



# **PROVEN 15/TM1500**

## **FOUNDATION INSTRUCTIONS**



## Foundation Pack for Proven 15/TM1500

### PACKING LIST

#### LIST OF PARTS TO BE SENT WITH BASE PLATE

1 - GALVANISED BASE PLATE

10 – M36 FOUNDATION RODS WITH BOSSES FITTED

10 – M36 x 100 HIGH TENSILE BOLTS AND 10 WASHERS

10 – M36 SPACER TUBE PIECES (25mm IN LENGTH)

6 – M30 HIGH TENSILE FOUNDATION RODS WITH BOSSES FITTED

6 – M30 x 60 HIGH TENSILE BOLTS AND 6 WASHERS

1 – M40 DIAMETER ANCHOR HAIRPIN

1 set Foundation Pack

- 1 Pack Description (this page)

- 1 Standard foundation diagram & Foundation description (incl. concrete mixing details)

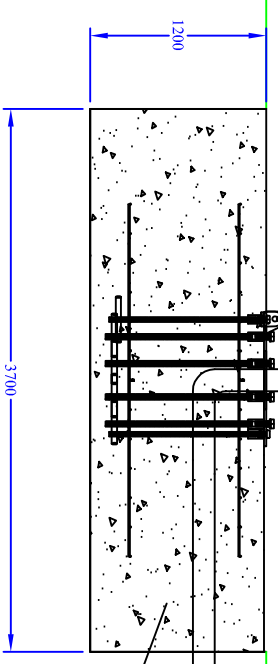
- 1 Anchor foundation diagram

- 1 Alignment/Access diagram

**N.B.** REINFORCING STEEL MESH SHEET IS ALSO REQUIRED FOR THE FOUNDATION WORK BUT IS NOT INCLUDED IN THE KIT SUPPLIED BY PROVEN

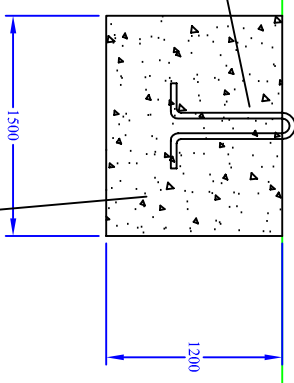


IMPORTANT NOTE: BASEPLATE HINGES ARE ON OPPOSITE SIDE TO THE ANCHOR POINT POSITION

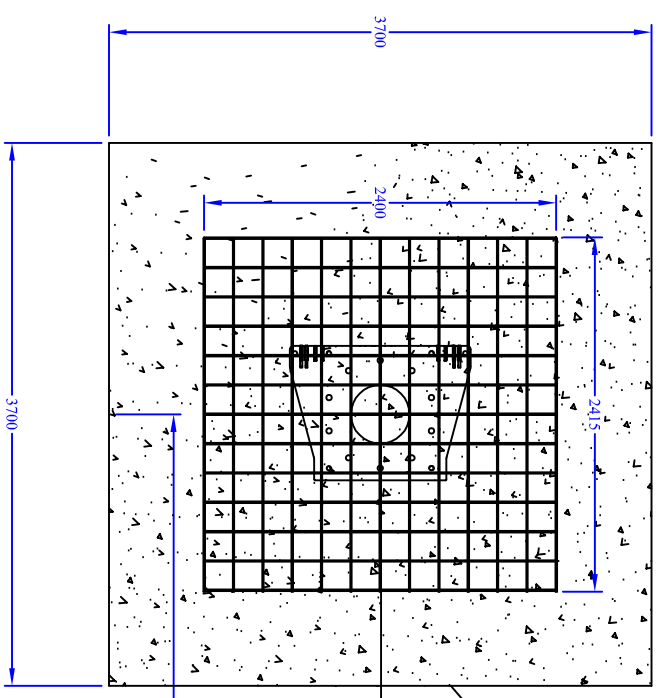


TOWER CONCRETE FOUNDATION BLOCK : 35 NEWTON OR BETTER HOLE 3.7M X 3.7M BY 1.2 M DEEP MINIMUM CAST CONCRETE DIRECTLY INTO HOLE DO NOT SHUTTER AND BACKFILL

