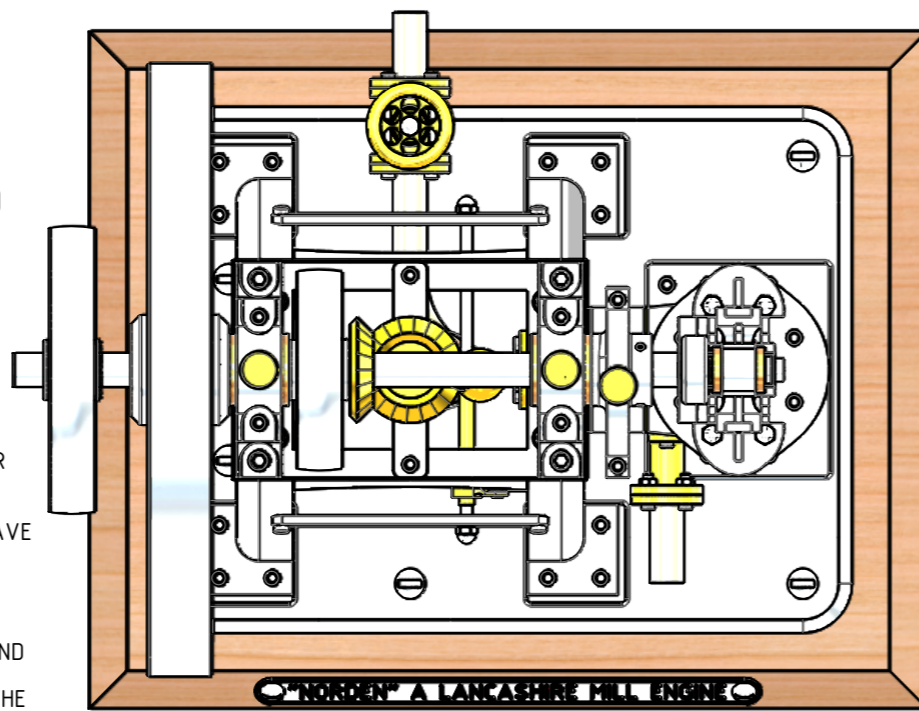


DUE TO THE LACK OF INFORMATION ON THE ORIGINAL DRAWING(S), SUCH AS VIEWS, DIMENSIONS, SECTIONS ETC AND/OR CLARITY OF COMPONENTS, OMITTED PARTS/COMPONENTS, SOME OF THE COMPONENTS MIGHT NOT BE AS CONSTRUCTED ORIGINALLY OR AS THE ORIGINAL DESIGNER INTENDED

ADDITIONAL NOTES ABOUT THESE DRAWINGS:

- 1) NO MATERIALS HAVE BEEN SPECIFIED ON THESE DRAWINGS. THE BUILDER TO CHOOSE ITS OWN PREFERRED MATERIAL FOR THE PARTS/COMPONENTS. THE FOLLOWING COLOURS ON THE DRAWINGS INDICATES POSSIBLE MATERIALS WHICH CAN BE USED FOR PARTS: YELLOW=BRASS, LIGHT GREY=ALUMINIUM OR MILD STEEL, REDDISH BROWN=COPPER, DARK BROWN=BRONZE OR GUN METAL, WHITISH=SILVER STEEL OR STAINLESS STEEL
- 2) FASTENERS. FASTENERS SUCH AS BOLTS, SCREWS, RIVETS, NUTS AND WASHERS HAVE BEEN SHOWN ON THESE DRAWINGS. THE BUILDER CAN CHOOSE ITS OWN PREFERRED TYPE OF FASTENERS.
- 3) PIPING. PREFERABLY ALL PIPING TO BE COPPER. THE PIPING ON THE DRAWINGS ARE INDICATIVE ONLY. THE BUILDER TO ESTABLISH THE PIPE LENGTH AND ROUTE FROM WORK PIECE. THE PIPE SIZES ARE INDICATIVE ONLY. THE BUILDER TO ESTABLISH THE AVAILABILITY OF THE PIPE SIZE(S) FROM THE LOCAL SUPPLIER(S). THE PIPE NUT(S) TO BE ADJUSTED TO THE USED PIPE SIZE.



GENERAL NOTES:

0. ALL DRAWINGS ARE IN METRIC MEASUREMENTS
1. ALL ENGINEERING PRACTICES SHALL BE APPLIED WITH REGARDS TO HOLE AND SHAFT TOLERANCES.
2. WHERE SCREWS OR BOLTS ARE USED THE CLEARANCE HOLES SHALL BE APPROXIMATELY 5% TO 8% LARGER THAN THE MATCHING TAPPED HOLE.
3. PREFERABLY ALL TAPPED HOLES AND MATCHING SCREWS AND/OR BOLTS TO BE METRIC FINE (MF)
4. MATERIALS SPECIFIED ON THE DRAWINGS ARE INDICATIVE ONLY. THE BUILDER CAN MAKE HIS/HER OWN MATERIAL CHOICE.
5. ALL CONNECTIONS/JOINTS WHICH HAVE STEAM PRESSURE APPLIED TO IT SHALL BE SILVER/HARD SOLDERED.
6. COMPRESSION SPRINGS ARE DRAWN IN COMPRESSED STATE (CP), UNCOMPRESSED STATE IS APPROX 40% TO 60% LONGER THEN COMPRESSED STATE.
7. WHERE PREFERRED SCREW OR RIVETED CONNECTIONS CAN BE OMITTED AND PARTS CAN BE BONDED TOGETHER BY USING EITHER HIGH STRENGTH GLUE, EPOXY RESIN, OR SOLDER.
8. PARTS WHICH ARE DIRECTLY EXPOSED TO STEAM AND/OR WATER SHOULD BE CONSTRUCTED USING NON-FERROUS OR NON CORROSIVE MATERIAL SUCH AS BRASS, BRONZE, GUNMETAL, STAINLESS STEEL, COPPER OR MONEL.
9. THE ORDER IN WHICH THE PARTS/COMPONENTS ARE MANUFACTURED AND THE MODEL IS ASSEMBLED IS ENTIRELY LEFT TO THE BUILDER/MODEL MAKER.
10. A COLOUR SCHEME FOR THIS PROJECT IS ENTIRELY LEFT UP TO THE MODEL MAKER.
11. THE MANNER IN WHICH THE PARTS/COMPONENTS ARE MANUFACTURED IS ENTIRELY LEFT UP TO THE BUILDER.
12. USE LOCTITE, ON SCREW OR PRESS FIT CONNECTIONS OR SURFACES, WERE DEEMED NECESSARY TO PREVENT PARTS FROM LOOSENING.
13. WASHERS AND/OR SPRING WASHERS SHALL BE USED WHERE DEEMED NECESSARY.
14. USE SEALING GASKETS WERE DEEMED NECESSARY.
15. REMOVE ALL SHARP EDGES
- XX. ERRORS AND/OR OMISSIONS MAY OCCUR IN THE DRAWINGS, DO NOT HESITATE TO CONTACT ME SO THAT THE ERRORS/OMISSIONS CAN BE RECTIFIED.

