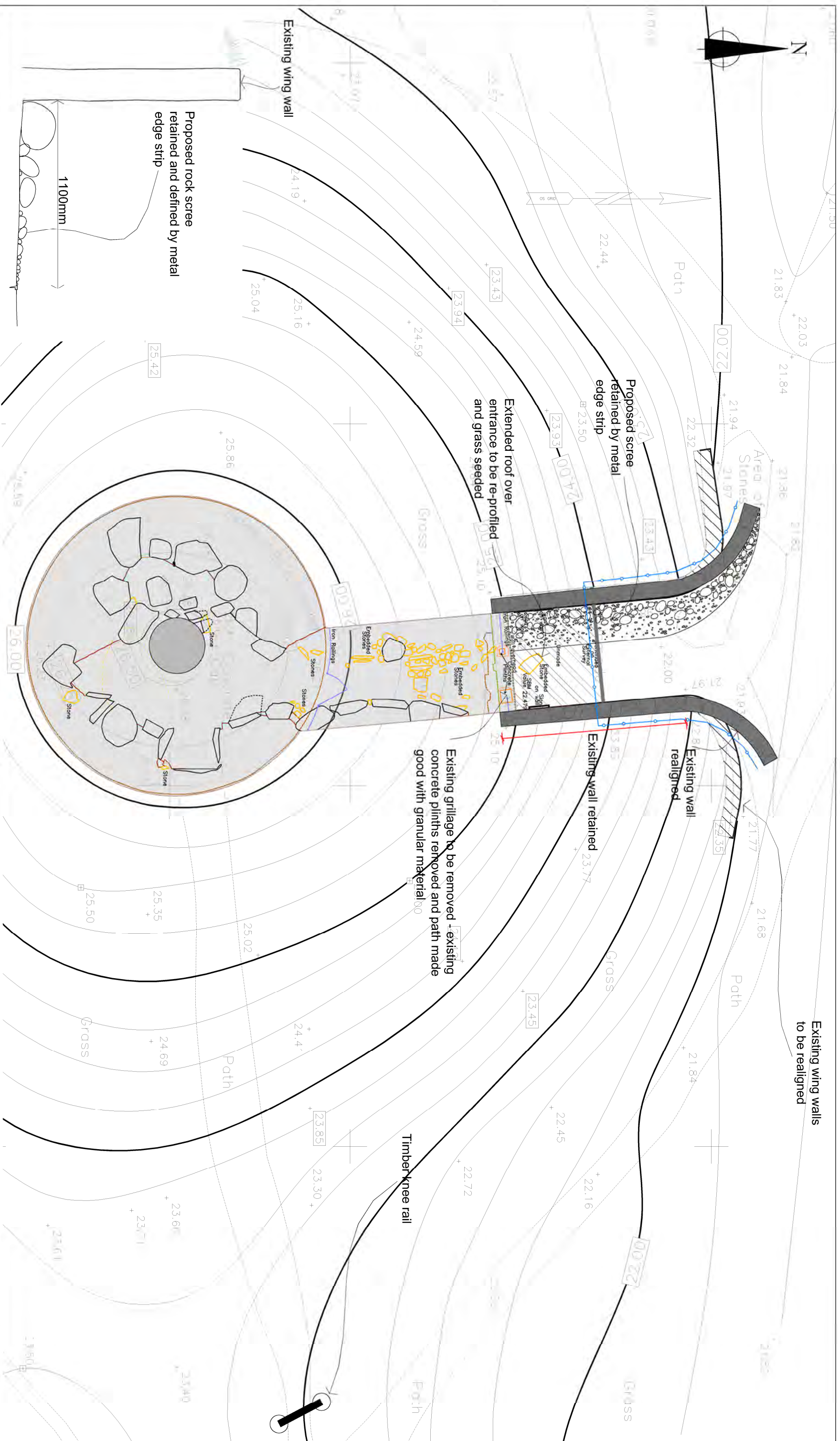
OS Grid Ref: SH 329 707

CAPITA

Property and Infrastructure
Bryn Eliras, Abergele Road, Colwyn Bay,
North Wales LL29 8BY
Tel: 01492 510200
Fax: 01492 510201

DRAWN BY	CHECKED BY	PASSED BY	DATE	SCALES @ A3	ISSUING OFFICE	DRAWING NUMBER	REV
SG	SG	JS	08/14	1:2000	Colwyn Bay	63944/ENV/SL01	P1

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Key



Proposed Fence



burial chamber



Existing wall retained
and realigned
Proposed rock scree

NOTE THE PROPERTY OF THIS DRAWING AND DESIGN IS VESTED IN CAPITA PROPERTY AND INFRASTRUCTURE LIMITED AND MUST NOT BE COPIED OR REPRODUCED IN ANY WAY WITHOUT THEIR WRITTEN CONSENT

Landscape Proposals Plan

Barclodiad y Gawres

CAPITA

Property and infrastructure
Bryn Eirias, Abergele Road, Colwyn Bay,
North Wales LL29 8BY
Tel: 01492 510200
Fax: 01492 510201

DRAWN BY LE/SG	CHECKED BY SG	PASSED BY JS	DATE 08/14	SCALES @ A3 1:100	ISSUING OFFICE Colwyn Bay	DRAWING NUMBER 63944/ENV/LP/01	REV P3
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Notes:

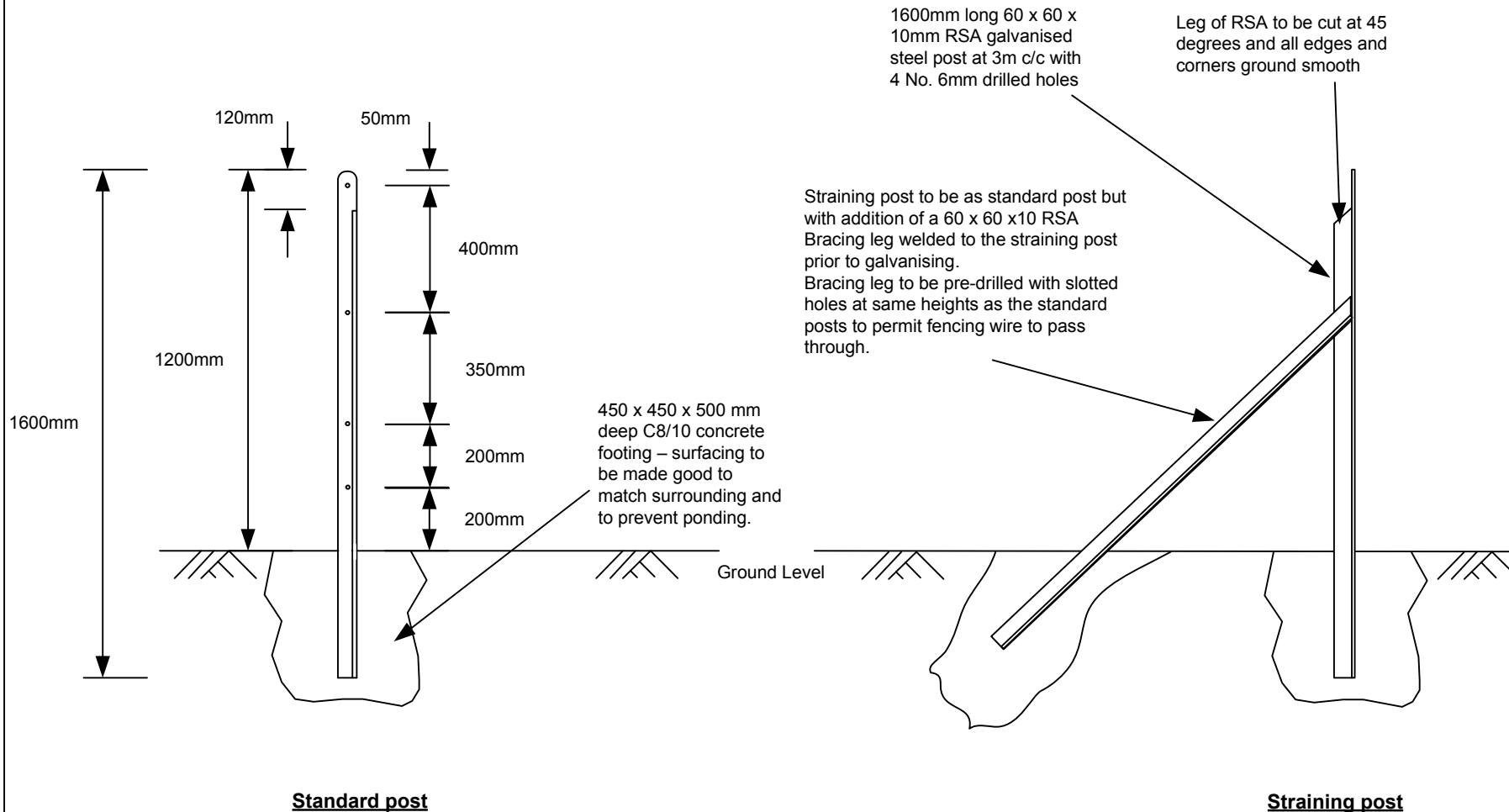
1. All steel units to be hot dip galvanised to BS EN ISO 3834-1:2005. Any damage to the galvanised finish is to be made good with zinc rich paint of at least equal thickness to the galvanising, all to BS EN ISO 14713:1999.
2. All sharp edges to be ground smooth prior to galvanising.
3. Posts to be coated with primer and two coats matt black paint
4. 3mm galvanised fencing wires fixed and strained in maximum 50m lengths between modified straining posts.

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Registered Charity No. 326550 (England and Wales) SC039263 (Scotland)

Do not scale from this drawing

Health and Safety Information:



Metal post and wire fence

A	First Issue	CHE	11/12/08
Rev	Description	Drawn	Date
			
George Nott House 119 Holloway Head Birmingham B1 1QP Tel: 0121 633 5500 Fax: 0121 643 1214			
Status: Standard detail			
Project: National Cycle Network			
Title: Metal post and wire fence			
Drawn and designed by: CHE		Checked by: GE	
Scale: Not to scale			
Drawing No: SD/33		Revision: A	

CHRIS PIKE ASSOCIATES HISTORIC ENVIRONMENT ENGINEERS www.cpaconservation.co.uk The Old Malthouse, 3 The Maltings, Springfields, Newport. Shropshire. TF10 7EZ Tel. 01952 581751 Email. admin@cpaconservation.co.uk			
Project: BARCLODIAD Y GAWES, BURIAL CHAMBER, ANGLESEY		Date. 30/07/2014	
Client: CAPITA working for CADW		Drg No. TS.769.D01	
Drawing Title: EXTENDED ENTRANCE ROOF SLAB - GENERAL NOTES AND SPECIFICATION		Issue: Construction	

GENERAL

1. This drawing specification is the copyright of CHRIS PIKE ASSOCIATES and must not be copied or reproduced without written authority.
2. This drawing specification relates solely to the design of the extended roof cover slab across the entranceway to the burial chamber. Refer detail drawing TS.769.R01A
3. This drawing specification should be read in conjunction with all other relevant project information & details; schedules, drawings and specifications.
4. This drawing specification has been tailored to suit the existing scheme proposals and prevailing site conditions. The durability and performance design criteria have been selected to meet the expected working life of the existing covering roof structure taking account of the severe - exposure conditions and other factors influencing the construction.

INTRODUCTION

5. This specification is to be read in conjunction with the drawings, special details, contract, preambles and schedule of repair works prepared by Capita and the appointed Architect Purcell.
6. Any ambiguity or conflict between specifications shall be clarified with the Contract Administrator (CA) before any remedial work is undertaken and material sourced.
7. The builder / contractor is responsible for all temporary support, falsework and protection of the monument historic site.
8. A suitable risk assessment and method statement shall be provided for approval of the CA / Architect prior to commencement of work.

9. Proprietary product material (where shown on the drawings) shall only be included within the permanent works when in full compliance with the manufacturer / supplier recommended guidelines for use.

10. Reference should be made to the following special product websites for technical information.

- i) RIW waterproofing membrane systems www.riw.co.uk
- ii) Helifix masonry crack repair systems www.helifix.co.uk
- iii) Simpson Strong-Tie masonry fixing & anchor systems www.strongtie.co.uk

1.0 MASONRY

1.1 GENERAL

- 1.1.1 Masonry repairs shall only be undertaken in areas agreed with the CA / Architect.
- 1.1.2 Design and construction of masonry walling shall be in accordance with BS 5628, Parts 1, 2 and 3.
- 1.1.3 Fresh laid masonry shall be adequately protected against rain.
- 1.1.4 In hot sunny or exposed conditions masonry units shall be thoroughly wetted prior to use.
- 1.1.5 No external work is to be carried out during frosty weather, or when the temperature is expected to fall below 4°C over the following 48 hours. All work laid during the day is to be covered up and adequately protected with hessian sacking or other approved methods overnight.
- 1.1.6 All facing bricks and stonework shall be laid the same way up, with sedimentary layers set in the horizontal plane, unless advised otherwise.
- 1.1.7 The Contractor shall allow for cutting around intrusions of built-in elements.
- 1.1.8 All joints are to be thoroughly flushed up as work proceeds and all vertical joints are to be completely filled for the unit depth. Joints to be all even and struck as work proceeds. New panels shall have all perpend; quoins and bedjoints align true and square, maintaining the existing bond pattern. All masonry shall be wetted before laying.
- 1.1.9 Completed sections of facing stone shall be protected from mortar droppings and staining. The contractor shall remove all traces of efflorescence at his own expense.
- 1.1.10 All new masonry work is to be set out and built to the dimensions, thickness and height shown on the drawings and /or defined in the schedule of works.
- 1.1.11 Wall construction shall proceed in a uniform manner by no more than 900mm per day, set plumb with bedjoints straight and level. There should never be more than 450mm height difference between inner and outer leafs of cavity walls.
- 1.1.12 No overhand laying, i.e. placement above eye level will be permitted.
- 1.1.13 Building tolerances shall comply with BS 5606. Out of plumbness shall in no circumstances exceed +/- 5mm per storey height for new wall panels (not accumulative).
- 1.1.14 Tied vertical movement joints shall be provided only where shown and detailed on the drawings. Vertical joints shall be completely filled with mortar unless compressible filler material is indicated on the drawings.

1.1.15 Chases shall also be saw cut and must not exceed one-third unit leaf thickness in the vertical direction and one sixth unit leaf thickness in the horizontal or diagonal directions.

1.1.16 No masonry shall sustain any floor, roof or other applied imposed load for a minimum seven day period after construction.

1.1.17 Testing of materials and mortar mixes shall be undertaken at the discretion of the Engineer / CA or frequency stipulated in the schedules of work.

1.2 MATERIALS & WORKMANSHIP

Cement

Cement shall be Ordinary Portland Cement to BS 12, or Sulfate Resisting Portland Cement to BS 4027.

The use of High Alumina Cement or Rapid Hardening Cement is not acceptable

Lime

Lime shall be dry hydrated lime to BS 890.

Premixed Lime/Sand

Premixed lime/sand for use in gauged mortar only shall conform to BS 4721.

Sand

Sand for use in mortars shall be clean sharp it sand to BS 1200 (table 1), completely free of all deleterious and impurities.

Water

Water shall be clean tap water, free of all harmful matter.

Additives / Plasticizers

Mortar shall comprise cement: lime: sand in set measured proportions by volume or by weight.

The use of additives or plasticizers shall not generally be accepted, and express permission in writing should be sought from the Engineer prior to any inclusion in standard mortar mixes.

Pigments, when permitted in writing by the Engineer /CA, shall conform to BS 1014.

Frost inhibitors having a Calcium Chloride base shall not be allowed under any circumstances.

Wall Ties

Wall ties in external walls (not exceeding 75mm) shall be 10g austenitic stainless steel conforming to BS 1243 of double triangular type (not butterfly type), minimum length 200mm.

DPC

Damp proof courses shall conform to BS 6398 and BS 743.

- 1.2.1 Workmanship shall generally be in accordance with BS 5628 unless otherwise stated.
- 1.2.2 Cement and lime shall be delivered to site in bags and stored clear of the ground in a dry weathertight area, and shall be used in order of delivery. Any bags which are damaged, damp or split shall be classed as defective and not used
- 1.2.3 Sand shall be stored in a bund away from other materials on a clean hard surface.
- 1.2.4 The classification mix of mortars for new construction shall be as shown in the table below:

MortarProportion by Volume (by dry weight in brackets)			
Class	Cement	Lime	Sand
i)	1 (1)	0.2 (0.1)	3 (4)
ii)	1 (1)	0.5 (0.3)	4.5 (6)
iii)	1 (1)	1 (0.45)	6 (8)
iv)	1 (1)	2 (0.9)	9 (12)

Gauged Mortar

- 1.2.5 Ideally, mortars should be mixed by dry weight to achieve a uniform consistency and strength. Mixing by volume is allowed only if accurate gauge boxes are used.
- 1.2.6 Cement mortars (for use in substructure walls) shall be Class (i), using Sulfate-resisting cement in aggressive ground conditions.
- 1.2.7 Plant and machinery used for mixing and transporting mortar must be kept clean. All such containers shall be thoroughly washed out immediately after use with clean fresh water and whenever a change of mix is required.
- 1.2.8 Water shall be added slowly to the mix through a fine sprinkler or rose to give the desired workability. Generally, a mechanical stirrer or drum mixing time of 10-15 minutes will suffice.
- 1.2.9 Mortars are be used before the initial set takes place and within two hours of mixing. Any mortar remaining after this period shall be discarded and on no account shall be knocked up (reconstituted) for re-use.
- 1.2.10 Walls subject to severe-exposure conditions (e.g. retaining walls, free standing walls, parapets and copings etc.) may use 'FL' or 'FN' bricks in class (ii) mortar on the back unexposed face where permitted. All other moderate to slight exposure conditions to use a normal class (iii) gauged mortar.
- 1.2.11 Masonry shall comply with the minimum crushing strength indicated on the drawings.
- 1.2.12 All new masonry work is to be set out and built to the dimensions, thickness and height shown on the drawings, and/or defined in the schedule of works

1.3 EXISTING MASONRY & REPOINTING.

- 1.3.1 Unless specified otherwise a mix of lime putty/ sharp sand shall be used for repointing work. Colouring may be added to match existing mortar only with the approval of the CA / Architect.
- 1.3.2 A sample panel of pointing is to be submitted for approval by the Architect before a mix is adopted for use.
- 1.3.3 Aggregate shall be clean, well graded fine gravel to coarse sand to BS1200 or BS EN 13139. The coarse aggregate shall be as gritty as existing mortar.
- 1.3.4 Repointing defective or disfigured pointing shall be raked out by hand using a fine chisel and bolster to 40mm depth or as necessary. The void shall be washed out to remove dust prior to filling the joint completely with new mortar.
- 1.3.5 Pointing work shall match existing unless stated otherwise. Feathered edges shall be avoided.
- 1.3.6 Mortar shall vary in hardness and density according to the exposure of the wall, but should always be slightly less hard and dense than the masonry when set.
- 1.3.7 The working area for repair shall not exceed 20% of a wall panel surface area at any one time. In addition, no more than 15% of masonry along lines running both longitudinally and transversely to a wall panel shall be temporarily removed for patch repair or rebuilding at any one time unless shoring or propping is provided to support the wall. New work shall be left to harden for a minimum 72 hours (3 days) prior to tackling adjacent areas.
- 1.3.8 Horizontal cracks or fractures shall be repointed with stiff mortar with medium to coarse aggregate. If horizontal fractures exceed 12mm in gap width either slate or slip tiles may be introduced as packing.

1.4 MASONRY REPAIR AND STRENGTHENING

- 1.4.1 Wall stitching or other strengthening measures shall be provided in the following situations:
 - i) Vertical or stepped fractures equal or greater than 5mm crack width.
 - ii) Any number of smaller vertical or stepped cracks in three metre section of wall with combined crack width greater than 6mm.
- 1.4.2 Vertical and stepped cracks in masonry walls shall be repaired using a stitch reinforcing technique. Stainless steel reinforcement twisted bars nominally 6mm diameter and 1200mm in length shall be introduced into preformed cut chases made along mortar bedjoints to 40mm depth.
- 1.4.3 Reinforcement ('Helifix' or similar approved) shall be embedded in 10mm bed and surround fast setting epoxy mortar / resin ('heligrout' or similar approved) with 30mm lime mortar cover made flush to match existing after minimum 24hours.

- 1.4.4 Badly eroded, spalled or splintered masonry shall be carefully removed piecemeal and replaced with similar masonry units / stone rubble in a lime mortar bed and surround. Hand bolster chisels shall be used to remove individual units. Mechanical rotating or diamond disc saws shall not be used under any circumstance.
- 1.4.5 If the loss of section is between 15% and 40 % it may be possible to re-use the original unit by turning and packing the void behind.
- 1.4.6 Allow for cleaning salvaged masonry material, removal of mortar dabs and surface vegetation by hand brushing.
- 1.4.7 Any invasive plants (moss, grass, saplings) and weeds including ivy growing within wall structures shall be treated and removed. Treat roots within masonry by cutting away the active growth and applying toxic paste (Herbicide) by brush (non spray) to roots and cover with plastic sheeting for minimum 7 days. Repeat application two or three times in very aggressive areas.
- 1.4.8 Dead plant roots within joints and surface micro-vegetation may be removed by light wire brushing with a very weak acid wash prior to thorough washing with clean water before repointing.
- 1.4.9 Temporary props and needles shall be provided by the builder / contractor to support walls where large openings are made and where poor material is to be removed to allow for repair.

1.5 LIME MORTAR MIXES

- 1.5.1 A pure lime putty / sand mix shall only be used in areas shown on drawings.
- 1.5.2 A pozzolanic material (5% by volume) may be used for external pointing work in lime only with the prior approval of the CA / Architect. The additive can be introduced immediately after knocking up and prior to use. The resulting mortar must be used within three hours or then discarded.
- 1.5.3 Premixed bagged hydraulic lime mortar shall be used as and where indicated due to the nature of the building type and urgency of the work. The hydraulic lime in dry hydrate form shall be mixed carefully with sand and minimum water to make a coarse stuff workable
- 1.5.4 Hydraulic lime shall be strength grade NHL 2.5 or 3.5 unless stated otherwise and conform to BS EN 459 in all respects. It shall be used within four hours of mixing and must never be knocked up again once it stiffens.
- 1.5.5 All existing masonry stone repairs to use a 1:2 NHL 3.5 lime / sand mortar to match existing in accordance with the requirements of BS 5628
- 1.5.6 The following general mortar mixes may be used for expediency in bedding, new work and for emergency patching rebuilding purposes, with the prior approval of the CA/ Architect, and only when the special lime repairs mortars have not been specified:

Severe exposure conditions (including all wall parapets, copings and sills)
shall use 2: 1: 9 (cement: lime: coarse sand)

2.0 REINFORCED CONCRETE CONSTRUCTION

2.1 GENERAL

- 2.1.1 Concrete shall be made with cement, coarse aggregate, fine aggregate and clean water. No other agent or ingredient shall be added to the concrete without the prior approval of the CA / Engineer.
- 2.1.2 Concrete shall be supplied in accordance with this specification and to meet the general requirements of BS8500-2, relating to delivery, conformity, production, transport, testing and control.
- 2.1.3 All concrete mixed and used in cast elements that will be visible in the final works shall be from cement and aggregates from single identifiable sources in order to maintain a consistency of colour, texture and general weathering appearance.
- 2.1.4 Notwithstanding any approval of batch materials, method and workmanship given on site by the Engineer / CA, the Contractor is solely responsible for the quality of material and standard of workmanship achieved in the finished permanent work, including meeting the stated requirements for strength, durability and appearance of all finished work elements.

2.2 MATERIALS

2.2.1 CEMENTS

- 2.2.1.1 Cements shall comply with the following British Standards
 - BS12 Ordinary Portland Cement
 - BS12 Rapid Hardening Portland Cement
 - BS4027 Sulfate Resisting Portland Cement
- 2.2.1.2 Ground granulated blastfurnace slag (GGBS) and rapid hardening cement may only be used with the approval of the Engineer / CA.
- 2.2.1.3 Sulfate Resisting Portland Cement may only be used in concrete strength grades of C25 or greater with the approval of the Engineer / CA.
- 2.2.1.4 High alumina cement or lightweight (low density) concrete shall not be used.
- 2.2.1.5 Bagged cement shall be stored in a well ventilated, weather-protected area and to be raised off the floor to keep dry.
- 2.2.1.6 Any bags that become moist or wet prior to use shall be discarded.

2.2.2 AGGREGATES

- 2.2.2.1 Coarse Aggregate shall be consistent well graded natural dense stone complying with BS EN 12620, with an absorption value not greater than 3%.
- 2.2.2.2 Fine aggregate shall be clean river or pit sand complying with BS EN 12620 grades CP or MP only. Sand from tidal rivers will not be permitted. Bagged sharp sand shall be kept dry in a similar fashion to cement bags.

- 2.2.2.3 No recycled aggregate will be permitted for this project.

2.2.3 WATER

- 2.2.3.1 Water shall be clean drinking water, free from all harmful matter, complying with BS EN 1008.

2.2.4 REINFORCEMENT

- 2.2.4.1. Steel reinforcement shall comply with the requirements and recommendations of the following standards
 - BS 4449 – Specification for Carbon Steel Bars
 - BS 6744 – Specification for Austenitic Stainless Steel Bars
- 2.2.4.2 Reinforcement sizes, lengths and shapes must comply with the detail drawings and bar bending schedules where provided. The Contractor is responsible in ensuring that the bar lengths are adjusted to suit the site dimensions where necessary.
- 2.2.4.3 Cutting and bending to comply with BS 8666 and BS8110
- 2.2.4.4 Prior to use, reinforcement shall be wire brushed to remove all loose deposits of rust and scale, grease and any other deleterious matter.
- 2.2.4.5 Reinforcement shall be accurately position to give the necessary minimum cover, lap length and anchorage. Minimum lap lengths shall be 40 times the bar diameter.
- 2.2.4.6 Tying wire shall be galvanised 16 gauge.

2.3 FORMWORK

- 2.3.1 Formwork shall be properly designed (responsibility of the Contractor) and accurately constructed to produce a finished concrete product to the lines, levels and dimensions indicated on the drawings, and to meet expected tolerances with no more than 3mm variance in the final vertical and horizontal position.
- 2.3.2 The formed surfaces shall be free from twist and bow with intersections, lines and angles square, plumb and true.
- 2.3.3 The formwork must be sufficiently strong and rigid so that proper compaction of the concrete can be achieved and so that reinforcement is not displaced during the concrete pour. Temporary props and shoring shall be appropriately anchored in place.
- 2.3.4 The formwork finish material shall be a suitable type to provide the required surface appearance.
- 2.3.5 A skilled carpenter or joiner shall fix in place any special drip details, corner mouldings or chamfers.

- 2.3.6 Suitable moulding oil should be pre-applied to the surface prior to casting to prevent any damage occurring during removal and stripping off the formwork.
- 2.3.7 The formwork space shall be kept clean and free of all dust and detritus. The space should be air blown immediately prior to the concrete pour to remove any debris, tying wire and free water.

2.4 CONCRETE MIXES

- 2.4.1 The consistency class of the wet concrete shall be S2 for this project.
- 2.4.2 Thorough mixing of material is to be carried out to achieve a consistent concrete material that will not segregate during pour and placement. The mix proportions shall be accurately measured (dry weight) to produce the expected 28 day concrete strength.
- 2.4.3 Site mixing shall take place in a suitable weight batching cement mixer conforming to the appropriate British Standard (BS1305 or BS4251). The mixing plant and scales shall be maintained in a clean serviceable condition
- 2.4.4 Site mixing shall otherwise conform to BS 8000-2.1, subsections 2, 3 and 4

2.5 PLACEMENT AND COMPACTION

- 2.5.1 Workability shall satisfy the slump consistency of the concrete mix immediately prior to placement, i.e. S2 equates to a slump of between 50 and 90mm.
- 2.5.2 Concrete must not be placed during any adverse weather, when air temperatures are less than 3°C or against any frozen or frost covered surfaces.
- 2.5.3 The concrete shall be transported by suitable means to prevent segregation occurring.
- 2.5.4 Concrete shall be placed in one continuous operation, in evenly spread in layers to allow efficient compaction using vibration pokers and tampers to properly compact the concrete around the reinforcement and expel air pockets up to the full desired thickness of the slab.
- 2.5.5 Vibro compaction shall continue until bubbles cease to appear at the surface.
- 2.5.6 The upper surface of the slab shall be evenly tamped off and compacted to provide a uniform flat surface with no lips or ridges greater than 3mm in height.

2.6 JOINTS AND FINISHES

- 2.6.1 The exposed surfaces of the cast concrete shall be cured in accordance with BS8500 to prevent excessive loss of moisture during hydration and to minimise the risk of shrinkage cracks developing during the initial seven day period.
- 2.6.2 Curing may be achieved by covering the work with hessian sacking or polythene sheet and by light spray wetting the surface from time to time. Alternatively a proprietary curing agent may be used.
- 2.6.3 The concrete element shall be protected from accidental damage and loading during the initial 72 hours.
- 2.6.4 The propping of the formwork shall remain in place for 11 days prior to its careful removal and stripping back to allow for finishing, sanding down of exposed joints and edges.
- 2.6.5 Concrete spacer blocks used to provide cover to bottom reinforcement shall be comparable in strength, durability and appearance of finished concrete.
- 2.6.6 The exposed underside of the slab shall achieve a uniform class F3 finish.

2.7 TESTING AND QUALITY CONTROL

- 2.7.1 The contractor shall provide slump test equipment on site to check the consistency of the mixed concrete immediately prior to placement.
- 2.7.2 No additional water is to be added to the mix under any circumstance once mixing has taken place.
- 2.7.3 The Contractor shall retain four test cube moulds on site, to be used only at the discretion of the Engineer / CA if there is a question mark over the suitability and quality of the mixed concrete prepared on site.
- 2.7.4 Test concrete moulds shall be cured in a similar fashion to the actual site element and carefully transported to an accredited laboratory for crushing and strength testing, all at the Contractors expense. Two cubes shall be tested after 7 days have elapsed and the remaining two cubes after 28 days have elapsed. The results shall be provided to the CA and Client for consideration.
- 2.7.5 Testing procedures shall comply with BS EN 12390-1: 2000
- 2.7.6 If the strength or other properties of the concrete fail to comply with the design requirement then the Client retains the right to refuse acceptance of the cast concrete element as part of the permanent work and is entitled to ask the Contractor to remove all defective work at his own expense.

CHRIS PIKE ASSOCIATES HISTORIC ENVIRONMENT ENGINEERS www.cpaconservation.co.uk The Old Malthouse, 3 The Maltings, Springfield, Newport. Shropshire. TF10 7EZ Tel. 01952 581751 Email. admin@cpaconservation.co.uk			
Project: BARCLODIAD Y GAWES, BURIAL CHAMBER, ANGLESEY		Date.	30/07/2014
Client: CAPITA working for CADW		Drg No.	TS.769.R01A
Drawing Title: EXTENDED ENTRANCE RC ROOF SLAB – CONSTRUCTION NOTES AND DETAILS		Issue:	Construction

GENERAL

1. This drawing is the copyright of Chris Pike Associates and must not be copied or reproduced without written authority.
2. This drawing must not be scaled. Use dimension figures shown only. Use architect drawings for setting out. If in doubt **ask**.
3. This drawing is to be read in conjunction with all relevant project information; schedules, drawings and specifications.

CONSTRUCTION NOTES

4. The Contractor is to comply with the structural specification (Drawing No. TS.769.D01) and the guidance notes provided on this drawing.
5. The Contractor is to provide a detailed method statement and risk assessment for construction of the extended entrance RC roof slab.
6. The concrete shall comply with the general requirements of BS8110 and BS 8500.
7. As the site is set remote from the coast road with access only available along a narrow uneven footpath, ready mix concrete is not considered a viable option for security of the concrete delivery and quality demands of workmanship.
8. The Contractor shall protect the existing site environs and ensure that there is no contamination of the scheduled ancient monument due to the works.

9. The raised formwork for casting the roof cover slab insitu shall be fully supported to prevent deflection with all joints sealed to prevent leaks during the pour.
10. Concrete for construction to be designed concrete with minimum concrete strength of **C35/45 to BS8500**, prepared and placed in accordance with BS8110 to give a class F3 fully flat smooth finish to the soffit. Other exposed faces to be scabbled back to provide a rough aggregate final finish.
11. The following prescribed mix is suggested for meeting the required strength and durability needs.

Minimum Cement Content = 380kg/m³
Maximum Water Cement Ratio = 0.40
Mix Proportion by dry weight = 1 : 1.5 : 2.5
(Cement / fine aggregate / coarse aggregate)
Maximum Aggregate Size = 20mm

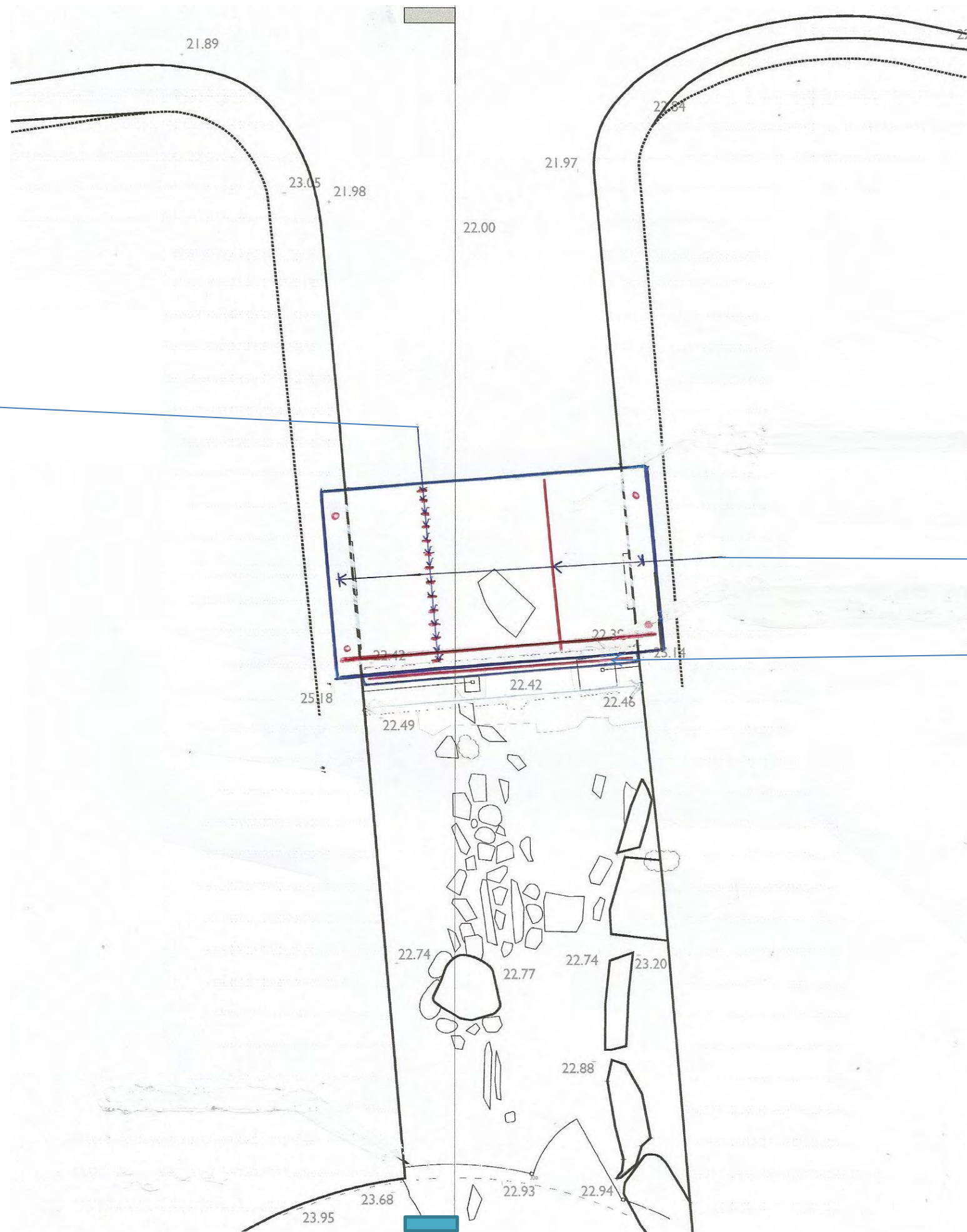
12. Straight reinforcement bars to BS4449 shall be provided as shown on drawing held permanently in position using galvanised wire ties. Twisted wire tie ends to be turned up and bent over.
13. Reinforcement shall be high yield (type 2) galvanised bar, ultimate stress $f_y = 500\text{N/mm}^2$. The galvanising process to EN ISO 1461 is to provide a mean average zinc coating of 50 micron
14. Minimum cover to steel to be 45mm. Straight bars lengths shall be supplied to suit. Provide suitable concrete stools at 450mm centres on a staggered grid.
15. Placed reinforcement is to be checked by the Engineer / CA prior to concreting.
16. The slab shall be constructed in one single pour of concrete with no construction joints. The placed wet concrete shall be fully vibro compacted to expel all air pockets.
17. Concrete quality testing shall comply with the Structural Specification.
18. The cover slab shall be protected from all external applied load and cured for a minimum 7 day period.
19. The wingwall finished stonework, headwall copings, topsoil, landscape seeding and fencing shall comply with the Architect drawing details and schedule.

GENERAL ARRANGEMENT
PLAN SHOWING PROPOSED
EXTENSION TO
ENTRANCE COVER RC SLAB

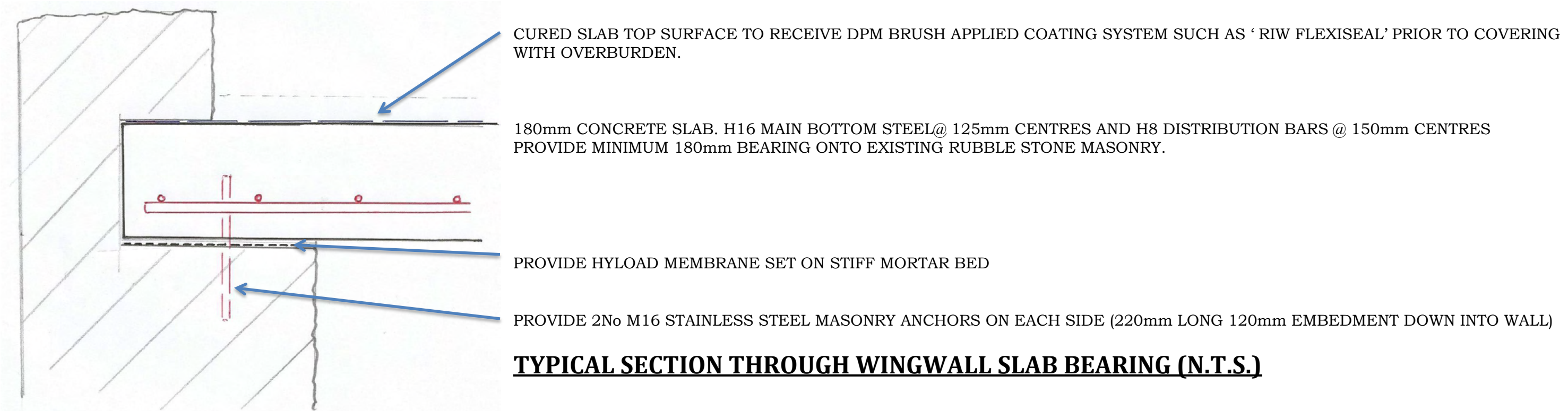
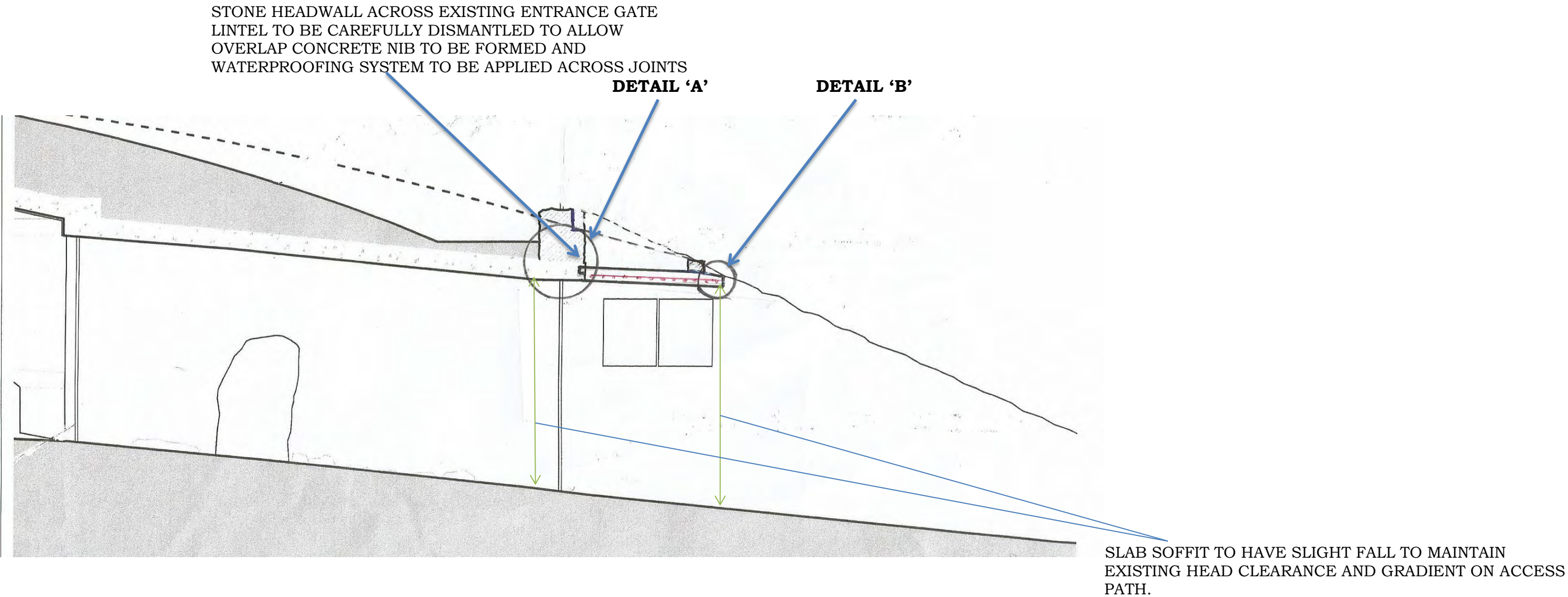
H16 MAIN BARS BOTTOM
@ 125mm c/c

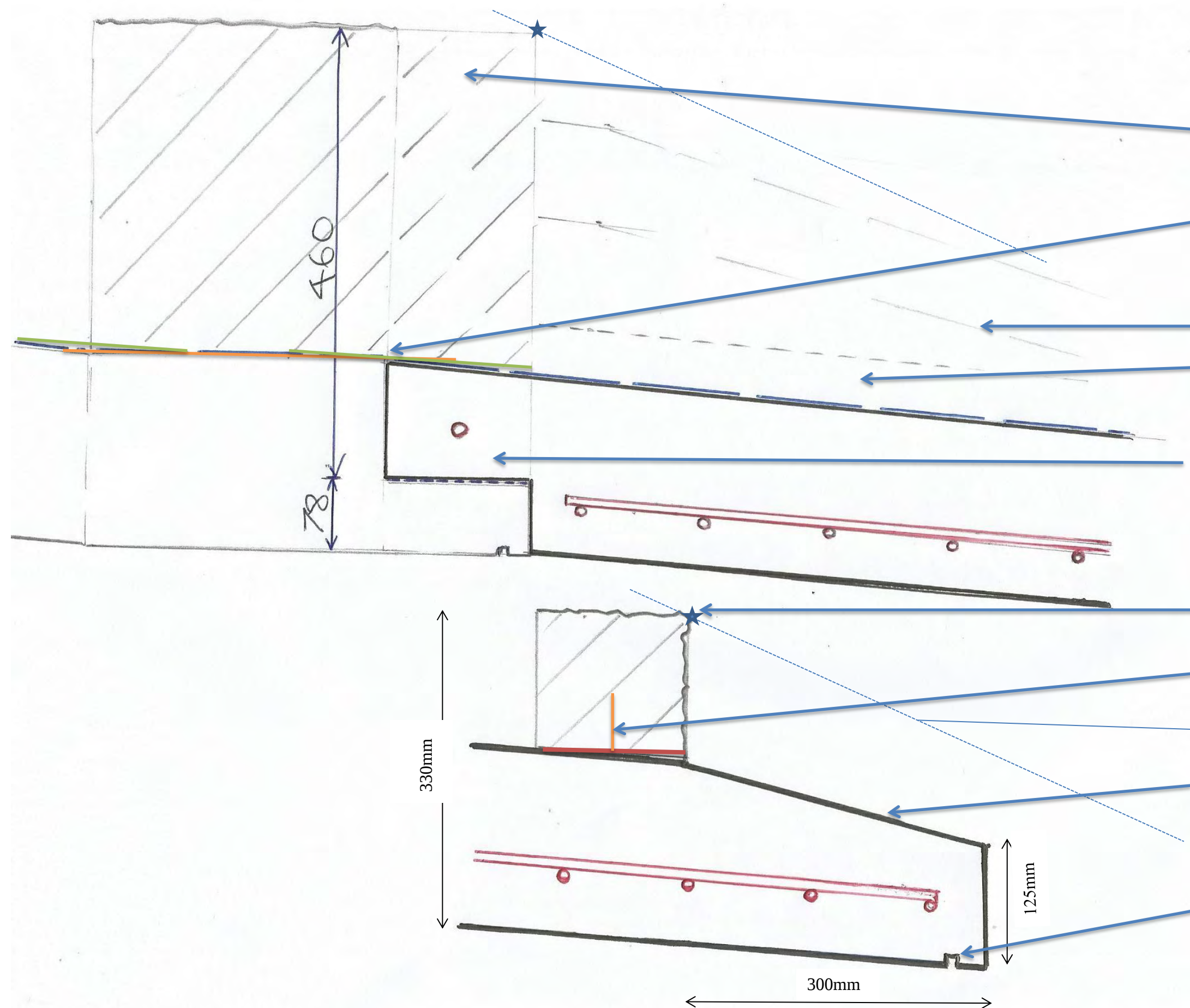
H8 DISTRIBUTION BARS @ 150mm c/c

SINGLE H20 LONGITUDINAL BAR



LONGITUDINAL SECTION (N.T.S.)