40mm DIAMETER SOLID STEEL BAR

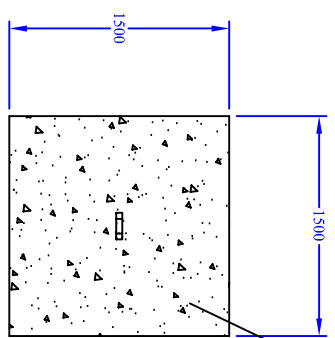


ANCHOR CONCRETE FOUNDATION BLOCK HOLE 1.5M X 1.5M BY 1.2M DEEP MINIMUM

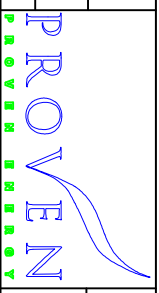


TWO LAYERS OF STEEL REINFORCING MESH MESH SHOULD BE 2.4 METRES SQUARE APPROX. 10mm DIAMETER A393 GRADE WITH APPROX 200mm SQUARE HOLE SPACING.

DISTANCE BETWEEN CENTRE OF BLOCKS 8600



| ZONE | REV | DESCRIPTION                               | REVISIONS | DATE     | APPROVED | PREPARED BY | PH | CHECKED BY | RC | SCALE | FSCM NO. | DWG NO.      | DATE       | SHEET        | REV |
|------|-----|---|-----------|----------|----------|-------------|----|------------|----|-------|----------|--------------|------------|--------------|-----|
|      | 2   | MODIFICATION TO SHOW NEW BOSS ARRANGEMENT |           | 13/04/04 | -        |             |    |            |    |       |          | 15000 FO 001 | 01/11/2002 | 15000 FO 001 | 3   |
|      | -   |   |           |          |          |             |    |            |    |       |          |              |            |              |     |
|      | -   |   |           |          |          |             |    |            |    |       |          |              |            |              |     |



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Drawing Title  
Proven 15 FOUNDATION SIZE DETAILS

## FOUNDATION PREPARATIONS

The main foundation consists of a large block of high-strength concrete. Sixteen High Tensile (HT) steel foundation rods are set into the concrete and are attached to and through the Foundation Base Plate. The Base Plate includes the hinge-pin attachment, which is used to raise and lower the turbine (see diagrams). Preferably, the concrete should be prepared and the foundation prepared with one load of concrete. Where this is not possible, the top layer should be added before the bottom one has had time to set.

***Important***  
Before setting the Base Plate and foundations into the concrete foundation consider which way your WT will be lowered/raised and position the hinge-pin accordingly

### **Don't 'Shutter & Backfill'**

When preparing house foundations a mould is prepared into which the concrete is poured. Earth/rocks are then filled around the foundation after the concrete has set.

For WT foundations it is better to have an irregular shaped foundation than to have a perfect cube and then surround it with loose earth - just dig a hole and then fill it! This will produce a foundation with good stability.

### **Preparing the Base Foundation**

The base foundation consists of approximately 16.5m<sup>3</sup> of strong-mix concrete (35 Newton). Normally this is prepared as a rough 3.7 x 3.7 x 1.2m cube, but where ground conditions dictate, a shallower wider foundation of the same volume may be used.

### **Assembling the steelwork**

With each foundation kit there are 6 M30 x 60 mm HT bolts, 6 M30 x 1000 mm foundation rods, 10 M36 x 100 mm HT bolts and 10 M36 x 1000 mm foundation rods, 1 base plate and a 40mm diameter anchor hairpin. **Steel reinforcing mesh is also required but not supplied.**

Refer to the assembly step diagrams for further details.

Insert mesh into foundation hole, the foundation rods will have to be fed through this before connecting to the foundation plate. Screw the 10 M30x100mm bolts into the foundation rod extension bosses through the 10 holes in a circular pattern in the middle of the base plate. These bolts will later be withdrawn and used to bolt the WT tower to the base plate, once concrete has cured. It is therefore necessary to place a 25mm spacer tube under the head of each bolt. Tighten bolts till the bosses are tight against the underside of the base plate.

