

STATUS

NOTES

# TRANSFORMING IMPERIAL WAR MUSEUMS, LONDON (TIWML)

## LEVEL 4 REFURBISHMENT

### MECHANICAL SERVICES TENDER ISSUE

Drawing List	
Sheet Number	Drawing Title
TIWML-4-SV-XX-XX-DR-E-0000	Cover Sheet
TIWML-4-SV-XX-XX-DR-E-0000	Air, Water Schematic & Electrical Wiring Diagram
TIWML-4-SV-XX-XX-DR-E-0040	Level 04 Demolition & Proposed - Air Conditioning & Ventilation
TIWML-4-SV-XX-XX-DR-E-0041	Roof Proposed Pipework
TIWML-4-SV-XX-XX-DR-E-0001	Roof Plant Layout Demolition & Proposed - Air Conditioning & Ventilation
TIWML-4-SV-XX-XX-DR-E-0041	Proposed & Existing 3D View

GENERAL

THE INTENT OF THIS SPECIFICATION IS TO SET OUT AND DESCRIBE THE WORK THAT SHALL BE COMPLETED BY THE MECHANICAL CONTRACTOR. THE DRAWINGS WITHIN THIS PACKAGE ILLUSTRATE THE SYSTEM CONCEPTS. THE CONTRACTOR IS TO COORDINATE THE FINAL SIZES, LOCATIONS AND RETICULATION OF SERVICES WITH THE CLIENT.

THE WORKS ARE TO BE UNDERTAKEN AS PART OF A DESIGN & CONSTRUCT CONTRACT. THE CONTRACT WORKS INCLUDE THE DETAIL DESIGN, SUPPLY, DELIVERY, INSTALLATION, COMMISSIONING, TESTING, CERTIFICATION AND WARRANTY OF THE MECHANICAL SERVICES AS SPECIFIED AND INDICATED ON THE DRAWINGS. WHERE AN ITEM IS USUAL OR NECESSARY AND IS REASONABLE OR PROPER TO BE REFERRED TO IN THE TYPE OF WORK GENERALISED IN THIS SPECIFICATION, BUT NOT SPECIFICALLY MENTIONED, IT SHALL BE DEEMED TO BE INCLUDED IN THE SPECIFICATION.

THE CONTRACTOR SHALL PROVIDE ALL PLANT, LABOUR AND MATERIALS TO COMPLETE THE WORKS AND COORDINATE AND COOPERATE WITH ALL OTHER TRADES ASSOCIATED WITH THIS TRADES WORK.

INTERRUPTION TO SERVICES - THE CONTRACTOR SHALL GIVE NOT LESS THAN FORTY EIGHT (48) HOURS NOTICE TO THE PROJECT MANAGER BEFORE ANY ALTERATION OR INTERRUPTION OF EXISTING SERVICES.

AFTER HOURS WORK - ALLOWANCES TO BE PROVIDED FOR CRITICAL PERIODS FOR CHANGING OVER OF SERVICES. SITE INSPECTION - THE SUBMISSION OF A TENDER WILL BE DEEMED CONCLUSIVE EVIDENCE THAT THE TENDERER HAS INSPECTED THE SITE, HAS READ AND STUDIED THE PLANS, SPECIFICATIONS AND OTHER RELEVANT CONTRACT DOCUMENTS. NO ALLOWANCE IN THE FORM OF ADDITIONAL COMPENSATION OR VARIATIONS SHALL BE ALLOWED FOR, BY REASON OF ERROR ON THE PART OF THE TENDERER OR HIS FAILURE TO HAVE MADE SUCH INSPECTION PRIOR TO THE DATE OF THE SUBMISSION OF THE TENDER.

GUARANTEE - OBTAIN ALL MANUFACTURERS WARRANTIES AND SUPPLY WITH TWELVE MONTH GUARANTEE TO BE EFFECTIVE FROM THE DATE OF PRACTICAL COMPLETION.

CO-ORDINATION WITH OTHERS TO BE CARRIED OUT BY CONTRACTOR.

CONTRACTOR TO CO-ORDINATE LEVELS AND LOCATIONS OF EXISTING AND NEW SERVICES.

