



Specification for: -

South East Coast Ambulance Service

NHS Foundation Trust

Accident and Emergency Ambulance Van

CEN 1789:2007 TYPE B EMERGENCY TRANSPORT AMBULANCE

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SECamb
Ambulance Specification
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1. BASE CHASSIS SPECIFICATION

Current - Fiat Ducato Maxi Van XHR XLB – L4 H3 3.0 Miltijet 16v 4250kgs Panel Van (It is ESSENTIAL that the Vehicle manufacturer's weight limit of 4 Tonnes is uprated to 4250kgs subject to written approval from FIAT HQ in Turin. The limit of 4250kgs must NOT be exceeded when the vehicle is in full operational mode. Base vehicle should be 4250kg).

Future – The Trust will consider alternative manufacturer front wheel drive vehicles as they come onto the market.

1.1 The base chassis will be free issued to the converter on embodiment loan.

1.2 The converter will be responsible for all storage and additional delivery charges.

2. OVERALL REQUIREMENTS

Please note that where equipment supplier names, part numbers and other details are referenced in this specification that this has been done solely for the purposes of identifying the equipment type and the performance levels required by the Trust. There is no mandatory requirement to incorporate the equipment referenced anywhere in this specification within any conversion offer submitted by the Converter. To assist the Trust in evaluating all offers equally please detail fully the equipment included in your submission including where applicable any associated technical and performance information.

2.1. ASSURANCE

2.1.1. Vehicles and equipment supplied as part of this specification comply with CEN/BSI regulations BS EN 1789:2007, BS EN 1865:2000, European Community Whole Vehicle Type Approval (ECWVTA) with reference to the National Specifications SLA.

A letter of Non Objection must be provided between each base vehicle manufacturer & the converter in order to demonstrate compliance with this element (ECWVTA).

2.1.2. The Converter must produce and certify that the completed vehicle with all equipment fitted, fully complies at the time of delivery with all current vehicle legislative regulations, British Standards and the latest CEN requirement for Type B; emergency ambulances and National Specification SLA.

- 2.1.3. The Converter shall ensure that they are at all times conversant with current vehicle legislative regulations, British Standards and the latest CEN requirement and any pending changes implement.
- 2.1.4. The Converter will be responsible for ensuring the converted vehicles operate legally and are fit for purpose. This will include; all aspects of liaison, warranty and support, setting agreements, and conformity/interface matters to do with the base vehicle and equipment manufacture.
- 2.1.5. The Converter will be responsible for assessing the vehicle build and requirement and must identify at the earliest opportunity to the Trust all issues/problems/non compliancy that may affect the operation/use of the vehicle, legal or any regulation or best standard or otherwise.
- 2.1.6. The Converter, for each build, will supply to the Trust an Assurance Manual with a statement confirming the vehicle meets its purpose and complies with the requirements stated.
- 2.1.7. No base vehicle system or circuit or will be broken into or altered unless a written no objection is provided by the base vehicle manufacturer.
- 2.1.8. All electrical systems as part of the conversion must interface with the base vehicles manufacturers' Canbus / FMS gateway system. This is the responsibility of the Converter to obtain written permission.

2.2. **DURABILITY**

The conversion will be designed and constructed to withstand the rigours of use as a 24/7 ambulance with a seven year life. Wear items are to last 7 years.

2.3. DELIVERY

For each purchase order the Converter will produce a delivery plan and meet all agreed target time scales. Changes to the timescale must be agreed by both parties. The Converter will deliver vehicles to the Trust's designated location.

2.4. ERGONOMICS & DESIGN

The Converter must ensure that the design and layout of a fully operational vehicle will meet the purpose of ambulance use and minimise exposure to risk from manual handling and work related musculoskeletal disorders to Trust staff and patients.

2.5. SPECIFICATION CONTROL

Changes to specification will be fully documented using a Change Control Document. Changes CAN ONLY be made following ratification by the Trust.

2.6. UNDER-BODY PROTECTION

The base vehicle will have under-body protection provided by the manufacturer. Where this is removed, damaged or new items/locations are exposed during body construction; exposed areas are to be made good by using the original standard protection materials and applied to the manufacturer's standard. Also, all fittings or alterations, which are carried out by the Converter must be de-rusted and treated, as above, to prevent corrosion and electrolytic corrosion.

2.7. WATER TEST

Each vehicle must pass a high volume whole vehicle pressure water test, which is to be certified.

2.8. TILT TEST

The converted vehicle will pass a tilt test. The vehicle will achieve a minimum of 38 degrees without the outside wheels losing contact with tilt bed. This is to be certified.

2.9. **ASSESSMENT OF HANDLING AND STABILITY**

A competent independent authority shall have subjected the complete vehicle design to an assessment of its handling characteristics (fully operational). A report shall be supplied covering a satisfactory assessment of the following:

- a) Steady state cornering
- b) Straight line behaviour
- c) Obstacle avoidance
- d) Straight line braking
- e) Braking in a turn
- f) Negotiation of speed humps without grounding
- g) Overall confidence and safety

2.10. **EMC TEST**

The Converter must certify that the complete vehicle with all communication and medical equipment fitted (supplied by relevant Trust until common equipment agreed) fully complies with the latest and any pending electromagnetic compatibility requirements.

2.11. **NOISE TEST**

- 2.11.1. The Converter will ensure that a fully converted Ambulance will not exceed the Noise at work Regulations 2005 (Directive 86/188/EEC). The standard to which must not be exceeded is 85db (A-weighted).
- 2.11.2. The vehicle will undergo and pass a noise test as outlined below;
- 2.11.3. The minimum test criterion will be: -
 - a) Sirens switched on.
 - b) Test noise levels from drivers and passenger seating position.
 - c) Test to be completed at road speeds of 30mph, 50mph, 70mph and maximum speed.
 - d) The test is to be repeated with the driver and passenger windows open.
- 2.11.4. The Converter will determine the maximum exposure time for each road speed stated.

2.11.5. The Converter will produce a report to confirm the test results.

2.12. **DESIGN EQUIPMENT & STOWAGE**

The Converter shall work with Trust representatives concerning the ambulance design and to ensure the exact locations are agreed.

2.13. **VEHICLE MASS TEST**

2.13.1. A test must be carried out to determine fit for use by ensuring the vehicle is not overloaded as whole, or an axle or a wheel position.

2.13.2. A fully constructed vehicle will be tested and will be loaded to its operational mass. Operating mass will include; a fully equipped operational vehicle i.e. all equipment and medical items on board, one 90kg person mass on each seat and stretcher, and a full tank of fuel. Trust will provide the non-supplied equipment.

2.13.3. To prevent unnecessary cost and time, the Converter shall undertake a theoretical calculation, before production commences, to confirm the test criterion requirement can be met. If the design fails any test criterion the ambulance design will be reconsidered by both parties. This test will be repeated until a satisfactory outcome is achieved.

2.13.4. The following test criterion has to be met;

- a) The Total Operating Vehicle Mass must be less than 95% of the base vehicle manufactures Gross Vehicle Mass.
- b) For each axle the Total Operating Axle Mass must be less than 95% of the base vehicle manufactures Gross Axle Mass.
- c) No wheel position shall exceed 60% of the its axle mass rating.

2.13.5. A certificate must be produced for each vehicle confirming: -

- a) Gross Kerbside Mass
- b) Gross Vehicle Mass
- c) Operational Mass
- d) Each Axle Mass
- e) Each wheel position Mass

- 2.13.6. Test criterion shall be for above; fully equipped operational vehicle i.e. all equipment and medical items on board, One 90kg person mass on each seat and stretcher and a full tank of fuel.

2.14. **INFECTION CONTROL**

To minimise infection, interior construction must be; free of material edging, easy to clean surfaces, white in appearance and will be clutter free of one piece design theory with no dirt or finger traps, with an overall appearance of being smooth, clean & tidy. Provision must be made to hide away as many medical items as possible. The converter must utilise materials and construction methods that are robust enough to withstand the rigours of current vehicle cleaning guidance in order to meet infection control requirements e.g. surfaces should be manufactured from materials that can withstand daily wear and resist surface corrosion under extreme cleaning regimes.