Insert conduit or soil pipe, as shown, this is used for wind turbine power cable from edge of hole up through centre of base plate

Similarly fit the remaining 6 foundations rods to the outer 6 holes around the edge of the plate.

Screw the 6 M30x60mm bolts into the foundation rod extension bosses; again tighten until the bosses are tight against the underside of the base plate. No spacers are required for these outer 6 bolts.

**Finally and most importantly make sure that base plate is completely level.**

Add concrete (Readymix supplier is usually easiest for this type of volume) and use vibrating concrete poker as necessary to remove air bubbles.

**Make sure that base plate is fully supported underneath by concrete.**

Clean the base plate of any excess concrete.

### **Winch Anchor Foundation**

Refer to foundation diagrams for positioning. The anchor consists of a 1.5m x 1.5m x 1.2m cube or equivalent. It should be located on the opposite side of the base plate to the hinge pin attachment.

**N.B. It is important that the anchor is placed exactly in line with the centre of the base plate and perpendicular to the line of the hinge brackets.**

### **Concrete Specification**

If using a Readymix supplier, ask for 35 Newton concrete. If mixing the concrete yourself, you should use the following proportions by volume

1:2:4  
cement:sand:gravel

Approximate volumes and weights for a 1m<sup>3</sup> foundation are

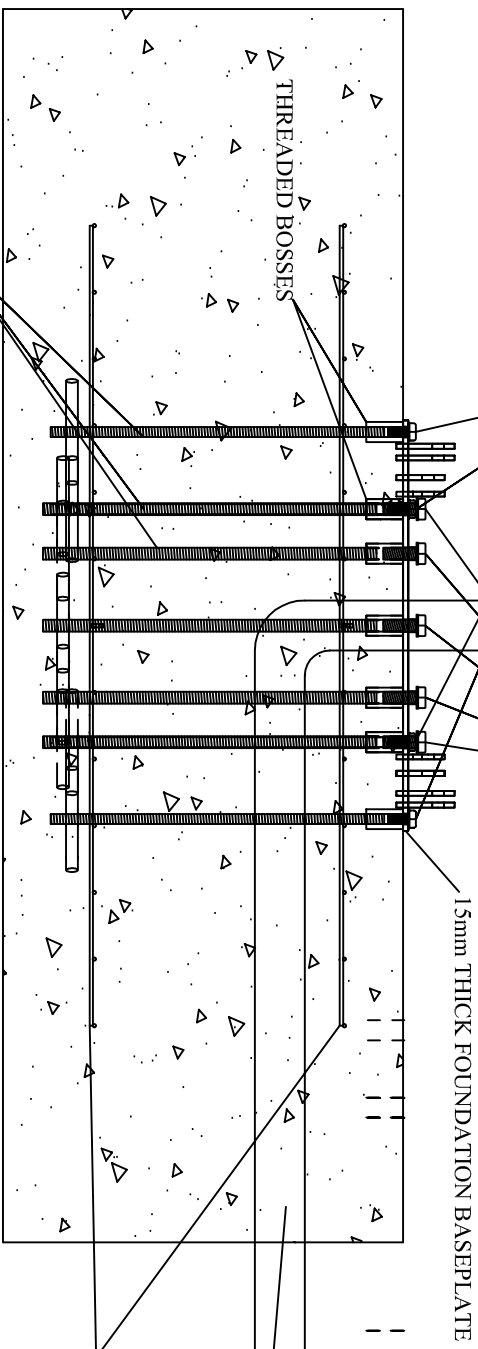
|         |                    |                               |
|---------|--------------------|-------------------------------|
| Cement: | 310kg or 6.2 bags  | (1 bag = 50kg)                |
| Sand:   | 0.43m <sup>3</sup> | (967 kg or approx 1.0 tonnes) |
| Gravel: | 0.86m <sup>3</sup> | (2150kg or approx 2.2 tonnes) |

### **Hardening Time**

You should allow plenty of time for the foundation to set and harden fully before erecting the turbine. We recommend a hardening period of approximately 2 weeks. For this reason, foundations are normally prepared in advance of the main installation. Note that the hardening time may be lengthened by poor weather conditions and shortened by the use of a quick-setting concrete additive.