DETAIL 'A' (N.T.S.)

STONE RUBBLE HEADWALL ON EXISTING FACE
LINTEL TO BE TAKEN DOWN TO ALLOW
APPLICATION OF JOINT SEAL AND DAMP
PROOFING.

PROVIDE FLEXIBLE SHEET DAMP PROOFING
MEMBRANE 150mm LAPS ACROSS FORMED
JOINTS (RIW STRUCTURESEAL OR SIMILAR)

PROVIDE SELECTED BACKFILL, TOPSOIL AND
SEEDING AS PER ARCHITECT SPECIFICATION

PROVIDE 50mm SAND BLINDING PROTECTION
TO DPM SYSTEM

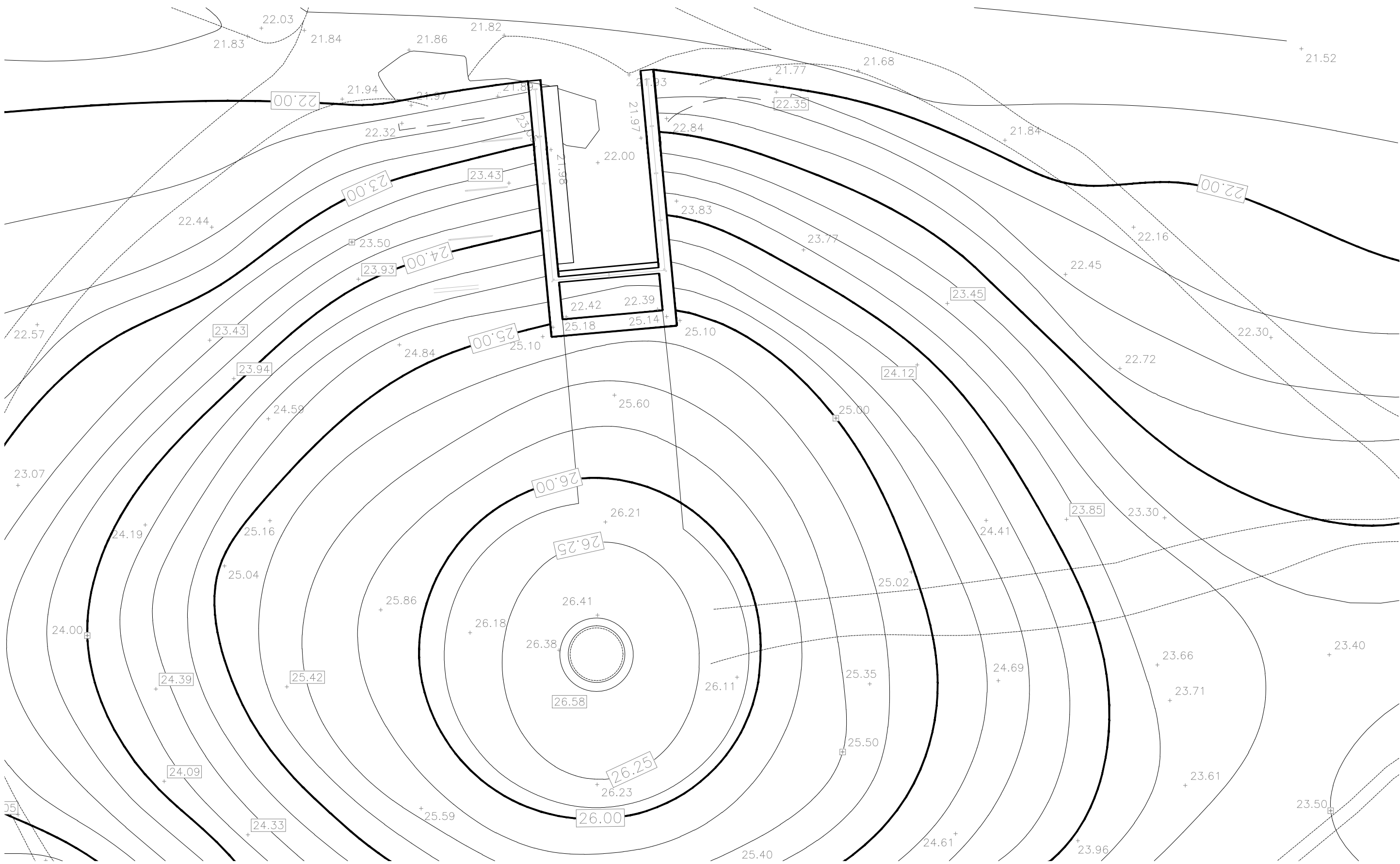
PROVIDE 150mm X 122mm OVERLAP OF
EXISTING LINTEL NIB WITH HYLOAD
MEMBRANE SANDWICHED BETWEEN

SETTING OUT POINT DETAIL 'B' (N.T.S.)

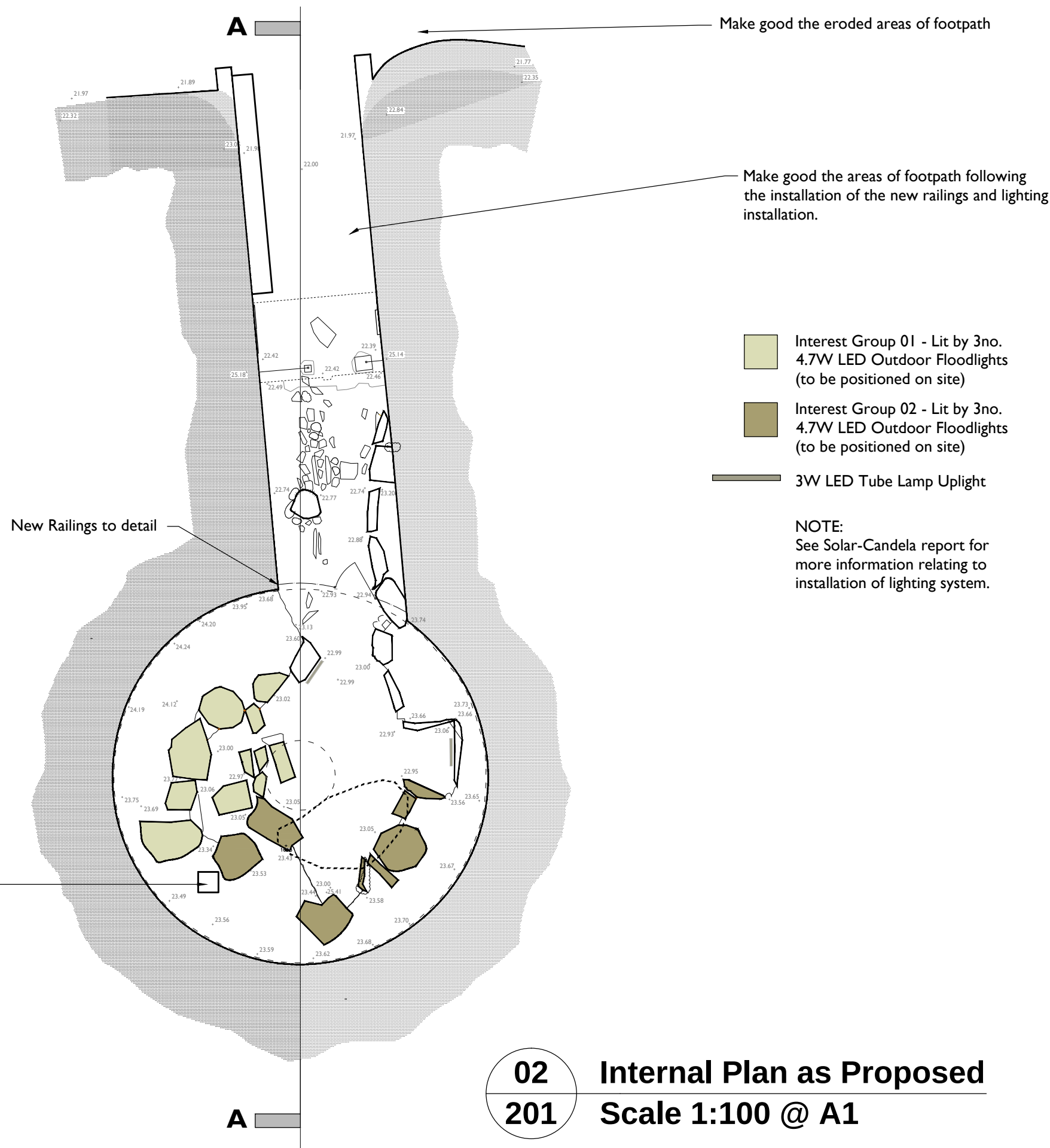
MATCHING RUBBLE STONE COPING ANCHORED
DOWN USING SS MASONRY FIXING

APPROXIMATE LINE OF WINGWALL BATTER
SLOPE
TAPER AND FRONT FACE OF CONCRETE SLAB
TO BE SCABBLED BACK TO EXPOSE
AGGREGATE

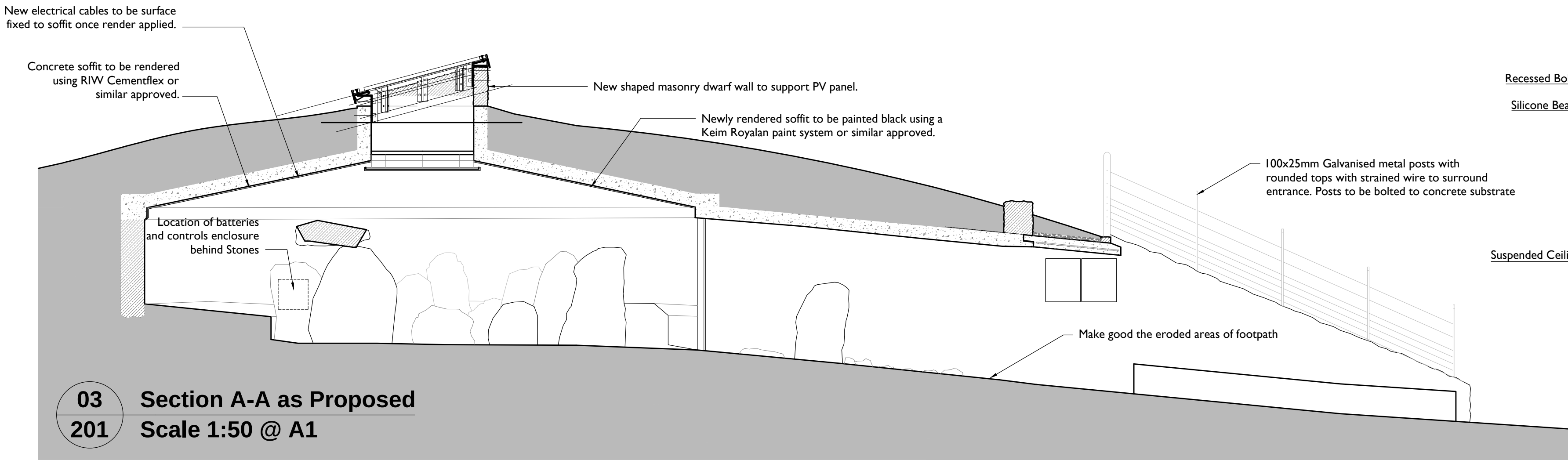
PROVIDE 7 X 7mm FORMED CHASE FOR DRIP



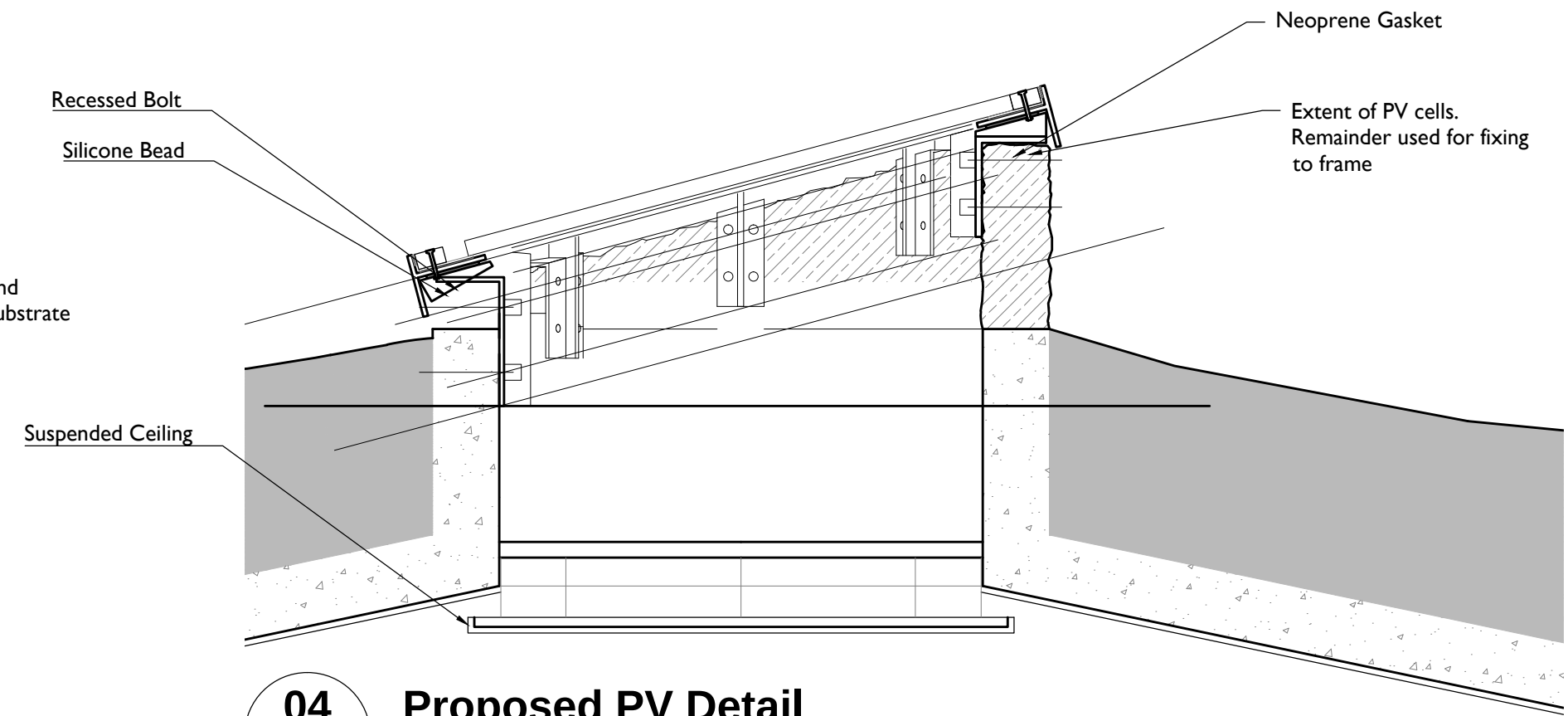
01 **Site Plan as Proposed**
201 **Scale 1:100 @ A1**



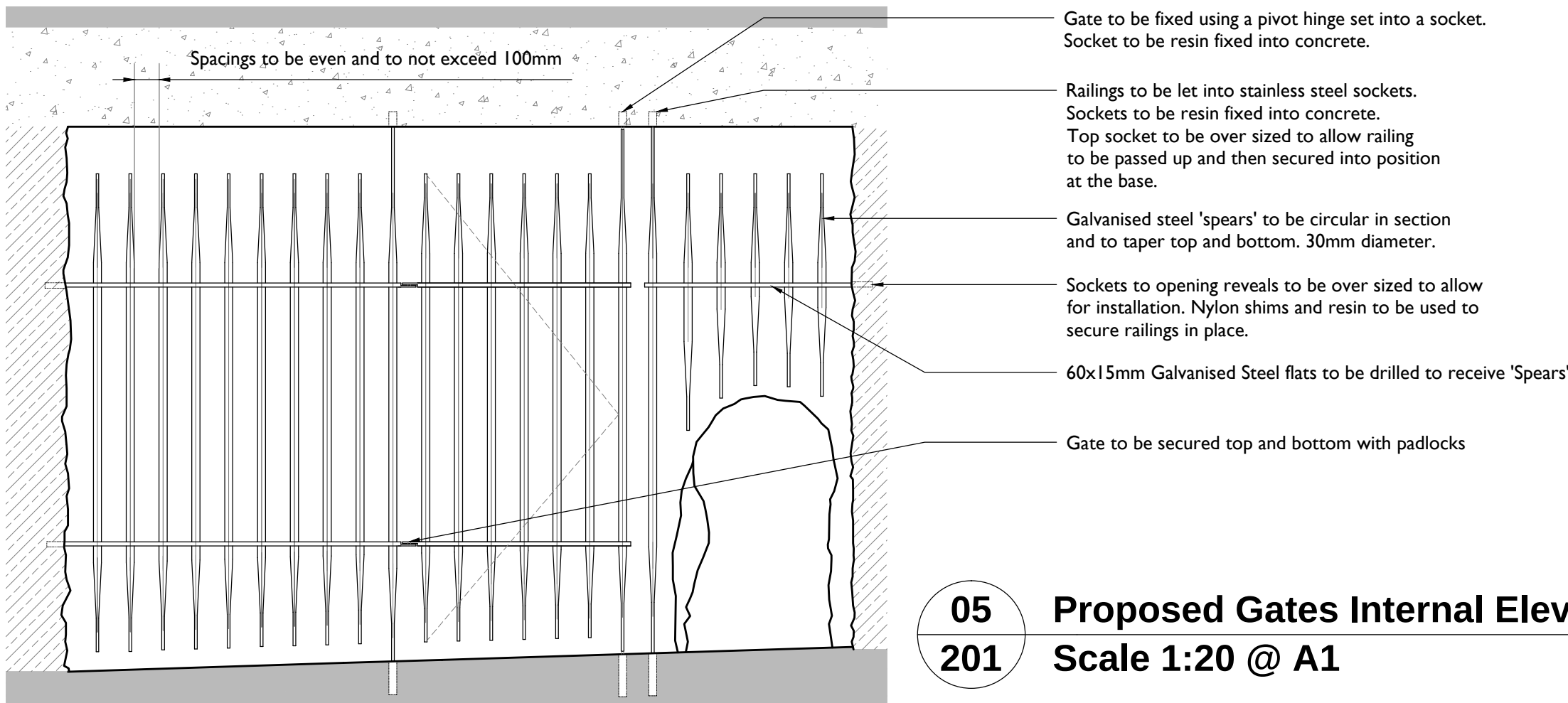
02 **Internal Plan as Proposed**
201 **Scale 1:100 @ A1**



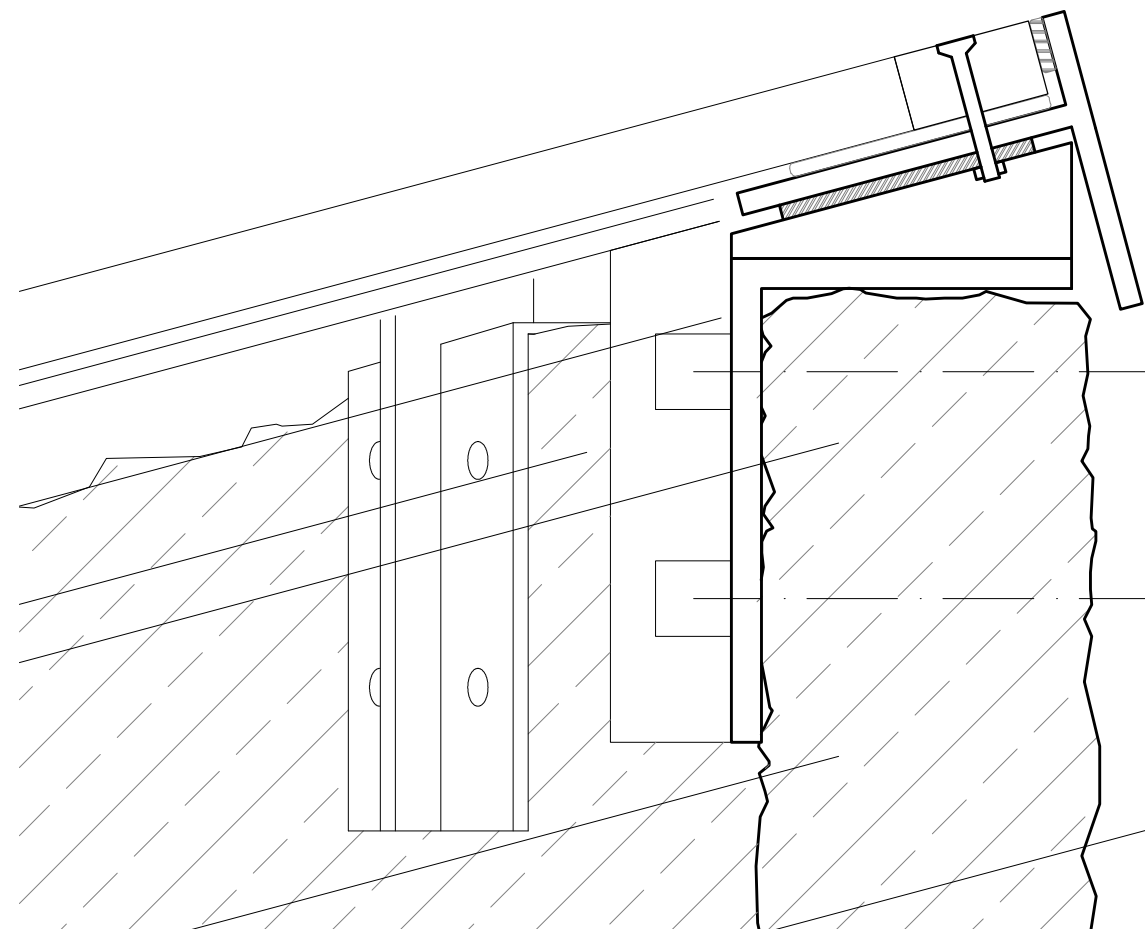
03 **Section A-A as Proposed**
201 **Scale 1:50 @ A1**



04 **Proposed PV Detail**
201 **Scale 1:20 @ A1**



05 **Proposed Gates Internal Elevation**
201 **Scale 1:20 @ A1**



06 **Proposed Fixing Detail for PV Array**
201 **Scale 1:5 @ A1**

Notes:

Drawings are based on survey data and may not accurately represent what is physically present.

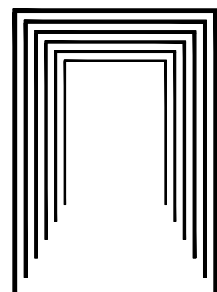
Do not scale from this drawing. All dimensions are to be verified on site before proceeding with the work.

All dimensions are in millimeters unless noted otherwise.

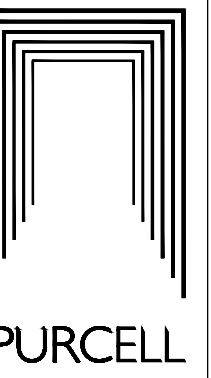
Purcell shall be notified in writing of any discrepancies.

Key Plan
not to scale

A	29/07/2014	AB	PV detail drawn	
First Issue	10/03/2014	EJ	MTO	
ISSUE	DATE	DRAWN	CHECKED	DESCRIPTION
CLIENT	Capita Symonds			
PROJECT	Barclodiad y Gawres			
DRAWING TITLE	Plans and Sections As Proposed			
SIZE & SCALE	A1L As Stated @ A1			
DRAWING STATUS	WORK IN PROGRESS			
JOB NUMBER	234054			
DRAWING NO.	201			
REVISION	A			



PURCELL

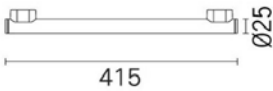


Led Tube

Design iGuzzini

iGuzzini

august 2014



Led Tube

code
BJ45

Technical description

Direct light luminaire, designed to use Neutral White monochrome LED lamps, with diffusing optic. Ceiling-/wall-mounted. Consists of a body and supports for installation, to be ordered separately. Extruded polycarbonate cylindrical body with semi-transparent (etched) finish and anti-UV treatment; die-cast Zamak cover plates and cable gland supports with opaque nickel galvanic treatment, complete with silicone seals. Monochrome version with electronic circuit 24V dc, neutral white LEDs, Dali dimmable using Dali ballast and interface to be ordered separately. Set up for pass-through wiring using a black plastic double PG11 cable gland and double multi-core cable L=500mm. Various wiring accessories are available: IP68 linear connectors for pass-through wiring, DIN bar or surface-mounted 24V dc external power supplies, dimming and control interfaces. All screws used are made of A2 stainless steel. The luminaire technical characteristics conform to EN60598-1 standards and particular requirements. LED Life Time with residual flow at 80% (L80): 50000h at Ta 25°C and 35000h at Ta 40°C.

Installation

Product fixed using AISI304 stainless steel arms, L=60 and 120mm, complete with safety screw, to be ordered separately.

Size (mm)
415x25x25

Colour
Grey/nitric (A1)

Weight (kg)
0.48

Mounting
wall arm | wall surface | ceiling surface

Wiring info

Luminaire equipped with 24V dc electronic circuit and electronic ballast to be ordered separately. Set up for pass-through wiring using a black plastic double PG11 cable gland and double multi-core cable L=500mm. Available for electrical connections: 2-pin IP68 linear connector, suitable for cables with diameter D=5-13.5mm complete with terminal block for cables with max. section 4mm² and cover plate for connectors.

Notes
Product complete with LED lamp.

Complies with EN60598-1 and pertinent regulations



Product configuration: BJ45+LED
LED: nr. 12 leds Neutral

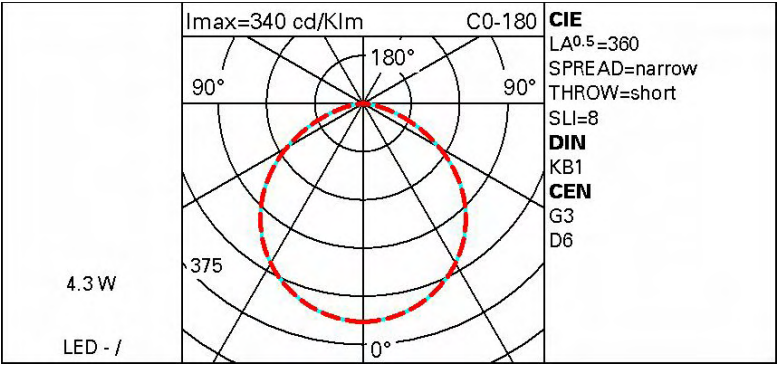
Product characteristics

Total lighting output [Lm]: 414	Total luminous flux at or above an angle of 90° [Lm]: 2.69
Total power [W]: 4.3	Emergency luminous flux [Lm]: /
Luminous efficacy [Lm/W]: 96.28	Voltage [V]: 24
Number of optical assemblies: 1	

Optical assembly Characteristics 1

Light Output Ratio (L.O.R.) [%]: 92	Number of lamps for optical assembly: 1
Lamp code: LED	Socket: /
ZVEI Code: LED	Ballast losses [W]: 1.1
Nominal power [W]: 3.2	Colour temperature [K]: 4000
Nominal luminous [Lm]: 450	CRI: 80
Lamp maximum intensity [cd]: /	Wavelength [Nm]: /
Beam angle [°]: 110°	MacAdam Step: <3

Polar



september 2014

iPro

code
BJ88

Technical description

Direct light outdoor floodlight, designed to use neutral white LED lamps, with light blade optic. Ground, wall or ceiling installation using special adjustable bracket. The luminaire consists of an optical assembly, rear cap and adjustable bracket. The optical assembly and rear cap are made of die-cast aluminium alloy coated with liquid acrylic paint (grey finish) or textured liquid (white finish) with a high level of resistance to weather and UV rays. The light blade optic lens is made of a two-component material (acrylic and polycarbonate), joined to the optical assembly with silicone. The adjustable fixing bracket is made of painted aluminium. It has a single stainless steel M14x1 cable gland and black rubber outlet cable complete with anti-transpiration device L=300mm, electronic circuit with neutral white LED. The electronic ballast must be ordered separately (max. 500mA). All external screws used are made of A2 stainless steel. The luminaire technical characteristics conform to EN60598-1 standards and particular requirements. LED Life Time with residual flow at 80% (L80): >100,000h at Ta 25°C and 90,000h at Ta 40°C.

Installation

Ground, wall or ceiling installation using special bracket. Secure using screw anchors for concrete, cement and solid brick.

Size (mm)
51x51x56

Colour
White (01) | Grey (15)

Weight (kg)
0.34

Mounting
free standing

Wiring info

Electronic ballast to be ordered separately: 6W/500mA (BZ98), 12W/500mA (BZ99), 20W/500mA (BZA0). Available for electrical connection: Sealed connector kit IP68 (9581), direct connector IP68 (BZK6), junction box with quick-coupling terminals (BZK7)

Notes

Product complete with LED lamp.

Complies with EN60598-1 and pertinent regulations



Product configuration: BJ88+LED
LED: Nr. 3 LED NEUTRAL WHITE

Product characteristics

Total lighting output [Lm]: 42.08
Total power [W]: 4.5
Luminous efficacy [Lm/W]: 9.35
Number of optical assemblies: 1

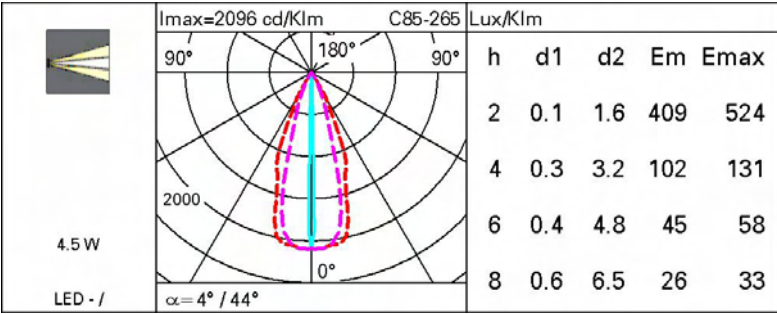
Total luminous flux at or above an angle of 90° [Lm]: 0
Emergency luminous flux [Lm]: /
Voltage [V]: -

Optical assembly Characteristics 1

Light Output Ratio (L.O.R.) [%]: 10
Lamp code: LED
ZVEI Code: LED
Nominal power [W]: 4.5
Nominal luminous [Lm]: 420
Lamp maximum intensity [cd]: /
Beam angle [°]: 4° / 44°

Number of lamps for optical assembly: 1
Socket: /
Ballast losses [W]: 0
Colour temperature [K]: 4000
CRI: 75
Wavelength [Nm]: /
MacAdam Step: <3

Polar



KEIM Royalan Mineral silicate paint for extreme climates



1. Product description

Keim Royalan is a high performance mineral paint system for use in extreme climatic conditions. Keim Royalan offers water repellency, vapour permeability and forms a chemical crystalline bond with the substrate.

Keim Royalan is made using pure inorganic mineral fillers, absolutely lightfast inorganic pigments, additives and potassium silicate binder.

2. Field of application

For all mineral, absorbent surfaces, in particular suitable for restoration coatings on repaired and stripped surfaces. Suitable for highly exposed surfaces, glass, ceramics and glazed surfaces.

3. Product properties

Keim Royalan is a long life exterior silicate based paint with a modified potassium silicate binder. Keim Royalan has a high coverage and contains only lightfast inorganic pigments.

Water vapour permeable
Lightfast
Easy to clean
Non flammable
Non film forming
Mineral matt
UV and weather resistant
Resistant to industrial pollution and acid rain
Water repellent
No solvents added
Resists extreme climatic conditions
Resists mould and fungal growth

Material characteristics

specific weight: approx. 1.4g/cm³
pH-value: approx. 11
lightfastness of colour: A1
water vapour transmission rate:
 $V > 1500\text{g/m}^2\text{d}$
diffusion equivalent air layer thickness:
 $s_d = 0.01\text{ m, class I}$
liquid water permeability rate (24 h):
 $w = 0.12\text{kg/m}^2\text{h}^{0.5}$
gloss at 85°: 0.5 matt

Colour shades

White and in accordance the Keim Exclusiv Palette with specials available.

4. Application instructions

Substrate preparation

All loose, flaking and unstable material must be identified and then thoroughly removed, all surfaces must be thoroughly washed down with clean cold water to remove all surface dirt and dust. When all surfaces are clean, sound, wind dry, dust free and free from all surface contaminants, decoration using Keim Mineral Paints may proceed.

Application

Onto unpainted surfaces Keim Royalan should be applied as a two coat system, the first coat to be diluted with 20% by weight Keim Royalan Dilution and applied by brush or roller, working well into all surfaces, with a minimum period of 12 hours between coats.

For previously painted surfaces Keim Royalan Grob should be used as a first coat.

Application conditions



Ambient and substrate temperature above 5°C and below 30°C. Do not apply in direct sunlight or onto sun-heated surfaces, nor if it is raining or if there is an immediate likelihood of rain.

Consumption

Approx. 0.4kg/m² Keim Royalan and 0.04lt/m² Keim Royalan Dilution.

Consumption rates are offered for guideline purposes only and are quoted for smooth rendered surfaces. Actual rates are the responsibility of the applicator. Project specifications should be referred to for specific rates.

Cleaning of tools

Clean immediately after use with water

5. Packaging

5kg and 25kg containers

6. Storage

Approx. 12 months, if kept cool, but frost free in tightly closed containers.

7. Disposal

Dispose completely emptied containers in accordance with local, regulations

8. Safety instructions

Cover surfaces which are not to be painted, in particular glass, natural stone, ceramics etc. Protect the eyes and skin from splashes. Keep out of reach of children.

Refer to COSHH data sheet.

The stated values and properties are the result of extensive development work and practical experience. Our recommendations for application, whether given verbally or in writing, are intended to provide assistance in the selection of our products and do not establish a contractual relationship. In particular, they do not release those purchasing and applying our products from the duty of establishing for themselves, with due care, the suitability of our products for the intended application. Standard building industry practices must be complied with. We retain the right to make modifications to improve the products or their application. This edition supersedes all earlier editions.

**KEIM**

MINERAL PAINTS LTD

Santok Building
Deer Park Way, Donnington Wood
Telford, Shropshire, TF2 7NA
Tel. (01952) 231250
Fax (01952) 231251

www.keimpaints.co.uk
sales@keimpaints.co.uk

Cementflex

RIW Cementflex is a two component, polymer modified, flexible, cement based, waterproof coating for concrete and masonry.

BENEFITS

- Totally waterproof
- Resists up to 100m head of positive and negative water pressure
- Tough & flexible to accommodate differential movement
- Seamless and fully bonded
- Applied to damp surfaces
- Abrasion and impact resistant
- Quick and easy to apply by hand or spray
- Environmentally friendly

APPLICATIONS

Waterproofing of;

- Basements & sub-structures
- Podium decks
- Balconies & Terraces
- Inverted roofs
- Temporary waterproofing

APPLIED TO

- Concrete
- Masonry
- Steel



DESCRIPTION

RIW Cementflex is a two component, cement based, polymer rich coating with excellent adhesion to prepared concrete and masonry substrates. When mixed, it exhibits a good degree of thixotropy to enable ease of application by brush or spray techniques to give an even finish with no sagging even in vertical situations. It hydrates to form a durable, highly alkaline, permanently elastomeric coating which not only protects the concrete, or other substrates, from water penetration and carbon dioxide diffusion, but also accommodates movement in cracks. The elastomeric coating maintains its flexibility under permanent immersion and when exposed externally.

TYPICAL USES

RIW Cementflex is ideally suited for waterproofing and protecting concrete and masonry structures which exhibit cracking, and where further movement is expected. Typical applications include preventing water ingress into basements, cellars and other below ground structures. The product can also be used for sealing water tanks, waterproofing of exposed or buried roofs, and as a crack isolation membrane on concrete floors or screeds.

DURABILITY

Subject to normal conditions of use, RIW Cementflex will provide an effective barrier to the transmission of liquid water for the life of the structure.

SPECIFICATION

J10 – Cementitious mortar tanking / damp proofing or C42 – Repairing / Renovating / Conserving concrete.

Please consult RIW Limited for further information.

INDEPENDENT AUTHORITY

	
RIW424	
RIW Limited Arc House, Terrace Road South, Binfield, Bracknell, Berkshire, RG42 4PZ, England 11 0086-CPD-530942	
EN1504-2: Surface Protection Systems - Coating Protection Against Ingress (PIC) Rigid trafficked system	
Adhesive Bond:	≥ 0.8 MPa
Water Vapour Permeability:	Class I <5m
Permeability to CO ₂ :	Equivalent to 135mm of concrete
Thermal Compatibility EN13687-1:	> 0.8 MPa
Capillary Absorption:	Class III <0.1 kg.m ⁻² .h ^{-0.5}
Dangerous Substances:	Complies with 5.4
Reaction to Fire:	Euroclass B-s1, d0
Cracking Bridging EN1062-7:	Class A5 > 2500µm

PERFORMANCE & COMPOSITION

TECHNICAL DATA	
Basis	Cement based, modified styrene acrylic copolymer
Mixed Colour	Concrete Grey
Mixed Density	1600 kg / m ³
Application temperature	5 – 35° C
Working life	45 minutes at 20° C
Drying Time	4 – 6 hours depending upon temperature.
Number of coats required	Two at 1mm thickness for overhead and vertical work. One at 2mm thickness for floors.

MECHANICAL CHARACTERISTICS (TYPICAL)	
Compressive Strength : BS 4551 Tested at 20°C 28 days 8 – 10 N / mm ²	
Flexural Strength : BS 4551 Tested at 20°C 28 days 3.5 – 4.0 N / mm ²	
Tensile Strength : 2mm film cured for 28 days Ambient 0.5 N / mm ² Immersed 0.4 N / mm ²	
Elongation : 2mm film cured for 28 days Ambient 120 – 130 % Immersed 70 – 80 %	
Water Permeability Coefficient : DIN 1048 Part 1 5.37 x 10 ⁻¹⁶ m / sec.	
2mm of RIW Cementflex = 2270mm of concrete	
Oxygen Diffusion Coefficient : BS EN 1062-6 Taywood Test DO ₂ = 1.706 x 10 ⁻⁵ cm ² s ⁻¹	

The above performance figures are typical values and should not be considered a product specification.

CONSTRUCTION

GENERAL

All construction should conform to the Building Regulations, Codes of Practices and British Standards in current use at the time the building is being constructed. In particular it is recommended that reference is made to BS 8102 : 1990.

PREPARATION

The areas to be treated must be free from all unsound material, i.e. dust, oil, grease, corrosion by-products and organic growth. Smooth surfaces should be cleaned to remove release agents, curing compounds and surface laitance ; preferably using wet grit or water blasting techniques or equivalent approved methods. The concrete sub-base should be a minimum of 20 N / mm². The prepared substrate should be thoroughly soaked (preferably 24 hours before) with clean water until uniformly saturated without any standing water.

PRIMING

Floors are to be primed with **RIW Cementseal Primer**, see separate data sheet.

MIXING

Shake Part A and pour into the tub supplied. Slowly add the powder and mix for a minimum of 5 minutes until homogeneous. The modules must be mechanically mixed using a slow speed drill and paddle, specially designed to entrap as little air as possible. Bottles of liquid and bags of powder are not to be split.

PLACING

RIW Cementflex should generally be applied using spray techniques. Brush or trowel applications may be employed although care must be taken to ensure that air is not entrapped into the surface. Apply the first coat, approximately 1mm thick, onto the prepared substrate. To ensure total protection, a second coat should be applied in the same way, after waiting approximately 4-6 hours - depending on temperature (when the first coat is stable but not fully set). On horizontal deck applications, apply as a single 2mm layer, spreading with a skid leveller or notched trowel and immediately use a spiked roller to release entrapped air.

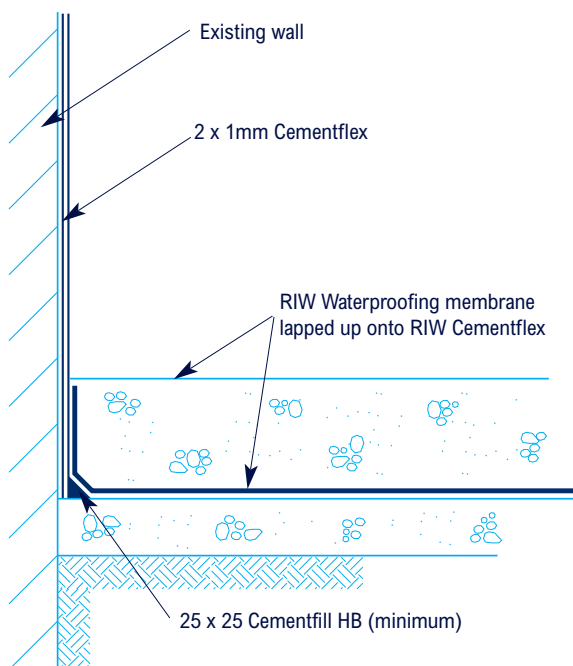
CLEANING

All tools should be cleaned with water immediately after use.