SCOPE OF WORK

THE CONTRACT WORKS SHALL INCLUDE THE SUPPLY, DELIVERY, INSTALLATION, COMMISSIONING, TESTING, CERTIFICATION AND WARRANTY OF THE MECHANICAL SERVICES AS SPECIFIED AND INDICATED ON THE DRAWINGS. NOTE: - THE MECHANICAL TRADE SHALL BE LEAD CONTRACTOR FOR THIS PROJECT AND SHALL BE RESPONSIBLE FOR ALL ASSOCIATED WORKS. THE EXTENT OF WORK INCLUDES BUT IS NOT LIMITED TO THE FOLLOWING:

1. NEW MUSEUM STANDARD AIR HANDLING UNIT INCLUDING FILTERS, COILS, FANS AND HUMIDIFIER
2. NEW TEMPERED AIR CONDITIONING SYSTEM INCLUDING PIPE FAN COIL UNIT AND RELIEF FAN
3. SHEET METAL WORK INCLUDING DUCTWORK, PERFORATED PLATE FOR BALANCING, HANGERS, FLEXIBLE DUCTING, FLEXIBLE CONNECTIONS, PLENUM BOXES, ACCESS PANELS, CLEAN-OUT PANELS IN DUCTS AND FIRE DAMPERS.
4. NEW MOTOR CONTROL CENTRE (MCC) AND BMS CONTROL PANEL
5. SOUND ATTENUATORS
6. INSULATION TO ALL DUCTWORK WHERE INDICATED ON DRAWINGS.
7. MODIFICATION TO EXISTING WATER SUPPLY AND DRAINAGE SYSTEMS WITHIN THE PLANTROOM.
8. COORDINATE OF FINAL ACCESS PANEL LOCATIONS
9. RELOCATION OF EXISTING RADIATORS AND PROVISION OF NEW RADIATORS INCLUDING PIPEWORK AND VALVES
10. OVERFLASHING OF ALL PENETRATIONS IN ROOF FOR MECHANICAL DUCTS ETC. (UNDERFLASHING BY BUILDING TRADE).
11. SUPPLY AND INSTALLATION OF SLEEVES IN PENETRATIONS IN THE BUILDING STRUCTURE WHERE REQUIRED FOR THE PASSAGE OF DUCTS ETC.
12. CHASING OF WALLS, SLABS AND OTHER BUILDING ELEMENTS WHERE REQUIRED FOR THE INSTALLATION OF MECHANICAL SERVICES DUCTS ETC.
13. BALANCING AND COMMISSIONING OF THE MECHANICAL SYSTEM
14. FULL TESTING, COMMISSIONING AND DEMONSTRATION OF PERFORMANCE OF THE SYSTEM TO THE SATISFACTION OF THE SUPERINTENDENT. PROVISION OF ALL TEST FIGURES AND TEST INFORMATION DERIVED FROM ACCEPTANCE TEST. QUALIFIED TECHNICIANS TO BE INCLUDED FOR THE TESTING AND COMMISSIONING PERIOD.
15. RECOMMISSIONING AND RE-BALANCING OF EXISTING CHILLED WATER AND LTHW SYSTEMS TO ENSURE SYSTEMS OUTSIDE OF THE PROJECT ARE NOT ADVERSELY AFFECTED.