MATERIAL ABBREVIATIONS:

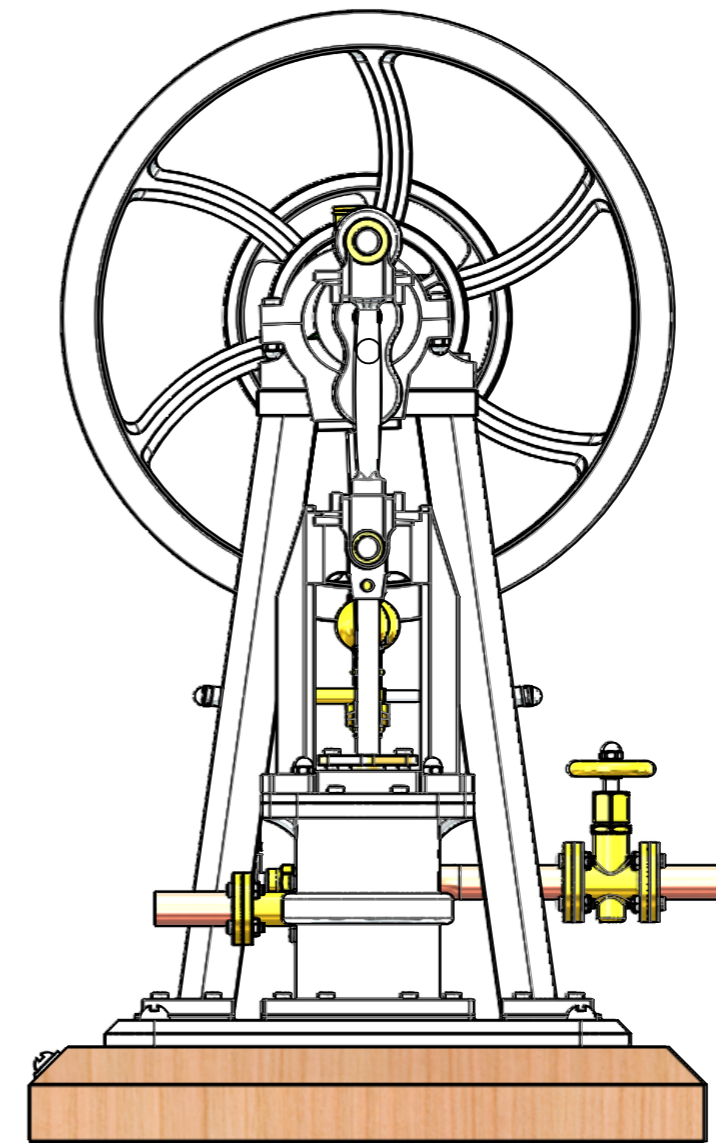
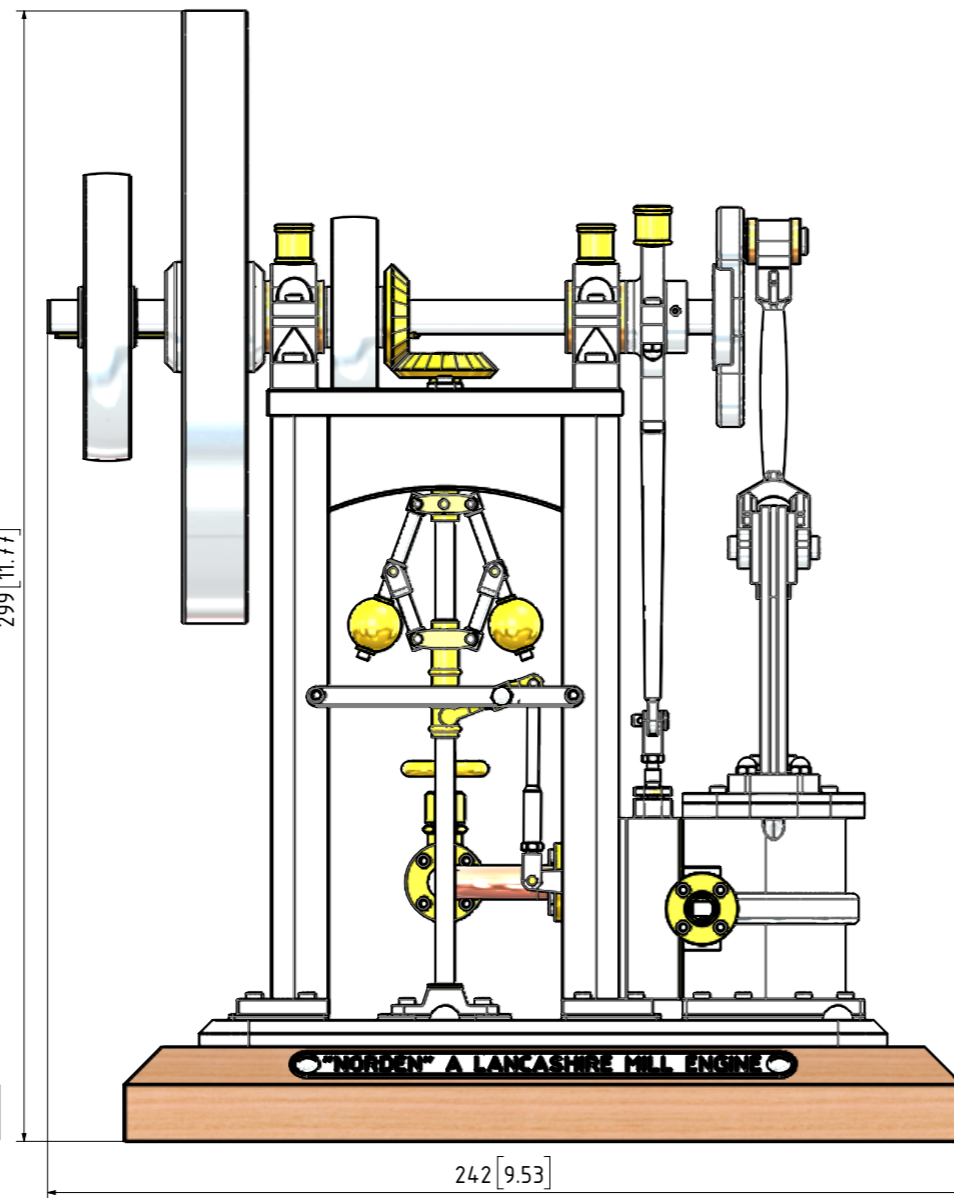
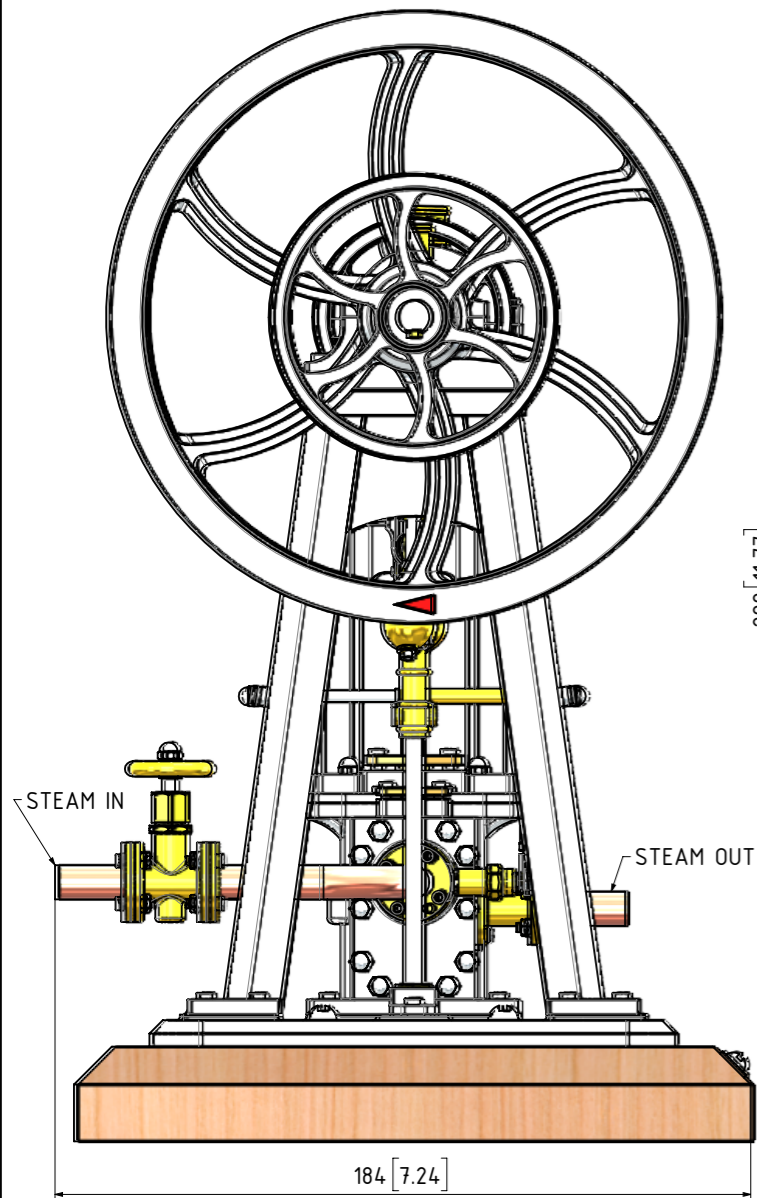
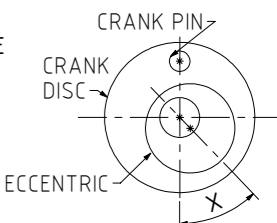
- ALU = ALUMINIUM
 - HALU= HARD ALUMINIUM
 - BRS = BRASS
 - PBRZ= PHOSPHORE BRONZE
 - BRZ = BRONZE OR GUNMETAL (BRZ/GM)
 - OLT = OILITE
 - CI = CAST IRON
 - CU = COPPER
 - GRA = GRAPHITE
 - MS = MILD STEEL/BRIGHT MILD STEEL
 - SS = SILVER STEEL OR STAINLESS STEEL
 - SPS = SPRING STEEL
 - PEEK= POLYETHER ETHER KETONE
 - SYN = SYNTHETIC MATERIAL SUCH AS VETON, NYLON, TEFLON OR RUBBER
- IN GENERAL SYNTHETIC MATERIALS SHOULD BE ABLE TO WITHSTAND THE HEAT AND PRESSURE(S) APPLIED TO THEM.