2.15. **ELECTRICAL**

- 2.15.1. Prior to starting build the Bodybuilder shall carryout a full and complete electrical calculation to determine the electrical drain when all equipment is in use and compare this to the alternator output over the entire engine rev range.
- 2.15.2. The calculation must be used to ensure the vehicle equipment and control systems are adequate and suitably designed to maintain the battery (auxiliary batteries) do not deteriorate below 11.7 volts and the main vehicle battery will not deteriorate below 12.5 volts. All batteries must be protected against doing so.
- 2.15.3. The vehicle will require a 'run lock' security system that will shut down the engine on the release of the vehicles handbrake/sensing access to the cab once activated. This system will enable the removal of the base vehicles ignition key but allow the engine to run at a speed that ensures the alternator output meets the maximum current consumption. The run lock can either activated through the 'arrival scene' mode and a specific button on the power management control panel.
- 2.15.4. **Emergency lighting;** must comply with European Regulations for blue lights and meet ECE-R-65 standard which defines the light outputs. Paragraph 7.2 contains a table which stipulates minimum light output values. Measured at a vertical angle of 0° and

a horizontal angle of 360° a minimum of 120cd (day) and 50cd (night) must be reached

- 2.15.5. **Base Vehicle Conversion for The Installation Of Auxiliary Electrics;** The vehicle converter will be approved by the chassis manufacturer for chassis conversion and will be responsible for ensuring that the chassis manufacturer is aware of the installation of all auxiliary electrics. A letter of non-objection should be issued by the chassis manufacturer to the vehicle converter. This should be supplied as part of the contract document pack at the conclusion of the contract.
- 2.15.6. **Auxiliary Electrical Demand;** Although recommendations are given for minimum auxiliary battery capacities and alternator size, it is the ultimate responsibility of the vehicle converter to ensure that the auxiliary power system is capable of supporting the auxiliary electrical demand on the ambulance. In particular, supporting documentation including test data should be supplied as part of the contract document pack at the conclusion of the contract. This should demonstrate the vehicle is capable of supporting its on-board electrical power requirements in use.
- 2.15.7. **General – Electrical Wiring & Installation;** All DC and AC wiring should be completed to conform to current IEE wiring regulations. The wiring looms should be professionally produced looms by an appropriate company. On completion, the wiring system should be inspected and tested to those standards and an NICEIC completion certificate be issued by an authorised body stating the chassis number of the ambulance. This should be supplied as part of the contract document pack at the conclusion of the contract. In particular, all wiring should be identified correctly by colour and be run through appropriate trunking or conduit (to protect it). Special attention needs to be given where wiring is routed through bulkheads and cross-members given the extreme use of the vehicle during operation, wiring should be protected by heavy duty armour protected glands and conduits. Wiring terminations should be adequately protected and insulated. All external electrical connections should be made using SUPERSEAL type plugs and connectors i.e. to auxiliary items such as light bars, lighting general etc. All connections made to the manufactures wiring must be 'plug & connector' so if a problem occurs isolation of converter systems from vehicle systems is possible for trouble shooting i.e. central

locking switch in rear of vehicle. All wiring should be completed with multi strand, flexible cable. DC cables should be protected by fuses or circuit breakers at source and these should be rated for the current carrying capability of the wire. AC cables should be protected by circuit breakers as described in the main specification. Cables should be sized correctly for the current required by the circuit they supply. In particular, to avoid overheating and excessive voltage drop. All wiring or appliances that require labelling as an electrical warning or hazard should be clearly identified in accordance with the current regulations. All auxiliary electrical components should be CE and “e-marked” in accordance with current regulations. If the component is not “e-marked” it must be supplied with an attestation with regard to annex I, 3.2.9. of 72/245/EEC as amended by 2006/28/EC. All electrical components should be mounted in identical locations and wiring routed uniformly where multiple vehicles are converted. Wherever possible, electrical components should be mounted on subassemblies using “plug and play” connectors. This is to facilitate easy removal and replacement if repair or maintenance is required. Designs incorporating “plug and play” wiring and sub-assemblies will be favoured. Electrical schematics for both DC and AC will be supplied for the ambulances as part of the contract document pack at the conclusion of the contract. All wiring to be of PVC covered cable protected by grommets or rubber at points liable to chafing. All under floor wiring to be fitted into approved sleeving and all joints sealed with PVC heat shrink and must comply with the current British Standard BS AU7:1963. All circuits separately protected and installed in accessible positions, tested for insulation, non-contact and continuity. With the exception of the isolator switch all switches positioned in cab are to be within easy reach of the driver and labelled appropriately.

- 2.15.8. **Batteries;** Base vehicle and conversion batteries will be disconnected/removed from the vehicle during production and reinstalled when testing the conversion. Before release to the Trust batteries will be fully charged.

2.16. **OPERATIONAL ASSESSMENT**

The Converter in conjunction with SECAMB representatives will conduct a risk assessment of the functionality of the vehicle

2.17. **QUALITY CONTROL**

Quality and build standard control will apply to a fully converted ambulance and will include the base vehicle and all components and systems identified in the specification or related requirements. The Converter will provide and ensure quality control is assured throughout the build, which will include all medical items and equipment and all components supplied. The Converter must have in place a current ISO quality control system that is relevant to the building of vehicles. Ambulance Service representatives will need access to the vehicle build during the process.

2.18. **WARRANTY AND SUPPORT.**

Provide a comprehensive three-year parts and labour warranty for the build, conversion and specified and purchased items. Written procedure for warranty claiming and carrying out campaign work for the Conversion and specified items. Have a process in place for resolving matters urgently and priority given. Appoint third party contractors to undertake repairs and campaign work 24/7. Seven -year anti-corrosion warranty. Provide technical workshop support between 08.00 and 17.00 hours Mondays to Fridays. An out of hours support contact must be supplied in addition for weekends and up to 22.00hrs during the week. Confirm support response times for all work. Provide detailed electrical/wiring diagrams for each batch of vehicles.

2.19. **SPECIALIST TOOLING.**

Provide a comprehensive list and provide each Trust with any special tooling required to maintain and repair the converted vehicle.

2.20. **SPARE PARTS**

Provide a comprehensive parts list (with part numbers), in electronic format. Parts are to be available for a minimum of seven years from date of manufacture.

2.21. **TRAINING**

- 2.21.1. Provide on- site training (Trust premises) or factory based training as appropriate for both Operational and Workshop staff. Operational training to cover the operational use of the vehicle and its equipment. Workshop training to cover maintenance, fault diagnosis and repairs.
- 2.21.2. Provide a written training syllabus and confirmation certificates to who has been trained and documentation that they have met the criterion.
- 2.21.3. Provide the following information for the vehicle and its equipment. This is to be used as part of the training delivery: -
 - a) Electronic and Hard Copy Operational Manual explaining operator use
 - b) Electronic and Hard Copy Maintenance Manual for Technical staff to include: -
 - i. system hardware location schematics
 - ii. wiring diagrams
 - iii. fault diagnosis guidance info
 - iv. warranty claims process and contact information
 - v. spare parts catalogue

2.22. **ACTIVE ASSESSMENTS**

The Converter will visit operational sites to establish product effectiveness and working relationship with the Trusts. These visits will be used to improve the product.

2.23. **BUILD INFORMATION PACK**

For each build batch a comprehensive manual (written & electronic copy) is to be supplied containing;

- a. Specification
- b. Agreed changes listing
- c. CEN compliancy certificates
- d. Proof of compliance with ECWVTA for the specific chassis type and vehicle design

- e. Statement confirming Disability Acts have been considered and applied where applicable.
- f. EMC test & report
- g. Build identification numbers for each chassis number
- h. Operational & equipment manual
- i. Training syllabus
- j. Vehicle Mass certificates
- k. Noise, Water and Tilt test reports
- l. Road Handling test report
- m. Other Component/Equipment certification
- n. Warranty terms, contacts and procedure
- o. Electrical wiring diagrams and location of components, connections on vehicles electrical system.
- p. Drawings of external and internal layouts
- q. Letters of no objection

2.24. MEETINGS

The Converter will hold timely meetings to resolve and update issues on build progression and any arising operational problems. Minutes of meetings will be produced and given to an agreed circulation.

- 2.24.1. Build progression meetings, at the factory or other location, will be required throughout the build process with the Trust.
- 2.24.2. Routine 'User Group' (Trusts) meetings will be required, hosted by the supplier, on a 6 monthly basis or as required and Chaired by the Trust.

3. CONVERSION

3.1. Production Process

- 3.1.1. A fully controlled and documented construction process should be used, which accurately documents each stage of the build process to maintain quality, traceability and provide accurate After Sales information. This will ensure that all spare parts are correct and fit first time, every time.

3.2. **Body Conversion**

3.2.1. Where achieved, suppliers should provide proof of certification to the following standards with their tender submission:

- EN 1789
- ISO 9001

3.2.2. The interior should:

- Be ergonomically designed using CAD

3.3. **Maximum Body Dimensions**

3.3.1. Exterior maximum overall height, including components must not exceed 2850mm (excluding flexible aerials and antennas).

3.3.2. Exterior maximum overall width must not exceed 2300 mm.

3.3.3. The saloon interior roof (including its components) height must be no less than 1900mm

3.3.4. The saloon interior design must allow a carry chair to pass between the wheel arch/ns seating and stretcher, in its locks, 475mm approx.

3.3.5. The vehicle must be able to carry bariatric stretcher in the fixed floor stretcher mountings without need to move any equipment.

3.4. **Insulation**

3.4.1. All cavities between the interior and exterior body mouldings (including rear doors) are to be filled with Rockwool fire retardant thermal insulation material to BS476 and fitted in accordance with manufacturer's recommendations. The insulation to extend into all relevant framing members.

3.5. **Body Exterior**

3.5.1. The complete exterior is finished in (RAL 1016) yellow.

3.5.2. Wheels and bumpers left in factory finish.

3.5.3. Wheel stud/nut indicators to be fitted and seen. Hub nut covers to be fitted.

- 3.5.4. If the base vehicle is not fitted with an OE rubbing strip, a suitable protective rubbing strip shall be fitted to each side of the vehicle.
- 3.5.5. All external door locks have central locking facility, and must have the additional facility to enable the vehicle to be locked whilst on run lock. A motion lock system must also be installed allowing all doors to lock after 5mph is reached. The vehicle will remain locked until stationary and the handbrake applied.
- 3.5.6 A Bariatric compact inboard SG Technical access ramp giving an angle of no more than 12 degrees allowing unrestricted access. The total area of the ramp is to be covered with anti-slip material and must be replaceable and maintainable through wear. All edges to be highlighted with yellow / black anti slip material. The ramp must be electrically operated and to the following dimensions: - 850mm usable width, 960 mm long with a safe working load of 500 kg and a ramp weight of no more than 15 kg. When not in use the ramp must fold flush with the vehicle floor. The ramp operation must incorporate an impact sensor to prevent injury. The ramp must be able to operate manually in the event of mechanical failure. No working components should be exposed to the elements. The SG Technical access wedge ramp is required to operate at any lowered height. High visibility to: -
- To highlight area where vehicle floor height changes.
- Black and yellow high visibility non-slip, to all walk on surfaces. Any stainless steel on the wedge ramp must be covered with none slip tape.