CURING

Normal procedures relating to curing of cementitious products should be strictly adhered to. It is important that the surface of the coating is protected from strong sunlight and drying winds with **RIW Cementseal Primer** polythene sheeting, damp hessian or similar. Curing must commence within 10 - 15 minutes of the completed application of the coating.

DETAIL 1



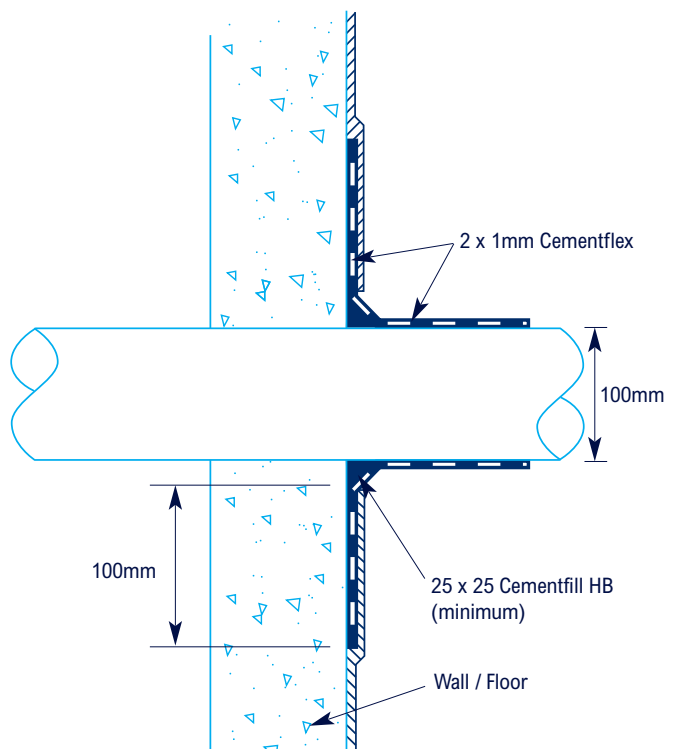
IMPORTANT NOTES

1. Apply only to clean, sound substrates which should be saturated but surface-dry and free of water back pressure.
2. Care should be taken when curing in hot, sunny or windy conditions.
3. **RIW Cementflex** is not a decorative finish and may temporarily discolour until uniformly weathered.

ADVANTAGES

- Dense matrix offers low permeability to water, even at 10 bar pressure (100m head of water).
- Brush, trowel or spray applied, normally in two coats. Flooring applications are a one coat operation.
- Tough, flexible coating which maintains its elastomeric properties even under immersed conditions to accommodate movement in cracks.
- Good abrasion and very high resistance to freeze / thaw cycles and de-icing salts.
- Excellent adhesion to steel and sound prepared concrete and masonry substrates.
- Non-hazardous and ideally suited for application in confined spaces.
- Can be applied to damp substrates.
- Water based product free from hazardous solvents making it suitable for use in confined spaces.
- Non-toxic when cured.

DETAIL 2 PIPE ENTRY DETAIL



SAFETY

Full health and safety instructions are contained on the product material safety data sheets and these must be referred to before use.

SUPPLY

AVAILABILITY

All RIW products can be obtained through Builders Merchants or approved stockists. A list of approved stockists is available from RIW Ltd's offices.

PACKAGING

Pack size	15 kg in plastic tub ie : 2No. x 7.5 kg (two part) mixes.
Yield	9.4 litres / 15 kg pack
Coverage	1.6 kg / mm / m ² ; On repaired and normal concrete surfaces, 15 kg packs will cover 4.7 m ² at 2mm thickness.

SHELF LIFE

12 months in dry, frost free conditions with unopened containers at 20° C

TECHNICAL SERVICES

The RIW Technical Department is available to advise on individual projects and to prepare and assist in the preparation and specifications and drawings. A list of experienced applicators of RIW materials is available from RIW Ltd's offices.

The information in this literature was correct at the time of going to press. However, we are committed to continually improving our products and reserve the right to change product specifications. For the latest information, please consult RIW Limited. Conditions of use are beyond our control, therefore we can not warrant the results to be obtained.



RIW Limited

Arc House, Terrace Road South, Binfield, Bracknell, Berkshire RG42 4PZ

Technical enquiries tel: **01344 397777**

Commercial enquiries tel: **01344 397788**

www.riw.co.uk





SOLAR-CANDELA^{LLC}
ILLUMINATING POWER SOLUTIONS

*REVISED OFF-GRID SOLAR POWER SOLUTION PROPOSAL:
BESPOKE CIRCULAR SOLAR PV INSTALLATION*

at
Barclodiad-y-Gawres
for
Purcell Architects



<i>Project:</i>	<i>Barclodiad-y-Gawres</i>
<i>Job No:</i>	<i>4015</i>
<i>Date:</i>	<i>5/8/14</i>
<i>Prepared by:</i>	<i>Ingrid O'Donnell</i>
<i>Checked by:</i>	<i>Ingrid O'Donnell</i>

Project Background

The Neolithic burial chamber Barclodiad-y-Gawres, situated on the south western coast of Ynys Mon houses unique rock art from the Neolithic period. The centre of the burial chamber contains the most significant rock carvings. However, the current ambient natural light levels here are poor - so that visitors to the site struggle to see and appreciate the full effect and visual significance of the rock carvings.

The site is located in a very remote position, close to the coast and far from any mains power connection. This proposal (originally commissioned by Purcell Architects email of 24/4/14, following Solar-Candela's quotation of 12/11/13 and Purcell's later revised email instruction of 13/6/14) addresses a way forward to improve the current situation by using an off-grid solar power supply to provide electricity for lighting. Since the site is a Scheduled Monument this proposal has given careful consideration to keeping any adverse visual impact of the standalone solar system to a minimum.

Lighting Requirement Specification

Following a site visit on 21/3/14 the following lighting requirements were identified for 2 different categories of visitor:

Interest Group 1. Visitors who have not made special arrangements for a guided tour to visit the tomb and who cannot pass the internal railings, requiring lighting to view the rock art from a distance of a few metres (eg *ad hoc* visitors interested in the site, walkers along the coast path who may have an existing interest in the site or, who may "discover" it after seeking shelter from the weather);

Interest Group 2. Visitors on a pre-booked guided tour, who may be escorted past the internal railings to get a more detailed close up view of the rock art.

We have been advised that the light fittings to provide the required lighting are 24V DC units (with no driver requirement) supplied by iGuzzini and have been specified by Purcell Architects (email 8/4/14) as follows:

- 2no. 3W tube LED lamps to provide feature lighting to individual stones
- 3no. 4.7W Outdoor Floodlights to provide lighting to Interest Group 01
- 3no. 4.7W Outdoor Floodlights to provide lighting to Interest Group 02
- 5no. 1W Graphic Lighting 'cube' for off-centre feature if required.

The likely required 'run times' of these lights have been estimated by Purcell Architects (email 7/5/14) as follows:

- Estimated summer run time: 2 minutes at a time for up to 100 times / day
- Estimated winter run time: 2 minutes at a time for up to 10 times / day

This information, in conjunction with the site location, CAD drawings supplied by Purcell (email 7/5/14) and solar irradiance modeling data from the European Commission's Photovoltaic Geographical Information System (a widely accepted tool for providing a reasonably accurate method of predicting localized solar power resource) have been used to calculate the size of the standalone solar power system proposed below.

SYSTEM DESIGN SUMMARY (see Appendix A for full technical calculations)

The solar power system will consist of a bespoke circular solar PV array which will harvest sunlight energy, transforming it into DC electricity which will be stored in a suitably sized, low maintenance battery bank. The batteries will provide 5 days autonomy (ie back up power to provide lighting output for 5 continuous days without significant sunlight energy input). An MPPT charge controller will ensure optimum efficiency from the solar array and battery bank at all times.

We recommend activation of the lighting by push switches on timers, as this also gives visitors the opportunity to experience the more natural dark environment of the tomb if they wish – although activation by PIR / visitor movement is also possible if preferred.

PV Array (see Appendix B for full technical specification)

Due to the low power requirement of the LED light fittings, only a single PV module is required. The single bespoke circular module will consist of black monocrystalline PV cells (approx. 1800mm in diameter) set in an outer 50mm rim of transparent glass to allow for overlap of the frame / mounting system. The total outside diameter of the module will therefore be 1900mm. In cross section the 12mm wide module will consist of:

- a) A top layer of water white (low iron for good transparency) toughened glass (for robustness) - 5mm wide
- b) An interlayer of PV cells sandwiched between PVB interlayers – 2mm wide
- c) A rear layer of heat-strengthened glass to compensate for thermal movement, with black screen print to rear – 5mm wide

The leads from the solar module will emerge from 1 or 2 no. junction boxes on the rear of the module. These will be located behind a black PV cell so that they are not visible from above and do not detract from the clean aesthetics of the module. The location of these junction boxes towards the centre, rather than at the edge of the module will not affect the perimeter stainless steel frame proposed. This proposed design for the solar module is not fixed until technical sign-off of the final design drawings.

The solar module would be mounted using a robust marine-grade stainless steel mounting system at the top of the oculus in a landscape orientation and at a minimum incline of 15 degrees to the horizontal so that it faces south and is completely unshaded – see proposed design drawing in Appendix B - based on details received from Purcell (again the design is not fixed until technical sign-off of the final detailed design drawings). A steeper mounting angle of 45-60 degrees (if possible) would be better for optimising power generation in winter and potentially providing additional power for future needs in the summer. However, a 15 degree mounting angle should prove adequate for current requirements. An incline is required to optimize the module's solar gain, but also to facilitate self-cleaning in the rain to remove accumulated dirt / guano, etc, to ensure the continuing function of the solar module. It is important that the installation should permit rainwater to drain away freely from the solar module. A 15 degree incline will result in the top edge of the PV array extending above the current external profile of the tomb by around 500mm.

To mitigate this visual impact, one option could be to remove the white concrete exterior of the oculus and mount the black solar module flush with a dark stone / slate enclosure – in a stonework style similar to the structures below (but not higher than the c.500mm required):



Photos indicating possible sympathetic stonework style for PV module mount

We would seek advice and approval from relevant authorities for the final structure aesthetics. We are assuming that the existing structure can support this additional weight of the PV array and the weight of any additional mounting materials. However, a structural engineer should be asked to provide confirmation of this assumption and verify that likely wind loadings are acceptable for the approved final design.

Battery Bank (see Appendix C for full technical specification)

The batteries proposed are VRLA gel batteries that do not require topping up with acid and require minimum maintenance. The battery bank is protected by a fused isolation switch to make future replacement safe. As standard in Solar-Candela solar power solutions, the battery bank has been designed to provide the specified loads with 5 days autonomy (ie sufficient energy storage to run loads for 5 continuous days without any additional power input).

The 24V DC battery bank proposed consists of 2 no. 41Ah batteries of dimensions 210mm(L) x 175mm (W) x 175mm (D) and weighing c14.8kg.



Eg of battery type



Eg of 450mm x 450mm x 450mm ground mounted enclosure for battery & controls

The battery bank and charge controller (see below) will be housed in a secure, lockable container to prevent unauthorized tampering. A dark coloured container would be selected to be as sympathetic to the surroundings as possible. This container will be located within the centre of the tomb and hidden behind the most suitable internal rock (to be agreed).



Internal photo of burial chamber illustrating the wide choice of locations for enclosure

Solar Charge Controller (see Appendix D for full technical specification)

The solar charge controller has 3 main functions:

1. To monitor the battery voltage
2. To control the charging process
3. To control the connection/disconnection of loads

The charge controller therefore optimizes the battery use and significantly extends its service life, protecting the battery from harmful states of charge. In addition, the charge controller we propose is equipped with a maximum power point tracking (MPPT) algorithm which means that the solar system will always be using the maximum available output of the solar module.



Example of charge controller

The charge controller would be housed within the same enclosure as the battery bank within the central area of the burial chamber itself.

DC Wiring Route

Cable entry through the oculus can be achieved during installation of the solar module. We understand that the internal façade of the dome is to be re-rendered in a more sympathetic style. Around 30m of 10mm² DC solar cable (which is typically black) would need to traverse the inside of the dome and drop down to the agreed location of the battery enclosure ideally using the shortest possible route. The cable can then enter the battery enclosure through a waterproof entry boot and connect to the charge controller. Then 2.5- 4mm² cable for the iGuzzini lights can leave the battery enclosure via the same waterproof entry boot and can be carried across the ground to the lights in a dark coloured protective sleeve (if burial in the ground is not an option at this sensitive site). This proposal allows for 60m of lighting cable.

ASSUMPTIONS

Shading Issues

Solar PV systems should not be shaded to any extent if possible. Shading will reduce the amount of energy produced by the system and therefore impact on the autonomy times and battery life. We will always recommend that systems are installed in an un-shaded location, facing south, at a tilt angle suitable for the location to maximize the energy generation potential of the system.

Safety and Site Access

Safe and adequate access to the installation site will be required for the safety of the system installers. This should be arranged locally or with the system installers.

Planning Permission

It will be the sole responsibility of the client to obtain any necessary approvals from the relevant planning authorities. Solar-Candela are happy to provide any technical support as required.

Structural Assessment

A structural engineer may be needed to assess the ability of the domed roof covering to withstand the additional loading of the PV array and mounting materials and also to assess the affect of wind loading on the final installation design. It is the responsibility of the client to identify if a survey is required and to make these arrangements.

Electrical Installation Regulations

The installation work should be commissioned by a qualified electrician to BS7671 in accordance with the 17th Edition Wiring Regulations.

COSTS

.	Item	Specification	No	Unit Price (£)	Total Price (£)
1	Solar PV module	Bespoke Romag 238W(p) 1900mm OD circular monocrystalline toughened glass*	1	2,270.41	2,270.41
2	Mounting frame for solar PV module	Marine grade stainless steel, to allow module to be removed and replaced if necessary and to allow for water run-off and drainage.	1	7,500.00 (est**)	7,500.00
3	Battery enclosure with internal frame	Forecourt Drawpit 450mm x 450mm x 450mm	1	345.00	345.00
4	Battery	Sonnenschein Solar S12/41A	2	173.18	346.37
5	Charge Controller	STECA MPPT 1010	1	165.00	165.00
6	DC Cables, Connectors, Fuses & Switches	As required for system	1	811.13	811.13
7	Operations & Maintenance Manual		1	Inc	
8	Technical Support		-	Inc	
9	Delivery to site, installation & commissioning	TBC (dependent on agreed solar module mounting method)	-	-	
	<i>Sub total</i>				<i>11,437.91</i>
	<i>VAT</i>				<i>2,287.58</i>
	TOTAL				13,725.49

* The lead time for the bespoke solar PV module is around 10-12 weeks from sign off of technical drawings.

** This cost is currently an estimate. An alternative, potentially less expensive approach to manufacturing the bespoke stainless steel frame is under investigation.

SOLAR POWER – A SUSTAINABLE SOLUTION

The global demand for good clean sources of high quality electrical energy has been increasing year on year. Therefore the need for renewable resources of energy to meet these has also increased. Over the last few years this requirement has seen a massive increase in production, resulting in an associated decrease in costs. This opportunity makes solar power an attractive option for remote offgrid electricity requirements. The advantages of a professional and robust solar power solution:

- ✓ Reduced grid electricity costs and generator fuel costs;
- ✓ A solar power system has no moving parts, is silent in operation and normally requires very little, if any, maintenance over the first 10 years post installation;
- ✓ Maintenance is limited to checking that the solar panels are successfully self-cleaning and checking battery terminals and connections;
- ✓ Zero carbon emissions and no adverse effect from any national grid power outages.

Solar-Candela Overview

A dynamic young company established in 2012, Solar-Candela's core values focus on matching client's needs with workable and cost-effective solutions. We work alongside well-established manufacturers to carefully select quality components whilst delivering excellent value for money and reliable robust solutions.

As a UK company, based in mid-Wales, we appreciate the importance of good solar design for seasonal and variable weather conditions. For many sites, a well-designed and commissioned solar solution can provide the most cost-effective, reliable, low-maintenance and low-carbon option for off-grid power requirements.

For bespoke commissions, we take pride in providing the best-design solutions for your needs. We listen carefully to your requirements and then professionally project manage the product build to ensure delivery that is on time, to budget and meets all expectations.

Professional design and assembly of all our solar products at our workshop facilities here in the UK, ensures that quality is maintained at every stage of production. Throughout all project stages, customer satisfaction is our paramount concern - and our UK-based staff are well-trained and available to answer any questions.



APPENDIX A

System Design Calculations

APPENDIX B

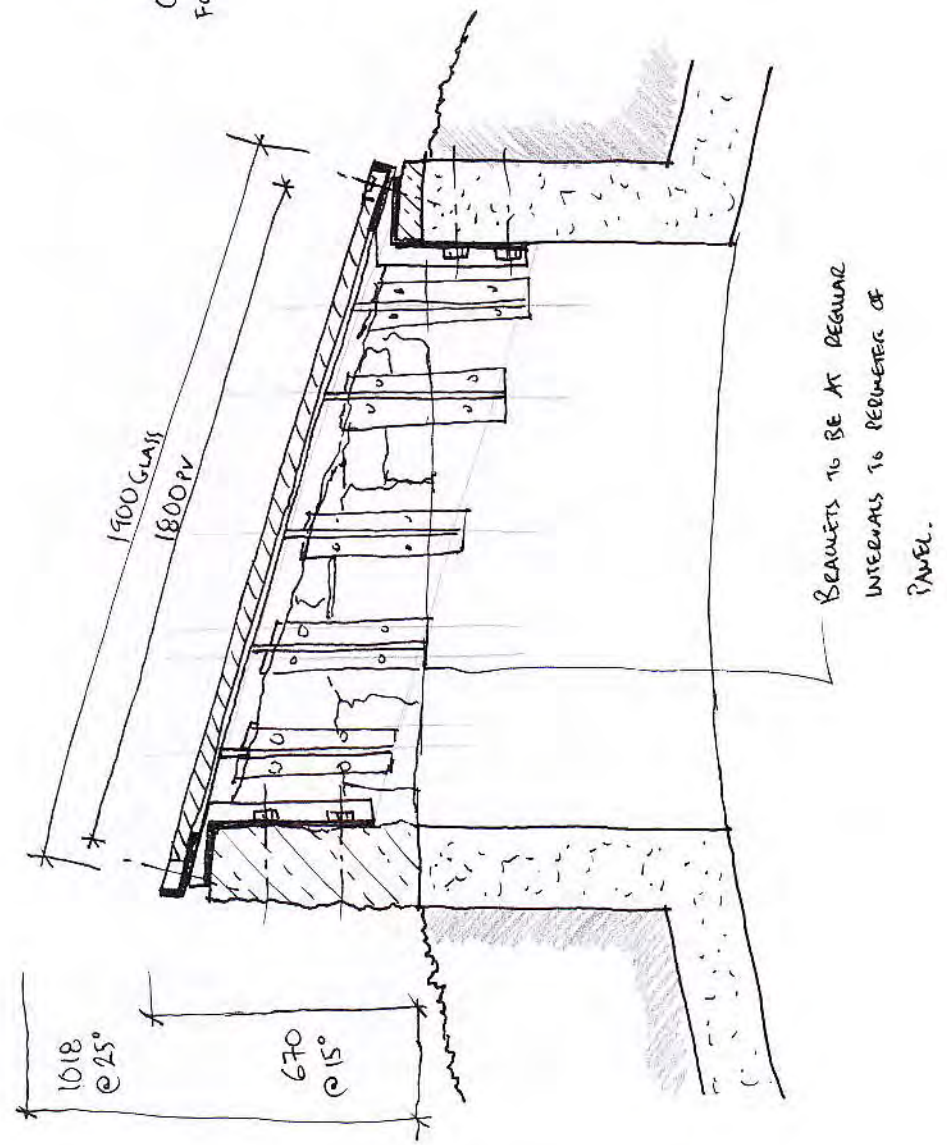
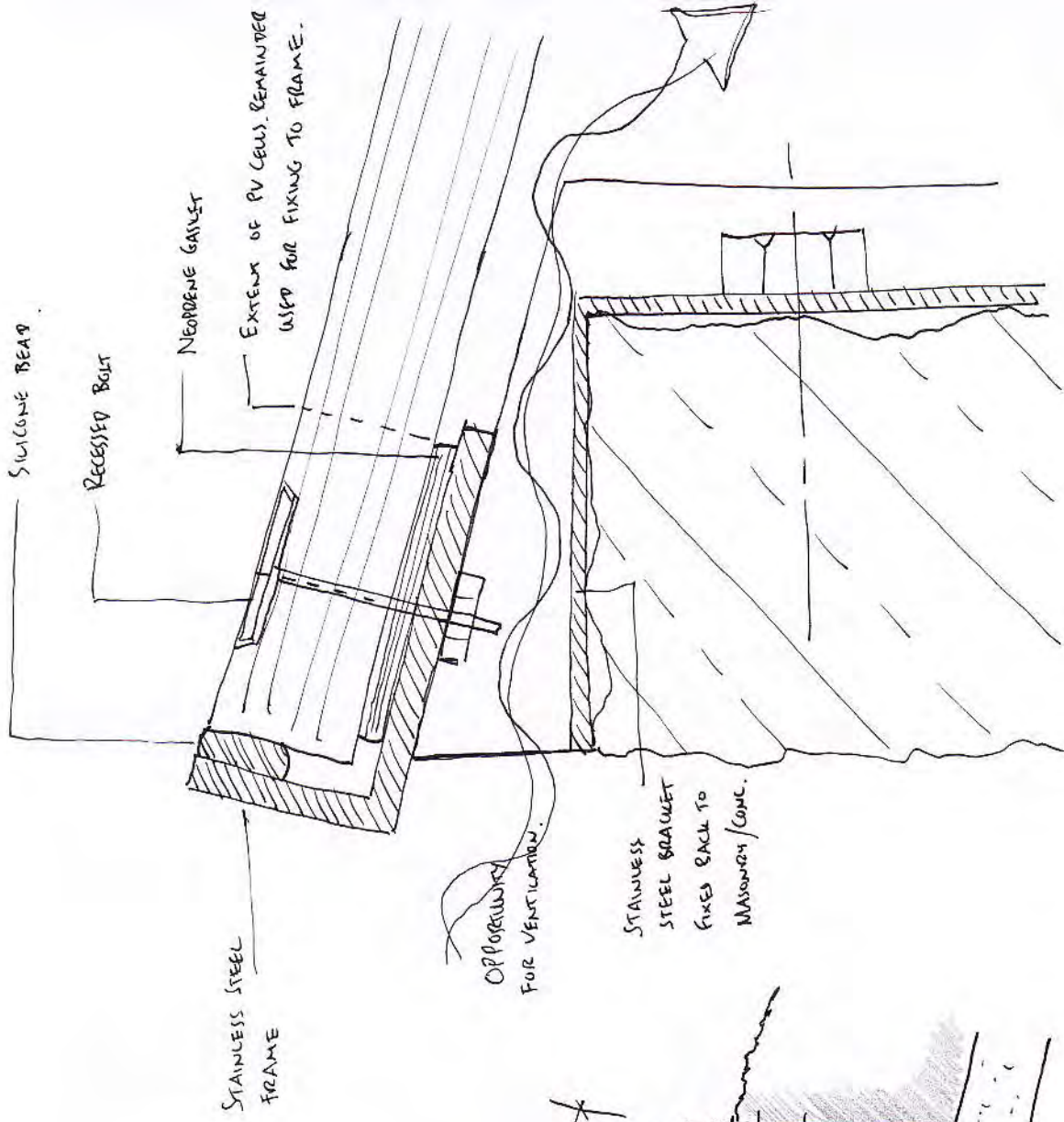
PV Module Technical Specification

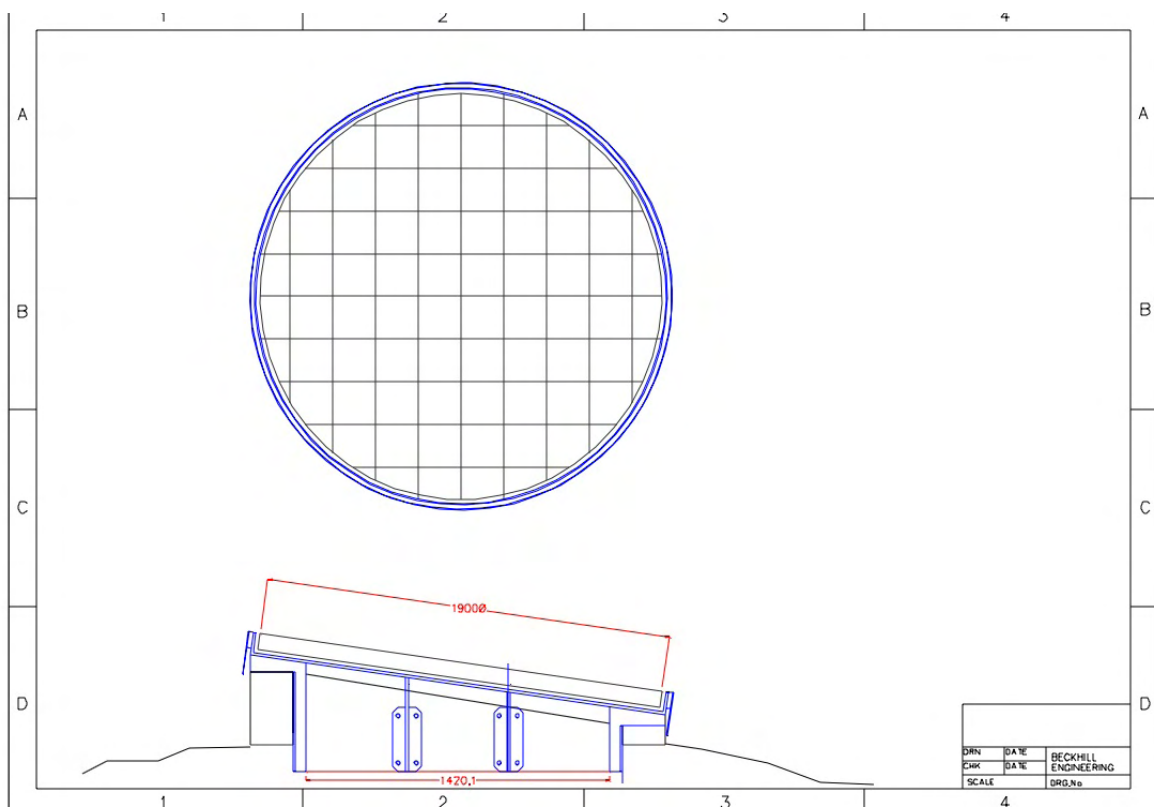
APPENDIX C

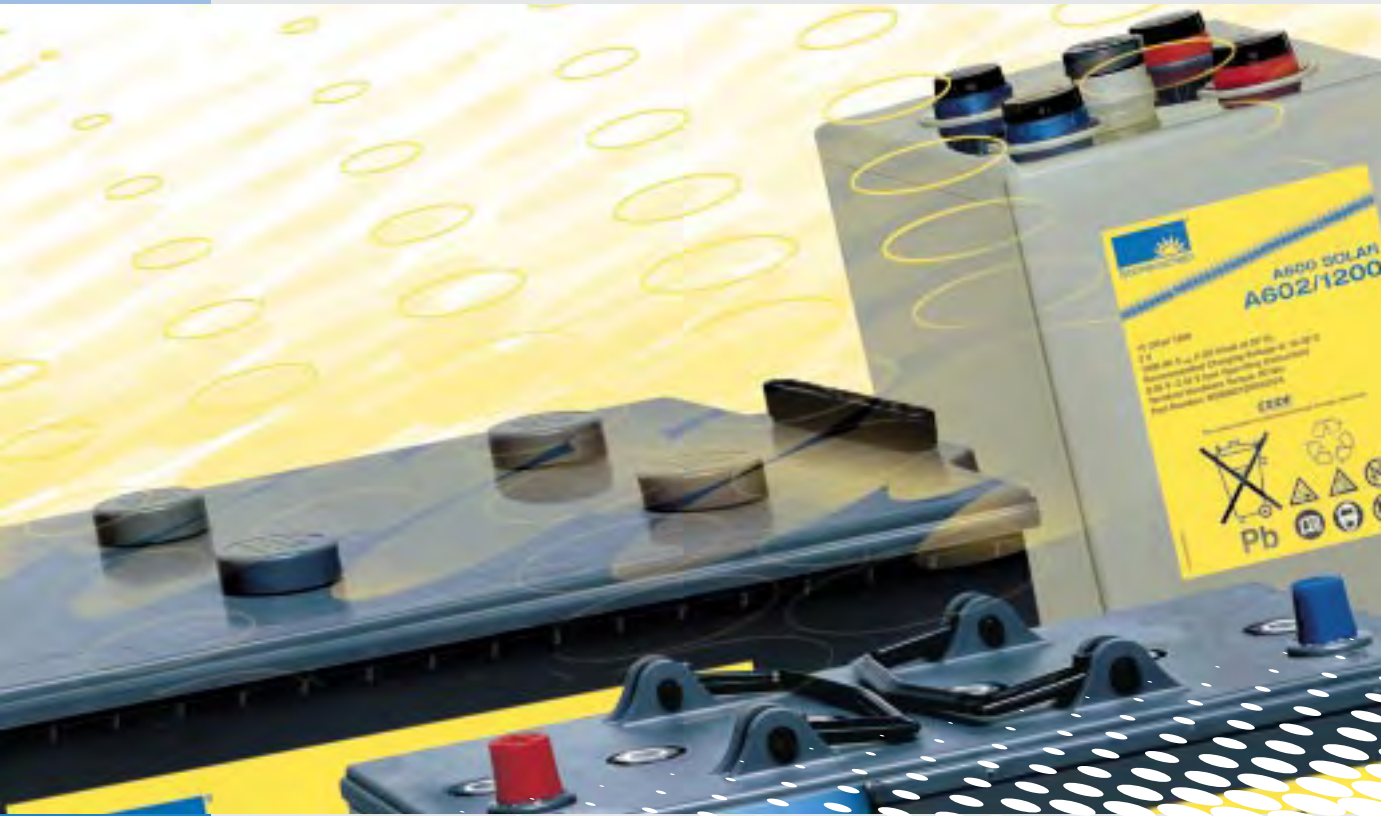
Battery Bank Technical Specification For Batteries and Battery Enclosure

APPENDIX D

Charge Controller Technical Specification







Industrial Batteries – Sonnenschein Solar
Safe storage capacity for renewable energy.

The compact alternative for smaller solar applications.

Sonnenschein Solar batteries are specially designed for small to medium performance requirements in leisure and consumer applications. The advantages of the maintenance free VRLA batteries are enhanced by the worldwide high reputation and technical image of the dryfit technology. Typical applications are weekend and holiday houses without mains supply, street solar stations, information signs, parking meters, wireless emergency phone boxes and also other safety equipment power supplies.



Valve
regulated



Grid plate



Nominal
capacity
6.6-230 Ah



Bloc battery



800 cycles *
acc. to
IEC 896-2



Maintenance-
free



Proof against
deep discharge
acc. to
DIN 43 539 T5

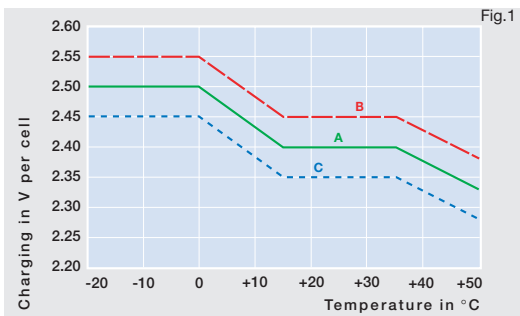


Recyclable



Technical characteristics and data

Type	Part number	Nominal voltage V	Nominal capacity C_{100} 1.8 V/C Ah	Discharge current I_{100} A	Length (l) max. mm	Width (b/w) max. mm	Height up to top of cover (h1) max. mm	Height incl. connectors (h2) max. mm	Weight approx. kg	Terminal	Terminal position
S12/6.6 S	NGSO1206D6HS0SA	12	6.6	0.066	151.7	65.5	94.5	98.4	2.6	S-4.8	3
S12/17 SR	NGSO120017HS0RA	12	17.0	0.170	181.0	76.0	152.0	156.4	6.1	SR-6.3	1
S12/27 G5	NGSO120027HS0BA	12	27.0	0.270	167.0	176.0	–	126.0	9.7	G-M5	1
S12/32 G6	NGSO120032HS0BA	12	32.0	0.320	197.0	132.0	160.0	184.0	11.2	G-M6	2
S12/41 A	NGSO120041HS0CA	12	41.0	0.410	210.0	175.0	–	175.0	14.8	A-Terminal	1
S12/60 A	NGSO120060HS0CA	12	60.0	0.600	261.0	136.0	208.0	230.0	19.0	A-Terminal	1
S12/85 A*	NGSO120085HS0CA	12	85.0	0.850	353.0	175.0	–	190.0	27.3	A-Terminal	1
S12/90 A	NGSO120090HS0CA	12	90.0	0.900	330.0	171.0	213.0	236.0	31.3	A-Terminal	2
S12/130 A	NGSO120130HS0CA	12	130.0	1.300	286.0	269.0	208.0	230.0	39.8	A-Terminal	4
S12/230 A	NGSO120230HS0CA	12	230.0	2.300	518.0	274.0	216.0	238.0	70.0	A-Terminal	3

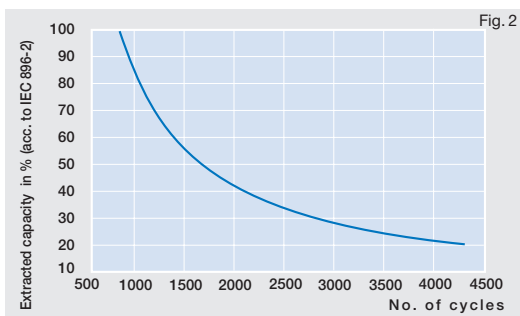
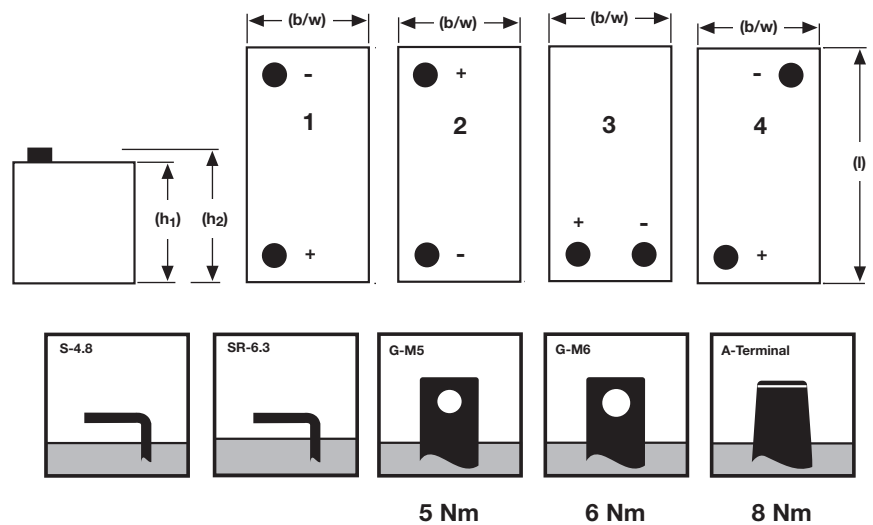


Charge mode (to Fig. 1):

- 1.) with switch regulator (two-step controller)
 - charge on curve **B** (max.charge voltage) for max.2 hrs/day
 - then switch over to continuous charge - curve **C**
- 2.) Standard charge (without switching) - curve **A**
- 3.) Boost charge (Equalizing charge with external generator)
 - charge on curve **B** for max. 5 hrs/month, then switch over to curve **C**

Capacities $C_1 - C_{100}$ (20°C)					
Type	C_1 1.70 V/C	C_5 1.70 V/C	C_{10} 1.70 V/C	C_{20} 1.75 V/C	C_{100} 1.80 V/C
S12/6.6 S	2.9	4.6	5.1	5.7	6.6
S12/17 SR	9.3	12.6	14.3	15.0	17.0
S12/27 G5	15.0	22.1	23.5	24.0	27.0
S12/32 G6	16.9	24.4	27.0	28.0	32.0
S12/41 A	21.0	30.6	34.0	38.0	41.0
S12/60 A	30.0	42.5	47.5	50.0	60.0
S12/85 A	55.0	68.5	74.0	76.0	85.0
S12/90 A	50.5	72.0	78.0	84.0	90.0
S12/130 A	66.0	93.5	104.5	110.0	130.0
S12/230 A	120.0	170.0	190.0	200.0	230.0

Drawings with terminal position, terminal and torque



(to Fig. 2)

Endurance in cycles according to IEC 896-2

* S12/85 A = 400 cycles

Not to scale!

Safe power supply for medium performance.

The Sonnenschein Solar Bloc battery range is very powerful and reliable in rough application conditions. As well as for use in private areas like holiday and weekend houses with more consumer terminals, this range is the ideal energy source for medium industrial solar systems, small solar and wind powerstations, offshore buoys, yachts and measuring stations as well as for other safety equipment power supplies.



VRLA
Valve regulated



Grid plate



Nominal capacity
60–330 Ah



Bloc battery



1200 cycles
acc. to
IEC 896-2



Maintenance-free



Proof against deep discharge
acc. to
DIN 43 539 T5

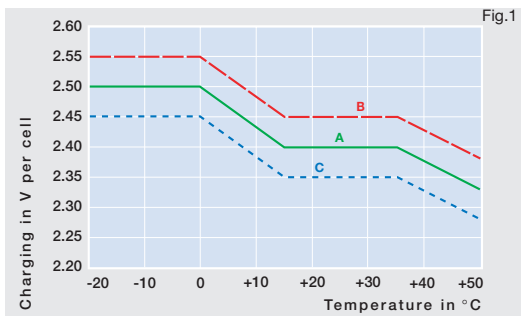


Recyclable



Technical characteristics and data

Type	Part number	Nominal voltage V	Nominal capacity C_{100} 1.8 V/C Ah	Discharge current I_{100} A	Length (l) max. mm	Width (b/w) max. mm	Height up to top of cover (h1) max. mm	Height incl. connectors (h2) max. mm	Weight approx. kg	Terminal	Terminal position
SB12/60 A	NGSB120060HS0CA	12	60	0.60	278	175	–	190	20	A-Terminal	1
SB12/75 A	NGSB120075HS0CA	12	75	0.75	330	171	214	236	28	A-Terminal	2
SB12/100 A	NGSB120100HS0CA	12	100	1.00	513	189	195	223	39	A-Terminal	3
SB12/130 A	NGSB120130HS0CA	12	130	1.30	513	223	195	223	48	A-Terminal	3
SB12/185 A	NGSB120185HS0CA	12	185	1.85	518	274	216	238	65	A-Terminal	3
SB6/200 A	NGSB060200HS0CA	6	200	2.00	190	244	254	275	31	A-Terminal	4
SB6/330 A	NGSB060330HS0CA	6	330	3.30	312	182	337	359	48	A-Terminal	4

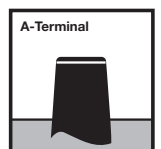
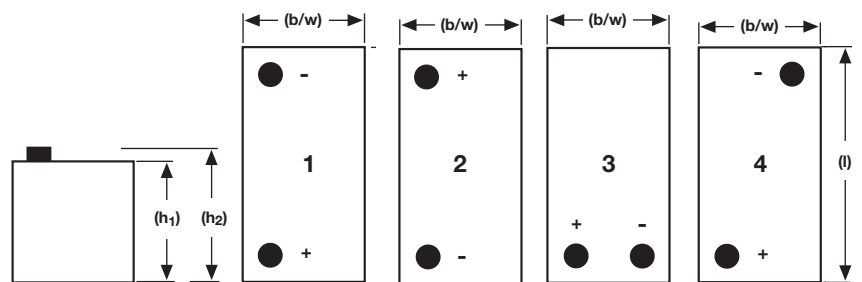


Charge mode (to Fig. 1):

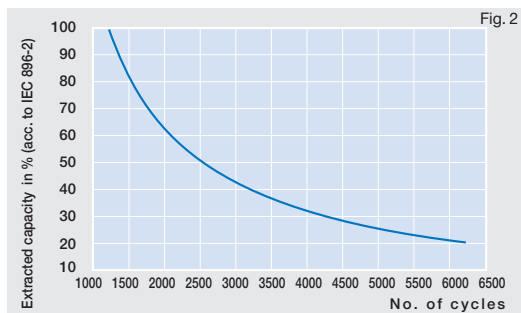
- 1.) with switch regulator (two-step controller)
 - charge on curve **B** (max. charge voltage) for max. 2 hrs/day
 - then switch over to continuous charge - curve **C**
- 2.) Standard charge (without switching) - curve **A**
- 3.) Boost charge (Equalizing charge with external generator)
 - charge on curve **B** for max. 5 hrs/month, then switch over to curve **C**

Capacities $C_1 - C_{100}$ (20°C)					
Type	C_1 1.70 V/C	C_5 1.70 V/C	C_{10} 1.70 V/C	C_{20} 1.75 V/C	C_{100} 1.80 V/C
SB12/60 A	34	45	52	56	60
SB12/75 A	48	60	66	70	75
SB12/100 A	57	84	89	90	100
SB12/130 A	78	101	105	116	130
SB12/185 A	103	150	155	165	185
SB6/200 A	104	153	162	180	200
SB6/330 A	150	235	260	280	330

Drawings with terminal position, terminal and torque



8 Nm



(to Fig. 2)

Endurance in cycles according to IEC 896-2

Not to scale!

Sonnenschein A 600 Solar batteries are developed for medium to large solar powered applications. The recyclability and long storage life without recharge makes this environmentally friendly solar battery system absolutely recommendable for various requirement profiles. Typical applications for these maintenance free VRLA batteries with successful dryfit technology, are solar and wind power stations, power distribution companies, telecommunications, railways and many other safety equipment power supplies.