M30 X 60 HIGH TENSILE BASE BOLTS  
6 BOLTS AROUND THE OUTSIDE OF THE  
FOUNDATION PLATE, SECURING BASEPLATE  
TO CONCRETE FOUNDATION.

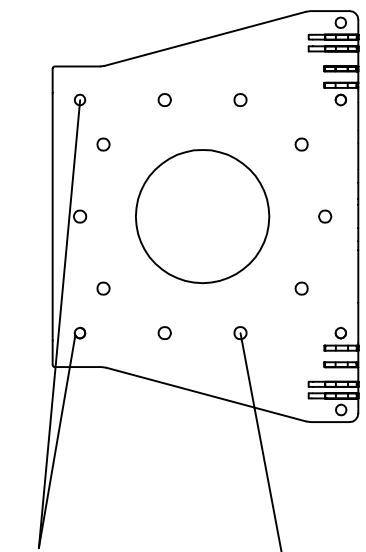
M36 X 100 HIGH TENSILE BASE BOLTS  
10 BOLTS WITH A PCD OF 735mm  
THESE BOLTS SECURE THE TOWER  
TO CONCRETE FOUNDATION.



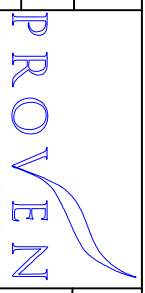
M30 & M36 HT SCREWED ROD IN LENGTHS  
WITH WELDED BOSSES AND CROSS BARS.

15000 FO 002

PROVEN 15M PROVEN MAST  
FOUNDATION BASEPLATE



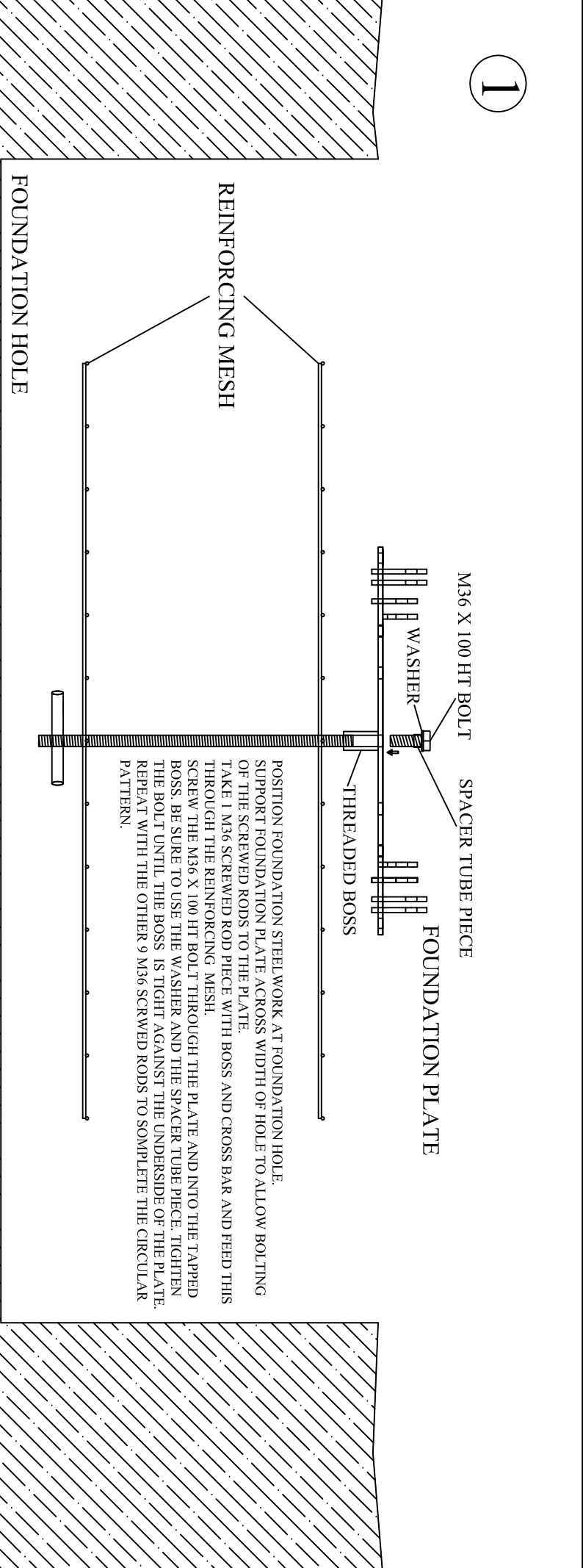
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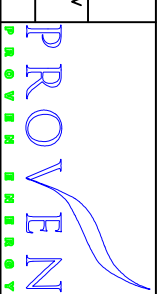
Drawing Title  
15kW 15m TOWER FOUNDATION DIAGRAM