3.6. **Body Exterior**

- 3.6.1. Provide one window to o/s, which shall be a formal means of escape for one person.
- 3.6.2 Provide one window to n/s and one window to side sliding door. Glass should be so designed so that in the event of a door sliding mechanism failing no part of the door can contact the glass resulting in breakage.

3.7. **Body Windows**

- 3.7.1. To be tinted cartridge type with integral Venetian blind allowing a maximum of 5% light transmission in 4mm toughened glass. Converter to advise if this is not possible.
- 3.7.2. Break glass hammers to be provided and located in a suitable location agreed with the Trust.

- 3.7.3. The fixed bulkhead is to have one 0.12 metre square window opening left side window and blind made from a black, impervious and easily cleaned material.

3.8. **Body Interior**

- 3.8.1. Attachment 1 shows the indicative layout to locate; equipment, medical items and positioning of all cabinets and cupboards. Exact location for equipment may vary and will be agreed in a pre-build meeting between the supplier and Trust, therefore a variable mounting system will be required. An area capable of storing three Trust issued personal equipment barrel bags will be required.
- 3.8.2. The bulkhead must have no protrusions that will come in conflict with a person sitting in the seat positioned in its most rearward position.
- 3.8.3. The original base vehicle cab dimensions must not be compromised during the construction of the bulkhead.
- 3.8.4. All seats coverings to be of single piece material, have sealed seams to prevent the ingress of body fluids for infection control purposes and protection to avoid damage in harsh usage.
- 3.8.5. To provide two cubic metres of storage in cabinets and overhead lockers.
- 3.8.6. All lockers to have contents identification labels and tested weight value applied to each locker.
- 3.8.7. Each locker door shall have a reset-Southco style lock device that indicates if it has been opened. It is intended that the vehicle will have a manual system, with a reset key.
- 3.8.8. All saloon door entrances to have grab rails/handles to aide entry/exit. Such devices must be robust enough to deal with any persons designed to be carried on the vehicle and be finished in RAL 1016 powder coating or rubberised and yellow.

3.9. **Floor Construction**

- 3.9.1. The floor covering is to be single piece floor covering or equivalent in light green to provide for contact, antibacterial properties and is to continue 100 mm up the sidewalls. The edges are to be sealed to provide easy washout facility and to enable enhanced infection control. The floor must be of a non-slip quality and resilient enough to withstand high wear rates.
- 3.9.2. Fastening of the stretcher must be tested according to EN 1789.

- 3.9.3. The underside of the floor panel is to be coated with Teroson under seal or equivalent.
- 3.9.4. The wheel arch sections should be treated with KTL stone chip protection or equivalent.
- 3.10. **Cab Area**
 - 3.10.1. The dashboard must be designed to appropriately incorporate the additional electrical switching, warning, communication equipment and mobile data terminal. This should be achieved through additional moulded cowls which are robust and do not prevent routine maintenance tasks. The final design must be ergonomically suitable look tidy and clean and must be compliant with construction and use regulations and should be agreed with the Trust. 2 USB sockets will also be required within the centre area of the cab.
 - 3.10.2. Install floor mounted centre console between the passenger and driver seat to provide the maximum storage space and incorporate document storage and drinks holders and a fridge capable of storing three Trust issued cool bags.
 - 3.10.3. Provision for 2 rechargeable torches with charger.
 - 3.10.4. Two coat hooks – standard manufacturer fitment to be accessible.
 - 3.10.5. Supply and fit a non-slip wear plate on cab floor below driver's pedals. Ensure this is sealed around to prevent ingress under the plate.
 - 3.10.6. Fit bump pads at the rear of cab seats and around door apertures to minimise head injuries.
 - 3.10.7. No fitments within the cab are to restrict the range of seat adjustment provided by the manufacturer.
 - 3.10.8. Install audio & visual systems to help prevent incorrect fuelling.
 - 3.10.9. One 2.0 litre, Aqueous Film Forming Foam (AFFF), visible gauge, controllable flow fire extinguisher is to be fitted within easy reach of the driver from both inside and outside the vehicle. The fire extinguisher is to be positioned, offside behind driver seat. Bracket to be a complete base not two pronged. Not to be fixed at head height.

3.11. Suspension

- 3.11.1 A Full VB Pneumatic Rear Suspension adjustable for height will be fitted as part of the conversion, the converter must be fully approved by VB to supply and fit this equipment and able to support in the field during the warranty period. On completion of the conversion work a full four-wheel laser alignment check must be carried out with certification of the results provided to the Trust as part of the Build Information Pack. VB must also provide evidence of having carried out a sample audit of completed vehicles.

4. Saloon Area

4.1. Zone A (Bulkhead cupboard)

- i. This area will be used to quickly access equipment and bags. These items must be accessible when the side sliding door is open or from the inside of the vehicle. The storage facility must have open shelving when accessing from the side door and door/s to access from the inside of the vehicle. This area will hold the following items: Response bags, Oxygen, Resuscitation equipment.
- ii. A locker with bolt fixings suitable for a Mangar Compressor charging base and 12 volt power supply and house the Entonox equipment.
- iii.

Install 24-hour emergency time manager LED clock hard wired and to be positioned on bulkhead.

Provide for: -

Mounting bolt points for a tested bracket for securing the Trusts specification, Lifepack 15 defibrillator with 12 lead monitoring attachment facility with the screen facing into the saloon centre and located on the bulkhead cabinet, fitted sufficiently low for comfortable access by shorter members of staff. Provision for a 12 lead ECG extension cable with socket

which commences in Zone A adjacent to Defib unit and terminates in Zone B on trauma wall.

- 4.1.1. Disposable glove box holders x 4 in area above sliding door. This should be a Perspex lidded construction with access holes to allow variable sized boxes to be retained.

4.2. **Zone B**

- 4.2.1. Provide 2 x 4-litre capacity min, UN rigid domestic waste container capable of accepting plastic liner. (one for domestic waste and one for clinical waste – clearly marked)
- 4.2.2. One 4.0 litre sharps box
- 4.2.3. Provide for a secure ventilator quick release bracket. (ventilator type – Smiths Medical Pneupac)
- 4.2.4. Provide for:
 - a) Secure mounting of converter supplied Laerdal Suction unit. Electrical supply to be hard wired.
- 4.2.5. Supply and fit two vertical chrome poles adjacent to the stretcher on the O/S wall for the purpose of attaching syringe pump drivers etc, with an adjustable locking cross bar which allows for the patient to lift and support themselves with.
- 4.2.6. Magnetic white marker board (A3 size) shall be fitted on the wall adjacent the rear saloon seat to include a holder and two dry wipe pens.

4.3. **Zone C**

- 4.3.1. Two forward facing seats, are to be fitted on the l/h side. Each seat to have reclining, swivelling (able to be locked at 45 degrees max) and be capable of being able to fold against the side of the vehicle. All seats must have a headrest and adjustable armrests and a three-point retractor seat belt with the tongue attachment to the r/h of the seat. Extra length seat belts are to be provided. The height of the seat squabs is to be

470 mm above floor level. These seats should be designed and placed to ensure maximum comfort, accessibility and ergonomic movement whilst also ensuring they suitably placed to allow effective care of a stretcher patient. Stainless steel plate must be fitted to n/s wall of vehicle to protect interior liner from seat damage. Attendants seat edges should be fitted with protectors to prevent damage to seat coverings from equipment contact i.e. stretchers and carry chairs etc.

- 4.3.2. Fixation device to be provided on the n/s hand rear door for a Ferno Compact 2 tracked carry chair. (Chair provided by the Trust) Bracket and fixation must have passed crash testing.
- 4.3.3. Storage unit with easy access through the l/h rear door, for a spinal board, head-blocks and a scoop stretcher. Spinal board, head blocks and scoop stretcher provided by the Trust. Equipment to be secured to prevent damage or loose items falling when the rear door is opened.
- 4.3.4. Storage unit to house various large items of medical equipment such as leg splints, cervical collars and a Lucas 2 resuscitation device. Also to provide additional overhead storage in this area suitable for three members of staff personal equipment including issued PPE.
- 4.3.5. Supply and fit vertical grab handles, one near the side door and one near the rear door. Grab handles to have sufficient recess area to accommodate large hands. (All handrails to be 35 mm diameter and finished in yellow, epoxy powder resin or rubberised C-type handle).

4.4. **Zone D**

- 4.4.1. A cupboard or mounting with shield shall be provided at the right-hand rear corner to accommodate two 10kg BOC CD size oxygen cylinders and three positions to secure 2ltrs BOC ED size oxygen/Entonox bottles. The cylinders are to be vertically mounted with the contents pressure gauges visible through a suitable window from all seating positions. (all cylinder mountings and cupboard enclosures require crash testing approval)

- 4.4.2. One BS EN3 2 litre foam AFFF type controllable fire extinguisher c/w gauge and bracket to be fitted to the in the saloon area within easy reach of the rear door access.
 - 4.4.3. Provide a secured drugs storage area, using the current Trust barrel locks and keys. It must be capable of storing the current Trust drugs bag and an Entonox barrel bag.
 - 4.4.4. The design of the stowage system should allow for maximising medical equipment stowage in this area. The equipment should be easily accessible but also secure from the patient stretcher area. This should also incorporate significant overhead lockorage in this area.
- 4.5. **Zone E**
- 4.5.1. A rearward facing attendant's seat is to be fitted at the head end of the stretcher. The seat is to include an infant four-point harness which will accommodate children of between 20 and 50 lbs and 28 and 47 inches and an adult three point inertia safety belt. The height of the seat squab is to be 470 mm above floor level. A padded panel is to be provided above attendant's seat for head protection. Ideally this seat would also have the facility for Isofix child seat fittings. Attendants seat edges should be fitted with protectors to prevent damage to seat coverings from equipment contact i.e. stretchers and carry chairs etc.