Valve regulated



Tubular plate



Nominal capacity
240 – 3500 Ah



Single cell



1600 cycles
acc. to
IEC 896-2



Maintenance-free



Proof against
deep discharge
acc. to
DIN 43 539 T5

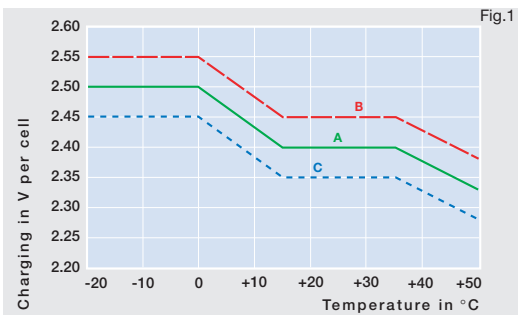


Recyclable



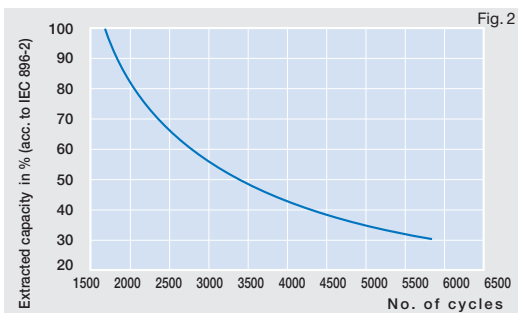
Technical characteristics and data

Type	Part number	Nominal voltage	Nominal capacity	Dis-charge current	Length (l)	Width (b/w)	Height up to top of cover (h1)	Height incl. connectors (h2)	Installed length (B/L)	Weight approx.	Terminal	Pole pairs
		V	C ₁₀₀ 1.85 V/C Ah	I ₁₀₀ A	max. mm	max. mm	max. mm	max. mm	mm	kg		
4 OPzV 240	NGS6020240HS0FA	2	240	2.4	105	208	360	398	112	19.5	F-M8	1
5 OPzV 300	NGS6020300HS0FA	2	300	3.0	126	208	360	398	135	23.5	F-M8	1
6 OPzV 360	NGS6020360HS0FA	2	360	3.6	147	208	360	398	155	28.0	F-M8	1
5 OPzV 400	NGS6020400HS0FA	2	400	4.0	126	208	475	513	135	31.0	F-M8	1
6 OPzV 500	NGS6020500HS0FA	2	500	5.0	147	208	475	513	155	36.5	F-M8	1
7 OPzV 600	NGS6020600HS0FA	2	600	6.0	168	208	475	513	175	42.0	F-M8	1
6 OPzV 720	NGS6020720HS0FA	2	720	7.2	147	208	650	688	155	50.0	F-M8	1
8 OPzV 960	NGS6020960HS0FA	2	960	9.6	215	193	650	688	220	68.0	F-M8	2
10 OPzV 1200	NGS6021200HS0FA	2	1200	12.0	215	235	650	688	220	82.0	F-M8	2
12 OPzV 1400	NGS6021400HS0FA	2	1400	14.0	215	277	650	688	220	97.0	F-M8	2
12 OPzV 1700	NGS6021700HS0FA	2	1700	17.0	215	277	800	838	220	120.0	F-M8	2
16 OPzV 2300	NGS6022300HS0FA	2	2300	23.0	215	400	775	815	220	160.0	F-M8	3
20 OPzV 2900	NGS6022900HS0FA	2	2900	29.0	215	490	775	815	220	200.0	F-M8	4
24 OPzV 3500	NGS6023500HS0FA	2	3500	35.0	215	580	775	815	220	240.0	F-M8	4



Charge mode (to Fig. 1):

- 1.) with switch regulator (two-step controller)
 - charge on curve **B** (max. charge voltage) for max. 2 hrs/day
 - then switch over to continuous charge - curve **C**
- 2.) Standard charge (without switching) - curve **A**
- 3.) Boost charge (Equalizing charge with external generator)
 - charge on curve **B** for max. 5 hrs/month, then switch over to curve **C**



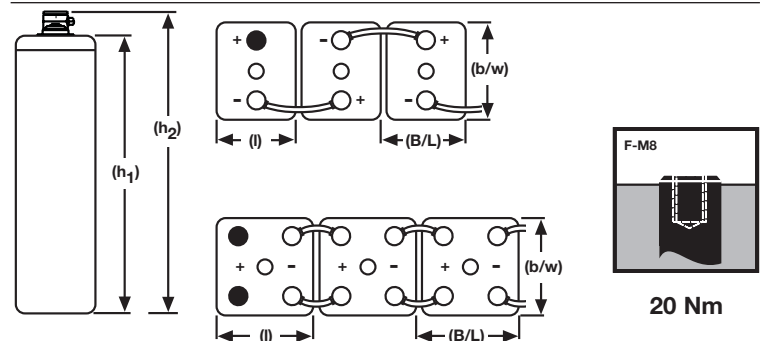
(to Fig. 2)

Endurance in cycles according to IEC 896-2

Capacities C₁ – C₁₀₀ (20°C)

Type	C ₁ 1.67 V/C	C ₃ 1.75 V/C	C ₅ 1.77 V/C	C ₁₀ 1.80 V/C	C ₁₀₀ 1.85 V/C
4 OPzV 240	108	151	175	200	240
5 OPzV 300	135	189	219	250	300
6 OPzV 360	162	227	263	300	360
5 OPzV 400	180	252	292	350	400
6 OPzV 500	225	315	365	420	500
7 OPzV 600	270	378	438	490	600
6 OPzV 720	324	454	526	600	720
8 OPzV 960	432	605	701	800	960
10 OPzV 1200	540	756	876	1000	1200
12 OPzV 1400	630	882	1022	1200	1400
12 OPzV 1700	765	1071	1241	1500	1700
16 OPzV 2300	1035	1449	1679	2000	2300
20 OPzV 2900	1305	1827	2117	2500	2900
24 OPzV 3500	1575	2205	2555	3000	3500

Drawings with terminal position, terminal and torque



Not to scale!

Exide Technologies Network Power – The Industry Leader.



ABSOLYTE™

MARATHON™

Sprinter™



Classic™

Powerfit™

Exide Technologies Network Power Division is the global leader in stored electrical energy solutions for all major critical reserve power applications and needs. Network power applications include communication/data networks, UPS systems for computers and control systems, electrical power generation and distribution systems, as well as a wide range of other industrial standby power applications. With a strong manufacturing base in both North America and Europe and a truly global reach (operations in more than 80 countries) in sales and service, Exide Technologies Network Power Division is best positioned to satisfy your back up power needs locally as well as all over the world.

Based on over 100 years of technological innovation the Network Power Division leads the industry with the most recognized global brands such as Absolyte, Sonnenschein, Marathon, Sprinter, and Flooded Classic. They have come to symbolize quality, reliability, performance and excellence in all the markets served.

Exide Technologies takes pride in its commitment to a better environment. Its Total Battery Management program, an integrated approach to manufacturing, distributing and recycling of lead acid batteries, has been developed to ensure a safe and responsible life cycle for all of its products.

EXIDE Technologies

Network Power
Im Thiergarten
63654 Büdingen
Germany
Tel.: +49 (0) 60 42 / 81 70
Fax: +49 (0) 60 42 / 81 233

www.exide.com

GNB Industrial Power

829 Parkview Boulevard
Lombard, IL 60148-3249
U.S.A.

Tel.: +1 630.629.5200
Fax: +1 630.629.2635

EXIDE
TECHNOLOGIES



CHAMBERTITE DRAW-PIT CHAMBERS

Cost Effective Construction Equipment

Forecourt Solutions are pleased to announce the addition of Draw Pits and Access Chambers to the ever growing **ChamberTite** range of products. The **ChamberTite** range of DrawPits is available in a range of sizes to suit most applications and to make even the most difficult projects easy. Each pit comprises of a polyethylene chamber interfaced to manhole cover frame and suitably rated manhole cover. We can also offer a custom design service to suit any application should one of our standard products not be ideal for your requirements.



Large chambers can be fitted with our modular range of manhole covers enabling a huge range of sizes to be achieved on short lead times. Common chamber sizes of 450 and 600 mm will usually be held in stock to meet urgent requirements however special sizes and larger quantities will be manufactured to order. Please contact us to enable us to quote your exact requirements.

Features & Benefits

- ➔ Cost effective off the shelf solutions
- ➔ High quality polyethylene chamber rectangular or circular
- ➔ Complete boxes or open based options
- ➔ Options for equipment fixing and mounting points.
- ➔ Watertight options
- ➔ Chambers can be divided into sections if required
- ➔ Composite manhole covers with security options if required
- ➔ Range of load ratings available from A15 to D400
- ➔ Quick to install
- ➔ Colours to suit customer requirements
- ➔ Suitable for direct burial without the need for concrete shuttering
- ➔ Pipe and duct entries can be simply cut on site and sealed by our own comprehensive range of conduit and duct seals (available off the shelf)
- ➔ Non slip covers can be customised to customer requirements
- ➔ Range of locks and security devices to prevent unauthorized entry to installed chambers.

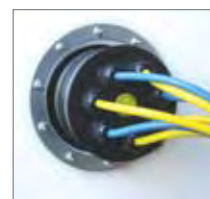
Applications

The number of applications for these chambers is almost limitless. We have already supplied such chambers to the following applications; Airfields, Hospitals, Power Stations, Perimeter Lighting Systems, Fibre Optic Cable Installations, CCTV installations, Petrol Filling Stations, Oil Distribution Terminals, IT Installations in Schools, Road Signs, Solar Power Battery Enclosures, Gas Regulation Equipment, Low Voltage Lighting Plant, Outside Exhibition Stand Wiring, Universities and Electricity Distribution Sub Stations.. As you can see the range of applications is almost endless but whatever the application we provide a chamber to suit.

Other Products



Electrical Draw Pits



Pipe & Cable Entry Boot



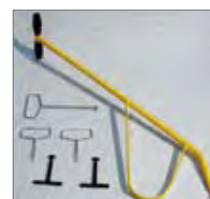
Composite Gully Grates



Tank & Dispenser Sumps



Composite Manhole Covers



Cover Lift Sticks



COMPOSITE
COVERS.COM



CHAMBER
TITE.COM



MODULAR
COVERS.COM



COMPOSITE
GRATES.COM

Forecourt Solutions Ltd
Unit F, Thistle Park
Crossways Road
Showground Business Park
Bridgwater, Somerset
TA6 6LS, UK

T: +44 (0) 1278 42 88 33
F: +44 (0) 1278 45 98 08
E: info@forecourtsolutionsltd.com
W: www.forecourtsolutionsltd.com
Registered in England & Wales No: 5669793
VAT Reg No: 879 904 263





Steca Solarix MPPT

MPPT 1010, MPPT 2010

Steca Solarix MPPT is a solar charge controller with Maximum Power Point Tracking. It is specially designed to work with all established module technologies and is optimized for solar systems with module voltages higher than the battery voltage. The Steca Solarix MPPT is especially qualified in combination with grid tied solar modules. The advanced MPP-tracking algorithm from Steca assures that the maximum available power of the solar generator is charged to the batteries. The Steca Solarix MPPT with latest technology ensures full performance in all conditions, a professional battery care combined with modern design and excellent protection.

Product features

- Maximum Power Point Tracker (MPP tracker)
- Voltage and current regulation
- PWM control
- Current compensated load disconnection
- Automatic load reconnection
- Temperature compensation
- Monthly maintenance charge

Electronic protection functions

- Overcharge protection
- Deep discharge protection
- Reverse polarity protection of load, module and battery
- Reverse polarity protection by internal fuse
- Automatic electronic fuse
- Short circuit protection
- Overvoltage protection at module input
- Open circuit protection without battery
- Reverse current protection at night
- Overtemperature and overload protection
- Battery overvoltage shutdown

Displays

- Multifunction LED display
- Multi-coloured LED
- 5 LEDs show operating states
— for operation, state of charge, fault messages

Options

- Night light function pre-set in the factory or adjustable via Steca PA RC 100
- Parameterisation of function values via Steca PA RC 100
- External temperature sensor

Certificates

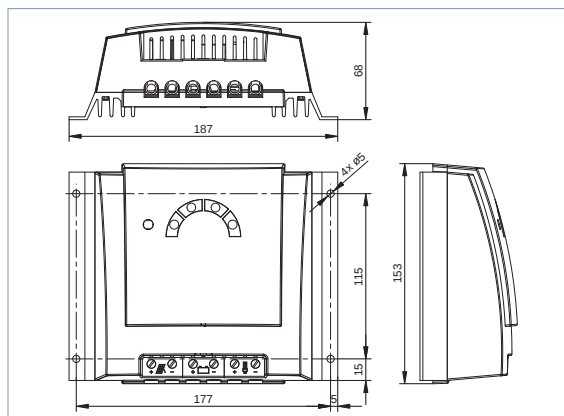
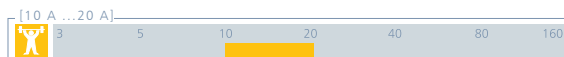
- Compliant with European Standards (CE)
- RoHS compliant
- Made in Germany
- Developed in Germany
- Manufactured according to ISO 9001 and ISO 14001



Steca PA TS10
External temperature sensor



Steca PA RC100
Remote control

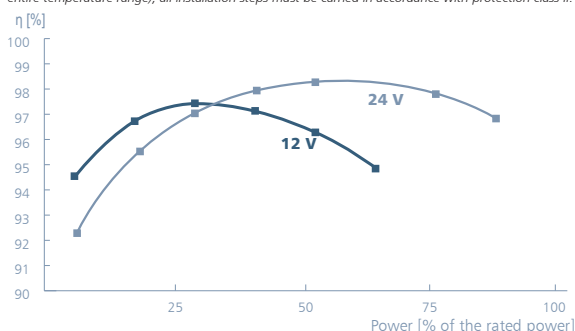


	MPPT 1010	MPPT 2010
Characterisation of the operating performance		
System voltage	12 V (24 V)	
Nominal power	125 W (250 W)	250 W (500 W)
Max. efficiency	> 98 %	
Own consumption	10 mA	
DC input side		
MPP voltage	15 V (30 V) < V _{module} < 75 V	15 V (30 V) < V _{module} < 100 V
Open circuit voltage solar module (at minimum operating temperature)	17 V ... 75 V (34 V ... 75 V)	17 V ... 100 V (34 V ... 100 V)**
Module current	9 A	18 A
DC output side		
Charge current	10 A	20 A
Load current	10 A	
End of charge voltage*	13.9 V (27.8 V)	
Boost charge voltage*	14.4 V (28.8 V)	
Equalisation charge*	14.7 V (29.4 V)	
Reconnection voltage (LVR)*	12.5 V (25 V)	
Deep discharge protection (LVD)*	11.5 V (23 V)	
Operating conditions		
Ambient temperature	-25 °C ... +40 °C	
Fitting and construction		
Terminal (fine / single wire)	16 mm² / 25 mm² - AWG 6 / 4	
Degree of protection	IP 32	
Dimensions (X x Y x Z)	187 x 153 x 68 mm	
Weight	approx. 900 g	

* see options

Technical data at 25 °C / 77 °F

****CAUTION:** If an open circuit voltage of more than 100 V is supplied to the connected solar module, the controller will be destroyed. When selecting the solar module, it is important to bear in mind that the open circuit voltage should never exceed 100 V over the entire working temperature range. When using solar modules with a maximum open circuit voltage of between 75 and 100 V (over the entire temperature range), all installation steps must be carried in accordance with protection class II.



[areas of application]



Array Tilt Summary



SOLAR-CANDELA
ILLUMINATING POWER SOLUTIONS

Solar
Power

Site Summary

Site Name: CADW

Location: VALLEY, , UNITED KINGDOM

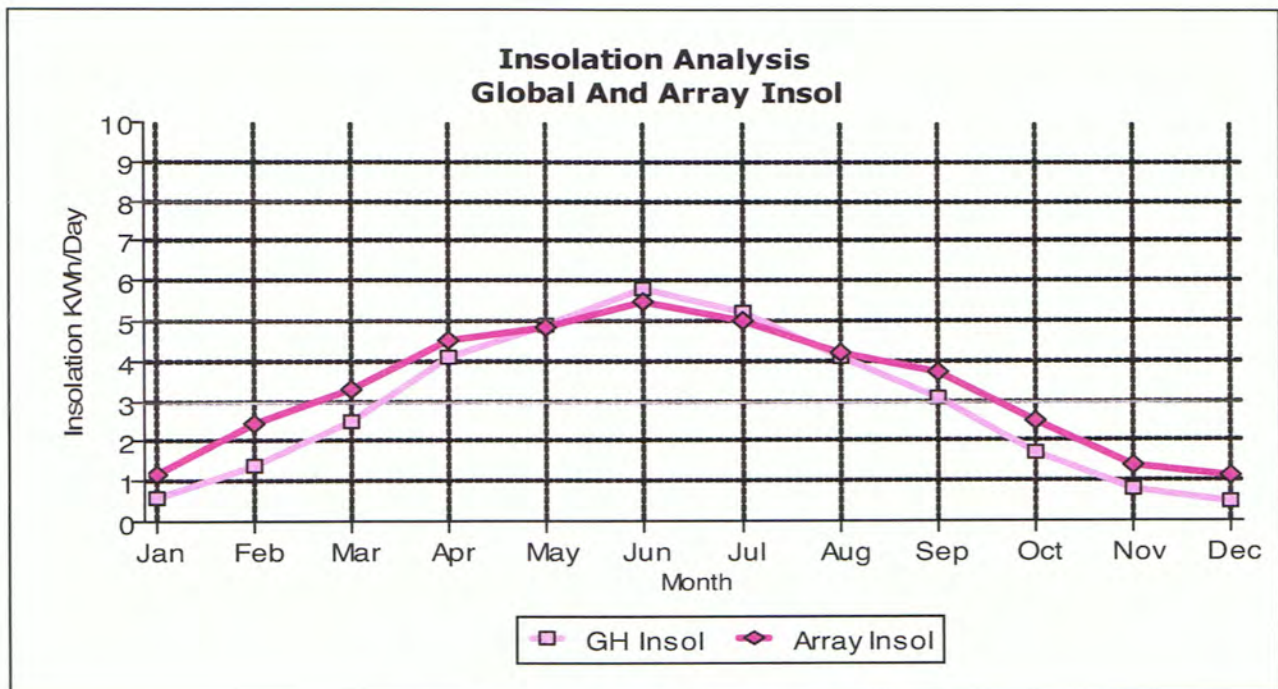
Latitude: 53.20N Longitude: 4.30W Elevation: 18m

Tilt: 45S Azimuth: 0E Tracking: Fixed

Comments: no source

Insolation Analysis

Month	Horiz Insol (kWh/m2/d)	Avg Temp (deg C)	Clearness (KT_bar)	Tilt Factor	Array Insol (kWh/m2/d)
Jan	0.60	6.2	0.34	1.99	1.19
Feb	1.40	6.0	0.42	1.75	2.44
Mar	2.50	7.1	0.44	1.32	3.29
Apr	4.10	8.9	0.49	1.11	4.55
May	4.90	11.2	0.47	0.99	4.84
Jun	5.80	13.8	0.52	0.95	5.50
Jul	5.20	15.2	0.48	0.96	5.00
Aug	4.10	15.4	0.44	1.02	4.20
Sep	3.10	14.0	0.45	1.19	3.70
Oct	1.70	11.3	0.39	1.47	2.51
Nov	0.80	8.6	0.33	1.75	1.40
Dec	0.50	7.1	0.36	2.25	1.12
Min Insol					1.12
Avg Insol					3.31



Battery State-Of-Charge Analysis



SOLAR-CANDELA
ILLUMINATING POWER SOLUTIONS

**Solar
Power**

Site Summary

Site Name: CADW

Location: VALLEY, UNITED KINGDOM

Latitude: 53.20N Longitude: 4.30W Elevation: 18 m

Comments: no source

Load / System Summary

Design Load: 6.0 Ah Day @ 24.0 VDC

Tilt: 45S Azimuth: 0E Tracking: Fixed

Min ALR: 3.32 Avg ALR: 6.39

LOLP: 0.000% Avail: 100.000% Avg BSOC: 97%

System Summary

PV (Module / Array)

Model: HIT N235SE01

Rating: 235W / 235Wp

Modules: 1

Config: 1 S x 1 P

Vmpp: 43.00 / 43.0

Imp: 5.48 / 5.5

Voc: 51.80 / 51.8

Isc: 5.84 / 5.8

Volts: 5.5

Battery (Unit / Total)

Model: SL2/41A

Rated kWh: 0.98

Units: 2

Config: 2 S x 1 P

Voltage: 12.0 / 24.0

Amp-hr: 41.0 / 41.0

Rated Days: 5.5

Controller:

Model: Solarix MPPT 1010

Type: MPPT

Voltage: 24

Rating: 10

Quantity: 1

Inverter:

Model: n/a

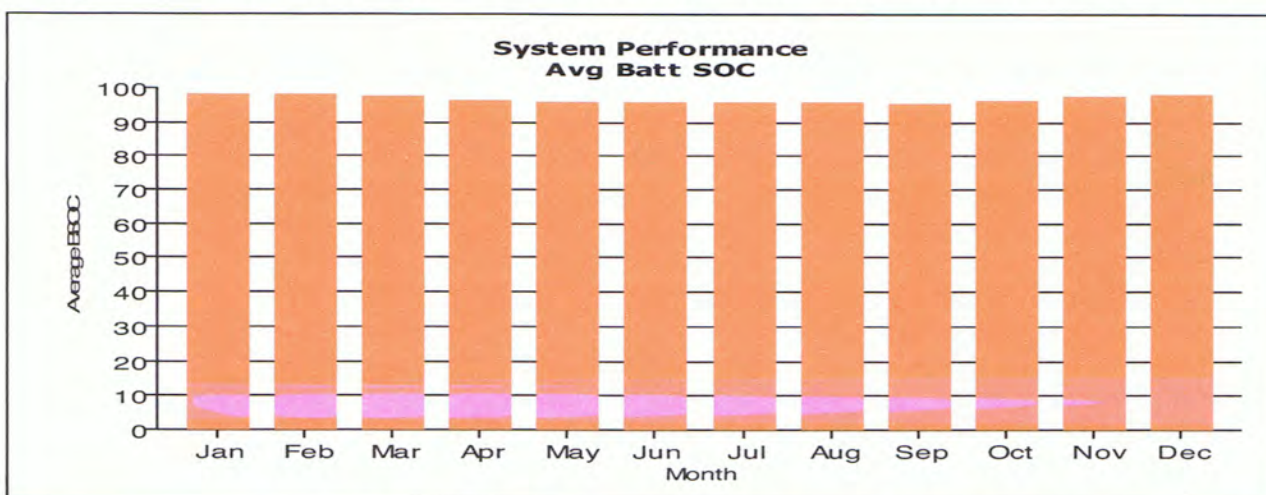
Voltage: n/a

Rating: n/a

Quantity: n/a

BSOC Analysis

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
92-100%	100.0	100.0	100.0	98.3	98.5	99.9	98.6	99.0	97.8	95.2	99.8	100.0
84-92%	0.0	0.0	0.0	1.6	1.4	0.1	1.3	1.0	2.1	4.3	0.2	0.0
76-84%	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.2	0.4	0.0	0.0
68-76%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60-68%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
52-60%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
44-52%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
36-44%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28-36%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20-28%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Average	98.4	98.4	98.0	96.5	95.9	96.0	95.9	95.9	95.8	96.5	97.6	98.4



PV Load Summary



SOLAR-CANDELA
ILLUMINATING POWER SOLUTIONS

**Solar
Power**

Site Summary

Site Name: CADW

Location: VALLEY, UNITED KINGDOM

Latitude: 53.20N Longitude: 4.30W Elevation: 18 m

Comments: no source

Load / System Summary

Design Load: 6.0 Ah Day @ 24.0 VDC

Tilt: 45S Azimuth: 0E Tracking: Fixed

Min ALR: 3.32 Avg ALR: 6.39

LOLP: 0.000 % Avail: 100.000 % Avg BSOC: 97 %

System Summary

PV (Module / Array)

Model: HIT N235SE01

Rating: 235W / 235Wp

Modules: 1

Config: 1 S x 1 P

Vtyp: 43.00 / 43.0

Ityp: 5.48 / 5.5

Voc: 51.80 / 51.8

Isc: 5.84 / 5.8

Volts: 5.5

Battery (Unit / Total)

Model: S12/41A

Rated kWh: 0.98

Units: 2

Config: 2 S x 1 P

Voltage: 12.0 / 24.0

Amp-hr: 41.0 / 41.0

Rated Days: 5.5

Controller:

Model: Solarix MPPT 1010

Type: MPPT

Voltage: 24

Rating: 10

Quantity: 1

Inverter:

Model: n/a

Voltage: n/a

Rating: n/a

Quantity: n/a

Load Summary

Load No.	Load Description	Load Value	Load Type	AC / DC	Conversion Eff (%)	Load Usage (Hrs/d)	Daytime Load (%)
1	Test 1	151.00	Wh/d	DC	100	24.00	50
2		0.00	Watts	DC	100	24.00	50
3		0.00	Watts	DC	100	24.00	50
4		0.00	Watts	DC	100	24.00	50
5		0.00	Watts	DC	100	24.00	50
6		0.00	Watts	DC	100	24.00	50
7		0.00	Watts	DC	100	24.00	50
8		0.00	Watts	DC	100	24.00	50
9		0.00	Watts	DC	100	24.00	50
10		0.00	Watts	DC	100	24.00	50

Annual Load

Month	Design--- (Ah/d)	Seasonal Load Summary - % of Rated Load ---										Net Load (Ah/day)
		Load1	Load2	Load3	Load4	Load5	Load6	Load7	Load8	Load9	Load10	
Jan	6	20	100	100	100	100	100	100	100	100	100	1
Feb	6	20	100	100	100	100	100	100	100	100	100	1
Mar	6	50	100	100	100	100	100	100	100	100	100	3
Apr	6	80	100	100	100	100	100	100	100	100	100	5
May	6	100	100	100	100	100	100	100	100	100	100	6
Jun	6	100	100	100	100	100	100	100	100	100	100	6
Jul	6	100	100	100	100	100	100	100	100	100	100	6
Aug	6	100	100	100	100	100	100	100	100	100	100	6
Sep	6	100	100	100	100	100	100	100	100	100	100	6
Oct	6	80	100	100	100	100	100	100	100	100	100	5
Nov	6	50	100	100	100	100	100	100	100	100	100	3
Dec	6	20	100	100	100	100	100	100	100	100	100	1

PV LOLP Summary



SOLAR-CANDELA
ILLUMINATING POWER SOLUTIONS

**Solar
Power**

Site Summary

Site Name: CADW
Location: VALLEY, UNITED KINGDOM
Latitude: 53.20N **Longitude:** 4.30W **Elevation:** 18 m
Comments: no source

Load / System Summary

Design Load: 6.0 Ah Day @ 24.0 VDC
Tilt: 45S **Azimuth:** 0E **Tracking:** Fixed
Min ALR: 3.32 **Avg ALR:** 6.39
LOLP: 0.000% **Avail:** 100.000% **Avg BSOC:** 97%

System Summary

PV (Module / Array)

Model: HIT N235SE01
Rating: 235W / 235Wp
Modules: 1
Config: 1 S x 1 P
Vmpp: 43.00 / 43.0
Imp: 5.48 / 5.5
Voc: 51.80 / 51.8
Isc: 5.84 / 5.8
Volts: 5.5

Battery (Unit / Total)

Model: S12/41A
Rated kWh: 0.98
Units: 2
Config: 2 S x 1 P
Voltage: 12.0 / 24.0
Amp-hr: 41.0 / 41.0
Rated Days: 5.5

Controller:

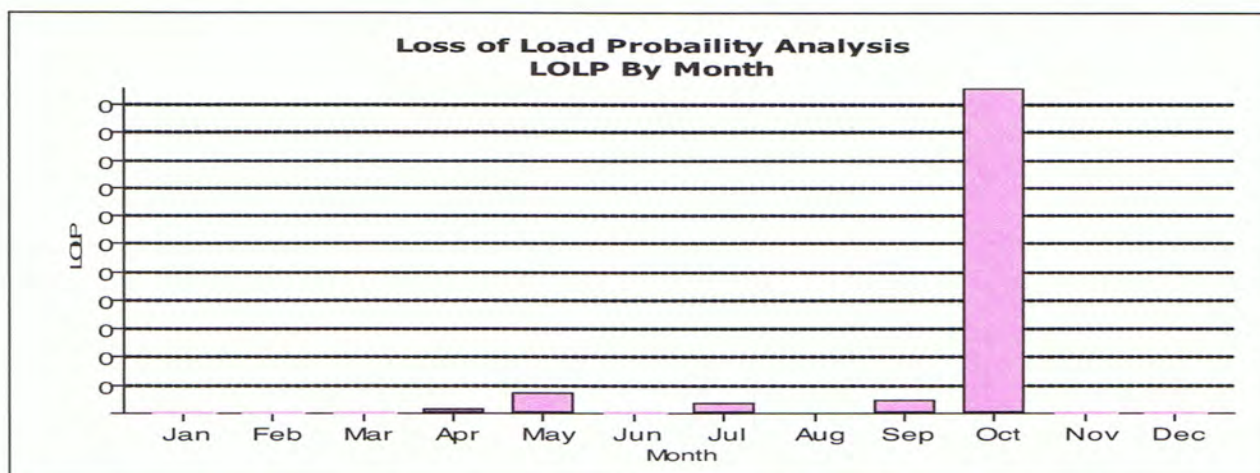
Model: Solarix MPPT 1010
Type: MPPT
Voltage: 24
Rating: 10
Quantity: xxx

Inverter:

Model: n/a
Voltage: n/a
Rating: n/a
Quantity: n/a

Availability Analysis

Month	Array Insol (kWh/m2/d)	Insolation Variability	Day to Day Correlation	Array / Load Ratio	Batt Size (days)	Avg BSOC (%)	LOLP (%)	SEP (%)
Jan	1.19	0.72	0.13	7.13	25.6	98	0.000	99.150
Feb	2.44	0.50	0.30	14.52	25.5	98	0.000	99.415
Mar	3.29	0.46	0.36	7.78	10.3	98	0.000	98.260
Apr	4.55	0.40	0.20	6.66	6.5	97	0.000	98.726
May	4.84	0.37	0.23	5.64	5.2	96	0.000	99.094
Jun	5.50	0.30	0.37	6.37	5.3	96	0.000	99.331
Jul	5.00	0.36	0.23	5.78	5.3	96	0.000	99.206
Aug	4.20	0.40	0.28	4.87	5.3	96	0.000	98.665
Sep	3.70	0.45	0.26	4.30	5.3	96	0.000	97.389
Oct	2.51	0.56	0.19	3.68	6.6	96	0.000	94.143
Nov	1.40	0.64	0.08	3.32	10.4	98	0.000	93.282
Dec	1.12	0.65	0.30	6.68	25.7	98	0.000	96.332



PV System ALR Sizing



SOLAR-CANDELA
ILLUMINATING POWER SOLUTIONS

Solar Power

Site Summary

Site Name: CADW

Location: VALLEY, UNITED KINGDOM

Latitude: 53.20N Longitude: 4.30W Elevation: 18 m

Comments: no source

Load / System Summary

Design Load: 6.0 Ah Day @ 24.0 VDC

Tilt: 45S Azimuth: 0E Tracking: Fixed

Min ALR: 3.32 Avg ALR: 6.39

System Summary

PV (Module / Array)

Model: HIT N235SE01
Rating: 235W / 235Wp
Modules: 1
Config: 1 S x 1 P
Vmpp: 43.00 / 43.0
Imp: 5.48 / 5.5
Voc: 51.80 / 51.8
Isc: 5.84 / 5.8
Volts: 5.5

Battery (Unit / Total)

Model: S12/41A
Rated kWh: 0.98
units: 2
Config: 2 S x 1 P
Voltage: 12.0 / 24.0
Amp-hr: 41.0 / 41.0
Rated Days: 5.5

Controller:

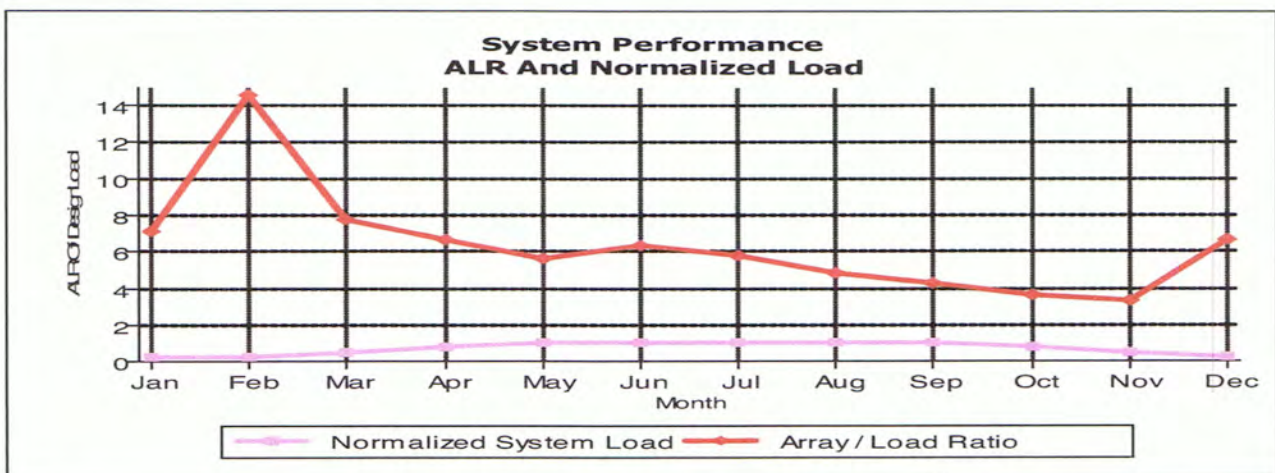
Model: Solarix MPPT 1010
Type: MPPT
Voltage: 24
Rating: 10
Quantity 1

Inverter:

Model: n/a
Voltage: n/a
Rating: n/a
Quantity n/a

Array / Load Ratio Analysis

Month	Array Insol (kWh/m2/d)	Avg Temp (deg C)	Array (Ah/day)	Sys Losses (%)	Load (Ah/day)	Night Load (%)	Battery Size (days)	Array/Load Ratio
Jan	1.19	6.2	8.5	10	1.2	50	25.6	7.13
Feb	2.44	6.0	17.4	10	1.2	50	25.5	14.52
Mar	3.29	7.1	23.3	10	3.0	50	10.3	7.78
Apr	4.55	8.9	31.9	10	4.8	50	6.5	6.66
May	4.84	11.2	33.8	10	6.0	50	5.2	5.64
Jun	5.50	13.8	38.2	10	6.0	50	5.3	6.37
Jul	5.00	15.2	34.7	10	6.0	50	5.3	5.78
Aug	4.20	15.4	29.2	10	6.0	50	5.3	4.87
Sep	3.70	14.0	25.8	10	6.0	50	5.3	4.30
Oct	2.51	11.3	17.6	10	4.8	50	6.6	3.68
Nov	1.40	8.6	10.0	10	3.0	50	10.4	3.32
Dec	1.12	7.1	8.0	10	1.2	50	25.7	6.68



PV System Summary



SOLAR-CANDELA
ILLUMINATING POWER SOLUTIONS

**Solar
Power**

Site Summary

Site Name: CADW
Location: VALLEY, UNITED KINGDOM
Latitude: 53.20N Longitude: 4.30W Elevation: 18 m
Comments: no source

Load / System Summary

Design Load: 6.0 Ah Day @ 24.0 VDC
Tilt: 45S Azimuth: 0E Tracking: Fixed
Min ALR: 3.32 Avg ALR: 6.39
LOLP: 0.000 % Avail: 100.000 % Avg BSOC: 97 %

System Summary

PV (Module / Array)

Model: HIT N235SE01
Rating: 235W / 235Wp
Modules: 1
Config: 1 S x 1 P
Vmpp: 43.00 / 43.0
Imp: 5.48 / 5.5
Voc: 51.80 / 51.8
Isc: 5.84 / 5.8
Volts: 5.5V @ Max Power

Battery (Unit / Total)

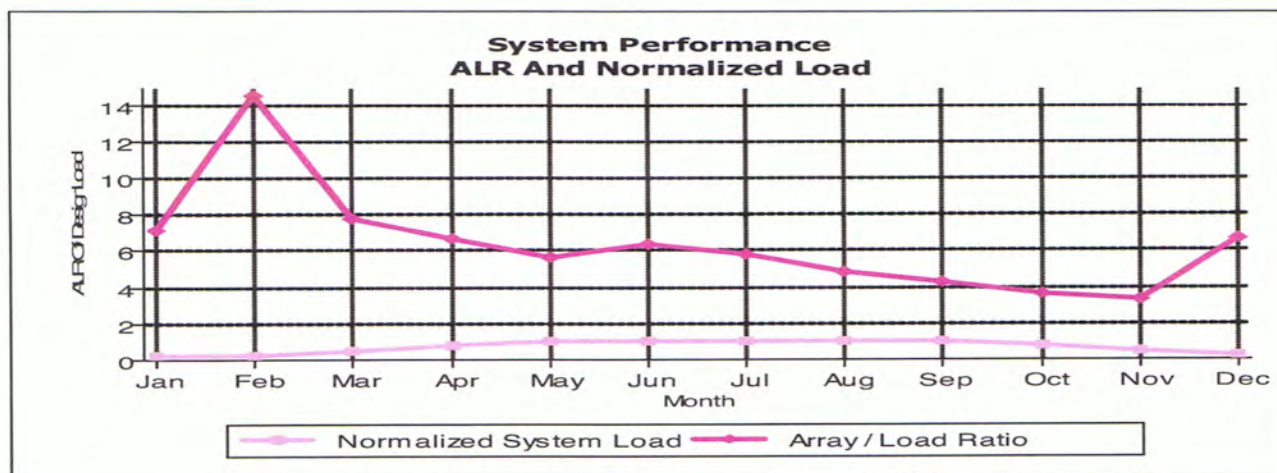
Model: S12/41A
Rating: 0.98
Units: 2
Config: 2 S x 1 P
Voltage: 12.0 / 24.0
Amp-hr: 41.0 / 41.0
Rating: 5.5 days

Controller:

Model: Solarix MPPT 1010
Type: MPPT
Voltage: 24
Rating: 10
Quantity: 1
Inverter:
Model: n/a
Voltage: n/a
Rating: n/a
Quantity: n/a

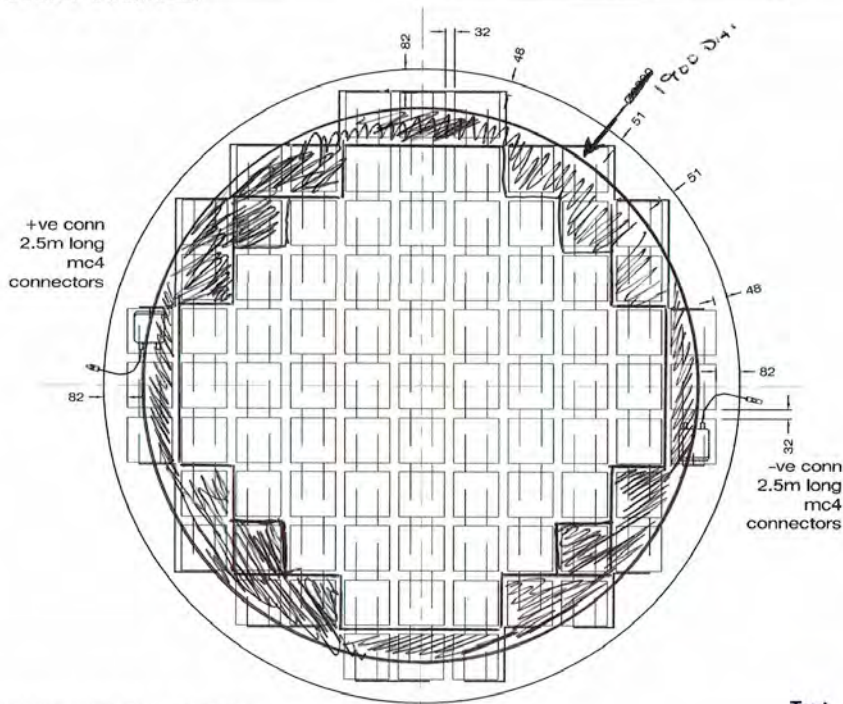
System Performance Summary

Month	Array Insol (kWh/m2/d)	Avg Temp (deg C)	Array (Ah/day)	Sys Losses (%)	Load (Ah/day)	Batt Size (days)	Array/Load Ratio	Avg BSOC (%)	LOLP (%)
Jan	1.19	6.2	8.5	10	1.2	25.6	7.13	98	0.000
Feb	2.44	6.0	17.4	10	1.2	25.5	14.52	98	0.000
Mar	3.29	7.1	23.3	10	3.0	10.3	7.78	98	0.000
Apr	4.55	8.9	31.9	10	4.8	6.5	6.66	97	0.000
May	4.84	11.2	33.8	10	6.0	5.2	5.64	96	0.000
Jun	5.50	13.8	38.2	10	6.0	5.3	6.37	96	0.000
Jul	5.00	15.2	34.7	10	6.0	5.3	5.78	96	0.000
Aug	4.20	15.4	29.2	10	6.0	5.3	4.87	96	0.000
Sep	3.70	14.0	25.8	10	6.0	5.3	4.30	96	0.000
Oct	2.51	11.3	17.6	10	4.8	6.6	3.68	96	0.000
Nov	1.40	8.6	10.0	10	3.0	10.4	3.32	98	0.000
Dec	1.12	7.1	8.0	10	1.2	25.7	6.68	98	0.000



NSol! Technology Copyright 1993-2012 FearTheSkunk

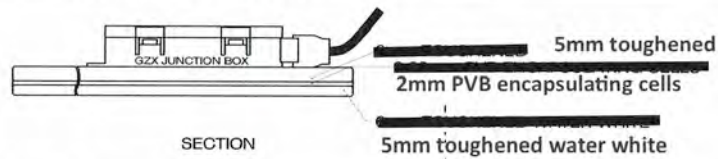
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETRES - NO NET SCALE THIS DRAWING



NOTE
1. EXTEND CABLE LENGTH TO 2.5M

Text

VIEWED FROM EXTERNAL FACE



SECTION

REV.	DESCRIPTION	CHECK	DATE
A	ISSUE FOR REV. 001		01/01/10
B	ISSUE FOR REV. 002		01/01/10
C	ISSUE FOR REV. 003		01/01/10
D	ISSUE FOR REV. 004		01/01/10
E	ISSUE FOR REV. 005		01/01/10
F	ISSUE FOR REV. 006		01/01/10
G	ISSUE FOR REV. 007		01/01/10
H	ISSUE FOR REV. 008		01/01/10
I	ISSUE FOR REV. 009		01/01/10
J	ISSUE FOR REV. 010		01/01/10

CELL LAYOUT INFORMATION

Cell type :
Cell array : 57 CELLS
Power Pmpp:
Voltage Vmpp:
Current Imp:

ALL EDGES GROUND

CUSTOMER APPROVAL

Date: Signature:
DO

Tolerances for laminated products will meet BS en 12543 pt 5. Romag final approval drawings will take precedence over all other drawings.