1



POSITION FOUNDATION STEEL WORK AT FOUNDATION HOLE.  
 SUPPORT FOUNDATION PLATE ACROSS WIDTH OF HOLE TO ALLOW BOLTING  
 OF THE SCREWED RODS TO THE PLATE.  
 TAKE 1 M36 SCREWED ROD PIECE WITH BOSS AND CROSS BAR AND FEED THIS  
 THROUGH THE REINFORCING MESH.  
 SCREW THE M36 X 100 HT BOLT THROUGH THE PLATE AND INTO THE TAPPED  
 BOSS. BE SURE TO USE THE WASHER AND THE SPACER TUBE PIECE. TIGHTEN  
 THE BOLT UNTIL THE BOSS IS TIGHT AGAINST THE UNDERSIDE OF THE PLATE.  
 REPEAT WITH THE OTHER 9 M36 SCREWED RODS TO COMPLETE THE CIRCULAR  
 PATTERN.

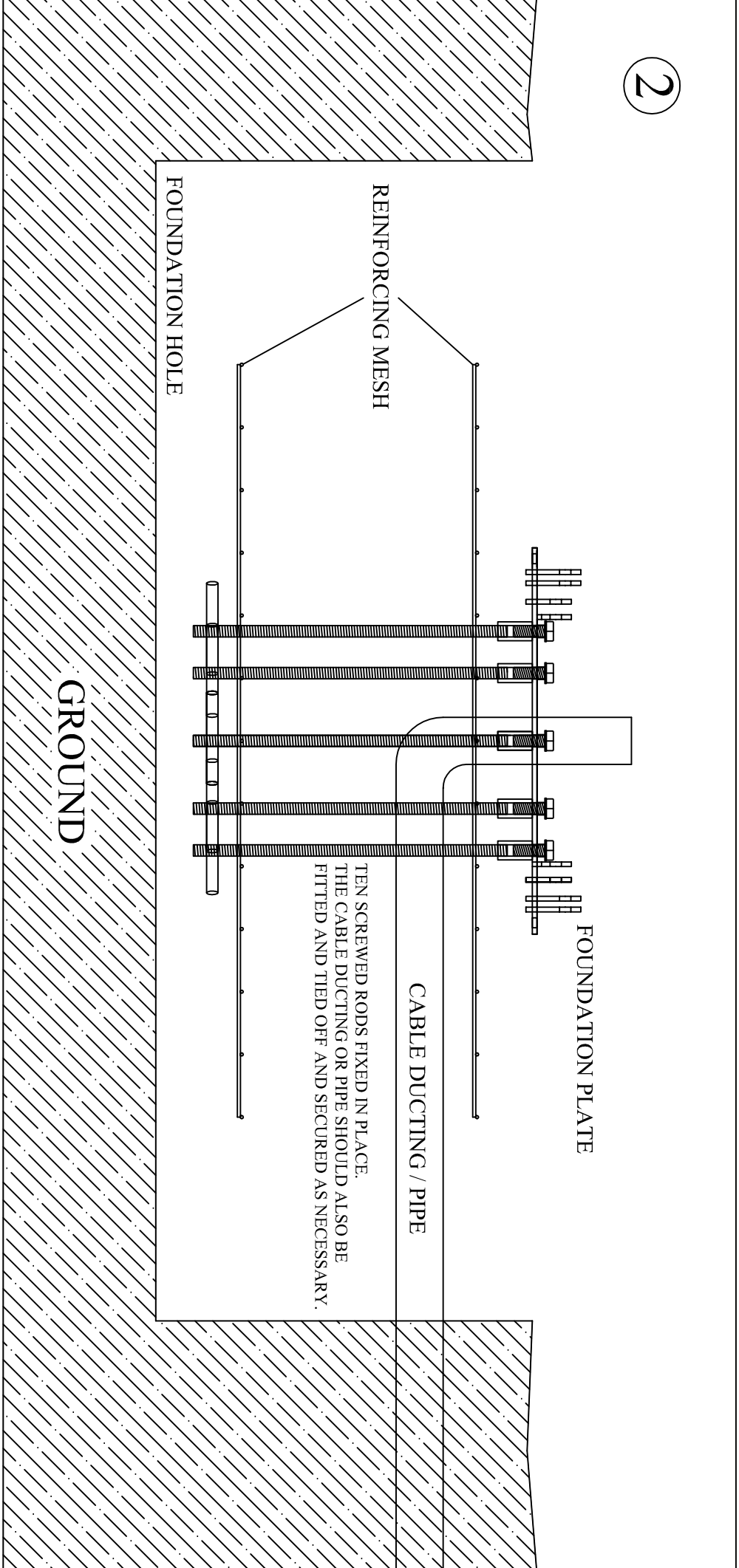
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| -    | -   | -           | -         | -    | -        | SCALE       | DATE    | 13/04/04     | SHEET sheet |