nnn/nnn MEANS THAT EITHER MATERIAL CAN BE USED

OTHER ABBREVIATIONS

- AS = AS SHOWN
- DP = DEEP
- DAA= DRILL AFTER ASSEMBLY
- D&TAA= DRILL AND TAP AFTER ASSEMBLY
- CF = CLOSE FIT (SIZE FOR SIZE)
- PF = PRESS FIT
- PFAA= PRESS FIT AFTER ASSEMBLY
- PCD = PITCH CIRCLE DIAMETER
- RM = REAM
- HEX = HEXAGON, 6SIDED
- CP = COMPRESSED
- KNL = KNURLED
- CSK = COUNTERSINK
- PL = PLACES
- DWL= DOWEL
- SPF= SPOTFACE
- (T)HESOP=(TAPPED)HOLES EQUALLY SPACED ON PCD
- (T)HESOC=(TAPPED)HOLES EQUALLY SPACED ON CIRCUMFERENCE
- OD = OUTSIDE DIAMETER
- ID = INSIDE DIAMETER
- MAX/MIN = CRITICAL DIMENSION
- [SA-xxx]= SUB ASSEMBLY-xxx

THE OFF SET ANGLE OF THE ECCENTRIC IN RELATION TO THE CRANK AXIS TO BE EXPERIMENTALLY DETERMINED FOR THE SMOOTH RUNNING OF THE ENGINE AND SATISFACTION OF THE BUILDER



NOTES: THE ORIGINAL DRAWINGS WERE GIVEN TO ME. THE ORIGINAL DRAWINGS DID NOT HAVE A DESIGNER OR AUTHOR MENTIONED ON THE DRAWINGS, DRAWINGS DATED 02/2009, DRAWING TITLE : "NORDEN" A LANCASHIRE MILL ENGINE. THE ENGINE SHOWN ON THESE DRAWINGS IS 1.5 TIMES LARGER THAN THE ORIGINAL DESIGN.