4.6. **Zone F (interior roof)**

- 4.6.1. One infusion bag holder shall be provided on the roof section along the length of the stretcher.
- 4.6.2. Full length driver alert strip in roof lining to activate buzzer in cab and additional strips positioned adjacent to attendant and rear saloon seats within easy reach. This system must have a cancel button in the cab area within reach of the driver.
- 4.6.3. Provide extract/intake fan
- 4.6.4. Aerials and antennas with access points. (see communications)

4.7. **Zone G (interior floor)**

- 4.7.1. Saloon floor must be constructed on 18 mm WBP grade resin bonded plywood (the Trust would prefer to see a composite material used in place of plywood where possible and compliant with testing requirements) and overlaid with a one piece hard wearing, scuff resistant, high grip, green coloured covering. It is to have anti soiling properties to meet BS EN ISO 11378-2 and anti-bacterial/fungicidal qualities. It must be laid with coving wherever possible at the edges and with reinforced corner radii. All floor covering edges to be sealed.
- 4.7.2. There will be one mechanical stretcher fixation device, provided by the Trust complete with Stryker trolley.
- 4.7.3. To secure the Aortic balloon pump four independent fixation devices are to be provided in the floor (flush fitting & easy fit), at the foot end of the stretcher complete with appropriate straps for the balloon pump.

4.8. **Oxygen System**

- 4.8.1. Three piped oxygen outlets are to be provided, one positioned in Zone B, one in Zone D and one in Zone C positioned relative to patient positions.
- 4.8.2. Provide an in line pressure gauge positioned in zone D which can be easily seen from any chair position.
- 4.8.3. An auto oxygen change-over valve is to be incorporated in the system with electronic low pressure warning system.
- 4.8.4. Access must be provided for the maintenance of the piped gas installation.

4.9. **Climate Control & Ventilation**

- 4.9.1. Provide an electronic climate control system for the saloon and cab, which allows the user to define the temperature setting in the saloon area, in increments of 1 degree. Temperature range must be from 10 to 30 degrees centigrade.
- 4.9.2. The electronic climate control system is required to also provide an independent circuit for control of cooling of the base vehicle cab area through the base chassis cooling / heating system.
- 4.9.3. The climate control system must be linked to the power management system which allows the climate control system to operate when ignition is off and shoreline is engaged and when the vehicle is operating on run lock.
- 4.9.4. Air flows vents must be positioned or guarded to prevent harm.

4.10. **Electrical General**

- 4.10.1. EMC standards and testing must be fulfilled by the converter.
- 4.10.2. General; an ATSR style electronic electrical power management control system shall be provided using Canbus type system or other suitable technology. This will control auxiliary circuits and batteries including chassis, assist with fault PC based diagnosis through gateway test nodes (mini Central Processing Unit (CPC)) and provide a sequenced load facility to ensure all vehicle batteries retain a charge status of more than 30% of their rated capacity. It will be a requirement for this system to interface with and be able to send and receive data from the chassis Canbus or alternative system and interface to the Trusts MDT solution. This will provide telemetric information such as battery status, vehicle controls activation, emergency controls activation, supported with the ATSR telematics system currently used by the Trust.
- 4.10.3. Vehicle manufacturer's battery to supply vehicle electrical loads as per manufacturers design. The battery system should be split into three independent banks. Battery bank one will consist of the chassis manufacturer's original starter battery. Battery bank two will support all additional ambulance auxiliary electrical loads with the exception of communications and should consist of 2 x 125amp (20 hr rating) AGM

(absorbed glass matt) batteries (part no GPL-31XT is the Trusts preferred type). Battery bank three will support communications and computer equipment and should consist of 1 x 125amp (20 hr rating) AGM (absorbed glass matt) battery (part no GPL-31XT is the Trusts preferred type) (absorbed glass matt). Batteries must be suitably vented. The mounts and brackets used to install the auxiliary batteries must be compliant with crash testing requirements.

- 4.10.4. A split charging system should be installed to allow the vehicle alternator in combination with a virtual alternator system to ensure optimum charging of batteries based on their individual requirements, to charge all three battery banks when the vehicle is in motion or the mains powered, onboard charger to replenish all three battery banks while the vehicle is connected to a land line supply. The split charging system should be factory set to engage and combine all battery positives when the DC voltage of either battery bank one or two rises to 13.1V DC. This voltage should be adjustable. The split charging system should disengage, isolating the three battery bank positives from each other if the combined voltage of the battery system drops to 12.4V DC (this should also be adjustable). The system should have an adjustable hold facility to allow a time buffer to be introduced to prioritise charge more toward battery banks two and three through the life of the ambulance as the health of the batteries deteriorate. The system should be dynamically self-adjusting to prevent nuisance split charge engagement and disengagement due to intermittent fluctuations in system voltages. The system should provide 12V outputs when split charging is engaged / disengaged for the purpose of driving / controlling warning lights or external relays.
- 4.10.5. Battery banks three should be protected from being flattened. If the DC voltages of this battery bank drops to 11.7V DC and remains below that threshold for more than two minutes, then the supplies from the batteries should be isolated. The electrical supply should be automatically re-activated, when the vehicle engine is started or when split charging is engaged (for instance by the mains charger). The flat battery protection system should be ignition inhibited to prevent isolation while the vehicle is in motion. The system should provide 12V outputs when isolated and non-isolated for the purpose of driving / controlling warning lights or external relays.

- 4.10.6. All auxiliary electrical loads on the ambulance should be run from a post battery load management system (PMS). This system should be approved and agreed. The load management system shall take its power from but operate independently to the split charge, emergency start and flat battery protection systems. The PMS must sense and control the batteries load and when detecting a battery voltage of 12 volts commence with a load shedding sequence that will protect the battery power by progressively isolating circuits (excluding essential life threatening ones). These will be agreed with the Trust. Should load shedding commence the vehicles voice activation system will advise the driver that it has started and if applicable for that person to start the engine.
- 4.10.7. All auxiliary and communications batteries must be positioned in suitable lockers easily accessible for maintenance purposes and MUST NOT be located within the vehicle cab.
- 4.10.8. Electrical circuits will be controlled by either separate switches or the power management system.
- 4.10.9. Provide anti-theft system, to allow engine to be left running with the ignition keys removed and doors either locked or open. The system is to be linked to the cab door entries and vehicle handbrake that cuts the engine when the handbrake is released.
- 4.10.10. A voice message is to be installed and indicate; when the batteries are becoming low or load shedding will commence and any exterior door is open. This must be protected from being disconnected by ambulance crews.
- 4.10.11. A battery charger with an output of no less than 60A @ 12V DC shall be fitted to the vehicle in an appropriate location for the purpose of charging the vehicle batteries when stationary. It should operate at full power from a mains input voltage window of 100-260V AC / 45-60Hz. The charger should be fully automatic in operation with a minimum of a three-stage charging curve. It should be adjustable to be able to charge sealed lead-acid, calcium/calcium lead-acid and AGM batteries at the correct voltage settings. It should be power factor corrected for efficient operation from the mains (in particular voltage transformers). The charger should provide a visual indication of charging status as well as any faults.

- 4.10.12. The vehicle should be fitted with an external waterproof mains input socket mounted in an agreed location and type. A mechanism should be installed to prevent the vehicle being driven with the mains input still connected. The mains output from the socket onboard the vehicle should be wired through an earth leakage device (RCCB) mounted in an appropriate enclosure. The mains supply should also be prevented from overload by the installation of an MCB (miniature circuit breaker). A combined MCB / RCCB (RCBO) could be used. The RCCB / RCBO must have an earth leakage trip current of 30mA. The RCCB / RCBO should be mounted as close as possible to the incoming mains supply on the vehicle. Mains protection devices should conform to the following standards: RCCB BS EN 61008 RCBO BS EN 61009 MCB BS EN 60-898
- 4.10.13. A two-way intercom system between the cab and the saloon area shall be supplied and installed. Power should be supplied to this system when the ignition is on. This device should have an open speech facility from the saloon to the cab and a press to talk button fitted within the cab for use by the driver. The system should also incorporate a volume control in the cab area but it must not be possible to turn off the device completely from the cab.
- 4.10.14. Provide three, independently switched spotlights in patient compartment roof to illuminate the stretcher area.
- 4.10.15. Provide in the ambulance saloon overhead lighting with dimming facility. Switching for interior saloon lights to be provided at all door entrances.
- 4.10.16. All lighting should be LED type
- 4.10.17. Install 2 12v power points & 2 USB sockets protected at 15 amps. Supply and fit 2 12v 50 amps terminal suitable for incubator and balloon pump units.
- 4.10.18. A DC to AC power inverter must be fitted with a minimum output of 2000W @ 25°C ambient. The output must be 230VAC (RMS +/- 3%), 50Hz (+/- 0.05%), pure sinewave (max 3% THD). The inverter must be self-protecting against overload, short circuit, over temperature and low DC input voltage. A panel to allow the inverter to be switched on and off remotely should be installed in an agreed location.
- 4.10.19. The 230v AC mains output from the inverter should be run through an enclosed RCCB & MCB or RCBO. The RCCB / RCBO must have an earth leakage trip current of 30mA. The RCCB / RCBO should be mounted as close as possible to the output of the

inverter. If neutral and earth are not bonded inside the inverter then this should be completed prior to the RCCB / RCBO.