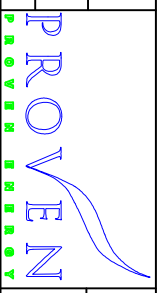
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Drawing Title  
 15kW ASSEMBLY STEPS NO. 1

2



| ZONE | REV | DESCRIPTION | REVISIONS | DATE | APPROVED | PREPARED BY | PH      | CHECKED BY | RC     |
|------|-----|-------------|-----------|------|----------|-------------|---------|------------|--------|
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| -    | -   | -           | -         | -    | -        | SCALE       | DATE    | 13/04/04   | SHEET  |
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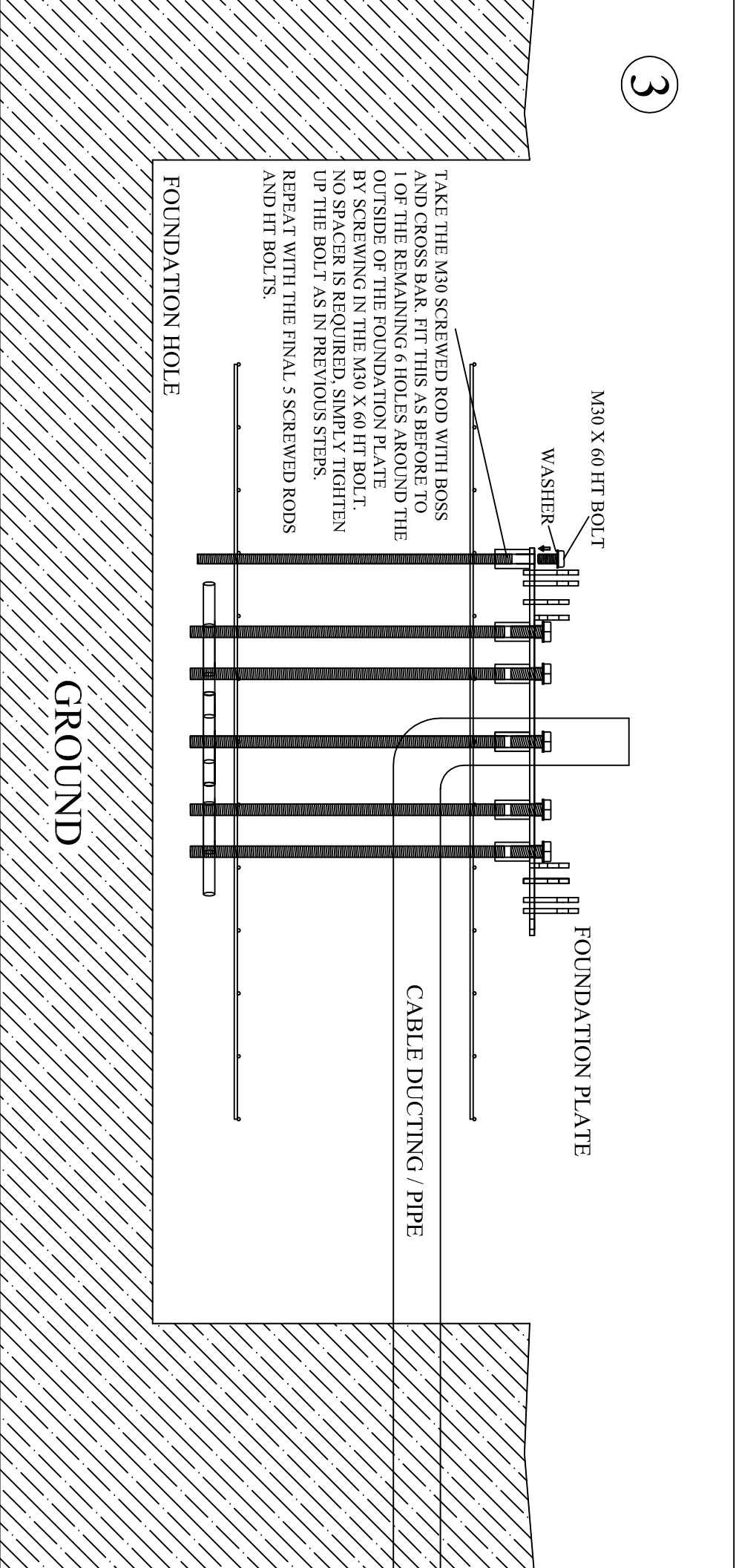