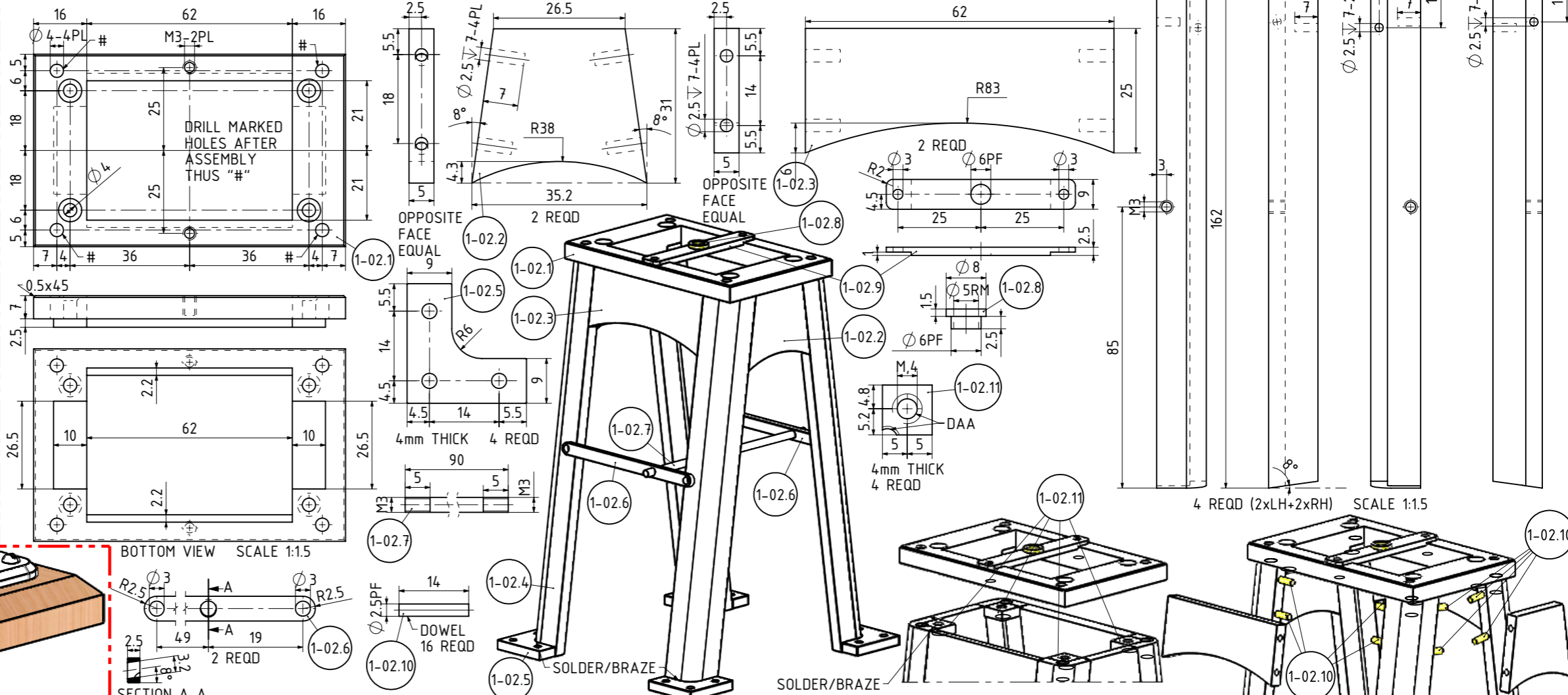
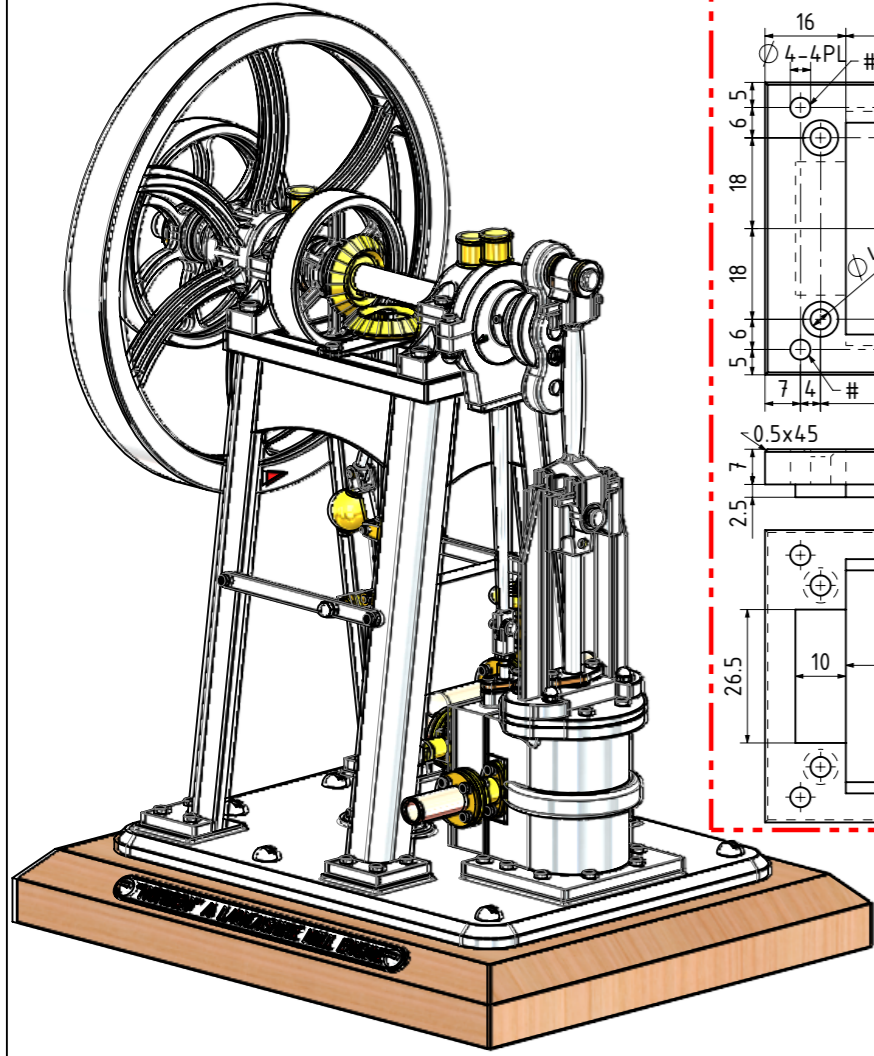
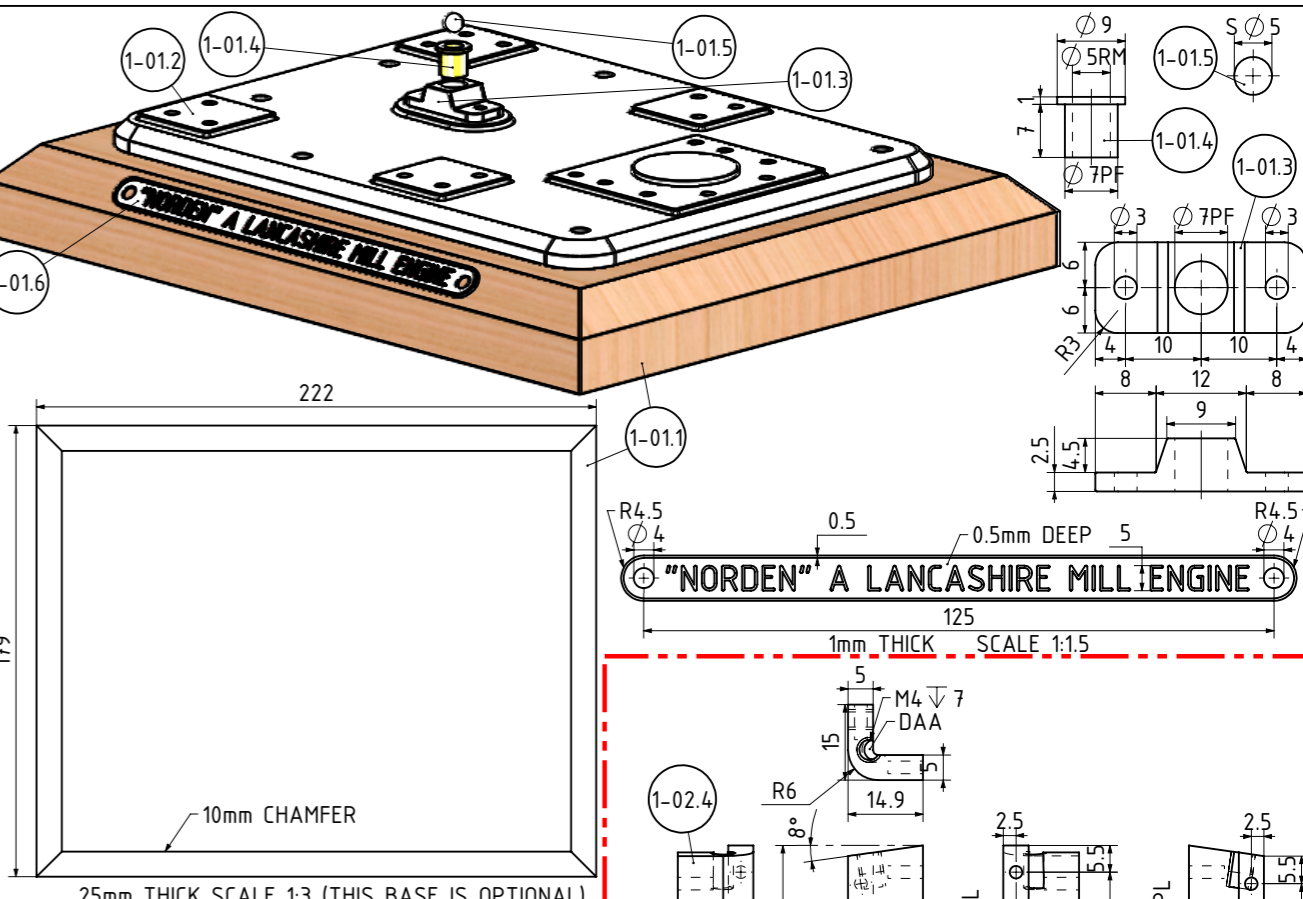