- 4.10.20. Install a twin standard household 3-pin electrical switched socket with neon lights, mounted on the trauma wall. The socket should be placed away from areas where cleaning product and water ingress could occur.
- 4.10.21. An audible reverse warning device operated by the gearbox mounted reverse lamp switch shall be fitted. This device will be used to alert pedestrians of the vehicle reversing and shall be fitted with a night isolation switch. Ultra sonic reversing aid with 2 sensors reversing proximity warning device to be provided to give audible and visual (tri-colour led located on the right of the main instrument console) warning to driver of rearward obstructions c/w external audible alarm. Device not to be affected by emergency vehicle LED lights.
- 4.10.22. Provide an audible warning system comprising of a wail/yelp/hyper/bullhorn noise siren, to face out of front but recessed so as not to cause injury. Minimum of 100W output with yelp/wail/hyper/bull-horn tones to be wired through and operated by the vehicle road-horn control and wired to prevent the road-horn – a bull horn button must also be installed for the driver's use. The siren system will be wired to also be controlled through a floor switch. A siren reduction system will allow the siren to be 10% audible when the handbrake is applied. The siren must provide an IDR output back to the power management system to provide data logging of siren activity.
- 4.10.23. The vehicle will be fitted with a comprehensive rear light bar which is all LED and provide the following functionality
 - Blue Flashing Lights – rear facing and corner facing
 - Red Flashing Lights – rear facing
 - Tail, Stop, Turn lights – rear facing to mirror OE lighting functions
 - Scene Light – rear facing angled downwards, to be operated via rear door switch and
 - or main control panel automatically switching off at 10mph.
 - Blue fixed Gatso Lights – rear facing
- 4.10.24. All opening doors must be fitted with warning red LED lights to warn moving traffic around the vehicle that a door is open.
- 4.10.25. Provide scene lights nearside, offside and at the rear with ability to be switched independently. The side scene lights to have 45 degree alley lights facility or separate light. Note: (scene lights must be switched off above road speed of 10mph).

- 4.10.26. Provide alley lights to n/s & o/s mounted above the driver and passenger doors (scene lights must be switched off above road speed of 10mph).
- 4.10.27. Provide suitable illumination to entries, switched through door activated micro switch. Provide puddle lamps to both cab doors areas.
- 4.10.28. All external door locks have central locking facility provided with the base vehicle. Activated by key and remote control with internal manual override on cab and saloon doors. Central locking must be independent of power management shut down and when the isolator switch is activated. A motion lock function must be provided where the saloon door entries automatically lock whilst vehicle is in motion above 5mph. The vehicle will also unlock when the vehicle is stationary and the handbrake applied.
- 4.10.29. Rear (reversing/incident) camera to aid reversing. This camera to be operated either when reverse gear is selected, image to be displayed on an independent monitor. This camera must be housed in a recessed position with suitable covering to prevent damage.
- 4.11. any Install a VUE style CCTV system for the protection of staff and to provide evidence in incident/Road Traffic Collision.
- VDRHD 8 channel recorder:
 - Records up to 8 cameras at resolution 720x 576
 - Records vehicle G Force data in 3 separate axis, each individually adjusted
 - Records vehicle GPS data for integration with mapping in playback software
 - Records vehicle GPS speed
 - Logs use of Left/ Right Indicators and brakes, all functions individually searchable in playback software.
 - Integration with ambulance management system outputs to record use of Sirens/ Blues/ HLF/ Panic alarm – system should be capable of differentiating between sirens armed and sirens emitting noise
 - Programmable shutdown delay
 - Programmable/ switched video output
 - Removable 1TB Hard drive with dedicated lock
 - Lockable front cover
 - Fault LED visible to engineering staff
 - Fault output for third party integration
 - Front accessed monitor output for setup and testing
 - Event search function allowing operator to search and view specific recorded scenarios, for example recordings only when vehicles blue lights are active, or when the vehicle is travelling at a certain speed, or any combination of multiple events.

- SD card back up recording function,
- SD card recording of driver behaviour data such as acceleration, braking and speed.
- Option for 3G live connection to vehicle to view live images and download recorded footage.
- Ability to review footage on PC direct from removable hard drive and remote from the vehicle with supplied suitable software.
- Option to auto convert encrypted format footage to AVI format directly from playback software.
- **Forward Facing Camera:**
 - Mounted behind the rear view mirror looking forwards, shielded to reduce reflection and glare.
 - Cameras to record when vehicle is in operation and predetermined length of time post ignition (to be agreed by trust)
- **Nearside and Offside Micro Dome Camera externally mounted:**
 - Mounted Near side and Offside at the rear of the vehicle facing forwards
 - External cameras mounted on **Micro Dome base**
 - Hi resolution with day/ night function min 600TVL
 - Vandal resistant with lockable rim
 - Cameras to record when vehicle is in operation and predetermined length of time post ignition (to be agreed by trust)
 - Wiring looms to be accessible when camera is replaced externally
- **Saloon Micro Dome Cameras:**
 - Flush mounted into the ceiling above rear facing attendants seat near bulkhead on o/s of vehicle
 - Hi resolution with day/ night function min 600TVL
 - Vandal resistant with lockable rim
 - Camera to record on operation of saloon panic button
 - Associated microphone installed in saloon area
 - Wiring looms to be accessible when camera is replaced externally
- **Rear camera :**
 - Mounted centrally at the rear of the vehicle. This camera is used as a reversing aid and to record events at the rear of the vehicle
 - Camera to record whilst vehicle is in operation and predetermined length of time post ignition (to be agreed by trust)
 - Wiring looms to be accessible when camera is replaced externally
- **Camera extension cables**
 - As required
- **Accident review service**

- CCTV supplier to offer option to recover or receive accident footage and prepare independent expert report on the circumstances, possible causation and liability of the accident.
 - **Footage preparation service**
 - CCTV supplier to offer option to retrieve or receive incident footage required for third party purposes such as Police request. Footage is to be prepared in a format that meets Home Office guidelines for Download of CCTV in accordance with Data Protection laws and fulfils appropriate audit trail guidelines.
- 4.11.1. Audible warning device to be fitted to fuel flap to warn vehicle is to be fuelled with diesel only.

5. EMERGENCY LIGHTING

Auxillary lighting must be compatible with current equipment fitted to Trust vehicles, market equivalents to the current equipment supplied by Woodway Engineering Ltd will be considered. For Clarification the front and rear lightbars must be cowed into the front roof panel above windscreen and above the rear doors.

For reference see attachment 1 showing the following specs:

- Front light bar – WMAS Woodway spec n° WMA411F
 - Rear light bar – WMAS Woodway spec n° WMA411R
- 5.1. All to be latest generation LED - max/light minimum voltage
- 5.2. Provide high level blue lights emitting light through 360 degrees around the Ambulance body, including forward-facing white LED piercer lights mounted centrally with random flash pattern
- 5.3. Provide two high level rear red lights with interlock to handbrake (to prevent operation whilst the vehicle is in motion) and with a dashboard warning light.
- 5.4. Provide 2 blue/white combination flashing lights - grille mounted and 2 blue flashing lights, side facing wing mounted.
- 5.5. Provide on each side of the vehicle (roof area) 2 x blue flashing lights (front and rear).
- 5.6. Provide multi-random flash headlamp system. The headlamps must flash on high beam and be wired so that they will not operate when the base vehicle headlamp switch is in the on position.
- 5.7. Emergency Lighting and Lighting Switching see section 7.

- 5.8. All body builder fitted accessories will be fed directly from the vehicle manufacturer's electrical interface. Items that function only in conjunction with sidelights or ignition are to be supplied by relays activated by appropriate vehicle system.
- 5.9. It is important that all lights in the patient compartment should be recessed or flush fitting.
- 5.10. In addition to the manufacturers standard cab interior lamps install additional (LED) map reading lamps, 2 off, located above and forward of driver and passenger seats.
- 5.11. An external roof mounted amber, airport beacon must be fitted

6. ELECTRICAL SWITCH LAYOUT:

- 6.1. Switch Panel Specification: The vehicle will be fitted with ATSR system (or market equivalent) to control the auxiliary systems and load management.
- 6.2. The following describes the functionality of the cab switch control panel and rear saloon panel (Navigation between one panel and another is to be provided via a menu option and thus operated from each position).
- 6.3. The manufacturer radio is to be removed and replaced with a Din E type radio fitted in the roof panel and a blank panel fitted in the vacated centre dash panel, sufficient to safely mount the Trusts MDT screen securely and provide an aperture for the one-piece switch panel although alternative MDT mounts may be considered. A flip up terrafix mounting panel will also be considered by the Trust
- 6.4. The switches will be housed in a one-piece panel allowing touch control and mounted in the centre dash panel (as 6.3), angled to aid easy visibility of controls and also in zone C. The switch panel facia will have an infection control barrier cover.
- 6.5. Cancel All Mode
- 6.6. Pre Check Sequence
 - When activated with the Ignition and handbrake on, after 5 seconds it will activate each function that can be visually inspected, individually and sequentially in a pre-determined order to allow it to be inspected. All modes functions will be checked and a warning given if defective.
- 6.7. 999 Mode
 - Activates all emergency lights and siren and headlight flash.