Romag

PROJECT: 001-001-001-001
SHEET: 01 OF 01
SCALE: 1:1
DATE: 01/02/10

TITLE: PV PANEL BRG
HERNANDS TECHNIK

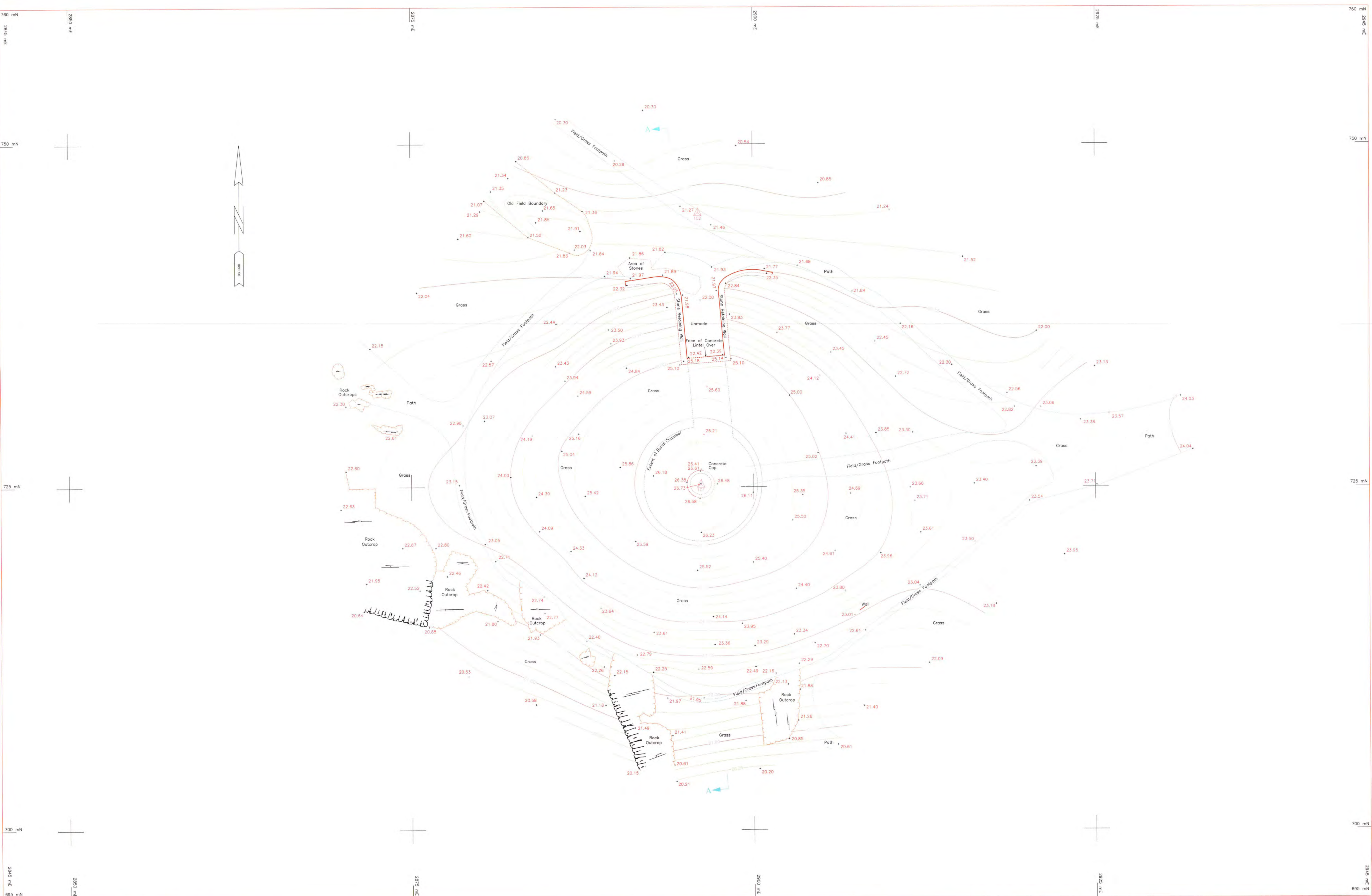
PROJECT No: N329-TEF-KLP-00851 rev 1.0

Date: 28/7/14 **Quotation Number:** AH Budget-Rev 2 **Project:** 1900mm Circular BIPV laminate **Customer:** Solar Candela

Glass Composition:

Front:	5mm WW Tough	2mm PG41	5mm H 0	0	Black screen print to rear glass
Cavity	None				
Rear	None				

[illegible][illegible]



BARCLODIAD y GWARES

BURIAL CHAMBER

ISLE OF ANGLESEY

Legend

Survey Station

Level Position

Major Contour

Intermediate Contour

Rock Outcrop (Proud)

Rock Outcrop (Flush)

Abbreviations

SITE SURVEY

012345101520

metres

Sheet Location

See Also Drawings

0605-1
Site Survey 1:100
0606-2
Internal Survey 1:50
0606-3
Cross Section 1:50
0606-4
Data Sheet 1:2500

DATUM

Vertical: Ordnance Datum, Newlyn. Established by GPS observations to Holyhead OS Active Network Station with checks to additional Active Network Stations and to the Ordnance Survey Bench Mark shown on the Ty Newydd survey.
Ty Newydd OSBM/BSM: GPS value 32.608m, OS levelled value 32.61m
HORIZONTAL: The survey is on a plane grid which has the same orientation as the National Grid. To obtain OS National Grid coordinates accurate to +/- 5cm apply the following corrections: E +230,000m, N +370,000m.

SURVEYED BY

STERLING

surveys

GROVE HOUSE, HEADLEY ROAD, GRAYSHOTT

WIMBORNE, DORSET, DT98 3JL

TEL: 01305 440171 FAX: 01305 440187 EMAIL: info@sterlingsurveys.co.uk

Scale:

1:100

Date:

February 2006

Sheet Information:

1 of 4

Monument Number:

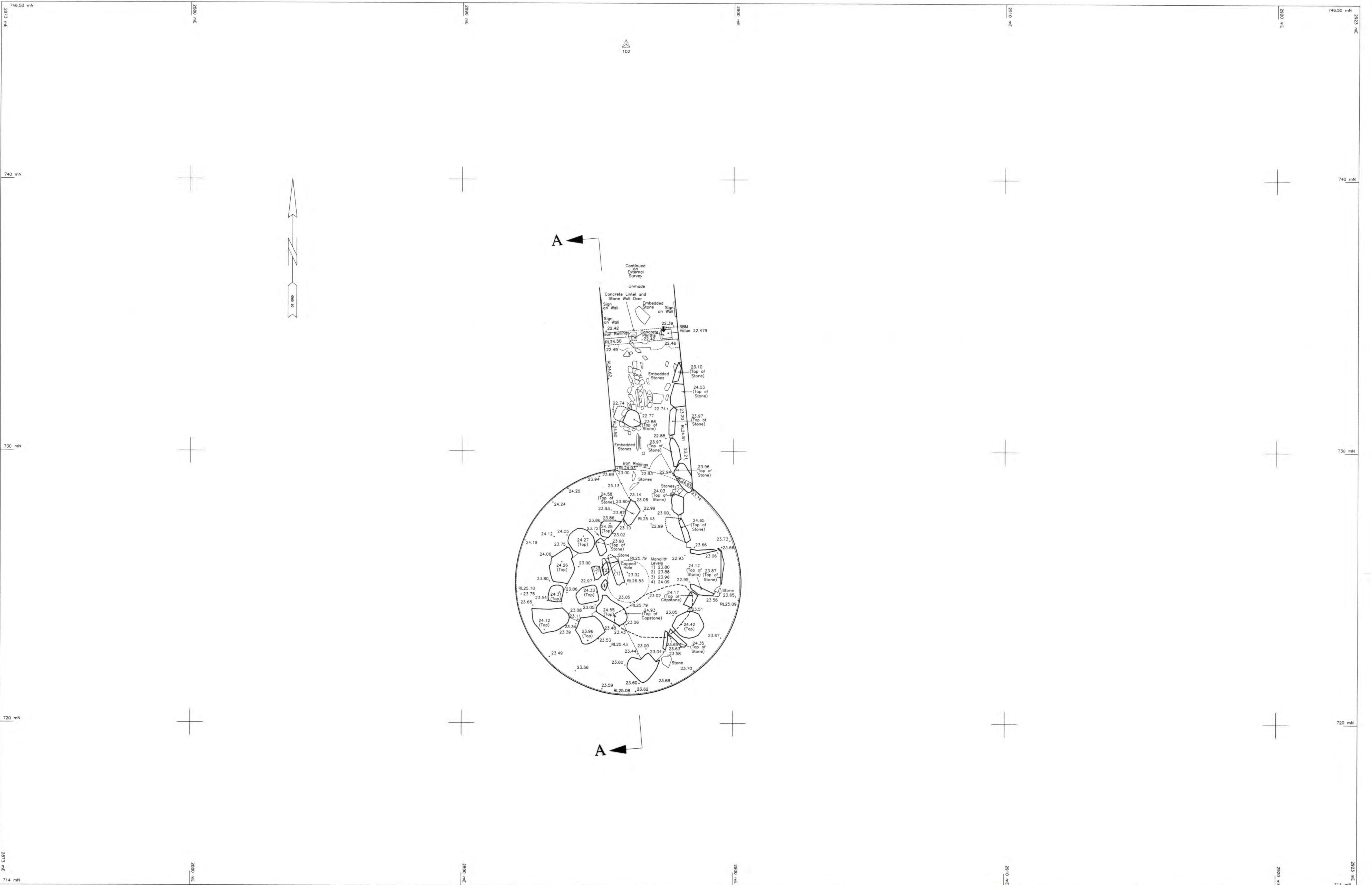
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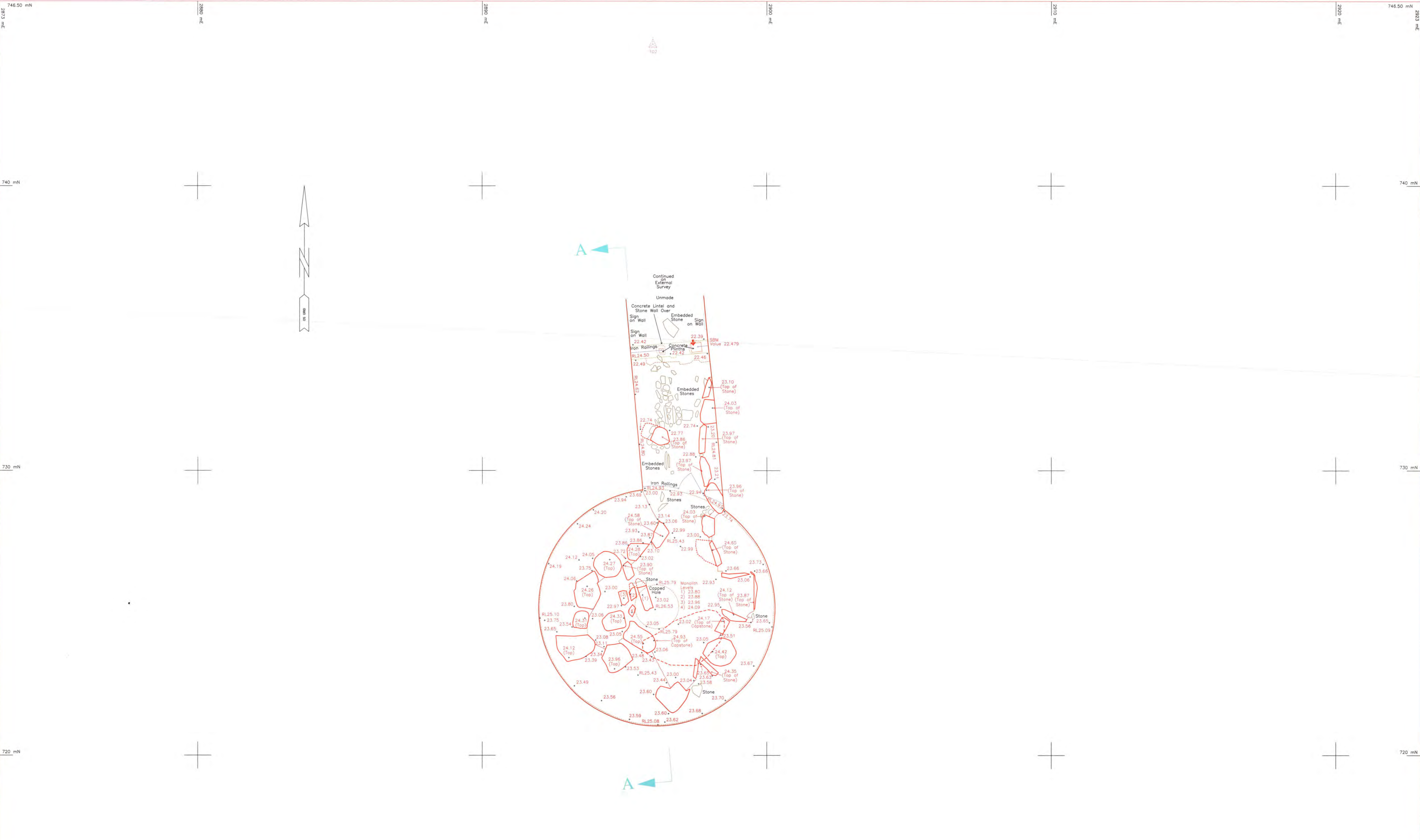
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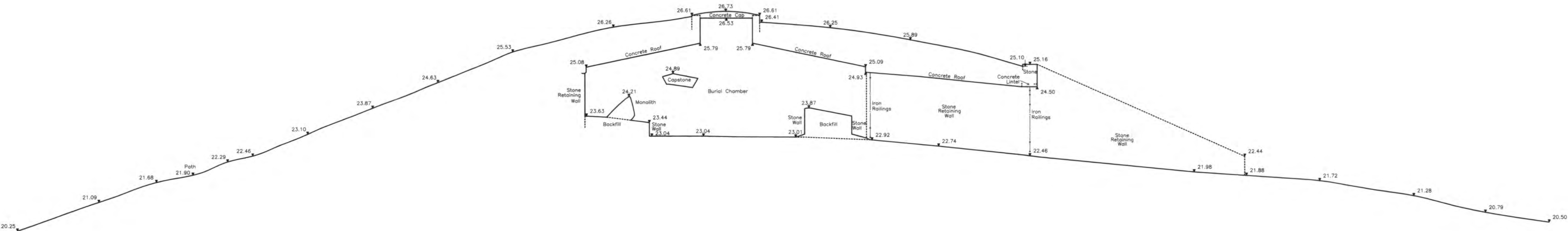
Dwg. No.

0606-1



BARCLODIAD y GWARES BURIAL CHAMBER ISLE OF ANGLESEY	Legend ▲ Survey Station +76.72 Level Position — Railings	Abbreviations RL Roof Level	INTERNAL SURVEY		Sheet Location 	See Also Drawings 0606-1 Site Survey 1:100 0606-2 Internal Survey 1:50 0606-3 Cross Section 1:50 0606-4 Data Sheet 1:2500	DATUM Vertical: Ordnance Datum, Newlyn. Established by GPS observations to Holyhead OS Active Network Station with checks to additional Active Network Stations and to the Ordnance Survey Bench Mark shown on the Ty Newydd survey. Ty Newydd OSBM/SBM: GPS value 32.608m, OS levelled value 32.61m. HORIZONTAL: The survey is on a plane grid which has the same orientation as the National Grid. To obtain OS National Grid coordinates accurate to +/- 5mm apply the following corrections: E +230.000m, N +370.000m.	SURVEYED BY STERLING SURVEYS GRUVE BRYNNE, HILARY BODLA, GRUVEBODD HYDROLOGICAL SURVEYS, GLENN HALL 100, BUCKINGHAM, 2, 401 100 000000, 000000, 000000	 Llywodraeth Cymru Welsh Assembly Government
				Scale: 1:50 Date: February 2006					



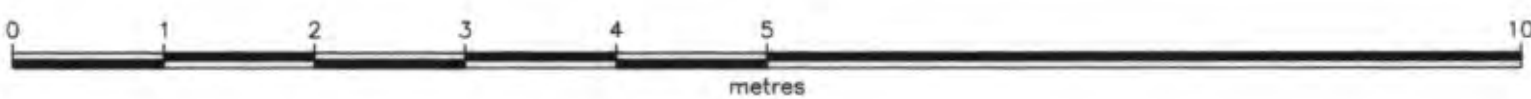


BARCLODIAD y GWARES
BURIAL CHAMBER
ISLE OF ANGLESEY

Legend

Abbreviations

SECTION A-A



Sheet Location



See Also Drawings
0606-1
Site Survey 1:100
0606-2
Internal Survey 1:50
0606-3
Cross Section 1:50
0606-4
Data Sheet 1:2500

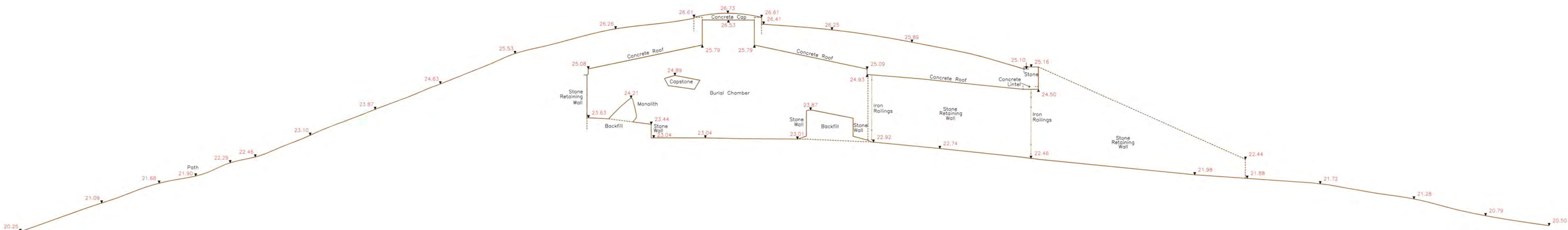
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Ty Newydd OSBM/BSM: GPS value 32.608m, OS levelled value 32.61m
HORIZONTAL: The survey is on a plane grid which has the same orientation as the National Grid. To obtain OS National Grid coordinates accurate to +/- 5cm apply the following corrections: E +230.000m, N +370.000m.

SURVEYED BY
STERLING
surveys
GROVE HOUSE, HEARLEY ROAD, GRAYHAMOTT
BENTON, WALES, LL23 7JG, UK
TEL: 01248 849111 FAX: 01248 849112 EMAIL: sterling@sterling-surveys.co.uk



Scale: **1:50**
Date: **February 2006**

Checked: **MEM**
Dwg. No. **0606-3**



DATUM 20.00m

BARCLODIAD y GWARES
BURIAL CHAMBER
ISLE OF ANGLESEY

Legend

Abbreviations

SECTION A-A



Sheet Location



See Also Drawings
0606-1
Site Survey 1:100
0606-2
Internal Survey 1:50
0606-3
Cross Section 1:50
0606-4
Data Sheet 1:2500

DATUM
Vertical: Ordnance Datum, Newlyn. Established by GPS observations to Holyhead OS Active Network Station with checks to additional Active Network Stations and to the Ordnance Survey Bench Mark shown on the Ty Newydd survey.
Ty Newydd OSBM/SBM: GPS value 32.608m, OS levelled value 32.61m.
HORIZONTAL: The survey is on a plane grid which has the same orientation as the National Grid. To obtain OS National Grid coordinates accurate to +/- 5cm apply the following corrections: E +230,000m, N +370,000m.

Sheet Information: 3 of 4
Monument Number: 0606

SURVEYED BY
STERLING
surveys
GROVE HOUSE, HEASLEY ROAD, GRAYSHOTT
HINDHEAD, WIMBORNE, GU24 0LG
TEL: 01420 480011 FAX: 01420 480012 EMAIL: sterling@sterling-surveys.co.uk

Scale: 1:50

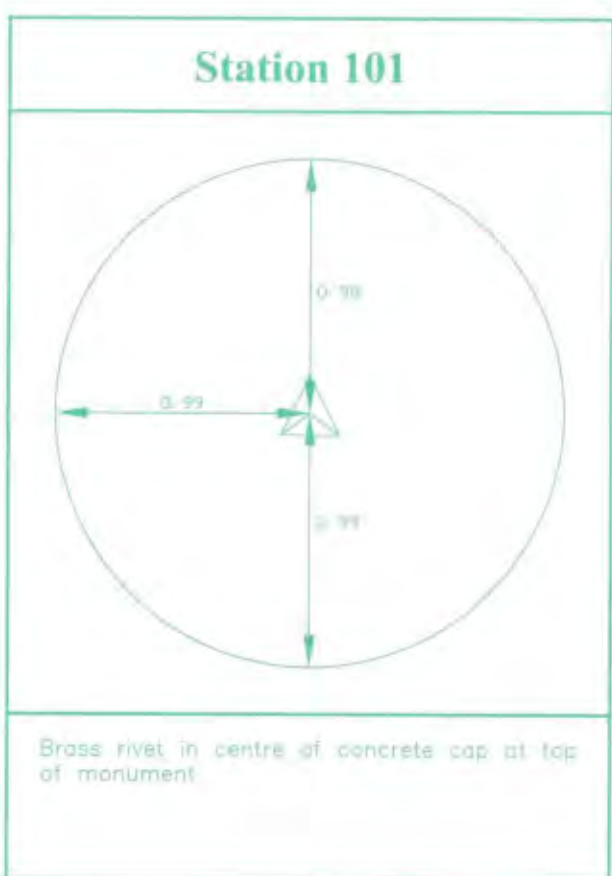
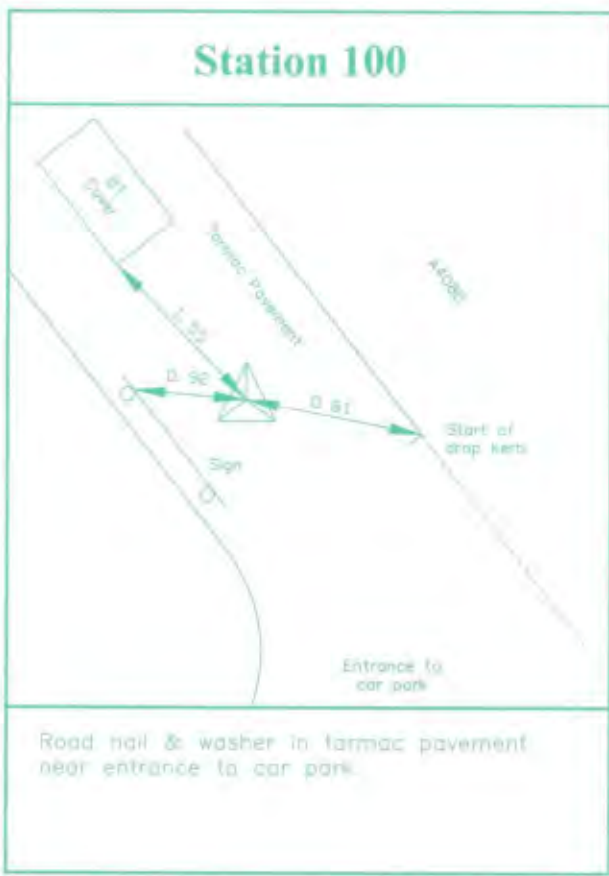
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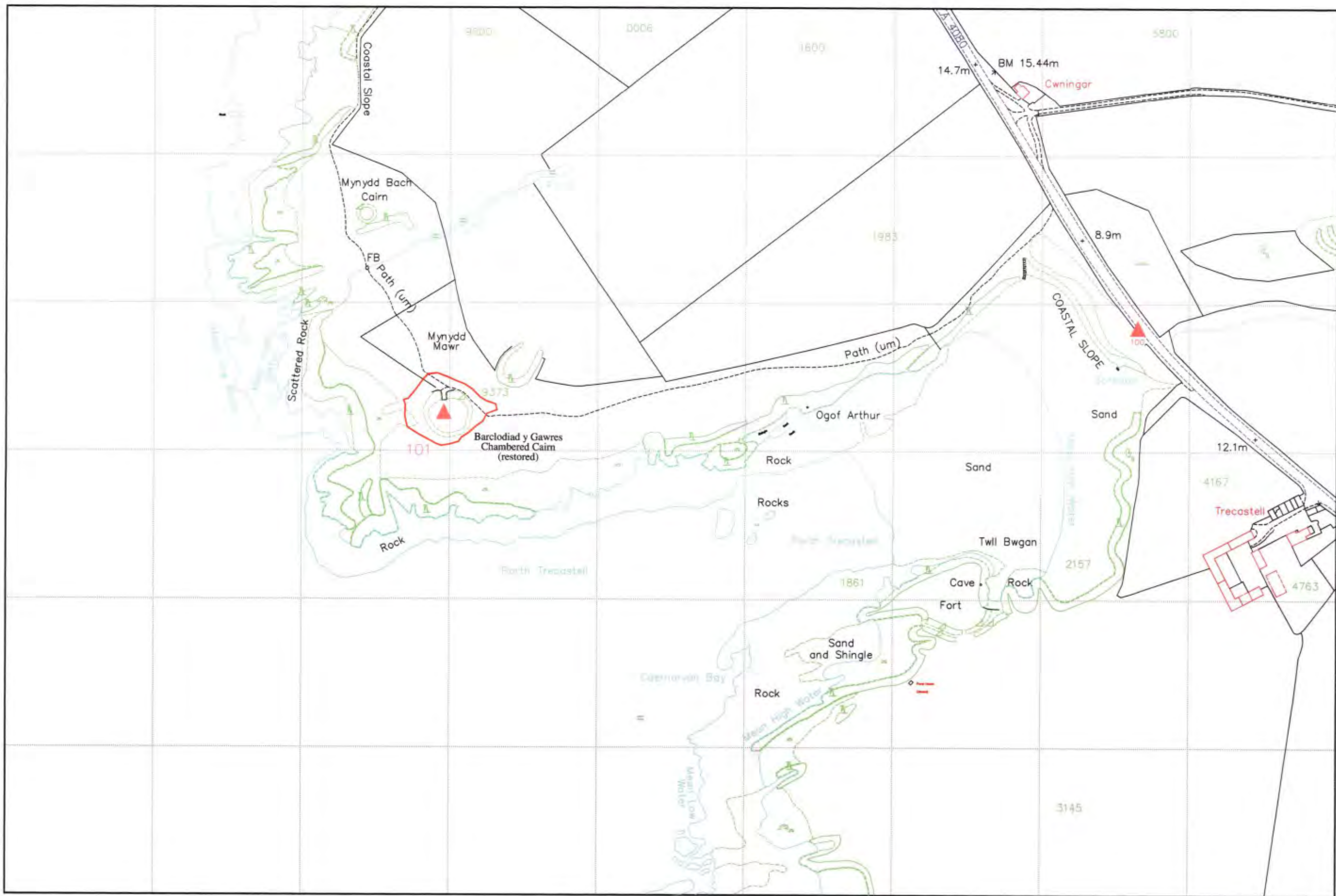
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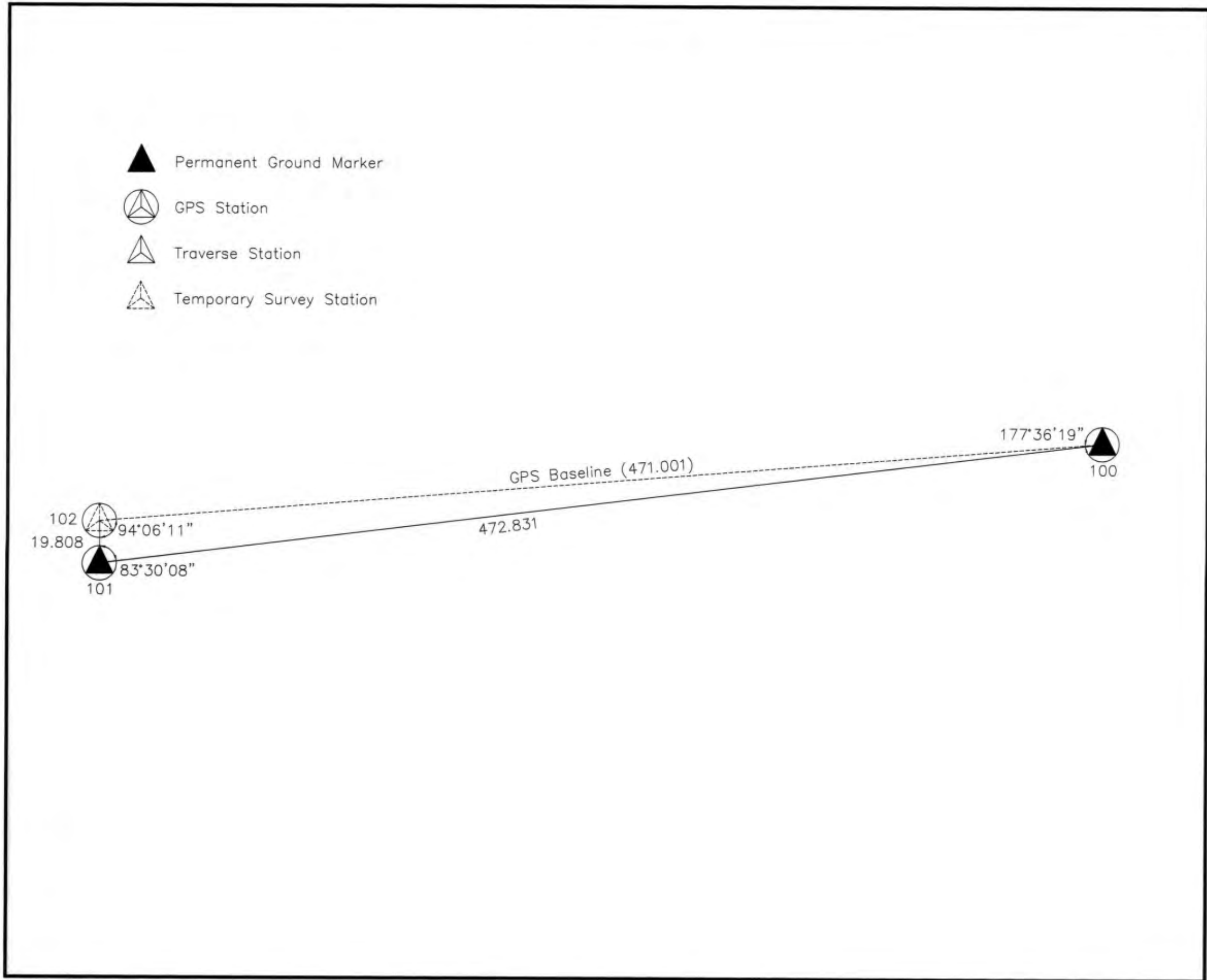
CO-ORDINATE SCHEDULE				
STN	EASTING	NORTHING	LEVEL	DESCRIPTION
100	3365.485	782.617	6.139	Road nail & washer in tarmac pavement near entrance to car park
101	2896.156	725.173	26.735	Brass rivet in centre of concrete cap at top of monument



LOCATION DIAGRAM
(SCALE 1/2500)



TRAVERSE DIAGRAM
(NOT TO SCALE)



BARCLODIAD y GWARES
BURIAL CHAMBER
ISLE OF ANGLESEY

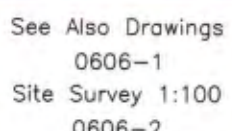
Legend
Survey Station

Abbreviations
BT British Telecom IC

DATA SHEET



Sheet Location



See Also Drawings
0606-1
Site Survey 1:100
0606-2
Internal Survey 1:50
0606-3
Cross Section 1:50
0606-4
Data Sheet 1:2500

DATUM
Vertical: Ordnance Datum, Newlyn. Established by GPS observations to Highfield OS Active Network Station with checks to additional Active Network Stations and to the Ordnance Survey Bench Mark shown on the Ty Nwydd survey.
Ty Nwydd OSBM/BSM: GPS value 32.608m, OS levelled value 32.61m
HORIZONTAL: The survey is on a plane grid which has the same orientation as the National Grid. To obtain OS National Grid coordinates accurate to +/- 5cm apply the following corrections: E +230,000m, N +370,000m.

Sheet Information:
4 of 4

Monument Number:
0606

SURVEYED BY
STERLING
SURVEYS
CROVE ROAD, HILDALEY WALK, GASTYBROT
HINCHFIELD, SURREY, GU24 0LE
TEL: 01438 660001 FAX: 01438 660002 EMAIL: info@sterling-surveys.co.uk

Scale:
1:2500
Date:
February 2006

Checked:
MEM

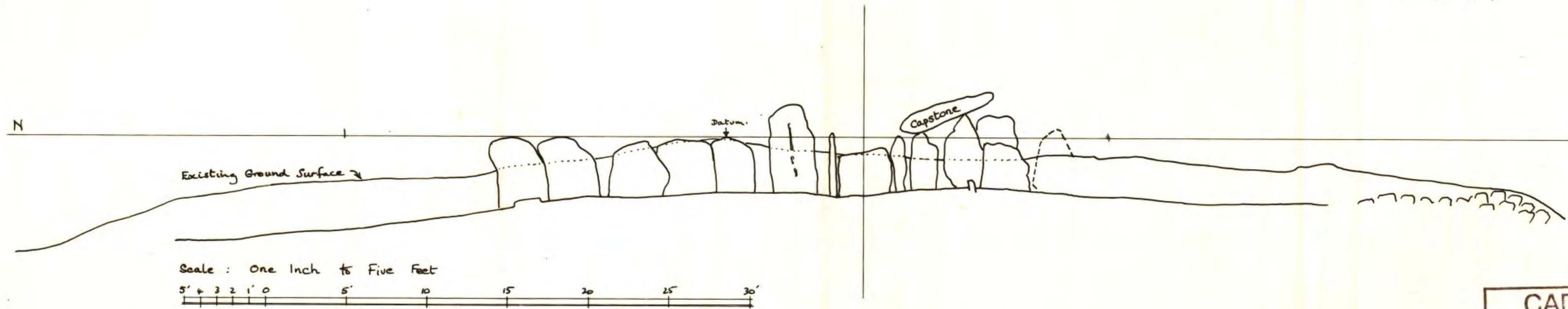
Dwg. No.
0606-4



BARCLODIAD Y GAWRES

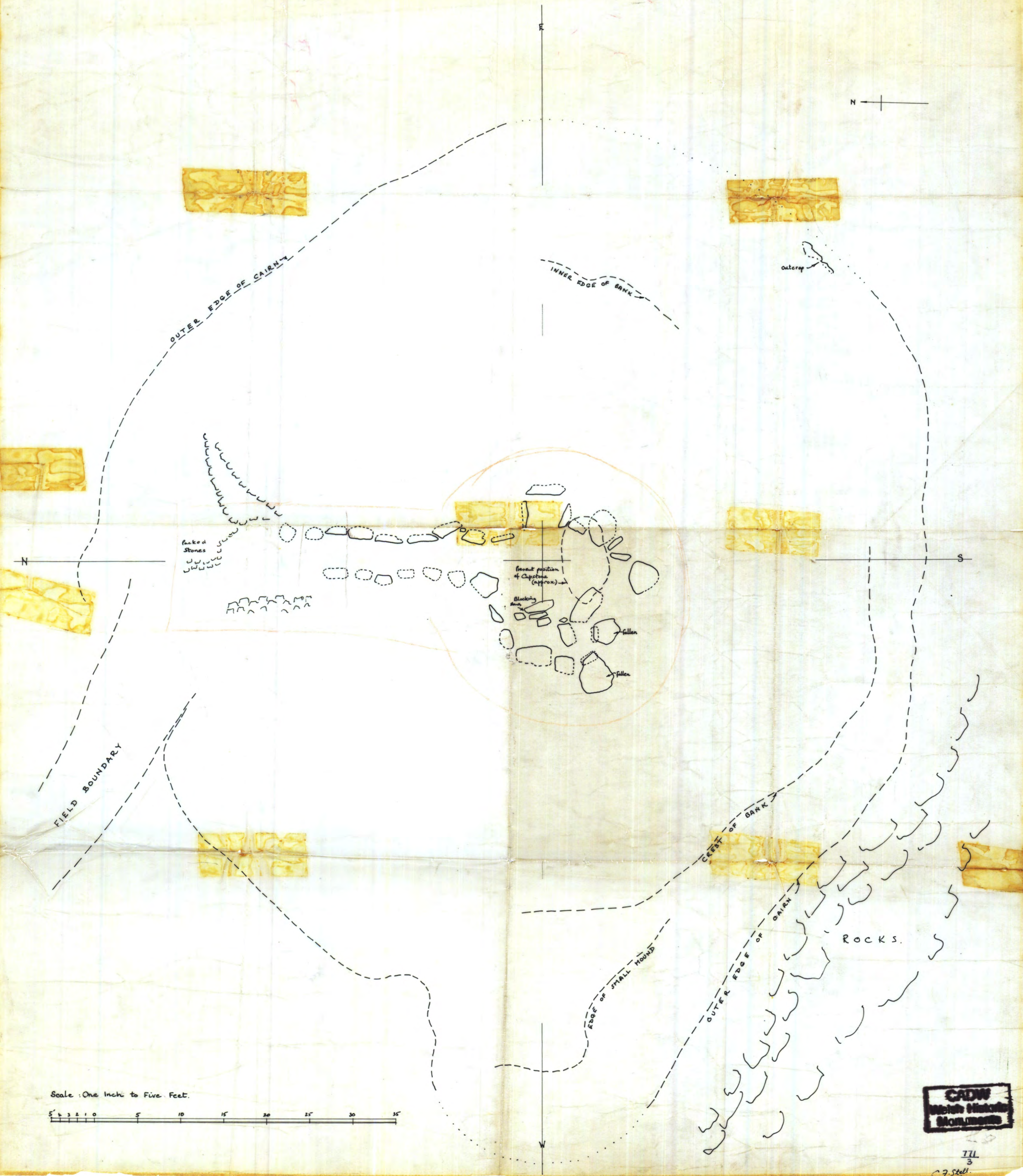
Anglesey.

Section N-S.

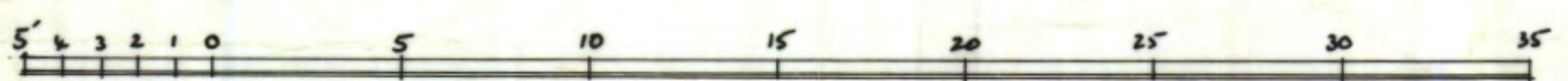


CADW
Welsh Historic
Monuments

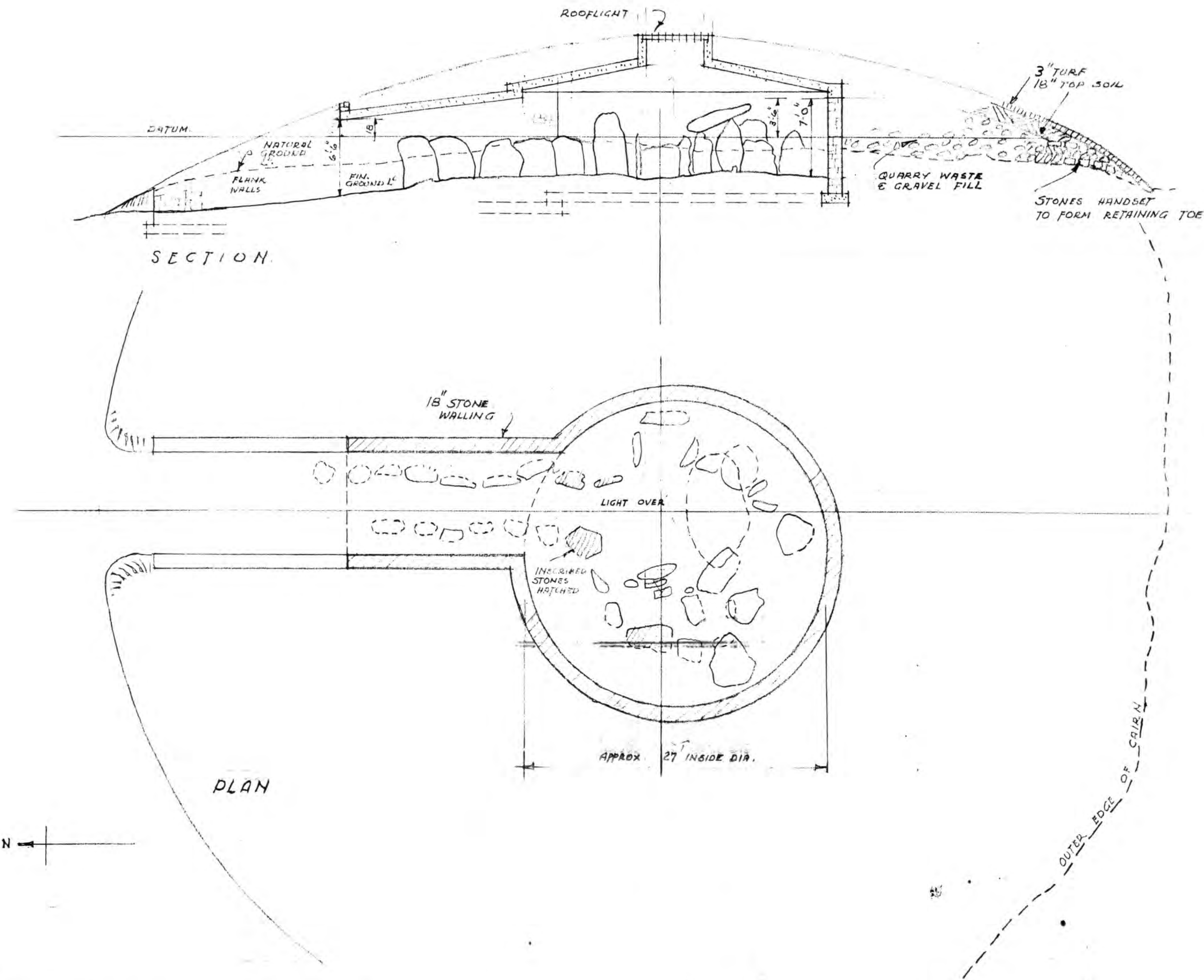
771
2
C.F. Stell.



Scale: One Inch to Five Feet.

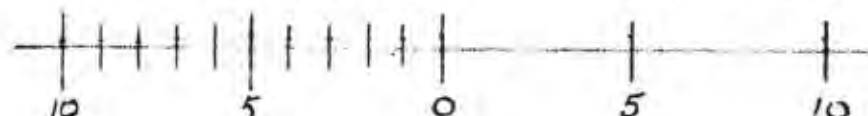


CADW
Welsh Historic
Monuments



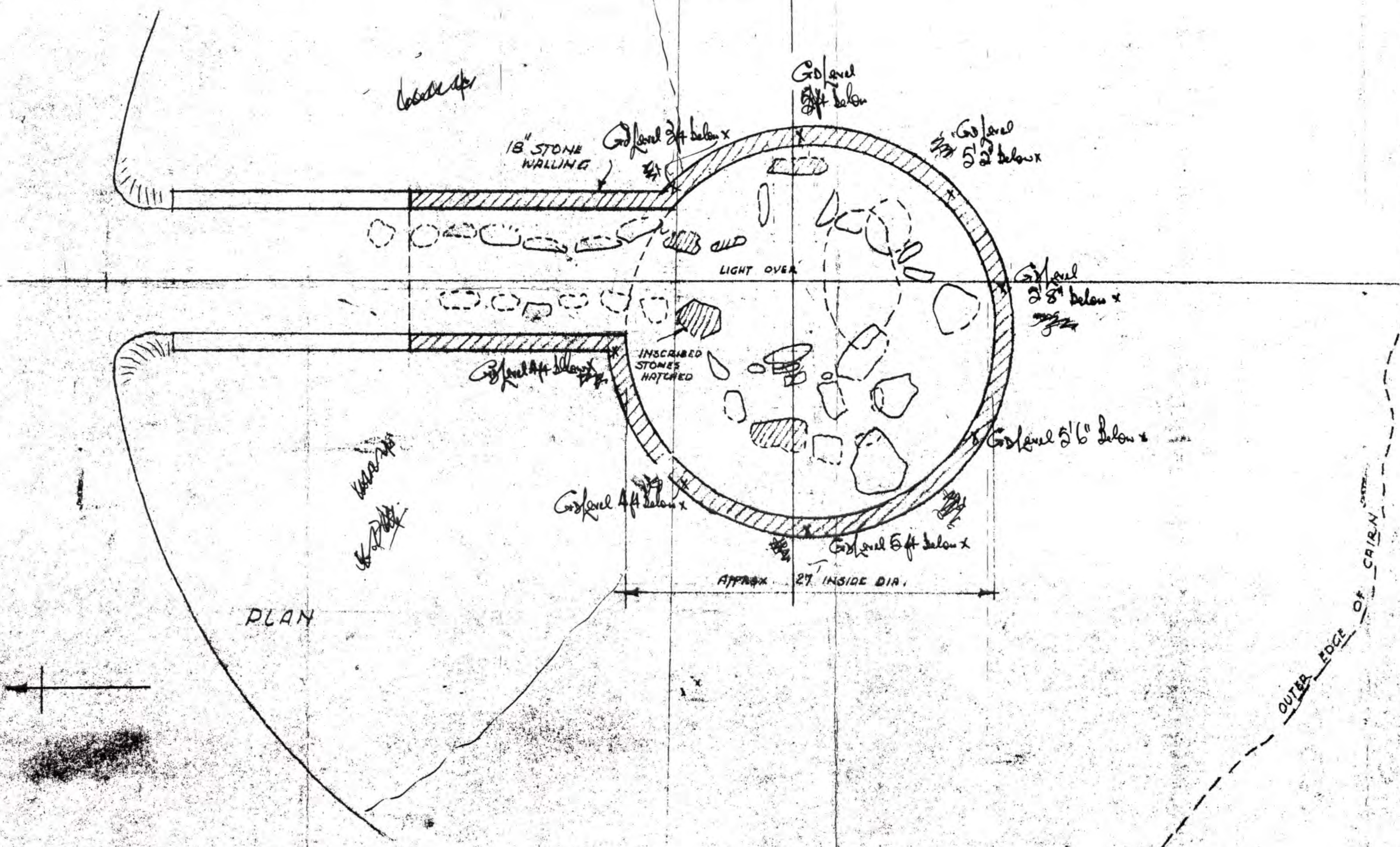
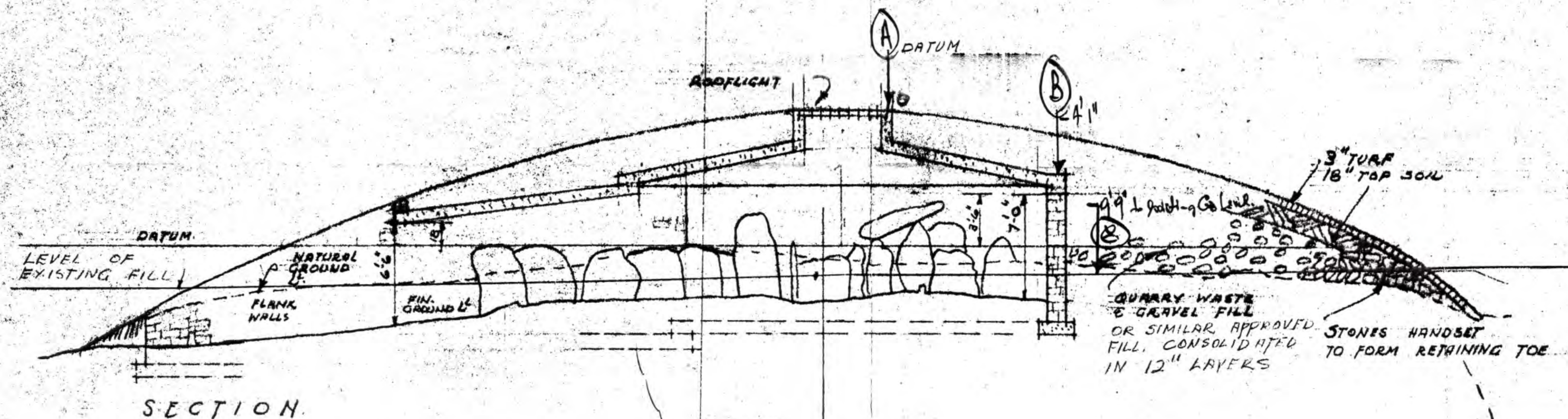
BARCLODIAD Y GAWRES
BURIAL CHAMBER - ANGLESEY

PRELIMINARY SKETCH OF PROPOSED HOUSING
SCALE: 1/5" TO 1 FOOT.