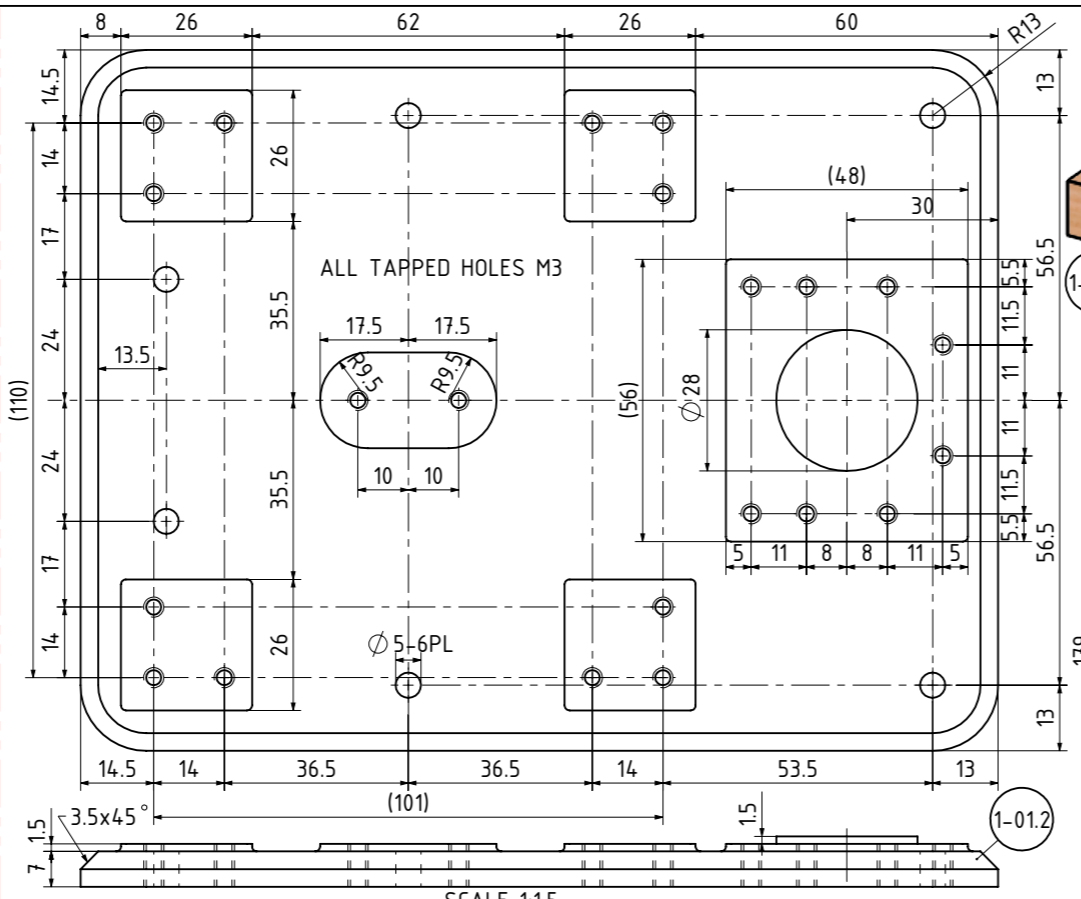
TITLE
A 1 CYLINDER VERTICAL NON REVERSING STEAM ENGINE CALLED "NORDEN"