- 6.8. Rear Emergency Lights
- Activates rear emergency lights only excluding flashing reds
- 6.9. Arrive Scene Mode
- Disables all emergency lighting, sirens and headlight flashing and 999 function but allows other functions to be used.
 - The ignition security feature is the first function to be activated allowing the driver to remove the keys and leave the engine running securely, depending on the specification the engine rpm may increase from idle. If the handbrake is released the engine will stall or the vehicle moves when the system is activated.
- 6.10. Leave Scene Mode
- Activates Saloon Lights; Grille Lights; Dashboard light Wing Lights and Head Light Flash.
- 6.11. Hospital Arrive Mode
- Deactivates emergency lighting and 999 function and activates Saloon Lights which are switched off after a stationary 20 minutes (key operation can override this).
- 6.12. Head Lamp Flash
- Activates headlight flash. This can only be selected when sidelights are off and is otherwise disabled.
- 6.13. Left Scene / Alley Light
- Activates 45-degree alley lights.
- 6.14. Rear Scene
- Activates when handbrake is on and stationary.
- 6.15. All Scene light
- Activates when handbrake is on and stationary.
- 6.16. Saloon Light Master
- Deactivates Saloon Light Dimming device.
- 6.17. Siren
- Activates siren
 - Siren reduction system will only be 10% audible when handbrake is applied.
- 6.18. Left Saloon Light
- Activates left saloon lights deactivating Saloon Light Dim.
- 6.19. Right Saloon Light

- Activates right saloon lights deactivating Saloon Light Dim.
- 6.20. Saloon Light Dim
 - Activates saloon dim lights.
- 6.21. Stretcher Light Bright
 - Activates above stretcher specialist lights
- 6.22. Climate Control
 - Activates and deactivates Climate Control system
- 6.23. At least 5 spare outlets are to be provided for.
- 6.24. Provide for a run lock activation function independent of all other functions mentioned above
- 6.25. Provide for a battery link emergency start function

7. COMMUNICATION SYSTEM

- 7.1. Radio communication (voice Tetra) – All relevant agreed cabling to be supplied by the Trust as free issue items. The converter is to install power cabling & coax cables to communications fitting location. Radio Installation to be carried out at Trust premises by Airwave appointed engineers after delivery. All aerial & GPS coax for Tetra/GPRS/Terrafix to terminate in communications cupboard for installation engineer use
- 7.2. Terrafix TVC 4000 – All relevant agreed cabling to be supplied by Trust suppliers Terrafix to the body builders and installed by body builder as free issued items (Screen Cable). Equipment Installation to be done at Trust premises by Terrafix engineer after delivery. Coax for Tetra/GPRS/Terrafix to terminate in communications cupboard for Terrafix use.
- 7.3. Provide all aerials and antennas.
- 7.4. Provide suitable mountings for MDT systems / monitors in upper central dash area (in place of OE entertainment radio)

- 7.5. Provide suitable location for all communication equipment with easy access for maintenance in the storage below zone A. This location should utilise a sliding comms tray arrangement with adequate cabling to allow the storage tray to fully extend for maintenance. Full ventilation should be provided in this area.
- 7.7. Provide all power feeds which are to be suitably fused
- 7.8. Final specification to be confirmed by the trusts, Technical Expert. Body converter to install:
- a) conduit path between electrical equipment/vehicle location & radio equipment cab mounting point of at least 20mm internal diameter
 - b) body converter to source and install wiring for communication equipment. Final location to be agreed by the Regional Fleet Engineering Manager/Comms Technical Expert.
- 7.9. Four antenna-mounting points are to be identified (to be agreed by trusts Regional Fleet Engineering Manager/Comms Technical Expert). 2 of M8 Mounts 2 x MIMO Sharks fin antennas (Panorama Sharkee) to be installed at agreed location with associated coax presented to comms installation cupboard. (Best practice for coax separation required) for Airwave and Terrafix MDT systems.
- 7.10. Co-axial cable RG58 CU OR URM76 (stranded core) to be supplied and fitted from the M8 mounts to the radio/vehicle equipment location.
- 7.11. Twin Co-axial cables URM76 and RG174 to be supplied and fitted from the Dual Bearer Antennae to the radio/vehicle equipment location.
- 7.12. Cables to be individually marked at each end. Joining of these cables lengths is not permitted without prior authorisation of the trusts Regional Fleet Engineering Manager/Comms Technical Expert).
- 7.13. All cable ends, antennae ground plane, radio wiring & vehicle location wiring to be accessible internally from module roof via inspection covers of a minimum diameter of 100mm. At least 0.5 metre (19.5") of antenna cable to be slack at each antenna position within the roof. Antenna cables to be fed to the radio equipment/vehicle location via conduit (see 24.a) and to have at least 1 meter (39") of free cable.

- 7.14. The cable route from the front antenna point must be via a different route to those of the rear two-antenna points. Cable routing to be agreed by trusts Engineering Manager/Comms Technical Expert).
- 7.15. Provide at least a 30 amp power supply to the radio/vehicle location equipment, directly fed from the communications battery and it must be connected to two 6 way fuse boxes one positive & one negative, fuse box to be located in cab.
- 7.16. At least a 3 amp rated ignition switched positive feed to be supplied to the positive 6 way fuse box.
- 7.17. The trusts radio/vehicle location equipment will be mounted in a secured comms cupboard in the cab centre console.
The converter shall ensure: -
- a) Provide a free flow of air around the radio/vehicle location equipment.
 - b) Protect the wiring to the unit
 - c) Should be able to be removed easily and quickly.
- 7.18. Final design to be approved by trusts Engineering Manager/Comms Technical Expert
- 7.19. Note: - Patterns for the radio/vehicle location equipment will be supplied to the body converter. As an indication the maximum size of one of the trusts vehicle location equipment box is approx 500mm x 450mm x 200mm.

8. VEHICLE LAYOUT

- 8.1. As a guide see the equipment below and the locations at Attachment 2. Final design to be agreed by the Trust's Head of Fleet.

9. VEHICLE INVENTORY

- 9.1. Below are examples of equipment to be carried on the Ambulance which will be confirmed post contract offer. (For guidance, also see equipment list at Attachment 4 & 5)
- 9.2. Area
- B Suction unit
 - B Ventilator

- A LP15 Unit & leads and Mangar Elk Pump
- C Vacuum Splints
- A Paramedic Bags x 2
- A Entonox kit
- B/D Various grab bags – burns, infection control, maternity paediatrics, first aid, trauma pack
- D 1 of Entonox cylinder (Horizontal)
- D 2 of Oxygen 2ltrs BOC cylinder
- D 2 of 10kg BOC Cylinders
- G Stryker Stretcher Power Pro TL
- D Rescue board (on wall)
- D 2 x Ferno Orange Equipment cases (fluids and first aid cons)
- C Scoop Stretcher
- D Head restraints
- C Cervical collar set
- A Crew kit bags x 3 (overhead locker)
- Cab 2x torches cab
- C Ferno tracked Carry Chair (on rear door)
- D Sharps box
- Cab Communication equipment – MDT/Satellite Navigation
- C Patient handling equipment
- A/B/C/D/E Miscellaneous medical items 2 cubic meters
- C Drugs Bag
- D Infection Control Pack
- C Blankets X6, Pillow Cases X6, Stretcher Sheets X6

- Note: Other equipment from the extensive but not exhaustive list above must be allocated in any available left over space in areas A and B and utilise the other possible storage areas of C, D and E.

10. VEHICLE MARKINGS

10.1. All markings to be in the universally recognised format: -

- Hazard Warnings – Black on Yellow Background
- Mandatory Instruction – White on Blue background
- Prohibition Signs – White on Red Background
- Exit/Safe condition signs – White on Green Background
- Equipment location signs red lettering on white

10.2. Exterior

10.2.1. Exterior marking specification is to be as per ATAG National Battenberg specification.

10.2.2. The following markings in 3M Deco-Flex polyester base under printed film are to be applied:

10.2.3.  on both side and rear door.

10.2.4. 100 mm green hazchem sign for compressed gas  on rear door.

10.2.5. 12.5 mm red lettering on white background, **BATTERY ACCESS** on compartment panel plus multiple hazard warning, Danger Battery Charging Area, Wear PPE, No Smoking,

No Naked Light.



10.2.6. 12.5 mm red lettering on white background **DIESEL ONLY** adjacent to fuel filler, plus warning triangle. 

10.2.7.  on hinged doors above door handle.



10.2.8 On side sliding door above outer door handle.

10.2.9. 10 mm black lettering “**TYRE PRESSURE ## PSI**” on front and
“**TYRE PRESSURE ## PSI**” on rear, over each wheel arch.

Note to be agreed after weight testing has been completed and approval obtained from tyre manufacturer.

10.2.10. 10 mm black lettering “**WHEEL NUT TORQUE ### Nm**” over each wheel arch.

10.2.11. Battery charging notice 110 mm x 90 mm with black print on yellow background to be attached to cab adjacent to mains charging point.

10.3. Interior

10.3.1. The following markings to be applied to firm surfaces where possible:

10.3.2. on hinged doors above door handle.

10.3.3. on side sliding door adjacent inner door handle.