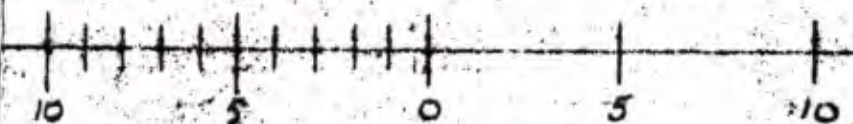
DRG N° 771/4/a
MINISTRY OF WORKS
CARDIFF. OCT. 1958

CADW
Welsh Historic
Monuments



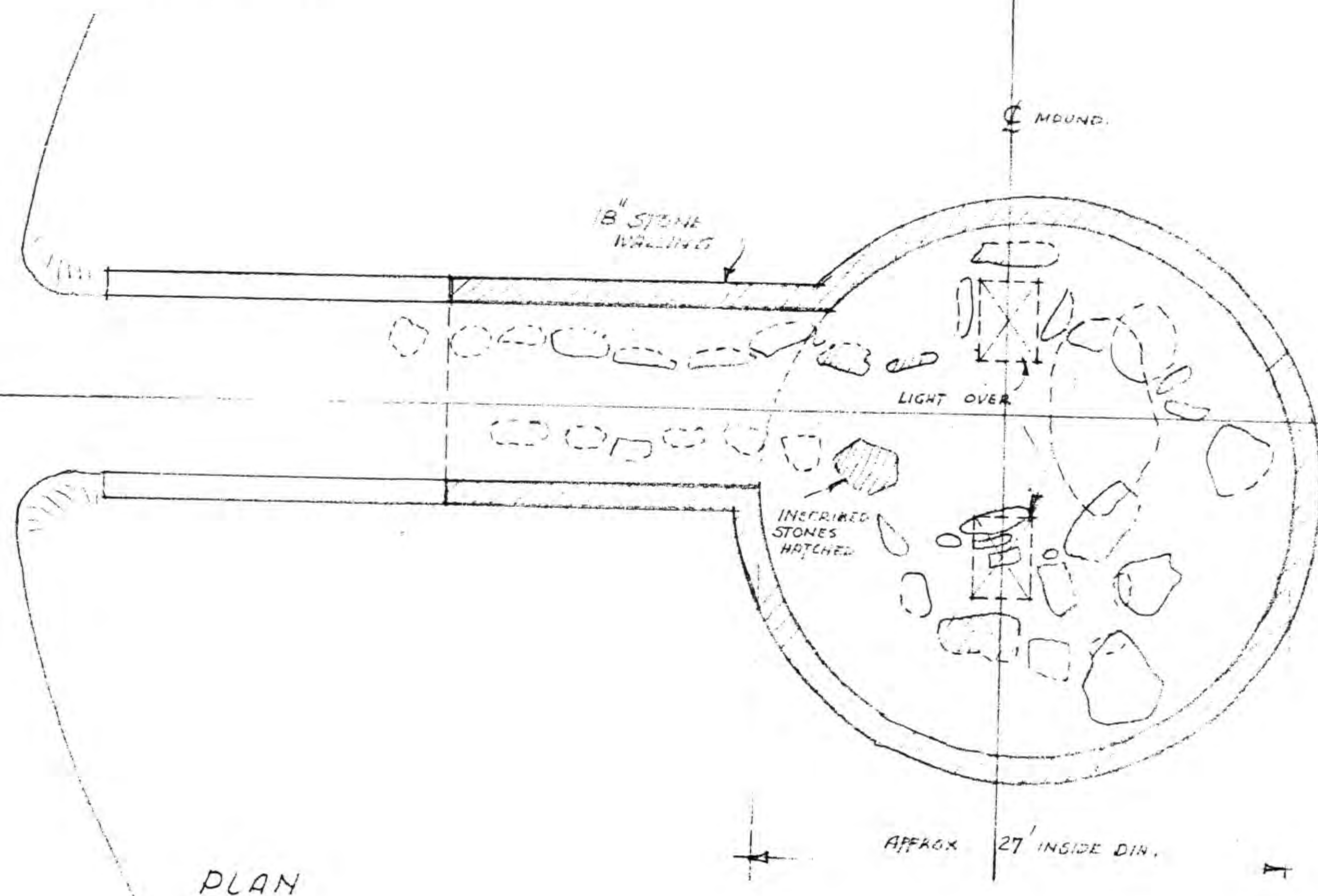
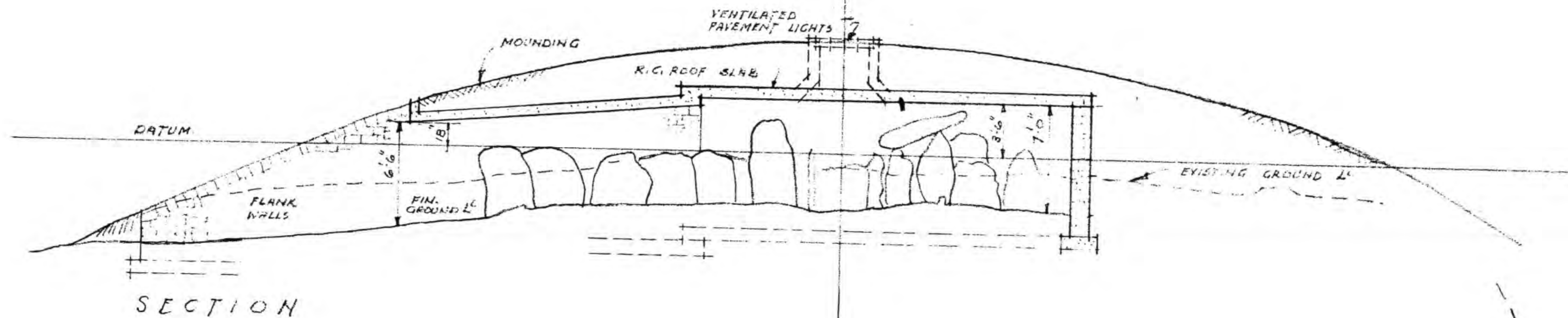
BARCLODIAD Y GAWRES
BURIAL CHAMBER - ANGLESEY

PRELIMINARY SKETCH OF PROPOSED HOUSING
SCALE: 1/5" TO 1 FOOT.



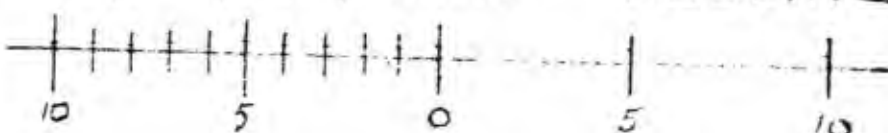
DRG NO 77/4/b
MINISTRY OF WORKS
CARDIFF. OCT. 1958

CADW
Welsh Historic
Monuments



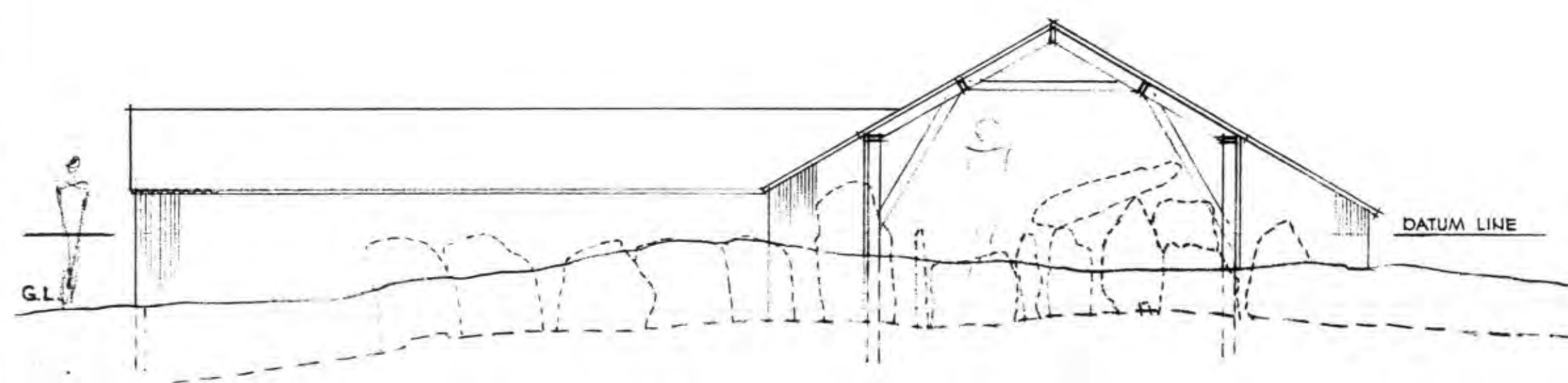
BARCLODIAD Y GAWRES
BURIAL CHAMBER - ANGLESEY

PRELIMINARY SKETCH OF PROPOSED HOUSING
SCALE: 1/5" TO 1 FOOT.

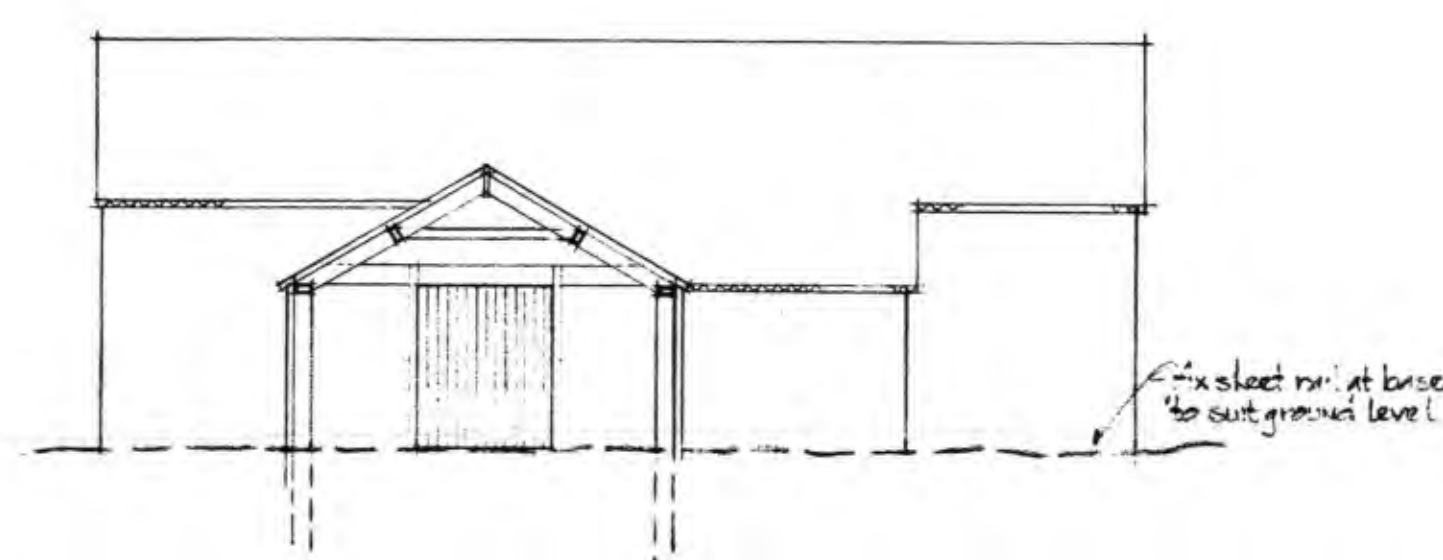


CADW
Welsh Historic
Monuments

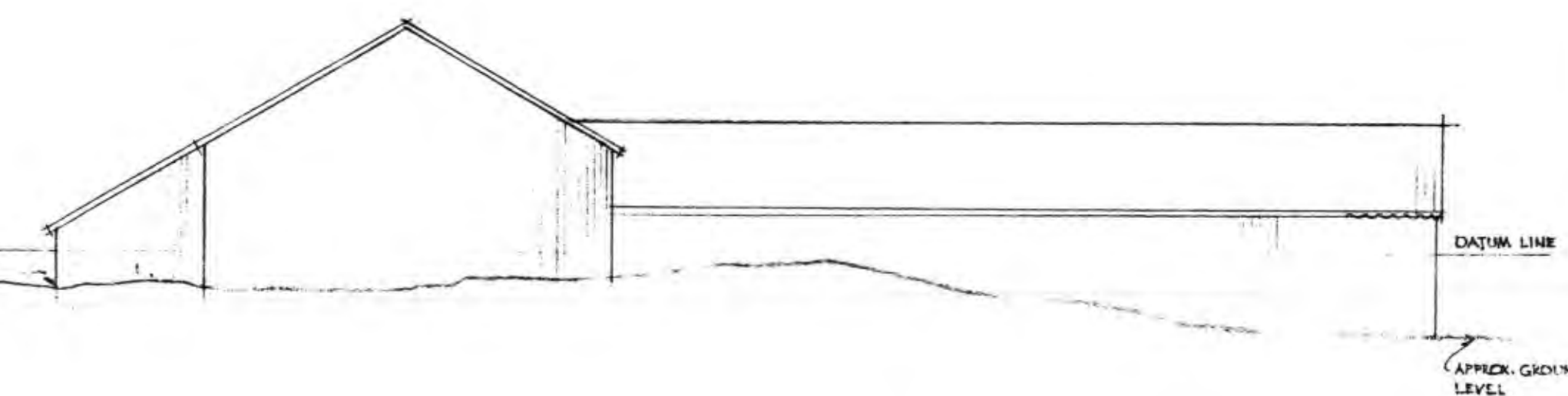
DRG No 771/4/1c
MINISTRY OF WORKS
CARDIFF. OCT. 1958



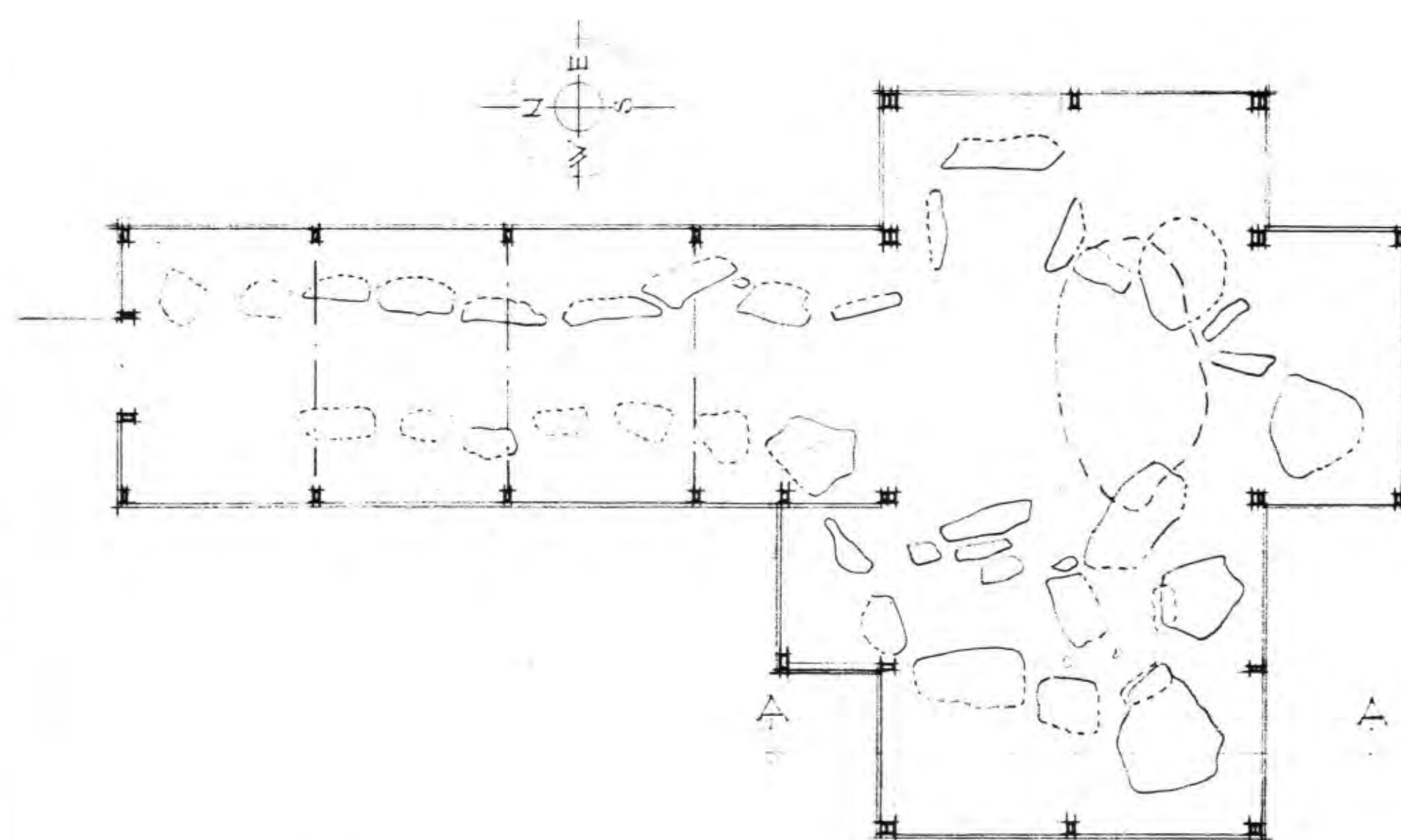
WEST ELEVATION



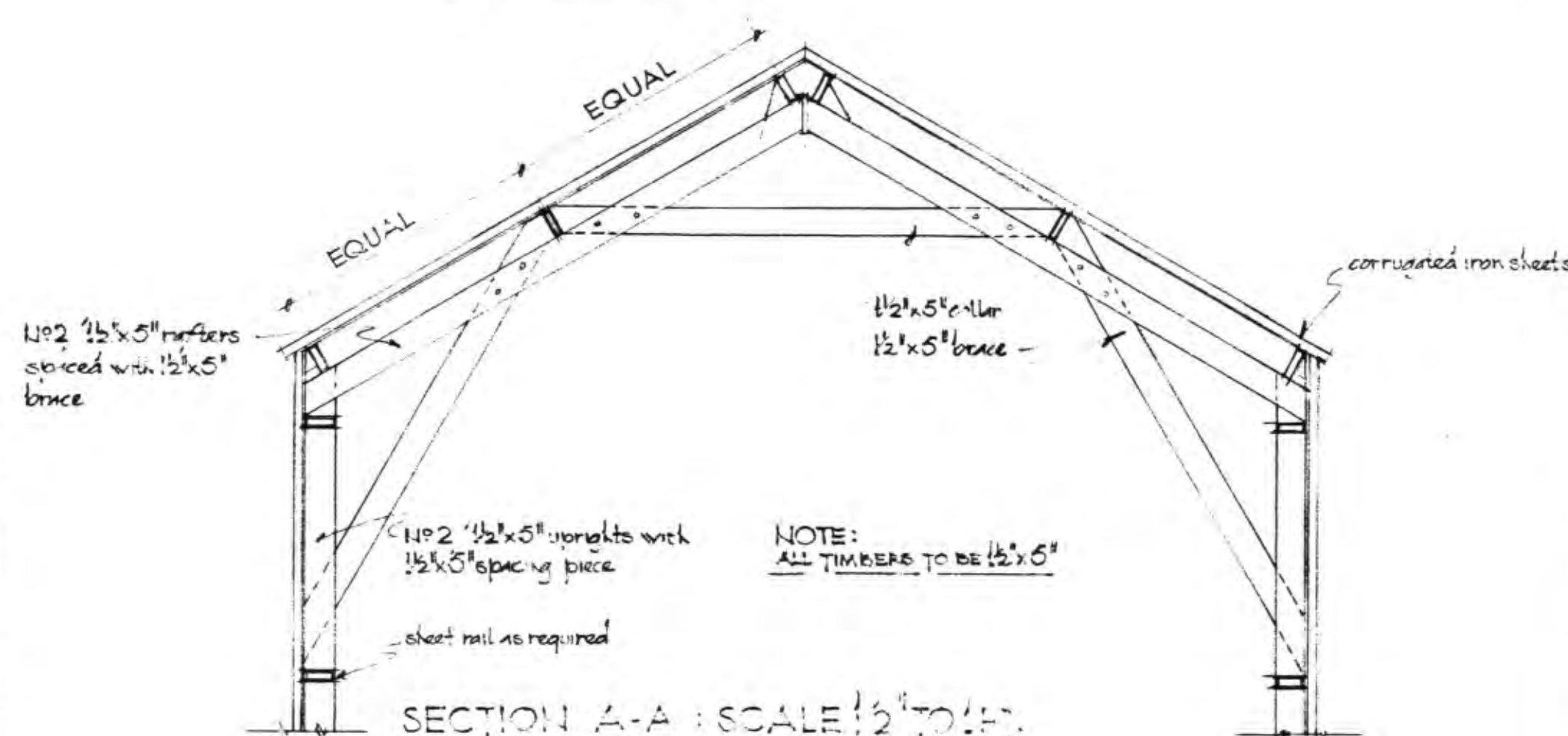
NORTH ELEVATION



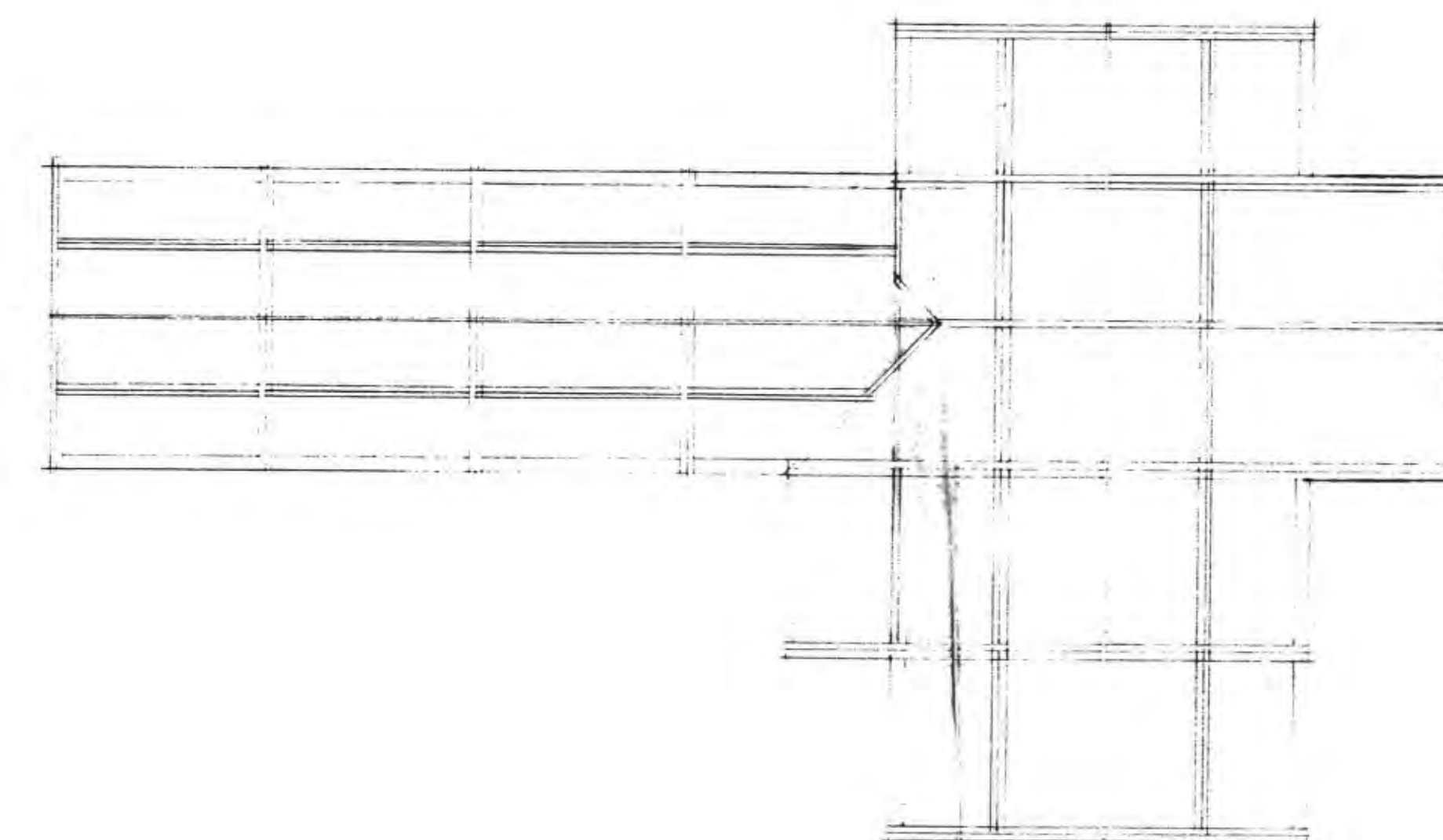
EAST ELEVATION



GROUND PLAN



SOUTH ELEVATION



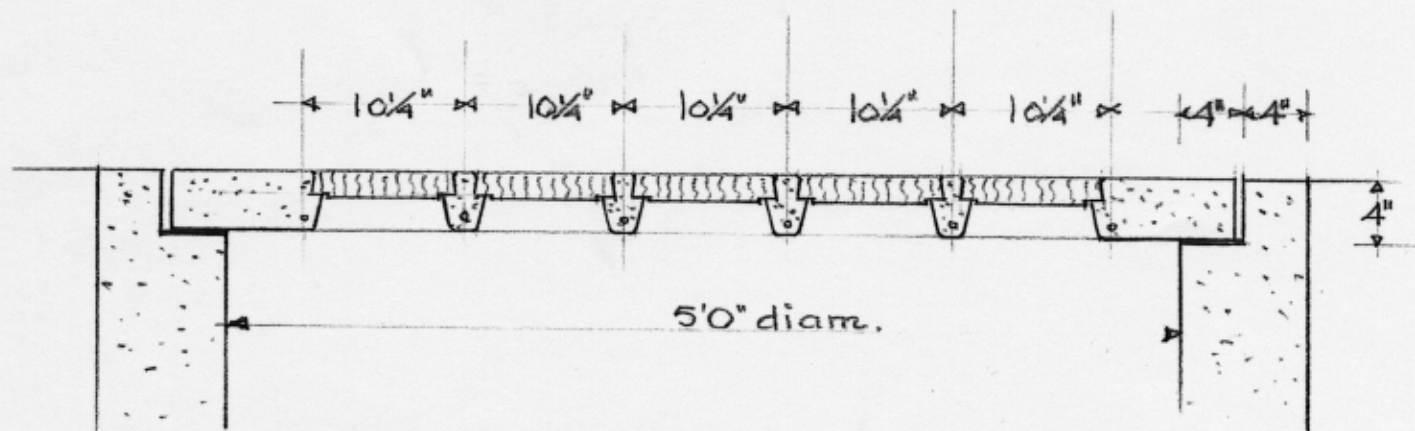
ROOF PLAN

BARCLODIAD-Y-GAWRES : PROPOSED TEMPORARY COVER TO CHAMBER

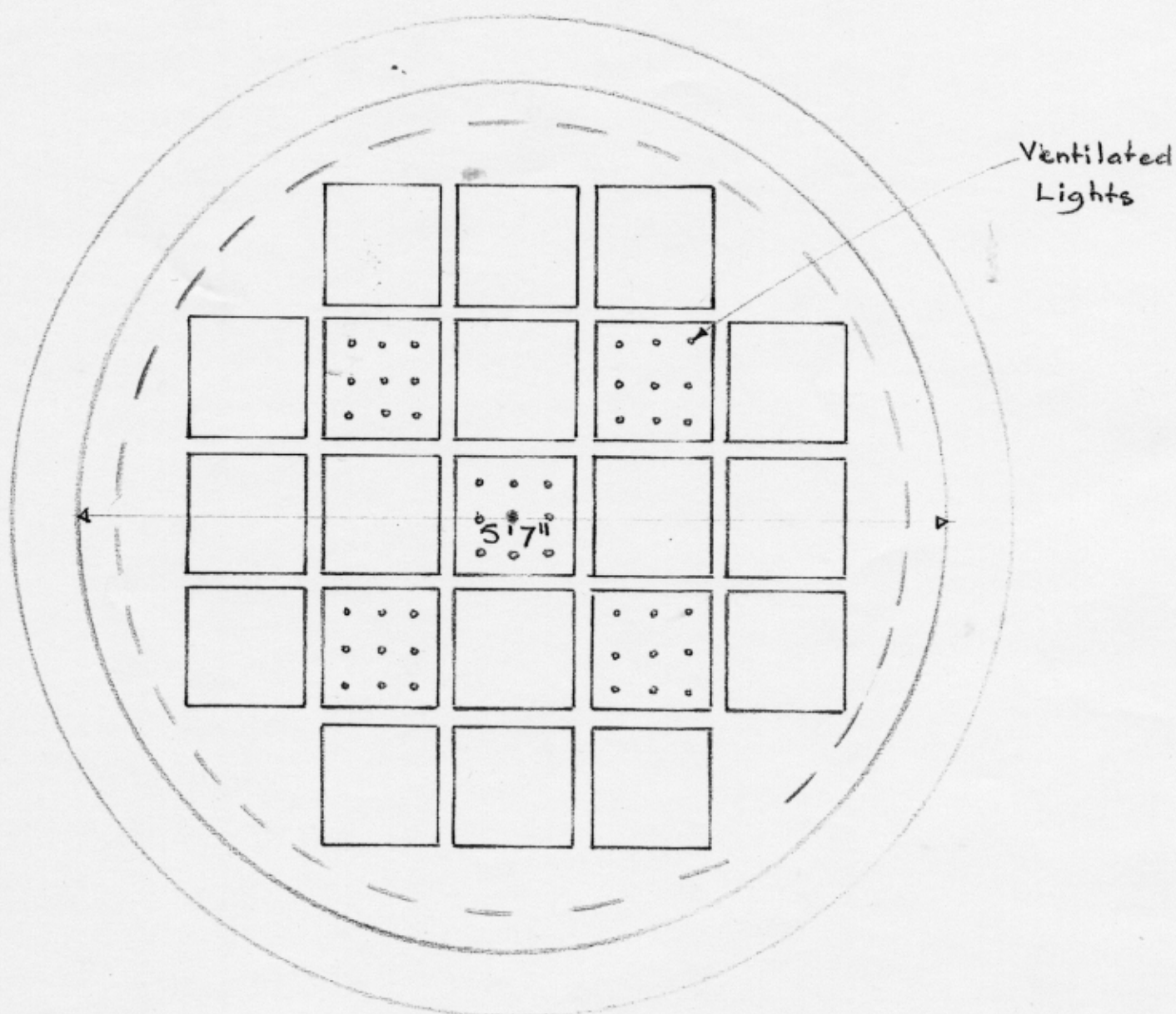
SCALE: 1/8" TO 1 FT.

M.O.W. ANCIENT MONUMENTS BRANCH - CARDIFF 771/5

CADW
Welsh Historic
Monuments



SECTION



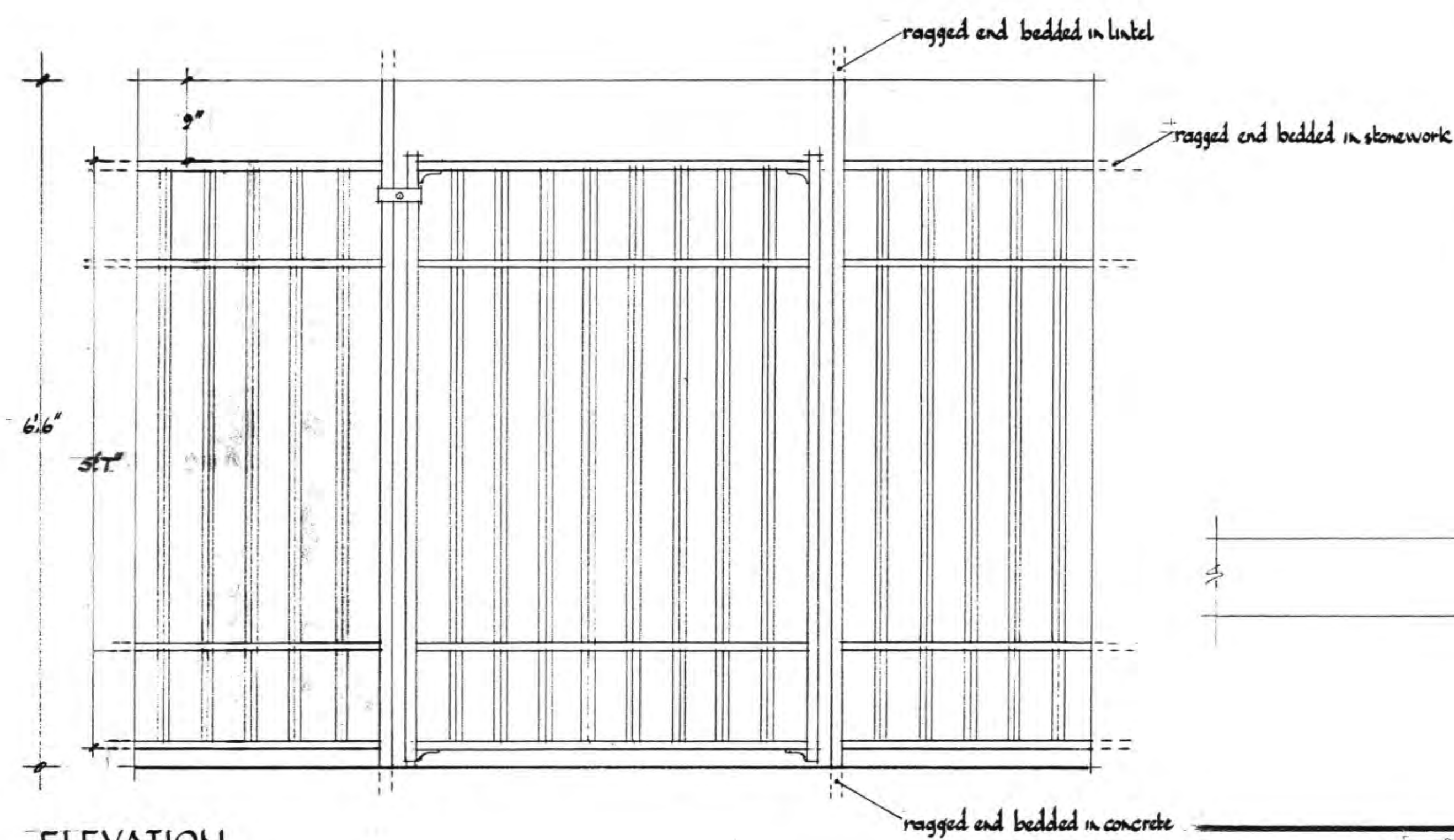
PLAN

BARCLODIAD-Y-GAWRES, PAVEMENT LIGHT, Scales 1" to 1'0"
 MINISTRY OF WORKS, A.M. BRANCH, GABALFA, CARDIFF

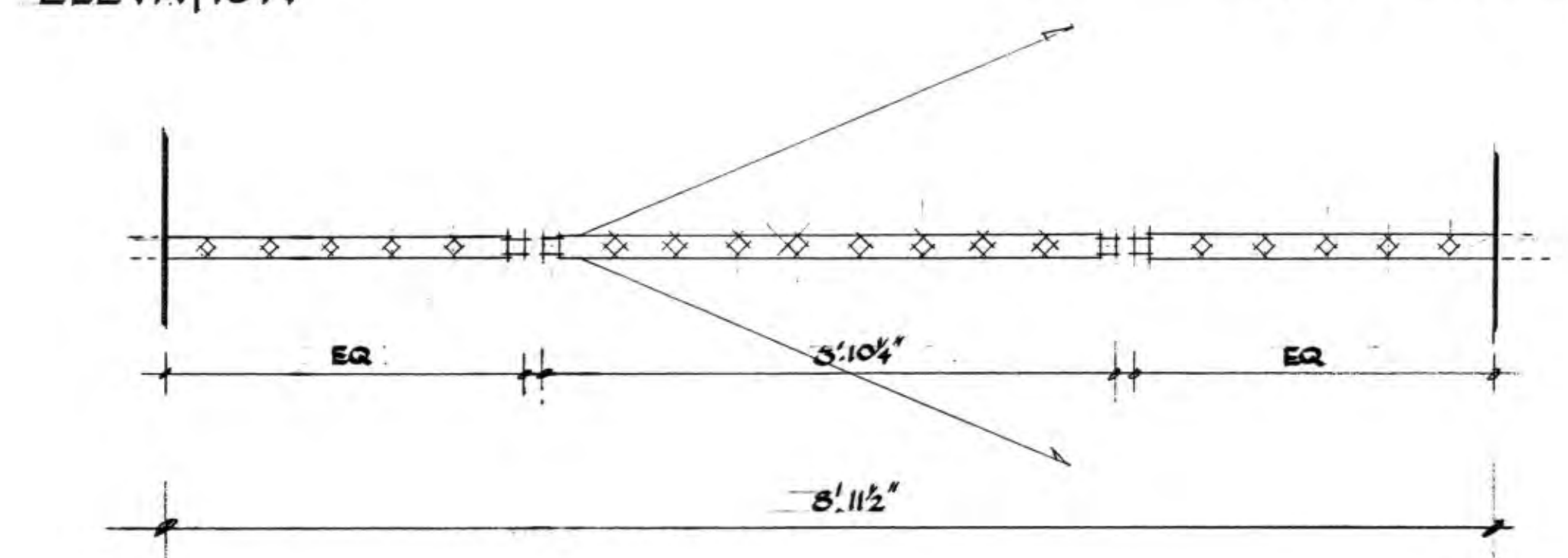
771/6

CADW
 Welsh Historic
 Monuments

DATE SENT: 10/02/00	BY: VEE
R/W or COLOUR: B/W	
PHOTOCOPIER: 100	
TYPE OF PAPER: CT+	
DATE COMED: 10/02/00	BY: VEE



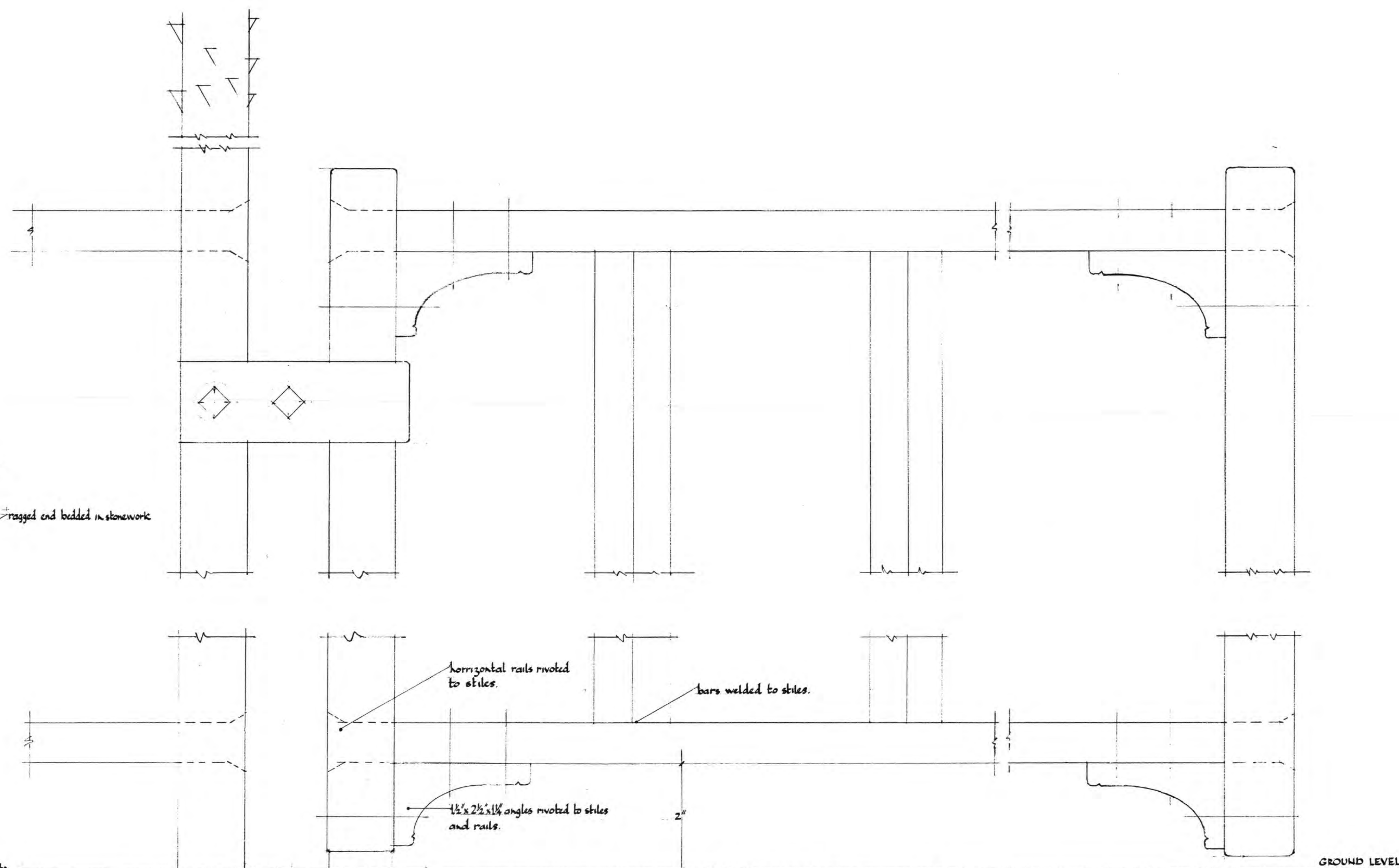
ELEVATION



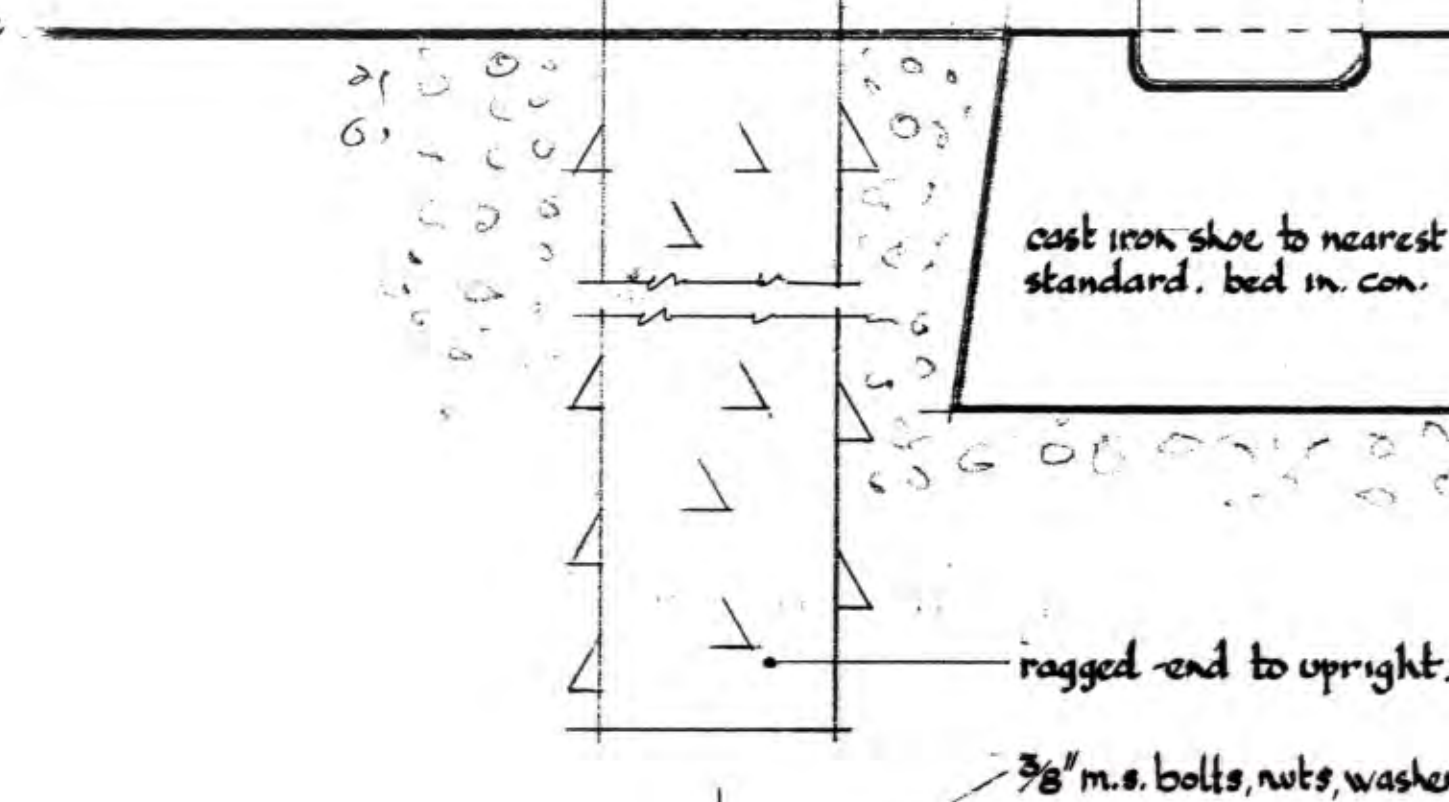
PLAN

NOTE:

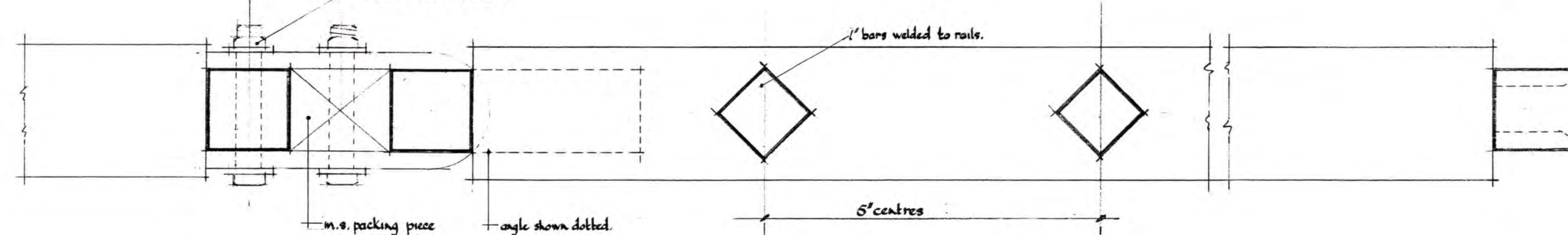
all bars at 5'centres welded to every horizontal rail
all work in best quality wrought iron.