DRAWING CONTENTS
GENERAL ARRANGEMENT AND NOTES

PROJECT No 09C-77-00
JDW DRAUGHTING SERVICES
J.A.M. DE WAAL, 12 BRIGHTWELL STREET PAPA KURA
2110, NEW ZEALAND. PHONE: 0064 09 2988815. MOB: 0211791000 E-MAIL: dewaal@xtra.co.nz.

PROJECTION
JDWDS MODEL SCALE: 1:1
DATE JUNE 2026 DWG SCALE: 1:1 @A3 OR AS SHOWN
SHEET: 01 OF 05 Copyright © J.A.M. DE WAAL PAPA KURA NZ
A3 No:09C-77-00-SHT-01

QTY.	PART NUMBER
1	09C-77-00-1-01-BASE PLATE
1	09C-77-00-1-02-MAIN BEARING STAND
2	09C-77-00-1-03-CRANKSHAFT MAIN BEARING
3	09C-77-00-1-04-OIL POT
1	09C-77-00-1-05-CYLINDER BLOCK
1	09C-77-00-1-06-INLET STEAM CONTROL HOUSING
1	09C-77-00-1-07-MAIN STEAM INLET VALVE
1	09C-77-00-1-08-CYLINDER TOP COVER
1	09C-77-00-2-01-CRANKSHAFT+FLYWHEEL
1	09C-77-00-2-02-PISTON+CROSSHEAD
1	09C-77-00-2-03-CON-ROD
1	09C-77-00-2-04-ECCENTRIC SHEAVE
1	09C-77-00-2-05-SLIDE VALVE
1	09C-77-00-2-06-ECCENTRIC STRAP
1	09C-77-00-2-14-GOVERNOR MAIN SPINDLE
1	09C-77-00-2-07-GOVERNOR DRIVEN GEAR WHEEL
1	09C-77-00-2-08-GOVERNOR MOVING CONTROL SLEEVE
2	09C-77-00-2-09-GOVERNOR FLY WEIGHT
2	09C-77-00-2-10-GOVERNOR FLYWEIGHT RESTRAINING LINK
1	09C-77-00-2-11-GOVERNOR ROCKING CONTROL ARM
1	09C-77-00-2-12-GOVERNOR STEAM CONTROL FLAP
1	09C-77-00-2-13-GOVERNOR FLAP LIFTING LINK
16	09C-77-00-M2.5 NUT
3	09C-77-00-M2.5x5 A-K GRUB SCREW
24	09C-77-00-M2.5x8 A-K CYL HEAD SCREW
9	09C-77-00-M3 DOME NUT
2	09C-77-00-M3 NUT
36	09C-77-00-M3x10 A-K CYL HEAD SCREW
4	09C-77-00-M3x14 A-K C-SINK SCREW
2	09C-77-00-M3x14 A-K CYL HEAD SCREW
10	09C-77-00-M3x20 DOME HEAD SCREW
2	09C-77-00-M3x6 A-K CYL HEAD SCREW
6	09C-77-00-M3x8 A-K C-SINK SCREW
1	09C-77-00-M4 NUT
4	09C-77-00-M4x10 A-K C-SINK SCREW
2	09C-77-00-M4x10-ROUND HEAD WOOD SCREW
4	09C-77-00-M4x18 A-K CYL HEAD SCREW
2	09C-77-00-M4x8 A-K C-SINK SCREW
6	09C-77-00-M5x20-ROUND HEAD WOOD SCREW



NOTES: THE ORIGINAL DRAWINGS WERE GIVEN TO ME. THE ORIGINAL DRAWINGS DID NOT HAVE A DESIGNER OR AUTHOR MENTIONED ON THE DRAWINGS, DRAWINGS DATED 02/2009, DRAWING TITLE : "NORDEN" A LANCASHIRE MILL ENGINE. THE ENGINE SHOWN ON THESE DRAWINGS IS 1.5 TIMES LARGER THAN THE ORIGINAL DESIGN.

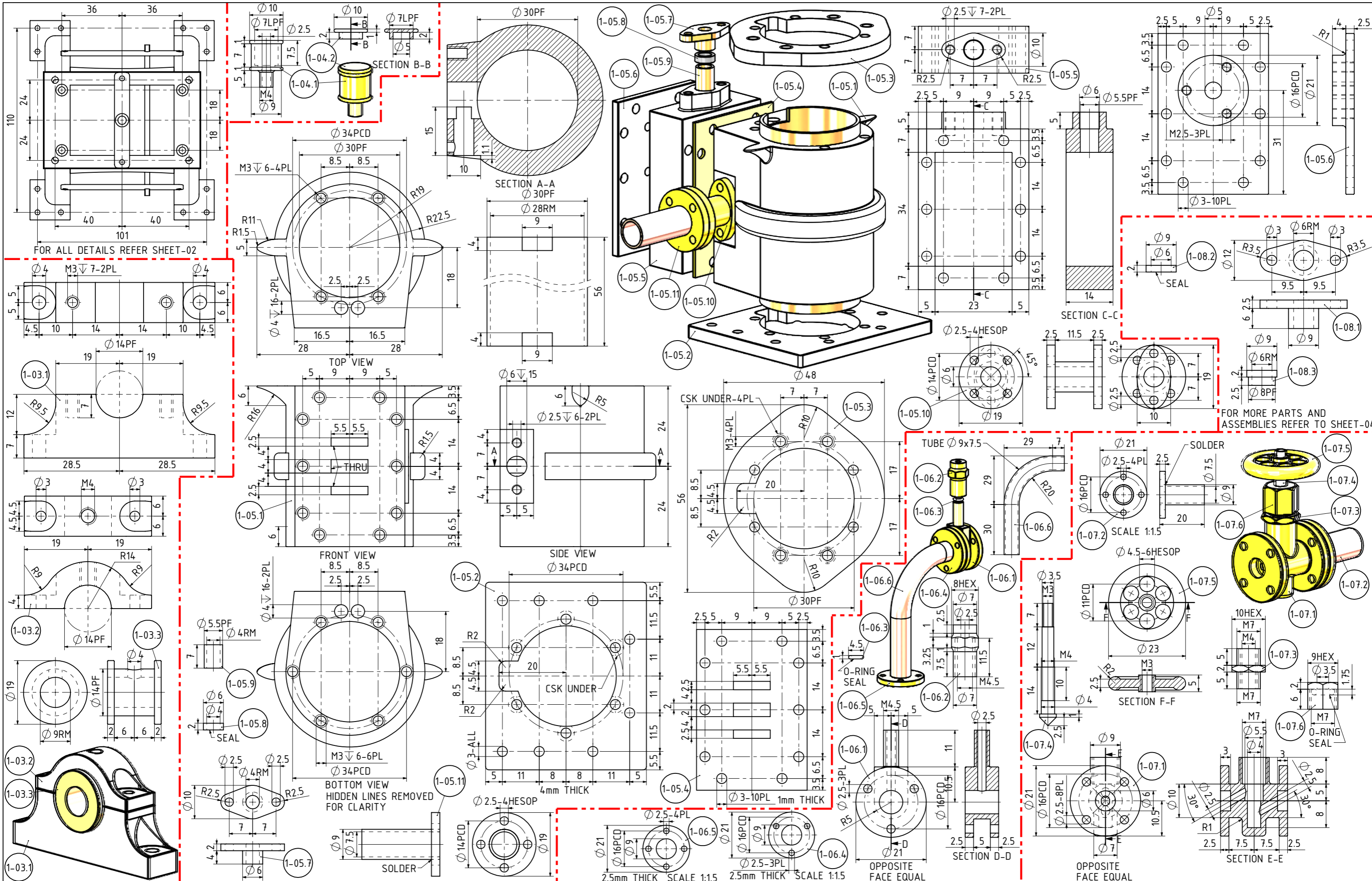
TITLE
A 1 CYLINDER VERTICAL NON REVERSING STEAM ENGINE CALLED "NORDEN"

DRAWING CONTENTS
ISOMETRIC VIEW, BILL OF MATERIALS PARTS AND ASSEMBLIES

PROJECT No 09C-77-00
 JDW DRAUGHTING SERVICES
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 2110, NEW ZEALAND. PHONE: 0064 09 2988815. MOB: 0211791000 E-MAIL: dewaal@xtra.co.nz.