16. PROVIDE POWER FROM NEW MCC. ALL NON PVC POWER AND NON PVC CONTROL WIRING FROM MOTOR CONTROL CENTRE (MCC) TO MOTORS, INCLUDING TERMINATION, CABLE TRAYS ETC. FINAL CONNECTION TO MCC BY MECHANICAL CONTRACTOR. LOCAL ELECTRICAL ISOLATORS SHALL BE PROVIDED TO ALL EQUIPMENT.
17. A DEFECTS LIABILITY PERIOD OF 12 MONTHS, DURING WHICH ALL DEFECTS ARISING SHALL BE RECTIFIED FREE OF CHARGE.
18. CONTRACTOR'S DOCUMENTS, AND AS INSTALLED DRAWINGS, FULL OPERATING AND MAINTENANCE INSTRUCTION MANUALS PRIOR TO PRACTICAL COMPLETION. A MANUAL SHALL BE PROVIDED FOR MECHANICAL SERVICES AND A SEPARATE ONE SHALL BE PROVIDED FOR BMS.
19. INSTRUCTION OF THE BUILDING'S PERSONNEL WHO WILL BE IN CHARGE OF OPERATION OF THE PLANT AFTER COMMISSIONING WITH REGARD TO PREVENTATIVE MAINTENANCE PROCEDURES.
20. PENETRATION THROUGH WALLS AND ROOF FOR MECHANICAL EQUIPMENT AND MAKE GOOD AROUND ALL PENETRATIONS AFTER INSTALLATION, AND WEATHER SEALING WHERE NECESSARY INCLUDING UNDERFLASHING (OVER FLASHING BY MECHANICAL TRADE).
21. FIRE / SMOKE / SECURITY / ACOUSTIC SEALS TO ALL PENETRATIONS FOR MECHANICAL SERVICES THROUGH FIRE, SMOKE, SECURITY AND ACOUSTIC RATED WALLS.
22. ANTI VIBRATION MOUNTS TO ALL FANS.
23. MAKING GOOD AFTER CHASING, DRILLING AND PLACING OF SLEEVES ETC REQUIRED FOR MECHANICAL WORKS.
24. SUPPLY AND INSTALLATION OF EXTERNAL LOUVRES TO ROOF AND WALLS, TO MECHANICAL SERVICES REQUIREMENTS / ARCHITECT'S DETAILS. EXTERNAL LOUVRES SHALL BE WEATHERPROOF AND BE FITTED WITH REMOVABLE VERMIN PROOF MESH SCREENS OF UPVC OR MARINE GRADE ALUMINIUM.
25. PROVISION OF 10 VOLTS POWER FOR MECHANICAL TRADE FOR HIS USE IN OPERATION OF HAND TOOLS, WELDING EQUIPMENT ETC.
26. PROVISION OF 400/230 VOLTS, 4 WIRE POWER FOR BALANCING AND TESTING OF THE PLANT, ALSO OUTLETS FOR TEMPORARY LIGHTING.
27. NEW MOTOR CONTROL CENTRE (MCC)
28. FIRE TRIP TO MECHANICAL MCC
29. MOTOR, STARTERS, VARIABLE FREQUENCY DRIVES, SWITCHGEAR AND SAFETY PROTECTION EQUIPMENT.
30. POWER WIRING INCLUDING FIRE RATED CABLING TO MEET STATUTORY REQUIREMENTS.
31. CONTROL WIRING IN MCC AND BETWEEN NEW FAN AND THE MCC INCLUDING FIRE RATED CABLING TO MEET STATUTORY REQUIREMENTS.
32. CONNECTION OF ALL ZONE SMOKE CONTROL ELEMENTS AS REQUIRED FOR CONTROL SEQUENCES.
33. CONTRACTOR TO ADVISE FINAL ELECTRICAL LOADS TO THE SUPERINTENDENT ON SIGNING OF CONTRACT.

PIPEWORK, FITTINGS AND VALVES

- ALL HEATING WATER AND CHILLED WATER PIPEWORK SHALL BE COPPER.
- THE FURNISHING AND INSTALLATION OF PIPEWORK AND FITTINGS SHALL INCLUDE ALL ITEMS REQUIRED TO COMPLETE THE INSTALLATION, WHETHER ACTUALLY INDICATED OR NOT IN THE SPECIFICATION OR DRAWINGS.
- THE COMPLETE INSTALLATION SHALL BE TO THE PROJECT MANAGER'S APPROVAL. IF ANY WORK DOES NOT COMPLY WITH THE REQUIREMENTS OF THE PROJECT MANAGER, THE MECHANICAL CONTRACTOR SHALL REMOVE, ALTER, AMEND OR REINSTATE THE PIPEWORK AND FITTINGS AS DETERMINED BY THE PROJECT MANAGER.
- PIPE RUNS SHOWN ON THE DRAWINGS ARE DIAGRAMMATIC ONLY AND THE COMPLETE INSTALLATION SHALL BE NEATLY ERECTED AND SPACED AND COORDINATED WITH THE CLIENT.
- ENSURE THAT THE DESIGN, CONSTRUCTION, MATERIALS AND FINISHES OF ALL EQUIPMENT ARE SUITABLE FOR THE LOCATION, CLIMATIC AND OPERATING CONDITIONS TO WHICH THE INSTALLATION WILL BE EXPOSED.
- ENSURE THAT THE WHOLE INSTALLATION COMPLIES WITH THE RELEVANT STANDARDS, INCLUDING THE FOLLOWING:  
1 BS EN 1057-41 - COPPER AND COPPER ALLOYS - SEAMLESS, ROUND COPPER TUBES FOR WATER AND GAS IN SANITARY AND HEATING APPLICATIONS.