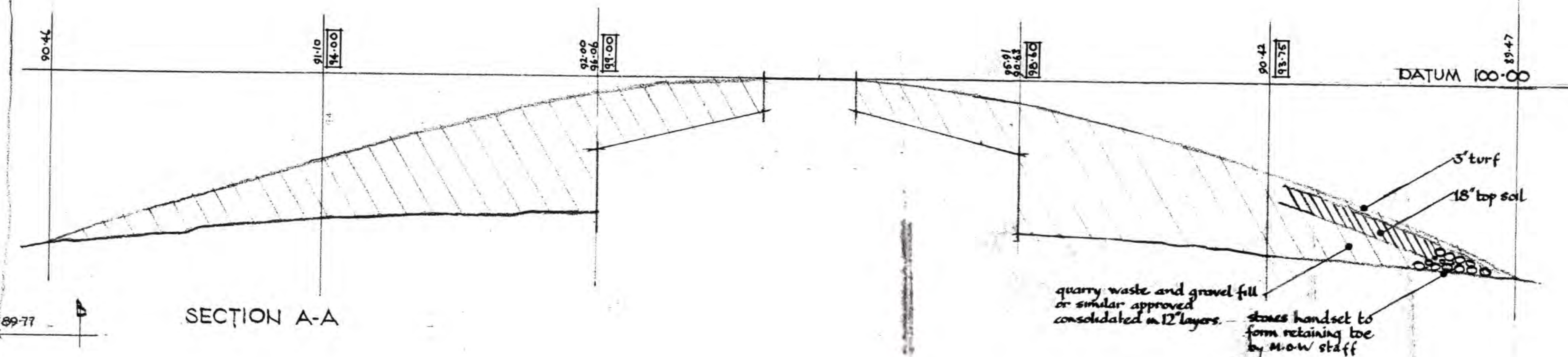
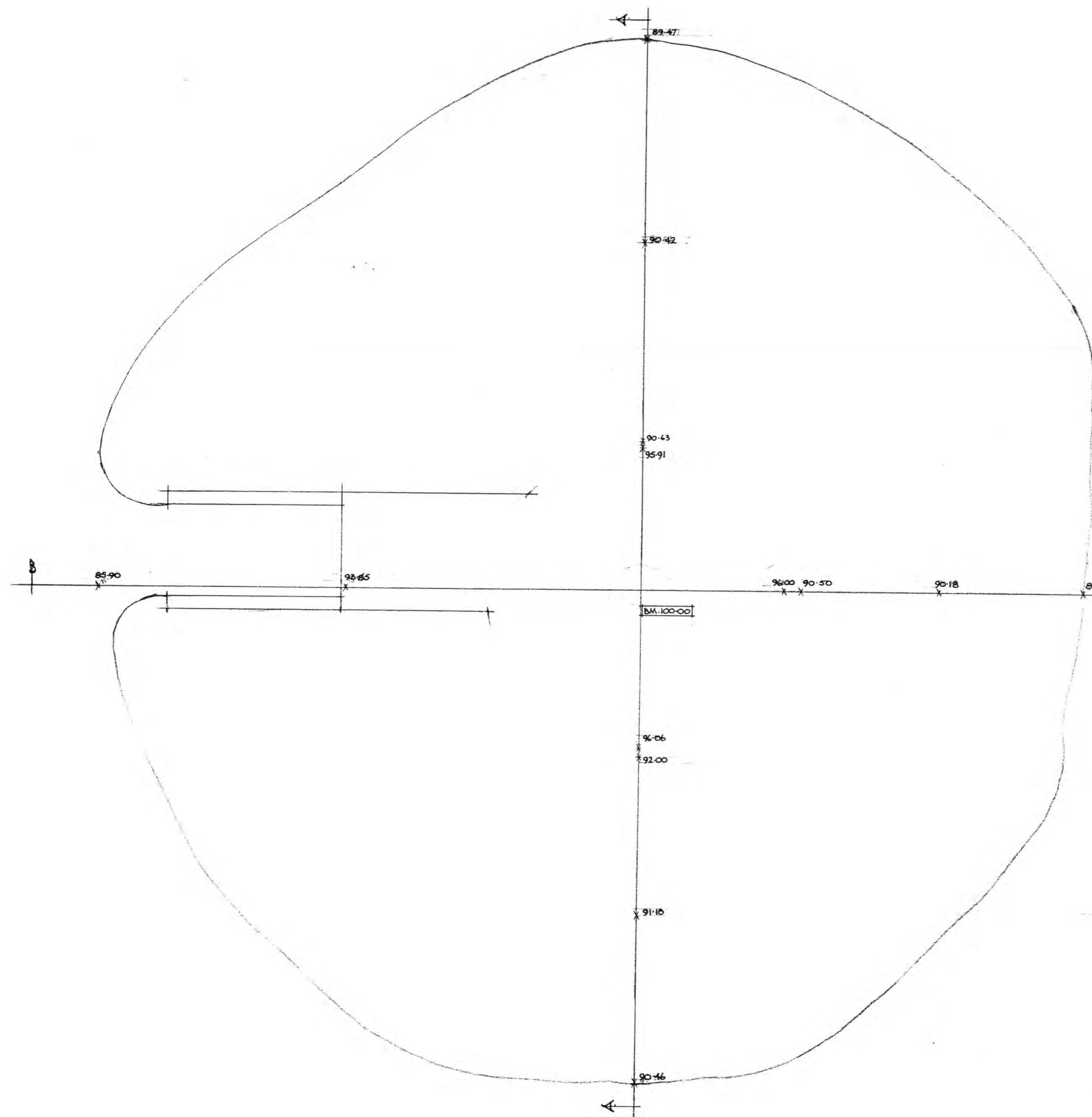


PART F.S. ELEVATION

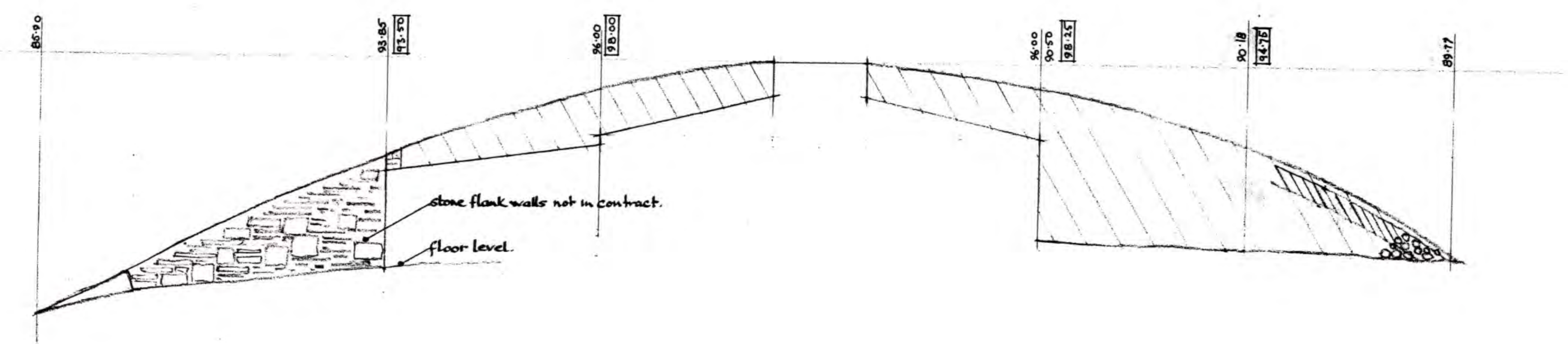


PART F.S. PLAN





NOTE:
existing ground level - 90.42 etc.
required mound level - 94.00 etc.



BARCLODIAD - Y - GAWRES BURIAL CHAMBER * FORMATION OF MOUND

SCALE: 1/8" TO 1 FT.

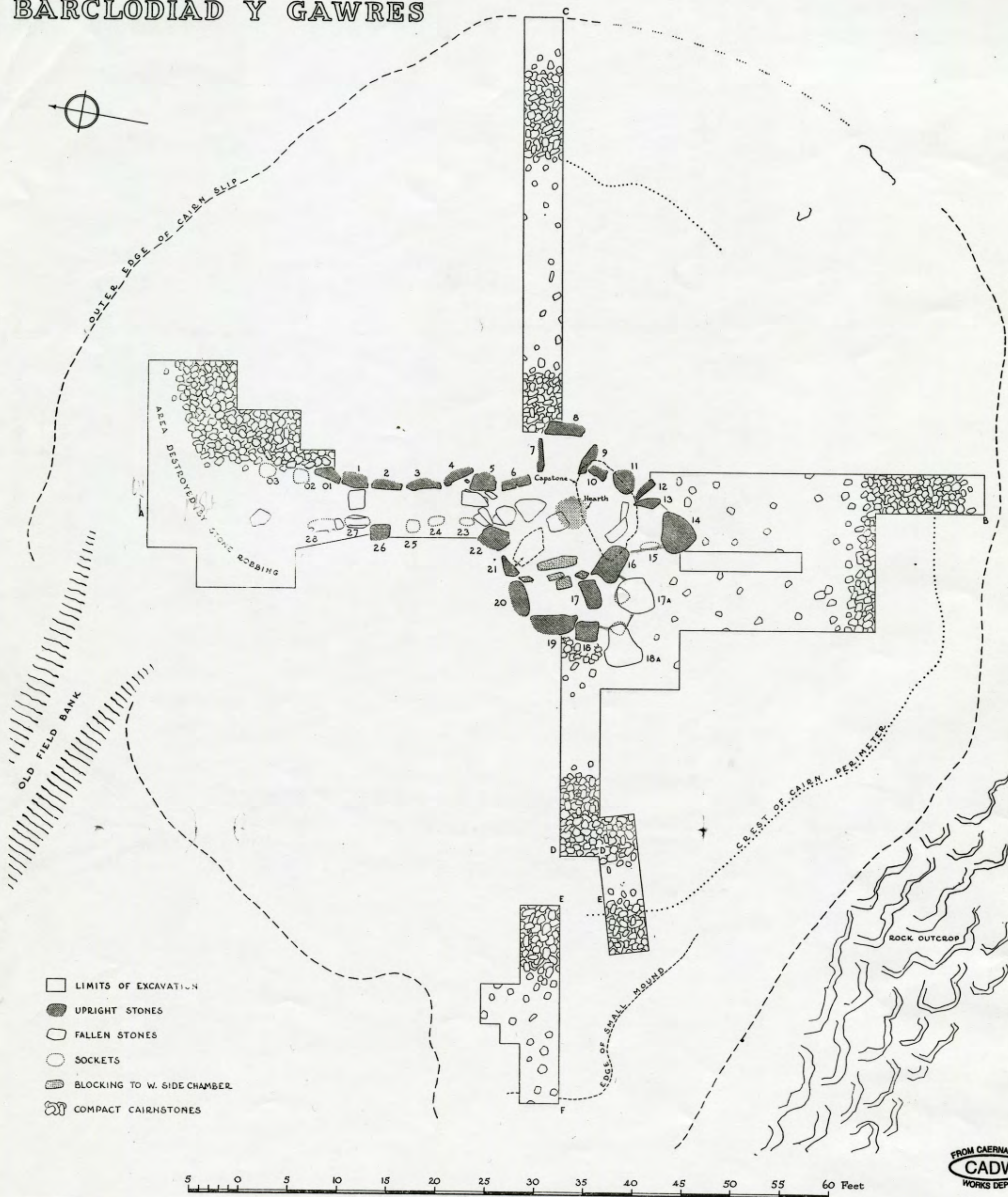
A.M. M.O.W. CARDIFF

CADW
Welsh Historic
Monuments

5.6.42 BS.

771/8

BARCLODIAD Y GAWRES



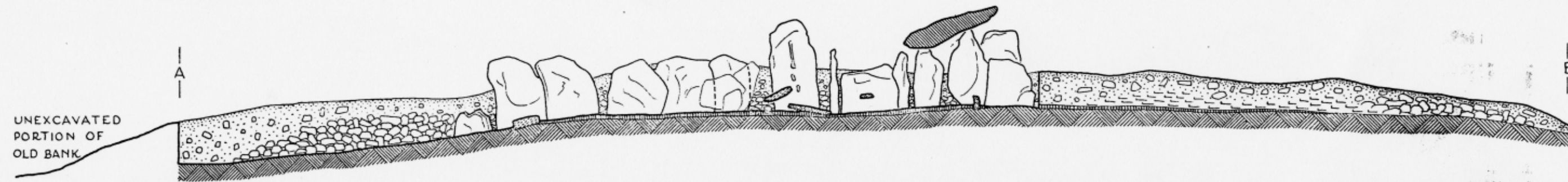
FROM CAERNARFON
CADW
WORKS DEPOT

C.F.E. 1954

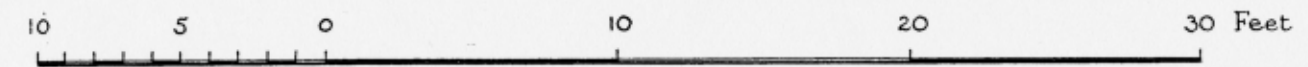
Fig. 18. Plan of monument & excavation.

771/14 C

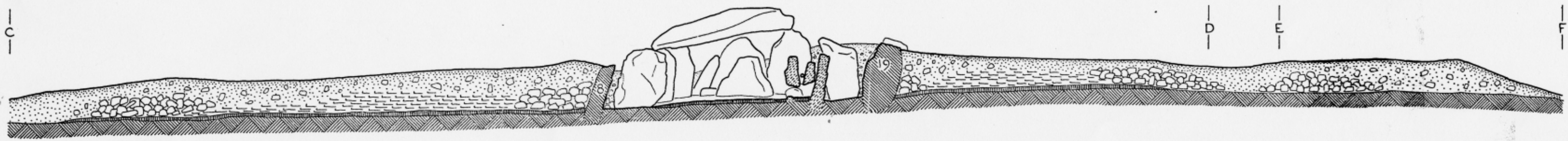
DATE SENT: 10/02/00	BY: VEE
TYPE OF PAPER: A4	DATE COPIED: 10/02/00
PHOTOGRAPH: 100	
SCALE OF COLOUR: 1/1	



SECTION : North - South



- SOIL AND SMALL STONES
- LOOSE CAIRN STONES & SOIL
- PEAT BUILT MOUND
- COMPACT CAIRN STONES
- OLD TURF LINE
- COMPACT GLACIAL DRIFT
- GOING TO ROCK IN PLACES



SECTION : East - West

BARCLODIAD Y GAWRES

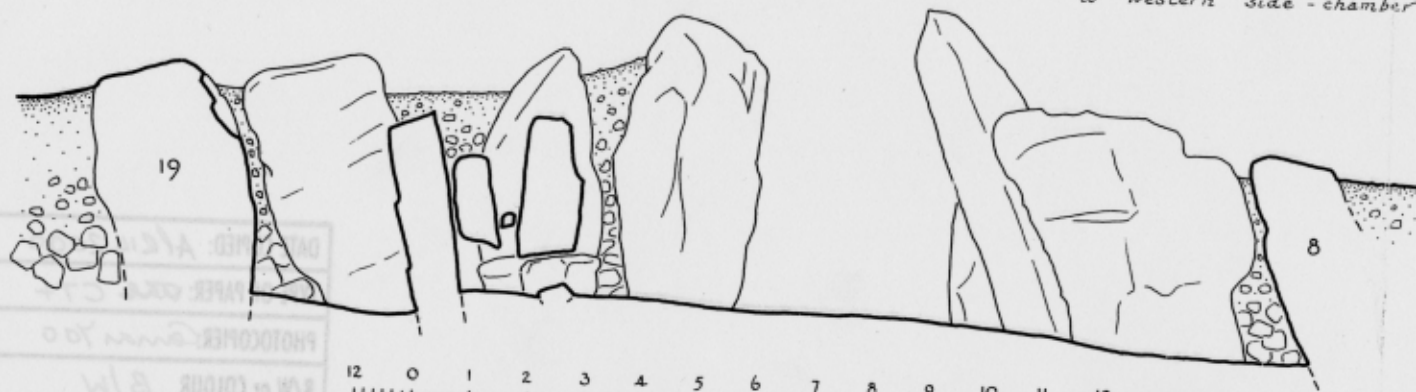
C.F.S 1954



Fig. 17. Main sections through the monument.

BARCLODIAD Y GAWRES

SECTION West-East through
central chamber, looking North.
*Shewing structure of blocking
to Western side-chamber*

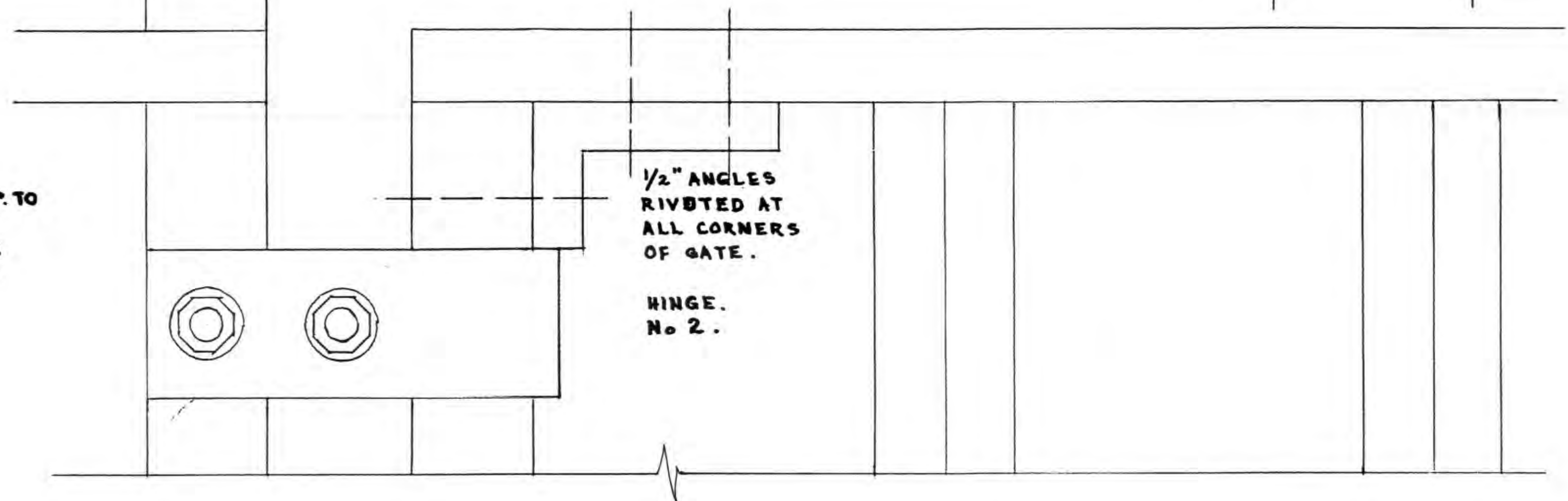
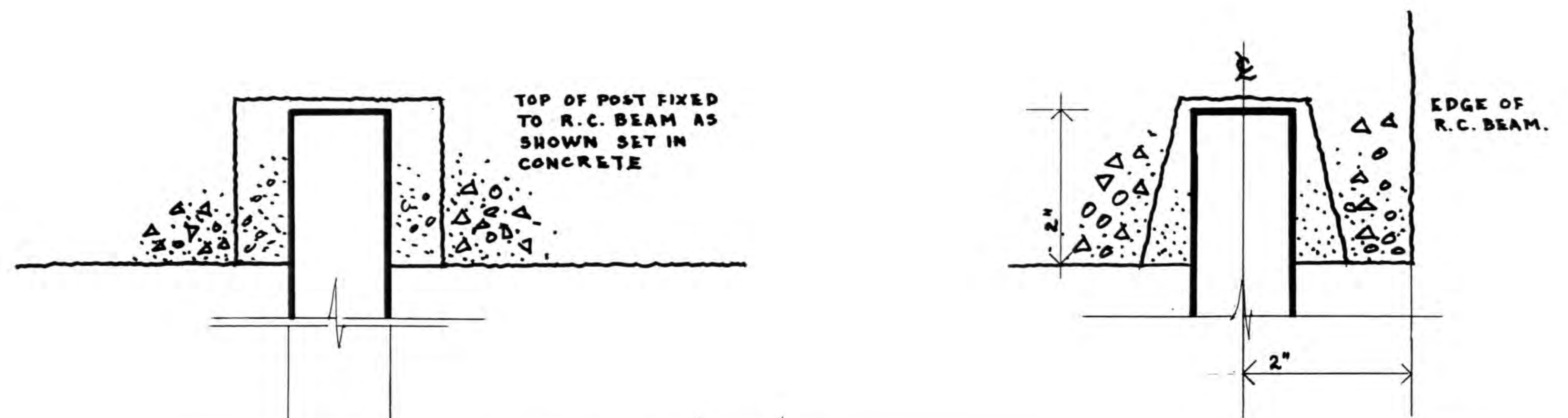
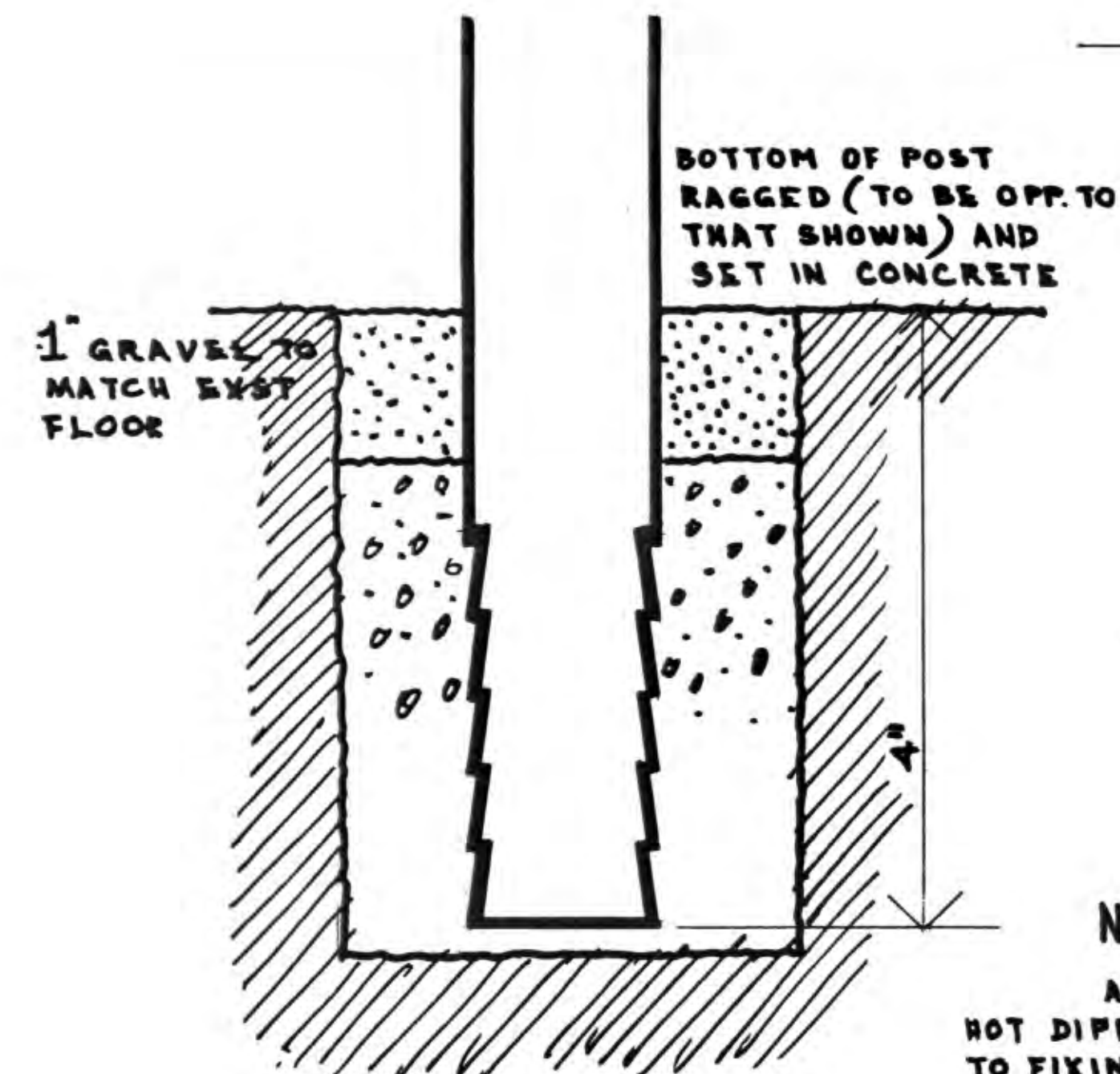
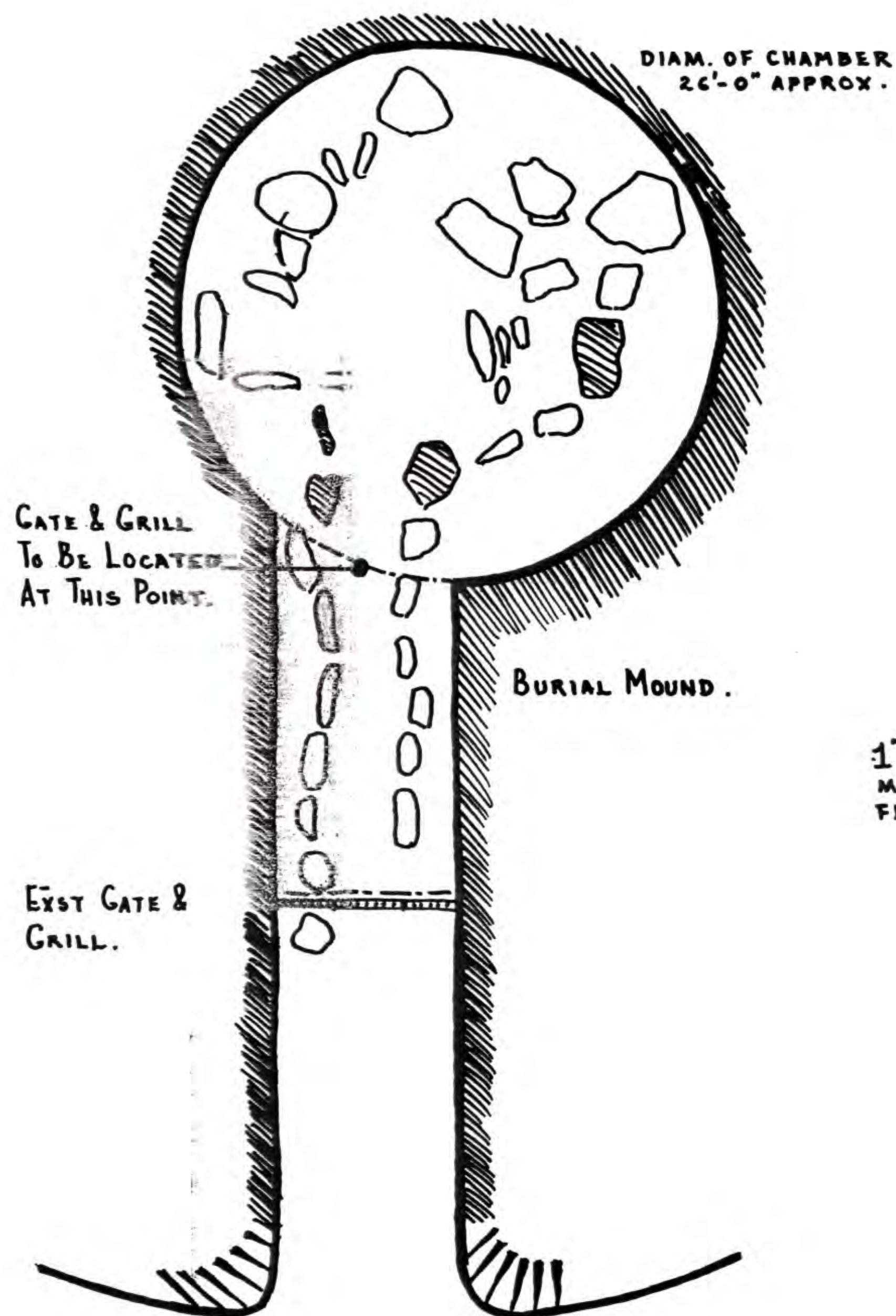


12 0 1 2 3 4 5 6 7 8 9 10 11 12
Inches



C.F.S. 354

771/16C



NOTES.

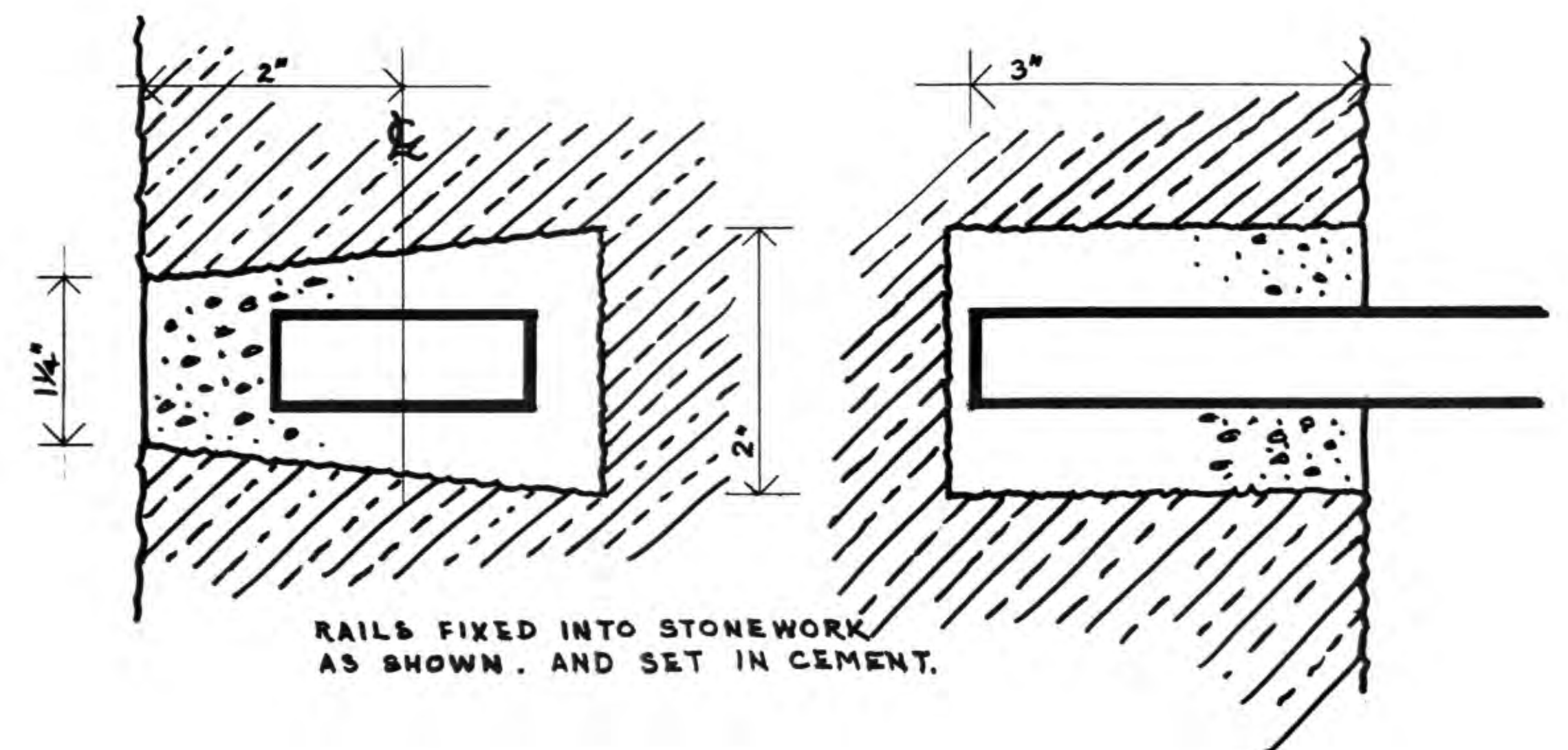
ALL METALWORK IS TO BE HOT DIPPED GALVANISED PRIOR TO FIXING.

GATE IS TO BE CHECKED TO PREVENT SWING DAMAGING STONES.

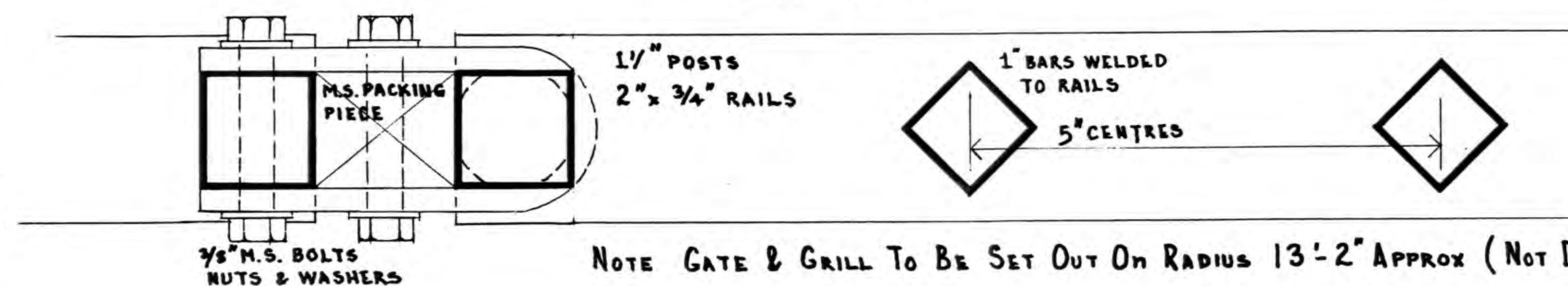
ESPECIAL CARE MUST BE TAKEN TO ENSURE NO DAMAGE IS CAUSED TO STONES DURING FIXING.

THE CONTRACTOR IS RESPONSIBLE FOR CHECKING ALL DIMENSIONS, TEMPLATES ETC ON SITE TO ENSURE THE METALWORK IS OF ACCURATE SIZE.

THE FASTENING IS TO BE AS THAT ON OUTER GATE.



F.S. DETAILS



NOTE GATE & GRILL TO BE SET OUT ON RADIUS 13'-2" APPROX (NOT DRAWN)

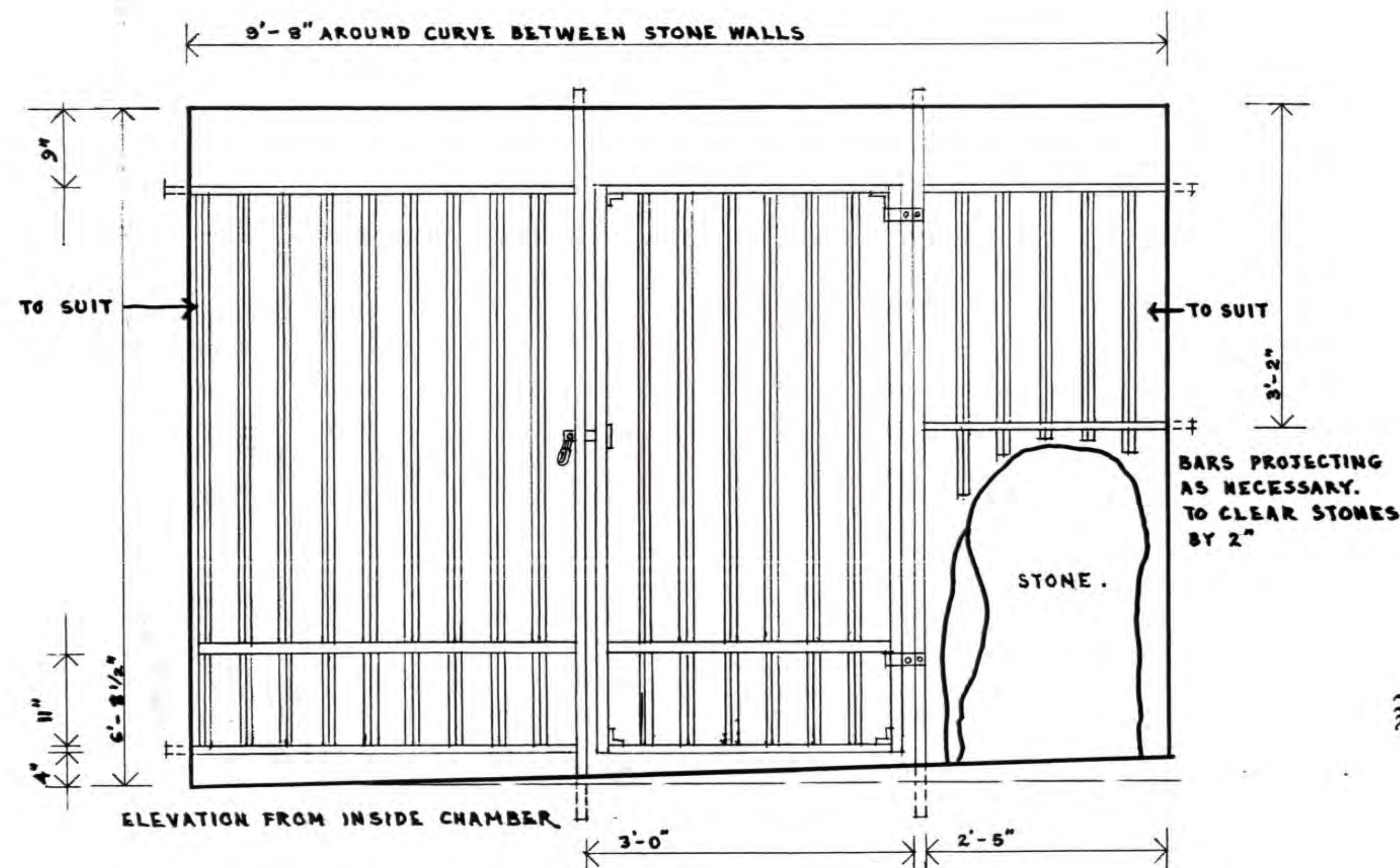
BARCLODIAID P GAWRES. ABERFFRAW.