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Drawing Title  
15kW ASSEMBLY STEPS NO. 2



3



TAKE THE M30 SCREWED ROD WITH BOSS AND CROSS BAR. FIT THIS AS BEFORE TO 1 OF THE REMAINING 6 HOLES AROUND THE OUTSIDE OF THE FOUNDATION PLATE BY SCREWING IN THE M30 X 60 HT BOLT. NO SPACER IS REQUIRED, SIMPLY TIGHTEN UP THE BOLT AS IN PREVIOUS STEPS. REPEAT WITH THE FINAL 5 SCREWED RODS AND HT BOLTS.

FOUNDATION HOLE

GROUND

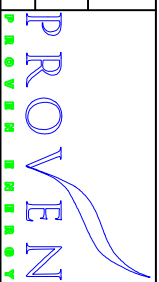
M30 X 60 HT BOLT

WASHER

FOUNDATION PLATE

CABLE DUCTING / PIPE

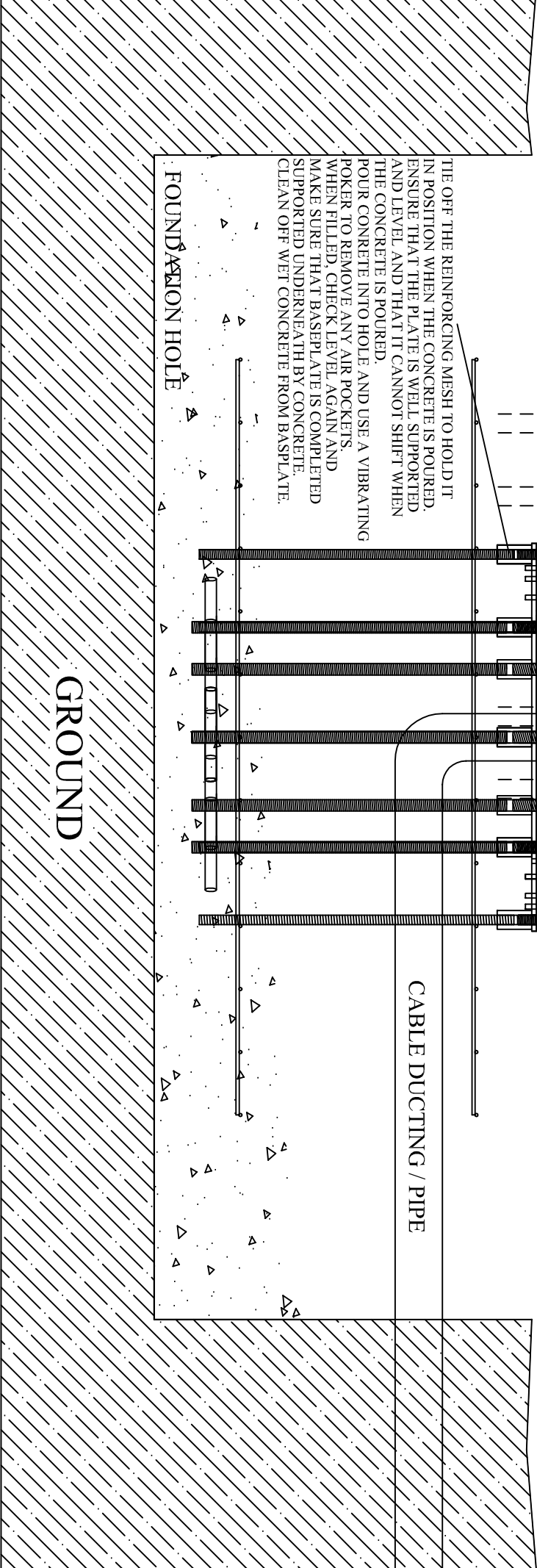
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| -    | -   | -           | -         | -    | -        | SCALE       | DATE    | 13/04/04     | SHEET sheet |



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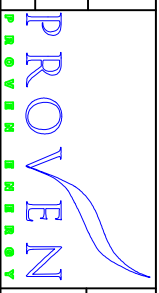
Drawing Title  
 15kW ASSEMBLY STEPS NO. 3

4



TIE OFF THE REINFORCING MESH TO HOLD IT IN POSITION WHEN THE CONCRETE IS POURED. ENSURE THAT THE PLATE IS WELL SUPPORTED AND LEVEL AND THAT IT CANNOT SHIFT WHEN THE CONCRETE IS POURED.  
POUR CONCRETE INTO HOLE AND USE A VIBRATING POKER TO REMOVE ANY AIR POCKETS. WHEN FILLED, CHECK LEVEL AGAIN AND MAKE SURE THAT BASEPLATE IS COMPLETED SUPPORTED UNDERNEATH BY CONCRETE. CLEAN OFF WET CONCRETE FROM BASEPLATE.