SHEET METAL DUCTWORK & AIR SIDE FITTINGS

- SHEET METAL WORK SHALL INCLUDE DUCTS, DRAIN PANS, PLENUMS, DIFFUSER BOXES, SUPPORTS, FLASHINGS, AND ALL ITEMS TO COMPLETE THE INSTALLATION WHETHER ACTUALLY INDICATED OR NOT IN THE SPECIFICATION OR DRAWINGS.
- THE COMPLETE INSTALLATION SHALL BE TO THE PROJECT MANAGER'S APPROVAL. IF ANY WORK DOES NOT COMPLY WITH THE REQUIREMENTS OF THE PROJECT MANAGER, THE MECHANICAL TRADE SHALL REMOVE, ALTER, AMEND AND REINSTATE THE SHEET METAL WORK AS DETERMINED BY THE PROJECT MANAGER.
- SHEET METAL WORK SHALL BE CONSTRUCTED WITH NEW LYSAGHT 'GALVABOND' GALVANISED STEEL SHEET OR OTHER METALS IF APPROVED.
- ALL DUCTWORK CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS AND RECOMMENDATIONS OF THE LATEST EDITIONS OF THE APPROPRIATE DUCT CONSTRUCTION STANDARDS OF THE ASHRAE GUIDE AND SHEET METAL CONSTRUCTION MANUALS ISSUED BY THE SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION INC., USA, EXCEPT WHERE SPECIFIED OTHERWISE.
- DUCT CONSTRUCTION SHALL BE LOW PRESSURE DESIGN.
- ALL DUCTWORK INCLUDING CASINGS, HOUSING, PLENUMS AND CHAMBERS FOR LOW OR MEDIUM PRESSURE SYSTEMS WITH GREATER DIMENSIONS IN ANY DIRECTION BETWEEN 1000 MM AND 1500 MM SHALL BE NOT LESS THAN 1.6 MM THICK.

THERMAL INSULATION

- SUPPLY & INSTALL THERMAL INSULATION TO ALL SUPPLY DUCTWORK, PIPEWORK, RETURN AIR DUCT, PLENUM, DIFFUSER BOXES IN AREAS WHERE REQUIRED TO PREVENT HEAT GAIN, HEAT LOSS & CONDENSATION ETC.
- ALLOW TO SHEATH WITH ALU SHEET AND LABEL PIPEWORK IN THE PLANTROOM AND WHERE EXPOSED TO VIEW OR AMBIENT.
- FIRE RESISTANCE INDICES SHALL MEET THE REQUIREMENTS OF BS1683.
- SAMPLES OF MANUFACTURE & TYPE OF INSULATION SHALL BE SUBMITTED FOR APPROVAL, TOGETHER WITH THE METHOD OF APPLICATION. THE CONTRACTOR SHALL MAKE GOOD ANY DAMAGE TO INSTALLED & EXISTING INSULATION DURING THE EXECUTION OF WORKS.
- REFRIGERANT PIPEWORK AS PER ARMAFLEX 13MM THICKNESS INSTALLED TOTALLY IN LINE WITH MANUFACTURERS' PUBLISHED RECOMMENDATIONS. EXTERNAL REFRIGERANT PIPEWORK TO BE SHEATHED AND PAINTED.
- CONDENSATE PIPEWORK TO BE INSULATED AND SHEATHED WHEN EXPOSED TO WEATHER.
- ENSURE THAT THE THERMAL INSULATION THICKNESS COMPLIES WITH THE FOLLOWING:  
1 BUILDING REGULATIONS APPROVED DOCUMENT PART L2A  
2 NON DOMESTIC BUILDING SERVICES COMPLIANCE GUIDE  
3 TRISA HVAC GUIDE SECTION 6.2.1 & 2.2  
4 BS 5422, TABLE 15 TO 18
- ALL INSULATED DUCT WORK AND PIPEWORK INSIDE PLANT ROOM AND/ OR EXPOSED TO EXTERNAL CONDITIONS MUST BE METAL SHEATHED UNLESS OTHERWISE SPECIFIED.
- ENSURE THAT THE WHOLE INSTALLATION COMPLIES OR IS TESTED TO THE RELEVANT STANDARDS, INCLUDING THE FOLLOWING:  
1 BS 4764-1: FIRE TESTS ON BUILDING MATERIALS AND STRUCTURES METHOD OF TEST FOR FIRE PROPAGATION FOR PRODUCTS  
2 BS 4767-1: FIRE TESTS ON BUILDING MATERIALS AND STRUCTURES METHOD OF TEST TO DETERMINE CLASSIFICATION OF SURFACE SPREAD OF FLAME OF PRODUCTS