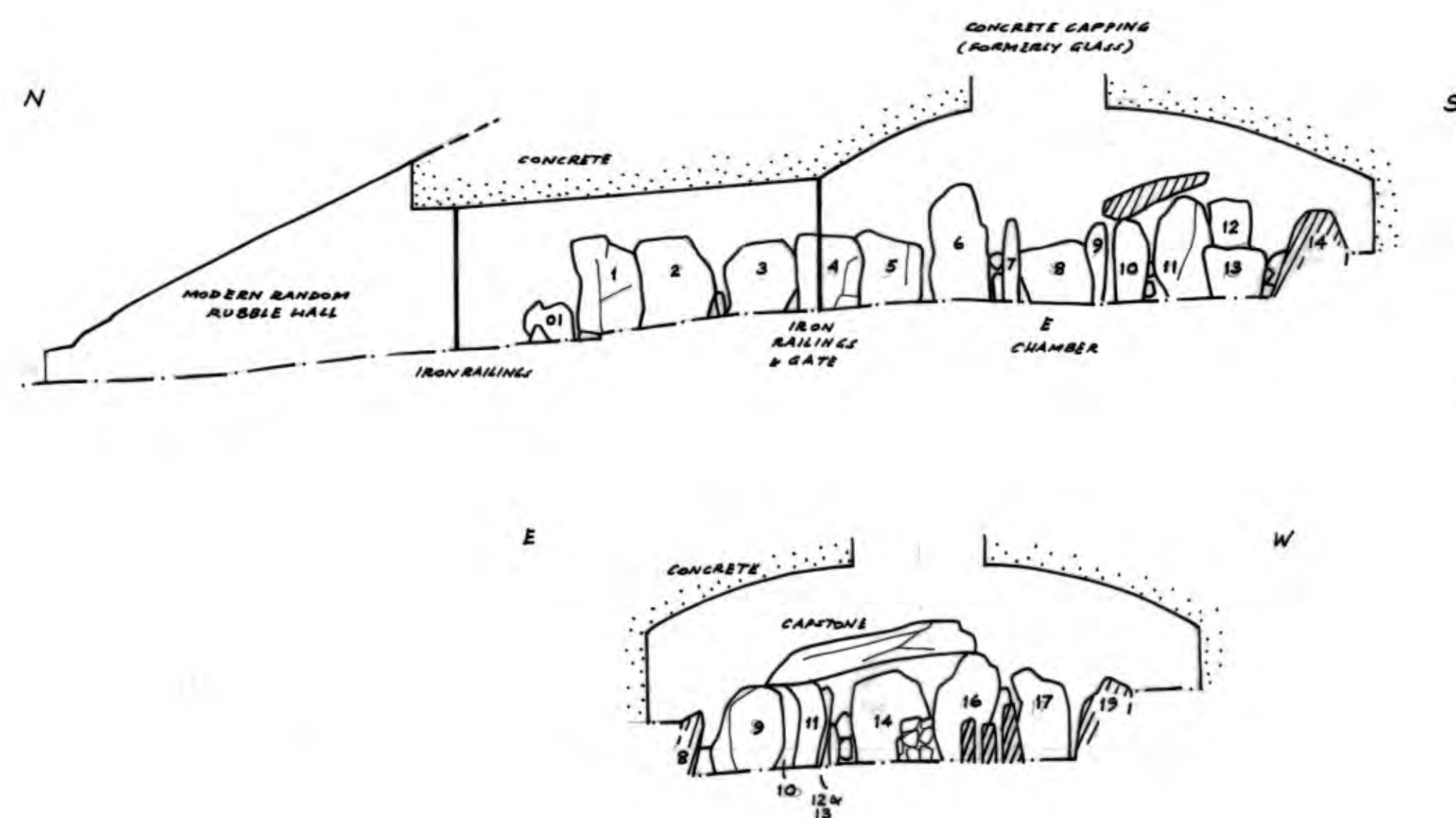
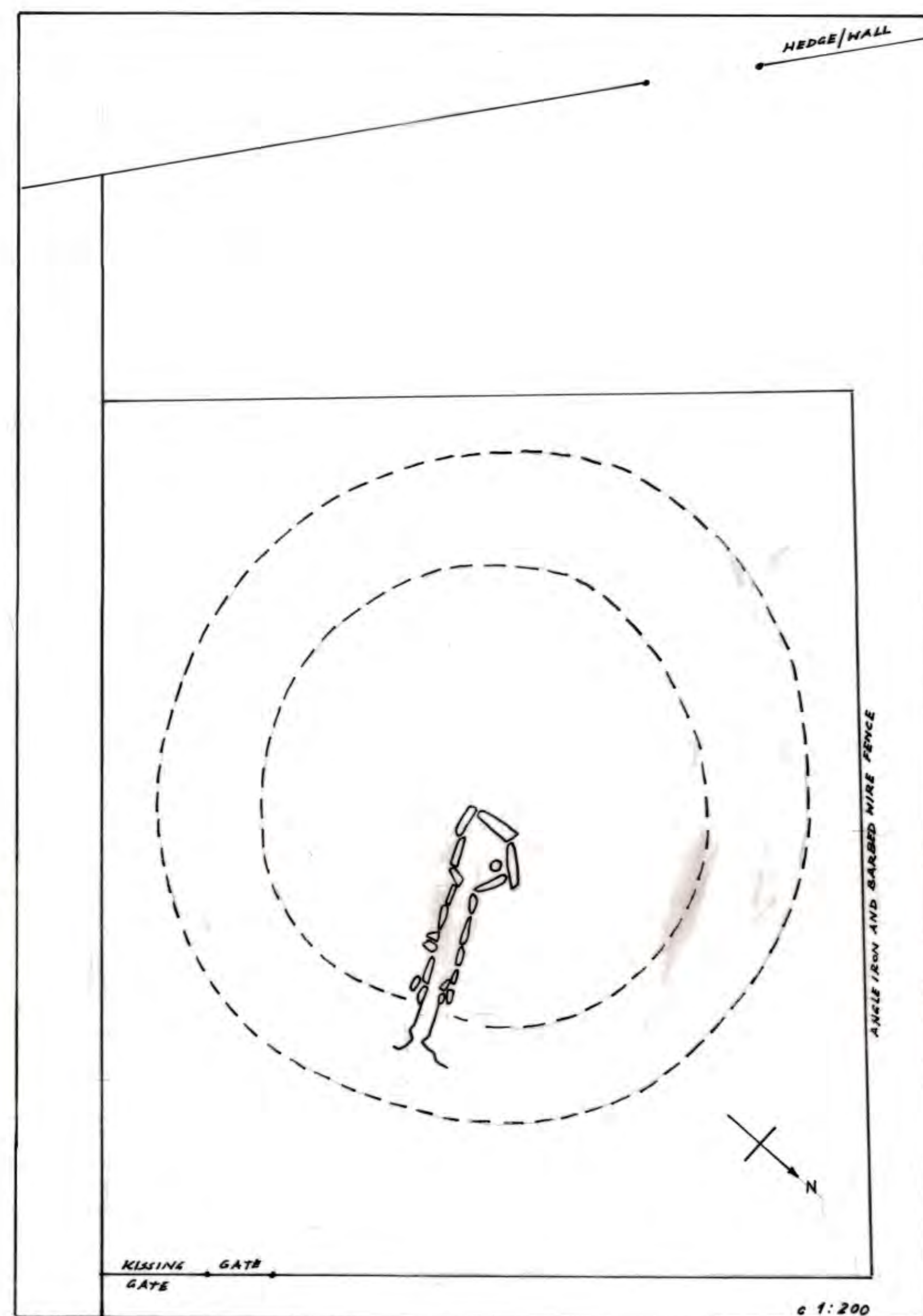
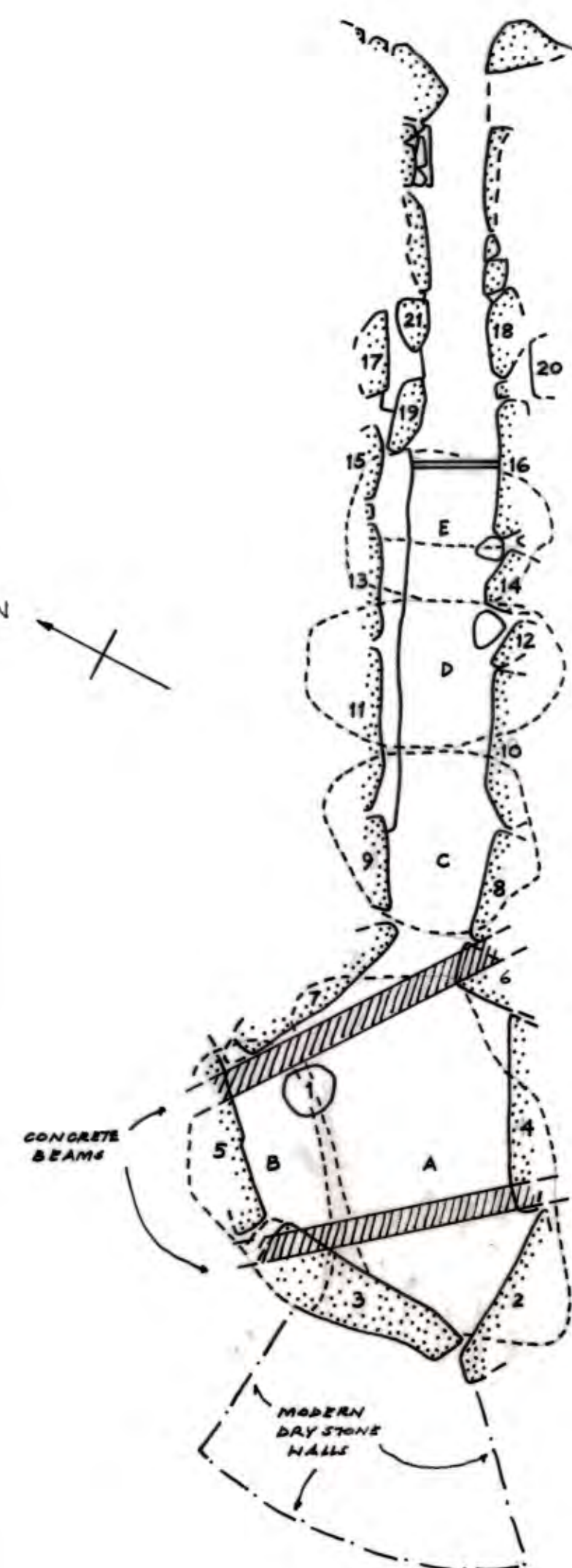
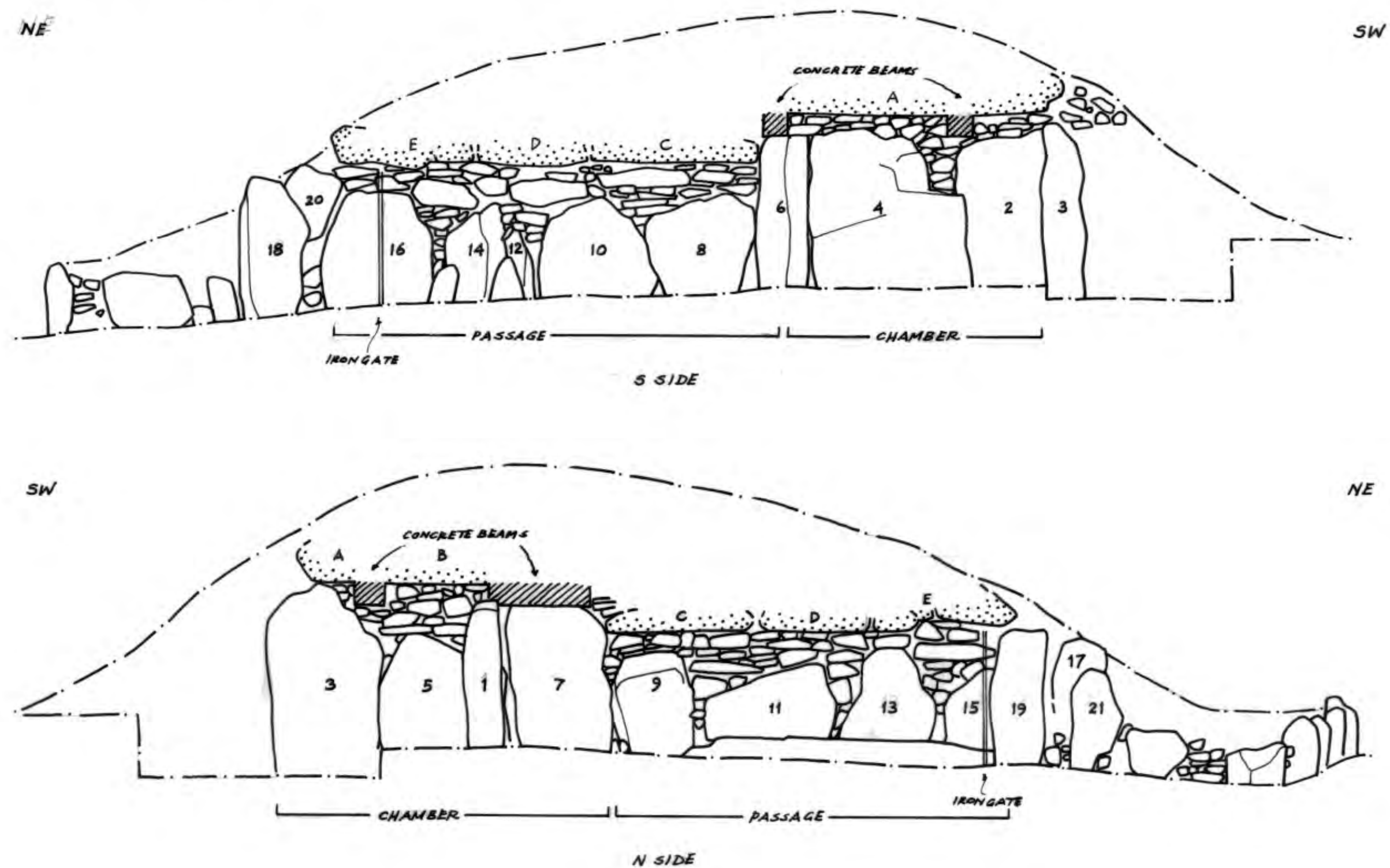
INNER GRILL & GATE

NOTE DETAILS TO MATCH EXISTING OUTER GRILL & GATE

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ANCIENT MONUMENTS BRANCH D.O.E.
TY GLAS. LLANISHEN. CARDIFF.
TEL. 0222 753271 EXT 2012
MCMLXXVI: XII: VH.

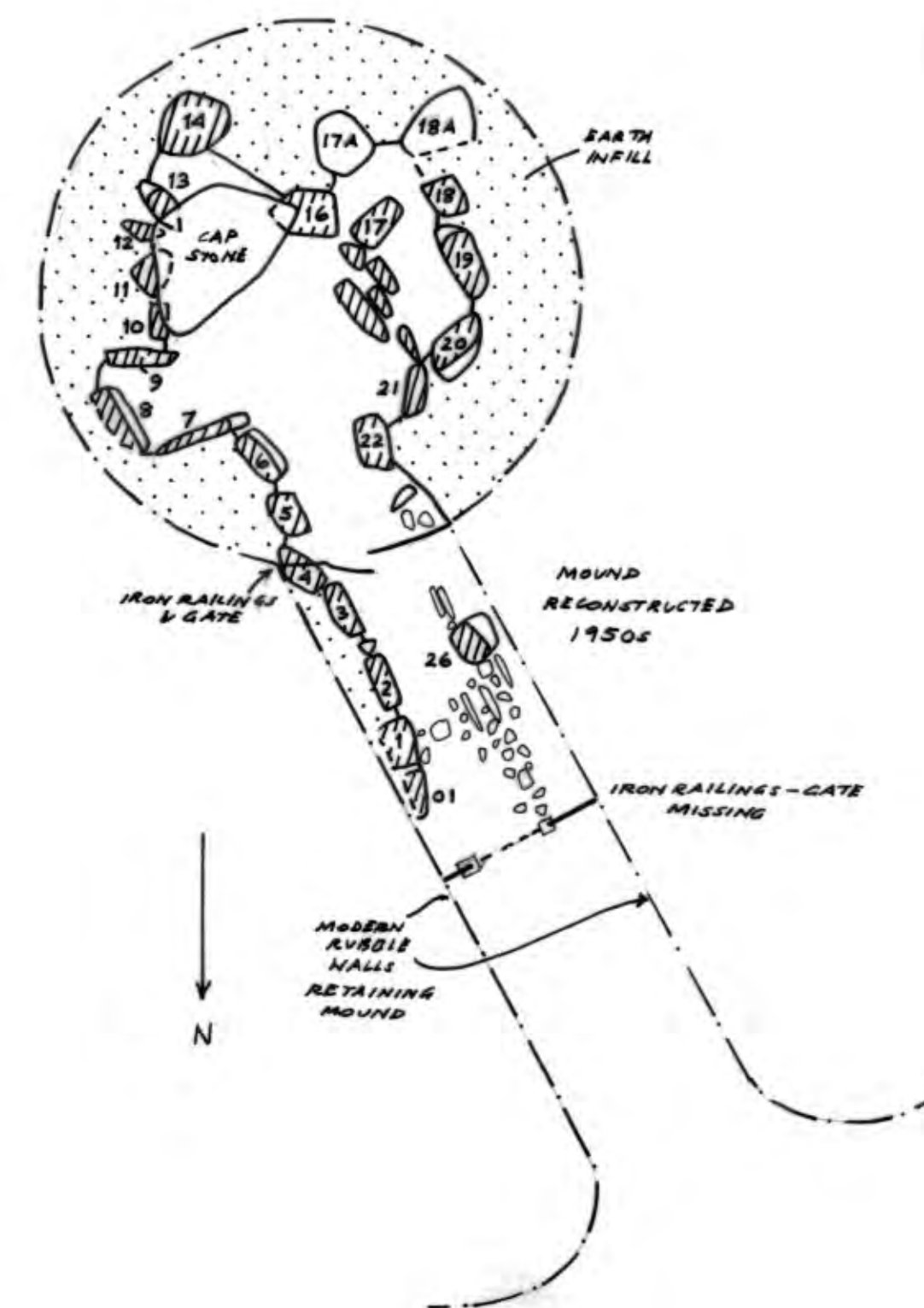




OVERLAYS TO FIG. 17
c 1:84

OVERLAY TO FIGS 8A, 8B
AND 18
1:100

BARCLODIAD Y GAWRES



AMENDMENTS

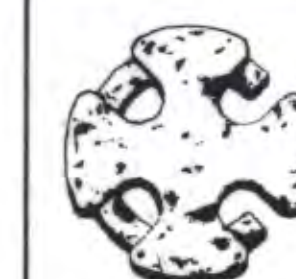
BRYN CELLI DDU B.C.
BARCLODIAD Y GAWRES B.C.

Scale 1:50; c 1:200
c 1:84; 1:100

Date Aug 1998

Job No. Monument No.

Drawing No. Sev/Pl 4



Cadw
WELSH
HISTORIC
MONUMENTS

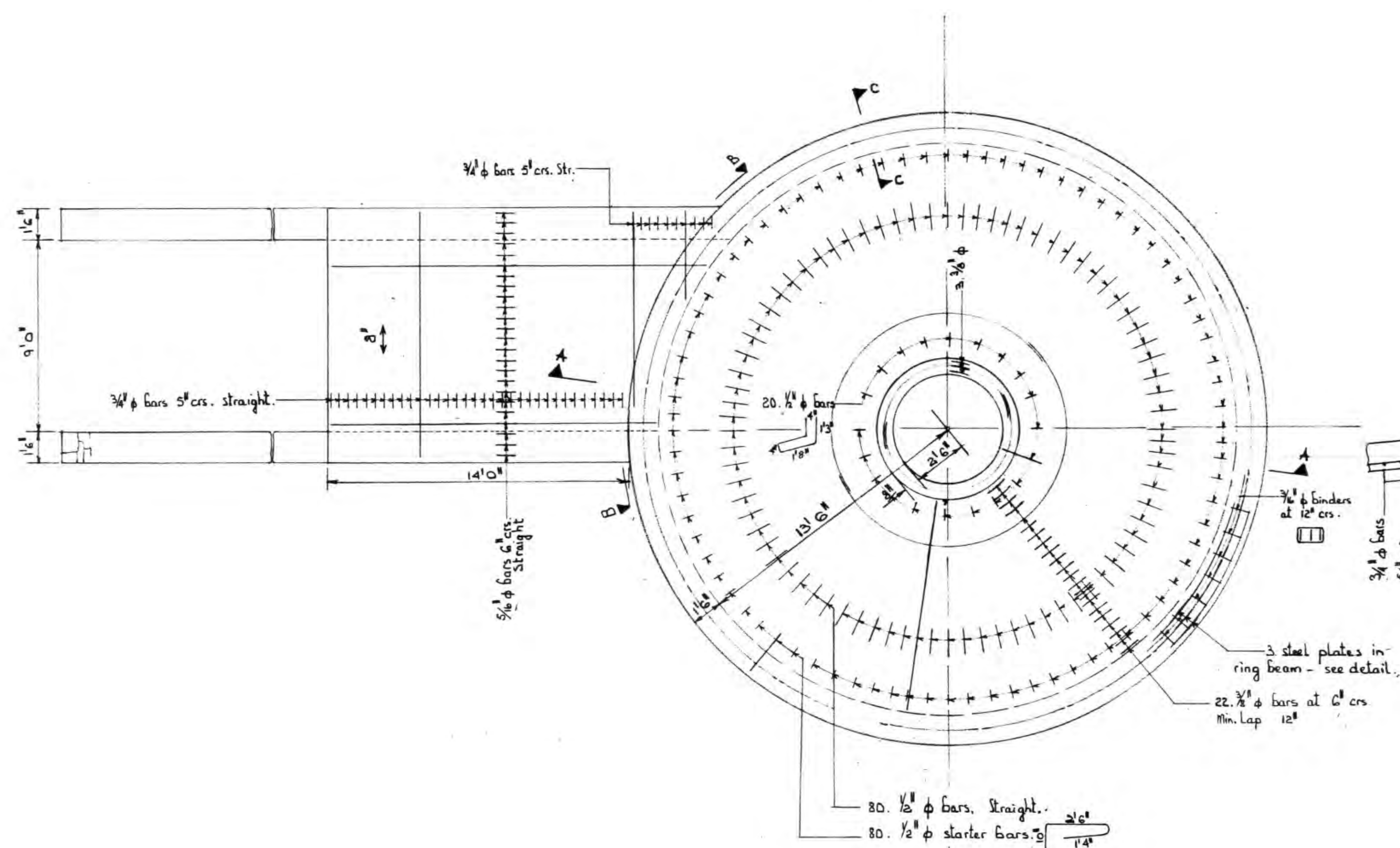
Brunel House, 2 Fitzalan Road,
Cardiff CF2 1UY Telephone (01222) 500200

Job Architect

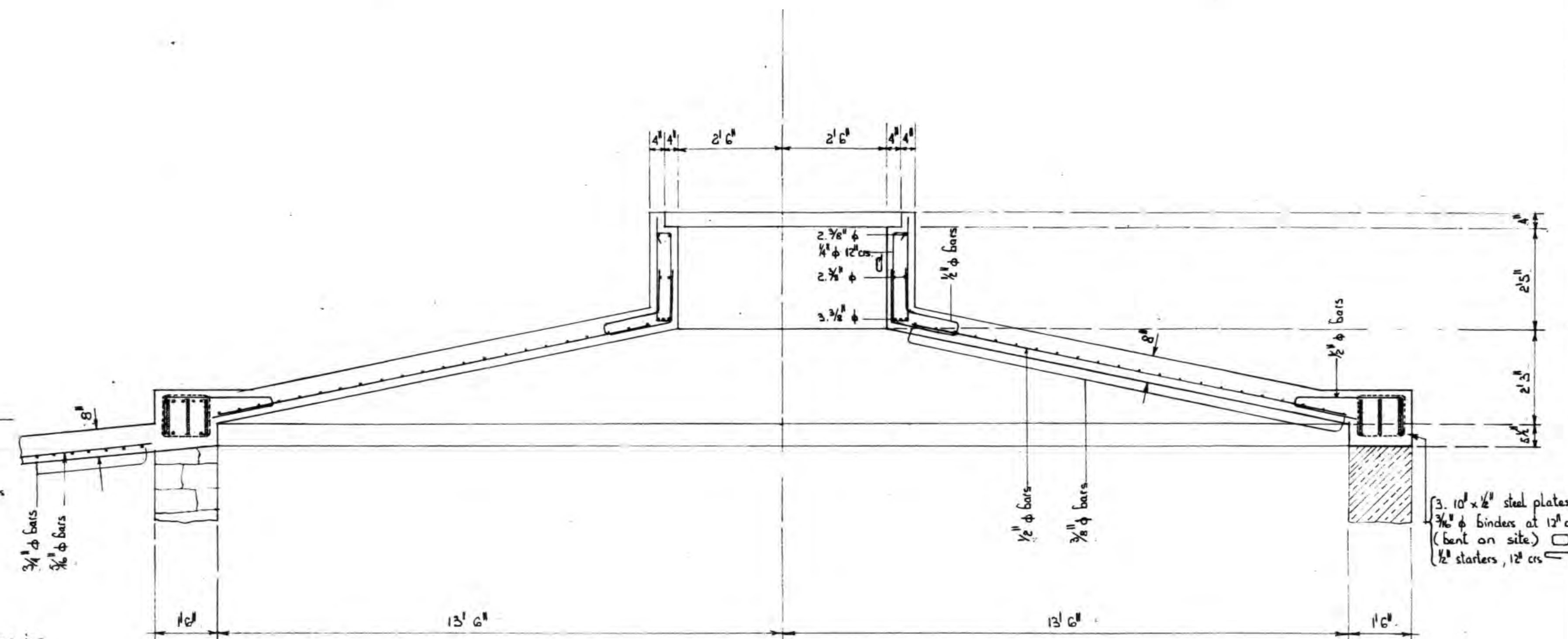
Drawn T.M.

Checked

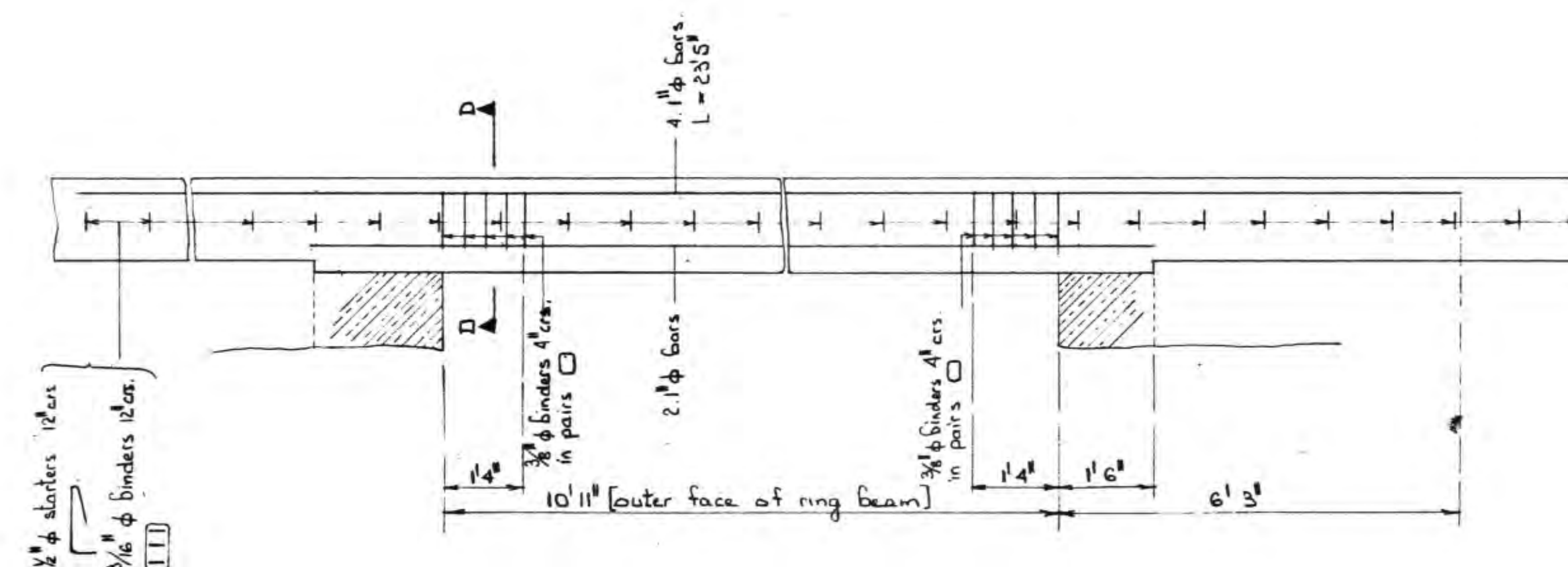
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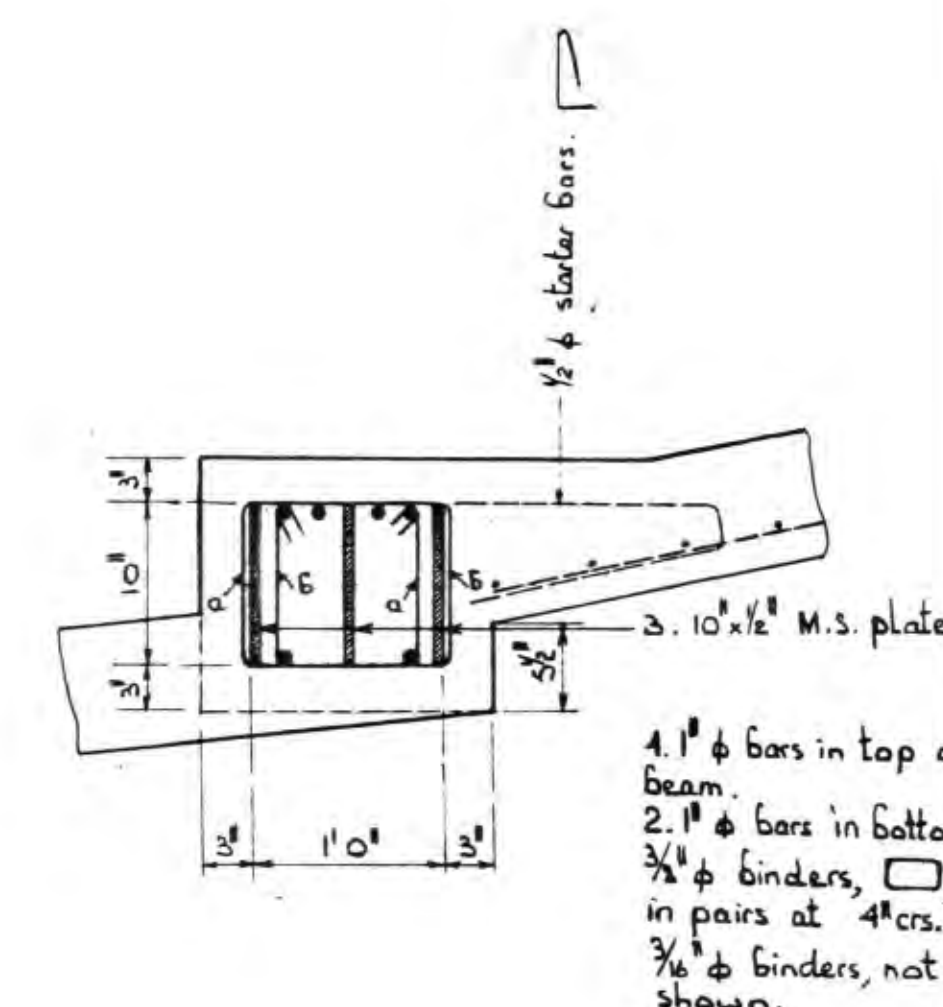
ROOF PLAN



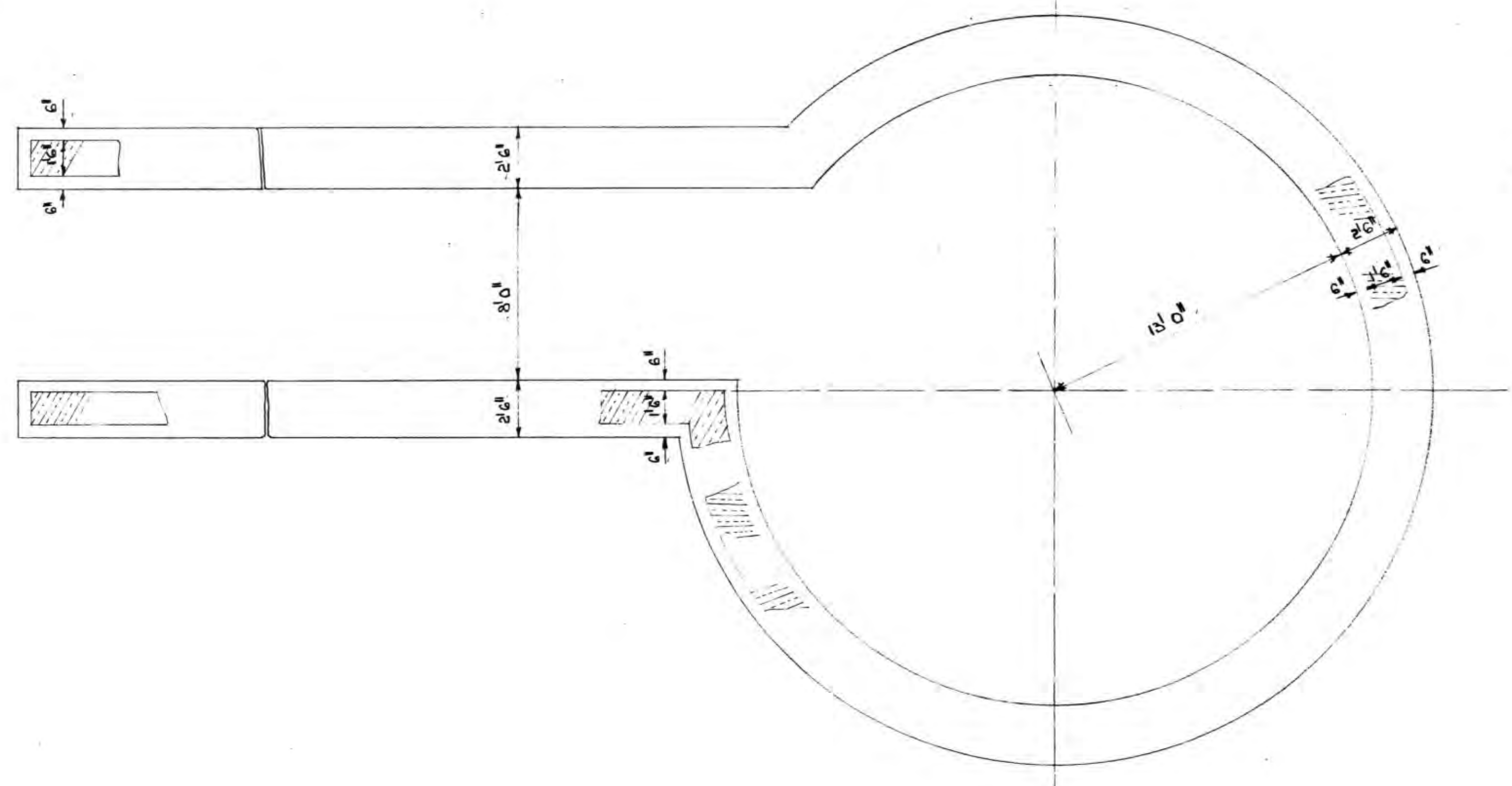
SECTION A-A



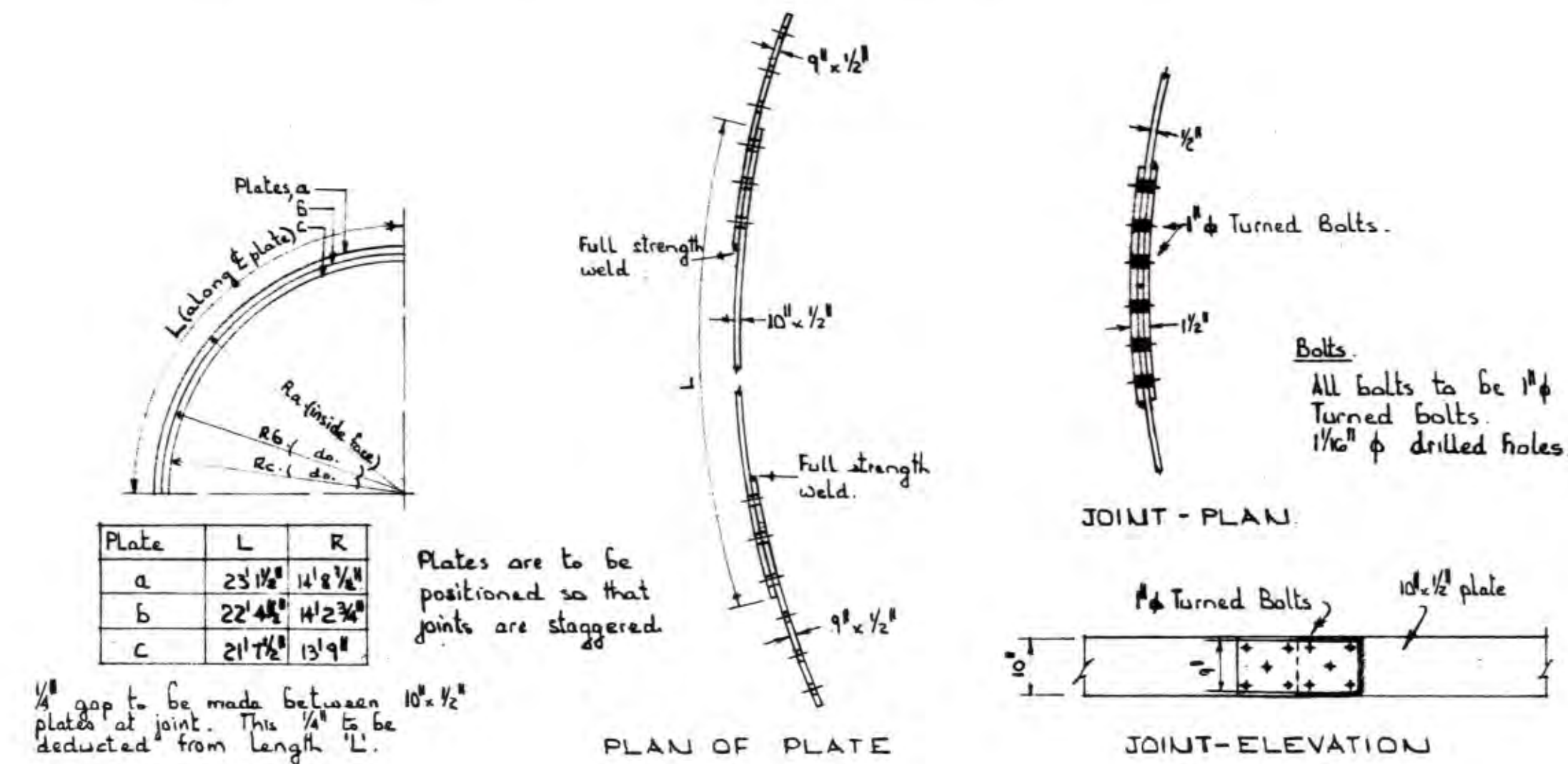
DEVELOPED SECTION B-B
[Steel plates in beam, and reinforcement in slab over entrance, not shown.]



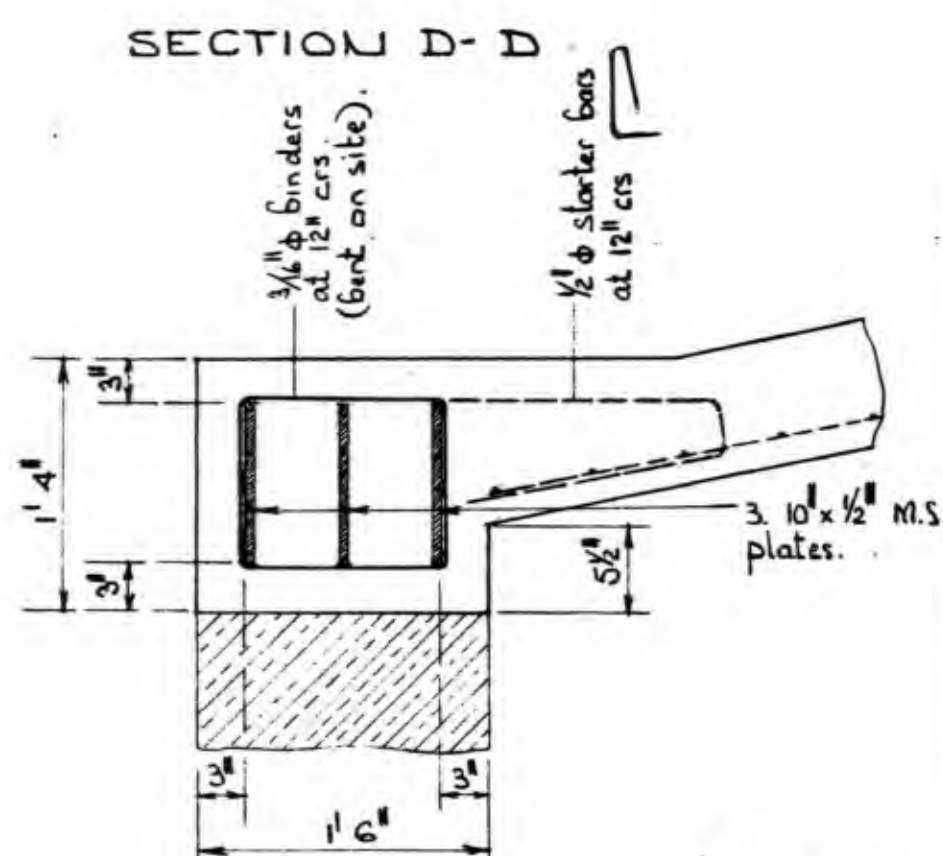
SECTION D-D



FOUNDATION PLAN



DETAILS OF M.S. PLATES.



SECTION C-C
Typical section through ring beam, except over entrance, (see section D-D).

NOTES

The contractor is responsible for the accuracy of all dimensions and for the correct setting out of the work on site.

The foundations have been designed on the assumption that the ground immediately under the foundations is capable of carrying a safe load of 2 ton. sq. ft. If upon opening up it is considered by the S.O. that the ground is incapable of safely withstanding this pressure the foundations shall be extended as directed by the Structural Engineer. Where pockets or holes occur below foundations they shall be infilled with 3000 lb. concrete.

Concrete is to be nominal quality controlled. Mass concrete to have a guaranteed crushing strength of 2000 lb. sq. in. at 28 days.

Reinforced concrete is to have a guaranteed crushing strength of 4000 lb. sq. in. at 28 days.

Reinforcement is to be accurately placed and secured at all intersections by the liberal use of 16 gauge soft iron wire.

Reinforcing bars are to conform to the appropriate B.S.S. Structural Steel to B.S.S. 15.

Structural Steel is to be thoroughly cleaned, wire brushed, free of scale, and of rust.

Welding is to conform to B.S.S. 538.

Cover to reinforcement, 2" minimum, or as shown.

This drawing is to be read in conjunction with relevant Architects drawings, and with the specification.

REF.	PARTICULARS	BY	DATE
AMENDMENTS			
BARCLODIAD Y GAWRES BURIAL CHAMBER ANGLESEY.			
R.C. DETAILS.		BY	DATE
SCALE: 1/4", 1/2", 1" TO 1'0"		DESIGNED BY	APRIL 59.
JOB NO. 875/8350/1631.		DRAWN BY	APRIL 59.
IDENT NO. 1		CHECKED BY	
DRAWING NO. XDI/1		WALES IDENT. NO.	
		MINISTRY OF WORKS	CARDIFF.