10.3.4. Nationally recognised NO SMOKING signs to be conspicuously positioned in cab and saloon.



10.3.5. SEAT BELTS MUST BE WORN in both cab and saloon, plus BS5378 blue 83 mm x 100 mm pictogram.



10.3.6 DO NOT ATTEMPT TO OPEN DOOR WHEN VEHICLE IS IN MOTION by each door

DO NOT ATTEMPT
TO OPEN DOOR
WHILST THE
VEHICLE IS IN
MOTION

- 10.3.6. EMERGENCY EXIT on; side and rear doors, and BREAK GLASS WITH HAMMER PROVIDED on side windows.



- 10.3.7. Fire equipment sign adjacent to each fire extinguisher highlighting it's location and the appropriate usage.



- 10.3.8. "Danger Compressed Gas" On the Gas Compartment Door,



- 10.3.9. HOT AIR OUTLET DO NOT OBSTRUCT, adjacent to saloon heater outlets, plus yellow warning triangles and AIR INLET DO NOT OBSTRUCT adjacent to duct.



- 10.3.10. Embossed plaque - red letters on white background, vehicle dimensions, length, width and height in SI and Imperial units, and positioned in the cab

- 10.3.11. 5mm red letters on white background **240v AC** directly adjacent to 13amp socket.

- 10.3.12. 10 mm red letters on white background **DOMESTIC WASTE ONLY** adjacent to container.

- 10.3.13. 10 mm red letter on white background **CLINICAL WASTE ONLY** adjacent container plus pictogram biohazard symbol



- 10.3.14. 10 mm red letter on white background **SHARPS ONLY** adjacent to container plus pictogram biohazard symbol



10.3.15. Personal radio/mobile telephone prohibition sign in saloon.



10.3.16. Tiger stripe Anti Slip floor markings to be fitted at floor edge next to entry/exits or suitable alternative, and in a conspicuous location



“Caution – Mind The Step”

10.3.17. All lockers to have contents identification labels applied to each locker in red lettering on white background with a red border.

10.3.18. In front of the passenger seat in the cab on the windscreen outside the windscreen wipers swept area and so as to not obstruct the driver’s vision but clearly visible,



“Caution Airbag Hazard Do not place feet on dash”

10.3.19 Opposite the saloon side entry door, a Data Protection compliant CCTV warning



10.3.20. Visible on entry to the rear doors, a CCTV in operation, caution sign



10.3.21. Stop Abuse placard placed in prominent position on n/s of vehicle – can be easily seen from stretcher



10.4. **LIVERY**

10.5. **General Livery**

10.5.1. Livery to be provided in 3M 3DG and to ATAG specification

10.5.2. Converter to provide Trust crests and name identification

10.5.3. The following detail is based upon the ATAG document of April 1999 (revised at 30 March 2000).

10.6. **Regulations**

10.6.1. The use of reflective films and design of livery must comply with the relevant Vehicle Lighting and Safety Regulations, current, Regulation 11 of The Road Vehicles Lighting Regulations 1989. Also to be included is the Variation order to Section 44 of the Road Transport Act, 1988.

10.7. **Design**

10.7.1. ATAG "BATTENBURG" Design and liveried up to the waist (window) line.

10.8. **Materials**

- 10.8.1. Retro-Reflective Material
- 10.8.2. High Performance Material
- 10.8.3. All sections laser edge sealed
- 10.8.4. Non-metallic construction to prevent corrosion
- 10.8.5. Application of mixed materials should be minimised

10.9. **Warranty on livery**

- 10.9.1. 5 Year minimum performance
- 10.9.2. No cracking
- 10.9.3. No fading
- 10.9.4. No peeling
- 10.9.5. No loss of adhesion
- 10.9.6. No ingress
- 10.9.7. Must provide a livery parts catalogue/drawing identified by a unique reference

10.10. External Agency Application

- 10.10.1. Application and position of markings must be consistent with the artwork supplied by the Trust for continuity of the Trusts fleets.
- 10.10.2. Recommended manufacturer preparation and application techniques must be strictly adhered to. Inappropriate application or surface preparation could reduce the life of the material or void the manufacturer's warranty, therefore the work must be carried out by an approved applicator.
- 10.10.3. Thorough preparation of vehicle body must be made prior to application of adhesive materials. This would include multiple degreasing steps with appropriate spirit to ensure good, long term adhesion to all surfaces. Use of factory edge sealing must be maximised, reducing risk of ingress.
- 10.10.4. Where possible all adjoining materials should maintain a seamless surface to minimise inadvertent catching of material edges or site for dirt accumulation.
- 10.10.5. Storage of unused materials or packs must be to manufacturer recommendations and used within a maximum of two (2) years of receipt of material.

11. COMPLIANCE VERIFICATION

11.1. Body Electrical Power Calculation

- 11.1.1. Tenders should supply a body Electrical power Calculation test data sheet with their tender submission.
- 11.1.2. The data sheet should include:
 - Power consumption in 999 Mode
 - Power consumption in Arrive Scene Mode
 - Power consumption in Leave Scene Mode
 - Power consumption in Hospital Arrive Mode
- 11.1.3. The data sheet should be based on a 5 continuous call basis to replicate the vehicle not being shoreline charged. The call outs should be based on:
 - 10 minutes urban travel to incident
 - 20 minutes on scene (show differential between engine running and engine off and run lock applied)
 - 10 minutes urban travel to hospital

- 20 minutes at hospital

11.2. **Body Tilt & Axle Bias**

11.2.1. Tenders should supply a body Tilt & Axle Bias Calculation test data sheet with their tender submission.

11.2.2. The data sheet should include:

- Total Centre of gravity
- Calculation of Axis
- Symmetry of Axis
- Height of Centre of gravity
- Tilt Angle
- Limiting Velocity

11.3. **Subjective Evaluation Test**

11.3.1. Tenders should provide with their tender a report showing a subjective handling test completed on an actual vehicle of similar design, the test shall be undertaken by a competent independent agency.

11.3.2. The report shall provide confirmation that a satisfactory assessment of the following key handling issues has been assessed:

- steady state cornering
- straight line behaviour
- obstacle avoidance
- straight line braking
- braking whilst turning
- negotiation of speed humps without grounding
- overall confidence and safe handling

11.3.3. The testing will include a tilt test in which the completed vehicle shall achieve a minimum tilt of 38 degrees without the outside wheels losing contact with the tilt bed.

11.4. **Environmental sustainability**

11.4.1. An overview of the deconstruction process and an end of life environmental impact assessment of conversion components should be provided with the tender response.

11.5. **Components Listing**

11.5.1. Converter to provide a comprehensive list of the proposed equipment to be supplied with tendered offer to supply.

11.6. **Body Parts Catalogue**

11.6.1. An example fully illustrated spare parts catalogue should be made available at the time of tender.

*Auxiliary lighting must be compatible with current equipment fitted to Trust vehicles, market equivalents to the current equipment supplied by Woodway Engineering Ltd will be considered. Equipment referenced in this Attachment is detailed for type and performance illustrative purposes only” For Clarification the front light bar must be cowed into the front roof panel above windscreen and the rear light bar must be cowed in above rear doors.

APPROVED
E FITTED. 16/02/12 JK
15/11/11

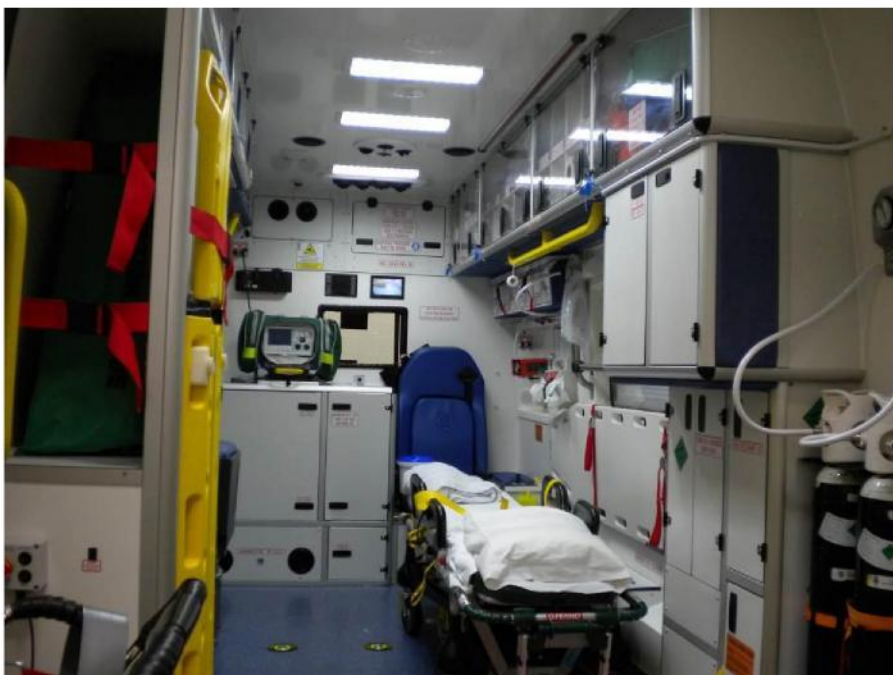
Attachment 2 - Current Ambulance exterior and interior pictures:



Exterior views



SG Tech wedge ramp deployed



View from rear doors



n/s cabinetry & attendants seating

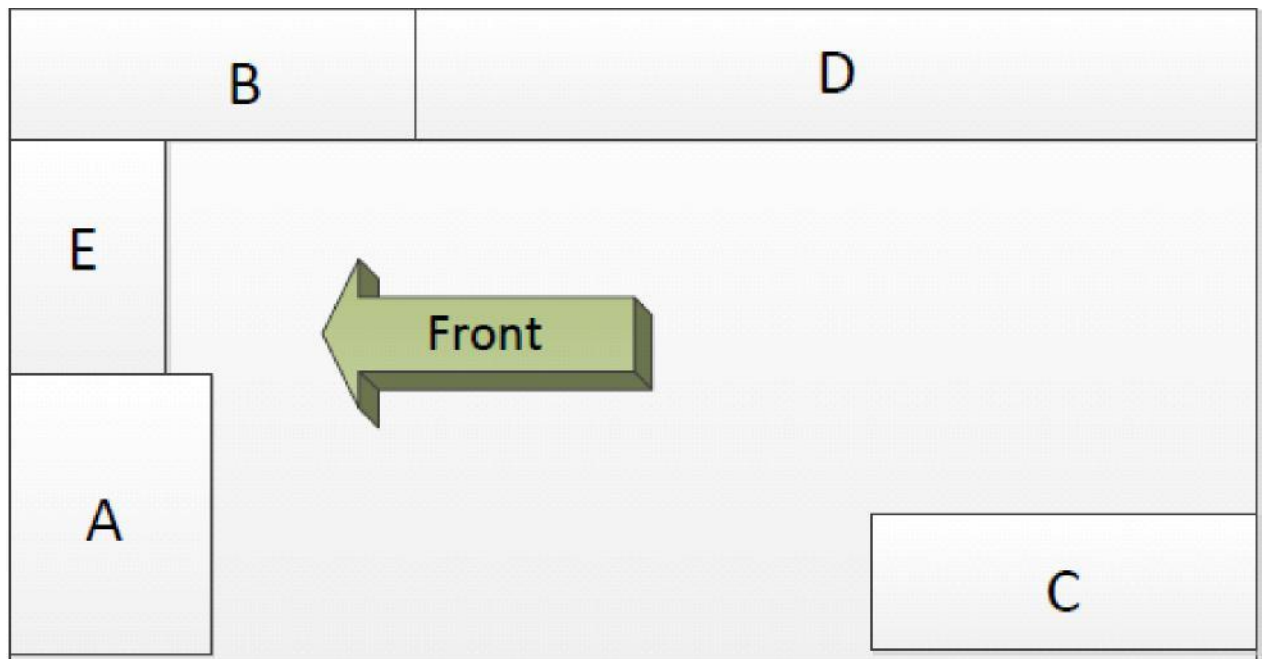


o/s bulkhead cupboard with defib bracket



o/s Trauma Wall

Attachment 3 – interior layout



F - Indicates Roof Area

G - Indicates Floor Area

Attachment 4 - Standard Equipment List

Description	Responsible for Purchasing/Arranging
Stryker Power Pro TL stretcher	SECAMB
Stryker Stretcher 2 part floor locking mechanism with end pedal	SECAMB
Ferno Scoop	SECAMB
Ferno Longboard	SECAMB
Ferno Compact 2 Carry Chair tracked	SECAMB
Mangar Elk Pump & Cushion	SECAMB
Mangar Elk 12 Volt Charger Unit	Convertor
IPad docking station, bracket and charger	Convertor
ECS & Other Ariel's (spare)	Convertor
Defib Bracket (Stafford Engineering)	Convertor
Ventilator Bracket	Convertor
Laerdal Suction Unit & bracket	Convertor
Terrafox TVC 4000	Convertor
Terrafox wiring kit	Convertor
Terrafox Installation	Convertor
ARP wiring kit	SECAMB
ARP Radio equipment	SECAMB
ARP Installation (SECAMB Funded)	Convertor
2 x Oxy Therapy heads (selecta flow meters)	Convertor
Fire Extinguishers	Convertor
VUE System	Convertor
Lifepac 15 Lead ECG Extension Cable	Convertor
Saloon Sharps and Waste Bins	Converter
Cab waste bin	Convertor
Oxygen system controls and piping	Convertor
Cab Torches	Convertor
Drug Safe	Convertor
Boxes of gloves	WMAS
*If items are not specifically listed assume convertor is to procure	

Attachment 5,
Additional Items - SECAMB standard load list

Cannulas	
Orange 14G	5
Grey 16G	5
Green 18G	10
Pink 20G	10
Blue 22G	5
Razors	3
Chloraprep	10
Medi Swab	20
Swabs (pack 5)	4
PreFilled Syringe (10ml)	5
Cannulation pack	2
Transpore tape	2
Plasters	10
Conforming Bandages small/large	1 of each
Normasol sachets 100ml	2
Syringe 1ml	5
Syringe 2ml	5
Syringe 5ml	5
Syringe 10ml	5
Syringe 20ml	5
Syringe 50ml	1
Needle (orange 25g 1")	5
Needle (blue 23g green 21g 1 1/2")	5 of each
Drawing up needle	10
3-way tap	2
Giving Sets	2
Fluid Warmer compartment	
Sodium Chloride 500ml (in warmer)+ 3 giving sets	3
Sodium Chloride 500ml (in bottom drawer)	3
Glucose 10% 500ml	2
Giving Sets in bottom drawer	2
Cannulation pack	5
OP airway size 4	3
OP airway size 3	3
OP airway size 2	3
OP airway size 1	3
OP airway size 0	3
OP airway size 00	3

OP airway size 000	3
Adult high flow 100% O2 mask	6
Adult med flow 40% O2 mask	3
Adult low flow 28% O2 mask (where available)	3
Adult neb mask	3
Paed 100% O2 mask	3
Paed neb mask	3
Cannulation pack	2
Peak Flow Mouthpieces - Adult & Child	4 of each
BM lancets	10
BM test strips	1 box
Tympanic covers	1 box
Entonox Mouthpieces + Filters	4
HME Filters	4
BVM T piece	1
Disposable Suction Lining	2
FR2 or LifePak 1000	1
Paediatric bag	1
Entonox bag	1
Collars	5 adult + 3 Paed(min3&2)
Burns bag	1
Critical haemorrhage kit	1
Scoop straps set	1
Longboard straps set	1
Base pad, headhuggers and straps	1
Vacuum mattress with pump and straps	1
Spare ED/CD Cylinder	* Dependant on vehicle layout
Drugs Locker	
Medicines bag	1
Morphine (crew to put on)	2
Airwave Handsets (now in Red Comms bag)	2
Major Incident Bags	1
Blankets	5
Drawer sheets	2
Carry sheet	2
Spare adult BVM	2
Spare paed BVM (with masks)	1
NP airways (size 6, 7, 8)	1 of each
LMA Pack (size 3,4 & 5)	1 of each
EZ-IO kit	1
Spare aspirator tubing	2
Yankauer catheter	2
Suction catheter - soft 12g & 16g	1 of each

Spare ventilator pipe circuit	1
Entonox administration set (vehicle set)	1
Kool Pak	2
Water Pots	5
Clinical Waste Bags (small)	1 roll or 10
Green Patient Medicine bags	10
Vomit Bowls and Absorbeze pads	10 of each
Inco pads	10
Denture Pots	2
ECG dots (x10)	10
ECG spare roll	1
Lifepak 15 /1000 & FR2 Defib Pads	2 of each
Paediatric SPO2 probe	1
CO2 Sampling line	2
Spare Lifepak 12 batteries	2
BP cuff Extra Large	1
BP cuff Extra Small (child)	1
ET Tube Securing Tape	6
Magills Forceps - Adult & Paed	1 of each
Laryngascope Handle	1
Laryngascope Blades, size 4, 3, 2 & (Miller 1 & Miller 2)	1 of each
Catheter Mounts	2
50 ml syringe	1
20 ml syringe	1
Intubation Stylet - Medium	2
Lubricating Gel	2
ET tubes - Paed (3, 3.5, 4, 4.5, 5 & 5.5)	1 of each
- Adult cuffed (6, 7, 8)	1 of each
Maternity bag (including 2 maternity packs)	1
Maternity pack	1
Infection control bag (new Contents)	1
Urinals Male	1
Body bag - adult	1
Frac straps 1 x S, 2 x M, 1 x L	1
Lifting Belts (Blue - Medium)(Green - Large)	1 of each
Disposable Slide Sheet	2
Rescue kit	1** at discretion of MRCM due to vehicle layout**
Manger Battery Pack (charger)	1
Spare Trolley Battery (in charger)	1
Frac Immobilisers(Box Splints(-(small, medium & large)	1** at discretion of MRCM due to vehicle layout**
Spare ED entonox	1 *Dependant on vehicle layout
Spare CD oxygen	1 *Dependant on vehicle layout

Clinell wipes	1
Air freshener spray	1
Hand alcohol gel (60 ml)	2
Spill kit	1
Paper roll	1
Clinical waste bags (Large)	5
Cupboard 16	
Gloves - S, M, L, XL	1 of each
Warning triangles	1
Oxygen HX	2
Entonox EX	2 or 1 depending on vehicle
Man Handling Kit-slide board, banana board ,turntable (behind attendant seat)	1
Alcohol Gel Dispenser	1
Paper Towel roll holder	1
Fire Extinguisher	1
Cab	
Maps (Surrey, W & E Sussex, Kent, Nth Hants & London)	1 of each
Vehicle Information Folder	1
Posse box incl. PCR's, Non Conveyance,ROLE, Continuation sheets	1
Mobile Phone & vehicle charger (now in Red Comms bag)	1
Pat slide (behind passenger seat)	1
Airwave battery charger, incl. 2 batteries (behind pat slide)	1
Torches	2
Hand Alcohol Gel	2
Gloves - S, M, L, XL	1 of each
Fuel cards	1
Fire Extinguisher	1
Small black sacks (for crew litter)	2