NOISE & VIBRATION ISOLATION

- FURNISH & INSTALL VIBRATION ELIMINATION FROM ALL ROTATING OR VIBRATION EMITTING EQUIPMENT INCLUDING FANS AND FAN COIL UNITS WHICH SHALL BE MOUNTED & ISOLATED FROM THE BUILDING STRUCTURE.
- ALL ISOLATION DEVICES SHALL BE SELECTED FOR UNIFORM STATIC DEFLECTIONS ACCORDING TO DISTRIBUTION OF WEIGHT.
- MOUNTING USED OUT ON FLOORS SHALL BE PAINTED WITH COLD GALVANISING PAINT.
- FOR FANS SUSPENDED FROM ROOF SLAB, PROVIDE UN-HOUSED SPRING MOUNTS WITH 25MM STATIC DEFLECTION AS FOLLOWS.
- FREE STANDING, UN-HOUSED SPRING
- Laterally STABLE
- STEEL SPRING
- TOP AND BOTTOM LOAD PLATE
- LEVELLING BOLT
- FOR FANS/HVIL FLOOR MOUNTED, PROVIDE SPRING COMPRESSION SUPPORTS WITH 25MM DEFLECTION.
- IN ADDITION SPRING HANGERS SHALL BE USED TO SUPPORT ALL PIPEWORK AND DUCTWORK CONNECTED TO ROTATING AND RECIPROCATING MACHINERY WITHIN PLANTROOM AREAS OR WITHIN 15 M OF THE PLANT WHICHEVER IS THE LESSER.
- WHEN USED FOR SUPPORTING PIPEWORK AND DUCTWORK THE SPRINGS SHALL HAVE A MINIMUM DEFLECTION OF 20MM UNLESS OTHERWISE STATED.
- THE HANGERS SHALL COMPRISE:  
- STEEL SPRING OR GLASS FIBRE PAD OR A COMBINATION OF BOTH RETAINED IN A WELDED STEEL BRACKET
- SPRING: FREE STANDING, UN-HOUSED AND LATERALLY STABLE HAVING A HORIZONTAL SPRING STIFFNESS EQUAL TO OR GREATER THAN 1.3 TIMES THE VERTICAL STIFFNESS.
- HANGER BRACKET DESIGNED TO CARRY FIVE TIMES OVERLOAD WITHOUT FAILURE AND SHALL ALLOW UP TO 15° ROD MISALIGNMENT WITHOUT METAL TO METAL CONTACT.

TESTING & COMMISSIONING

- AIR AND NOISE TESTS SHALL BE CARRIED ON BEFORE AND AFTER THE NEW WORK. ALL CONTROLS SHALL BE CALIBRATED, TESTED & COMMISSIONED TO PERFORM AS REQUIRED. FINAL PROOF & ACCEPTANCE TESTS SHALL BE CARRIED OUT AFTER A TEN (10) DAY PERIOD OF OPERATION. FINALLY ADJUST AIR SYSTEMS.
- NOTE: AIR QUANTITIES SHOWN ON DRAWINGS WHICH ARE TO BE +5%-0% OF THE DESIGN FIGURES. TESTING & BALANCING RECORDS TO BE PROVIDED. ALL TESTS SHALL BE CONDUCTED IN LINE WITH CIBSE AND COMMISSIONING CODE REQUIREMENTS GUIDELINES

NOTES

1. THESE DRAWINGS ARE INTENDED TO CONVEY DESIGN INTENT. THE CONTRACTOR IS TO COORDINATE PROPOSED WORKS WITH BUILDING AND SERVICES.
2. ALL WEATHER PROOF LOUVRES ARE TO BE REMOVABLE TO ALLOW REMOVAL AND CLEANING OF BIRD WIRE MESH.
3. ALL WORKMANSHIP AND INSTALLATION SHALL BE OF A HIGH QUALITY AND BE OF A NEAT CLEAN APPEARANCE.
4. THE MECHANICAL CONTRACTOR SHALL ADVISE OF ALL ACCESS PANEL REQUIREMENTS TO THE BUILDER INDICATING NUMBER AND LOCATION OF PANELS ON THE DRAWINGS.
5. PROVIDE FIRE DAMPERS AND ACCESS PANELS FOR ALL NEW DUCTWORK PENETRATING FIRE AND SMOKE WALLS.
6. THE MECHANICAL CONTRACTOR SHALL ALLOW FOR ALL WEEKEND AND OVERTIME AND HAVE SUFFICIENT RESOURCES TO MEET THE CONSTRUCTION PROGRAMME.

AMENDMENTS		
REV	DESCRIPTION	DATE
P1	Tender Issue	16.03.18

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STEENSEN VARMING

PROJECT  
IMPERIAL WAR MUSEUM SOUTH EAST  
BLOCK

DRAWING TITLE  
MECHANICAL SERVICES  
Cover Sheet

A0			
CREATED	DRAWN	DESIGNED	CHECKED
Jan' 18	AA	AB	AB
APPROVED	SCALE		NORTHPOINT
-	NTS		
PROJECT No.	DRAWING No.		REVISION
174034 TIWML4-SV-XX-XX-DR-E-0000 P1			