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Drawing Title  
 15kW ASSEMBLY STEPS NO. 4



Dear Sir/Madam,

**PROVEN CUSTOMER FOUNDATION CONFIRMATION**

Please read the following statement. On completion of your foundation work please sign the statement and return to Proven Energy Ltd, at the above below.

I CERTIFY THAT THE FOUNDATIONS FOR THE WIND TURBINE AND TOWER (TO BE INSTALLED AT THE ADDRESS BELOW) ARE COMPLETED AS PER PROVEN INSTRUCTIONS\*. I UNDERSTAND THAT I MAY BE CHARGED FOR ADDITIONAL INSTALLATION WORK IF REQUIRED DUE TO ANY DEVIATION FROM THE PROVEN SPECIFICATION\*\*.

SIGNED: .....

DATE: .....

NAME (CAPITALS): .....

SITE ADDRESS: .....

.....

.....

\* Foundation specification for each wind turbine model is available from Proven Energy Ltd. Please check that you have the current Proven Foundation Pack for your particular wind turbine and tower combination.

\*\* e.g. lack of anchor block, wrong hinge orientation etc.

N.B. This form need only be completed and returned if your system is being installed by Proven Engineers. If your system is being installed by others e.g. Proven Authorised Distributor, consult them directly regarding foundation requirements.

Proven Energy Ltd, Wardhead Park, Stewarton, KA3 5LH, Scotland, UK

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