PROJECTION
JDWDS MODEL SCALE: 1:1
 DWG SCALE: 1:1 @A3 OR AS SHOWN
 DATE JUNE 2026 Copyright © J.A.M. DE WAAL PAPA KURA NZ
 SHEET: 02 OF 05 **A3** No:09C-77-00-SHT-02

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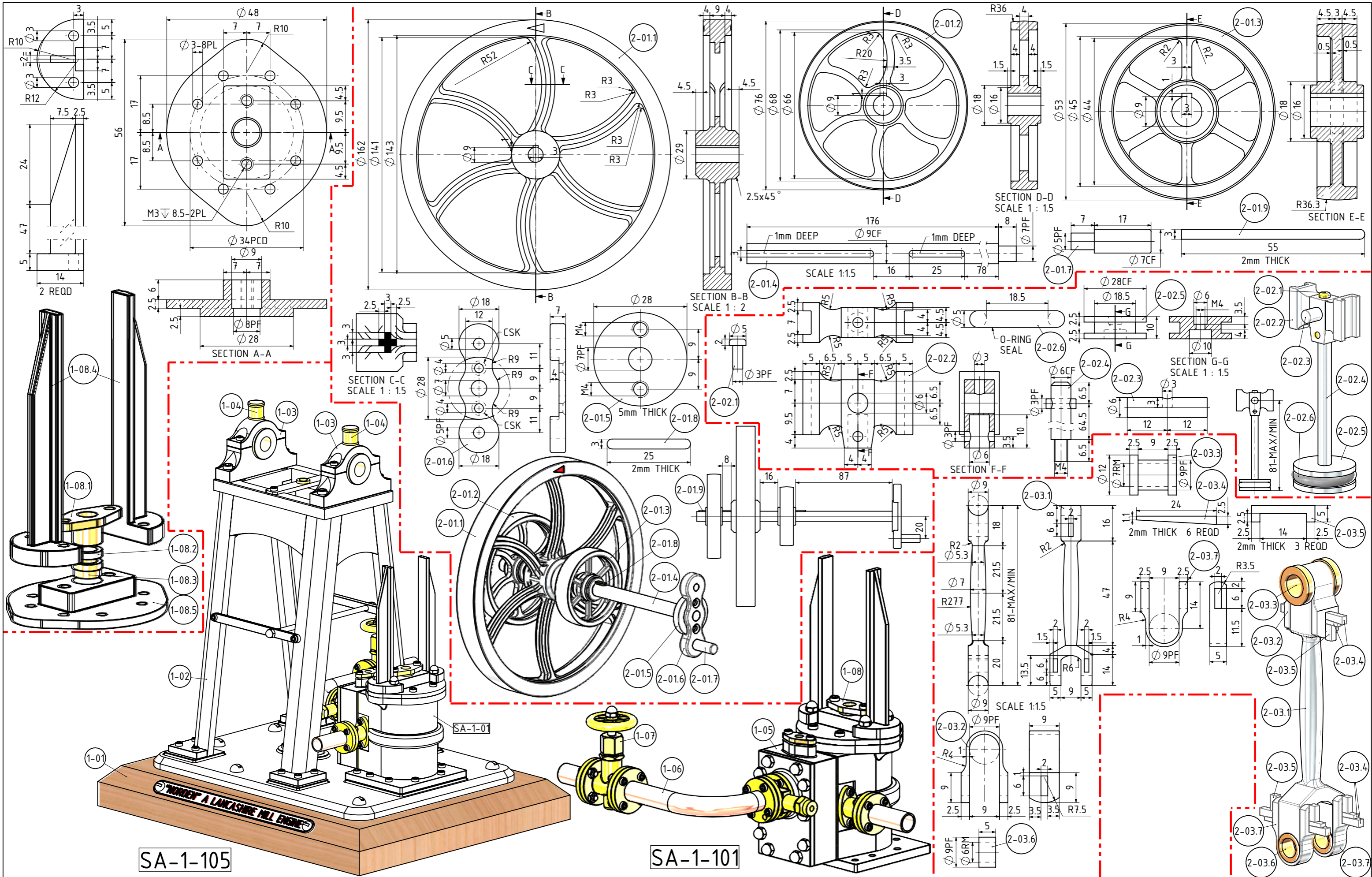
TITLE
A 1 CYLINDER VERTICAL NON REVERSING STEAM ENGINE CALLED "NORDEN"

DRAWING CONTENTS
PARTS AND ASSEMBLIES

PROJECT No 09C-77-00
 JDW DRAUGHTING SERVICES
 J.A.M. DE WAAL, 12 BRIGHTWELL STREET PAPAOKURA
 2110, NEW ZEALAND. PHONE: 0064 09 2988815. MOB: 0211791000 E-MAIL: dewaal@xtra.co.nz.

PROJECTION
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TITLE
A 1 CYLINDER VERTICAL NON REVERSING STEAM ENGINE CALLED "NORDEN"

DRAWING CONTENTS
PARTS AND ASSEMBLIES

PROJECT No 09C-77-00
 JDW DRAUGHTING SERVICES
 J.A.M. DE WAAL, 12 BRIGHTWELL STREET PAPAOKURA
 2110, NEW ZEALAND. PHONE: 0064 09 2988815. MOB: 0211791000 E-MAIL: dewaal@xtra.co.nz.

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